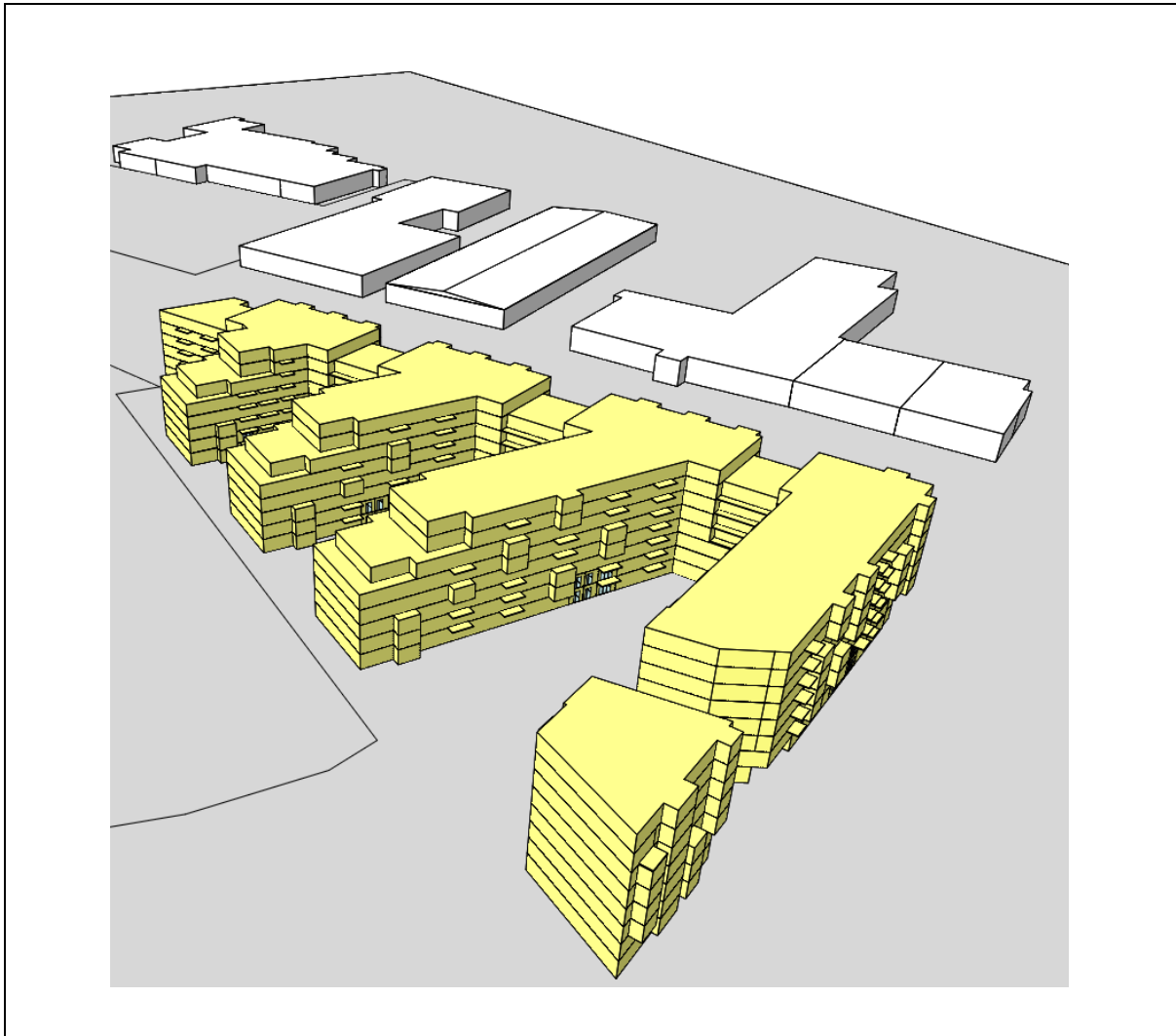


Report for: John Spain Associates

Project No.: 13997

## Concorde Industrial Estate, Dublin

*Daylight, Sunlight and Overshadowing Study*



**Confidential**

# Version History

**Document created by:**

Integrated Environmental Solutions Limited

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## **Executive Summary**

The following can be concluded based on the studies undertaken

### **Sun Light to Proposed Amenity spaces:**

One of the priorities for this development is to ensure quality amenity space. The amenity area has been located to maximise sunlight and provide protection from wind. In terms of sunlight, the amenity space is regarded as a quality space under BRE guidelines if over 50% of the space required achieves a least 2 hours of sunlight on March 21<sup>st</sup>.

In our case all of the amenity area receives 2 hours of sunlight on March 21<sup>st</sup>.

### **Average Daylight factors:**

BRE guidelines recommend a daylight factor of 1.0 in bedrooms and 1.5 in living rooms / kitchens.

We have a tested 102 rooms in this sample of which 98 exceed the BRE guidelines. The results show 96% of the rooms tested across the floors have Average Daylight Factors (ADF) above the recommended values of the BRE guidelines.

The majority of the rooms tested are at Ground and First floor locations on the Blocks to the rear of the main Block A and are therefore worst-case rooms. The daylight factors would improve further on the upper floors.

For the small number of rooms that fall below the BRE guidelines, these have Average Daylight Factors (ADF) just marginally below the recommended values and look onto a south facing landscape courtyard rich in sunlight levels.

The design team believe we have achieved a balance on window design to achieve optimum daylight factor with no adverse effect on heat loss and energy efficiency.

### **Shadow Analysis**

In terms of shading on surrounding properties, the impact of the proposed development is almost identical to that from the existing situation as shown by the images in Section 6.

## **Discussion**

It should be noted that the guidance in 'Site layout planning for daylight and sunlight: a guide to good practice' is not mandatory and the Report itself states 'although it gives numerical guidelines these should be interpreted flexibly because natural lighting is only one of many factors in site layout design.

Whilst the results shown relate to the criteria as laid out in the BRE guidance targets it is important to note that the BRE targets have been drafted primarily for use in low density suburban development and should therefore be used with flexibility and caution when dealing other types of sites.

Despite the above, the results within this report shows the proposed development exceed the BRE recommendations in the BRE 'Site Layout Planning for Daylight and Sunlight' guide, sometimes referred to as BRE Digest 209.

## 1 Introduction

This report was completed to consider the Sunlight, Daylight and Shading impact across the proposed Concorde Industrial Estate development site as appropriate.

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

- **Sunlight to proposed amenity space and gardens** – via annual sunlight hours comparison.
- **Average Daylight Factors** – via average daylight factor calculations across sample rooms on the ground, first and second floor of the proposed development
- **Shadow Analysis** - a visual representation of any potential impact the proposed buildings have on themselves at the development at Concorde Industrial Estate.

The analysis was completed using the IES VE software.

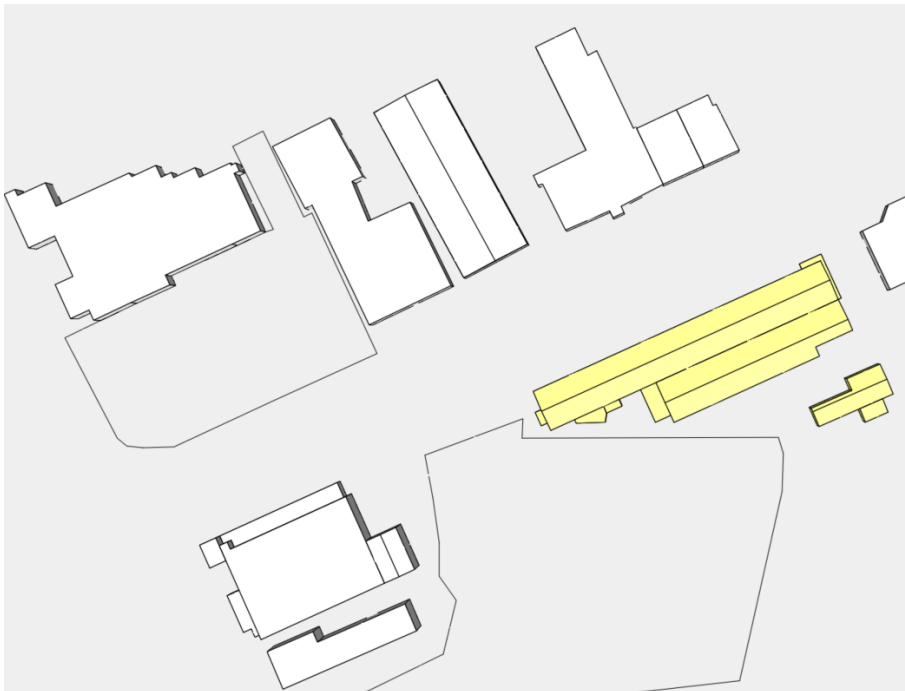
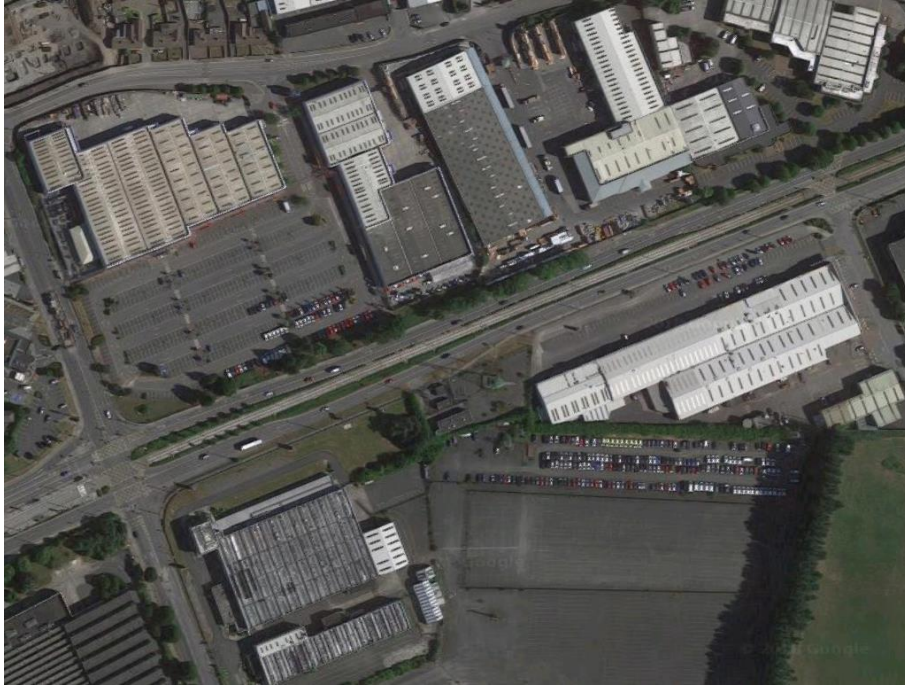
The assessment is based on recommendations given in BRE – Site Layout Planning for Daylight and Sunlight guide.

## 2 Methodology

### 2.1 Orientation

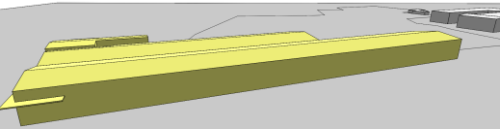
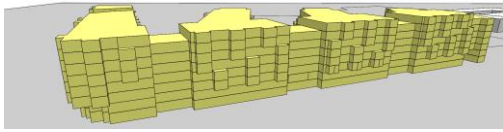
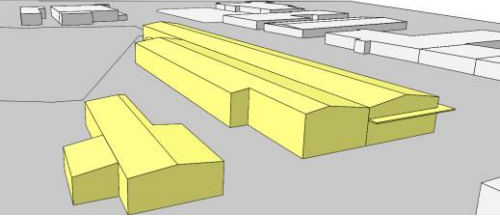
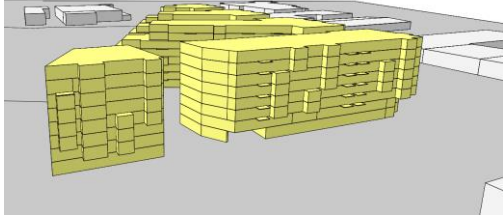


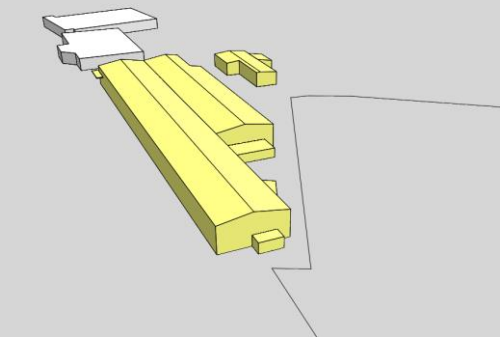
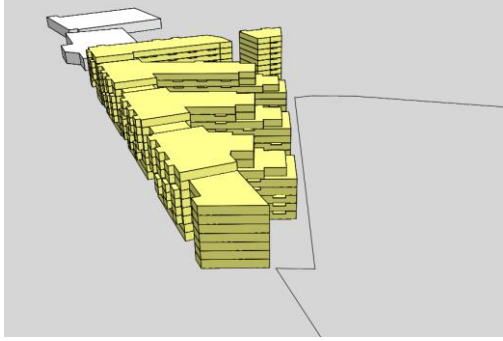
The model orientation has been taken from drawings provided by the Architect and the resulting angle shown below used in the analysis.

#### Orientation



## 2.2 Proposed models

The following images show the models created for use across various views:

	Existing Situation	Proposed Scheme
View Looking from North of Site	 A 3D perspective view of the existing site from the north. It shows a long, narrow, low-profile yellow rectangular block with a few smaller rectangular blocks at the far end.	 A 3D perspective view of the proposed scheme from the north. It shows a more complex, multi-story yellow structure with several rectangular blocks of varying heights and widths, arranged in a more clustered fashion.
View looking from East of Site	 A 3D perspective view of the existing site from the east. It shows a long, narrow yellow block with a few smaller blocks at the end, set against a background of other grey buildings.	 A 3D perspective view of the proposed scheme from the east. It shows a more complex, multi-story yellow structure with several rectangular blocks of varying heights and widths, arranged in a more clustered fashion.
View looking from South of Site	 A 3D perspective view of the existing site from the south. It shows a long, narrow yellow block with a few smaller blocks at the end, set against a background of other grey buildings.	 A 3D perspective view of the proposed scheme from the south. It shows a more complex, multi-story yellow structure with several rectangular blocks of varying heights and widths, arranged in a more clustered fashion.
View looking from West of Site	 A 3D perspective view of the existing site from the west. It shows a long, narrow yellow block with a few smaller blocks at the end, set against a background of other grey buildings.	 A 3D perspective view of the proposed scheme from the west. It shows a more complex, multi-story yellow structure with several rectangular blocks of varying heights and widths, arranged in a more clustered fashion.



### 3 BRE – Site Layout Planning for Daylight and Sunlight (2nd edition)

Access to daylight and sunlight is a vital part of a healthy environment. Sensitive design should provide sufficient daylight and sunlight to new housing while not obstructing light to existing homes nearby.

The BRE Report, Site layout planning for daylight and sunlight: a guide to good practice (BR209), advises on planning developments for good access to daylight and sunlight, and is widely used by local authorities to help determine the impacts of new developments.

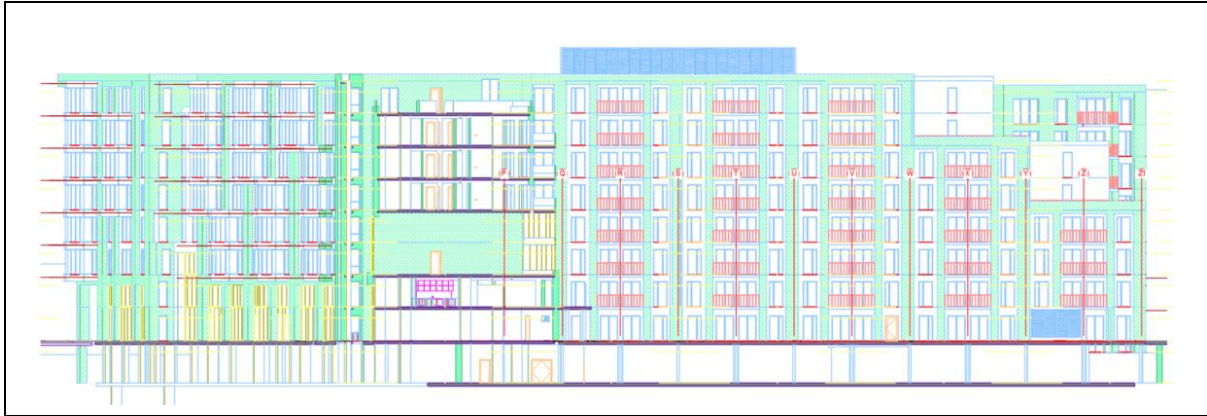
#### 3.1 Impact classification discussion

BRE guidance in Appendix I – Environmental Impact Assessment suggests classifications of potential impacts with respect to criteria as follows;

<i>Negligible to minor adverse impacts</i>	<i>Fully meets guidelines in BRE report</i>
<i>Negligible adverse impact</i>	<ul style="list-style-type: none"> <li>• <i>Loss of light well within guidelines, or</i></li> <li>• <i>only a small number of windows or limited area of open space losing light (within the guidelines)</i></li> </ul>
<i>Minor adverse impact (a)</i>	<ul style="list-style-type: none"> <li>• <i>Loss of light only just within guidelines, or</i></li> <li>• <i>A large number of windows or large areas of open space areas affected (within the guidelines)</i></li> </ul>
<i>Minor adverse impact (b)</i>	<ul style="list-style-type: none"> <li>• <i>only a small number of windows or limited open space areas are affected</i></li> <li>• <i>the loss of light is only marginally outside the guidelines</i></li> <li>• <i>an affected room has other sources of skylight or sunlight</i></li> <li>• <i>the affected building or open only has a low level requirement for skylight or sunlight</i></li> <li>• <i>there are particular reason why an alternative, less stringent, guideline should be applied</i></li> </ul>
<i>Major adverse impact</i>	<ul style="list-style-type: none"> <li>• <i>large number of windows or large open space areas are affected</i></li> <li>• <i>the loss of light is only substantially outside the guidelines</i></li> <li>• <i>all the windows in a particular property are affected</i></li> <li>• <i>the affected indoor or outdoor spaces have a particularly strong requirement for skylight or sunlight (living rooms / playground)</i></li> </ul>

### 3.1.1 Windows on proposed development

Windows shown on the proposed development can be seen below and are larger than conventional windows to ensure daylight factors exceed the recommended levels from the BRE guide.



## 4 Sunlight to the Proposed Amenity Spaces

The following section illustrates how the proposed development exceeds the BRE's recommendations for sunlight to the amenity areas.

In terms of sunlight, the amenity space is regarded as a quality space under BRE guidelines if over 50% of the space required achieves a least 2 hours of sunlight on March 21<sup>st</sup>.

In the proposed building all of the amenity area receives 2 hours of sunlight on March 21<sup>st</sup>.

### 4.1 Requirements

The sunlight availability in the amenity areas will be considered to determine how they perform when assessed against the BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight which states the following in Section 3.3.17;

#### Summary

3.3.17 It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on 21 March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable. If a detailed calculation cannot be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21 March.

BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight states in 3.3.17 that for a space to, appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least 2 hours of sunlight on 21<sup>st</sup> March.

## 4.2 Assessment

### 4.2.1 Methodology

As stated above for a space to, appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least 2 hours of sunlight on 21<sup>st</sup> March.

This analysis has been complete on the following proposed amenity spaces shown in the images below:

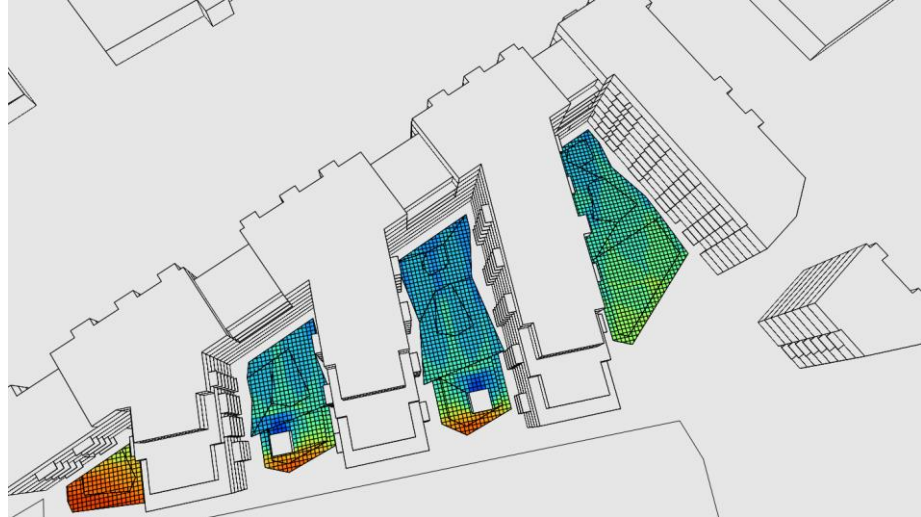
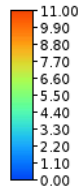


The following images shows results with respect to this space receiving at least 2 hours of sunlight on 21st March, across the gridded cells. The second image below shows all of the amenity area achieves two hours of sunlight on March 21<sup>st</sup> due to it favourable orientation.

**Absolute Scale showing all hours**

21/Mar - 00:00 to 21/Mar - 23:00

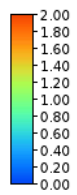
Hours



**Custom Scale - showing hours > 2 in red (Any gridded cells area below 2 hours are shown as grey)**

21/Mar - 00:00 to 21/Mar - 23:00

Hours



### **4.3 Discussion**

As mentioned above under Section 3.3.17 of BRE's Site Layout Planning for Daylight and Sunlight states that for a space to appear adequately sunlit throughout the year, at least half of the garden or amenity area should receive at least 2 hours of sunlight on the 21st of March.

The images above show on the 21st of March shows almost all of the amenity area achieves two hours of sunlight on March 21<sup>st</sup> due to its favourable orientation and therefore exceeds the BRE recommendations.

## 5 Average Daylight Factors

This section addresses daylight to the proposed apartments.

BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight states the following in Appendix C with respect to Average Daylight Factors (ADF);

C4 If a predominantly daylit appearance is required, then the ADF should be 5% or more if there is no supplementary electric lighting, or 2% or more if supplementary electric lighting is provided. There are additional recommendations for dwellings of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms. These additional recommendations are minimum values of ADF which should be attained even if a predominantly daylit appearance is not achievable.

From BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight

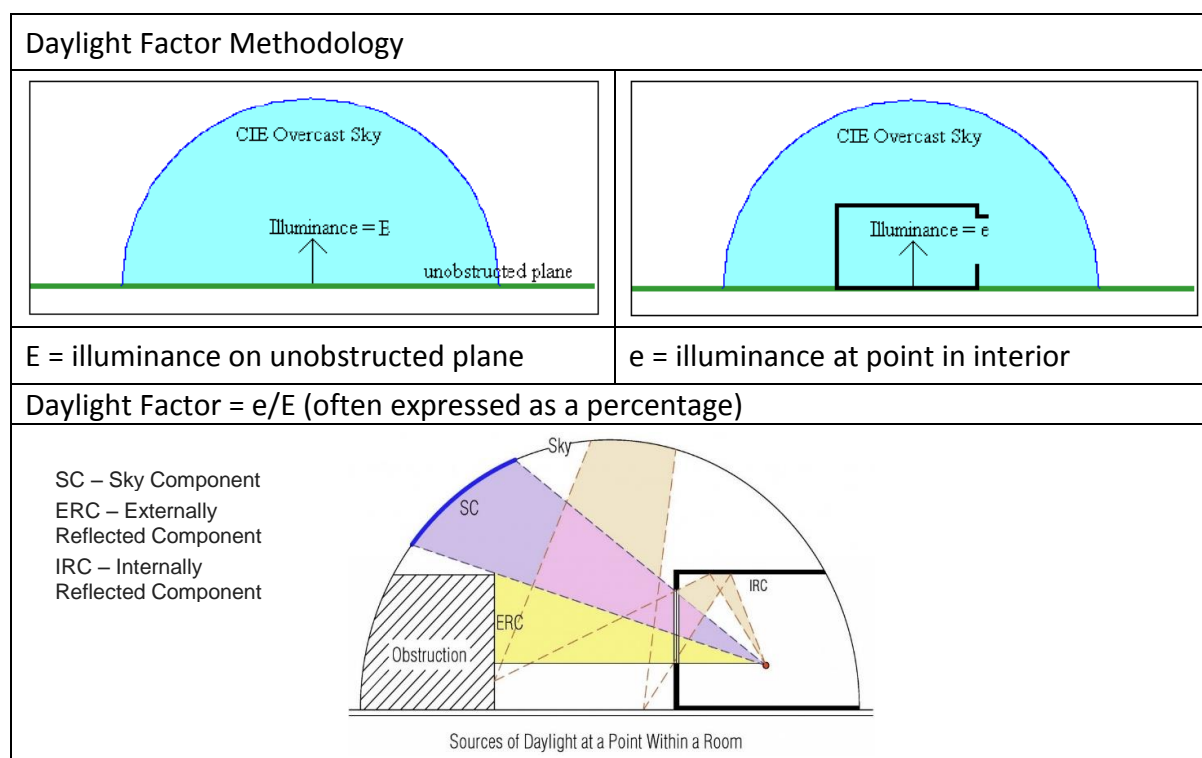
From this the recommended Average Daylight Factors (ADF) are therefore;

- Bedrooms – 1.0%
- Living Rooms / Kitchens – 1.5%

This study will consider the predicted average daylight factor to the proposed apartments. Analysis has been carried by using the Radiance module of IES VE software to quantify the metrics describe below.

Daylight is constantly changing, so its level at a point in a building is usually defined as an average daylight factor.

This is the ratio of the indoor illuminance at the point in question to the outdoor unobstructed horizontal illuminance.



Both illuminances are measured under the same standard sky, a CIE overcast sky. Since the sun is in a particular position for only a short period each day, direct sunlight is excluded. Instead diffuse sunlight is used for average daylight calculations. Diffuse sunlight describes the sunlight that has been scattered by molecules and particles in the atmosphere but has still made it down to surface of the earth.

For average daylight factor there are three possible paths along which diffuse light can get into a room through glazed windows.

- Light from the patch of sky visible at the point considered, is expressed as the sky component.
- Light reflected from opposing exterior surfaces and then reaches the point, is expressed as the externally reflected component.
- Light entering through the window but reaching the point only after reflection from internal surfaces, is expressed as the internally reflected component.



## 5.1 Assumptions

The following assumptions are to be used in the study:

- Sky Conditions: Standard CIE overcast sky
- Time (24hr): 12:00
- Date: 21 September
- Working Plane: 0.85m
- Floor to Floor Height: 3.00m

The following Surface Reflectance's are to be used in the study:

Material Surface	Reflectance
External Wall	0.50
Internal Partition	0.50
Roof	0.20
Ground	0.20
Floor/Ceiling (Floor)	0.20
Floor/Ceiling (Ceiling)	0.70

### Glazing Transmittance:

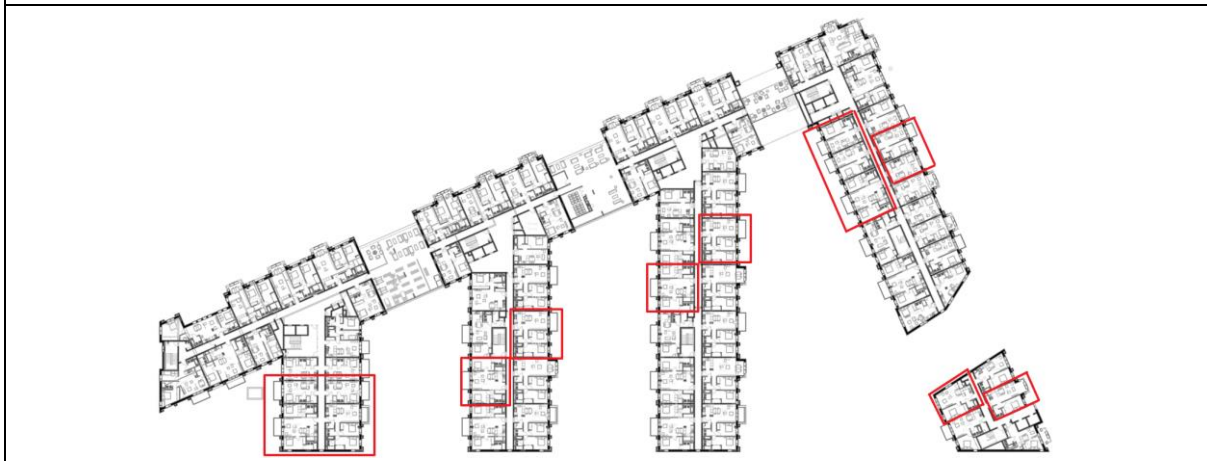
- Light Transmittance: 70%
- Assumed Window Frame thickness: 50 mm

## 5.2 Rooms Considered

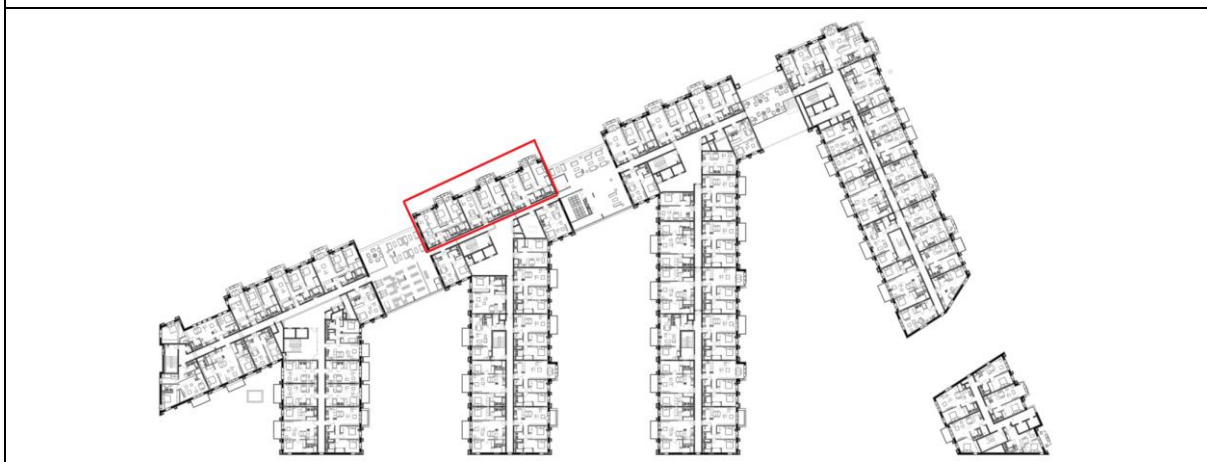
Typical rooms across the following floor plate were considered are highlighted in red.



**Ground - First Floor**



**Second Floor**



**Second Floor: NW Facing Block**

## 5.3 Average Daylight Factor Results

### 5.3.1 Ground Floor



Ref. Point	Floor	Block	Room Reference	Room Activity	Average Daylight Factor	BRE Recommendation
1	Ground Floor	B	L00: Block B_0.A01_Bedroom 01	Bedroom	2.31	✓
2	Ground Floor	B	L00: Block B_0.A01_Living/Kitchen	Living	2.60	✓
3	Ground Floor	B	L00: Block B_0.A01_Bedroom 02	Bedroom	4.80	✓
4	Ground Floor	B	L00: Block B_0.A06_Living/Kitchen	Living	4.19	✓
5	Ground Floor	B	L00: Block B_0.A06_Bedroom 01	Bedroom	2.80	✓
6	Ground Floor	B	L00: Block B_0.A06_Bedroom 02	Bedroom	4.99	✓
7	Ground Floor	C	L00: Block C_0.A08_Bedroom 1	Bedroom	2.06	✓
8	Ground Floor	C	L00: Block C_0.A08_Living/Kitchen	Living	1.83	✓
9	Ground Floor	C	L00: Block C_0.A08_Bedroom 2	Bedroom	2.40	✓
10	Ground Floor	C	L00: Block C_0.A12_Bedroom 1	Bedroom	1.73	✓
11	Ground Floor	C	L00: Block C_0.A12_Bedroom 2	Bedroom	1.77	✓
12	Ground Floor	D	L00: Block D_0.A18_Bedroom 1	Bedroom	1.70	✓
13	Ground Floor	D	L00: Block D_0.A18_Living/Kitchen	Living	1.56	✓
14	Ground Floor	D	L00: Block D_0.A18_Bedroom 2	Bedroom	1.92	✓
15	Ground Floor	D	L00: Block D_0.A22_Living/Kitchen	Living	1.53	✓
16	Ground Floor	D	L00: Block D_0.A22_Bedroom 1	Bedroom	1.99	✓
17	Ground Floor	D	L00: Block D_0.A22_Bedroom 2	Bedroom	2.00	✓
18	Ground Floor	F	L00: Block F_0.A32_Bedroom	Bedroom	0.89	x
19	Ground Floor	F	L00: Block F_0.A32_Living/Kitchen	Living	1.44	x
20	Ground Floor	F	L00: Block F_0.A31_Living/Kitchen	Living	1.61	✓
21	Ground Floor	F	L00: Block F_0.A31_Bedroom	Bedroom	1.63	✓
22	Ground Floor	F	L00: Block F_0.A30_Bedroom 1	Bedroom	2.06	✓
23	Ground Floor	F	L00: Block F_0.A30_Living/Kitchen	Living	1.97	✓
24	Ground Floor	F	L00: Block F_0.A30_Bedroom 2	Bedroom	2.39	✓
25	Ground Floor	F	L00: Block F_0.A34_Living/Kitchen	Living	5.29	✓
26	Ground Floor	F	L00: Block F_0.A34_Bedroom	Bedroom	3.03	✓
27	Ground Floor	F	L00: Block F_0.A35_Bedroom/Living	Living	4.02	✓
28	Ground Floor	F	L00: Block F_0.A28_Living/Kitchen	Living	3.85	✓
29	Ground Floor	F	L00: Block F_0.A28_Bedroom	Bedroom	2.61	✓
30	Ground Floor	F	L00: Block F_0.A40_Living/Kitchen	Living	3.96	✓
31	Ground Floor	F	L00: Block F_0.A40_Bedroom	Bedroom	2.67	✓

The following conclusions can be made:

- ✓ All these rooms have an average daylight factor greater than the recommended minimum values (1.5% for living rooms and 1.0% for bedrooms) as stated under BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight.

Therefore, these rooms are all compliant with the BRE recommendations.

- x These rooms have an average daylight factor below the BRE recommended values.

### 5.3.2 First Floor



Ref. Point	Floor	Block	Room Reference	Room Activity	Average Daylight Factor	BRE Recommendation
1	First Floor	B	L01: Block B_1.A01_Bedroom 01	Bedroom	2.69	✓
2	First Floor	B	L01: Block B_1.A01_Living	Living	2.39	✓
3	First Floor	B	L01: Block B_1.A01_Bedroom 02	Bedroom	5.14	✓
4	First Floor	B	L01: Block B_1.A07_Living	Living	4.12	✓
5	First Floor	B	L01: Block B_1.A07_Bedroom 01	Bedroom	3.01	✓
6	First Floor	B	L01: Block B_1.A07_Bedroom 02	Bedroom	5.26	✓
7	First Floor	C	L01: Block C_1.A09_Bedroom 1	Bedroom	2.51	✓
8	First Floor	C	L01: Block C_1.A09_Living/Kitchen	Living	1.79	✓
9	First Floor	C	L01: Block C_1.A09_Bedroom 2	Bedroom	2.8	✓
10	First Floor	C	L01: Block C_1.A14_Bedroom 1	Bedroom	2.04	✓
11	First Floor	C	L01: Block C_1.A14_Bedroom 2	Bedroom	2.11	✓
12	First Floor	D	L01: Block D_1.A20_Bedroom 1	Bedroom	2.11	✓
13	First Floor	D	L01: Block D_1.A20_Living/Kitchen	Living	1.58	✓
14	First Floor	D	L01: Block D_1.A20_Bedroom 2	Bedroom	2.35	✓
15	First Floor	D	L01: Block D_1.A25_Living/Kitchen	Living	1.52	✓
16	First Floor	D	L01: Block D_1.A25_Bedroom 1	Bedroom	2.27	✓
17	First Floor	D	L01: Block D_1.A25_Bedroom 2	Bedroom	2.3	✓
18	First Floor	F	L01: Block F_1.A37_Bedroom	Bedroom	1.05	✓
19	First Floor	F	L01: Block F_1.A37_Living/Kitchen	Living	1.23	x
20	First Floor	F	L01: Block F_1.A36_Living/Kitchen	Living	1.55	✓
21	First Floor	F	L01: Block F_1.A36_Bedroom	Bedroom	1.93	✓
22	First Floor	F	L01: Block F_1.A35_Bedroom 1	Bedroom	2.44	✓
23	First Floor	F	L01: Block F_1.A35_Living/Kitchen	Living	1.89	✓
24	First Floor	F	L01: Block F_1.A35_Bedroom 2	Bedroom	2.75	✓
25	First Floor	F	L01: Block F_1.A40_Living/Kitchen	Living	5.49	✓
26	First Floor	F	L01: Block F_1.A40_Bedroom	Bedroom	3.15	✓
27	First Floor	F	L01: Block F_1.A41_Bedroom/Living	Living	4.13	✓
28	First Floor	F	L01: Block F_1.A31_Living/Kitchen	Living	3.64	✓
29	First Floor	F	L01: Block F_1.A31_Bedroom	Bedroom	2.56	✓
30	First Floor	F	L01: Block F_1.A48_Living/Kitchen	Living	3.38	✓
31	First Floor	F	L01: Block F_1.A48_Bedroom	Bedroom	2.57	✓

- ✓ All these rooms have an average daylight factor greater than the recommended minimum values (1.5% for living rooms and 1.0% for bedrooms) as stated under BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight.

Therefore, these rooms are all compliant with the BRE recommendations.

- x These rooms have an average daylight factor below the BRE recommended values.

### 5.3.3 Second Floor



Ref. Point	Floor	Block	Room Reference	Room Activity	Average Daylight Factor	BRE Recommendation
1	Second Floor	B	L02: Block B_2.A01_Bedroom 01	Bedroom	2.86	✓
2	Second Floor	B	L02: Block B_2.A01_Living	Living	2.46	✓
3	Second Floor	B	L02: Block B_2.A01_Bedroom 02	Bedroom	5.24	✓
4	Second Floor	B	L02: Block B_2.A15_Living	Living	1.73	✓
5	Second Floor	B	L02: Block B_2.A15_Bedroom 01	Bedroom	3.15	✓
6	Second Floor	B	L02: Block B_2.A15_Bedroom 02	Bedroom	5.21	✓
7	Second Floor	C	L02: Block C_2.A09_Bedroom 1	Bedroom	2.83	✓
8	Second Floor	C	L02: Block C_2.A09_Living/Kitchen	Living	2.08	✓
9	Second Floor	C	L02: Block C_2.A09_Bedroom 2	Bedroom	3.02	✓
10	Second Floor	C	L02: Block C_2.A14_Bedroom 1	Bedroom	2.31	✓
11	Second Floor	C	L02: Block C_2.A14_Bedroom 2	Bedroom	2.34	✓
12	Second Floor	D	L02: Block D_2.A20_Bedroom 1	Bedroom	2.46	✓
13	Second Floor	D	L02: Block D_2.A20_Living/Kitchen	Living	1.87	✓
14	Second Floor	D	L02: Block D_2.A20_Bedroom 2	Bedroom	2.67	✓
15	Second Floor	D	L02: Block D_2.A25_Living/Kitchen	Living	1.67	✓
16	Second Floor	D	L02: Block D_2.A25_Bedroom 1	Bedroom	2.46	✓
17	Second Floor	D	L02: Block D_2.A25_Bedroom 2	Bedroom	2.57	✓
18	Second Floor	F	L02: Block F_2.A37_Bedroom	Bedroom	1.05	✓
19	Second Floor	F	L02: Block F_2.A37_Living/Kitchen	Living	1.27	x
20	Second Floor	F	L02: Block F_2.A36_Living/Kitchen	Living	1.62	✓
21	Second Floor	F	L02: Block F_2.A36_Bedroom	Bedroom	2.18	✓
22	Second Floor	F	L02: Block F_2.A35_Bedroom 1	Bedroom	2.76	✓
23	Second Floor	F	L02: Block F_2.A35_Living/Kitchen	Living	2.16	✓
24	Second Floor	F	L02: Block F_2.A35_Bedroom 2	Bedroom	3.01	✓
25	Second Floor	F	L02: Block F_2.A40_Living/Kitchen	Living	5.50	✓
26	Second Floor	F	L02: Block F_2.A40_Bedroom	Bedroom	3.14	✓
27	Second Floor	F	L02: Block F_2.A41_Bedroom/Living	Living	4.10	✓
28	Second Floor	F	L02: Block F_2.A49_Living/Kitchen	Living	3.79	✓
29	Second Floor	F	L02: Block F_2.A49_Bedroom	Bedroom	2.62	✓
30	Second Floor	F	L02: Block F_2.A68_Living/Kitchen	Living	3.27	✓
31	Second Floor	F	L02: Block F_2.A68_Bedroom	Bedroom	2.55	✓

The following conclusions can be made:

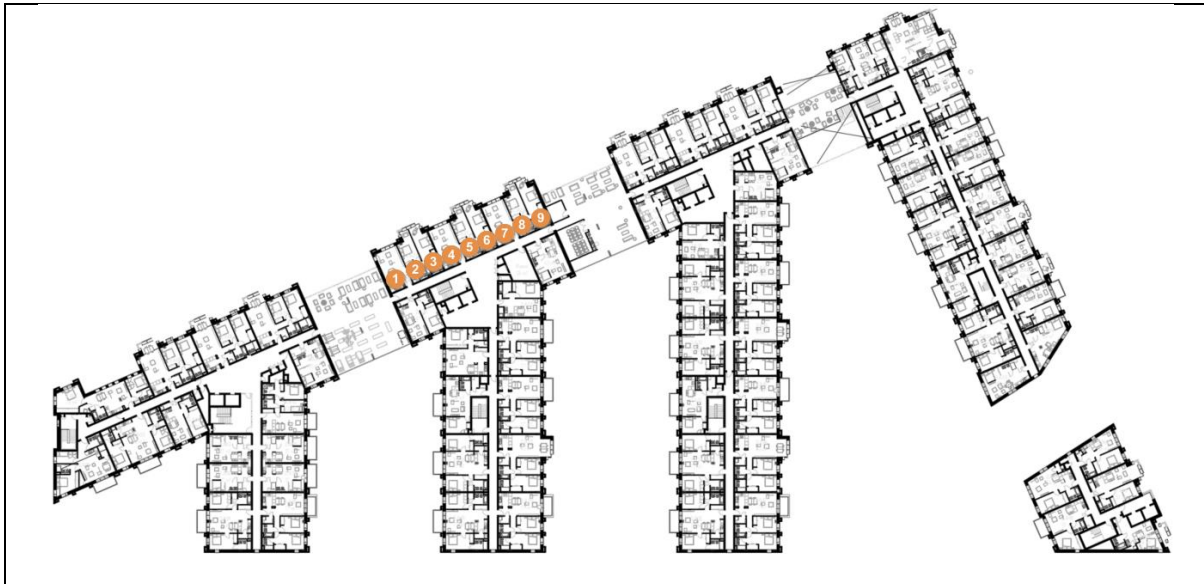
- ✓ All these rooms have an average daylight factor greater than the recommended minimum values (1.5% for living rooms and 1.0% for bedrooms) as stated under BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight.

Therefore, these rooms are all compliant with the BRE recommendations.

- x These rooms have an average daylight factor below the BRE recommended values.



### 5.3.4 Second Floor NW Facing Block



Ref. Point	Floor	Block	Room Reference	Room Activity	Average Daylight Factor	BRE Recommendation
1	Second Floor	A	L02: Block A_2.A21_Living	Living	5.42	✓
2	Second Floor	A	L02: Block A_2.A21_Bedroom 2	Bedroom	4.89	✓
3	Second Floor	A	L02: Block A_2.A21_Bedroom 1	Bedroom	6.17	✓
4	Second Floor	A	L02: Block A_2.A22_Living	Living	5.00	✓
5	Second Floor	A	L02: Block A_2.A22_Bedroom 2	Bedroom	4.75	✓
6	Second Floor	A	L02: Block A_2.A22_Bedroom 1	Bedroom	6.44	✓
7	Second Floor	A	L02: Block A_2.A23_Living	Living	4.71	✓
8	Second Floor	A	L02: Block A_2.A23_Bedroom 2	Bedroom	4.75	✓
9	Second Floor	A	L02: Block A_2.A23_Bedroom 1	Bedroom	5.68	✓

The following conclusions can be made:

- ✓ All these rooms have an average daylight factor greater than the recommended minimum values (1.5% for living rooms and 1.0% for bedrooms) as stated under BRE's 2011 guidance document Site Layout Planning for Daylight and Sunlight.

Therefore, these rooms are all compliant with the BRE recommendations.

## 5.4 Discussion

Full results for the rooms considered can be seen above. These are summarised as follows:

### Ground Floor:

<b>Tested</b>	31
<b>Exceeds BRE recommendations</b>	29
<b>Below BRE recommendations</b>	2
<b>% of Rooms above BRE recommendations</b>	<b>94%</b>

### First Floor:

<b>Tested</b>	31
<b>Exceeds BRE recommendations</b>	30
<b>Below BRE recommendations</b>	1
<b>% of Rooms above BRE recommendations</b>	<b>97%</b>

### Second Floor:

<b>Tested</b>	31
<b>Exceeds BRE recommendations</b>	30
<b>Below BRE recommendations</b>	1
<b>% of Rooms above BRE recommendations</b>	<b>97%</b>

### Second Floor NW Facing Block:

<b>Tested</b>	9
<b>Exceeds BRE recommendations</b>	9
<b>Below BRE recommendations</b>	0
<b>% of Rooms above BRE recommendations</b>	<b>100%</b>

### Summary:

<b>Tested</b>	102
<b>Exceeds BRE recommendations</b>	98
<b>Below BRE recommendations</b>	4
<b>% of Rooms above BRE recommendations</b>	<b>96%</b>

The results above show that 96% of the rooms tested have Average Daylight Factors (ADF) above the recommended values as outlined in the BRE guidelines.

## 6 Shadow Analysis

The statistics of Met Eireann, the Irish Meteorological Service, show that the sunniest months in Ireland are May and June.

The following can also be shown:

- During December, Dublin receives a mean daily duration of 1.7 hours of sunlight out of a potential 7.4 hours sunlight each day (i.e. only 22% of potential sunlight hours).
- During June, Dublin receives a mean daily duration of 6.4 hours of sunlight out of a potential 16.7 hours sunlight each day (i.e. only 38% of potential sunlight hours).

Therefore, impact caused by overshadowing are generally most noticeable during the summer months and least noticeable during the winter months.

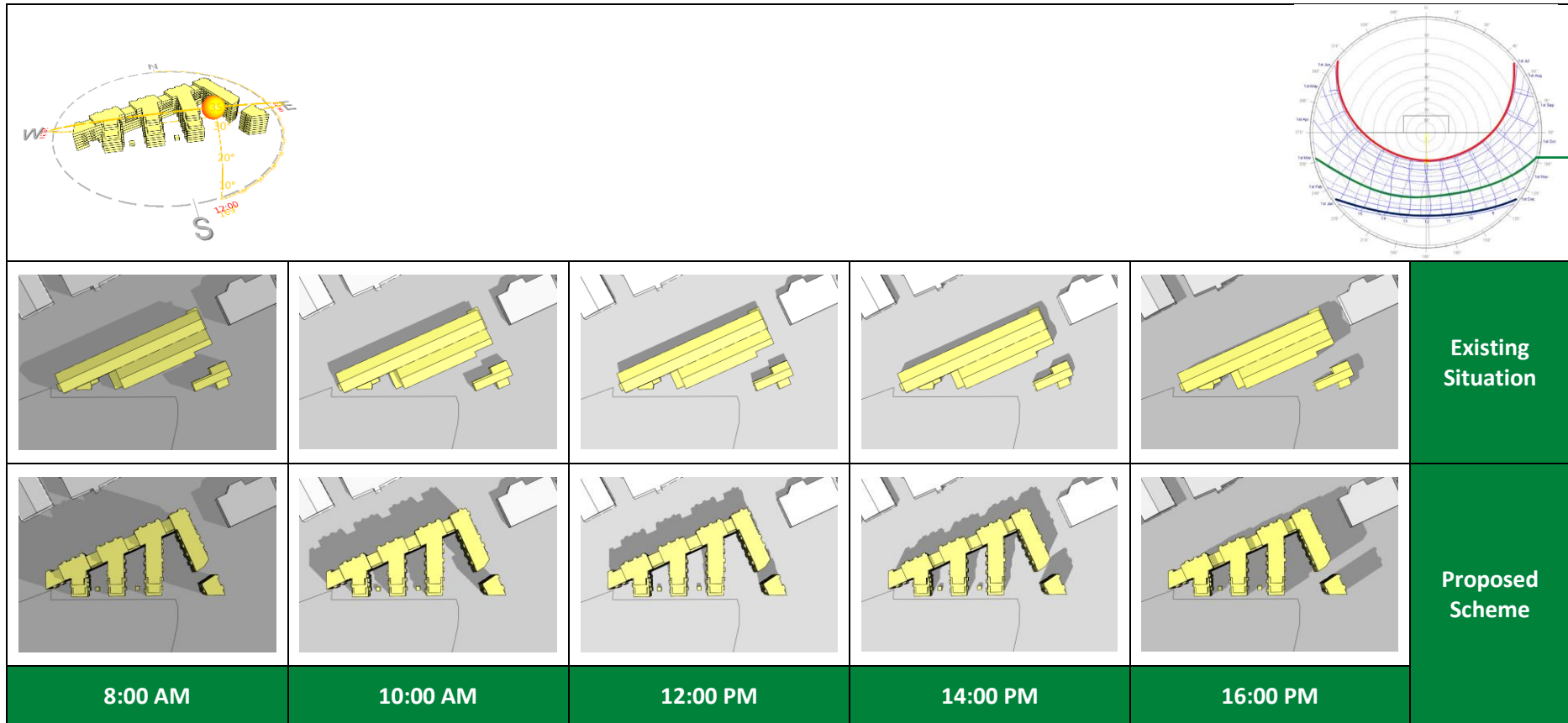
This section will consider the shadows cast for both the Existing Situation and the Proposed development for the following dates;

- March 21<sup>st</sup> / September 21<sup>st</sup> (Equinox)
- June 21<sup>st</sup> (Summer solstice)
- December 21<sup>st</sup> (Winter Solstice)

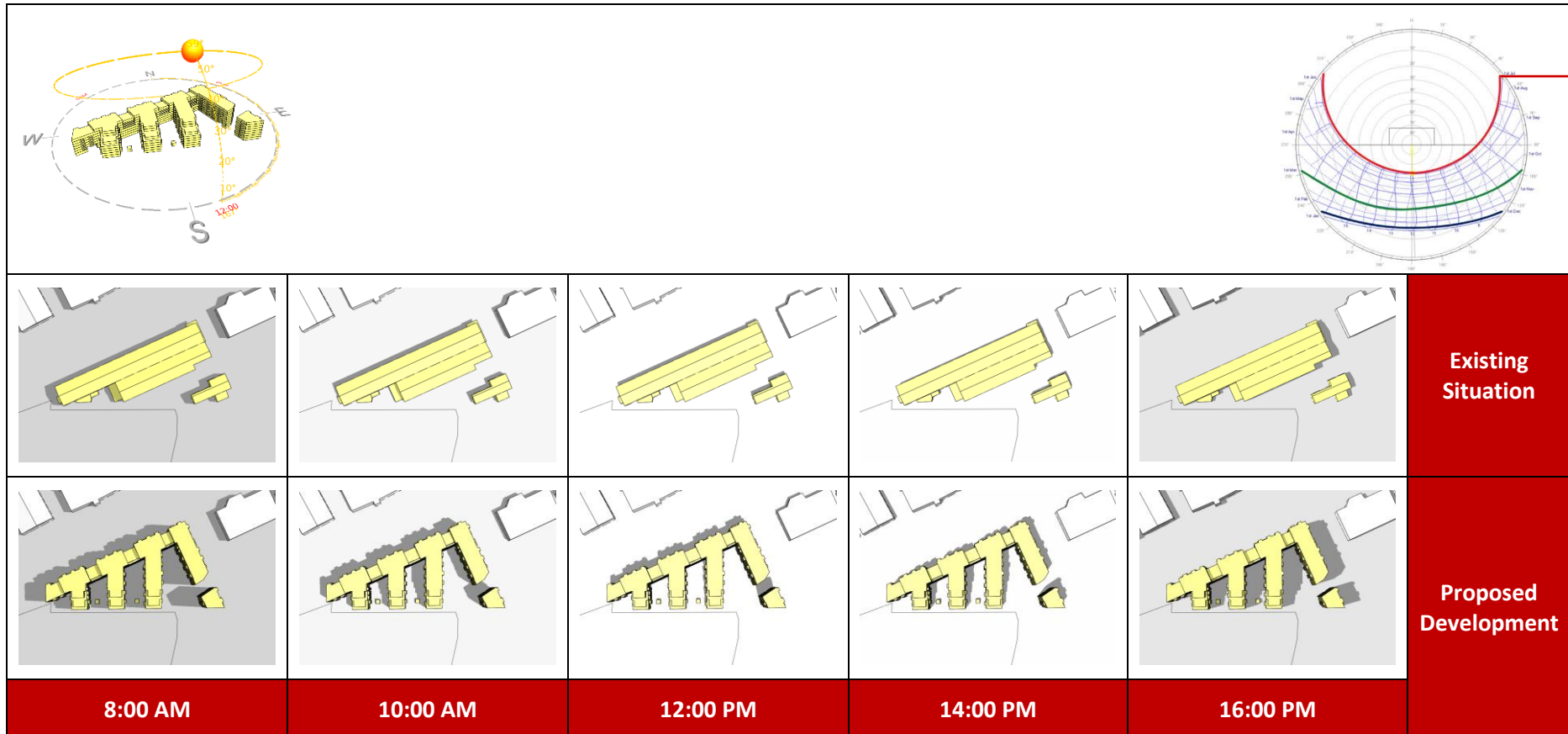
These images will show shadows cast for 'perfect sunny' conditions with no clouds and assumed that the sun is out for every hour shown. Given the discussion above it is important to remember that this is not always going to be the case.

## 6.1 Plan View

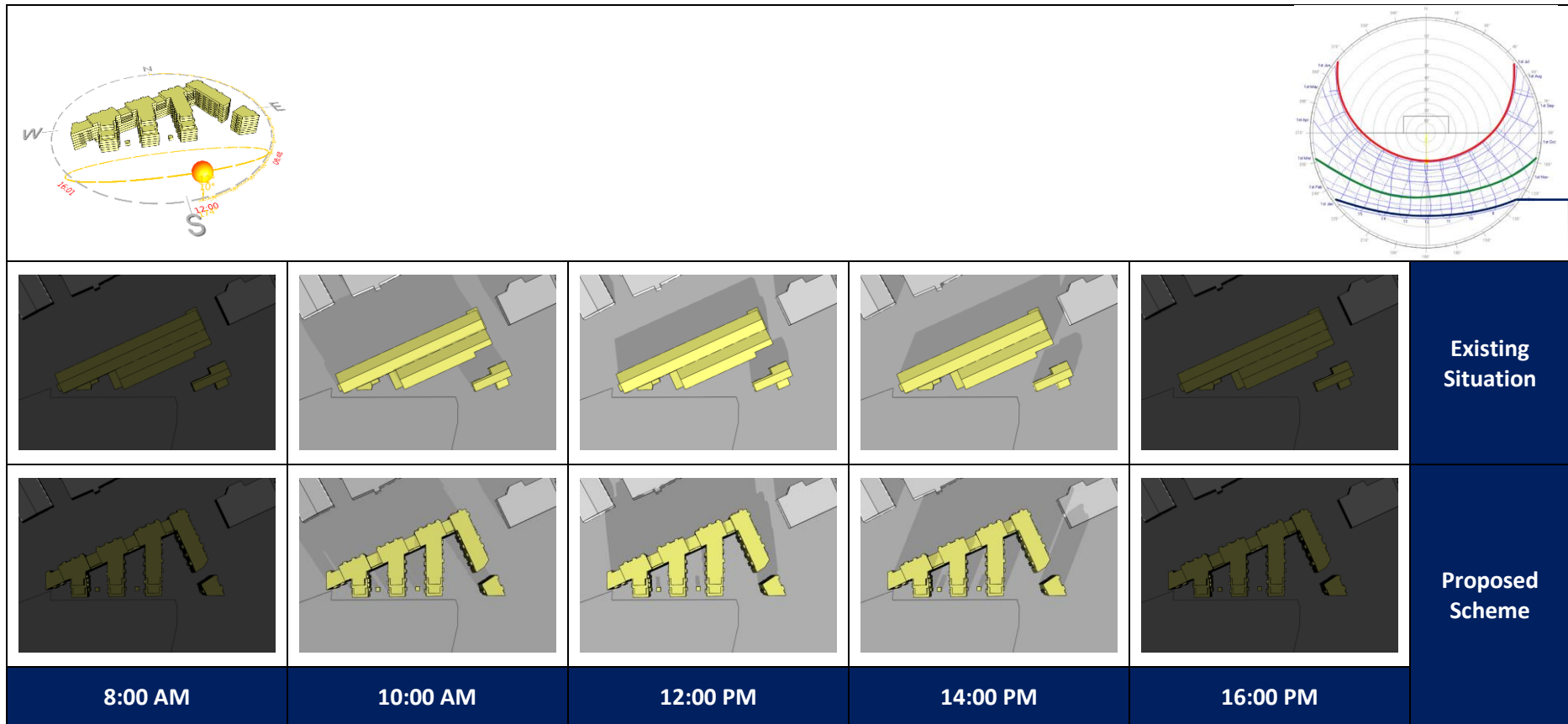
### 6.1.1 March 21st



6.1.2 June 21st



### 6.1.3 December 21st

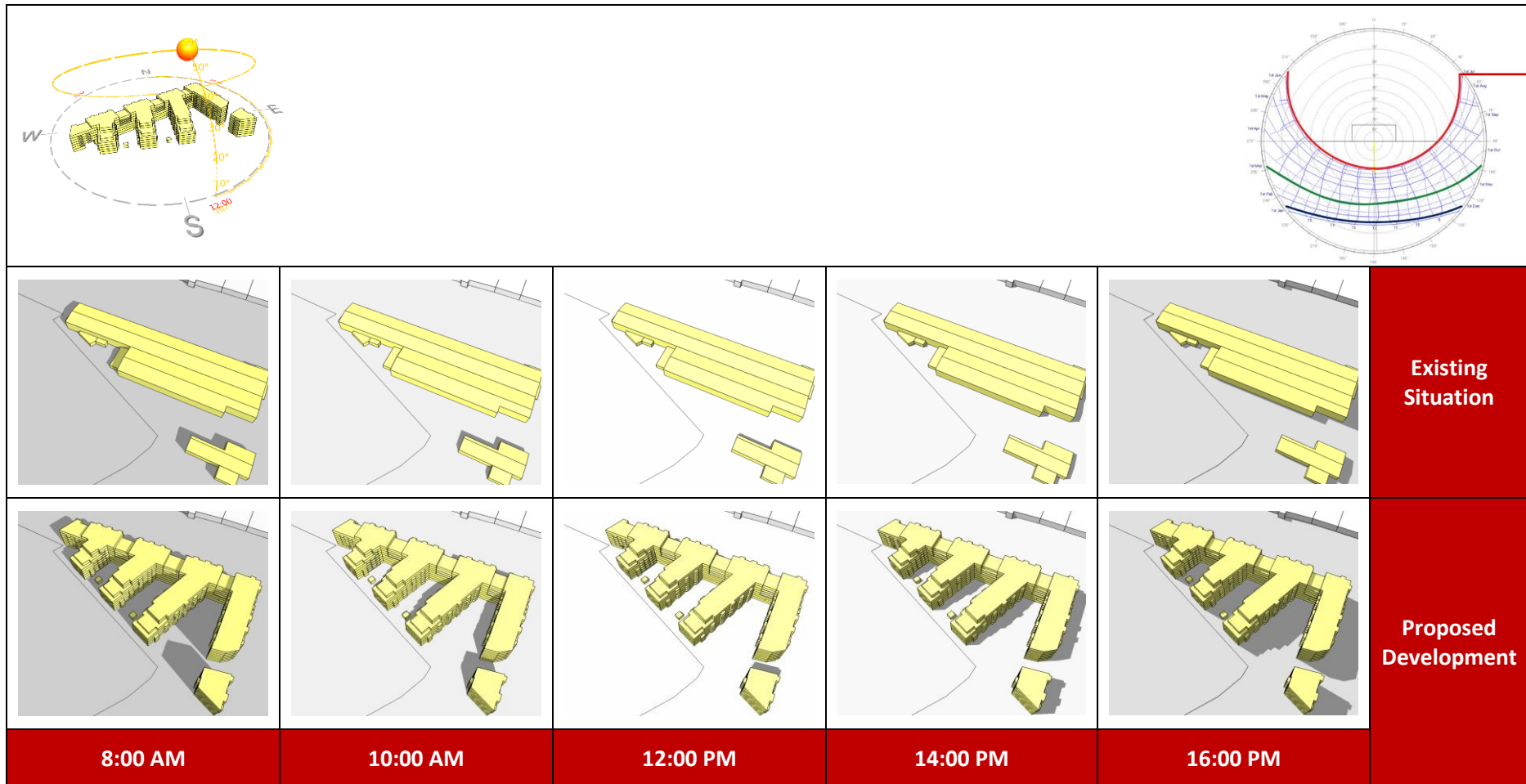


## 6.2 View 01

### 6.2.1 March 21st

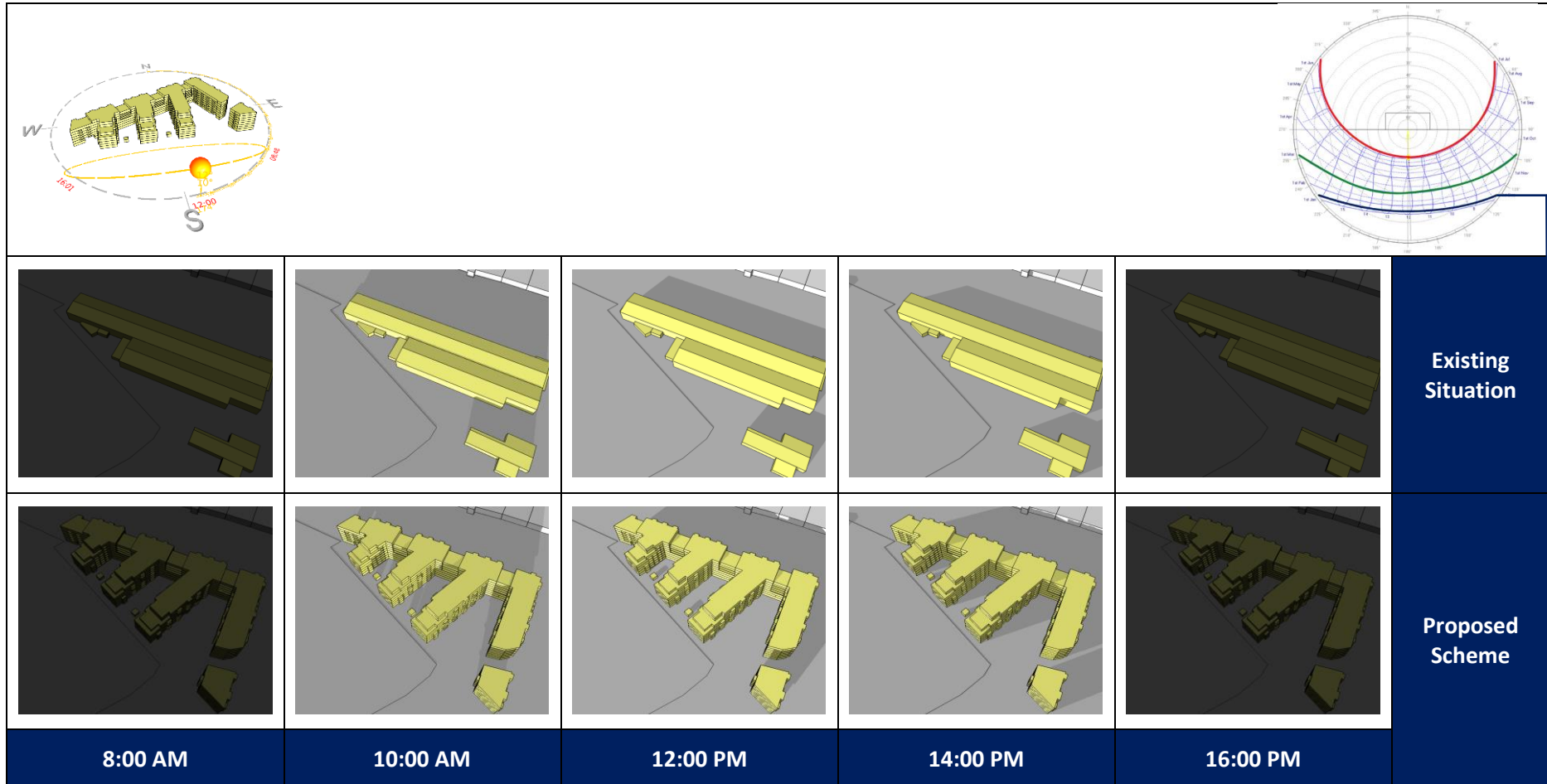


6.2.2 June 21st





6.2.3 December 21st



### **6.3 Discussion**

Shading from the proposed development is summarised as follow based on the analysis of images above.

In terms of shading on the existing buildings surrounding the development site, no additional shading is observed on these properties from the proposed development.

In terms of shading on the proposed development amenity areas, whilst the amenity areas are observed to be shaded during the early hours of the morning (08h00-10h00) and late afternoon (16h00 onwards) they are in sunlight for the majority of the day (12h00-16h00)

The amount of sunlight hours reaching the amenity areas is quantified under 'Section 4 Sunlight to the Proposed Amenity Spaces'.

## **7 Conclusion**

The following can be concluded based on the studies undertaken

### **Sun Light to Proposed Amenity spaces:**

One of the priorities for this development is to ensure quality amenity space. The amenity area has been located to maximise sunlight and provide protection from wind. In terms of sunlight, the amenity space is regarded as a quality space under BRE guidelines if over 50% of the space required achieves a least 2 hours of sunlight on March 21<sup>st</sup>.

In our case all of the amenity area receives 2 hours of sunlight on March 21<sup>st</sup>.

### **Average Daylight factors:**

BRE guidelines recommend a daylight factor of 1.0 in bedrooms and 1.5 in living rooms / kitchens.

We have tested 102 rooms in this sample of which 98 exceed the BRE guidelines. The results show 96% of the rooms tested across the floors have Average Daylight Factors (ADF) above the recommended values of the BRE guidelines.

The majority of the rooms tested are at Ground and First floor locations on the Blocks to the rear of the main Block A and are therefore worst-case rooms. The daylight factors would improve further on the upper floors.

For the small number of rooms that fall below the BRE guidelines, these have Average Daylight Factors (ADF) just marginally below the recommended values and look onto a south facing landscape courtyard rich in sunlight levels.

The design team believe we have achieved a balance on window design to achieve optimum daylight factor with no adverse effect on heat loss and energy efficiency.

### **Shadow Analysis**

In terms of shading on surrounding properties, the impact of the proposed development is almost identical to that from the existing situation as shown by the images in Section 6.

## **Discussion**

It should be noted that the guidance in 'Site layout planning for daylight and sunlight: a guide to good practice' is not mandatory and the Report itself states 'although it gives numerical guidelines these should be interpreted flexibly because natural lighting is only one of many factors in site layout design.

Whilst the results shown relate to the criteria as laid out in the BRE guidance targets it is important to note that the BRE targets have been drafted primarily for use in low density suburban development and should therefore be used with flexibility and caution when dealing other types of sites.

Despite the above, the results within this report shows the proposed development exceed the BRE recommendations in the BRE 'Site Layout Planning for Daylight and Sunlight' guide, sometimes referred to as BRE Digest 209.



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