

Proposed Block D at Marina Village, Greystones, Co. Wicklow

Daylight and sunlight assessment report

+353 (0) 1 2880186

✉ info@3ddesignbureau.com

🌐 www.3ddesignbureau.com



**3D DESIGN
BUREAU**

We Deliver Superior 3D Solutions
For Design, Planning & Marketing

Contents	Page
Glossary.....	03
Introduction.....	04
Methodology.....	05
Results - Impact to existing Vertical Sky Component (VSC).....	06
Results - Impact to existing Annual Probable Sunlight Hours (APSH).....	13
Results - Average Daylight Factor (ADF).....	15
Shadow Study for March 21st.....	17
Shadow Study for June 21st.....	20
Shadow Study for December 21st.....	24
Summaries.....	26
Conclusion.....	27

Glossary

VSC (Vertical Sky Component)

Ratio of that part of illuminance, at a point on a given vertical plane, that is received directly from a CIE standard overcast sky, 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.

APSH (Annual Probable Sunlight Hours)

Annual probable sunlight hours (APSH) is a measure of sunlight that a given window may expect over a year period. The BRE guidance recognises that sunlight is less important than daylight in the amenity of a room and is heavily influenced by orientation. North facing windows may receive sunlight on only a handful of occasions in a year, and windows facing eastwards or westwards will only receive sunlight for some of the day. Therefore, BRE guidance states that only windows with an orientation within 90 degrees of due south need be assessed.

ADF (Average daylight factor)

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 CIE standard overcast sky.

Thus a 1% ADF would mean that the average indoor illuminance would be one hundredth the outdoor unobstructed illuminance.

Applied Target Value

The applied target value is generated by calculating 80% of a baseline figure (ATV).

If the ATV is above the recommended target for the relevant study, the recommended target is taken as the target value.

If the ATV is below the recommended target for the relevant study, the ATV is taken as the target value.

Working plane

Horizontal, vertical or inclined plane in which a visual task lies. Normally the working plane may be taken to be horizontal, 0.85 m above the floor in houses and factories, 0.7 m above the floor in offices.

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.

Definition of Impacts

The terminology used in this report to determine the definition of impacts has been taken from 2002 publication

"Guidelines on the information to be contained in environmental impact statements"

By The Environmental Protection Agency (EPA) These Definitions can be seen below.

Imperceptible Impact

An impact capable of measurement but without noticeable consequences.

For the purposes of this report, an "Imperceptible" level of impact will be stated if the level of impact is within the criteria as recommended in the BRE guidelines and the applied target value has been achieved.

Slight Impact

An impact which causes noticeable changes in the character of the environment without affecting its sensitivities.

For the purposes of this report, a "Slight" level of impact will be stated if the level of impact is marginally outside of the criteria as stated in the BRE guidelines. There are many factors to consider when interpreting a level of impact, typically a "Slight" level of impact will be applied if the level of impact is between 80-99% of the applied target value.

Moderate Impact

An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends.

For the purposes of this report, a Moderate level of impact will be stated if the level of impact is greater than a "Slight" level of impact, and the assessed property is reduced to a level that is consistent with similar properties in the surrounding areas. A "Moderate" level of impact would be quite typical in instances where a proposed development is planned on an under-developed plot of land.

Significant Impact

An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.

For the purposes of this report, a "Significant" level of impact will be stated if the proposed development reduces the availability of daylight or sunlight of a neighbouring property to a very low level. There are many factors to consider when interpreting a level of impact, typically a "Significant" level of impact will be applied if the level of impact is between 10-50% of the applied target value.

Profound Impact

An impact which obliterates sensitive characteristics.

For the purposes of this report, a "Profound" level of impact 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.

Introduction

3D Design Bureau (3DDB) were commissioned to carry out a daylight analysis, sunlight analysis and shadow study for the proposed residential development "Block D" as part of the Marina Village in Greystones, Co. Wicklow.

In this study we will assess the impact the proposed development will have on the level of daylight and sunlight received by the neighbouring properties that are in close proximity to the proposed apartment block.
The assessed properties are: Harbour View, Yanchep, Glencoe, Alberta, Yarrayarra, 1-12 The Strand & the south facing elevation of Block E in Greystones Marina Village.

In addition to the assessment of the impact the proposed development would have on the neighbouring properties, an assessment will be carried out on the level of daylight in the proposed residential units and a shadows study to give visual representation of the additional shadowing the proposed development would cause.

For all target values of daylight and sunlight the 2011 BRE guidelines as set out in "Site layout planning for daylight and sunlight" have been followed.

Note: The BRE Guidelines should be treated as guidelines as opposed to rules, the document clearly states:

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

This analysis will be carried out in 3 parts:

1.) Impact to VSC (Vertical Sky Component)

Obstructions can limit access to light from the sky. This can be checked by measuring or calculating the Vertical Sky Component (VSC) at the centre of the lowest window where daylight is required.

If VSC is:

- At least 27%, then conventional window design will usually give reasonable results.
- Between 15% and 27%, then special measures (larger windows, changes to room layout) are usually needed to provide adequate daylight.
- Between 5% and 15%, then it is very difficult to provide adequate daylight unless very large windows are used.
- Less than 5%, then it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed.

When measuring the affect a proposed development will have on the VSC of an existing window, if the value drops below the 27% guideline and is less than 0.8 times the existing value, the proposed development could possibly have a noticeable impact on the amount of daylight received.

The VSC of an assessment point on each of the assessed windows will be calculated both in the baseline state and as it would appear should the proposed development be constructed as proposed. A comparison between these values will determine the level of impact.

The results for the study on the impact to VSC caused by the proposed development can be seen on pages 06-12.

2.) Impact to Annual Probable Sunlight Hours. (APSH)

Annual probable sunlight hours (APSH) is a measure of sunlight that a given window may expect to receive over the period of a year. The BRE guidelines recognises that sunlight is less important than daylight in the amenity of a room and is heavily influenced by orientation. North facing windows may receive sunlight on only a handful of occasions in a year, and windows facing eastwards or westwards will only receive sunlight for some of the day. Therefore, BRE guidance states that only windows with an orientation within 90 degrees of due south need be assessed.

If the assessment 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 affect a proposed development will have on the APSH of an existing window, if the APSH value drops below the annual (25%) or winter (5%) guidelines and is both less than 0.8 times the baseline value and there is a reduction of more than 4% of the annual APSH, the proposed development could possibly have a noticeable impact on sunlight.

An assessment will be carried out to calculate the impact the proposed development would have on the APSH of the surrounding properties that have a south facing window looking towards the proposed site.
No APSH assessment will be carried out on the windows that do not have an aspect within 90° of due south.

In the case of this study, there is only one elevation facing within 90° of due south that faces the proposed site. This is the south facing elevation of Block E in Greystones Marina Village which is located directly north of the proposed development. The APSH for these windows will be calculated both in the baseline state and as they would appear should the proposed development be constructed as proposed.
A comparison of these results will determine the level of impact.

The results of the study on APSH can be found on page 13-14.

Introduction Cont'd

3.) Average Daylight Factor (ADF).

BS 8206-2 Code of practice for daylighting, recommends an ADF of 5% for a well day lit space and 2% for a partly daylight space. Below 2% the room will look dull and electric lighting is likely to be turned on. In terms of housing, BS 8206-2 also gives minimum values of ADF: 2% for Kitchens, 1.5% for living rooms and 1% for bedrooms.

This study will assess the Average Daylight Factor (ADF) received in the Living/Kitchen/Dining (LKD) and bedrooms rooms in all apartments across the first floor of the proposed development. The first floor will be assessed as it is the lowest floor to contain apartments. The ground floor will be predominantly used as commercial premises. No assessment has been carried out on subsequent floors as the levels of daylight naturally increase as the floor level increases and the lowest floor is deemed to be the worst case scenario.

For definition of spaces and target values applied, please see the methodology section below.

The results for the study on ADF can be seen on pages 15-16.

Methodology

Building the proposed and existing models.

In order to obtain the results of this analysis, 3D Design Bureau (3DDB) worked with a series of 3D digital models. A model of the proposed development was issued by O'Mahony Pike Architects (OMP).

A combination of survey information, aerial photography, available on-line photography, photogrammetry & ordnance survey information were used to model the surrounding context and assessed buildings.

As the information gathered from on-line sources is not as accurate as surveyed information, some tolerance should be allowed to the results generated.

Trees.

Normally trees and shrubs do not need to be included in the studies carried out in this report, partly because their shapes are almost impossible to predict, and partly because the dappled shade of a tree is more pleasant than the deep shadow of a building (this applies especially to deciduous trees). Where a dense belt or group of evergreens is specifically planned as a windbreak or for privacy purposes, it is better to include their shadow in the calculation of shaded area.

Defining Areas.

All of the living spaces in the proposed development are open plan and connected to a kitchen and dining room (LKD). The LKDs will be analysed as one space with a target value of 2%.

Bedrooms will have a target value of 1%, with circulation areas being removed from the analysis area.

Winter gardens have been considered an extension of the internal space and have been included as part of the adjoining room in order to determine ADF.

Circulation spaces, corridors, bathrooms etc. have not been analysed as they have no target values for daylight.

Work plane.

The calculation of ADF is carried out on a hypothetical work plane which lies 850mm from the finished floor level and is offset 500mm from the room boundaries. Room boundaries are taken from the inside face of the interior walls and the centerline of any external windows.

Daylight Factor (DF) has been calculated on the work plane across a series of points on a grid of approximately 200mm. The average of these figures determines the Average Daylight Factor (ADF).

Assessment points.

Assessment points, when measuring VSC or APSH of a window, are taken from the centre point of a standard window.

If the window being assessed is a full height window the assessment point is taken at 1600mm above the finished floor level. If it can be determined that multiple windows are servicing the same room, each window will be assessed and the average value will be taken.

Only habitable rooms need to be assessed for impact to daylight and sunlight. Where available previous planning applications were used to determine the functionality of existing neighbouring rooms. Where this information was not available assumptions were made.

Generating results.

The 3D models as stated above were brought into specialist software packages using state of the art daylight and sunlight analysis methods.

All target values are obtained from the 2011 BRE guidelines as set out in "site layout planning for daylight and sunlight".

Shadow Study

The shadow study renderings have been carried out in order to give a visual representation to the additional shadowing cast by the proposed development. Please see pages 17-25.

Hourly renderings have been shown from sunrise to sunset on the following dates:

- Spring Equinox: March 21st. Sunrise 6:25 | Sunset 18:40.
- Summer Solstice: June 21st. Sunrise 4:57 | Sunset 21:57.
- Winter Solstice: December 21st. Sunrise 8:38 | Sunset 16:08.
- Note: The Spring and Autumn Equinox yield similar results.



Results

Impact to VSC- Vertical Sky Component Harbour View

Window Number	Baseline VSC Value	Applied VSC Target Value*	Proposed VSC Value	% of Target VSC Value Achieved	Level of Impact
Ground Floor					
Ga	28.86%	23.08%	28.75%	>100%	Imperceptible
Gb	31.54%	25.23%	31.32%	>100%	Imperceptible
Gc	32.72%	26.17%	32.68%	>100%	Imperceptible
Gd	32.32%	25.86%	32.32%	>100%	Imperceptible
Ge	27.66%	22.13%	27.66%	>100%	Imperceptible
Gf	25.16%	20.13%	25.16%	>100%	Imperceptible
First Floor					
1a	36.76%	27.00%	35.85%	>100%	Imperceptible
1b	36.51%	27.00%	35.55%	>100%	Imperceptible
1c	36.72%	27.00%	35.74%	>100%	Imperceptible
1d	36.71%	27.00%	35.70%	>100%	Imperceptible
1e	36.63%	27.00%	35.60%	>100%	Imperceptible
1f	36.52%	27.00%	35.47%	>100%	Imperceptible
1g	36.32%	27.00%	35.25%	>100%	Imperceptible
1h	35.91%	27.00%	34.82%	>100%	Imperceptible
1i	33.82%	27.00%	32.70%	>100%	Imperceptible
1j	33.96%	27.00%	32.79%	>100%	Imperceptible

* The BRE guidelines state that in order for a proposed development to have a noticeable impact on the VSC of an existing window, the value needs to both drop below the stated target value of 27% and be reduced by more than 20% of the existing value.

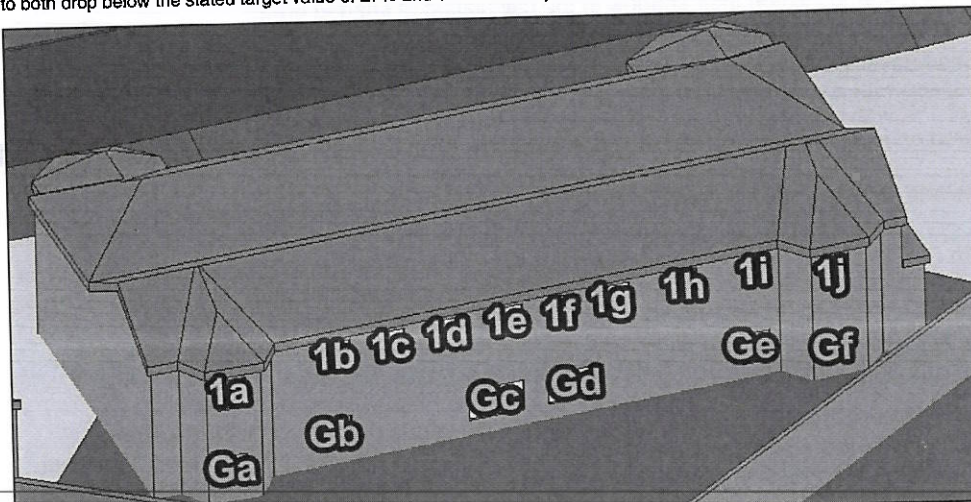


Image of Harbour View with assessed windows highlighted.



Aerial view of assessed location.

Results

Impact of VSC - Vertical Sky Component

Yanchep, Glencoe, Alberta & Yarrayarra, Beach Road

Window Number	Baseline VSC Value	Applied VSC Target Value*	Proposed VSC Value	% of Target VSC Value Achieved	Level of Impact
Yanchep					
Ya	32.03%	25.62%	32.03%	>100%	Imperceptible
Yb	38.64%	27.00%	37.48%	>100%	Imperceptible
Yc	37.39%	27.00%	36.13%	>100%	Imperceptible
Yd	38.21%	27.00%	37.35%	>100%	Imperceptible
Glencoe					
Ga	30.92%	24.73%	30.92%	>100%	Imperceptible
Gb	38.70%	27.00%	37.41%	>100%	Imperceptible
Gc	37.66%	27.00%	36.67%	>100%	Imperceptible
Alberta					
Aa	25.71%	20.57%	25.59%	>100%	Imperceptible
Ab	30.63%	24.50%	30.44%	>100%	Imperceptible
Ac	35.37%	27.00%	33.81%	>100%	Imperceptible
Ad	35.83%	27.00%	34.28%	>100%	Imperceptible
Yarrayarra					
YRa	32.30%	25.84%	30.27%	>100%	Imperceptible
YRb	30.95%	24.76%	29.27%	>100%	Imperceptible
YRc	38.30%	27.00%	35.14%	>100%	Imperceptible
YRd	36.38%	27.00%	33.07%	>100%	Imperceptible
YRe	37.75%	27.00%	34.16%	>100%	Imperceptible

* The BRE guidelines state that in order for a proposed development to have a noticeable impact on the VSC of an existing window, the value needs to both drop below the stated target value of 27% and be reduced by more than 20% of the existing value.

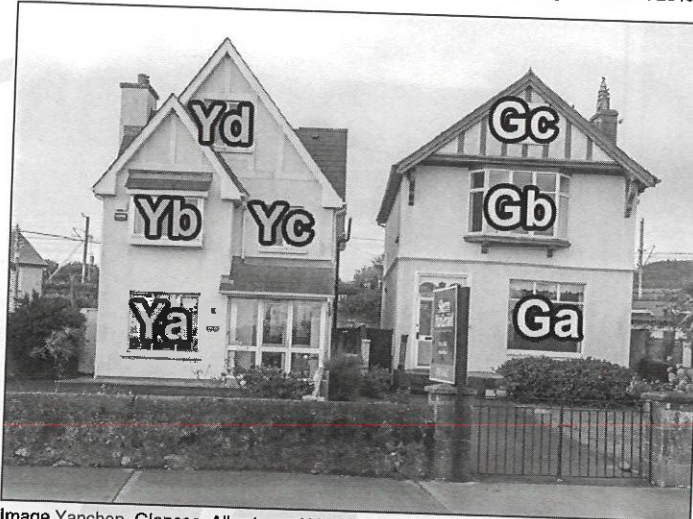


Image Yanchep, Glencoe, Alberta and Yarrayarra with assessed windows highlighted.



Aerial view of assessed location.

Results

Impact of VSC - Vertical Sky Component 1, 2, 3, 4 The Strand, Marina Village

Window Number	Baseline VSC Value	Applied VSC Target Value*	Proposed VSC Value	% of Target VSC Value Achieved	Level of Impact
1 The Strand					
1a	37.89%	27.00%	28.79%	>100%	Imperceptible
1b	36.61%	27.00%	29.36%	>100%	Imperceptible
1c	34.33%	27.00%	27.70%	>100%	Imperceptible
2 The Strand					
2a	37.54%	27.00%	28.72%	>100%	Imperceptible
2b	34.73%	27.00%	28.05%	>100%	Imperceptible
2c	36.31%	27.00%	29.55%	>100%	Imperceptible
3 The Strand					
3a	35.82%	27.00%	29.50%	>100%	Imperceptible
3b	37.32%	27.00%	32.77%	>100%	Imperceptible
3c	37.44%	27.00%	33.23%	>100%	Imperceptible
3d	34.59%	27.00%	31.40%	>100%	Imperceptible
3e	34.44%	27.00%	31.55%	>100%	Imperceptible
4 The Strand					
4a	35.49%	27.00%	30.21%	>100%	Imperceptible
4b	37.26%	27.00%	33.59%	>100%	Imperceptible
4c	37.09%	27.00%	33.76%	>100%	Imperceptible
4d	34.31%	27.00%	31.66%	>100%	Imperceptible
4e	34.17%	27.00%	31.76%	>100%	Imperceptible

* The BRE guidelines state that in order for a proposed development to have a noticeable impact on the VSC of an existing window, the value needs to both drop below the stated target value of 27% and be reduced by more than 20% of the existing value.

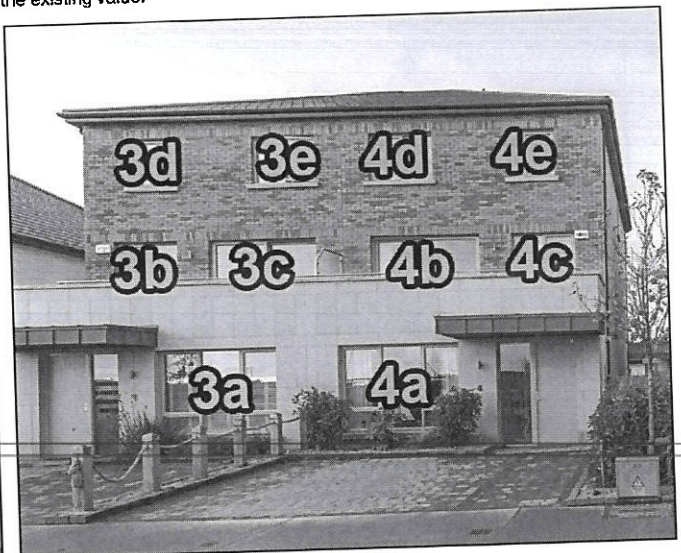
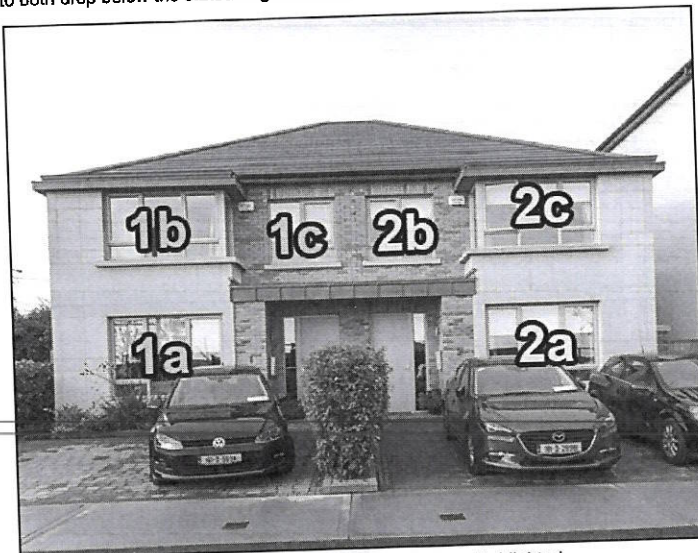
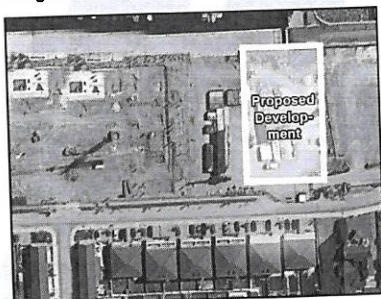


Image of 1, 2, 3 & 4 The Strand with assessed windows highlighted.



Aerial view of assessed location.

Results

Impact of VSC - Vertical Sky Component 5, 6, 7 & 8 The Strand, Marina Village

Window Number	Baseline VSC Value	Applied VSC Target Value*	Proposed VSC Value	% of Target VSC Value Achieved	Level of Impact
5 The Strand					
5a	34.39%	27.00%	30.78%	>100%	Imperceptible
5b	36.76%	27.00%	33.89%	>100%	Imperceptible
5c	36.51%	27.00%	33.87%	>100%	Imperceptible
5d	33.89%	27.00%	31.83%	>100%	Imperceptible
5e	33.68%	26.94%	31.80%	>100%	Imperceptible
6 The Strand					
6a	33.86%	27.00%	30.68%	>100%	Imperceptible
6b	36.15%	27.00%	33.82%	>100%	Imperceptible
6c	35.90%	27.00%	33.77%	>100%	Imperceptible
6d	33.48%	26.79%	31.77%	>100%	Imperceptible
6e	33.28%	26.63%	31.73%	>100%	Imperceptible
7 The Strand					
7a	31.90%	25.52%	29.64%	>100%	Imperceptible
7b	35.32%	27.00%	33.49%	>100%	Imperceptible
7c	34.97%	27.00%	33.28%	>100%	Imperceptible
7d	32.83%	26.26%	31.52%	>100%	Imperceptible
7e	32.55%	26.04%	31.36%	>100%	Imperceptible
8 The Strand					
8a	30.83%	24.67%	28.82%	>100%	Imperceptible
8b	34.38%	27.00%	32.87%	>100%	Imperceptible
8c	33.89%	27.00%	32.52%	>100%	Imperceptible
8d	32.31%	25.84%	31.21%	>100%	Imperceptible
8e	31.91%	25.53%	30.91%	>100%	Imperceptible

* The BRE guidelines state that in order for a proposed development to have a noticeable impact on the VSC of an existing window, the value needs to both drop below the stated target value of 27% and be reduced by more than 20% of the existing value.

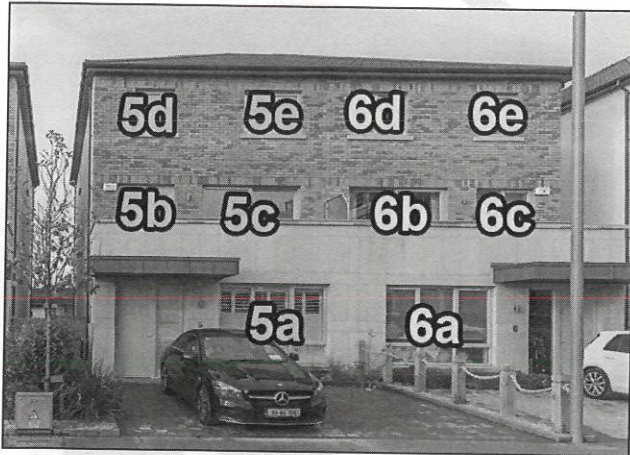
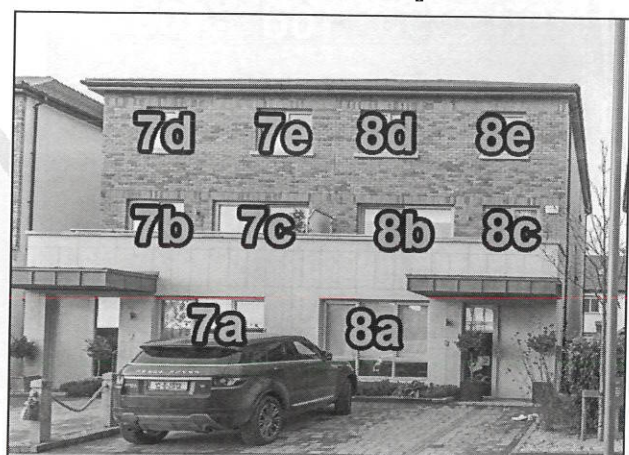


Image of 5, 6, 7 & 8 The Strand with assessed windows highlighted.



Aerial view of assessed location.

Results

Impact of VSC - Vertical Sky Component 9, 10, 11 & 12 The Strand, Marina Village

Window Number	Baseline VSC Value	Applied VSC Target Value*	Proposed VSC Value	% of Target VSC Value Achieved	Level of Impact
9 The Strand					
9a	26.10%	20.88%	24.64%	>100%	Imperceptible
9b	32.16%	25.73%	30.98%	>100%	Imperceptible
9c	31.39%	25.11%	30.29%	>100%	Imperceptible
9d	30.62%	24.50%	29.77%	>100%	Imperceptible
9e	30.06%	24.05%	29.28%	>100%	Imperceptible
10 The Strand					
10a	25.23%	20.19%	24.04%	>100%	Imperceptible
10b	30.77%	24.62%	29.82%	>100%	Imperceptible
10c	30.45%	24.36%	29.78%	>100%	Imperceptible
10d	29.75%	23.80%	29.04%	>100%	Imperceptible
10e	29.64%	23.71%	29.06%	>100%	Imperceptible
11 The Strand					
11a	26.99%	21.59%	26.43%	>100%	Imperceptible
11b	28.42%	22.73%	27.96%	>100%	Imperceptible
11c	27.14%	21.71%	27.13%	>100%	Imperceptible
12 The Strand					
12a	28.25%	22.60%	27.96%	>100%	Imperceptible
12b	27.78%	22.23%	27.48%	>100%	Imperceptible
12c	29.54%	23.63%	29.30%	>100%	Imperceptible

* The BRE guidelines state that in order for a proposed development to have a noticeable impact on the VSC of an existing window, the value needs to both drop below the stated target value of 27% and be reduced by more than 20% of the existing value.

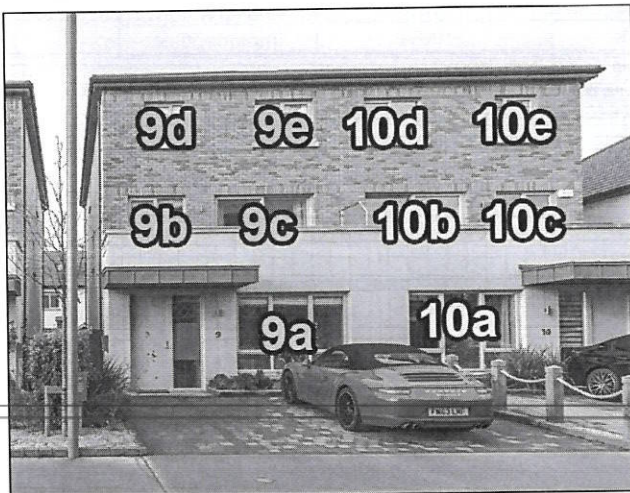
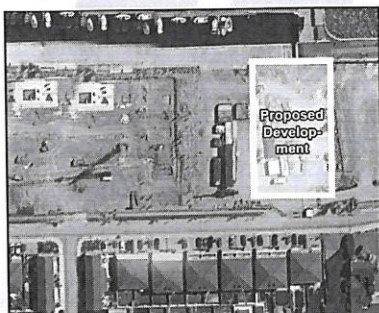


Image of 9, 10, 11 & 12 (image is indicative of building) The Strand with assessed windows highlighted.



Aerial view of assessed location.

Results

Impact of VSC - Vertical Sky Component Block E, Marina Village

Window Number	Baseline VSC Value	Applied VSC Target Value*	Proposed VSC Value	% of Target VSC Value Achieved	Level of Impact
Ground Floor					
Ga	37.32%	27.00%	34.16%	>100%	Imperceptible
Gb	37.63%	27.00%	34.23%	>100%	Imperceptible
Gc	37.92%	27.00%	34.25%	>100%	Imperceptible
Gd	38.40%	27.00%	34.20%	>100%	Imperceptible
Ge	38.59%	27.00%	34.18%	>100%	Imperceptible
Gf	38.77%	27.00%	34.18%	>100%	Imperceptible
Gg	39.00%	27.00%	34.28%	>100%	Imperceptible
Gh	39.09%	27.00%	34.41%	>100%	Imperceptible
Gi	39.17%	27.00%	34.59%	>100%	Imperceptible
Gj	39.24%	27.00%	34.83%	>100%	Imperceptible
First Floor					
1a	38.72%	27.00%	36.43%	>100%	Imperceptible
1b	38.88%	27.00%	36.43%	>100%	Imperceptible
1c	39.05%	27.00%	36.38%	>100%	Imperceptible
1d	39.20%	27.00%	36.31%	>100%	Imperceptible
1e	39.32%	27.00%	36.24%	>100%	Imperceptible
1f	39.42%	27.00%	36.18%	>100%	Imperceptible
1g	39.52%	27.00%	36.13%	>100%	Imperceptible
1h	39.59%	27.00%	36.11%	>100%	Imperceptible
1i	39.64%	27.00%	36.13%	>100%	Imperceptible
1j	39.69%	27.00%	36.19%	>100%	Imperceptible
1k	39.73%	27.00%	36.30%	>100%	Imperceptible
1l	39.76%	27.00%	36.45%	>100%	Imperceptible
1m	39.79%	27.00%	36.62%	>100%	Imperceptible
1n	39.81%	27.00%	36.82%	>100%	Imperceptible
1o	39.82%	27.00%	37.05%	>100%	Imperceptible

* The BRE guidelines state that in order for a proposed development to have a noticeable impact on the VSC of an existing window, the value needs to both drop below the stated target value of 27% and be reduced by more than 20% of the existing value.

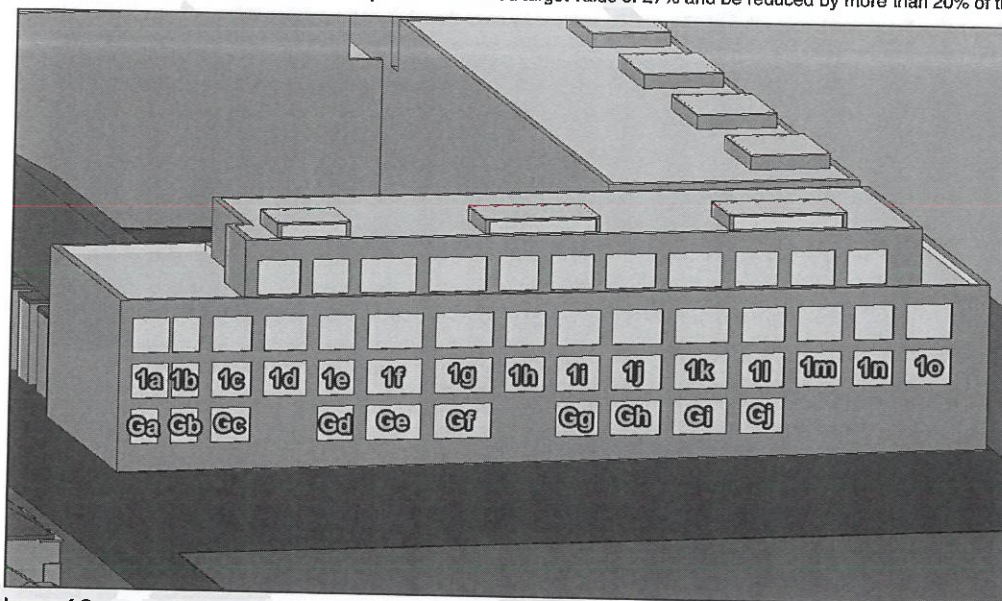
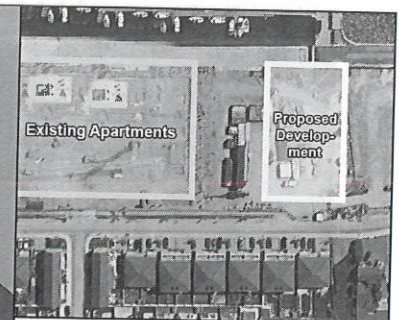


Image of Greystones Harbour Apartment Block with assessed windows highlighted.



Aerial view of assessed location.

Results

Impact of VSC - Vertical Sky Component Block E, Marina Village

Window Number	Baseline VSC Value	Applied VSC Target Value*	Proposed VSC Value	% of Target VSC Value Achieved	Level of Impact
Second Floor					
2a	39.76%	27.00%	38.46%	>100%	Imperceptible
2b	39.80%	27.00%	38.41%	>100%	Imperceptible
2c	39.83%	27.00%	38.33%	>100%	Imperceptible
2d	39.87%	27.00%	38.23%	>100%	Imperceptible
2e	39.89%	27.00%	38.14%	>100%	Imperceptible
2f	39.91%	27.00%	38.06%	>100%	Imperceptible
2g	39.93%	27.00%	37.99%	>100%	Imperceptible
2h	39.94%	27.00%	37.95%	>100%	Imperceptible
2i	39.95%	27.00%	37.94%	>100%	Imperceptible
2j	39.96%	27.00%	37.96%	>100%	Imperceptible
2k	39.97%	27.00%	38.00%	>100%	Imperceptible
2l	39.97%	27.00%	38.08%	>100%	Imperceptible
2m	39.98%	27.00%	38.17%	>100%	Imperceptible
2n	39.98%	27.00%	38.27%	>100%	Imperceptible
2o	39.98%	27.00%	38.40%	>100%	Imperceptible
Third Floor					
3a	40.00%	27.00%	39.60%	>100%	Imperceptible
3b	40.00%	27.00%	39.58%	>100%	Imperceptible
3c	40.00%	27.00%	39.56%	>100%	Imperceptible
3d	40.00%	27.00%	39.54%	>100%	Imperceptible
3e	40.00%	27.00%	39.53%	>100%	Imperceptible
3f	40.00%	27.00%	39.53%	>100%	Imperceptible
3g	40.00%	27.00%	39.53%	>100%	Imperceptible
3h	40.00%	27.00%	39.54%	>100%	Imperceptible
3i	40.00%	27.00%	39.55%	>100%	Imperceptible
3j	40.00%	27.00%	39.57%	>100%	Imperceptible
3k	40.00%	27.00%	39.59%	>100%	Imperceptible

* The BRE guidelines state that in order for a proposed development to have a noticeable impact on the VSC of an existing window, the value needs to both drop below the stated target value of 27% and be reduced by more than 20% of the existing value.

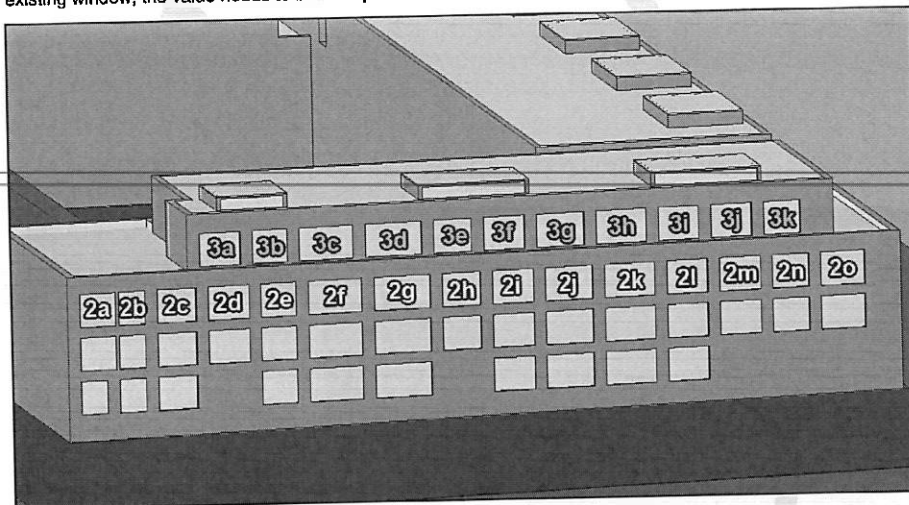


Image of Greystones Harbour Apartment Block with assessed windows highlighted.



Aerial view of assessed location.

Results

APSH - Annual Probable Sunlight Hours Block E, Marina Village

Window Number	Annual APSH				Winter APSH				Level of Impact
	Baseline Annual APSH	Applied Annual APSH Target Value*	Proposed Annual APSH	% of Target Annual APSH Achieved	Baseline Winter APSH	Applied Annual APSH Target Value*	Proposed Winter APSH	% of Target Winter APSH Achieved	
Ground Floor									
Ga	77.5%	25.0%	72.8%	>100%	80.5%	5.0%	68.2%	>100%	Imperceptible
Gb	78.2%	25.0%	73.5%	>100%	82.3%	5.0%	70.0%	>100%	Imperceptible
Gc	78.8%	25.0%	74.1%	>100%	83.8%	5.0%	71.5%	>100%	Imperceptible
Gd	79.8%	25.0%	75.3%	>100%	86.1%	5.0%	74.5%	>100%	Imperceptible
Ge	80.1%	25.0%	75.9%	>100%	86.9%	5.0%	75.8%	>100%	Imperceptible
Gf	80.4%	25.0%	76.5%	>100%	87.7%	5.0%	77.5%	>100%	Imperceptible
Gg	80.8%	25.0%	77.6%	>100%	88.6%	5.0%	80.3%	>100%	Imperceptible
Gh	81.0%	25.0%	78.2%	>100%	89.0%	5.0%	81.7%	>100%	Imperceptible
Gi	81.1%	25.0%	78.8%	>100%	89.3%	5.0%	83.3%	>100%	Imperceptible
Gj	81.2%	25.0%	79.5%	>100%	89.5%	5.0%	84.9%	>100%	Imperceptible
First Floor									
1a	80.6%	25.0%	77.5%	>100%	87.9%	5.0%	80.0%	>100%	Imperceptible
1b	80.8%	25.0%	77.8%	>100%	88.5%	5.0%	80.7%	>100%	Imperceptible
1c	81.1%	25.0%	78.1%	>100%	89.1%	5.0%	81.6%	>100%	Imperceptible
1d	81.3%	25.0%	78.4%	>100%	89.6%	5.0%	82.4%	>100%	Imperceptible
1e	81.4%	25.0%	78.7%	>100%	90.0%	5.0%	83.2%	>100%	Imperceptible
1f	81.6%	25.0%	79.1%	>100%	90.4%	5.0%	84.0%	>100%	Imperceptible
1g	81.7%	25.0%	79.4%	>100%	90.7%	5.0%	84.9%	>100%	Imperceptible
1h	81.8%	25.0%	79.8%	>100%	91.0%	5.0%	85.8%	>100%	Imperceptible
1i	81.9%	25.0%	80.1%	>100%	91.2%	5.0%	86.6%	>100%	Imperceptible
1j	82.0%	25.0%	80.5%	>100%	91.4%	5.0%	87.6%	>100%	Imperceptible
1k	82.1%	25.0%	80.9%	>100%	91.5%	5.0%	88.6%	>100%	Imperceptible
1l	82.1%	25.0%	81.4%	>100%	91.7%	5.0%	89.7%	>100%	Imperceptible
1m	82.2%	25.0%	81.8%	>100%	91.8%	5.0%	90.8%	>100%	Imperceptible
1n	82.2%	25.0%	82.1%	>100%	91.9%	5.0%	91.5%	>100%	Imperceptible
1o	82.3%	25.0%	82.3%	>100%	92.0%	5.0%	92.0%	>100%	Imperceptible

the BRE guidelines state that in order for a proposed development to have a positive impact on the environment, it must be able to demonstrate that it will be able to meet the BRE guidelines.

*The BRE guidelines state that in order for a proposed development to have a noticeable impact on the APSH of an existing window, the value needs to both drop below the stated target value of 25% (annual) / 5% (winter) and be reduced by more than 20% of the baseline value and it has to have a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.

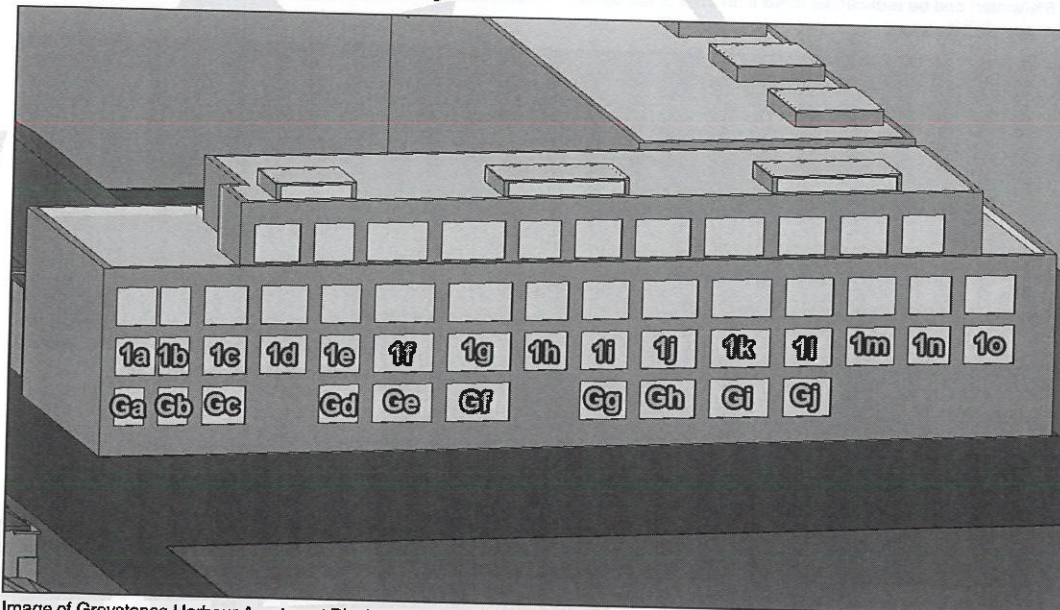


Image of Greystones Harbour Apartment Block with assessed windows highlighted.



Aerial view of assessed location.



Results

APSH - Annual Probable Sunlight Hours Block E, Marina Village

Block E, Marina Village

Window Number	Annual APSH				Winter APSH				Level of Impact
	Baseline Annual APSH	Applied Annual APSH Target Value*	Proposed Annual APSH	% of Target Annual APSH Achieved	Baseline Winter APSH	Applied Annual APSH Target Value*	Proposed Winter APSH	% of Target Winter APSH Achieved	
Second Floor									
2a	82.2%	25.0%	80.6%	>100%	92.0%	5.0%	88.1%	>100%	Imperceptible
2b	82.3%	25.0%	80.7%	>100%	92.2%	5.0%	88.3%	>100%	Imperceptible
2c	82.3%	25.0%	80.9%	>100%	92.3%	5.0%	88.7%	>100%	Imperceptible
2d	82.4%	25.0%	81.0%	>100%	92.5%	5.0%	89.0%	>100%	Imperceptible
2e	82.5%	25.0%	81.2%	>100%	92.7%	5.0%	89.4%	>100%	Imperceptible
2f	82.5%	25.0%	81.3%	>100%	92.7%	5.0%	89.7%	>100%	Imperceptible
2g	82.5%	25.0%	81.5%	>100%	92.8%	5.0%	90.2%	>100%	Imperceptible
2h	82.6%	25.0%	81.7%	>100%	92.8%	5.0%	90.6%	>100%	Imperceptible
2i	82.6%	25.0%	81.8%	>100%	92.8%	5.0%	90.9%	>100%	Imperceptible
2j	82.6%	25.0%	82.0%	>100%	92.9%	5.0%	91.4%	>100%	Imperceptible
2k	82.6%	25.0%	82.3%	>100%	92.9%	5.0%	92.0%	>100%	Imperceptible
2l	82.6%	25.0%	82.5%	>100%	92.8%	5.0%	92.6%	>100%	Imperceptible
2m	82.6%	25.0%	82.6%	>100%	92.9%	5.0%	92.9%	>100%	Imperceptible
2n	82.6%	25.0%	82.6%	>100%	92.9%	5.0%	92.9%	>100%	Imperceptible
2o	82.6%	25.0%	82.6%	>100%	92.9%	5.0%	92.9%	>100%	Imperceptible
Third floor									
3a	82.7%	25.0%	82.4%	>100%	93.2%	5.0%	92.5%	>100%	Imperceptible
3b	82.7%	25.0%	82.4%	>100%	93.2%	5.0%	92.5%	>100%	Imperceptible
3c	82.7%	25.0%	82.5%	>100%	93.3%	5.0%	92.7%	>100%	Imperceptible
3d	82.7%	25.0%	82.5%	>100%	93.2%	5.0%	92.7%	>100%	Imperceptible
3e	82.7%	25.0%	82.6%	>100%	93.2%	5.0%	92.9%	>100%	Imperceptible
3f	82.7%	25.0%	82.6%	>100%	93.2%	5.0%	93.0%	>100%	Imperceptible
3g	82.7%	25.0%	82.7%	>100%	93.2%	5.0%	93.1%	>100%	Imperceptible
3h	82.7%	25.0%	82.7%	>100%	93.2%	5.0%	93.2%	>100%	Imperceptible
3i	82.8%	25.0%	82.8%	>100%	93.2%	5.0%	93.2%	>100%	Imperceptible
3j	82.8%	25.0%	82.8%	>100%	93.2%	5.0%	93.2%	>100%	Imperceptible
3k	82.6%	25.0%	82.8%	>100%	93.1%	5.0%	93.2%	>100%	Imperceptible

*The BRE guidelines state that in order for a proposed development to have a noticeable impact on the APSH of an existing window, the value needs to both drop below the stated target value of 25% (annual) / 5% (winter) and be reduced by more than 20% of the baseline value and it has to have a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.

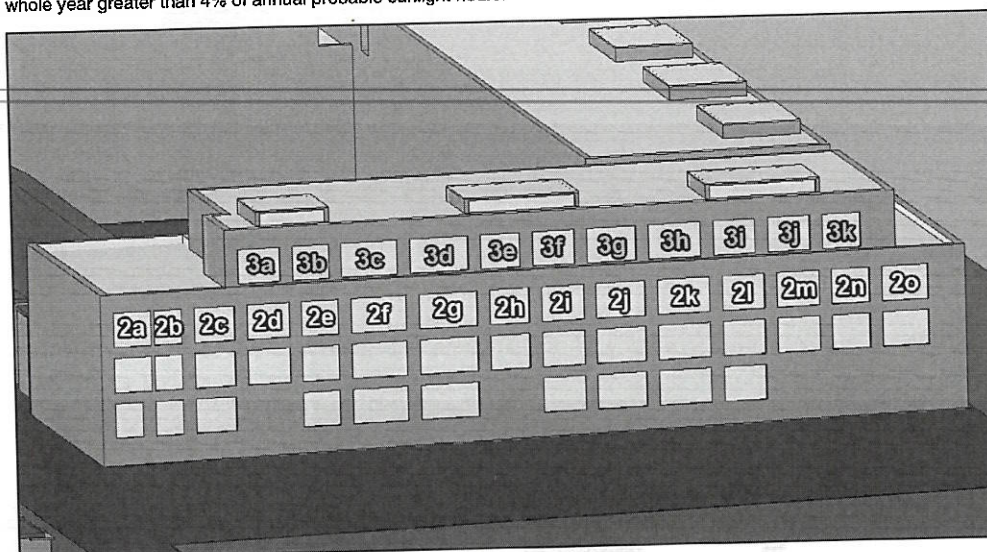
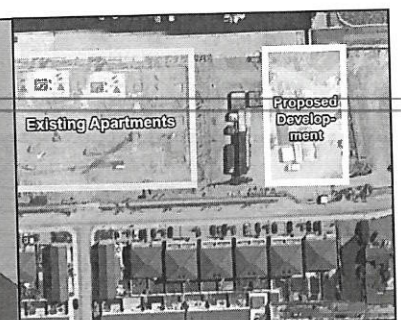


Image of Greystones Harbour Apartment Block with assessed windows highlighted.



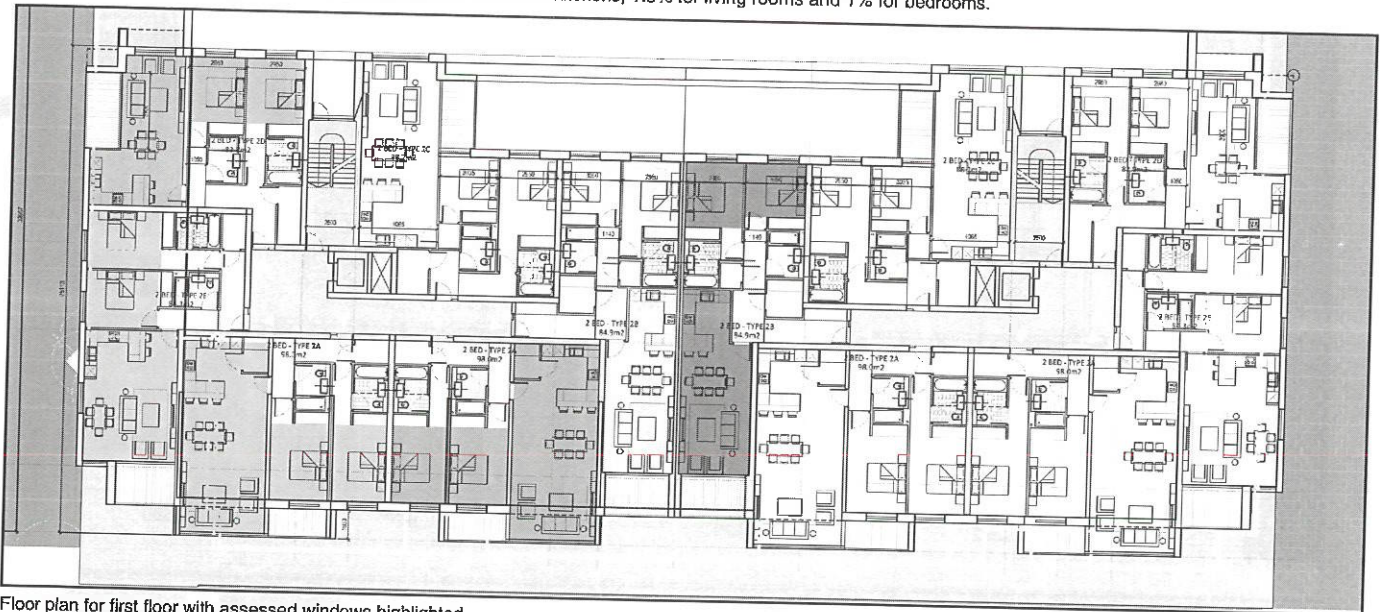
Aerial view of assessed location.

Results

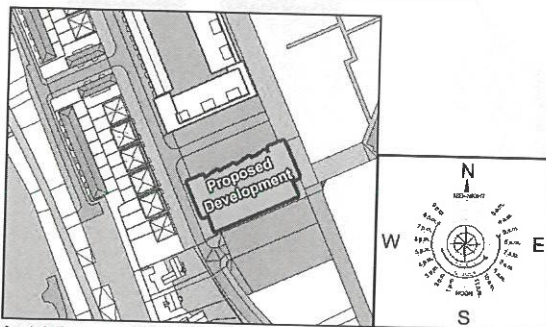
ADF- Average Daylight Factor First Floor Habitable Rooms

Room Number	Room Description	Target ADF	ADF	% of Target Value Achieved	Meets BRE Guidelines [^]
First Floor					
Unit 0101	LKD	2.0%	7.45%	>100%	Yes
Unit 0101	Bedroom 1	1.0%	6.59%	>100%	Yes
Unit 0101	Bedroom 2	1.0%	6.83%	>100%	Yes
Unit 0102	LKD	2.0%	4.38%	>100%	Yes
Unit 0102	Bedroom 1	1.0%	6.98%	>100%	Yes
Unit 0102	Bedroom 2	1.0%	6.65%	>100%	Yes
Unit 0103	LKD	2.0%	7.00%	>100%	Yes
Unit 0103	Bedroom 1	1.0%	3.18%	>100%	Yes
Unit 0103	Bedroom 2	1.0%	5.93%	>100%	Yes
Unit 0104	LKD	2.0%	6.99%	>100%	Yes
Unit 0104	Bedroom 1	1.0%	5.08%	>100%	Yes
Unit 0104	Bedroom 2	1.0%	3.15%	>100%	Yes
Unit 0105	LKD	2.0%	2.16%	>100%	Yes
Unit 0105	Bedroom 1	1.0%	5.63%	>100%	Yes
Unit 0105	Bedroom 2	1.0%	6.51%	>100%	Yes
Unit 0106	LKD	2.0%	2.17%	>100%	Yes
Unit 0106	Bedroom 1	1.0%	5.64%	>100%	Yes
Unit 0106	Bedroom 2	1.0%	6.47%	>100%	Yes

[^]BS 8206-2 Code of practice for daylighting, recommends an ADF of 5% for a well day-lit space and 2% for a partly day-lit space. Below 2% the room will look dull and electric lighting is likely to be turned on.
In housing BS 8206-2 also gives minimum values of ADF of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms.



Floor plan for first floor with assessed windows highlighted.



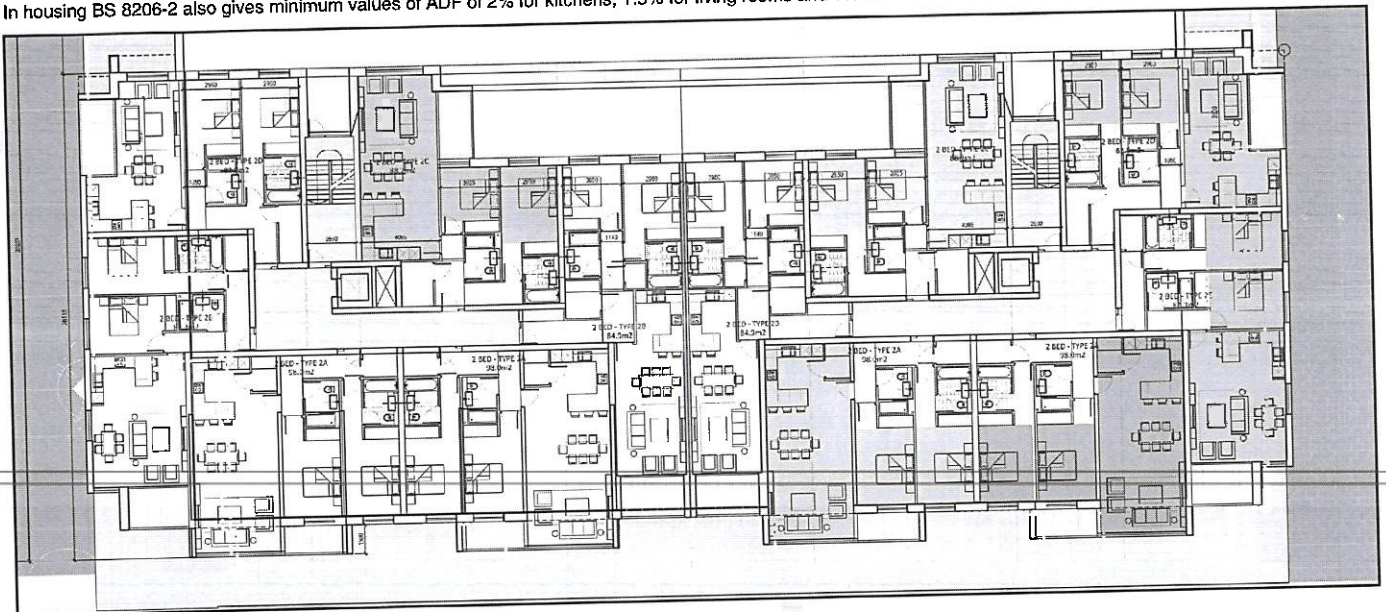
Aerial view of assessed location.

Results

ADF- Average Daylight Factor First Floor Habitable Rooms

Room Number	Room Description	Target ADF	ADF	% of Target Value Achieved	Meets BRE Guidelines [^]
First Floor					
Unit 0107	LKD	2.0%	7.07%	>100%	Yes
Unit 0107	Bedroom 1	1.0%	3.23%	>100%	Yes
Unit 0107	Bedroom 2	1.0%	4.75%	>100%	Yes
Unit 0108	LKD	2.0%	7.09%	>100%	Yes
Unit 0108	Bedroom 1	1.0%	3.16%	>100%	Yes
Unit 0108	Bedroom 2	1.0%	5.80%	>100%	Yes
Unit 0109	LKD	2.0%	5.19%	>100%	Yes
Unit 0109	Bedroom 1	1.0%	7.54%	>100%	Yes
Unit 0109	Bedroom 2	1.0%	7.33%	>100%	Yes
Unit 0110	LKD	2.0%	8.12%	>100%	Yes
Unit 0110	Bedroom 1	1.0%	7.01%	>100%	Yes
Unit 0110	Bedroom 2	1.0%	6.35%	>100%	Yes
Unit 0111	LKD	2.0%	6.26%	>100%	Yes
Unit 0111	Bedroom 1	1.0%	4.44%	>100%	Yes
Unit 0111	Bedroom 2	1.0%	2.33%	>100%	Yes
Unit 0112	LKD	2.0%	6.35%	>100%	Yes
Unit 0112	Bedroom 1	1.0%	4.48%	>100%	Yes
Unit 0112	Bedroom 2	1.0%	2.36%	>100%	Yes

[^]BS 8206-2 Code of practice for daylighting, recommends an ADF of 5% for a well day-lit space and 2% for a partly day-lit space. Below 2% the room will look dull and electric lighting is likely to be turned on.
In housing BS 8206-2 also gives minimum values of ADF of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms.



Floor plan for first floor with assessed windows highlighted.



Aerial view of assessed location.



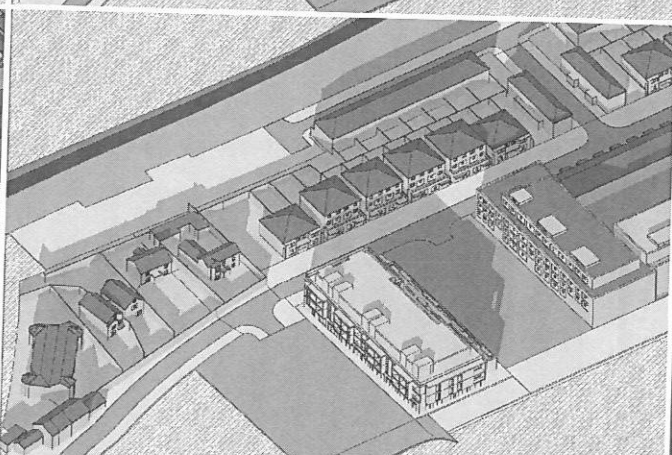
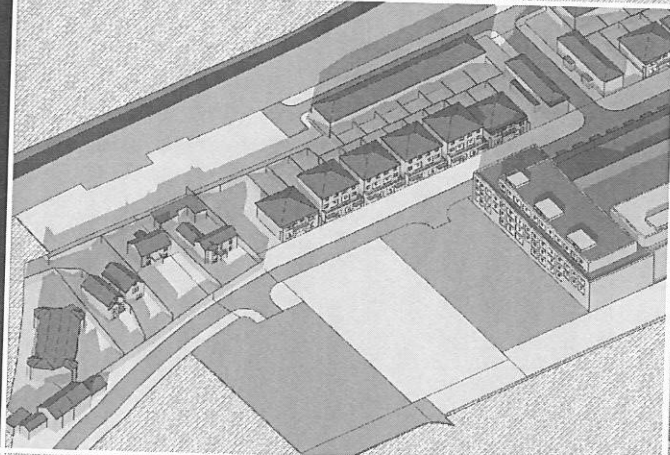
Baseline

Proposed

March 21st 7:00



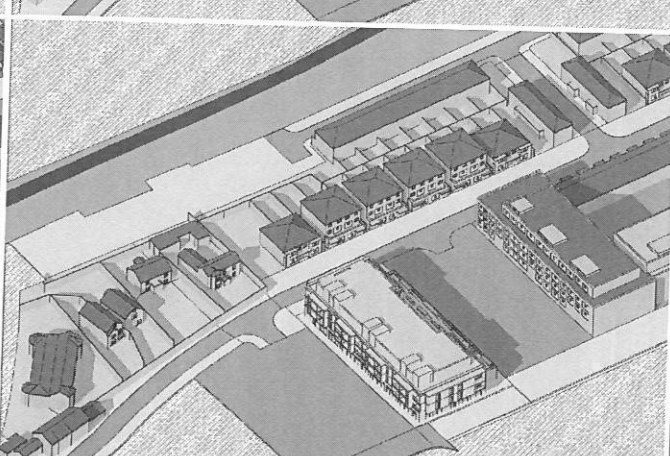
March 21st 8:00



March 21st 9:00



March 21st 10:00



Project Title:
Proposed Block D
at Greystones Marina Village

Shadow study by



March 21st

Sunrise 6:25 | Sunset 18:40

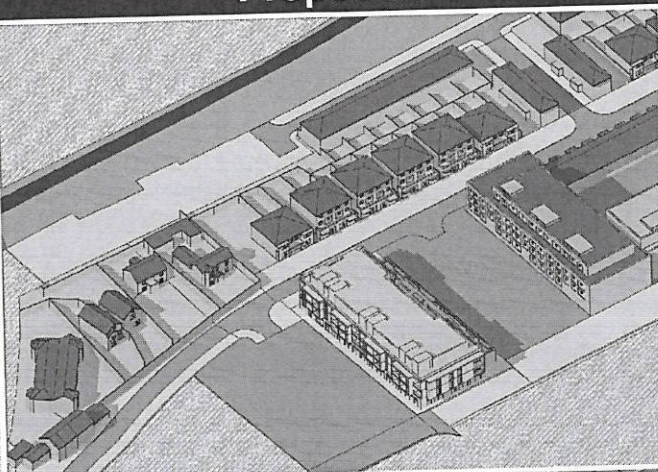
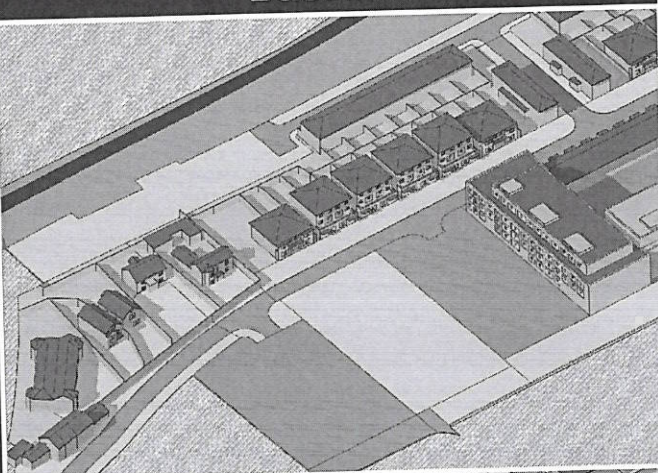
Tel: 01 288 0186
www.3ddesignbureau.com
info@3ddesignbureau.com



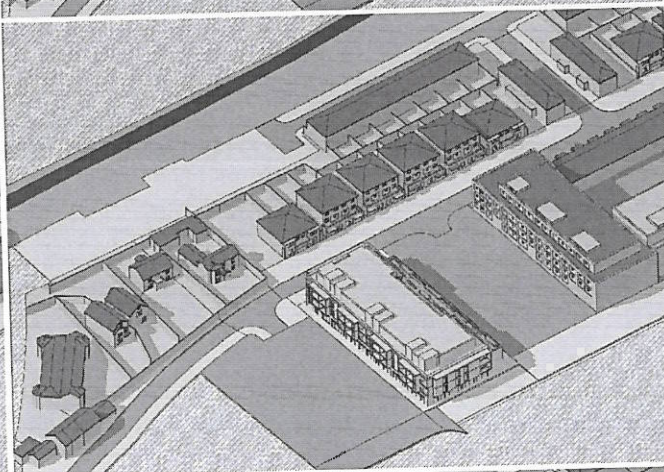
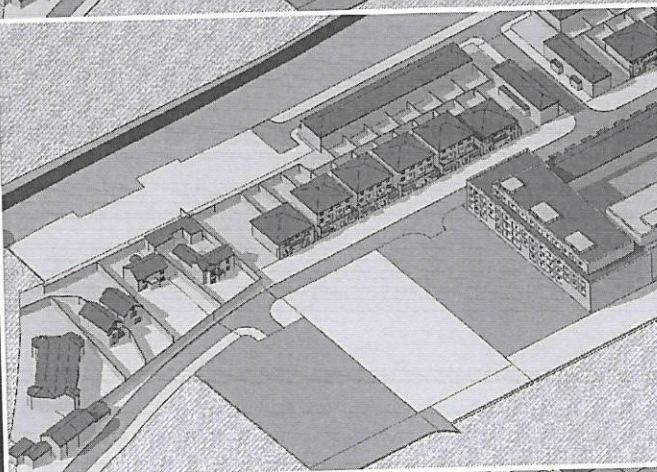
Baseline

Proposed

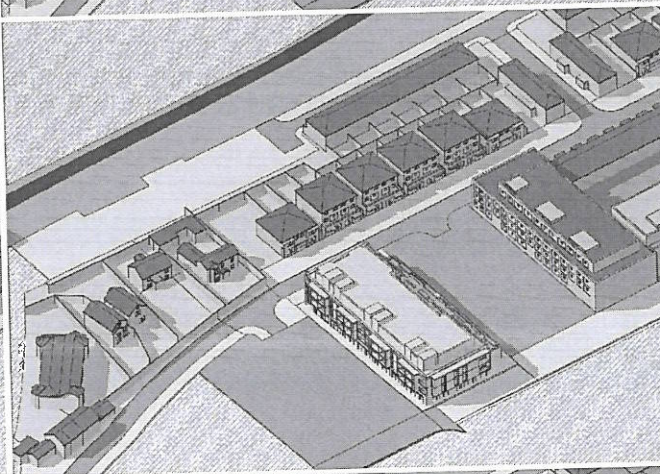
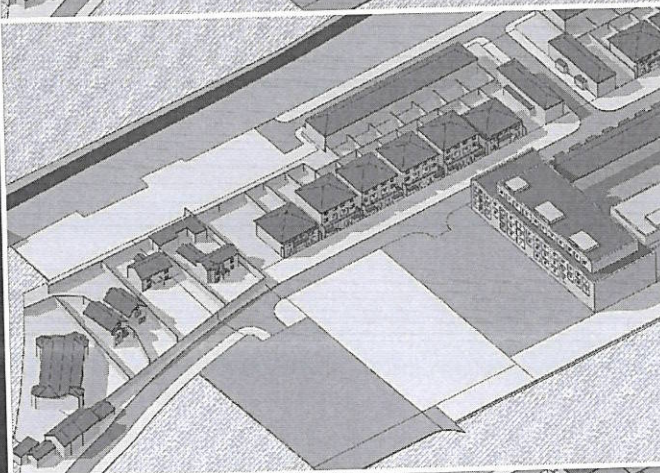
March 21st 11:00



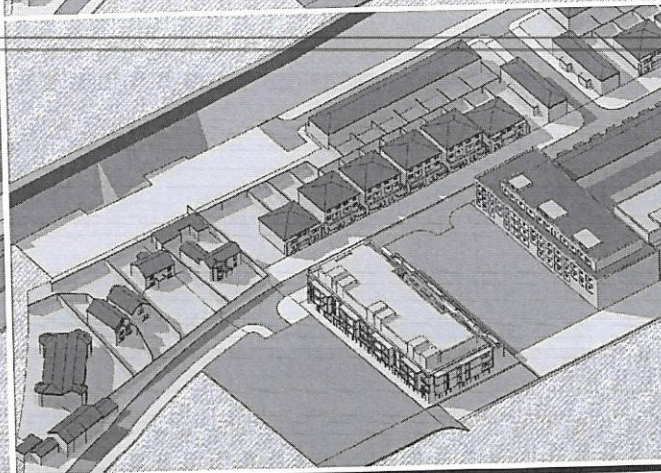
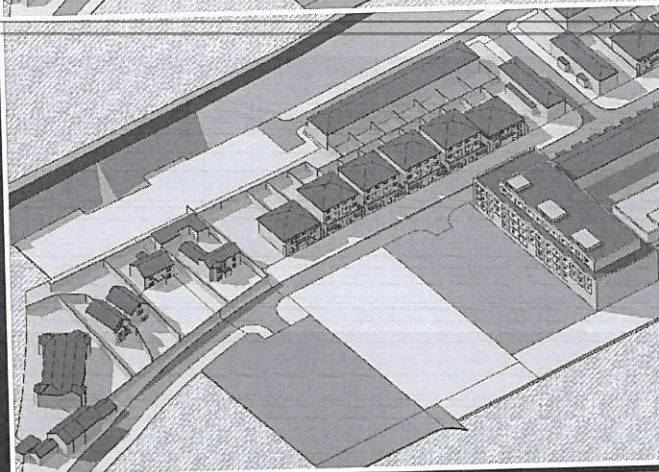
March 21st 12:00



March 21st 13:00



March 21st 14:00



Project Title:
Proposed Block D
at Greystones Marina Village

Shadow study by



**3D DESIGN
BUREAU**

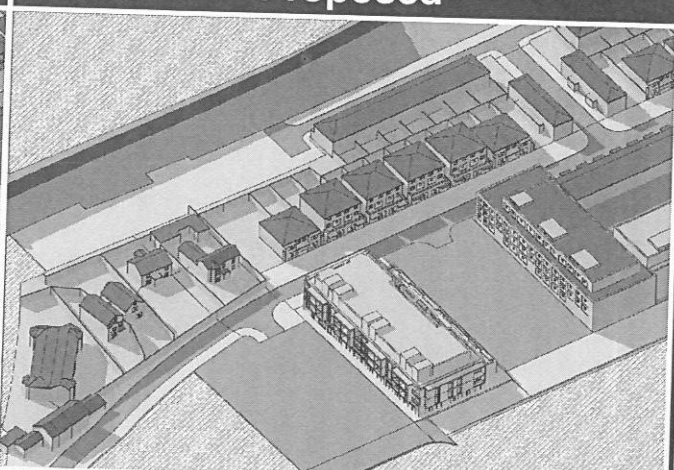
March 21st
Sunrise 6:25 | Sunset 18:40
Tel: 01 288 0186
www.3ddesignbureau.com
info@3ddesignbureau.com



Baseline

Proposed

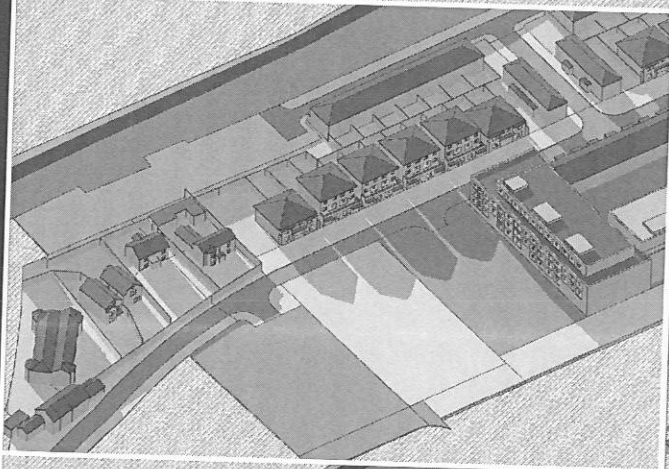
March 21st 15:00



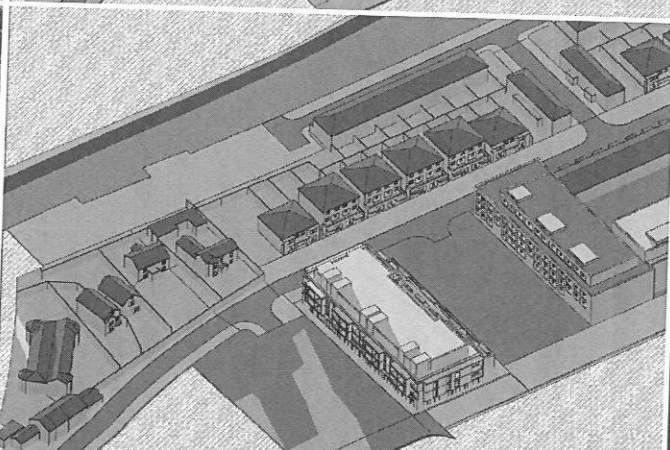
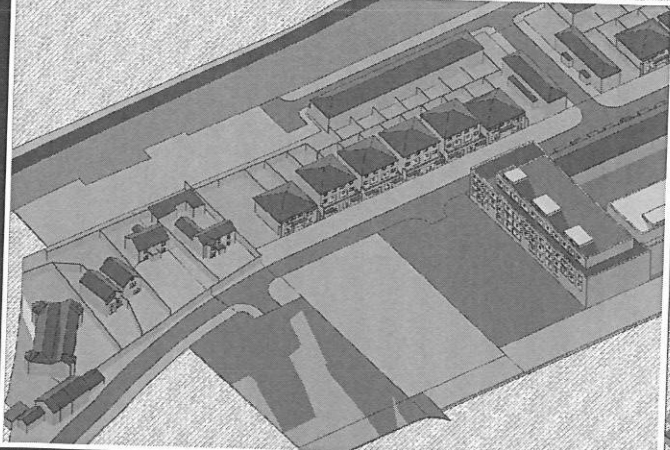
March 21st 16:00



March 21st 17:00



March 21st 18:00



Project Title:
Proposed Block D
at Greystones Marina Village

Shadow study by



Tel: 01 288 0186
www.3ddesignbureau.com
info@3ddesignbureau.com

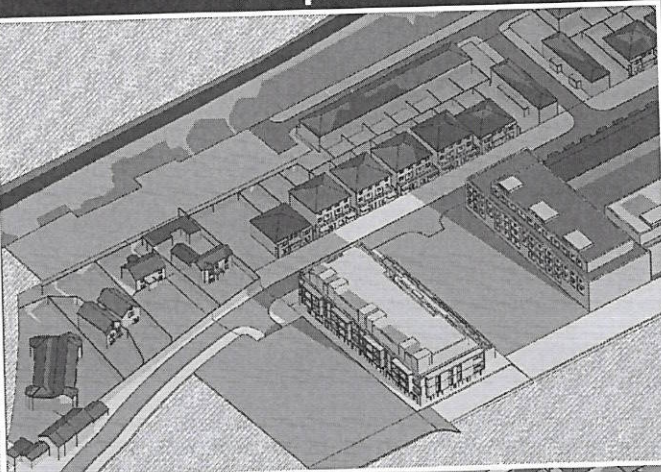
March 21st
Sunrise 6:25 | Sunset 18:40

z

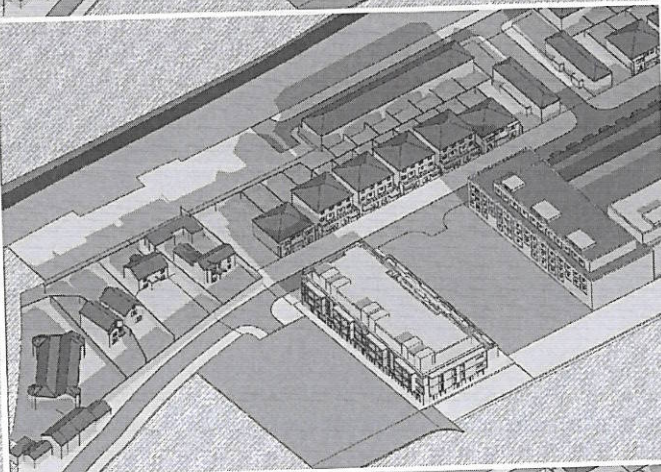
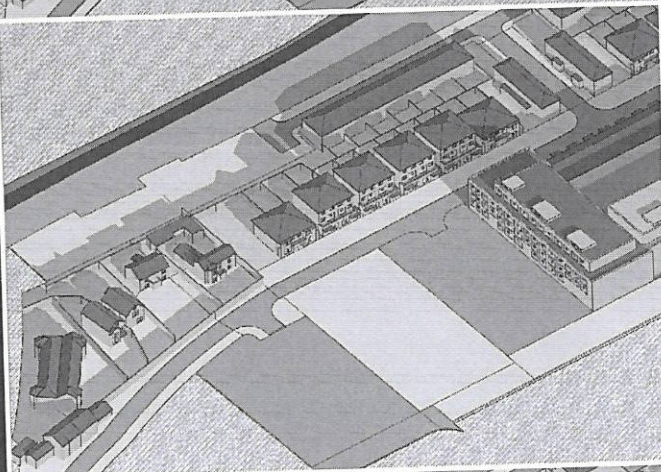
Baseline

Proposed

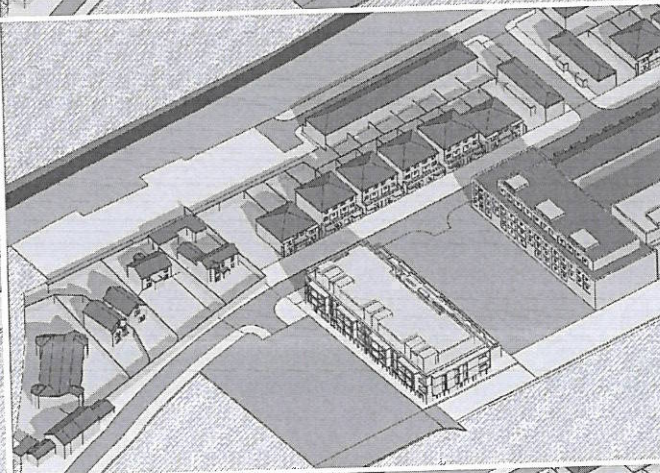
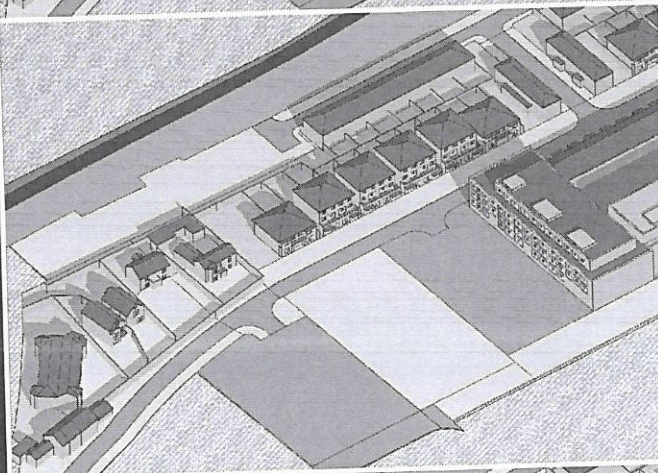
June 21st 6:00



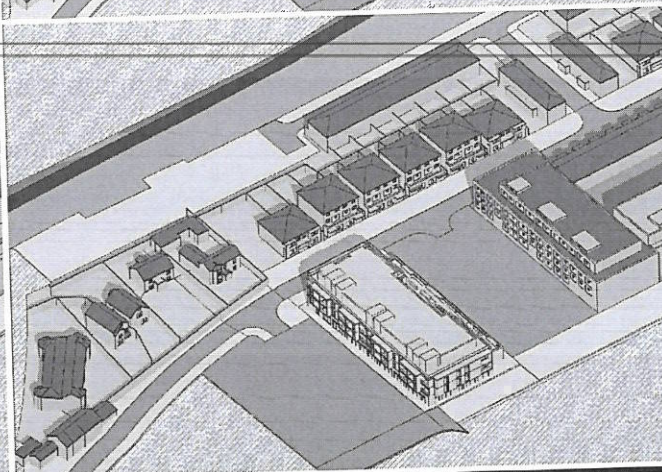
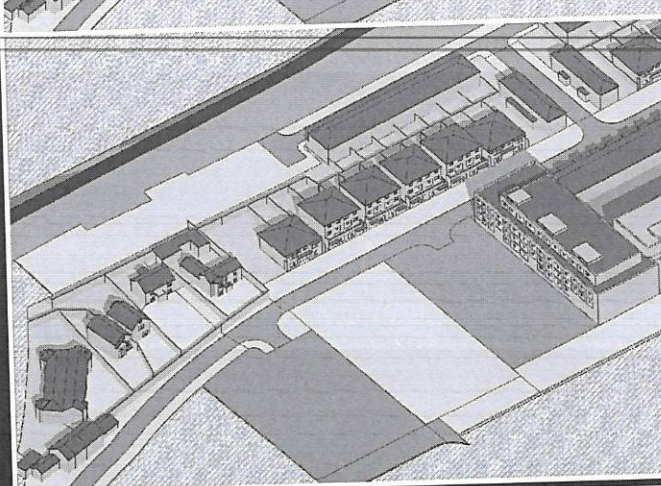
June 21st 7:00



June 21st 8:00



June 21st 9:00



Project Title:
Proposed Block D
at Greystones Marina Village

Shadow study by



**3D DESIGN
BUREAU**

Tel: 01 258 0186
www.3ddesignbureau.com
info@3ddesignbureau.com

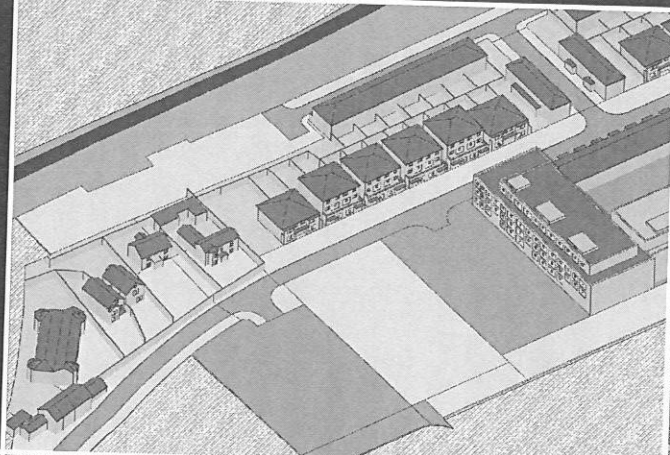
June 21st
Sunrise 4:57 | Sunset 21:57

z ➤

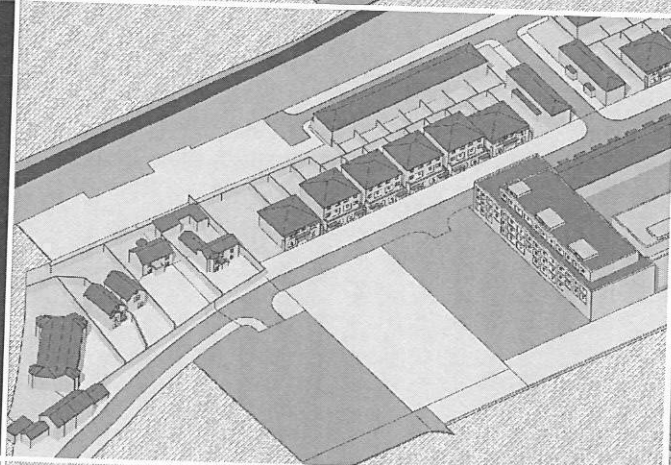
Baseline

Proposed

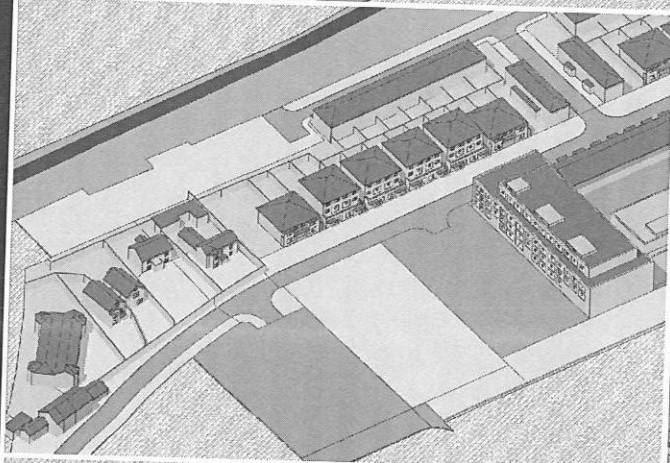
June 21st 10:00



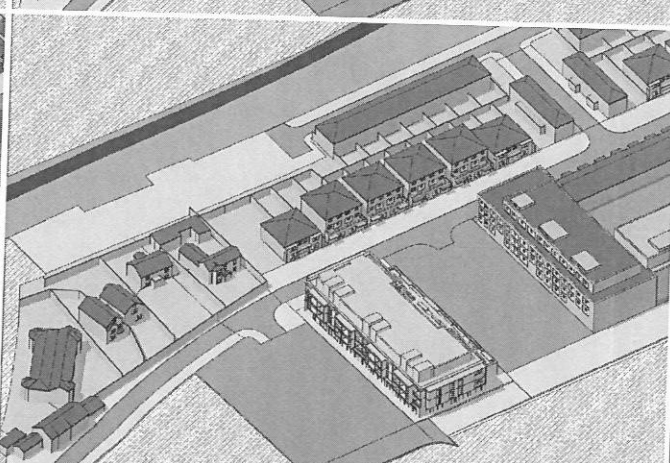
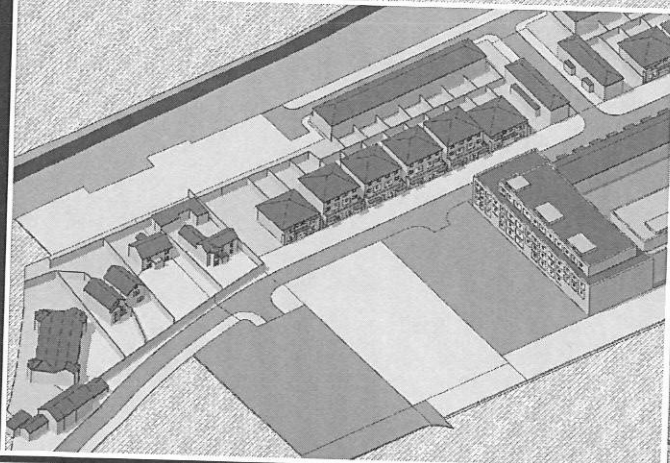
June 21st 11:00



June 21st 12:00



June 21st 13:00



Project Title:
Proposed Block D
at Greystones Marina Village

June 21st
Sunrise 4:57 | Sunset 21:57

Shadow study by



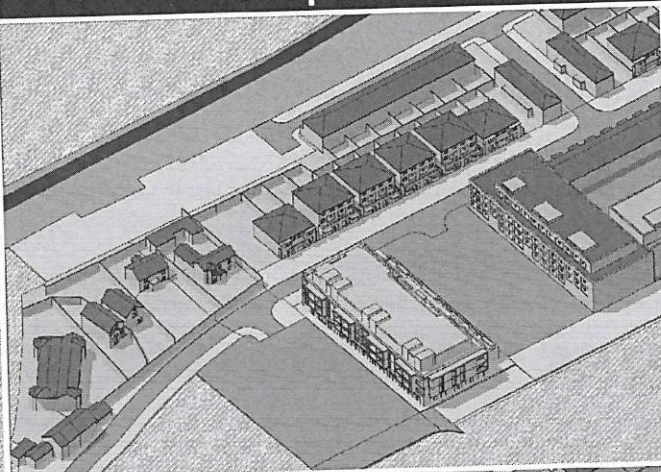
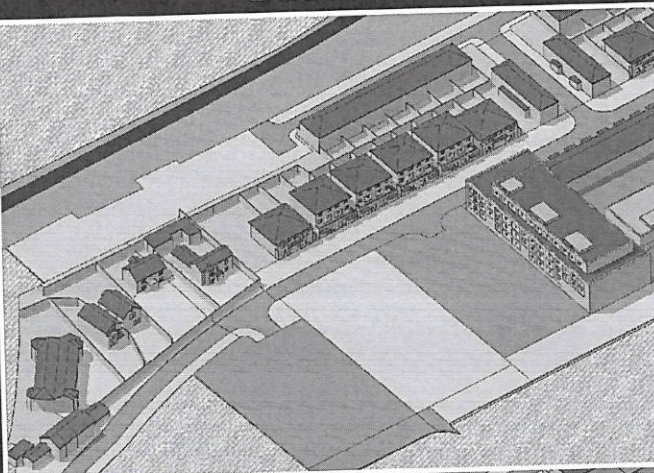
Tel: 01 288 0186
www.3ddesignbureau.com
info@3ddesignbureau.com



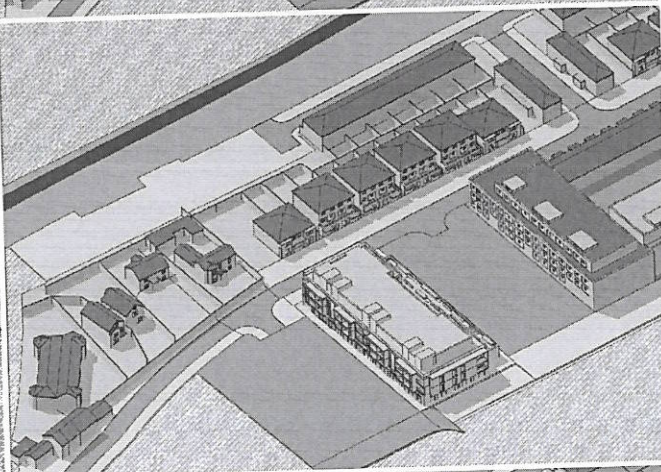
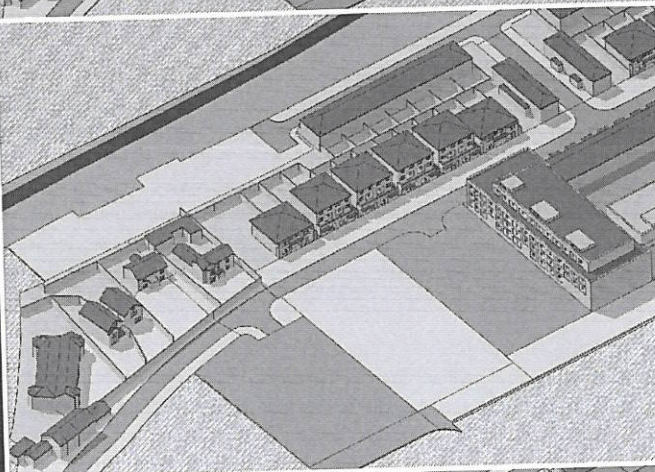
Baseline

Proposed

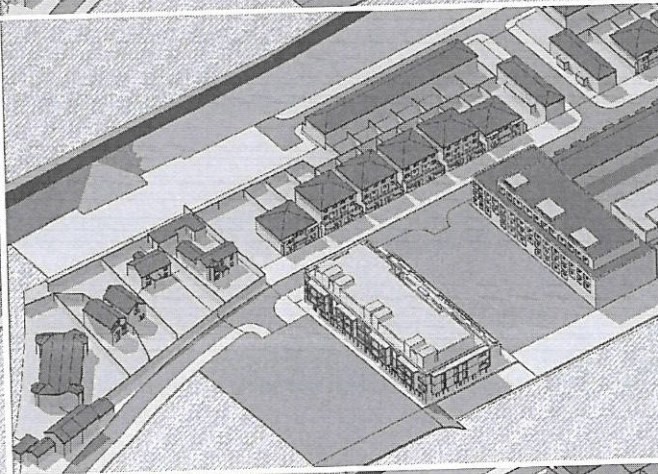
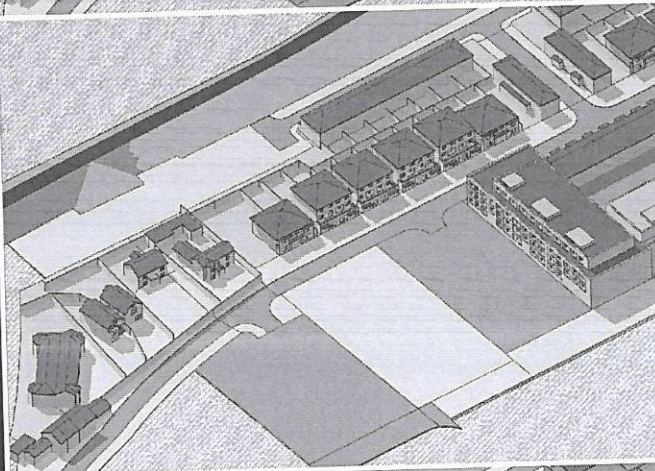
June 21st 14:00



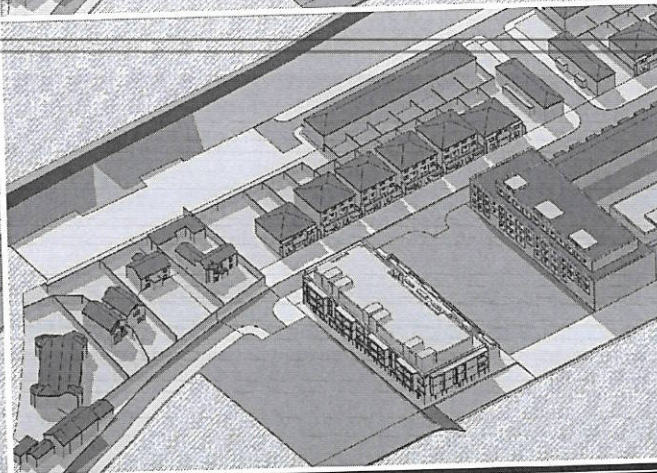
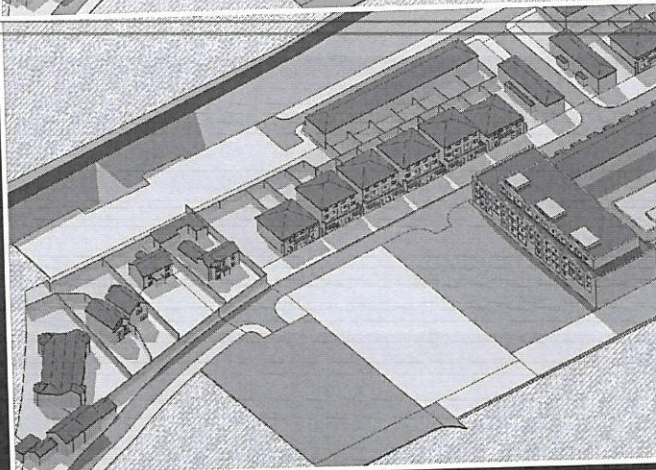
June 21st 15:00



June 21st 16:00



June 21st 17:00



Project Title:
Proposed Block D
at Greystones Marina Village

Shadow study by



**3D DESIGN
BUREAU**

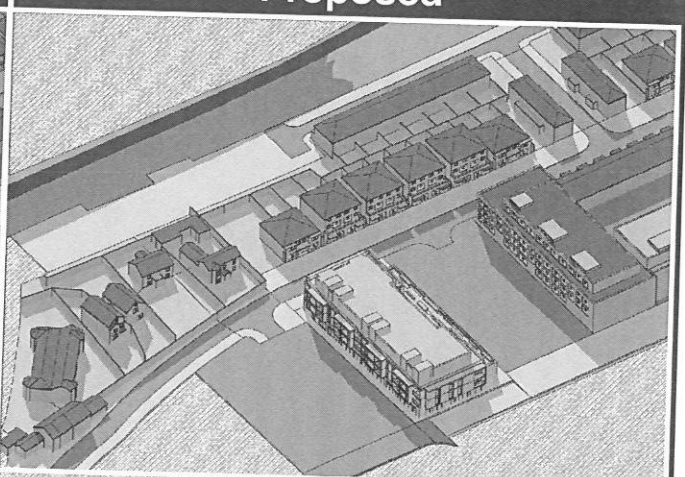
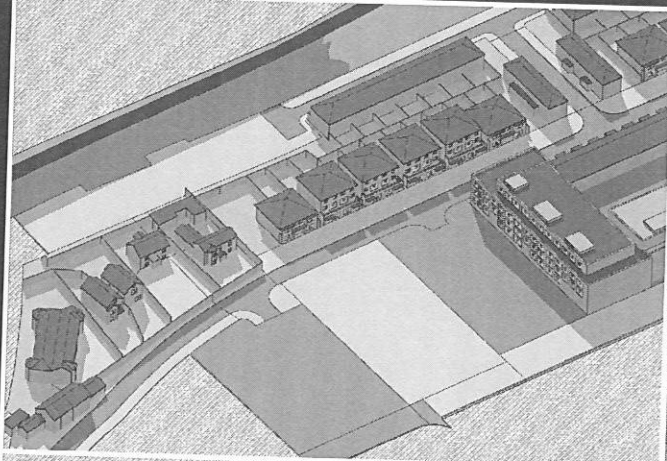
June 21st
Sunrise 4:57 | Sunset 21:57
Tel: 01 288 0186
www.3ddesignbureau.com
info@3ddesignbureau.com

z ➤

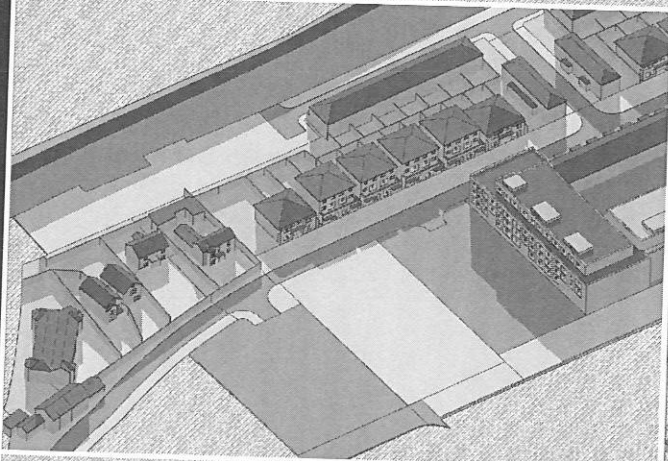
Baseline

Proposed

June 21st 18:00



June 21st 19:00



June 21st 20:00



June 21st 21:00



Project Title:
Proposed Block D
at Greystones Marina Village

Shadow study by



June 21st
Sunrise 4:57 | Sunset 21:57

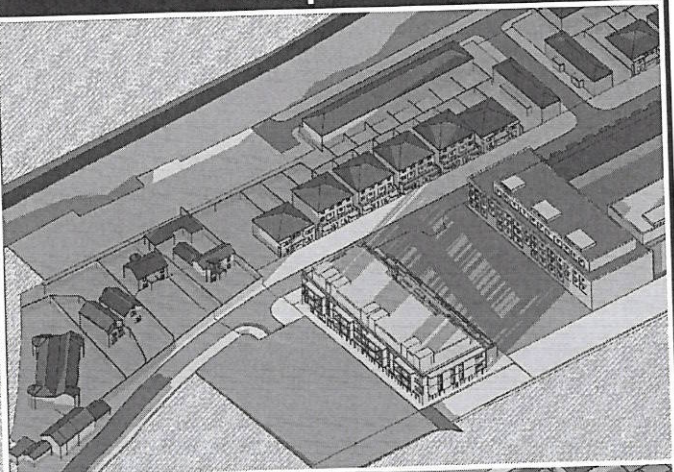
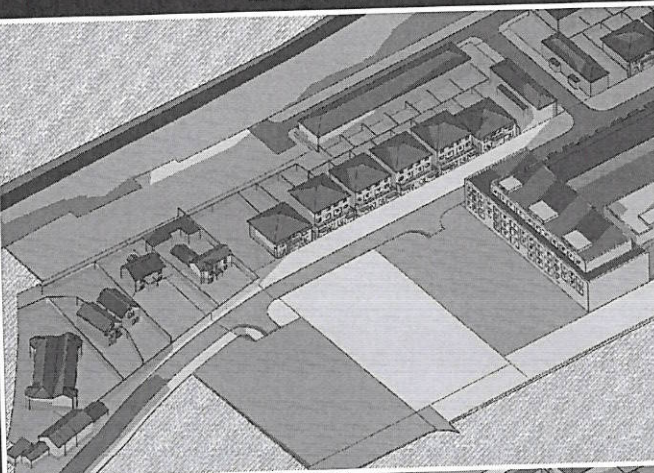
Tel: 01 288 0186
www.3ddesignbureau.com
info@3ddesignbureau.com



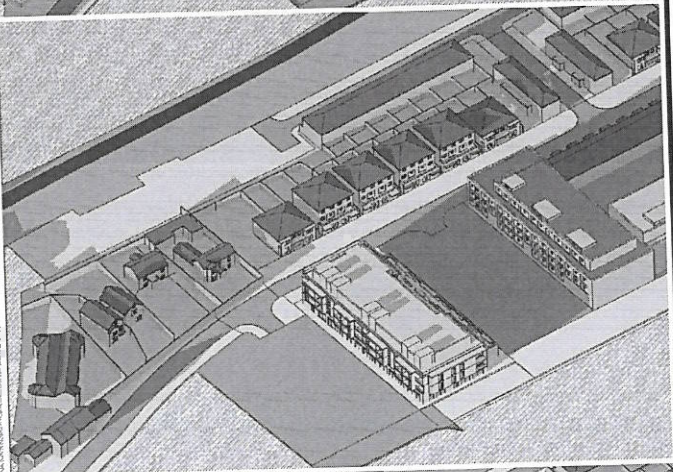
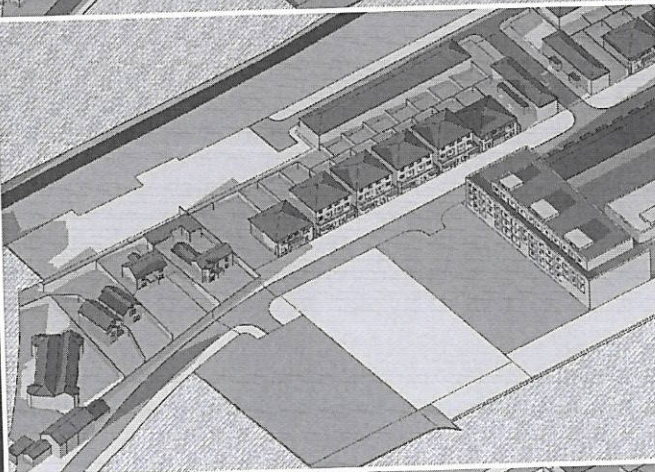
Baseline

Proposed

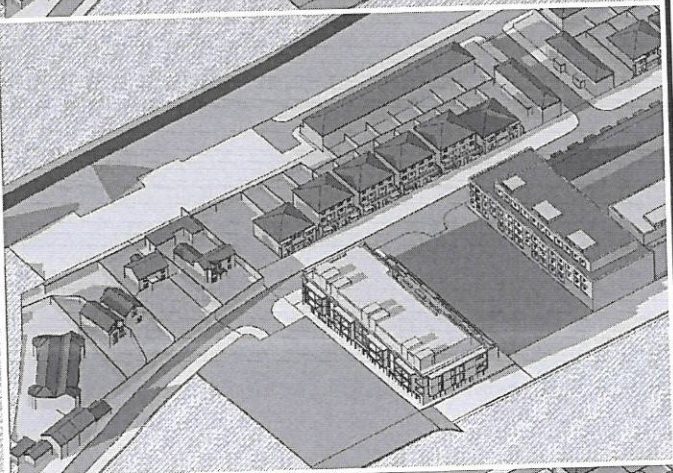
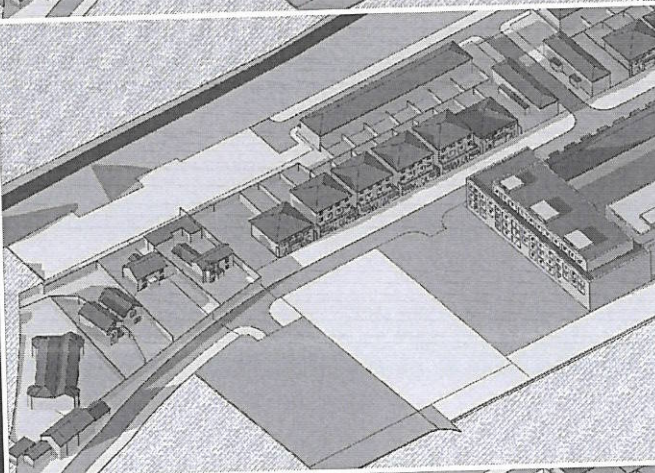
December 21st 9:00



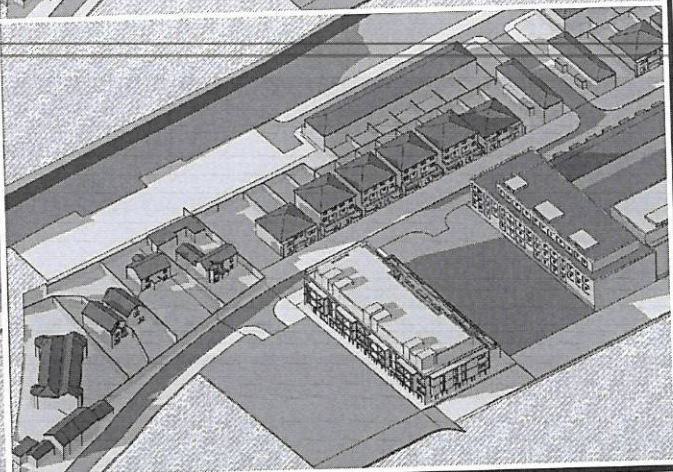
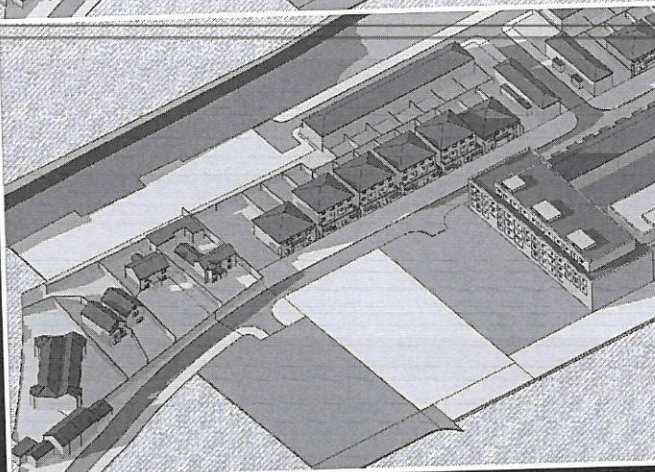
December 21st 10:00



December 21st 11:00



December 21st 12:00



Project Title:
Proposed Block D
at Greystones Marina Village

Shadow study by



**3D DESIGN
BUREAU**

Tel: 01 288 0185
www.3ddesignbureau.com
info@3ddesignbureau.com

December 21st

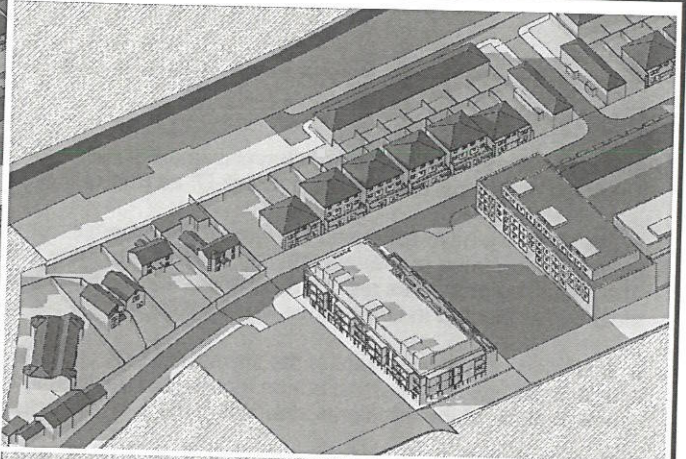
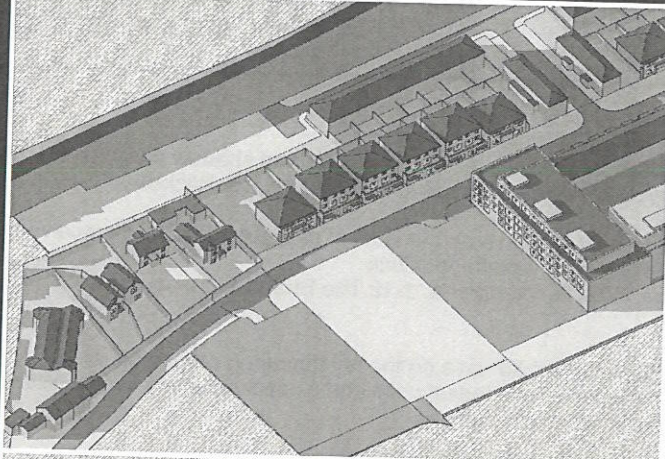
Sunrise 8:38 | Sunset 16:08

z ➤

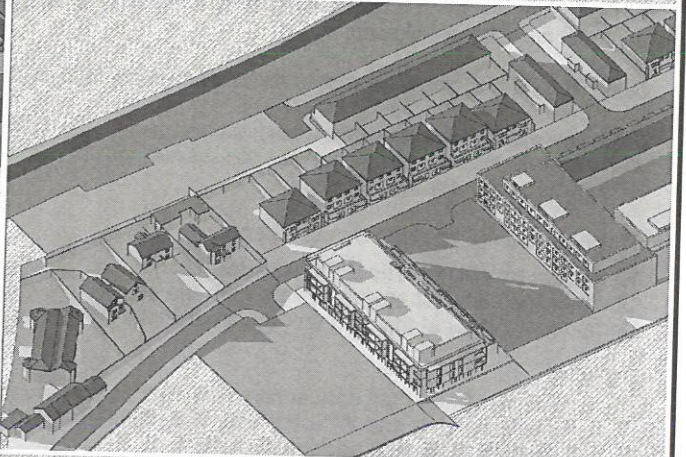
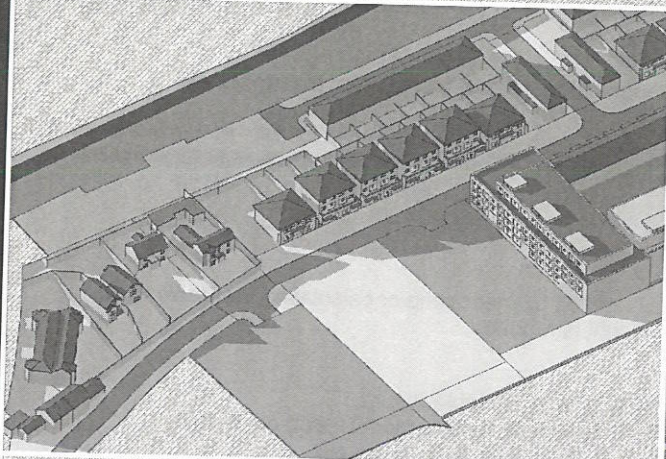
Baseline

Proposed

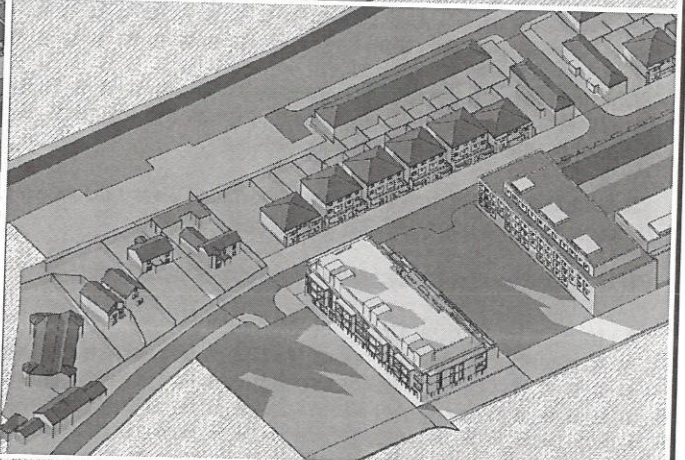
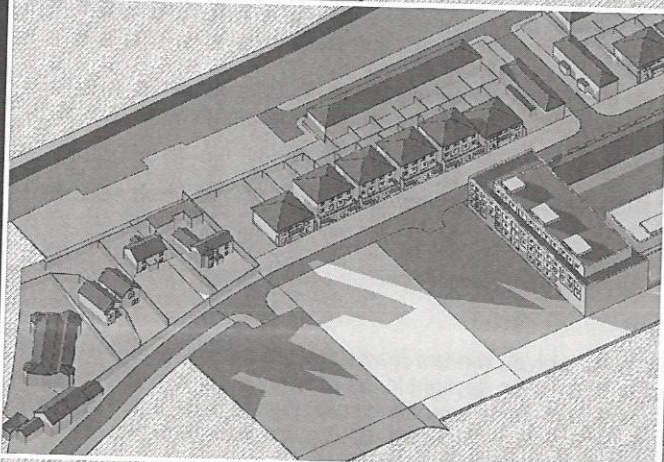
December 21st 13:00



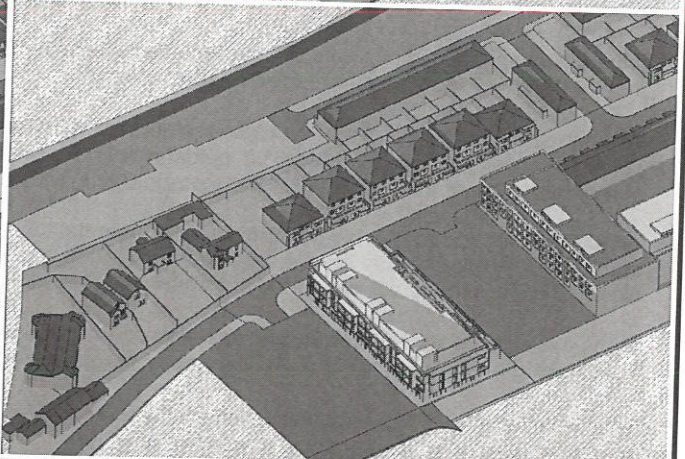
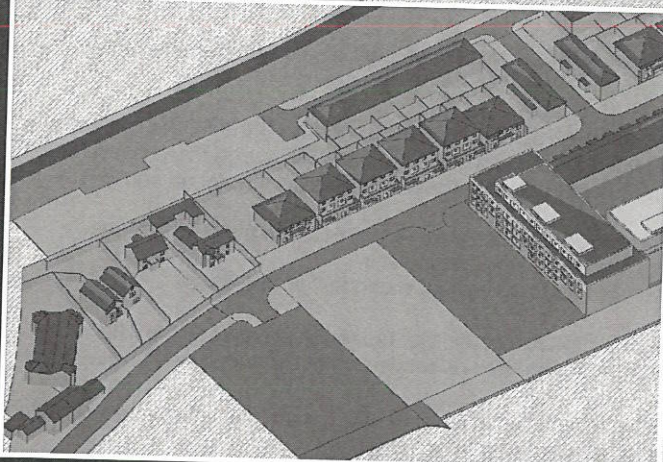
December 21st 14:00



December 21st 15:00



December 21st 16:00



Project Title:
Proposed Block D
at Greystones Marina Village

Shadow study by



December 21st
Sunrise 8:38 | Sunset 16:08

Tel: 01 288 0186
www.3ddesignbureau.com
info@3ddesignbureau.com



Summary

3D Design Bureau (3DDB) were commissioned to carry out a daylight analysis, sunlight analysis and shadow study for the proposed residential development "Block D" as part of the Greystones Marina Village in Greystones, Co. Wicklow.

In this study we have assessed the impact the proposed development will have on the level of daylight and sunlight received by the neighbouring properties that are in close proximity to the proposed apartment block. The assessed properties are: Harbour View, Yanchep, Glencoe, Alberta, Yarrayarra, 1-12 The Strand & the south facing elevation of Block E in Greystones Marina Village.

In addition to the assessment of the impact the proposed development would have on the neighbouring properties, an assessment has been carried out on the level of daylight in the proposed residential units and a shadows study to give visual representation of the additional shadowing the proposed development would cause.

For all target values of daylight and sunlight the 2011 BRE guidelines as set out in "Site layout planning for daylight and sunlight" have been followed.

Note: The BRE Guidelines should be treated as guidelines as opposed to rules, the document clearly states:

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

This analysis will be carried out in 3 parts:

1.) Impact to VSC (Vertical Sky Component)

Obstructions can limit access to light from the sky. This can be checked by measuring or calculating the Vertical Sky Component (VSC) at the centre of the lowest window where daylight is required.

If VSC is:

- At least 27%, then conventional window design will usually give reasonable results.
- Between 15% and 27%, then special measures (larger windows, changes to room layout) are usually needed to provide adequate daylight.
- Between 5% and 15%, then it is very difficult to provide adequate daylight unless very large windows are used.
- Less than 5%, then it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed.

When measuring the affect a proposed development will have on the VSC of an existing window, if the value drops below the 27% guideline and is less than 0.8 times the existing value, the proposed development could possibly have a noticeable impact on the amount of daylight received.

The impact to VSC has been assessed for 138 windows across the surrounding properties, 138 (100%) of which meet the criteria as set out in the BRE guidelines.

The results for the study on the impact to VSC caused by the proposed development can be seen on pages 06-12.

2.) Impact to Annual Probable Sunlight Hours. (APSH)

Annual probable sunlight hours (APSH) is a measure of sunlight that a given window may expect to receive over the period of a year. The BRE guidelines recognises that sunlight is less important than daylight in the amenity of a room and is heavily influenced by orientation. North facing windows may receive sunlight on only a handful of occasions in a year, and windows facing eastwards or westwards will only receive sunlight for some of the day. Therefore, BRE guidance states that only windows with an orientation within 90 degrees of due south need be assessed.

If the assessment 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 affect a proposed development will have on the APSH of an existing window, if the APSH value drops below the annual (25%) or winter (5%) guidelines and is both less than 0.8 times the baseline value and there is a reduction of more than 4% of the annual APSH, the proposed development could possibly have a noticeable impact on sunlight.

An assessment will be carried out to calculate the impact the proposed development would have on the APSH of the surrounding properties that have a south facing window looking towards the proposed site. No APSH assessment will be carried out on the windows that do not have an aspect within 90° of due south.

In the case of this study, there is only one elevation facing within 90° of due south that faces the proposed site. This is the south facing elevation of Block E in Greystones Marina Village which is located directly north of the proposed development.

The impact to APSH has been assessed for 54 windows on the adjacent Block E, all of which meet the criteria as set out in the BRE guidelines. The impact to the APSH of all of these windows would be Imperceptible.

The results of the study on APSH can be found on page 13-14.



Summary Cont'd

3.) Average Daylight Factor (ADF).

BS 8206-2 Code of practice for daylighting, recommends an ADF of 5% for a well day lit space and 2% for a partly daylight space. Below 2% the room will look dull and electric lighting is likely to be turned on. In terms of housing, BS 8206-2 also gives minimum values of ADF: 2% for Kitchens, 1.5% for living rooms and 1% for bedrooms.

This study has shown that the ADF in all of the habitable rooms across the first floor will receive adequate levels of daylight. The majority of the rooms have an ADF far in excess of 5% and would be considered to have excellent levels of daylight.

For definition of spaces and target values applied, please see the methodology section of this report on page 05.

The results for the study on ADF can be seen on pages 15-16.

Conclusion

The proposed development would result in an Imperceptible level of impact to the daylight and sunlight received by the surrounding properties.

Future occupants will enjoy excellent levels of daylight within the proposed apartment.

