



Wallwork Wainwright LLP

34 – 36 Crown Street, Reading

Proposed Residential Building

**Daylight, Sunlight and Overshadowing
Assessment**

September 2017

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1.0 Introduction

WYG Environment Planning Transport were commissioned by Wallwork Wainwright LLP, to undertake a Daylight, Sunlight and Overshadowing Assessment, to assess the impact of a new residential building, on land south of 34-36 Crown Street, Reading.

This assessment has been undertaken to review the existing access to daylight and sunlight in the vicinity of the site. Potential impacts have been assessed in accordance with BRE Guidance (Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice) and BS 8206-2:2008 (Lighting for Buildings, Part 2: Code of Practice for Daylighting). The assessment methodology and results are detailed in the following sections of the report.



2.0 Extant Policy, Legislation and Relevant Agencies

2.1 Documents Consulted

The following documents were consulted during the undertaking of this assessment:

- Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice, BRE, 2011; and,
- BS 8206-2: 2008 – Lighting for Buildings – Part 2: Code of Practice for Daylighting, British Standards Institute, 2008.
- National Planning Policy Framework, Office of the Deputy Prime Minister, 2012;
- National Planning Practice Guidance on Light Pollution, Department for Communities and Local Government, 6th March 2013;
- Reading Borough Council Draft Local Plan May 2017 .

2.2 Planning Guidance

The National Planning Practice Guidance web-based resource was launched by the Department for Communities and Local Government (DCLG) on 6 March 2014 to support the National Planning Policy Framework and make it more accessible. This document gives some guidance in regards to access to daylight and sunlight when considering new buildings.

Paragraph 27:

"Account should be taken of local climatic conditions, including daylight and sunlight, wind, temperature and frost pockets."

However, no quantifiable assessment methodology is provided in the national policy so the BRE Report 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice' is the established National guidance to aid the developer to prevent and/or minimise the impact of a new development on the availability of daylight and sunlight in the vicinity of the site. It has been developed in conjunction with interior daylight recommendations in BS 8206: Part 2: 'Lighting for Buildings - Code of Practice for Daylighting'.

34 – 36 Crown Street, Reading

Daylight Assessment



2.2.1 Local Policy

Reading Borough Council Draft Local Plan May 2017

The following policy was identified as relevant:

"Policy CC8: Safeguarding Amenity

Development will not cause a significant detrimental impact to the living environment of existing or new residential properties, in terms of

Access to sunlight and daylight

The local plan recommends referring to "BRE Site Layout Planning for Daylight and Sunlight: A guide to good practice". As such, this report seeks to evaluate whether the proposed development will be acceptable based on the method detailed in Section 3.0 below.



3.0 Assessment Methodology

Predictions are necessary when forecasting future impacts. Established good practice methods are used throughout this assessment to ensure that these predictions are as accurate as possible.

Impacts of the proposed scheme on daylight and sunlight have been assessed with reference to the baseline environment and the following guidance:

- Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice, BRE, 2011; and,
- BS 8206-2: 2008 – 'Lighting for Buildings – Part 2: Code of Practice for Daylighting', British Standards Institute, 2008.

Daylight, sunlight and overshadowing modelling was undertaken using Ecotect Analysis 2011 software, an independent lighting model which is capable of calculating daylight and artificial lighting scenes in interior and exterior scenarios.

3.1 Daylight

3.1.1 Context

The BRE Guidance outlines a number of different assessment methods to assess the potential for daylight to enter a room where it is required. These include:

- Stage 1 - "25° Rule" – the preliminary screening method of assessment;
- Stage 2 - Vertical Sky Component (VSC) method; and,
- Stage 3 - Average Daylight Factor (ADF).

The "25° Rule" is described by BRE as:

"No obstruction, measured in a vertical section perpendicular to the main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal."

BRE state that if the 25° Rule is satisfied then the proposed development is unlikely to have a significant effect on the diffuse skylight received by adjoining properties. Detailed numerical testing is therefore not required if the 25° test is satisfied. Where the proposed development results in an exceedance of the 25° test, any reduction in the amount of skylight can be determined by calculating the Vertical Sky Component (VSC). The VSC is the measure of the amount of daylight falling on a vertical wall or window and is defined by BRE as:



"The ratio of that part of illuminance, at a point on a given vertical plane (window wall), that is received directly from a CIE standard overcast sky, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky."

The following daylight criteria given within the BRE Guidelines can be used as a basis to assess the potential impacts of a proposed development on access to daylight:

- For existing properties, diffuse lighting may be adversely affected if the VSC measured at the centre of the window is less than 27%; and less than 80% its former value.
- For proposed properties, if the VSC is at least 27% conventional window design will usually give reasonable results. If the VSC is below 27%, special measures (larger windows) are usually required.

As such if the VSC is greater than 27% then sufficient skylight should be reaching the windows of existing and proposed buildings. Where existing room layouts are known, the 'no sky line' may also be plotted.

To check adequate daylight is provided in new rooms, the Average Daylight Factor (ADF) may be calculated. The ADF is used as the measure of general illumination from skylight within a room and is defined by BRE as:

"Ratio of total daylight flux incident on the working plane (0.85 for domestic use and 0.7m for office use) 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."

It is considered good practice to ensure that rooms have a predominantly daylight appearance. BS 8206-2 recommends that the ADF should be at least the relevant value described in Table 1.

Table 1 Recommended Minimum ADF

Room Type	Minimum ADF (%)
Bedroom	1.0
Living Room	1.5
Kitchens	2.0

BRE note that not only the amount of daylight within a room, but the distribution should also be considered.

The following sections describe a standard approach for a daylight assessment, as outlined in the BRE Guidance.



3.1.2 Assessment method

Stage 1

Each sensitive building façade surrounding the proposed development has been identified and a tangent 25° to the horizontal at a height of 2m plotted. Where the proposals intersected this tangent, the BRE 25° test is not met and the proposed development should be assessed in more detail, by calculating the VSC values. A Stage 2 assessment has therefore been undertaken for these locations.

Stage 2

Where the 25° Rule was not achieved, worst case window locations have been included within the Ecotect model along the building façade, in accordance with BRE methodology.

At each window location the VSC for the existing and proposed scenarios in place has been calculated.

Where the VSC is less than 27%, the baseline conditions have been analysed to calculate the marginal change and determine if any changes would be significant, i.e. less than 0.8 times its former value.

Stage 3

Should significant impacts be determined during Stage 2 of the assessment, a further stage may be undertaken to quantify the 'no sky line' at working height within the affected rooms to establish any potential right to light claims. BRE recommend a height of 0.85m is used in dwellings and 0.70m in offices. If the percentage of room which has a view of the sky is within 0.8 of its value in the baseline scenario, it is not considered that the change in daylight will be noticeable.

3.2 Sunlight

3.2.1 Context

In accordance with the methodology outlined within the BRE Guidance, the assessment of sunlight availability was undertaken by calculating the Annual Probable Sunlight Hours (APSH). This is defined by BRE as:

"The long-term average of the total number of hours during a year in which direct sunlight reaches the unobstructed ground (when clouds are taken into account)."

The BRE Guidance suggests that sunlight availability is checked at the centre of at least one window to a main living room on each main window wall which faces within 90° of due south.



BRE guidance suggests that should the following British Standard, BS 8206-2, be achieved at all assessment points, “*the building face as a whole should have good sunlighting potential*”:

- For existing properties a window may be adversely affected if a point at the centre of the window receives in the year, less than 25% of the APSH, including less than 5% of the probable sunlight hours during the winter months; and less than 80% its former sunlight hours during either period; and has a reduction in sunlight received over the whole year greater than 4% of APSH.

The “winter months” are classified as between 21st September and 21st March.

The BRE Guidance can be used as a screening tool. The British Standard is likely to be met if either of the following is correct:

- The window wall faces within 90° of due south and no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal. Obstructions within 90° of due north of the reference point need not count here; or,
- The window wall faces within 20° of due south and the reference point has a VSC of 27% of more.

The following sections describe a stated approach for a Sunlight Assessment, as outlined in the BRE Guidance.

3.2.2 Assessment Method

Stage 1

Each building façade surrounding the proposed development facing within 90° of due south has been identified and a tangent 25° to the horizontal from the centre of the window plotted. Where the proposals intersect this tangent, the proposed development has the potential to impact on the access to sunlight along the relevant façade. A Stage 2 assessment has subsequently been undertaken at these locations.

Stage 2

Where the 25° Rule was not achieved, worst case window locations have been included within the Ecotect model along the building façade, in accordance with BRE methodology.

At each assessment point (centre of window) the APSH has been calculated with the existing and proposed scenarios in place, both annually and during winter months.



3.3 Overshadowing

The BRE Guidance recommends the following for garden and amenity areas:

'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 21st March'.

As such the assessment has also considered the impact of the proposed development with respect to existing gardens and amenity areas adjoining the proposed site boundary.



4.0 Identification of Impacts

Potential direct impacts of the proposed development on access to daylight include reduction in the quality of daylight available in neighbouring residential properties. These identified impacts were assessed in accordance with the previously stated methodology and the results summarised in the following sections.

4.1 Model

This assessment was undertaken using Ecotect Software, a building analysis program which utilises the analysis methods outlined within BRE Guidance. A model was produced based upon the block plans and elevations of the proposals.

4.2 Daylight Assessment

Existing Receptors

4.2.1 Stage 1

No. 34 Crown Street does not meet the BRE 25° screening test, and therefore further analysis is required. Figure 3 shows that No 1-11 St Giles Close doesn't require further testing due to passing the BRE 25 screening test however the windows have been included for completeness.

4.2.2 Stage 2

At each assessment location, at the centre of the windows, the VSC was calculated in both the existing and proposed development scenarios, the findings of these calculations are shown in Table 2 below.

Table 2 Summary of the Daylight Assessment Results for Existing Receptors – VSC

Window Location	Vertical Sky Component (%)		Difference	Ratio	Within Criteria?
	Existing Condition	Proposed Development			
1	4.81	4.73	-0.08	0.98	Yes
2	29.62	28.15	-1.47	0.95	Yes
3	34.47	30.24	-4.23	0.88	Yes
4	30.67	26.59	-4.08	0.87	Yes
5	5.07	4.24	-0.83	0.84	Yes
6	39.29	38.92	-0.37	0.99	Yes
7	38.52	34.84	-3.68	0.90	Yes
8	38.47	34.44	-4.03	0.90	Yes
9	38.13	33.54	-4.59	0.88	Yes
10	34.65	27.92	-6.73	0.81	Yes
11	35.30	27.18	-8.12	0.77	No
12	34.48	25.58	-8.90	0.74	No
13	28.68	27.15	-1.53	0.95	Yes
14	38.21	36.96	-1.25	0.97	Yes
15	38.40	37.51	-0.89	0.98	Yes
16	32.15	31.96	-0.19	0.99	Yes
17	35.33	34.78	-0.55	0.98	Yes



Window Location	Vertical Sky Component (%)		Difference	Ratio	Within Criteria?
	Existing Condition	Proposed Development			
18	35.18	34.92	-0.26	0.99	Yes
19	35.80	35.75	-0.05	1.00	Yes
20	36.91	36.91	0.00	1.00	Yes
21	33.83	33.81	-0.02	1.00	Yes
22	31.90	31.69	-0.21	0.99	Yes
23	34.63	34.40	-0.23	0.99	Yes
24	34.78	34.53	-0.25	0.99	Yes
25	32.65	32.26	-0.39	0.99	Yes
26	34.99	34.69	-0.30	0.99	Yes
27	35.17	34.75	-0.42	0.99	Yes
28	33.23	32.70	-0.53	0.98	Yes
29	35.12	34.74	-0.38	0.99	Yes
30	33.09	32.52	-0.57	0.98	Yes
31	34.36	33.59	-0.77	0.98	Yes
32	32.37	30.97	-1.40	0.96	Yes
33	34.78	33.96	-0.82	0.98	Yes
34	32.25	30.94	-1.31	0.96	Yes
35	35.23	34.48	-0.75	0.98	Yes
36	32.43	31.41	-1.02	0.97	Yes
37	35.29	34.59	-0.70	0.98	Yes
38	32.52	31.57	-0.95	0.97	Yes
39	35.34	34.68	-0.66	0.98	Yes
40	32.19	31.41	-0.78	0.98	Yes

As indicated in Table 2, the results show that the BRE VSC criterion is achieved at all assessed locations except windows 11-12 therefore further analysis of the internal room layout for the room that these two windows serve has been examined in section 4.2.3 below.

4.2.3 Stage 3

Existing Receptors

Analysis of the worst case room's internal daylight was undertaken at the closest ground floor room supplied by windows 11 & 12 respectively. The results of the 'no sky line' analysis are presented in Table 3 below. Reference should be made to Figures 7-8 for an illustrative representation of the daylight distribution calculated.

Table 3 Summary of Internal Daylight Analysis

Room Location	Room Type	Area of Room above 0.2% Sky Factor (%)		Ratio	Meets Criteria?
		Baseline	Proposed		
Windows 11,12	Bedroom	99.9	91.7	0.92	Yes

As the above table shows, the worst case room supplied by Windows 11-12 receives a reduction of 0.92 times their former value therefore the reduction in daylight at these rooms as a result of the proposed development is not significant as the BRE criteria has been met.



Proposed Receptors

4.2.4 Stage 1

In order to assess potential daylight access within the proposed residential unit, window locations were analysed across the proposed development, as illustrated in Figures 3. The results of the VSC analysis based on assessment points at the centre of these modelled windows are presented in Table 4.

Table 4 Summary of the Daylight Assessment Results for the Proposed Receptors - VSC

Window Location – Room Type	Vertical Sky Component (%)	Meets VSC Criteria?
E1	25.80	No
E2	25.33	No
E3	24.62	No
E4	24.82	No
E5	23.51	No
E6	20.18	No
E7	19.06	No
E8	21.10	No
E9	13.36	No
E10	16.01	No
E11	15.48	No
E12	16.78	No
E13	32.92	Yes
E14	38.20	Yes
E15	34.98	Yes
E16	31.17	Yes
E17	30.68	Yes

As illustrated by Table 4, the calculated VSC at the centre of 12 of the 17 modelled proposed windows are below 27% and for the rooms served by these windows. It should be noted that stairs and hallways are not considered sensitive in terms of daylight therefore it is only necessary to examine the actual internal lighting conditions by calculating ADF values for the rooms supplied by windows E9-10, E11-12, E5-6 and E7-8. Further analysis is shown in Stage 2, below.

4.2.5 Stage 2

The worst-case rooms on each facade have been assessed for internal daylight. Analysis was undertaken in order to identify the Average Daylight Factor of the working plane (0.85m) in accordance with the guidance summarised in Section 3.1.2. The ADF for the worst-case rooms which did not meet the VSC criteria at Stage



1 were calculated, the results of the ADF analysis are presented in Table 5, based on the proposed window dimensions and inclusive of glazing and screening.

Table 5 Summary of the Average Daylight Factor (ADF) Results for Proposed Receptors

Proposed Receptor	ADF Requirement (%)	Modelled ADF (%)	Meets recommended ADF?
E9-10 (Lower Ground Floor) Bedroom/Kitchen	2.00	0.43	No
E11-12 (Lower Ground Floor) Bedroom/Kitchen	2.00	0.42	No
E5-6 (Ground Floor) Bedroom	1.00	1.72	Yes
E7-8 (Ground Floor) Kitchen	2.00	2.09	Yes

As illustrated by Table 5, in accordance with the relevant guidance, the lower ground floor rooms supplied by lightwells in the form of windows E9-10 and E11-12 do not meet the recommended criteria, therefore supplementary electric lighting is required.

However the ground floor rooms supplied by windows E5-6 and E7-8 do meet the recommended criteria and should receive sufficient daylight therefore it can be anticipated that the rooms on the first floor and second floor will also receive sufficient daylight as the VSC results are higher.

4.3 Sunlight

A staged assessment was undertaken to determine the impact of the development on access to sunlight at surrounding residential properties. This is discussed in the following sections.

4.3.1 Stage 1

Figure 5 shows that those properties with windows facing within 90 degrees of due south did pass the BRE 25° screening test for daylight therefore further assessment hasn't been undertaken.

4.4 Overshadowing Assessment

Existing Amenity Areas

The assessment has considered the impact of the development on residential garden at adjoining properties on the eastern boundary of the site, with respect to overshadowing. Reference should be made to Figures 9 - 12 for a visual representation of the shadowing effects of the development on the 21st March between the hours of 07:00 and 18:00. As these figures illustrate, in accordance with the BRE guidelines there will be no significant change in the baseline overshadowing at surrounding amenity areas.



5.0 Summary and Conclusions

WYG Environment Planning and Transport were commissioned by Wallwork Wainwright LLP to undertake a Daylight, Sunlight and Overshadowing Assessment to assess the effect of a new residential building on existing buildings at 34-36 Crown Street, Reading.

Building Research Establishment Guidance (Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice) and BS 8206-2:2008 (Lighting for Buildings, Part 2: Code of Practice for Daylighting) were used to assess potential impacts and determine the significance of any change in access to daylight and sunlight.

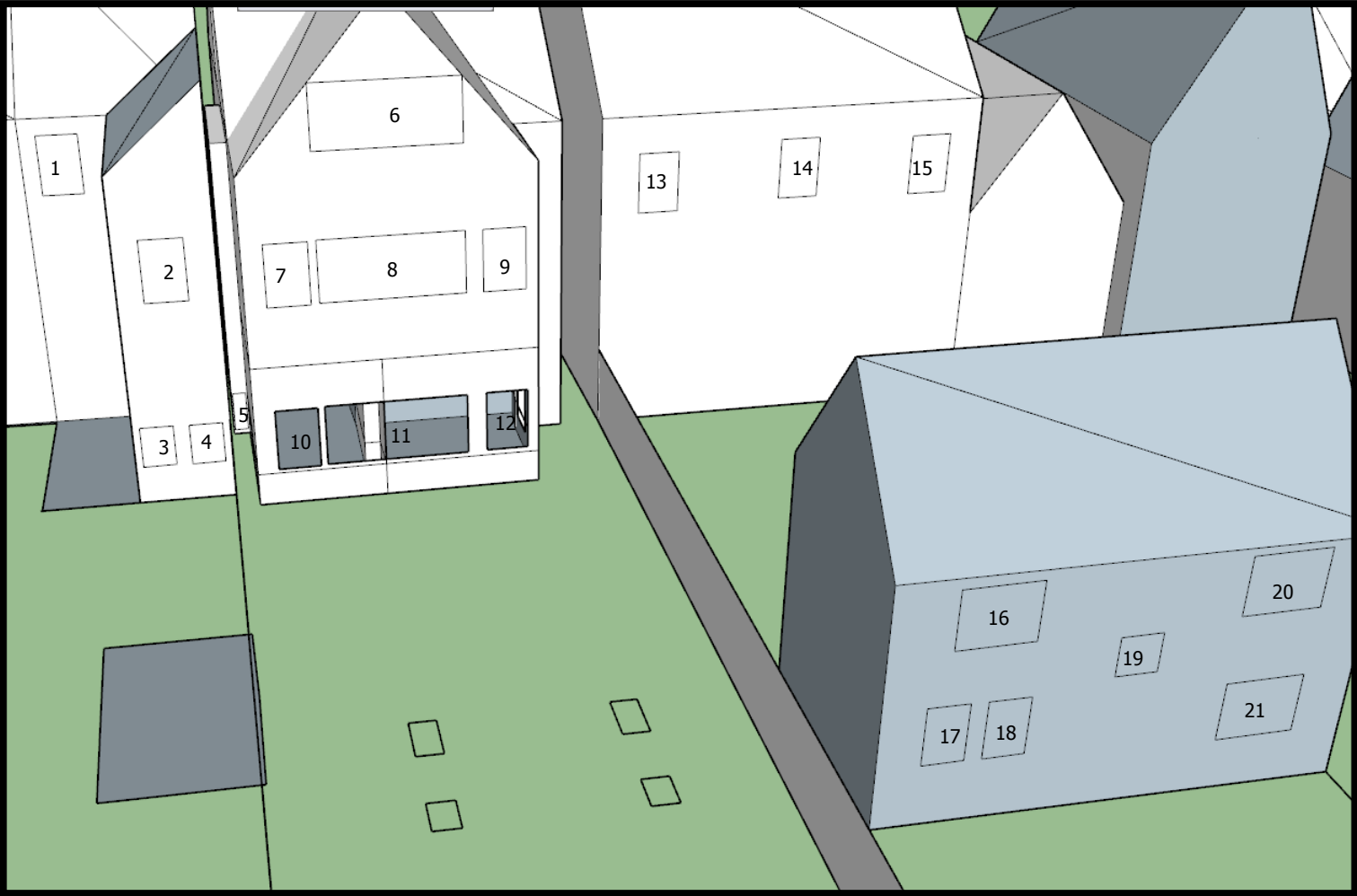
Worst case windows were identified surrounding the development which would receive some obstruction as a result of the proposed development. The results of the detailed technical analysis demonstrate that the daylight targets would be achieved at all the surrounding modelled windows and there will be no significant loss of access to daylight for surrounding residents. Further assessment of internal daylight of the closest ground floor room showed that there will be no significant loss of access to daylight as a result of the proposed development. Therefore, it can be concluded there will be no significant loss of access to daylight for surrounding residents.

The results of the overshadowing analysis identified that there won't be and significant change in the baseline overshadowing at existing gardens / amenity areas with the development in place. As such, given that the BRE standards have been comfortably satisfied, they are adequately sunlit throughout the year.

The assessment has also shown that the lower ground floor rooms will require supplementary lighting however for the rest of the floors (Ground, First, Second) there will be adequate daylight.



Figures



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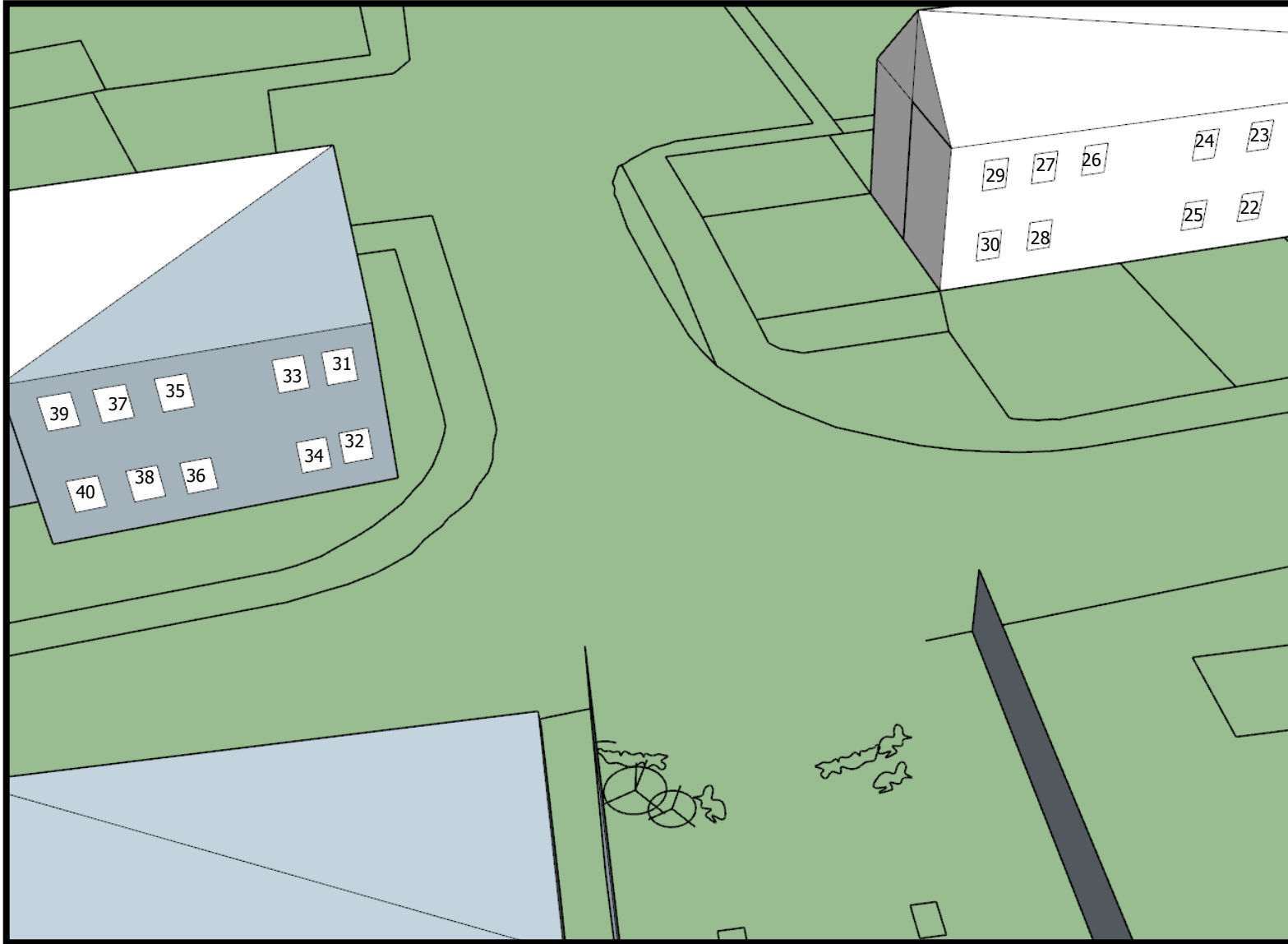
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**34-36 Crown Street
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Figure 1: Existing Windows

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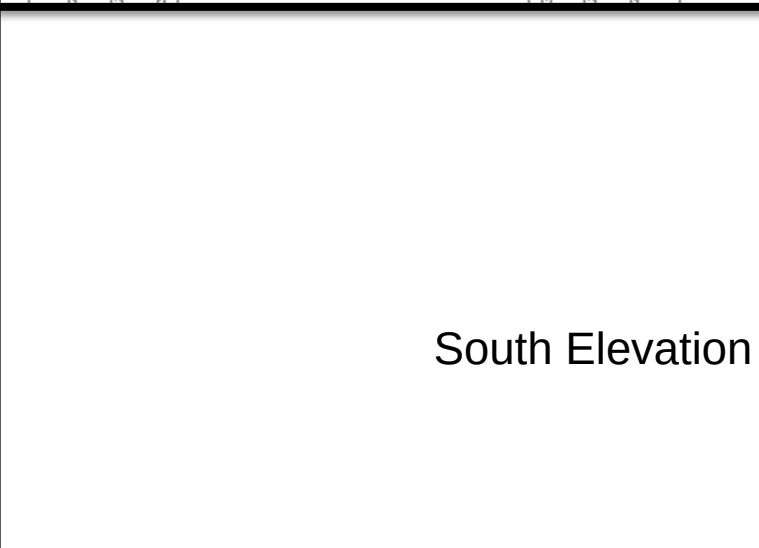
Figure 2: Existing Windows

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North Elevation



South Elevation

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Avalon Way
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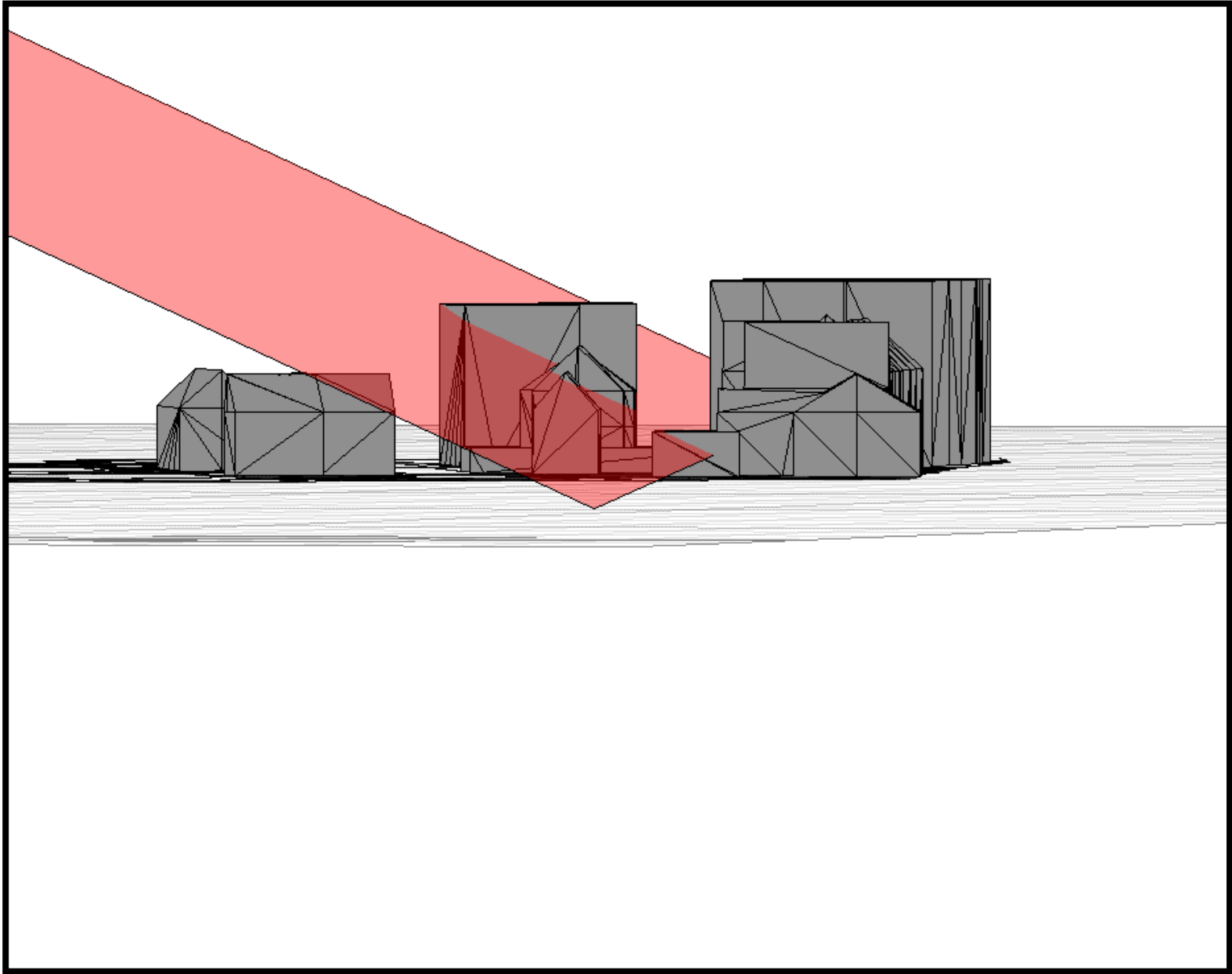
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Figure 3: Proposed Windows

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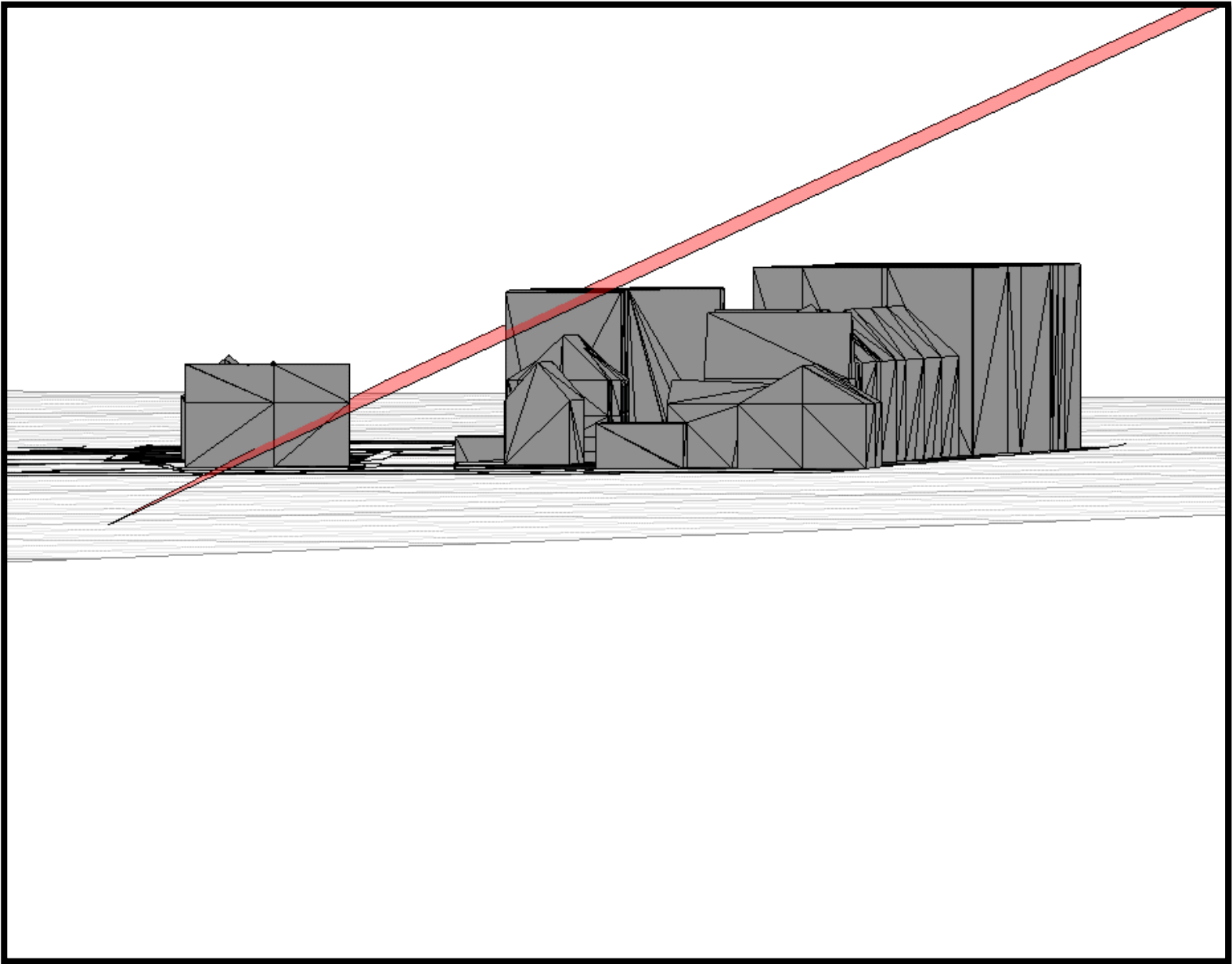
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Figure 4 : 34 Crown Street
25 Degree Rule Test- Fail

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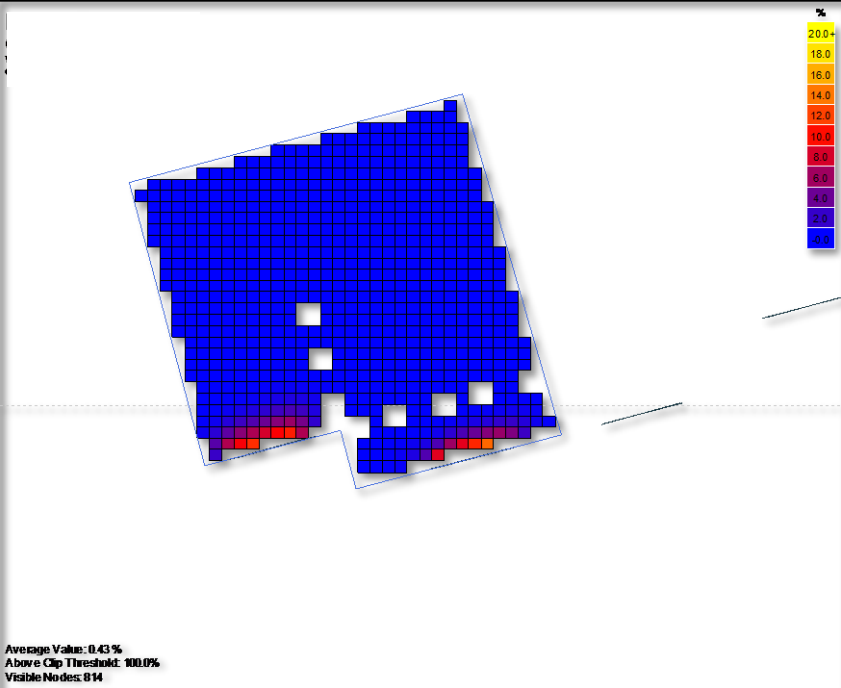
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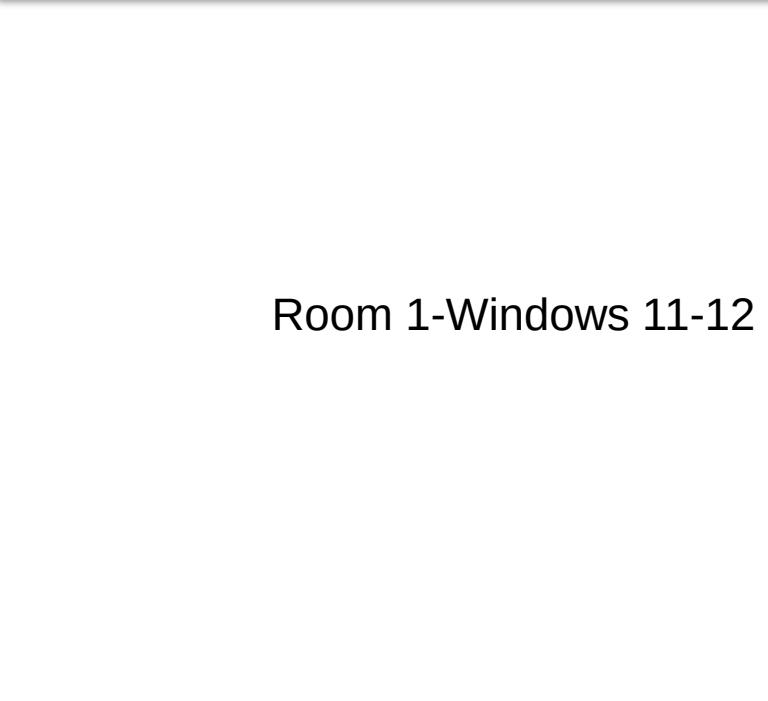
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Figure 5: 1-11 St Giles Close
25 Degree Rule Test- Pass

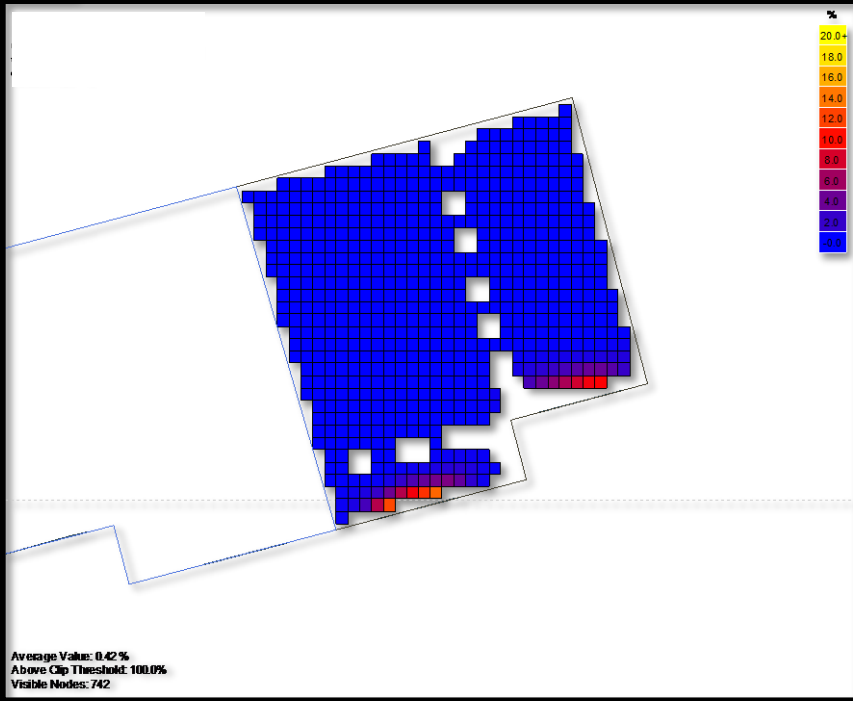
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Room 1-Windows 9-10



Room 1-Windows 11-12



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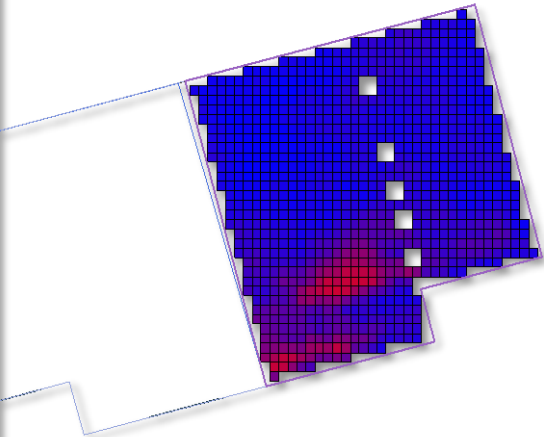
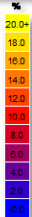
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Drawing Title:
Figure 6: Average Daylight
Factor Lower Ground Floor

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Daylight Analysis

Daylight Factor
Value Range: 0.0 - 20.0 %
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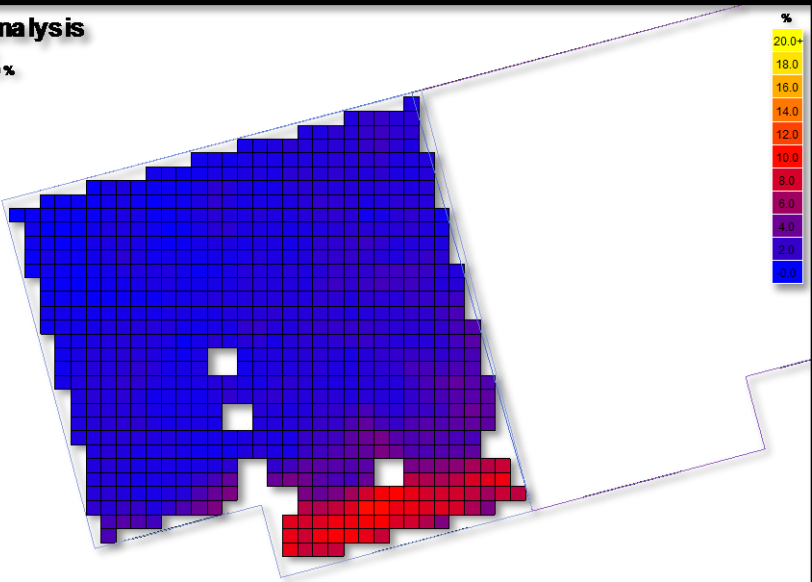


Average Value: 1.71 %
Above Clip Threshold: 100.0%
Visible Nodes: 1023

Room 1-Windows 5-6

Daylight Analysis

Daylight Factor
Value Range: 0.0 - 20.0 %
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Average Value: 2.09 %
Above Clip Threshold: 100.0%
Visible Nodes: 820

Room 1-Windows 7-8

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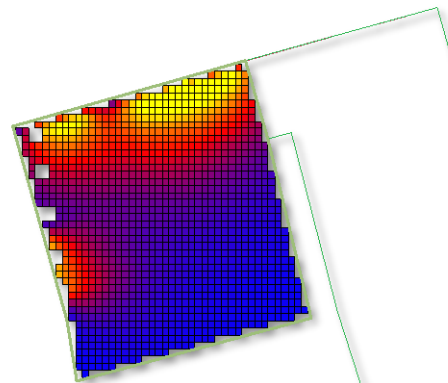
Project:
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Reading
Client:
Wallwork Wainwright LLP

Drawing Title:
Figure 7: Average Daylight
Factor Ground Floor Proposed
Kitchen & Bedroom

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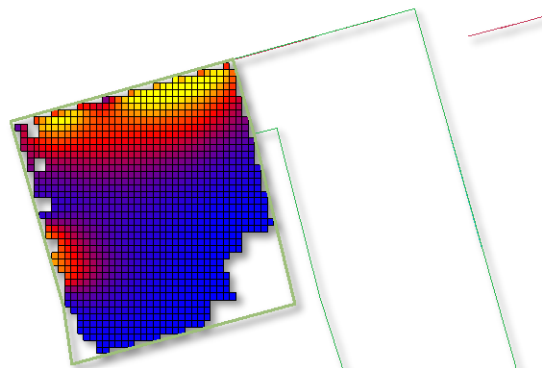
Right To Light
Overcast Sky Component
Value Range: 0.2 - 20.0 %
© ECOTECT VS



Existing

Average Value: 5.89 %
Above Clip Threshold: 59.9%
Visible Nodes: 1345

Right To Light
Overcast Sky Component
Value Range: 0.2 - 20.0 %
© ECOTECT VS



Proposed

Average Value: 4.76 %
Above Clip Threshold: 91.7%
Visible Nodes: 1341

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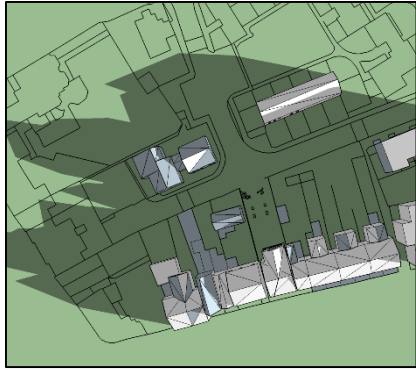
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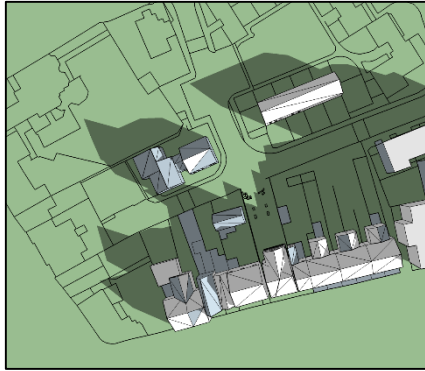
Drawing Title:
Figure 8: No Sky Line % for
Bedroom of windows 11-12

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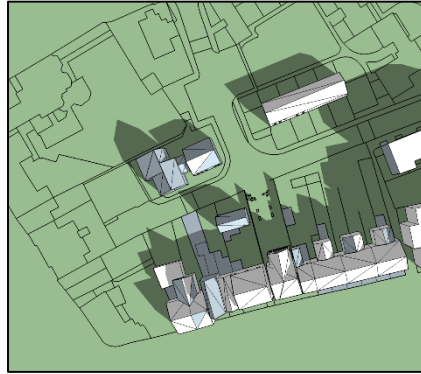
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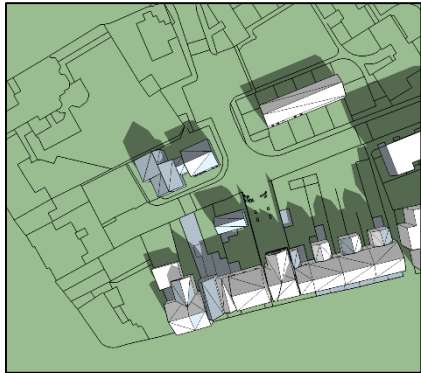
07:00



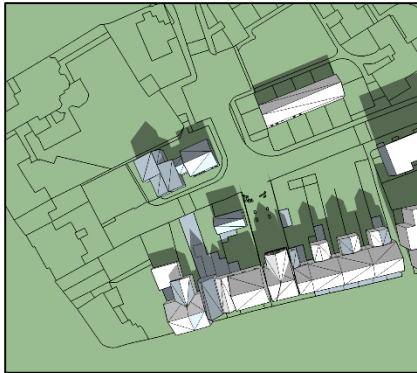
08:00



09:00



10:00



11:00



12:00

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Drawing Title:

Figure 9: Existing Shadow
Diagram 21st March 07:00 –
12:00

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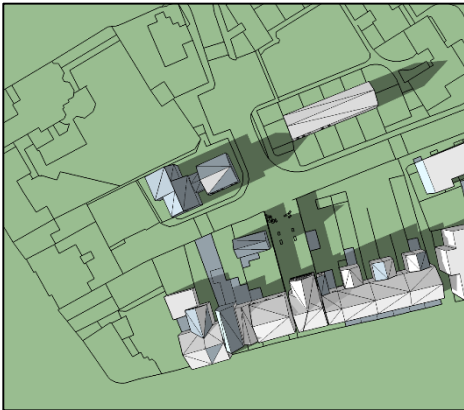
13:00



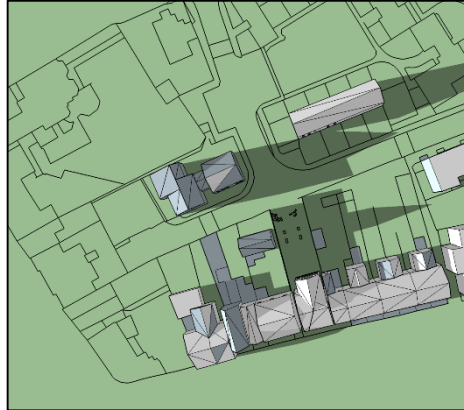
14:00



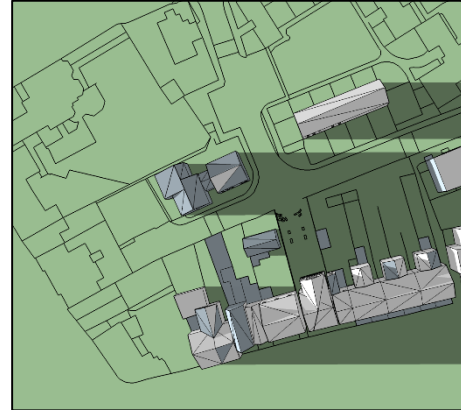
15:00



16:00



17:00



18:00

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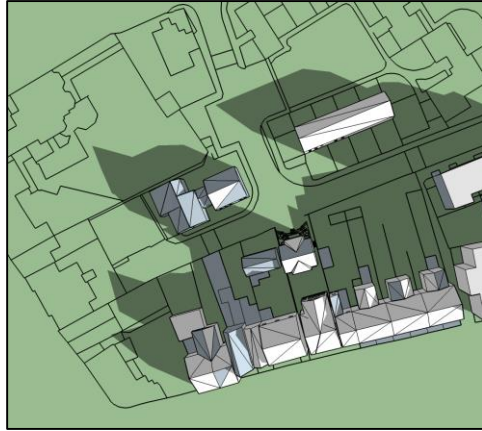
Figure 10: Existing Shadow
Diagram 21st March 13:00 –
18:00

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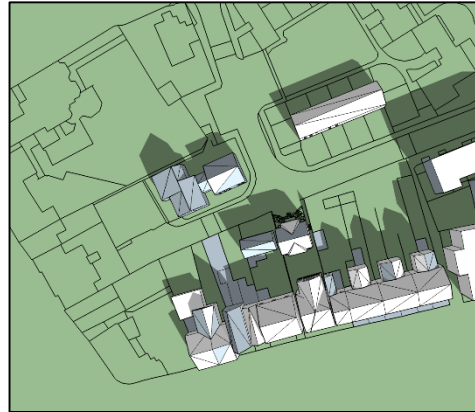
07:00



08:00



09:00



10:00



11:00



12:00

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Drawing Title:

Figure 11: Proposed Shadow
Diagram 21st March 07:00 –
12:00

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Drawing Title:

Figure 12 Proposed Shadow
Diagram 21st March 13:00 –
18:00

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13:00

14:00

15:00

16:00

17:00

18:00