Daylight/Sunlight Assessment: 82 Guilford Street, Bloomsbury

Sudaj Limited

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1. INTRODUCTION

Hawkins Environmental Limited has been instructed by Sudaj Limited to undertake a daylight/sunlight assessment for the redevelopment of 82 Guilford Street, Bloomsbury, situated within the London Borough of Camden. The site currently comprises a four storey plus basement terraced property containing a number of bedsitting rooms. The proposals will see the conversion of the existing building structure into four self-contained apartments. A site location plan can be seen in **Appendix 1**.

During the planning process, it has been identified that the site may require a daylight/sunlight assessment to determine whether the proposed development may have an adverse impact on the levels of daylight and sunlight falling on the windows of adjacent buildings. As a consequence, a daylight/sunlight assessment has been carried out in accordance with The Building Research Establishment (BRE) report, “Site layout planning for daylight and sunlight” by PJ Littlefair. This report summarises an assessment of the impacts of the proposed development on the surrounding properties potential to receive daylight and sunlight.

In addition, it has been identified that the proposed rooms within the basement may not be well internally lit. Therefore, this report also calculates the internal level of daylight within these rooms to determine whether these rooms meet the best practice guidance on levels of internal daylight.

This report fully incorporates the changes in methodology as a consequence of the publication of the Second Edition of the BRE Report in 2011.

2. POLICY & ASSESSMENT CRITERIA

2.1. Daylight and Sunlight

The provision of daylight is as important as ensuring low levels of noise, or low levels of odour, in maintaining the enjoyment of one's property. Adequate levels of daylight are important not only to light and heat the home, but also for an occupant's emotional well being. Daylight is widely accepted to have a positive psychological effect on human beings and there is a great deal of evidence to suggest that people who are deprived of daylight are more susceptible to depression and mood swings. This is common in northern countries, such as Norway, Iceland and Canada where daylight is scarce during the winter months.

When assessing the effects of proposed building projects on the potential to cause issues relating to light, it is important to recognise the distinction between daylight and sunlight. Daylight is the combination of all direct and indirect sunlight during the daytime, whereas sunlight (for the purposes of this report) comprises only the direct elements of sunlight. On a cloudy or overcast day diffused daylight still shines through windows, even when sunlight is absent.

2.2. National Policy

The Department for Communities and Local Government (DCLG) sets national planning policy. Their document 'The Planning System: General Principles (2005), published in conjunction with Planning Policy Statement 1: Delivering Sustainable Development, now replaced by the National Planning Policy Framework (NPPF), discusses the need to protect amenities in the public's interest, of which the need for daylight/sunlight could be considered one such amenity. However, the government does not have an adopted policy on daylight, sunlight and the effects of overshadowing, and does not have targets, criteria or relevant planning guidance, in the way it has for other environmental impacts such as noise, landscape or air quality.

However, the **Building Research Establishment (BRE) report, *"Site layout planning for daylight and sunlight"* Second Edition 2011 by PJ Littlefair** (referred to as the BRE Report) is almost universally used as the official method in the UK and Ireland for determining whether a development meets good practice standards of daylight and sunlight and for determining the impact of a development on daylight and sunlight availability; In addition, the **British Standard BS 8206:2008 Lighting for buildings – Part 2: Code of practice for daylighting** contains guidance on the minimum recommended levels of interior daylighting and introduces some of the calculation procedures used in the BRE Report.

2.3. The BRE Report

The BRE Report contains guidance on how to design developments, whilst minimising the impacts on existing buildings from overshadowing and reduced levels of daylight and sunlight. In addition, the BRE Report provides advice on how to design buildings to ensure that they retain good practice levels of daylight and sunlight. As well as advice, the report contains a methodology to assess levels of daylight, sunlight and overshadowing, and contains criteria to determine the potential impacts of a new development on surrounding buildings and to determine whether new developments are well lit internally. However, the report does state that the good practice guidelines are not mandatory, but should be considered a guide to help rather than constrain the designer.

The BRE Report looks at three separate areas when considering the impacts on lighting:

- **Daylight** – i.e. the combined impacts of all direct sunlight and indirect skylight during the daytime;
- **Sunlight** – i.e. the impacts of only the direct sunlight; and
- **Overshadowing of Gardens and Open spaces**.

It is important to note that the BRE Report "Site Layout Planning for Daylight and Sunlight" is not a test to determine whether a development "Passes" or "Fails", rather "*A Guide to Good Practice*". Therefore, whilst one should try to achieve the numerical guidance within the report (e.g. ADF, VSC, APSH etc.), the failure to do so does not indicate that the development is unsuitable, nor is it an indication that planning permission should be refused.

2.4. Daylight Impact Assessment Criteria

The assessment of daylight is required for windows serving rooms in adjoining dwellings where daylight is required, including living rooms, kitchens and bedrooms. Windows to bathrooms, toilets, store rooms, circulation areas and garages need not be assessed. The guidelines also apply to any room that may have a reasonable expectation of daylight, including schools, hospitals, hotels and some offices.

When assessing daylight, the numerical criteria must be viewed flexibly and should be considered against other site layout constraints. In addition, it is important to consider whether the existing building is itself a good neighbour, standing a reasonable distance from the boundary and not taking more than its fair share of light.

Figure 2.1 shows the decision chart, showing the processes involved in determining daylight impact. The assessment takes on several specific stages:

1) **The Distance Test**: loss of light to windows need not be analysed if the distance from the existing window to the development is three of more times its height above the centre of the existing window;

2) **The 25° Rule**: loss of light to windows need not be analysed if the angle to the horizontal subtended by the new development from the centre of the existing window is less than 25°;

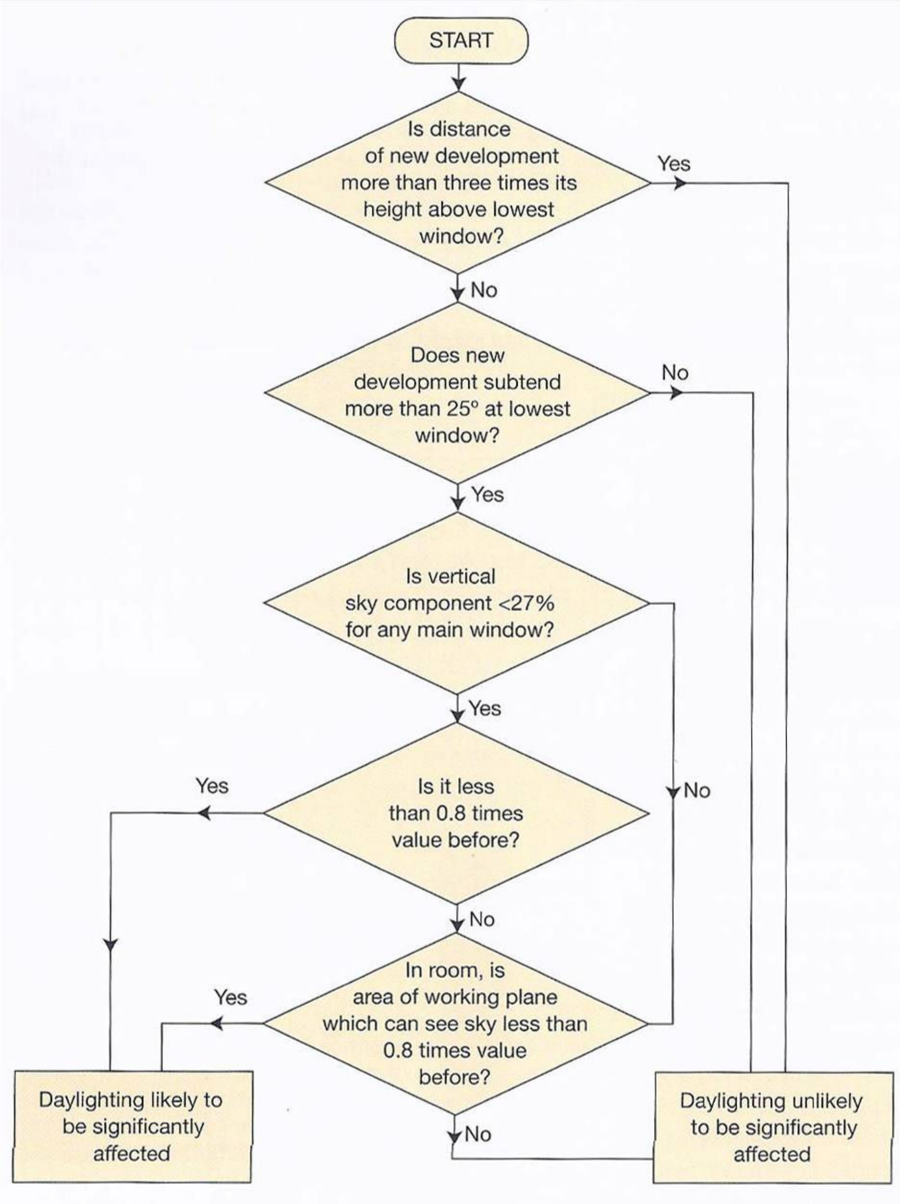
3) **Daylight Assessment**: diffuse daylight of an existing may be adversely affected by a proposed development if either:

   a. the Vertical Sky Component (VSC) measured at the centre of an existing main window is less than 27%, **and** less than 0.8 times its former value; or

   b. the area of the working plane which can receive direct skylight is reduced to less than 0.8 times its former value.

It should be noted at determining the area of the working plane with can receive direct light from the sky (which is often referred to as the No-Sky Line or NSL) is seen as an additional assessment, rather than as an alternative to VSC. However, since plotting the NSL requires knowledge of the room geometry, which is not usually available during an impact assessment, it is not always possible to calculate the NSL since the use of too many assumptions would make the results meaningless and unreliable.

Figure 2.1: Decision Chart – Diffuse Daylight in Existing Buildings (taken from the BRE Report)



2.5. Sunlight Impact Assessment Criteria

The assessment of sunlight is required for rooms in adjoining dwellings where sunlight is required. Generally, all main living rooms and conservatories should have access to direct sunlight. Kitchens and bedrooms are less important, although care should be taken not to block too much sun.

As with daylight, the numerical criteria for sunlight should be viewed flexibly and should be considered against other site layout constraints. It is important to understand that people like and appreciate sunlight and may resent the loss of sunlight, although is not an essential requirement of a dwelling, unlike daylight availability or access to a quiet noise environment. Therefore, larger reductions in sunlight may be acceptable, for example if new development is to match the height and proportion of existing buildings nearby.

The assessment of sunlight takes on several specific stages:

1. **Facing South**: loss of sunlight to windows only needs to be assessed if the window faces within 90° of due south;
2. **The Distance Test**: loss of sunlight to windows need not be analysed if the distance from the existing window to the development is three of more times its height above the centre of the existing window;
3. **The 25° Rule**: loss of sunlight to windows need not be analysed if the angle to the horizontal subtended by the new development from the centre of the existing window is less than 25°;
4. **Sunlight Assessment**: direct sunlight of an existing windows may be adversely effected by a proposed development if at the centre of a window:
    a. receives less than 25% of Annual Probable Sunlight Hours (APSH), or less than 5% APSH between 21st September and 21st March; **and**
    b. receives less lean 0.8 times its former APSH during either period; **and**
    c. has a reduction in sunlight over the whole year of greater than 4% APSH.

2.6. Overshadowing of Gardens and Open Spaces Impact Assessment Criteria

The effects of overshadowing and the loss of sunlight on open spaces and gardens is another important element of any sunlight or daylight assessment. Assessments should not restrict themselves to looking at just the effects on providing good natural lighting within buildings as sunlight in the spaces between buildings has an important impact on the overall appearance and ambience of a development.

The Second Edition of the BRE Report, published in 2011, requires at least 50% of the garden or amenity space must receive at least two hours of direct sunlight on the 21st March. If this cannot be achieved, providing that the area overshadowed was greater than 0.8 times its former value, no impact would have occurred. The BRE Report suggests that the following open spaces should be checked:

- Gardens, usually the main back garden of a house;
- Parks and playing fields;
- Children's playgrounds;
- Outdoor swimming pools and paddling pools;

- Sitting out areas such as those between non-domestic buildings and in public squares; and
- Focal points for views such as a group of monuments or fountains.

2.7. The Impacts of Vegetation

It is important to note that according to the BRE Report, calculations normally do not take into account vegetation. The exception is when evergreen vegetation exists that forms a continuous barrier.

2.8. Determining Significance

The previous edition of the BRE Report has often been significantly misapplied when determining whether an impact to a development is significant and whether a development should be refused planning permission. Page 1 of the BRE Report states:

> *"The advice given (in the report) is not mandatory and 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 layout design."*

Often, Local Planning Authorities interpret the failure of a development to meet the guideline criteria as an indicator as to whether a development is acceptable. However, this is not the case and the BRE report suggests that the numerical values are purely advisory and there are times where alternative targets may be used, as described in Appendix F of the 2011 Edition of the BRE Report. For example:

- where the site already has an extant planning permission that the developer wants to vary, the VSC and APSH of the permitted scheme may be used as alternative benchmarks;
- in historic city centre environments, it is often not possible to achieve 27% VSC, therefore it is sensible to use a target value consistent with levels of daylight typically experienced in the street. For example, if the obstruction angle from ground floor level at other properties in the street is typically 40°, which corresponds to a VSC of 18%, this level could be used as a target value for development in that street, if new development is to match the scale and size of the existing development;
- where an existing building has windows that are unusually close to the site boundary and taking more than their fair share of light, to ensure that new development matches the height and proportions of existing buildings, the VSC and APSH targets for these windows could be set to those for a "mirror-image" building of the same height and size, an equal distance away on the other side of the boundary.

In addition, Appendix I of the 2011 Edition of the BRE Report provides new guidance on how to assess impact, which suggests that a semantic scale can be used to describe the impact, which can then be used help place the impact in context. **Table 2.1** summarises the impact magnitude criteria as described in the BRE Report.

Table 2.1: Impact Magnitude Criteria (adapted from Appendix I of the BRE Report 2011)

<table>
<tr><th>Criteria</th><th>Impact Magnitude</th></tr>
<tr><td>Where the decrease in daylight or sunlight fails to meet the guidelines, and one or more of the following scenarios applies:
a large number of windows or large area of open space is affected;
the loss of light is substantially outside the guidelines;
all windows in a particular property are affected;
the affected building or outdoor space has a particularly strong requirement for light, e.g. a living room in a dwelling or a children's playground.</td><td>Major Adverse</td></tr>
<tr><td>Where the decrease in daylight or sunlight is only just within the guidelines and a larger number of windows or open space are affected;
or
Where the decrease in daylight or sunlight fails to meets the guidelines, but one or more of the following scenarios applies:
only a small number of windows or limited area of open space is affected;
the loss of light is only just outside the guidelines;
an affected room has other sources of light;
the affected building or outdoor space has a low level requirement for light.</td><td>Minor Adverse</td></tr>
<tr><td>Where the increase/decrease in daylight or sunlight fully meets the guidelines and only a small number of windows are affected;
and
If there is an increase in daylight or sunlight, the increase is "tiny".</td><td>Negligible</td></tr>
<tr><td>Where the increase in daylight or sunlight is small and/or the number of affected windows or area of open space affected is small.</td><td>Minor Beneficial</td></tr>
<tr><td>Where the increase in daylight or sunlight is large and/or the number of affected windows or area of open space affected is large.</td><td>Major Beneficial</td></tr>
</table>

Note: Appendix I of the BRE report also suggests the use of "moderate adverse" and "moderate beneficial" impacts. However, there is no guidance on how to designate moderate impacts, although the guidance suggests that judgement should be used when classifying impact magnitude.

2.9. Internal Daylight Assessment

The BRE report contains guidance on how to design developments, whilst retaining good levels of daylight. As well as advice, the report contains a methodology to assess levels of daylight and contains criteria to determine whether a development is well day lit. However, the report does state that the guidelines are not mandatory, but should be considered a guide to help rather than constrain the designer.

The Average Daylight Factor (ADF) is a very common and easy to understand measure for expressing the daylight availability in a room. It describes the ratio of outside illuminance over inside illuminance, expressed as a percentage. The higher the ADF the more natural light is available in the room.

Rooms with an average DF of 2% give us a feeling of being day lit. However, it is only when the ADF rises above 5% that we perceive it as well day lit. Different types of rooms have different minimum requirements for daylighting. **Table 2.2** details the acceptable criteria for average daylight factor for habitable rooms.

Table 2.2: Daylight Factor Criteria

Criteria	Minimum Daylight Factor
Predominantly daylight without the need for supplementary electric lighting	5%
With supplementary electric lighting:	
Suitable for kitchens	2%
Suitable for living rooms	1.5%
Suitable for bedrooms	1%

2.10. The London Plan

The London Plan[1], published in July 2011, provides an overall strategic plan for London, and it sets out a fully integrated economic, environmental, transport and social framework for the development of the capital to 2031. The Plan brings together the Mayor's strategies, including policy on a range on environmental issues, such as climate change, air quality, noise and waste. London boroughs' local plans need to be in general conformity with the London Plan, and its policies guide decisions on planning applications by councils and the Mayor.

Policy 3.5 relates to the quality and design of housing developments and states that

"Housing developments should be of the highest quality internally, externally and in relation to their context and to the wider environment, taking account of strategic policies in this Plan to protect and enhance London's residential environment and attractiveness as a place to live."

[1] The London Plan - Spatial Development Strategy for Greater London (July 2011), Mayor of London.

3. DAYLIGHT/SUNLIGHT IMPACT ASSESSMENT

This section summarises the impact of the proposed development on levels of daylight and sunlight on surrounding windows.

3.1. Identification of Receptors

Based on a site visit on the 5th September 2013, and also based on the plans of the development, a number of windows have been identified as of being of concern. The properties of concern can be seen in the site plan in **Appendix 1**. The windows under consideration can be seen in **Appendix 2**.

The main properties of interest are:

- 13-15 Grenville Street; and
- 81 Guilford Street.

3.2. Methodology

This section summarises the daylight and sunlight impacts of the proposed development on surrounding properties. To determine these impacts, the software packages created by MBS Survey Software Limited have been utilised to create both Waldram Diagrams which plot VSC, as well as the Sunlight Availability Indicators which plot APSH. The tools created by MBS are one of the only tools in the Daylight/Sunlight sector that fully incorporate the methodologies introduced in the Building Research Establishment (BRE) report, *"Site layout planning for daylight and sunlight"* Second Edition 2011 by PJ Littlefair and is widely acknowledged to be a suitable tool for undertaking daylight, sunlight and overshadowing assessments in accordance with the BRE Guidance. For the purposes of the assessment, a three dimensional computer model was constructed both with and without the proposed development in place. **Figures 3.1** to **Figure 3.10** show the three dimensional model of the development, with and without the proposed development.

At this site, Hawkins Environmental were provided with a site survey of the existing site layout and plans and elevations of the proposed development. This information has been used to construct the three dimensional computer model. Wherever possible, survey information provided by the client and their agents has been utilised to add information to the model; however, where details were not present in the survey information, professional judgement has been used to estimate information where necessary.

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Figure 3.1: 3D model without new development from the North

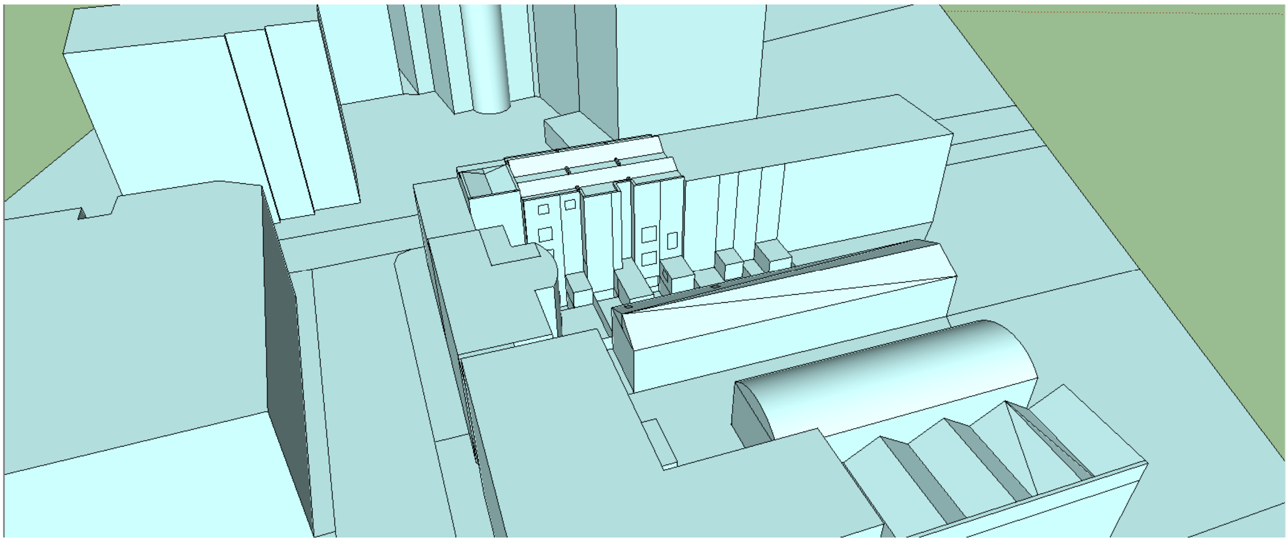


Figure 3.2: 3D model with new development from the North

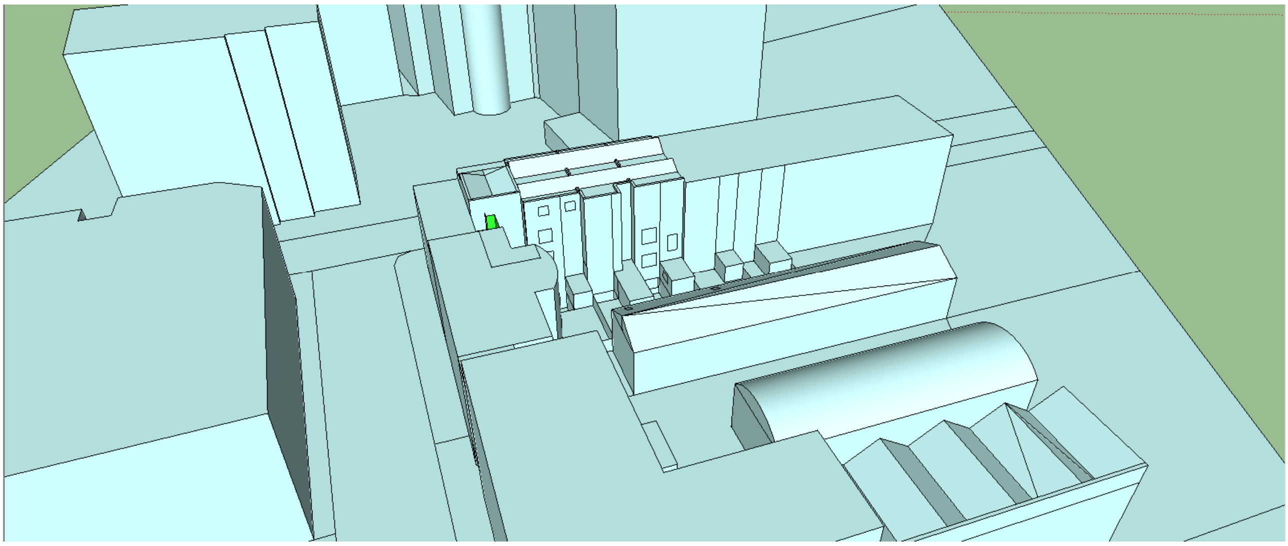


Figure 3.3: 3D model without new development from the East

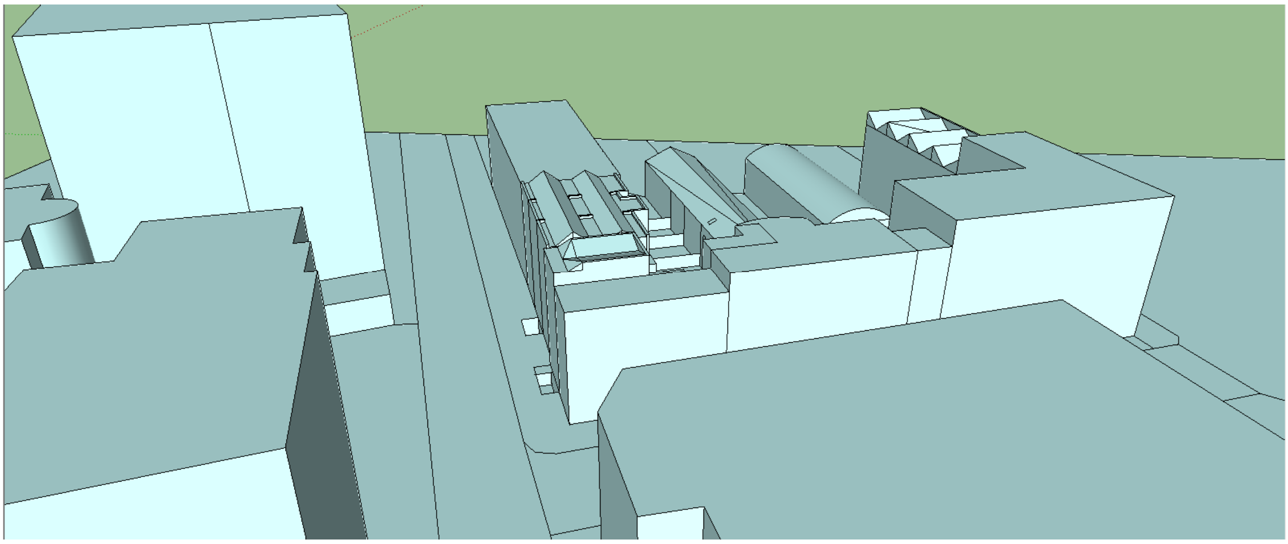


Figure 3.4: 3D model with new development from the East

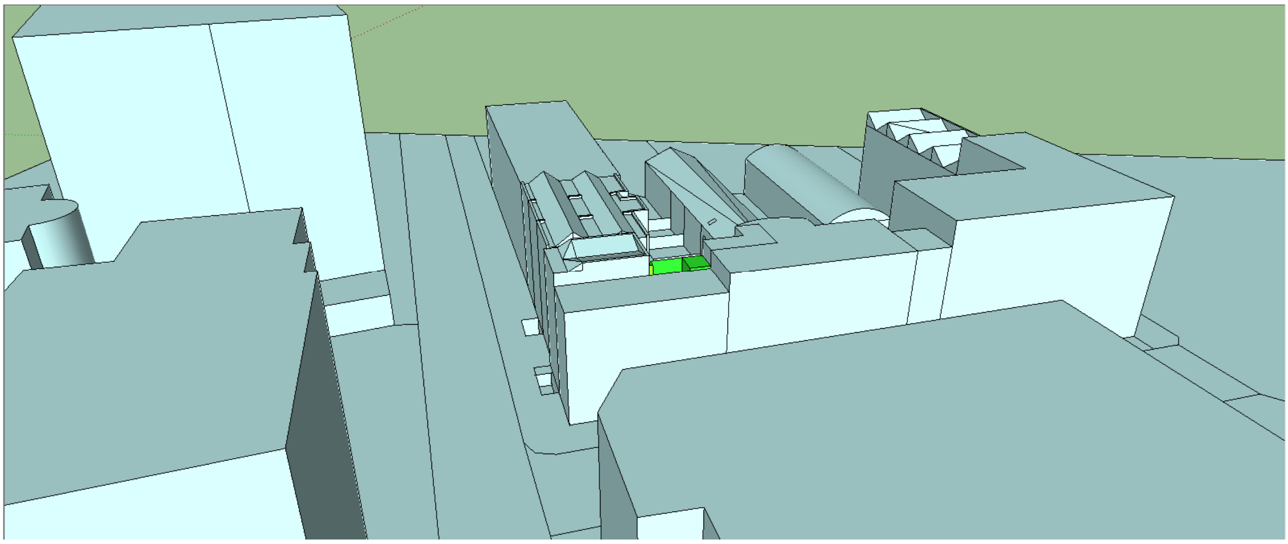


Figure 3.5: 3D model without new development from the South

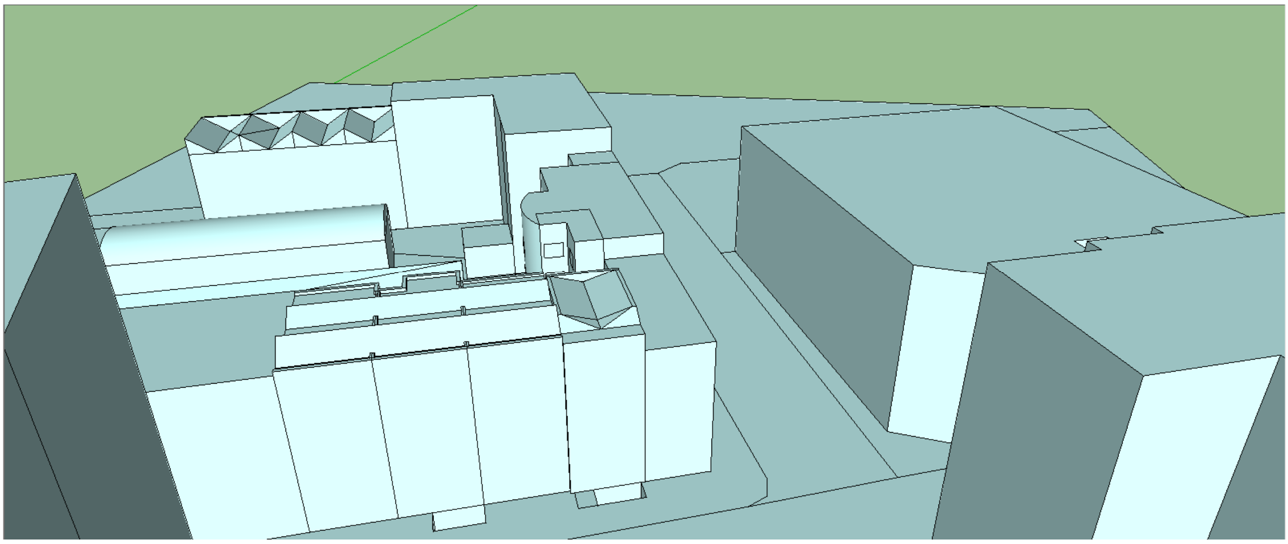


Figure 3.6: 3D model with new development from the South

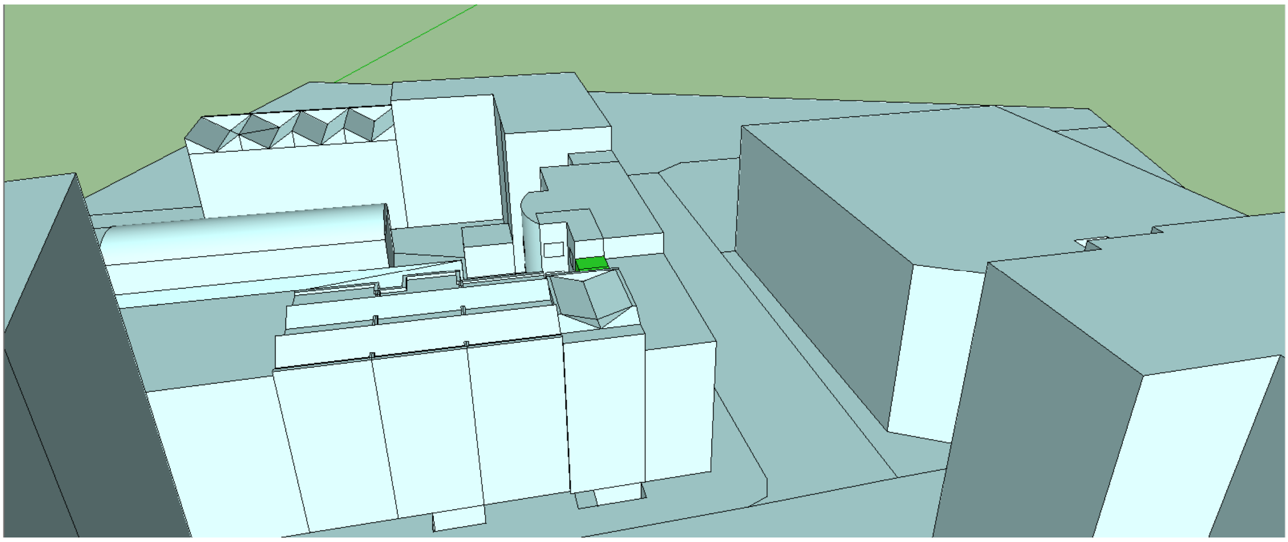


Figure 3.7: 3D model without new development from the West

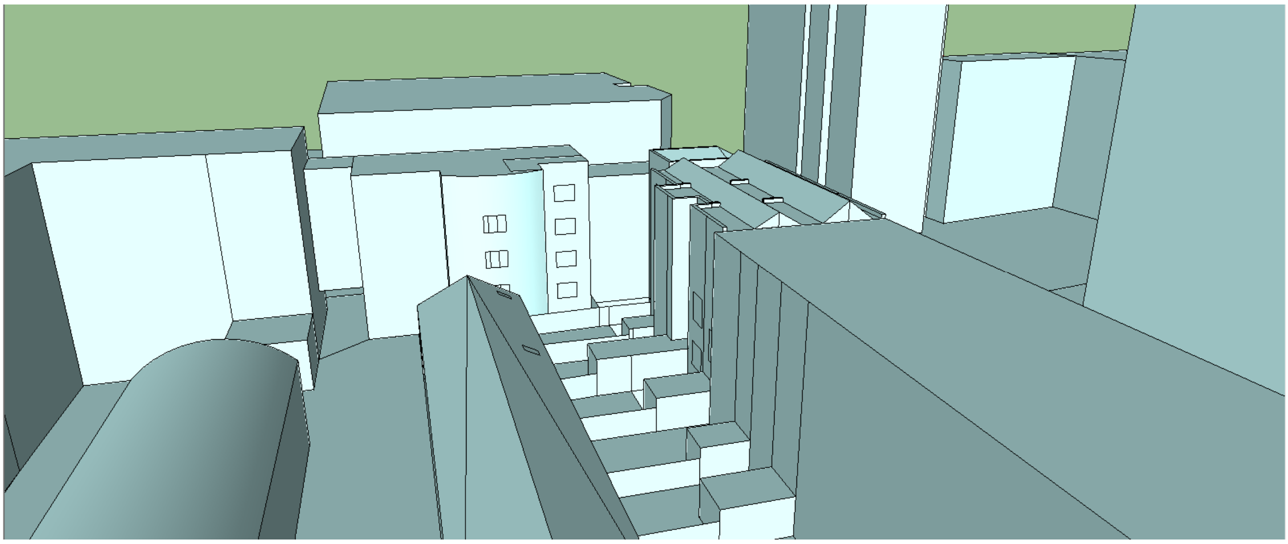


Figure 3.8: 3D model with new development from the West

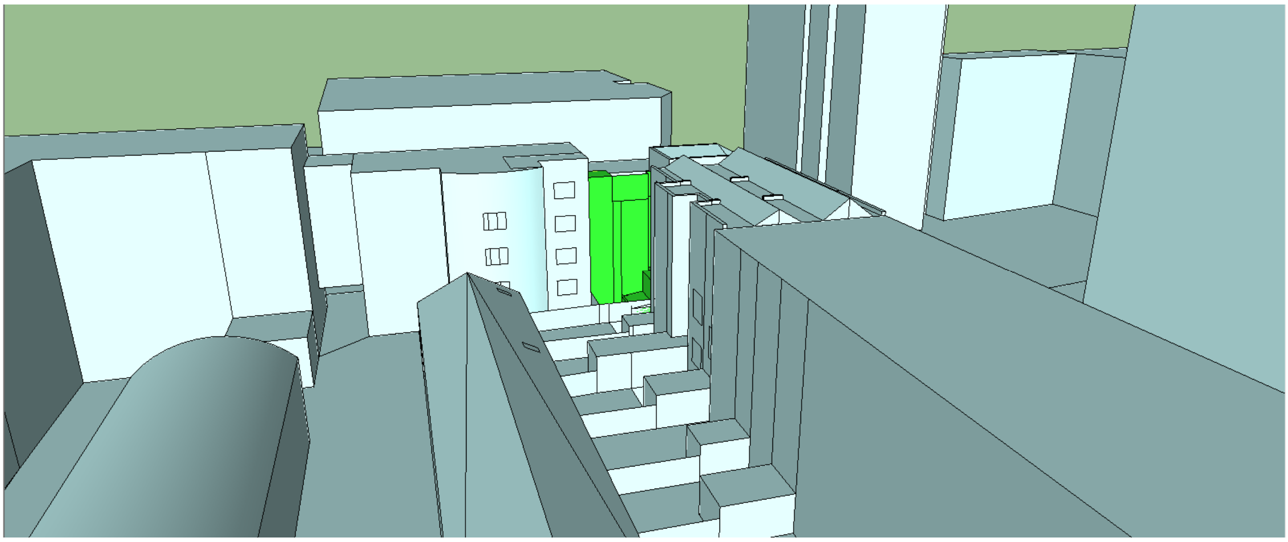


Figure 3.9: 3D model without new development from Overhead

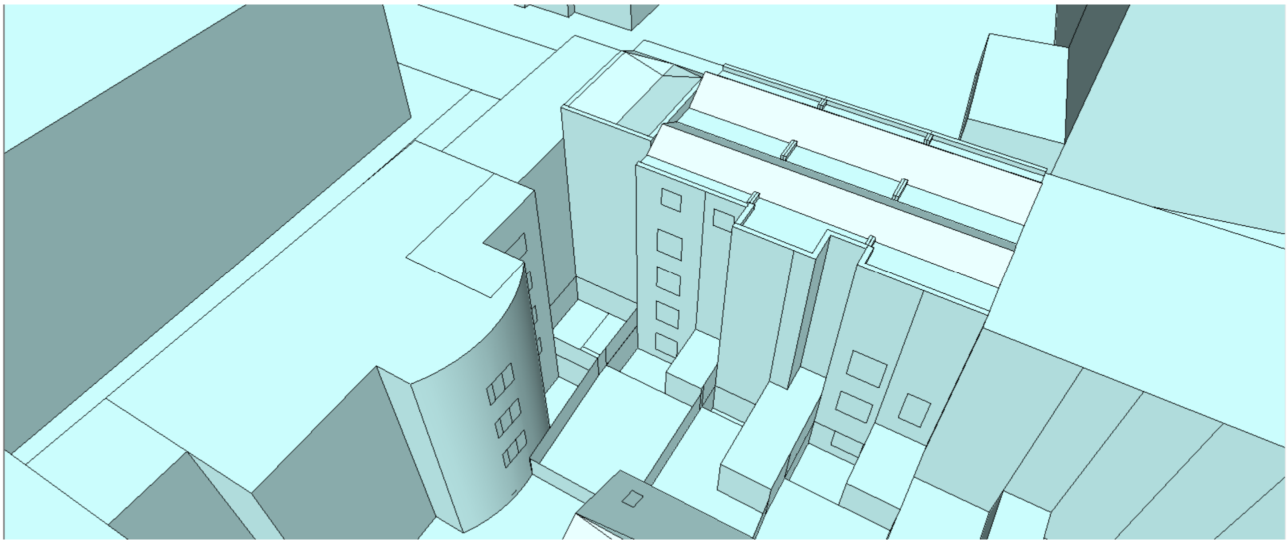
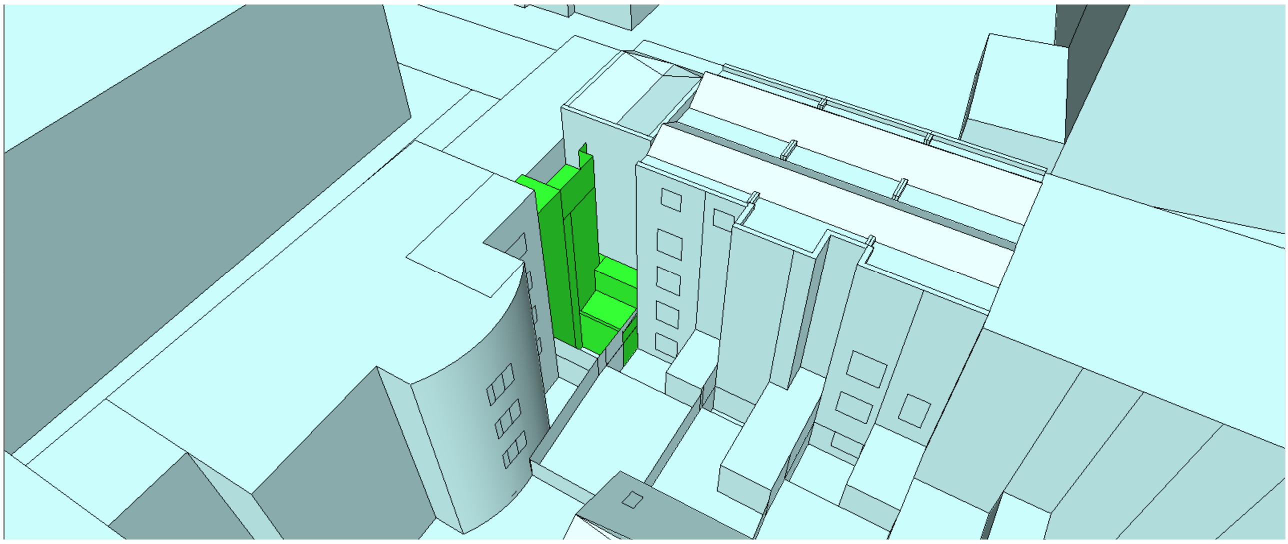


Figure 3.10: 3D model with new development from the Overhead



3.3. Daylight Assessment

When undertaking a daylight assessment, the BRE Report suggests a VSC of 27% or more should be achieved if a room is to be adequately daylit. It also suggests that when existing levels of daylight are below 27% VSC, a reduction of more than 20% from the existing level will be noticeable to the inhabitants, i.e. an impact will occur.

Based on the plans of the site and the positions of the closest buildings, it is possible to calculate the vertical sky component for the residential buildings, for both with and without the proposed development. The Waldram Diagrams can be seen in **Appendix 3** and the results summarised in **Table 3.1**.

3.3.1. 13-15 Grenville Street

It can be seen from **Table 3.1** that all windows will continue to receive the minimum recommended 27% VSC and/or the proposed level of daylight would be greater than 0.8 times the former. Therefore at these windows, under the guidance contained within Appendix I of the BRE Report and replicated in **Table 2.1** of this report, the impact on these windows is considered to be *"negligible"*.

3.3.2. 81 Guilford Street

It can be seen from **Table 3.1** that all windows will continue to receive the minimum recommended 27% VSC and/or the proposed level of daylight would be greater than 0.8 times the former. Therefore at these windows, under the guidance contained within Appendix I of the BRE Report and replicated in **Table 2.1** of this report, the impact on these windows is considered to be *"negligible"*.

3.4. Sunlight Assessment

In order to assess the impact of a development on the levels of sunlight, the APSH has been calculated for windows to 13-15 Grenville Street, as they face within 90° of due south.

According to the BRE Report, direct sunlight on an existing window may be adversely effected by the proposed development if the centre of a window receives less than 25% of Annual Probable Sunlight Hours (APSH), or less than 5% APSH between 21st September and 21st March; **and** receives less lean 0.8 times its former APSH during either period; **and** has a reduction in sunlight over the whole year of greater than 4% APSH.

Table 3.1 details the results of the Annual Probable Sunlight Hours (APSH) calculations for the windows under consideration. **Appendix 4** shows the Sunlight Availability Indicators for these windows.

3.4.1. 13-15 Grenville Street

It can be seen from **Table 3.1** that whilst the windows will experience a reduction in the amount of sunlight that they receive, the reduction is small such that it is not considered to be significant according to the BRE guidance, even with the construction of the proposed development. Consequently, whilst there will be a reduction in sunlight to some windows, any impact on sunlight at any of the windows with the development in place will be considered *"negligible"* under Appendix I of the BRE Report.

Table 3.1: Daylight and Sunlight Impact Assessment

Address	Window No.	Floor	Sky Component			Annual Probable Sunlight Hours					
			Existing	Proposed	Ratio*	Existing		Proposed		Ratio*	
						Full Year	Winter Only	Full Year	Winter Only	Full Year	Winter Only
13-15 Grenville St	1001	Third	22.8%	22.7%	1.00	51%	17%	51%	17%	1.00	1.00
13-15 Grenville St	1002	Third	30.8%	30.8%	1.00	53%	15%	53%	15%	1.00	1.00
13-15 Grenville St	1003	Second	18.1%	17.3%	0.96	43%	12%	43%	12%	1.00	1.00
13-15 Grenville St	1004	Second	26.7%	26.7%	1.00	47%	9%	47%	9%	1.00	1.00
13-15 Grenville St	1005	First	14.1%	12.9%	0.91	37%	6%	36%	6%	0.97	1.00
13-15 Grenville St	1006	First	22.7%	22.7%	1.00	40%	6%	40%	6%	1.00	1.00
13-15 Grenville St	1007	Ground	11.2%	9.8%	0.88	30%	5%	28%	5%	0.93	1.00
13-15 Grenville St	1008	Ground	19.1%	19.1%	1.00	28%	3%	28%	3%	1.00	1.00
81 Guilford Street	1009	Third	35.8%	35.8%	1.00	Sunlight Assessment Not Required (North Facing)					
81 Guilford Street	1010	Third	30.6%	30.6%	1.00	Sunlight Assessment Not Required (North Facing)					
81 Guilford Street	1011	Second	28.9%	28.7%	1.00	Sunlight Assessment Not Required (North Facing)					
81 Guilford Street	1012	First	23.7%	23.4%	0.99	Sunlight Assessment Not Required (North Facing)					
81 Guilford Street	1013	Ground	19.2%	18.9%	0.99	Sunlight Assessment Not Required (North Facing)					

Address	Window No.	Floor	Sky Component			Annual Probable Sunlight Hours					
						Existing		Proposed		Ratio*	
			Existing	Proposed	Ratio*	Full Year	Winter Only	Full Year	Winter Only	Full Year	Winter Only
81 Guilford Street	1014	Basement	11.3%	11.1%	0.99	Sunlight Assessment Not Required (North Facing)					

*= Ratio of proposed levels compared to existing levels

4. INTERIOR DAYLIGHTING CALCULATIONS

It has been determined during the process of the planning application that the rooms within the basement of No 82 will require internal daylight assessments to determine whether they meet the best practice guidelines on internal daylighting.

4.1. Average Daylight Factor

The average daylight factor assessment has been calculated for all of the proposed development. Under the BRE guidelines, the minimum ADF recommended for bedrooms is 1%, living rooms is 1.5% and for kitchens is 2%.

The ADF is calculated by the following formula provided within the Building Research Establishment (BRE) report, *"Site layout planning for daylight and sunlight – Second Edition 2011"* by PJ Littlefair:

$$ADF = \frac{T A_w \theta}{A(1 - R^2)}$$

Where:

T is the diffuse visible transmittance of the glazing (normally 0.68 for double glazing, or lower for roof lights that may be susceptible to soiling);

A_w is the net glazed area of the windows (in m^2);

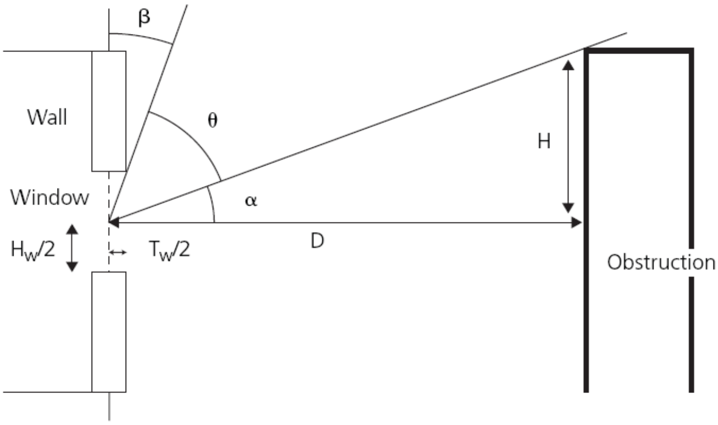
θ is the angle of visible sky in degrees;

A is the total area of room surfaces (in m^2), which includes walls, ceilings and floors; and

R is the average room reflectance (normally 0.5).

Whilst most of the values in the calculation are self explanatory, the angle of visible sky (θ) is more complicated to calculate. **Figure 4.1** graphically shows the angle of concern. θ (the angle of visible sky), can be calculated by subtracting β (the angle of sky obscured by the thickness of the wall) and α (the angle to the sky from the horizontal) from 90°. The angle to the sky from the horizontal is the most important angle, and this is a function of the height of the main obstruction to the window, as well as the distance to this obstruction.

Figure 4.1: Calculating the Angle of Visible Sky



In more complex situations, where there are multiple obstructions, at different heights and distances from the windows of concern, it is possible to model the Vertical Sky Component (VSC) of each window. The VSC is the amount of light falling on the window and is a function of the angle of sky visible from the window. Once the VSC is calculated, it is possible to convert this figure into θ, based on factors provided within the BRE Report, in order to calculate the ADF.

To calculate the VSC, the IES Virtual Environment software (VE-Pro Suite) has been utilised. The VE-Pro software has been accredited by CIBSE and acknowledged by the BRE as a suitable software tool for undertaking daylight, sunlight and overshadowing assessments in accordance with the Building Research Establishment (BRE) report, *"Site layout planning for daylight and sunlight"* Second Edition 2011 by PJ Littlefair. Two separate modules of the VE-Pro suite have been utilised for this assessment:

- ModelIT: enables the creation of three dimensional "Virtual Environment" models without CAD data, or alternatively allows you to create a 3D model from 2D CAD data. ModelIT interfaces with ACAD Revit and Google SketchUp, allowing the import of models created within this packages; and
- RadianceIES: is a detailed 3D simulation tool designed to predict daylight and electric light levels, and the appearance of a space prior to construction. Vertical Sky Components can be calculated for proposed developments using RadianceIES.

For the proposed basement dwellings, **Table 4.1** shows the daylight factor calculations for each window, with **Table 4.2** showing the aggregated results of these calculations for each room.

Table 4.1: Daylight Factor Calculations

Flat	Room Use	Window	T	A_w m²	VSC %	Θ Degrees	A m³	R
Basement	Master Bedroom	Main	0.68	4.6	7.0	30	66	0.5
		Rooflight	0.57	1.1	28.0	67		
	Bedroom 2	Main	0.68	0.6	11.2	37	47	0.5
	Bedroom 3	Main	0.68	0.6	15.6	45	54	0.5

It should be noted in the calculations detailed in **Table 4.1** that the diffuse visible transmittance of the rooflight serving the master bedroom has been adjusted for the fact that it is angled and not vertical.

Table 4.2: ADF Results

Flat	Room Use	Average Daylight Factor (%)
Basement	Master Bedroom	2.7
	Bedroom 2	0.4
	Bedroom 3	0.5

The BRE Report suggests that kitchens should have a minimum ADF of 2%, living rooms 1.5% and bedrooms 1%. **Table 4.2** shows that in the basement of No 82, light within the master bedroom exceeds the minimum recommended best practice levels of daylight; however neither of the other bedrooms meet the minimum best practice guidance on interior daylighting.

5. CONCLUSIONS

Calculations were conducted in accordance with the BRE Report in order to determine the extent to which the proposed redevelopment of82 Guilford Street will affect the levels of daylight and sunlight at adjacent properties.

The calculations have shown that at surrounding properties, there will be a reduction in both daylight and sunlight to a number of windows. However, the reductions in both daylight and sunlight will be fairly small and as such, under the BRE Guidance, the impacts are considered to be *"negligible"*.

The level of interior daylight within the proposed basement has also been assessed. The Master Bedroom, which is considered to be the most important bedroom in terms of daylight, is considered to be well lit with levels of daylight in excess of the best practice guidelines; however the other bedrooms in the basement fail to meet the minimum recommended levels of daylight. It is important to note that the BRE Guidance contains recommendations on internal daylighting. The numerical values given within the report are not minimum standards, but rather aspirational good practice design criteria. Whilst it may be desirable to meet the recommendations within the BRE Guidance, failure to meet these recommendations does not mean that the accommodation is sub-standard, nor should be refused planning permission on this basis. The BRE report states that *"The advice given (in the report) 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 layout design."* Therefore, since the design of the development has been crafted to maximise the available daylight within all rooms, overall, it is recommended that daylight should not be a constraint upon the development of the site.

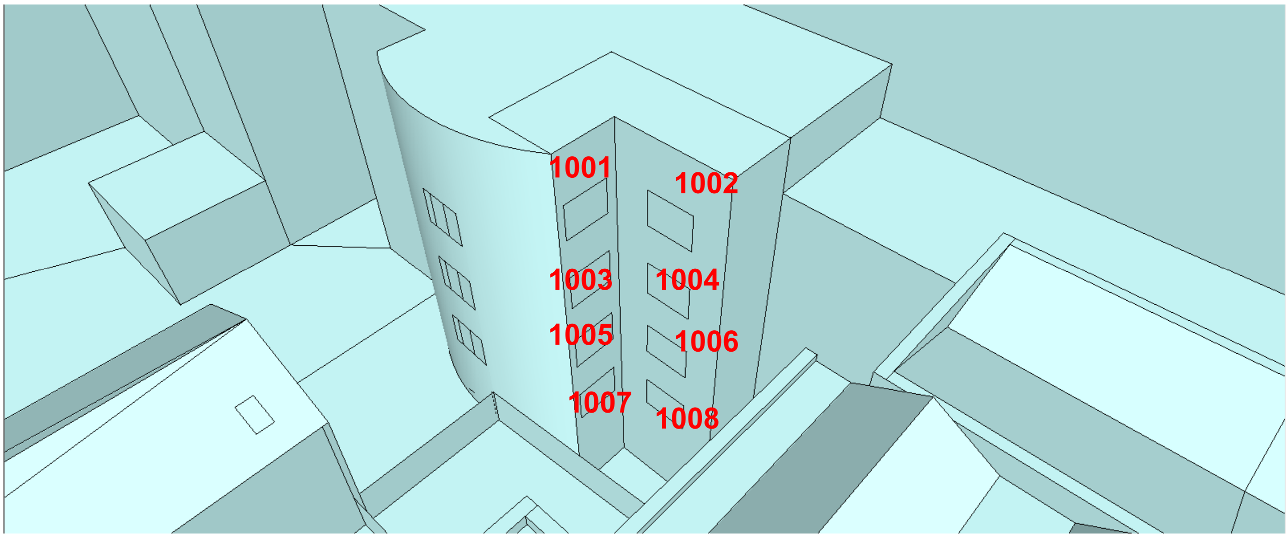
Appendix 1
Site Location Plan

Appendix 1: Site Location Plan

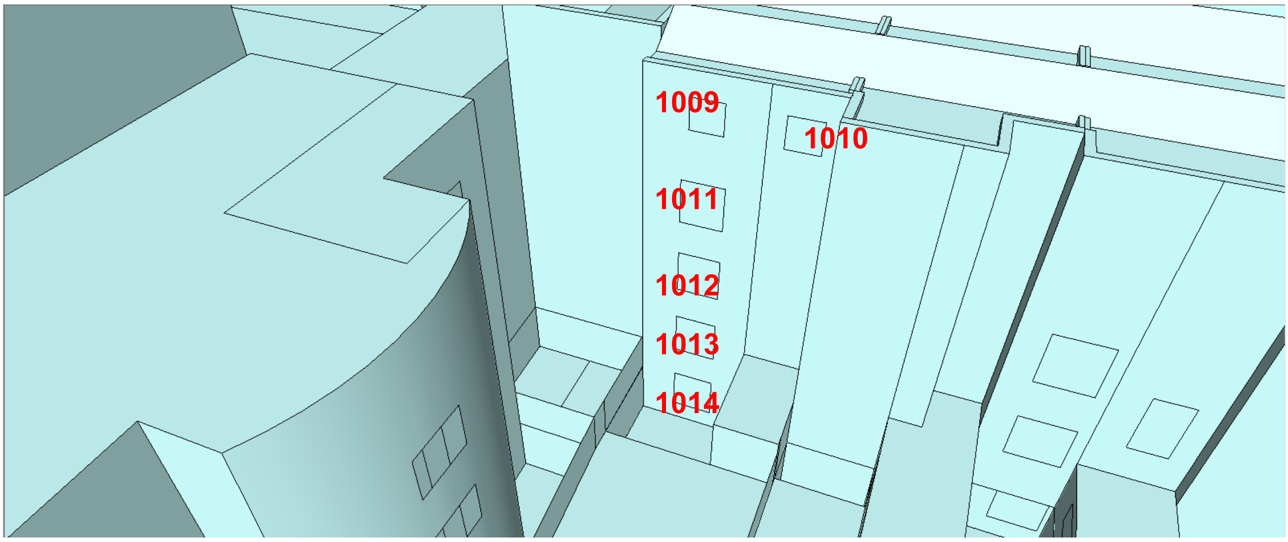
Appendix 2
Window Schedules

Appendix 2: Window Schedules

13-15 Grenville Street



81 Guilford Street



Appendix 3
Waldram Diagams

Appendix 3: Waldram Diagrams

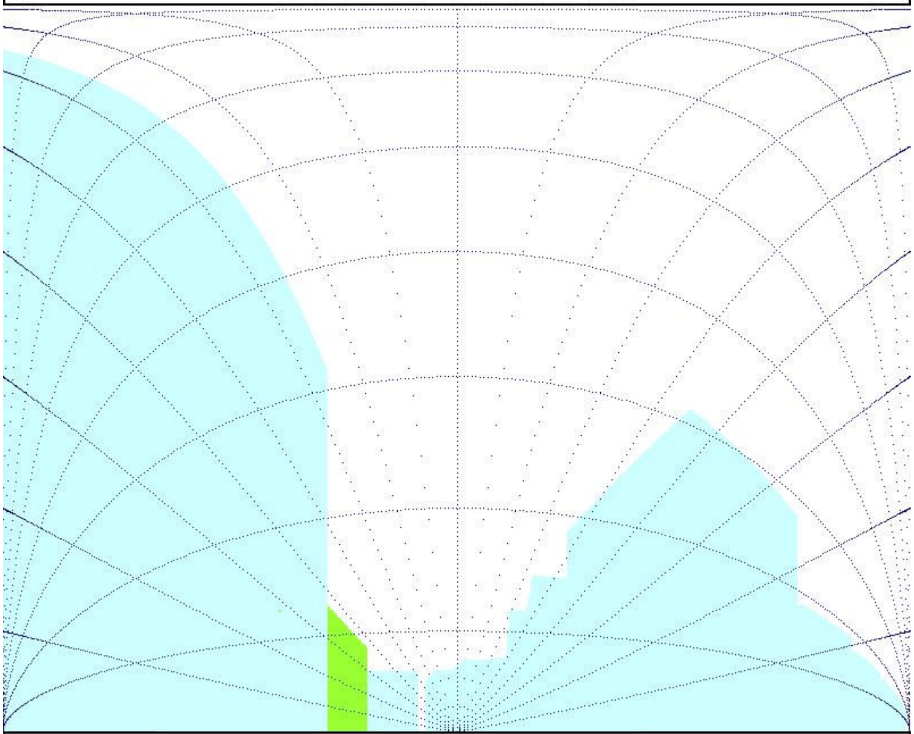
The methodology for calculating the VSC using the Waldram Diagrams is detailed within Appendix B of the Building Research Establishment (BRE) report, "Site layout planning for daylight and sunlight – a guide to good practice" by PJ Littlefair.

The Waldram Diagram dates back to 1923 and consists of a grid of squares, each representing an equal portion of available daylight. Upon the grid, it is possible to draw projections of obstructions as seen from a reference point, plotted with reference to the azimuth angles and altitude angles measured from a reference point. The area of the diagram un-obscured equates to the VSC. If the Waldram Diagram is totally un-obscured by obstructions, this represents the maximum possible VSC of 39.6%. The diagram has been designed in such a way that vertical edges remain vertical in projection, but horizontal edges follow the so called "droop" lines in order to take the cosine law of illumination and the non-uniform luminance of the sky into account. The Waldram Diagram method is a more complex method than the skylight indicator method also described in the BRE report. However, it tends to be more accurate and less open to interpretation and error.

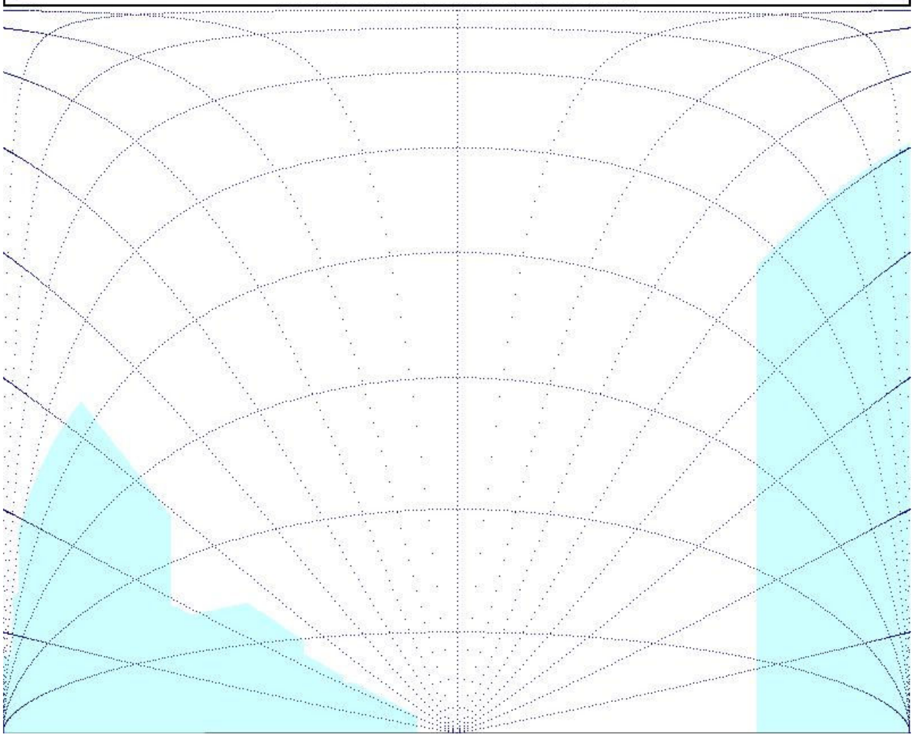
The following pages show a copy of the Waldram Diagrams for each of the affected windows. In the following Waldram Diagrams, the green areas represent the obstructions formed by the proposed development.

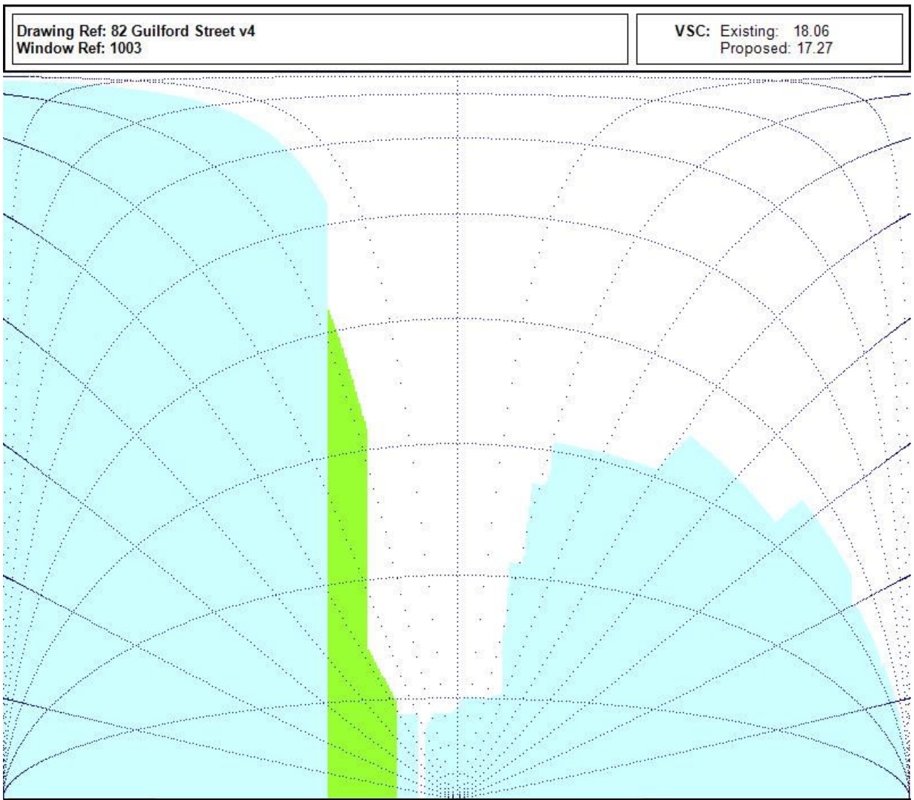
It should be noted that the Waldram Diagrams provided here are for information only. The Waldram Diagrams should only be interpreted by professionals with appropriate experience. The full results from these diagrams are provided earlier in the report.

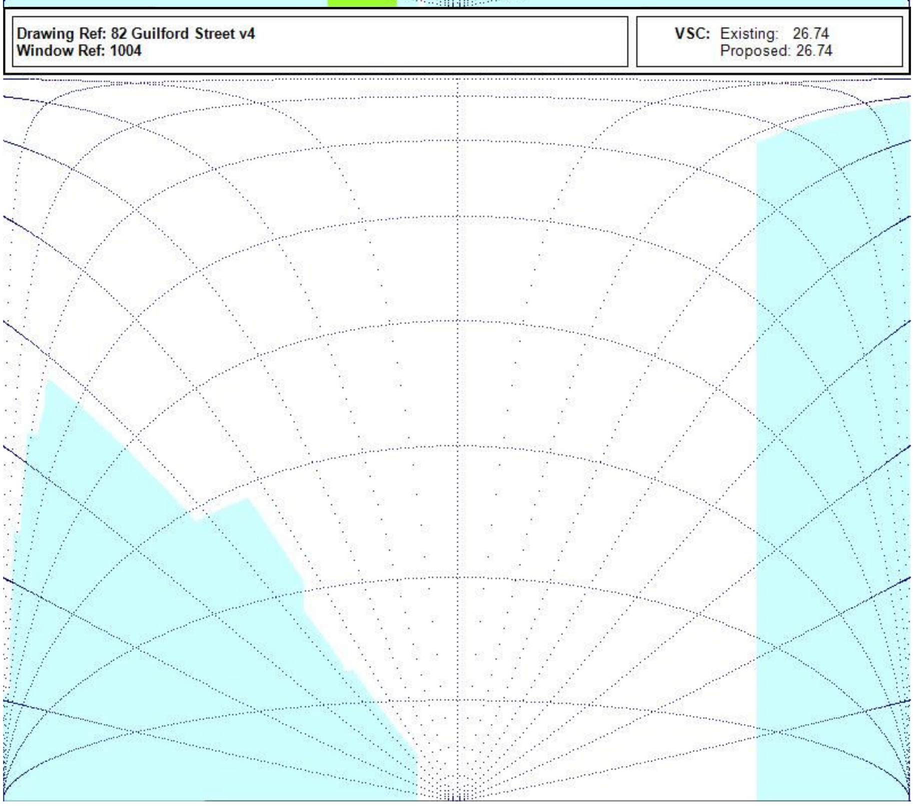
Drawing Ref: 82 Guilford Street v4 **Window Ref:** 1001	**VSC:** Existing: 22.82 Proposed: 22.72

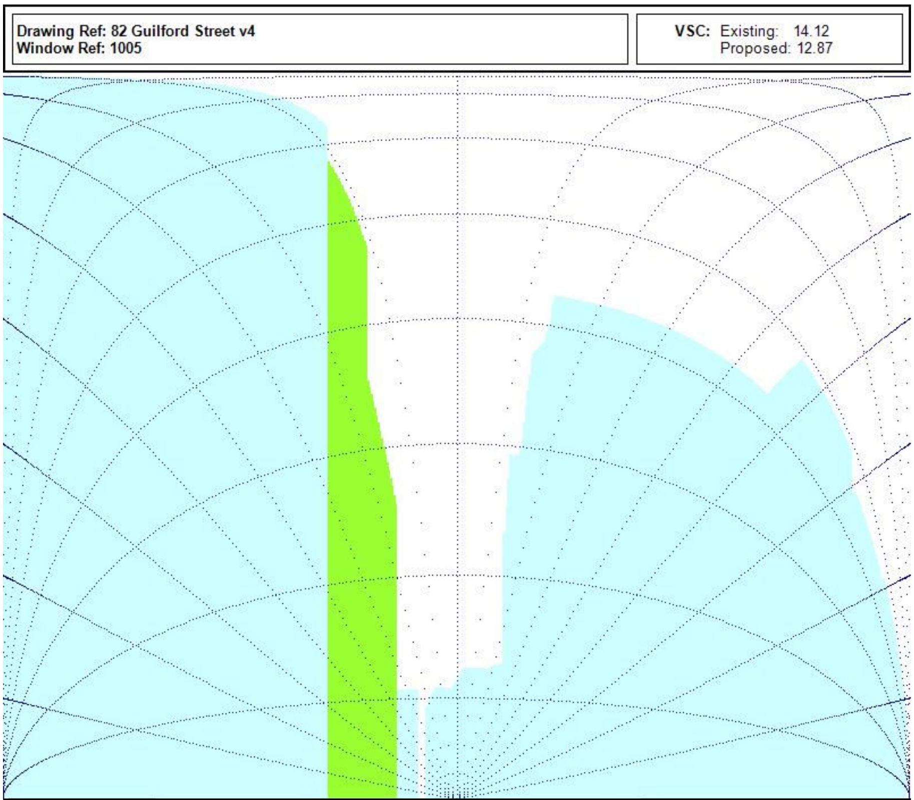


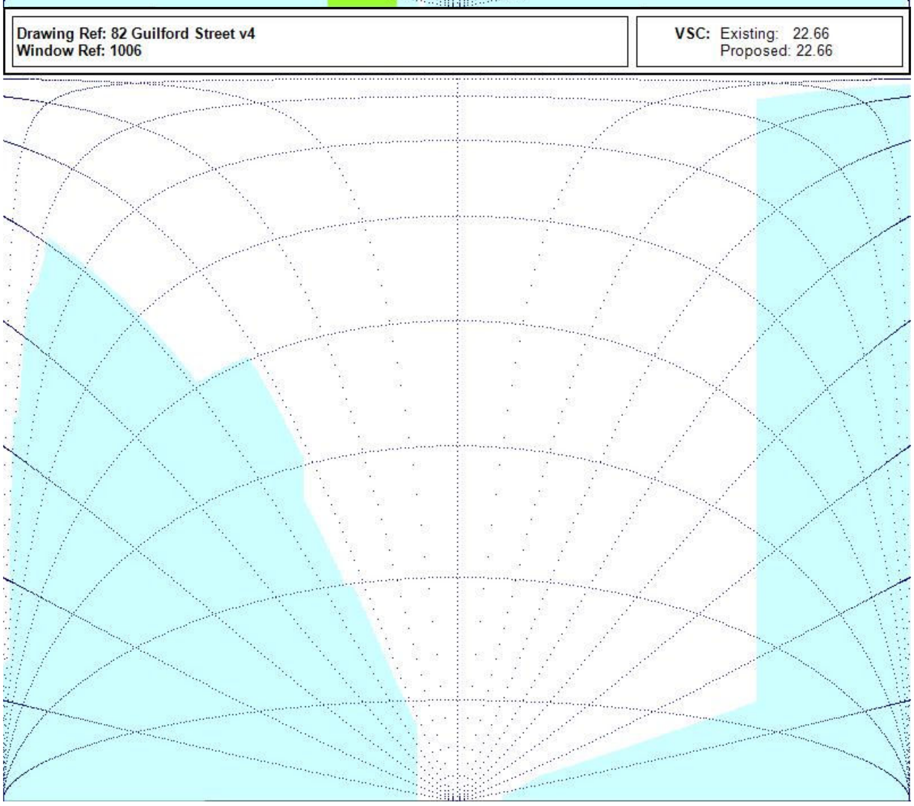
Drawing Ref: 82 Guilford Street v4 **Window Ref:** 1002	**VSC:** Existing: 30.77 Proposed: 30.77



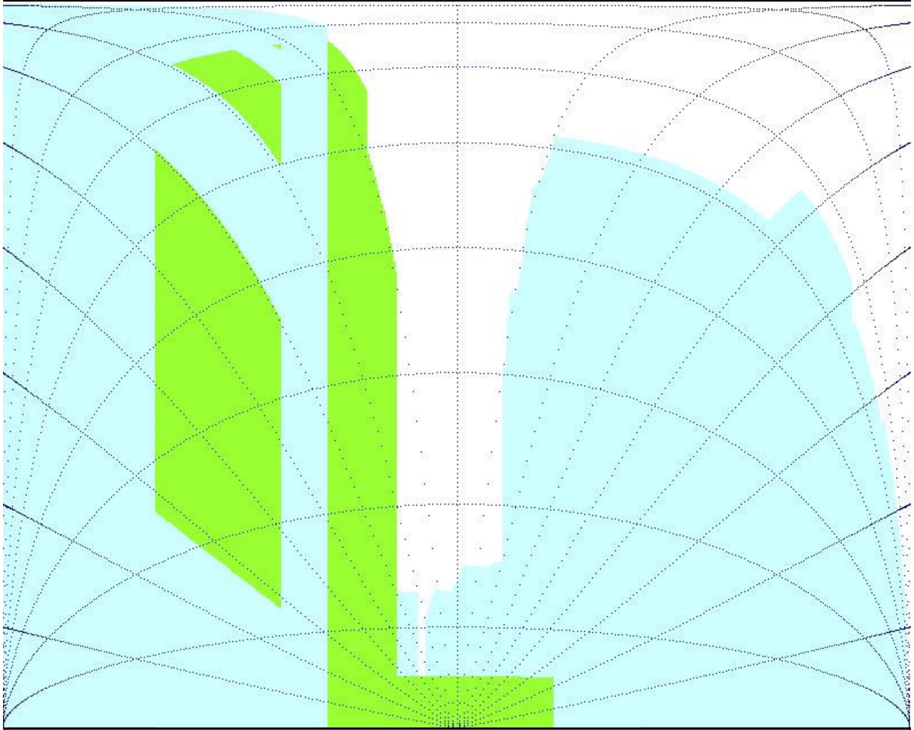

Drawing Ref: 82 Guilford Street v4
Window Ref: 1003
VSC: Existing: 18.06
Proposed: 17.27


Drawing Ref: 82 Guilford Street v4
Window Ref: 1004
VSC: Existing: 26.74
Proposed: 26.74

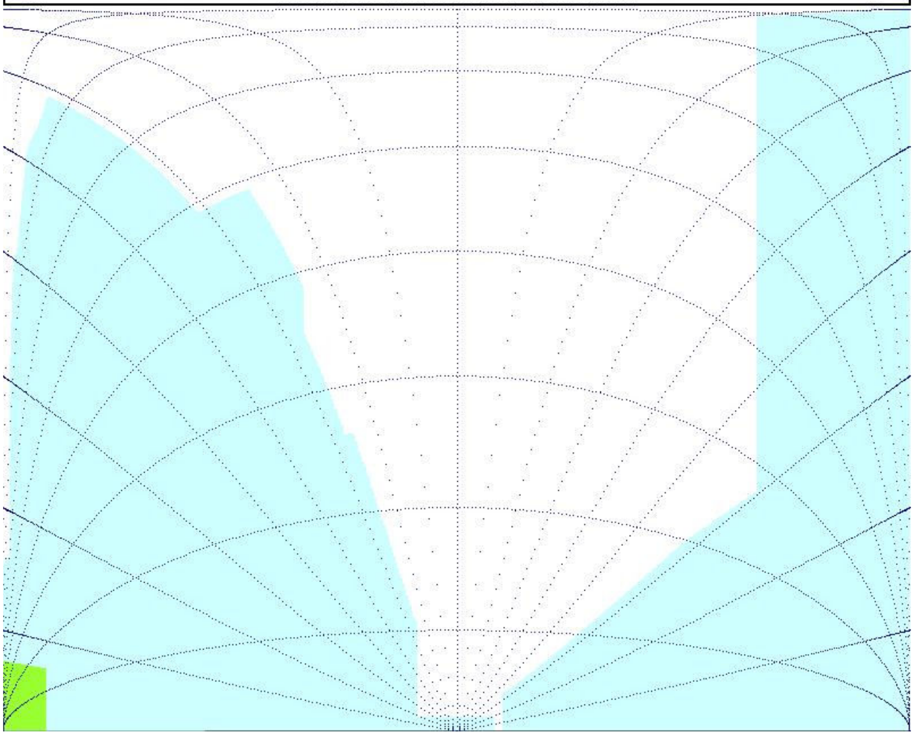

Drawing Ref: 82 Guilford Street v4
Window Ref: 1005
VSC: Existing: 14.12
Proposed: 12.87

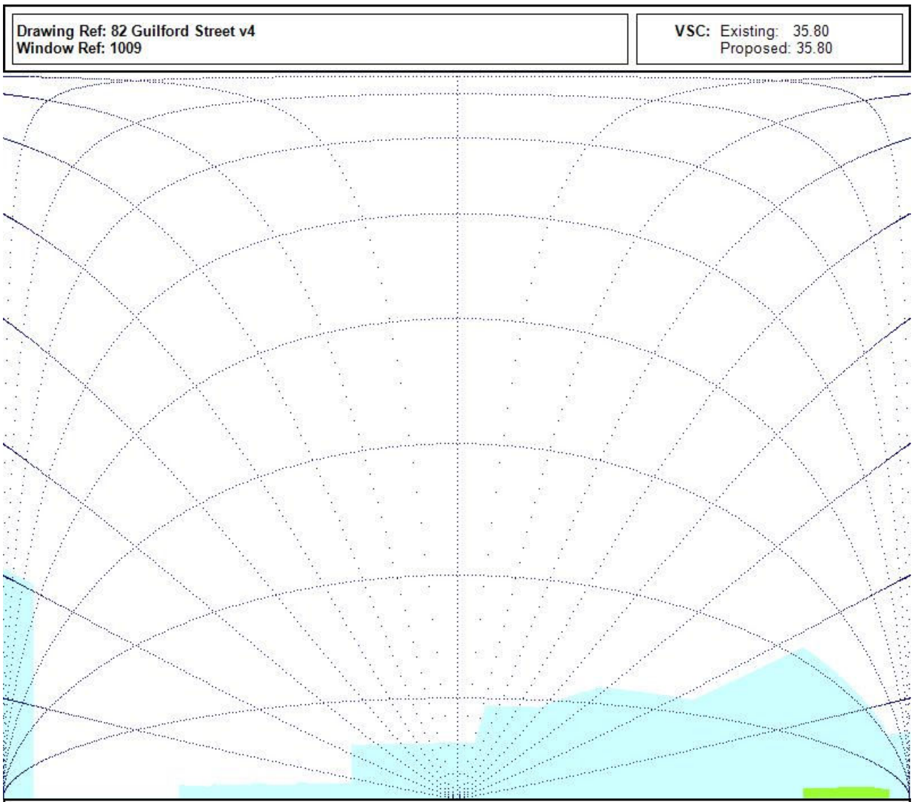

Drawing Ref: 82 Guilford Street v4
Window Ref: 1006
VSC: Existing: 22.66
Proposed: 22.66

Drawing Ref: 82 Guilford Street v4 Window Ref: 1007	VSC: Existing: 11.23 Proposed: 9.84



Drawing Ref: 82 Guilford Street v4 Window Ref: 1008	VSC: Existing: 19.09 Proposed: 19.09

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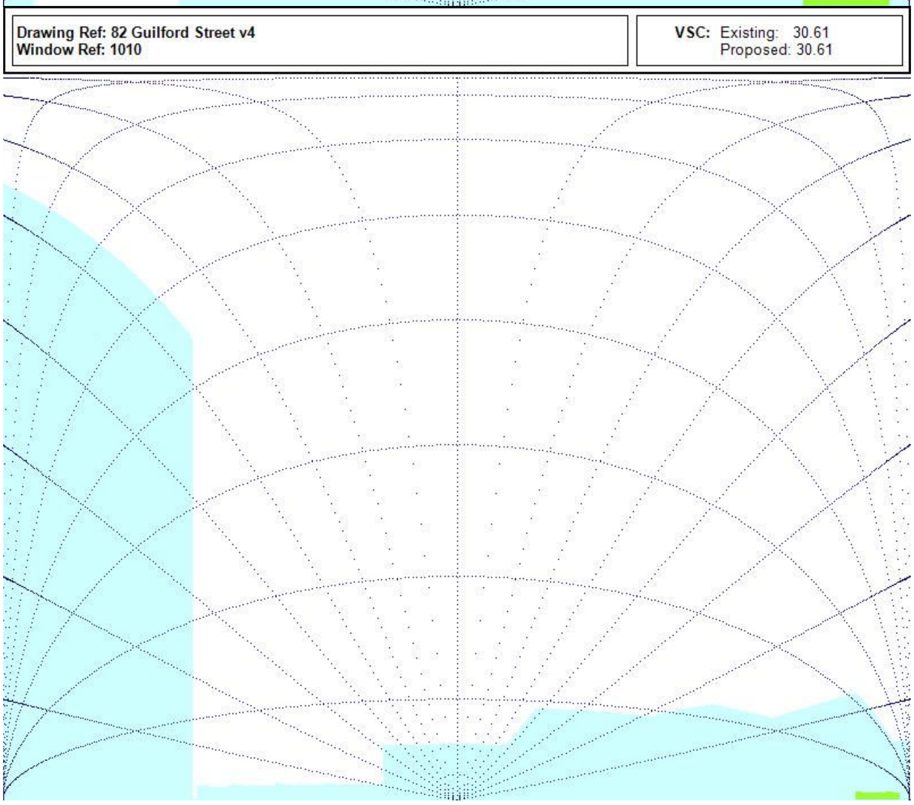
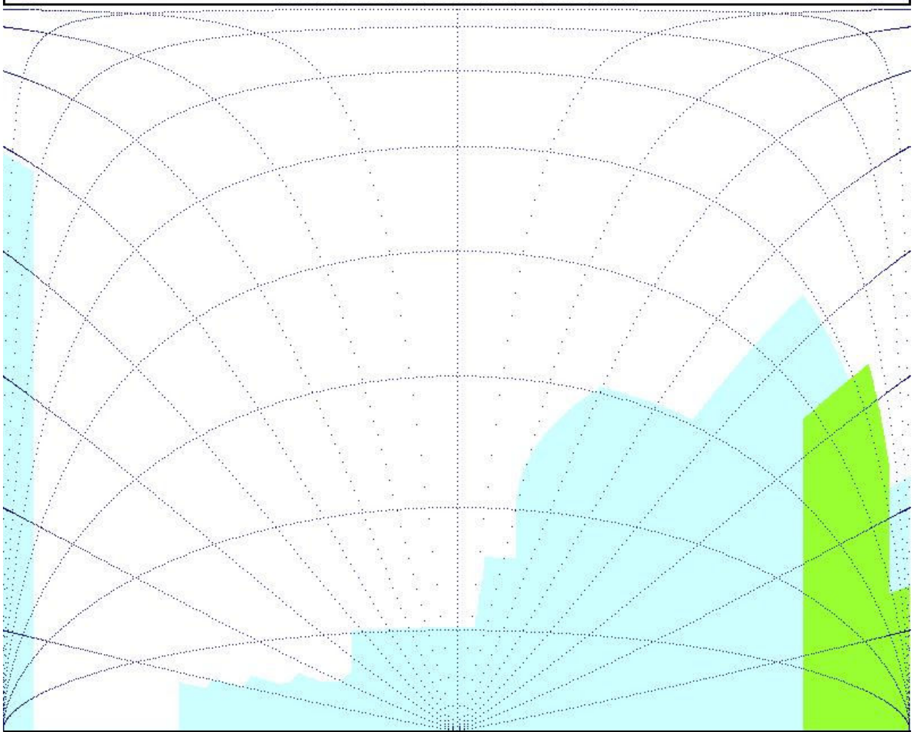
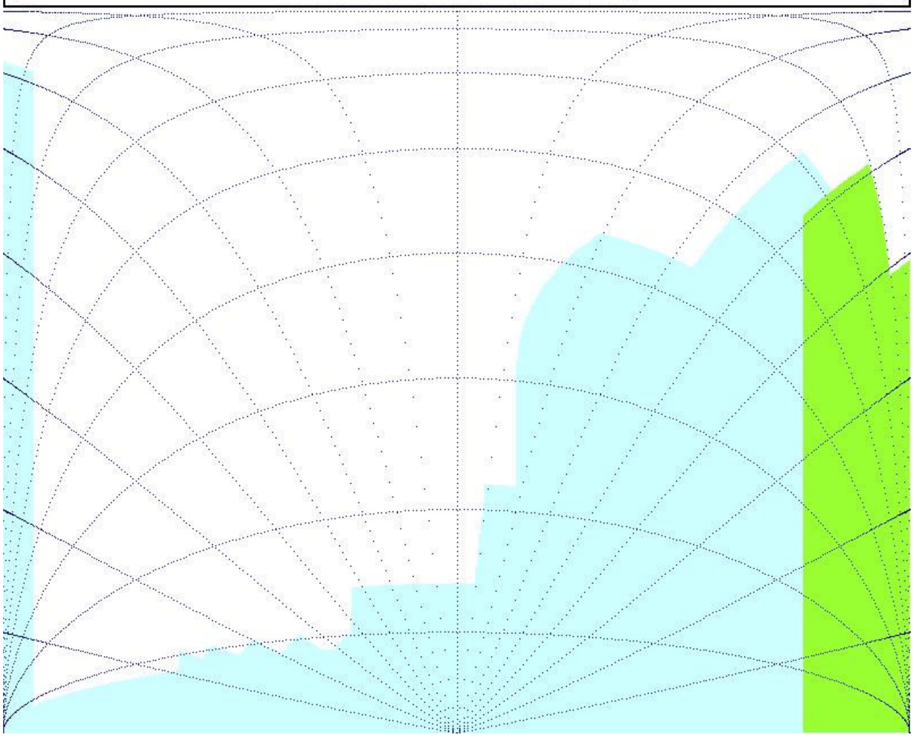
Window Ref: 1009
VSC: Existing: 35.80
Proposed: 35.80

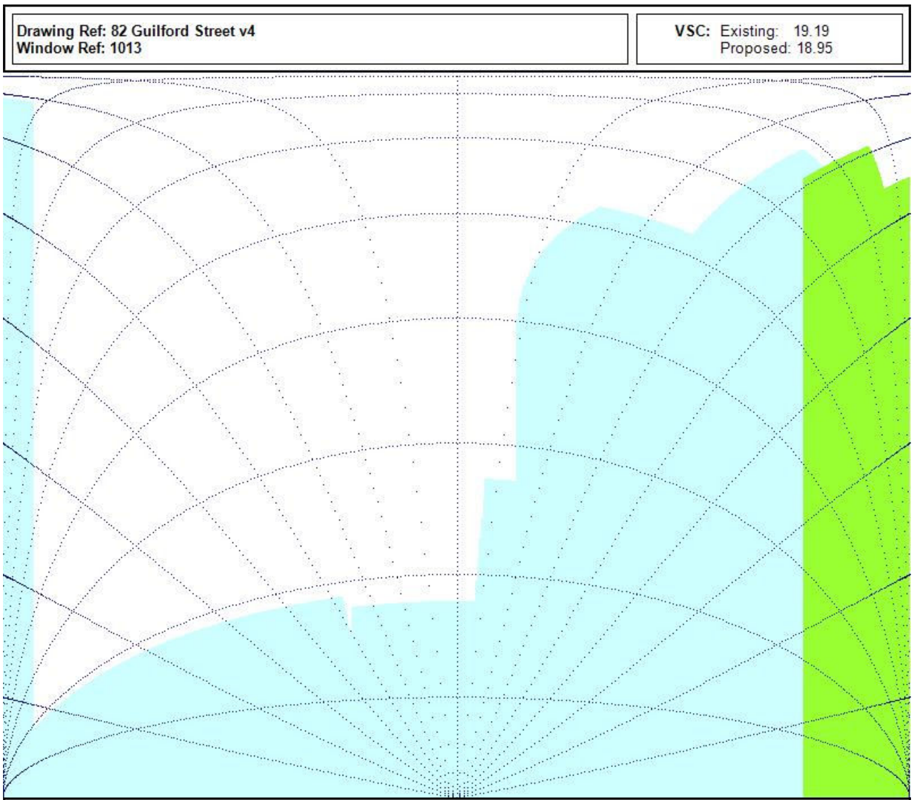

Drawing Ref: 82 Guilford Street v4
Window Ref: 1010
VSC: Existing: 30.61
Proposed: 30.61

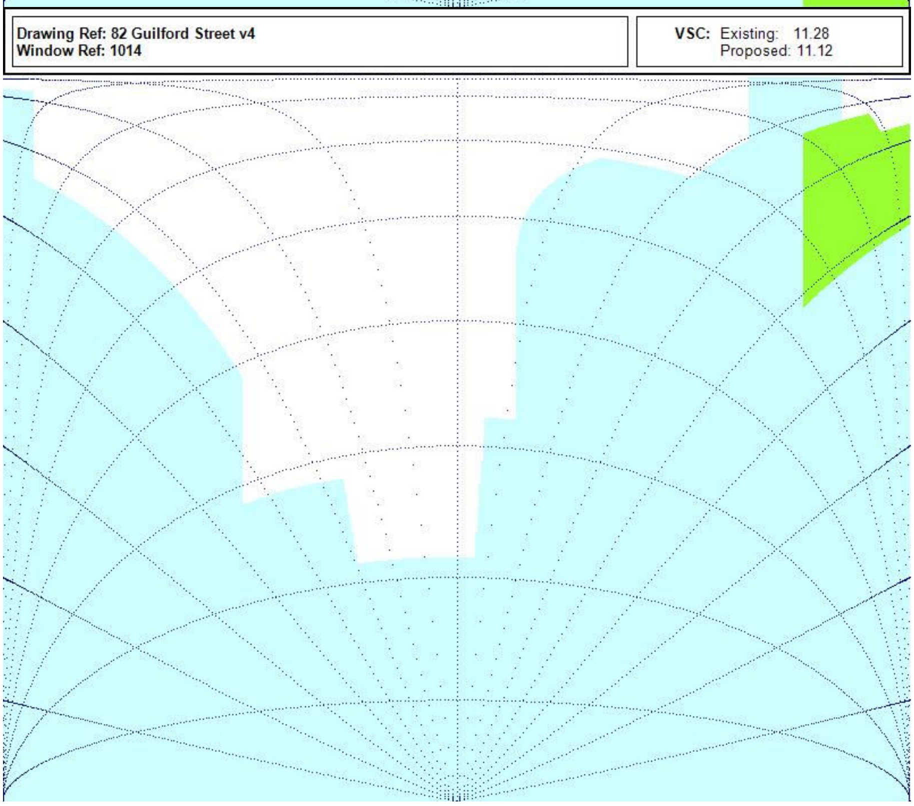
Drawing Ref: 82 Guilford Street v4 **Window Ref:** 1011	**VSC:** Existing: 28.86 Proposed: 28.75



Drawing Ref: 82 Guilford Street v4 **Window Ref:** 1012	**VSC:** Existing: 23.66 Proposed: 23.42

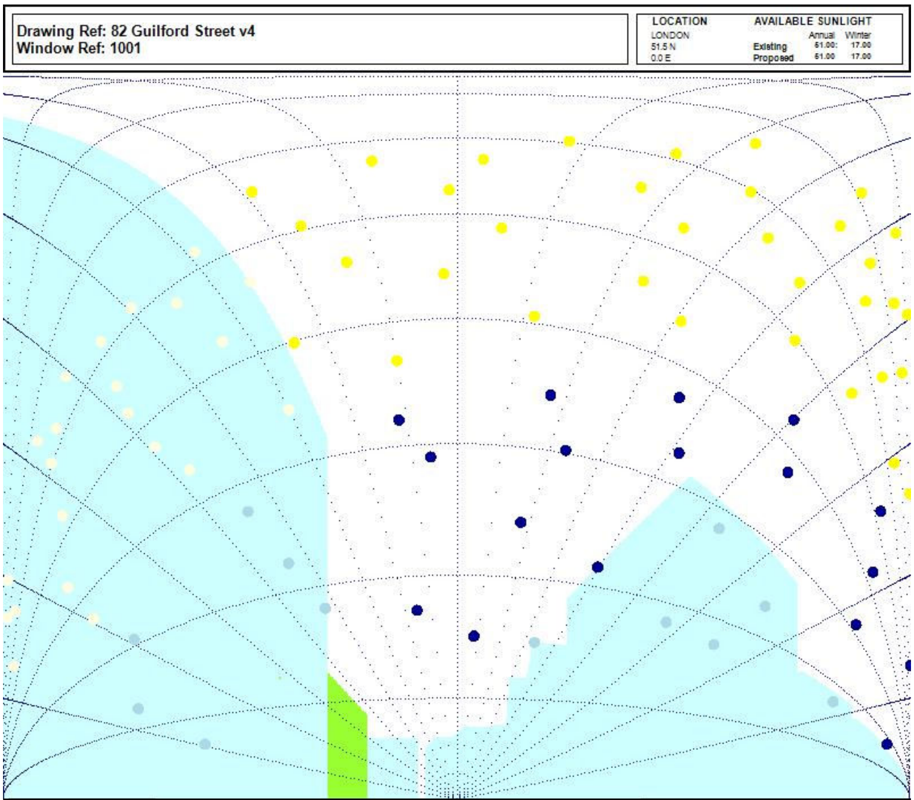


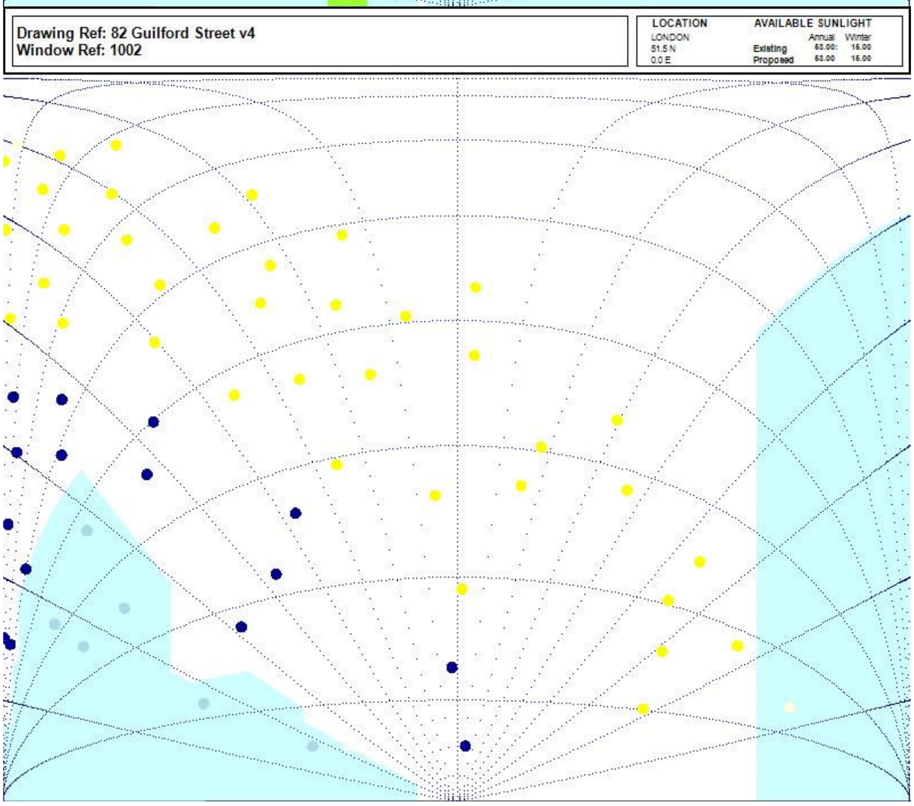

Drawing Ref: 82 Guilford Street v4
Window Ref: 1013
VSC: Existing: 19.19
Proposed: 18.95

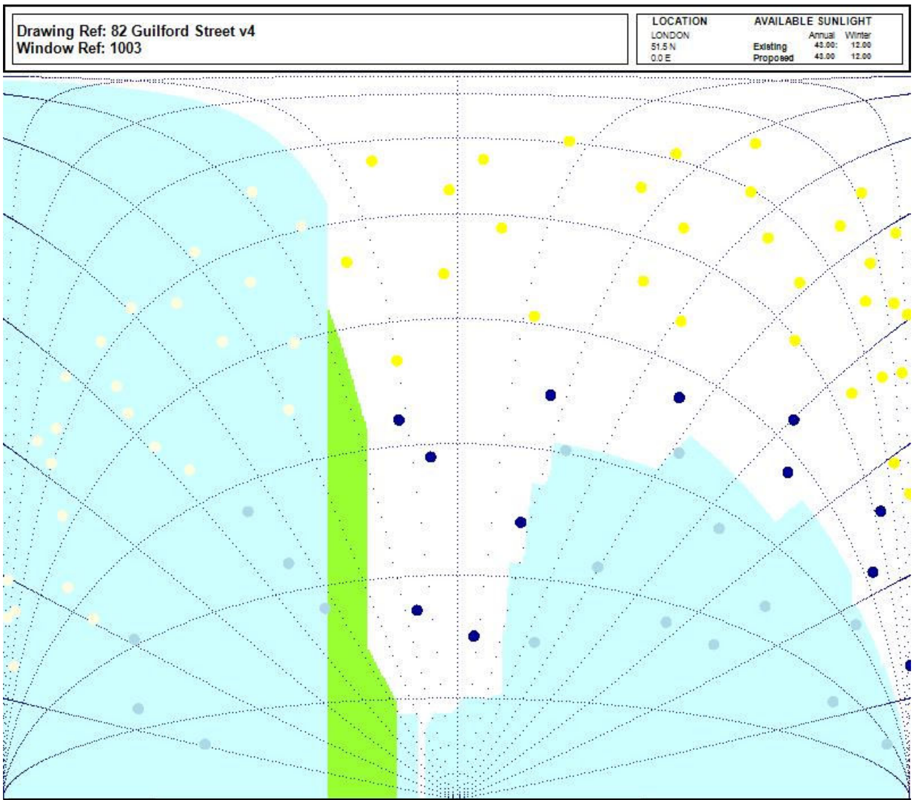

Drawing Ref: 82 Guilford Street v4
Window Ref: 1014
VSC: Existing: 11.28
Proposed: 11.12

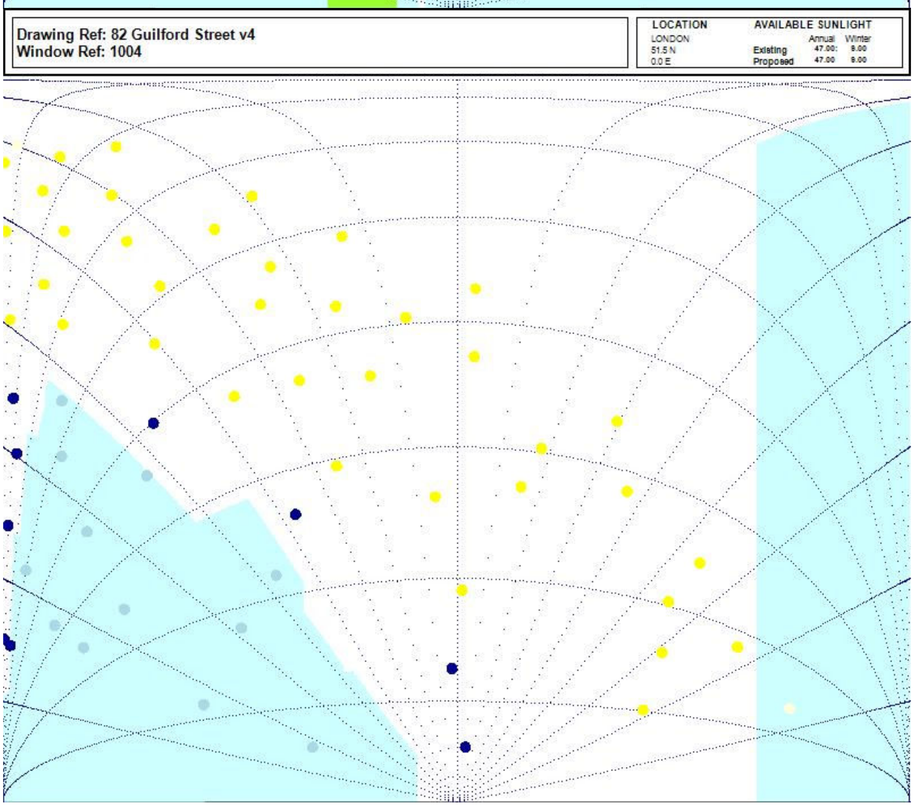
Appendix 4
Sunlight Availability Indicators

Appendix 4: Sunlight Availability Indicators






Drawing Ref: 82 Guilford Street v4
Window Ref: 1003
LOCATION
LONDON
51.5 N
0.0 E
AVAILABLE SUNLIGHT
Annual Winter
Existing 43.00: 12.00
Proposed 43.00 12.00


Drawing Ref: 82 Guilford Street v4
Window Ref: 1004
LOCATION
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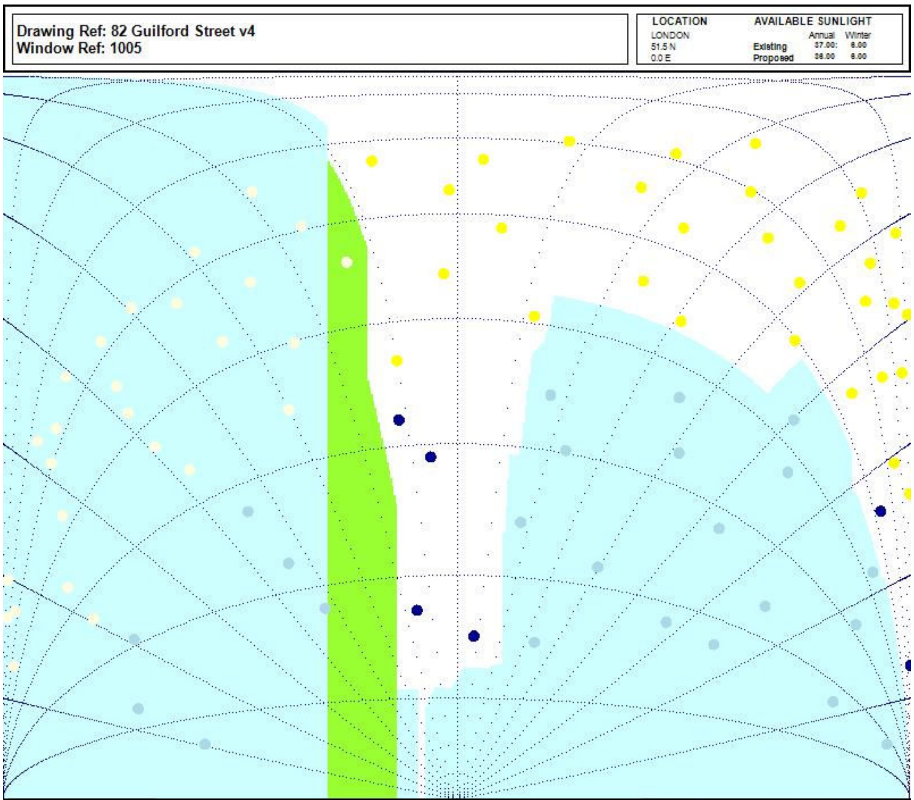
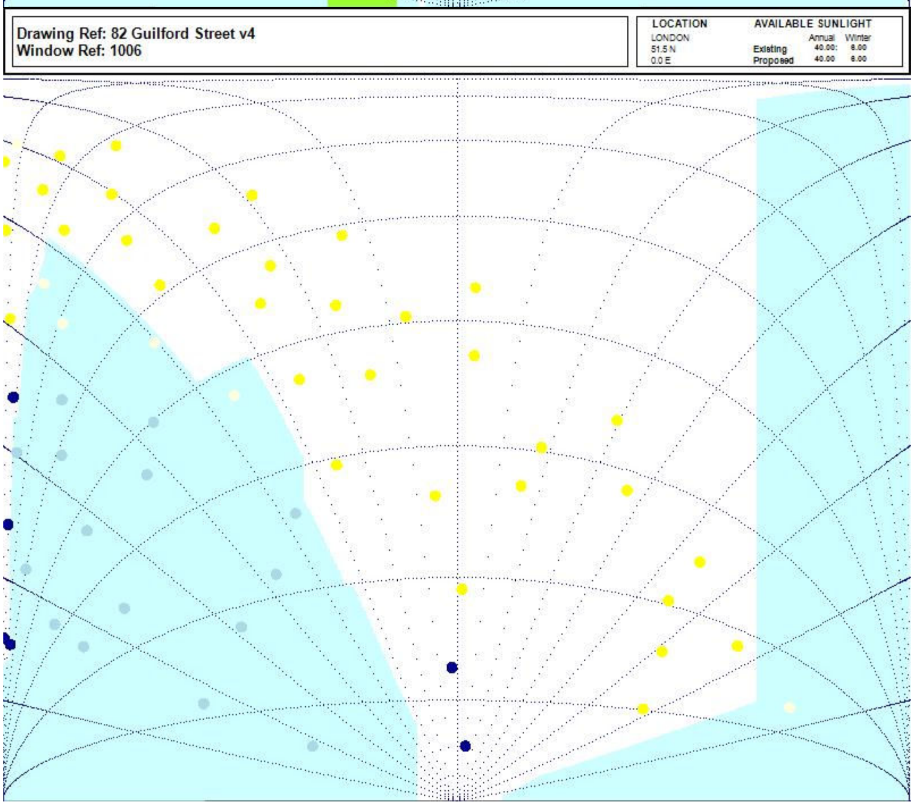
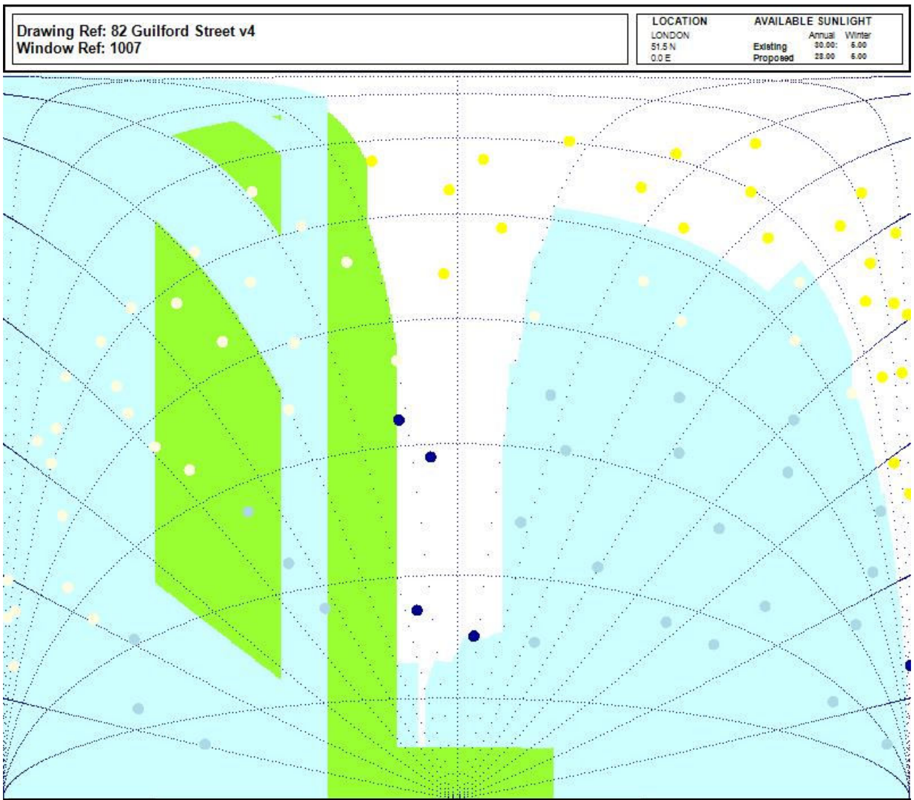
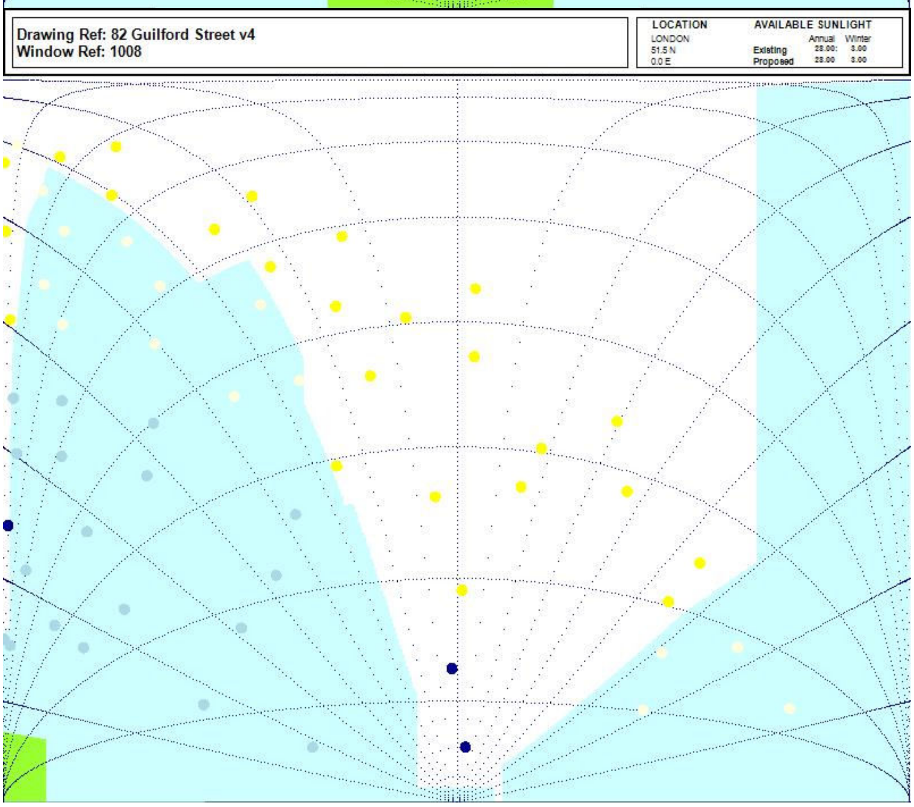
51.5 N
0.0 E
AVAILABLE SUNLIGHT
Annual Winter
Existing 47.00: 9.00
Proposed 47.00 9.00


Drawing Ref: 82 Guilford Street v4
Window Ref: 1005
LOCATION
LONDON
51.5 N
0.0 E
AVAILABLE SUNLIGHT
Annual Winter
Existing 37.00: 6.00
Proposed 36.00 6.00


Drawing Ref: 82 Guilford Street v4
Window Ref: 1006
LOCATION
LONDON
51.5 N
0.0 E
AVAILABLE SUNLIGHT
Annual Winter
Existing 40.00: 6.00
Proposed 40.00 6.00


Drawing Ref: 82 Guilford Street v4
Window Ref: 1007
LOCATION
LONDON
51.5 N
0.0 E
AVAILABLE SUNLIGHT
Annual Winter
Existing 30.00: 6.00
Proposed 28.00 6.00


Drawing Ref: 82 Guilford Street v4
Window Ref: 1008
LOCATION
LONDON
51.5 N
0.0 E
AVAILABLE SUNLIGHT
Annual Winter
Existing 28.00: 3.00
Proposed 28.00 3.00