



Client : Hind Property Co. Ltd

Daylight and Sunlight Assessment for
24 Sackville Street, Barnsley

November 2013

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1 **Background and Scope of Appraisal**

Herrington Consulting has been commissioned by Hind Property Co Ltd to assess the potential impact of the proposed development at 24 Sackville Street, Barnsley, S70 2NQ in relation to daylight, sunlight and overshadowing on the neighbouring building(s). The key objectives of the assessment are as follows:

- To assess the baseline conditions at the site;
- to analyse the potential impacts of the Development on the daylight and sunlight currently received by the existing neighbouring buildings;
- to assess these impacts in line with any relevant planning policies and best practice guidance.

2 The Site and Development Proposals

2.1 Site Location

The site is located on Sackville Street in Barnsley, adjacent to the recently constructed Gateway Plaza building. The site plan included in Appendix A.1 of this report gives a more detailed reference to the site location and layout.

2.2 The Development

The proposals for development are to demolish the existing building and to construct a new three-storey block of 6 houses, with parking provision on a semi-basement level. Drawings of the proposed scheme are included in Appendix A.1 of this report.

3 Policy and Guidance

3.1 Best Practice Guidance

In the absence of official national planning guidance / legislation on daylight and sunlight, the most recognised guidance document is published by the Building Research Establishment and entitled 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice', Second Edition, 2011; herein referred to as the 'BRE Guidelines'.

The BRE Guidelines are not mandatory and themselves state that they should not be used as an instrument of planning policy, however in practice they are heavily relied upon as they provide a good guide to approach, methodology and evaluation of daylight and sunlight impacts.

In conjunction with the BRE Guidelines further guidance is given within the British Standard (BS) 8206-2:2008: 'Lighting for buildings - Part 2: Code of practice for daylighting'.

In this assessment the BRE Guidelines have been used to establish the extent to which the Proposed Development meets current best practice guidelines. In cases where the Development is likely to reduce light to key windows the study has compared results against the BRE criteria.

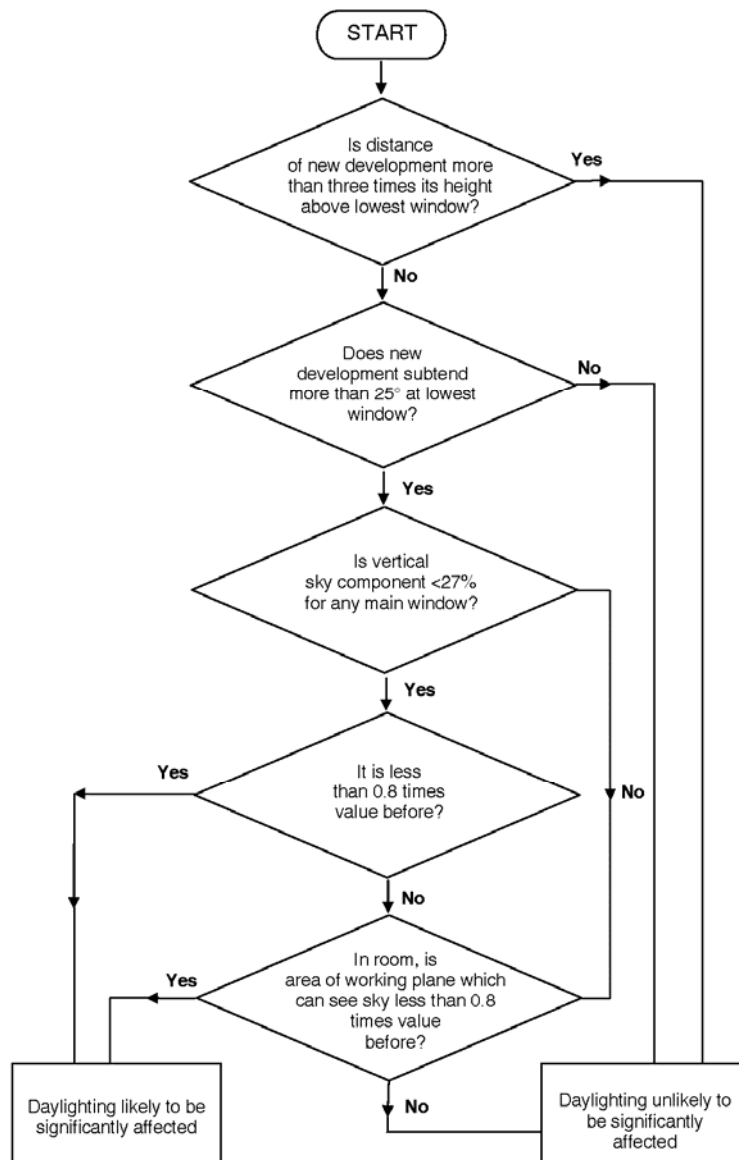
Whilst the BRE Guidelines provide numerical guidance for daylight, sunlight and overshadowing, these criteria should not be seen as absolute targets since, as the document states, the intention of the guide is to help rather than constrain the designer. The Guide is not an instrument of planning policy, therefore whilst the methods given are technically robust, it is acknowledged that some level of flexibility should be applied where appropriate.

4 Assessment Techniques

4.1 Background

Natural light refers to both daylight and sunlight. However, a distinction between these two concepts is required for the purpose of analysis and quantification of natural light in buildings. In this assessment, the term '*Daylight*' is used for natural light where the source is the sky in overcast conditions, whilst '*Sunlight*' refers specifically to the light coming directly from the sun.

The primary objective of this assessment is to quantify the impacts of the proposed development on the adjacent building and therefore the methods employed by this study are focussed on this objective. These methodologies are described in the following sections of this report and follow the hierarchical approach set out by the BRE Guidelines. The 'decision chart' outlining this process (Figure 20 of the Guidelines) has been reproduced below.



The BRE guidelines are intended for use for rooms in adjoining dwellings. They may also be applied to any existing non-domestic buildings where the occupants have a reasonable expectation of daylight, which could include schools, hospitals, hotels and offices. For dwellings it states that living rooms, dining rooms and kitchens should be assessed. Bedrooms should also be checked, although it states that they are less important. Other rooms, such as bathrooms, toilets, storerooms, circulation areas and garages need not be assessed.

4.2 Vertical Sky Component (VSC)

The Vertical Sky Component (VSC) calculation is the ratio of the direct sky illuminance falling on the outside of a window, to the simultaneous horizontal illuminance under an unobstructed sky. The standard CIE (Commission Internationale d'Éclairage) Overcast Sky is used and the ratio is expressed as a percentage. For example, a window that has an unobstructed view over open fields would benefit from the maximum VSC, which would be close to 40%. For a window to be considered as having a reasonable amount of skylight reaching it, the BRE Guidelines suggests that a minimum VSC value of 27% should be achieved. When assessing the impact of a new development on an existing building the BRE Guidelines sets out the following specific requirement:

If the VSC with the new development in place is both less than 27% and less than 0.8 times its former value, then the reduction in light to the window is likely to be noticeable.

This means that a reduction in the VSC value of up to 20% its former value would be acceptable and thus the impact would be considered negligible. It is important to note that the VSC is a simple geometrical calculation, which provides an early indication of the potential for daylight entering the space. It does not, however, assess or quantify the actual daylight levels inside the rooms.

4.3 No Sky Line

The No Sky Line, or sometimes referred to as No Sky View method, describes the distribution of daylight within rooms by calculating the area of the 'working plane', which can receive a direct view of the sky and hence 'skylight'. The working plane height is generally set at 850mm above floor level within a residential property and 700mm within a commercial property.

The BRE Guidelines state that if following the construction of a new development the No Sky Line moves so that the area of existing room that does not receive direct skylight is reduced to less than 0.8 times its former value, the impact will be noticeable to the occupants. This is also true if the No Sky Line encroaches onto key areas like kitchen sinks and worktops.

One benefit of the daylight distribution test is that the resulting contour plans show where the light falls within a room, both in the existing and proposed conditions, and a judgment may be made as to whether the room will retain light to a reasonable depth.

This method can only be accurately used to examine the impact of new development on the daylight distribution within existing buildings when the internal room layout is known. However, in

circumstances where the internal layout and dimensions of the affected room are not known, best estimates are used.

4.4 Overshadowing

The BRE Guidance suggests that where a large building is proposed, which may affect a number of gardens or an area of open space, then analysis can be undertaken to quantify the loss of sunlight resulting from overshadowing. Typical examples of areas that could be considered as open spaces or amenity areas are main back gardens of houses, allotments, parks and playing fields, children's playgrounds, outdoor swimming pools, sitting-out areas, such as in public squares and focal points for views, such as a group of monuments or fountains. The Guidance suggests that at least half of the amenity area should receive at least two hours of sunlight on the 21st March.

When undertaking this analysis sunlight from an altitude of 10° or less has been ignored as this is likely to be obscured by planting and undulations in the surrounding topography. Driveways and hard standing for cars is also usually left out of the area used for this calculation. Fences or walls less than 1.5 metres high are also ignored. Front gardens which are relatively small and visible from public footpaths are omitted with only main back gardens needing to be analysed.

The guide notes that "normally, trees and shrubs need not be included, partly because their shapes are almost impossible to predict, and partly because the dappled shade of a tree is more pleasant than a deep shadow of a building". This is especially the case for deciduous trees, which provide welcome shade in the summer whilst allowing sunlight to penetrate during the winter months.

4.5 Annual Probable Sunlight Hours

It is also possible to quantify the amount of sunlight available to a new development and the recognised methodology for undertaking this analysis is the Annual Probable Sunlight Hours (APSH) method.

In the case of sunlight, the assessment is equally applied to adjoining dwellings and any existing non-domestic buildings where there is a particular requirement for sunlight. The BRE Guidelines set out a hierarchy of tests to determine whether the proposed development will have a significant impact. These are set out in order of complexity below:

Test 1 – Assess whether the windows to main living rooms and conservatories of the buildings surrounding the site are situated within 90° of due south. Obstruction to sunlight may become an issue if some part of the new development is situated within 90° of due south of a main window wall of an existing building.

Test 2 - Draw a section perpendicular from the centre of the window in any window walls identified by Test 1. If the angle subtended between the horizontal line drawn from the centre of

the lowest window of the existing building and the proposed development is less than 25°, then the proposed development is unlikely to have a substantial effect on the direct sunlight enjoyed by the existing window.

Test 3 – If the window wall faces within 20° of due south and the reference point has a VSC of 27% or more, then the room is considered to receive sufficient sunlight.

Test 4 – If all of the above tests have been failed, then a more detailed analysis is required to determine the obstruction level to the existing building. In such cases, the BRE Guidance recommends the use of the Annual Probable Sunlight Hours (APSH) test to assess the impact on the availability of sunlight. To pass this test the centre point of the window will need to receive more than one quarter of APSH, including at least 5% APSH in the winter months between 21st September and the 21st March. The BRE Guidelines state that if 'post-development' the available sunlight hours are both less than the amount above and less than 0.8 times their 'pre-development' value, either over the whole year or just within the winter months, then the occupants of the existing building will notice the loss of sunlight. In addition, if the overall annual loss is greater than 4% of APSH, the room may appear colder and less pleasant.

4.6 **Average Daylight Factor**

The Average Daylight Factor (ADF) method calculates the average illuminance within a room as a proportion of the illuminance available to an unobstructed point outdoors under a sky of known luminance and luminance distribution. This is the most detailed of the daylight calculations and considers the physical nature of the room behind the window, including; window transmittance, and surface reflectivity.

This method of quantifying the availability of daylight within a room does, however, require the internal layout to be known and is generally only used for establishing daylight provision in new rooms. The BRE Guide sets out the following guidelines for the assessment of the ADF:

If a predominantly daylit appearance is required, then the ADF should be 5% or more if there is no supplementary electric lighting, or 2% or more if supplementary electric lighting is provided. In dwellings, the following minimum average daylight factors should be achieved: 1% in bedrooms, 1.5% in living rooms and 2% in kitchens.

For offices, the British Council for Offices (BCO) Guide to Lighting provides guidance on how to specify good office lighting. The main message is to use daylight effectively and use artificial lighting only where and when it's needed. The new guide recognises that maximising natural daylight within offices can bring about tangible benefits for employee wellbeing and suggests that a well daylit office space is one that achieves an average daylight factor of between 2% and 5%.

5 Assessment Methodology

5.1 Identification of Key Sensitive Receptors

The BRE Guidelines are intended for use for rooms and adjoining dwellings where daylight is required, including living rooms, kitchens and bedrooms. Windows to bathrooms, toilets, storerooms circulation areas and garages are not deemed as requiring daylight and therefore are not identified as sensitive receptors. The BRE document also states that the guidelines may also be applied to any non-domestic building where the occupants have a reasonable expectation of daylight. This would normally include schools, hospitals, hotels, hostels, small workshops and some offices.

The first step in this process is to determine the key sensitive receptors, i.e. which windows may be affected by the proposed development. Key receptors are those windows that face, or are located broadly perpendicular to the proposed development

If a window falls into this category, the second step is to measure the obstruction angle. This is the angle at the level of the centre of the lowest window between the horizontal plane and the line joining the highest point of nearest obstruction formed from any part of the proposed development. If this angle is less than 25° then it is unlikely to have a substantial effect on the diffuse daylight enjoyed by the existing window and the window is not deemed to be a sensitive receptor. A graphical representation of the 25° rule is illustrated in Figure 5.1 below.

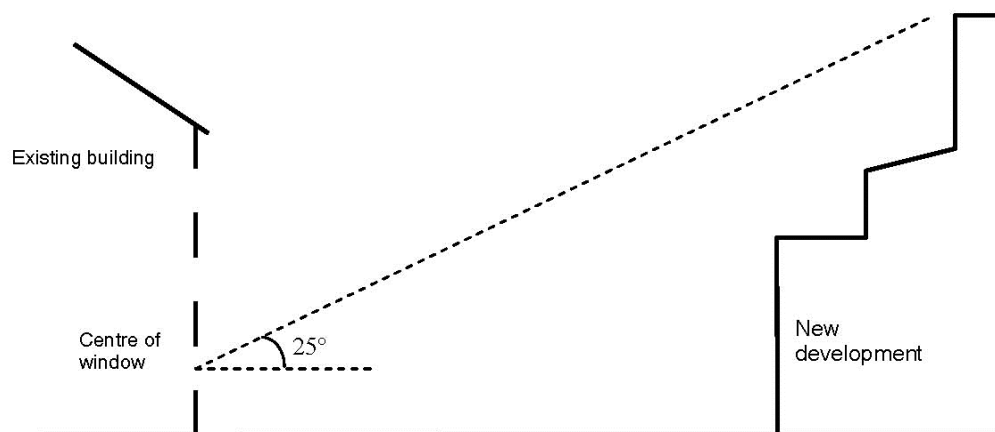


Figure 5.1 – Graphical representation of the 25° Rule

As part of this assessment a digital three dimensional model of the study area has been created for both the 'pre' and 'post' development scenarios. Images of these models are shown in Figures 5.2 and 5.3.



Figure 5.2 – Image of the 3D digital model of the pre-developed site and surrounding area



Figure 5.3 – Image of the 3D digital model of the post-developed site and surrounding area

Using the 3D model it is possible to construct 25° 'wedges' that extend outwards from the identified receptor window. If these intersect the proposed development then the window is identified as a sensitive receptor.

An example of the way in which the 25° obstruction angle test is used in this way is shown graphically in Figures 5.4 to 5.6 below.

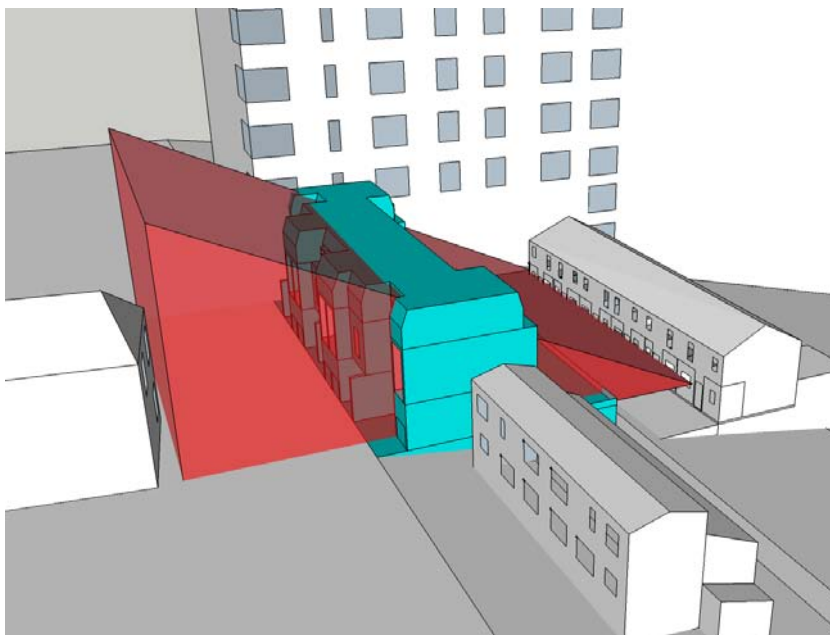


Figure 5.4 – 25° obstruction angle test applied to Holwick Court

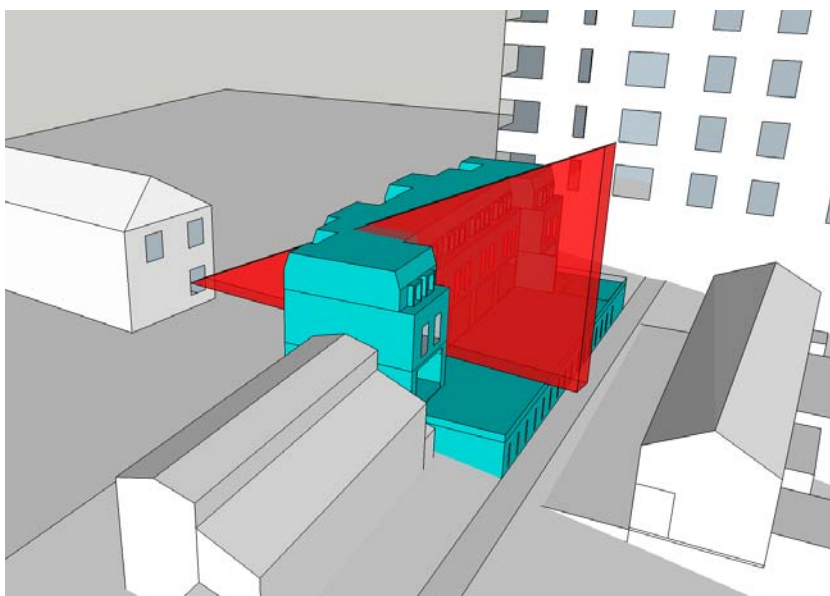


Figure 5.5 – 25° obstruction angle test applied to No. 30 Churchfield

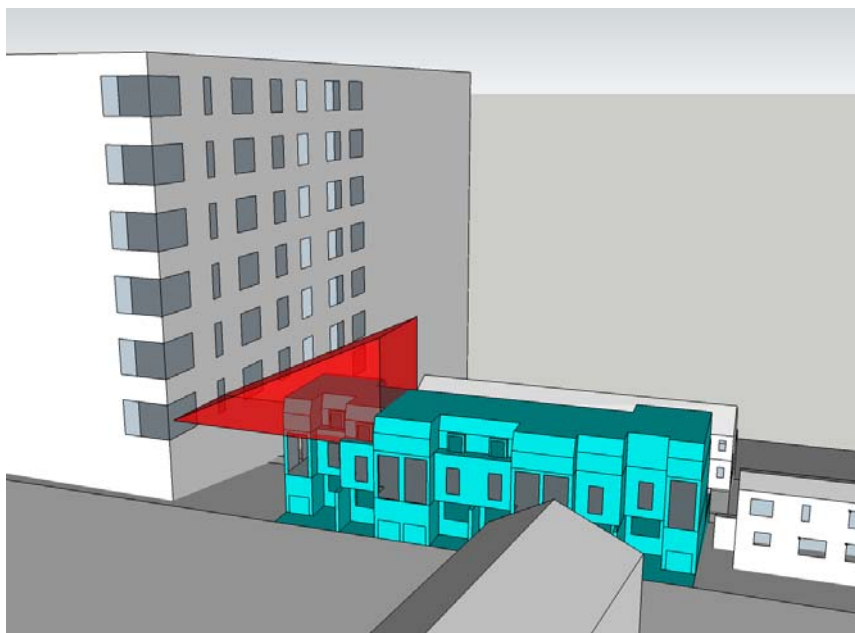


Figure 5.6 – 25° obstruction angle test applied to first floor apartments of Gateway Plaza

Applying the 25° obstruction angle test to all windows serving habitable rooms results in a list of windows that are identified as requiring more detailed analysis, as prescribed by the hierarchical approach promoted by the BRE Guidelines and discussed in Section 4.1. All windows not taken forward to the second stage of analysis are deemed to pass the 25° obstruction angle test and consequently the impact of the proposed development on these windows is considered to be negligible.

The windows taken forward for more detailed assessment are summarised in Table 5.1 and are shown on the location plan in Figure 5.7

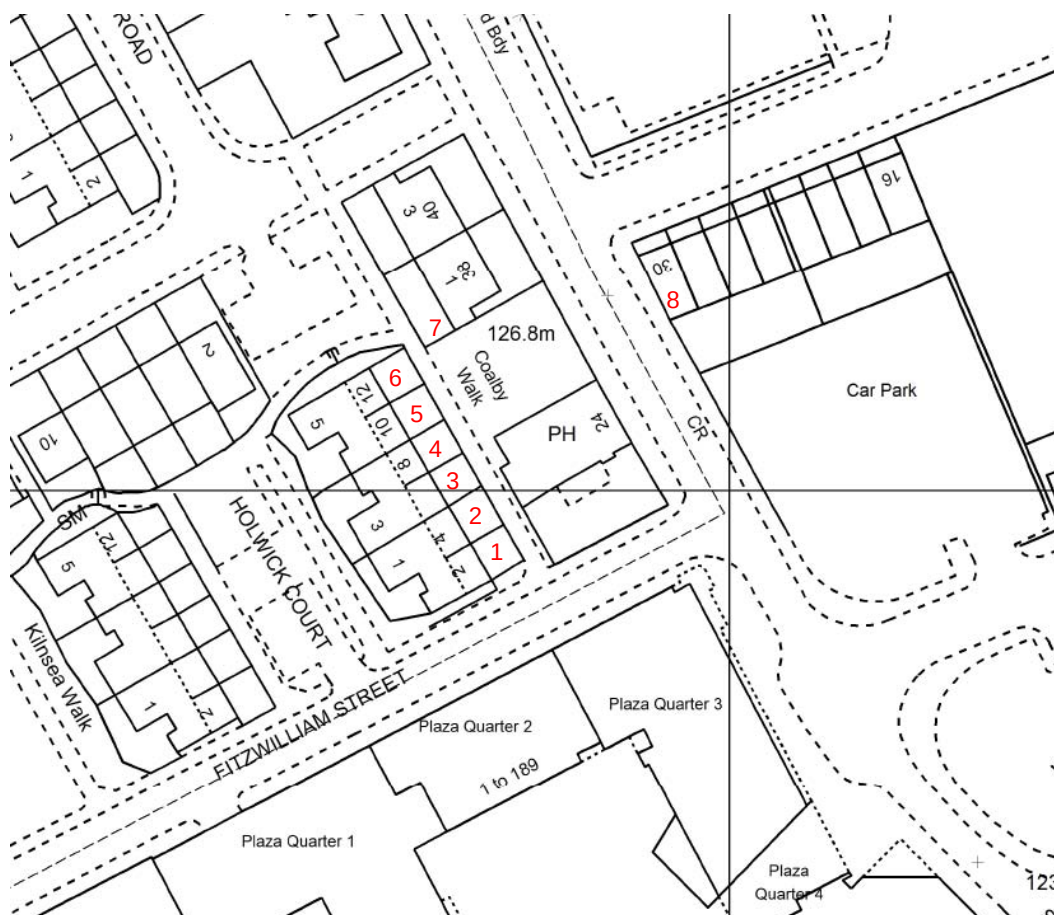


Figure 5.7 – Location of sensitive receptors

Window Number	Building	Floor	Room Type
1	2 Holwick Court	Ground	Habitable
2	4 Holwick Court	Ground	Habitable
3	6 Holwick Court	Ground	Habitable
4	8 Holwick Court	Ground	Habitable
5	10 Holwick Court	Ground	Habitable
6	12 Holwick Court	Ground	Habitable
7	38 Sackville Street	Ground	Habitable
8	30 Churchfield	Ground	Habitable

Table 5.1 – Receptor window naming convention (to be read in conjunction with the layout plan included in Appendix A.1)

5.2 Method of Baseline Data Collation

The following data and information has been used to inform this study:

- OS Mastermap mapping
- AutoCAD drawings of scheme proposals
- Photographic information (provided by architect/client)
- Aerial photography (Google Maps and Bing)

5.3 Numerical Modelling

The numerical analysis used in this assessment has been undertaken using the software packages within the IES Virtual Environment suite (Version 2013.0.0.1). The packages/models used are described below:

ModelIT - ModelIT is the model-building component of the Virtual Environment and allows the user to create the 3D models required by other components within the Virtual Environment. ModelIT is designed to enable appropriate levels of complexity to be incorporated within a model across the entire design spectrum. The 3D model of the proposed development and adjacent buildings is shown in Figures 5.2 and 5.3.

SunCast - SunCast can be used at any stage of the design process to perform shading and solar insolation studies and can generate images and animations quickly and easily from a model created by the IES model builder (ModelIT). SunCast can be used to investigate:

- External obstruction and self-shading of a building
- Solar mapping through windows and openings
- The effects of changing orientation of building

SunCast generates shadows and internal solar insolation from any sun position defined by date, time, orientation, site latitude and longitude.

Radiance - Radiance is a software package developed by the Lighting Systems Research group at the Lawrence Berkeley Laboratory in California, USA. It was developed as a research tool for predicting the distribution of visible radiation in illuminated spaces. A three-dimensional geometric model of the physical environment is used, and a default material or map file detailing the spectral radiance values into a “photo-realistic” colour image. It can be used to calculate lighting levels, Daylight Factors or Glare for daylight and/or artificial lighting. Radiance is internationally recognised as one of the leading lighting simulation tools available and for this appraisal has been used to calculate both the Daylight Factor and the Vertical Sky Component.

FlucsDL – This package calculates a point by point illuminance within each specified room which allows the daylight factor on any surface within the model, or on specified work planes (e.g. the height of a desk) to be determined. It is also used to calculate the sky view from any point within a room, again on any surface within the model, or on specified work planes. Using the data from the sky view analysis it is then possible to plot a contour of that surface that has a view of the sky and calculate this area as a percentage of the total surface. These results are used to inform the No Sky Line test described in Section 4.3.

The numerical modelling has been used to examine the scenarios described below.

‘Without Development’ Scenario: This is simply an accurate replication of the existing buildings, with the results of the analysis being used as a baseline against which to compare the proposed development.

‘With Development’ Scenario: The Proposed Development is representative of the buildings that would be present once the development is complete. The model includes the existing adjoining properties.

5.4 Calculation Assumptions

The following assumptions have been made when undertaking the analysis:

- When assessing the VSC the calculation is based on the centre point of the window position
- When assessing the ADF for internal rooms, the glazing type is assumed to be double clear glazing with a light transmittance of 0.8 and the Frame Factor is taken as 0.8
- In the absence of internal room layouts of the adjacent property, best estimates as to room layout and size have been made in order to undertake the ADF and/or No Skyline analysis.
- In areas where survey data has not been provided or needs to be supplemented with additional information, photographs, OS mapping and brick counts have been used in the process of building the 3D model of the surrounding and existing buildings.
- When analysing the effect of the new building on the existing buildings, the shading effect of the existing trees has been ignored. This is the recommended practice where deciduous trees that do not form a dense belt or tree line are present (BRE Guidelines – Appendix H). This is because daylight is at its scarcest and most valuable in the winter when most trees will not be in leaf.

6 Daylight Analysis

6.1 Vertical Sky Component Assessment

Using the analytical techniques discussed above, the VSC for the key receptors has been calculated for the 'pre' and 'post' development conditions. The results are summarised in Table 6.1 below.

Receptor	VSC (pre-development)	Achieve BRE minimum value?	VSC (post-development)	Ratio of change	BRE minimum requirements met?
Window 1	25.9	No	18.6	0.7	Marginal
Window 2	26.5	No	19.0	0.7	Marginal
Window 3	25.7	No	19.4	0.8	Yes
Window 4	25.6	No	19.9	0.8	Yes
Window 5	30.5	Yes	23.4	0.8	Yes
Window 6	30.6	Yes	24.3	0.8	Yes
Window 7	24.5	No	12.7	0.5	No
Window 8	31.6	Yes	24.7	0.8	Yes

Table 6.1 – Comparison of 'pre' and 'post' development VSC Tests

From the above it can be seen that the proposed development will have either a negligible or marginal impact on the daylighting provision to all but window W7. The graphical outputs from the numerical analysis are included in Appendix A.2.

6.2 No Sky Line Assessment

In order to pass the No Sky Line Assessment the BRE Guidelines state that the area of the working plane within the room that has a view of the sky should not be reduced to less than 0.8 times its former value as a result of new development. One benefit of the daylight distribution test is that the resulting contour plans show where the light falls within a room, both in the existing and proposed conditions, and a judgement may be made as to whether the room will retain light to a reasonable depth.

In this case the dimensions and exact layout of the rooms within the existing buildings are not known. However, in order to gain an understanding of the impact of the proposed development on the daylight distribution within the potentially affected rooms an estimate of the room dimension and layout has been made. The results of this analysis are summarised in Table 6.2.

Where the internal arrangements and room uses have been estimated, as noted above, this has no bearing upon the tests for VSC or APSH because the reference point is at the centre of the window being tested and windows have been accurately drawn from the survey information. It is relevant to the daylight distribution assessment, but in the absence of suitable plans, estimation is a conventional approach.

Receptor	Percentage of working plane area with a sky view		Ratio of change
	Pre Development	Post Development	
Window 1	100.0	86.2	0.9
Window 2	98.5	80.0	0.8
Window 3	99.0	69.3	0.7
Window 4	100.0	73.4	0.7
Window 5	100.0	100.0	1.0
Window 6	100.0	100.0	1.0
Window 7	69.9	27.1	0.4
Window 8	100.0	100.0	1.0

Table 6.2 – Comparison of 'pre' and 'post' development No Sky Line tests

The general principle under which the BRE Guidelines operate is that, if following the construction of a new development, the no sky line moves so that the area of the room that does receive direct skylight is reduced to less than 0.8 times its former value, this will be noticeable to the occupants, and more of the room will appear poorly lit. From the above results, it can be seen that as a result of the proposed development the impact on the area of the working plane within each room that receives direct light from the sky is negligible or marginal with the exception on the room served by window W7.

7

Sunlight and Overshadowing Analysis

7.1 Annual Probable Sunlight Hours Assessment

Section 4 of this report sets out the four tests prescribed by the BRE Guidelines for assessing the impact of development on sunlight. These tests are applied in hierarchical order below.

Test 1 – Assess whether the windows to main living rooms and conservatories of the buildings surrounding the site are situated within 90° of due south.

Of the windows that have been identified as sensitive receptors, only windows W7 and W8 are situated within 90° of due south. Therefore Test 2 needs to be applied to these windows.

Test 2 - Draw a section perpendicular from the centre of the window and if the angle subtended between the horizontal line drawn from the centre of the lowest window of the existing building and the proposed development is less than 25°, then the proposed development is unlikely to have a substantial effect on the direct sunlight enjoyed by the existing window.

Given that the proposed extension will not be constructed directly in front of W7 then this test is not applicable. The obstruction angle for W8 is greater than 25° therefore Tests 3 and 4 are applied.

Test 3 – If the window wall faces within 20° of due south and the reference point has a VSC of 27% or more, then the room is considered to receive sufficient sunlight.

Windows W7 and W8 face 30° and 64° from due south and therefore this test is not applicable

Test 4 – The above tests for assessing the impacts of the development on sunlight have been applied, however, these are simplistic tests based mainly on geometry and have not been passed or applicable. In following the procedures set out within the BRE Guidelines it is therefore necessary to apply the Annual Probable Sunlight Hours test.

To pass this test the centre point of the window will need to receive more than one quarter of APSH, including at least 5% APSH in the winter months between 21st September and the 21st March. The BRE Guidelines state that if 'post-development' the available sunlight hours are both less than the amount above and less than 0.8 times their 'pre-development' value, either over the whole year or just within the winter months, then the occupants of the existing building will notice the loss of sunlight. The results of the analysis are shown in Tables 7.1 and 7.2 below and the model outputs are included in Appendix A.4.

APSH - Assessment over Whole Year						
Window	Pre-development APSH (hours)	% of APSH pre - development	Post-development APSH (hours)	% of APSH post - development	Ratio of change	Reduction in APSH as a %
W7	936	63.0%	525	35.3%	0.6	27.7%
W8	763	51.4%	605	40.7%	0.8	10.7

Table 7.1 – Comparison of 'pre' and 'post' development APSH Tests based on a total annual unobstructed APSH of 1486 hours – Assessment over Whole Year

APSH - Assessment over 6 month winter period (21 st Sept to 21 st March)					
Window	Pre-development APSH (hours)	% of APSH pre-development	Post-development APSH (hours)	% of APSH post-development	Ratio of change
W7	123	8.3%	74	5.0%	0.6
W8	107	7.2%	40	2.7%	0.4

Table 7.2 – Comparison of 'pre' and 'post' development APSH Tests based on a total annual unobstructed APSH of 1486 hours – Assessment over the Winter Months Period

The assessment requirements set out in the BRE Guidelines have been reiterated below. For the assessment to conclude that the sunlighting of the existing dwelling could be adversely affected, all three of the following tests need to have been failed:

- Does the window receive less than 25% of the APSH, or less than 5% the APSH between 21st September and 21st March?
- Does the assessed window receive less than 0.8 times its former sunlight hours during either the 'whole year' or 'winter' period?
- Is the reduction in sunlight received over the whole of the year greater than 4% of the APSH?

When the results of the APSH analysis summarised in Tables 7.1 and 7.2 are inspected, it can be seen that window W7 passes Test a) and as such it can be concluded that the impacts of the development will be negligible. However, window W8 does not pass any of the tests and therefore it is likely that the proposals will have an adverse impact on the sunlighting to this window.

7.2 Permanent Overshadowing

The BRE Guidelines acknowledge that good site layout planning for daylight and sunlight should not limit itself to providing good natural light inside buildings. Sunlight in the space between buildings has an important effect on the overall appearance and ambience of a development. The worst situation is to have significant areas on which the sun does not shine for a large part of the year. These areas would, in general, be damp, chilly and uninviting. The BRE Guidelines suggest that the Spring Equinox (21st March) is a good date for assessment.

When the shadow path for the proposed development is examined it is evident that there are no areas of permanent overshadowing created by the proposals.

7.3 Transient Overshadowing

The BRE Guidelines suggest that where large buildings are proposed, which may affect a number of open spaces or amenity areas, it is useful and illustrative to plot a shadow plan to show the location of shadows at different times of the day and year.

Typical examples of areas that could be considered as open spaces or amenity areas are main back gardens of houses, allotments, parks and playing fields, children's playgrounds, outdoor swimming pools, sitting-out areas, such as in public squares and focal points for views. In assessing and quantifying potential impacts, the Guidance suggests that for the impact to be deemed insignificant, at least half of the amenity area should receive at least two hours of sunlight on the 21st March with the proposed development in place.

The only amenity areas within close proximity to the proposed development are the gardens of the Holwick Court terrace. However, when the shadow plots are again examined for transient overshadowing impacts, it is evident that the shadows cast by the newly constructed Gateway Plaza are more predominant. Effectively, the proposed development and the surrounding buildings sit within the shadow of the Gateway Plaza building and the impacts of the proposed development are negligible.

7.4 Solar Glare

Solar glare or dazzle can affect neighbouring buildings and pose potential hazards for road users under certain circumstances. The BRE Guidelines highlight two particular cases where this can be a problem; these being where there are large areas of reflective glass or cladding on the façade, or where large areas of glass or cladding slope back such that high altitude sunlight can be reflected along the ground.

When the proposed design is considered, it can be seen that the building does not slope back, nor does it include large areas of reflective glass or cladding. Given the building design and the BRE Guideline's stance on this matter, it is not considered necessary or appropriate to incorporate an analysis of solar glare.

8

Conclusions

The detailed analysis undertaken as part of this assessment has examined the impact of the proposed development on the amount of daylight and sunlight enjoyed by the neighbouring buildings.

The BRE Guidelines operate on the general principle that if the amount of daylight is reduced to less than 0.8 times its former value, the reduction in daylight will be noticeable to the building's occupants. However, a point that should be stressed here is that 'noticeable' does not necessarily equate to 'unacceptable' and the BRE's standard target values should not be considered as pass/fail criteria. Ultimately the local planning authority will need to make a judgement as to whether any impacts are acceptable when weighed against the many other planning considerations

When considering the impact on daylighting, as assessed using the VSC test, the only window that has been shown to have a significant reduction in potential daylight provision is window W7. The use of the room that this window serves is not known and if this room is not classified as a 'habitable' room, i.e. living room, kitchen, dining room, bedroom or study, then in line with the BRE assessment criteria this impact can be ignored.

When considering the impacts that the proposed development will have on the sunlight received by each of the assessed windows, it is evident that the only window that does not meet the assessment criteria is W8. This window is a secondary window to what is thought to be the kitchen of No. 30 Churchfield and as such the reduction in direct sunlight to this window is to a greater extent offset by the south-facing primary window to this room. Consequently the reduction in sunlight to window W8 is unlikely to be noticeable.

However, one very important factor to consider here is the way in which the sunlight criteria are applied. In particular the Guidelines require the window to receive 25% of the Annual Probable Sunlight Hours (APSH) or 5% the APSH between 21st September and 21st March. When the results of the analysis are inspected it can be seen that throughout the year the APSH is 40.7% and it is only during the winter months that the reduction more noticeable. However, examination of the shadows paths during the winter months reveal that the Gateway Plaza building has had a far greater impact on this building. The bulk and massing of the Gateway Plaza has had a significant impact on the amount of direct sunlight received by window W8 and therefore when the impact of the proposed development is considered, only a very small change results in a APSH value that falls below the normally accepted threshold.

Consequently, in this situation it is not considered appropriate to apply the BRE assessment criteria in a strict pass-fail manner. In assessing the impact the proposed development has on the daylight and sunlight provision to the buildings that surround the site it is necessary to also consider the impacts of the newly constructed Plaza Gateway building. The sheer scale and massing of this building has in effect reduced the potential for development on the subject site

and in doing so has not presented itself as a good neighbour. In light of the findings of this assessment and taking into account the disproportional impact the Plaza Gateway building has on the buildings in this location, it is concluded that on balance, the proposed development will not result in an unacceptable reduction in daylight or sunlight to the surrounding buildings.

A Appendices

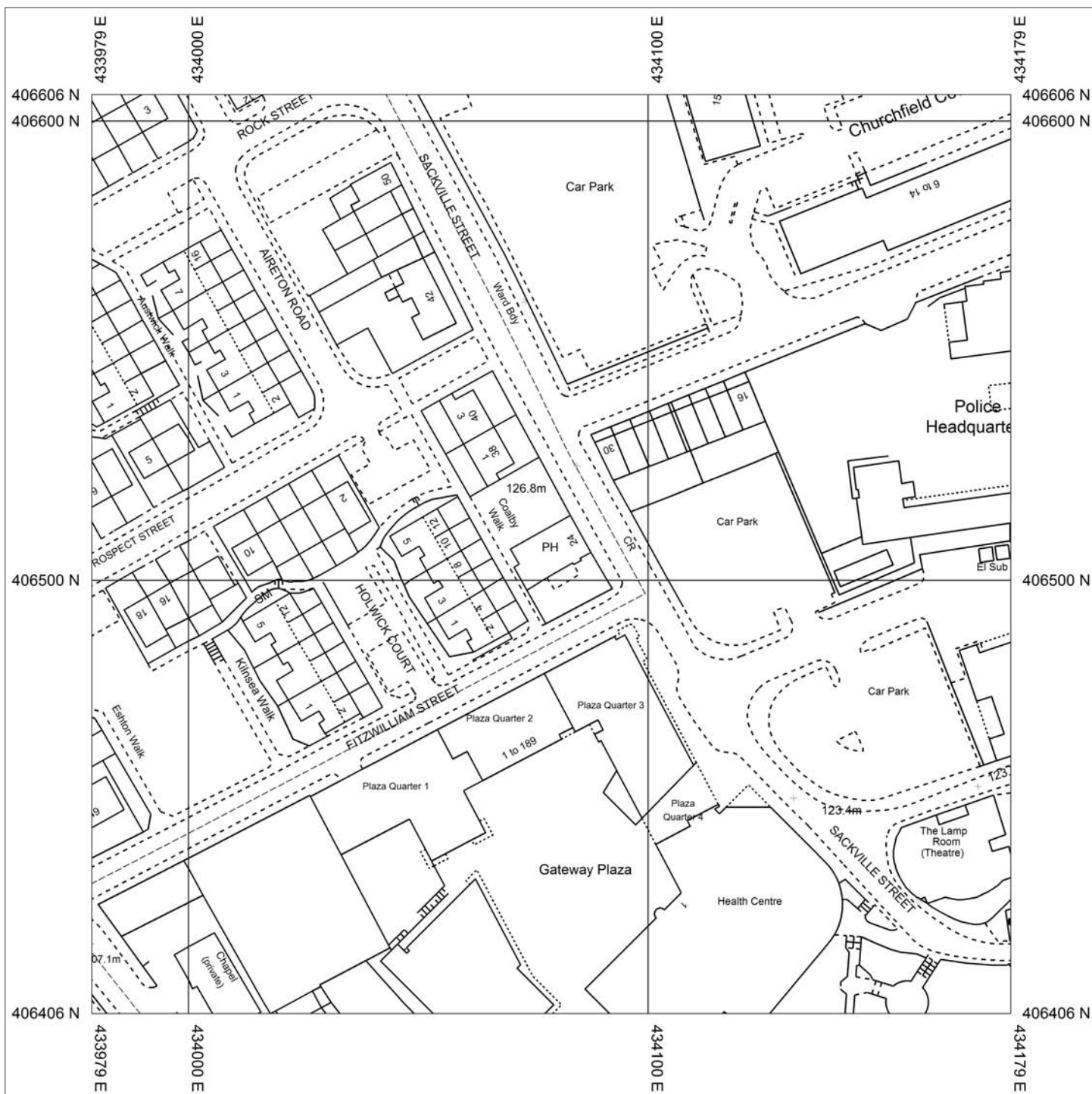
A.1 Appendix A.1 – Scheme Drawings

A.2 Appendix A.2 – Vertical Sky Component Calculations

A.3 Appendix A.3 – No Sky Line Assessment Outputs

A.4 Appendix A.4 – APSH Calculations

Appendix A.1 – Scheme Drawings



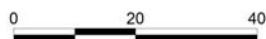
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The representation of a road, track or path is no evidence of a right of way.

The representation of features as lines is no evidence of a property boundary.



Scale 1:1250

Supplied By: The Building Centre

Serial number: 001096000

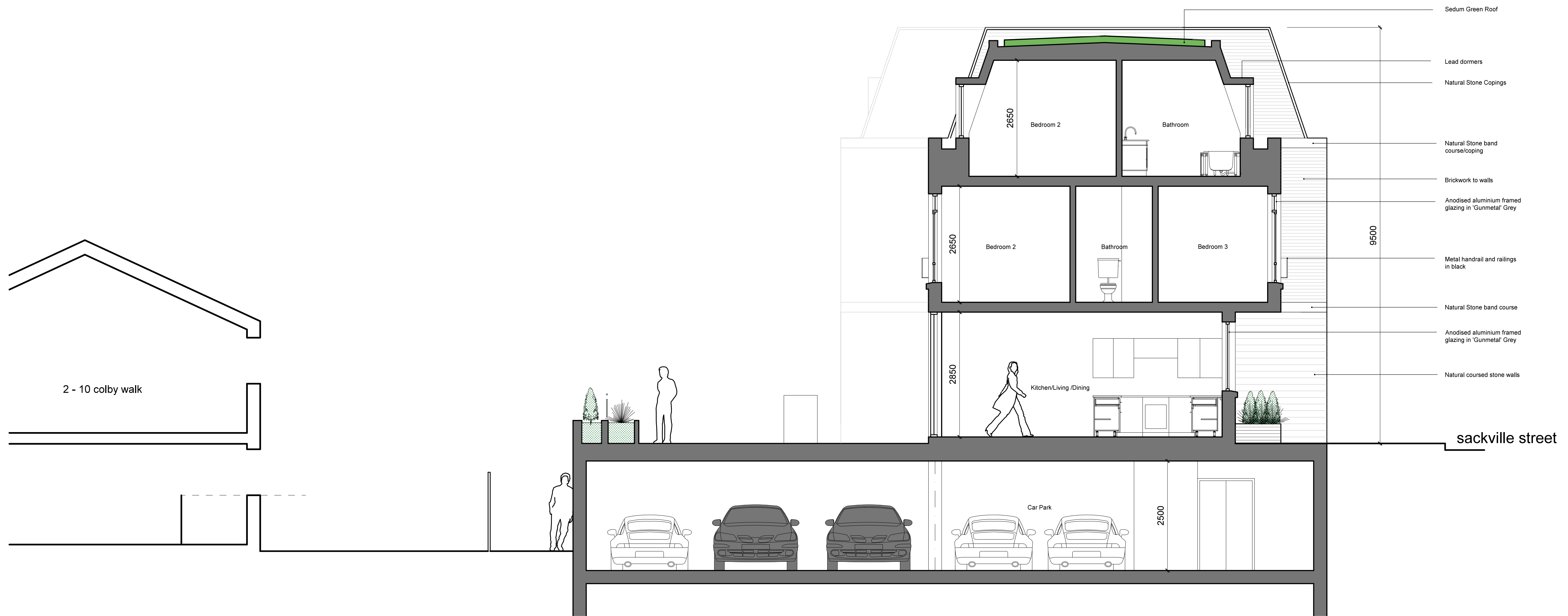
Plot Centre Coordinates: 434079, 406506



PRELIMINARY

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Sackville Street, Barnsley
Context drawing
Scale 1:100 at A1
Drawing No: 72/364/

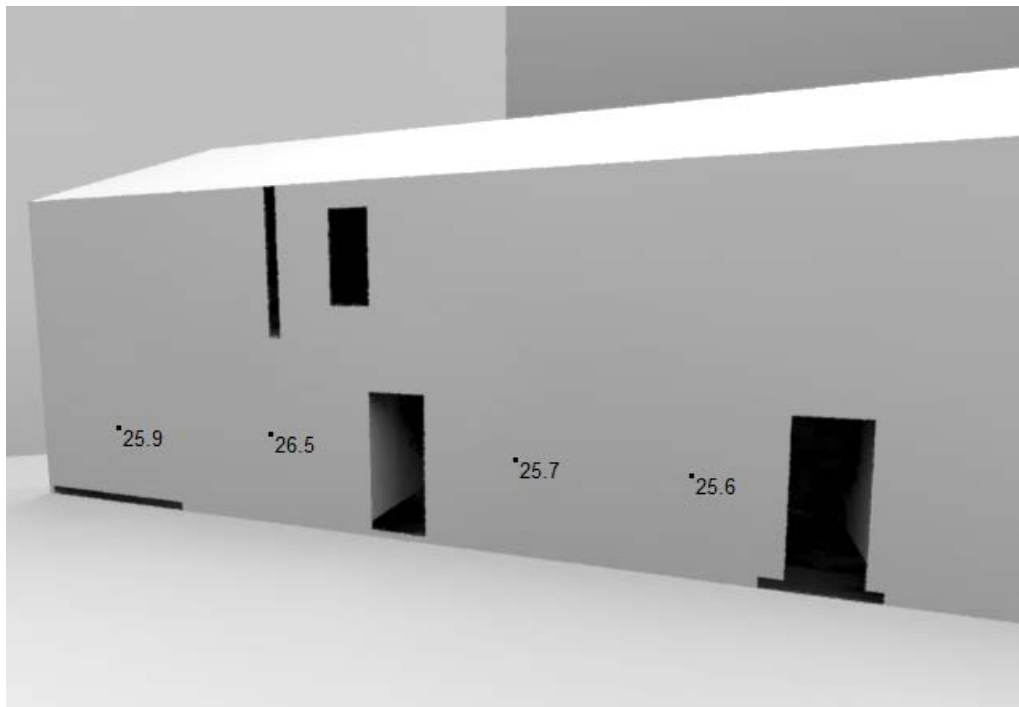


REV A - Sept 13 - Redesign

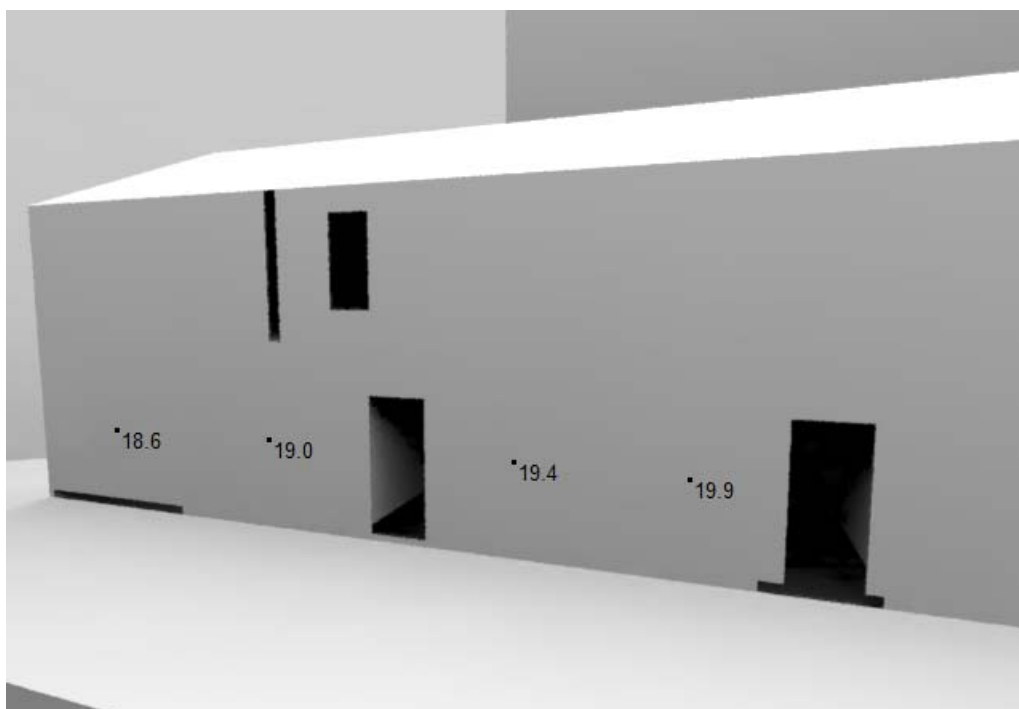
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Sackville Street, Barnsley
Proposed Section
Scale 1:50 at A1
Drawing No: 72/364/204 A

Appendix A.2 – Vertical Sky Component Calculations



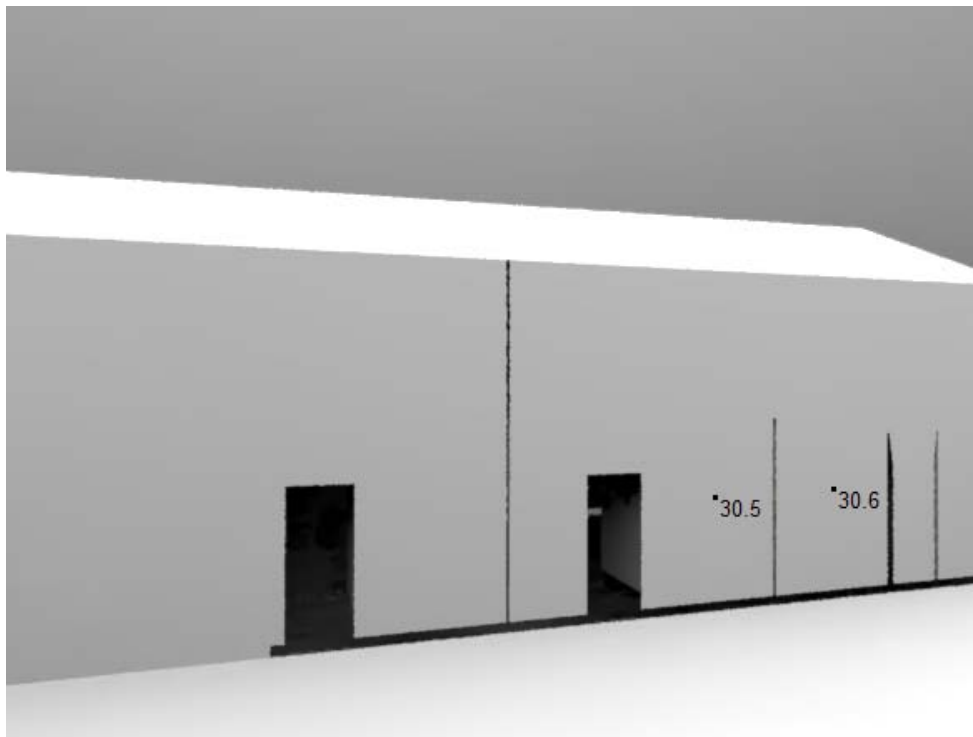
Windows 1 to 4 – Pre-development



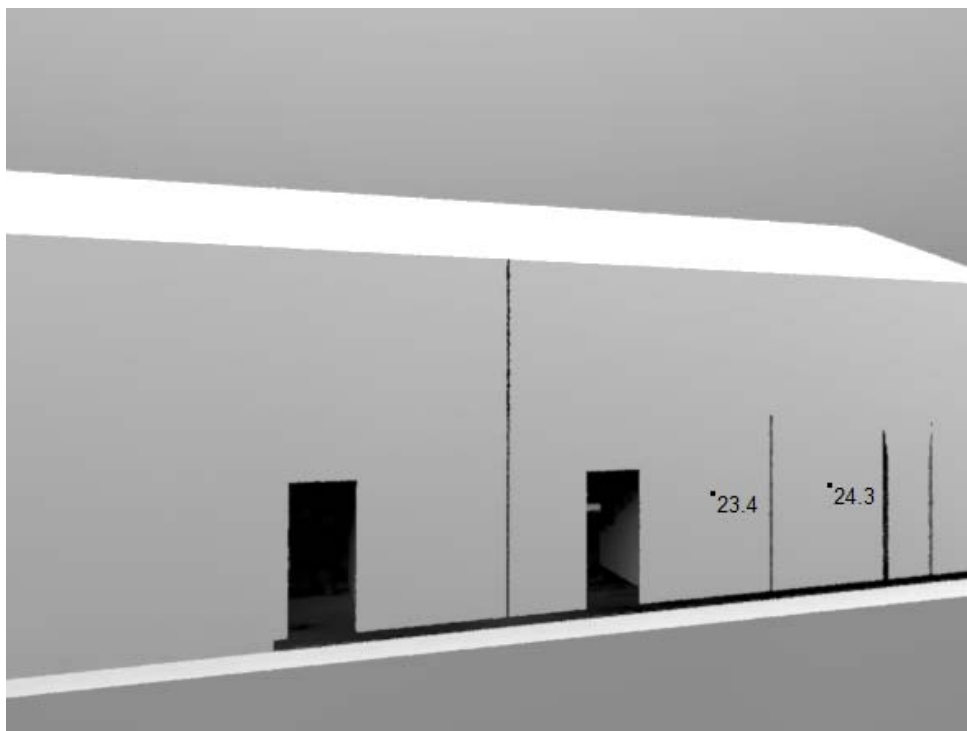
Windows 1 to 4 – Post-development

Sackville Street - Barnsley

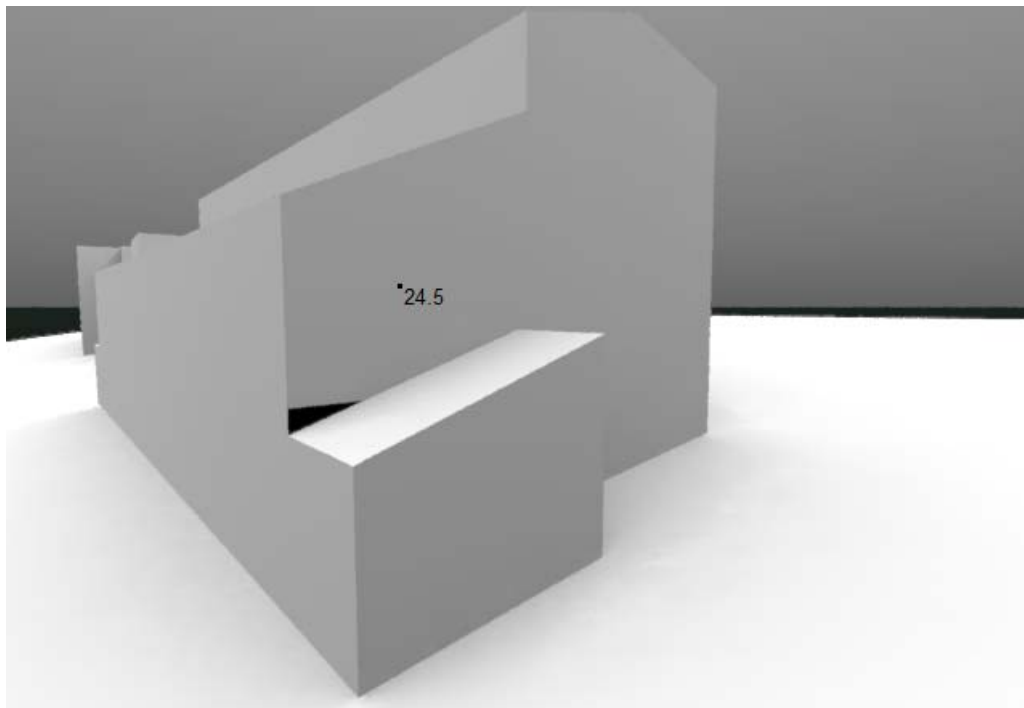
Daylight Assessment – Vertical Sky Component
November 2013



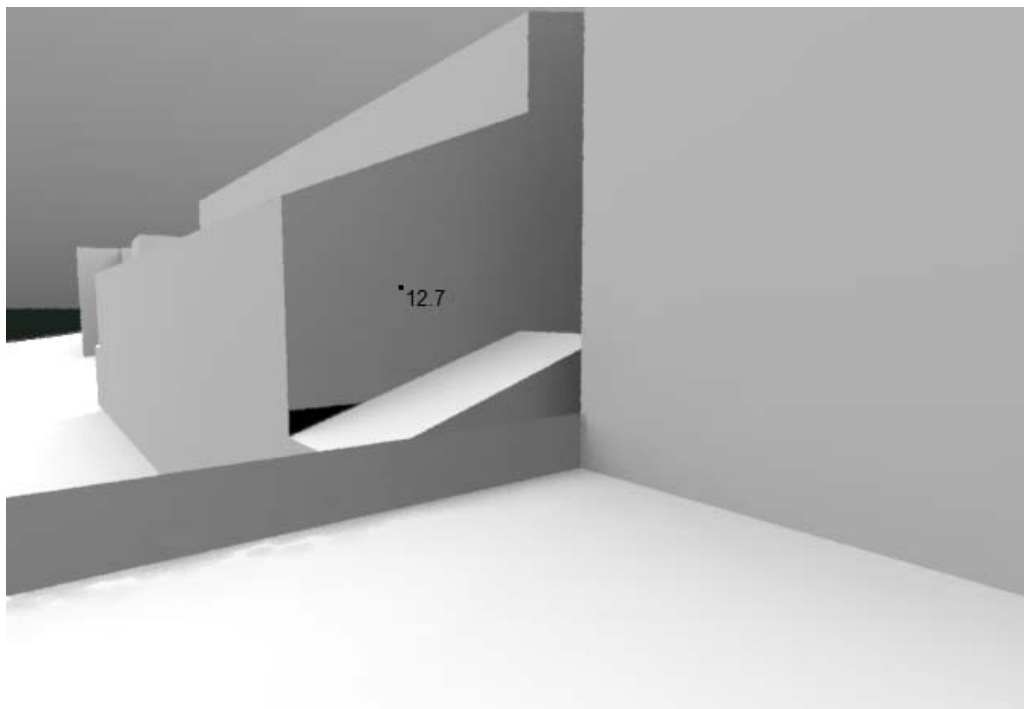
Windows 5 and 6 – Pre-development



Windows 5 to 6 – Post-development



Window 7 – Pre-development



Window 7 – Post-development

Sackville Street - Barnsley

Daylight Assessment – Vertical Sky Component
November 2013

herrington
CONSULTING LIMITED



Window 8 – Pre-development



Window 8 – Post-development

Appendix A.3 – No Sky Line Assessment Outputs

Analysis Overview

Analysis Comparison (against previous assessment)

	Total	Comparison (with previous)
Daylight levels (lux)	406.413	No previous
Percentage area above threshold (%)	84.9	No previous

Analysis History

Date / Time	Area-weighted average daylight factor (%)	Area-weighted average illumination (lux)
-------------	---	--

Threshold Calculation

Building Results

Total floor area (m ²)	Total floor area above threshold (m ²)	Percentage floor area above threshold (%)	Area-weighted average daylight factor (%)	Area-weighted average illumination (lux)
67.365	57.173	84.9	3.3	406.413

Rooms included in the analysis

Room ID	Room name	Working plane	Floor area (m ²)	Floor area > threshold (m ²)	Percentage floor area > threshold (%)	Average illumination (%)
00000000	Room 001	0	4.250	4.250	100.0	270.304
00000001	Room 002	0	4.533	4.533	100.0	661.874
00000002	Room 003	0	3.931	3.931	100.0	715.801
00000003	Room 004	0	2.232	2.232	100.0	402.880
00000004	Room 005	0	4.118	0.000	0.0	0.000
00000005	Room 006	0	5.740	5.740	100.0	429.823
00000006	Room 007	0	6.295	6.232	99.0	421.320
00000007	Room 008	0	4.002	3.941	98.5	332.563
00000008	Room 009	0	5.386	5.386	100.0	476.082
00000009	Room 010	0	3.458	0.000	0.0	0.000

Things to consider:

Increase amount of **glazing** (assess **trade-off** with energy consumption)

Evaluate size and shape of glass (glass **above** 2.3m (7'6") has **greater impact**)

Select a **glass type** with a different **visible transmittance** (Tvis)

Evaluate other daylighting metrics such as **glare**

00000010	Room 011	0	15.133	15.133	100.0	557.615
00000011	Room 012	0	8.287	5.794	69.9	248.878

Rooms not included in the analysis

Room ID	Room name	Reason
---------	-----------	--------

Calculation Data

Location: Emley Moor, United Kingdom(53.55 N, 1.49 W)
Calculated: 14 Nov 2013 at 16:22
Sky Model: CIE Standard Overcast Sky
Working plane height: 0.850m
Grid Size: 0.250m
Illuminance Threshold (%): 1.000
Light Penetration: With light penetration through internal windows

Analysis Overview

Analysis Comparison (against previous assessment)

	Total	Comparison (with previous)
Daylight levels (lux)	333.573	No previous
Percentage area above threshold (%)	72.2	No previous

Analysis History

Date / Time	Area-weighted average daylight factor (%)	Area-weighted average illumination (lux)
-------------	---	--

Threshold Calculation

Building Results

Total floor area (m ²)	Total floor area above threshold (m ²)	Percentage floor area above threshold (%)	Area-weighted average daylight factor (%)	Area-weighted average illumination (lux)
67.365	48.620	72.2	2.7	333.573

Rooms included in the analysis

Room ID	Room name	Working plane	Floor area (m ²)	Floor area > threshold (m ²)	Percentage floor area > threshold (%)	Average illumination (%)
00000000	Room 001	0	4.250	4.188	98.6	239.940
00000001	Room 002	0	4.533	4.533	100.0	565.968
00000002	Room 003	0	3.931	3.931	100.0	597.646
00000003	Room 004	0	2.232	2.170	97.2	334.822
00000004	Room 005	0	4.118	0.000	0.0	0.000
00000005	Room 006	0	5.740	4.213	73.4	372.787
00000006	Room 007	0	6.295	4.363	69.3	348.939
00000007	Room 008	0	4.002	3.202	80.0	261.257
00000008	Room 009	0	5.386	4.643	86.2	376.710
00000009	Room 010	0	3.458	0.000	0.0	0.000

Things to consider:

Increase amount of **glazing** (assess **trade-off** with energy consumption)

Evaluate size and shape of glass (glass **above** 2.3m (7'6") has **greater impact**)

Select a **glass type** with a different **visible transmittance** (Tvis)

Evaluate other daylighting metrics such as **glare**

00000010	Room 011	0	15.133	15.133	100.0	478.897
00000011	Room 012	0	8.287	2.243	27.1	136.443

Rooms not included in the analysis

Room ID	Room name	Reason
---------	-----------	--------

Calculation Data

Location: Emley Moor, United Kingdom(53.55 N, 1.49 W)
Calculated: 14 Nov 2013 at 16:32
Sky Model: CIE Standard Overcast Sky
Working plane height: 0.850m
Grid Size: 0.250m
Illuminance Threshold (%): 1.000
Light Penetration: With light penetration through internal windows

Appendix A.4 – APSH Calculations

Annual Probable Sunlight Hours

Project : Sackville Street - Barnsley

Window Ref : W7

Pre Development Conditions

Month	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
Jan									0	0	0	0	0	0	0.8	0							
Feb								0	0	0	0	0	0	0	100	20.6	0						
Mar							100	66	98.6	0	0	0	100	100	100	0	0	0					
Apr						0	100	100	100	100	100	100	100	100	100	0	0	0					
May					100	0	100	100	100	100	100	100	100	100	0	0	0	0	0				
Jun				0	100	100	100	100	100	100	100	100	100	100	0	0	0	0	0	0			
Jul					100	9.3	100	100	100	100	100	100	100	100	0	0	0	0	0	0			
Aug					100	0	100	100	100	100	100	100	100	100	100	0	0	0	0	0			
Sep						0	100	99.8	100	0	30.2	100	100	100	100	0	0	0					
Oct							100	0	99.9	0	0	0	0	100	100	0							
Nov								0	0	0	0	0	0	100	0								
Dec									0	0	0	0	0	0	0								

Percentage of direct sunlight falling on assessed area (Calculated using SunCast)

	APSH	APSH (all year)	935.6 hours
Jan	0.1		63.0%
Feb	12.1		
Mar	62.1	APSH (winter)	123.2 hours
Apr	117.0		8.3%
May	135.0		
Jun	170.0		
Jul	145.5		
Aug	150.0		
Sep	94.9		
Oct	40.0		
Nov	9.0		
Dec	0.0		

Annual unobstructed total of probable sunlight (London 51.5 deg) = 1486 hours

Annual Probable Sunlight Hours

Project : Sackville Street - Barnsley

Window Ref : W7

Post Development Conditions

Month	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
Jan									0	0	0	0	0	0	0.8	0							
Feb								0	0	0	0	0	0	0	100	20.6	0						
Mar							0	0	0	0	0	0	100	100	100	0	0	0					
Apr						0	0	0	0	0	100	100	100	100	100	0	0	0					
May					100	0	0	0	0	0	100	100	100	100	0	0	0	0	0				
Jun				0	100	0	0	0	0	0	100	100	100	100	0	0	0	0	0	0			
Jul					100	0	0	0	0	0	96.7	100	100	100	0	0	0	0	0	0			
Aug					100	0	0	0	0	0	100	100	100	100	100	0	0	0	0	0			
Sep						0	0	0	0	0	30.2	100	100	100	100	0	0	0					
Oct							0	0	0	0	0	0	0	100	100	0							
Nov								0	0	0	0	0	0	100	0								
Dec									0	0	0	0	0	0	0								

Percentage of direct sunlight falling on assessed area (Calculated using SunCast)

	APSH		
Jan	0.1	APSH (all year)	524.5 hours
Feb	12.1		35.3%
Mar	33.0	APSH (winter)	74.1 hours
Apr	65.0		5.0%
May	75.0		
Jun	85.0		
Jul	79.5		
Aug	90.0		
Sep	55.9		
Oct	20.0		
Nov	9.0		
Dec	0.0		

Annual unobstructed total of probable sunlight (London 51.5 deg) = 1486 hours

Annual Probable Sunlight Hours

Project : Sackville Street - Barnsley

Window Ref : W8

Pre Development Conditions

Month	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
Jan									0	0	100	0	0	0	0	0							
Feb								0	0	0	100	0	0	0	0	100	0						
Mar							0	0	0	0	100.1	0	0	100	95.4	100	100	52.2					
Apr						0	0	0	0	0	0	100	100	100	100	100	100	38.7					
May					0	0	0	0	0	0	0	100	100	100	100	100	100	100	55.1				
Jun				0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	26			
Jul					0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	55.6			
Aug					0	0	0	0	0	0	0	100	100	100	100	100	100	100	0				
Sep						0	0	0	0	0	100	0	100	100	100	100	100	0					
Oct							0	0	0	0	0	0	0	0	83.1	100							
Nov								0	0	0	0	0	0	0	0								
Dec									0	0	0	0	0	0	0								

Percentage of direct sunlight falling on assessed area (Calculated using SunCast)

	APSH		
Jan	8.0	APSH (all year)	763.2 hours
Feb	20.0		51.4%
Mar	60.2	APSH (winter)	106.6 hours
Apr	83.0		7.2%
May	113.3		
Jun	140.4		
Jul	136.9		
Aug	105.0		
Sep	78.0		
Oct	18.3		
Nov	0.0		
Dec	0.0		

Annual unobstructed total of probable sunlight (London 51.5 deg) = 1486 hours

Annual Probable Sunlight Hours

Project : Sackville Street - Barnsley

Window Ref : W8

Post Development Conditions

Month	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00
Jan									0	0	100	0	0	0	0	0							
Feb								0	0	0	100	0	0	0	0	0	0						
Mar							0	0	0	0	100.1	0	0	100	2.4	0	0	0					
Apr						0	0	0	0	0	0	100	100	100	98	13.5	0	22.4					
May					0	0	0	0	0	0	0	100	100	100	100	100	50.5	100	55.1				
Jun				0	0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	26			
Jul					0	0	0	0	0	0	0	100	100	100	100	100	100	100	100	55.6			
Aug					0	0	0	0	0	0	0	100	100	100	100	74.7	4.1	95	0				
Sep						0	0	0	0	0	100	0	100	100	2.9	0	0	0					
Oct							0	0	0	0	0	0	0	0	0	0							
Nov								0	0	0	0	0	0	0	0								
Dec									0	0	0	0	0	0	0								

Percentage of direct sunlight falling on assessed area (Calculated using SunCast)

	APSH	APSH (all year)	605.3 hours
Jan	8.0		40.7%
Feb	10.0		
Mar	22.3	APSH (winter)	40.3 hours
Apr	56.4		2.7%
May	105.8		
Jun	140.4		
Jul	136.9		
Aug	86.1		
Sep	39.4		
Oct	0.0		
Nov	0.0		
Dec	0.0		

Annual unobstructed total of probable sunlight (London 51.5 deg) = 1486 hours