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Squire and Partners

Twyman House, London NW1

Internal Daylight and Overshadowing Report

By GIA

For CIT Developments Ltd

10003

June 2011

Internal Daylight and Overshadowing Report

Twyman House
Project No: 5428

June 08, 2011

DAYLIGHT AND SOLAR DESIGN

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Client	CIT
Architect	Squire and Partners
Project Title	Twyman House
Project Number	5428
Report Title	Internal Daylight and Overshadowing Report
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1. Executive Summary

The assessment undertaken shows that this development has good daylight and sunlight potential and that the vast majority of habitable rooms will meet the BRE recommended levels for day lighting. Further details are provided in the following pages.

2. Introduction and Objective

GIA has been instructed to provide a report upon the potential availability of Daylight and Sunlight to the proposed accommodation within the residential scheme prepared by Squire and Partners. GIA was specifically instructed to carry out the following:

- To create a 3D computer model of the proposal based upon drawings prepared by Squire and Partners.
- Review the overall potential of the scheme to receive adequate daylight and sunlight.
- Carry out technical daylight and sunlight assessments using the BRE guidelines for Average Daylight Factor and Permanent Overshadowing to those areas that experience potentially more restricted potential.
- Prepare of a report setting out the analysis and our findings.

3. BRE guidelines

The Building Research Establishment (BRE) have set out in their handbook *Site Layout Planning for Daylight and Sunlight a Guide to Good Practice (1991),* guidelines and methodology for the measurement and assessment of daylight and sunlight within proposed buildings. This document states that it is also intended to be used in conjunction with the interior daylight recommendations found within the *British Standard BS8206-2:2008* and *The Applications Manual on Window Design* of the Chartered Institution of Building Services Engineers (CIBSE).

The guide also provides advice on site layout planning to determine the quality of daylight and sunlight within open spaces between buildings.

It is important to note, however, that this document is a guide whose stated aim *"is to help rather than constrain the designer".*

The document provides advice, but also clearly states that it *"is not mandatory and this document should not be seen as an instrument of planning policy."* The report acknowledges also in its introduction that *"in special circumstances the developer or planning authority may wish to use different target values. For example, in a historic City centre a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings."*

It is an inevitable consequence of the built up urban environment that daylight and sunlight will be more limited in these areas. It is well acknowledged that in such situations there may be many other conflicting and potentially more important planning and urban design matters to consider other than just the provision of ideal levels of daylight and sunlight.

3.1. Daylight

The BRE set out various methods for assessing the daylight within a proposed building within section 2.1 and Appendix C of the handbook. The summary of this, given at the end of section 2.1 of the guide, states as follows:

"in general, a building will retain the potential for good interior defused daylighting provided that on all its main faces:

A. No obstruction, measured in a vertical section perpendicular to the main face, from a point two metres above ground level, subtends an angle of more than 25 degrees to the horizontal;

Or

B. If (A) is not satisfied, then all points on the main face on a line two metres above ground level are within four metres (measured sideways) of a point which has a vertical sky line component of 27% or more."

3.1.1. Average Daylight Factor (ADF)

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

This method of assessment takes into account the total glazed area to the room, the transmittance quality of the glazing proposed, the total area of the room surfaces including ceilings and floors, and the internal average reflectance for the room being assessed. The method also takes into account the Vertical Sky Component and the quantum of reflected light off external surfaces.

This is, therefore, a significantly more detailed method of assessment than the Vertical Sky Component method set out above.

3.2. Overshadowing

The BRE guidance in respect of overshadowing of amenity spaces is set out in section 3.3 of the handbook. Here it states as follows:

"Sunlight in the spaces between buildings has an important impact on the overall appearance and ambiance of a development. It is valuable for a number of reasons:

- *To provide attractive sunlit views (all year)*
- *To make outdoor activities, like sitting out and children's play more pleasant (mainly during the warmer months)*
- *To encourage plant growth (mainly in spring and summer)*
- *To dry out the ground, reducing moss and slime (mainly during the colder months)*
- *To melt frost, ice and snow (in winter)*
- *To dry clothes (all year)"*

Again, it must be acknowledged that in urban areas the availability of sunlight on the ground is a factor which is significantly controlled by the existing urban fabric around the site in question and so may have very little to do with the form of the development itself. Likewise there may be many other urban design, planning and site constraints which determine and run contrary to the best form, siting and location of a proposed development in terms of availability of sun on the ground.

The summary of section 3.3 of the guide states as follows:

"It is suggested that, for it to appear adequately sunlit throughout the year, no more than two-fifths and preferably no more than a quarter of any garden or amenity area should be prevented by buildings from receiving any sun at all on 21 March. If, as a result of new development, an existing garden or amenity area does not meet these guidelines, and the area which can receive some sun on 21 March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable."

3.3. Further relevant information

Further information can be found in *The Daylight in Urban Areas Design Guide* (Energy Saving Trust CE257, 2007) which provides the following recommendation with regards to VSC levels in urban areas:

"If 'theta' (Visible sky angle) is greater than 65º (obstruction angle less than 25ºor VSC at least 27 percent) conventional window design will usually give reasonable results.

If 'theta' is between 45º and 65º(obstruction angle between 25º and 45º, VSC between 15 and 27 percent), special measures such as larger windows and changes to room layout are usually needed to provide adequate daylight.

If 'theta' is between 25º and 45º (obstruction angle between 45º and 65º, VSC from 5 to15 percent.), it is very difficult to provide adequate daylight unless very large windows are used.

If 'theta' is less than 25º (obstruction angle more than 65º, VSC less than 5 percent) it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed."

4. Methodology

In order to undertake the daylight and sunlight assessments set out above, and in accordance with your instructions, we have prepared a three dimensional computer model and used specialist lighting simulation software.

The three dimensional representation of the proposed development has been modelled using the scheme drawings provided to us by Squire and Partners . This has been placed in the context of its surrounding buildings which have been modelled from survey information, photogrammetry, OS and site photographs. This allows for a precise model, which in turn ensures that analysis accurately represents the amount of daylight and sunlight available to the building facades, internal and external spaces, considering all of the surrounding obstructions and orientation.

4.1. Simulation assumptions

Where no values for reflectance, transmittance and maintenance factor were specified by the designer the following values from *BS 8206-2:2008, Annex A, tables A.1-A.6* were used for the calculation Average Daylight Factor values:

Reflectance values

Surrounding walls	0.2
Pavement	0.2
Internal walls	0.65
Internal ceiling	0.85
Internal floor	0.3

Transmittance values:

Double glazing:	0.74
Single glazing:	0.89
Balustrades:	0.8
Framing factor:	0.8

Maintenance factors

Vertical glazing	0.92
Horizontal glazing	0.76

5. Sources of information

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10003_P_01_G200_003

10003_P_LG_G200_003

6. Conclusions on Daylight

6.1. Conclusions on Daylight

It is clear from the overview of the scheme that the significant majority of the accommodation (Blocks B, C and upper floors of Block A) will have good open aspects and will therefore have good potential for daylight levels that will meet the guidelines set out in the BRE documents. As such no technical analysis of these areas was considered necessary.

However both ourselves and the LPA felt that some of the accommodation on the lower two floors of Block A and the conversion of the Pluse House (Block D) would have a more restricted outlook and therefore the potential for good daylight would be restricted. We have therefore undertaken a detailed technical review of the accommodation in these areas.

The VSC and ADF analysis shows that in these areas there is a good level of daylight acheivable by the vast majority of the habitable rooms tested.

Just three rooms of the 24 rooms tested (a very small proportion of the overall development) fall a little short of the ADF guideline. These are room ref. DLG03 which falls short by 0.3% and is mainly because of the obstruction to the North of an existing building as well as the efforts to retain the existing facade.

The second room is room ref. ALG04 which again falls short by 0.3%. This is a secondary bedroom in a 3-bedroom apartment where the rest of the areas have good daylighting levels and will compensate for this.

Last room is ref AGF09 which again falls short by 0.3%. This is mainly because of the presence of the recessed balcony but the private amenity space can compensate for this. These are minor issues and in our opinion do not represent an issue for a development in an urban area. They are also all private accommodation and as such there is freedom of choice.

6.2. Sunlight- Overshadowing

The existing site is already constrained by the presence of large buildings to the East and South. The logical need to have buildings fronting the East and South boundaries also means that the internal courtyard / access road sits to the North of the majority of the proposed development. The scheme has responded to these external and existing site layout constraints well by sitting the lowest part of the development along the southern boundary thus ensuring that the maximum sunlight potential is available to the courtyard and it is however, inevitable, given the site orientation that there will be shadow along the south part of the court yard space.

The proposal has also cleverly optimized the sunlight potential by sitting the children's play area in the best sunlit location. As this is a critical area in terms of sunlight we have carried out a BRE permanent overshadowing analysis for this area. The results of that analysis are shown in Figure 6 on page 11 of this report and clearly show the space will have good sunlight on the 21 March and therefore throughout the year easily meeting the BRE criteria.

6.3. Summary

We have therefore found that the bulk and mass of the proposed development would not give rise to any material issues relating to daylight and sunlight. This is with the exception of the areas pointed out within the report, which still come close to recomended levels. We believe that the proposal demonstrates a good level of daylight and sunlight potential which will ensure that the proposed accommodation is of good quality and will have an amenity quality that is better than other residential accommodation in urban areas

Figure 1: View from South

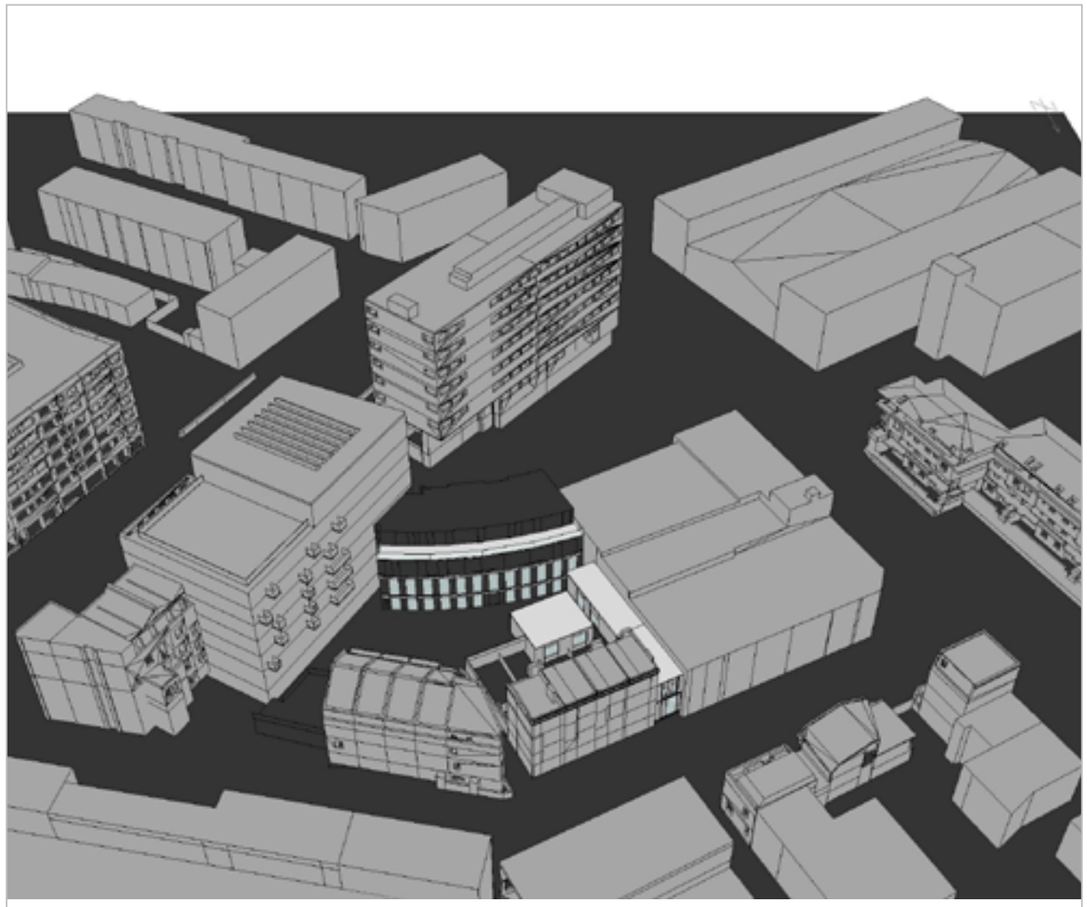

Figure 2: View from North

Daylight Quantum		
Room Ref.	**Room Use**	**ADF (%)**
Block A		
ALG01	Bedroom	1.3
ALG02	Living room	3.2
ALG03	L/K/D	3.1
ALG04	Bedroom	0.7
ALG05	Bedroom	1.4
ALG06	Bedroom	1.2
ALG07	Bedroom	1.1
ALG08	Bedroom	1.1
AGL01	Bedroom	3
AGL02	Bedroom	5.6
AGL03	Bedroom	6.2
AGL04	L/K/D	3.7
AGL05	Bedroom	1.1
AGL06	Bedroom	2.5
AGL07	Bedroom	3.1
AGL08	L/K/D	2.1
AGL09	Living room	1.2

Daylight Quantum		
Room Ref.	**Room Use**	**ADF (%)**
Block D		
DLG01	Bedroom	1.1
DLG02	Bedroom	1
DLG03	Living room	1.2
DLG04	Kitchen	2.5
DGL01	Bedroom	3
DFF01	Living room	3.1
DFF02	Bedroom	1.2

Figure 3: Plan View - Lower Ground

Daylight Quantum		
Room Ref.	**Room Use**	**ADF (%)**
Block A		
ALG01	Bedroom	1.3
ALG02	Living room	3.2
ALG03	L/K/D	3.1
ALG04	Bedroom	0.7
ALG05	Bedroom	1.4
ALG06	Bedroom	1.2
ALG07	Bedroom	1.1
ALG08	Bedroom	1.1
AGL01	Bedroom	3
AGL02	Bedroom	5.6
AGL03	Bedroom	6.2
AGL04	L/K/D	3.7
AGL05	Bedroom	1.1
AGL06	Bedroom	2.5
AGL07	Bedroom	3.1
AGL08	L/K/D	2.1
AGL09	Living room	1.2

Daylight Quantum		
Room Ref.	**Room Use**	**ADF (%)**
Block D		
DLG01	Bedroom	1.1
DLG02	Bedroom	1
DLG03	Living room	1.2
DLG04	Kitchen	2.5
DGL01	Bedroom	3
DFF01	Living room	3.1
DFF02	Bedroom	1.2

Figure 4: Plan View - Ground Floor

Daylight Quantum		
Room Ref.	**Room Use**	**ADF (%)**
Block D		
DLG01	Bedroom	1.1
DLG02	Bedroom	1
DLG03	Living room	1.2
DLG04	Kitchen	2.5
DGL01	Bedroom	3
DFF01	Living room	3.1
DFF02	Bedroom	1.2

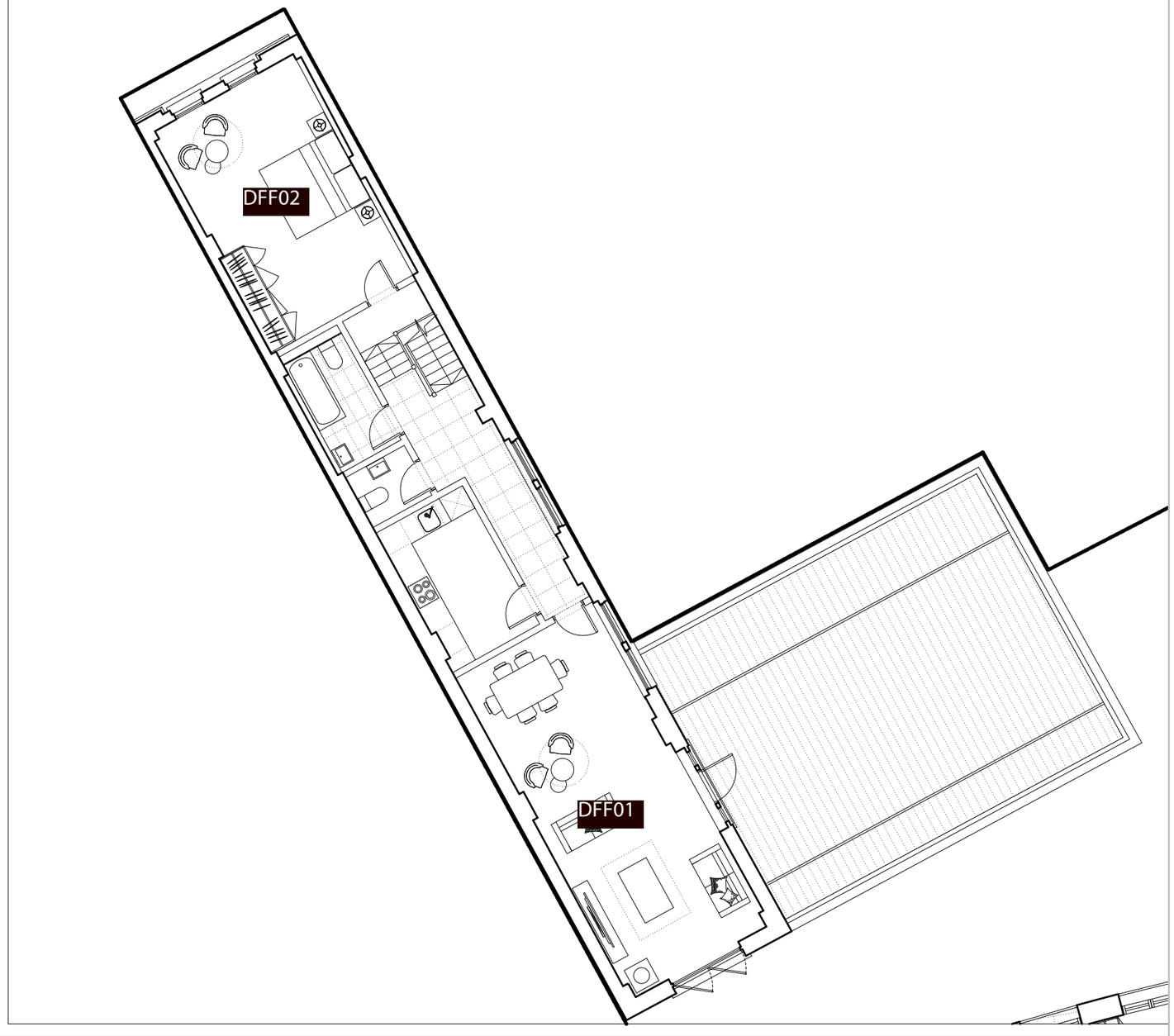

Figure 5: Plan View - First Floor

Figure 6: Permanent Overshadowing for playground area