INTERNAL DAYLIGHT REPORT

2 London Road, Twickenham

REPORT STATUS: 7.0

Document Control Sheet

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Client	Sky Lofts		
Development	2 London Road, Twickenham TW1 3RY		
Report Title	Internal Daylight Report		
Author	Muhammad Ali	Reviewed by	Naomi Sadler
Date	25/10/2024	Revision No.	7.0
Reason for Issue	For planning permission application		

Revision History				
Revision	**Date**	**Description**	**Prepared by**	**Checked by**
1.0	20/05/2024	For information	Muhammad Ali	Naomi Sadler
2.0	21/06/2024	Revise the proposed building by incorporating passive measures	Muhammad Ali	Naomi Sadler
3.0	26/06/2024	Update the conclusion	Muhammad Ali	Naomi Sadler
4.0	18/09/2024	Update the internal daylight results with original windows schedule	Muhammad Ali	Naomi Sadler
5.0	19/09/2024	Update the wording	Muhammad Ali	Naomi Sadler
6.0	22/10/2024	Revised with updated glass transmission value and floor layout	Muhammad Ali	Naomi Sadler
7.0	25/10/2024	Revised with trees dimensions/position, glass transmission values and internal floor layout	Muhammad Ali	Naomi Sadler

About Sadler Energy and Environmental Services Ltd.

Our team of technical specialists offer advanced levels of expertise and experience to our clients. We have a wide experience of the construction and development industry from the concept and planning stage through to the completion of the project.

Our emphasis is to provide innovative and cost-effective solutions that respond to increasing demands for energy efficiency, quality and practical on-site applications.

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1. Executive Summary

Sadler Energy & Environmental Services Ltd have been instructed by Sky Lofts to undertake a detailed daylight assessment to understand the potential daylight and sunlight changes that the proposed development, 2 London Road, TwickenhamThe daylight evaluation takes into account the most recent drawings created by Wyeth Burrell Properties Architects, with the existing building plans dated May 3, 2024, and the proposed building plans dated June 13, 2024.

The daylight analysis has been concluded by employing the methodologies outlined in the Building Research Establishment Guidelines titled 'Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice (2022)'. In order to carry out an assessment, we have generated a 3D computer model (Test Environment) of the proposed development and the relevant surrounding obstructions. Using this model and our specialist software, we have calculated the daylight levels within the proposed dwellings. Our assessment has considered all of the proposed residential units within the scheme. The daylight assessment considers all of the main habitable rooms (e.g. bedrooms, study, living rooms, kitchens etc.). However, areas like toilets, hallways, and staircases are not classified as habitable and are therefore excluded from the internal daylight assessment, in accordance with the BRE's guidelines in "Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice (2022)."

The initial results show that only 43% of all habitable rooms assessed demonstrate compliance to the BRE minimum targets. The further simulations were performed to increase the internal daylight level by adopting some passive measures. **Finaly, we have achieved 100% which are 14 out of 14 of all habitable ensure compliance to the BRE minimum criteria, utilizing illuminance (sDA) assessment method.** The table provided below summarises the outcomes for the whole property (existing vs proposed). It is important to note that these guidelines are not a rigid set of rules but are advisory and need to be applied flexibly according to the specific context of a site.

Assessment Method	No. of rooms assessed	Rooms meeting target	Rooms meeting target
		Existing	Proposed with passive measures
Illuminance (sDA)	14	6 (43%)	14 (100%)

Internal Daylight Analysis Summary passing the minimum target utilizing Illuminance (SDA) method-Existing Vs Proposed with passive measures

The rooms that did not meet the criteria during the initial assessment were evaluated using different passive strategies, such as incorporating new glass with high transmission values and modifying the internal floor area to ensure compliance (section 6.2, Mitigation measures and updated results).

Moreover, to address the issues for plot 5 and plot 6, roof lights have been suggested as a mitigation measure to enhance the amount of natural daylight in the habitable rooms at the 3rd floor. Furthermore, existing windows glass will be replaced with new glass that has a transmittance value of 0.75 and 0.82 (section 6.2, Mitigation measures and updated results).

The BRE guidelines in question are precisely that: guidelines which provide a recommendation to inform site layout and design. They are not mandatory, nor do they form planning policy, and their interpretation may be treated flexibly depending on the specifics of each site.

2. Introduction

Sadler Energy and Environmental Services Ltd have been instructed to assess the quality of internal amenity within the proposed development at 2 London Road, Twickenham. Our assessment has considered all the proposed residential units within the dwelling. The daylight assessment considers all the main habitable rooms (bedrooms, living rooms, kitchens etc.), toilets, hallways and staircases are not considered habitable use. The report is based on a technical analysis that follows the guidelines outlined in the Building Research Establishment Guidelines called 'Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice (2022)'.

Figure 1 – Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice (2022)

These guidelines are recommendations for site layout and design, but they are not mandatory and do not constitute planning policy. The interpretation of these guidelines can be flexible depending on the unique characteristics of each site.

2.1.1 The Building Research Establishment (BRE) Report 209, *'Site layout planning for daylight and sunlight: A guide to good practice'*, is the reference document used by most local authorities for assessing daylight and sunlight in relation to new developments. Commonly referred to as 'the BRE guidelines', it provides various testing methodologies to calculate the potential light levels received by neighboursof a development site and provided within proposed new development.

2.1.2 The guidance given within the BRE document makes direct reference to the British Standard BS EN17037 (2018) and the CIBSE (Chartered Institute of Building Services Engineers) guide LG10: Daylighting – a guide for designers (2014). It is intended to be used in conjunction with these documents, which provide guidance on the assessment of daylight and sunlight within new buildings.

The BRE Guidelines are not mandatory, though decision-takers may consider the suitability of a proposed scheme for a site using the BRE guidance. Consideration will be given to the urban context within which a scheme is located, and the daylight and sunlight will be one of several planning considerations which the local authority will weigh in the planning balance.

2.1 Local Plan – London Borough of Richmond Upon Thames Council (2018)

4.8 Amenity and Living Conditions

Policy LP 8 Amenity and Living Conditions

All development will be required to protect the amenity and living conditions for occupants of new, existing, adjoining and neighbouring properties. The Council will: 1. ensure the design and layout of buildings enables good standards of daylight and sunlight to be achieved in new development and in existing properties affected by new development; where existing daylight and sunlight conditions are already substandard, they should be improved where possible.

3. BRE Guideline for Internal Daylight Assessment

The 2022 update to the BRE 209 document was published on 9th June 2022. The new guidance reflects the UK National Annex of the British Standard: BS EN17037 (2018) and provides two methodologies for assessing the internal daylight amenity to new residential properties. These assessment methods are known as **'Daylight Illuminance' or 'Daylight Factor'** and are described in more detail below. **Either method can be used in an assessment.**

3.1 Daylight Illuminance (sDA) Assessment

The Daylight Illuminance method utilises climactic data for the location of the site, based on a weather file for a typical or average year, to calculate the illuminance at points within a room on at least hourly intervals across a year. The illuminance is calculated across an assessment grid sat at the reference plane (usually desk height "0.85m").

The guidance provides target illuminance levels that should be achieved across at least half of the reference plane for half of the daylight hours within a year. The targets set out within the national annex are as follows:

- Bedrooms – 100 Lux
- Living Rooms – 150 Lux
- Kitchens – 200 Lux

For spaces with a shared use the higher target would generally apply such that it would be appropriate to adopt a target of 150 Lux for a student bed sitting room if students would often spend time in their room during the day. The guidance notes that discretion should be used and, for example, a target of 150 Lux may be appropriate in a Living / Kitchen / Dining Room within a modern flatted development where the kitchens are not 'habitable' space, and small separate kitchens are to be avoided.

3.2 Daylight Factor Assessment

The Daylight Factor method involves the computation of the daylight factor at each calculation point on the assessment grid.

The daylight factor is a ratio between internal and external illuminance expressed as a percentage. The calculation uses the CIE overcast sky model and is independent of orientation and location. In order to account for different climatic conditions at different locations different daylight factor targets may be applied for different cities with targets varying throughout the UK.

The daylight factor targets are to be achieved over at least 50% of the room assessment grid and are expressed as a median figure. For London these median daylight factor targets are:

- Bedrooms – 0.7%
- Living Rooms – 1.1%
- Kitchens – 1.4%

For multi-purpose living / kitchen / diner arrangements the higher 'kitchen' targets can be difficult to achieve due to the depth of internal space. In such cases, it is generally accepted that the 1.5% target for living rooms be used instead as this represents the predominant use of the space. The BRE guide gives the following: -

"2.1.15 Non-daylit internal kitchens should be avoided wherever possible, especially if the kitchen is used as a dining area too. Daylight levels in kitchen areas should be checked. If the layout means that a small internal kitchen is inevitable, it should be directly linked to a well daylit room. Further guidance forassessment of this situation is given in Appendix C."

4. Sources of Information

2D Architectural drawings showing the proposed and surrounding buildings have been used to create a 3D computer model of the proposed development in the context of the surrounding buildings.

Architect: Wyeth Burrell Properties

2D drawings-v3.2 (Existing Building)
Existing Ground Floor Plan-FUL.04B.
Existing First Floor Plan-FUL.04C.
Existing Second Floor Plan-FUL.04D.
Existing Third Floor Plan-FUL.04E.
Existing Roof Plan-FUL.04F.
Existing Section- FUL.06.
Existing Section- FUL.07.
Existing Front & Rear Elevations- FUL.08A.
Existing Side Elevation- FUL.08B.
Location Plan- FUL.15.

2D drawings (Proposed Building)
Proposed Ground Floor Plan- P-01.
Proposed First Floor Plan- P-02.
Proposed Second Floor Plan- P-03.
Proposed Third Floor Plan- P-04.
Proposed Roof Plan- P-05.
Proposed Section- P-06.
Proposed Section- P-18.
Proposed Front & Rear Elevations- P-17.
Proposed Side Elevation- P-15.
Location Plan- FUL.15.

5. Assumptions

In order to produce the daylight and sunlight assessments in line with BRE guidance, we have applied a number of inputs to represent the physical nature of the proposed development and surrounding context. These inputs are: -

Material reflectance values

Reflectance for rooms internal surfaces affect the resulting internal daylight. Lighter colours result in higher reflectance (white: 1.0; black:0.0). Windows Light Transmittance is the amount of light that enter the glazed surface.

Surface	Reflectance value
Interior walls	0.7
Interior ceilings	0.7
Floors	0.2
Exterior walls and obstructions	0.3
Exterior ground	0.2

Table 1 - Surface reflectance of construction materials

Glazing properties

We have assumed that the glazing used within the development will be standard clear double glazed with a low emissivity coating with a diffuse transmittance factor of 0.68 for initial simulations. However, as mitigation measure, we have proposed to replace the new glazing with transmittance factor of 0.75 and 0.82 (section 6.2, Mitigation measures and updated results). We have also applied a window framing factor, to account for the proportion of frame to glazing. We have used the standard BRE assumptions as listed in appendix C of the BRE guidance.

6. Results Overview

6.1 Initial results (Existing Building)

Initially, a detailed 3-dimensional computer model of the proposed development, and all the surrounding obstruction including trees and building of higher hight difference was created. The model was assessed using proprietary software to calculate the various measures of daylight. The resulting levels were then compared to the relevant BRE guideline to determine the level of impact to each habitable room of residential development.

Internal Daylight Analysis Summary Utilizing Illuminance (sDA) Method,
Old windows 0.68 transmittance values (Existing State)

Assessment Method	No. of rooms assessed	Rooms meeting target
Illuminance (sDA)	14	6 (43%)

Table 2 - Internal Daylight Analysis Summary (Existing State)

Details of Initial results (Existing Building)

Building Name	Unit No.	Floor	Room	Room Use	Illuminance (SDA)		Daylight Factor (DF)		
					Target Lux	% of Room meeting target	Target DF	% of Room meeting target	Median DF of Room
					(Lux)	(%)	(%)	(%)	(%)
Existing	Plot 1	First	R1	LKD	150	55%	1.1	29%	1.093
			R2	Bedroom	100	31%	0 .7	22%	0.534
			R3	Study	100	32%	0 .7	36%	0.695
	Plot 2	First	R4	LKD	150	100%	1.1	85%	2.427
			R5	Bedroom	100	100%	0 .7	100%	2.275
	Plot 3	Second	R6	LKD	150	39%	1.1	19%	0.648
			R7	Bedroom (1)	100	30%	0 .7	24%	0.659
			R8	Bedroom (2)	100	47%	0 .7	44%	0.963
	Plot 4	Second	R9	LKD	150	94%	1.1	74%	1.527
			R10	Bedroom	100	100%	0 .7	55%	0.991
	Plot 5	Third	R11	LKD	150	14%	1.1	9%	0.413
			R12	Bedroom	100	33%	0 .7	37%	0.763
	Plot 6	Third	R13	Bedroom	100	100%	0 .7	81%	2.034
			R14	LKD	150	49%	1.1	42%	1.221

Table 3 - Internal Daylight Analysis Results (Existing Building)

6.2 Mitigation measures and updated results

I. It is assumed that some windows glass will be replaced with new glass that has a transmittance value of 0.75 and 0.82, characteristic of the new double glazing, in order to enhance the overall results.

Building Name	Unit No.	Floor	Room	Room Use	Glazing	
					Transmission Value (%)	Replacement of Existing Glass
Proposed	Plot 1	First	R1	LKD	0.68	No
			R2	Bedroom	0.82	Yes
			R3	Study	0.82	Yes
	Plot 2	First	R4	LKD	0.68	No
			R5	Bedroom	0.68	No
	Plot 3	Second	R6	LKD	0.82	Yes
			R7	Bedroom (1)	0.75	Yes
			R8	Bedroom (2)	0.75	Yes
	Plot 4	Second	R9	LKD	0.68	No
			R10	Bedroom	0.68	No
	Plot 5	Third	R11	LKD	0.68 / 0.75	Existing Windows/Rooflight
			R12	Bedroom	0.68 / 0.75	Existing Windows/Rooflight
	Plot 6	Third	R13	Bedroom	0.68 / 0.75	Existing Windows/Rooflight
			R14	LKD	0.68 / 0.75	Existing Windows/Rooflight

Table 4 – Required transmission value of glass as per room type

II. Two additional rooflights are proposed one for Plot 5-bedroom room (1.0m x 1.0m) and other for Plot 5 kitchen/living/dining room (1.0m x 1.5m). Moreover, the size of Plot 6 kitchen/living/dining room rooflight is adjusted to (1.0m x 1.5m).

III. To comply with the internal daylight requirements, the internal floor area for two rooms in Plot 1 and Plot 3 are modified as follows.

- **Plot 1**: The **bedroom** features a full wall-height cupboard measuring (0.8m x 2.5m), to ensure compliance. In accordance with NDSS a built-in wardrobe counts towards the bedroom floor area requirements therefore the GIA remains as a compliant 11.5 m².
- **Plot 3**: The internal door's location for the **kitchen, living, and dining areas** has been adjusted to minimize the internal floor space, ensuring compliance with the sDA target. The revised internal floor area needed is now 24.5 m².

The results indicate mitigation measures help the rooms meet the BRE criteria. The detailed results can be found in Table 6. However, **Table 5 shows the results summary where all the rooms pass internal daylight requirement utilizing Illuminance (sDA) method.**

Assessment Method	No. of rooms assessed	Rooms meeting target
Illuminance (sDA)	14	14 (100%)

Table 5 - Internal Daylight Analysis Summary, Illuminance (SDA)- (0.75 and 0.82 Transmittance Value)

Details of Updated results (Proposed Building)

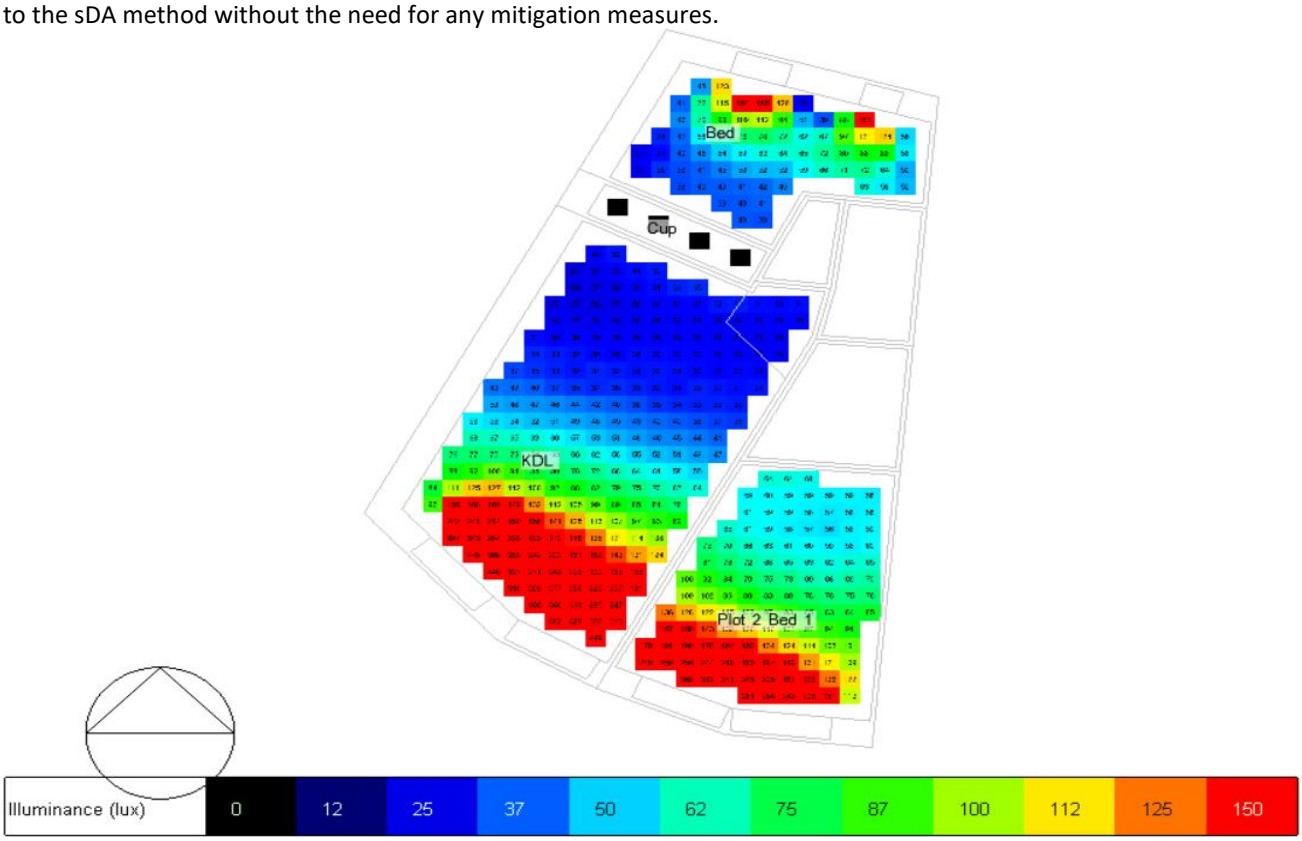
Building Name	Unit No.	Floor	Room	Room Use	Illuminance (SDA)		Daylight Factor (DF)		
					Target Lux	% of Room meeting target	Target DF	% of Room meeting target	Median DF of Room
					(Lux)	(%)	(%)	(%)	(%)
Proposed	Plot 1	First	R1	LKD	150	55%	1.1	29%	1.093
			R2	Bedroom	100	55%	0 .7	49%	0.819
			R3	Study	100	51%	0 .7	44%	0.825
	Plot 2	First	R4	LKD	150	100%	1.1	85%	2.427
			R5	Bedroom	100	100%	0 .7	100%	2.275
	Plot 3	Second	R6	LKD	150	51%	1.1	25%	0.831
			R7	Bedroom (1)	100	63%	0 .7	62%	0.659
			R8	Bedroom (2)	100	70%	0 .7	65%	0.963
	Plot 4	Second	R9	LKD	150	94%	1.1	74%	1.527
			R10	Bedroom	100	99%	0 .7	54%	0.987
	Plot 5	Third	R11	LKD	150	81%	1.1	64%	2.486
			R12	Bedroom	100	100%	0 .7	100%	3.389
	Plot 6	Third	R13	Bedroom	100	100%	0 .7	85%	2.034
			R14	LKD	150	75%	1.1	51%	1.908

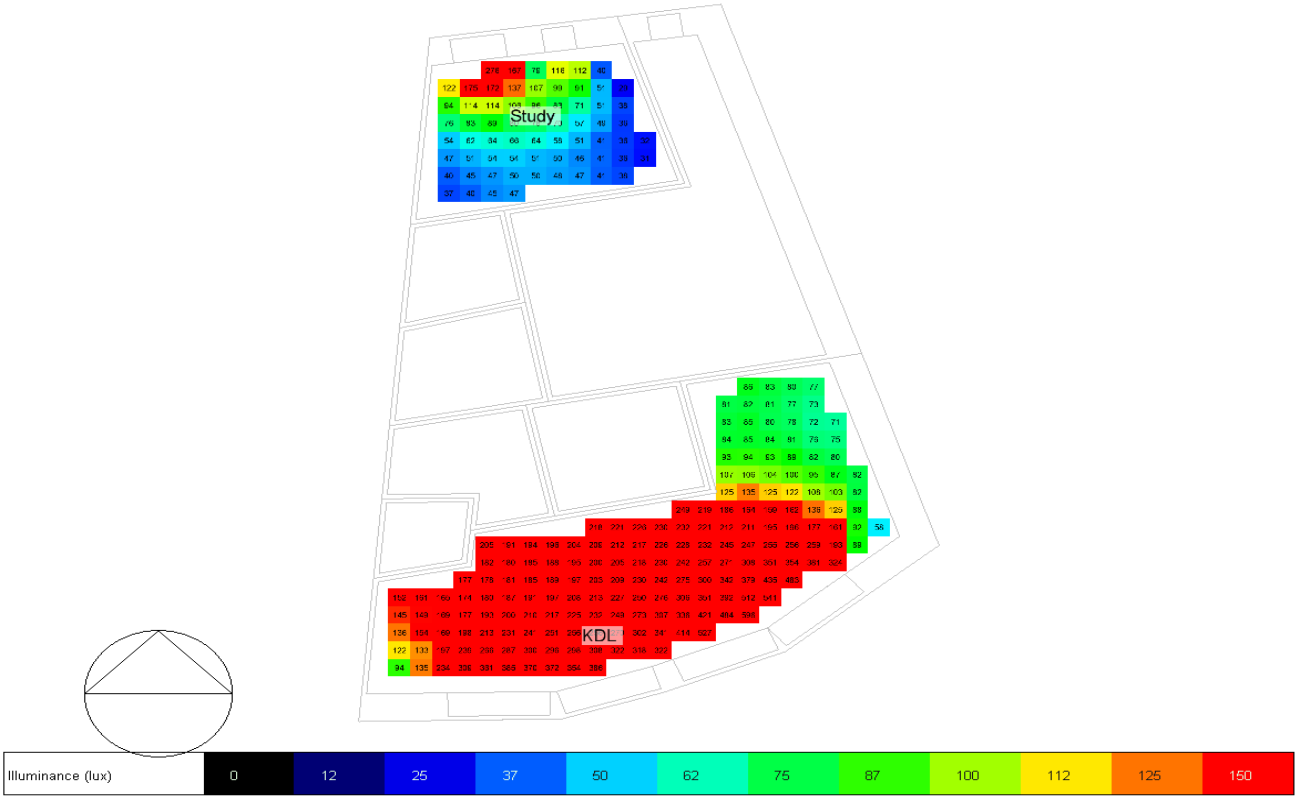
Table 6 - Internal Daylight Analysis Results Utilizing Illuminance (sDA) Method (Proposed Building)

6.3 Discussion on Results

6.1.1 First Floor (Plot 1 & Plot 2)

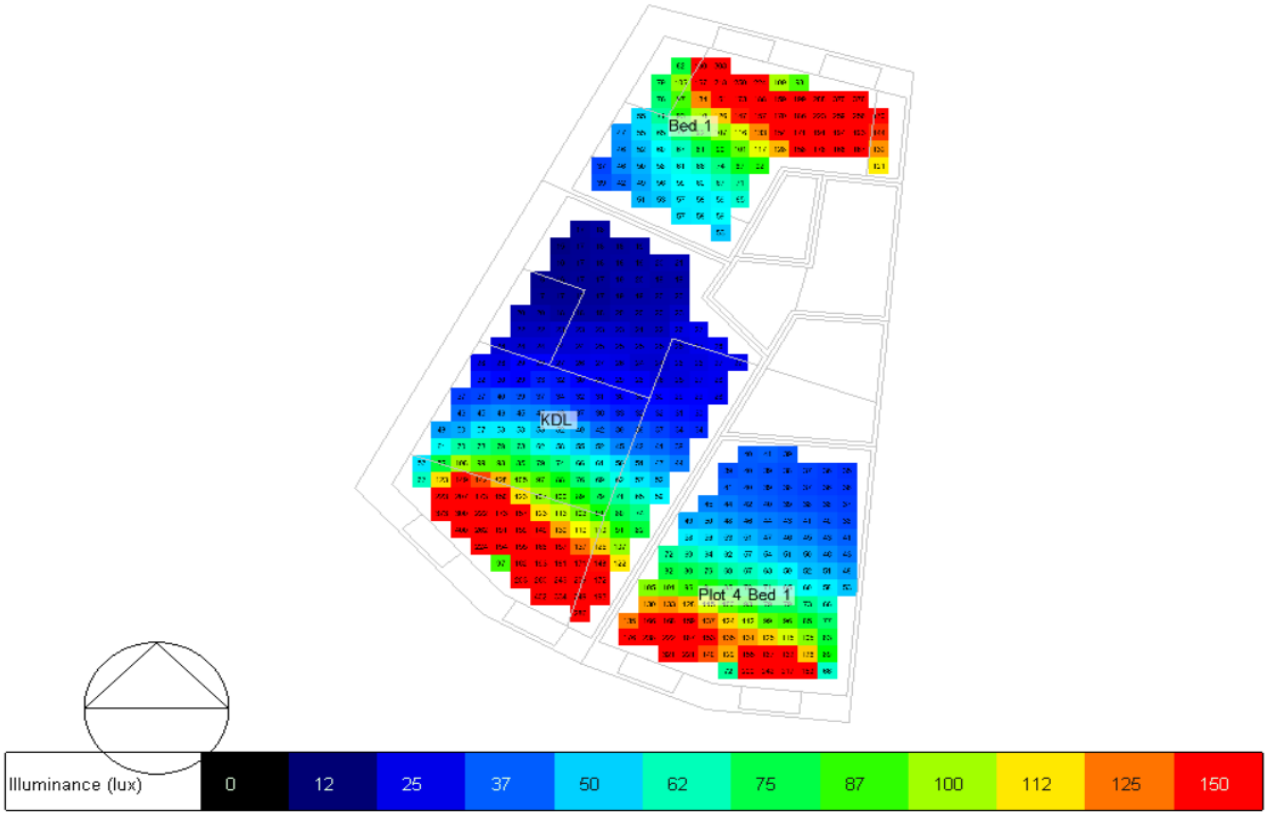
The findings indicate that every habitable room in Plot 1 satisfies the BRE minimum daylight standards through passive strategies using the sDA assessment method. In contrast, the habitable rooms in Plot 2 comply with the criteria according to the sDA method without the need for any mitigation measures.

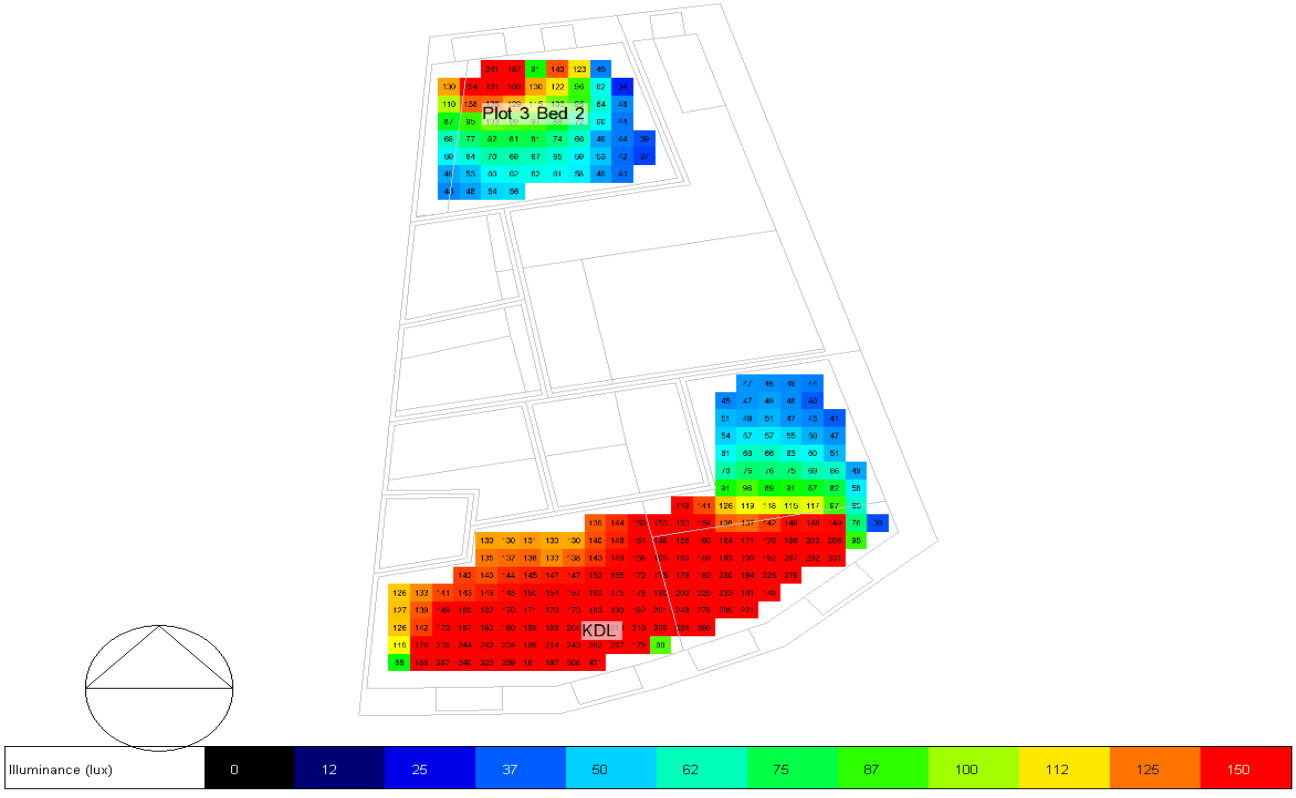




6.1.3 Second Floor (Plot 3 & Plot 4)

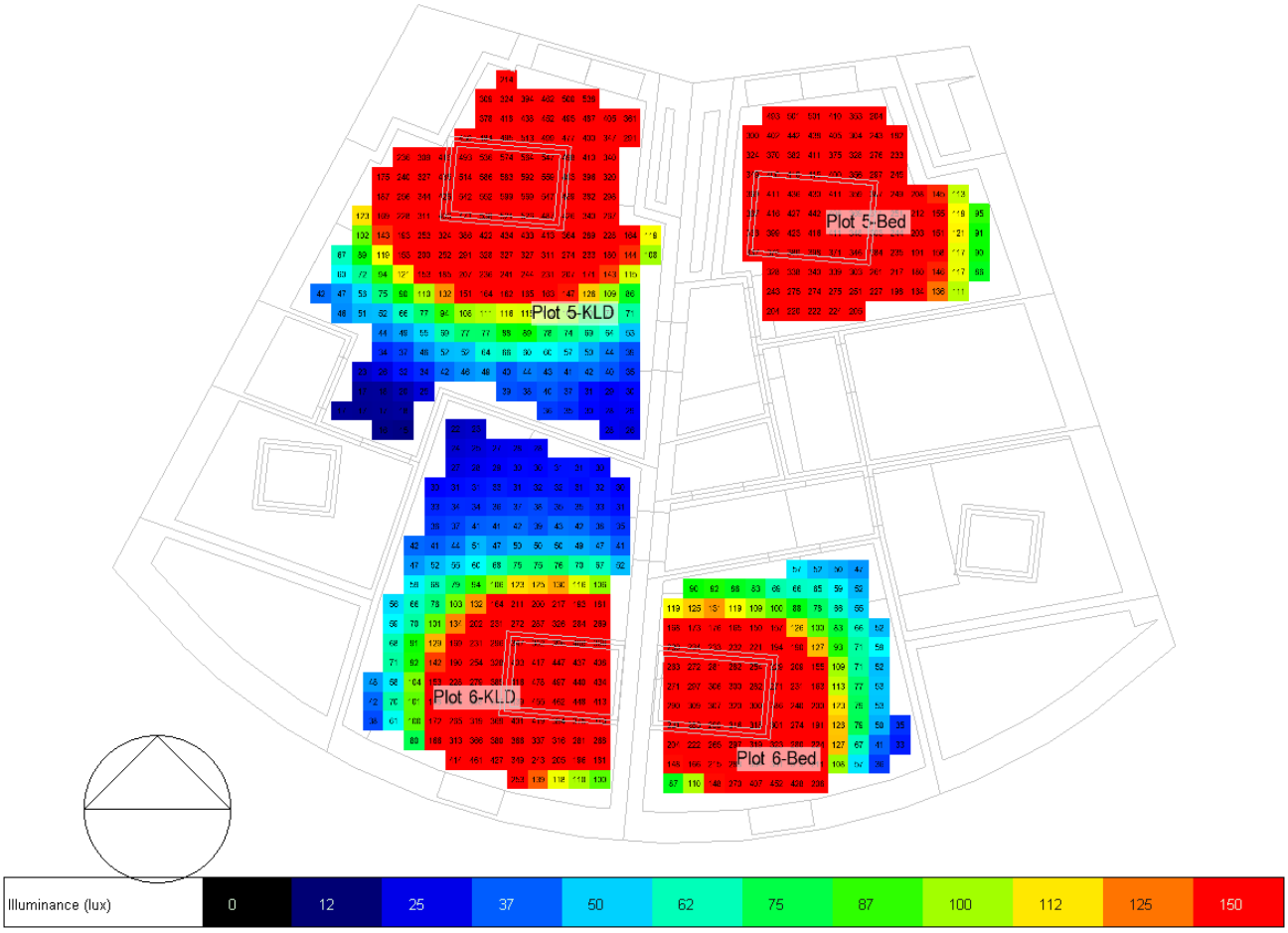
The findings indicate that every habitable room in Plot 3 satisfies the BRE minimum daylight standards through passive strategies using the sDA assessment method. In contrast, the habitable rooms in Plot 4 comply with the criteria according to the sDA method without the need for any mitigation measures.





6.1.5 Third Floor (Plot 5 & Plot 6)

The findings show that all habitable rooms in plot 5 and plot 6 with passive measures meet the BRE standards utilizing sDA assessment method.



7. Conclusion

The daylighting analysis has been completed by utilising the methodologies specified in the Building Research Establishment Guidelines entitled 'Site Layout Planning for Daylight and Sunlight - A Guide to Good Practice (2022)'. The daylight assessment includes all the main habitable rooms (e.g. bedrooms, living rooms, kitchens, etc.), while toilets, hallways, and staircases are not considered habitable spaces and are therefore excluded from the internal daylight assessment, in accordance with the BRE guideline.

Results achieved:

The initial results indicate that over 60% of all habitable rooms failed to comply with the minimum standards established by BRE. Therefore, further simulations were performed to increase the internal daylight level by adopting some passive measures. **Finaly, we have achieved 100% which are 14 out of 14 of all habitable ensure compliance to the BRE minimum criteria, utilizing illuminance (sDA) assessment method.** The table provided below summarises the outcomes for the whole property (existing vs proposed with passive measures).

It is important to note that BRE guidelines are not a rigid set of rules but are advisory and need to be applied flexibly according to the specific context of a site.

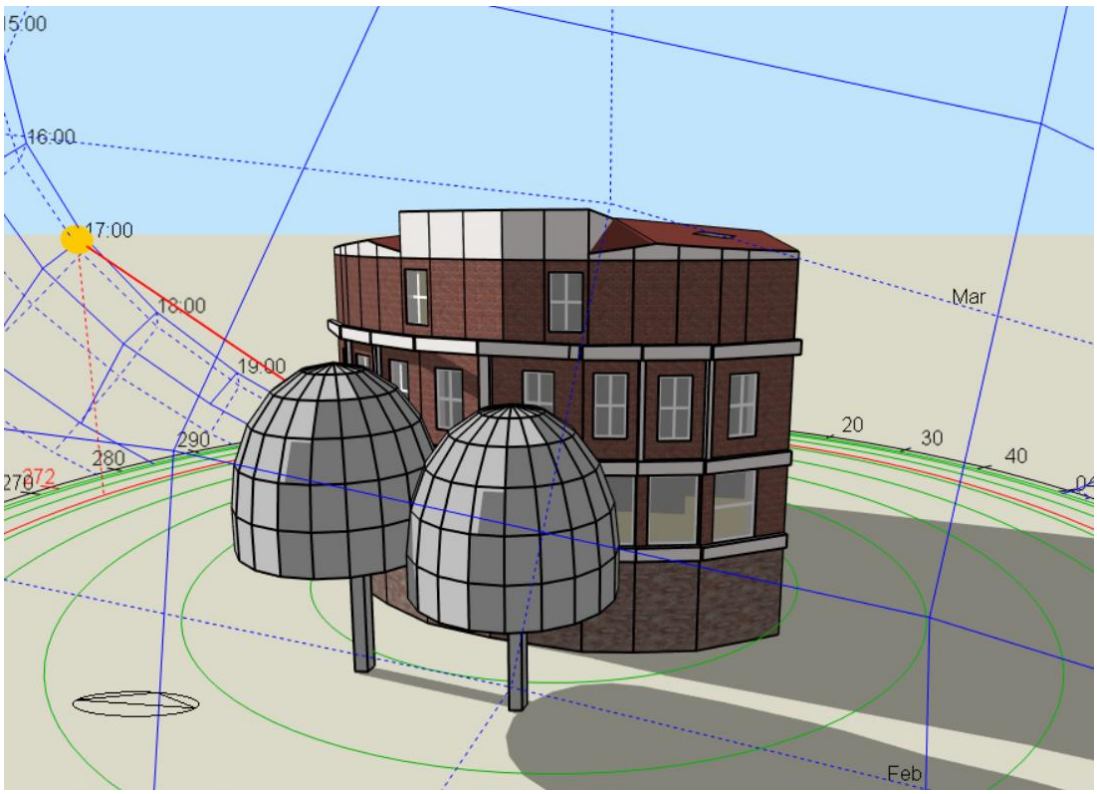
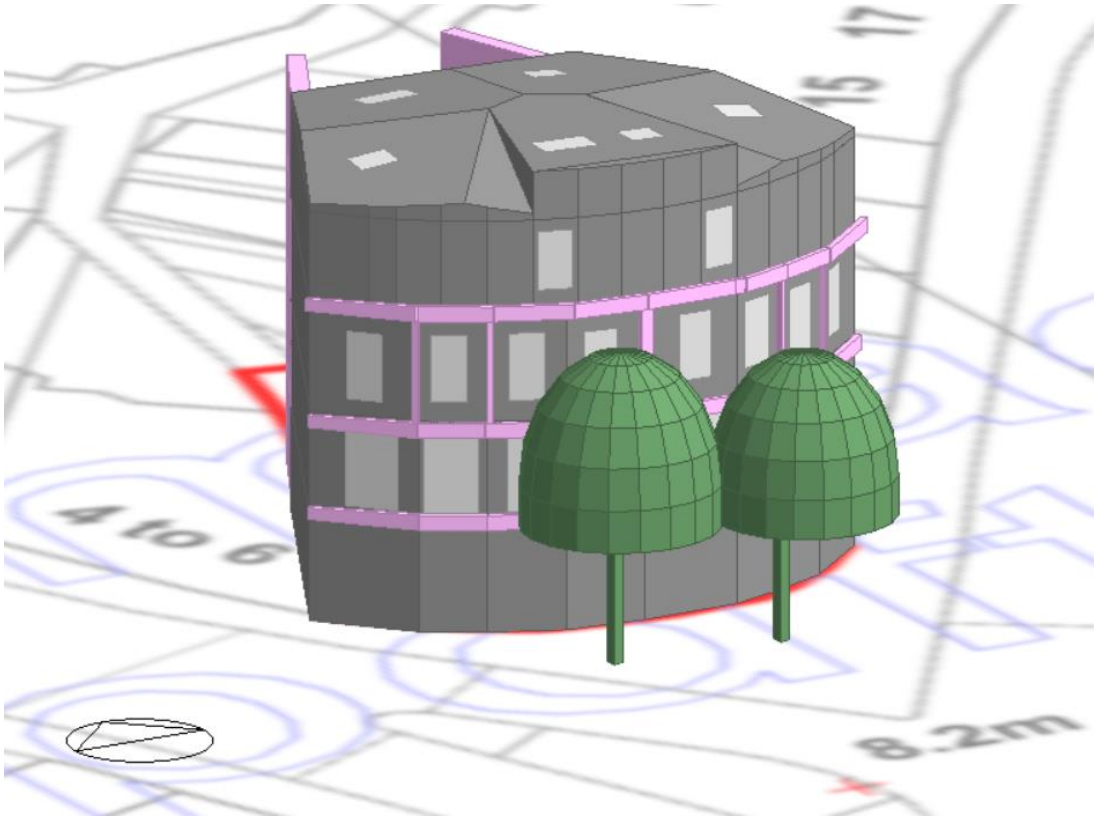
Assessment Method	No. of rooms assessed	Rooms meeting target	Rooms meeting target
		Existing	Proposed with passive measures
Illuminance (sDA)	14	6 (43%)	14 (100%)

Site complications and mitigation measures taken:

The rooms that failed to meet the standards in the initial evaluation were reassessed through various passive strategies, including the installation of new glass with high transmission values (i.e. 0.75 & 0.82) and adjustments to the internal floor area to achieve compliance. Additionally, to resolve the issues for plot 5 and plot 6, the introduction of roof lights has been proposed as a solution to increase the natural daylight in the habitable rooms at third floor.

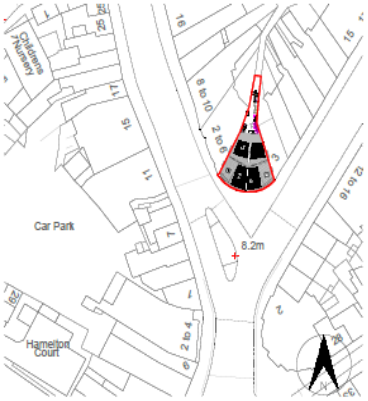
The BRE guidelines in question are precisely that: guidelines which provide a recommendation to inform site layout and design. They are not mandatory, nor do they form planning policy, and their interpretation may be treated flexibly depending on the specifics of each site.

APPENDIX A – Model Image

Image 1	
Image 2	

APPENDIX B – Layouts of Proposed Development

PROPOSED 1ST FLOOR PLAN 1 : 100 0 1 2 3 4 5 6



1 : 100 0 1 2 3 4 5 6

A DD.MM.YY

REV	DATE	DESCRIPTION	DRN	CHKD

CLIENT
Wyeth Burrell Pearce Ltd. /
Skyloft

PROJECT
Refurbishment of former HSBC Bank to create
Commercial unit on B1 and GRND floors &
6 no. residential units on 1st/2nd and 3rd floors

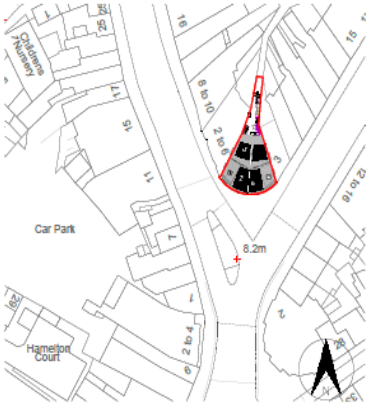
DRAWING
Proposed First Floor Plan

LEWIS AND HICKEY
18 Farnham Road
Guildford
Surrey, GU1 4XA
Tel: 01483 560 808
Fax: 01483 560 660
Email: guildford@lewishickey.com

SCALE	DATE	DRAWN	CHECKED
1:100	13.06.2024	HYA	

PROJECT No	DRAWING No	STATUS	REV
G4788	P-03	PLANNING	02

PROPOSED 2ND FLOOR PLAN 1 : 100 0 1 2 3 4 5 6



1 : 100 0 1 2 3 4 5 6

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REV DATE DESCRIPTION DRN CHKD

CLIENT
Wyeth Burrell Pearce Ltd. / Skyloft

PROJECT
Refurbishment of former HSBC Bank to create Commercial unit on B1 and GRND floors & 6 no. residential units on 1st/2nd and 3rd floors

DRAWING
Proposed Second Floor Plan

L&H
18 Farnham Road
Guildford
Surrey, GU1 4XA
LEWIS AND HICKEY
Tel 01483 560 908
Fax 01483 560 660
Email guildford@lewishickey.com

SCALE	DATE	DRAWN	CHECKED
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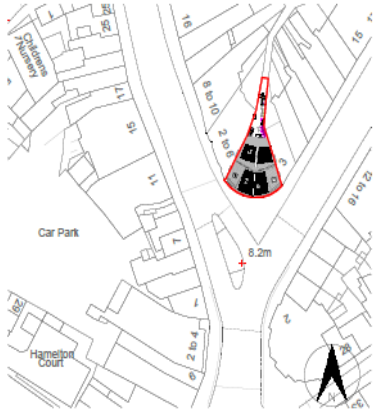
PROJECT No	DRAWING No	STATUS	REV
G4788	P-04	PLANNING	02

PROPOSED 3RD FLOOR PLAN 1 : 100 0 1 2 3 4 5 6



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REV	DATE	DESCRIPTION	DRN	CHKD

CLIENT
Wyeth Burrell Pearce Ltd. /
Skyloft

PROJECT
Refurbishment of former HSBC Bank to create
Commercial unit on B1 and GRND floors &
6 no. residential units on 1st/2nd and 3rd floors

DRAWING
Proposed Third Floor Plan

L&H

LEWIS AND HICKEY

18 Farnham Road
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Surrey, GU1 4XA

Tel: 01483 560 908
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Email: guildford@lewishickey.com

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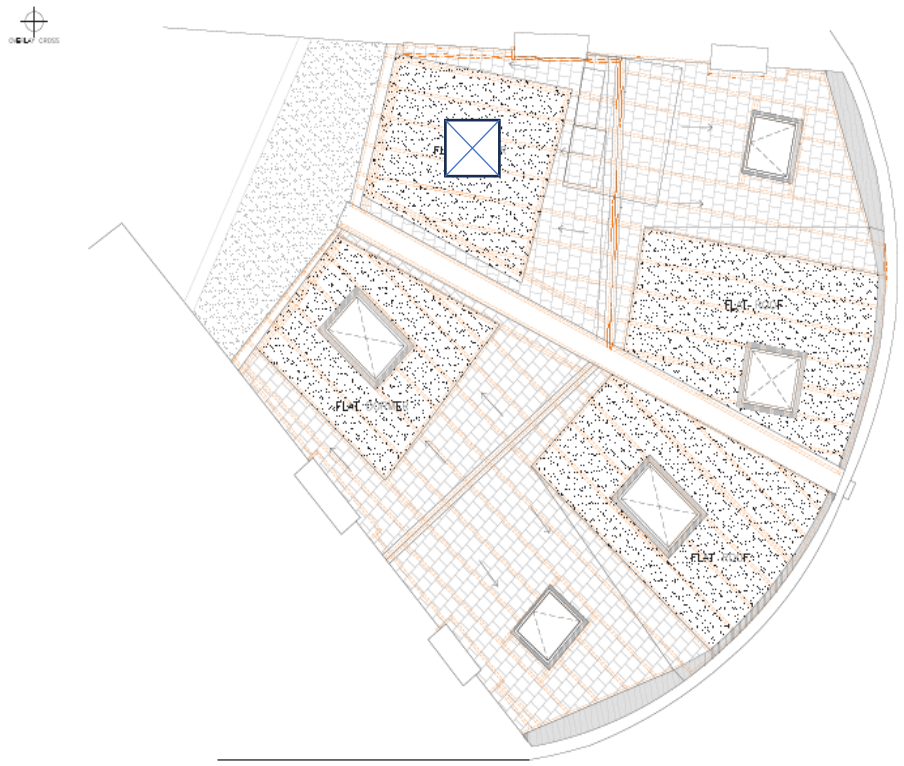
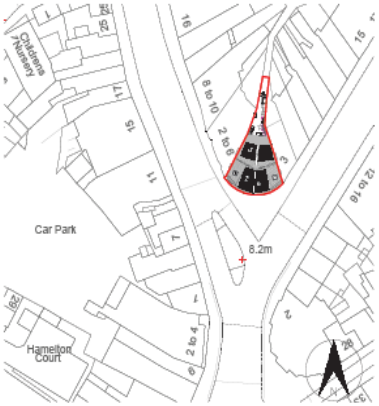


PROPOSED ROOF PLAN

1 : 100 0 1 2 3 4 5 6



1 : 100 0 1 2 3 4 5 6

A DD/MM/YY

REV	DATE	DESCRIPTION	DRN	CHKD

CLIENT
Wyeth Burrell Pearce Ltd. /
Skyloft

PROJECT
Refurbishment of former HSBC Bank to create
Commercial unit on B1 and GRND floors &
6 no. residential units on 1st/2nd and 3rd floors

DRAWING
Proposed Roof Plan

L&H

LEWIS AND HICKEY

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PROJECT No	DRAWING No	STATUS	REV
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Sadler Energy and Environmental Services Ltd (SEES)
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