Abbey Rose, London Borough of Camden

Overheating Assessment

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1 Introduction

This report assesses the overheating potential of the proposed Abbey Rose flat, in the London borough of Camden. The project consists of the refurbishment of 2 storeys of an existing building to provide a 4 bedroom duplex. The site location is shown in Figure 1-1 below.

Figure 1-1 – Abbey Rose location

2 Guidance

2.1 CIBSE TM 59 - Design methodology for the assessment of overheating risk in homes

TM 59 outlines specific criteria for assessing overheating in residential buildings. In the case of free running or natural ventilation, including homes that have mechanical ventilation with heat recovery (MVHR), both of the following criteria must be passed for all relevant rooms in order to ensure the building does not overheat.

1. For living rooms, kitchens and bedrooms: The number of hours during which temperature difference between the actual operative temperature in the room and the limiting maximum acceptable temperature (ΔT) is greater than or equal to one degree during the period May to September inclusive shall not be more than 3% of occupied hours. (CIBSE TM52 Criterion 1: Hours of exceedance).

2. For bedrooms only: to guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10 pm to 7 am shall not exceed 26 °C for more than 1% of annual hours. (Note: 1% of the annual hours between 22:00 and 07:00 for bedrooms is 32 hours, so 33 or more hours above 26 °C will be recorded as a fail).

3 Assessment Methodology

A dynamic overheating assessment was conducted for the flat, using IES Virtual Environment software. A model of the proposed development was created in the IES ModelIt module using drawings provided by the architect. The surrounding buildings have been modelled based on satellite imagery and information provided in the drawings. Trees and other greenery has been excluded from the model due to the difficulty of accurately assessing its size/location. A sample image of the assessment is shown in figure 3-1

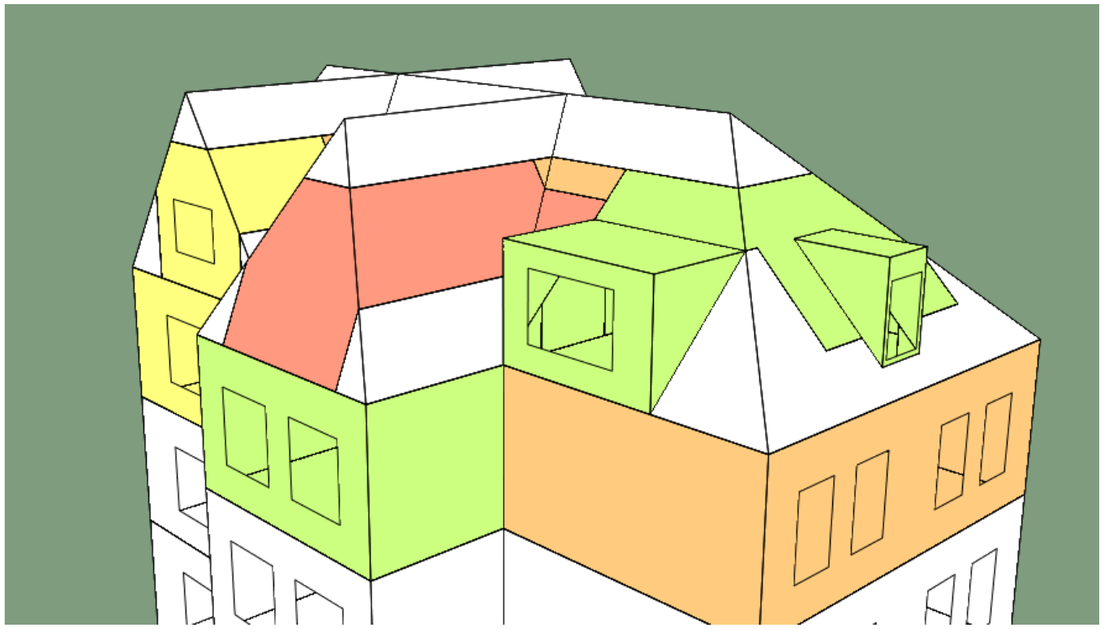

Figure 3-1 – Overheating Model

A dynamic thermal assessment was conducted using the IES Apache module, which is a CIBSE AM11 compliant thermal modelling software. The Design Summer Year 1 (DSY1), London Heathrow, high emission, 50% percentile weather file has been used.

No mechanical cooling systems were included in the overheating assessment.

The building and modelling assumptions used in the assessment are outlined below. The building fabric used are outlined in Table 3-1.

Building Element	U – Value (W/m²K)	G - Value
External Walls	0.46 – 0.60	
Roof	0.13	
New Windows	1.6	0.63
Existing/Secondary Glazed Windows	1.6	0.80

Table 3-1 – Building fabric properties

All residential spaces were modelled in line with TM 59. Overheating was only assessed in occupied spaces, such as bedrooms, living rooms and kitchens.

Natural ventilation was modelled through operable windows using the IES MacroFlo Module. Operable windows in the residential areas were set to open when the room is occupied and internal air temperatures is greater 22°C and greater than external air temperature, in line with the guidance in TM 59. Casement windows were assumed to open to 90 degrees.

4 Results & Discussion

The results for the overheating assessment are outlined in Table 4-1 below.

Room	Criteria 1	Criteria 2	CIBSE Criteria Met?
Requirement	=<3.0	=<32	
2F-03 Sitting Room	4.0		×
2F-05 Bedroom	1.3	34	×
2F-10 Bedroom 04	1.3	32	✓
2F-11 Kitchen Dinning	1.4		✓
3F-03 Master Bedroom	0.3	35	×
3F-08 Bedroom 02	0.5	21	✓

Table 4-1 – Overheating results

The results show that half of the assessed units within the development pass the overheating assessment for the DSY1, 2020, High emission 50th percentile scenario, which is the weather file recommended to be used in TM59.

The development has a significant amount of shading from surrounding trees, which are located to the south of the proposed unit. These will provide some shading to the proposed unit, however these have been excluded from the overheating model due to the difficulty of accurately assessing its size/location. The external fabric has been insulated to minimise any heat gain through conduction and all existing windows have been provided with secondary glazing.

Internal heat generation will be minimised throughout the development. Highly efficient lighting will be installed, which minimises internal heat generation. Heating pipework will be fully insulated to minimise heat gain from LTHW pipework.

Due to the nature of the development as an existing building, it has limited thermal mass which means it does not perform that well against the overheating criteria, as it has limited ability to buffer itself against high external temperatures.

All occupied rooms are provided with operable windows. These allow the occupants to use natural ventilation to control their indoor temperature. The development has not been provided with mechanical ventilation. Due to its small size and provision of operable windows throughout, it was not deemed necessary. No mechanical cooling systems were included in the overheating assessment.

5 Conclusion

This report assesses the overheating potential of the proposed Abbey Rose flat, in the London borough of Camden. A TM 59 assessment undertaken using IES Virtual Environment software, which is a CIBSE AM11 compliant thermal modelling software. The DSY1, London Heathrow, high emission, 50% percentile weather files were used to assess current overheating potential.

The results show that half of the occupied rooms met the CIBSE criteria, however half did not. The development followed the cooling hierarchy, with external shading from trees, efficient internal lighting and operable windows to provide passive ventilation, however due to the nature of it as an existing building with limited thermal mass, it has minimal ability to buffer itself against extreme external temperature.