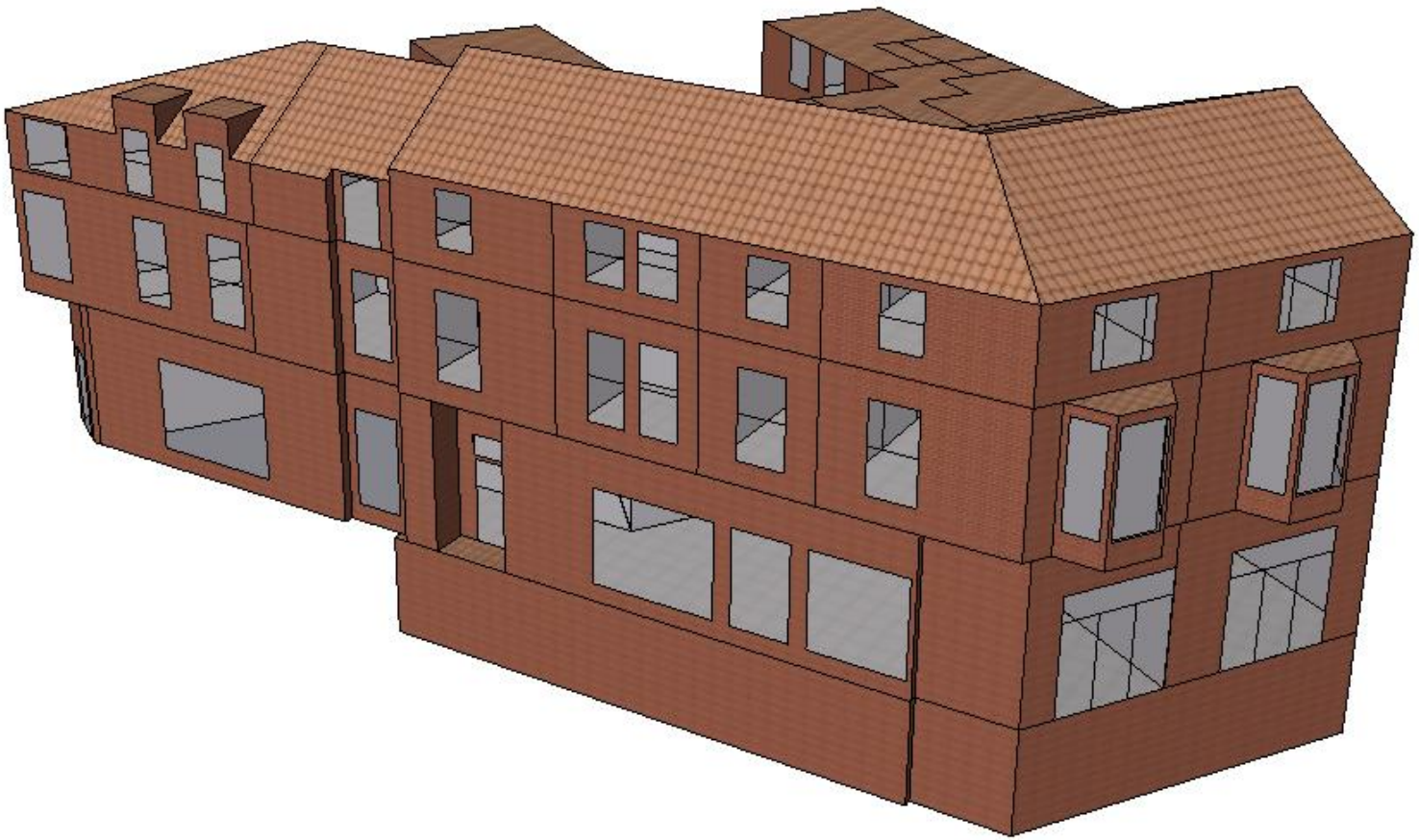


compliant EPC
dynamic energy consultancy

Wilbraham Road, Chorlton

Project: 577-579 Wilbrham Road, Chorlton, M21 9AH

Assessment: Overheating Assessment

SECTION			CHECKED		
REV	TITLE	BY	BY	DATE	SIGNED
00	TM59 Assessment	CS	AA	26.01.2024	
01	TM59 Assessment	CS	WNL	01.03.2024	

Contents:

- **Section 1** – Executive Summary
- **Section 2** – Introduction
- **Section 3** – Key Assumptions
- **Section 4** – Results
- **Section 5** – Conclusion
- **Section 6** – 3D Model & Orientation

Section 1.0 – Executive Summary

This assessment has been produced to address and satisfy the requirements of building regulations Part O: Overheating mitigation assessment to address the potential overheating risk in homes. This project and assessment relate to the project situated at 577-579 Wilbrham Road, Chorlton, M21 9AH.

In order to undertake this assessment, dynamic simulation modelling with approved software, IES Virtual Environment v2023.2.0.0 has been used to model the proposed development.

The current proposed design strategy is based upon a natural & partial mechanical ventilation strategy via acoustic trickle vents within the windows and summertime cooling via KERS boost extract. The windows have restricted opening times as detailed below:

- **Bedrooms – Night time only.**
- **Kitchens & Living Areas – Day time only.**

The analysis performed to date confirms that all assessed, occupied rooms are shown to be **compliant** with regards to the TM59 domestic overheating criteria & Part O requirements when mechanical ventilation and openable windows are utilised.

The ADO requires an assessment based on the TM59 methodology with some specific limits on operation of openings during the day and night with omission of internal blinds/curtains as a means of reducing solar gain – A comparative assessment has been ran under TM59 methodology with internal blinds included to check performance, as this is a realistic assessment of actual building use and operation.

The current proposed ventilation air flow rates for the units served by KERS boost extract are as follows:

- **KERS boost extract system:**
  - System minimum flow rate = **80l/s.**

Section 1.1 - CIBSE TM59

This assessment considers the overheating criteria for occupied spaces during occupied hours as detailed CIBSE TM59: Design methodology for the assessment of overheating risk in homes.

The fresh air is provided to the living rooms and bedrooms by MVHR units with extract taken from the kitchen and bathrooms. It should be noted the ventilation flow rates indicated in this report are for worst case operation during peak summer temperatures. Typical operation for the UK temperate climate for the majority of the year will be lower.

The mechanical ventilation systems are sized to provide sufficient supply air flow to occupied kitchen/living and bedrooms to maintain temperatures. The mechanical ventilation shall operate at standard rates for the majority of the year with a boost capacity during peak summer temperatures.

The specified mechanical ventilation system for the scheme is a 'KERS boost extract system' which provides minimum flow rates of 80l/s.

The results herein indicate all of the assessed bedrooms and living rooms/kitchens are **compliant** with regards to the TM59 domestic overheating criteria.

Section 1.2 - Part O

In accordance with the general update to Building Regulations with regards to Part L (Energy Conservation), Part F (Ventilation) the UK government introduced a new Part O (Overheating) which took effect on 15th June 2022.

The requirements for compliance with the Building Regulations 2010 Part O are detailed in the approved document (ADO).

The aim of requirement O is to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures.

The ADO requires an assessment based on the TM59 methodology with some specific limits on operation of openings during the day and night with omission of internal blinds/curtains as a means of reducing solar gain.

Section 2.0 – Introduction

The project comprises the conversion and part extension of a existing building into six apartments, each containing two bedrooms and combined kitchen, living, dining areas and bathrooms.

Section 2.1 – Software

IES version v2023.2.0.0 'ApacheSim' has been used to analyse the thermal comfort and fresh air supply rates likely to be experienced within the building.

The dynamic simulation software combines the effects of:

- **CIBSE Annual Example Weather Year** (Manchester DSY 2020 – High Emissions – 50th percentile) weather data.
- **Airflow** through external façade and internal openings.
- Casual, lighting and people **heat gains.**
- **Operational/occupation profiles.**
- **Thermal mass** of the building.
- **Solar** heat gain.

Section 2.2 – Weather File and Building Operation

The weather file selected for the project is **Manchester DSY 2020 – High Emissions – 50th percentile a**s advised by the CIBSE guidance

The predicted internal temperatures and comfort levels are based on a number of variables which are only possible to approximate, and the actual use of the building may result in different outcomes. However, the thermal modelling process provides an understanding of the building behaviour under the specific conditions highlighted herein.

Section 3.0 – Key Assumptions

Section 3.1 – TM59 Key Features

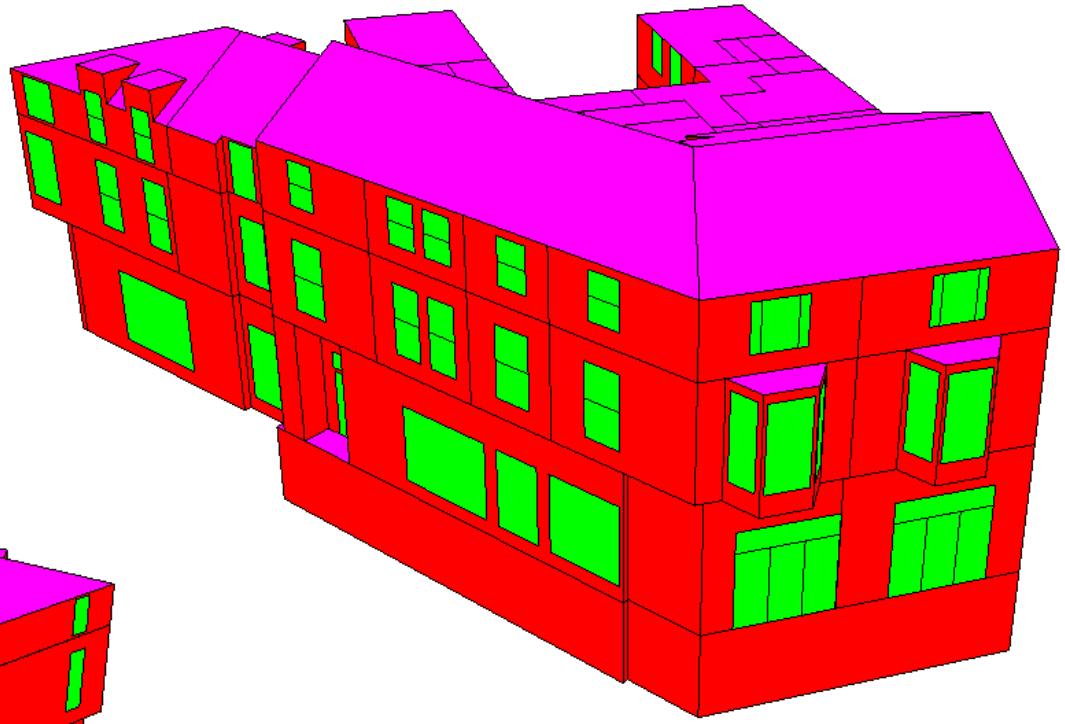
CIBSE TM59 Methodology	
Feature	**Assessed Spaces**
Compliance	TM59 Overheating Assessment
Temperature	Operative Temperature
Mechanically Ventilated	Operative Temperature not to exceed 26°C for more than 3% of occupied hours
Naturally Ventilated	*Living rooms, kitchens, bedrooms: TM52 Criterion 1: Threshold temperature not to be exceeded for more than 3% of occupied hours*
Naturally Ventilated	*Bedrooms: Operative Temperature >26°C for no more than 1% (max.32) of occupied hours (10pm-7am)*
Communal Corridors	Operative Temperature not to exceed 28°C for more than 3% of annual hours (not mandatory)
Occupancy Profile	TM59 Annual
Weather File	DSY01 2020, High, 50th percentile
Internal Shading	Curtains/Blinds shading coefficient - 0.30
Ventilation	Mechancial
Opening Type	N/A
External Shading	N/A
Window Restrictor	N/A
Opening Profile	N/A

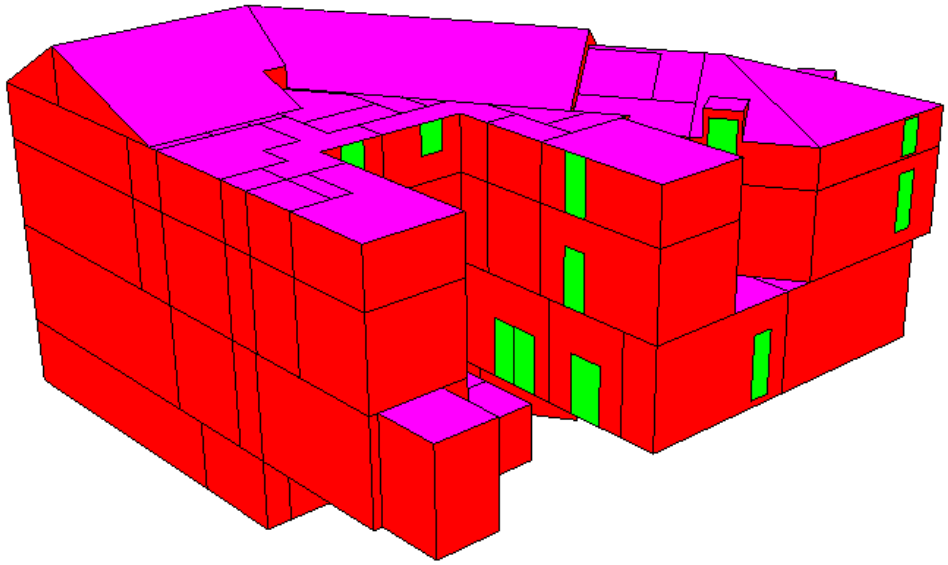
Section 3.2 – Part O Key Features

Building Regulations Part O - Overheating	
Feature	**Assessed Spaces**
Compliance	TM59 Overheating Assessment
Temperature	Operative Temperature
Mechanically Ventilated	Operative Temperature not to exceed 26°C for more than 3% of annual occupied hours
Naturally Ventilated	*Living rooms, kitchens, bedrooms: TM52 Criterion 1: Threshold temperature not to be exceeded for more than 3% of occupied hours*
Naturally Ventilated	*Bedrooms: Operative Temperature >26°C for no more than 1% (max.32) of occupied hours (10pm-7am)*
Communal Corridors	Operative Temperature not to exceed 28°C for more than 3% of annual hours (not mandatory)
Occupancy Profile	Annual occupied hours
Opening profile day (8am-11pm)	N/A
Opening profile night (11pm-8am)	N/A
External Shading	N/A
Internal shading (blinds/curtains)	Not permitted
External shading foliage/ tree cover	Not permitted
Fresh air ventilation	Mechancial
Opening Type	N/A
Window Restrictor	N/A

Section 3.2 – Constructions

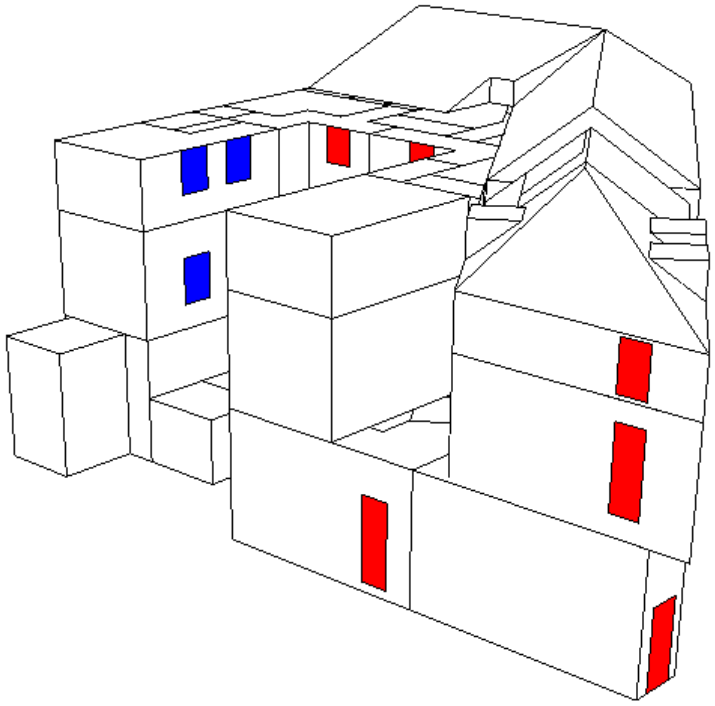
External Wall U=0.18 (STD_WAL1)
External Window U=1.4 G=0.40 (STD_EXTW)
Ground Floor U=0.13 (STD_FLO1)
Internal Ceiling/Floor (STD_CEIL)
Internal Partition (STD_PART)
Roof U=0.13 (STD_ROOF)

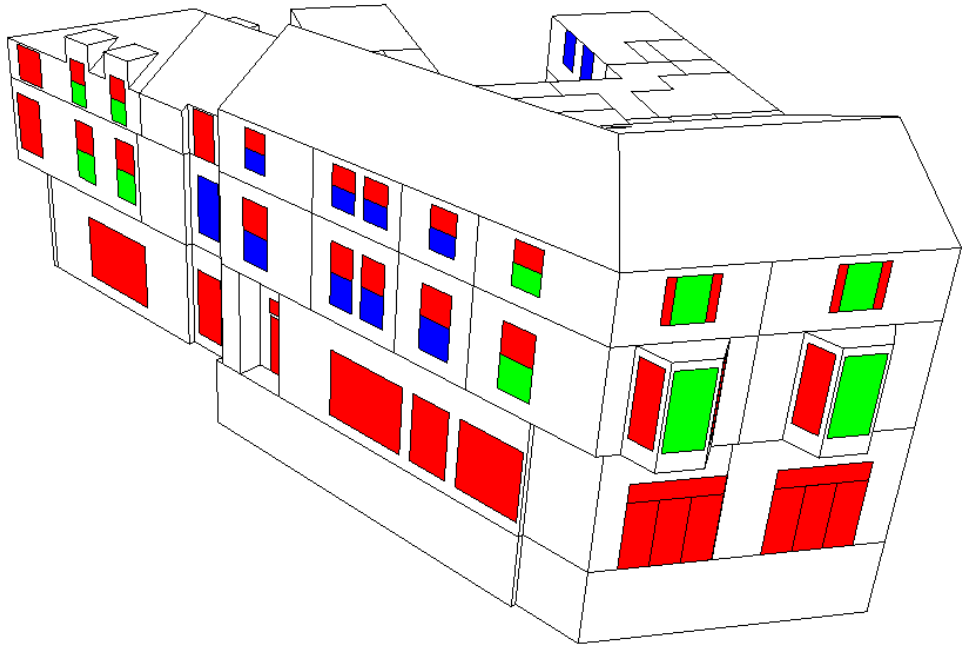




Section 3.3 – Window Opening

XTRN0001 (ADO section 2.6d (closed))
XTRN0004 (ADO section 2.6a (day))
XTRN0005 (ADO section 2.6a + b (night))





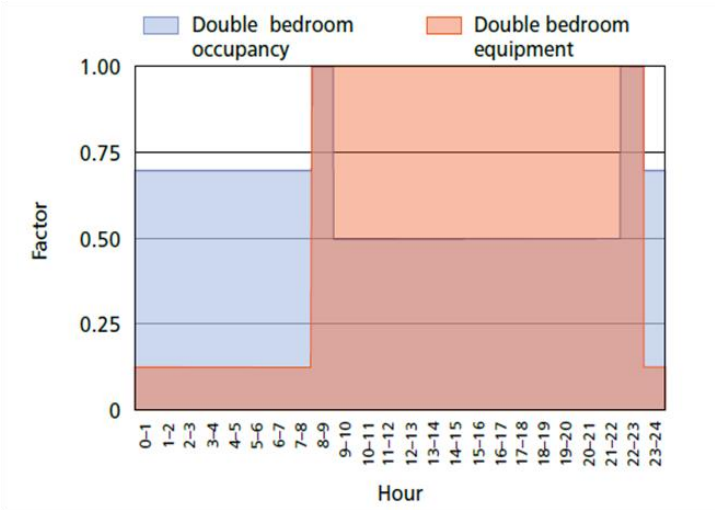
- Opening profile (day) - Start opening at internal temperature 22°C and fully open at 26°C. Start to close below 26°C and fully closed at 22°C **(Day only profile).**
- Opening profile (night) - Openings modelled open only to open on first floor & second floor and internal temperature exceeds 23°C at 11pm **(Night only profile).**

Section 3.4 – Occupancy Profiles

The figures below indicate daily variable profiles for a combined living room/kitchen and double bedroom utilising the TM59 requirements.



Living room/Kitchen occupancy and equipment profile



Bedroom occupancy and equipment profile

Section 3.5 – Internal Heat Gain Summary

The following is a summary of the internal heat gains input to example room area based on the TM59 requirements:

Number of people	Description	Peak load (W) Sensible	Peak load (W) Latent	Period 00–01	01–02	02–03	03–04	04–05	05–06	06–07	07–08	08–09	09–10	10–11	11–12	12–13	13–14	14–15	15–16	16–17	17–18	18–19	19–20	20–21	21–22	22–23	23–24
				Hour-ending 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	24.00
1	Single bedroom occupancy	75	55	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7
2	Double bedroom occupancy	150	110	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.7
2	Studio occupancy	150	110	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1-bed: living/kitchen occupancy	75	55	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
1	1-bed: living occupancy	75	55	0	0	0	0	0	0	0	0	0	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0
1	1-bed: kitchen occupancy	75	55	0	0	0	0	0	0	0	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0	0
2	2-bed: living/kitchen occupancy	150	110	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
2	2-bed: living occupancy	150	110	0	0	0	0	0	0	0	0	0	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0
2	2-bed: kitchen occupancy	150	110	0	0	0	0	0	0	0	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0	0
3	3-bed: living/kitchen occupancy	225	165	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
3	3-bed: living occupancy	225	165	0	0	0	0	0	0	0	0	0	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0
3	3-bed: kitchen occupancy	225	165	0	0	0	0	0	0	0	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0	0
	Single bedroom equipment	80		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.13
	Double bedroom equipment	80		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.13
	Studio equipment	450		0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1	1	0.44	0.44	0.24	0.24
	Living/kitchen equipment	450		0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1	1	0.44	0.44	0.24	0.24
	Living equipment	150		0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1	1	1	1	0.4	0.4
	Kitchen equipment	300		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	1	1	0.17	0.17	0.17	0.17
	Lighting profile	2 (W/m2)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0

Section 4.0 – Results

The table below provides a room-by-room summary of the TM59 overheating compliance criteria.

Target Overheating	
Mechanically Ventilated	Operative Temperature not to exceed 26°C for more than 3% of occupied hours
Naturally Ventilated	*Living rooms, kitchens, bedrooms* : TM52 Criterion 1: Threshold temperature not to be exceeded for more than 3% of occupied hours
	Bedrooms : Operative Temperature not to exceed 26°C for more than 3% of occupied hours (10pm-7am)
Communal Corridors	Operative Temperature no to exceed 28°C for more than 3% of annual hours (not mandatory)

The results of the current design proposal indicate that **all assessed rooms demonstrate compliance** of TM59 overheating criteria through both assessed options.

Section 4.1 – Occupied Rooms with Natural Ventilation (TM52: Criterion 1)

TM52 Criterion 1: Threshold temperature not to be exceeded for more than 3% of occupied hours				
Room Name	Criteria 1 (%Hrs Top-Tmax>=1K)			
	TM59 (inc blinds)	Result	Part O (no blinds)	Result
APT 1 - Bedroom 1	2.2	Pass	2.4	Pass
Apt 1 - Bedroom 2	2.2	Pass	2.2	Pass
Apt 1 - KLD	1.8	Pass	1.8	Pass
APT 2 - Bedroom 1	2.0	Pass	2.2	Pass
Apt 2 - Bedroom 2	2.2	Pass	2.4	Pass
Apt 2 - KLD	1.8	Pass	1.9	Pass
APT 3 - Bedroom 1	1.9	Pass	2.1	Pass
Apt 3 - Bedroom 2	1.9	Pass	2.1	Pass
Apt 3 - KLD	2.5	Pass	2.9	Pass
APT 4 - Bedroom 1	2.3	Pass	2.5	Pass
Apt 4 - Bedroom 2	1.5	Pass	1.5	Pass
Apt 4 - KLD	1.8	Pass	1.8	Pass
APT 5 - Bedroom 1	2.1	Pass	2.3	Pass
Apt 5 - Bedroom 2	2.3	Pass	2.5	Pass
Apt 5 - KLD	1.8	Pass	2.0	Pass
APT 6 - Bedroom 1	1.9	Pass	2.0	Pass
Apt 6 - Bedroom 2	2.0	Pass	2.1	Pass
Apt 6 - KLD	2.6	Pass	2.9	Pass

Section 4.2 – Bedrooms with Natural Ventilation (22:00 – 07:00)

Operative temperature (°C) - % hours exeeding target (Summer)				
Room Name	No more than 1% occupied hours >26°C			
	TM59 (inc blinds)	Result	Part O (no blinds)	Result
APT 1 - Bedroom 1	0.3	Pass	0.4	Pass
Apt 1 - Bedroom 2	0.3	Pass	0.3	Pass
APT 2 - Bedroom 1	0.4	Pass	0.5	Pass
Apt 2 - Bedroom 2	0.5	Pass	0.6	Pass
APT 3 - Bedroom 1	0.4	Pass	0.5	Pass
Apt 3 - Bedroom 2	0.4	Pass	0.5	Pass
APT 4 - Bedroom 1	0.4	Pass	0.5	Pass
Apt 4 - Bedroom 2	0.4	Pass	0.4	Pass
APT 5 - Bedroom 1	0.3	Pass	0.4	Pass
Apt 5 - Bedroom 2	0.5	Pass	0.6	Pass
APT 6 - Bedroom 1	0.6	Pass	0.6	Pass
Apt 6 - Bedroom 2	0.6	Pass	0.6	Pass

Section 4.3 – Circulation Corridors

Operative temperature (°C) - % hours exeeding target		
Location	> 28.00	Result
FF Corridor	0	Pass
SF Corridor	0	Pass

Section 5.0 – Conclusion

This assessment considers the overheating criteria for occupied spaces during occupied hours as detailed CIBSE TM59: Design methodology for the assessment of overheating risk in homes.

Section 5.1 – Overheating

Based upon the current proposed design strategy of natural & partial mechanical ventilation strategy via acoustic trickle vents within the windows and summertime cooling via KERS boost extract, all the assessed bedrooms, living rooms and kitchen are **compliant** with regards to the TM59 domestic overheating criteria.

In addition to minimum overheating compliance, this report has assessed the design proposals in line with the proposed changes highlighted in Building Regulation Part O. The modelling results indicate an increase in mechanical air flow rates to achieve compliance due to the requirement to omit blinds from the assessment.

Section 5.2 - Disclaimer

The assessment carried out to date is based upon the provided architectural drawings, specification and a number of assumptions for a 'design stage' assessment.

The predicted internal temperatures and comfort levels are based on a number of variables which are only possible to approximate, and the actual use of the building may result in different outcomes. However, the thermal modelling process provides an understanding of the building behaviour under the specific conditions highlighted herein.

Compliant EPC holds no responsibility for the outcome and performance of the actual building.

6.0 - 3D Model & Orientation

