



JPM ACOUSTICS

PARKHILL AVENUE, CRUMPSALL

APPROVED DOCUMENT O: OVERHEATING ASSESSMENT

APRIL 2024



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APPROVED DOCUMENT O: OVERHEATING ASSESSMENT COMPLIANCE REPORT

EXECUTIVE SUMMARY

JPM Acoustics has been appointed to undertake an assessment of overheating risk for 24x proposed dwellings at Parkhill Avenue, Crumpsall. The proposed development comprises 9x semi-detached dwellings, and 15x flats.

Furthermore, JPM Acoustics has also been appointed to undertake a noise impact assessment to support a planning application for the proposed development. The results of the noise impact assessment (report reference 0112024) identified that internal noise levels would be acceptable in the proposed 9x dwelling-houses with windows open for ventilation or comfort cooling. However, in the 15x flats, openable windows should not be relied upon at night-time (23:00 – 07:00) for ventilation or comfort cooling.

An assessment of overheating risk has been undertaken, which draws on information provided by the design team, which aligns with the provisional SAP calculations for the proposed dwelling-houses and flats. The resultant Approved Document O: Overheating Compliance Report for the proposed dwellings is included in Appendix A.

The assessment has found a low residual risk of overheating in all dwellings across the site, provided the mitigation measures outlined in this document are incorporated into the scheme design; principally a scheme of Mechanical Ventilation with Heat Recovery in the 15x proposed flats where openable windows are prohibited at night due to high external noise levels. Details of the required MVHR system for in the 15x flats, and the assumed natural scheme of ventilation in the dwelling / houses are presented in this report. A glazing g-value of 0.40 for the proposed flats, and 0.5 for the dwelling-houses has been assumed .

A summary of measures that form the overheating mitigating strategy include:

- Natural ventilation via window openings as per the architectural drawings (where noise restrictions allow)
- Window openings to be opened to maximal permissible opening angles in accordance with Approved Document K (safeguarding measures may be required)
- Glazing solar performance (g value) of 0.4 for flats and 0.5 for the dwelling-houses.
- Mechanical ventilation with Heat Recovery to the flats.
- Decentralised Mechanical Extract ventilation to the houses (system 3).
- Internal doors to be left open when possible
- Window trickle ventilators meeting minimum Approved Document F requirements.

1.0. INTRODUCTION

1.1. OVERVIEW

- 1.1.1. JPM Acoustics has been appointed to undertake an assessment of overheating risk for 24x proposed dwellings at Parkhill Avenue, Crumpsall. The proposed development comprises 9x semi-detached dwellings, and 15x flats.
- 1.1.2. The results of this study are intended to inform and verify the design proposals, thereby providing the basis for mitigating overheating risk, and producing dwellings which provide comfortable environmental conditions for future occupants.
- 1.1.3. In addition, this Overheating Assessment is intended to support a Planning Application for the development, and demonstrates that the proposed development complies with the relevant current guidance (i.e. CIBSE TM59: Design Methodology for the Assessment of Overheating Risk in Homes 2017 (TM59), and the requirements of dynamic thermal modelling outlined in Approved Document O: Overheating Mitigation (ADO) of the Building Regulations).
- 1.1.4. It should be noted that with any modelling exercise relies in part on assumptions and approximations. As far as possible, details of all assumptions and approximations are provided within this report. Assumptions and approximations are predominantly informed by information provided by design team, but should be reviewed carefully by the design team to ensure they are appropriate.
- 1.1.5. Furthermore, all results based on the output from computer modelling software should be taken as an indication of the likely final situation. The predicted conditions cannot, however, be guaranteed.

1.2. SITE LOCATION AND PROPOSED DEVELOPMENT

- 1.2.1. The proposed development site comprises open land which is located in a mixed-use area of Crumpsall. Immediately to the north lies Cleveland Road, with the premises of British Cables Company approximately 60 m further north; to the east lies Delaunays Road; to the south are residential properties along Delaunays Road and Parkhill Avenue; and to the west lies Parkhill Avenue.
- 1.2.2. The site location is presented in **Figure 1.1**.

Figure 1.1: Site location plan



1.2.3. The development proposals include for 9x dwelling-houses with private gardens and 15x flats with an associated shared garden space. **Figure 1.2** shows the proposed development layout.

Figure 1.2: Proposed Development Layout



2.0. OVERHEATING ASSESSMENT CRITERIA

- 2.1.1. TM59 sets separate overheating compliance criteria for homes that are predominantly naturally ventilated and those that are predominantly mechanically ventilated.
- 2.1.2. For homes that are predominantly naturally ventilated, two criterion should be used to assess overheating. The first overheating criterion, which applies to both living rooms/kitchens and bedrooms, is an adaptive criterion. The second overheating criterion is a fixed temperature parameter which applies only to bedrooms. Both criteria must be met for all spaces for compliance to be achieved.
- 2.1.3. For mechanically ventilated homes, a fixed temperature method with a single criterion should be adopted. This single criterion must be met for all spaces (living rooms/kitchens and bedrooms) for compliance to be achieved
- 2.1.4. The TM59 criteria for naturally and mechanically ventilated homes are summarised in **Table 2.1**.

Table 2.1: Overheating Assessment Criteria

Assessment Type	Assessment Criteria	Applicable Rooms	Occupied Hours	Naturally Ventilated Homes (open windows)	Mechanically Ventilated Homes (closed windows)
Predominantly Natural Ventilation	Criterion 1	Living rooms, kitchens and bedrooms	Living / Kitchen / Dining rooms – 9am to 10pm (13 hours/day) Bedrooms – 24-hour occupancy	The number of hours during which external and internal temperature difference is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3% of occupied hours.	Not applicable
	Criterion 2	Bedrooms only	Bedrooms – 24-hour occupancy	The operative temperature in the bedroom from 10 pm to 7 am shall not exceed 26 °C for more than 1% of annual hours. 33 or more hours above 26°C will be a fail	Not applicable
Predominantly Mechanical Ventilation	Criterion 1	Living rooms, kitchens and bedrooms	Living / Kitchen / Dining rooms – 9am to 10pm (13 hours/day) Bedrooms – 24-hour occupancy	Not applicable	The operative temperature in occupied all occupied rooms should not exceed 26°C for more than 3% of the annual occupied annual hours. 143 or more hours above 26°C for living rooms and kitchens will be a fail. 263 or more hours above 26 °C for bedrooms will be a fail

3.0. DESIGN PRINCIPLES

3.1. OVERVIEW

- 3.1.1. In order to demonstrate compliance with Requirement O1 from ADO, this assessment has adopted the Dynamic Thermal Modelling Approach.
- 3.1.2. To demonstrate compliance using the dynamic thermal modelling method, all of the following have been considered:
- (a) CIBSE TM59 methodology for predicting overheating risk;
 - (b) limits on the use of CIBSE TM59 methodology set out below; and
 - (c) acceptable strategies for reducing overheating risk

3.2. LIMITS OF CIBSE TM59 MODELLING

- 3.2.1. All of the following limits of CIBSE's TM59, section 3.3 shall apply:
- a) When a room is occupied during the day (08:00 – 23:00), openings should be modelled as follows:
 - i) Start to open when the internal temperature exceeds 22°C
 - ii) Be fully open when the internal temperature exceeds 26°C
 - iii) Start to close when internal temperature falls below 26°C
 - iv) Be fully closed when the internal temperature falls below 22°C
 - b) At night (23:00 – 08:00), openings should be modelled as fully open (in naturally ventilated spaces) if both of the following apply:
 - i) The opening is on the first floor or above and not easily accessible
 - ii) The internal temperature exceeds 23°C at 11pm.
 - c) When a ground floor or easily accessible room is unoccupied, both of the following apply:
 - i) In the day, windows, patio doors and balcony doors should be modelled as open, if this can be done securely.
 - ii) At night, windows, patio doors and balcony doors should be modelled as closed.
 - d) An entrance door should be included, which should be shut all the time.
 - e) Acceptable strategies for reducing overheating risk should be employed.

3.3. LIMITING SOLAR GAINS

3.3.1. Solar gains in summer should be limited by any of the following means:

- a) Fixed shading devices, comprising any of the following.
 - i) Shutters
 - ii) External blinds
 - iii) Overhangs
 - iv) Awnings
- b) Glazing design, involving any of the following solutions:
 - i) Size
 - ii) Orientation
 - iii) g-value
 - iv) Depth of the window reveal
- c) Building design – for example, the placement of balconies.
- d) Shading provided by adjacent permanent buildings, structures, or landscaping.

3.4. REMOVING EXCESS HEAT

3.4.1. Excess heat should be removed by any of the following means:

- a) Opening windows (the effectiveness of this method is improved by cross-ventilation)
- b) Ventilation louvres in external walls
- c) A mechanical ventilation system
- d) A mechanical cooling system

4.0. DESIGN CRITERIA

4.1.1. The following general criteria have been adopted in the simulation.

4.2. AIR PERMEABILITY

4.2.1. An air infiltration rate of 0.15ACH has been applied to all plots based on Table 4.24 of CIBSE Guide A for an air permeability target of $3 \text{ m}^3/(\text{h.m}^2)$.

4.3. EXTERNAL ENVELOPE

4.3.1. The U-values in **Table 4.1** have been assumed.

Table 4.1: Assumed U-Values

Element	Proposed U-value (W/m ² K)	Part L1A U-value (W/m ² K)
External Walls	0.19	0.18
Exposed floor	0.11	0.13
Roof	0.15	0.11
Glazing	1.20	1.40
Patio Doors	1.20	1.40
Doors	1.20	1.00

4.4. GLAZING SPECIFICATION

4.4.1. The glazing is based on a G-value of 0.40 for the apartments and 0.50 for the houses.

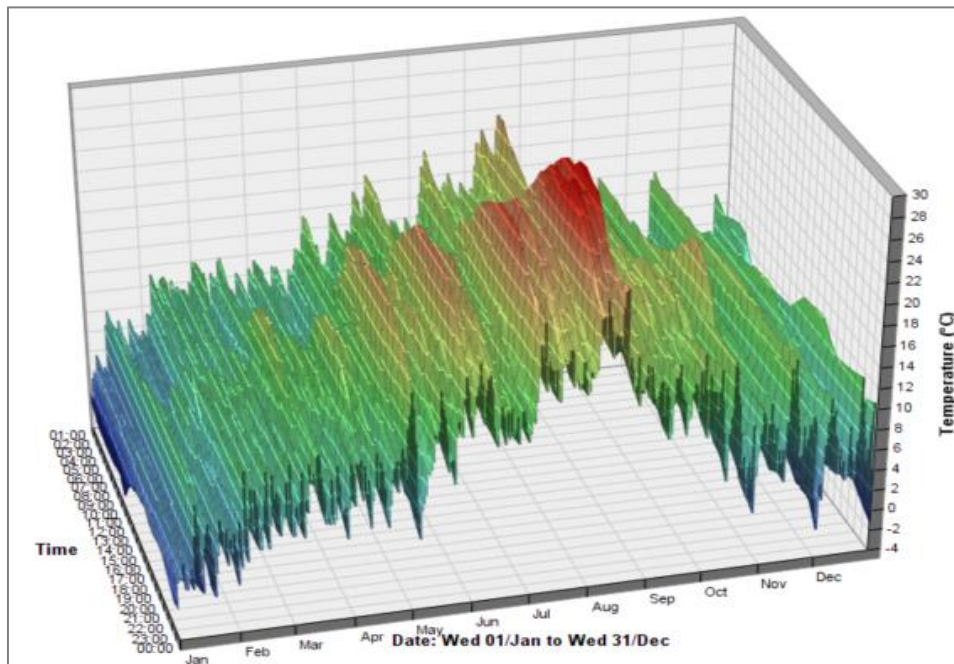
4.5. INTERNAL WINDOW BLINDS

4.5.1. Internal blinds have been not included in the calculations

4.6. WEATHER

4.6.1. The development site is located in Crumpsall, Manchester. Weather file used in the calculation:- Manchester_DSY1_2020High50_.epw. The peak summer temperature is 30°C (see **Figure 4.1**).

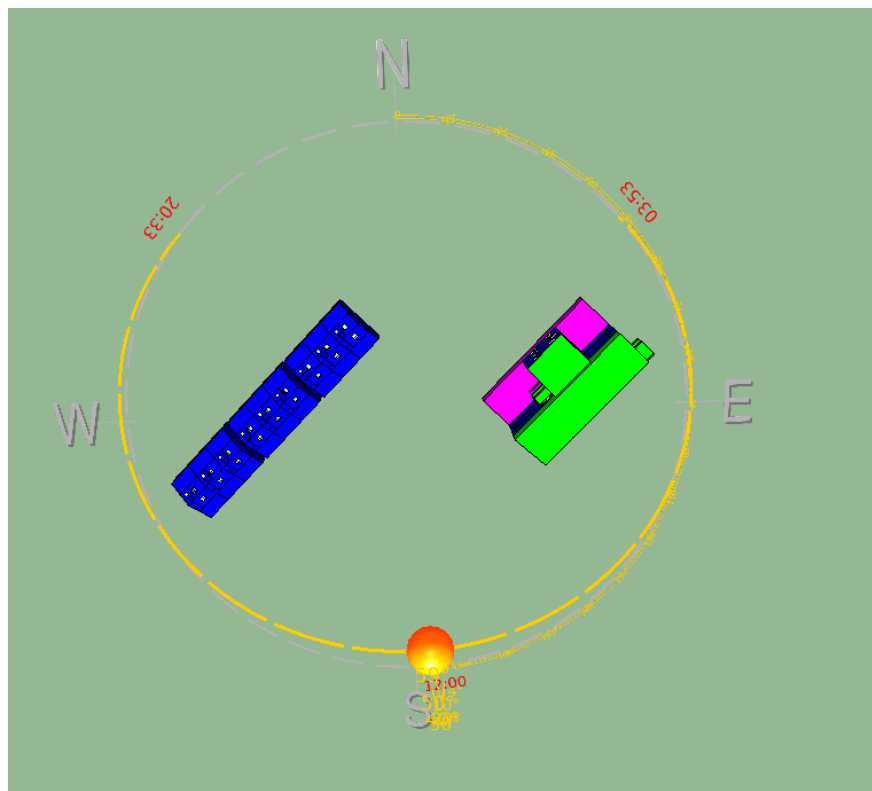
Figure 4.1: Annual dry-bulb temperature graph of modelled weather file



4.7. SITE ORIENTATION

- 4.7.1. The dwelling has been modelled in its correct orientation as per the Site Plan Drawing (see **Figure 4.2**)

Figure 4.2: Development Orientation



5.0. REFERENCE DATA

5.1. ARCHITRECTORAL DRAWINGS

- 5.1.1. The modelling on which this assessment is based has adopted scheme layout plans detailed in drawings provided by the project Architects.

6.0. INTERNAL GAINS

6.1. OVERVIEW

- 6.1.1. Internal gains adopted throughout the simulations are detailed in this section. No differences between weekdays and weekends are considered. Bedrooms are have been assumed to have a 24-hour occupancy profile which means that one person is always assumed to be present in each bedroom during the daytime, and two people in each double bedroom at night. Kitchen/living rooms are assumed to be unoccupied during sleeping hours and occupied during the rest of the day. Occupied periods are totaled at 3672 hours per year for bedrooms (24/7 May to September) and 1989 hours for living areas (13 hours per day May to September).

6.2. OCCUPANCY

- 6.2.1. Based on CIBSE Guide A (2015a), a maximum sensible heat gain of 75W per person is assumed in living spaces. An allowance for 30% reduced gain during sleeping is based on Addendum g to ANSI/ASHRAE Standard 55-2010.

Table 6.1: Assumed Occupancy Gains

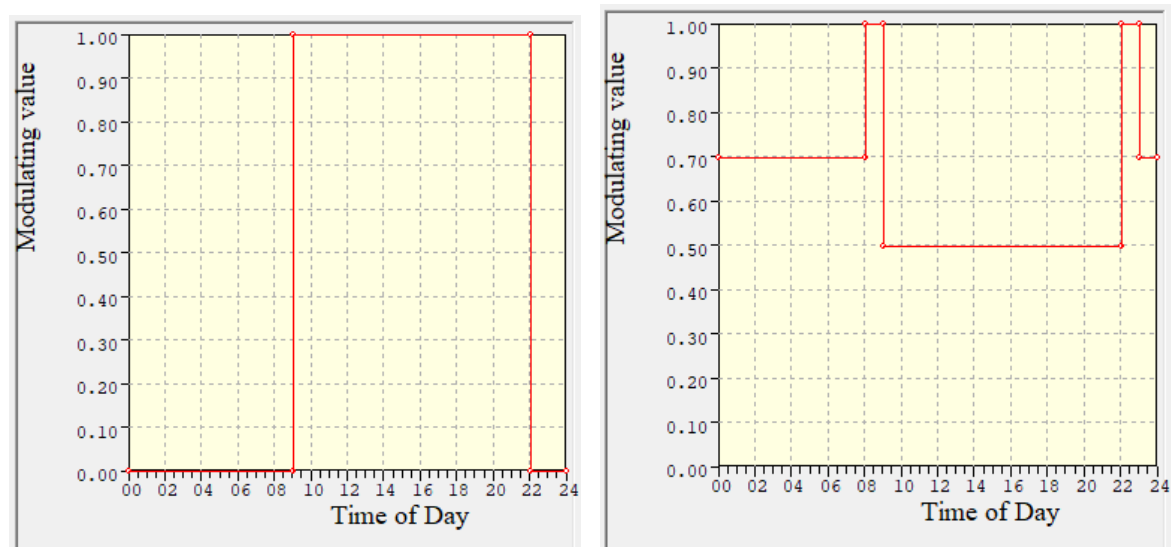
Activity	Sensible Heat Gain per Person (W)
Standard	75
Sleeping	55

Table 6.2: Assumed Occupancy

Unit / Room Type	Occupancy
1 bed living/kitchen	1 person from 9am to 10pm room is unoccupied for the rest of the day
2 bed living/kitchen	2 people from 9am to 10pm room is unoccupied for the rest of the day
3 bed living/kitchen	3 people from 9am to 10pm room is unoccupied for the rest of the day

Unit / Room Type	Occupancy
Double bedroom	2 people at 70% gain from 11pm to 8am 2 people at full gain from 8am to 9am and from 10pm to 11pm 1 person at full gain from 9am to 10pm
Single bedroom	1 person at 70% gain from 11pm to 8am 1 person at full gain from 8am to 11pm

Figure 6.1: Typical living / Kitchen Occupancy Profile (left image), Typical double bedroom occupancy profile (right image)



6.3. LIGHTING

- 6.3.1. Lighting energy is assumed to be proportional to floor area. A default value of 2 w/m² is applied to all occupied areas from 18:00 until 23:00.

Table 6.3: Assumed Lighting Gains

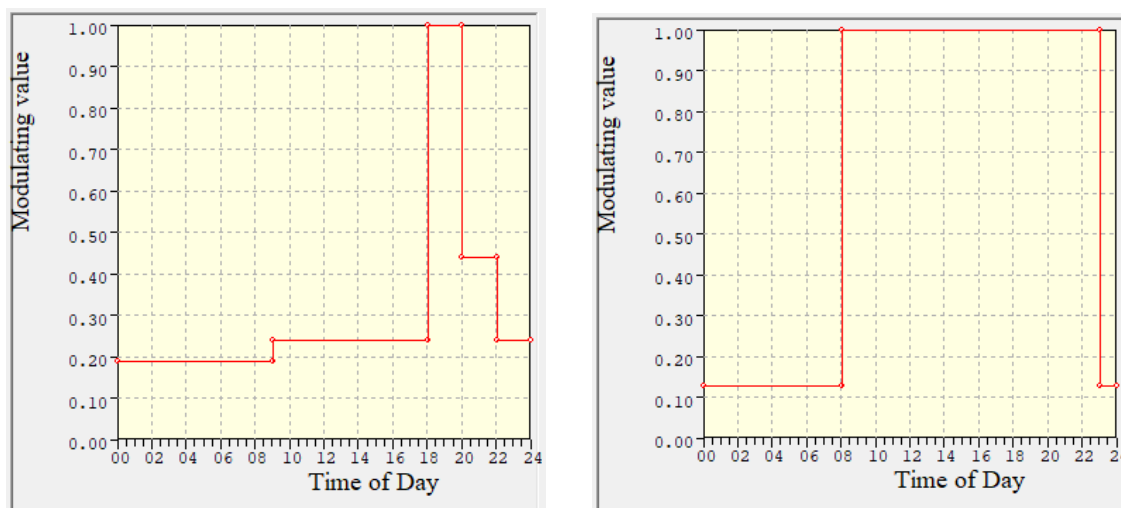
Zone Type	Gain (W)
Living / kitchen / dining area	2
Bedroom	0

6.4. EQUIPMENT

- 6.4.1. Assumed equipment gains per room type are detailed in **Table 6.4**.

Table 6.4: Assumed Equipment Gains

Activity	Sensible Heat Gain per Person (W)
1 bed living/kitchen	Peak load of 450W from 6pm to 8pm 200W from 8pm to 10pm 110W from 9am to 6pm and 10pm to 12pm Base load of 85W for the rest of the day
2 bed living/kitchen	Peak load of 450W from 6pm to 8pm 200W from 8pm to 10pm 110W from 9am to 6pm and 10pm to 12pm Base load of 85W for the rest of the day
3 bed living/kitchen	Peak load of 450W from 6pm to 8pm 200W from 8pm to 10pm 110W from 9am to 6pm and 10pm to 12pm Base load of 85W for the rest of the day
Double bedroom	Peak load of 80W from 8am to 11pm Base load of 10W during sleeping hours
Single bedroom	Peak load of 80W from 8am to 11pm Base load of 10W during sleeping hours
Communal corridors	Assumed to be zero

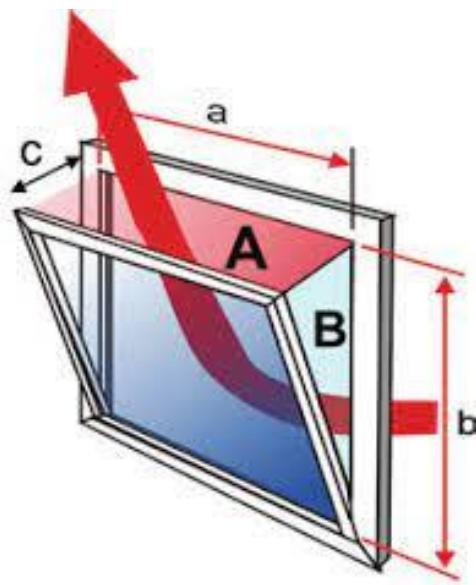
Figure 6.2: Typical Living / Kitchen Equipment Gain Profile (left image), Typical Double Bedroom Equipment Gain Profile (right image)

7.0. VENTILATION

7.1. NATURAL VENTILATION

- 7.1.1. The windows of the development have been modelled using an opening profile that simulates the occupants within the rooms opening the windows when the internal air temperature reaches 22°C, as stipulated by ADO. The same procedure operates in reverse as the air temperature cools.
- 7.1.2. The free area is a way of measuring what the equivalent completely open area is for a glazing assembly. Sufficient free area to the opening windows in a dwelling is vital to the overheating mitigation strategy and can be calculated using the combined areas of **A+B** (in m²), as identified in **Figure 7.1**.

Figure 7.1: Illustration of Window Opening for Natural Ventilation



- 7.1.3. Opening angle is the degree of opening of area **B** in **Figure 7.1**. Windows have been modelled to be either top or side hung as shown on the architectural drawings.
- 7.1.4. Dimension **C** refers to the opening length that windows reach when opened. As referenced in ADO section 3.9, if the maximum opening angle (**B**) exceeds 100 mm of dimension length **C** then the following three criteria must be met:
- Window handles on windows that open outwards are not more than 650 mm from the inside face of the wall when the window is at its maximum openable angle.
 - Guarding meets the minimum standards in Table 3.1
 - Guarding does not allow children to easily climb it. For example, horizontal bars should generally be avoided.

7.2. INTERNAL DOORS

- 7.2.1. It is recommended for dwelling occupants to keep internal doors open at all times where possible so to allow air movement between rooms. Openable windows in non-habitable spaces such as landings / halls and bathrooms have been modelled, and can contribute to the overall natural ventilation strategy for the dwelling.
- 7.2.2. ADO stipulates bedroom doors must be modelled to be closed during sleeping hours, however there are no constraints during the day and are therefore modelled as open. All non-bedroom doors are considered open on a 24/7 basis.

7.3. WINDOW OPENING SCHEDULE

- 7.3.1. Figures below identify the assumed window opening schedule in the thermal model.

Opening Type	
■	XTRN0000 (Window / Door Closed)
■	XTRN0002 (Internal Doors Living)
■	XTRN0003 (Internal Doors Bedroom)
■	XTRN0004 (Patio Doors (Section 26a))
■	XTRN0009 (Top Hung (Section 26a))
■	XTRN0011 (Top Hung (Section 26ab))

- Window/Door Closed: Fixed pane, unopenable
- Patio Doors section 2.6a (day) – Patio Doors: Day Open, Night Closed
- Top Hung section 2.6a (day) – Window: Day Open, Night Closed
- Top Hung section 2.6a+b (day & night) Window: Day Open, Night Open

Figure 7.2: Allocation of Window Types Across the Dwelling Houses on the Site

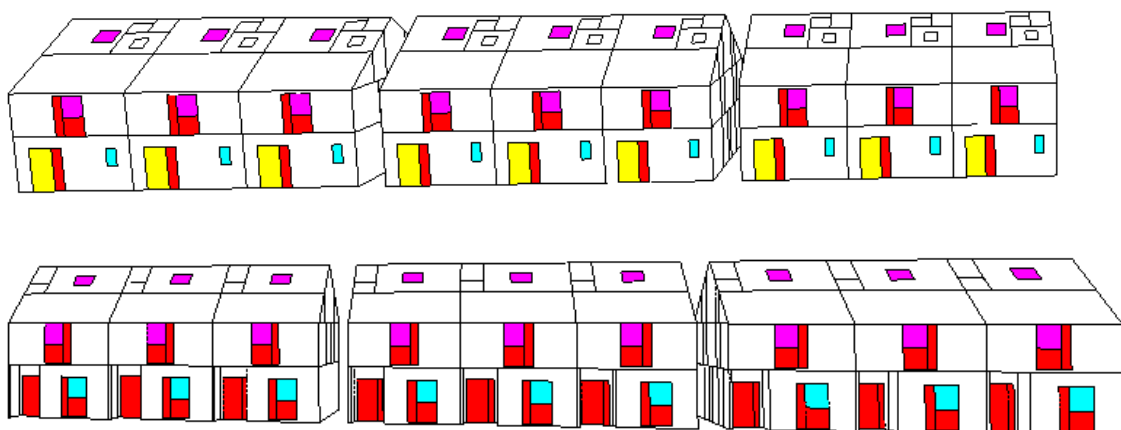
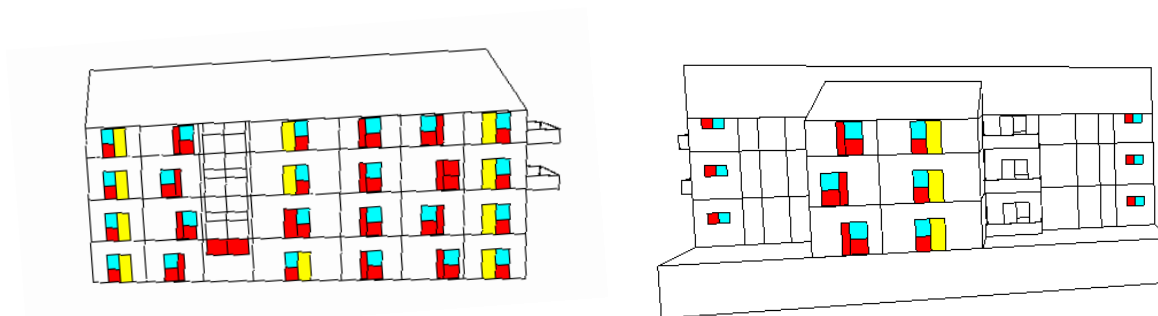


Figure 7.3: Allocation of Window Types Across the Flats on the Site



7.4. TRICKLE VENTILATORS

7.4.1. As per section 1.64 of Approved Document F: Ventilation (ADF) of the Building Regulations, where intermittent extract ventilation is present, supply / replacement air is to be provided by trickle ventilators in windows to meet the following conditions:

- a) Not to be installed in wet rooms
- b) Provide a minimum equivalent area of 4000 mm² for each habitable room in the dwelling
- c) Provide a minimum total number of ventilators that is the same as the number of bedrooms plus two ventilators (i.e. a one-bedroom dwelling should have three background ventilators, a two bedroom dwelling should have four background ventilators, etc.)

Figure 7.4: Reproduction of Table 1.1 from ADF

Table 1.1 Minimum extract ventilation rates for intermittent extract systems	
Room	Intermittent extract rate (l/s)
Kitchen (cooker hood extracting to the outside) ^[1]	30
Kitchen (no cooker hood or cooker hood does not extract to the outside) ^[2]	60
Utility room	30
Bathroom	15
Sanitary accommodation ^[3]	6
NOTES:	
1. See Diagram 1.1.	
2. See Diagram 1.2.	
3. As an alternative for sanitary accommodation, the purge ventilation guidance may be used.	

8.0. MECAHNICAL VENTILATION WITH HEAT RECOVERY

8.1. OVERVIEW

- 8.1.1. Mechanical Ventilation with Heat Recovery (MVHR) is proposed in flats where environmental noise levels require that windows remain closed at night.
- 8.1.2. MVHR is a low energy, continuous mechanical ventilation system designed to replace conventional extract ventilation systems (such as intermittent systems) by drawing moisture laden air out of the kitchen and wet rooms (bathrooms and utility) while supplying fresh air to habitable rooms such as Bedrooms and Living spaces.
- 8.1.3. An additional benefit is an air pathway is also formed drawing warm air out of habitable spaces and evacuated from the dwelling, with the makeup air being provided by mechanically supplied air from the unit in addition to any windows in habitable spaces (when opened).
- 8.1.4. The minimum whole house ventilation rates are presented in Table 1.3 of ADF, as reproduced in **Figure 8.1** below.

Figure 8.1: Reproduction of Table 1.3 from ADF, Minimum Whole Dwelling Ventilation Rates

Table 1.3 Minimum whole dwelling ventilation rates determined by the number of bedrooms	
Number of bedrooms ⁽¹⁾⁽²⁾	Minimum ventilation rate by number of bedrooms (l/s)
1	19
2	25
3	31
4	37
5	43
NOTES:	
1. If the dwelling only has one habitable room, a minimum ventilation rate of 13l/s should be used.	
2. For each additional bedroom, add 6l/s to the values in Table 1.3.	

- 8.1.5. The required supply rates for TM59 compliance in habitable rooms are as follows:

- Bedrooms: 10l/s (boosted to 25 l/s)
- Kitchen/Dining/Living: 10l/s (boosted to 25 l/s)

- 8.1.6. A “boost mode” has been assumed to operate when internal temperatures exceed 22°C.

9.0. ENSURING THE OVERHEATING STRATEGY IS USEABLE

9.1. OVERVIEW

- 9.1.1. ADO lists a number of measures to ensure the overheating mitigation strategy can be feasibly implemented, as well as complying with overlapping building codes. The full literature can be found in Section 3: Ensuring the Overheating Mitigation Strategy is Usable of ADO. A summary of the key constraints is presented below.

9.2. NOISE

- 9.2.1. In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (23:00 – 07:00).
- 9.2.2. Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits: A) 40dB $L_{Aeq,T}$, averaged over 8 hours (between 23:00 – 07:00). & b) 55 dB L_{AFmax} , more than 10 times a night (between 23:00 – 07:00).
- 9.2.3. As outlined previously in this report, external noise levels incident on the proposed flats are predicted to exceed 40 dB $L_{Aeq,8hrs}$ overnight. As such, it has been assumed that windows will remain closed at night.

9.3. POLLUTION

- 9.3.1. Buildings located near to significant local pollution sources should be designed to minimise the intake of external air pollutants. Guidance is given in Section 2 of Approved Document F, Volume 1: Dwellings.

9.4. SECURITY

- 9.4.1. When determining the free area available for ventilation during sleeping hours, only the proportion of openings that can be opened securely should be considered to provide useful ventilation. This particularly applies in the following locations, where openings may be vulnerable to intrusion by a casual or opportunistic burglar:
- a) Ground floor bedrooms
 - b) Easily accessible bedrooms

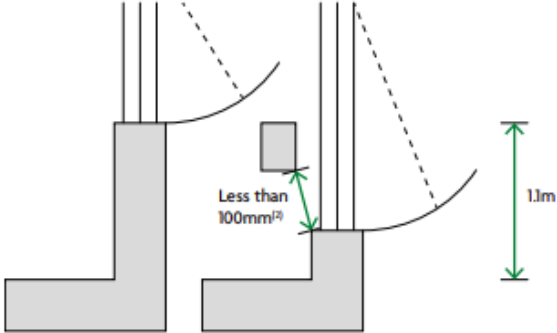
9.5. PROTECTION FROM FALLING

- 9.5.1. Openings which are intended to be open for long periods to reduce overheating risk might pose a higher risk of falls from height.

- 9.5.2. Only the proportion of openings which can be opened with a very low risk of occupants falling from height should be considered to form part of the overheating mitigation strategy.
- 9.5.3. Openings that can be opened wider than 100mm may form part of the overheating mitigation strategy where they meet all of the following conditions:
- Window handles on windows that open outwards are not more than 650mm from the inside face of the wall when the window is at its maximum openable angle.
 - Guarding meets the minimum standards in Table 3.1
 - Guarding does not allow children to easily climb it. For example, horizontal bars should generally be avoided.

Figure 9.1: Reproduction of Table 3.1 from ADF

Table 3.1 Guarding heights	
Change in floor level between inside and outside	Guarding height ⁽¹⁾
Less than 600mm	See Approved Document K
More than 600mm	1.1m



NOTES:

1. This approved document has increased levels of protection from falling compared to Approved Document K. Where applicable, the higher standard applies.
2. Guarding should be sized to prevent the passage of a 100mm sphere.

10.0. RESULTS SUMMARY

10.1.1. Table 11.1 below presents a summary results table detailing the overheating assessment findings.

House Type	Description	Orientation	Overheating Strategy Summary	TM59 / Part O Compliance	Results
House Type C.1 House Type C.2 House Type C.3	1 Bed 2 Person Apartment	North West/South East	Natural ventilation from unrestricted windows (windows closed during the night).	☑	Appendix A
			0.4 G value		
			MVHR		
House Type D	3 Bed 6 Person House	North West/South East	Natural ventilation from unrestricted windows (windows open during the day and night)	☑	Appendix A
			0.5 G value		
			Extract ventilation in wet rooms		

11.0. ASSESMENT SUMMARY

- 11.1.1. The assessment has found a low residual risk of overheating in all dwellings across the site, provided the mitigation measures outlined in this document are incorporated into the scheme design; principally a scheme of Mechanical Ventilation with Heat Recovery in the 15x proposed flats where openable windows are prohibited at night due to high external noise levels. Details of the required MVHR system for in the 15x flats, and the assumed natural scheme of ventilation in the dwelling / houses are presented in this report.
- 11.1.2. A summary of the assumed mitigation measures adopted in the overheating assessment is provided below:
- Natural ventilation via window openings as per the architectural drawings.
 - Window openings to be opened to maximal permissible opening angles in accordance with Approved Document K (safeguarding measures may be required)
 - Glazing solar performance (g value) of 0.40 for apartments and 0.5 for the houses.
 - Mechanical ventilation with Heat Recovery to the apartments.
 - Decentralised Mechanical Extract ventilation to the house (system 3).
 - Internal doors to be left open when possible.
 - Window trickle ventilators meeting minimum ADF requirements.
- 11.1.3. With the above measures implemented, the modelling found all spaces in the assessed dwellings to pass the overheating criteria and comply with ADO building regulations.
- 11.1.4. It should be noted that while the regulations do not permit the use of blinds and curtains in the calculations, if the sun shines directly into a living space, the occupant should consider closing the curtains or blinds to limit solar gains and try and keep rooms as cool as possible.
- 11.1.5. During periods where the intern temperature is below the external temperature, it is advised that occupants should keep their windows closed, to prevent bringing warm air in. If it reaches a point where the temperature inside the house is equal to that outside, then the occupant should open the windows, keeping the curtains closed.

12.0. MODELLING DISCLAIMER

- 12.1.1. The calculations produced by JPM Acoustics have been carried out with due care and draw on information provided by others to determine whether the thermal model of the proposed building can achieve compliance, at design stage, with the stated criteria within this report.
- 12.1.2. It should be noted that the data generated by this work is obtained using computer simulations. These simulations are the best means of predicting the performance of the building at this stage. Full certainty can only be achieved by measuring the performance of the building and associated systems after a period of use.
- 12.1.3. The actual operative temperatures within the building once occupied may vary from the calculated values within this report. These differences will occur due to a number of variable parameters between the modelled building and the actual building. Such differences will include the hours, levels of occupancy, equipment, how the windows are used etc.
- 12.1.4. Whilst the simulations have been undertaken in good faith using reasonable skill and care, JPM Acoustics can take no responsibility for differences between the computer simulations and the actual performance of the completed development due to the inherent complexity and variability of the physics in a building and its environment.

APPROVED DOCUMENT O: OVERHEATING ASSESSMENT COMPLIANCE REPORT

Approved Document O report
Overheating risk in residential buildings
for
Parkhill Avenue

Parkhill Avenue

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Building details

Project name: Parkhill Avenue	Date: 17-04-2024 12:16:21
Location: Manchester Ap, United Kingdom	
Address: Parkhill Avenue, Crumpsall, Manchester	
Building use: Residential	
Are there any security, noise, or pollution issues: Apartment windows to remain shut during the night	

Designer's details

Designer's name:
Designer's organisation:
Designer's address:

Dynamic thermal model

Software: IESVE version 2023.4.1.0	
Weather file: Manchester_DSY1_2020High50_.epw	
Results file: Parkhill Ave.aps	
Number of rooms analysed: 66	
TM59: summer elevated air speed: 0.1	
TM59: occupant category: Category II (normal)	
Overheating mitigation strategy:	
Has the building construction proposal been modelled accurately?	YES
Have the analysed rooms passed the assessment for Approved Doc O Dynamic Thermal Modelling Method (CIBSE TM 59)?	YES
Designer's signature:	

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Summary

CIBSE TM59 overheating methodology for predominantly naturally ventilated rooms assesses against two criteria, (a) and (b) (for Category I occupancy, T_{max} is reduced by 1K):

- Criterion (a) states that for living rooms, kitchens and bedrooms, the number of hours during which ΔT is greater than or equal to 1K from May to September (or November to March for southern hemisphere locations) shall not exceed 3% of occupied hours
- Criterion (b) states that the operative temperature of the bedrooms from 22:00-07:00 shall not exceed 26°C for more than 1% of annual hours (33 hours is therefore recorded as a fail). Approved document O applies limits to CIBSE TM59 section 3.3 (openings); these requirements are applied by appropriate assignment of MacroFlo types / scripted profiles in the model (see Modelled Openings Section).

CIBSE TM59 overheating methodology for predominantly mechanically ventilated rooms states the operative temperature of all rooms shall not exceed 26°C for more than 3% of annual occupied hours.

CIBSE TM59 also states that the inclusion of corridors in the overheating analysis is mandatory where community heating pipework runs through them. While there is no mandatory target for communal corridors, if an operative temperature of 28°C is exceeded for more than 3% of the total annual hours this should be identified as a significant risk.

Room name	Naturally ventilated Criterion a check	Naturally ventilated Criterion b check	Mechanically ventilated check	Corridor overheating risk check
LGF - Type C2 - Kitchen / Living	Pass	-	-	-
LGF - Type C2 - Bedroom	Pass	-	-	-
LGF - Type C1 - Bedroom	Pass	Pass	-	-
LGF - Type C1 - Kitchen / Living	Pass	N/A	-	-
LGF - Type C2 - Kitchen / Living	Pass	N/A	-	-
LGF - Type C2 - Bedroom	Pass	Pass	-	-
LGF - Type C3 - Bedroom	Pass	-	-	-
LGF - Type C3 - Kitchen / Living	Pass	-	-	-
GF - Type C2 - Kitchen / Living	Pass	-	-	-
GF - Type C2 - Bedroom	Pass	-	-	-
GF - Type C1 - Bedroom	Pass	-	-	-
GF - Type C1 - Kitchen / Living	Pass	-	-	-
GF - Type C2 - Kitchen / Living	Pass	-	-	-
GF - Type C2 - Bedroom	Pass	-	-	-
LGF - Type C3 - Bedroom	Pass	-	-	-
LGF - Type C3 - Kitchen / Living	Pass	-	-	-
GF - Type C2 - Kitchen / Living	Pass	-	-	-
GF - Type C2 - Bedroom	Pass	-	-	-
GF - Type C1 - Bedroom	Pass	-	-	-
GF - Type C1 - Kitchen / Living	Pass	-	-	-

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Room name	Naturally ventilated Criterion a check	Naturally ventilated Criterion b check	Mechanically ventilated check	Corridor overheating risk check
GF - Type C2 - Kitchen / Living	Pass	-	-	-
GF - Type C2 - Bedroom	Pass	-	-	-
LGF - Type C3 - Bedroom	Pass	Pass	-	-
LGF - Type C3 - Kitchen / Living	Pass	N/A	-	-
GF - Type C2 - Kitchen / Living	Pass	-	-	-
GF - Type C2 - Bedroom	Pass	-	-	-
GF - Type C1 - Bedroom	Pass	Pass	-	-
GF - Type C1 - Kitchen / Living	Pass	N/A	-	-
GF - Type C2 - Kitchen / Living	Pass	N/A	-	-
GF - Type C2 - Bedroom	Pass	Pass	-	-
GF - Type D (Mid) - Kitchen / Living / Dining	Pass	-	-	-
FF - Type D (Mid) - Double Bedroom	Pass	-	-	-
FF - Type D (Mid) - Single Bedroom	Pass	-	-	-
SF - Type D (Mid) - Twin Bedroom	Pass	-	-	-
GF - Type D (End) - Kitchen / Living / Dining	Pass	-	-	-
FF - Type D (End) - Double Bedroom	Pass	-	-	-
FF - Type D (End) - Single Bedroom	Pass	-	-	-
SF - Type D (End) - Twin Bedroom	Pass	-	-	-
GF - Type D (Mid) - Kitchen / Living / Dining	Pass	-	-	-
FF - Type D (Mid) - Double Bedroom	Pass	-	-	-
FF - Type D (Mid) - Single Bedroom	Pass	-	-	-
SF - Type D (Mid) - Twin Bedroom	Pass	-	-	-
GF - Type D (Mid) - Kitchen / Living / Dining	Pass	-	-	-
FF - Type D (Mid) - Double Bedroom	Pass	-	-	-
FF - Type D (Mid) - Single Bedroom	Pass	-	-	-

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Room name	Naturally ventilated Criterion a check	Naturally ventilated Criterion b check	Mechanically ventilated check	Corridor overheating risk check
SF - Type D (Mid) - Twin Bedroom	Pass	-	-	-
GF - Type D (End) - Kitchen / Living / Dining	Pass	-	-	-
FF - Type D (End) - Double Bedroom	Pass	-	-	-
FF - Type D (End) - Single Bedroom	Pass	-	-	-
SF - Type D (End) - Twin Bedroom	Pass	-	-	-
GF - Type D (Mid) - Kitchen / Living / Dining	Pass	-	-	-
FF - Type D (Mid) - Double Bedroom	Pass	-	-	-
FF - Type D (Mid) - Single Bedroom	Pass	-	-	-
SF - Type D (Mid) - Twin Bedroom	Pass	-	-	-
GF - Type D (Mid) - Kitchen / Living / Dining	Pass	-	-	-
FF - Type D (Mid) - Double Bedroom	Pass	-	-	-
FF - Type D (Mid) - Single Bedroom	Pass	-	-	-
SF - Type D (Mid) - Twin Bedroom	Pass	-	-	-
GF - Type D (End) - Kitchen / Living / Dining	Pass	N/A	-	-
FF - Type D (End) - Double Bedroom	Pass	Pass	-	-
FF - Type D (End) - Single Bedroom	Pass	Pass	-	-
SF - Type D (End) - Twin Bedroom	Pass	Pass	-	-
GF - Type D (Mid) - Kitchen / Living / Dining	Pass	N/A	-	-
FF - Type D (Mid) - Double Bedroom	Pass	Pass	-	-
FF - Type D (Mid) - Single Bedroom	Pass	Pass	-	-
SF - Type D (End) - Twin Bedroom	Pass	Pass	-	-

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Naturally ventilated rooms – criterion (a)

Criterion (a) states that for living rooms, kitchens and bedrooms, the number of hours during which ΔT is greater than or equal to 1K from May to September (or November to March for southern hemisphere locations) shall not exceed 3% of occupied hours.

Room name	Occupied hours	No. hours $\Delta T \geq 1^\circ\text{K}$	% Occupied hours $\Delta T \geq 1^\circ\text{K}$	Criterion a check
LGF - Type C2 - Kitchen / Living	1989	1	0.1	Pass
LGF - Type C2 - Bedroom	3672	3	0.1	Pass
LGF - Type C1 - Bedroom	3672	0	0.0	Pass
LGF - Type C1 - Kitchen / Living	1989	0	0.0	Pass
LGF - Type C2 - Kitchen / Living	1989	0	0.0	Pass
LGF - Type C2 - Bedroom	3672	0	0.0	Pass
LGF - Type C3 - Bedroom	3672	0	0.0	Pass
LGF - Type C3 - Kitchen / Living	1989	0	0.0	Pass
GF - Type C2 - Kitchen / Living	1989	1	0.1	Pass
GF - Type C2 - Bedroom	3672	3	0.1	Pass
GF - Type C1 - Bedroom	3672	0	0.0	Pass
GF - Type C1 - Kitchen / Living	1989	0	0.0	Pass
GF - Type C2 - Kitchen / Living	1989	5	0.3	Pass
GF - Type C2 - Bedroom	3672	3	0.1	Pass
LGF - Type C3 - Bedroom	3672	0	0.0	Pass
LGF - Type C3 - Kitchen / Living	1989	0	0.0	Pass
GF - Type C2 - Kitchen / Living	1989	1	0.1	Pass
GF - Type C2 - Bedroom	3672	0	0.0	Pass
GF - Type C1 - Bedroom	3672	0	0.0	Pass
GF - Type C1 - Kitchen / Living	1989	0	0.0	Pass
GF - Type C2 - Kitchen / Living	1989	5	0.3	Pass
GF - Type C2 - Bedroom	3672	3	0.1	Pass
LGF - Type C3 - Bedroom	3672	0	0.0	Pass
LGF - Type C3 - Kitchen / Living	1989	0	0.0	Pass
GF - Type C2 - Kitchen / Living	1989	1	0.1	Pass
GF - Type C2 - Bedroom	3672	3	0.1	Pass
GF - Type C1 - Bedroom	3672	0	0.0	Pass

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Room name	Occupied hours	No. hours $\Delta T \geq 1^\circ\text{K}$	% Occupied hours $\Delta T \geq 1^\circ\text{K}$	Criterion a check
GF - Type C1 - Kitchen / Living	1989	1	0.1	Pass
GF - Type C2 - Kitchen / Living	1989	7	0.4	Pass
GF - Type C2 - Bedroom	3672	3	0.1	Pass
GF - Type D (Mid) - Kitchen / Living / Dining	1989	1	0.1	Pass
FF - Type D (Mid) - Double Bedroom	3672	0	0.0	Pass
FF - Type D (Mid) - Single Bedroom	3672	1	0.0	Pass
SF - Type D (Mid) - Twin Bedroom	3672	1	0.0	Pass
GF - Type D (End) - Kitchen / Living / Dining	1989	1	0.1	Pass
FF - Type D (End) - Double Bedroom	3672	2	0.1	Pass
FF - Type D (End) - Single Bedroom	3672	3	0.1	Pass
SF - Type D (End) - Twin Bedroom	3672	2	0.1	Pass
GF - Type D (Mid) - Kitchen / Living / Dining	1989	1	0.1	Pass
FF - Type D (Mid) - Double Bedroom	3672	0	0.0	Pass
FF - Type D (Mid) - Single Bedroom	3672	1	0.0	Pass
SF - Type D (Mid) - Twin Bedroom	3672	0	0.0	Pass
GF - Type D (Mid) - Kitchen / Living / Dining	1989	1	0.1	Pass
FF - Type D (Mid) - Double Bedroom	3672	0	0.0	Pass
FF - Type D (Mid) - Single Bedroom	3672	1	0.0	Pass
SF - Type D (Mid) - Twin Bedroom	3672	1	0.0	Pass
GF - Type D (End) - Kitchen / Living / Dining	1989	1	0.1	Pass
FF - Type D (End) - Double Bedroom	3672	2	0.1	Pass
FF - Type D (End) - Single Bedroom	3672	3	0.1	Pass
SF - Type D (End) - Twin Bedroom	3672	2	0.1	Pass

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Room name	Occupied hours	No. hours $\Delta T \geq 1^\circ\text{K}$	% Occupied hours $\Delta T \geq 1^\circ\text{K}$	Criterion a check
GF - Type D (Mid) - Kitchen / Living / Dining	1989	1	0.1	Pass
FF - Type D (Mid) - Double Bedroom	3672	0	0.0	Pass
FF - Type D (Mid) - Single Bedroom	3672	1	0.0	Pass
SF - Type D (Mid) - Twin Bedroom	3672	0	0.0	Pass
GF - Type D (Mid) - Kitchen / Living / Dining	1989	1	0.1	Pass
FF - Type D (Mid) - Double Bedroom	3672	0	0.0	Pass
FF - Type D (Mid) - Single Bedroom	3672	1	0.0	Pass
SF - Type D (Mid) - Twin Bedroom	3672	1	0.0	Pass
GF - Type D (End) - Kitchen / Living / Dining	1989	1	0.1	Pass
FF - Type D (End) - Double Bedroom	3672	2	0.1	Pass
FF - Type D (End) - Single Bedroom	3672	4	0.1	Pass
SF - Type D (End) - Twin Bedroom	3672	2	0.1	Pass
GF - Type D (Mid) - Kitchen / Living / Dining	1989	1	0.1	Pass
FF - Type D (Mid) - Double Bedroom	3672	0	0.0	Pass
FF - Type D (Mid) - Single Bedroom	3672	1	0.0	Pass
SF - Type D (Mid) - Twin Bedroom	3672	0	0.0	Pass

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Naturally ventilated rooms – criterion (b)

Criterion (b) states that the operative temperature of the bedrooms from 22:00-07:00 shall not exceed 26°C for more than 1% of annual hours (33 hours is therefore recorded as a fail). Any rooms that are not bedrooms are therefore not assessed, hence the corresponding N/A values.

Room name	No. hours > 26°C 22:00-24:00	No. hours > 26°C 00:00-07:00	Total hours > 26°C	Criterion b check
LGF - Type C2 - Kitchen / Living	N/A	N/A	N/A	N/A
LGF - Type C2 - Bedroom	12	13	25	Pass
LGF - Type C1 - Bedroom	9	8	17	Pass
LGF - Type C1 - Kitchen / Living	N/A	N/A	N/A	N/A
LGF - Type C3 - Bedroom	9	7	16	Pass
LGF - Type C3 - Kitchen / Living	N/A	N/A	N/A	N/A
GF - Type C2 - Kitchen / Living	N/A	N/A	N/A	N/A
GF - Type C2 - Bedroom	9	15	24	Pass
GF - Type C1 - Bedroom	13	11	24	Pass
GF - Type C1 - Kitchen / Living	N/A	N/A	N/A	N/A
GF - Type D (Mid) - Kitchen / Living / Dining	N/A	N/A	N/A	N/A
FF - Type D (Mid) - Double Bedroom	1	0	1	Pass
FF - Type D (Mid) - Single Bedroom	3	0	3	Pass
SF - Type D (Mid) - Twin Bedroom	0	0	0	Pass
GF - Type D (End) - Kitchen / Living / Dining	N/A	N/A	N/A	N/A
FF - Type D (End) - Double Bedroom	2	0	2	Pass
FF - Type D (End) - Single Bedroom	3	0	3	Pass
SF - Type D (End) - Twin Bedroom	0	0	0	Pass

Mechanically ventilated rooms

CIBSE TM59 overheating methodology for predominantly mech. vent. rooms states the operative temperature of all rooms shall not exceed 26°C for more than 3% of annual occupied hours.

Room name	No. hours > 26°C	% Annual hours > 26°C	Mechanically ventilated check
No mech vent rooms	N/A	N/A	N/A

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Communal corridors

CIBSE TM59 states that whilst there is no mandatory target for communal corridors, if an operative temperature of 28°C is exceeded for more than 3% of annual hours, then this should be identified as a significant risk within the TM59 overheating report.

Room name	No. hours > 28°C	% Annual hours > 28°C	Corridor overheating risk check
No corridors	N/A	N/A	N/A

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Modelled details & overheating mitigation strategy

Approved document O: Providing Information & Appendix B requires information about the model and the overheating mitigation strategy. The following tables detail the modelling method and mitigation strategies applied to each analysed room. Where multiple active openings per space (windows & louvres) exist they are all listed. Occupancy, equipment and lighting profiles for occupied rooms comply with TM59 section 5.

Modelled occupancy

Room name	Floor area m ²	Thermal template	Occupancy profile	Equipment profile	Lighting profile
LGF - Type C2 - Kitchen / Living	29.36	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
LGF - Type C2 - Bedroom	16.43	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
LGF - Type C1 - Bedroom	16.4	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
LGF - Type C1 - Kitchen / Living	32.77	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
LGF - Type C2 - Kitchen / Living	29.58	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
LGF - Type C2 - Bedroom	17.12	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
LGF - Type C3 - Bedroom	15.77	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
LGF - Type C3 - Kitchen / Living	31.83	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
GF - Type C2 - Kitchen / Living	29.36	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
GF - Type C2 - Bedroom	16.43	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type C1 - Bedroom	16.4	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type C1 - Kitchen / Living	32.77	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
GF - Type C2 - Kitchen / Living	29.58	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
GF - Type C2 - Bedroom	17.12	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
LGF - Type C3 - Bedroom	15.77	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
LGF - Type C3 - Kitchen / Living	31.83	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h

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Room name	Floor area m ²	Thermal template	Occupancy profile	Equipment profile	Lighting profile
GF - Type C2 - Kitchen / Living	29.36	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
GF - Type C2 - Bedroom	16.43	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type C1 - Bedroom	16.4	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type C1 - Kitchen / Living	32.77	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
GF - Type C2 - Kitchen / Living	29.58	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
GF - Type C2 - Bedroom	17.12	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
LGF - Type C3 - Bedroom	15.77	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
LGF - Type C3 - Kitchen / Living	31.83	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
GF - Type C2 - Kitchen / Living	29.36	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
GF - Type C2 - Bedroom	16.43	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type C1 - Bedroom	16.4	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type C1 - Kitchen / Living	32.77	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
GF - Type C2 - Kitchen / Living	29.58	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
GF - Type C2 - Bedroom	17.12	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type D (Mid) - Kitchen / Living / Dining	44.59	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
FF - Type D (Mid) - Double Bedroom	16.41	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
FF - Type D (Mid) - Single Bedroom	16.15	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
SF - Type D (Mid) - Twin Bedroom	19.39	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type D (End) - Kitchen / Living / Dining	44.59	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h

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Room name	Floor area m ²	Thermal template	Occupancy profile	Equipment profile	Lighting profile
FF - Type D (End) - Double Bedroom	16.41	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
FF - Type D (End) - Single Bedroom	16.15	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
SF - Type D (End) - Twin Bedroom	19.39	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type D (Mid) - Kitchen / Living / Dining	44.59	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
FF - Type D (Mid) - Double Bedroom	16.41	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
FF - Type D (Mid) - Single Bedroom	16.15	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
SF - Type D (Mid) - Twin Bedroom	19.39	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type D (Mid) - Kitchen / Living / Dining	44.59	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
FF - Type D (Mid) - Double Bedroom	16.41	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
FF - Type D (Mid) - Single Bedroom	16.15	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
SF - Type D (Mid) - Twin Bedroom	19.39	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type D (End) - Kitchen / Living / Dining	44.59	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
FF - Type D (End) - Double Bedroom	16.41	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
FF - Type D (End) - Single Bedroom	16.15	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
SF - Type D (End) - Twin Bedroom	19.39	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type D (Mid) - Kitchen / Living / Dining	44.59	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
FF - Type D (Mid) - Double Bedroom	16.41	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
FF - Type D (Mid) - Single Bedroom	16.15	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
SF - Type D (Mid) - Twin Bedroom	19.39	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type D (Mid) - Kitchen / Living / Dining	44.59	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
FF - Type D (Mid) - Double Bedroom	16.41	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h

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Room name	Floor area m ²	Thermal template	Occupancy profile	Equipment profile	Lighting profile
FF - Type D (Mid) - Single Bedroom	16.15	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
SF - Type D (Mid) - Twin Bedroom	19.39	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type D (End) - Kitchen / Living / Dining	44.59	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
FF - Type D (End) - Double Bedroom	16.41	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
FF - Type D (End) - Single Bedroom	16.15	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
SF - Type D (End) - Twin Bedroom	19.39	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
GF - Type D (Mid) - Kitchen / Living / Dining	44.59	TM59 - 2 Bedroom - Living / Kitchen	Living / Kitchen Occupancy	Living / Kitchen Equipment	18-23h
FF - Type D (Mid) - Double Bedroom	16.41	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
FF - Type D (Mid) - Single Bedroom	16.15	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h
SF - Type D (Mid) - Twin Bedroom	19.39	TM59 - Double Bedroom	Double Bedroom Occupancy	Double Bedroom Equipment	18-23h

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Modelled openings

Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
LGF - Type C2 - Kitchen / Living	17.52	0.3987, 0.3987	1.91, 1.64, 0.77, 0.87, 1.64, 0.77, 0.87	98.33999633789062, 98.33999633789062, 0.0, 56.599998474121094, 98.33999633789062, 0.0, 56.599998474121094	20.74	on continuously, off continuously, ADO.Section_26a
LGF - Type C2 - Bedroom	23.12	0.3987	1.91, 0.82, 0.86, 0.95	98.33999633789062, 0.0, 0.0, 56.599998474121094	14.7	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a
LGF - Type C1 - Bedroom	23.17	0.3987	1.91, 0.86, 0.95, 0.82	98.33999633789062, 0.0, 56.599998474121094, 0.0	14.73	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a
LGF - Type C1 - Kitchen / Living	19.23	0.3987	1.91, 1.64, 0.77, 0.87, 1.91	98.33999633789062, 98.33999633789062, 0.0, 56.599998474121094, 98.33999633789062	17.89	on continuously, off continuously, ADO.Section_26a
LGF - Type C2 - Kitchen / Living	8.74	0.3987	1.91, 1.64, 0.77, 0.87	98.33999633789062, 98.33999633789062, 0.0, 56.599998474121094	13.47	on continuously, off continuously, ADO.Section_26a
LGF - Type C2 - Bedroom	22.32	0.3987	1.91, 0.86, 0.82, 0.95	98.33999633789062, 0.0, 0.0, 56.599998474121094	14.11	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a
LGF - Type C3 - Bedroom	10.69	0.3987	0.82, 0.86, 0.95, 1.91	0.0, 0.0, 56.599998474121094, 98.33999633789062	15.32	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a

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Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
LGF - Type C3 - Kitchen / Living	9.13	0.3987	0.77, 0.87, 1.64, 1.91, 1.91	0.0, 56.59999 8474121094, 98.339996337 89062, 98.339 99633789062, 98.339996337 89062	18.42	on continuously, off continuously, ADO.Section_26a
GF - Type C2 - Kitchen / Living	16.22	0.3987, 0.3987, 0.3987	1.91, 1.64, 0.77, 0.87, 1.64, 0.77, 0.87, 0.4, 0.4	98.339996337 89062, 98.339 99633789062, 0.0, 56.59999 8474121094, 98.339996337 89062, 0.0, 56.59999847412 1094, 0.0, 56.59999847412 1094	21.51	on continuously, off continuously, ADO.Section_26a
GF - Type C2 - Bedroom	23.12	0.3987	1.91, 0.86, 0.82, 0.95	98.339996337 89062, 0.0, 0.0, 56.59999 8474121094	14.7	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a
GF - Type C1 - Bedroom	23.17	0.3987	1.91, 0.86, 0.95, 0.82	98.339996337 89062, 0.0, 56.59999847412 1094, 0.0	14.73	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a
GF - Type C1 - Kitchen / Living	19.23	0.3987	1.91, 0.77, 0.87, 1.64, 1.91	98.339996337 89062, 0.0, 56.59999847412 1094, 0.0, 98.33999633789 062	12.97	on continuously, off continuously, ADO.Section_26a
GF - Type C2 - Kitchen / Living	16.15	0.3987, 0.3987, 0.3987	0.4, 0.4, 1.91, 1.64, 0.77, 0.87, 1.64, 0.77, 0.87	0.0, 56.59999 8474121094, 98.339996337 89062, 98.339 99633789062, 0.0, 56.59999 8474121094, 98.339996337 89062, 0.0, 56.59999847412 1094	21.35	on continuously, off continuously, ADO.Section_26a

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Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
GF - Type C2 - Bedroom	22.32	0.3987	1.91, 0.82, 0.86, 0.95	98.339996337 89062, 0.0, 0.0, 56.59999 8474121094	14.11	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a
LGF - Type C3 - Bedroom	10.69	0.3987	0.82, 0.86, 0.95, 1.91	0.0, 0.0, 56.59 99984741210 94, 98.339996 33789062	15.32	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a
LGF - Type C3 - Kitchen / Living	9.13	0.3987	0.77, 0.87, 1.64, 1.91, 1.91	0.0, 56.59999 8474121094, 98.339996337 89062, 98.339 99633789062, 98.339996337 89062	18.42	on continuously, off continuously, ADO.Section_26a
GF - Type C2 - Kitchen / Living	16.22	0.3987, 0.3987, 0.3987	1.91, 1.64, 0.77, 0.87, 1.64, 0.77, 0.87, 0.4, 0.4	98.339996337 89062, 98.339 99633789062, 0.0, 56.59999 8474121094, 98.339996337 89062, 0.0, 56.59999847412 1094, 0.0, 56.59999847412 1094	21.51	on continuously, off continuously, ADO.Section_26a
GF - Type C2 - Bedroom	23.12	0.3987	1.91, 0.82, 0.86, 0.95	98.339996337 89062, 0.0, 0.0, 0.0	11.43	Internal Doors Bedroom Weekly, off continuously
GF - Type C1 - Bedroom	23.17	0.3987	1.91, 0.86, 0.95, 0.82	98.339996337 89062, 0.0, 56.59999847412 1094, 0.0	14.73	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a
GF - Type C1 - Kitchen / Living	19.23	0.3987	1.91, 0.77, 0.87, 1.64, 1.91	98.339996337 89062, 0.0, 56.59999847412 1094, 98.3399 9633789062, 98.339996337 89062	17.89	on continuously, off continuously, ADO.Section_26a

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Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
GF - Type C2 - Kitchen / Living	16.15	0.3987, 0.3987, 0.3987	0.4, 0.4, 1.91, 1.64, 0.77, 0.87, 1.64, 0.77, 0.87	0.0, 56.59999 8474121094, 98.339996337 89062, 98.339 99633789062, 0.0, 56.59999 8474121094, 98.339996337 89062, 0.0, 56 .59999847412 1094	21.35	on continuously, off continuously, ADO.Section_ 26a
GF - Type C2 - Bedroom	22.32	0.3987	1.91, 0.82, 0.86, 0.95	98.339996337 89062, 0.0, 0.0, 56.59999 8474121094	14.11	Internal Doors Bedroom Weekly, off continuously, ADO.Section_ 26a
LGF - Type C3 - Bedroom	15.27	0.3987	0.82, 0.86, 0.95, 1.91	0.0, 0.0, 56.59 99984741210 94, 98.339996 33789062	15.32	Internal Doors Bedroom Weekly, off continuously, ADO.Section_ 26a
LGF - Type C3 - Kitchen / Living	13.05	0.3987	0.77, 0.87, 1.64, 1.91, 1.91	0.0, 56.59999 8474121094, 98.339996337 89062, 98.339 99633789062, 98.339996337 89062	18.42	on continuously, off continuously, ADO.Section_ 26a
GF - Type C2 - Kitchen / Living	23.09	0.3987, 0.3987, 0.3987	1.91, 1.64, 0.77, 0.87, 1.64, 0.77, 0.87, 0.38, 0.38	98.339996337 89062, 98.339 99633789062, 0.0, 56.59999 8474121094, 98.339996337 89062, 0.0, 56 .59999847412 1094, 0.0, 56. 59999847412 1094	21.47	on continuously, off continuously, ADO.Section_ 26a
GF - Type C2 - Bedroom	33.02	0.3987	1.91, 0.86, 0.82, 0.95	98.339996337 89062, 0.0, 0.0, 56.59999 8474121094	14.7	Internal Doors Bedroom Weekly, off continuously, ADO.Section_ 26a

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Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
GF - Type C1 - Bedroom	33.1	0.3987	1.91, 0.86, 0.95, 0.82	98.339996337 89062, 0.0, 56 .59999847412 1094, 0.0	14.73	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a
GF - Type C1 - Kitchen / Living	27.47	0.3987	1.91, 0.77, 0.87, 1.64, 1.91	98.339996337 89062, 0.0, 56 .59999847412 1094, 98.3399 9633789062, 98.339996337 89062	17.89	on continuously, off continuously, ADO.Section_26a
GF - Type C2 - Kitchen / Living	23.0	0.3987, 0.3987, 0.3987	0.38, 0.38, 1.91, 1.64, 0.77, 0.87, 1.64, 0.77, 0.87	0.0, 56.59999 8474121094, 98.339996337 89062, 98.339 99633789062, 0.0, 56.59999 8474121094, 98.339996337 89062, 0.0, 56 .59999847412 1094	21.31	on continuously, off continuously, ADO.Section_26a
GF - Type C2 - Bedroom	31.89	0.3987	1.91, 0.82, 0.86, 0.95	98.339996337 89062, 0.0, 0.0, 56.59999 8474121094	14.11	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a
GF - Type D (Mid) - Kitchen / Living / Dining	15.24	0.5, 0.5	2.15, 0.95, 0.41, 0.76, 0.9, 1.04, 1.91, 1.91	98.339996337 89062, 0.0, 56 .59999847412 1094, 0.0, 0.0, 56.599998474 121094, 0.0, 9 8.3399963378 9062	10.79	on continuously, off continuously, ADO.Section_26a
FF - Type D (Mid) - Double Bedroom	14.87	0.5	0.76, 0.88, 0.97, 1.91, 1.91	0.0, 0.0, 56.59 99984741210 94, 98.339996 33789062, 98. 33999633789 062	26.24	Internal Doors Bedroom Weekly, ADO. Section_26ab, off continuously
FF - Type D (Mid) - Single Bedroom	17.08	0.5	1.91, 0.76, 0.9, 1.04	98.339996337 89062, 0.0, 0.0, 56.59999 8474121094	15.28	ADO.Section_26ab, Internal Doors Bedroom Weekly, off continuously

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Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
SF - Type D (Mid) - Twin Bedroom	N/A	0.5044, 0.5044	1.02, 1.02, 1.65, 1.76	56.599998474121094, 56.599998474121094, 98.33999633789062	23.25	Internal Doors Bedroom Weekly, ADO. Section_26ab
GF - Type D (End) - Kitchen / Living / Dining	19.44	0.5, 0.871, 0.5	2.15, 0.95, 0.41, 1.13, 1.22, 0.66, 0.76, 0.9, 1.04, 1.91, 1.91	98.33999633789062, 0.0, 56.599998474121094, 0.0, 0.0, 0.0, 56.599998474121094, 0.0, 98.33999633789062	10.79	on continuously, off continuously, ADO. Section_26a
FF - Type D (End) - Double Bedroom	23.61	0.5	0.76, 0.88, 0.97, 1.91, 1.91	0.0, 0.0, 56.599998474121094, 98.33999633789062	26.24	Internal Doors Bedroom Weekly, ADO. Section_26ab, off continuously
FF - Type D (End) - Single Bedroom	24.34	0.5	1.91, 0.76, 0.9, 1.04	98.33999633789062, 0.0, 0.0, 56.599998474121094	15.28	ADO. Section_26ab, Internal Doors Bedroom Weekly, off continuously
SF - Type D (End) - Twin Bedroom	0.0	0.5044, 0.5044	1.02, 1.02, 1.65, 1.76	56.599998474121094, 56.599998474121094, 98.33999633789062	23.25	Internal Doors Bedroom Weekly, ADO. Section_26ab
GF - Type D (Mid) - Kitchen / Living / Dining	11.02	0.5, 0.5	2.15, 0.95, 0.41, 0.76, 0.9, 1.04, 1.91, 1.91	98.33999633789062, 0.0, 56.599998474121094, 0.0, 98.33999633789062	10.79	Internal Doors Bedroom Weekly, off continuously, ADO. Section_26a
FF - Type D (Mid) - Double Bedroom	14.87	0.5	0.76, 0.88, 0.97, 1.91, 1.91	0.0, 0.0, 56.599998474121094, 98.33999633789062	26.24	Internal Doors Bedroom Weekly, ADO. Section_26ab, off continuously

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Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
FF - Type D (Mid) - Single Bedroom	14.5	0.5	1.91, 0.76, 0.9, 1.04	98.33999633789062, 0.0, 0.0, 56.599998474121094	15.28	ADO.Section_26ab, Internal Doors Bedroom Weekly, off continuously
SF - Type D (Mid) - Twin Bedroom	0.0	0.5044, 0.5044	1.02, 1.02, 1.65, 1.76	56.599998474121094, 56.599998474121094, 98.33999633789062, 98.33999633789062	23.25	Internal Doors Bedroom Weekly, ADO. Section_26ab
GF - Type D (Mid) - Kitchen / Living / Dining	15.24	0.5, 0.5	2.15, 0.95, 0.41, 0.76, 0.9, 1.04, 1.91, 1.91	98.33999633789062, 0.0, 56.599998474121094, 0.0, 0.0, 56.599998474121094, 0.0, 98.33999633789062	10.79	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a
FF - Type D (Mid) - Double Bedroom	14.87	0.5	0.76, 0.88, 0.97, 1.91, 1.91	0.0, 0.0, 56.599998474121094, 98.33999633789062, 98.33999633789062	26.24	Internal Doors Bedroom Weekly, ADO. Section_26ab, off continuously
FF - Type D (Mid) - Single Bedroom	17.08	0.5	1.91, 0.76, 0.9, 1.04	98.33999633789062, 0.0, 0.0, 56.599998474121094	15.28	ADO.Section_26ab, Internal Doors Bedroom Weekly, off continuously
SF - Type D (Mid) - Twin Bedroom	N/A	0.5044, 0.5044	1.02, 1.02, 1.65, 1.76	56.599998474121094, 56.599998474121094, 98.33999633789062, 98.33999633789062	23.25	Internal Doors Bedroom Weekly, ADO. Section_26ab
GF - Type D (End) - Kitchen / Living / Dining	19.44	0.5, 0.871, 0.5	2.15, 0.95, 0.41, 1.13, 1.22, 0.66, 0.76, 0.9, 1.04, 1.91, 1.91	98.33999633789062, 0.0, 56.599998474121094, 0.0, 0.0, 0.0, 56.599998474121094, 0.0, 98.33999633789062	10.79	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a

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Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
FF - Type D (End) - Double Bedroom	23.61	0.5	0.76, 0.88, 0.97, 1.91, 1.91	0.0, 0.0, 56.59 99984741210 94, 98.339996 33789062, 98. 33999633789 062	26.24	Internal Doors Bedroom Weekly, ADO. Section_26ab, off continuously
FF - Type D (End) - Single Bedroom	24.34	0.5	1.91, 0.76, 0.9, 1.04	98.339996337 89062, 0.0, 0.0, 56.59999 8474121094	15.28	ADO.Section_26ab, Internal Doors Bedroom Weekly, off continuously
SF - Type D (End) - Twin Bedroom	0.0	0.5044, 0.5044	1.02, 1.02, 1.65, 1.76	56.599998474 121094, 56.59 99984741210 94, 98.339996 33789062, 98. 33999633789 062	23.25	Internal Doors Bedroom Weekly, ADO. Section_26ab
GF - Type D (Mid) - Kitchen / Living / Dining	11.02	0.5, 0.5	2.15, 0.95, 0.41, 0.76, 0.9, 1.04, 1.91, 1.91	98.339996337 89062, 0.0, 56 .59999847412 1094, 0.0, 0.0, 56.599998474 121094, 0.0, 9 8.3399963378 9062	10.79	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a
FF - Type D (Mid) - Double Bedroom	14.87	0.5	0.76, 0.88, 0.97, 1.91, 1.91	0.0, 0.0, 56.59 99984741210 94, 98.339996 33789062, 98. 33999633789 062	26.24	Internal Doors Bedroom Weekly, ADO. Section_26ab, off continuously
FF - Type D (Mid) - Single Bedroom	14.5	0.5	1.91, 0.76, 0.9, 1.04	98.339996337 89062, 0.0, 0.0, 56.59999 8474121094	15.28	ADO.Section_26ab, Internal Doors Bedroom Weekly, off continuously
SF - Type D (Mid) - Twin Bedroom	0.0	0.5044, 0.5044	1.02, 1.02, 1.65, 1.76	56.599998474 121094, 56.59 99984741210 94, 98.339996 33789062, 98. 33999633789 062	23.25	Internal Doors Bedroom Weekly, ADO. Section_26ab

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Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
GF - Type D (Mid) - Kitchen / Living / Dining	15.24	0.5, 0.5	2.15, 0.95, 0.41, 0.76, 0.9, 1.04, 1.91, 1.91	98.33999633789062, 0.0, 56.599998474121094, 0.0, 0.0, 56.599998474121094, 0.0, 98.33999633789062	10.79	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a
FF - Type D (Mid) - Double Bedroom	14.87	0.5	0.76, 0.88, 0.97, 1.91, 1.91	0.0, 0.0, 56.59998474121094, 98.33999633789062, 98.33999633789062	26.24	Internal Doors Bedroom Weekly, ADO. Section_26ab, off continuously
FF - Type D (Mid) - Single Bedroom	17.08	0.5	1.91, 0.76, 0.9, 1.04	98.33999633789062, 0.0, 0.0, 56.599998474121094	15.28	ADO.Section_26ab, Internal Doors Bedroom Weekly, off continuously
SF - Type D (Mid) - Twin Bedroom	N/A	0.5044, 0.5044	1.02, 1.02, 1.65, 1.76	56.599998474121094, 56.59998474121094, 98.33999633789062, 98.33999633789062	23.25	Internal Doors Bedroom Weekly, ADO. Section_26ab
GF - Type D (End) - Kitchen / Living / Dining	19.44	0.5, 0.871, 0.5	2.15, 0.94, 0.41, 1.13, 1.22, 0.66, 0.76, 0.9, 1.04, 1.91, 1.91	98.33999633789062, 0.0, 56.599998474121094, 0.0, 0.0, 0.0, 56.599998474121094, 0.0, 98.33999633789062	10.79	Internal Doors Bedroom Weekly, off continuously, ADO.Section_26a
FF - Type D (End) - Double Bedroom	23.61	0.5	0.76, 0.88, 0.97, 1.91, 1.91	0.0, 0.0, 56.59998474121094, 98.33999633789062, 98.33999633789062	26.24	Internal Doors Bedroom Weekly, ADO. Section_26ab, off continuously
FF - Type D (End) - Single Bedroom	24.34	0.5	1.91, 0.76, 0.9, 1.04	98.33999633789062, 0.0, 0.0, 56.599998474121094	15.28	ADO.Section_26ab, Internal Doors Bedroom Weekly, off continuously

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Room name	Window to wall ratio %	Window g-value (EN 410)	Opening gross area m ²	Opening free area (avg) %	Opening free area / floor area ratio %	Opening profile(s)
SF - Type D (End) - Twin Bedroom	0.0	0.5044, 0.5044	1.02, 1.02, 1.65, 1.76	56.599998474121094, 56.599998474121094, 98.33999633789062	23.25	Internal Doors Bedroom Weekly, ADO. Section_26ab
GF - Type D (Mid) - Kitchen / Living / Dining	11.02	0.5, 0.5	2.15, 0.95, 0.41, 0.76, 0.9, 1.04, 1.91, 1.91	98.33999633789062, 0.0, 56.599998474121094, 0.0, 0.0, 56.599998474121094, 0.0, 98.33999633789062	10.79	Internal Doors Bedroom Weekly, off continuously, ADO. Section_26a
FF - Type D (Mid) - Double Bedroom	14.87	0.5	0.76, 0.88, 0.97, 1.91, 1.91	0.0, 0.0, 56.599998474121094, 98.33999633789062, 98.33999633789062	26.24	Internal Doors Bedroom Weekly, ADO. Section_26ab, off continuously
FF - Type D (Mid) - Single Bedroom	14.5	0.5	1.91, 0.76, 0.9, 1.04	98.33999633789062, 0.0, 0.0, 56.599998474121094	15.28	ADO. Section_26ab, Internal Doors Bedroom Weekly, off continuously
SF - Type D (Mid) - Twin Bedroom	0.0	0.5044, 0.5044	1.02, 1.02, 1.65, 1.76	56.599998474121094, 56.599998474121094, 98.33999633789062, 98.33999633789062	23.25	Internal Doors Bedroom Weekly, ADO. Section_26ab

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Modelled ventilation

Room name	Infiltration rate ACH	Mech vent flow rate ACH
LGF - Type C2 - Kitchen / Living	0.15	1.02
LGF - Type C2 - Bedroom	0.15	1.83
LGF - Type C1 - Bedroom	0.15	1.83
LGF - Type C1 - Kitchen / Living	0.15	0.92
LGF - Type C2 - Kitchen / Living	0.15	1.01
LGF - Type C2 - Bedroom	0.15	1.75
LGF - Type C3 - Bedroom	0.15	1.9
LGF - Type C3 - Kitchen / Living	0.15	0.94
GF - Type C2 - Kitchen / Living	0.15	1.02
GF - Type C2 - Bedroom	0.15	1.83
GF - Type C1 - Bedroom	0.15	1.83
GF - Type C1 - Kitchen / Living	0.15	0.92
GF - Type C2 - Kitchen / Living	0.15	1.01
GF - Type C2 - Bedroom	0.15	1.75
LGF - Type C3 - Bedroom	0.15	1.9
LGF - Type C3 - Kitchen / Living	0.15	0.94
GF - Type C2 - Kitchen / Living	0.15	1.02
GF - Type C2 - Bedroom	0.15	1.83
GF - Type C1 - Bedroom	0.15	1.83
GF - Type C1 - Kitchen / Living	0.15	0.92
GF - Type C2 - Kitchen / Living	0.15	1.01
GF - Type C2 - Bedroom	0.15	1.75
LGF - Type C3 - Bedroom	0.15	2.72
LGF - Type C3 - Kitchen / Living	0.15	1.35
GF - Type C2 - Kitchen / Living	0.15	1.46
GF - Type C2 - Bedroom	0.15	2.61
GF - Type C1 - Bedroom	0.15	2.61
GF - Type C1 - Kitchen / Living	0.15	1.31
GF - Type C2 - Kitchen / Living	0.15	1.45
GF - Type C2 - Bedroom	0.15	2.5
GF - Type D (Mid) - Kitchen / Living / Dining	0.15	0.39
FF - Type D (Mid) - Double Bedroom	0.15	0.0
FF - Type D (Mid) - Single Bedroom	0.15	0.0
SF - Type D (Mid) - Twin Bedroom	0.15	0.0
GF - Type D (End) - Kitchen / Living / Dining	0.15	0.39
FF - Type D (End) - Double Bedroom	0.15	0.0
FF - Type D (End) - Single Bedroom	0.15	0.0
SF - Type D (End) - Twin Bedroom	0.15	0.0
GF - Type D (Mid) - Kitchen / Living / Dining	0.15	0.39
FF - Type D (Mid) - Double Bedroom	0.15	0.0

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Room name	Infiltration rate ACH	Mech vent flow rate ACH
FF - Type D (Mid) - Single Bedroom	0.15	0.0
SF - Type D (Mid) - Twin Bedroom	0.15	0.0
GF - Type D (Mid) - Kitchen / Living / Dining	0.15	0.39
FF - Type D (Mid) - Double Bedroom	0.15	0.0
FF - Type D (Mid) - Single Bedroom	0.15	0.0
SF - Type D (Mid) - Twin Bedroom	0.15	0.0
GF - Type D (End) - Kitchen / Living / Dining	0.15	0.39
FF - Type D (End) - Double Bedroom	0.15	0.0
FF - Type D (End) - Single Bedroom	0.15	0.0
SF - Type D (End) - Twin Bedroom	0.15	0.0
GF - Type D (Mid) - Kitchen / Living / Dining	0.15	0.39
FF - Type D (Mid) - Double Bedroom	0.15	0.0
FF - Type D (Mid) - Single Bedroom	0.15	0.0
SF - Type D (Mid) - Twin Bedroom	0.15	0.0
GF - Type D (Mid) - Kitchen / Living / Dining	0.15	0.39
FF - Type D (Mid) - Double Bedroom	0.15	0.0
FF - Type D (Mid) - Single Bedroom	0.15	0.0
SF - Type D (Mid) - Twin Bedroom	0.15	0.0
GF - Type D (End) - Kitchen / Living / Dining	0.15	0.39
FF - Type D (End) - Double Bedroom	0.15	0.0
FF - Type D (End) - Single Bedroom	0.15	0.0
SF - Type D (End) - Twin Bedroom	0.15	0.0
GF - Type D (Mid) - Kitchen / Living / Dining	0.15	0.39
FF - Type D (Mid) - Double Bedroom	0.15	0.0
FF - Type D (Mid) - Single Bedroom	0.15	0.0
SF - Type D (Mid) - Twin Bedroom	0.15	0.0