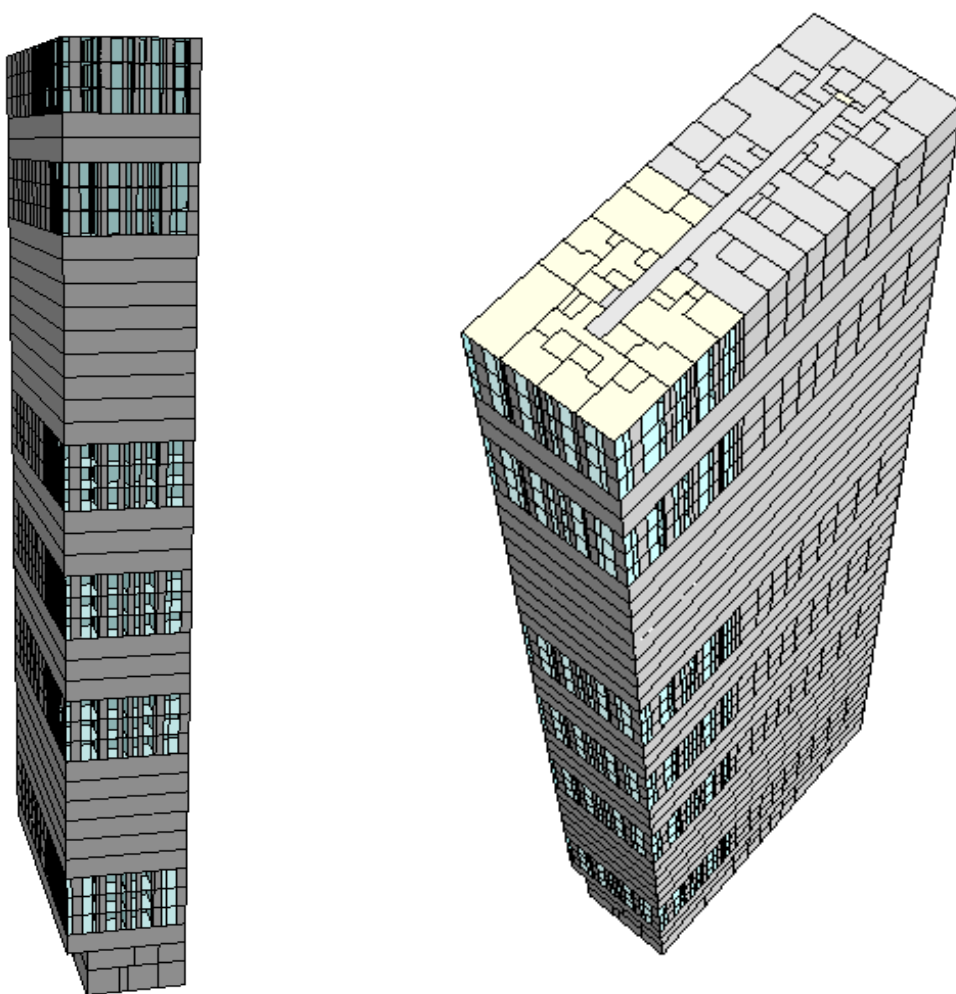




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2-4 Whitworth Street West

Summertime Internal Environment Report

CIBSE TM59 Overheating Analysis

For

Glenbrook WWS Limited, Maizelands Limited and Arringford Limited

QA

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Executive Summary

This report assesses the risk of overheating for the proposed Whitworth Street West residential development. Sample floor plates were taken from the bottom, middle and top levels of the development.

CIBSE TM59 methodology has been utilised to assess the overheating risk within a relevant selection of units. Compliance with TM59 minimum criteria has been analysed using the Manchester weather Centre data. Current scenario weather files were considered. The assessment has been conducted following the criteria from the Building Regulations Part O 2021.

Futureserv understands that certain facades are exposed to high noise levels which will limit the use of natural ventilation for reducing the risk of overheating within the affected dwellings.

To demonstrate consideration of acoustic measures, we are restricting window opening times as below:

Floor	North Façade	East Façade	South Façade	West Façade
Up to Level 5	2.5	2.5	2.5	2.5
Up to Level 10	5	2.5	2.5	5
Up to Level 15	8	5	5	8
Up to Level 20	13	6	6	13
Up to Level 25	16	10	10	16
Up to Level 30	16	13	13	16
Up to Level 35	16	16	16	16
Up to Level 40	16	16	16	16

The residential development was assessed against the requirements of CIBSE TM59. The report outlines the basis of the proposals and the intended overheating mitigation strategy.

The simulation indicated that all assessed LKDs and Bedrooms passed the TM59 simulation.

The Glazing G values were simulated at 0.45 on South and West Elevations, and 0.57 on North and East elevations.

The amenity areas at Ground floor level shall be provided with local ceiling void mounted heat recovery mechanical ventilation systems together with heat pump heating and cooling systems to maintain comfort temperatures in these highly occupied spaces.

Important Notes

The free area openings/ventilation rates stated are as required for compliance with TM59 overheating only. An assessment of the required free area for purge ventilation in line with Guide F of the building regulation is required to satisfy building control.

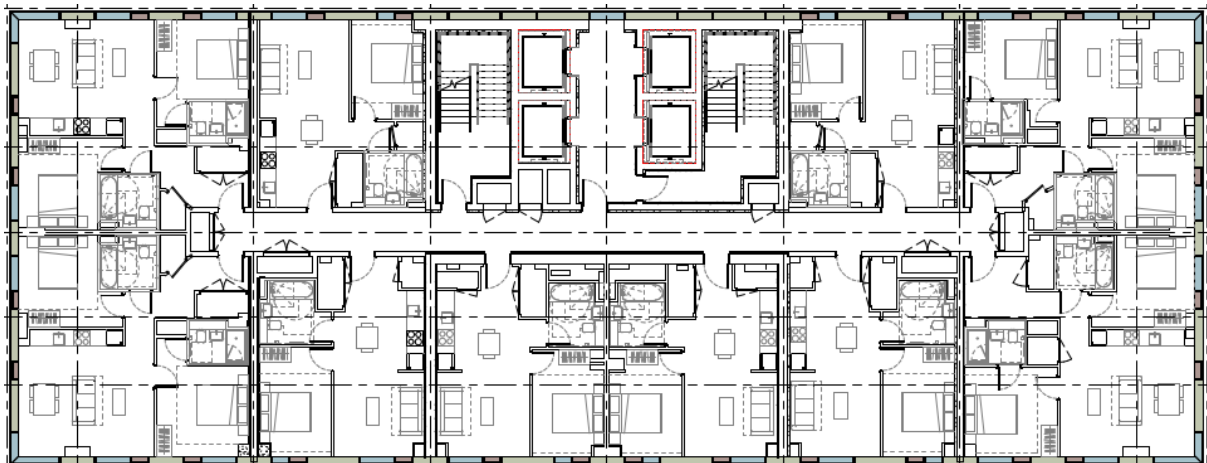
1.0 Introduction

A thermal model exercise has been undertaken to predict the internal temperatures over a typical year for the proposed residential development known as Whitworth Street West, Manchester. The development comprises 43 storeys and a total of 364 apartments. At this stage the key areas of the development were modelled to represent the various room types, window types and orientations within the building.

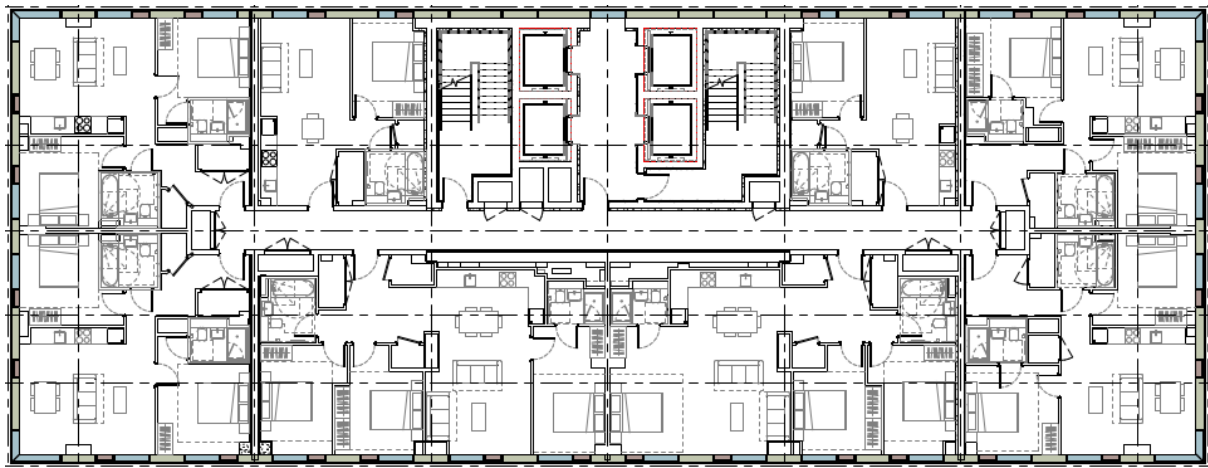
Assessing overheating risk in residential developments is a complex issue. Therefore, CIBSE TM59 is utilised to conduct a dynamic analysis of the residential apartments to assess overheating. This assessment aims to identify whether the proposals meet the requirements of CIBSE TM59 and Part O.



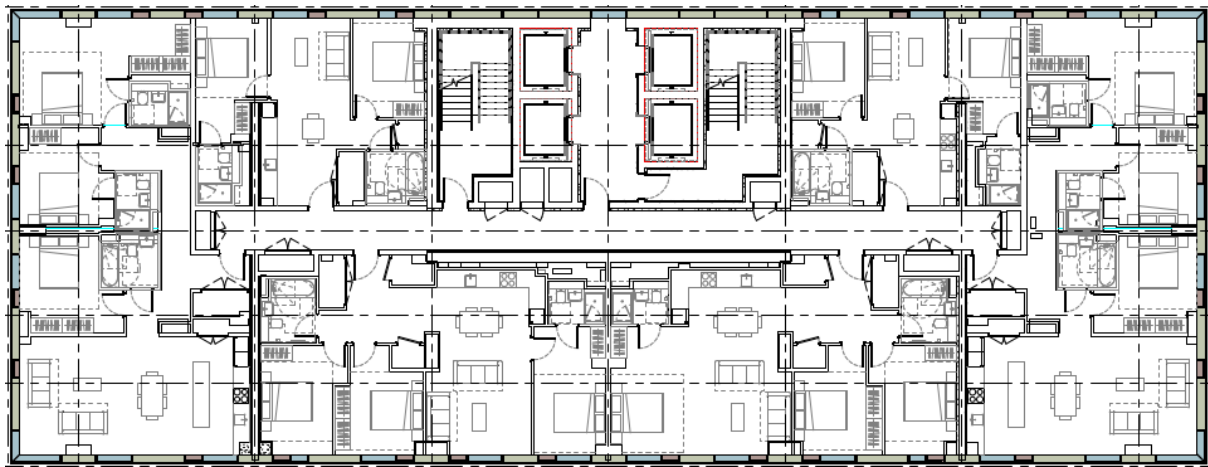
WSW – Floor Type 1 – Levels 03-22



WSW – Floor Type 2 – Levels 23-33



WSW – Floor Type 3 – Levels 34-40



WSW – Floor Type 4 – Levels 41-43

2.0 Assessment Methodology and Criteria

Part O Building Regulations 2021

The aim of requirement O1 is to protect the health and welfare of occupants of the building by reducing the occurrence of high indoor temperatures.

In the Secretary of State's view, requirement O1 is met by designing and constructing the building to achieve both of the following:

- Limiting unwanted solar gains in summer.
- Providing an adequate means of removing excess heat from the indoor environment.

The guidance and regulations are written for the purposes of protecting health and welfare. Following this guidance does not guarantee the comfort of building occupants.

In the Secretary of State's view, compliance with requirement O1 can be demonstrated by using one of the following methods.

- a. The simplified method for limiting solar gains and providing a means of removing excess heat.
- b. The dynamic thermal modelling method, in line with the TM59 methodology, but incorporating additional elements from the guide O 2021.

These additional elements include a specific window opening formula as detailed in section 3.0 of this report, no blinds to be incorporated, any GF or easily accessible rooms to have daytime ventilation only via window/door openings.

This project will use the dynamic thermal modelling method of compliance.

TM59 Methodology

The TM59 methodology is a standardised approach to predicting overheating risk for residential building designs using dynamic thermal analysis. The aim is to produce a test that encourages good design that is comfortable within sensible limits, without being so stringent that it over promotes the use of mechanical cooling.

CIBSE TM59 also sets out profiles that represent reasonable usage patterns for a home suitable for evaluating overheating risk. The profiles are developed to test a design and do not cover all usage models.

The Methodology is intended for use by designers in order to influence building design for the better. It could be used at planning stage to assess risk, as well as at later design stages.

This methodology will:

- Allow different designs to be compared based on reasonable assumptions.
- Support design decisions that improve comfort without cooling
- Provide consistency across the industry for overheating risk prediction.



This methodology will not:

- Guarantee that people will always be comfortable in compliant spaces, however they act.
- Take into account unusual use.

The Basis of the design comfort criteria for CIBSE TM59 is:

- CIBSE TM52: Limits of thermal comfort: avoiding overheating – Provides the principles of thermal comfort.
- CIBSE Guide A: Environmental design – Includes advice regarding sleep quality.

The methodology is prescriptive so as to be consistently applied. It uses thermal modelling tools, defined internal gains profiles and specific weather files with a clearly defined thresholds to provide a clear pass/ fail result.

It is vital that the mitigation options selected as a result of the assessment are fully incorporated into the design or the assessment will have no value.

TM 59 Criteria – Homes

CIBSE TM59 sets out two different overheating criteria for different design strategies. The two strategies are:

- Buildings that are predominantly naturally ventilated
- Buildings that are predominantly mechanically ventilated

For homes that are predominantly naturally ventilated:

For homes that are predominantly naturally ventilated, two criteria apply. These are:

1. Living Rooms, Kitchens and Bedrooms – Hours of exceedance

The number of hours during which ΔT is greater than or equal to one degree ($^{\circ}\text{K}$) during the period May to September inclusive shall not be more than 3% of occupied hours. ΔT is defined as operative temperature less the maximum acceptable temperature. ΔT is rounded to the nearest whole degree (CIBSE TM52, criteria 1).

This has been determined as being 110.2 hours a year or less for Bedrooms and 59.6=7 hours or less for Living/Kitchen areas.

2. Bedrooms Only – Sleeping Conditions

During the sleeping hours the operative temperature in the bedroom from 11pm to 8am shall not exceed 26°C for more than 1% of annual hours. This has been determined as being 32 hours a year.

For homes that are predominantly mechanically ventilated:

1. For homes with restricted window openings, the CIBSE fixed temperature test must be followed, i.e. all occupied rooms should not exceed an operative temperature of 26°C for more than 3% of the annual occupied annual hours (CIBSE Guide A (2015a)).

The TM59 criteria set out above provides a basis for assessing the risk of perceived overheating. The criteria above and results contained within this report are estimates of the temperatures that may be experienced in a typical year based on the CIBSE DSY1 (Design Summer Year), weather file for the 2020's, high emissions, 50% percentile scenarios.

3.0 Model Settings

3.1 Software

The model was created using IES VE 2023 software. The 'Suncast' solar shading software has been used to model the sun path and solar shading effect for the proposed building.

3.2 Drawings

The model is based on the following plans by Sheppard Robson:

- 7196-SRA-ZZ-XX-DR-A-SK041
- 7196-SRA-ZZ-XX-DR-A-SK042
- 7196-SRA-ZZ-XX-DR-A-SK043
- 7196-SRA-ZZ-XX-DR-A-SK044

3.3 Weather file and weather file characteristics

The Manchester DSY1 2020High50 (Design Summer Year) weather file was used as directed by TM59 methodology, as it is the closest DSY weather file to the site.

3.4 Ventilation

3.4.1 Natural ventilation

All apartments do not have access to natural ventilation as windows have opening restrictions due to acoustic reasons. An infiltration rate of 0.1 ach/hr has been applied to all areas as based on a targeted air permeability of 3.0m³.m².hr@50Pa based on CIBSE guide A table 4.16.

Window opening is manual and have been set to open based on the following restrictions:

Floor	North Façade	East Façade	South Façade	West Façade
Up to Level 5	2.5	2.5	2.5	2.5
Up to Level 10	5	2.5	2.5	5
Up to Level 15	8	5	5	8
Up to Level 20	13	6	6	13
Up to Level 25	16	10	10	16
Up to Level 30	16	13	13	16
Up to Level 35	16	16	16	16
Up to Level 40	16	16	16	16

3.5 Auxiliary ventilation

The apartment areas are ventilated with MVHR's. These supply and extract air to the apartment spaces and extract air from the studio areas. The apartments have a trickle ventilation rate as supplied by an MVHR unit. The ventilation rates have been applied as per Part F 2021 in terms of trickle and standard boost rates. Ventilation Boost profiles 24/7.

In addition to the boosted air flowrate, due to limited openings for windows as per the acoustic report, additional ventilation is required in the form of an extra purge fan and supply air cooling (peak lopping. For the purposes of this report, we have modelled a purge fan (to supply extra air) and peak lopping which cools the supply air temperature & reduces the required air volume to a rate achievable by MVHR's without inducing excessive noise. Cooling is provided by a heat pump built into the MVHR which uses the refrigeration cycle to cool incoming air.

Boosted ventilation rates have then been applied to the overheating simulations to go beyond the standard Part F rates and are based on a boosted rates referenced below

1 Bed	Trickle	Boost	Total
LKD	13	29	
Bed	8	29	79
2 Bed	Trickle	Boost	Total
LKD	13	18	
Bed	8	16	
Bed	8	16	79
3 Bed	Trickle	Boost	Total
LKD	13	12	
Bed	8	10	
Bed	8	10	
Bed	8	10	79

The apartments also benefit from MVHR units. These supply air to the apartments. The apartments have a trickle ventilation rate as supplied by an MVHR unit. The ventilation rates have been applied as per Part F 2021 in terms of trickle and standard boost rates.

Boosted ventilation rates have then been applied to the overheating simulations, as required beyond the standard Part F rates and are based on a boosted rates referenced in the mark ups above.

The apartments with restricted opening hours require the supplied air to be cooled during summer conditions. The cooling will be provided by a heat pump built into the MVHR. This analysis models the ancillary unit to reduce the incoming air temperature by 11.5°C.

3.6 Internal Gains TM59

The internal gains and profiles that have been used for the internal temperature analysis model have been taken from CIBSE TM59 and are listed in appendix B.

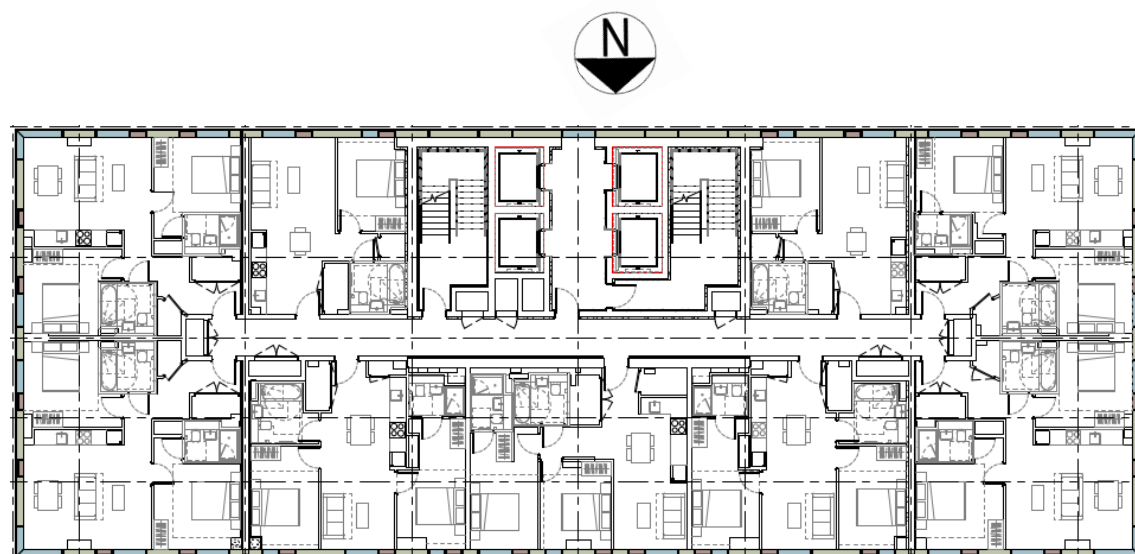
3.7 Building Fabric Specification

The building specification used in the Initial model is as follows:

- G Value (S/W): 0.45
- G Value (N/E): 0.57

Construction Element	Building Regulation Specification	Development Specification
Floor	0.18 W/m ² K	0.11 W/m ² K
External Wall	0.26 W/m ² K	0.15 W/m ² K
Roof	0.16 W/m ² K	0.11 W/m ² K
Curtain Walling	1.60 W/m ² K	0.89 W/m ² K
Air Permeability	8.00 m ³ /h/m ²	3.00 m ³ /h/m ²

3.9 Building Orientation



4.0 Results

4.1 Summary of Part O Overheating assessment results – No blinds

COLOUR KEY	LOW RISK	MED RISK	HIGH RISK	OVERHEATING
Criteria 1	< 2.4 %	2.4 - 2.7 %	2.7 - 3.0 %	> 3.0 %
Criteria 2	< 25 hrs	25 - 27 hrs	28 - 32 hrs	> 32 hrs

The results for the final overheating simulation can be seen in table 4.1 below.

The results from the final overheating simulation showed that all of the assessed bedrooms and Kitchen/Living/Dining Areas comply with the TM59 overheating criteria.

None of the assessed living/Kitchen/bedroom areas failed criterion 1, whereby the ΔT (Tmax-Toperative) is $\geq 1K$ for more than 3% of Occupied Summer Hours. None of the assessed bedrooms failed criterion 2, whereby the Toperative exceeds 26°C for more than 1% of the sleeping hours (11pm till 7am).

Room Name	Criteria 1	Criteria 2	Compliance
37_2B3P_BR_04	0.1	0	Pass
37_2B3P_BR_04.2	1.4	0	Pass
37_2B4P_BR_05.2	1	0	Pass
37_2B4P_BR_05	0.1	0	Pass
42_3B5P_BR_05.2	0.1	0	Pass
42_3B5P_BR_05.3	0.1	0	Pass
42_3B5P_BR_05	0.2	0	Pass
42_3B6P_BR_04	1.7	0	Pass
42_3B6P_BR_04.2	1.5	0	Pass
42_3B6P_BR_04.3	0.9	0	Pass
42_2B3P_BR_03.2	0.1	0	Pass
42_2B3P_BR_03	0.2	0	Pass
43_3B5P_BR_05.2	0	0	Pass
43_3B5P_BR_05.3	0.1	0	Pass
43_3B5P_BR_05	0.1	0	Pass
43_3B6P_BR_04	1.6	0	Pass
43_3B6P_BR_04.2	1.4	0	Pass
43_3B6P_BR_04.3	0.8	0	Pass
43_2B3P_BR_03.2	0	0	Pass
43_2B3P_BR_03	0.2	0	Pass
04_2B3P_BR_06	2.8	7	Pass
04_2B4P_BR_05.2	0.5	0	Pass
04_2B4P_BR_05	2	16	Pass
04_2B3P_BR_04	1.6	20	Pass
04_2B3P_BR_04.2	0.2	0	Pass
04_1B1P_BR_03	0.3	0	Pass
25_2B3P_BR_04.2	0	0	Pass
25_2B3P_BR_04	1.7	0	Pass
25_2B4P_BR_05	1	0	Pass
25_2B4P_BR_05.2	0	0	Pass

25_1B1P_BR_06	0	0	Pass
37_2B3P_LKD_04	1.4	N/A	Pass
37_2B4P_LKD_05	1.7	N/A	Pass
42_2B3P_LKD_03	0.8	N/A	Pass
42_3B5P_LKD_06.2	0.4	N/A	Pass
42_3B6P_LKD_04	1.7	N/A	Pass
43_2B3P_LKD_03	0.7	N/A	Pass
43_3B5P_LKD_06.2	0.2	N/A	Pass
43_3B6P_LKD_04	1.7	N/A	Pass
04_2B3P_LKD_06	0.2	N/A	Pass
04_1B1P_LKD_03	0	N/A	Pass
04_2B3P_LKD_04	1.7	N/A	Pass
04_2B4P_LKD_05	2.1	N/A	Pass
25_2B4P_LKD_05	1.3	N/A	Pass
25_2B3P_LKD_04	1.5	N/A	Pass
25_1B1P_LKD_06	0	N/A	Pass

4.1 Summary of AVO Overheating assessment Results – blinds applied

For AVO compliance, we have applied blinds to the analysis. This approach has been successfully adopted on other high rise residential projects in Manchester.

All apartments were tested using the using the Part O modelling inputs detailed above, and with blinds applied only to fixed windows.

All of the rooms on the typical floor comply with the overheating criteria when purge panels are only open according to the AVO restrictions and blinds are closed- applied as follows:

Floor	North Façade	East Façade	South Façade	West Façade
Up to Level 5	2.5	2.5	2.5	2.5
Up to Level 10	5	2.5	2.5	5
Up to Level 15	8	5	5	8
Up to Level 20	13	6	6	13
Up to Level 25	16	10	10	16
Up to Level 30	16	13	13	16
Up to Level 35	16	16	16	16
Up to Level 40	16	16	16	16

The apartments with restricted opening hours require the supplied air to be cooled during summer conditions. The cooling will be provided by a heat pump built into the MVHR. This analysis models the ancillary unit to reduce the incoming air temperature by 11.5°C and is applied to the following:

- Floors 03-05 in all sampled apartments (03 ,04, 05, 06)



- Floors 12-14 (04, 05)



- Floors 18-20 (04)

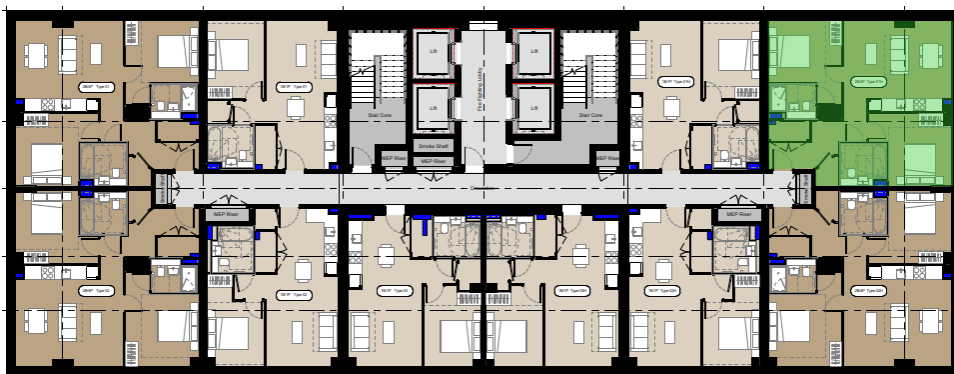


In addition to the boosted air flowrate, due to limited openings for windows as per the acoustic report, additional ventilation is required in the form of an extra purge fan and is applied to the following:

- Floors 03-14 LKD (05) at 35 l/s



- Floors 03-20 LKD (04) at 90 l/s



Room Name	Criteria 1	Criteria 2	Compliance
37_2B3P_BR_04	0.1	0	Pass
37_2B3P_BR_04.2	1.4	0	Pass
37_2B4P_BR_05.2	1	0	Pass
37_2B4P_BR_05	0	0	Pass
42_3B5P_BR_05.2	0	0	Pass
42_3B5P_BR_05.3	0	0	Pass
42_3B5P_BR_05	0	0	Pass
42_3B6P_BR_04	1.6	0	Pass
42_3B6P_BR_04.2	1.4	0	Pass
42_3B6P_BR_04.3	0.9	0	Pass
42_2B3P_BR_03.2	0.1	0	Pass
42_2B3P_BR_03	0.2	0	Pass
43_3B5P_BR_05.2	0	0	Pass
43_3B5P_BR_05.3	0	0	Pass

43_3B5P_BR_05	0	0	Pass
43_3B6P_BR_04	1.5	0	Pass
43_3B6P_BR_04.2	1.3	0	Pass
43_3B6P_BR_04.3	0.8	0	Pass
43_2B3P_BR_03.2	0	0	Pass
43_2B3P_BR_03	0.2	0	Pass
04_2B3P_BR_06.2	0.3	6	Pass
04_2B3P_BR_06	0.5	12	Pass
04_2B4P_BR_05.2	0	0	Pass
04_2B4P_BR_05	1.1	0	Pass
04_2B3P_BR_04	0.9	0	Pass
04_2B3P_BR_04.2	0	0	Pass
04_1B1P_BR_03	0.9	5	Pass
25_2B3P_BR_04.2	0	1	Pass
25_2B3P_BR_04	1.7	0	Pass
25_2B4P_BR_05	1	0	Pass
25_2B4P_BR_05.2	0	0	Pass
25_1B1P_BR_06	0	0	Pass
13_2B3P_BR_06.2	0.4	6	Pass
13_2B3P_BR_06	0.5	0	Pass
13_2B4P_BR_05.2	0	0	Pass
13_2B4P_BR_05	1.6	0	Pass
13_2B3P_BR_04	1.3	0	Pass
13_2B3P_BR_04.2	0	0	Pass
13_1B1P_BR_03	1.2	0	Pass
19_2B3P_BR_06.2	0.3	5	Pass
19_2B3P_BR_06	0	0	Pass
19_2B4P_BR_05.2	0	0	Pass
19_2B4P_BR_05	1.5	0	Pass
19_2B3P_BR_04	0.6	0	Pass
19_2B3P_BR_04.2	0	0	Pass
19_1B1P_BR_03	1.3	0	Pass
37_2B3P_LKD_04	1.4	N/A	Pass
37_2B4P_LKD_05	1.5	N/A	Pass
42_2B3P_LKD_03	0.7	N/A	Pass
42_3B5P_LKD_06.2	0	N/A	Pass
42_3B6P_LKD_04	1.5	N/A	Pass
43_2B3P_LKD_03	0.7	N/A	Pass
43_3B5P_LKD_06.2	0	N/A	Pass
43_3B6P_LKD_04	1.3	N/A	Pass
04_2B3P_LKD_06	0	N/A	Pass
04_1B1P_LKD_03	0	N/A	Pass
04_2B3P_LKD_04	2.5	N/A	Pass
04_2B4P_LKD_05	1.9	N/A	Pass
25_2B4P_LKD_05	1.6	N/A	Pass
25_2B3P_LKD_04	1.8	N/A	Pass
25_1B1P_LKD_06	0	N/A	Pass
13_2B3P_LKD_06	0	N/A	Pass

13_1B1P_LKD_03	0.4	N/A	Pass
13_2B4P_LKD_05	2.9	N/A	Pass
19_2B3P_LKD_06	0	N/A	Pass
19_1B1P_LKD_03	0.3	N/A	Pass
19_2B3P_LKD_04	2.9	N/A	Pass
19_2B4P_LKD_05	1.9	N/A	Pass
13_2B3P_LKD_04	3	N/A	Pass

Assumptions	Target performance
Glazing G-value (all glazing areas excluding purge vents)	0.45 SW elevations 0.57 NE elevations
Façade layout	As per floor plan
Weather data	Manchester_DSY1_2020High50.epw
MVHR boost rates – All apartments	79l/s boost rate
Peak Lopping	-11.5°C applied to: Floors 03-05 (Apts 03, 04, 05, 06) Floors 12-14 (Apts 04, 05) Floors 18-20 (Apts 04)
Purge Fan	Apt 5 (bottom right corner LKD) floors 03-14 at 35 l/s Apt 4 (top right corner LKD) floors 03-20 at 90l/s
Blinds	Not included in Part O analysis Applied to fixed windows in AVO analysis
Ventilations opening profiles Part O	8:00- 23:00

Ventilation opening profiles AVO:

Floor	North Façade	East Façade	South Façade	West Façade
Up to Level 5	2.5	2.5	2.5	2.5
Up to Level 10	5	2.5	2.5	5
Up to Level 15	8	5	5	8
Up to Level 20	13	6	6	13
Up to Level 25	16	10	10	16
Up to Level 30	16	13	13	16
Up to Level 35	16	16	16	16
Up to Level 40	16	16	16	16

Appendix A – CIBSE TM59 Rooms Gains and Profiles

Extract from TM59: 2017 Section 6

Supplementary information on profile development

7

Table 2 Occupancy and equipment gain descriptions

Unit/ room type	Occupancy	Equipment load
Studio	2 people at 70% gains from 11 pm to 8 am 2 people at 100% gains from 8 am to 11 pm	Peak load of 450 W from 6 pm to 8 pm*. 200 W from 8 pm to 10 pm 110 W from 9 am to 6 pm and 10 pm to 12 pm Base load of 85 W for the rest of the day
1-bedroom apartment: living room/kitchen	1 person from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 450 W from 6 pm to 8 pm 200 W from 8 pm to 10 pm 110 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 85 W for the rest of the day
1-bedroom apartment: living room	1 person at 75% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 150 W from 6 pm to 10 pm 60 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 35 W for the rest of the day
1-bedroom apartment: kitchen	1 person at 25% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 300 W from 6 pm to 8 pm Base load of 50 W for the rest of the day
2-bedroom apartment: living room/kitchen	2 people from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 450 W from 6 pm to 8 pm 200 W from 8 pm to 10 pm 110 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 85 W for the rest of the day
2-bedroom apartment: living room	2 people at 75% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 150 W from 6 pm to 10 pm 60 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 35 W for the rest of the day
2-bedroom apartment: kitchen	2 people at 25% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 300 W from 6 pm to 8 pm Base load of 50 W for the rest of the day
3-bedroom apartment: living room/kitchen	3 people from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 450 W from 6 pm to 8 pm 200W from 8 pm to 10 pm 110 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 85 W for the rest of the day
3-bedroom apartment: living room	3 people at 75% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 150 W from 6 pm to 10 pm 60 W from 9 am to 6 pm and from 10 pm to 12 pm Base load of 35 W for the rest of the day
3-bedroom apartment: kitchen	3 people at 25% gains from 9 am to 10 pm; room is unoccupied for the rest of the day	Peak load of 300 W from 6 pm to 8 pm base load of 50 W for the rest of the day
Double bedroom	2 people at 70% gains from 11 pm to 8 am 2 people at full gains from 8 am to 9 am and from 10 pm to 11 pm 1 person at full gains in the bedroom from 9 am to 10 pm	Peak load of 80 W from 8 am to 11 pm Base load of 10 W during the sleeping hours
Single bedroom (too small to accommodate double bed)	1 person at 70% gains from 11 pm to 8 am 1 person at full gains from 8 am to 11 pm	Peak load of 80 W from 8 am to 11 pm Base load of 10 W during sleeping hours
Communal corridors	Assumed to be zero	Pipework heat loss only; see section 3.1 above

* All times in GMT

Figure 1 Heat gain profile

Number of people	Description	Peak load (W)		Period																							
		Sensible	Latent	Hour-ending																							
				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
1	Single bedroom occupancy	75	55	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	1	0.7
2	Double bedroom occupancy	150	110	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	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	1	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	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0
1	1-bed: kitchen occupancy	75	55	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	0.25	0	0
2	2-bed: living/kitchen occupancy	150	110	0	0	0	0	0	0	0	0	1	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	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0
2	2-bed: kitchen occupancy	150	110	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	0.25	0	0
3	3-bed: living/kitchen occupancy	225	165	0	0	0	0	0	0	0	0	1	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	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0
3	3-bed: kitchen occupancy	225	165	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	0.25	0	0
		80		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	1	0.13
		80		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	1	0.13
		450		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	0.24	1	1	0.44	0.44	0.24	0.24
		450		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	0.24	1	1	0.44	0.44	0.24	0.24
		150		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	
		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	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	1	1	1	1	1	0	



Extract from TM59: 2017 Section 5.2

For the purposes of the assessment, lighting energy is assumed to be proportional to floor area, and lighting loads are measured in W/m². From 6 pm to 11 pm, 2 W/m² should be assumed as the default for an efficient new-build home. This assumes that good daylight levels are available (also noting that only May to September is assessed within CIBSE TM52). For existing buildings, or specialist lighting designs, a calculated higher value should be used. For communal corridors, use 2 W/m²; this may be assumed as zero if passive infrared (pir) sensors are present.