Client: Focus 360
Building address:
3 New Close,
London,
SW19 2SX
TM59 & Part O Overheating Analysis Report

Document Version:

Table 1 Document Version

Rev	Date	Description	Prepared	Proofed
R1	03/06/2024	V1	Dr Bilal Alsheglawi	D.Barsted

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1. Executive Summary

Thermal Overheating modelling has been undertaken on the proposed site 3 New Close, London SW19 2SX. This is to determine the impact of summer overheating in accordance with CIBSE guide TM59 & Building Regulations Part O, IES VE software has been used to undertake the assessment and has been designed in accordance with AM11, TM59, NCM guides & CIBSE Guide A. The model has been created in accordance with the below architectural drawings.

- 3-New-Close

2. Project Overview

The proposed project consists of three floors residential dwelling built in accordance with the standards set out in Building Regulations Approved Documents. The homes are predominantly naturally ventilated and incorporates good levels of insulation, air permeability and low carbon heating.

3. TM59 Overheating Criteria

Homes that are predominantly naturally ventilated, including homes that have mechanical ventilation with heat recovery (mvhr), with good opportunities for natural ventilation in the summer should assess overheating using the adaptive method based on CIBSE TM52 (2013), as described in section 3.1 below.

In order to allow the occupants to 'adapt', each habitable room needs operable windows with a minimum free area that satisfies the purge ventilation criteria set in Part F of the Building Regulations for England (NBS, 2010), and equivalent regulations in other countries, i.e. the window opening area should be at least 1/20th of the floor area of the room (different conditions exist for windows with restricted openings, and the same requirement applies for external doors). Control of overheating may require accessible, secure, quiet ventilation with a significant openable area.

Homes that are predominantly mechanically ventilated because they have either no opportunity or extremely limited opportunities for opening windows (e.g., due to noise levels or air quality) should be assessed for overheating using the fixed temperature method based on CIBSE Guide A (2015a), as described in section 3.2 below.

3.1 Criteria for homes predominantly naturally ventilated

Compliance is based on passing *both* of the following two criteria:

- *For living rooms, kitchens, and bedrooms*: the number of hours during which D*T* is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3 percent of occupied hours. (CIBSE TM52 Criterion 1: *Hours of exceedance*).
- *For bedrooms only*: to guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10 pm to 7 am shall not exceed 26 °C for more than 1% of annual hours. (*Note*: 1% of the annual hours between 22:00 and 07:00 for bedrooms is 32 hours, so 33 or more hours above 26 °C will be recorded as a fail). Criteria 2 and 3 of CIBSE TM52 may fail to be et, but both (*a*) and (*b*) above *must* be passed for all relevant rooms.

3.2 Criteria for homes predominantly mechanically ventilated

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)).

4. Overheating Model and Simulation Software

4.1 Simulation Software

The software used to model this simulation is IES VE (Virtual Environment), the following applications within IES VE have been utilised throughout the simulation process.

- IES Model IT
- IES Apache
- IES Macroflo
- IES VE Compliance (UK & Ireland)

4.2 Weather Files

During the analysis a number of different weather files have been used to review the overheating for both current and future climates as set out below:

- London GTW DSY 1,2 & 3 2020 High 50
- DSY files 2 & 3 are not viewed as mandatory requirements and therefore have not been included within the reports, DSY2&3 files will be used to review the designs and the readiness for climate change.

4.3 Model Images

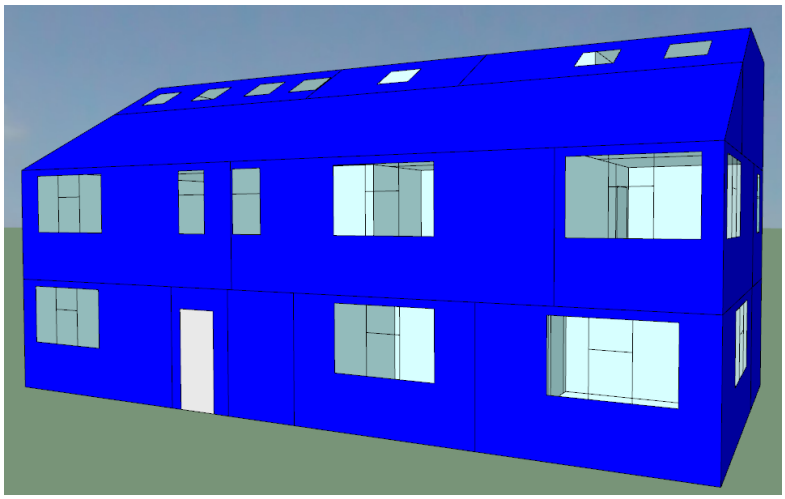


Figure 1 Model view 1

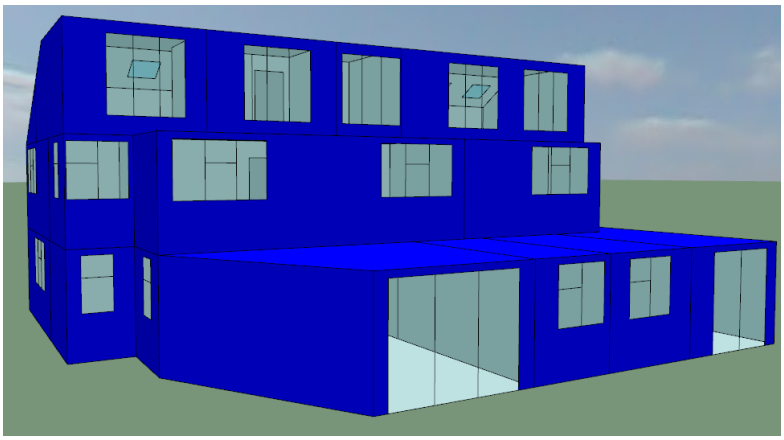


Figure 2 Model view 2

5. Construction Fabric Specifications

The below table outlines the fabric U-Values used within the model, these elements are to be confirmed on site and if any alterations are made throughout the design process the simulations should be reran to ensure that the outcomes have not altered.

5.1 Fabric Overview

Table 2 Fabric details

Element	U-Value (W/m2K)
External walls	0.15
Internal Partitions	1.8
Roof	0.14
Ground Floor	0.15

5.2 Glazing Specification

Table 3 Glazing details

U-Value (W/m2K)	G-Value	Glazed Percentage	Frame Material
1.4	0.47	N/A	Metal
1.3 Rooflight	0.63	N/A	Metal

5.3 Air Permeability

The Air permeability rate for the proposed site has target of 5.

6. HVAC Specification

The proposed building is to be heated using Electric powered air source heat pump operating on a low temperature system, controlled via zones. The zones will be ventilated via natural ventilation.

6.1 Heating Specifications

Table 4 Building heating details

Space Type	Heating Setpoint (°C) (Real)	Cooling Setpoint (°C) (Real)
Living Areas	21	N/A
Kitchen Dining Areas	21	N/A
Bedrooms	21	N/A
Circulation Areas (Corridors)	19	N/A
Bathrooms & En-Suites	19	N/A
Study	19	N/A
Store	19	N/A

6.2 Mechanical Ventilation

The proposed development does not incorporate a 'whole dwelling' ventilation system, wet rooms will contain exhaust fans with a SFP of 0.25 W(l/s).

7. Natural Ventilation

The Natural ventilation strategy has been outlined by the architectural drawings; the strategy will rely upon a large number of openable glazing across all aspects of the dwelling to allow for cross ventilation. The dwellings are multi-level and therefore the ability to open lower ground and upper ground windows to replicate stack effect is possible.

7.1 Falling protection

Openings which are intended to be open for long periods to reduce overheating risk might pose a higher risk of falls from height. 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. Openings that can be opened wider than 100mm may form part of the overheating mitigation strategy where they meet all of the following conditions.

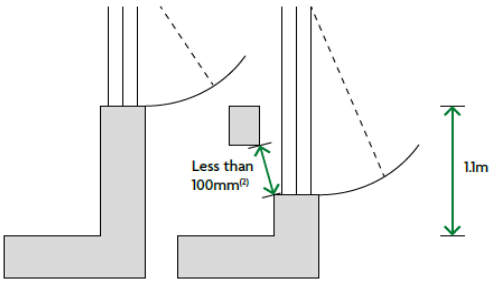
a. Window handles on windows that open outwards are not more than 650mm from the inside face of the wall when the window is at its maximum openable angle.

b. Guarding meets the minimum standards in following table.

c. Guarding does not allow children to easily climb it. For example, horizontal bars should generally be avoided.

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.

7.2 Windows Openings Profiles and Types

Table 5 TM59 Windows opining and types profiles

Opening Type	Profile	Opening Specifications	
External window opening - Side Hung - Night Open	TM59/Part O Night Open	**Day-** Opening threshold if internal temperatures exceed 22oC window will start opening, Windows Fully open at 26oC. **Night-** Opening Threshold if internal temperatures exceed 23 oC	Areas assigned; security measures would be required to open ground floor windows at night
External window opening - Side Hung - Night Closed	TM59/Part O Night Closed	Day- Opening threshold if internal temperatures exceed 22°C window will start opening, Windows Fully open at 26°C. Night- Closed	All Bedroom/Living Area Sliding Doors
External window opening - Fixed	Closed Permanently	Closed	Front Door and Fixed panels adjacent to front door.
External Bifold opening - Side Hung Short - Night Closed	TM59/Part O Night Closed	**Day-** Opening threshold if internal temperatures exceed 22°C window will start opening, Windows Fully open at 26°C. **Night-** Closed	Ground floor Kitchen

All windows have been designed according to individual locations, sizes, orientations, and designs; it is also recommended that the openings have opening functions linked to internal C02 levels.

The dwelling does not allow for any open windows at night for ground floor areas or for any areas with easy accessibility, this is to ensure that a security issue is not present.

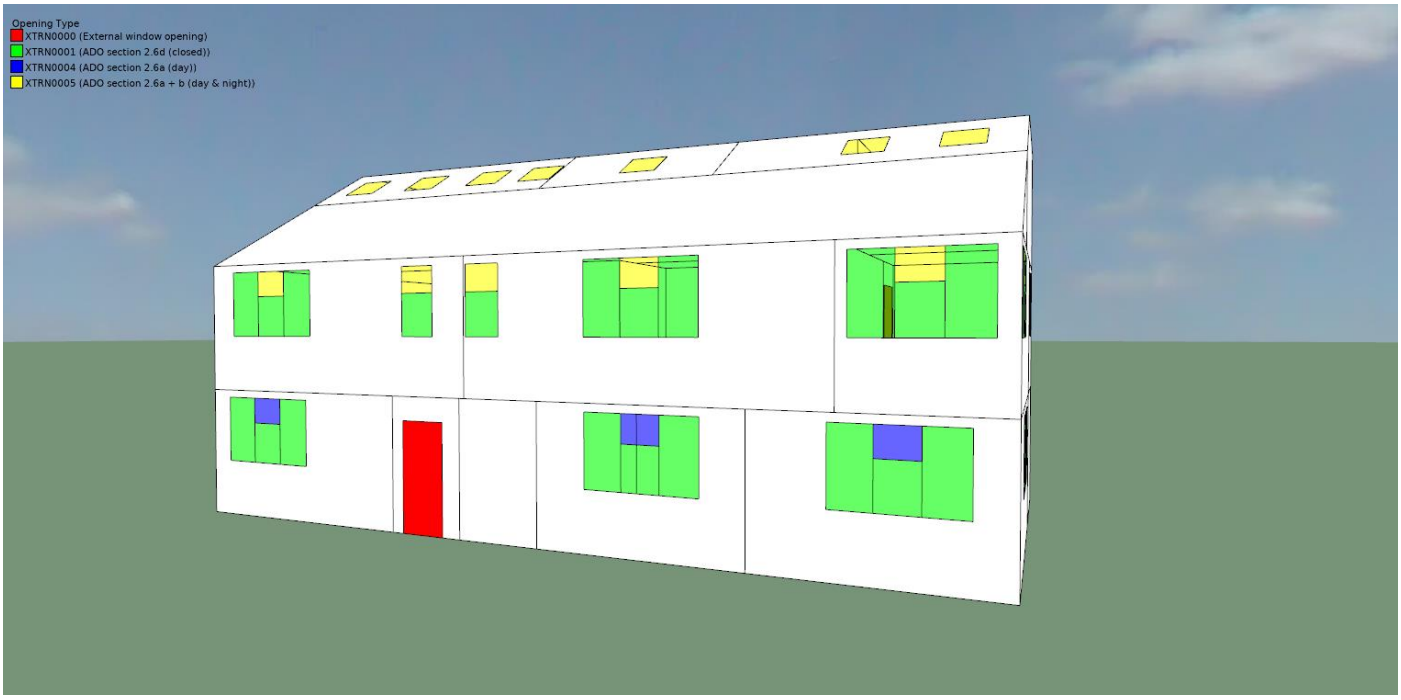


Figure 3 Opening types

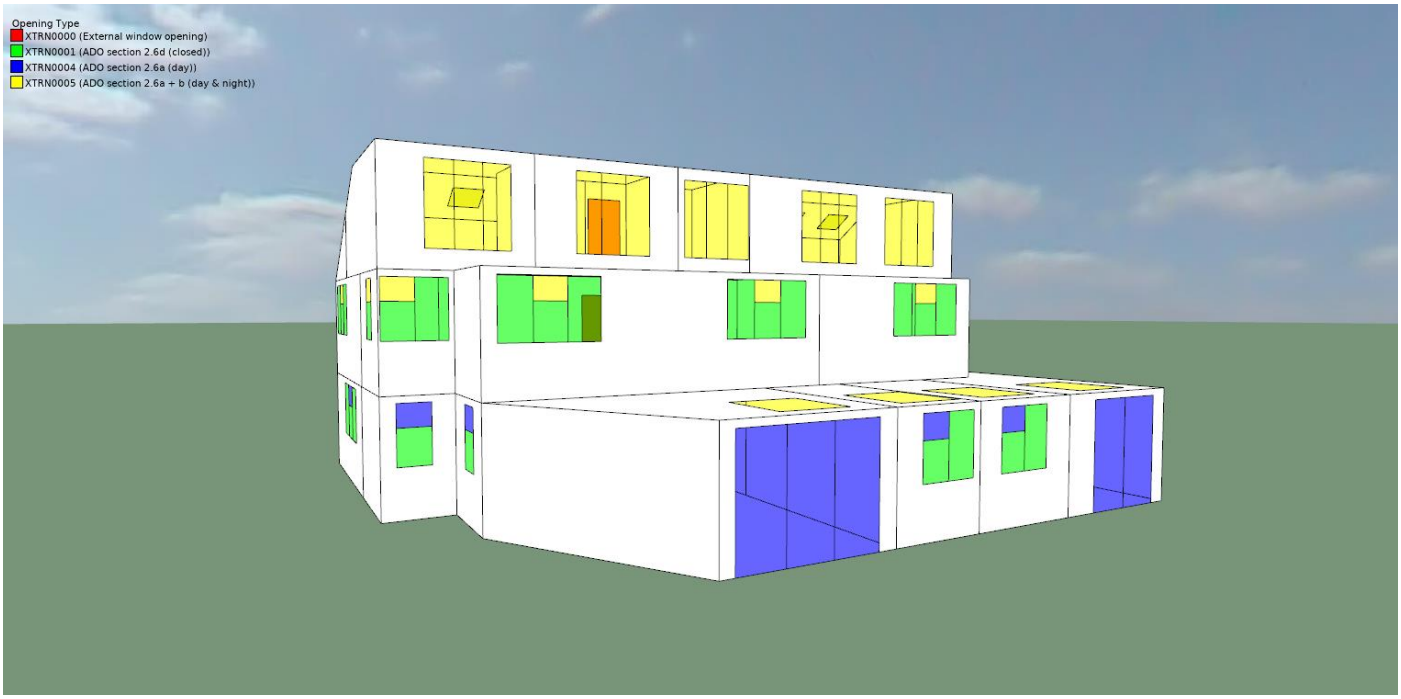


Figure 4 Opening types

8. Internal Gains, Profiles and Air Exchanges

The Internal gains for the model have been taken from the TM59 profiles as set out in the below table, these figures have been taken from the recommended profiles for habitable areas. The below profiles have been applied to the building zones as per the below Figure:

Figure 1 Heat gain profile

Number of people	Description	Peak load (W) Sensible	Latent	Period 00–01	01–02	02–03	03–04	04–05	05–06	06–07	07–08	08–09	09–10	10–11	11–12	12–13	13–14	14–15	15–16	16–17	17–18	18–19	19–20	20–21	21–22	22–23	23–24
				Hour ending 1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00
1	Single bedroom occupancy	75	55	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7
2	Double bedroom cccupancy	150	110	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.7
2	Studio occupancy	150	110	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7
1	1-bedroom living/kitchen occupancy	75	55	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
1	1-bedroom living occupancy	75	55	0	0	0	0	0	0	0	0	0	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0
1	1-bedroom kitchen occupancy	75	55	0	0	0	0	0	0	0	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0	0
2	2-bedroom living/kitchen occupancy	150	110	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
2	2-bedroom living occupancy	150	110	0	0	0	0	0	0	0	0	0	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0
2	2-bedroom kitchen occupancy	150	110	0	0	0	0	0	0	0	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0	0
3	3-bedroom living/kitchen occupancy	225	165	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
3	3-bedroom living occupancy	225	165	0	0	0	0	0	0	0	0	0	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0	0
3	3-bedroom kitchen occupancy	225	165	0	0	0	0	0	0	0	0	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0	0
	Single bedroom equipment	80		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.13
	Double bedroom equipment	80		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.13
	Studio equipment	450		0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1	1	0.44	0.44	0.24	0.24
	Living/litchen equipment	450		0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1	1	0.44	0.44	0.24	0.24
	Living equipment	150		0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1	1	1	1	0.4	0.4
	Kitchen equipment	300		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	1	1	0.17	0.17	0.17	0.17
	Lighting profile	2 (W/m2)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0

Figure 3 TM59 Heat Gain Profiles

9. Calculation Results

9.1 DSY1 2020 High 50

Table 6 Overheating summary

Natural ventilated rooms	Natural ventilated criterion (a) results	Natural ventilated criterion (b) results	Pass/Fail
GF-Flat A-Bedroom 2	Pass	Pass	Pass
GF-Flat B-KLD	Pass	N/A	Pass
GF-Flat B-Bed	Pass	Pass	Pass
GF-Flat B-Master Bed	Pass	Pass	Pass
GF-Flat B-Bed	Pass	Pass	Pass
GF-Flat A-Bedroom	Pass	Pass	Pass
GF-Flat A-KDL	Pass	N/A	Pass
GF-Flat A-Master Bed	Pass	Pass	Pass
FF-Flat D-KDL	Pass	N/A	Pass
FF-Flat C-Bed	Pass	Pass	Pass
FF-Flat D-Bed	Pass	Pass	Pass
FF-Flat C-KLD	Pass	N/A	Pass
SF-Flat E-Master Bed	Pass	Pass	Pass
SF-Flat E-Bed	Pass	Pass	Pass
SF-Flat E-KLD	Pass	N/A	Pass
FF-Flat D-Master Bed	Pass	Pass	Pass

Table 7 Natural ventilated rooms criterion (a)

Room Name	Occupied Hours	No. hours ΔT ≥ 1ºK	% Occupied hours ΔT ≥ 1ºK	Pass/Fail
GF-Flat A-Bedroom 2	3672	63	1.7	Pass
GF-Flat B-KLD	1989	26	1.3	Pass
GF-Flat B-Bed	3672	30	0.8	Pass
GF-Flat B-Master Bed	3672	31	0.8	Pass
GF-Flat B-Bed	3672	18	0.5	Pass
GF-Flat A-Bedroom	3672	64	1.7	Pass
GF-Flat A-KDL	1989	22	1.1	Pass
GF-Flat A-Master Bed	3672	15	0.4	Pass
FF-Flat D-KDL	1989	17	0.9	Pass
FF-Flat C-Bed	3672	12	0.3	Pass
FF-Flat D-Bed	3672	46	1.3	Pass
FF-Flat C-KLD	1989	10	0.5	Pass
SF-Flat E-Master Bed	3672	22	0.6	Pass
SF-Flat E-Bed	3672	24	0.7	Pass
SF-Flat E-KLD	1989	28	1.4	Pass
FF-Flat D-Master Bed	3672	24	0.7	Pass

Table 8 Natural ventilated rooms criterion (b)

Room Name	No. hours > 26ºC 22:00-24:00	No. hours > 26ºC 00:00-07:00	Total hours > 26ºC	Pass/Fail
GF-Flat A-Bedroom 2	5	0	5	Pass
GF-Flat B-KLD	N/A	N/A	N/A	N/A
GF-Flat B-Bed	11	11	22	Pass
GF-Flat B-Master Bed	10	18	28	Pass
GF-Flat A-Bedroom	6	0	6	Pass
GF-Flat A-KDL	N/A	N/A	N/A	N/A
GF-Flat A-Master Bed	10	8	18	Pass
FF-Flat D-KDL	N/A	N/A	N/A	N/A
FF-Flat C-Bed	9	3	12	Pass
FF-Flat D-Bed	13	8	21	Pass
FF-Flat C-KLD	N/A	N/A	N/A	N/A
SF-Flat E-Master Bed	6	0	6	Pass
SF-Flat E-Bed	6	0	6	Pass
SF-Flat E-KLD	N/A	N/A	N/A	N/A
FF-Flat D-Master Bed	11	8	19	Pass
GF-Flat A-Bedroom 2	5	0	5	Pass

10. Summary

Overheating analysis has been undertaken on the proposed development at 3 New Close, London SW19 2SX. the development meets the criteria set out in TM59 for naturally ventilated buildings for DSY1.

Table 9 Summary

1 Modelling Details		
Dynamic software name and version	IES Virtual Environment Version 2022.1.2.0	
Weather file location used, including any additional, more extreme weather files	London GTW DSY1,2 &3 2020 High 50	
Number of sample units modelled, including an explanation of why the size/selection has been chosen	N/A	
2 Modelled occupancies		
Has the project passed the assessment described in CIBSE's TM59, taking into account the limits detailed in paragraphs 2.5 and 2.6? (1)	Yes	No
Details of the occupancy profiles used	TM59 (detailed in report)	
Details of the equipment profiles used	TM59 (detailed in report)	
Details of the opening profiles used	Bespok in line with TM59/Part O (detailed in report)	
3 Modelled overheating mitigation strategy		
Free areas	Calculated in model	
Infiltration and mechanical flow rates	0.25	
Window g-value	N/A	
Shading strategy	Local Shading	
Mechanical cooling	N/A	
4 Modelling results		
Has the project passed the assessment described in CIBSE's TM59, taking into account the limits detailed in paragraphs 2.5 and 2.6?	Yes	No
What is the overall overheating strategy (i.e. what design features are key to the project passing)?	Natural Ventilation / openable areas	
5 Designer's declaration		
Has the building construction proposal been modelled accurately?	Yes	No
Consultant's name	Dr Bilal Alsheglawi	
Consultant's organisation	Vision Energy	
Consultant's signature		
Date	03/06/2024	