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**Dynamic
Overheating Report**

Peabody Trust, Catalyst by Design
and Hill Residential Limited

**St Ann's New
Neighbourhood
Phase 1b and 2**

Final

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Executive Summary

The purpose of this report is to demonstrate that the proposed development at St Ann's New Neighbourhood (Phase 1b and 2) has been designed to mitigate the risk of summertime overheating in accordance with Condition 80 of the hybrid consent and Part O (2021) of the Building Regulations.

The performance of dwellings and communal corridors has been assessed against the Chartered Institution of Building Services Engineers (CIBSE) guidance TM59 *Design methodology for the assessment of overheating risk in homes* (2017) and Approved Document O *Overheating* (2021), as required by Condition 80.

A sample of dwellings and communal corridors has been selected for the dynamic overheating assessment based on design characteristics that establish them as representative of the overall proposed scheme. This selection of dwellings includes consideration of unit types at varying floor levels and of different orientations in line with the modelling requirements set out in Condition 80.

For the purpose of this report, passive mitigation measures have been explored as far as practicable to avoid the need for active cooling, except for those dwellings with limitations on window opening due to external noise constraints.

All dwellings tested demonstrate compliance with the CIBSE TM59 and AD(O) overheating assessment criteria with the London Weather Centre weather file, under the mandatory DSY1 for the 2020s, high emissions, 50% percentile scenario. Compliance is achieved using passive measures alone and assuming no window usability issues.

The south facing apartments in Blocks G1, G2, J1 and J2 will be impacted by external noise within bedrooms during the night with windows open. In order to ensure these bedrooms can still achieve acceptable levels of thermal comfort with windows closed, an active cooling system is proposed.

Overheating will be mitigated within communal corridors by reducing heat losses from distribution pipework and providing a background mechanical ventilation system. All corridors tested demonstrate compliance with the CIBSE TM59 and AD(O) overheating assessment criteria under the mandatory weather file (DSY1 for the 2020s, high emissions, 50% percentile scenario).

The results are based on key design features and passive mitigation measures following the London Plan cooling hierarchy, as outlined within Table i. A mark-up of the proposed strategy across the scheme is provided within the appendices.

Table i: Design features incorporated in accordance with the London Plan cooling hierarchy

Cooling hierarchy	Design feature	Discussion
1. Reduce amount of heat entering the building	Efficient building fabric and air tightness standards	<i>In line with energy strategy</i>
	Solar control glazing with G-value ranging from 0.50-0.42 (frame factor 0.80)	<i>A low G-value reduces solar gain, but has implications on CO₂ emissions, fabric energy efficiency and internal daylight levels and has therefore been optimised to balance all aspects as far as possible</i>
	External shading provided by balcony overhangs	<i>In line with design proposals</i>
2. Minimise internal heat generation	Energy efficient design of building services	<i>In line with energy strategy</i>
3. Manage the heat	Concrete floor slab between dwellings in apartment blocks	<i>The thermal mass of this will help reduce the risk of overheating by absorbing heat during the daytime</i>
4. Passive ventilation	Openable windows used as the primary means of ventilation for mitigating overheating Window opening schedules adapted where required based on noise risk assessment by Cass Allen.	<i>Windows are simulated to start to open when the internal temperature exceeds 22°C and the external temperature is lower than the internal temperature, and be fully open when internal temperatures reach 26°C</i> <i>If bedroom temperatures exceed 23°C at 23:00, windows are simulated open through the night. Otherwise, bedroom windows are simulated to be closed during sleeping hours</i>

Cooling hierarchy	Design feature	Discussion
5. Mechanical ventilation	MVHR system providing ventilation rates ranging from 29 to 110l/s depending on dwelling size and overheating risk Background ventilation system providing 0.50 ach within communal corridors	<i>A background mechanical ventilation system capable of achieving or exceeding minimum Part F requirements</i>
6. Active cooling	Cooling bolt-on to MVHR ('air tempering' / 'peak lopping') or active cooling system to be provided only for those apartments with limitations on window opening due to external noise constraints	<i>Passive measures utilised as far as reasonably practicable prior to incorporating cooling</i>

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1. INTRODUCTION

- 1.1** This document has been prepared by Hodkinson Consultancy, a specialist energy and environmental consultancy for planning and development. It presents the overheating mitigation strategy for the Reserved Matters Application 1 (Phases 1b and 2) at St Ann's New Neighbourhood by Peabody Trust, Catalyst Design and Hill Residential Limited.

Site Location

- 1.2** The development site is located in the London Borough of Haringey, as shown in Figure 1 below.

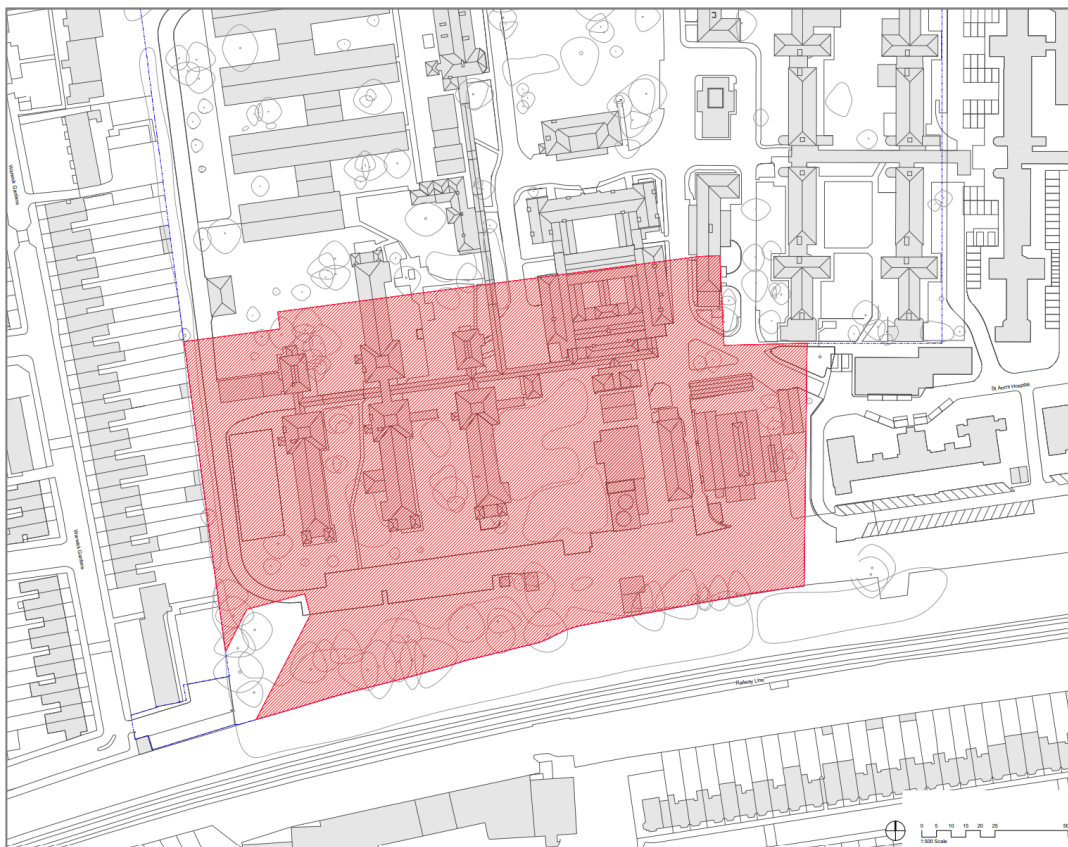


Figure 1: Site Location - KCA (July 2023)

Development Description

- 1.3** RMA 1 seeks detailed approval of the appearance, landscaping, layout and scale of Phases 1b and 2 of the outline component of the hybrid application at St Ann's Hospital, which covers Plots E-J on the illustrative masterplan.

1.4 The proposed development is described as follows:

Application for the approval of reserved matters respect of appearance, landscaping, layout and scale relating to Phases 1b and 2 associated with the outline component of planning permission HGY/2022/1833 for "Outline planning permission (with all matters reserved except for access) for Phases 1B, 2 and 3, for: (a) the erection of new buildings for residential development (Use Class C3) and a flexible range of non-residential uses within Use Class E, F1/F2; (b) provision of associated pedestrian and cycle accesses; (c) landscaping including enhancements to the St Ann's Hospital Wood and Tottenham Railsides Site of Importance for Nature Conservation (SINC); and, (d) car and cycle parking spaces and servicing spaces."

1.5 Figure 2 below indicates the proposed site plan.



Figure 2: Proposed Site Layout – KCA (June 2023)

Overheating and Thermal Comfort

- 1.6** Maintaining comfortable thermal comfort conditions in the face of climate change and increasing temperatures is one of the greatest challenges to be addressed by designers. The main objective is to achieve thermal comfort and minimise summertime overheating without the use of conventional air conditioning systems, which typically have associated greenhouse gas emissions and impact on the urban heat island effect.
- 1.7** Dynamic thermal simulations have been carried out for representative dwellings, to determine whether there is a risk of overheating. Appropriate mitigation measures have been recommended to mitigate the overheating risk and ensure that comfortable thermal conditions are achieved.

2. PLANNING CONDITION

- 2.1** The following planning condition, as stated within the Decision Notice (HGY/2022/1833, July 2023), has informed the overheating mitigation strategy of Phases 1b and 2.

Condition 80: Overheating Strategy (Outline)

(a) Prior to commencement of above ground works to the relevant phase a detailed Overheating Assessment shall be submitted for the written approval of the Local Planning Authority and shall be informed by Dynamic Thermal Modelling based on CIBSE TM59 for the residential spaces and TM52 for the non-residential spaces and TM49 weather files for London's future weather/temperature projections. The assessment shall be undertaken in line with the following:

- > The London Weather Centre dataset for all three DSYS;*
- > Future weather patterns to projected impacts over the time periods DSY1 for 2050s and 2080s, all time periods should be modelled;*
- > Mitigation for the 2020s period must be integrated into the design through passive design measures. The risks and the mitigation strategy for the periods of the 2050s and 2080s should be set out in a retrofit plan, confirming that measures can be fitted in the future and who will own the overheating risk;*
- > Specification and location of mitigation measures (especially where they are mitigating risk of crime, air or noise pollution);*
- > Confirmation of the modelled pipework heat losses;*
- > Include any replacement / repair cycles and the annual running costs for the occupiers;*

- > *Floor plans highlighting the modelled dwellings across the development and showing all rooms (with unique reference number). The applicant is expected to model the following most likely to overheat dwellings:*
 - > *At least 15% of all rooms across the development site;*
 - > *All single-aspect dwellings facing west, east, and south;*
 - > *At least 50% of rooms on the top floor;*
 - > *75% of all modelled rooms will face South or South/west;*
 - > *Strategy that mitigates any risk of crime / noise and / or air pollution in line with the AVO Residential Design Guide, with windows closed at all times (unless they do not need to be opened and confirmed in the Noise and the Air Quality Assessments).*

(b) Any overheating mitigation measures set out in an approved Overheating Assessment shall be implemented before any of the dwellings in the Block to which they relate are first occupied and retained thereafter for the lifetime of the development.

Reason: In the interest of reducing the impacts of climate change, to enable the Local Planning Authority to assess overheating risk and to ensure that any necessary mitigation measures are implemented prior to construction, and maintained, in accordance with London Plan (2021) Policy SI4 and Local Plan (2017) Policies SP4 and DM21.

3. OVERHEATING CRITERIA

- 3.1** The following building regulations and guidance provide a standardised approach to predicting overheating risk in residential dwellings within the UK. They set out the criteria by which the risk of overheating can be assessed or identified.

Approved Document O (2021)

- 3.2** The proposed development will be subject to Part O of the Building Regulations, for which requirements are set out within Approved Document O (AD(O)) for Overheating (2021). Compliance is based on meeting the following requirements:
- > Reasonable provision to limit unwanted solar gains in summer and to provide adequate means to remove excess heat;
 - > Taking account of safety, noise, pollution, protection of falling and entrapment when developing the strategy. Mechanical cooling should only be considered when feasible passive means are insufficient.
- 3.3** There are two methods for demonstrating compliance under AD(O):
- > **Simplified:** The simplified method requires dwellings to accommodate design limitations on maximum glazed areas, minimum openable areas for natural ventilation and external shading.
 - > **Dynamic:** The dynamic method requires dwellings to demonstrate compliance with CIBSE TM59 criteria (with a few specific limitations on use of the TM59 methodology) via dynamic thermal modelling.

CIBSE TM59 (2017) Assessment Criteria

- 3.4** The criteria for the assessment of overheating risk have been specified by the Chartered Institute of Building Services Engineers (CIBSE) in TM59 *Design methodology for the assessment of overheating risk in homes* (2017). CIBSE TM59 provides a standardised approach to predicting overheating risk for both naturally and mechanically ventilated residential buildings.
- 3.5** The following criteria must be met in order to demonstrate compliance:
- > **Criterion A:** The indoor operative temperature should not exceed the threshold comfort temperature by 1°C or more for more than 3% of occupied hours in living rooms, kitchens and bedrooms.
 - > **Criterion B:** To guarantee comfort during the sleeping hours the operative temperature in the bedroom from 10 pm to 7 am should not exceed 26°C for more than 1% of annual hours.

- 3.6** Whilst there is no mandatory target to meet for communal corridors, TM59 suggests a threshold temperature of 28°C to be exceeded for no more than 3% of the total annual hours.

4. MODELLING APPROACH

- 4.1** Dynamic thermal modelling has been undertaken using DesignBuilder Software (v.7). The performance of the units has been assessed following CIBSE TM59 and the adaptive thermal comfort method for a primarily natural ventilated scenario. Additional modelling limitations set by AD(O) have also been applied.
- 4.2** Thermal comfort category II has been used (normal expectation for new buildings and renovations).

Unit Selection

- 4.3** Representative dwelling units with different layouts, sizes, orientation and external shading have been assessed. The selection of the units for overheating risk assessment was based on the following design characteristics:
- > 15% of dwellings (70 out of 464);
 - > One of every single aspect unit type on the west, east and south elevations;
 - > 25 units located on the top floor, representing a significant proportion of the worst-case units;
 - > 25 units facing south or south west, representing a significant proportion of the worst-case units;
 - > Four communal corridors, each from a different block.
- 4.4** The location and the internal layouts of the homes and communal corridors selected for assessment are presented in Appendix A. Design modelling inputs for the assessed dwellings can be found in Appendix B.

Site External Weather Conditions

- 4.5** External temperatures and incident solar gains are greatest during summer months, coinciding with periods of lower wind speeds. Solar altitude is also highest during summer months, increasing the effects of façade shading from balcony overhangs and window reveals. Such considerations should be accounted for when designing for overheating risk.
- 4.6** The effects of external conditions are vital in an overheating assessment as they influence:

- > Solar heat gains (a function of incident direct and diffuse solar radiation and solar altitude); and
- > Calculated natural ventilation rates (a function of external temperature, wind directions and speeds).

4.7 CIBSE design summer year (DSY) weather data for London Weather Centre (representative of urban areas within the GLA central activity zone (CAZ)) has been used for the 2020s, high emissions, 50% percentile scenario as required by Condition 80. The scheme is not located within the GLA CAZ, however this weather file is specified by the London Borough of Haringey (the London Heathrow weather file is usually used as representative of development in urban and suburban areas outside the CAZ).

4.8 The assessment of overheating risk has been undertaken using the DSY1 weather file, in accordance with the requirements of TM59, AD(O) and the London Plan. The final mitigation strategy has also been tested under the more extreme DSY2 and DSY3 weather files for the 2020s scenario, and DSY1 for the 2050s and 2080s scenarios, as required by Condition 80. The results are presented in Appendix C.

Model Geometry and Local Shading

4.9 Overshadowing from the building blocks has been taken into account during the simulation, based on the model geometry and the site orientation.

4.10 Solar control forms an integral part of overheating mitigation strategies. External shading in the form of balconies is applied across many of the façades as part of the design proposals. These were incorporated in the simulation model as shown in Figures 3 and 4.

4.11 Horizontal shading devices such as balconies and overhangs are more efficient when applied in south oriented façades and during midday when the solar angle is high. Their role in reducing solar gains in the summer period is considered to be paramount.

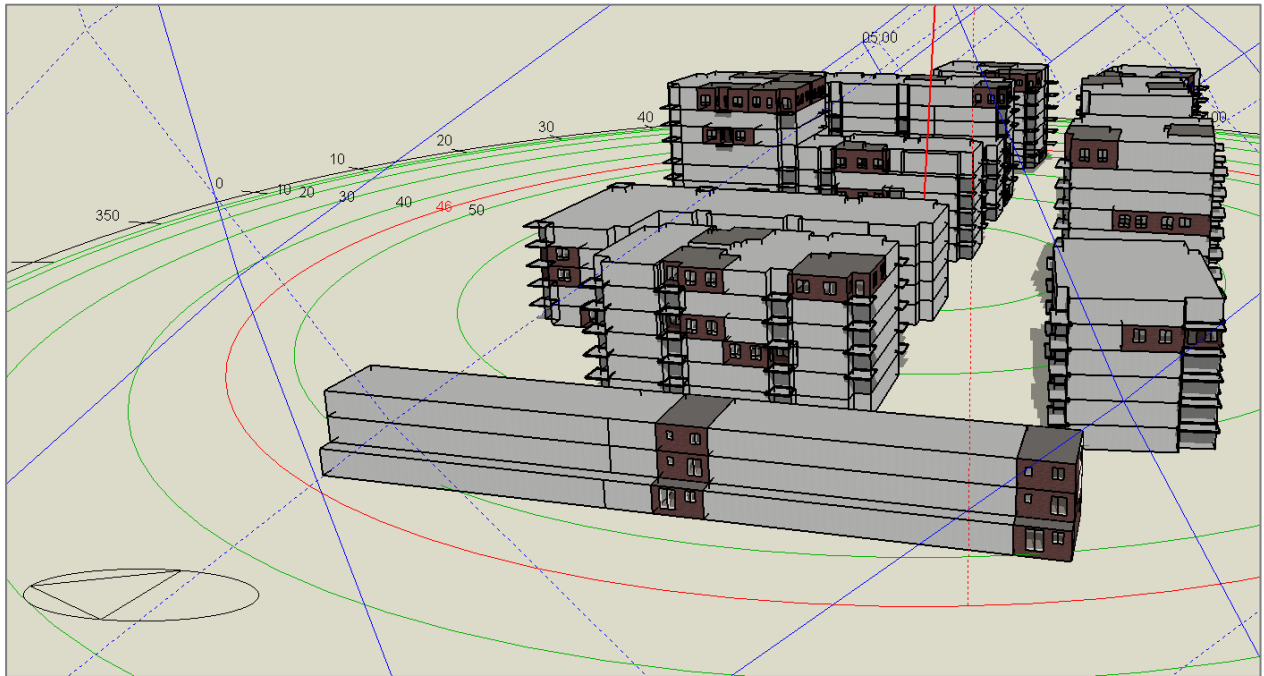


Figure 3: Simulation model from DesignBuilder, view from the west showing shadows for 15:00 on 21 June

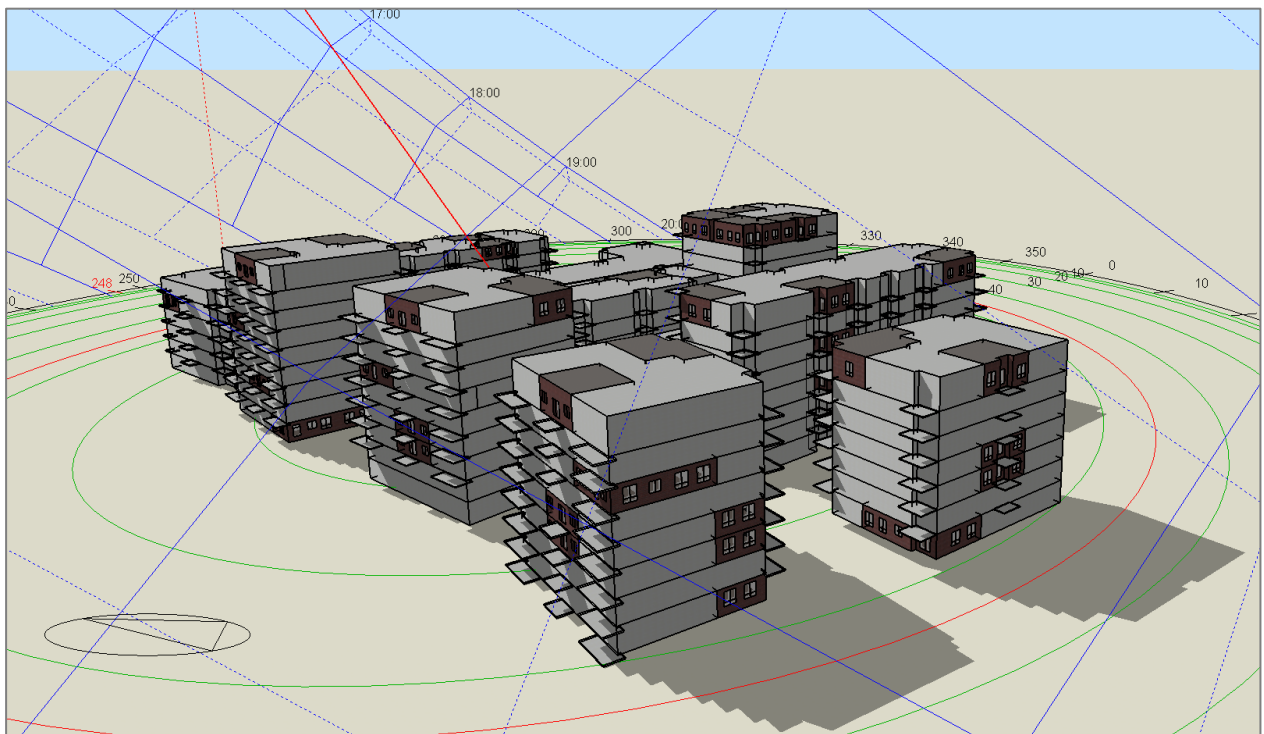


Figure 4: Simulation model from DesignBuilder, view from the south east showing shadows for 15:00 on 21 June

5. EXTERNAL NOISE AND AIR QUALITY CONSTRAINTS

Noise

- 5.1** An acoustic report has been provided by Cass Allen (report ref TN01-21150-R0, May 2023) to review the predicted internal noise levels within bedrooms during the night. A copy of this acoustic technical note is provided in Appendix D.
- 5.2** The findings of the Part O acoustic review is that bedroom windows on east, south and west elevations of Blocks G1, G2, J2 and J2 (highlighted orange and yellow in the note) must have restricted opening during night time hours (23:00-07:00) in order to ensure internal noise levels remain within Part O limits.

Air Quality

- 5.3** A site wide air quality assessment was undertaken as part of the hybrid planning application (RSK, report ref 444237-01 (01), May 2022). The report concludes that future residents are not predicted to be exposed to air quality concentrations exceeding the UK air quality standards and no air quality mitigation measures are specified for the development in operation. It is assumed, therefore, that there are no limits to window opening due to air quality constraints.

Window Opening Schedule

- 5.4** Table 1 outlines the window opening schedule, based on the assessed risk from external noise impacts.

Table 1: Proposed window opening strategy for dwellings based on Cass Allen noise risk assessment in Appendix D

Façade	Room	Occupancy schedule (TM59)	Window opening area	Window opening schedule
All façades falling into noise ref	Kitchen / Living areas	09:00-22:00	Fully inwards openable to 90°	09:00-22:00 for ground floor 24/7 for all others

Façade	Room	Occupancy schedule (TM59)	Window opening area	Window opening schedule
category ADO01 (green)	Bedrooms	24/7 (allowing for use as home office or daytime resting in addition to night-time use)	Fully inwards openable to 90°	24/7 Ground floor windows have security grilles
All façades falling into noise ref category AD02 (yellow)	Kitchen / Living areas	09:00-22:00	Fully inwards openable to 90°	09:00-22:00 for ground floor 24/7 for all others
	Bedrooms	24/7 (allowing for use as home office or daytime resting in addition to night-time use)	Fully inwards openable to 90° Restricted to 100mm at night	24/7
All façades falling into noise ref category AD03 (orange)	Kitchen / Living areas	09:00-22:00	Fully inwards openable to 90°	09:00-22:00 for ground floor 24/7 for all others
	Bedrooms	24/7 (allowing for use as home office or daytime resting in addition to night-time use)	Fully inwards openable to 90° Required to be restricted to less than 100mm at night	07:00 – 23:00 (closed during sleeping hours)

- 5.5** In accordance with TM59 and additional limits set by AD(O), windows are simulated to gradually open when the internal temperature exceeds 22°C and the external temperature is lower than the internal temperature, to be fully open when internal temperatures reach 26°C.
- 5.6** For those apartments without external noise constraints, bedroom windows will be simulated to remain open through the night if the internal temperature exceeds 23°C at 23:00. If the bedroom temperature is below 23°C at 23:00, windows will be simulated to remain closed until 07:00.

- 5.7** Where there are no security constraints, living room windows are simulated to be kept open during the night (following AD(O) window opening rules) in order to provide additional natural ventilation during summertime.

6. OVERHEATING MITIGATION STRATEGY

Dwellings

Strategy Development

- 6.1** In accordance with AD(O) requirements and the London Plan cooling hierarchy, the initial stage of overheating assessment aims to ensure that all dwellings will achieve compliance with the overheating criteria using passive means only (no mechanical cooling) and assuming no usability issues. In this scenario, the windows are simulated to be open following TM59 and AD(O) modelling rules during all occupied hours (schedule as per 'ADO01' category in Table 1).
- 6.2** As part of the strategy development, changes were made to the elevations and window design to reduce solar gain on the most at risk facades. This included the following:
- > Living room bifold doors to Block E houses replaced with double doors and a single window to reduce the fixed glazing and solar heat gain;
 - > Removed fixed panes of glazing below the transom on the south elevations of Blocks G and J, making the overall amount of glazing smaller and ensuring no fixed panes on these elevations, to reduce solar gain;
 - > Reduced G-value to east, south and west elevations to reduce solar gain;
 - > Increased the number of openable window panes on the more exposed west elevations to increase natural ventilation; and
 - > Ensured all window panes are fully openable, inward opening so they can be open to 90° to increase natural ventilation.
- 6.3** Once solar gains had been limited as far as practicable, and all tested dwellings passing the TM59 and AD(O) criteria using passive measures alone, the window restrictions outlined in Table 1 (categories 'ADO02' and 'ADO03') were applied to evaluate the impact. Following this, mechanical measures are specified to reduce the residual overheating risk to an acceptable level.

Proposed Passive Measures

- 6.4** The following passive design measures have been incorporated in order to reduce the risk of overheating to an acceptable level as defined by CIBSE TM59:
- > Highly efficient fabric envelope to keep the heat out and high efficiency building services heating system, lighting and appliances are proposed in all dwellings to reduce internal gains;
 - > High performance solar control glazing with the following g-values. These have been balanced to mitigate overheating risk whilst achieving fabric energy efficiency targets and natural daylight provision:
 - > East, south and west facades of apartment blocks: 0.42
 - > North facades of apartment blocks: 0.50
 - > Houses: 0.50
 - > External shading is provided to some windows in form of balconies;
 - > Fully openable windows, inward opening to allow maximum free area for natural ventilation; and
 - > A concrete floor slab within the apartment blocks provides some thermal capacity to absorb excessive heat within the building.
- 6.5** Background mechanical ventilation will be provided through MVHR to all dwellings. This will have the ability to provide ventilation rates exceeding minimum Part F requirements for the dwellings at most risk of overheating.
- 6.6** A mark-up of the overheating mitigation strategy across the scheme is provided in Appendix E.

Results of Passive Strategy

- 6.7** The following results presented in Table 2 indicate that, based on the design modelling inputs in Appendix B, window opening schedules assuming no usability issues and passive overheating mitigation measures outlined above, all assessed rooms meet the CIBSE TM59 criteria and therefore demonstrate an acceptable level of overheating risk in accordance with AD(O).
- 6.8** The overheating risk has also been investigated using the more extreme weather files DSY2 and DSY3 for 2020s and DSY1 for 2050s and 2080s and the results are presented in Appendix C.

Table 2: TM59 overheating results for dwellings under DSY1 2020s with passive mitigation measures, assuming no usability issues on window opening

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
F101_2ndF2	DoubleBed	0.0	19	Pass
F101_2ndF2	LKD	0.0	N/A	Pass
F101_2ndF	DoubleBedroom2	0.0	17	Pass
F101_2ndF	LKD	0.0	N/A	Pass
F101_TopF3	DoubleBed	0.2	26	Pass
F101_TopF3	LKD	0.3	N/A	Pass
F101_TopF	DoubleBedroom2	0.0	24	Pass
F101_TopF	LKD	0.0	N/A	Pass
F1022ndF2	DoubleBed	0.0	18	Pass
F1022ndF2	LKD	0.2	N/A	Pass
F1022ndF	DoubleBed	0.0	18	Pass
F1022ndF	LKD	0.2	N/A	Pass
F102_TopF2	DoubleBed1	0.0	20	Pass
F102_TopF2	DoubleBed2	0.0	23	Pass
F102_TopF2	LKD	0.4	N/A	Pass
F102_TopFloor1	DoubleBed	0.2	28	Pass
F102_TopFloor1	LKD	0.6	N/A	Pass
F1_01_GF	DoubleBed	0.0	20	Pass
F1_01_GF	LKD	0.1	N/A	Pass
F_01EastFacing2ndF1	DoubleBed	0.0	16	Pass
F_01EastFacing2ndF1	LKD	0.0	N/A	Pass
F_01EastFacing2ndF	DoubleBed	0.0	16	Pass
F_01EastFacing2ndF	LKD	0.0	N/A	Pass
F_01EastFacingGF	DoubleBed	0.0	18	Pass
F_01EastFacingGF	LKD	0.2	N/A	Pass
F_01EastFacingTopF2	DoubleBed	0.0	20	Pass
F_01EastFacingTopF2	LKD	0.0	N/A	Pass
F_01EastFacingTopF2Q1	DoubleBed	0.1	25	Pass
F_01EastFacingTopF2Q1	LKD	0.2	N/A	Pass
F_01WestF_2ndF	DoubleBed1	0.0	22	Pass
F_01WestF_2ndF	DoubleBed2	0.0	20	Pass
F_01WestF_2ndF	LKD	0.1	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
F_01WestF_3rdF	DoubleBed1	0.0	21	Pass
F_01WestF_3rdF	DoubleBed2	0.0	20	Pass
F_01WestF_3rdF	LKD	0.1	N/A	Pass
F_01WestF_GF	DoubleBed1	0.0	24	Pass
F_01WestF_GF	DoubleBed2	0.0	21	Pass
F_01WestF_GF	LKD	0.7	N/A	Pass
F_02_WstFcng_2ndF2	Bedroom	0.0	18	Pass
F_02_WstFcng_2ndF2	LKD	0.1	N/A	Pass
F_02_WstFcng_3rdF1	DoubleBed1	0.0	17	Pass
F_02_WstFcng_3rdF1	LKD	0.2	N/A	Pass
F_02_WstFcng_TpF2	DoubleBed1	0.0	24	Pass
F_02_WstFcng_TpF2	LKD	0.3	N/A	Pass
G1_01_TopFloor	LKD	0.0	N/A	Pass
G1_02_2NDFloor1	DoubleBed1	0.0	29	Pass
G1_02_2NDFloor1	DoubleBed2	0.0	29	Pass
G1_02_2NDFloor1	LKD	0.3	N/A	Pass
G1_02_4thFloor	DoubleBed1	0.0	28	Pass
G1_02_4thFloor	DoubleBed2	0.0	27	Pass
G1_02_4thFloor	LKD	0.3	N/A	Pass
G2_01_5thFloor	LKD	0.0	N/A	Pass
G2_01_TopFloor	LKD	0.0	N/A	Pass
G2_02_GF_South	DoubleBed1	0.0	24	Pass
G2_02_GF_South	DoubleBed2	0.0	28	Pass
G2_02_GF_South	KitchenDining	0.5	N/A	Pass
G2_02_GF_South	Living	0.3	N/A	Pass
G2_02_GF_South	SingleBed3	0.0	25	Pass
G2_2_TopFloor	DoubleBedroom1	0.0	18	Pass
G2_2_TopFloor	DoubleBedroom2	0.0	18	Pass
G2_2_TopFloor	LKD	0.1	N/A	Pass
H1_03_2ndFloor	DoubleBed	0.0	20	Pass
H1_03_2ndFloor	LKD	0.0	N/A	Pass
H1_03_3rdFloor	DoubleBedroom	0.1	16	Pass
H1_03_3rdFloor	LKD	0.2	N/A	Pass
H1_03_TopFloor	DoubleBedroom	0.1	18	Pass
H1_03_TopFloor	LKD	0.2	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
H203TopF	DoubleBed1	0.0	25	Pass
H203TopF	DoubleBed2	0.0	22	Pass
H203TopF	LKD	0.3	N/A	Pass
H2_016th	DoubleBed	0.1	20	Pass
H2_016th	LKD	0.2	N/A	Pass
H2_01TopF	DoubleBed	0.1	21	Pass
H2_01TopF	LKD	0.2	N/A	Pass
H2_01_2ndFloor	DoubleBedroom	0.0	16	Pass
H2_01_2ndFloor	LKD	0.0	N/A	Pass
H2_01_3rdFloor	DoubleBedroom	0.0	12	Pass
H2_01_3rdFloor	LKD	0.0	N/A	Pass
H2_01_topF	DoubleBedroom	0.1	17	Pass
H2_01_topF	LKD	0.2	N/A	Pass
H2_03TopF	DoubleBed1	0.0	0	Pass
H2_03TopF	DoubleBed2	0.1	24	Pass
H2_03TopF	LKD	0.3	N/A	Pass
H2_04_GF	DoubleBed	0.0	15	Pass
H2_04_GF	LKD	0.0	N/A	Pass
H3_01_3rdFloor	DoubleBedroom1	0.0	29	Pass
H3_01_3rdFloor	DoubleBedroom2	0.1	32	Pass
H3_01_3rdFloor	LDK	0.2	N/A	Pass
H3_01_TopFloor	DoubleBedroom1	0.0	28	Pass
H3_01_TopFloor	DoubleBedroom2	0.1	31	Pass
H3_01_TopFloor	LDK	0.2	N/A	Pass
H3_02	DoubleBed	0.0	18	Pass
H3_02	LKD	0.1	N/A	Pass
H3_02_2ndFloor	DoubleBedroom1	0.0	18	Pass
H3_02_2ndFloor	DoubleBedroom2	0.0	19	Pass
H3_02_2ndFloor	LDK	0.1	N/A	Pass
H3_02_GF	DoubleBedroom1	0.0	19	Pass
H3_02_GF	DoubleBedroom2	0.0	24	Pass
H3_02_GF	LDK	0.4	N/A	Pass
H3_3	DoubleBed	0.0	24	Pass
H3_3	LKD	0.1	N/A	Pass
H4_01TopFloor	Bedroom	0.2	19	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
H4_01TopFloor	LDK	0.0	N/A	Pass
H4_01_2ndFloor	Bedroom	0.0	17	Pass
H4_01_2ndFloor	LDK	0.0	N/A	Pass
H4_01_3rdFloor	Bedroom	0.0	17	Pass
H4_01_3rdFloor	LDK	0.0	N/A	Pass
H4_01_GF	Bedroom	0.0	17	Pass
H4_01_GF	LDK	0.0	N/A	Pass
H4_03_2ndFloor	Bedroom	0.0	15	Pass
H4_03_2ndFloor	LDK	0.1	N/A	Pass
H4_2_3rdFloor	DoubleBed	0.0	17	Pass
H4_2_3rdFloor	LKD	0.0	N/A	Pass
J_01_4thFloor1	DoubleBed1	0.0	20	Pass
J_01_4thFloor1	DoubleBed2	0.0	20	Pass
J_01_4thFloor1	LKD	0.3	N/A	Pass
J_01_SF1TopFloor	DoubleBed1	0.0	30	Pass
J_01_SF1TopFloor	DoubleBed2	0.0	28	Pass
J_01_SF1TopFloor	LKD	0.3	N/A	Pass
J_01_SF	DoubleBed1	0.0	26	Pass
J_01_SF	DoubleBed2	0.0	29	Pass
J_01_SF	LKD	0.5	N/A	Pass
J3_01_2nd	DoubleBedroom	0.0	32	Pass
J3_01_2nd	LDK	0.0	N/A	Pass
J3_01_TopFloor	DoubleBedroom	0.0	31	Pass
J3_01_TopFloor	LDK	0.0	N/A	Pass
J3_03_TopFloor	DoubleBedroom	0.0	25	Pass
J3_03_TopFloor	LDK	0.0	N/A	Pass
J3_03_TopFloor	SingleBedroom	0.0	26	Pass
J_3	DoubleBed	0.0	22	Pass
J_3	LKD	0.0	N/A	Pass
J_4	DoubleBed	0.0	22	Pass
J_4	LKD	0.0	N/A	Pass
J_5_TopFloor	DoubleBed	0.0	24	Pass
J_5_TopFloor	LKD	0.0	N/A	Pass
J__01_2nd	DoubleBedroom	0.0	23	Pass
J__01_2nd	LDK	0.0	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
J__01_2ndFloor	DoubleBed1	0.0	20	Pass
J__01_2ndFloor	DoubleBed2	0.0	19	Pass
J__01_2ndFloor	LKD	0.3	N/A	Pass
J__01_3rd	DoubleBedroom	0.0	23	Pass
J__01_3rd	LDK	0.0	N/A	Pass
J__01_6thFloor	DoubleBedroom	0.0	20	Pass
J__01_6thFloor	DoubleBedroom2	0.0	19	Pass
J__01_6thFloor	LDK	0.4	N/A	Pass
J__01_TopFloor	DoubleBedroom	0.0	23	Pass
J__01_TopFloor	LDK	0.0	N/A	Pass
J__01_TopFloorQ1	DoubleBedroom	0.0	17	Pass
J__01_TopFloorQ1	DoubleBedroom2	0.0	17	Pass
J__01_TopFloorQ1	LDK	0.1	N/A	Pass
J__02_5th	DoubleBedroom1	0.0	18	Pass
J__02_5th	DoubleBedroom2	0.0	25	Pass
J__02_5th	Kitchen	0.0	N/A	Pass
J__02_5th	Living	0.3	N/A	Pass
J__02_5th	SingleBedroom	0.1	28	Pass
J__02_5thFloor	DoubleBedroom1	0.0	15	Pass
J__02_5thFloor	DoubleBedroom2	0.1	23	Pass
J__02_5thFloor	Kitchen	0.2	N/A	Pass
J__02_5thFloor	LivingRoom	0.3	N/A	Pass
J__02_5thFloor	SingleBedroom	0.2	31	Pass
J__02_TopF	DoubleBedroom1	0.0	25	Pass
J__02_TopF	DoubleBedroom2	0.1	31	Pass
J__02_TopF	Kitchen	0.0	N/A	Pass
J__02_TopF	Living	0.5	N/A	Pass
J__02_TopF	SingleBedroom	0.3	32	Pass
House_E_00	KD	0.1	N/A	Pass
House_E_00	LivingRoom	1.6	N/A	Pass
HouseE01	DoubleBed1	0.4	26	Pass
HouseE01	SingleBed2	0.2	19	Pass
HouseE02	DoubleBed4	0.2	21	Pass
HouseE02	SingleBed3	0.1	27	Pass
House_E_1	KD	0.3	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
House_E_1	LivingRoom	1.8	N/A	Pass
HouseE3	DoubleBed1	0.4	26	Pass
HouseE3	SingleBed2	0.3	24	Pass
HouseE4	DoubleBed4	0.2	24	Pass
HouseE4	SingleBed3	0.0	29	Pass

Results for Noise Impacted Dwellings

- 6.9** The following results presented in Table 3 demonstrate the impact of the nighttime window opening limitations for apartments in Blocks G1, G2, J1 and J2 as a result of external noise. Window opening schedules are modelled as presented in Table 1, and the same passive overheating mitigation measures are incorporated as previously described.
- 6.10** Due to external noise constraints, all affected dwellings fail to achieve compliance with CIBSE TM59 Criterion B using passive mitigation measures alone. It is therefore proposed to specify mechanical cooling for these dwellings. The exact system will be determined at the detailed design stage. This could be a cooling bolt-on to MVHR (known as an 'air tempering' or 'peak lopping' system), or active cooling through ASHP or VRF system, to be sized accordingly by an M&E consultant at a later stage.
- 6.11** The specified cooling system will be designed to ensure that all dwellings pass the overheating criteria.

Table 3: TM59 overheating results for dwellings under DSY1 2020s with passive mitigation measures and limitations on window opening due to noise constraints

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
G1_02_2NDFloor1	DoubleBed1	0.3	146	Fail
G1_02_2NDFloor1	DoubleBed2	0.2	144	Fail
G1_02_2NDFloor1	LKD	0.5	N/A	Pass
G1_02_4thFloor	DoubleBed1	0.3	139	Fail
G1_02_4thFloor	DoubleBed2	0.3	136	Fail
G1_02_4thFloor	LKD	0.4	N/A	Pass
G2_01_5thFloor	LKD	0.0	N/A	Pass
G2_01_5th_SouthEast	DoubleBedroom1	0.2	121	Fail

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
G2_01_5th_SouthEast	DoubleBedroom2	0.4	147	Fail
G2_01_5th_SouthEast	Kitchen	0.5	N/A	Pass
G2_01_5th_SouthEast	Living	0.2	N/A	Pass
G2_01_5th_SouthEast	SingleBedroom	0.6	179	Fail
G2_01_TopFloor	LKD	0.0	N/A	Pass
G2_02_GF_South	DoubleBed1	0.0	69	Fail
G2_02_GF_South	DoubleBed2	0.1	94	Fail
G2_02_GF_South	KitchenDining	0.4	N/A	Pass
G2_02_GF_South	Living	0.3	N/A	Pass
G2_02_GF_South	SingleBed3	0.1	88	Fail
G2_02_TpFlr_Sth1	DoubleBed1	0.0	116	Fail
G2_02_TpFlr_Sth1	DoubleBed2	0.1	151	Fail
G2_02_TpFlr_Sth1	KitchenDining	0.5	N/A	Pass
G2_02_TpFlr_Sth1	Living	0.3	N/A	Pass
G2_02_TpFlr_Sth1	SingleBed3	0.2	155	Fail
J_3	DoubleBed	0.0	66	Fail
J_3	LKD	0.0	N/A	Pass
J_4	DoubleBed	0.0	66	Fail
J_4	LKD	0.0	N/A	Pass
J_5_TopFloor	DoubleBed	0.0	65	Fail
J_5_TopFloor	LKD	0.0	N/A	Pass
J__01_2nd	DoubleBedroom	0.0	67	Fail
J__01_2nd	LDK	0.0	N/A	Pass
J__01_2ndFloor	DoubleBed1	0.0	70	Fail
J__01_2ndFloor	DoubleBed2	0.0	65	Fail
J__01_2ndFloor	LKD	0.4	N/A	Pass
J__01_3rd	DoubleBedroom	0.0	71	Fail
J__01_3rd	LDK	0.1	N/A	Pass
J__01_6thFloor	DoubleBedroom	0.1	62	Fail
J__01_6thFloor	DoubleBedroom2	0.1	59	Fail
J__01_6thFloor	LDK	0.7	N/A	Pass
J__01_TopFloor	DoubleBedroom	0.0	74	Fail
J__01_TopFloor	LDK	0.0	N/A	Pass
J__01_TopFloorQ1	DoubleBedroom	0.0	59	Fail
J__01_TopFloorQ1	DoubleBedroom2	0.0	63	Fail

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
J__01_TopFloorQ1	LDK	0.4	N/A	Pass
J__02_5th	DoubleBedroom1	0.0	80	Fail
J__02_5th	DoubleBedroom2	0.1	109	Fail
J__02_5th	Kitchen	0.0	N/A	Pass
J__02_5th	Living	0.4	N/A	Pass
J__02_5th	SingleBedroom	0.4	127	Fail
J__02_5thFloor	DoubleBedroom1	0.0	75	Fail
J__02_5thFloor	DoubleBedroom2	0.2	122	Fail
J__02_5thFloor	Kitchen	0.3	N/A	Pass
J__02_5thFloor	LivingRoom	0.3	N/A	Pass
J__02_5thFloor	SingleBedroom	0.2	150	Fail
J__02_TopF	DoubleBedroom1	0.1	84	Fail
J__02_TopF	DoubleBedroom2	0.3	115	Fail
J__02_TopF	Kitchen	0.3	N/A	Pass
J__02_TopF	Living	0.8	N/A	Pass
J__02_TopF	SingleBedroom	0.4	137	Fail

6.12 At detailed design stage, the cooling strategy will be developed to ensure all these dwellings achieve the TM59 and Part O criteria with limitations on bedroom window opening at night due to noise.

6.13 The dynamic overheating assessment has also been run under the more extreme DSY 2 and 3 for the 2020s, along with DSY 1 for the 2050s and 2080s as required by Condition 80, with results presented in Appendix C.

Communal Corridors

6.14 Four communal corridors have been tested to evaluate the risk of overheating within communal areas in the apartment blocks. The main risk of overheating in these areas is as a result of heat losses from communal heating distribution pipework. This will be mitigated as far as practicable by utilising low flow / return temperatures and sufficiently insulating all pipework.

6.15 Additional passive mitigation measures proposed for corridors include:

- > A background mechanical ventilation system providing a minimum of 0.5 air changes per hour (ach);

- > For corridors with windows:
 - > G-values to match those specified within the dwelling assessment, to maintain consistency across facades and reduce solar gain;
 - > Windows openable on 100mm restrictors.
- > PIR sensors installed to corridor lighting to avoid lighting being on all the time and reduce internal gains.

6.16 The following results presented in Table 4 indicate that, based on the design modelling inputs in Appendix B and passive overheating mitigation measures outlined above, all assessed corridors meet the CIBSE TM59 criteria and therefore demonstrate an acceptable level of overheating risk.

Table 4: TM59 overheating results for corridors under DSY1 2020s

Block	Zone	Hours of Exceedance (Pass ≤ 3%)	Pass/Fail
F1	Corridor1	0.0	Pass
F1	Corridor2	0.1	Pass
F1	Corridor3	0.8	Pass
F1	Stairs	2.1	Pass
F	Corridor1	0.0	Pass
F	Corridor2	0.0	Pass
F	Corridor3	0.0	Pass
F	Stairs	0.0	Pass
H3	Corridor1	0.1	Pass
H3	Corridor2	0.2	Pass
H3	Corridor3	1.0	Pass
H3	Stairs	0.6	Pass
J	Corridor1	0.0	Pass
J	Corridor2	0.0	Pass
J	Corridor3	0.0	Pass
J	Stairs	0.0	Pass

7. CONCLUSION

- 7.1** The purpose of this report is to demonstrate that the proposed development at St Ann's New Neighbourhood (Phase 1b and 2) has been designed to mitigate the risk of summertime overheating in accordance with Condition 80 of the hybrid consent and Part O (2021) of the Building Regulations.
- 7.2** The performance of dwellings and communal corridors has been assessed against the Chartered Institution of Building Services Engineers (CIBSE) guidance TM59 Design methodology for the assessment of overheating risk in homes (2017) and Approved Document O Overheating (2021), as required by Condition 80.
- 7.3** A sample of dwellings and communal corridors has been selected for the dynamic overheating assessment based on design characteristics that establish them as representative of the overall proposed scheme. This selection of dwellings includes consideration of unit types at varying floor levels and of different orientations in line with the modelling requirements set out in Condition 80.
- 7.4** For the purpose of this report, passive mitigation measures have been explored as far as practicable to avoid the need for active cooling, except for those dwellings with limitations on window opening due to external noise constraints.
- 7.5** All dwellings tested demonstrate compliance with the CIBSE TM59 and AD(O) overheating assessment criteria with the London Weather Centre weather file, under the mandatory DSY1 for the 2020s, high emissions, 50% percentile scenario. Compliance is achieved using passive measures alone and assuming no window usability issues.
- 7.6** The south facing apartments in Blocks G1, G2, J1 and J2 will be impacted by external noise within bedrooms during the night with windows open. In order to ensure these bedrooms can still achieve acceptable levels of thermal comfort with windows closed, an active cooling system is proposed.
- 7.7** Overheating will be mitigated within communal corridors by reducing heat losses from distribution pipework and providing a background mechanical ventilation system. All corridors tested demonstrate compliance with the CIBSE TM59 and AD(O) overheating assessment criteria under the mandatory weather file (DSY1 for the 2020s, high emissions, 50% percentile scenario).
- 7.8** The results are based on key design features and passive mitigation measures following the London Plan cooling hierarchy.

APPENDICES

Appendix A

Assessed Dwellings and Communal Corridors

Appendix B

Design Modelling Inputs

Appendix C

Results of More Extreme Weather Scenarios

Appendix D

Acoustic Technical Note (Cass Allen)

Appendix E

Overheating Mitigation Strategy Mark-up

Appendix A

Assessed Dwellings and Communal Corridors

Unit selection for Overheating assessment of St Ann's Haringey Site



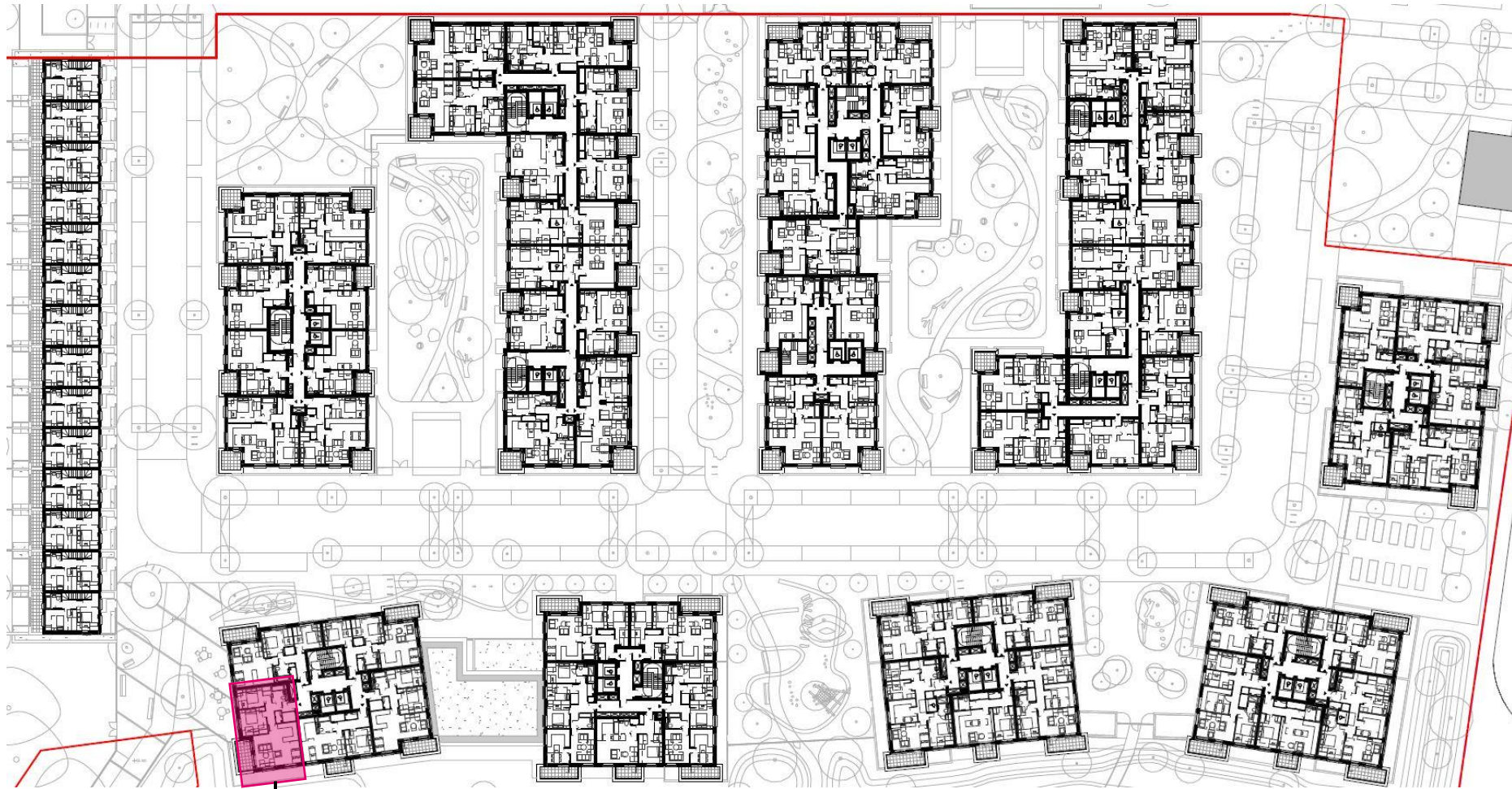
Unit selection- Ground floor



Unit selection- 2nd floor



Unit selection- 3rd floor

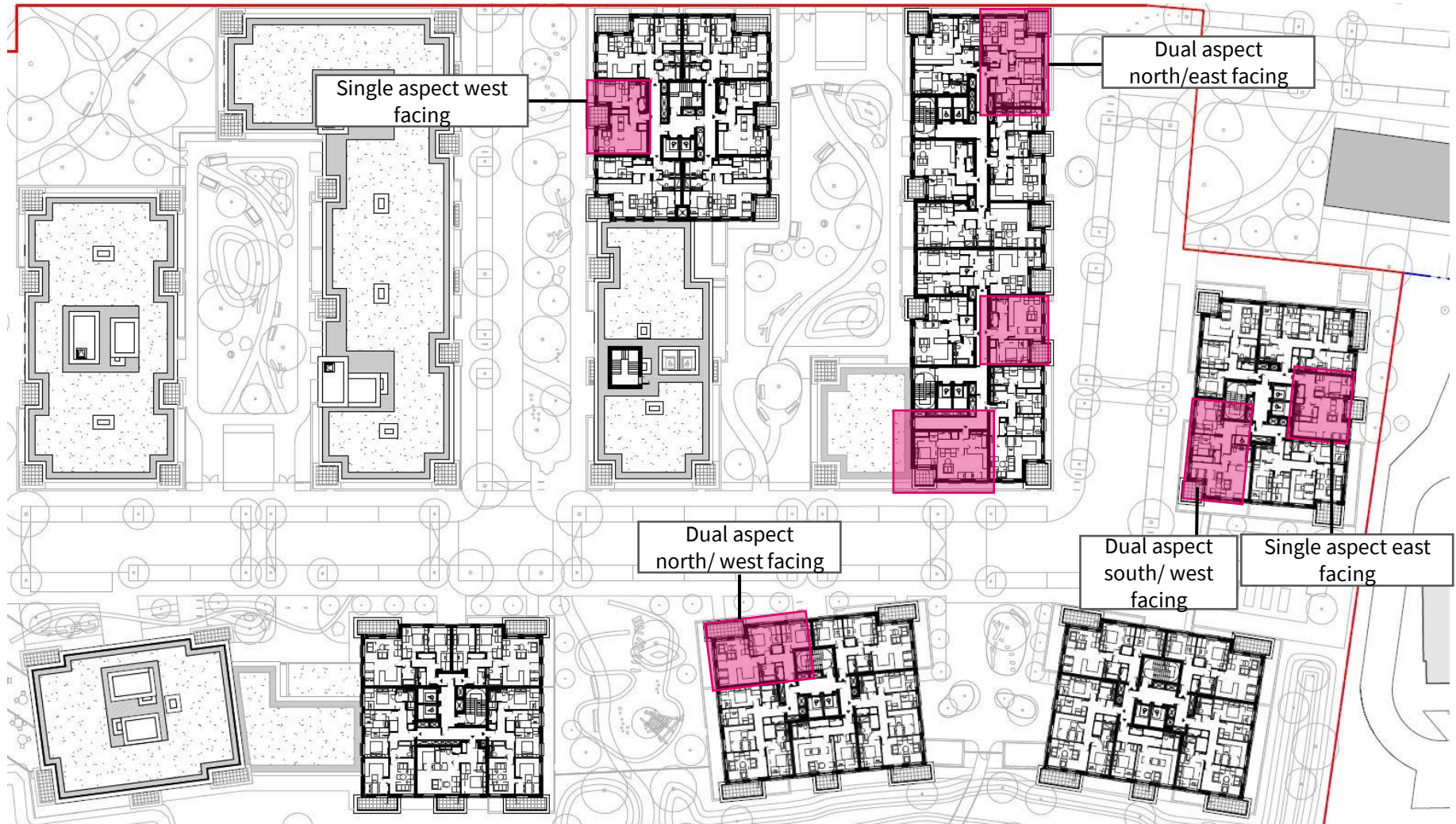


Dual aspect
south/west facing

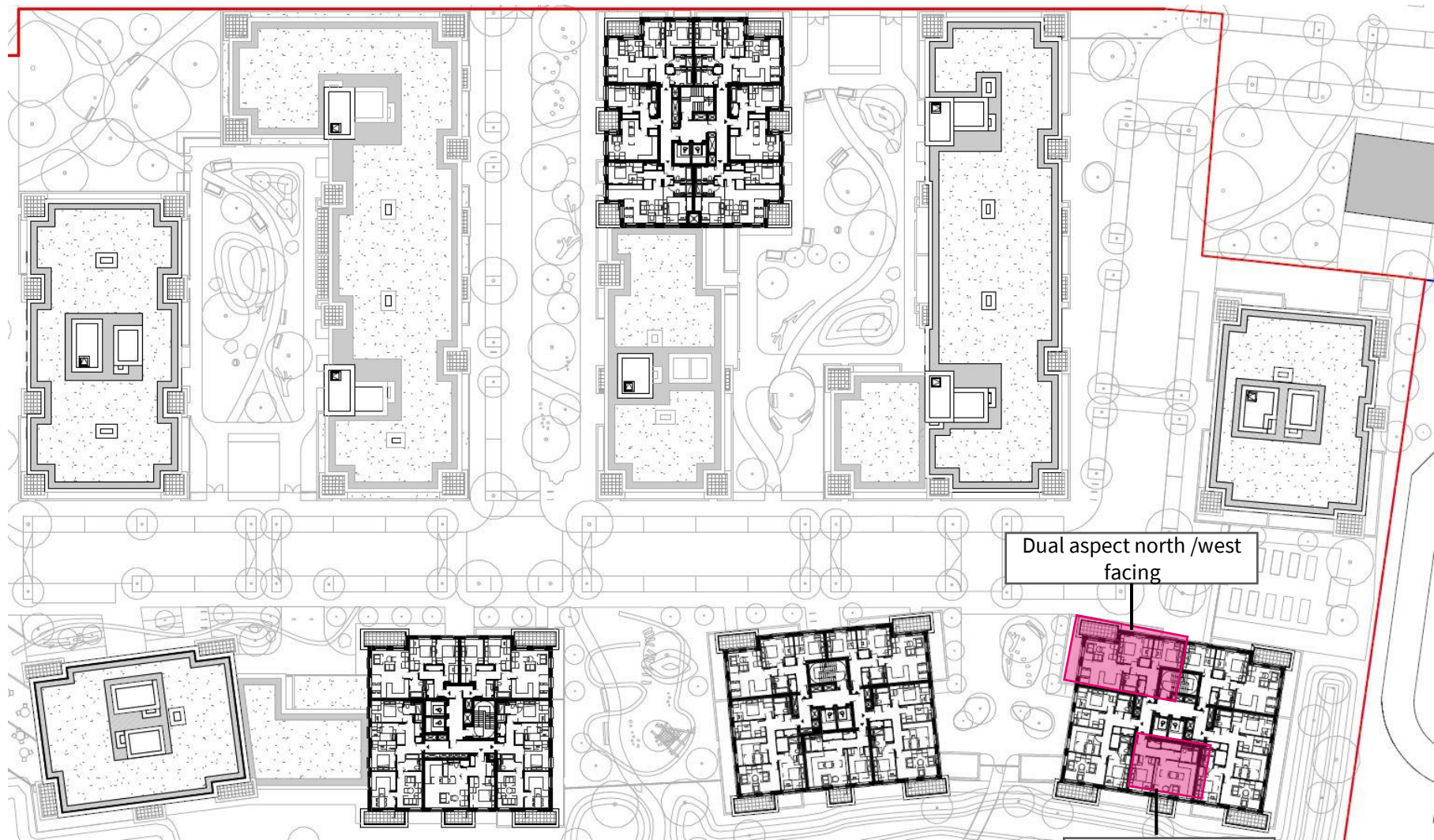
Unit selection- 4th floor



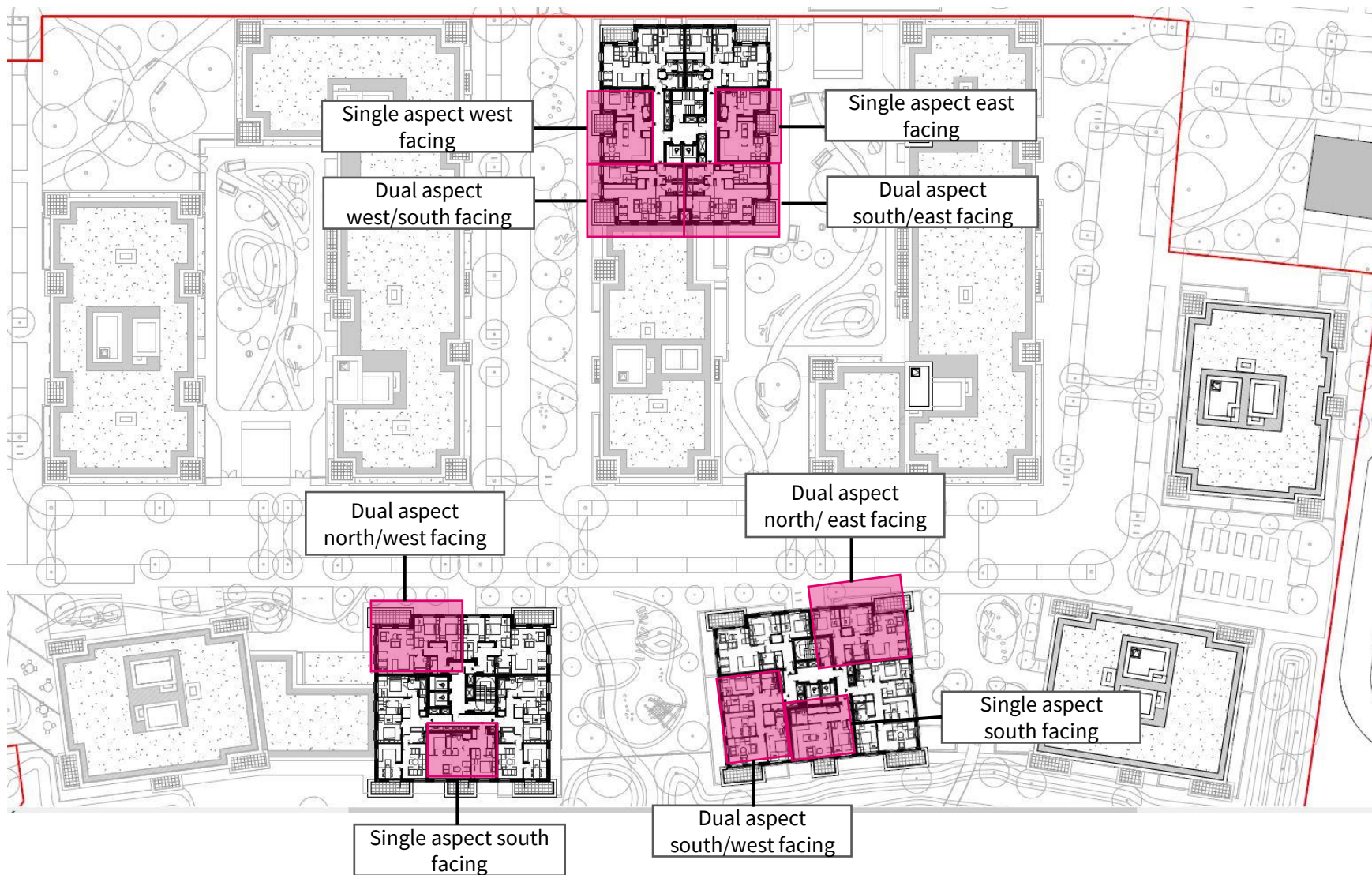
Unit selection- 5th floor



Unit selection- 6th floor



Unit selection- 7th floor



Unit selection- 8th floor



Corridor selection

Appendix B

Design Modelling Inputs

Dwelling Inputs

The following modelling inputs have been included in the baseline dynamic thermal simulation.

Table B.1: Baseline dynamic thermal modelling design assumptions

Data Input			Discussion
Weather data	Location	CIBSE London Weather Centre Design Summer Years (DSYs) for 2020s, high emissions, 50% percentile scenario	Industry-standard CIBSE weather data file, location specified by Planning Condition
	External walls	0.18 W/m ² K	As per the Energy Statement (Hodkinson Consultancy, July 2023)
Building Fabric Construction details	Roofs	0.10 W/m ² K	As per the Energy Statement (Hodkinson Consultancy, July 2023)
	Ground floor	0.13 W/m ² K	As per the Energy Statement (Hodkinson Consultancy, July 2023)
	Ceilings/floors	Assumed to be adiabatic between adjacent floors	Concrete slabs will add to the thermal capacity of the building When dwelling units above / below heat loss is assumed to be zero
	Party walls between units and houses	Assumed to be adiabatic between adjacent dwellings	Walls adjacent to other units are assumed to be lightweight partitions Adjacent units have been included in the dynamic simulation calculations
	Partitions within units	Plasterboard partitions	Assumed thicknesses as per drawings (KCA, June 2023)
	Internal doors	0.80 m width	As per drawings (KCA, June 2023)
	Windows and Glazed Doors	U value 0.80 W/m ² K	As per the Energy Statement (Hodkinson Consultancy, July 2023)
Windows	Reveal depth	External reveal: 192 mm	As measured from drawings (KCA, June 2023)
	Discharge Coefficient	Discharge coefficient: 0.62	Default discharge coefficient for a clear, sharp-edged orifice
Infiltration	Air Tightness	2.5 m ³ /hr-m ² @ 50 pascals for apartments 3.0 m ³ /hr-m ² @ 50 pascals for houses	As per the Energy Statement (Hodkinson Consultancy, July 2023)

The following occupancy schedules and internal gains assumptions have been used, in accordance with CIBSE TM59 guidance.

Table B.2: Occupancy and equipment gains for dwellings (CIBSE TM59)

Unit/room type	Occupancy	Equipment Load
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
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
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
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 gain 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	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
Utility cupboard	N/A	10 W on 24/7

A mechanical ventilation system should be provided which is capable of meeting or exceeding minimum Part F ventilation rates. The minimum Part F ventilation rates for the assessed dwellings are shown in the table below. Some units will require enhanced ventilation rates up to 90 l/s or 110 l/s as shown in Appendix E.

Table B.3: Minimum Part F mechanical ventilation rates for dwellings

Dwelling	G2 - 02 - GF - South	G2 - 01 - 2nd floor	G2 - 01 - 5th - South East	G2 - 2 - Top floor	G2 - 01 - top floor	H2 - 04 - GF
Floor area / m ²	86.6	55.0	86.5	71.3	55.0	57.0
Storey height / m	2.8	2.6	2.6	2.6	2.6	2.8
Volume / m ³	242.4	143.0	224.9	185.4	143.0	159.6
Minimum high rate						
Kitchen / l/s	13	13	13	13	13	13
Utility cupboard / l/s	8	8	8	8	8	8
Bathroom / l/s	8	8	8	8	8	8
WC / l/s						
Ensuite / l/s	8		8			
Boost rate / l/s	37	29	37	29	29	29
Whole dwelling ventilation rate / m ³ /hr	133.2	104.4	133.2	104.4	104.4	104.4
Air change rate / ach	0.55	0.73	0.59	0.56	0.73	0.65

Dwelling	H1 - 03 - 2nd floor	H2 - 01 - 2nd floor	H2 - 01 - 3rd floor	H1 - 03 - 3rd floor	H2 - 01 6th	H2 - 01 - top floor
Floor area / m ²	51.0	52.4	52.0	51.0	52.4	52.0
Storey height / m	2.6	2.6	2.6	2.6	2.6	2.6
Volume / m ³	132.6	136.2	135.2	132.6	136.2	135.2
Minimum high rate						
Kitchen / l/s	13	13	13	13	13	13
Utility cupboard / l/s	8	8	8	8	8	8
Bathroom / l/s	8	8	8	8	8	8

Dwelling	H1 - 03 - 2nd floor	H2 - 01 - 2nd floor	H2 - 01 - 3rd floor	H1 - 03 - 3rd floor	H2 - 01 6th	H2 - 01 - top floor
WC / l/s						
Ensuite / l/s						
Boost rate / l/s	29	29	29	29	29	29
Whole dwelling ventilation rate / m ³ /hr	104.4	104.4	104.4	104.4	104.4	104.4
Air change rate / ach	0.79	0.77	0.77	0.79	0.77	0.77

Dwelling	H4 - 01 - GF	H3 - 02 - GF	H4 - 03 - 2nd floor	H4 - 01 - 2nd floor	H3 - 01 - 3rd floor	JX - 02 - 5th floor
Floor area / m ²	51.2	70.9	59.8	51.0	73.0	93.0
Storey height / m	2.8	2.8	2.6	2.6	2.6	2.6
Volume / m ³	143.4	198.5	155.5	132.6	189.8	241.8
Minimum high rate						
Kitchen / l/s	13	13	13	13	13	13
Utility cupboard / l/s	8	8	8	8	8	8
Bathroom / l/s	8	8	8	8	8	8
WC / l/s						
Ensuite / l/s		8			8	8
Boost rate / l/s	29	37	29	29	37	37
Whole dwelling ventilation rate / m ³ /hr	104.4	133.2	104.4	104.4	133.2	133.2
Air change rate / ach	0.73	0.67	0.67	0.79	0.70	0.55

Dwelling	JX - 01 - 2nd	JX -01 - top floor	JX - 02 - 5th	J3 - 01 - GF	J3 - 01 - 2nd	
Floor area / m ²	53.3	71.5	93.0	89.3	52.0	
Storey height / m	2.6	2.6	2.6	2.8	2.6	
Volume / m ³	138.7	185.8	241.8	250.1	135.2	
Minimum high rate						
Kitchen / l/s	13	13	13	13	13	
Utility cupboard / l/s	8	8	8	8	8	
Bathroom / l/s	8	8	8	8	8	
WC / l/s						
Ensuite / l/s			8	8		
Boost rate / l/s	29	29	37	37	29	
Whole dwelling ventilation rate / m ³ /hr	104.4	104.4	133.2	133.2	104.4	
Air change rate / ach	0.75	0.56	0.55	0.53	0.77	

Corridors

The same building fabric details and glazing properties used in the modelling of the selected homes (Table B.1) were used in the modelling of the corridors. The baseline assumptions were based on the following:

- > Flow and return temperatures of 55°C and 30°C respectively;
- > 35 mm pipe insulation with maximum thermal conductivity of 0.025W/mK;
- > The corridor will utilise an AOV ventilation system which will be capable of providing 0.5 ach;
- > Windows in corridors open on AOV, with maximum window openability restricted to 100mm;
- > Internal doors within corridors on hold-open devices (with automatic close linked to fire alarms) to allow air flow – note that this must be confirmed within the fire strategy;

The following LTHW heat gains used in the assessment were calculated using the above assumptions.

Table 5: Distribution pipework heat losses assumed for assessed corridors

Block/Corridor	Riser Heat Losses (W)	Corridor Heat Losses (W)
JX	20.3	68.2
H3	20.3	160.4
FX	20.3	163.4
F1	20.3	133.2

Appendix C

Result of More Extreme Weather Scenarios

The dynamic overheating assessment has also been run under the more extreme DSY 2 and 3 for the 2020s, along with DSY 1 for the 2050s and 2080s as required by Condition 80, with results presented in the following Tables.

TM59 states that compliance should be met for the DSY1 weather scenario. Whilst it is best practice for additional testing to be undertaken using the more extreme weather scenarios, it is acknowledged that meeting the CIBSE compliance criteria for these is particularly challenging.

The overheating mitigation strategy presented within the main body of this report demonstrates the passive measures that have been implemented to reduce the risk of overheating as far as practicable. In the future, residents could use further adaptation measures to combat any additional overheating risk such as the use of fans and internal reflective blinds.

Table C.1: Dwelling overheating results for DSY2 2020s – TM59

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
F101_2ndF2	DoubleBed	0.5	52	Fail
F101_2ndF2	LKD	1.0	N/A	Pass
F101_2ndF	DoubleBedroom2	0.5	50	Fail
F101_2ndF	LKD	1.0	N/A	Pass
F101_TopF3	DoubleBed	0.7	57	Fail
F101_TopF3	LKD	1.2	N/A	Pass
F101_TopF	DoubleBedroom2	0.3	54	Fail
F101_TopF	LKD	1.1	N/A	Pass
F1022ndF2	DoubleBed	0.6	61	Fail
F1022ndF2	LKD	1.1	N/A	Pass
F1022ndF	DoubleBed	0.6	58	Fail
F1022ndF	LKD	1.2	N/A	Pass
F102_TopF2	DoubleBed1	0.6	61	Fail
F102_TopF2	DoubleBed2	0.7	64	Fail
F102_TopF2	LKD	1.5	N/A	Pass
F102_TopFloor1	DoubleBed	0.8	70	Fail
F102_TopFloor1	LKD	1.4	N/A	Pass
F1_01_GF	DoubleBed	0.2	62	Fail

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
F1_01_GF	LKD	1.2	N/A	Pass
F_01EastFacing2ndF1	DoubleBed	0.5	49	Fail
F_01EastFacing2ndF1	LKD	1.0	N/A	Pass
F_01EastFacing2ndF	DoubleBed	0.5	50	Fail
F_01EastFacing2ndF	LKD	1.0	N/A	Pass
F_01EastFacingGF	DoubleBed	0.5	55	Fail
F_01EastFacingGF	LKD	1.2	N/A	Pass
F_01EastFacingTopF2	DoubleBed	0.5	53	Fail
F_01EastFacingTopF2	LKD	1.1	N/A	Pass
F_01EastFacingTopF2Q1	DoubleBed	0.6	58	Fail
F_01EastFacingTopF2Q1	LKD	1.1	N/A	Pass
F_01WestF_2ndF	DoubleBed1	0.6	59	Fail
F_01WestF_2ndF	DoubleBed2	0.5	58	Fail
F_01WestF_2ndF	LKD	1.2	N/A	Pass
F_01WestF_3rdF	DoubleBed1	0.6	58	Fail
F_01WestF_3rdF	DoubleBed2	0.5	57	Fail
F_01WestF_3rdF	LKD	1.2	N/A	Pass
F_01WestF_GF	DoubleBed1	0.6	67	Fail
F_01WestF_GF	DoubleBed2	0.5	63	Fail
F_01WestF_GF	LKD	1.9	N/A	Pass
F_02_WstFcng_2ndF2	Bedroom	0.6	57	Fail
F_02_WstFcng_2ndF2	LKD	1.1	N/A	Pass
F_02_WstFcng_3rdF1	DoubleBed1	0.6	56	Fail
F_02_WstFcng_3rdF1	LKD	1.1	N/A	Pass
F_02_WstFcng_TpF2	DoubleBed1	0.7	69	Fail
F_02_WstFcng_TpF2	LKD	1.2	N/A	Pass
G1_01_TopFloor	LKD	0.8	N/A	Pass
G1_02_2NDFloor1	DoubleBed1	0.7	72	Fail
G1_02_2NDFloor1	DoubleBed2	0.6	71	Fail
G1_02_2NDFloor1	LKD	1.3	N/A	Pass
G1_02_4thFloor	DoubleBed1	0.7	71	Fail
G1_02_4thFloor	DoubleBed2	0.6	70	Fail
G1_02_4thFloor	LKD	1.3	N/A	Pass
G2_01_5thFloor	LKD	0.9	N/A	Pass
G2_01_TopFloor	LKD	1.1	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
G2_02_GF_South	DoubleBed1	0.4	67	Fail
G2_02_GF_South	DoubleBed2	0.6	71	Fail
G2_02_GF_South	KitchenDining	1.7	N/A	Pass
G2_02_GF_South	Living	1.5	N/A	Pass
G2_02_GF_South	SingleBed3	0.6	67	Fail
G2_2_TopFloor	DoubleBedroom1	0.3	57	Fail
G2_2_TopFloor	DoubleBedroom2	0.3	57	Fail
G2_2_TopFloor	LKD	1.1	N/A	Pass
H1_03_2ndFloor	DoubleBed	0.5	54	Fail
H1_03_2ndFloor	LKD	1.1	N/A	Pass
H1_03_3rdFloor	DoubleBedroom	0.6	52	Fail
H1_03_3rdFloor	LKD	1.2	N/A	Pass
H1_03_TopFloor	DoubleBedroom	0.6	58	Fail
H1_03_TopFloor	LKD	1.3	N/A	Pass
H203TopF	DoubleBed1	0.5	69	Fail
H203TopF	DoubleBed2	0.6	68	Fail
H203TopF	LKD	1.4	N/A	Pass
H2_016th	DoubleBed	0.7	55	Fail
H2_016th	LKD	1.1	N/A	Pass
H2_01TopF	DoubleBed	0.7	57	Fail
H2_01TopF	LKD	1.1	N/A	Pass
H2_01_2ndFloor	DoubleBedroom	0.6	51	Fail
H2_01_2ndFloor	LKD	1.0	N/A	Pass
H2_01_3rdFloor	DoubleBedroom	0.6	44	Fail
H2_01_3rdFloor	LKD	1.0	N/A	Pass
H2_01_topF	DoubleBedroom	0.7	52	Fail
H2_01_topF	LKD	1.0	N/A	Pass
H2_03TopF	DoubleBed1	1.1	0	Pass
H2_03TopF	DoubleBed2	0.4	52	Fail
H2_03TopF	LKD	1.3	N/A	Pass
H2_04_GF	DoubleBed	0.4	54	Fail
H2_04_GF	LKD	1.1	N/A	Pass
H3_01_3rdFloor	DoubleBedroom1	0.3	64	Fail
H3_01_3rdFloor	DoubleBedroom2	0.6	66	Fail
H3_01_3rdFloor	LDK	1.2	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
H3_01_TopFloor	DoubleBedroom1	0.2	61	Fail
H3_01_TopFloor	DoubleBedroom2	0.5	62	Fail
H3_01_TopFloor	LDK	1.1	N/A	Pass
H3_02	DoubleBed	0.3	52	Fail
H3_02	LKD	1.1	N/A	Pass
H3_02_2ndFloor	DoubleBedroom1	0.4	62	Fail
H3_02_2ndFloor	DoubleBedroom2	0.3	56	Fail
H3_02_2ndFloor	LDK	1.1	N/A	Pass
H3_02_GF	DoubleBedroom1	0.4	67	Fail
H3_02_GF	DoubleBedroom2	0.2	59	Fail
H3_02_GF	LDK	1.4	N/A	Pass
H3_3	DoubleBed	0.3	56	Fail
H3_3	LKD	1.2	N/A	Pass
H4_01TopFloor	Bedroom	0.8	61	Fail
H4_01TopFloor	LDK	1.2	N/A	Pass
H4_01_2ndFloor	Bedroom	0.5	55	Fail
H4_01_2ndFloor	LDK	1.1	N/A	Pass
H4_01_3rdFloor	Bedroom	0.5	54	Fail
H4_01_3rdFloor	LDK	1.1	N/A	Pass
H4_01_GF	Bedroom	0.5	55	Fail
H4_01_GF	LDK	1.3	N/A	Pass
H4_03_2ndFloor	Bedroom	0.5	55	Fail
H4_03_2ndFloor	LDK	1.0	N/A	Pass
H4_2_3rdFloor	DoubleBed	0.2	50	Fail
H4_2_3rdFloor	LKD	1.1	N/A	Pass
J_01_4thFloor1	DoubleBed1	0.5	57	Fail
J_01_4thFloor1	DoubleBed2	0.5	57	Fail
J_01_4thFloor1	LKD	1.3	N/A	Pass
J_01_SF1TopFloor	DoubleBed1	0.4	65	Fail
J_01_SF1TopFloor	DoubleBed2	0.4	64	Fail
J_01_SF1TopFloor	LKD	1.2	N/A	Pass
J_01_SF	DoubleBed1	0.2	68	Fail
J_01_SF	DoubleBed2	0.2	70	Fail
J_01_SF	LKD	1.7	N/A	Pass
J3_01_2nd	DoubleBedroom	0.6	74	Fail

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
J3_01_2nd	LDK	1.1	N/A	Pass
J3_01_TopFloor	DoubleBedroom	0.6	74	Fail
J3_01_TopFloor	LDK	1.0	N/A	Pass
J3_03_TopFloor	DoubleBedroom	0.4	68	Fail
J3_03_TopFloor	LDK	1.2	N/A	Pass
J3_03_TopFloor	SingleBedroom	0.6	69	Fail
J_3	DoubleBed	0.5	65	Fail
J_3	LKD	1.1	N/A	Pass
J_4	DoubleBed	0.5	64	Fail
J_4	LKD	1.1	N/A	Pass
J_5_TopFloor	DoubleBed	0.5	67	Fail
J_5_TopFloor	LKD	1.1	N/A	Pass
J__01_2nd	DoubleBedroom	0.5	66	Fail
J__01_2nd	LDK	1.0	N/A	Pass
J__01_2ndFloor	DoubleBed1	0.5	56	Fail
J__01_2ndFloor	DoubleBed2	0.5	56	Fail
J__01_2ndFloor	LKD	1.3	N/A	Pass
J__01_3rd	DoubleBedroom	0.5	66	Fail
J__01_3rd	LDK	1.2	N/A	Pass
J__01_6thFloor	DoubleBedroom	0.6	57	Fail
J__01_6thFloor	DoubleBedroom2	0.6	55	Fail
J__01_6thFloor	LDK	1.2	N/A	Pass
J__01_TopFloor	DoubleBedroom	0.4	66	Fail
J__01_TopFloor	LDK	1.1	N/A	Pass
J__01_TopFloorQ1	DoubleBedroom	0.2	56	Fail
J__01_TopFloorQ1	DoubleBedroom2	0.3	56	Fail
J__01_TopFloorQ1	LDK	1.1	N/A	Pass
J__02_5th	DoubleBedroom1	0.5	60	Fail
J__02_5th	DoubleBedroom2	0.6	66	Fail
J__02_5th	Kitchen	0.9	N/A	Pass
J__02_5th	Living	1.3	N/A	Pass
J__02_5th	SingleBedroom	0.7	68	Fail
J__02_5thFloor	DoubleBedroom1	0.6	63	Fail
J__02_5thFloor	DoubleBedroom2	0.5	59	Fail
J__02_5thFloor	Kitchen	0.9	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
J__02_5thFloor	LivingRoom	1.3	N/A	Pass
J__02_5thFloor	SingleBedroom	0.7	61	Fail
J__02_TopF	DoubleBedroom1	0.6	62	Fail
J__02_TopF	DoubleBedroom2	0.7	73	Fail
J__02_TopF	Kitchen	1.0	N/A	Pass
J__02_TopF	Living	1.6	N/A	Pass
J__02_TopF	SingleBedroom	0.8	75	Fail
House_E_00	KD	1.0	65	Fail
House_E_00	LivingRoom	0.6	43	Fail
HouseE01	DoubleBed1	0.7	53	Fail
HouseE01	SingleBed2	0.7	72	Fail
HouseE02	DoubleBed4	1.0	65	Fail
HouseE02	SingleBed3	0.6	43	Fail
House_E_1	KD	1.2	N/A	Pass
House_E_1	LivingRoom	4.1	N/A	Fail
HouseE3	DoubleBed1	1.1	64	Fail
HouseE3	SingleBed2	1.0	49	Fail
HouseE4	DoubleBed4	1.0	56	Fail
HouseE4	SingleBed3	0.7	72	Fail

Table C.2: Dwelling overheating results for DSY3 2020s – TM59

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
F101_2ndF2	DoubleBed	0.1	47	Fail
F101_2ndF2	LKD	0.3	N/A	Pass
F101_2ndF	DoubleBedroom2	0.0	44	Fail
F101_2ndF	LKD	0.1	N/A	Pass
F101_TopF3	DoubleBed	0.5	56	Fail
F101_TopF3	LKD	0.9	N/A	Pass
F101_TopF	DoubleBedroom2	0.0	47	Fail
F101_TopF	LKD	0.1	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
F1022ndF2	DoubleBed	0.1	59	Fail
F1022ndF2	LKD	0.8	N/A	Pass
F1022ndF	DoubleBed	0.0	56	Fail
F1022ndF	LKD	1.1	N/A	Pass
F102_TopF2	DoubleBed1	0.1	67	Fail
F102_TopF2	DoubleBed2	0.2	57	Fail
F102_TopF2	LKD	1.6	N/A	Pass
F102_TopFloor1	DoubleBed	1.0	73	Fail
F102_TopFloor1	LKD	1.8	N/A	Pass
F1_01_GF	DoubleBed	0.0	62	Fail
F1_01_GF	LKD	0.9	N/A	Pass
F_01EastFacing2ndF1	DoubleBed	0.0	44	Fail
F_01EastFacing2ndF1	LKD	0.3	N/A	Pass
F_01EastFacing2ndF	DoubleBed	0.0	46	Fail
F_01EastFacing2ndF	LKD	0.3	N/A	Pass
F_01EastFacingGF	DoubleBed	0.0	52	Fail
F_01EastFacingGF	LKD	1.0	N/A	Pass
F_01EastFacingTopF2	DoubleBed	0.2	50	Fail
F_01EastFacingTopF2	LKD	0.4	N/A	Pass
F_01EastFacingTopF2Q1	DoubleBed	0.2	55	Fail
F_01EastFacingTopF2Q1	LKD	0.5	N/A	Pass
F_01WestF_2ndF	DoubleBed1	0.2	57	Fail
F_01WestF_2ndF	DoubleBed2	0.1	55	Fail
F_01WestF_2ndF	LKD	0.9	N/A	Pass
F_01WestF_3rdF	DoubleBed1	0.2	55	Fail
F_01WestF_3rdF	DoubleBed2	0.1	53	Fail
F_01WestF_3rdF	LKD	0.9	N/A	Pass
F_01WestF_GF	DoubleBed1	0.0	67	Fail
F_01WestF_GF	DoubleBed2	0.0	61	Fail
F_01WestF_GF	LKD	2.2	N/A	Pass
F_02_WstFcng_2ndF2	Bedroom	0.0	54	Fail
F_02_WstFcng_2ndF2	LKD	0.9	N/A	Pass
F_02_WstFcng_3rdF1	DoubleBed1	0.0	54	Fail
F_02_WstFcng_3rdF1	LKD	0.7	N/A	Pass
F_02_WstFcng_TpF2	DoubleBed1	0.4	70	Fail

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
F_02_WstFcng_TpF2	LKD	1.1	N/A	Pass
G1_01_TopFloor	LKD	0.0	N/A	Pass
G1_02_2NDFloor1	DoubleBed1	0.4	81	Fail
G1_02_2NDFloor1	DoubleBed2	0.4	79	Fail
G1_02_2NDFloor1	LKD	1.3	N/A	Pass
G1_02_4thFloor	DoubleBed1	0.4	79	Fail
G1_02_4thFloor	DoubleBed2	0.4	78	Fail
G1_02_4thFloor	LKD	1.1	N/A	Pass
G2_01_5thFloor	LKD	0.0	N/A	Pass
G2_01_TopFloor	LKD	0.1	N/A	Pass
G2_02_GF_South	DoubleBed1	0.0	69	Fail
G2_02_GF_South	DoubleBed2	0.0	74	Fail
G2_02_GF_South	KitchenDining	2.1	N/A	Pass
G2_02_GF_South	Living	1.6	N/A	Pass
G2_02_GF_South	SingleBed3	0.0	68	Fail
G2_2_TopFloor	DoubleBedroom1	0.0	52	Fail
G2_2_TopFloor	DoubleBedroom2	0.0	51	Fail
G2_2_TopFloor	LKD	0.8	N/A	Pass
H1_03_2ndFloor	DoubleBed	0.0	49	Fail
H1_03_2ndFloor	LKD	0.2	N/A	Pass
H1_03_3rdFloor	DoubleBedroom	0.3	46	Fail
H1_03_3rdFloor	LKD	1.2	N/A	Pass
H1_03_TopFloor	DoubleBedroom	0.3	51	Fail
H1_03_TopFloor	LKD	1.3	N/A	Pass
H203TopF	DoubleBed1	0.1	82	Fail
H203TopF	DoubleBed2	0.2	61	Fail
H203TopF	LKD	1.4	N/A	Pass
H2_016th	DoubleBed	0.8	55	Fail
H2_016th	LKD	0.9	N/A	Pass
H2_01TopF	DoubleBed	0.7	57	Fail
H2_01TopF	LKD	0.7	N/A	Pass
H2_01_2ndFloor	DoubleBedroom	0.4	54	Fail
H2_01_2ndFloor	LKD	0.2	N/A	Pass
H2_01_3rdFloor	DoubleBedroom	0.1	39	Fail
H2_01_3rdFloor	LKD	0.3	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
H2_01_topF	DoubleBedroom	0.3	48	Fail
H2_01_topF	LKD	0.5	N/A	Pass
H2_03TopF	DoubleBed1	0.1	0	Pass
H2_03TopF	DoubleBed2	0.2	52	Fail
H2_03TopF	LKD	1.0	N/A	Pass
H2_04_GF	DoubleBed	0.0	48	Fail
H2_04_GF	LKD	0.2	N/A	Pass
H3_01_3rdFloor	DoubleBedroom1	0.0	59	Fail
H3_01_3rdFloor	DoubleBedroom2	0.4	65	Fail
H3_01_3rdFloor	LDK	0.9	N/A	Pass
H3_01_TopFloor	DoubleBedroom1	0.0	56	Fail
H3_01_TopFloor	DoubleBedroom2	0.2	60	Fail
H3_01_TopFloor	LDK	0.6	N/A	Pass
H3_02	DoubleBed	0.0	44	Fail
H3_02	LKD	0.5	N/A	Pass
H3_02_2ndFloor	DoubleBedroom1	0.0	65	Fail
H3_02_2ndFloor	DoubleBedroom2	0.0	49	Fail
H3_02_2ndFloor	LDK	0.7	N/A	Pass
H3_02_GF	DoubleBedroom1	0.0	72	Fail
H3_02_GF	DoubleBedroom2	0.0	56	Fail
H3_02_GF	LDK	1.8	N/A	Pass
H3_3	DoubleBed	0.0	50	Fail
H3_3	LKD	0.4	N/A	Pass
H4_01TopFloor	Bedroom	0.8	52	Fail
H4_01TopFloor	LDK	0.5	N/A	Pass
H4_01_2ndFloor	Bedroom	0.0	50	Fail
H4_01_2ndFloor	LDK	0.0	N/A	Pass
H4_01_3rdFloor	Bedroom	0.0	50	Fail
H4_01_3rdFloor	LDK	0.0	N/A	Pass
H4_01_GF	Bedroom	0.0	51	Fail
H4_01_GF	LDK	0.8	N/A	Pass
H4_03_2ndFloor	Bedroom	0.0	52	Fail
H4_03_2ndFloor	LDK	0.4	N/A	Pass
H4_2_3rdFloor	DoubleBed	0.0	44	Fail
H4_2_3rdFloor	LKD	0.4	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
J_01_4thFloor1	DoubleBed 1	0.0	56	Fail
J_01_4thFloor1	DoubleBed 2	0.0	56	Fail
J_01_4thFloor1	LKD	1.3	N/A	Pass
J_01_SF1TopFloor	DoubleBed 1	0.0	74	Fail
J_01_SF1TopFloor	DoubleBed 2	0.0	71	Fail
J_01_SF1TopFloor	LKD	1.2	N/A	Pass
J_01_SF	DOUBLEBED1	0.0	77	Fail
J_01_SF	DOUBLEBED2	0.0	80	Fail
J_01_SF	LKD	2.3	N/A	Pass
J3_01_2nd	DoubleBedroom	0.1	81	Fail
J3_01_2nd	LDK	0.1	N/A	Pass
J3_01_TopFloor	DoubleBedroom	0.0	81	Fail
J3_01_TopFloor	LDK	0.1	N/A	Pass
J3_03_TopFloor	DoubleBedroom	0.0	76	Fail
J3_03_TopFloor	LDK	0.8	N/A	Pass
J3_03_TopFloor	SingleBedroom	0.1	79	Fail
J_3	DoubleBed	0.0	63	Fail
J_3	LKD	0.0	N/A	Pass
J_4	DoubleBed	0.0	62	Fail
J_4	LKD	0.0	N/A	Pass
J_5_TopFloor	DoubleBed	0.0	67	Fail
J_5_TopFloor	LKD	0.0	N/A	Pass
J__01_2nd	DoubleBedroom	0.0	65	Fail
J__01_2nd	LDK	0.0	N/A	Pass
J__01_2ndFloor	DoubleBed1	0.0	57	Fail
J__01_2ndFloor	DoubleBed2	0.0	56	Fail
J__01_2ndFloor	LKD	1.5	N/A	Pass
J__01_3rd	DoubleBedroom	0.0	64	Fail
J__01_3rd	LDK	0.1	N/A	Pass
J__01_6thFloor	DoubleBedroom	0.1	54	Fail
J__01_6thFloor	DoubleBedroom2	0.1	51	Fail
J__01_6thFloor	LDK	1.5	N/A	Pass
J__01_TopFloor	DoubleBedroom	0.0	65	Fail
J__01_TopFloor	LDK	0.0	N/A	Pass
J__01_TopFloorQ1	DoubleBedroom	0.0	47	Fail

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
J__01_TopFloorQ1	DoubleBedroom2	0.0	48	Fail
J__01_TopFloorQ1	LDK	0.7	N/A	Pass
J__02_5th	DoubleBedroom1	0.2	51	Fail
J__02_5th	DoubleBedroom2	0.4	80	Fail
J__02_5th	Kitchen	0.2	N/A	Pass
J__02_5th	Living	1.4	N/A	Pass
J__02_5th	SingleBedroom	0.8	81	Fail
J__02_5thFloor	DoubleBedroom1	0.0	53	Fail
J__02_5thFloor	DoubleBedroom2	0.3	50	Fail
J__02_5thFloor	Kitchen	0.3	N/A	Pass
J__02_5thFloor	LivingRoom	1.2	N/A	Pass
J__02_5thFloor	SingleBedroom	0.7	57	Fail
J__02_TopF	DoubleBedroom1	0.2	56	Fail
J__02_TopF	DoubleBedroom2	0.5	83	Fail
J__02_TopF	Kitchen	0.5	N/A	Pass
J__02_TopF	Living	1.8	N/A	Pass
J__02_TopF	SingleBedroom	0.9	85	Fail
House_E_00	KD	0.0	N/A	Pass
House_E_00	LivingRoom	5.0	N/A	Fail
HouseE01	DoubleBed1	1.0	68	Fail
HouseE01	SingleBed2	1.0	41	Fail
HouseE02	DoubleBed4	1.0	44	Fail
HouseE02	SingleBed3	0.0	69	Fail
House_E_1	KD	1.0	N/A	Pass
House_E_1	LivingRoom	6.0	N/A	Fail
HouseE3	DoubleBed1	1.0	67	Fail
HouseE3	SingleBed2	1.0	46	Fail
HouseE4	DoubleBed4	1.0	46	Fail
HouseE4	SingleBed3	0.0	70	Fail

Table C.3: Dwelling overheating results for DSY1 2050s – TM59

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
F101_2ndF2	DoubleBed	0.2	58	Fail
F101_2ndF2	LKD	0.5	N/A	Pass
F101_2ndF	DoubleBed 2	0.1	55	Fail
F101_2ndF	LKD	0.3	N/A	Pass
F101_TopF3	DoubleBed	0.3	78	Fail
F101_TopF3	LKD	0.9	N/A	Pass
F101_TopF	DoubleBed 2	0.2	73	Fail
F101_TopF	LKD	0.3	N/A	Pass
F1022ndF2	DoubleBed	0.1	61	Fail
F1022ndF2	LKD	0.7	N/A	Pass
F1022ndF	DoubleBed	0.1	60	Fail
F1022ndF	LKD	0.7	N/A	Pass
F102_TopF2	DoubleBed 1	0.3	69	Fail
F102_TopF2	DoubleBed 2	0.2	75	Fail
F102_TopF2	LKD	1.0	N/A	Pass
F102_TopFloor1	DoubleBed	0.6	87	Fail
F102_TopFloor1	LKD	1.2	N/A	Pass
F1_01_GF	DoubleBed	0.0	63	Fail
F1_01_GF	LKD	0.7	N/A	Pass
F_01EastFacing2ndF1	DoubleBed	0.1	50	Fail
F_01EastFacing2ndF1	LKD	0.4	N/A	Pass
F_01EastFacing2ndF	DoubleBed	0.2	54	Fail
F_01EastFacing2ndF	LKD	0.4	N/A	Pass
F_01EastFacingGF	DoubleBed	0.0	55	Fail
F_01EastFacingGF	LKD	0.8	N/A	Pass
F_01EastFacingTopF2	DoubleBed	0.2	63	Fail
F_01EastFacingTopF2	LKD	0.5	N/A	Pass
F_01EastFacingTopF2Q1	DoubleBed	0.2	73	Fail
F_01EastFacingTopF2Q1	LKD	0.8	N/A	Pass
F_01WestF_2ndF	DoubleBed1	0.2	68	Fail
F_01WestF_2ndF	DoubleBed2	0.2	64	Fail
F_01WestF_2ndF	LKD	0.6	N/A	Pass
F_01WestF_3rdF	DoubleBed1	0.2	66	Fail

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
F_01WestF_3rdF	DoubleBed2	0.2	63	Fail
F_01WestF_3rdF	LKD	0.6	N/A	Pass
F_01WestF_GF	DoubleBed1	0.1	79	Fail
F_01WestF_GF	DoubleBed2	0.0	67	Fail
F_01WestF_GF	LKD	1.7	N/A	Pass
F_02_WstFcng_2ndF2	Bedroom	0.1	59	Fail
F_02_WstFcng_2ndF2	LKD	0.6	N/A	Pass
F_02_WstFcng_3rdF1	DoubleBed1	0.0	54	Fail
F_02_WstFcng_3rdF1	LKD	0.6	N/A	Pass
F_02_WstFcng_TpF2	DoubleBed1	0.4	77	Fail
F_02_WstFcng_TpF2	LKD	0.8	N/A	Pass
G1_01_TopFloor	LKD	0.0	N/A	Pass
G1_02_2NDFloor1	DoubleBed1	0.4	89	Fail
G1_02_2NDFloor1	DoubleBed2	0.4	87	Fail
G1_02_2NDFloor1	LKD	0.8	N/A	Pass
G1_02_4thFloor	DoubleBed1	0.4	85	Fail
G1_02_4thFloor	DoubleBed2	0.4	83	Fail
G1_02_4thFloor	LKD	0.8	N/A	Pass
G2_01_5thFloor	LKD	0.0	N/A	Pass
G2_01_TopFloor	LKD	0.3	N/A	Pass
G2_02_GF_South	DoubleBed1	0.0	74	Fail
G2_02_GF_South	DoubleBed2	0.1	87	Fail
G2_02_GF_South	KitchenDining	1.6	N/A	Pass
G2_02_GF_South	Living	1.1	N/A	Pass
G2_02_GF_South	SingleBed3	0.1	78	Fail
G2_2_TopFloor	DoubleBedroom1	0.1	58	Fail
G2_2_TopFloor	DoubleBedroom2	0.1	59	Fail
G2_2_TopFloor	LKD	0.6	N/A	Pass
H1_03_2ndFloor	DoubleBed	0.1	63	Fail
H1_03_2ndFloor	LKD	0.3	N/A	Pass
H1_03_3rdFloor	DoubleBed	0.3	55	Fail
H1_03_3rdFloor	LKD	0.7	N/A	Pass
H1_03_TopFloor	DoubleBed	0.4	60	Fail
H1_03_TopFloor	LKD	0.8	N/A	Pass
H203TopF	DoubleBed 1	0.3	77	Fail

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
H203TopF	DoubleBed 2	02	73	Fail
H203TopF	LKD	09	N/A	Pass
H2_016th	DoubleBed	0.5	65	Fail
H2_016th	LKD	0.8	N/A	Pass
H2_01TopF	DoubleBed	0.4	66	Fail
H2_01TopF	LKD	0.8	N/A	Pass
H2_01_2ndFloor	DoubleBed	0.3	56	Fail
H2_01_2ndFloor	LKD	0.5	N/A	Pass
H2_01_3rdFloor	DoubleBed	0.2	47	Fail
H2_01_3rdFloor	LKD	0.5	N/A	Pass
H2_01_topF	DoubleBed	0.2	57	Fail
H2_01_topF	LKD	0.6	N/A	Pass
H2_03TopF	DoubleBed 1	0.3	0.0	Pass
H2_03TopF	DoubleBed 2	0.2	72	Fail
H2_03TopF	LKD	0.5	N/A	Pass
H2_04_GF	DoubleBed	0.0	47	Fail
H2_04_GF	LKD	0.3	N/A	Pass
H3_01_3rdFloor	DoubleBed 1	0.2	81	Fail
H3_01_3rdFloor	DoubleBed 2	0.3	91	Fail
H3_01_3rdFloor	LDK	0.9	N/A	Pass
H3_01_TopFloor	DoubleBed 1	0.2	79	Fail
H3_01_TopFloor	DoubleBed 2	0.2	87	Fail
H3_01_TopFloor	LDK	0.8	N/A	Pass
H3_02	DoubleBed	0.1	58	Fail
H3_02	LKD	0.4	N/A	Pass
H3_02_2ndFloor	DoubleBed 1	0.0	55	Fail
H3_02_2ndFloor	DoubleBed 2	0.1	61	Fail
H3_02_2ndFloor	LDK	0.6	N/A	Pass
H3_02_GF	DoubleBed 1	0.0	66	Fail
H3_02_GF	DoubleBed 2	0.0	65	Fail
H3_02_GF	LDK	1.0	N/A	Pass
H3_3	DoubleBed	0.1	67	Fail
H3_3	LKD	0.4	N/A	Pass
H4_01TopFloor	DoubleBed	0.6	64	Fail
H4_01TopFloor	LDK	0.5	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
H4_01_2ndFloor	Bedroom	0.0	57	Fail
H4_01_2ndFloor	LDK	0.1	N/A	Pass
H4_01_3rdFloor	Bedroom	0.0	56	Fail
H4_01_3rdFloor	LDK	0.0	N/A	Pass
H4_01_GF	Bedroom	0.0	53	Fail
H4_01_GF	LDK	0.8	N/A	Pass
H4_03_2ndFloor	Bedroom	0.0	51	Fail
H4_03_2ndFloor	LDK	0.4	N/A	Pass
H4_2_3rdFloor	DoubleBed	0.1	52	Fail
H4_2_3rdFloor	DoubleBed 1	0.1	65	Fail
J_01_4thFloor1	DoubleBed 2	0.1	64	Fail
J_01_4thFloor1	LKD	0.8	N/A	Pass
J_01_4thFloor1	DoubleBed 1	0.3	89	Fail
J_01_SF1TopFloor	DoubleBed 2	0.1	85	Fail
J_01_SF1TopFloor	LKD	0.8	N/A	Pass
J_01_SF1TopFloor	DoubleBed 1	0.0	81	Fail
J_01_SF	DoubleBed 2	0.0	85	Fail
J_01_SF	LKD	1.7	N/A	Pass
J_01_SF	DoubleBed 1	0.1	65	Fail
J3_01_2nd	DoubleBed	0.1	95	Fail
J3_01_2nd	LDK	0.3	N/A	Pass
J3_01_TopFloor	DoubleBed	0.1	96	Fail
J3_01_TopFloor	LDK	0.3	N/A	Pass
J3_03_TopFloor	DoubleBedroom	0.1	80	Fail
J3_03_TopFloor	LDK	0.5	N/A	Pass
J3_03_TopFloor	SingleBedroom	0.3	83	Fail
J_3	DoubleBed	0.0	22	Pass
J_3	LKD	0.0	N/A	Pass
J_4	DoubleBed	0.0	21	Pass
J_4	LKD	0.0	N/A	Pass
J_5_TopFloor	DoubleBed	0.0	24	Pass
J_5_TopFloor	LKD	0.0	N/A	Pass
J__01_2nd	DoubleBedroom	0.0	23	Pass
J__01_2nd	LDK	0.0	N/A	Pass
J__01_2ndFloor	DoubleBed1	0.0	19	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
J__01_2ndFloor	DoubleBed2	0.0	19	Pass
J__01_2ndFloor	LKD	0.3	N/A	Pass
J__01_3rd	DoubleBedroom	0.0	22	Pass
J__01_3rd	LDK	0.0	N/A	Pass
J__01_6thFloor	DoubleBedroom	0.0	20	Pass
J__01_6thFloor	DoubleBedroom2	0.0	19	Pass
J__01_6thFloor	LDK	0.4	N/A	Pass
J__01_TopFloor	DoubleBedroom	0.0	22	Pass
J__01_TopFloor	LDK	0.0	N/A	Pass
J__01_TopFloorQ1	DoubleBedroom	0.0	17	Pass
J__01_TopFloorQ1	DoubleBedroom2	0.0	17	Pass
J__01_TopFloorQ1	LDK	0.1	N/A	Pass
J__02_5th	DoubleBedroom1	0.0	18	Pass
J__02_5th	DoubleBedroom2	0.0	25	Pass
J__02_5th	Kitchen	0.0	N/A	Pass
J__02_5th	Living	0.3	N/A	Pass
J__02_5th	SingleBedroom	0.1	28	Pass
J__02_5thFloor	DoubleBedroom1	0.0	15	Pass
J__02_5thFloor	DoubleBedroom2	0.1	23	Pass
J__02_5thFloor	Kitchen	0.1	N/A	Pass
J__02_5thFloor	LivingRoom	0.2	N/A	Pass
J__02_5thFloor	SingleBedroom	0.2	30	Pass
J__02_TopF	DoubleBedroom1	0.0	25	Pass
J__02_TopF	DoubleBedroom2	0.0	30	Pass
J__02_TopF	Kitchen	0.0	N/A	Pass
J__02_TopF	Living	0.5	N/A	Pass
J__02_TopF	SingleBedroom	0.3	32	Fail
House_E_00	KD	0.4	N/A	Pass
House_E_00	LivingRoom	6.5	N/A	Fail
HouseE01	DoubleBed1	0.7	77	Fail
HouseE01	SingleBed2	0.3	57	Fail
HouseE02	DoubleBed4	0.3	63	Fail
HouseE02	SingleBed3	0.4	74	Fail
House_E_1	KD	0.7	N/A	Pass
House_E_1	LivingRoom	7.2	N/A	Fail

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
HouseE3	DoubleBed1	0.6	76	Fail
HouseE3	SingleBed2	0.7	70	Fail
HouseE4	DoubleBed4	0.7	68	Fail
HouseE4	SingleBed3	0.4	76	Fail

Table C.4: Dwelling overheating results for DSY1 2080s – TM59

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
F101_2ndF2	DoubleBed	0.4	176	Fail
F101_2ndF2	LKD	0.9	N/A	Pass
F101_2ndF	DoubleBedroom2	0.3	166	Fail
F101_2ndF	LKD	0.7	N/A	Pass
F101_TopF3	DoubleBed	0.9	217	Fail
F101_TopF3	LKD	1.8	N/A	Pass
F101_TopF	DoubleBedroom2	0.5	211	Fail
F101_TopF	LKD	0.8	N/A	Pass
F1022ndF2	DoubleBed	0.5	188	Fail
F1022ndF2	LKD	1.8	N/A	Pass
F1022ndF	DoubleBed	0.4	185	Fail
F1022ndF	LKD	1.7	N/A	Pass
F102_TopF2	DoubleBed1	0.8	200	Fail
F102_TopF2	DoubleBed2	0.5	208	Fail
F102_TopF2	LKD	2.7	N/A	Pass
F102_TopFloor1	DoubleBed	1.6	226	Fail
F102_TopFloor1	LKD	3.4	N/A	Fail
F1_01_GF	DoubleBed	0.2	200	Fail
F1_01_GF	LKD	1.6	N/A	Pass
F_01EastFacing2ndF1	DoubleBed	0.3	156	Fail
F_01EastFacing2ndF1	LKD	0.9	N/A	Pass
F_01EastFacing2ndF	DoubleBed	0.3	163	Fail
F_01EastFacing2ndF	LKD	0.8	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
F_01EastFacingGF	DoubleBed	0.3	170	Fail
F_01EastFacingGF	LKD	1.9	N/A	Pass
F_01EastFacingTopF2	DoubleBed	0.5	189	Fail
F_01EastFacingTopF2	LKD	1.1	N/A	Pass
F_01EastFacingTopF2Q1	DoubleBed	0.5	220	Fail
F_01EastFacingTopF2Q1	LKD	1.5	N/A	Pass
F_01WestF_2ndF	DoubleBed1	0.6	205	Fail
F_01WestF_2ndF	DoubleBed2	0.5	197	Fail
F_01WestF_2ndF	LKD	1.5	N/A	Pass
F_01WestF_3rdF	DoubleBed1	0.6	199	Fail
F_01WestF_3rdF	DoubleBed2	0.5	192	Fail
F_01WestF_3rdF	LKD	1.5	N/A	Pass
F_01WestF_GF	DoubleBed1	0.3	236	Fail
F_01WestF_GF	DoubleBed2	0.3	212	Fail
F_01WestF_GF	LKD	5.4	N/A	Fail
F_02_WstFcng_2ndF2	Bedroom	0.4	179	Fail
F_02_WstFcng_2ndF2	LKD	1.4	N/A	Pass
F_02_WstFcng_3rdF1	DoubleBed1	0.3	167	Fail
F_02_WstFcng_3rdF1	LKD	1.6	N/A	Pass
F_02_WstFcng_TpF2	DoubleBed1	0.9	218	Fail
F_02_WstFcng_TpF2	LKD	2.3	N/A	Pass
G1_01_TopFloor	LKD	0.5	N/A	Pass
G1_02_2NDFloor1	DoubleBed1	1.0	246	Fail
G1_02_2NDFloor1	DoubleBed2	0.9	243	Fail
G1_02_2NDFloor1	LKD	2.0	N/A	Pass
G1_02_4thFloor	DoubleBed1	1.0	236	Fail
G1_02_4thFloor	DoubleBed2	0.9	232	Fail
G1_02_4thFloor	LKD	1.8	N/A	Pass
G2_01_5thFloor	LKD	0.5	N/A	Pass
G2_01_TopFloor	LKD	0.7	N/A	Pass
G2_02_GF_South	DoubleBed1	0.3	231	Fail
G2_02_GF_South	DoubleBed2	0.4	261	Fail
G2_02_GF_South	KitchenDining	4.6	N/A	Fail
G2_02_GF_South	Living	3.4	N/A	Fail
G2_02_GF_South	SingleBed3	0.3	233	Fail

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
G2_2_TopFloor	DoubleBedroom1	0.3	183	Fail
G2_2_TopFloor	DoubleBedroom2	0.3	184	Fail
G2_2_TopFloor	LKD	1.5	N/A	Pass
H1_03_2ndFloor	DoubleBed	0.3	190	Fail
H1_03_2ndFloor	LKD	1.0	N/A	Pass
H1_03_3rdFloor	DoubleBedroom	0.9	162	Fail
H1_03_3rdFloor	LKD	1.8	N/A	Pass
H1_03_TopFloor	DoubleBedroom	1.1	176	Fail
H1_03_TopFloor	LKD	2.1	N/A	Pass
H203TopF	DoubleBed1	0.7	222	Fail
H203TopF	DoubleBed2	0.4	203	Fail
H203TopF	LKD	2.2	N/A	Pass
H2_016th	DoubleBed	1.2	183	Fail
H2_016th	LKD	1.9	N/A	Pass
H2_01TopF	DoubleBed	1.1	188	Fail
H2_01TopF	LKD	1.8	N/A	Pass
H2_01_2ndFloor	DoubleBedroom	0.7	166	Fail
H2_01_2ndFloor	LKD	1.0	N/A	Pass
H2_01_3rdFloor	DoubleBedroom	0.5	143	Fail
H2_01_3rdFloor	LKD	1.0	N/A	Pass
H2_01_topF	DoubleBedroom	0.7	168	Fail
H2_01_topF	LKD	1.2	N/A	Pass
H2_03TopF	DoubleBed1	0.7	0	Pass
H2_03TopF	DoubleBed2	0.6	213	Fail
H2_03TopF	LKD	1.6	N/A	Pass
H2_04_GF	DoubleBed	0.3	152	Fail
H2_04_GF	LKD	0.6	N/A	Pass
H3_01_3rdFloor	DoubleBedroom1	0.3	245	Fail
H3_01_3rdFloor	DoubleBedroom2	0.9	270	Fail
H3_01_3rdFloor	LDK	1.9	N/A	Pass
H3_01_TopFloor	DoubleBedroom1	0.3	247	Fail
H3_01_TopFloor	DoubleBedroom2	0.6	261	Fail
H3_01_TopFloor	LDK	1.6	N/A	Pass
H3_02	DoubleBed	0.3	179	Fail
H3_02	LKD	1.2	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
H3_02_2ndFloor	DoubleBedroom1	0.3	180	Fail
H3_02_2ndFloor	DoubleBedroom2	0.4	186	Fail
H3_02_2ndFloor	LDK	1.52	N/A	Pass
H3_02_GF	DoubleBedroom1	0.2	199	Fail
H3_02_GF	DoubleBedroom2	0.3	212	Fail
H3_02_GF	LDK	2.9	N/A	Pass
H3_3	DoubleBed	0.3	202	Fail
H3_3	LKD	1.2	N/A	Pass
H4_01TopFloor	Bedroom	1.5	181	Fail
H4_01TopFloor	LDK	1.1	N/A	Pass
H4_01_2ndFloor	Bedroom	0.3	174	Fail
H4_01_2ndFloor	LDK	0.6	N/A	Pass
H4_01_3rdFloor	Bedroom	0.3	172	Fail
H4_01_3rdFloor	LDK	0.6	N/A	Pass
H4_01_GF	Bedroom	0.3	166	Fail
H4_01_GF	LDK	1.9	N/A	Pass
H4_03_2ndFloor	Bedroom	0.3	163	Fail
H4_03_2ndFloor	LDK	1.2	N/A	Pass
H4_2_3rdFloor	DoubleBed	0.3	166	Fail
H4_2_3rdFloor	LKD	1.0	N/A	Pass
J_01_4thFloor1	DoubleBed1	0.4	197	Fail
J_01_4thFloor1	DoubleBed2	0.4	196	Fail
J_01_4thFloor1	LKD	1.8	N/A	Pass
J_01_SF1TopFloor	DoubleBed1	0.4	255	Fail
J_01_SF1TopFloor	DoubleBed2	0.4	246	Fail
J_01_SF1TopFloor	LKD	1.7	N/A	Pass
J_01_SF	DoubleBed1	0.2	244	Fail
J_01_SF	DoubleBed2	0.2	259	Fail
J_01_SF	LKD	5.0	N/A	Fail
J3_01_2nd	DoubleBedroom	0.6	280	Fail
J3_01_2nd	LDK	0.9	N/A	Pass
J3_01_TopFloor	DoubleBedroom	0.5	283	Fail
J3_01_TopFloor	LDK	0.8	N/A	Pass
J3_03_TopFloor	DoubleBedroom	0.5	232	Fail
J3_03_TopFloor	LDK	1.2	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
J3_03_TopFloor	SingleBedroom	0.7	239	Fail
J_3	DoubleBed	0.3	225	Fail
J_3	LKD	0.6	N/A	Pass
J_4	DoubleBed	0.3	221	Fail
J_4	LKD	0.7	N/A	Pass
J_5_TopFloor	DoubleBed	0.3	238	Fail
J_5_TopFloor	LKD	0.6	N/A	Pass
J__01_2nd	DoubleBedroom	0.3	229	Fail
J__01_2nd	LDK	0.7	N/A	Pass
J__01_2ndFloor	DoubleBed1	0.4	188	Fail
J__01_2ndFloor	DoubleBed2	0.3	184	Fail
J__01_2ndFloor	LKD	2.1	N/A	Pass
J__01_3rd	DoubleBedroom	0.3	229	Fail
J__01_3rd	LDK	1.0	N/A	Pass
J__01_6thFloor	DoubleBedroom	0.5	187	Fail
J__01_6thFloor	DoubleBedroom2	0.5	182	Fail
J__01_6thFloor	LDK	2.4	N/A	Pass
J__01_TopFloor	DoubleBedroom	0.3	235	Fail
J__01_TopFloor	LDK	0.6	N/A	Pass
J__01_TopFloorQ1	DoubleBedroom	0.3	178	Fail
J__01_TopFloorQ1	DoubleBedroom2	0.3	184	Fail
J__01_TopFloorQ1	LDK	1.6	N/A	Pass
J__02_5th	DoubleBedroom1	0.3	190	Fail
J__02_5th	DoubleBedroom2	0.8	220	Fail
J__02_5th	Kitchen	1.0	N/A	Pass
J__02_5th	Living	1.9	N/A	Pass
J__02_5th	SingleBedroom	1.3	226	Fail
J__02_5thFloor	DoubleBedroom1	0.4	167	Fail
J__02_5thFloor	DoubleBedroom2	0.7	213	Fail
J__02_5thFloor	Kitchen	1.0	N/A	Pass
J__02_5thFloor	LivingRoom	1.7	N/A	Pass
J__02_5thFloor	SingleBedroom	1.1	233	Fail
J__02_TopF	DoubleBedroom1	0.4	210	Fail
J__02_TopF	DoubleBedroom2	1.0	233	Fail
J__02_TopF	Kitchen	1.3	N/A	Pass

Unit	Room	Criterion A (%)	Criterion B (hr)	Pass/Fail
		Hours of Exceedance (Pass ≤ 3%)	Bedroom temperature > 26°C (Pass ≤ 32 hrs)	
J__02_TopF	Living	3.0	N/A	Pass
J__02_TopF	SingleBedroom	1.5	240	Fail
House_E_00	KD	1.0	N/A	Pass
House_E_00	LivingRoom	13.2	N/A	Fail
HouseE01	DoubleBed1	1.7	203	Fail
HouseE01	SingleBed2	0.7	165	Fail
HouseE02	DoubleBed4	0.9	186	Fail
HouseE02	SingleBed3	1.0	225	Fail
House_E_1	KD	1.9	N/A	Pass
House_E_1	LivingRoom	14.1	N/A	Fail
HouseE3	DoubleBed1	1.7	202	Fail
HouseE3	SingleBed2	1.9	190	Fail
HouseE4	DoubleBed4	1.8	193	Fail
HouseE4	SingleBed3	0.9	233	Fail

Corridors

Table C.5: TM59 overheating results for corridors under DSV2 2020s

Block	Zone	Hours of Exceedance (Pass ≤ 3%)	Pass/Fail
F1	CORRIDOR1	13.6	Fail
F1	CORRIDOR2	14.7	Fail
F1	CORRIDOR3	14.3	Fail
F1	STAIRS	15.6	Fail
F	CORRIDOR1	11.8	Fail
F	CORRIDOR2	10.2	Fail
F	CORRIDOR3	11.5	Fail
F	STAIRS	12.0	Fail
H3	STAIRS	12.4	Fail
H3	CORRIDOR1	2.7	Pass
H3	CORRIDOR2	2.3	Pass
H3	CORRIDOR3	2.8	Pass
J	STAIRS	2.4	Pass
J	CORRIDOR1	9.9	Fail
J	CORRIDOR2	12.4	Fail
J	CORRIDOR3	11.9	Fail

Table C.6: TM59 overheating results for corridors under DSV3 2020s

Block	Zone	Hours of Exceedance (Pass ≤ 3%)	Pass/Fail
F1	CORRIDOR1	0.4	Pass
F1	CORRIDOR2	0.5	Pass
F1	CORRIDOR3	0.9	Pass
F1	STAIRS	2.3	Pass
F	CORRIDOR1	0.2	Pass
F	CORRIDOR2	0.3	Pass
F	CORRIDOR3	0.4	Pass
F	STAIRS	0.0	Pass
H3	STAIRS	0.0	Pass
H3	CORRIDOR1	2.0	Pass
H3	CORRIDOR2	1.8	Pass

Block	Zone	Hours of Exceedance (Pass ≤ 3%)	Pass/Fail
H3	CORRIDOR3	2.8	Pass
J	STAIRS	2.1	Pass
J	CORRIDOR1	0.0	Pass
J	CORRIDOR2	0.0	Pass
J	CORRIDOR3	0.0	Pass

Table C.7: TM59 overheating results for corridors under DSY1 2050s

Block	Zone	Hours of Exceedance (Pass ≤ 3%)	Pass/Fail
F1	CORRIDOR1	19.9	Fail
F1	CORRIDOR2	21.4	Fail
F1	CORRIDOR3	21.3	Fail
F1	STAIRS	22.3	Fail
F	CORRIDOR1	18.3	Fail
F	CORRIDOR2	18.2	Fail
F	CORRIDOR3	18.7	Fail
F	STAIRS	17.6	Fail
H3	STAIRS	18.8	Fail
H3	CORRIDOR1	5.9	Fail
H3	CORRIDOR2	4.8	Fail
H3	CORRIDOR3	5.3	Fail
J	STAIRS	4.3	Fail
J	CORRIDOR1	16.7	Fail
J	CORRIDOR2	17.6	Fail
J	CORRIDOR3	17.3	Fail

Table C.8: TM59 overheating results for corridors under DSY1 2080s

Block	Zone	Hours of Exceedance (Pass ≤ 3%)	Pass/Fail
F1	CORRIDOR1	30.6	Fail
F1	CORRIDOR2	31.1	Fail
F1	CORRIDOR3	31.3	Fail
F1	STAIRS	31.9	Fail
F	CORRIDOR1	28.7	Fail

Block	Zone	Hours of Exceedance (Pass ≤ 3%)	Pass/Fail
F	CORRIDOR2	28.1	Fail
F	CORRIDOR3	28.9	Fail
F	STAIRS	28.8	Fail
H3	STAIRS	28.9	Fail
H3	CORRIDOR1	15.4	Fail
H3	CORRIDOR2	14.4	Fail
H3	CORRIDOR3	14.9	Fail
J	STAIRS	13.6	Fail
J	CORRIDOR1	29.4	Fail
J	CORRIDOR2	30.0	Fail
J	CORRIDOR3	29.9	Fail

Appendix D

Acoustic Technical Note (Cass Allen)

St. Ann's Hospital, Haringey

Architectural & Environmental Acousticians
Noise & Vibration Engineers

Phase 1B & 2 – Part O Guidance

Client: HILL
Ref: TN01-21150-R0
Date: 16 May 2023
Note by: Henry Cox, BEng AMIOA, Acoustics Consultant
Quality assurance: Sam Bryant, MPhys CEng MIOA, Director

Approved Document O – Noise Criteria

1.1 Part O of the Building Regulations (Approved Document O) states that:

“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 (11pm to 7am).

Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

a. 40dB LAeq,T, averaged over 8 hours (between 11pm and 7am).

b. 55dB LAFmax, more than 10 times a night (between 11pm and 7am).”

Assessment

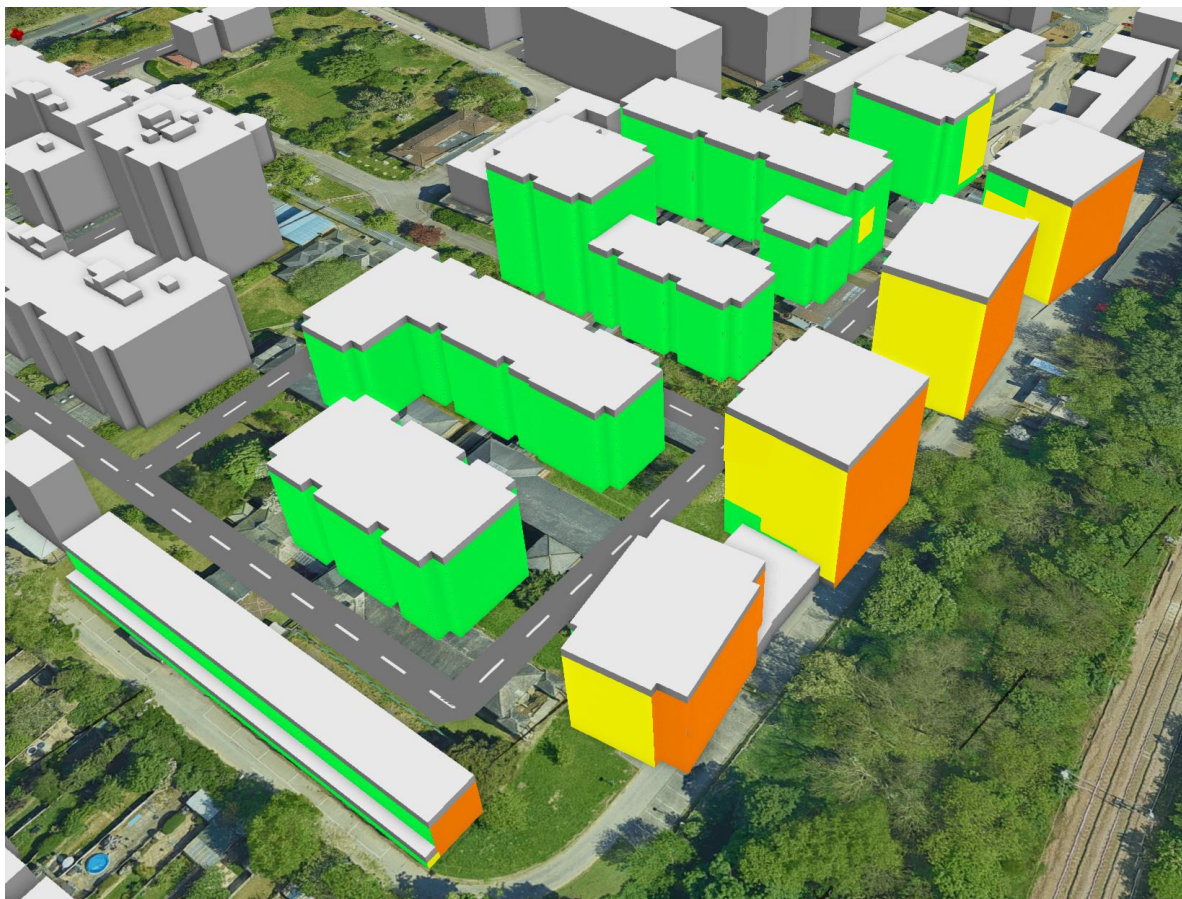
1.2 This assessment is based on the noise survey carried out by Cass Allen, the results of which are set out in Tables 12.11 and 12.12 of Chapter 12 – Noise and Vibration of the ES, and subsequent 3D noise modelling in CadnaA V2023. The 3D model was calibrated to the results of the site noise survey, in order to calculate the spread of noise levels at the facades of the development.

1.3 Calculations have been carried out based on guidance in BS8233:2014 ‘Guidance on sound insulation and noise reduction for buildings’ and the Association of Noise Consultants draft “Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O” Version 1.0 (July 2022) to estimate the extent of open window area in bedrooms during the night that would result in compliance with the above limits. A markup of these estimated areas is provided in Appendix 1.

- 1.4 This information can be submitted to the relevant project design team members to assist with the overheating risk assessment and strategy (e.g. TM59 assessment) used to demonstrate compliance with Part O.
- 1.5 The guidance is provided as actual open area, which should not be confused with (and may need to be converted to) “equivalent” open area used in ventilation and overheating risk calculations. This area is provided as a percentage of the floor area of bedrooms and therefore is still applicable if room sizes are changed.
- 1.6 This design assessment is based on current best practice, including the current draft ANC guidelines, and is considered to be fully compliant with ADO requirements. It is important to note that the final achieved noise levels in the finished development will vary given the natural fluctuation in ambient noise levels, the final window design and the inherent uncertainty in acoustic calculations and predictions. It is therefore strongly recommended that compliance with this element of Part O is sought at the design stage based on this information rather than relying on internal noise level testing at a later date.

Appendix 1 Marked Up Elevations

South West View



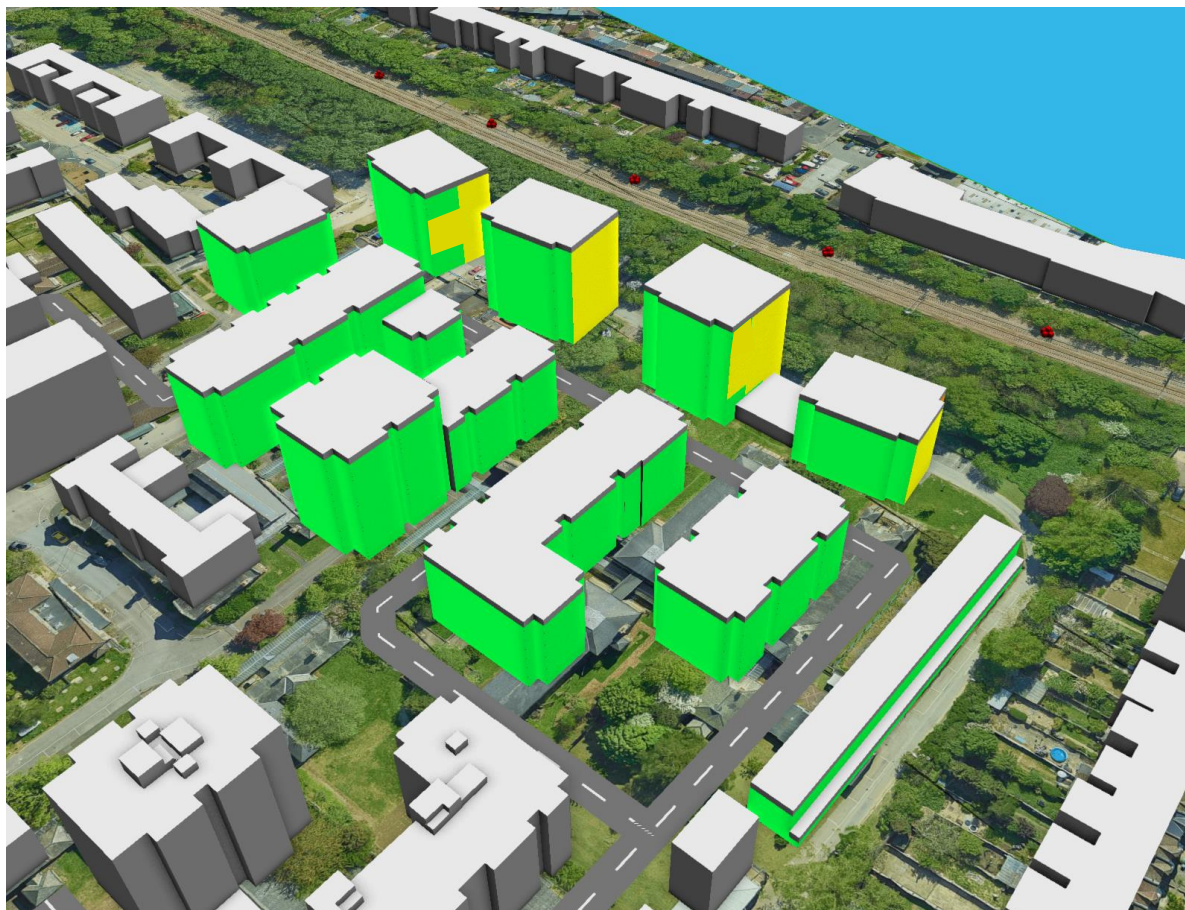
Ref.	Colour	Outside-to-inside noise reduction requirement	Open window area, bedrooms only, 2300-0700hrs
ADO01	Green	5 dB	Estimated to result in noise levels compliant with ADO limits with windows partially open up to ~13% of floor area (e.g. 1.3m ² for an indicative bedroom of 10m ² floor area).
ADO02	Yellow	10 dB	Estimated to result in noise levels compliant with ADO limits with windows partially open up to ~4% of floor area (e.g. 0.4m ² for an indicative bedroom of 10m ² floor area).
ADO03	Orange	13 dB	Estimated to result in noise levels compliant with ADO limits with windows partially open up to ~2% of floor area (e.g. 0.2m ² for an indicative bedroom of 10m ² floor area).

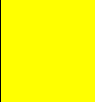
Note 1 ADO requirements only apply to bedrooms and only at night (2300-0700hrs).

Note 2 These values are based on calculations from BS8233:2014, as used in the published draft document “*Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O*” Version 1.0 July 2022, by the Association of Noise Consultants. The values assume floor-to-ceiling height of minimum 2.4m.

Note 3 The window open area is specified above as an actual open area, not ‘equivalent open area’ and the values may therefore need to be converted as part of the overheating assessment.

North West View



Ref.	Colour	Outside-to-inside noise reduction requirement	Open window area, bedrooms only, 2300-0700hrs
ADO01		5 dB	Estimated to result in noise levels compliant with ADO limits with windows partially open up to ~13% of floor area (e.g. 1.3m ² for an indicative bedroom of 10m ² floor area).
ADO02		10 dB	Estimated to result in noise levels compliant with ADO limits with windows partially open up to ~4% of floor area (e.g. 0.4m ² for an indicative bedroom of 10m ² floor area).
ADO03		13 dB	Estimated to result in noise levels compliant with ADO limits with windows partially open up to ~2% of floor area (e.g. 0.2m ² for an indicative bedroom of 10m ² floor area).

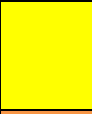
Note 1 ADO requirements only apply to bedrooms and only at night (2300-0700hrs).

Note 2 These values are based on calculations from BS8233:2014, as used in the published draft document “*Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O*” Version 1.0 July 2022, by the Association of Noise Consultants. The values assume floor-to-ceiling height of minimum 2.4m.

Note 3 The window open area is specified above as an actual open area, not ‘equivalent open area’ and the values may therefore need to be converted as part of the overheating assessment.

North East View



Ref.	Colour	Outside-to-inside noise reduction requirement	Open window area, bedrooms only, 2300-0700hrs
ADO01		5 dB	Estimated to result in noise levels compliant with ADO limits with windows partially open up to ~13% of floor area (e.g. 1.3m ² for an indicative bedroom of 10m ² floor area).
ADO02		10 dB	Estimated to result in noise levels compliant with ADO limits with windows partially open up to ~4% of floor area (e.g. 0.4m ² for an indicative bedroom of 10m ² floor area).
ADO03		13 dB	Estimated to result in noise levels compliant with ADO limits with windows partially open up to ~2% of floor area (e.g. 0.2m ² for an indicative bedroom of 10m ² floor area).

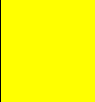
Note 1 ADO requirements only apply to bedrooms and only at night (2300-0700hrs).

Note 2 These values are based on calculations from BS8233:2014, as used in the published draft document “*Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O*” Version 1.0 July 2022, by the Association of Noise Consultants. The values assume floor-to-ceiling height of minimum 2.4m.

Note 3 The window open area is specified above as an actual open area, not ‘equivalent open area’ and the values may therefore need to be converted as part of the overheating assessment.

South East View



Ref.	Colour	Outside-to-inside noise reduction requirement	Open window area, bedrooms only, 2300-0700hrs
ADO01		5 dB	Estimated to result in noise levels compliant with ADO limits with windows partially open up to ~13% of floor area (e.g. 1.3m ² for an indicative bedroom of 10m ² floor area).
ADO02		10 dB	Estimated to result in noise levels compliant with ADO limits with windows partially open up to ~4% of floor area (e.g. 0.4m ² for an indicative bedroom of 10m ² floor area).
ADO03		13 dB	Estimated to result in noise levels compliant with ADO limits with windows partially open up to ~2% of floor area (e.g. 0.2m ² for an indicative bedroom of 10m ² floor area).

Note 1 ADO requirements only apply to bedrooms and only at night (2300-0700hrs).

Note 2 These values are based on calculations from BS8233:2014, as used in the published draft document “*Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O*” Version 1.0 July 2022, by the Association of Noise Consultants. The values assume floor-to-ceiling height of minimum 2.4m.

Note 3 The window open area is specified above as an actual open area, not ‘equivalent open area’ and the values may therefore need to be converted as part of the overheating assessment.

Appendix E

Overheating Mitigation Strategy Mark-up

G-value mark-up



Figure E.1: Proposed G-values for all levels

Ventilation mark-up

Minimum Part F

90 l/s

110 l/s



Figure E.2: Proposed ventilation strategy for dwellings

Cooling mark-up

Due to noise constraints
limiting window opening

Cooling bolt-on to MVHR system (air tempering / peak lopping)

OR

Cooling system through other means with capacity determined by M&E consultant



Figure E.3: Proposed cooling strategy for dwellings