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BEDHAMPTON PHASE 2 OVERHEATING ASSESSMENT

Technical Report: R11014-4 Rev 0

Date: 31 October 2025

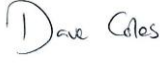
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Document Status and Approval Schedule

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1.0 INTRODUCTION

- 1.1 24 Acoustics Ltd has been appointed by Bargate Homes Ltd to provide an overheating risk assessment for the Bedhampton Phase 2 residential development.

2.0 SITE DESCRIPTION AND CONSTRAINTS

- 2.1 The A27 junction with Bedhampton Roundabout follows the site's western boundary. The A3(M) junction with the A27 lies further west and a train line follows the site's southern boundary. The main carriageway of the A27 lies further south at a distance of approximately 200 m. The site layout is described in Figure 1.
- 2.2 There are restrictions to window openings due to noise for properties facing the road and railway, as previously identified by 24 Acoustics (report reference R8907-5 Rev 2). The site is in a 'moderate' overheating risk location, as defined in Approved Document O.

3.0 STANDARDS AND GUIDANCE

- 3.1 The following guidance documents have been referenced in the preparation of this assessment.

Approved Document O of the Building Regulations

- 3.2 The requirement to assess overheating is stated in Part O of the Building Regulations (ADO). The principal requirements of Part O are as follows:

(1) Reasonable provision must be made in respect of a dwelling, institution or any other building containing one or more rooms for residential purposes, other than a room in a hotel ("residences") to –

- a. limit unwanted solar gains in summer;*
- b. provide an adequate means to remove heat from the indoor environment.*

(2) In meeting the obligations in paragraph (1) –

- a. account must be taken of the safety of any occupant, and their reasonable enjoyment of the residence; and*
- b. mechanical cooling may only be used where insufficient heat is capable of being removed from the indoor environment without it.*

3.3 ADO refers to noise levels within the dwellings. Section 3 states that windows are likely to need to be closed during sleeping hours if noise within bedrooms exceeds the following levels:

- 40dB $L_{Aeq,T}$, averaged over 8 hours (between 11pm and 7am).
- 55dB L_{AFmax} , more than 10 times a night (between 11pm and 7am).

3.4 The Frequently Asked Questions (FAQ) for Approved Document O (published by the Department for Levelling Up, Housing and Communities, June 2022) provides additional clarifications. Of relevance here, it states that homes are considered predominantly naturally ventilated where mechanical ventilation is provided for cooling at night.

3.5 ADO offers a simplified method of assessing overheating and where this is not sufficient (which is typically the case when noise issues are present), the document calls for detailed dynamic thermal modelling in accordance with TM59.

TM59 – CIBSE: Design Methodology for the Assessment of Overheating Risk in Homes

3.6 TM59 provides a standardised approach to predicting overheating using dynamic thermal modelling.

3.7 TM59 draws a distinction between homes that are predominantly naturally ventilated and those that are mainly mechanically ventilated. The former group is assessed using the adaptive method and dwellings within the group are required to pass both of the following criteria:

1. For living rooms, kitchens and bedrooms: the number of hours during which ΔT is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 3 per cent of occupied hours. (CIBSE TM52 Criterion 1: Hours of exceedance).

NB: ΔT is defined as the difference between the actual operative temperature in the room at any time (T_{op}) and the limiting maximum acceptable temperature (T_{max}).

2. 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).

- 3.8 Homes that are predominantly mechanically ventilated (with restricted window openings) are assessed using the fixed temperature test, 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)).
- 3.9 TM59 acknowledges that the methodology is necessarily prescriptive to enable it to be consistently applied. To undertake the assessment, information on the heat loads, thermal properties of the building construction, weather data and methods of providing ventilation are required.
- 3.10 The weather file used for the methodology should be the DSY1 (design summer year) file most appropriate for the site location for the 2020s, high emissions, 50% percentile scenario.

4.0 THERMAL MODEL

- 4.1 Representative plots have been selected for this risk assessment based on their exposure to noise, glazed area and orientation (see Figure 1). Details of the thermal modelling exercise and construction information (including the required glazing performance data) are described in Appendix A.
- 4.2 The parameters outlined in TM59 are standardised and do not necessarily represent the future building, which may have differing operations and heat gain patterns. External weather conditions will also vary compared to the standard CIBSE weather files. Therefore, the output of the model is an assessment of the risk of overheating rather than a prediction of conditions in the occupied building.

Risk Assessment

- 4.3 The following thermal modelling criteria apply for predominantly naturally ventilated dwellings, including those served by MEV/MVHR and where mechanical ventilation is provided for cooling:
- A. Temperature difference in habitable rooms no more than 3 per cent of occupied hours. (CIBSE TM52 Criterion 1: Hours of exceedance).
 - B. The operative temperature in bedrooms from 10 pm to 7 am shall not exceed 26 °C for more than 1% of annual hours. (i.e., no more than 32 hours above 26 °C).
- 4.4 The proposed dwellings do not form part of a care home or facility specifically for vulnerable occupants. Therefore, the standard CAT II thermal comfort category applies.

- 4.5 Appendix B describes the results of the overheating analysis for DSY1 2020 for a representative sample of plots in line with TM59.
- 4.6 To achieve the ADO requirements for overheating, it will be necessary to provide enhanced ventilation to some plots, as discussed in Section 5.

5.0 NOISE AND OVERHEATING MITIGATION MEASURES

- 5.1 In addition to the construction parameters set out in Appendix A, noise mitigation measures for the scheme include:
- Glazing and ventilation sound insulation performance (please refer to 24 Acoustics' report reference R11014-1 Rev 1)
 - Some bedrooms require windows to be partially or fully closed at night to comply with the requirements of Approved Document O (detailed in Appendix C)
- 5.2 The proposed ventilation strategy is mechanical extract with trickle vents. The design describes all first floor window panes to be openable and further mitigation measures applied to the overheating models include:
- Bedrooms constrained by noise require enhanced ventilation rates provided by dedicated extract fans, MEV or DMEV
- 5.3 A schedule of mitigation measures for each plot (including the window opening areas assumed in the model) is provided in Appendix C.
- 5.4 Noise associated with high ventilation rates may present a risk of disturbance to residents. This is not a regulatory issue but please contact 24 Acoustics if assistance is required in assessing/addressing this risk.
- 5.5 Please ensure that the mitigation measures required to demonstrate compliance with Approved Document O are provided in the residents' Home User Guide, as described in Section 9 of Approved Document L, Volume 1: Dwellings.

6.0 CONCLUSIONS

- 6.1 An overheating risk assessment has been completed for the Bedhampton Phase 2 residential development.
- 6.2 The construction and ventilation details are set out in Appendix A and the mitigation measures applied to the overheating models to demonstrate compliance with Approved Document O are set out in Appendix C.



Project: Bedhampton Phase 2		Title: Site Plan and Plots Modelled		 24Acoustics
DWG No: Figure 1		Scale: N.T.S.	Rev: 0	
Date: October 2025		Drawn By: NM	Job No: 11014	

APPENDIX A – MODELLING AND CONSTRUCTION DETAILS

Software

The thermal model has been produced using Design Builder V2025.1.0.089 software which provides full dynamic thermal analysis for comfort and energy in line with CIBSE AM11: Building Performance Modelling, 2015b. The analysis has been carried out in accordance with the Design Builder manuals and with use of the software's EnergyPlus simulation engine, visualisation and daylighting modules.

Site Location and Orientation

- Latitude 50.85
- Longitude -1.01
- Elevation 11 m

Layout and Sample Units

Drawings of the plot types, received from Bargate Homes Ltd in October 2025, have been used to generate the thermal model along with the site plan (Thrive Architects drawing ref SL.01 Rev B).

Occupancy and Internal Gains

The occupancy and internal gains specified in the model are in accordance with TM59.

Window Open Areas and G-Value

Maximum window opening areas have been estimated with reference to the window dimensions scaled from elevation drawings, a sill depth of 0.25 m and the opening restrictions of ADO.

The dynamic model assumes that windows are allowed to open fully at all times except when ADO acoustic or security restrictions apply (e.g., ground floor or easily accessible windows during sleeping hours).

The architectural design must ensure that all openings meet the minimum standards to protect from falling in paragraph 3.1 of Approved Document O, with due consideration given to the relationship with other Building Regulations, including Approved Document K.

All glazed elements are modelled with the following properties:

- a certified U-value of 1.3 W/m²k
- a g-value of 0.44

Note that these values include both the glass and frame together.

Infiltration and Mechanical Flow Rate

All properties will rely on open windows in line with Building Regulations requirements.

Some properties require additional ventilation to mitigate overheating risk, which may be provided by de-centralised Mechanical Extract Ventilation (DMEV). The models assume a base level fresh air supply of at least 13 l/s to living rooms and kitchens, and 6 l/s to bedrooms at all times. The enhanced ventilation strategy required to control overheating is set out for each plot in Appendix C.

The assessment herein is determining compliance with Approved Document O, and additional checks may be required to ensure compliance with other Building Regulations requirements, including the minimum ventilation rates specified in Approved Document F.

Shading

In addition to the above performance values, the model includes:

- No built-in blinds or additional shading features

Mechanical Cooling

In addition to the above performance values, the model includes:

- No mechanical cooling

Internal Openings

The model allows for the following internal openings:

- Internal doors open during the daytime.
- Bedroom access doors closed at night.

Weather Files

The most current CIBSE files for Southampton Weather Station (WMO: 038650 Lat: 50.95 Lon: -1.357 Elev: 13 m) were chosen for the simulation, in accordance with the CIBSE TM59:2017 "Design methodology for the assessment of overheating risk in homes" guidelines:

- Design Summer Year 1 2020, High, 50th percentile.

Thermal Comfort Category

- Ref CIBSE TM52, 2013, CAT II

APPENDIX B – THERMAL MODEL RESULTS DSY1 2020

Plot	Room	Criterion A(%)	Criterion B(hr)	Pass/Fail
1	Bedroom 1	0.06	13.67	Pass
	Bedroom 2	0.04	10.83	Pass
	Bedroom 3	0.01	17.00	Pass
	Bedroom 4	0.02	19.50	Pass
	Kitchen Dining	0.13		Pass
	Living Room	0.17		Pass
2	Bedroom 1	0.00	13.50	Pass
	Bedroom 2	0.11	14.50	Pass
	Kitchen Dining	1.38		Pass
	Living Room	1.16		Pass
6	Bedroom 1	0.18	11.18	Pass
	Bedroom 2	0.02	11.50	Pass
	Bedroom 3	0.06	8.67	Pass
	Kitchen Dining	0.39		Pass
	Living Room	1.26		Pass
8	Bedroom 1	0.00	14	Pass
	Bedroom 2	0.30	27.00	Pass
	Bedroom 3	0.44	25.00	Pass
	Kitchen Dining	0.09		Pass
	Living Room	1.02		Pass
10	Bedroom 1	0.11	24.00	Pass
	Bedroom 2	0.41	27.50	Pass
	Bedroom 3	0.46	27.83	Pass
	Bedroom 4	0.19	29.83	Pass
	Kitchen Dining	0.09		Pass
	Living Room	0.20		Pass
11	Bedroom 1	0.07	28.50	Pass
	Bedroom 2	0.06	25.50	Pass
	Bedroom 3	0.17	27.83	Pass
	Bedroom 4	0.16	27.67	Pass
	Kitchen Dining	0.09		Pass
	Living Room	0.03		Pass
14	Bedroom 1	0.06	23.50	Pass
	Bedroom 2	0.35	27.00	Pass
	Bedroom 3	0.38	21.83	Pass
	Bedroom 4	0.12	26.67	Pass
	Kitchen Dining	0.00		Pass
	Living Room	0.18		Pass
15	Bedroom 1	0.09	13.50	Pass
	Bedroom 2	0.03	13.33	Pass
	Bedroom 3	0.04	13.83	Pass
	Kitchen Dining	0.86		Pass
	Living Room	0.62		Pass

Plot	Room	Criterion A(%)	Criterion B(hr)	Pass/Fail
17	Bedroom 1	0.08	12.50	Pass
	Bedroom 2	0.00	14.67	Pass
	Kitchen Dining	1.71		Pass
	Living Room	0.50		Pass
20	Bedroom 1	0.73	27.00	Pass
	Bedroom 2	0.17	30.83	Pass
	Bedroom 3	0.40	23.83	Pass
	Kitchen Dining	0.28		Pass
	Living Room	1.05		Pass
23	Bedroom 1	0.87	31.33	Pass
	Bedroom 2	0.19	15.67	Pass
	Bedroom 3	0.48	12.00	Pass
	Kitchen Dining	1.22		Pass
	Living Room	1.65		Pass
25	Bedroom 1	0.21	25.00	Pass
	Bedroom 2	0.22	29.17	Pass
	Bedroom 3	0.04	27.00	Pass
	Bedroom 4	0.00	30.00	Pass
	Kitchen Dining	1.42		Pass
	Living Room	0.00		Pass
26	Bedroom 1	0.02	14.50	Pass
	Bedroom 2	0.38	27.50	Pass
	Bedroom 3	0.36	25.83	Pass
	Kitchen Dining	0.76		Pass
	Living Room	0.79		Pass
27	Bedroom 1	0.21	21.33	Pass
	Bedroom 2	0.14	16.33	Pass
	Bedroom 3	0.00	29.33	Pass
	Kitchen Dining	2.08		Pass
	Living Room	1.11		Pass
28	Bedroom 1	0.02	12.67	Pass
	Bedroom 2	0.07	12.17	Pass
	Kitchen Dining	1.07		Pass
	Living Room	0.79		Pass
42	Bedroom 1	0.01	14.17	Pass
	Bedroom 2	0.43	26.17	Pass
	Bedroom 3	0.52	18.50	Pass
	Kitchen Dining	1.08		Pass
	Living Room	0.78		Pass
43	Bedroom 1	0.09	30.17	Pass
	Bedroom 2	0.56	31.33	Pass
	Bedroom 3	0.91	31.50	Pass
	Kitchen Dining	1.33		Pass
	Living Room	0.50		Pass

APPENDIX C – NOISE AND OVERHEATING MITIGATION MEASURES

Plot No.	Ventilation Rate (l/s)				Maximum Window Openings (m ²) at Night (23:00 to 07:00 hours)			
	Bed 1	Bed 2	Bed 3	Bed 4	Bed 1	Bed 2	Bed 3	Bed 4
1	ADF	ADF	ADF	ADF	-	-	-	-
2	ADF	ADF	-	-	-	-	-	-
3	ADF	ADF	-	-	-	-	-	-
4	ADF	ADF	-	-	-	-	-	-
5	ADF	ADF	-	-	-	-	-	-
6	ADF	ADF	ADF	-	-	-	-	-
7	ADF	ADF	ADF	-	-	-	-	-
8	ADF	25	25	-	0.285 (~300mm)	Closed	Closed	-
9	12	ADF	35	20	0.145 (~100mm)	0.145 (~100mm)	Closed	Closed
10	20	45	40	35	-	-	-	-
11	12	ADF	35	20	0.145 (~100mm)	0.145 (~100mm)	Closed	Closed
12	12	ADF	35	20	0.145 (~100mm)	0.145 (~100mm)	Closed	Closed
13	12	ADF	35	20	0.145 (~100mm)	0.145 (~100mm)	Closed	Closed
14	30	35	25	30	Closed	Closed	0.285 (~300mm)	Closed
15	ADF	ADF	ADF	-	-	-	-	-
16	ADF	ADF	-	-	-	-	-	-
17	ADF	ADF	-	-	-	-	-	-
18	ADF	ADF	-	-	-	-	-	-
19	ADF	ADF	-	-	-	-	-	-
20	20	25	20	-	0.285 (~300mm)	0.145 (~100mm)	0.145 (~100mm)	-
21	20	25	20	-	0.285 (~300mm)	0.145 (~100mm)	0.145 (~100mm)	-
22	30	ADF	35	-	Closed	-	Closed	-
23	42	ADF	ADF	-	Closed	-	-	-
24	42	ADF	ADF	-	Closed	-	-	-
25	20	30	30	20	Closed	Closed	Closed	Closed

Plot No.	Ventilation Rate (l/s)				Maximum Window Openings (m ²) at Night (23:00 to 07:00 hours)			
	Bed 1	Bed 2	Bed 3	Bed 4	Bed 1	Bed 2	Bed 3	Bed 4
26	ADF	30	20	-	-	Closed	Closed	-
27	30	ADF	35	-	Closed	-	Closed	-
28	ADF	ADF	-	-	-	-	-	-
29	ADF	ADF	-	-	-	-	-	-
30	ADF	ADF	-	-	-	-	-	-
31	ADF	ADF	-	-	-	-	-	-
32	ADF	ADF	-	-	-	-	-	-
33	ADF	ADF	-	-	-	-	-	-
34	ADF	ADF	ADF	-	-	-	-	-
35	ADF	ADF	ADF	-	-	-	-	-
36	ADF	ADF	ADF	-	0.285 (~300mm)	0.285 (~300mm)	0.285 (~300mm)	-
37	ADF	ADF	ADF	-	0.285 (~300mm)	0.285 (~300mm)	0.285 (~300mm)	-
38	ADF	ADF	-	-	-	-	-	-
39	ADF	ADF	-	-	-	-	-	-
40	ADF	ADF	-	-	-	-	-	-
41	ADF	ADF	ADF	-	0.285 (~300mm)	0.285 (~300mm)	0.285 (~300mm)	-
42	ADF	ADF	ADF	-	0.285 (~300mm)	0.285 (~300mm)	0.285 (~300mm)	-
43	35	35	25	-	Closed	Closed	Closed	-

* ADF – Ventilation rates in accordance with Approved Document F