RETIREMENT UNITS AT BANBURY

OVERHEATING RISK ASSESSMENT

Feb 2022

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1. SCOPE

Inkling was commissioned by Churchill Retirement Living to analyse the overheating risk for this housing development in Banbury, Oxfordshire.

The purpose of this report is to describe the modelling exercise undertaken including all assumptions used, and the results obtained.

It is important to note that with any modelling exercise there are assumptions and approximations that have to be made. As far as possible, details of all assumptions made, and approximations used are supplied as part of the report. These should be read carefully.

All results are based on the output from computer modelling software and should be taken as an indication of the likely final situation, but these conditions cannot be guaranteed.

2. THE MODEL

The building was modelled using TAS 9.5.1 thermal modelling software written by EDSL Ltd dynamic thermal modelling software.

2.1. GEOMETRY

The following images are taken of the 3D model and attempt to show the full geometry. As with any modelling exercise, some approximations have to be made, but care has been taken to ensure the scale and internal dimensions of the model are as close as practicable to the design drawings, and that glazing areas etc are accurately represented.

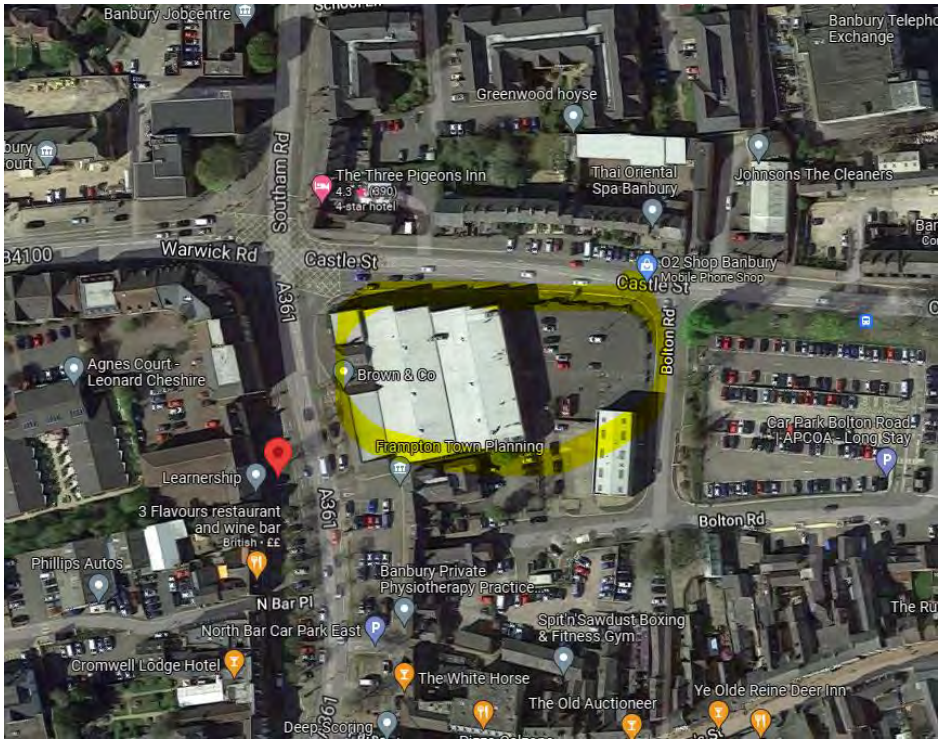

Figure 1. Site location taken from Google Earth

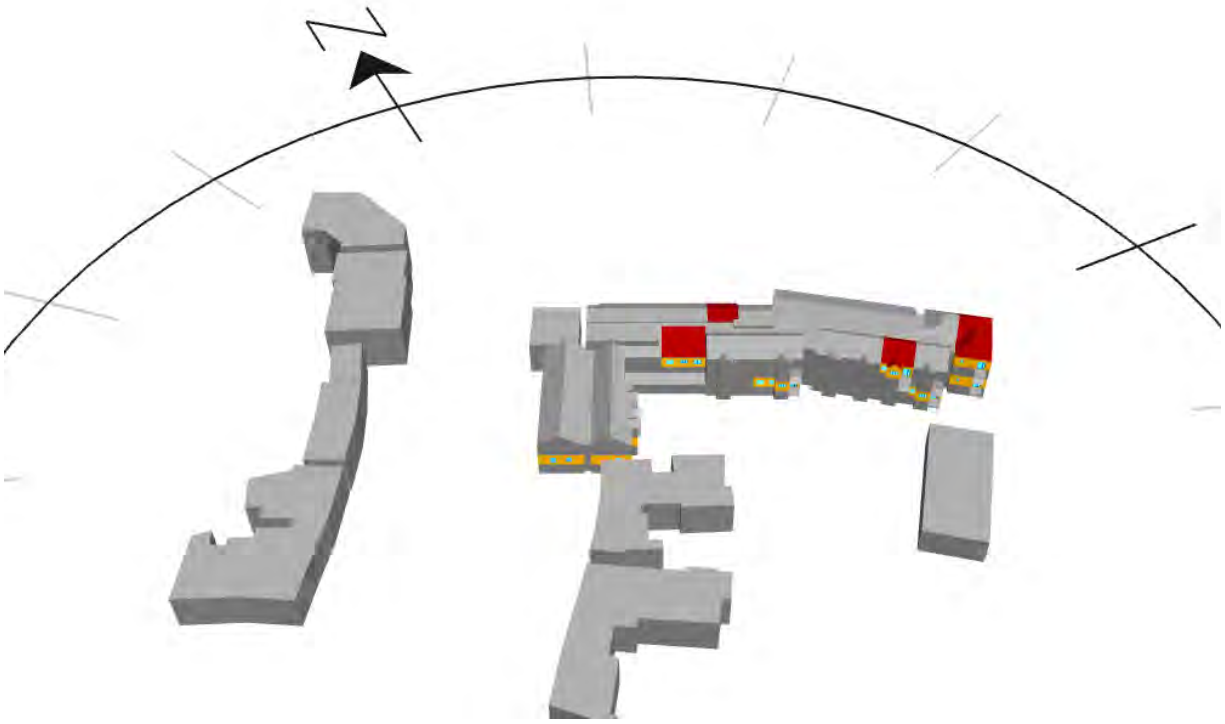

Figure 2. Image of the dynamic thermal model showing the North angle, and surrounding buildings included for shading effects

A sample of 11 units has been selected to reflect a range of unit types, glazing options, orientations and noise constraints with a focus on those likely to have the highest overheating risk.

The sample units selected are shown with coloured walls, with the remainder of the building in grey.

The units numbers for the sample units selected are: 23, 24, 25, 30, 37, 38, 42, 55, 69, 74 & 76.

Note that roof shapes have been approximated, but are not necessarily an accurate reflection of the design as the model details is focussed on the sample units.

The windows frames within the model are colour coded to indicate the opening type assumed:

	Dark blue frames	Pane doesn't open
	Mid blue frames	Opening windows and patio doors (daytime only)
	Pale blue frames	Bedroom windows (able to open 24/7)
	Dark green frames	Living room windows and patio doors that are on facades with acoustic constraints
	Pale green frames	Bedroom windows on facades with acoustic constraints

Figure 3. Image indicating the facades affected by acoustic constraints

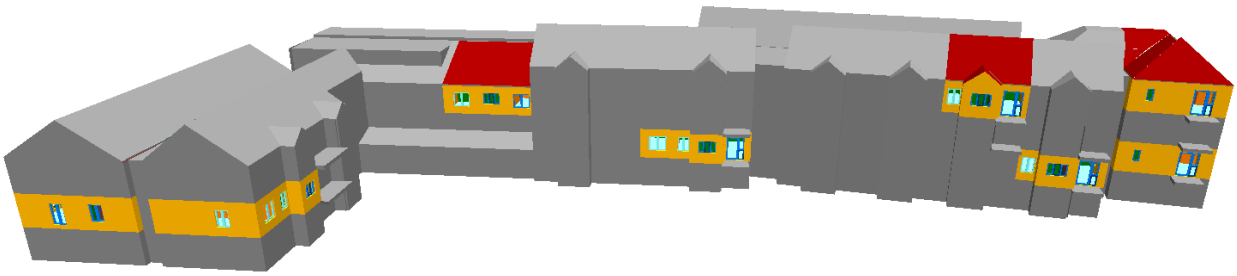

Figure 4. Model showing south façade

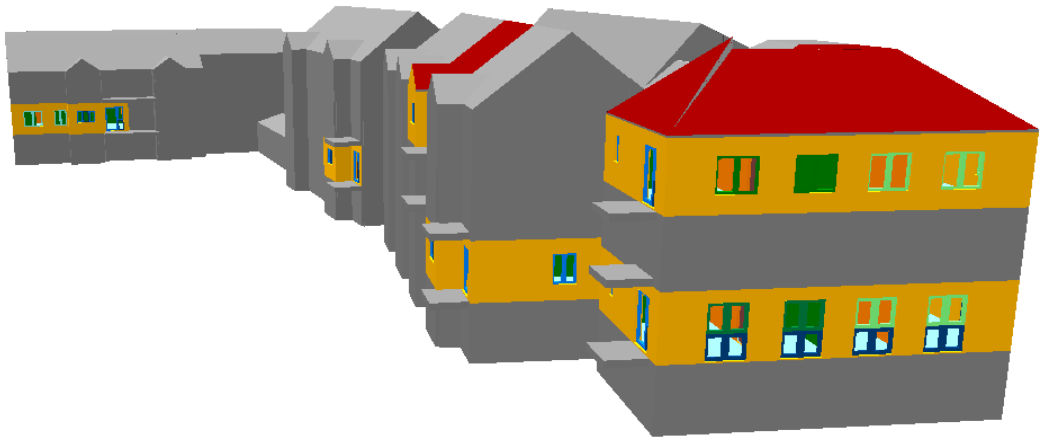

Figure 5. Model showing East façade

Figure 6. Model showing North façade

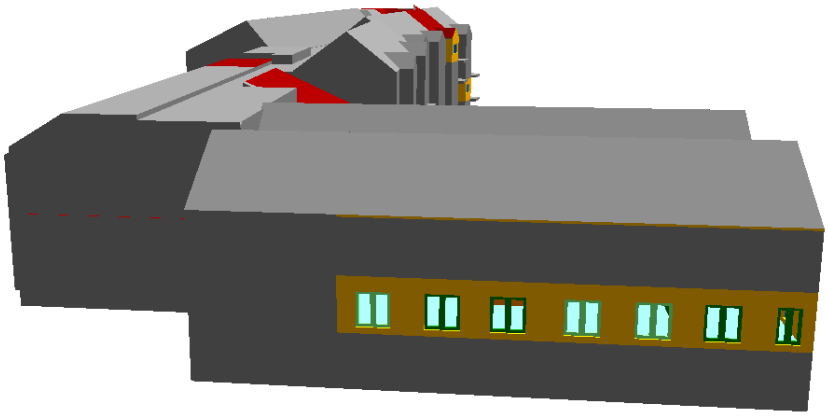

Figure 7. Model showing West facade

2.2. ZONE LAYOUTS

The sample units are zoned to match the internal room layouts as shown on the zone layouts for each floor shown below.

Zones are labelled according to the room use, prefixed with the unit number as taken from the floor plans.

Ground floor is not included as there are no sample apartments on the ground floor.

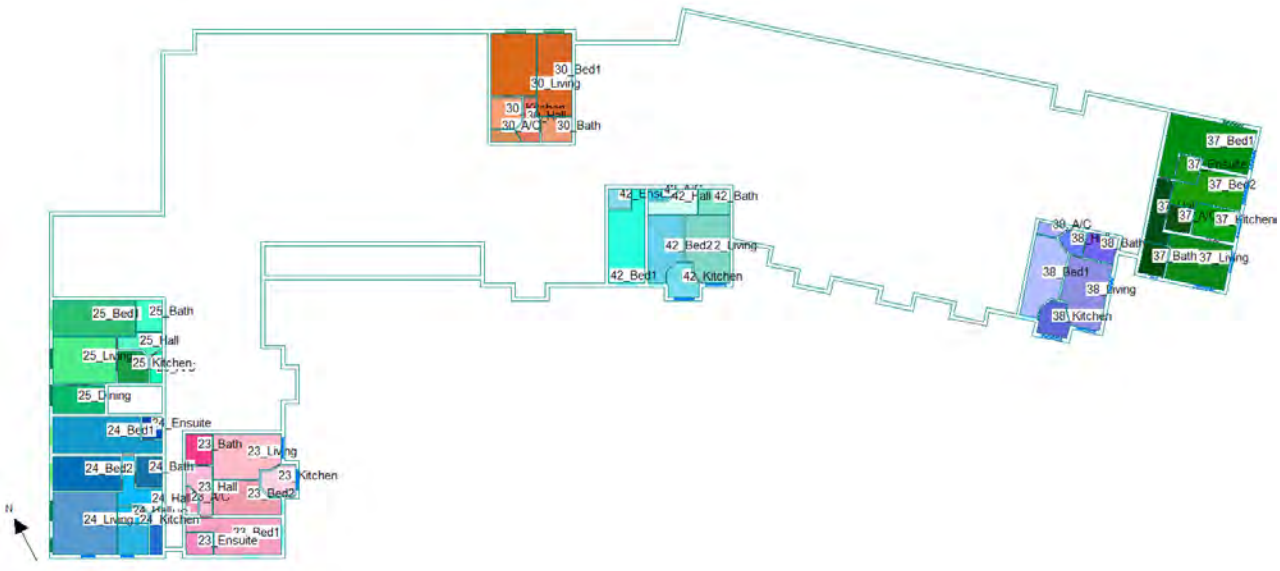

Figure 8. First floor zone layout

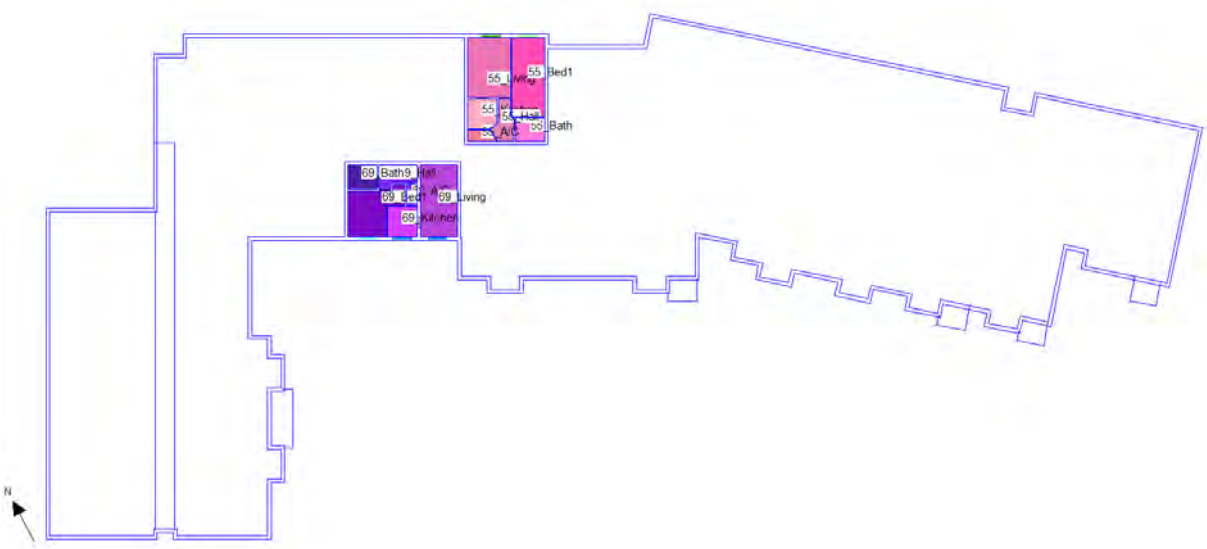

Figure 9. Second floor zone layout

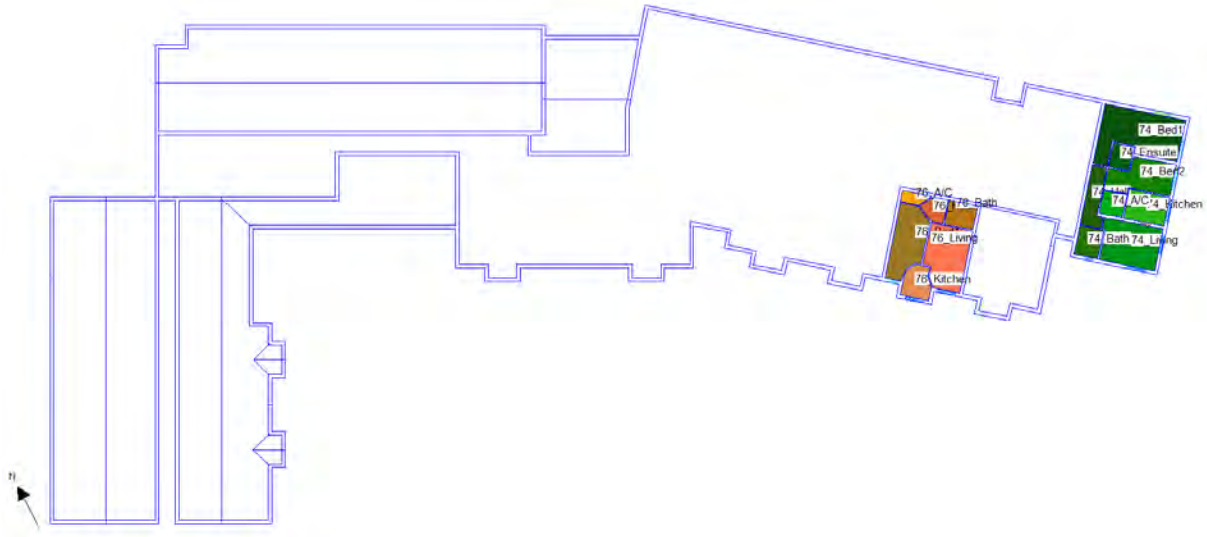

Figure 10. Third floor zone layout

2.3. BUILDING ELEMENTS

The following thermal performance parameters have been assumed for the main construction elements within the model.

Building Element	U-Value ($W/m^2 K$)	g-value	Notes
Ground Floors	0.12	n/a	Concrete ground floor slab with insulation
External Walls	0.22	n/a	Brick and block construction assumed
Flat roofs: over apartments	0.20	n/a	Flat concrete roof

Ceilings to pitched roofs over apartments	0.11	n/a	Cold roof – ventilated. NB insulation is assumed to be in the attic floor/unit ceiling
Windows (including frame)	1.40	0.73	Double glazed low E soft coat 16mm air gap, argon filled – no solar control

2.4. INTERNAL GAINS

2.4.1 Occupancy, equipment and lighting gains

Occupancy, equipment lighting gains for the residential spaces are based on the guidance in CIBSE TM59 Design methodology for the assessment of overheating risk in homes. This provides a set of profiles that represent reasonable usage patterns for homes suitable for testing overheating risk.

The profiles were developed to test the building design, not to cover all usage modes, so won't necessarily represent the actual occupancy patterns for these units. They are designed to work with the whole methodology which includes the pass/fail thresholds and the hours that are assessed.

Zone	Max # People	Occupancy profile	Peak Equipmt Gain (W)	Equipment profile
Kitchen/Living rooms	2	9am to 10pm	450	9am-10pm with peak 6-8pm
Double Bedrooms ~	2	24 hrs, peak at night	80	Peak 9am – 11pm
Single Bedrooms	1	24 hrs, peak at night	80	Peak 9am – 11pm
Bathrooms	0	-	-	-
Airing cupboards	0	-	44	24/7 based on cylinder standing losses*

*see section 2.4.2 below

~All bedrooms have been assumed to be double bedrooms.

Lighting gains have been included based on 2W/m² in the evenings within apartments, and 24/7 in communal stairwells.

2.4.2 Airing cupboard heat gains

All apartments are assumed to be provided with Telford Tornado B electric emersion heaters with 150 litre cylinders. These are located in airing cupboards and are stated as having standing heat losses of 1.06 kWh/24 hours, which works out at **44W.**

2.4.3 Solar gains

Solar gains are calculated automatically by the modelling software based on the orientation of the building, the transmission coefficients of the glazing and the solar angles.

2.5. HEATING AND VENTILATION

2.5.1 Infiltration

The air permeability target for these apartments is **5 m³/hr/m²@50Pa**. According to table 4.24 in the CIBSE Guide A, this air permeability represents an infiltration rate of approximately **0.35 ach**. This value is pro-rated within the model, with this value occurring when external wind speed is 3m/s.

2.5.2 Background ventilation

Continuous background ventilation will be provided as required by building regulations. This will be assumed to meet the Part F rate of **0.3l/s/m²** from table 5.1b shown below for reference.

Table 5.1b **Whole dwelling ventilation rates**

	Number of bedrooms in dwelling				
	1	2	3	4	5
Whole dwelling ventilation rate [a, b] (l/s)	13	17	21	25	29

Notes:

a. In addition, the minimum ventilation rate should be not less than 0.3 l/s per m² of internal floor area. (This includes all floors, e.g. for a two-storey building add the ground and first floor areas.)

b. This is based on two occupants in the main bedroom and a single occupant in all other bedrooms. This should be used as the default value. If a greater level of occupancy is expected add 4 l/s per occupant.

Figure 11. Table 5.1b from Part F of the Building Regulations

2.5.3 Natural Ventilation

Natural ventilation for purge and to mitigate overheating is assumed to be provided via openable windows.

Whilst the submitted acoustic report acknowledges the need for acoustic trickle vents on some elevations, the report does not require windows to remain fixed shut. Residents will have the choice to open a window for purge ventilation.

Openable windows are assumed to open when internal temperatures exceed 22°C (i.e. in warm weather) as specified by TM59.

How wide each window will open is based on:

- **Patio doors** are assumed to be open in warm weather and achieve a free area of **90%**.

- All **side hung windows** are assumed to be opened wide in warm weather and achieve a free area (opening) of **90%** of the pane area.
- All top hung windows are assumed to achieve a free area of **50%**

NB It is understood that windows will have 30mm restrictors fitted, but these are designed to be over-ridden in warm weather, so have not been applied in this overheating risk assessment.

All apartments are modelled with internal doors (within apartments) open (90% free area) to allow cross-vent between the rooms during the day, and closed at night with an undercut of 5%.

2.6. WEATHER DATA

CIBSE weather files for Swindon (Brize Norton) were selected this project based on the site location in Banbury.

The 2020s DSY1 (Design Summer Year) weather data will be used in accordance with the requirements for TM59 (Design methodology for the assessment of overheating risk in homes).

3. CIBSE TM59 DOMESTIC OVERHEATING CRITERIA

The CIBSE TM59 domestic overheating risk assessment methodology was published in April 2017 and includes the following pass/fail criteria.

The methodology borrows from TM52 and from other areas of CIBSE guidance.

It recommends that for homes designed to be cooled in summer via openable windows:

1. **Criterion 1 from TM52 is passed for all occupied rooms**

   AND

2. **All bedrooms - night time (22:00-07:00) resultant temperatures do not exceed 26°C for more than 1% of these hours (32 hours).**

CIBSE TM52 ('The limits of thermal comfort: avoiding overheating in European buildings') includes 3 criteria:

Criterion 1: Hours of Exceedance

Criterion 2: Daily Weighted Exceedance

Criterion 3: Upper Limit Temperature

Criterion 1 sets a limit for the number of hours (3%) that the internal operative temperature in each occupied room can exceed the threshold comfort temperature (calculated from the running mean for the preceding days within the weather data) by 1°C or more during the occupied hours of a typical non-heating season (1 May to 30 September).

The TM59 recommendation for communal corridors and stairwells is that an operative temperature of 28°C should not be exceeded for more than 3% of the time (24/7).

4. RESULTS

4.1. BASE CASE

The model was run initially with all windows free to be opened in warm weather as a base case.

The TM59 results for every occupied room in the sample set of units are shown in the table below. The results are colour coded with red backgrounds indicating where results do not meet the criteria, becoming darker red the further over the threshold they are.

Table 1. Base case TM59 results

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms.	Result
23_Bed1	3672	110	1	32	0	Pass
23_Bed2	3672	110	0	32	0	Pass
23_Kitchen	1989	59	13	N/A	N/A	Pass
23_Living	1989	59	1	N/A	N/A	Pass
24_Bed1	3672	110	1	32	0	Pass
24_Bed2	3672	110	18	32	0	Pass
24_Kitchen	1989	59	24	N/A	N/A	Pass
24_Living	1989	59	21	N/A	N/A	Pass
25_Bed1	3672	110	7	32	0	Pass
25_Dining	1989	59	45	N/A	N/A	Pass
25_Kitchen	1989	59	21	N/A	N/A	Pass
25_Living	1989	59	23	N/A	N/A	Pass
30_Bed1	3672	110	0	32	1	Pass
30_Kitchen	1989	59	19	N/A	N/A	Pass
30_Living	1989	59	6	N/A	N/A	Pass
37_Bed1	3672	110	1	32	0	Pass
37_Bed2	3672	110	14	32	0	Pass
37_Kitchen	1989	59	44	N/A	N/A	Pass
37_Living	1989	59	27	N/A	N/A	Pass
38_Bed1	3672	110	0	32	0	Pass
38_Kitchen	1989	59	25	N/A	N/A	Pass
38_Living	1989	59	7	N/A	N/A	Pass
42_Bed1	3672	110	0	32	0	Pass
42_Bed2	3672	110	0	32	0	Pass
42_Kitchen	1989	59	49	N/A	N/A	Pass
42_Living	1989	59	0	N/A	N/A	Pass
55_Bed1	3672	110	6	32	0	Pass
55_Kitchen	1989	59	31	N/A	N/A	Pass
55_Living	1989	59	14	N/A	N/A	Pass
69_Bed1	3672	110	37	32	0	Pass
69_Kitchen	1989	59	77	N/A	N/A	Fail
69_Living	1989	59	30	N/A	N/A	Pass
74_Bed1	3672	110	8	32	0	Pass

74_Bed2	3672	110	17	32	0	Pass
74_Kitchen	1989	59	35	N/A	N/A	Pass
74_Living	1989	59	43	N/A	N/A	Pass
76_Bed1	3672	110	41	32	6	Pass
76_Kitchen	1989	59	78	N/A	N/A	Fail
76_Living	1989	59	62	N/A	N/A	Fail

These results are essentially very good, with only 3 spaces showing some small overheating risk.

The possible causes for these spaces not meeting the TM59 criteria are discussed below:

- Top floor units tend to be at higher risk of overheating as attics can get very hot and even with good ceiling insulation, and there is often less shading available. These can increase internal temperatures more than for lower floors
- These two kitchens are small rooms which are at higher risk of overheating as internal gains, including solar gains are more concentrated in the smaller space

4.2. CASE 2 – LOW G-VALUE GLAZING

Case 2 explores the impact predicted by the model of changing the glazing specification to reduce the g-value (increase the solar control).

The glazing g-value was reduced from 0.74 to 0.5 for all windows not affected by the acoustic concerns i.e. the south façade and the internal west elevation (see Fig 11).

These case 2 results show all zones passing the TM59 criteria.

Table 2. Case 2 TM59 results

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms.	Result
23_Bed1	3672	110	0	32	0	Pass
23_Bed2	3672	110	0	32	0	Pass
23_Kitchen	1989	59	8	N/A	N/A	Pass
23_Living	1989	59	0	N/A	N/A	Pass
24_Bed1	3672	110	1	32	0	Pass
24_Bed2	3672	110	15	32	0	Pass
24_Kitchen	1989	59	11	N/A	N/A	Pass
24_Living	1989	59	15	N/A	N/A	Pass
25_Bed1	3672	110	7	32	0	Pass
25_Dining	1989	59	45	N/A	N/A	Pass
25_Kitchen	1989	59	21	N/A	N/A	Pass
25_Living	1989	59	23	N/A	N/A	Pass
30_Bed1	3672	110	0	32	0	Pass
30_Kitchen	1989	59	19	N/A	N/A	Pass
30_Living	1989	59	2	N/A	N/A	Pass

37_Bed1	3672	110	0	32	0	Pass
37_Bed2	3672	110	7	32	0	Pass
37_Kitchen	1989	59	26	N/A	N/A	Pass
37_Living	1989	59	11	N/A	N/A	Pass
38_Bed1	3672	110	0	32	0	Pass
38_Kitchen	1989	59	5	N/A	N/A	Pass
38_Living	1989	59	0	N/A	N/A	Pass
42_Bed1	3672	110	0	32	0	Pass
42_Bed2	3672	110	0	32	0	Pass
42_Kitchen	1989	59	10	N/A	N/A	Pass
42_Living	1989	59	0	N/A	N/A	Pass
55_Bed1	3672	110	4	32	0	Pass
55_Kitchen	1989	59	27	N/A	N/A	Pass
55_Living	1989	59	12	N/A	N/A	Pass
69_Bed1	3672	110	15	32	0	Pass
69_Kitchen	1989	59	38	N/A	N/A	Pass
69_Living	1989	59	7	N/A	N/A	Pass
74_Bed1	3672	110	8	32	0	Pass
74_Bed2	3672	110	16	32	0	Pass
74_Kitchen	1989	59	33	N/A	N/A	Pass
74_Living	1989	59	25	N/A	N/A	Pass
76_Bed1	3672	110	16	32	4	Pass
76_Kitchen	1989	59	38	N/A	N/A	Pass
76_Living	1989	59	18	N/A	N/A	Pass

4.3. CATEGORY 1 OCCUPANTS

These apartments are intended for retired occupants. Retired people are not necessarily more vulnerable, but age can be a factor in determining those more vulnerable to the impacts of overheating. Where dwellings are intended for more vulnerable occupants e.g. care homes then a more onerous target is set within TM59.

The results below are for case 2 but run against Category 1 (vulnerable) occupants.

Table 3. TM59 results for case 2 assuming vulnerable occupants

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms.	Result
23_Bed1	3672	110	8	32	0	Pass
23_Bed2	3672	110	6	32	0	Pass
23_Kitchen	1989	59	38	N/A	N/A	Pass
23_Living	1989	59	9	N/A	N/A	Pass
24_Bed1	3672	110	19	32	0	Pass
24_Bed2	3672	110	42	32	0	Pass
24_Kitchen	1989	59	40	N/A	N/A	Pass
24_Living	1989	59	45	N/A	N/A	Pass
25_Bed1	3672	110	45	32	0	Pass

25_Dining	1989	59	87	N/A	N/A	Fail
25_Kitchen	1989	59	66	N/A	N/A	Fail
25_Living	1989	59	69	N/A	N/A	Fail
30_Bed1	3672	110	14	32	0	Pass
30_Kitchen	1989	59	74	N/A	N/A	Fail
30_Living	1989	59	50	N/A	N/A	Pass
37_Bed1	3672	110	13	32	0	Pass
37_Bed2	3672	110	39	32	0	Pass
37_Kitchen	1989	59	76	N/A	N/A	Fail
37_Living	1989	59	51	N/A	N/A	Pass
38_Bed1	3672	110	11	32	0	Pass
38_Kitchen	1989	59	43	N/A	N/A	Pass
38_Living	1989	59	16	N/A	N/A	Pass
42_Bed1	3672	110	6	32	0	Pass
42_Bed2	3672	110	16	32	0	Pass
42_Kitchen	1989	59	64	N/A	N/A	Fail
42_Living	1989	59	19	N/A	N/A	Pass
55_Bed1	3672	110	44	32	0	Pass
55_Kitchen	1989	59	85	N/A	N/A	Fail
55_Living	1989	59	68	N/A	N/A	Fail
69_Bed1	3672	110	60	32	0	Pass
69_Kitchen	1989	59	84	N/A	N/A	Fail
69_Living	1989	59	50	N/A	N/A	Pass
74_Bed1	3672	110	26	32	0	Pass
74_Bed2	3672	110	52	32	0	Pass
74_Kitchen	1989	59	74	N/A	N/A	Fail
74_Living	1989	59	71	N/A	N/A	Fail
76_Bed1	3672	110	61	32	4	Pass
76_Kitchen	1989	59	84	N/A	N/A	Fail
76_Living	1989	59	70	N/A	N/A	Fail

To try to improve on these results the low-g glazing was extended to **all** windows and reduced to a lower value of **0.4**.

These results show significant improvement with only 3 kitchens not meeting the category 1 TM59 criteria, probably due to their concentrated internal gains.

Table 4. TM59 results for case 2 assuming vulnerable occupants, and all windows g=0.4

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms.	Result
23_Bed1	3672	110	5	32	0	Pass
23_Bed2	3672	110	1	32	0	Pass
23_Kitchen	1989	59	23	N/A	N/A	Pass
23_Living	1989	59	6	N/A	N/A	Pass
24_Bed1	3672	110	5	32	0	Pass
24_Bed2	3672	110	16	32	0	Pass
24_Kitchen	1989	59	29	N/A	N/A	Pass

24_Living	1989	59	19	N/A	N/A	Pass
25_Bed1	3672	110	10	32	0	Pass
25_Dining	1989	59	39	N/A	N/A	Pass
25_Kitchen	1989	59	29	N/A	N/A	Pass
25_Living	1989	59	22	N/A	N/A	Pass
30_Bed1	3672	110	0	32	0	Pass
30_Kitchen	1989	59	37	N/A	N/A	Pass
30_Living	1989	59	11	N/A	N/A	Pass
37_Bed1	3672	110	9	32	0	Pass
37_Bed2	3672	110	16	32	0	Pass
37_Kitchen	1989	59	37	N/A	N/A	Pass
37_Living	1989	59	25	N/A	N/A	Pass
38_Bed1	3672	110	2	32	0	Pass
38_Kitchen	1989	59	30	N/A	N/A	Pass
38_Living	1989	59	11	N/A	N/A	Pass
42_Bed1	3672	110	0	32	0	Pass
42_Bed2	3672	110	9	32	0	Pass
42_Kitchen	1989	59	47	N/A	N/A	Pass
42_Living	1989	59	11	N/A	N/A	Pass
55_Bed1	3672	110	16	32	0	Pass
55_Kitchen	1989	59	64	N/A	N/A	Fail
55_Living	1989	59	35	N/A	N/A	Pass
69_Bed1	3672	110	39	32	0	Pass
69_Kitchen	1989	59	72	N/A	N/A	Fail
69_Living	1989	59	28	N/A	N/A	Pass
74_Bed1	3672	110	15	32	0	Pass
74_Bed2	3672	110	24	32	0	Pass
74_Kitchen	1989	59	40	N/A	N/A	Pass
74_Living	1989	59	35	N/A	N/A	Pass
76_Bed1	3672	110	49	32	1	Pass
76_Kitchen	1989	59	72	N/A	N/A	Fail
76_Living	1989	59	59	N/A	N/A	Pass

In order to mitigate the overheating risk for more vulnerable residents in these kitchens two further changes were made to the model:

1. **Kitchen windows were reduced from 3 panes to 2, both openable (as shown below)**
2. **Internal kitchens (without windows) such as unit 55 had the mechanical extract ventilation boosted to achieve an extra 1ach (above the 0.3l/s/m² background ventilation already assumed) in warm weather.**

Figure 12. Image indicating the kitchen windows that were reduced to 2 panes

With both these changes, the TH59 results show all of the sample units passing the TM59 criteria for more vulnerable occupants as shown below.

Table 5. TM59 results assuming vulnerable occupants, all windows g=0.4, reduced kitchen window panes and increased MEV to internal kitchens

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms.	Result
23_Bed1	3672	110	5	32	0	Pass
23_Bed2	3672	110	1	32	0	Pass
23_Kitchen	1989	59	17	N/A	N/A	Pass
23_Living	1989	59	5	N/A	N/A	Pass
24_Bed1	3672	110	5	32	0	Pass
24_Bed2	3672	110	15	32	0	Pass
24_Kitchen	1989	59	29	N/A	N/A	Pass
24_Living	1989	59	19	N/A	N/A	Pass
25_Bed1	3672	110	10	32	0	Pass
25_Dining	1989	59	37	N/A	N/A	Pass
25_Kitchen	1989	59	29	N/A	N/A	Pass
25_Living	1989	59	20	N/A	N/A	Pass
30_Bed1	3672	110	0	32	0	Pass
30_Kitchen	1989	59	32	N/A	N/A	Pass
30_Living	1989	59	9	N/A	N/A	Pass
37_Bed1	3672	110	9	32	0	Pass
37_Bed2	3672	110	15	32	0	Pass
37_Kitchen	1989	59	35	N/A	N/A	Pass
37_Living	1989	59	24	N/A	N/A	Pass
38_Bed1	3672	110	2	32	0	Pass
38_Kitchen	1989	59	17	N/A	N/A	Pass
38_Living	1989	59	9	N/A	N/A	Pass
42_Bed1	3672	110	0	32	0	Pass
42_Bed2	3672	110	6	32	0	Pass
42_Kitchen	1989	59	28	N/A	N/A	Pass
42_Living	1989	59	8	N/A	N/A	Pass

55_Bed1	3672	110	14	32	0	Pass
55_Kitchen	1989	59	52	N/A	N/A	Pass
55_Living	1989	59	31	N/A	N/A	Pass
69_Bed1	3672	110	30	32	0	Pass
69_Kitchen	1989	59	56	N/A	N/A	Pass
69_Living	1989	59	24	N/A	N/A	Pass
74_Bed1	3672	110	14	32	0	Pass
74_Bed2	3672	110	24	32	0	Pass
74_Kitchen	1989	59	40	N/A	N/A	Pass
74_Living	1989	59	34	N/A	N/A	Pass
76_Bed1	3672	110	44	32	1	Pass
76_Kitchen	1989	59	58	N/A	N/A	Pass
76_Living	1989	59	51	N/A	N/A	Pass

4.4. ACOUSTIC CONSTRAINTS

In order to assess the potential impact of the acoustic constraints the model was run with all the windows on the affected facades (North, West and East end) reflecting occupants who might be slower to open the windows in warm weather.

This was done by modelling these windows to open when internal temperatures exceed 24°C rather than the 22°C suggested by TM59.

These results indicate that with this more reversed approach to opening windows on the noisier facades, all spaces still meet the TM59 criteria.

Table 6. Case 2a results with windows on noisier facades opening above 24°C internal temp (category 2 – non-vulnerable occupants)

Zone Name	Occupied Summer Hours	Max. Exceedable Hours	Criterion 1: #Hours Exceeding Comfort Range	Max Exceedable Night Hours	Criterion 2: Number of Night Hours Exceeding 26 °C for Bedrooms.	Result
23_Bed1	3672	110	0	32	0	Pass
23_Bed2	3672	110	0	32	0	Pass
23_Kitchen	1989	59	8	N/A	N/A	Pass
23_Living	1989	59	0	N/A	N/A	Pass
24_Bed1	3672	110	7	32	0	Pass
24_Bed2	3672	110	22	32	0	Pass
24_Kitchen	1989	59	19	N/A	N/A	Pass
24_Living	1989	59	20	N/A	N/A	Pass
25_Bed1	3672	110	24	32	0	Pass
25_Dining	1989	59	58	N/A	N/A	Pass
25_Kitchen	1989	59	35	N/A	N/A	Pass
25_Living	1989	59	39	N/A	N/A	Pass
30_Bed1	3672	110	0	32	3	Pass
30_Kitchen	1989	59	35	N/A	N/A	Pass

30_Living	1989	59	13	N/A	N/A	Pass
37_Bed1	3672	110	7	32	0	Pass
37_Bed2	3672	110	17	32	1	Pass
37_Kitchen	1989	59	36	N/A	N/A	Pass
37_Living	1989	59	16	N/A	N/A	Pass
38_Bed1	3672	110	0	32	0	Pass
38_Kitchen	1989	59	5	N/A	N/A	Pass
38_Living	1989	59	0	N/A	N/A	Pass
42_Bed1	3672	110	0	32	0	Pass
42_Bed2	3672	110	0	32	0	Pass
42_Kitchen	1989	59	10	N/A	N/A	Pass
42_Living	1989	59	0	N/A	N/A	Pass
55_Bed1	3672	110	18	32	1	Pass
55_Kitchen	1989	59	49	N/A	N/A	Pass
55_Living	1989	59	32	N/A	N/A	Pass
69_Bed1	3672	110	15	32	0	Pass
69_Kitchen	1989	59	38	N/A	N/A	Pass
69_Living	1989	59	7	N/A	N/A	Pass
74_Bed1	3672	110	12	32	0	Pass
74_Bed2	3672	110	22	32	0	Pass
74_Kitchen	1989	59	43	N/A	N/A	Pass
74_Living	1989	59	30	N/A	N/A	Pass
76_Bed1	3672	110	16	32	4	Pass
76_Kitchen	1989	59	38	N/A	N/A	Pass
76_Living	1989	59	18	N/A	N/A	Pass