# Caxton Road, London Borough of Haringey

# Overheating Assessment

Version 02

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## Contents

# 1 Introduction

This report assesses the overheating potential of the residential sections of the proposed development of Caxton Road, in the London Borough of Haringey.

The development is a 9 storey development, comprising of a commercial space on the ground and 1st floors, with 75 residential units located above. The site is largely surrounding by lower developments of 1 to 2 stories. To the south east of the site is a multi-storey car park, with the entrance ramp directly bordering the site. The site location is shown in Figure 1-1.

Overheating has been assessed in line with the guidance and criteria outlined in 'CIBSE TM 52 - The limits of thermal comfort: avoiding overheating in European buildings' (2013) and 'CIBSE TM 59 - Design methodology for the assessment of overheating risk in homes' (2017).


Figure 1-1 – Site location

# 2 Guidance

## 2.1 The London Plan (2020) Policy SI 4 Managing heat risk

A. Development proposals should minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure.

B. Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the following cooling hierarchy:

1) reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure
2) minimise internal heat generation through energy efficient design
3) manage the heat within the building through exposed internal thermal mass and high ceilings
4) provide passive ventilation
5) provide mechanical ventilation
6) provide active cooling systems.

## 2.2 CIBSE TM 59 - Design methodology for the assessment of overheating risk in homes

TM 59 outlines specific criteria for assessing overheating in residential buildings. In the case of free running or natural ventilation, including homes that have mechanical ventilation with heat recovery (MVHR), both of the following criteria must be passed for all relevant rooms in order to ensure the building does not overheat.

1. For living rooms, kitchens and bedrooms: The number of hours during which temperature difference between the actual operative temperature in the room and the limiting maximum acceptable temperature ($\Delta T$) is greater than or equal to one degree during the period May to September inclusive shall not be more than 3% of occupied hours. (CIBSE TM52 Criterion 1: Hours of exceedance).

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 Overheating

## 3.1 Overheating Checklist

The London Plan overheating checklist has been used to assess the risk of overheating in the flats.

| Section 1 – Site features affecting vulnerability to overheating | | Yes or No |
|---|---|---|
| Site location | Urban – within central London[29] or in a high density conurbation | Yes |
| | Peri-urban - on the suburban fringes of London[30] | No |
| Air quality and/or Noise sensitivity - are any of the following in the vicinity of buildings? | Busy roads / A roads | Yes |
| | Railways / Overground / DLR | Yes |
| | Airport / Flight path | No |
| | Industrial uses / waste facility | No |
| Proposed building use | Will any buildings be occupied by vulnerable people (e.g. elderly, disabled, young children)? | Yes |
| | Are residents likely to be at home during the day (e.g. students)? | No |
| Dwelling aspect | Are there any single aspect units? | No |
| Glazing ratio | Is the glazing ratio (glazing: internal floor area) greater than 25%? | Yes |
| | If yes, is this to allow acceptable levels of daylighting? | Yes |
| Security - Are there any security issues that could limit opening of windows for ventilation? | Single storey ground floor units | No |
| | Vulnerable areas identified by the Police Architectural Liaison Officer | No |
| | Other | N/A |

[29] Urban - as defined in CIBSE Guide TM49. Broadly equivalent to Central Activities Zone and Inner London areas in Map 2.2 of the London Plan

[30] Peri-urban – as defined in CIBSE Guise TM49. Broadly equivalent to Outer London areas in Map 2.2 of the London Plan

| Section 2 – Design features implemented to mitigate overheating risk | | Please Respond |
|---|---|---|
| Landscaping | Will deciduous trees be provided for summer shading (to windows and pedestrian routes)? | No |
| | Will green roofs be provided? | Yes |
| | Will other green or blue infrastructure be provided around buildings for evaporative cooling? | No |
| Materials | Have high albedo (light colour) materials been specified? | Yes |
| Dwelling aspect | % of total units that are single aspect | 1.3% |
| | % single aspect with NE orientation | 0 |
| | % single aspect with SE orientation | 0 |
| | % single aspect with SW orientation | 0 |
| | % single aspect with NW orientation | 1.3% |
| Glazing ratio - What is the glazing ratio (glazing; internal floor area) on each facade? | NE | 3.7% |
| | SE | 3.6% |
| | SW | 4% |
| | NW | 3.7% |
| Daylighting | What is the average daylight factor range? | 1-7% |
| Window opening | Are windows openable? | Yes |
| Window opening | What is the average percentage of openable area for the windows? | 65% |
| Window opening - What is the extent of the opening? | Fully openable | Yes |
| | Limited (e.g. for security, safety, wind loading reasons) | No |
| Security | Where there are security issues (e.g. ground floor flats) has an alternative night time natural ventilation method been provided (e.g. ventilation grates)? | N/A |
| Shading | Is there any external shading? | Yes overhanging balconies |
| | Is there any internal shading? | Yes, internal blinds |
| Glazing specification | Is there any solar control glazing? | Yes, low emissivity glazing is specified |
| Ventilation - What is the ventilation strategy? | Natural – background | Yes |
| | Natural – purge | Yes |
| | Mechanical – background (e.g. MVHR) | Yes |
| | Mechanical – purge | Yes |
| | What is the average design air change rate | - |
| Heating system | Is communal heating present? | Yes |
| | What is the flow/return temperature? | |
| | Have horizontal pipe runs been minimised? | |
| | Do the specifications include insulation levels in line with the London Heat Network Manual[31] | |

[31] http://www.londonheatmap.org.uk/Content/uploaded/documents/LHNM_Manual2014Low.pdf

## 3.2 Cooling Hierarchy

### 3.2.1 Minimise internal heat generation

Internal heat generation will be minimised throughout the development. Highly efficient LED lighting will be required as part of the energy strategy, which minimises internal heat generation.

A communal heating system is currently being proposed. These pipes should be fully insulated to minimise any heat loss from the LTHW and prevent heat build-up in corridors & risers.

### 3.2.2 Reduce the amount of heat entering a building

The surrounding structures provide minimal external shading, even to the lowest floors of residential units. The building has been designed with a central courtyard, which means it provides shading to itself. The floor layouts have been designed to prevent there being any single aspect units.

The development has balcony projections, as well as an external walkway in the central courtyard area, which provides external shading to a large number of external windows.

The development has will have highly insulated external walls, which minimise any heat gain through conduction.

Following an initial run of the overheating assessment, it was recommended that blinds are included in the development. This allows individual control of solar gain and reduces overheating.

Highly insulated walls have been specified, which minimise any internal heat gain through conduction.

### 3.2.3 Manage the heat within the building

The development has a reinforce concrete frame and brickwork and steel framing system external walls, which provide a significant amount for thermal mass. This provides a damping effect, allowing the development to buffer itself from extremely high temperatures outside. This allows the development to perform well against criteria 1.

### 3.2.4 Passive ventilation

All units are provided with operable windows. These allow the occupants to use natural ventilation to control their indoor temperature. The windows opening has been maximised to improve rates of purge ventilation, with top hung windows set to open to 45 degrees. This has been increased from 30 degrees to improve the performance of the development.

### 3.2.5 Mechanical ventilation

The development has been specified with MVHR, which can be used to provide background ventilation rates to the development. This means ventilation is possible even in situations when occupants do not want to leave windows open, as well as allowing ventilation to rooms that do not have external windows, such as bathrooms and some kitchens.

### 3.2.6 Active cooling systems

The commercial units have been proposed with mechanical cooling, due to the use type, as outlined in the energy strategy. Actions have been taken to minimise to demand on the cooling systems. The commercial units have been designed to reduce cooling demand by specifying U-Values to balance heating and cooling demand and setting a low g-value to minimise solar gain.

The performance of the commercial units with relation to overheating has been assessed by comparing the predicted cooling demand to the notional cooling demand. The notional cooling demand is 46.1 MJ/m$^2$ and the actual cooling demand is 43.0 MJ/m$^2$. Highly efficient systems have been proposed to ensure carbon emissions are minimised.

# 4 Assessment Methodology

The assessment was undertaken using IES Virtual Environment software. A model of the proposed development was created in the IES ModelIt module using drawings provided by the architect. The surrounding buildings have been modelled based on satellite imagery and information provided in the drawings. An image of the model used within the assessment is shown in Figure 3-1.

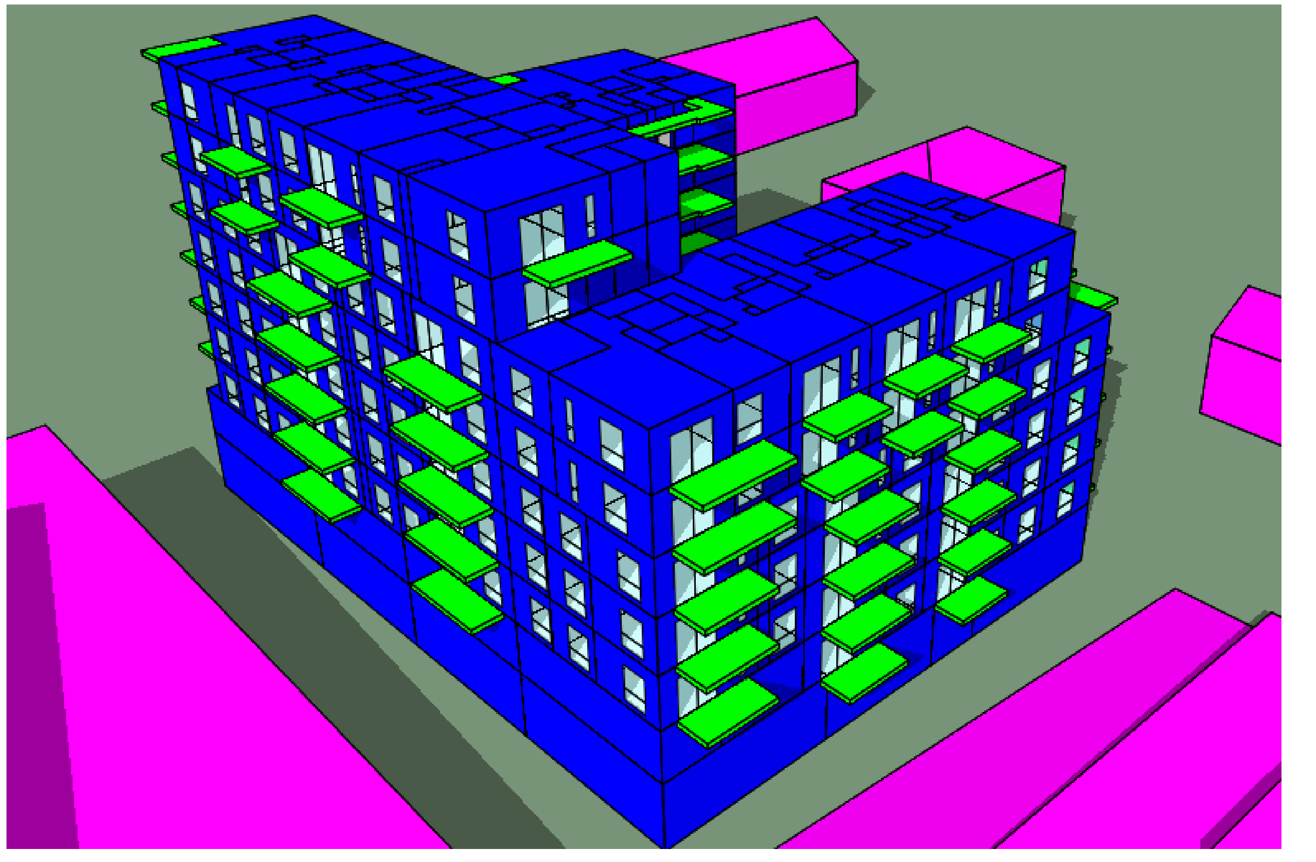

Figure 3-1 – IES model for Caxton Road

A dynamic thermal assessment was conducted using the IES Apache module, which is a CIBSE AM11 compliant thermal modelling software.

The following units have been included in the assessment to meet the guidance provided following the pre-application advice meeting:

- A102, A104, A105
- A204, A206,
- A303, A305, A307,
- A404, A406, B401, B403
- A503, A505, A507
- A603, A604, A605, A607, B601, B604
- A703
- A802, A804

The location of these units has been highlighted in the floor plans shown in the Appendix.

The Design Summer Year 1 (DSY1), Design Summer Year 2 (DSY2) and Design Summer Year 3 (DSY3), London Heathrow, high emission, 50% percentile weather files have been used from 2020 for the current scenarios.

The three DSY scenarios represent different types of hot summers:

- DSY1 – moderately warm summer, with a return period of seven years
- DSY2 – short, intense warm spell, about the same length as the moderate summer year but with a higher intensity
- DSY3 – long, less intense warm spell, which is less intense than the high-intensity year, but longer and more intense than the moderate summer year

For future weather scenarios, the following weather files have been used:

- 2050 – DSY1, DSY2, DSY3, medium emissions, 50% percentile
- 2080 – DSY1, DSY2, DSY3, low emissions, 50% percentile

# 5 Results

The results for the overheating assessment using 2020 weather data is outlined in Table 4-1 below. The results show that all assessed units within the development pass the overheating assessment for the DSY1, 2020, High emission 50th percentile scenario, which is the weather file recommended to be used in TM59.

The results for the future weather scenarios are shown in the Appendix.

| Room | DSY1 | | DSY2 | | DSY3 | |
|---|---|---|---|---|---|---|
| | Criteria 1 | Criteria 2 | Criteria 1 | Criteria 2 | Criteria 1 | Criteria 2 |
| Requirement | =<3.0 | =<32 | =<3.0 | =<32 | =<3.0 | =<32 |
| L01 A102 Bed Double | 0.0 | 11 | 0.0 | 21 | 0.0 | 33 |
| L01 A102 LKD 1B | 0.0 | | 0.0 | | 0.0 | |
| L01 A104 Bed Double | 0.0 | 17 | 0.2 | 25 | 0.2 | 39 |
| L01 A104 Bed Double | 0.1 | 17 | 0.3 | 24 | 0.5 | 39 |
| L01 A104 LKD 2B | 0.1 | | 0.6 | | 0.8 | |
| L01 A105 Bed Double | 0.0 | 12 | 0.0 | 22 | 0.0 | 36 |
| L01 A105 LKD 1B | 0.0 | | 0.0 | | 0.2 | |
| L02 A204 Bed Double | 0.0 | 18 | 0.4 | 28 | 0.5 | 46 |
| L02 A204 Bed Double | 0.0 | 20 | 0.4 | 31 | 0.4 | 45 |
| L02 A204 LKD 2B | 0.1 | | 0.9 | | 0.8 | |
| L02 A206 Bed Double | 0.0 | 17 | 0.4 | 26 | 0.5 | 43 |
| L02 A206 LKD 1B | 0.1 | | 1.0 | | 0.9 | |
| L03 A303 Bed Double | 0.1 | 21 | 0.7 | 33 | 0.8 | 48 |
| L03 A303 Bed Double | 0.1 | 20 | 0.7 | 33 | 0.9 | 47 |
| L03 A303 LKD 2B | 0.2 | | 1.1 | | 1.2 | |
| L03 A305 Bed Double | 0.0 | 17 | 0.4 | 26 | 0.5 | 43 |
| L03 A305 LKD 1B | 0.1 | | 0.9 | | 0.8 | |
| L03 A307 Bed Double | 0.4 | 21 | 0.8 | 34 | 1.2 | 50 |
| L03 A307 Bed Double | 0.5 | 21 | 0.8 | 34 | 1.4 | 49 |
| L03 A307 LKD 2B | 1.1 | | 1.8 | | 2.5 | |
| L04 A404 Bed Double | 0.0 | 20 | 0.5 | 32 | 0.5 | 46 |
| L04 A404 Bed Double | 0.0 | 18 | 0.5 | 28 | 0.6 | 47 |
| L04 A404 LKD 2B | 0.1 | | 1.0 | | 0.9 | |
| L04 A406 Bed Double | 0.0 | 17 | 0.5 | 26 | 0.6 | 41 |
| L04 A406 LKD 1B | 0.1 | | 1.1 | | 1.1 | |
| L04 B401 Bed Double | 0.2 | 25 | 0.8 | 37 | 1.1 | 50 |
| L04 B401 Bed Double | 0.2 | 24 | 0.7 | 36 | 1.0 | 50 |
| L04 B401 Bed Single | 0.2 | 21 | 0.7 | 28 | 0.9 | 44 |
| L04 B401 Kitchen 3B | 0.6 | | 1.4 | | 2.0 | |
| L04 B401 Lounge 3B | 0.5 | | 1.6 | | 2.0 | |
| L04 B403 Bed Double | 0.0 | 18 | 0.4 | 29 | 0.6 | 48 |
| L04 B403 Bed Double | 0.0 | 20 | 0.5 | 33 | 0.6 | 47 |
| L04 B403 Kitchen 2B | 0.2 | | 1.0 | | 0.9 | |
| L04 B403 Lounge 2B | 0.1 | | 0.9 | | 1.1 | |
| L05 A503 Bed Double | 0.1 | 20 | 0.7 | 32 | 0.9 | 47 |
| L05 A503 Bed Double | 0.1 | 20 | 0.7 | 33 | 0.8 | 47 |
| L05 A503 LKD 2B | 0.2 | | 1.1 | | 1.2 | |
| L05 A505 Bed Double | 0.0 | 17 | 0.4 | 25 | 0.5 | 40 |
| L05 A505 LKD 1B | 0.1 | | 0.9 | | 0.7 | |
| L05 A507 Bed Double | 0.5 | 21 | 0.8 | 33 | 1.4 | 48 |
| L05 A507 Bed Double | 0.4 | 21 | 0.7 | 34 | 1.2 | 49 |
| L05 A507 LKD 2B | 1.1 | | 1.7 | | 2.5 | |
| L06 A603 Bed Double | 0.1 | 20 | 0.7 | 31 | 0.8 | 46 |
| L06 A603 Bed Double | 0.1 | 19 | 0.6 | 32 | 0.7 | 47 |
| L06 A603 LKD 2B | 0.2 | | 1.1 | | 1.2 | |
| L06 A604 Bed Double | 0.0 | 17 | 0.4 | 25 | 0.5 | 43 |
| L06 A604 Bed Double | 0.0 | 18 | 0.3 | 29 | 0.4 | 42 |
| L06 A604 LKD 2B | 0.1 | | 1.0 | | 0.8 | |
| L06 A605 Bed Double | 0.0 | 16 | 0.3 | 24 | 0.4 | 38 |
| L06 A605 LKD 1B | 0.0 | | 0.6 | | 0.6 | |
| L06 A607 Bed Double | 0.4 | 21 | 0.7 | 32 | 1.2 | 48 |
| L06 A607 Bed Double | 0.6 | 21 | 0.9 | 33 | 1.5 | 46 |
| L06 A607 LKD 2B | 1.0 | | 1.7 | | 2.6 | |
| L06 B601 Bed Double | 0.2 | 23 | 0.8 | 35 | 1.1 | 48 |
| L06 B601 Bed Double | 0.1 | 21 | 0.6 | 32 | 0.9 | 48 |
| L06 B601 LKD 2B | 0.4 | | 1.4 | | 1.6 | |
| L06 B604 Bed Double | 0.1 | 21 | 0.7 | 31 | 0.9 | 45 |
| L06 B604 LKD 1B | 0.1 | | 0.9 | | 1.2 | |
| L07 A703 Bed Double | 0.1 | 18 | 0.5 | 29 | 0.7 | 42 |
| L07 A703 LKD 1B | 0.2 | | 1.0 | | 1.0 | |
| L08 A802 Bed Double | 0.1 | 20 | 0.6 | 32 | 0.8 | 47 |
| L08 A802 Bed Double | 0.4 | 21 | 0.9 | 29 | 1.6 | 47 |
| L08 A802 LKD 2B | 0.4 | | 1.3 | | 1.5 | |
| L08 A804 Bed Double | 0.2 | 18 | 0.8 | 29 | 0.9 | 44 |
| L08 A804 Bed Double | 0.6 | 20 | 1.0 | 32 | 1.5 | 48 |
| L08 A804 LKD 2B | 1.1 | | 2.0 | | 2.8 | |
| Pass | 66/66 | 40/40 | 66/66 | 28/40 | 66/66 | 0/40 |
| | 100.0% | 100.0% | 100.0% | 70.0% | 100.0% | 0.0% |

Table 4-1 – Overheating results for 2020 weather files

# 6 Discussion

The results show that all assessed units within the development pass the overheating assessment for the DSY1, 2020, High emission 50th percentile scenario, which is the weather file recommended to be used in TM59. Across all weather files and future weather scenarios, the results also show that the development consistently performs well against Criteria 1, which looks at extremely high internal temperatures.

In more extreme heat, such as the DSY2 and DSY3 scenarios, as well as future weather scenarios, the building struggles to meet the requirements of Criteria 2, which assesses the number of night-time hours bedrooms spend above 26 degrees. Examination of the model demonstrates that the majority of hours above 26 degrees occur between 10pm and 12am, rather than between 12am and 7am, so are unlikely to have a major impact on sleep patterns. The results show that due to the thermal mass of the building, it does not cool down instantly on warm summer evening. However, the thermal mass of the building helps improve the performance of the development against Criteria 1, by providing a buffer against extreme temperatures during the day, so lowering the thermal mass is not recommended. All design steps have been taken to minimise overheating, such as minimising solar gain and providing large openable windows to allow purge ventilation. Further measures, such as mechanical cooling, would be excessive given the performance of the development against the current recommended weather scenarios.

DSY2 and DSY3 represent rare weather events that are not representative of a typical or common summer and are unlikely to occur regularly. Following the results of the overheating assessment, some guidance has been provided to help occupants prevent overheating:

- Ensure internal gains are minimised, by turning of lighting and appliances that may generate heat and use blinds to minimise solar gain.
- Leaving windows partially open can leave to effective ventilation and prevent the build up of heat. When this is not possible, the MVHR can be used to provide ventilation.
- When heat builds up, open the windows to purge the room of heat. When possible, open internal doors and windows to allow cross ventilation throughout the unit.
- In server heat or extremely sunny days, it can be more effective to close windows and blinds on any windows that are facing the sun.

# 7 Conclusion

This report assesses the overheating potential of the residential sections of the proposed development of Caxton Road, in the London Borough of Haringey. Overheating has been assessed in line with the guidance and criteria outlined in CIBSE TM 59.

Action was taken at each stage of the cooling hierarchy in order to minimise overheating. Following initial runs of the model, a number of further measures were incorporated, including blinds and maximising the opening angle of the windows.

A TM 59 assessment undertaken using IES Virtual Environment software, which is a CIBSE AM11 compliant thermal modelling software. The DSY1, DSY2 and DSY3, London Heathrow, high emission, 50% percentile weather files were used to assess current overheating potential. Future overheating potential has also been assessed.

The results show that all assessed units within the development pass the overheating assessment for the current DSY1 scenario, which is the weather file recommended to be used in TM59. The results also show that the development consistently performs well against Criteria 1, which looks at extremely high internal temperatures.

However, in more extreme heat, such as the DSY2 and DSY3 scenarios, as well as future weather scenarios, the building struggles to meet the requirements of Criteria 2. Guidance was provided to help occupants prevent overheating.

# 8 Appendix

## 8.1 Model Assumptions

The building and modelling assumptions used in the assessment are outlined below. The building fabric used are outlined in Table 7-1.

| Building Element | U – Value (W/m²K) | G - Value |
|---|---|---|
| External Walls | 0.13 | |
| Roof | 0.11 | |
| External Glazing | 1.20 | 0.40 |

Table 7-1 – Building fabric properties

All residential spaces were modelled in line with TM 59.

Natural ventilation was modelled through operable windows using the IES MacroFlo Module. Operable windows in the residential areas were set to open when the room is occupied and internal air temperatures is greater 22$^{o}$C and greater than external air temperature, in line with the guidance in TM 59. Top hung windows have been set to open to 45 degrees.

Auxiliary ventilation was modelled within the apartments, providing 1 ACH to bedrooms, kitchens, living room and bathrooms.

Blinds with a shading coefficient of 0.5 were modelled to start being lowered when global horizontal solar flux reaches 200 W/m$^2$ and be fully lowered when global horizontal solar flux reaches 400 W/m$^2$, when outside air is greater than inside air temperature. This prevents them operating at the same time as windows are open.

## 8.2 Results – 2050

| Room | DSY1 | | DSY2 | | DSY3 | |
|---|---|---|---|---|---|---|
| | Criteria 1 | Criteria 2 | Criteria 1 | Criteria 2 | Criteria 1 | Criteria 2 |
| Requirement | =<3.0 | =<32 | =<3.0 | =<32 | =<3.0 | =<32 |
| L01 A102 Bed Double | 0.0 | 29 | 0.1 | 43 | 0.0 | 62 |
| L01 A102 LKD 1B | 0.0 | | 0.2 | | 0.0 | |
| L01 A104 Bed Double | 0.1 | 33 | 0.6 | 52 | 0.7 | 76 |
| L01 A104 Bed Double | 0.2 | 34 | 0.7 | 51 | 1.2 | 76 |
| L01 A104 LKD 2B | 0.4 | | 1.3 | | 2.1 | |
| L01 A105 Bed Double | 0.0 | 30 | 0.1 | 44 | 0.0 | 65 |
| L01 A105 LKD 1B | 0.1 | | 0.1 | | 0.6 | |
| L02 A204 Bed Double | 0.2 | 38 | 0.7 | 54 | 0.8 | 78 |
| L02 A204 Bed Double | 0.2 | 39 | 0.7 | 55 | 0.8 | 79 |
| L02 A204 LKD 2B | 0.4 | | 1.3 | | 1.4 | |
| L02 A206 Bed Double | 0.2 | 38 | 0.7 | 52 | 0.8 | 75 |
| L02 A206 LKD 1B | 0.4 | | 1.5 | | 1.7 | |
| L03 A303 Bed Double | 0.4 | 47 | 1.0 | 60 | 1.3 | 85 |
| L03 A303 Bed Double | 0.4 | 47 | 1.1 | 58 | 1.6 | 81 |
| L03 A303 LKD 2B | 0.5 | | 1.6 | | 1.9 | |
| L03 A305 Bed Double | 0.2 | 37 | 0.6 | 51 | 0.8 | 75 |
| L03 A305 LKD 1B | 0.4 | | 1.4 | | 1.3 | |
| L03 A307 Bed Double | 0.8 | 45 | 1.2 | 59 | 2.0 | 87 |
| L03 A307 Bed Double | 1.1 | 44 | 1.5 | 58 | 2.5 | 82 |
| L03 A307 LKD 2B | 2.1 | | 3.0 | | 4.3 | |
| L04 A404 Bed Double | 0.2 | 39 | 0.7 | 55 | 0.8 | 81 |
| L04 A404 Bed Double | 0.2 | 38 | 0.7 | 54 | 1.0 | 79 |
| L04 A404 LKD 2B | 0.4 | | 1.5 | | 1.7 | |
| L04 A406 Bed Double | 0.2 | 38 | 0.7 | 51 | 1.0 | 75 |
| L04 A406 LKD 1B | 0.4 | | 1.6 | | 1.8 | |
| L04 B401 Bed Double | 0.7 | 48 | 1.4 | 61 | 2.2 | 88 |
| L04 B401 Bed Double | 0.5 | 45 | 1.3 | 59 | 1.8 | 86 |
| L04 B401 Bed Single | 0.5 | 43 | 1.1 | 54 | 1.7 | 78 |
| L04 B401 Kitchen 3B | 1.2 | | 2.5 | | 3.8 | |
| L04 B401 Lounge 3B | 1.1 | | 2.7 | | 4.0 | |
| L04 B403 Bed Double | 0.2 | 42 | 0.7 | 56 | 1.1 | 79 |
| L04 B403 Bed Double | 0.2 | 41 | 0.7 | 58 | 1.1 | 84 |
| L04 B403 Kitchen 2B | 0.5 | | 1.4 | | 1.8 | |
| L04 B403 Lounge 2B | 0.4 | | 1.3 | | 2.0 | |
| L05 A503 Bed Double | 0.4 | 44 | 1.2 | 56 | 1.6 | 79 |
| L05 A503 Bed Double | 0.4 | 44 | 1.0 | 59 | 1.4 | 80 |
| L05 A503 LKD 2B | 0.5 | | 1.7 | | 1.9 | |
| L05 A505 Bed Double | 0.2 | 36 | 0.6 | 49 | 0.8 | 75 |
| L05 A505 LKD 1B | 0.4 | | 1.4 | | 1.3 | |
| L05 A507 Bed Double | 1.1 | 42 | 1.4 | 57 | 2.4 | 80 |
| L05 A507 Bed Double | 0.8 | 42 | 1.2 | 59 | 2.0 | 83 |
| L05 A507 LKD 2B | 2.1 | | 2.9 | | 4.2 | |
| L06 A603 Bed Double | 0.4 | 43 | 1.1 | 56 | 1.5 | 78 |
| L06 A603 Bed Double | 0.3 | 43 | 0.9 | 58 | 1.3 | 78 |
| L06 A603 LKD 2B | 0.5 | | 1.7 | | 1.9 | |
| L06 A604 Bed Double | 0.2 | 37 | 0.6 | 50 | 0.8 | 77 |
| L06 A604 Bed Double | 0.1 | 36 | 0.6 | 52 | 0.7 | 75 |
| L06 A604 LKD 2B | 0.4 | | 1.3 | | 1.5 | |
| L06 A605 Bed Double | 0.1 | 35 | 0.6 | 48 | 0.8 | 75 |
| L06 A605 LKD 1B | 0.2 | | 1.1 | | 1.2 | |
| L06 A607 Bed Double | 0.8 | 42 | 1.1 | 56 | 2.0 | 81 |
| L06 A607 Bed Double | 1.2 | 40 | 1.4 | 56 | 2.6 | 79 |
| L06 A607 LKD 2B | 2.1 | | 2.8 | | 4.2 | |
| L06 B601 Bed Double | 0.6 | 45 | 1.4 | 57 | 2.2 | 84 |
| L06 B601 Bed Double | 0.4 | 47 | 1.0 | 57 | 1.5 | 82 |
| L06 B601 LKD 2B | 1.0 | | 2.2 | | 3.4 | |
| L06 B604 Bed Double | 0.4 | 40 | 1.1 | 55 | 1.9 | 82 |
| L06 B604 LKD 1B | 0.4 | | 1.4 | | 2.2 | |
| L07 A703 Bed Double | 0.3 | 38 | 0.8 | 55 | 1.1 | 78 |
| L07 A703 LKD 1B | 0.4 | | 1.5 | | 2.0 | |
| L08 A802 Bed Double | 0.5 | 44 | 1.0 | 59 | 1.7 | 84 |
| L08 A802 Bed Double | 1.1 | 41 | 1.5 | 57 | 2.6 | 81 |
| L08 A802 LKD 2B | 1.1 | | 2.4 | | 3.6 | |
| L08 A804 Bed Double | 0.5 | 40 | 1.1 | 56 | 1.7 | 78 |
| L08 A804 Bed Double | 1.3 | 39 | 1.6 | 56 | 2.6 | 80 |
| L08 A804 LKD 2B | 2.1 | | 3.3 | | 4.6 | |
| Pass | 66/66 | 2/40 | 65/66 | 0/40 | 58/66 | 0/40 |
| | 100.0% | 5.0% | 98.5% | 0.0% | 87.9% | 0.0% |

Table 7-2 – Overheating results for 2050 weather files

## 8.3 Results - 2080

| Room | DSY1 | | DSY2 | | DSY3 | |
|---|---|---|---|---|---|---|
| | Criteria 1 | Criteria 2 | Criteria 1 | Criteria 2 | Criteria 1 | Criteria 2 |
| Requirement | =<3.0 | =<32 | =<3.0 | =<32 | =<3.0 | =<32 |
| L01 A102 Bed Double | 0.0 | 31 | 0.1 | 48 | 0.0 | 69 |
| L01 A102 LKD 1B | 0.0 | | 0.3 | | 0.0 | |
| L01 A104 Bed Double | 0.1 | 37 | 0.6 | 54 | 0.8 | 81 |
| L01 A104 Bed Double | 0.3 | 36 | 0.7 | 54 | 1.3 | 80 |
| L01 A104 LKD 2B | 0.4 | | 1.4 | | 2.3 | |
| L01 A105 Bed Double | 0.0 | 31 | 0.1 | 49 | 0.1 | 74 |
| L01 A105 LKD 1B | 0.1 | | 0.2 | | 0.8 | |
| L02 A204 Bed Double | 0.2 | 43 | 0.7 | 58 | 1.0 | 85 |
| L02 A204 Bed Double | 0.2 | 45 | 0.7 | 61 | 0.8 | 85 |
| L02 A204 LKD 2B | 0.4 | | 1.5 | | 1.7 | |
| L02 A206 Bed Double | 0.2 | 40 | 0.7 | 56 | 1.0 | 83 |
| L02 A206 LKD 1B | 0.4 | | 1.7 | | 1.8 | |
| L03 A303 Bed Double | 0.4 | 51 | 1.1 | 63 | 1.5 | 95 |
| L03 A303 Bed Double | 0.5 | 52 | 1.2 | 63 | 1.8 | 91 |
| L03 A303 LKD 2B | 0.5 | | 1.8 | | 2.0 | |
| L03 A305 Bed Double | 0.2 | 40 | 0.7 | 56 | 1.0 | 81 |
| L03 A305 LKD 1B | 0.4 | | 1.4 | | 1.6 | |
| L03 A307 Bed Double | 1.0 | 48 | 1.3 | 62 | 2.3 | 94 |
| L03 A307 Bed Double | 1.2 | 50 | 1.7 | 60 | 2.7 | 91 |
| L03 A307 LKD 2B | 2.2 | | 3.2 | | 4.8 | |
| L04 A404 Bed Double | 0.2 | 45 | 0.8 | 62 | 1.0 | 84 |
| L04 A404 Bed Double | 0.2 | 43 | 0.7 | 58 | 1.0 | 86 |
| L04 A404 LKD 2B | 0.4 | | 1.6 | | 1.8 | |
| L04 A406 Bed Double | 0.2 | 40 | 0.7 | 56 | 1.0 | 82 |
| L04 A406 LKD 1B | 0.5 | | 1.7 | | 1.9 | |
| L04 B401 Bed Double | 0.7 | 53 | 1.6 | 64 | 2.3 | 99 |
| L04 B401 Bed Double | 0.6 | 50 | 1.4 | 64 | 2.0 | 96 |
| L04 B401 Bed Single | 0.5 | 49 | 1.1 | 60 | 1.9 | 82 |
| L04 B401 Kitchen 3B | 1.4 | | 2.7 | | 3.8 | |
| L04 B401 Lounge 3B | 1.4 | | 2.8 | | 4.2 | |
| L04 B403 Bed Double | 0.2 | 43 | 0.7 | 58 | 1.1 | 91 |
| L04 B403 Bed Double | 0.2 | 45 | 0.8 | 62 | 1.2 | 94 |
| L04 B403 Kitchen 2B | 0.5 | | 1.7 | | 2.0 | |
| L04 B403 Lounge 2B | 0.5 | | 1.6 | | 2.2 | |
| L05 A503 Bed Double | 0.5 | 50 | 1.3 | 63 | 1.8 | 91 |
| L05 A503 Bed Double | 0.4 | 49 | 1.1 | 63 | 1.5 | 93 |
| L05 A503 LKD 2B | 0.6 | | 1.8 | | 2.1 | |
| L05 A505 Bed Double | 0.2 | 40 | 0.7 | 55 | 1.0 | 79 |
| L05 A505 LKD 1B | 0.4 | | 1.4 | | 1.5 | |
| L05 A507 Bed Double | 1.2 | 48 | 1.6 | 60 | 2.6 | 88 |
| L05 A507 Bed Double | 1.0 | 48 | 1.3 | 61 | 2.3 | 91 |
| L05 A507 LKD 2B | 2.1 | | 3.1 | | 4.6 | |
| L06 A603 Bed Double | 0.5 | 48 | 1.3 | 63 | 1.7 | 88 |
| L06 A603 Bed Double | 0.4 | 48 | 1.1 | 63 | 1.3 | 90 |
| L06 A603 LKD 2B | 0.5 | | 1.8 | | 2.1 | |
| L06 A604 Bed Double | 0.2 | 40 | 0.7 | 57 | 0.9 | 81 |
| L06 A604 Bed Double | 0.1 | 42 | 0.7 | 55 | 0.8 | 82 |
| L06 A604 LKD 2B | 0.4 | | 1.4 | | 1.7 | |
| L06 A605 Bed Double | 0.2 | 38 | 0.6 | 54 | 0.8 | 78 |
| L06 A605 LKD 1B | 0.3 | | 1.2 | | 1.3 | |
| L06 A607 Bed Double | 0.9 | 45 | 1.2 | 61 | 2.4 | 88 |
| L06 A607 Bed Double | 1.3 | 46 | 1.6 | 60 | 2.8 | 85 |
| L06 A607 LKD 2B | 2.1 | | 3.0 | | 4.5 | |
| L06 B601 Bed Double | 0.7 | 49 | 1.5 | 63 | 2.4 | 91 |
| L06 B601 Bed Double | 0.4 | 48 | 1.0 | 62 | 1.6 | 91 |
| L06 B601 LKD 2B | 1.1 | | 2.5 | | 3.8 | |
| L06 B604 Bed Double | 0.5 | 43 | 1.2 | 61 | 2.0 | 86 |
| L06 B604 LKD 1B | 0.5 | | 1.5 | | 2.4 | |
| L07 A703 Bed Double | 0.3 | 40 | 0.9 | 58 | 1.3 | 83 |
| L07 A703 LKD 1B | 0.4 | | 1.7 | | 2.3 | |
| L08 A802 Bed Double | 0.5 | 48 | 1.2 | 63 | 1.8 | 96 |
| L08 A802 Bed Double | 1.2 | 46 | 1.6 | 61 | 2.8 | 86 |
| L08 A802 LKD 2B | 1.2 | | 2.5 | | 4.0 | |
| L08 A804 Bed Double | 0.6 | 43 | 1.3 | 60 | 1.9 | 84 |
| L08 A804 Bed Double | 1.3 | 45 | 1.7 | 60 | 2.8 | 85 |
| L08 A804 LKD 2B | 2.2 | | 3.6 | | 5.0 | |
| Pass | 66/66 | 2/40 | 63/66 | 0/40 | 58/66 | 0/40 |
| | 100.0% | 5.0% | 95.5% | 0.0% | 87.9% | 0.0% |

Table 7-3 – Overheating results for 2080 weather files

JAWSustainability

## 8.4 Assessed Units - Floor Plans

The floor plans below highlight all the units that have been assessed as part of the overheating assessment, in line with the guidance provided following the pre-application advice meeting.


A207
2B4P
A208
2B3P W
B204
3B5P
A206
1B2P
B203
2B4P
A205
1B2P
B202
3B5P
A204
2B4P
A203
2B4P W
A202
2B4P
A201
2B4P
B201
3B5P
Caxton Road
Level 2 Floor Plan
AA8418-01102
REV D
COORDINATION
PRP


A307
2B4P
A308
2B3P W
B304
3B5P
A306
1B2P
B303
2B4P
A305
1B2P
B302
3B5P
A304
2B4P
A303
2B4P W
A302
2B4P
A301
2B4P
B301
3B5P
Caxton Road
Level 3 Floor Plan
AA8418-01103
REV D
COORDINATION
PRP


Drawn YW
Checked CS
Date June 2019
Scale @ A1 1 : 100

**Caxton Road**

Level 4 Floor Plan

**AA8418-01104**
**REV D**

COORDINATION

PRP


Private Terrace
A507
2B4P
A506
1B2P
A505
1B2P
A504
2B4P
A503
2B4P W
A502
2B4P
A501
2B4P
B505
1B2P
B504
1B2P
B503
1B2P
B502
1B2P
B501
2B4P
Caxton Road
Level 5 Floor Plan
AA8418-01105
REV D
COORDINATION
PRP


A607
2B4P
A606
1B2P
A605
1B2P
A604
2B4P
A603
2B4P W
A602
2B4P
A601
2B4P
B605
1B2P
B604
1B2P
B603
1B2P
B602
1B2P
B601
2B4P
Caxton Road
Level 6 Floor Plan
AA8418-01106
REV D
COORDINATION
PRP


Core A Roof Terrace
Core B Roof Terrace
A703
1B2P
A702
2B4P
A704
2B4P
A701
2B4P
Private Terrace
Caxton Road
Level 7 Floor Plan
AA8418-01107
REV E
COORDINATION
PRP


A804
2B4P
A803
1B2P
A802
2B4P
A801
2B4P
Caxton Road
Level 8 Floor Plan
AA8418-01108
REV D
COORDINATION
PRP