



**807 High Road,  
London. SE24 0DJ**

**CIBSE TM52  
Overheating Assessment**

**Revision 02**

**20 February 2024**

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## 1. INTRODUCTION

This is an investigative report into the potential summertime overheating of the proposed development at 807 High Road. The project is a new build mixed use development with a ground floor flexible commercial, business and service use (Class E) space and new student accommodation on the upper floors with common rooms and circulation spaces.

All occupied areas being assessed have been thermally modelled to comply with CIBSE TM52 overheating criteria detailed within this report, using CIBSE certified Level 5 approved Dynamic Simulation Modelling software.

The model has been constructed using the information available at the time of modelling. Therefore, geometry details may differ to the latest architectural model issued separately to this report; the thermal modelling will not be reflective of these changes.

Internal comfort will always be a subjective issue, individual to the people using the space. However, as detailed in the Chartered Institute of Building Services Engineers (CIBSE) recommended Technical Memorandum, TM52: The limits of thermal comfort: avoiding overheating are used as a benchmark.

The thermal model will follow the methodology of CIBSE TM52 whilst employing overheating mitigation measures detailed in Part O.

The development has low g-value glazing to limit the solar gain. The windows & rooflight open to provide cross ventilation and night-time purge. However, the windows facing High Road cannot be opened overnight due to noise.

## 2. METHODOLOGY

The CIBSE recommends that the simulation is carried out in accordance with the guidance and data sets in CIBSE Technical Memorandum TM52 which defines the limits of thermal comfort for non-residential buildings. It is a standardised approach to predicting overheating risk for non-residential building designs for new-build or major refurbishment.

CIBSE TM52 Compliance is based on passing *two of below the three thermal comfort criteria*:

- Threshold temperature exceeded  $\nless 3\%$  of occupied hours per year - This criterion sets a limit for the number of hours that the operative temperature exceeds the threshold comfort temperature by 1°C or more.
- Daily weighted exceedance (degree hours)  $\nless 6$  - This criterion deals with the severity of overheating within any one day, which is important as its frequency, the level of which is a function of both temperature rise and its duration. This criterion sets a daily limit (6 degree hours) for acceptability.
- Temperature  $\nless$  upper limit • Threshold temperature based on running mean daily mean outside air temperature. - The third criterion sets an absolute maximum daily temperature for a room, beyond which the level of overheating is unacceptable

Dynamic modelling has been undertaken with AD Part O compliant modelling software, to check the project and the natural ventilation strategy to ensure that thermal comfort levels and the elimination of overheating risks were compliant.

The bedrooms are also assessed under Part "O" - CIBSE TM59 criteria B, to ensure comfort during the sleeping hours. To comply with this criterion, 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*)

TM59 sets the requirements and parameters for occupancy levels and internal gains, and AD Part O sets window opening schedule.

### 3. BASIS OF THE ASSESSMENT

#### 3.1 Thermal Modelling Software

The thermal modelling work has been carried out using the dynamic thermal software package developed by Integrated Environmental Solutions Virtual Environment (IESVE) developed by Integrated Environmental Solutions (IES) applied in accordance with CIBSE TM52.

The accredited IESVE thermal modelling package has been used to create a theoretical representation of the proposed development. In the first instance a three-dimensional model of the building was constructed within IES based on the architectural plans and elevations. The model is a representation of the building in respect of floor areas, room volumes, window sizes and orientation. Below are the model images.

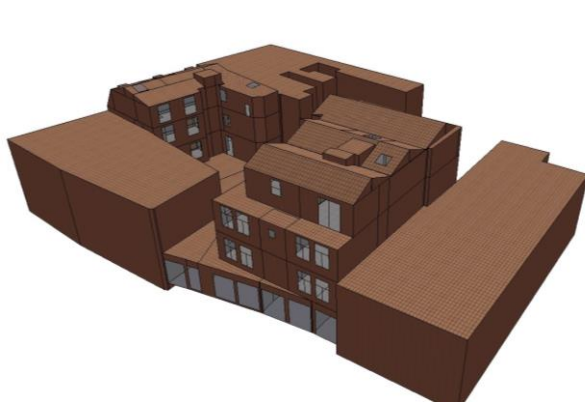


Figure 1 – 3D View of North West Elevation

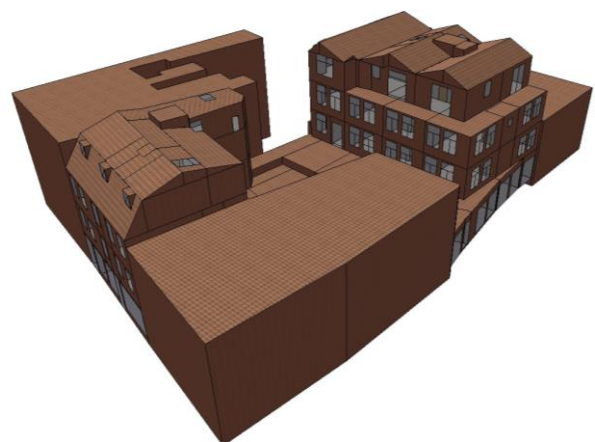


Figure 2 – 3D View of North East Elevation

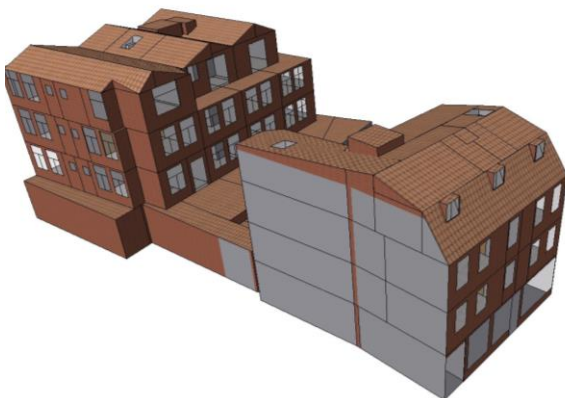


Figure 3 – 3D View of South East Elevation

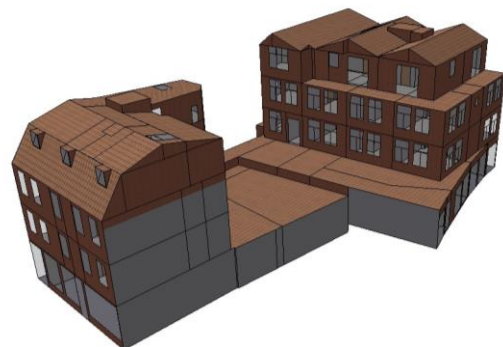


Figure 4 – 3D View of North East Elevation without adjacent buildings

Once the geometric model had been completed, elements such as building fabric details (U Values for walls floors, roof, windows and doors) and window opening were assigned to the model.

Following this each room was assigned a thermal template specifying Occupancy Gains, Lighting Gains, Miscellaneous Gains and Infiltration and Ventilation Rates.

Each gain is assigned as a specific profile that can be turned on / off, depending on the occupancy times. Any solar shading devices can be added to the model and the corresponding effects of any shading devices are modelled by the SunCast engine. Each window opening has been given an opening profile which considers the open area discharge co-efficient, opening/closing times, orientation, and the exposure level.

Openable windows will be assigned profiles to enable modelling of the natural ventilation during summer and winter times of occupation. The weather data assigned is the closest detailed weather file available within the software. Upon completion of the above criteria, the model is ready to simulate the overheating analysis.

### 3.2 External shades

External shades are commonly used to mitigate solar heat gain and reduce the reliance on air conditioning systems. As the building is located within a dense urban area where neighbouring structures cast shadows for a significant portion of the day. A thorough analysis of the site's solar exposure, considering the height and orientation of adjacent buildings, has been conducted.

External shading systems involve initial installation costs, maintenance expenses, and potential repair or replacement costs. In cases where natural shading is sufficient, not implementing external shades can lead to cost savings without compromising energy efficiency or occupant comfort.

Based on the initial analysis it was been recommended to consider the benefits of natural shading and potential cost savings. However it was noted that as the building is within a conservation area, external shading is considered inappropriate on the High Road therefore for the purposes of this analysis the decision was made to exclude external shades from the building.

### 3.3 Building Fabric Performance

Elemental U-Values have been taken as follows:

| Category             | U value (W/m <sup>2</sup> .K) | Comments     |
|----------------------|-------------------------------|--------------|
| External Window      | 1.0                           | G-value 0.30 |
| Ground/Exposed Floor | 0.11                          |              |
| Roof                 | 0.11                          |              |
| External Wall        | 0.14                          |              |

Table 1 – Building's Fabric Performance

The air permeability is targeted at 3 m<sup>3</sup>/m<sup>2</sup>.h @ 50 Pa

### 3.4 Internal Gains

The following internal gains were used for the areas when undertaking the thermal comfort analysis. The daily occupancy pattern and occupancy gains in the model were a combination of the recommended Notional Calculation Methodology (NCM) and custom profiles reflecting the

occupied times.

A Person is 70W sensible gain and 55W latent gain.

| Room Type              | Internal Gains |                     |                       |
|------------------------|----------------|---------------------|-----------------------|
|                        | Occupancy      | Miscellaneous       | Lighting              |
| Studio (Single Person) | 1              | 8 W/m <sup>2</sup>  | 2.5 W/m <sup>2</sup>  |
| Studio (Two Person)    | 2              | 8 W/m <sup>2</sup>  | 2.5 W/m <sup>2</sup>  |
| Common Rooms           | 8m2/person     | 10 W/m <sup>2</sup> | 3.75 W/m <sup>2</sup> |
| Circulation Areas      | -              | 10 W/m <sup>2</sup> | 3.75 W/m <sup>2</sup> |

Table 2 – Internal Gains

### 3.5 Opening / Working Hours

It is assumed the building is occupied 24hr all days in a week.

### 3.6 Weather File

The proposed development is in Central London, the nearest CIBSE weather data for the location is London weather centre. The building is assessed for year 2050 for following three weather files.

#### DSY1 – A moderately warm summer.

Summers will have a 1-in-7 chance of being equal or hotter than this DSY.

#### DSY2 – A summer with a short intense warm spell.

An intense summer with a heat event the same length of that of DSY1, but with a higher intensity.

#### DSY3 – A summer with a long less intense warm spell.

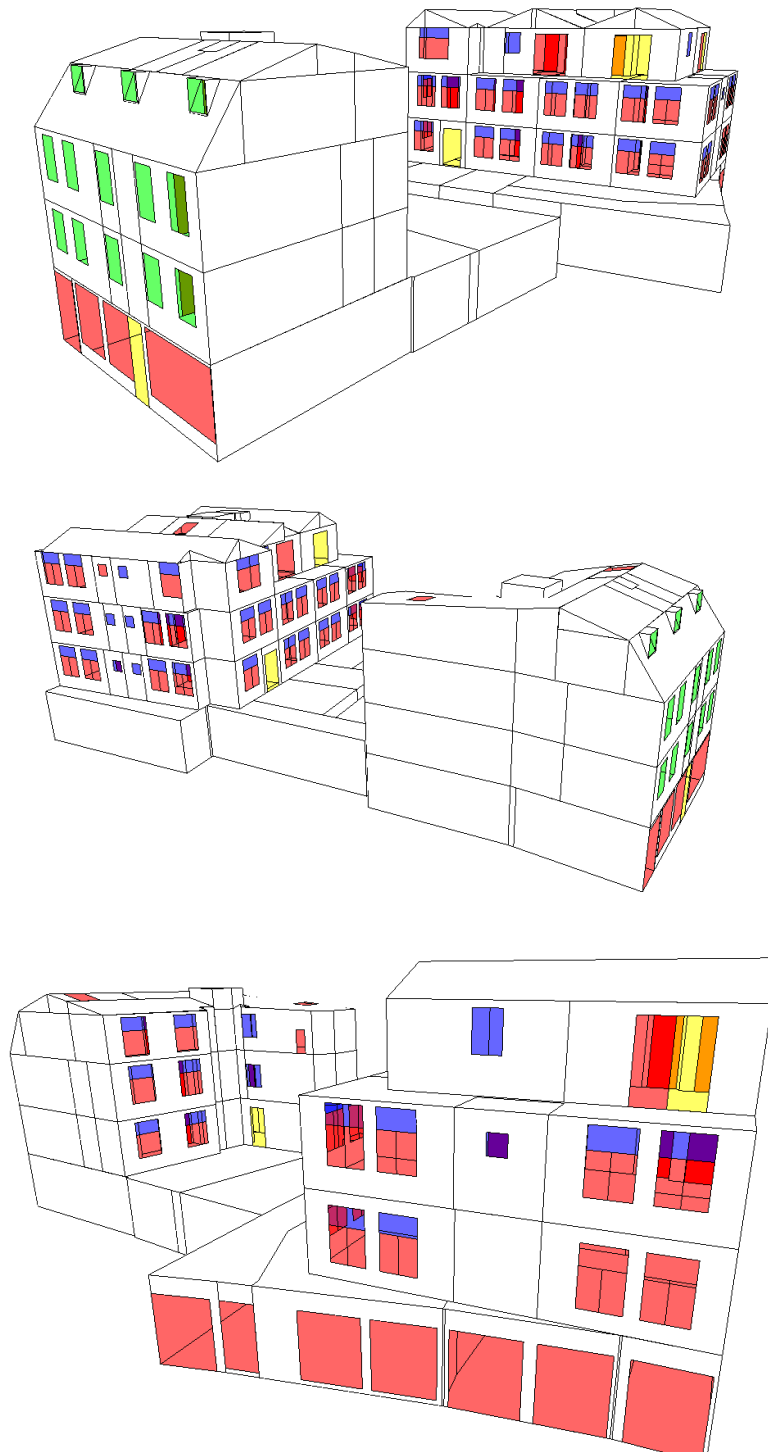
The heat event is less intense than that of DSY2, but has a higher intensity than DSY1. It has a longer duration than that of DSY1.

### 3.7 VENTILATION METHOD.

The project has been assessed for natural ventilation by opening windows.

Natural ventilation to be provided via openable windows.

- Block A High Road facing windows (Sash windows) – Assumed openable to 40% of area between 8AM-8PM, windows open when internal temperature exceeds 19°C and internal temperature greater than external temperature.
- Block A rear top windows (Top Hung) - Assumed openable to 30° angle, windows open when internal temperature exceeds 19°C and greater than external temperature.
- Block B top windows (Top Hung) - Assumed openable to 30° angle, windows open when internal temperature exceeds 19°C and greater than external temperature.
- Doors (Side Hung) - Assumed openable to 90° angle between 8AM-8PM, windows open when internal temperature exceeds 19°C and greater than external temperature.



Opening Category  
■ Custom / sharp edge orifice  
■ Window - sash  
■ Window - top hung  
■ Window / door - side hung

The figures above shown window opening types..

#### 4. DESIGN ASSESSMENT

Based upon the above-mentioned design criteria a dynamic simulation was run to assess whether the dwelling as designed has an overheating potential when assessed against the appropriate weather data.

The TM52 results are shown in the table below. When tested against DSY 1, most of the rooms in Block A fail and the rooms in Block B pass, this is due to nighttime ventilation. When the building is assessed under DSY 2, intense summer: Most of the rooms fail in Block B and all the rooms in Block A Fail. Most of the rooms fail when assessed under DSY 3, which has a longer summer with less intense spells.

All the bedroom fails CIBSE TM59 criterion b for most of the weather files, this assesses thermal comfort of the bedroom overnight.

##### Result summary

| CIBSE Weather Files | Percent of rooms overheat                |                                       |
|---------------------|------------------------------------------|---------------------------------------|
|                     | CIBSE TM 52 Criteria all occupied spaces | CIBSE TM 59 criteria (b) for bedrooms |
| 2020 LWC DSY 1      | 20%                                      | 68%                                   |
| 2020 LWC DSY 2      | 50%                                      | 100%                                  |
| 2020 LWC DSY 3      | 60%                                      | 100%                                  |
| 2050 LWC DSY 1      | 48%                                      | 100%                                  |
| 2050 LWC DSY 2      | 90%                                      | 100%                                  |
| 2050 LWC DSY 3      | 83%                                      | 100%                                  |
| 2080 LWC DSY 1      | Not assessed                             |                                       |
| 2080 LWC DSY 2      | Not assessed                             |                                       |
| 2080 LWC DSY 3      | Not assessed                             |                                       |

Overheating analysis was not carried out for 2080 weather files, as this would have been worse than 2050 weather files results.

Based on the above results, whilst the building has been shown not to need cooling to pass the overheating criteria today, it is fair to assume that with the expected rises in global temperatures, the building will overheat with just the passive design measures in the future. Therefore to future proof the building active cooling will be required to ensure the building is maintained at optimum temperature during peak summer.

The building is heated via air source heat pumps, which can work in reverse to provide chilled water for cooling. This therefore means that this cooling can be provided very efficiently and with minimal additional plant by using the ASHPs and fan coil units in each student's room. Providing the cooling centrally in this manor will also allow the building to be setup to only activate the cooling when peak external temperatures require it.

However, upon occupation, residents will be provided with a user guide that explains to the occupants the key features of the scheme; It should cover measures they can take to prevent overheating in their rooms without use of active cooling.

We would recommend installing internal window blinds, the white or light in colour blinds offer an increased reflectivity than darker colours. Vertical fin blinds work more effectively to as the offer least restriction to the airflow, which provides an element of free cooling.

During days of peak summer temperatures, occupants will be advised to keep the windows closed, when the building is left unoccupied and when the external air temperature exceeds the internal air temperature.

Finally, advice will be given on evening purge ventilation; this will be that the windows shall be opened during evening/nighttime (where possible) once the external air temperature drops below the room temperature, this will subsequently reduce the likeliness of night-time overheating and heat buildup.

**CIBSE TM59 – Criteria b results for year 2020 London weather file**

| Room name             | 2020 DSY1          |                   | 2020 DSY2          |                   | 2020 DSY3          |                   |
|-----------------------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|
|                       | Total hours > 26°C | Criterion b check | Total hours > 26°C | Criterion b check | Total hours > 26°C | Criterion b check |
| Block A-1F-S1 Studio  | 36                 | Fail              | 73                 | Fail              | 79                 | Fail              |
| Block A-1F-S2 Studio  | 389                | Fail              | 467                | Fail              | 447                | Fail              |
| Block A-1F-S3 Studio  | 427                | Fail              | 483                | Fail              | 465                | Fail              |
| Block A-2F-S4 Studio  | 34                 | Fail              | 71                 | Fail              | 78                 | Fail              |
| Block A-2F-S5 Studio  | 352                | Fail              | 382                | Fail              | 408                | Fail              |
| Block A-2F-S6 Studio  | 347                | Fail              | 361                | Fail              | 397                | Fail              |
| Block A-3F-R1 Bedroom | 761                | Fail              | 927                | Fail              | 733                | Fail              |
| Block A-3F-R2 Bedroom | 561                | Fail              | 706                | Fail              | 572                | Fail              |
| Block B-1F-S7 Studio  | 13                 | Pass              | 39                 | Fail              | 37                 | Fail              |
| Block B-1F-S9 Studio  | 35                 | Fail              | 73                 | Fail              | 78                 | Fail              |
| Block B-1F-S10 Studio | 43                 | Fail              | 85                 | Fail              | 85                 | Fail              |
| Block B-1F-S11 Studio | 17                 | Pass              | 36                 | Fail              | 38                 | Fail              |
| Block B-1F-S12 Studio | 1361               | Fail              | 1381               | Fail              | 1403               | Fail              |
| Block B-2F-S13 Studio | 12                 | Pass              | 37                 | Fail              | 32                 | Pass              |
| Block B-2F-S14 Studio | 29                 | Pass              | 70                 | Fail              | 62                 | Fail              |
| Block B-2F-S15 Studio | 34                 | Fail              | 71                 | Fail              | 77                 | Fail              |
| Block B-2F-S16 Studio | 35                 | Fail              | 74                 | Fail              | 78                 | Fail              |
| Block B-2F-S17 Studio | 11                 | Pass              | 34                 | Fail              | 32                 | Pass              |
| Block B-2F-S18 Studio | 30                 | Pass              | 67                 | Fail              | 69                 | Fail              |
| Block B-3F-S19 Studio | 13                 | Pass              | 39                 | Fail              | 38                 | Fail              |
| Block B-3F-S20 Studio | 34                 | Fail              | 75                 | Fail              | 69                 | Fail              |
| Block B-3F-S21 Studio | 55                 | Fail              | 100                | Fail              | 100                | Fail              |
| Block B-3F-S22 Studio | 34                 | Fail              | 76                 | Fail              | 83                 | Fail              |
| Block B-3F-S23 Studio | 375                | Fail              | 432                | Fail              | 448                | Fail              |
| Block B-S1F-8 Studio  | 28                 | Pass              | 68                 | Fail              | 57                 | Fail              |

**CIBSE TM59 – Criteria b results for year 2050 London weather file**

| Room name             | 2050 DSY1          |                   | 2050 DSY2          |                   | 2050 DSY3          |                   |
|-----------------------|--------------------|-------------------|--------------------|-------------------|--------------------|-------------------|
|                       | Total hours > 26°C | Criterion b check | Total hours > 26°C | Criterion b check | Total hours > 26°C | Criterion b check |
| Block A-1F-S1 Studio  | 105                | Fail              | 114                | Fail              | 138                | Fail              |
| Block A-1F-S2 Studio  | 680                | Fail              | 732                | Fail              | 654                | Fail              |
| Block A-1F-S3 Studio  | 699                | Fail              | 737                | Fail              | 675                | Fail              |
| Block A-2F-S4 Studio  | 104                | Fail              | 110                | Fail              | 135                | Fail              |
| Block A-2F-S5 Studio  | 630                | Fail              | 645                | Fail              | 609                | Fail              |
| Block A-2F-S6 Studio  | 610                | Fail              | 623                | Fail              | 598                | Fail              |
| Block A-3F-R1 Bedroom | 1013               | Fail              | 1054               | Fail              | 828                | Fail              |
| Block A-3F-R2 Bedroom | 793                | Fail              | 996                | Fail              | 763                | Fail              |
| Block B-1F-S7 Studio  | 60                 | Fail              | 73                 | Fail              | 84                 | Fail              |
| Block B-1F-S9 Studio  | 101                | Fail              | 115                | Fail              | 132                | Fail              |
| Block B-1F-S10 Studio | 130                | Fail              | 129                | Fail              | 152                | Fail              |
| Block B-1F-S11 Studio | 53                 | Fail              | 66                 | Fail              | 86                 | Fail              |
| Block B-1F-S12 Studio | 1523               | Fail              | 1514               | Fail              | 1461               | Fail              |
| Block B-2F-S13 Studio | 50                 | Fail              | 63                 | Fail              | 75                 | Fail              |
| Block B-2F-S14 Studio | 92                 | Fail              | 107                | Fail              | 124                | Fail              |
| Block B-2F-S15 Studio | 98                 | Fail              | 115                | Fail              | 132                | Fail              |
| Block B-2F-S16 Studio | 102                | Fail              | 114                | Fail              | 132                | Fail              |
| Block B-2F-S17 Studio | 38                 | Fail              | 61                 | Fail              | 75                 | Fail              |
| Block B-2F-S18 Studio | 96                 | Fail              | 109                | Fail              | 127                | Fail              |
| Block B-3F-S19 Studio | 54                 | Fail              | 72                 | Fail              | 80                 | Fail              |
| Block B-3F-S20 Studio | 102                | Fail              | 114                | Fail              | 130                | Fail              |
| Block B-3F-S21 Studio | 169                | Fail              | 166                | Fail              | 195                | Fail              |
| Block B-3F-S22 Studio | 106                | Fail              | 116                | Fail              | 142                | Fail              |
| Block B-3F-S23 Studio | 648                | Fail              | 689                | Fail              | 667                | Fail              |
| Block B-S1F-8 Studio  | 86                 | Fail              | 100                | Fa                | 117                | Fail              |

**CIBSE TM52 Results– DSY1 weather file: Moderate summer**

| Room Name                     | Occupied days (%) | Criteria 1 (%Hrs Top-Tmax>=1K) | Criteria 2 (Max. Daily Deg.Hrs ) | Criteria 3 (Max. DeltaT ) | Criteria failing | Overall Result |
|-------------------------------|-------------------|--------------------------------|----------------------------------|---------------------------|------------------|----------------|
| Block A-1F-S1 Studio          | 100               | 1.6                            | 30                               | 4                         | 2                | PASS           |
| Block A-2F-S4 Studio          | 100               | 2                              | 32                               | 4                         | 2                | PASS           |
| Block B-1F-S7 Studio          | 100               | 1.4                            | 28                               | 3                         | 2                | PASS           |
| Block B-1F-S9 Studio          | 100               | 1.1                            | 22                               | 2                         | 2                | PASS           |
| Block B-1F-S10 Studio         | 100               | 1.3                            | 26                               | 2                         | 2                | PASS           |
| Block B-1F-S11 Studio         | 100               | 1                              | 28                               | 3                         | 2                | PASS           |
| Block B-2F-S13 Studio         | 100               | 1.8                            | 37                               | 4                         | 2                | PASS           |
| Block B-2F-S15 Studio         | 100               | 1.2                            | 23                               | 2                         | 2                | PASS           |
| Block B-2F-S16 Studio         | 100               | 1.1                            | 23                               | 2                         | 2                | PASS           |
| Block B-2F-S17 Studio         | 100               | 0.9                            | 25                               | 3                         | 2                | PASS           |
| Block B-2F-S18 Studio         | 100               | 1.4                            | 25                               | 3                         | 2                | PASS           |
| Block B-3F-S19 Studio         | 100               | 1.4                            | 29                               | 3                         | 2                | PASS           |
| Block B-3F-S21 Studio         | 100               | 3                              | 38                               | 3                         | 2                | PASS           |
| Block B-3F-S22 Studio         | 100               | 1                              | 22                               | 2                         | 2                | PASS           |
| Block B-S1F-8 Studio          | 100               | 2                              | 33                               | 3                         | 2                | PASS           |
| Block A-1F-S2 Studio          | 100               | 15.5                           | 80                               | 4                         | 1 & 2            | FAIL           |
| Block A-1F-S3 Studio          | 100               | 16.6                           | 95                               | 5                         | 1 & 2 & 3        | FAIL           |
| Block A-2F-S5 Studio          | 100               | 11.4                           | 75                               | 4                         | 1 & 2            | FAIL           |
| Block A-2F-S6 Studio          | 100               | 11.6                           | 75                               | 4                         | 1 & 2            | FAIL           |
| Block A-3F-Kitchen Cluster    | 100               | 5.1                            | 54                               | 6                         | 1 & 2 & 3        | FAIL           |
| Block A-3F-R1 Bedroom         | 100               | 49.1                           | 155                              | 8                         | 1 & 2 & 3        | FAIL           |
| Block A-3F-R2 Bedroom         | 100               | 58.3                           | 143                              | 7                         | 1 & 2 & 3        | FAIL           |
| Block A-GF-Retail Unit        | 100               | 80.6                           | 240                              | 12                        | 1 & 2 & 3        | FAIL           |
| Block B-1F-S12 Studio         | 100               | 99.3                           | 245                              | 11                        | 1 & 2 & 3        | FAIL           |
| Block B-2F-S14 Studio         | 100               | 4                              | 46                               | 4                         | 1 & 2            | FAIL           |
| Block B-3F-S20 Studio         | 100               | 4.3                            | 46                               | 4                         | 1 & 2            | FAIL           |
| Block B-3F-S23 Studio         | 100               | 11.9                           | 74                               | 5                         | 1 & 2 & 3        | FAIL           |
| Block B-GF-Laundry            | 100               | 96.9                           | 223                              | 10                        | 1 & 2 & 3        | FAIL           |
| Block B-GF-PBSA Amenity Space | 100               | 100                            | 480                              | 22                        | 1 & 2 & 3        | FAIL           |

**CIBSE TM52 Results – – DSY2 weather file: Short intense summer**

| Room Name                     | Occupied days (%) | Criteria 1 (%Hrs Top-Tmax>=1K) | Criteria 2 (Max. Daily Deg.Hrs) | Criteria 3 (Max. DeltaT) | Criteria failing | Overall Result |
|-------------------------------|-------------------|--------------------------------|---------------------------------|--------------------------|------------------|----------------|
| Block B-1F-S9 Studio          | 100               | 2.7                            | 52                              | 4                        | 2                | PASS           |
| Block B-2F-S15 Studio         | 100               | 2.9                            | 58                              | 4                        | 2                | PASS           |
| Block B-2F-S16 Studio         | 100               | 3                              | 60                              | 4                        | 2                | PASS           |
| Block A-1F-S1 Studio          | 100               | 3.3                            | 51                              | 4                        | 1 & 2            | FAIL           |
| Block A-1F-S2 Studio          | 100               | 20                             | 129                             | 6                        | 1 & 2 & 3        | FAIL           |
| Block A-1F-S3 Studio          | 100               | 21.1                           | 142                             | 7                        | 1 & 2 & 3        | FAIL           |
| Block A-2F-S4 Studio          | 100               | 3.5                            | 54                              | 5                        | 1 & 2 & 3        | FAIL           |
| Block A-2F-S5 Studio          | 100               | 16.3                           | 117                             | 6                        | 1 & 2 & 3        | FAIL           |
| Block A-2F-S6 Studio          | 100               | 15.3                           | 119                             | 6                        | 1 & 2 & 3        | FAIL           |
| Block A-3F-Kitchen Cluster    | 100               | 7.3                            | 99                              | 9                        | 1 & 2 & 3        | FAIL           |
| Block A-3F-R1 Bedroom         | 100               | 64.9                           | 210                             | 11                       | 1 & 2 & 3        | FAIL           |
| Block A-3F-R2 Bedroom         | 100               | 77                             | 180                             | 8                        | 1 & 2 & 3        | FAIL           |
| Block A-GF-Retail Unit        | 100               | 83.7                           | 311                             | 14                       | 1 & 2 & 3        | FAIL           |
| Block B-1F-S7 Studio          | 100               | 3.6                            | 57                              | 7                        | 1 & 2 & 3        | FAIL           |
| Block B-1F-S10 Studio         | 100               | 3.6                            | 71                              | 5                        | 1 & 2 & 3        | FAIL           |
| Block B-1F-S11 Studio         | 100               | 2.5                            | 51                              | 5                        | 2 & 3            | FAIL           |
| Block B-1F-S12 Studio         | 100               | 100                            | 261                             | 12                       | 1 & 2 & 3        | FAIL           |
| Block B-2F-S13 Studio         | 100               | 4.4                            | 68                              | 8                        | 1 & 2 & 3        | FAIL           |
| Block B-2F-S14 Studio         | 100               | 7.4                            | 100                             | 8                        | 1 & 2 & 3        | FAIL           |
| Block B-2F-S17 Studio         | 100               | 2                              | 49                              | 5                        | 2 & 3            | FAIL           |
| Block B-2F-S18 Studio         | 100               | 3.6                            | 57                              | 5                        | 1 & 2 & 3        | FAIL           |
| Block B-3F-S19 Studio         | 100               | 4.5                            | 69                              | 7                        | 1 & 2 & 3        | FAIL           |
| Block B-3F-S20 Studio         | 100               | 7.7                            | 105                             | 8                        | 1 & 2 & 3        | FAIL           |
| Block B-3F-S21 Studio         | 100               | 6.7                            | 80                              | 5                        | 1 & 2 & 3        | FAIL           |
| Block B-3F-S22 Studio         | 100               | 2.7                            | 53                              | 5                        | 2 & 3            | FAIL           |
| Block B-3F-S23 Studio         | 100               | 14.7                           | 110                             | 6                        | 1 & 2 & 3        | FAIL           |
| Block B-GF-Laundry            | 100               | 100                            | 245                             | 11                       | 1 & 2 & 3        | FAIL           |
| Block B-GF-PBSA Amenity Space | 100               | 100                            | 504                             | 23                       | 1 & 2 & 3        | FAIL           |
| Block B-S1F-8 Studio          | 100               | 5                              | 79                              | 6                        | 1 & 2 & 3        | FAIL           |

**CIBSE TM52 Results– DSY3 weather file, Long less intense summer**

| Room Name                     | Occupied days (%) | Criteria 1 (%Hrs Top-Tmax>=1K) | Criteria 2 (Max. Daily Deg.Hrs) | Criteria 3 (Max. DeltaT) | Criteria failing | Overall Result |
|-------------------------------|-------------------|--------------------------------|---------------------------------|--------------------------|------------------|----------------|
| Block B-1F-S9 Studio          | 100               | 2.5                            | 39                              | 3                        | 2                | PASS           |
| Block B-1F-S11 Studio         | 100               | 2.9                            | 49                              | 4                        | 2                | PASS           |
| Block B-2F-S16 Studio         | 100               | 2.9                            | 46                              | 4                        | 2                | PASS           |
| Block B-2F-S17 Studio         | 100               | 2.7                            | 48                              | 4                        | 2                | PASS           |
| Block B-2F-S18 Studio         | 100               | 3                              | 41                              | 4                        | 2                | PASS           |
| Block A-1F-S1 Studio          | 100               | 3.6                            | 45                              | 5                        | 1 & 2 & 3        | FAIL           |
| Block A-1F-S2 Studio          | 100               | 19.3                           | 114                             | 6                        | 1 & 2 & 3        | FAIL           |
| Block A-1F-S3 Studio          | 100               | 20.8                           | 126                             | 7                        | 1 & 2 & 3        | FAIL           |
| Block A-2F-S4 Studio          | 100               | 3.9                            | 48                              | 5                        | 1 & 2 & 3        | FAIL           |
| Block A-2F-S5 Studio          | 100               | 16                             | 102                             | 5                        | 1 & 2 & 3        | FAIL           |
| Block A-2F-S6 Studio          | 100               | 15.6                           | 103                             | 6                        | 1 & 2 & 3        | FAIL           |
| Block A-3F-Kitchen Cluster    | 100               | 7.5                            | 82                              | 9                        | 1 & 2 & 3        | FAIL           |
| Block A-3F-R1 Bedroom         | 100               | 49.6                           | 184                             | 9                        | 1 & 2 & 3        | FAIL           |
| Block A-3F-R2 Bedroom         | 100               | 54.4                           | 151                             | 7                        | 1 & 2 & 3        | FAIL           |
| Block A-GF-RetailUnit         | 100               | 75.2                           | 302                             | 16                       | 1 & 2 & 3        | FAIL           |
| Block B-1F-S7 Studio          | 100               | 3.5                            | 53                              | 5                        | 1 & 2 & 3        | FAIL           |
| Block B-1F-S10 Studio         | 100               | 3.6                            | 51                              | 4                        | 1 & 2            | FAIL           |
| Block B-1F-S12 Studio         | 100               | 99                             | 269                             | 12                       | 1 & 2 & 3        | FAIL           |
| Block B-2F-S13 Studio         | 100               | 4.8                            | 61                              | 6                        | 1 & 2 & 3        | FAIL           |
| Block B-2F-S14 Studio         | 100               | 6.2                            | 61                              | 5                        | 1 & 2 & 3        | FAIL           |
| Block B-2F-S15 Studio         | 100               | 3.1                            | 46                              | 4                        | 1 & 2            | FAIL           |
| Block B-3F-S19 Studio         | 100               | 3.8                            | 58                              | 5                        | 1 & 2 & 3        | FAIL           |
| Block B-3F-S20 Studio         | 100               | 6.5                            | 65                              | 6                        | 1 & 2 & 3        | FAIL           |
| Block B-3F-S21 Studio         | 100               | 6.1                            | 66                              | 5                        | 1 & 2 & 3        | FAIL           |
| Block B-3F-S22 Studio         | 100               | 3.3                            | 46                              | 4                        | 1 & 2            | FAIL           |
| Block B-3F-S23 Studio         | 100               | 17.1                           | 98                              | 6                        | 1 & 2 & 3        | FAIL           |
| Block B-GF-Laundry            | 100               | 97.5                           | 248                             | 11                       | 1 & 2 & 3        | FAIL           |
| Block B-GF-PBSA Amenity Space | 100               | 100                            | 512                             | 23                       | 1 & 2 & 3        | FAIL           |
| Block B-S1F-8 Studio          | 100               | 4.1                            | 48                              | 4                        | 1 & 2            | FAIL           |

