LBC Issue 1: No proposed efficiency figure for MVHR provided.

The heat exchange efficiency figure for the proposed MVHR system is 81.6%.

This is incorporated within the SAP calculations, detailed in the DER worksheet.

This efficiency is superior to the recommended minimum figure of 70% defined by the 2018 Domestic Building Services Compliance Guide.

LBC Issue 2a: The flat-by-flat overheating study results are not provided in order to evidence which specific apartments require active cooling (only those with the worst overheating risk should be permitted to apply active cooling).

Overheating Analysis and Active Cooling

An overheating analysis has shown that all apartments require active cooling.

The analysis has been conducted in accordance with the appropriate London Plan Energy Assessment Guidance and the below is a narrative and data intended to accompany the content of the original Energy Assessment document.

We have included a table of results below as part of our response.

West-Facing Bedrooms

6 of the 7 proposed apartments have at least one bedroom on the West façade.

The West façade faces Gray's Inn Road. This is a busy road with poor air quality that prevents openable windows being provided. This eliminates the possibility of obtaining passive cooling via natural ventilation in these spaces. Practically, this means that these spaces are difficult to keep cool in hot weather.

These spaces have been tested against overheating criteria after the cooling hierarchy has been applied. Unfortunately, modelling has shown that with passive measures to reduce solar gain, the provision mechanical purge ventilation (provided by a suitable MVHR system with a summer bypass function) and ceiling fans, these spaces still fail all the appropriate criteria across all Design Summer Years.

Our conclusion is therefore that overheating is inevitable in these spaces in hot summer periods and so, despite the provision of passive mitigation measures, the provision of active cooling to the associated apartments is unavoidable.

Passive mitigation measures, discussed in our Energy Assessment report for the project, will reduce energy use of cooling system and minimise when cooling is needed in the building. These measures include the provision of planters on the West façade to provide summertime shading and the use of glazing with a solar coating to reduce solar gains and the provision of MVHR systems with summer bypass function to maximise the usage of night time passive cooling before cooling is brought on. The latest high efficiency air source heat pumps are proposed to be used to provide the active cooling to further mitigate the energy usage.

Small Living Areas

The remaining apartment, Apartment 1, does not have a West-facing bedroom. The bedroom in this apartment faces East, is well shaded, and therefore compares favourably to the West-facing bedroom, passing all criteria across all Design Summer Years. However, this apartment has a small living area, which, as discussed in the following, our modelling has shown to be problematic.

In this proposed development the living areas can be placed in two categories, large living areas facing onto both facades and smaller living areas facing onto just the East facade. Our overheating analyses have shown that when the TM59 occupancy profiles and associated gains are applied, the smaller living areas are liable to overheat. Apartment 1 has one of these small living rooms.

The results show that even with the use of ceiling fans, the small living spaces still fail the necessary criteria for DSY 2 and DSY 3.

Our conclusion is therefore that the risk of overheating in these small living rooms are high and despite mitigation measures, the provision of active cooling will be necessary to sufficiently reduce the risk.

Overheating Tests

There is repetition in this development and, informed by early stage overheating analyses, a sample was selected for the final overheating analyses.

The occupied spaces in the proposed residential development can be characterised in five ways:

1. Bedrooms on the West façade, adjacent to Gray's Inn Road.
2. Bedrooms on the East façade, shaded by balconies above.
3. Bedrooms on the East façade, without shading from balconies above.
4. Small living areas.
5. Large living areas.

All these spaces are contained within Apartment 4 and Apartment 5 and these were selected as the representative sample.

This was modelled in IES VE 2018.

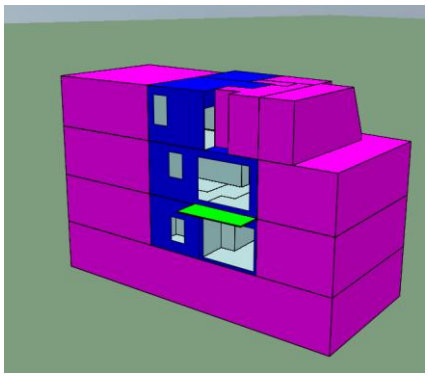

Image – DSY overheating model of Panther House (Gray's Inn Road Building) – extract from IES VE – shown from Courtyard side.

Overheating Results

Test	Room	Bed - West			Bed - East, Shaded			Bed - East, UnShaded			Living - Small			Living - Large		
	Weather Year	DSY 1	DSY 2	DSY 3	DSY 1	DSY 2	DSY 3	DSY 1	DSY 2	DSY 3	DSY 1	DSY 2	DSY 3	DSY 1	DSY 2	DSY 3
1	Standard G-value, Half Open Rear Windows	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
2	MVHR - Boost mode (summer bypass)	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
3	Add balconies & Planters (shading)	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
4	Fully open rear windows	F	F	F	P	P	F	P	F	F	F	F	F	P	F	F
5	Low G-value Solar Glazing, g=0.4	F	F	F	P	P	P	P	P	P	P	F	F	P	F	F
6	Ceiling fans	F	F	F	P	P	P	P	P	P	P	F	F	P	P	F

Notes

P = Pass

F = Fail

Each subsequent test incorporates the measures taken in the last test

LBC Issue 2b: It is not clear if alternative cooling strategies have been considered such as ceiling fans which can be effective.

As detailed above, we have considered the use of ceiling fans in our tests. Whilst somewhat effective, unfortunately these have not been shown to be sufficiently effective to reduce the installation of active cooling. See results above.