

UCL Rare Dementia Support Centre Overheating Mitigation Note

1. Introduction

An overheating mitigation review has been undertaken at the Rare Dementia Support Centre RDSC at 25 and 26 Woburn Square.

There are 6 No spaces within the RDSC which are likely to be impacted by overheating due to the high density of guests within the space, high heat gains from AV equipment and external gains in the summer months.

Figure 1 below identify the spaces on the lower ground, ground and first floor that are likely to overheat.

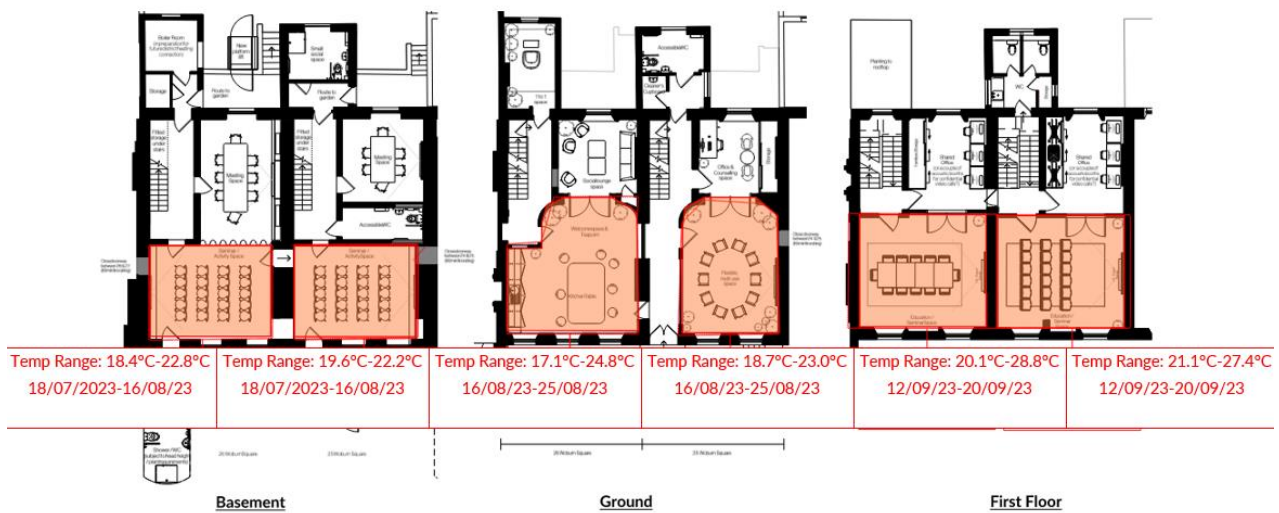


Figure 1: Spaces with RDSC which are likely to be impacted by overheating- C/W temperature monitoring.

This note provides an overview of the overheating mitigation approach the design team undertook during stage 2 and early stage 3. It also provides a high-level summary of the actual temperature monitoring undertaken in the summer months of 2023.

2. Air Quality monitoring

The air temperature monitoring was undertaken during the period of 18th July 2023 to 3rd October 2023. It should be noted during the monitoring period the buildings had limited or no occupancy. The data showed some spaces reached almost 29°C as can be seen in Figure 2.

Monitoring Period	Location	Average Temperature (°C)	Period Average Temperature (°C)	Temperature Range (°C)	Period Average External Temperature (°C)
1 (18/07/2023 - 16/08/2023)	B.04	20.2	20.3	19.6 - 22.2	18.4
	B.05	20.8		17.7 - 23.7	
	B.07	19.7		18.4 - 22.8	
	B.08	20.4		18.0 - 22.0	
	G.03	20.7		18.7 - 23.0	
	G.05	20.0		17.1 - 24.8	
2.1 (16/08/2023 - 25/08/2023)	G.04	22.1	21.9	22.1 - 27.3	20.3
	G.10	21.0		21.2 - 26.3	
	1.03	22.2		21.1 - 27.4	
	1.05	20.2		19.6 - 27.1	
	1.07	21.6		20.1 - 28.8	
	1.08	20.2		20.0 - 25.6	
2.2 (12/09/2023 - 20/09/2023)	G.04	21.2	21.5	19.5 - 25.9	18.4
	G.06	22.9		19.5 - 25.9	
	1.03	21.5		20.1 - 25.4	
	1.05	20.2		19.9 - 25.1	
	1.07	21.3		20.7 - 26.2	
	1.08	20.9		18.8 - 25.4	
	2.04	19.3	19.4	17.5 - 20.6	17.0
	2.08	19.0		17.9 - 20.8	

Monitoring Period	Location	Average Temperature (°C)	Period Average Temperature (°C)	Temperature Range (°C)	Period Average External Temperature (°C)
3 (20/09/2023 - 03/10/2023)	2.12	19.2		17.5 - 20.5	
	3.04	19.5		17.2 - 30.2	
	3.06	19.9		17.5 - 20.7	
	3.11	19.4		17.4 - 20.8	

Note: **Bold** indicates exceedance of the CIBSE Guide A temperature specifications.

Figure 2: Indicating the ranges that are close to or exceeding 29°C in bold.

3. Overheating Mitigation Approach.

The design team undertook a study to mitigate overheating by using a sustainability focused methodology, we looked at passive measures first, then moving to more active measures once it was determined the passive measures were not viable. The following steps were considered:

Step 1 Relocate the function of the space to another location where the building and associated infrastructure is more appropriate.

A key functional requirement of the Rare Dementia Support Centre is to be able to host larger meetings for groups of circa 30 people for education meetings, larger social activities and diagnosis-specific support sessions: <https://www.raredementiasupport.org/wp-content/uploads/2021/02/RDS-brochure.pdf>

Due to the nature of the historic floorplan, the larger spaces sit to the front of the building facing the square, and smaller, cellular spaces towards the back of the building. Therefore, the only possible locations to host these higher-occupancy functions are to the larger spaces, which all face onto the square.

Step 2 Improve the building envelop to limit external gains.

As the architect has confirmed, some fabric upgrades (e.g. repointing of brickwork / refurbishment of sash windows / replacement of loose roof tiles / replastering of internal walls where they are damaged) will be undertaken in accordance with the conditions survey to ensure the building is watertight / performance is improved where possible. However, this will be very 'light-touch' owing to the grade 2 listing, which restricts any significant alterations to the building fabric, that could alter its historic or architectural appearance. There will be further investigation into the secondary or double glazing.

Step 3 Enhance natural ventilation to limit overheating.

Hybrid ventilation was explored with fan boxes located internally within the individual spaces which draw ventilation air directly from external and into the spaces.

However, after exploring this with the design team it was felt that the large ventilation louvres (approx. 2 No X 900*300 per room) required on the façade would not be acceptable by the planning authorities.

Step 4 Provide active mechanical cooling.

The final step was to consider active mechanical cooling to temper these spaces. It is proposed the following is considered to reduce the amount of mechanical cooling:

- Space cooling is controlled centrally via a key switch or BMS enabled.
- Temperature setpoint of 26°C.
- Controls to prevent simultaneous heating and cooling of the infrastructure.

4. Conclusion

It is proposed that active mechanical cooling is required to prevent overheating within these spaces. Even if the building fabric could be improved it is still likely the active cooling is required due to the internal gains from the high occupancy density and AV equipment.

It is proposed that steps are undertaken to mitigate the extent of mechanical cooling.