AMP 44772/1

Chorlton Library - Design Process and Reasoning for Current Rotonda Heating and De-stratification Design

Introduction & Concerns

Part of the refurbishment project involves reinstating the entrance rotunda by removing the non-original infill floor and suspended ceiling to expose the original dome above. This will have a significant an impact on the heating requirement as there will be greater heat loss though the dome.

Further, by virtue of the height of the rotunda, heated buoyant air will naturally stratify at high level in the dome increasing the temperature difference between inside and outside, accelerating the heat loss.

Methods Considered

Additional Radiators at Ground Floor Level with No Destratification

In order to cater for the increased heat loss and stratification loss, large radiators would be needed at ground floor level. As this is a public building new radiators would need to be low surface temperature (LST) – modern LST radiators would not be in keeping with the building – traditional radiators with LST covers are not ideal further there is insufficient wall space at low level around the rotunda to accommodate these.

The stratification effect would impact on energy efficiency, running costs and carbon emissions and may give rise to colder air/draughts in the occupied ground floor zone.

Additional Radiators at Ground Floor Level with Destratification Fans

Whilst the addition of destratification fans would mitigate the stratification concerns and marginally decrease the radiator sizes, there would still be insufficient wall space for suitably sized radiators.

Additional Radiators at Balcony Level with Destratification Fans

This method will obviate the need for ground floor LST radiators with the being heated at balcony level. The heated air will be directed into the occupied zone by the destratification fans. The destratification fans will again mitigate the stratification concerns. As the balcony will not be accessible to the public, they can be traditional, non-LST type in keeping with the building.

This method is considered the least impactful most practical method which is also energy efficient and will help maintain thermal comfort in the occupied ground floor zone.

Destratification fans are often employed in traditional contexts to improve energy efficiency and occupant comfort.

The destratification fans can be ordered in different colours. They could be removed if not required in the future with minimal impact on the fabric.

Summary of Considerations

Method	Pros	Cons	Conclusion
Additional ground floor radiators without destratification fans	N/A	Insufficient wall space. Inefficient.	Not appropriate
Additional ground floor radiators with destratification fans	More efficient than above	Insufficient wall space.	Not appropriate
Additional balcony level radiators with destratification fans	Minimum impact on ground floor entrance. More efficient	Introduction of current technology requiring fixing to existing fabric	This is considered the most discrete effective method