



## Cooling Hierarchy Covering Letter (Planning Application)

Project Name:	27 Goodge Street (Ground and Basement)		
Project No:	P2282	Rev:	00
Issued:	07/03/2022	Engineer:	DC

As part of the planning application for the refurbishment works for the proposed Basement and Ground Floor unit at 27 Goodge Street, QuinnRoss have undertaken an assessment of the internal heat losses and heat gains associated with the potential usage of the space.

The assessment of heat losses is a relatively simple steady state calculation based on fabric data and the external design criteria during summer. Based on this calculated load various heat generating sources were reviewed and air source (air-to-air) heat pumps were considered the most optimal solution in terms of their efficiency, lack of contribution to local air pollution (no use of fossil fuels), and their minimal external plant space requirements. Variable Refrigerant Flow (VRF) type air source heat pump units are proposed for heating and cooling. These units have been selected as the most appropriate and sustainable means of heating/cooling for the proposed space.

With regards to heat gains and the provision of comfort cooling, the cooling hierarchy under the London Plan is thoroughly considered, and as with all our projects we only recommend active cooling where necessary.

As the fabric is largely existing and being retained the 'lean' measures applicable to the refurbishment are largely restricted to the building services design. As part of the design, LED lighting is proposed to limit internal heat gains.

As the fabric is existing, with no proposed change to the overall building height proposed, it is not possible to provide high floor to ceiling levels. Whilst limited, existing fabric elements with high thermal mass shall be left exposed and this has been considered within our heating and cooling assessment.

Due to the depth of the space and only single sided natural ventilation being available at ground floor and no natural ventilation possible at basement, natural ventilation is not sufficient to meet either the the peak cooling load and must therefore be supplemented. Refer to Figures 1 & 2 below for maximum cooling capacity of natural ventilation and cooling loads of Restaurant/Retail spaces.

Description	Rule of thumb	Comments
	Measurement of ventilation system area	
Maximum cooling capacity of a natural ventilation system	40 W/m <sup>2</sup>	A natural ventilation system is unlikely to cope with heat gains exceeding 40 W/m <sup>2</sup>

Figure 1 - Extract from BSRIA Rules of Thumb 5th Ed. (Table 15)

Description	Rule of thumb
	Cooling load (W/m <sup>2</sup> )
Restaurants	200
Retail establishments	140

Figure 2 - Extract from BSRIA Rules of Thumb 5th Ed. (Table 16)

Allowance for mechanical ventilation will be made for the unit to ensure sufficient fresh air can be provided for the potential occupants and will offer periods of free cooling when external temperatures allow, reducing the annual cooling demand. However, the volume of air introduced will offer limited cooling benefit in peak summer conditions when 30°C+ air would be being introduced, without active cooling.

As the unit has potential for a proposed restaurant use and therefore could contain a kitchen, the heat gains are high and based on the above it is deemed that there is a requirement for active cooling to be provided to meet the peak summer conditions. This will allow the space to be suitable for use by incoming tenants and their customers.

As an air source heat pump is proposed to provide space heating, QuinnRoss have proposed utilising the same system in reverse to provide cooling benefit during peak summer conditions. The units shall be located in an enclosure on the roof of the building. These will be sized to meet the heating load and will be selected from among the most space efficient available on the market.

The units proposed will be of the current generation with the latest energy efficient technology and feature a refrigerant with zero ozone depletion potential (ODP) and low global warming potential (GWP).

All works will be undertaken to the highest standards and 'best practice' procedures to ensure the highest environmental and energy efficient rating (and improvement upon the existing).

Signed on behalf of QuinnRoss Consultants Ltd:

