Cooling Hierarchy Covering Letter (Planning Application)

Project Name:	64 Goodge Street		
Project No:	P1934	Rev:	01
Issued:	10/03/21	Engineer:	DC

As part of the planning application for the refurbishment works at 64 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. As set out in the Environmental Noise Assessment, two Mitsubishi PUMY-P200YKM units are proposed for heating and cooling which are a type of air source heat pump. These units have therefore been specified as the most appropriate and sustainable means of heating/cooling for the basement and ground floor unit

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.

Whilst the rear roof area is being renewed, with insulation levels brought up to current standards, 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 tenants on the upper floors it is not possible to provide high floor to ceiling levels. Existing fabric elements with high thermal mass however 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, natural ventilation is not sufficient to meet either the total fresh air requirements of the space or 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^2	A natural ventilation system is unlikely to cope with heat gains exceeding 40 W/m^2

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

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

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

Allowance for mechanical ventilation has been 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 a proposed restaurant use and will 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. In addition, as active cooling is proposed, heat recovery shall be provided for the restaurant ventilation system to ensure supply air is pre-cooled by extract air, outside of periods where free cooling is viable, to minimise the annual cooling demand.

The air source heat pumps used for heating, and also providing the benefit of cooling during peak summer conditions, shall be located to the rear of the building. These have been sized to meet the heating load and are among the most space efficient available on the market.

The units proposed are of the current generation with the latest energy efficient technology and feature refrigerants 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:	Name: Daryl Curtis Tel: Email: [redacted]