

7-9 Piccadilly
Ventilation Strategy Statement

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Glossary

Term	Definition
MCC	Manchester City Council
AHU	Air Handling Unit
VRF	Variable refrigerant
ASHP	Air source heat pump
BCO	British Council for Offices
VAV	Variable Air Volume
FCU	Fan Coil Unit
MVHRU	Mechanical Ventilation Heat Recovery Units

1 Introduction

This ventilation document has been produced as a requirement of the Manchester City Council Planning Authority to communicate the basis of design and outline description of the main ventilation systems for the redevelopment of 7-9 Piccadilly, Manchester.

1.1 Context

Buro Happold Engineering have been appointed by Thackray Estates to undertake design works for the proposed redevelopment of 7-9 Piccadilly, Manchester. The development will comprise of ground floor retail, basement support facilities and a further six floors of new build office development.

1.2 Site Description

The site is currently occupied by a three-story retail and office building, constructed in 2001. The main public access to the commercial retail units is from Piccadilly Gardens, although secondary access for deliveries is available to the rear of the building from Back Piccadilly. The existing building is connected on two sides to other commercial developments.

1.3 Proposed development

The proposed developments use will be as follows:

Table 1—1 Building Uses by Level

Level	Use	Area (GIA m ²)	Notes
Roof	Roof plant compound	148	Accommodating the buildings WC extract fan, Ground Level extract fan(s) from the commercial unit and the external air conditioning units.
Level 06	Office	537	GIA inc. toilets, building plant and building core
Level 05	office	669	GIA inc. toilets, building plant and building core
Level 04	Office	687	GIA inc. toilets, building plant and building core
Level 03	Office	687	GIA inc. toilets, building plant and building core
Level 02	Office	687	GIA inc. toilets, building plant and building core
Level 01	Office	689	GIA inc. toilets, building plant and building core
Ground Floor	Commercial retail units	716	Commercial retail units and back of house
Basement	Bike Storage, bins, changing room, retail units staff welfare, WCs, small gym space	708	
Total		5,377	

2 Ventilation Strategy Description

2.1.1 Design Parameters

The internal design parameters are detailed in the table below. For each area of the building these have been used as a basis for the ventilation system design. These figures are based upon BCO and CIBSE guidance.

Table 2—1 Indicative internal Design Criteria

Room Type	Design Temperature (°C)		Noise Criteria (NR)	Ventilation Rate	
	Winter Minimum	Summer		Air Changes / Hour	Litres / Sec / Person
Office Space	21-23	22-25	35	-	12
Retail Space	19-21	21-25	35-40	-	12
Internal Plant Space	To suit plant	To suit plant	-	-	To suit plant
Reception / Lobby	19-21	21-25	35-40	-	Not controlled
Circulation Space	19-21	21-25	40	-	Not controlled
WC's / Changing/ Showers	19-22	21-25	35-45	6	-
Refuse Store	NC	NC	-	3	
Cycle Store	NC	NC	-	1	
Gym	16-20	16-20	35-40		20

2.1.2 Office spaces (Levels 1 to 6)

The development is being designed to provide sustainable, high quality office space. To achieve this, a mixed mode ventilation system is being proposed that offers the ability for occupants to either open windows for natural ventilation or rely on mechanical ventilation system when the windows are closed. This blended approach will help reduce energy consumption, carbon emissions and better connect the offices occupants to outside.

The opening windows will be manually operated, whilst the mechanical ventilation will be delivered by heat recovery units (MVHRU), located within the ceiling voids of the office accommodation. The MVHRU's will duct fresh and exhaust air to and from the office. The fresh air will be distributed around each floor plate by ductwork mounted at high level, which will be circulated via fan coil units, all mounted within the ceiling zone. Ventilation louvres will be located at high level over the windows in the façade, providing the route for fresh and exhaust air to the MVHRU's.

The flow of fresh air to the offices will be 'demand controlled', using feedback from carbon dioxide sensors located within each space. When rooms are at a lower occupancy for a period, a drop in CO₂ levels will be detected and variable air volume control (VAV) will reduce the volume of air supplied. Similarly, a high occupancy will result in higher CO₂ levels and therefore an increased volume flow rate. This approach will ensure sufficient fresh air is provided to all spaces whilst also contributing to energy efficiency.

To ensure good quality outside air is drawn into the building, the extract and air intakes from the MVHRU's will connect to different louvres to minimise the risk of cross contamination and short-circuiting.

A VRF system, served from a series of outdoor units installed at roof level, will provide heating and cooling internally via room fan coil units (FCU). The FCU's will control the internal space temperatures to maintain a comfortable thermal environment for the occupants.

2.2 Core toilets

The toilets within the core, will be ventilated by a twin extract fan located in the roof external plant compound. The toilet extract systems ductwork will be located within the landlords' riser, adjacent to the core, connecting the roof extract to the toilets on each floor. The location of the exhaust fans discharge will be positioned to avoid the risk of surrounding developments being adversely affected by the exhaust air.

2.3 Ground level commercial retail units

The ground level retail units are currently occupied by a baker (Gregs) and a health and beauty retailer (Superdrug). It is anticipated that these tenants will continue to occupy these units after the development is complete, although provision has also been made within the design for these to change use to a food or beverage outlet with a moderate catering capacity.

The retail units will be served by mechanical ventilation heat recovery units (MVHRU). These will efficiently duct fresh and exhaust air around the retail unit. Ventilation louvres will be located within the façade facing onto Back Piccadilly. These louvres will provide an air path for supply and exhaust air to the retail units ventilation system.

It is proposed that the retail units heating, and cooling systems will be all-electric. A VRF system, served from a series of outdoor units, located at roof level, will provide heating and cooling via fan coil units or cassette units to the retail accommodation. These will ensure the retail space temperatures are moderated to achieve a comfortable thermal environment.

Space allowance has been made for 1-2 extract fans to be located at roof level, serving the ground floor units. This provision will future proof the retail units for a potential change of use to a food and beverage operation. The associated extract ductwork will be located within the tenant's riser, adjacent to the core. The location of the exhaust fans discharge will be positioned to avoid the risk of surrounding developments being adversely affected by the exhaust air.

2.4 Basement space

The basement will potentially contain a mixture of space types, including

- Drying Room
- Cycle store
- Refuse bins
- Changing rooms
- Small gym
- Toilets
- Storage for the retail units

Much of the basement accommodation will be ventilated by a centralised air handling unit, located within the roof level compound. Fresh air will be distributed to each space by ductwork mounted within the ceiling zone.

The showers and lockers will be provided with an elevated air change rate of 6 ACH, in accordance with CIBSE guidelines. A separate 'dirty extract' system will be provided to toilets, the drying room, cycle store and refuse store.

The gym, changing rooms and drying room will be heated (and cooled in the case of the gym), with a VRF system. The VRF room units will be served from a series of outdoor units located in the external roof compound. Heating and cooling will be provided via ceiling mounted cassette units, which will ensure that air circulated in these spaces is moderated to achieve a comfortable thermal environment for the occupants.

Areas of the building requiring heat, but without fan coil units, such as toilets and stair cores with external walls, will be provided with electric panel radiators.

2.5 Ancillary Areas

Corridors and circulation spaces will be ventilated by the movement of air from surrounding spaces.

Areas of the building requiring heat, but without fan coil units, such circulation and stair cores with outside walls, will be provided with electric panel radiators.

3 Conclusion

The ventilation strategies described above have ensured Building Regulations Part F of the building regulations are met and that the air quality and occupant comfort within the buildings is satisfactory.

Any negative impact of ventilation systems on accommodation within the proposed development or neighbouring properties has been mitigated by:

- Ensuring all ventilation systems do not exhaust onto any neighbouring buildings or locations where people are likely to be present. This is typically by exhausting at roof level where possible.
- Installing noise attenuation equipment on ventilation plant to comply with the acoustic criteria.
- Avoid the use of natural gas fired boilers, so negating the need for flues.

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