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Weston Halls & Pendulum Hotel Student Accommodation

Manchester

Ventilation Statement

QA

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Section 1 - Introduction

This statement has been prepared in support of the planning application for the development of the Weston Halls & Pendulum Hotel Scheme located on Charles Street in Manchester.

The proposed new phased development comprises:

(a) Partial removal of existing structures and erection of two buildings comprising purpose-built student accommodation (sui generis), one of 50 storeys and one of 17 storeys with an 8-storey link, together with associated amenity space, external landscaping, highways works, and change of use of the Pendulum Hotel to purpose-built student accommodation; and

(b) Removal of remaining existing structures and erection of two buildings comprising purpose-built student accommodation (sui generis), one of 33 storeys and one of part-24 and part-8 storeys with a 1-storey link, together with associated amenity space, external landscaping, and highways works.

This statement has been produced to detail the supply and extract ventilation strategy for the proposed development and describes how ventilation requirements have been incorporated into the design of the building.

Futureserv have been appointed by IQ Student Accommodation to produce a Ventilation Statement in support of a planning application for the construction of the PBSA development in Manchester.

This Ventilation Statement has been prepared to illustrate the proposed ventilation designs. It addresses the building regulation requirements described within Approved Document Part F, 2021 for ventilation to the various facets of the proposed development.

The statement also highlights the need to provide complete, energy efficient, fully working and balanced ventilation systems that can:-

- Deliver sufficient outdoor fresh air to occupants;
- Deliver good indoor air quality;
- Ensure acceptable internal noise levels are not exceeded;
- Assist in the removal of heat gains;
- Remove odours, contaminants and moisture;
- Avoid cold draughts;
- Assist in avoidance of summertime overheating;
- Provide summertime night time cooling of the building fabric when required;
- Provide an easily controlled and maintainable system;
- To prevent cross infection (by full fresh air and negative pressure regime);
- To recover heat from the exhaust air stream for re-use in the fresh air supply.

Futureserv Consulting Engineers have collaborated with the design team in order to provide a holistic solution for the building that will provide an efficient envelope and contain intelligent building services reducing the environmental impact of the proposed development whilst providing comfortable living and working accommodation.

Section 2 - Design

The ventilation design shall comply with the following building regulation approved documents and standards:

Design Standards

The ventilation systems will be designed in accordance with recognised UK and industry best practice.

Design will be based on standards and guidelines, including:

- British and European Standards (BSI).
- Chartered Institution of Building Services Engineers (CIBSE).
- Building Services Research and Information Association (BSRIA).
- Building Research Establishment (BRE).
- Heating & Ventilating Contractors Association (HVCA).

Statutory Requirements

Ventilation systems design will also be based on the following Statutory Requirements:

- The Building Regulations
- Clean Air Act
- The Control of Pollution Act
- The Construction (Design and Management) Regulations
- British Standards and Codes of Practice
- Manchester City Council Planning Conditions & Requirements

Section 3 – Ventilation Rates

Area/Room	**Ventilation Criteria**
Clusters/Studio accommodation	To meet Approved Document Part F of the Building Regulations - "Means of Ventilation" Section 5, New dwellings, System 4 – Continuous mechanical supply and extract with heat recovery (MVHR)
Staff/ Managers Office. Amenity provision	10l/s/person
Staff Change and WCs	6 ACH
Parcel & moving in Stores	2 ACH
Refuse	5l/s/m²
Mechanical and electrical plant rooms	To be provided with natural ventilation or mechanical ventilation as appropriate to their use.
Residents Gym	20l/s/person

Section 4 - Ventilation Strategy

4.1 - Basis of Design

The ventilation strategy has been designed to comply with the Building Regulations approved document Part F Means of Ventilation 2021, and the Domestic and Non-Domestic Ventilation Compliance guides.

This document describes the basis of the design and outline scope of ventilation works for the various parts of the proposed development.

Abstract from Approved Document Part 'F'

Table 1.2 Minimum extract ventilation rates for continuous extract systems[1]

Room	High rate (l/s)	Continuous rate
Kitchen	13	The sum of all extract ventilation in the dwelling on its continuous rate should be at least the whole dwelling ventilation rate given in Table 1.3
Utility room	8	
Bathroom	8	
Sanitary accommodation	6	

NOTE:

1. If the continuous rate of ventilation provided in a room is equal to or higher than the minimum high rate specified in the table, no extra ventilation is needed.

Table 1.3 Minimum whole dwelling ventilation rates determined by the number of bedrooms

Number of bedrooms[1][2]	Minimum ventilation rate by number of bedrooms (l/s)
1	19
2	25
3	31
4	37
5	43

NOTES:

1. If the dwelling only has one habitable room, a minimum ventilation rate of 13l/s should be used.
2. For each additional bedroom, add 6l/s to the values in Table 1.3.

4.2 – Cluster/Studio Ventilation

The living space ventilation systems will be designed to operate continuously at low-speed air volumes created by energy efficient fans. This will allow the construction of a tightly sealed and correctly ventilated environment reducing thermal heat loss through reduced infiltration, whilst at the same time improving air quality and reducing the occurrence of moisture and mould.

To provide minimum fresh air rates to the living spaces each habitable space will be provided with a whole dwelling mechanical ventilation heat recovery (MVHR) system. This system comprises of a continuous mechanical supply and extract ventilation unit located in a suitable position based on the space design.



Image of Wall Mounted MVHR units

The units will be provided with a high level of heat recovery efficiency for example an integrated counterflow heat recovery cell designed to aid part L compliance of the Building Regulations as detailed within the energy statement associated with this planning application.

The air volumes will be determined to satisfy the requirements of the Approved Document Part F of the Building Regulations (see abstract from Approved Document Part F).

Each unit will intake fresh air and discharge exhaust air through the façade. The intake and exhaust louvres will be located a suitable distance apart to prevent cross contamination.

An intake supply filter inside the unit will be provided to remove incoming particulate and pollen matter.

The ventilation unit will remove air from the bathrooms and kitchens and provide air to the habitable rooms; namely the bedrooms and the living spaces, this will be via a rigid flat ductwork system with supply and extract air grilles located in the ceilings.

These systems shall operate day to day automatically and be controlled to vary ventilation rates via EC/DC motors' as they receive signals from one of the interconnected sensors and controllers such as a humidity sensor. When a signal is received the fans shall vary their speed proportionally or on a trickle and boost principle. The units may also be provided with manual control by means of switch control serving kitchens and ensuites.

Ventilation extract boost will be operated by a switch located in the kitchen. The MVHR will also incorporate summer bypass.

The units shall have the facility to commission the supply and extract fans individually via inbuilt minimum and maximum speed adjustments, or alternative wired remote-control unit. The fans themselves shall have independent, infinitely variable speed control.

The ventilation systems will be designed in rooms to meet the noise levels stated within available Acoustic design specifications. These figures will apply for all supply and extract systems.

Louvres on the façade shall be required for connecting the MVHR ventilation ductwork intake and discharge points to outside.

Attenuators will be installed to reduce external noise intrusion.

Cookers will be provided with recirculation hoods, as specified during detailed design.

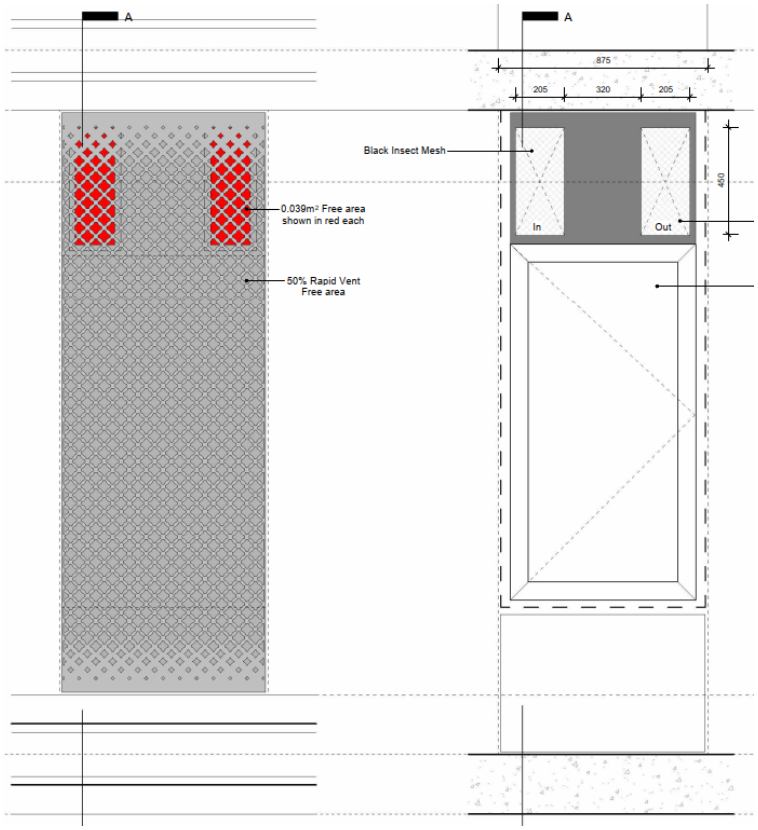
The MVHR units will be fitted with G3 filters as standard. During occupation the tenants have the option to replace these filters in line with the MVHR installation and user guide replacement with G3 filters or enhanced filtration of M5 or F7. Heat Recovery units require regular maintenance. The unit shall be designed to facilitate access to facilitate enable maintenance to be carried out easily. The MVHR unit shall display a warning symbol, code, light or similar to confirm cleaning or replacement filters is overdue.

The MVHR units shall be fitted with Nox filters where required in line with the requirements of the air quality assessment.

Part F Purge Ventilation & Part O Overheating

Purge/Overheating ventilation, giving the occupant final control over their environment, will be provided by free area natural ventilation openings in the building façade and a boost mode on the MVHR units. These openings shall only be used for purge and overheating comfort, with day-to-day ventilation being provided by the mechanical MVHR systems.

Purge/overheating Ventilation shall be provided to each habitable room (Bedrooms and Living / Kitchens) within each cluster/studio. Purge Ventilation shall be provided via rapid/purge panel vents installed in the façade. These openings are to be provided alongside an MVHR summer/purge boost mode (as required) which shall be operated locally via a manual switch within each cluster/studio.



Typical Purge Ventilation Panel Detail

It should be noted that the purge panels are purely for user comfort and shall satisfy the building regulations compliance for purge ventilation for odour control and to offset summertime overheating.

Effective ventilation area openings shall be in line with the minimum requirements set out in Approved Document Part F of the Building Regulations including Appendix B.

4.3 –Amenity Spaces

Local Heat Recovery units shall be provided to supply tempered fresh air to each of these spaces. The units shall be located locally within the ceiling voids of the area served discharging to atmosphere via local louvres within the facade. The units shall be of the heat recovery type as per Mitsubishi Lossnay units or equal and approved. The units shall generally comprise of the following sections: -

- Return air fan
- Air intake louvre
- Motorised shut off damper
- Fresh air filter (F7 Grade Filter)
- Extract filter (M5 Grade Filter)
- Counter flow heat exchanger (providing heat recovery)
- Supply fan
- Local controllers provided on each office floor plate.

The systems shall be controlled to supply a constant air volume during occupied hours to meet minimum fresh air requirements and be provided with manufacturers controls package to ensure fresh air rates and temperatures are maintained at comfortable levels and allow connection to the central building management system.

The spaces shall be ventilated to provide 10l/s per person.

Heat Recovery units shall be mounted within the ceiling void and these will be routed via rigid ductwork to supply and extract grilles located in the ceiling.

Intake and exhaust ductwork will be insulated to prevent condensation.
Louvres on the façade shall be required for connecting the ventilation ductwork intake and discharge points to outside.

Attenuators will be installed to reduce external noise intrusion.

4.3.1 – Entrance and Reception

The entrance and reception areas will be provided with a dedicated ventilation system. Outside air will be provided at 10 l/s per person as per the CIBSE guide recommendation. These areas will be served by filtered heat recovery supply and extract units located within ceiling voids of each space.

Outdoor air intake and exhaust louvres will be formed at high level in the ground floor façade. These shall be separate at a distance from each other to minimise recirculation of intake and exhaust air flows.

4.3.2 – Residents Amenity areas

These areas will be provided with a dedicated ventilation system. Outside air will be provided at 10 l/s per person as per the CIBSE guide recommendation. These areas will be served by filtered heat recovery supply and extract units located within ceiling voids of each space.

Outdoor air intake and exhaust louvres will be formed at high level in the façade. These shall be separate at a distance from each other to minimise recirculation of intake and exhaust air flows.

4.4 – Toilets, Refuse, Cleaners & Plant area Ventilation

Toilet, refuse and cleaners rooms will be ventilated by means of mechanical extract systems with the fan units located locally to the space they are serving. Make up air shall be provided naturally via one of the following methods: undercut doors, door transfer grilles, transfer ducts or make-up air drawn directly from outside via a louvred façade. Subject to the extent of air volumes required.

The local WC extract fans shall be complete with the following.

- Time clock controller
- Electronic fan speed controller
- Fan auto changeover facility
- Duty/share facility which changes the lead fan every 12 hours
- AV mounts
- Back draught shutters
- Ductwork distribution system rising vertically through the building

Plant areas shall be naturally ventilated through louvred doors/louvres in the façade.

4.4.1 – Mechanical and Electrical Plantrooms

All plant rooms shall be provided with ventilation as appropriate to their use either natural via louvred doors or minimum 2 ACHs if basement wet plantrooms.

4.4.2 – Refuse Stores

All proposed refuse areas are to be provided with appropriate dedicated extract ventilation. Refuse store extract ventilation shall be provided via an extract fan and ducting system that shall exhaust foul air to atmosphere at ground floor level, away from public spaces and air intakes.

A refuse holding area and refuse store is located at the Ground Level. This will use mechanical extract ventilation which will be provided in line with current industry standard practice levels as set out in BS 5906:2005 - Waste management in buildings - Code of practice. A localised extract air fan will be located at high level (soffit mounted), within each refuse store, to provide 5 l/s-m2 of mechanical extract ventilation.

This is in accordance with ASHRAE, Ventilation for Acceptable Indoor Air Quality, 62.1-2004, TABLE 6-4 Minimum Exhaust Rates. This extract ventilation will be ducted to the louvered façade. Supply air make-up will be drawn from the adjacent areas and via infiltration through intake louvres along the elevation to external.

Bin stores shall be ventilated at 5l/s /m² via a fire rated fan. All ductwork external to the bin store shall be fire rated.

4.5 – Smoke Ventilation System

A smoke clearance system shall be installed that shall operate automatically in the event of a fire within the residential sections of the development.

The contractor shall provide an automatic opening vent (AOV) at the head of each of the stair cores. This shall open automatically at the dictates of the fire control panel. Separate natural shafts serving the lift lobbies shall be provided to deliver make up air for the smoke clearance system. Air shall be transferred to the corridor through the door opening onto the affected floor from the lift lobbies.

A grille complete with fire damper (Lobby Ventilator) located within the residential corridor shall open automatically at the dictates of the fire control panel to allow the passage of smoke from the affected corridor, into the mechanical smoke shafts formed within the core area. A dedicated corridor smoke detector located at each level shall be used to actuate the fire damper at the affected floor.

Smoke fans at roof level, controlled automatically by the fire control panel, once energised shall extract smoke from the building through the automatic opening vents. The fans shall be run in duty / standby mode to ensure operation in the event of a fan failure.

The system shall be designed to operate on only one level at a time, on first activation.

All plant items associated with the system shall also be fed by the Generator to ensure operation when the electricity supply is interrupted.

The control panel for each system shall be located at the foot of the stair core adjacent to the fire personnel entry point.

5.0 – Conclusion

The ventilation strategy improves on the fundamental principles of the Building Regulations and will make a contribution to reducing the annual CO_2 emissions of the proposed development.

The proposed development will incorporate energy reduction measures in the ventilation systems to reduce the carbon footprint of the site using heat recovery devices and energy efficient fan selections.

Waste heat will be recovered by the mechanical ventilation heat recovery (MVHR) systems. This type of ventilation will help to reduce heat demand and provide filtered air to the PBSA accommodation thus promoting healthy living conditions for the occupants. All fans and motors shall be specified to incorporate accredited technology and appropriate controls.