
Manchester Hyde Road School

Ventilation and Extract Planning Statement

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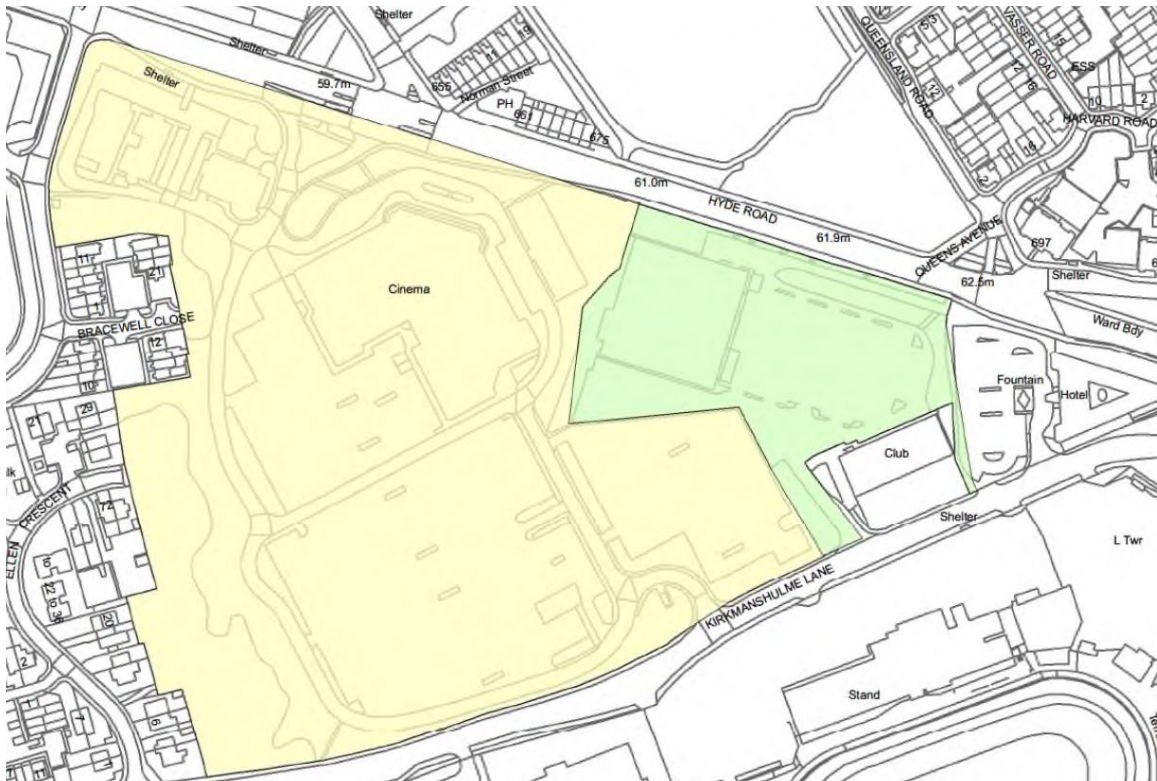
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1.0 Introduction

This ventilation and extract statement supports the Full Planning Application for the proposed Hyde Road School development, Manchester.

The proposed development is located in Manchester and the site is bounded by Hyde Road and Kirkmanshulme Lane, postcode M12 5AL. Currently the site is occupied by the Showcase cinema building. The application seeks approval for a three storey educational facility.



The ventilation strategies comply with the guidance in the building regulations Approved Document part F: - Means of Ventilation as well as the following standards and guidance:

- AD L2A Conservation of fuel and power in new buildings other than dwellings
- Non Domestic Building Services compliance guide
- BS EN 13053:2006+A1:2011 Ventilation for buildings. Air handling units. Ratings and performance for units, components and sections
- BS EN 5588-9:1999 Fire precautions in the design, construction and use of buildings. Code of practice for ventilation and air conditioning ductwork (AMD 14993) (No longer current but cited in Building Regulations guidance)
- BS 9999:2008
- CIBSE guide B
- CIBSE commissioning code A
- HSG 258 A guide to local extract ventilation
- DW 144
- DW172
- EU directive 2009/125/EC Regulation 1253/1254 Ecodesign requirements for ventilation units
- BB 101: Ventilation, thermal comfort and indoor air quality 2018

2.0 Ventilation Systems

The ventilation systems shall be designed in accordance with buildings regulations part F and CIBSE guide B and shall provide an adequate means of ventilation for the buildings occupants whilst ensuring that air quality and occupant comfort is satisfactorily maintained.

The table below details the ventilation strategy:

Usage	Ventilation Strategy	Heating / Cooling Strategy
Changing area	Mechanical ventilation with heat recovery with integral heat pump	Radiant panels
Circulation	Mechanical ventilation with heat recovery with integral heat pump	Radiant panels
Perimeter Classrooms (general)	Hybrid Natural Ventilation Units	Heating Coils within the Hybrid Units
Community area	Mechanical Ventilation with Heat Recovery	Heating Coils within the MVHR Units
Entrances	Natural Ventilation	Door Curtains
Dining areas	Mechanical ventilation with heat recovery with integral heat pump	Radiant panels
Main hall, Activity studio and Drama	Mechanical ventilation with heat recovery with integral heat pump	Radiant panels
Activity studio	Mechanical ventilation with heat recovery with integral heat pump	VRF Cooling to be assessed
Sports Hall	Solar powered assisted natural ventilation turret & mechanical ventilation	Radiant panels
Library	Mechanical ventilation with heat recovery	VRF cooling to be assessed
IT Classrooms / High Heat Gain Spaces	Hybrid Natural Ventilation Units	VRF cooling – rooms to be assessed
Kitchen	Mechanical Ventilation	Duct mounted heater batteries
Offices	Mechanical Ventilation	Radiators
Plant Rooms	Natural	Frost protection
Perimeter Science Classrooms	Hybrid Natural Ventilation Units	Heating Coils within the Hybrid Units
Internal Classrooms	Mechanical ventilation with heat recovery with integral heat pump	Duct mounted heating coils
Server Rooms	Transfer grilles	DX Split Systems
WC's	Mechanical ventilation	Radiant panels

Generally care shall be taken to ensure that ventilation systems are exhausted at roof level and that exhausts are located in areas away from natural ventilation openings, neighbouring buildings and fresh air intakes.

Due to the nature of the buildings use, noise control shall be critical throughout the building, this is also true of the buildings ventilation systems, with acoustic control measures being adopted as required by the acoustic consultant to ensure that noise breakout from ventilation plant is controlled to satisfactory levels throughout. As required, flexible joints, couplings and fixings shall be employed as required for isolation purposes with acoustic attenuators being utilised between rooms and at equipment.

2.1 General Supply and Extract

The building has been split into zones with each zone served by a separate air handling unit that will have filtered and tempered air supply and heat recovery on the extract. The air intake and discharge shall be separated to ensure no cross contamination.

The main mechanical ventilation systems proposed are:

- AHU 01 – Dining
- AHU 02 – Sports Hall and Changing areas
- AHU 03 – Drama and Activity Studios
- AHU 04 – Offices, open spaces (atria), corridors and internal classrooms
- AHU 05 – Main Hall / Auditorium
- AHU 06 - Kitchen

Supply and extract shall be ducted from the roof plant down through purpose made service risers and distributed to supply and extract grilles and bellmouths in the served spaces.

2.2 Kitchen extract systems

The building will benefit from a main kitchen to prepare food for students and staff. In addition, the food technology space (training kitchen) shall be predominantly used for education purposes.

The kitchen extract system shall be provided in accordance with the kitchen consultants design with bifurcated extract fans as required and dedicated fire rated extract ductwork provided to roof level.

Each canopy to be selected shall be suitably sized by the relevant specialist contractor to provide an adequate rate of ventilation. During times that the kitchen / catering area is not operational there will be a requirement for carbon monoxide and heat sensors to be installed and linked to the extract fans to ensure there is no build-up of fumes which could be hazardous to health.

Adequate interlinks and safety systems shall be employed as necessary in conjunction with any natural gas cooking equipment. The choice of the cooking equipment is not yet finalised and shall be confirmed by a catering specialist during the next phases of design.

Makeup air for the kitchen extract shall be provided by the general system derived from roof mounted air handling units (AHU's).

Although the kitchen extract is exhausted at roof level there shall still be a system of treatment before the fumes are exhausted, refer to section 3.0 below.

2.3 Central Open Space (Atrium) Ventilation System

The central open space including social spaces and adjoining corridors that are open to the atrium shall be ventilated via a mechanical mode solution with low level supply and high level mechanical extract to be employed. A mixed mode ventilation solution shall be further investigated and would include additional opening louvres at high level within the atrium to provide an additional boost of natural ventilation at peak summer periods.

Currently, no smoke extract ventilation has been considered for this area. The specification of such systems shall be confirmed by a fire consultant, part of the general fire strategy.

2.4 Teaching Spaces Hybrid Ventilation System

The perimeter teaching spaces shall be ventilated by means of hybrid ventilation units. The mixing ventilation system allows single sided, natural ventilation in deep plan spaces whilst making the most of internal heat gains to deliver thermal comfort. The units shall be installed at high level within each classroom and connected to louvres integrated in the windows systems.

2.5 Boiler plant room

The boiler room will be provided with low and high level ventilation to deliver combustion air and also maintain the space at a reasonable working temperature.

The plant room shall incorporate natural ventilation with suitably located intake and discharge louvres.

2.6 Local extract ventilation

There are several areas where local fume extract is being provided for activities these include:-

- Food tech kitchens
- Soldering
- Kilns

These systems shall be ducted to the roof in fire rated ductwork and discharged away from air intakes.

A number of fume cupboards shall be installed in the Science labs. These are projected to be of the recirculating type with no dedicated exhaust to the roof level.

3.0 Filtration System (Odour and Grease Removal)

All kitchen extract systems require filters to be used; hence there will always be a need to have a strict maintenance regime in place to ensure each type of filter performs as it is supposed to, and that the system installed complies with the building regulations.

The exact specification of the filtration system and exhaust shall be developed based on the cooking type, equipment and intensity as advised by the catering specialist. Consideration shall be given to the proximity of sensitive receptors.

Below is a typical table showing maintenance periods for different types of filters.

Kitchen extract component	Recommended maintenance intensity
Grease, smoke and solid filtration	
Grease filter – mesh / baffle / cartridge / water wash	Daily cleaning
Cold water mist hood	Daily cleaning
Electrostatic precipitator	4 weekly cleaning
Low intensity odour control	
3 stage fine filters	2 weekly replacement
Odour control	
Ultra violet odour control	4 weekly clean, annual lamp replacement
Adsorption – activated carbon filter	4 to 6 month filter replacement
Wet scrubbing – spray/venturi/packed tower	Manufacturer dependant
Odour counteraction	
Odour neutralising spray	Manufacturer dependant
Ductwork	
Kitchen extract ductwork	3 to 6 monthly

Table 1 (above): Kitchen Extract System Maintenance Requirements

As can be seen in the suitability matrix below for ESP filters and regular maintenance, subject to the applicable preparation method to be carried out in each area, appropriate filters shall be installed in order to reduce the amount of grease, oil and smoke passing into the ductwork, greatly reducing the need for duct cleaning and reducing the risk of duct borne fires within the duct systems. Along with the ESP filters, ultraviolet odour control filters should also be installed to eliminate odours in the air stream. Additionally, as can be seen from the below table, these two filters are suitable for all types of catering types.

Catering type	Smoke grease and odour characteristics			Grease, smoke and solid filtration			Low intensity odour control	Odour control			Odour counteraction
	Smoke	Grease	Odour	Grease filter	Cold water mist hood	Electrostatic precipitator		Ultra violet odour control	Activated carbon filter	Wet scrubbing	Odour neutralising spray
African	Low	Moderate	Moderate	✓	✗	✓	✗	✓	✗	✗	✗
Chinese	Low	Very high	Moderate	✓	✓	✓	✗	✓	✗	✗	✗
Char grilling	Very high	High	High	✓	✓	✓	✗	✓	✓	✗	✗
European	Low	Low	Moderate	✓	✗	✓	✗	✓	✗	✗	✗
Fish & chips	Low	High	Moderate	✓	✓	✓	✗	✓	✗	✗	✗
Fried chicken	Low	High	High	✓	✓	✓	✗	✓	✓	✗	✗
Indian	Low	High	Very high	✓	✓	✓	✗	✓	✓	✗	✗
Malaysian	Low	High	High	✓	✓	✓	✗	✓	✓	✗	✗
Mexican	Low	High	High	✓	✓	✓	✗	✓	✓	✗	✗
Pizzeria	Low	Low	Low	✓	✗	✓	✗	✓	✗	✗	✗
Pub food	Moderate	Moderate	Moderate	✓	✗	✓	✗	✓	✗	✗	✗
Sea food	Low	Low	High	✓	✗	✓	✗	✓	✗	✗	✗
Turkish	High	Moderate	Moderate	✓	✗	✓	✗	✓	✗	✗	✗
Warmed food	None	Low	Low	✗	✗	✗	✓	✗	✗	✗	✗

✓ Recommended

✗ Unlikely to be required

Table 2 (above): Matrix of Kitchen Extract Filter Systems

The advantages and disadvantages of ESP filter systems are presented in the table below;

Advantages	Disadvantages
- Will significantly reduce the amount ducts need cleaning as ESP filters prevent 98% of Grease/oil and smoke getting into the duct. - Significantly reduces the risk of fires within ducts. - As there isn't much grease in the air within the duct, lower velocities can be used without hindering performance. - Greater fan life span due to cleaner air flow. - Although ESP filters are quite expensive, money will be saved on the reduced number of fans making the capital cost lower with the combined extract system. - Although more complex controls required they can be wireless. - ESP cleaning and servicing is expected to be less than the cost of cleaning the individual kitchen extract ducts.	- ESP filters require regular cleaning and servicing by a specialist contractor. - An odour control filter will still be required i.e. ultra-violet

Table 3 (above): Advantages and disadvantages of electrostatic cleaning to kitchen extract systems

4.0 Spatial Coordination

The ventilation and extract plant shall be located on roof platforms or big foot systems. Units shall be arranged so that they can be maintained from the roof deck or access walkways. Ductwork shall be installed within service risers and ceiling voids with consideration given to maintenance and access to fire dampers, cleaning access ports, etc.

The Boiler room louvres shall be sited to avoid any air intakes or discharges from the general ventilation plant on the roof.