

The pipes are to be tested to 50 mm psig and held constant for a period of 5 minutes. In the event of failure of the test the defect shall be located and repaired and re-tested. This operation must be witnessed by the CA and the appropriate test documentation completed

3.4.0 MECHANICAL VENTILATION

3.4.1 UNIVERSAL SPECIFICATION

3.4.1.1 General

The Mechanical Contractor shall design, supply, install and commission, the complete ventilation system for the building. This shall also include the catering kitchen, restaurant and bar where applicable. The Mechanical Contractor shall specify and supply all fans and speed controllers and shall pass the power requirements for each fan to the Electrical Contractor as early as possible.

The Electrical Contractor shall then provide all necessary supplies and isolators for the fans in predetermined locations as agreed with the Mechanical Contractor. Final connection wiring from isolator to fan is to be by the Mechanical Contractor which also includes the speed controller wiring. Where wall fans are specified, these shall be supplied and installed by the Mechanical Contractor and wired by the Electrical Contractor.

The Mechanical Contractor shall specify and supply all fan ancillaries, including mountings, anti vibration pads, flexible connections, etc. All ventilation fans being mounted in rigid galvanized ductwork shall have anti-vibration mounts and flexible connections fitted to minimize the transmission of fan noise and vibration along the ducts. The Mechanical Contractor shall design and specify all attenuators deemed necessary for the quiet operation of systems and shall consider both internal and external noise conditions.

3.4.1.2 Design Parameters

It is the responsibility of the Contractor to carry out any design development throughout the contract and design co-ordination necessary on the project. The installations will be consistent with achieving high standards of end user comfort, with safety, efficiency, effectiveness, durability and ease of operation and maintenance as priorities. At the same time the aim will be to achieve economies in procurement and installation costs.

The following will be of high priority

- End User comfort, through achieving the specified design criteria.
- Health and safety in installation, maintenance and the day to day operation of the systems.
- Energy efficiency, through good design and appropriate control systems
- Ease and economy of maintenance.
- Durability, through good design and installation practice.

To clarify certain definitions within the IEE Wiring Regulations the following shall be adopted for the basis of the various design scenarios: -

Instructed Person

Shall be regarded as all members of staff and/or appointed contractors undertaking works for the Client, who will have been trained in the safe use of any electrical equipment required to carry out their duties.

Where Contractors are employed to carry out non-electrical works anywhere within the premises it shall be assumed that all such operatives have been trained to ensure their operations are carried out in a safe manner.

Skilled Person

Shall be regarded as anybody with sufficient experience to enable them to avoid the dangers of electricity (see above) (This follows the definition within the IEE Wiring Regulations).

To ensure adequate levels of protection are incorporated into the design of the Mechanical installation the following shall be taken into account during the Detail Design process:

All "None Public" areas i.e. Offices / Kitchens / Plant Areas etc shall be regarded as being only accessible to members of Staff and/or appointed contractors undertaking works for the client, these persons being regarded as Instructed Persons.

All other areas shall be deemed 'public'.

Design Operating Temperatures

All items of equipment, inter-connecting cables and cableways are to be capable of operating under the following external conditions

EXTERNAL TEMPERATURES		
<u>AREA/LOCATION</u>	<u>SUMMER</u>	<u>WINTER</u>
External Temperature	40°C @ 50% RH	-10°C @ 90% RH

The criteria for the design of the mechanical services shall be as detailed within the Wisdom RDS and as per current CIBSE Codes (UK) and ASHRAE regards external summertime WB/DB temperatures and humidity levels.

INTERNAL TEMPERATURES		
<u>AREA/LOCATION</u>	<u>SUMMER</u>	<u>WINTER</u>
External Temperature	29°C @ 50% RH	-5°C @ 90% RH
Entrance Lobby	N/A	18°C
Emergency Stairs	N/A	15°C
Main Reception / Foyer	N/A	21°C
Bedrooms	22°C	23°C
Corridors & Circulation / Stores & Linen Stores	N/A	18°C
Restaurant	21°C	22°C
Meeting Rooms	21°C	22°C
Bar	21°C	22°C
Kitchen	N/A	28°C MAX
FOH Toilets	N/A	19°C
BOH Offices	21°C	23°C
BOH Staff Areas / Team Rooms	21°C	20°C
BOH Toilets	N/A	19°C
Plant Areas	N/A	15°C
Comms Rooms	23°C	21°C

Where areas are indicated as having comfort cooling then the tolerance temperature shall be +/- 1oC unless otherwise stated.

Ventilation Rates

Fresh Air is provided generally by natural means but shall be also provided as follows:-

VENTILATION RATES		
<u>AREA</u>	<u>NATURAL INFILTRATION RATE (AC/HR)</u>	<u>MECHANICAL VENTILATION RATE (AC/HR / l/s)</u>
Delivery Bay	N/A	See Provisional Sum
Entrance Lobby	2.0	N/A



Main Reception / Foyer	1.0	12 l/s/person
Bedrooms	0.5	16 l/s (Supply & Extract)
Meeting Rooms	0.5	10 l/s/person
Corridors & Circulation / Stores & Linen Stores	0.5	8 Ac/Hr Note Linen Rooms With Dishwasher / Washing Machine Or Drier – EXTRACT ONLY
Restaurant	0.5	10 l/s/person
Bar	0.5	10 l/s/person
Kitchen	0.5	As Per Kitchen Installer Requirements (Circa 40 AC/Hr) Glasswash – 20 AC / Hr
FOH Toilets	0.5	10 AC/Hr
BOH PI Offices	0.5	12 l/s/person
BOH Beefeater Offices	0.5	12 l/s/person
BOH Staff Areas / Team Rooms	0.5	4 AC/Hr
BOH Toilets & Showers	0.5	10 AC/Hr
Plant Areas	0.5	Natural
Emergency Stairs	0.5	N/A
Comms Rooms	0.5	N/A

Air Permeability

When undertaking the SBEM the following figure for Air Permeability has been used

5.0 m³/h/m² at 50 Pa

Occupancy

OCCUPANCY	
Area	Occupancy
Entrance Lobby	N/A
Main Reception / Foyer	10
Bedrooms	4
Meeting Rooms	As Arch DWG
Corridors & Circulation / Stores & Linen Stores	N/A
Restaurant	As Licensing
Bar	Incl Above
Kitchen	N/A
FOH Toilets	N/A
BOH PI Offices	4
BOH Staff Areas / Team Rooms	N/A
BOH Toilets	N/A
Plant Areas	N/A
Emergency Stairs	N/A
Comms Rooms	N/A

Ductwork Velocities

When calculating ductwork sizes etc the contractor shall take due account of noise transmittance by ductwork configurations etc to adjacent occupied areas and shall design out all bad connections which may cause noise regeneration etc.

The following velocities and pressure drops shall be used when calculating ductwork sizes / csa:-

DUCTWORK VELOCITIES		
Service	Velocity	Pressure Drop
Main Duct Runs - General	6 m/s	1 Pa/m
Main Duct Runs - Kitchen	8 m/s	1 Pa/m



Branches	3 m/s	1 Pa/m
Louvres	2.5 m/s Face	25 Pa Max

Noise Criteria

The noise criteria laid down by the client will be as follows, although it is the responsibility of the contractor to ascertain any additional boundary noise criteria that may be stipulated by the Planning Regulations or Environmental Health Officer who must be consulted :-

NOISE CRITERIA	
Room Areas	Performance
Bedroom – Bedroom Bedroom – Bathroom (different rooms) Bathroom – Bathroom	Walls - $D_{nT,w} + C_{tr}$ 43 dB Floors - $D_{nT,w} + C_{tr}$ 45 dB
Bedroom – Restaurant/bar	$D_{nT,w}$ 60 dB
Bedroom – Kitchen	$D_{nT,w}$ 60 dB
Bedroom – Other tenancies	$D_{nT,w}$ 65 dB
Bedroom – Corridor	Walls - $D_{nT,w} + C_{tr}$ 43 dB
Bathroom – Corridor	$D_{nT,w}$ 45 dB
Bedroom – Laundry	$D_{nT,w} + C_{tr}$ 43 dB
Bedroom – Plantroom	$D_{nT,w}$ 60 dB

Background Noise Levels – External Sources

The noise level in any hotel bedroom with windows closed due to all external sources including road, rail and air traffic and noise from activities outside the hotel and any adjacent premises shall not exceed the following levels:

INTERNAL BACKGROUND NOISE LEVEL REQUIREMENTS	
Period	Noise Level
Daytime (07:00 – 23:00 hrs)	$L_{Aeq,1hour}$ 35 dB
Night-time (23:00 – 07:00 hrs)	$L_{Aeq,1hour}$ 30 dB
	L_{AFmax} 42 dB (*)

(*) The maximum criterion applies to all vehicle and railway train pass-bys and all aircraft flyovers. It also applies to the noise from all street activities including those associated with patrons attending and leaving adjacent, neighbouring or connected entertainment venues and church bells. Genuinely infrequent and unpredictable sources such as sirens or car alarms occurring no more than twice a night are excluded.

Music and patron noise intrusion from inside any adjacent, neighbouring or connected bar/restaurant or nightclub demises, into the guest bedrooms shall be controlled such that this source of noise intrusion is inaudible.

It is suggested that this can be achieved if the music/patron noise predicted in the guestroom, as an $L_{max}(FAST)$ in each 1/3 octave frequency band, is at least 10dB below the prevailing background noise level in the guestroom, described as an L_{90} in each 1/3 octave frequency band.

Noise from any building services plant serving neighbouring adjacent or connected demises shall not cause noise levels to exceed NR20 L10, 1 hour between 23:00-07:00 within any bedroom

Vibration within guest bedrooms shall be imperceptible. Guidance on levels of vibration considered being imperceptible to seated standing and resting persons can be found in BS6472.

Background Noise Levels – Internal Sources



The background noise level in any hotel bedroom as a result of comfort cooling room units serving the bedroom shall not exceed NR25 Leq when the systems are operating at their design duty. Comfort cooling systems serving bedrooms should also have the facility to be operated at quieter duties and be switched off by room occupants.

The background noise level in any hotel bedroom as a result of constant minimum fresh air ventilation systems serving the guestroom or other parts of the development shall not exceed NR20 Leq when the systems are operating at their design duty.

The background noise level in any hotel bedroom as a result of any other building services systems serving the bedroom or any other parts of the development shall not exceed NR20 Leq within the bedroom.

Building services noise in other areas of the hotel shall not exceed the following levels:

OTHER BACKGROUND NOISE LEVELS	
AREA	NOISE LEVEL
Delivery Bay	N/A
Entrance Lobby	NR 45
Main Reception / Foyer	NR 40
Bathrooms	NR 45
Corridors & Circulation / Stores & Linen Stores	NR 40
Meeting Rooms	NR 35 - 40
Restaurant	NR 40
Bar	NR 40
Kitchen	NR 45
FOH Toilets	NR 40
BOH PI Offices	NR 40
BOH Staff Areas / Team Rooms	NR 40
BOH Toilets	NR45
Plant Areas	NR40
Emergency Stairs	NR 40
Comms Rooms	NR 40

Noise emission from hydraulic systems including domestic hot and cold water services, refrigerant pipe work, soil and waste pipes serving other guestrooms particularly shall be inaudible in normal use.

Noise from the operation of lifts shall be inaudible in hotel bedrooms.

Notes:

- Cooling (and heating) equipment installed by cellar refrigeration direct contractor.
- Current Whitbread Group standard is 10 litres per second, per person of supply air. This allows for a percentage of re-circulation.
- For catering kitchen ventilation refer to the HVAC guide to kitchen ventilation systems DW/172. The supply air is to be heated to achieve a minimum 10°C air temperature within the kitchen
- Dictated by Building Regs/Architect
- Heating and Cooling to be provided to all bedrooms and ground floor front of house areas (reception, restaurant and bar). Summer and winter temperatures detailed.
- No ventilation required for standard room usage. Ventilation required if heat producing appliances are to be installed (i.e. TV amps, telephone exchanges, plant etc), or if stored materials dictate ventilation.

- Ground floor linen rooms to achieve 15 air changes/hour with upper floor linen rooms set to achieve 4 air changes/hour (applies to both individual systems and central systems), house keepers room to achieve 8 air changes/hour.

Air changes provided as a guide and should be regarded as minimum requirements. Increased ventilation levels will be required if additional heat sources are installed to these areas or if the layout of the building dictates reason for change (e.g. breakfast/buffet counter/servery etc).

The installation of supply and extract ductwork and grilles shall be as detailed within the Standard Specification and to good industry standards. Ductwork shall be hidden from view at all times and under all circumstances. All ductwork shall be insulated throughout its entirety including supply air, re-circulated and extract air ducting to comply with Building Regulations. Ductwork shall be sized to minimise noise and to comply with ADL2.

Generally the ventilation shall be designed to achieve good air flow (at the required rates) from staff positions to public areas. The following criteria shall also apply to "Front of House" areas:

- The supply and extract grilles shall be located to provide good air movement but also to eliminate short circuit of air.
- Cool/ambient air shall not be directed at food stations/breakfast counters etc

3.4.1.3 Individual Bedroom/Bathroom Heat exchange Units

Within each bedroom entrance lobby bulkhead the Mechanical Contractor shall install a bedroom/bathroom ventilation heat exchange unit. The heat exchange unit shall be located behind the bedrooms fan coil unit as detailed on Wisdom. The unit's details are as per the room data sheets on Wisdom. The unit shall be complete with internal supply and extract fan/s, plate heat exchanger, condensate tray and drain, acoustic lining, separate accessible mesh filter in a filter box on the fresh air intake side, Johnson and Starley 100mm² exhaust grille / filter (for the bathroom) and controls. The unit shall be hung from the underside of the floor above complete with anti-vibration hangers.

The unit shall operate constantly (24/7) at 8L/s (trickle) supply and extract. On insertion of the bedroom key card in to the energy switch the units' duty shall remain at 8L/s. The boost mode will operate via the bathroom light switch after a 2 minute delay. When the switch is 'on' the unit will increase its duty to 24L/s(boost). When the switch is 'off' the unit will return to providing 8L/s. Under all circumstances, when the key card is removed from the key card energy switch the unit will return and remain in trickle mode (8L/s).

The system is to be installed as per the standard detail on Wisdom for the particular room type. Within the bathroom the Mechanical Contractor shall install the J&S grille and filter which is to be positioned as per the standard bedroom layout. The duct work is to be 100mm dia. Insulated spirally wound galvanised steel duct, installed as per the standard drawings and shall be complete with flexible connections to the unit. Flexible duct work to make the final connection to the unit shall be no longer than 300mm in length and shall be pulled taut ensuring that the cross sectional area of the duct is maintained at all times. The duct work shall be insulated throughout its entirety. The duct work shall be routed to the external elevation via the bedroom bulkhead running the length of the bedroom from the entrance bulkhead to the external wall.

At the external wall the extract shall terminate at high level and the supply at low level via a suitable external air brick/s or wall grille.

NOTE – Where construction requires then PVC connections and Hilti Fire Collars shall be fitted prior to connection to the external termination

NOTE – BATHROOM VENTILATION EXTERNAL LOUVRES SHALL NOT BE FITTED WITH INSECT MESH

To avoid cross contamination the systems in the bedroom above and below shall have the supply and extract termination points 'alternated' i.e. the supply at high level and the extract at low level. The Mechanical Contractor is to ensure that inlet locations are not situated near pollutant sources.

The units shall be complete with isolation which is to be located within the bulkhead as detailed on the standard drawings.

The units condensate drain shall be gravity system and connected in to the FCU condensate drain complete with its own independent in-line dry trap.

The Mechanical Contractor shall also consider the acoustic implications of the site and shall, where required, to meet the acoustic requirements of the bedroom, install suitable attenuation to both the supply and extract ducts as per the recommendations of the acoustic consultant.

The system installed shall meet the requirements of Approved Document L and F of the Building Regulation's.

3.4.1.4 Linen Rooms/Stores Supply and Extract Fans

The fans shall be individual wall/Inline Heat Recovery supply and extract fans with local speed controller and generally controlled via a PIR off the lighting circuit and be complete with over run timer. The Mechanical Contractor shall supply and install the fan which shall be wired by the Electrical Contractor for installation.

Where a ducted system is required the Mechanical Contractor shall supply, install, set to work and commission a ducted supply and extract system to the Linen and Housekeeper's room. The air change rate shall be based upon 8 air changes per hour and current Building Regulation Requirements. The fans shall again operate via the lighting circuit and be complete with overrun timer

The Mechanical Contractor shall site fans in positions best suited to avoid noise or vibration and shall install anti-vibration mounts, flexible connections and attenuators where required. Where access hatches are required for maintenance, the Mechanical Contractor shall detail the positions and dimensions of any hatches required, on his mechanical drawings.

Where ducting passes through fire rated risers or floors, suitably rated fire/smoke damper shutters shall be installed.

The Mechanical Contractor should note that where any ventilation ductwork is routed over an escape route that the ductwork is to be fire rated.

NOTE – Where Linen Rooms have a Washer/Drier or Glasswasher then extract only i.e. No Heat Recovery shall be installed

3.4.1.5 Fire Alarm Operated Smoke Dampers

The Mechanical Contractor shall ensure that all ducted ventilation systems are installed with suitably fire rated smoke dampers that are operated by the fire alarm system to fully comply with the requirements of Approved Document B of the Building Regulations. The Mechanical Contractor shall also ensure that suitable/adequate access is provided to each damper for inspection and maintenance purposes, refer to Section 2 for further details

3.4.1.6 Attenuation

The Mechanical Contractor shall refer to the Whitbread Standard Acoustic requirements and site specific acoustic report for the site and shall design, supply, install and set to work any attenuation required to meet the acoustic requirements for the site.

3.4.2 OTHER AREAS

3.4.2.1 Admin/GM Office

The Mechanical Contractor shall design, supply, install, set to work and commission the ventilation system to the admin/GM office as detailed on the standard drawings available on Whisdom.

Generally the Mechanical Contractor shall size a suitable wall mounted fan complete with low level air brick. The fan shall be sized to provide the required fresh air for the occupants. The fan shall be complete with controller and back draft shutter. The Mechanical Contractor shall hand the fan to the Electrical Contractor for installation.

The office shall be complete with an electric convector heater panel as discussed later.

The Mechanical Contractor shall also install a wall mounted heat pump unit which shall be as manufactured by Mitsubishi from their City Multi range. The unit shall be complete with controller.

3.4.2.2 UA Toilet

The Mechanical Contractor shall design, supply, install, set to work and commission the ventilation system to the UA Toilet as detailed on the standard drawings available on Whisdom.

The Mechanical Contractor shall supply and install a suitably sized fan which shall be ceiling mounted and ducted to atmosphere with slim line duct work. The fan shall be switched via the lighting circuit and PIR within the W/C. The fan shall be complete with 15 minute overrun. Where the ducting penetrates fire barriers the Mechanical Contractor shall provide suitably rated fire collars.

3.4.2.3 Reception/Foyer

The standard hotel receptions up to 80 beds do not require mechanical ventilation as natural ventilation is considered adequate. However the Mechanical Contractor shall determine the requirement for the provision of ventilation to these areas and advise the M&E consultant if considered required.

3.4.2.4 Restaurant, Reception and Bar

The Mechanical Contractor shall be responsible for the design, supply, installation, setting to work and commissioning of the ventilation systems to these areas.

In hotels with restaurants the ventilation system is provided by Mitsubishi Lossnay heat exchange units or central plant. The number of units required to provide the required fresh air in to the space shall be based on the number of occupants the restaurant area is licensed to accommodate plus 10%. The reception/foyer area ventilation requirements shall be as per guidance set out in CIBSE B for hotels.

Fresh air is to be provided via the Mitsubishi Lossnay Heat Exchange units. These units shall be sized to provide each area with the required fresh air in accordance with the requirements of this specification and Building Control requirements. It is crucial that these are sized correctly and the external fan's static resistance is not exceeded by the ductwork arrangement/attenuators etc. The sizes of the LOSSNAYS shall be based on X Speed Setting and if required attenuators used. If the static resistance cannot be achieved then central plant or alternative units shall be considered

Lossnay units shall be hung from the floor structure above with suitable drop rods/hanger complete with anti-vibration points to isolate the units from the structure and to prevent vibration passing through to the floor structure above.

The distribution of air shall be via suitably sized spirally wound galvanised steel duct work which is to be in accordance with DW/144 and TR/19 for cleaning. The distribution system shall be insulated



throughout its entirety in compliance with Building Regulations. The systems shall be complete with all ancillary equipment such as balancing dampers (complete with lockable handles), fire dampers, smoke dampers, attenuation, flexible connections and anti-vibration hangers as required to ensure correct operation of the system. Duct work is to be clearly labelled. Rigid duct work is to terminate within 500mm of each grill position to allow final connection by flexible duct work which is to be pulled taut. Under no circumstances is flexible duct work to be left sagging on top of ceilings or equipment. Under no circumstances shall flexible duct be crushed/flattened or pulled at such an angle that the free area of the duct is affected. Each grille shall be complete with plenum box and spigot connection and opposed blade damper for fine tuning during commissioning. The systems shall operate at low velocity to minimise noise levels and draughts. Consideration shall be given to the location of the external louvers for intake and exhaust to eliminate cross contamination of the systems or pulling in contaminated air i.e. bin stores, heat dumps etc.

The Lossnay units shall not supply air directly to the area. Duct work from Lossnays shall be ducted and terminate within 500mm of the air intake of the respective fan coil units (detailed below) adjacent the fan coil units re-circ grille within the ceiling. Extract from the room is to be ducted directly to the Lossnay unit only.

Positioning of the supply and exhaust grille shall be considered to provide an even flow of air distribution throughout the area to be ventilated and heated and cooled. There are to be no cold spots within the areas.

The above section shall be read in conjunction with the heating and cooling section below.

3.4.2.5 Catering Kitchen

The Mechanical Contractor shall design, supply and install the complete catering kitchen supply and extract ventilation systems.

The Mechanical Contractor shall liaise directly with the catering contractor during the design stage.

The Mechanical Contractor shall be responsible for progressing this information. The catering contractor shall furnish the Mechanical Contractor with full details of the required volume flow rate for the extract and supply system and the Mechanical Contractor shall design and specify the correct fans for this purpose.

The Mechanical Contractor shall refer to DW/172, TR19, DW/144 and DEFRA Guidelines and the previous clauses within this specification for guidance on design and installation of the catering kitchen supply and extract systems. The kitchen supply air system is to be pre-heated to provide a minimum ambient air temperature of 10°C under the external design parameters detailed above. All equipment proposed to meet these criteria is to be suitable for use on kitchen systems. The kitchen supply air volume flow rate shall be calculated at 85% of the requested extract flow rate.

Where an induction canopy is installed, both supply and extract system shall terminate at the canopy at suitably sized spigots, detailed by the catering contractor. The Mechanical Contractor shall attach (rivet) and seal the spigots to the ducts using slip joints and suitable high temperature mastic sealant. A proportion of air shall also be supplied into the catering kitchen at ceiling level.

Where an extract only canopy is installed, the Mechanical Contractor shall design, supply and install suitable ceiling mounted supply air grilles (not to be positioned over hot food holding areas). The catering kitchen extract system mechanical design drawing(s) shall be issued to the catering contractor for his consideration and comment prior to installation.

The Mechanical Contractor shall site the kitchen ventilation AHU in positions best suited to avoid noise or vibration and shall install anti-vibration mounts, flexible connections and attenuators where required. Where access hatches are required for maintenance, the Mechanical Contractor shall detail the positions and dimensions of any hatches required, on his mechanical drawings.



Where supply air ducting passes through fire rated risers, walls or floors, suitably rated fire damper shutters shall be installed. Fire damper shutters shall not be used on the kitchen extract system under any circumstances. If extract ductwork penetrates the kitchen fire barrier into other areas then the ductwork shall be suitably fire rated (preferably fire rated duct work as opposed to fire cladding) from such point throughout its entirety to the termination point of the system.

The design, supply and installation of canopies and stainless steel wall cladding shall be the responsibility of the catering contractor.

The Mechanical Contractor shall take due consideration at design stage to future cleaning of the ductwork and the contractors attention is brought to the detailed notes regards access / fire rated ductwork with Section 2 of this specification

3.4.2.6 Staff Room

The staff room is to be ventilated by a dedicated ducted heat recovery extract and supply system comprising of a Vent-Axia fans and heat exchange unit complete with duct work, grilles, flexible connections, controller, anti-vibration mounts and insulation. This system shall be controlled locally via a local wall mounted controller.

The heat exchange unit is to be installed in accordance with the manufacturer's recommendations and shall be complete with gravity condensate drain routed above the ceiling and connected to the nearest SVP/RWP stack. The condensate drain shall be complete with in-line dry trap.

The Mechanical Contractor shall ensure that all ancillaries that require access for maintenance shall have suitable access hatches provided and shall advise the main contractor of location and size of all access hatches required.

The staff room shall be complete with Heat Pump Air Conditioning.

3.4.2.7 Staff Toilets/Changing Room

The staff toilets and changing are to be vented using an In-line extract fan and galvanized spiral ducting terminating via a suitable wall grille on the rear elevation. The fan is to be wired to the local lighting circuit and fitted with 15 min. run-on timer. The make-up air shall be drawn from the staff room via a low level air transfer grille located within the changing room door and toilet doors.

3.4.2.8 Glass Wash:

The Mechanical Contractor shall design, supply, install, set to work and commission the glass wash extract system.

The fan shall be an In-line fan located within the ceiling space with galvanized spiral ducting terminating via a suitable wall grille on the rear elevation. The Mechanical Contractor shall ensure that the duty of the fan is adequate to expel steam generated by the glass wash machines and heat loads of the ice machine. The fan shall be complete with local speed controller. Fan to be wired to local lighting circuit and fitted with 30 min run-on timer. The Mechanical Contractor shall also supply a suitably sized air transfer grille complete with intumescent block (suitably fire rated) within the glass wash door at low level to assist air throughput. The Mechanical Contractor shall supply transfer grille to main contractor for installation into door.

3.4.2.9 Male & Female Toilets:

The Mechanical Contractor shall design, supply, install, set to work and commission the male and female restaurant WC extract system.

The Mechanical Contractor shall provide single In-line supply and exhaust fans to the w/c's complete with heat exchange unit, galvanized spiral ducting terminating via suitable wall grille on the rear elevation. Fans are to be wired to each areas lighting circuit and fitted with 30 min. run-on

timers. The supply air ventilation system to terminate within the lobby terminating via a suitably sized 4-way diffuser located in the toilet lobby.

The W/C's shall be complete with electric heater panels as discussed later if deemed required

3.4.2.10 Disabled Toilets and Baby Change:

The UA W/C extract system shall form part of the Male and Female Toilets supply and extract system as detailed above.

Where the ventilation system for one area is designed to incorporate another area (i.e. male and UA) the fan shall be switched by both areas PIR's. This is to ensure that no matter which WC is used the ventilation will be activated from detection of last presence.

3.4.2.11 Luggage and Cleaners Stores

The Mechanical Contractor shall design, supply, install, set to work and commission the luggage and cleaner's stores extract systems.

This system shall comprise in-line extract fan complete with spirally wound steel ducting terminating to wall louver on rear elevation. Fire dampers shall be installed at all points of penetration through fire walls. The fans shall operate 24/7.

The cleaners store ventilation system shall be designed to meet the requirements of COSHH and CIBSE guidance.

3.4.2.12 Managers and General Admin Office Ventilation System

The Mechanical Contractor shall design, supply, install and set to work the manager's office and general admin office mechanical ventilation systems. The general office system shall include a Vent-Axia heat exchange unit complete with duct work, grilles, flexible connections, controller, anti-vibration mounts and insulation. The system shall be sized to provide the required fresh air to the space based on occupancy and in accordance with AD'F' of the Building Regulations.

The office shall be complete with air conditioning to provide heating and cooling as discussed below.

3.4.2.13 Internal Bin Store

The Mechanical Contractor shall design, supply, install, set to work and commission the internal bin store extract system.

This system shall comprise in-line extract fan complete with spirally wound steel ducting terminating to wall louver on rear elevation. Air is to be drawn in to the plant room via the fully louvered external doors by the extract system.

The extract system shall operate 24/7 at the required duties. The fan shall be linked in to the plant failure alarm panel to warn of fault.

3.5 HEATING AND COOLING SYSTEMS

3.5.1 UNIVERSAL SPECIFICATION

3.5.1.1 Design Parameters

It is the responsibility of the Contractor to carry out any design development throughout the contract and design co-ordination necessary on the project. The installations will be consistent with achieving high standards of end user comfort, with safety, efficiency, effectiveness, durability and