
Holiday Inn Express, Manchester

Ventilation, Extraction & Odour Strategy Report

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Executive Summary

This document provides an overview of the proposed ventilation, extract and odour strategy to the extension of Holiday Inn Express, Manchester and the modifications to the existing systems that serve the hotel currently.

The extension will consist of the construction of an additional 2 guestroom floors above the existing 11th floor roof area. The 11th floor houses the existing hotel plant areas and plantroom.

The existing plantroom will be relocated and the services and flues to the plantroom modified to suit the new plantroom location.

The existing ventilation systems' plant will be retained in the current location. The ventilation terminations to atmosphere will be adapted to suit the extension construction over the existing roof plant area.

The existing variable refrigerant flow (VRF) heat pump systems will be relocated to the new roof area over the extension, alongside new systems to serve the extension.

Generally, ventilation to the extension areas will be localised self-contained systems dedicated to the extension areas.

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1. Introduction

The Holiday Inn Express on Oxford Road Manchester is an existing 10 storey hotel situated adjacent to the River Medlock. The proposal is to extend the hotel by 2 floors.

The intention is to retain all existing areas, 10th floor and below, as is, and retain all the plant on the existing roof and construct the 2 additional storeys above the existing plant deck.

The plant deck will become the 11th floor and will have an open façade all around its periphery. The new 12th and 13th floors will have an additional 24 guestrooms between them.

This report forms part of the full planning application and is intended to set out the principles of the ventilation strategy to the extended areas and the modifications to the existing plant areas in accordance with Building Regulations and project specific acoustic report.



2. Part F Overview

Approved Document Part F of the Building Regulations has minimum requirements that there shall be adequate means of ventilation provided for people in the building.

- Extract ventilation from rooms where water vapour or pollutants are likely to be released (e.g. bathrooms, sanitary accommodation, and kitchens in buildings other than dwellings), to minimise their spread to the rest of the building. Ventilation fans may be either intermittent operation or continuous operation.
- Whole building ventilation to provide fresh air to the building and to dilute, disperse and remove water vapour and pollutants not removed by extract ventilation. Whole building ventilation provides nominally continuous air exchange.
- Purge ventilation to remove high concentrations of pollutants and water vapour. Purge ventilation is used intermittently and required only for pollutants produced by occasional activities (e.g. fumes from painting). Purge ventilation may be provided by natural means (e.g. an openable window) or mechanical means (e.g. a fan).

The ventilation can be achieved by natural means, mechanical means, or a combination of types.

Adequate means of ventilation in buildings other than offices and car parks may be demonstrated by meeting the relevant standards set out in CIBSE's Guide A.

Mechanical - Any mechanically driven ventilation that both continuously supplies outdoor air to the inside of the building and continuously extracts indoor air and discharges it to the outside. This includes decentralised supply and extract ventilation, and mechanical ventilation with heat recovery (MVHR, a mechanical supply and extract ventilation system that includes a heat recovery mechanism).

Generally, the extension areas will only have mechanical ventilation.

The new guestroom ventilation on this extension development will be provided by MVHR units, ramping up when increased ventilation is required, i.e. when the room is occupied.

Linen stores will be provided with mechanical extract ventilation.

As the windows are fixed shut purge ventilation where required would be via task ventilation, to suit the task being carried out. Any potential overheating is addressed by the VRF heat pump fan coils.

As a minimum ventilation rates to all new areas will meet the requirements of Approved Document Part F.

3. Design Criteria

Ventilation Rates

All ventilation rates will as a minimum meet the requirements of Approved Document Part F.

Guestrooms fresh air supply will boost when the guestroom is occupied.

Continual background ventilation to each is proposed when the guestroom is not occupied. Each guestroom will be served by a heat pump VRF fan coil providing heating and cooling to each guestroom.

Linen storerooms will have mechanical extract ventilation.

Corridors are transient areas and will be reliant on the slight negative pressure created by the linen stores to induce the air to migrate down the corridors with foot traffic from guestrooms assisting the air movement.

External Design Conditions

External ambient temperatures of -4°C in winter and +30°C in summer

Internal Design Conditions

Hotel Guestroom 21°C +/- 2°C in Winter and 23°C +/- 2°C in summer.

Stairwell 18°C +/- 2°C in Winter not controlled in summer.

Linen store 18°C +/- 2°C in Winter not controlled in summer.

Thermal control to the guestrooms will be automatic control by means of the VRF systems automatic control system.

The thermal control to the heating in the stairwells and the storerooms would be by means of the standalone integral controls to each heat emitter.

4. Ventilation

4.1. Existing Hotel Ventilation

The hotel below Level 11 is to be retained with all ventilation system being retained on the existing plant deck.

However, to accommodate the extension staircase and lift some plant requires relocating or adapting. With the extension providing a slab over the existing plant area, to ensure that the ventilation system operate correctly and efficiently and prevent cross contamination from the different systems, there will be some adjustments required to duct work terminations.

The existing VRF systems serving the existing areas of the hotel are to be relocated to the new roof over the extension. The extension areas VRF systems condensing units will also be located on the new roof area over the extension.

The air intake to the existing restaurant/lobby/BoH areas and guestrooms will each be extended and terminate at the periphery of the new elevation treatment on plant deck. The elevation for the Level 11 plant deck will have a large free area. This will allow the existing ducts to be extended and terminate via a plenum to the rear of the elevation ensuring that only fresh air is drawn into the system directly from atmosphere (See Figure 1 and 2).

The existing restaurant/lobby/BoH areas exhaust shall remain as it currently is with the exhaust discharged into the plant areas. As the Level 11 plant deck has opposite elevations with large free areas the exhaust air will be discharged and dispersed to atmosphere from the cross flow of air. Figure 3 shows a section with the large free areas on opposite sides.

The existing extract only system which exhausts dirty air from the existing guestroom bathrooms will be extended to terminate at the elevation to discharge the air directly to atmosphere. This exhaust point will be set away from the inlet locations.

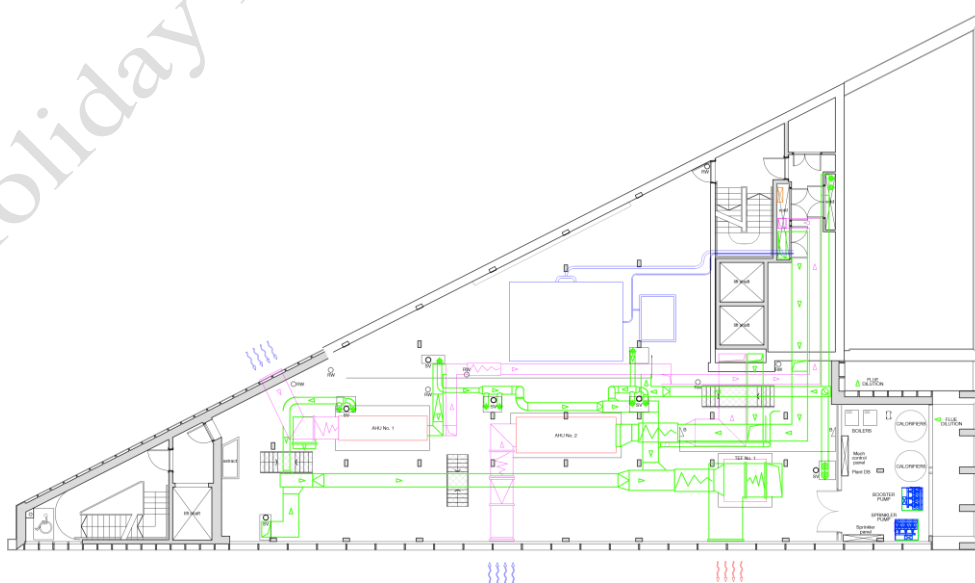


Fig 1 : 11th Floor Plant Deck



Fig 2 : 11th Floor Plant Deck section with large free area facades

4.2. New Guestroom Ventilation

All new guestrooms will be complete with sealed windows. Trickle ventilation will not be incorporated into the window panels due to possible acoustic issues but, background ventilation will be achieved via a mechanical ventilation heat recovery (MVHR) unit the operation of which is as proposed below.

These types of systems are complete with integrated fans, heat exchanger, boost functions and filters. The unit shall be sized to achieve Building Regulations and be complete with boost function. The boost rate of ventilation will be rated for the room occupancy.

The MVHR unit shall be located within the guestroom bulkhead with the supply ducted to the bedroom area and extract ducted from the bathroom. The fresh air to the guestroom is generally tempered via the heat exchange unit using energy from the exhausted bathroom air to temper the incoming fresh air before being discharged into the room.

Thermal comfort in the hotel guestrooms is achieved via a fan coil served by the VRF heat pump system. See Figure 3 for a typical guestroom ventilation arrangement.

The intake and exhaust ducts will terminate to air bricks at the external elevation of each guestroom with the ducting being routed within the ceiling void or dedicated bulkhead.

The ducting, where connecting to the air bricks at the façade where required are to be treated acoustically to the acoustic report requirements.

When not occupied the system will operate continually providing background ventilation and shall enter boost mode when the room is occupied.

Purge ventilation will be carried out via task ventilation to the room.

The MVHR ventilation to the guestroom could supplement the task ventilation if required ensuring the ventilation is in boost while propping open the bathroom door, to provide a more rapid exchange rate of air.

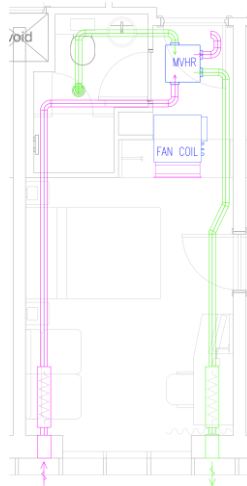


Fig 3 : Typical Guestroom Ventilation Arrangement

4.2. Smoke Ventilation

The existing smoke ventilation system terminates at level 11 via a mechanical extract system with an AOV (automatic opening vent) at the head of the stairs.

As the stairwell will be extended to accommodate the extension levels 12 and 13 the smoke vent systems will need extending as well.

A smoke ventilation specialist will design and extend the mechanical smoke ventilation system to incorporate the new levels to terminate at the new roof level.

Each new level within the firefighting lobby will incorporate a new actuated AOV, to the smoke ventilation specialists' requirements.

The existing head of stair vents will be relocated to the new head of the stairs at the new roof level.

The system shall be installed/extended by the smoke ventilation specialist in compliance with the relevant Fire Strategy, Building Regulation and British Standards.

4.3. General Areas Ventilation

Plant room/s

The existing plantroom that serves the existing hotel houses pump sets, booster sets, control panels and heating and hot water generation equipment is at level 11. This plantroom will be relocated on level 11 to accommodate the lift shaft that requires extending to serve the new accommodation levels at level 12 and 13.

The plantrooms gas supply, along with the relevant water pipes will be extended to the new plantroom location. Along with the relocated plant, new condensing gas fired boilers will replace the existing gas fired plant.

Plant room/s ventilation shall be achieved by means of ventilation in accordance with the requirements set out in BS 6644.

The boiler flues will be designed and installed by a flue specialist, these flues will be combined into flue dilution system, diluting the flue gases with fresh air drawn from the atmosphere.



The flue dilution system will discharge on a façade away from guestroom windows. Intake will be on an alternative façade to avoid the risk of short cycling of the discharged air.

The proposed flue dilution system will be developed as the extension design develops and details of the proposed system will be submitted to the planning department for comment/approval.

As the design of the extension develops other means of fluing the boilers to atmosphere may be considered and if this happens any alternative flue arrangement will be submitted to the planning department for comment/approval.

Other general areas within each demise

Each new linen room will have a dedicated local extract fan that will be ducted from a ceiling mounted extract grille to grilles mounted in the façade to discharge to atmosphere.

Corridors are a transient area and will be reliant on the slight negative pressure created by the extracted air from the linen stores to induce the air to migrate down the corridors with foot traffic from guestrooms assisting the air movement and mixing of the air.

All other areas not highlighted above shall be ventilated in accordance with Part F of the building Regulations and guidance as set out in CIBSE Guide unless the requirements of the operator exceed the requirements set out in the aforementioned documentation.

Compliance with Regulations, Standards and Guidance

All ventilation systems will comply as a minimum with Building Regulations. The design of the systems will meet the operator's requirements if they exceed those of the minimum requirements of Building Regulations.

5. New Roof Plant Area

To incorporate the extension over the existing plant deck at level 11 some of the plant is proposed to be relocated to the new roof area. As the proposal is to route stairs and extend the 2 lifts up through the plant room the plant room will need to be relocated.

The existing VRF condensing units and new VRF condensing units are to be located on the new roof over the extension. (See Figure 4). The new and existing condensing units will be isolated from the structure to avoid vibration or noise transfer to the structure.

The relocation of existing plant will incur a period of down time for the hotel due to the isolation and rerouting of the refrigerant systems for the VRF (system drain down, rerouting of pipe work and recommissioning), relocation of the electrical DB and controls panel (new boards, extend cables and test and commission).

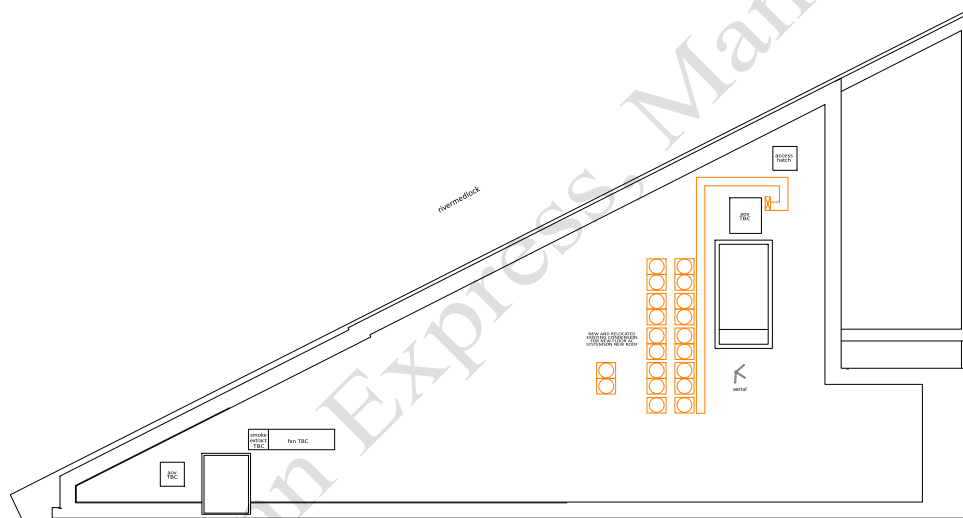


Fig 4 : New roof area with relocated and new plant