1 Pakenham St - Proposed Basement Ventilation Specification

Introduction

Client brief was to design a ventilation system for the basement area within a newly developed private dwelling at 1 Pakenham St, London WC1X 0LA (formerly Pakenham Arms PH).

Basement area was designated as communal area/small gallery/private display area.

Ventilation system is to incorporate tempered fresh air only (no extracted air).

Building drawings supplied by architects Brill Owen.

We had previously discussed a nominal route with the architects utilising an external flat roof space, ground floor room G5 and an un-surveyed plant room between the GF and Basement levels.

We visited site on 5-3-19 and undertook a deep survey of the proposed route.

Brief also advised that any scheme had to satisfy Local Authority noise restrictions.

CASI instructed Sound Licensing Ltd to act on their behalf and undertake a suitable background noise survey and accompanying report on my subsequent design

Calculations & Pre-Design

From the perceived habitation requirements of the basement space, and using CIBSE guidelines, an assigned air change rate of 10 has been allocated

We have given a nominal ceiling height within the basement space of 2.6m AFFL

We have then calculated the combined volume of rooms B1, B2, B3 and B6 – 140m³

From the ACR of 10, we have a flow rate of 1400m³/hr = 0.38m³/sec rounded up to 0.4m³/sec.

From this flow rate, I calculated the required power of an electrical in-duct heater (EHB) to give a 25°C uplift of exterior ambient temperature.

0.4m³/sec x 25°C x 1.22 = 12.2KW – rounded down to 12KW as a standard size heater.

We have explored the option of using an LPHW coil for the heating, but with space restrictions, cost consideration, coil geometry and additional services requirements, we have elected to propose an electric solution.

Note – site, we believe, does not currently have a 3ph 400V power supply. This should be investigated and confirmed. As previous usage was as a PH, I would expect it to have a 3ph 400V supply – maybe this has been removed.

The EHB suggested will require a 3ph 400V power supply rated at 25A.

The maximum size EHB available using a 1ph 230V supply is 9KW. This could be explored as an option but will not allow a 25°C uplift. The uplift available for a 9 KW heater is 18°C, and the rating of a 1ph 230V supply would be 50A.

Design

The proposed design is as per CASI drawing 05133-01-01 No Rev.

With one eye on the acoustic consideration, we managed to locate the atmosphere side attenuator within the building in room G5, with just a rectangular duct terminal on the external flat roof section.

The route follows that suggested by Brill Owen Architects

Note – builder work penetrations are unproved – we have made notes on the drawing where a duct path needs to be established through walls, roofs and floors.

Re-routing of duct within the basement rooms if paths through archways cannot be established may lead to a more cumbersome distribution of ducts going under existing arches.

I have noted where existing items may clash and would possibly require moving – e.g existing consumer unit in 'Landing Plant Room'

All ducts to be fixed to walls and soffits in each area using proprietary fixings and bracketry.

We do not see any structural issues with what has been proposed.

Majority of design utilises standard spiral circular section ductwork and associated fitting – with fabricated square to round items where required.

We have not shown any supply terminal within the basement areas – there are various option here to suit aesthetics/colour scheme/space concept etc.

The positions of the terminal legs from the perimeter duct run are nominal to suit the space plan.

It was confirmed by Sound Licensing Ltd that the level of attenuation included within this proposed design met the Local Authority external noise criteria as per their report 29-3-19.

Equipment Specifications

Fan Controller – Suitably rated 3ph 400V Inverter VSD – e.g. Danfoss/Siemens/Toshiba

Duct Heater – Neatafan 12KW 3ph 400V in-duct unit within 355mm Día duct. Suitable for thyristor control by others.

System Control – Bespoke ventilated control panel with inverter drive for fan and thyristor and duct thermostat for duct heater.

Attenuator - Flakt-Woods BI 101204

Filter Box – Flakt-Woods BI 100406 – Utilising G4 rated filters.

Ductwork – Lindab or Equivalent Vent Fittings for spiral ductwork. Competent bespoke duct workshop for other.