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Consultants in Acoustics, Noise & Vibration

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Open Society Foundations
Herbal House, London

M&E noise & vibration criteria
Acoustic specification

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Version	Date	Comments	Author	Reviewer
A	15 May 19		Sam Daintree	Stephen Stringer
B	9 July 19	Guidance updated following change to location of kitchen extract termination	Sam Daintree	Edward Farrer

1 Introduction

This specification relates to the control of noise and vibration from all parts of the mechanical, electrical, public health and air distribution services installations, hereafter referred to as the 'Services'.

This specification is addressed to the mechanical services contractor who shall comply with its requirements; it shall be read in conjunction with specifications and drawings issued by Cushman & Wakefield and TP Bennett.

2 Noise

2.1 Internal noise

2.1.1 Normally operational services

The total noise level from all normally operational Services shall not exceed the maximum figures given in Table 1.

Table 1 Schedule of maximum permissible internal services noise levels

Space	NR level
Meeting room, Response room, Flexi room	35
Cellular office	35
Focus, Cave, 1p/2p lounge, Bluejeans cave	35
Contemplation, Sanctuary, Parenting room, First aid room	38
Open plan offices, copy/store	40
Circulation, stores, IT build	40
Kitchen, cafe, WCs	45
Comms rooms/MER	65-70(1)

(1) Low frequency limit of 75 dB in the 63 Hz and 125 Hz octave bands

The noise criteria shall apply at any point greater than 1 metre from an enclosing surface (floor, wall or ceiling) unless the designed use of the space necessitates occupancy within this zone.

2.2 Characteristics

The noise from all Services shall not contain any distinguishable, discrete, continuous tones (whine, hiss, screech, hum etc) or distinct impulses (bangs, clicks, clatters or thumps) and shall not be irregular enough to attract attention.

Where this is not possible, the total noise level shall be at least 5 dB lower than the criteria specified above.

2.3 Attenuation measures

All necessary sound attenuation measures shall be incorporated into the design such that the noise criteria are achieved. Such measures are to include in-duct attenuators, internal acoustic lining to ductwork and external acoustic lagging to ductwork as appropriate.

2.4 External noise levels

The total noise level generated by any new mechanical and electrical services plant, machinery and air-flow systems shall comply with appropriate criteria stipulated by the landlord on the basis of local planning requirements.

2.4.1 Planning limits

The overall plant noise emissions from Herbal House shall not exceed the levels set out in Table 2, at the facade of nearby noise-sensitive receptors.

Table 2 Overall planning noise limits at nearby noise-sensitive receptors (Herbal House total)

Location	Period	Plant noise emission limit (dBA)(1)
Ray Street receptors	Daytime (07:00 – 23:00)	46
	Night (23:00 – 07:00)	42
Herbal Hill receptors	Daytime (07:00 – 23:00)	45
	Night (23:00 – 07:00)	41
St Peters Italian Church	Daytime (07:00 – 23:00)	45
	Night (23:00 – 07:00)	42
Back Hill residences	Daytime (07:00 – 23:00)	45
	Night (23:00 – 07:00)	42

(1) If there are tonal or intermittent characteristics to the plant noise, the limits shall be 5 dB lower

The cumulative noise from all tenant plant shall not exceed the levels set out in Table 3, at the facade of nearby noise-sensitive receptors.

Table 3 Planning noise limits at nearby noise-sensitive receptors (cumulative contribution from all tenant plant)

Location	Period	Plant noise emission limit (dBA)(1)
Ray Street receptors	Daytime (07:00 – 23:00)	43
	Night (23:00 – 07:00)	39
Herbal Hill receptors	Daytime (07:00 – 23:00)	42
	Night (23:00 – 07:00)	38
St Peters Italian Church	Daytime (07:00 – 23:00)	42
	Night (23:00 – 07:00)	39
Back Hill residences	Daytime (07:00 – 23:00)	42
	Night (23:00 – 07:00)	39

(1) If there are tonal or intermittent characteristics to the plant noise, the limits shall be 5 dB lower

2.4.2 Tenant plant limits

In order to meet the limits set out in Table 3, each individual tenant should apportion the cumulative tenant limit with a -10log[*N*] dB correction, where *N* is the number of tenants.

On the basis of there being 3 tenants in the building, Open Society Foundation plant noise emissions shall not exceed the limits set out in Table 4 at the facade of nearby noise-sensitive receptors.

Table 4 Planning noise limits at nearby noise-sensitive receptors (Open Society Foundation plant)

Location	Period	Plant noise emission limit (dBA)(1)
Ray Street receptors	Daytime (07:00 – 23:00)	38
	Night (23:00 – 07:00)	34
Herbal Hill receptors	Daytime (07:00 – 23:00)	37
	Night (23:00 – 07:00)	33
St Peters Italian Church	Daytime (07:00 – 23:00)	37
	Night (23:00 – 07:00)	34
Back Hill residences	Daytime (07:00 – 23:00)	37
	Night (23:00 – 07:00)	34

(1) If there are tonal or intermittent characteristics to the plant noise, the limits shall be 5 dB lower

2.4.3 Guidance on achieving the planning limits

The following is provided as guidance, based on the design at the time of writing. If any changes to plant locations are made, an assessment shall be carried out by the mechanical services contractor or their sub-contractor to ensure the planning limits are expected to be met.

In order to meeting the limits set out in Section 2.4.2, limiting sound power levels for external plant items and atmospheric connections are provided in Table 5.

Table 5 Limiting sound power levels for external plant items and atmospheric connections

Item	Limiting sound power level - L_w (dBA)	Notes
Kitchen extract fan (roof)	62(1)	Cumulative sound power level of discharge and casing breakout above parapet line
HRU terminations – Back Hill facade (west)	45	Applies to each termination on facade
HRU terminations – Ray Street facade (north)	56	Applies to each termination on facade
HRU terminations – Herbal Hill facade (east)	42	Applies to each termination on facade

(1) Based on the extract fan itself being screened from nearby receptors by the plant enclosure, with the discharge ducted to above the parapet line and including in-duct attenuation. If the extract fan is moved, casing break-out may require attenuation to meet the planning limits set out in Table 4.

3 Vibration

3.1 Maximum vibration levels

Maximum permissible vibration amplitudes should not:

a) Exceed a Vibration Dose Value (VDV) of 0.4 m/s$^{1.75}$ as given in BS 6472 Part 1: 2008 '*Guide to evaluation of human exposure to vibration in buildings : Part 1 Vibration sources other than blasting'* in any occupiable space

b) Be of a magnitude which causes the maximum noise criteria specified above to be exceeded.

4 Services penetrations

4.1 General

Where practicable, services should be run within the corridors thereby avoiding penetrations through crosswalls which typically have a much higher sound insulation performance.

All services passing through sound insulating constructions shall be acoustically sealed.

If in any location common supply air ductwork is to penetrate crosswalls and pass above adjoining cellular spaces, the ductwork within the rooms shall be acoustically lagged. The lagging shall comprise a 10 kg/m^2 flexible mass layer on 25 mm mineral fibre.

4.1.1 Pipework/ductwork

An indicative detail for ductwork/pipework is shown in Figure 1.

Adopt this detail or similar and approved for all ductwork/pipework penetrations through sound insulating constructions.

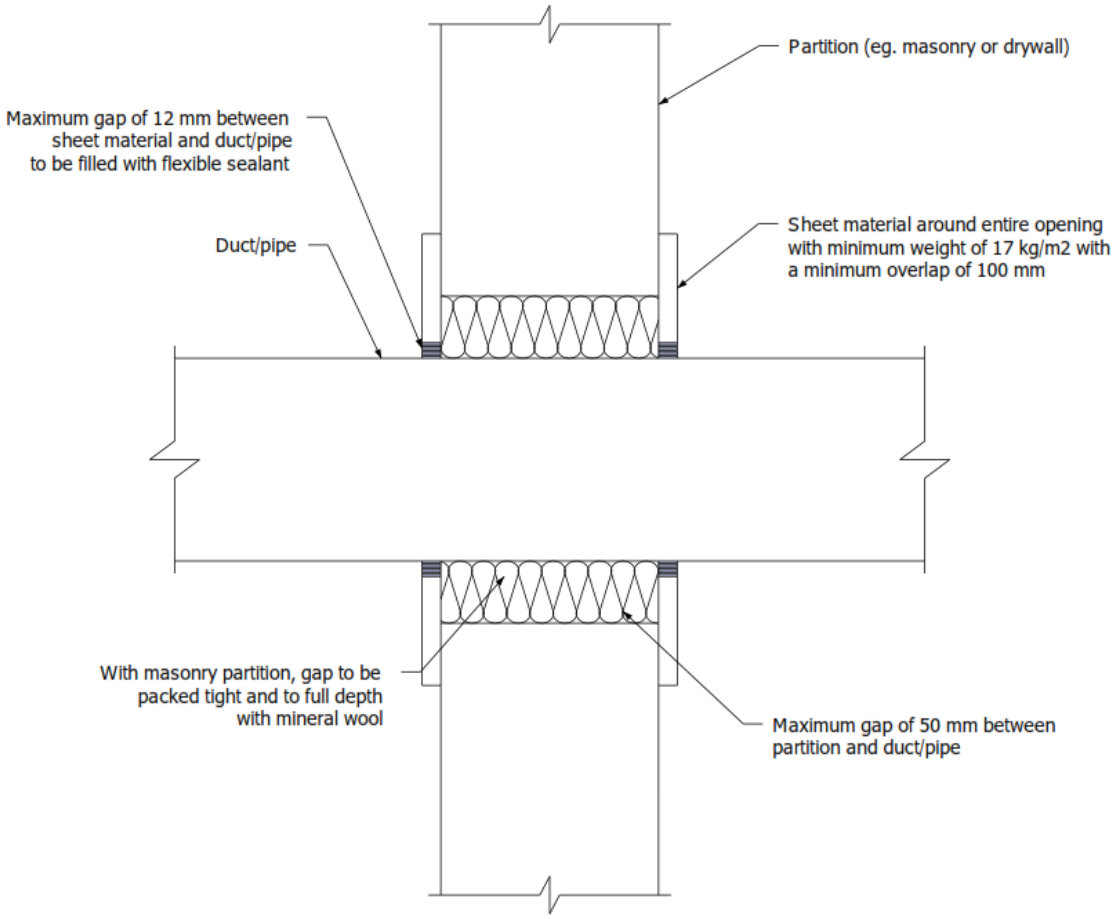

Figure 1 Indicative ductwork/pipework penetration detail

4.2 Cable trunking/trays

Similar principles to those above shall be adopted for cable trunking/trays.

The following detail shall be employed where cable trays penetrate full-height walls above ceiling level.

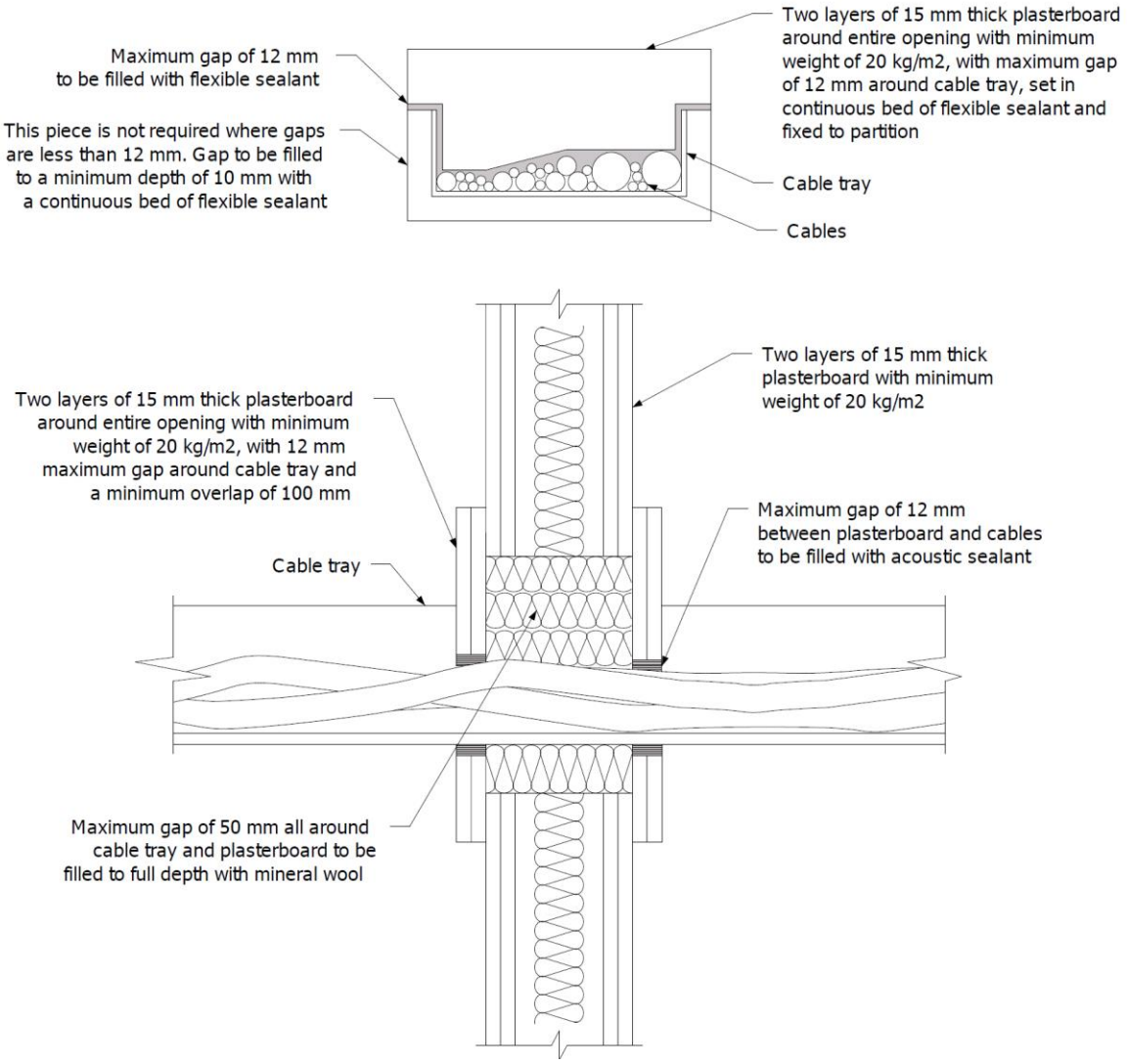

Figure 2 Indicative cable tray penetration detail

Where cable trays penetrate walls below the raised access floor a fire-stopping type detail shall be adopted, providing that there are no open penetrations within the floor. Two 50 mm thick layers of dense mineral wool batt (minimum 140 kg/m^3) shall be cut to tightly close the gap and installed so that their outside faces are flush with the outside faces of the partition. The batts and any remaining gaps shall then be sealed with a non-setting and flexible sealant.

4.3 Electrical sockets

Electrical sockets shall be appropriately staggered to ensure that they are not back-to-back within separating walls.

Where sockets are located within sound insulating drywalls, the plasterboard wall linings shall be returned around the rear of sockets to maintain sound insulation. Hilti putty pads (www.hilti.co.uk) would be an acceptable alternative to returning linings around the rear of sockets.

5 Cross-talk

Where common ductwork/ventilation openings are formed through sound insulating constructions, these shall be appropriately attenuated such that the sound insulation performance of the construction is not significantly degraded.

Cross-talk attenuators shall be installed as necessary in common ductwork.

6 Pipework

Any potentially noisy pipework which passes above acoustically sensitive rooms shall be either:

- Acoustically lagged (10 kg/m^2 flexible mass layer on 25 mm mineral fibre) or;
- Boxed in with 2 x 12.5 mm standard plasterboard (16 kg/m^2), independent of the pipework and 25 mm Isowool 1200 or equivalent insulation in the void.