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By email only

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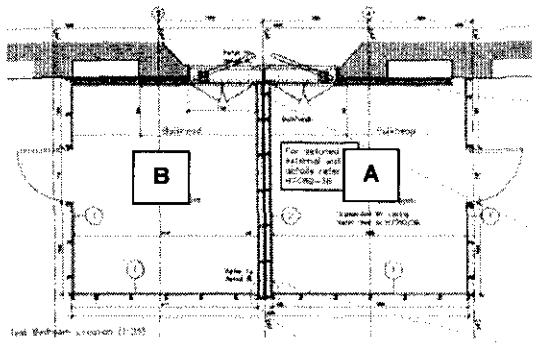
Dear Andy,

Travelodge, Drury Lane
Mock-Up Testing

Following the tests undertaken today, I can advise results as follows. Tests were performed in order to assess the level of airborne sound insulation between the rooms, and also the level of external road traffic noise intrusion.

The mock-up was laid out as follows, and the two rooms will be nominated for reference as A and B;



1.0 Airborne Sound Insulation

1.1 The results of the tests were as follows, to be compared to a minimum performance target of 43 dB;

Condition	Sound Insulation A to B ($D_{nT,w} + C_{tr}$)
All windows closed (outer and inner)	48 dB
Outer windows open, inner windows closed	48 dB
Outer windows closed, inner window open on side	46 dB
Outer windows closed, inner windows open both sides	45 dB
All windows open (outer and inner)	31 dB

1.2 In the "regular" design condition, with outer windows open (for ventilation) and inner windows closed, the performance is 5 dB in excess of the minimum requirement. In fact, the required level of performance is achieved even when the inner windows are slightly open on both sides (but with the outer windows closed). This confirms the current design will provide adequate sound insulation.

1.3 When the outer and inner windows are opened, the level of sound insulation is severely diminished. This is due to flanking sound via the open outer windows – as these are hinged to face each other, sound from one room is easily reflected back into the adjacent room. This demonstrates that, should residents decide (or be allowed) to open both windows for "rapid" ventilation in the summer months, then privacy between rooms will be negligible. It would be advisable to prevent this from happening.

1.4 Overall, we are very pleased with the achieved level of sound insulation. Note that although there appears to be some margin to spare, we would be reluctant to "value engineer" the design, as this margin is a useful insurance against any differences in the quality of installation between the mock-up and the main contract works (which being on a larger scale may not be as carefully realised).

2.0 Background Noise Levels

2.1 Short term sample measurements were made in each room to determine the likely overall level of road traffic noise intrusion, which is normally assessed over a 16 hour day or 8 hour night period. The sample measurement was long enough to include at least one traffic light cycle at the road junction outside the hotel, which can be considered reasonably representative if extrapolated to cover the full daytime period (as the road traffic flow/movements seem to be regular).

2.2 As the sample measurements were taken during the day, it is necessary to apply a correction to account for the reduced overall traffic flows at night. Based upon the original site noise survey data the correction is – 5 dB.

2.3 The results have also been corrected to account for the difference in reverberation time between the mock-up room and an actual hotel bedroom.

2.4 The results of the daytime measurements (and night-time predictions) are as follows, in comparison to the Travelodge internal noise level criteria;

Room	Condition	Period	Result	Criteria
A	Both windows closed	Daytime, L_{Aeq}	31 dB	40 dB
		Night-time, L_{Aeq}	26 dB	35 dB
		Night-time, L_{Amax}	39 dB	45 dB
B		Daytime, L_{Aeq}	30 dB	40 dB
		Night-time, L_{Aeq}	25 dB	35 dB
		Night-time, L_{Amax}	38 dB	45 dB
A	Outer window open	Daytime, L_{Aeq}	40 dB	40 dB
		Night-time, L_{Aeq}	35 dB	35 dB
		Night-time, L_{Amax}	48 dB	45 dB
B		Daytime, L_{Aeq}	33 dB	40 dB
		Night-time, L_{Aeq}	28 dB	35 dB
		Night-time, L_{Amax}	41 dB	45 dB

N.B. Night-time data estimated, based on original survey data

2.5 The design case is for the outer windows to be open but the inner windows to be closed, and for the ventilation path to be open. In this condition, the results demonstrate the criteria has been achieved with one slight exception, i.e. the estimated night-time L_{Amax} value in room A; however, it is worth pointing out that the noise levels in room B were lower than in room A by 7 dB – aural inspection on site revealed this is because the secondary glazing in B is performing better than in A.

2.6 There appeared to be more sound leakage via the frame of the window in A, although there was no obvious reason for this - it could be that the perimeter seals are not working as effectively. This variation is probably indicative of the possible differences in windows when installed throughout the project.

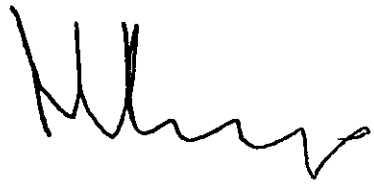
2.7 We note there are two seal elements to the window – a compressible seal in the fixed frame, and a brush seal around the edge of the opening light frame. If possible we suggest that the brush seal be replaced with a second compressible seal, as this should help overall performance and may reduce some of the variation noted.

2.8 With regard to ventilation, we note that it had not been possible to install the Aircore tube to the back of the grille in the cill, due to space issues. Nevertheless, it was found that the level of sound transfer via the two grilles was acceptable, so it can be concluded that the Aircore tube is not actually required. This should simplify installation, as we understand alternative grilles may need to be sourced (such grilles not being compatible with the Aircore tube in any event).

2.9 We note that the insulation provided in the void between the two grilles is providing sufficient attenuation, and this should of course be retained. We must raise the issue of potential fibre migration, as this insulation is exposed to the airstream. To prevent this, the insulation should be provided with a tissue facing (or similar; however, please note this must not affect the sound absorption properties of the insulation – to this end it will not be possible to use, for example, foil facing to the insulation).

In conclusion, I trust this report is clear however please let me know if you require any further information or assistance.

Yours sincerely,
for Applied Acoustic Design



Mark Bishop
Director