

Technical Note

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Project	Isleworth and Syon Boys School	Ref:	4341
For:	LB Hounslow, Pick Everard	Page:	1 of 4
Subject:	Acoustic Assessment of Existing Art & Technology Block		

1. Introduction

The Art and Technology Block at Isleworth and Syon Boys School was constructed in 1979. The school experiences a number of issues with this block including excessive aircraft noise break-in. WBM was retained by LB Hounslow to carry out an assessment of the block to comment on its acoustic performance. The results and findings of the assessment are presented in this Technical Note.

2. School Location

Isleworth and Syon Boys School is located off Ridgeway Road, Isleworth within the London Borough of Hounslow. It is located approximately 6km to the east of the eastern end of the northern runway at Heathrow Airport, broadly in line with the extended centre-line of the northern runway. As such, the school will be worst affected by aircraft noise when Heathrow Airport is on westerly operations with aircraft landing over London and with the northern runway in use.

3. External Noise Levels

WBM has measured external levels at two other schools that are located broadly in line with the extended centre line of the northern runway. The measurements were undertaken in the spring of 2013.

Springwell Schools are approximately 3-4km east of the Heathrow Airport with external levels of 68 dB $L_{Aeq,T}$ during westerly operations.

Grove Park Primary is approximately 11km east of the Heathrow Airport with external levels of 59-60 dB $L_{Aeq,T}$ during westerly operations.

It is expected that the noise levels during westerly operations at Isleworth and Syon Boys School would be between these values, around 65 dB $L_{Aeq,T}$.

External noise levels of 66-67 dB $L_{Aeq,T}$ during westerly operations were recorded at Isleworth and Syon Boys School in 2007 and 2009 by Applied Acoustic Design, which are in keeping with the expected worst case aircraft noise levels at this school.

4. Block Description

Art and Technology Block is a single storey building located between the dining hall/kitchen and the humanities block. It has predominantly single glazed external walls and sloped high level glazing around the top of the building. The roof is believed to be of timber construction and contains rooflights. The external doors to the internal quad have single glazing and other external doors have double glazing.

5. WBM Acoustic Tests

WBM visited the site on Tuesday 2 December 2014 between 6am and 9am to carry out acoustic tests on the block. The purpose of the tests was to determine the sound reduction performance of the existing façade and also to measure reverberation times in a sample of rooms within the block. Measurements were obtained within the following rooms:

AGF0103 Multi Mat CDT Room – this is a room located on the corner of the building with two external glazed walls, a double glazed external door, high level single glazing along two walls and rooflights above.

AGF00099 CDT Resources Area – this is an internal room, although does have some high level single glazing along one wall and rooflights above.

AGF0112 Art – this is a room located adjacent to the internal quad. It has one external glazed wall, a single glazed external door and high level single glazing along one wall.

6. Measurements of Sound Reduction

At the time of the tests, Heathrow Airport was on easterly operations with few aircraft flying near to the school. Therefore, WBM used a loudspeaker within the block to measure noise break-out in order to provide an indication of the apparent sound reduction performance of different construction elements.

During the tests it was observed that the single glazing forming the external walls and high level glazing, and the single glazed doors were poorly sealed allowing excessive sound transmission at the edges/junctions.

The indicative tests involved generating high levels of noise within the rooms and measuring the external noise break-out close to the particular building element. The results were used to calculate the indicative apparent sound reduction values of different elements of the building envelope. The full test details and results are available upon request, and a summary of the calculated sound reduction values are presented below:

Element	Indicative Apparent Sound Reduction
Roof	35 dB R'_w
Skylight	30 dB R'_w
Single glazing	21 dB R'_w
Single glazed door	16 dB R'_w
Double glazed door	22 dB R'_w

7. Estimated External Noise Ingress

The indicative apparent sound reduction values have been used to calculate external noise ingress due to aircraft noise when Heathrow Airport is on westerly operations with the northern runway in use.

Assuming an external noise level of 65 dB $L_{Aeq,T}$, it is expected that external noise ingress would be 45-50 dB $L_{Aeq,T}$ within AGF0103 Multi Mat CDT and AGF0112 Art, mainly due to break-in via the single glazed walls, high level glazing and external doors.

External noise ingress to AGF00099 CDT Resources Area would be lower as this is an internal room with no external doors, and the calculations indicate this would be around 40 dB $L_{Aeq,T}$.

For new school buildings, BB93 requires internal noise levels to be at or below 40 dB $L_{Aeq,30min}$ in Technology and Art rooms. Although not applicable to existing buildings, this demonstrates that the rooms within the Art and Technology Room with external walls and doors have internal noise ingress levels that are up to 10 dB above BB93 new build design levels.

It is anticipated that significant upgrading would be required to the single glazed walls, high level glazing and external doors in order to reduce internal noise levels to achieve the current BB93 standards. Some upgrading would also be required to the roof/ceiling constructions.

8. Internal Noise from Building Services

During WBM's site visit it was observed that there were noisy vents operating in some of the rooms. WBM carried out measurements of the noise at around 2m from the vents, with results of 52-54 dB $L_{Aeq,T}$. These values are well above the current BB93 requirements for internal noise indicating that these vents and the associated building services system require substantial attenuation.

9. Reverberation Times

The reverberation time was measured in the rooms to determine the mid-frequency reverberation time (T_{mf}) values. T_{mf} is the average of the RT values at 500, 1k and 2k Hz. The results were as follows:

Room	Measured RT	BB93 RT Requirements
AGF0103 Multi Mat CDT Room	0.77 seconds T_{mf}	<0.8 seconds T_{mf}
AGF00099 CDT	0.58 seconds T_{mf}	<0.8 seconds T_{mf}
AGF0112 Art	0.87 seconds T_{mf}	<0.8 seconds T_{mf}

The BB93 RT requirements are for unfurnished rooms. The effects of furniture within a room usually reduce the RT value.

As shown above, the CDT rooms tested both met the current BB93 requirement for RT, although the Art room was above the required value.

10. Summary

WBM visited the Art and Technology Block at Isleworth and Syon Boys School on Tuesday 2 December 2014 to carry out an acoustic assessment.

Indicative apparent sound reduction values for different elements of the building envelope were measured. During the tests it was observed that the single glazing forming the external walls, high level glazing and the single glazed doors were poorly sealed allowing excessive sound transmission at the edges/junctions.

Calculated external noise ingress for the worst case aircraft activity affecting the school shows that internal levels would be 5-10 dB higher than current standards in BB93. Significant upgrading would be required to the single glazed walls, high level glazing and external doors in order to reduce internal noise levels to achieve the current BB93 standards. Some upgrading would also be required to the roof/ceiling constructions.

The noisy vents and the associated building services system would also require substantial attenuation.

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