



To:	Liam Garrow	of:	MSMCR
Author:	Ross Chamberlain	of:	AEC
Checked:	Paul Knowles	of:	AEC

59 Upper Chorlton Road – Verification Testing

1.0 Introduction

- 1.1 Noise measurements were undertaken within a living room and bedroom on the ground floor and a bedroom on the first floor of 59 Upper Chorlton Road, Manchester between approximately 1300 and 1400h on Friday 12 May 2023. The results of the testing and our comments are presented in this technical note.
- 1.2 The location of the measurements is shown in Appendix A.
- 1.3 AEC prepared a noise assessment as part of the planning submission for the development in October 2021, AEC ref: P4465/PJK/R1a.
- 1.4 These verification measurements were required to confirm that the installed glazing and ventilation strategy complies with the Local Authority requirements for internal noise levels.

2.0 Measured Noise Levels

- 2.1 All measurements were carried out in general accordance with BS EN ISO 16283-3:2016 '*Acoustics – Field measurement of sound insulation in buildings and of building elements. Part 3: Façade Sound Insulation*'. A summary of the measurement survey and the results are shown in Appendix B. All calibration certificates for the equipment used during the survey is presented in Appendix C.
- 2.2 External noise level measurements were carried out at the beginning of the survey to confirm that the external noise climate was unchanged from AEC's original noise assessment. An additional measurement check could not be completed at the end of the survey as nearby construction works began and it was believed this would affect the measurements.
- 2.3 However, given that the free-field ambient noise level external to the elevation facing Upper Chorlton Road was 1dB higher than during the original noise survey, AEC are satisfied that the noise climate was representative of typical conditions.
- 2.4 The resultant internal noise level measurements have been corrected by the above figure and the results are presented in Table 2.1, below, along with the Local Authorities required internal noise level limits for reference purposes.
- 2.5 Please note that all internal noise level measurements were undertaken within unfurnished rooms and, therefore, have been appropriately corrected for a furnished space.
- 2.6 The ventilation strategy within all rooms was a mechanical ventilation with heat recovery (MVHR) system and acoustic trickle vents. The MVHR system was running during all internal measurements and the trickle vents were in the open position.

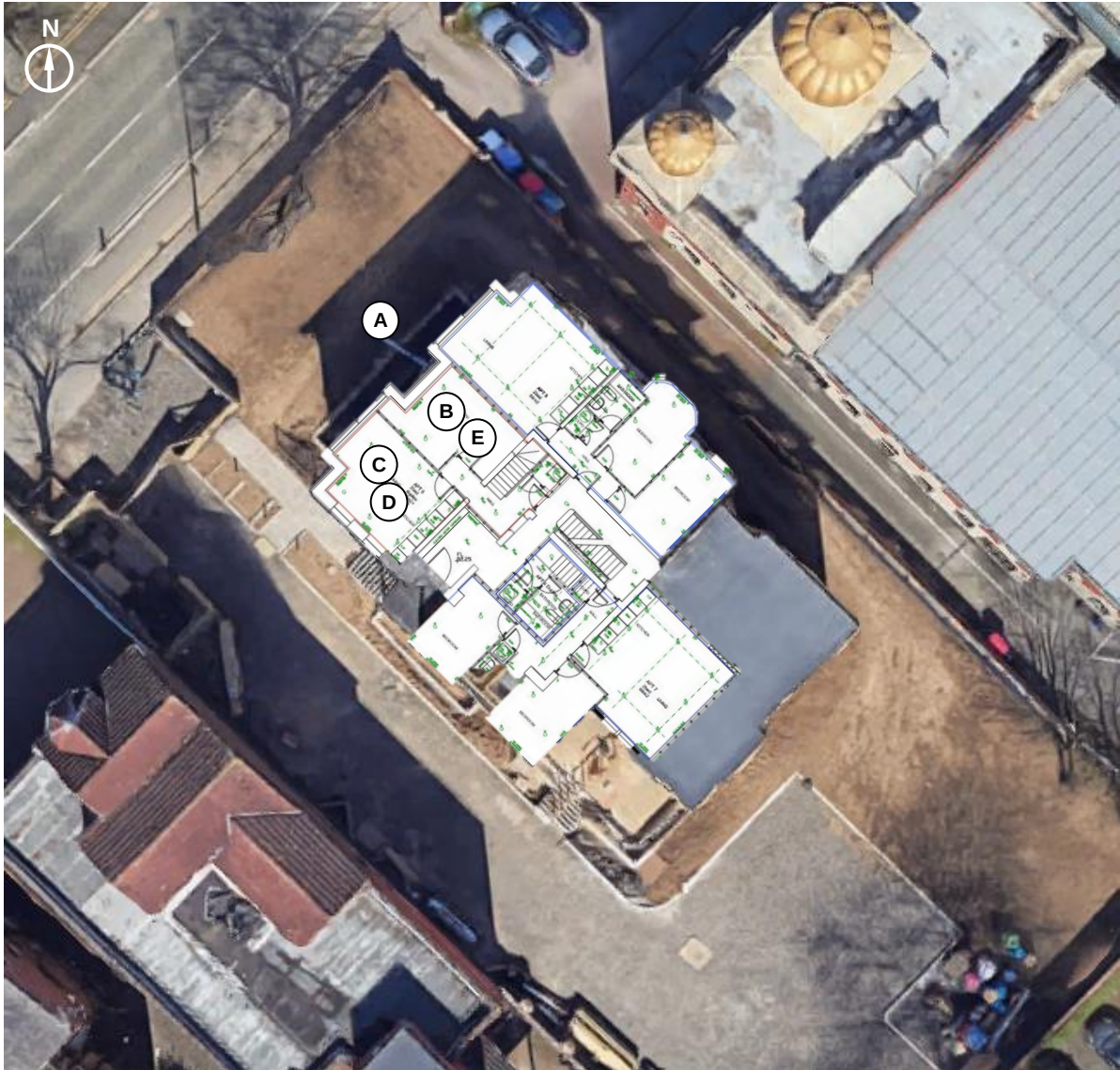
Table 1 – Measured Resultant Level Difference & Calculated Internal Noise Levels

Meas. No. / Appendix A Ref	Floor	Room	Ambient Noise Level, dBL _{Aeq,T}		Criterion Met?
			Measured Noise Level	Criteria	
01 / B	Ground Floor	Bedroom	25	30	✓
02 / C		Living Room / Kitchen	37	35	✓*
03 / E	First Floor	Bedroom 1	30	30	✓

***2dB is considered within acceptable measurement tolerance**

- 2.7 As identified above, all rooms met the requirements. While the ambient noise level in the ground living room / kitchen was 2dB higher than the criteria, this is considered acceptable within measurement tolerance. Furthermore, this was due to the MVHR system which was understood to not be balanced at the time of testing in this room. As a result, this 2dB exceedance would be considered an absolute worst-case.
- 2.8 To provide assurance that external noise level break-in was not the dominant noise source in the room, a measurement was undertaken in the living room / kitchen with the unbalanced MVHR system switched off (meas. D). Once corrected for the 1dB higher external noise level and the unfurnished room effect, noise levels internally were 31dBL_{Aeq,5min} and thus the requirements would be achieved.
- 2.9 In relation to maximum noise levels in the bedroom, maximum noise levels were no greater than 41dBL_{Amax,F} during the measurement period and, therefore, the requirement to not exceed 45dBL_{Amax,F} no more than 10 times during the night-time period would be met.
- 2.10 Based on the above, the internal noise levels are within the required limits and hence the glazing and ventilation strategy is suitable and performing as expected.

Appendix A – Measurement Location



- A – External Measurement
- B – Ground floor bedroom
- C / D – Ground floor living room / kitchen
- E – First floor bedroom

Appendix B – Measurement Details

Table B.1 – Noise Survey Details

Date & Time of Survey:	Friday 12 May 2023, 1310 – 1401h.					
Personnel:	Ross Chamberlain (AEC).					
Equipment Used:	Cirrus CR:171B Real Time Analyser (AEC Kit 5).					
Calibration:	The sound level analysers, which conforms to BS EN 61672-1: 2013 ' <i>Electroacoustics – Sound level meters - Part 1 Specifications</i> ' for Class 1 Type Z meters, was in calibration and check calibrated before and after the measurement periods using a Brüel & Kjær type 4231 (94dB) calibrator. There was no significant drift of calibration. Calibration certificates are available on request.					
Weather Conditions:	Date	Period	Wet/Dry	Temp°C	Wind Speed & Direction	Cloud Cover
	12.05.23	Day	Dry	12°C	Negligible	50%
Measurement Details:	Measurements at Location A were undertaken under facade conditions. Measurements were undertaken over various periods in terms of L_{eq}, L_{10}, L_{90}, and L_{max} and were logged continuously over 1s for post processing and assessment. Full results for the measurements are given in Table B.2.					
Measured Data:	Full octave band centre frequency data was obtained for all measurements.					

Table B.2 – Measured Daytime Noise Levels

Location	Period, h	Noise Level, dB				Comments
		L_{Aeq}	L_{A10}	L_{A90}	$L_{Amax, F}$	
A (North-West External Façade)	1310 -1325	65.6	68.7	56.5	76.2	External
B (Ground Floor Bedroom)	1333 - 1338	27.1	30.0	20.1	39.8	No Comments
C (Ground Floor Living Room)	1338 - 1343	39.4	40.5	38.1	43.0	MVHR Running
D (Ground Floor Living Room)	1347 - 1352	33.9	35.8	25.8	49.2	MVHR Switched Off
E (Ground Floor Bedroom)	1356 – 1401	32.6	34.5	29.4	41.8	No Comments

Appendix C – Calibration Details

Certificate of Calibration Issued by University of Salford (Acoustics Calibration Laboratory)	University of Salford MANCHESTER
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APPROVED SIGNATORIES Claire Lomax [x] Andy Moorhouse [] <i>C. Lomax</i> Gary Phillips [] Danny McCaul []	
acoustic calibration laboratory The University of Salford, Salford, Greater Manchester, M5 4WT, UK http://www.acoustics.salford.ac.uk t 0161 295 3030/0161 295 3319 f 0161 295 4456 e c.lomax@salford.ac.uk	

Certificate Number: 05392/2

Date of Issue: 2 July 2021

PERIODIC TEST OF A SOUND LEVEL METER to IEC 61672-3:2006

FOR:	Acoustic & Engineering Consultants Ltd Suite 316, 3rd Floor Broadstone Mill, Broadstone Road Stockport Cheshire, SK5 7DL
FOR THE ATTENTION OF:	Ross Chamberlain
DATE RECEIVED:	22/07/2021
PERIODIC TEST DATE:	29 July 2021
LOCATION OF CALIBRATION:	Acoustic Calibration Laboratory, Newton G31, University of Salford
TEST PROCEDURE:	CTP12 (Laboratory Manual)

Sound Level Meter Details-

Manufacturer	Cirrus
Model	CR-171B
Serial number	G056597
Class	1
Firmware	V3.2.2690

Associated Items:-

Type	Manufacturer	Model	Serial Number
Microphone	Cirrus	MK224	207463B
Preamplifier	Cirrus	MK170	0108

Test Engineer (initial):	GP	Name:	Gary Phillips
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Results in this certificate relate only to instruments tested.

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Certificate Number: 05392/2

Date of Issue: 2 July 2021

Procedures from IEC 61672-3: 2006 and TPS 49 Edition 2 June 2009 were used to perform the periodic tests. Manufacturer's instruction manual was marked as follows: Optimus Sound Level Meters Part B Technical Information for Optimus sound level meters fitted with firmware version 2.3 or later and User manual for optimus sound level meters Issue 2.1 November 2012 optimus/11/12/21EN. Adjustment data used to adjust the sound levels indicated in response to the application of an electrostatic actuator to sound levels equivalent to those that would be indicated in response to plane, progressive sound waves were obtained from the manufacturer. The sound level meter calibration check frequency is 1000 Hz, the reference sound pressure level is 94 dB. As this instrument only has a single range, this range is the reference level range.

The environmental conditions in the laboratory at the start of the test were:

Static pressure 100.189 kPa $\pm$ 0.013 kPa; air temperature 23.1 °C $\pm$ 0.4 °C; relative humidity 55.8 % $\pm$ 2.1 %.

The initial response of the instrument to application of the suitable laboratory sound calibrator was 93.7 dB (A). No adjustment of the instrument was required. This indication was obtained from the calibration certificate of the calibrator and information in the manufacturer's instruction manual specified in this certificate when the instrument is configured with the supplied microphone extension cable and associated windscreen.

With the microphone installed the level of self-generated noise was:

A: 17.4 dB*

* Under-range indicated on instrument display.

With the microphone replaced by the electrical input device specified in the manufacturer's instruction manual, the levels of self-generated noise were:

A: 14.6 dB*

C: 23.6 dB*

Z: 33.6 dB*

* Under-range indicated on instrument display.

The environmental conditions in the laboratory at the end of the test were: Static pressure 100.214 kPa $\pm$ 0.013 kPa; air temperature 23.3 °C $\pm$ 0.4 °C; relative humidity 55.9 % $\pm$ 2.1 %.

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The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

No adjustment data have been published in the instruction manual or made available by the manufacturer or supplier of the sound level meter to account for the average effects of reflections from the influence of the supplied windscreen, as required by IEC 61672-3:2006. The average effects of reflections from the influence of the supplied windscreen have therefore been assumed to be numerically zero for the purposes of this periodic test. If these adjustment data are not actually zero, there is a possibility that the frequency response of the sound level meter may not meet the requirements of IEC 61672-1:2002 (BS EN 61672-1:2003).

Instruments used in the verification procedure were traceable to National Standards. The electrostatic actuator method was employed in the acoustical tests of a frequency weighting.

All measurement results are retained at the acoustic calibration laboratory for at least four years.

-----END OF CERTIFICATE-----

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acoustic calibration laboratory The University of Salford, Salford, Greater Manchester, M5 4WT, UK http://www.acoustics.salford.ac.uk t 0161 295 3030/0161 295 3319 f 0161 295 4456 e c.lomax1@salford.ac.uk		

Certificate Number: 05392/1

Date of Issue: 2 August 2021

CALIBRATION OF A SOUND CALIBRATOR

FOR: Acoustic & Engineering Consultants Ltd
Suite 316, 3rd Floor
Broadstone Mill
Broadstone Road
Stockport
Cheshire
SK5 7DL

FOR THE ATTENTION OF: Ross Chamberlain

DESCRIPTION: Sound calibrator with housing for half-inch microphones.

MANUFACTURER: Cirrus

TYPE: CR:515

SERIAL NUMBER: 56719

DATE RECEIVED: 22 July 2021

DATE OF CALIBRATION: 27 July 2021

LOCATION OF CALIBRATION: Acoustic Calibration Laboratory,
Newton G31, University of Salford.

TEST PROCEDURE: CTP06 (Laboratory Manual)

Test Engineer (initial):	CL	Name:	Claire Lomax
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Results in this certificate relate only to instruments tested.

This certificate provides traceability of measurement to the SI system of units and/or to the units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.

Certificate of Calibration

Issued by University of Salford (Acoustic Calibration Laboratory)
UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801

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Certificate Number: 05392/1

Date of Issue: 2 August 2021

MEASUREMENTS

The sound pressure level generated by the calibrator was measured using a calibrated, WS2P condenser microphone as specified in this certificate. The calibration was carried out with the calibrator in the half-inch configuration.

Five determinations of the sound pressure level, frequency and total distortion were made.

The reported results are valid at the environmental conditions at the time of calibration. Corrections to the stated level may be required depending on the actual environmental conditions at the time of use. Consult the manufacturer's instruction manual for further information.

RESULTS

Coupler configuration: Half-inch
Microphone type: B&K4192
Output level (dB re 20µPa): 94.05 dB ± 0.09 dB
Frequency (Hz): 1000.30 Hz ± 0.12 Hz
Total Distortion (%): 1.23 % ± 0.22 %

Average environmental conditions at the time of measurement were:

Pressure: 100.150 kPa ± 0.015 kPa
Temperature: 22.2 °C ± 0.4 °C
Relative humidity: 52.6 % ± 2.1 %

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

-----END OF CERTIFICATE-----

This certificate provides traceability of measurement to the SI system of units and/or to the units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full except with the prior written approval of the issuing laboratory.