



Measurement of Environmental Noise

Report Reference Number: 8084-1

For: Wendy Churchill

Project/Site Address

Central Building, Brook Street, Wrexham, LL13 7LH

Prepared by

John Ashe

Test Date

16th June 2018

Report Date

19th June 2018

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Measurement Survey
Undertaken By

John Ashe

Report Completed By

John Ashe



2.0 – Objectives

The purpose of the survey was to assess noise at the proposed development from local noise sources such as local public houses/clubs and traffic. The assessment has been done to BS8233 as no industrial noise i.e. noise from commercial ventilation, heat pumps and general work noise was not present.

The site is a proposed conversion works of an existing building into dwellings and a new build development on the vacant land to the rear of the building to be converted.

3.0 – Site Description

As can be seen by the below satellite image the development is close to the town centre which houses a number of local pubs and clubs and local businesses to the surrounding the building. The general area is busy during the day with medium to heavy traffic and pedestrian traffic.

The general construction of the building appears to be a cavity wall although it is not known if this has been insulated or not. The windows on the elevation facing the main road is double glazed.

During the night time measurement noise was generally from music from the night clubs. Noise from the main road could also be heard as people walked about from pub to pub.

Pictures of the development and a satellite image outlining the local area are below:



As can be seen in the above image, the building highlighted in red is the building to be developed into dwelling flats and the area highlighted in yellow shows the area to be developed to create new dwellings.

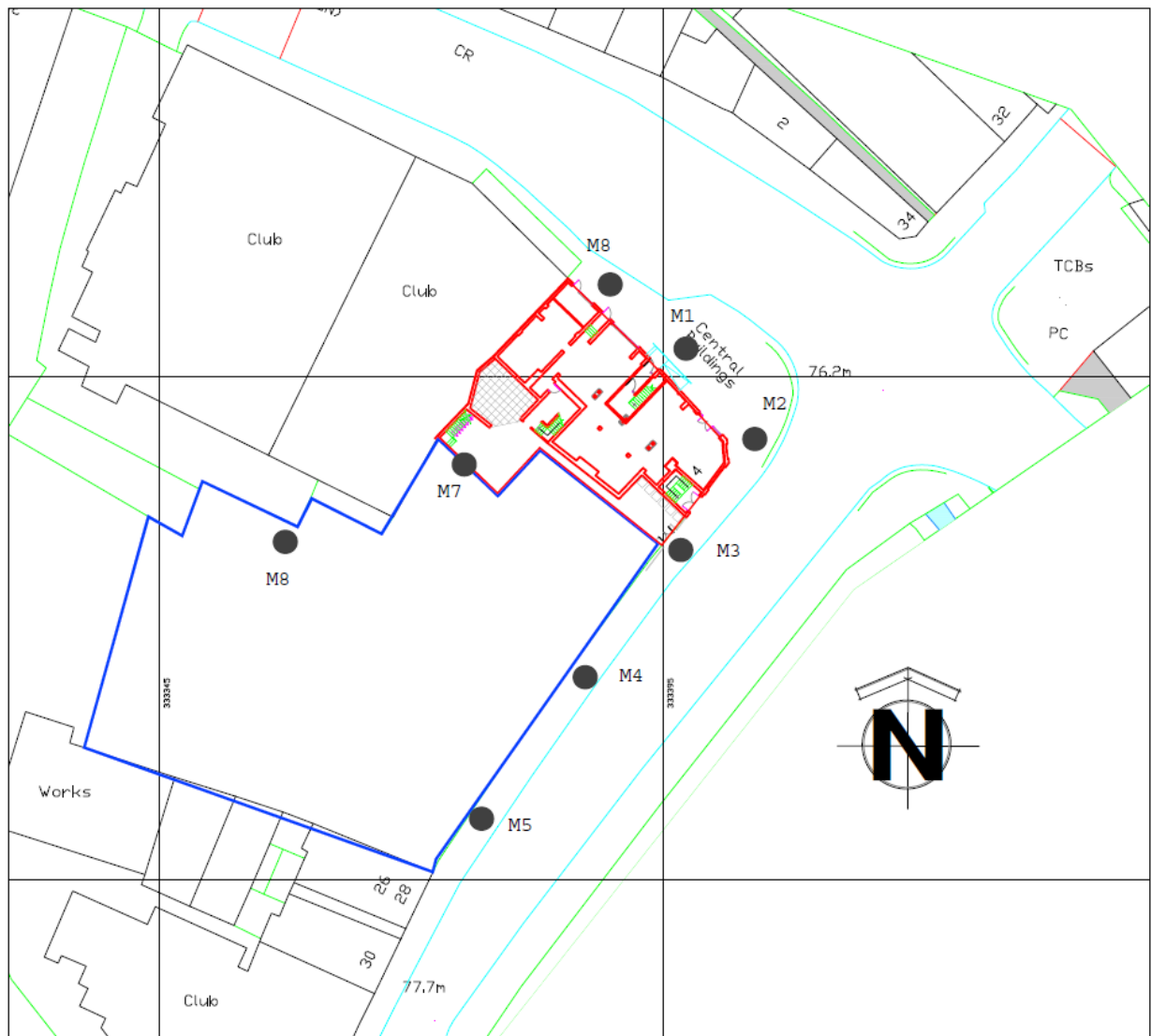
4.0 – Microphone Position

The microphone was placed around the development both internally and externally. All readings the microphone was placed at least 3m away from any surface to avoid noise reflection.

The following measurements were taken:

Measurement Time	Location Ref	Reading Reference	Duration
08/06/2018 11:30	M5 External	180608-0001l	1 Hour
08/06/2018 12:40	M6 External	180608-0002l	1 Hour
08/06/2018 13:50	M4 External	180608-0003l	1 Hour
08/06/2018 15:00	M3 External	180608-0004l	1 Hour
16/06/2018 18:30	M6 External	180616-0001j	1 Hour
16/06/2018 19:40	M1 Internal	180616-0002j	1 Hour
16/06/2018 20:45	M8 Internal	180616-0003j	1 Hour
16/06/2018 21:59	M7 External	180616-0004j	30 Min
16/06/2018 23:50	M1 Internal	180616-0006j	30 Min
17/06/2018 00:52	M2 Internal	180617-0001j	30 Min
17/06/2018 01:30	M8 Internal – Top Floor	180617-0002j	30 Min
17/06/2018 02:09	M7 External	180617-0003j	30 Min
17/06/2018 02:44	M6 External	180617-0004j	30 Min
17/06/2018 03:15	M4 External	180617-0005j	30 Min
17/06/2018 03:47	M3 External	180617-0006j	30 Min

The locations are marked below on a site plan:



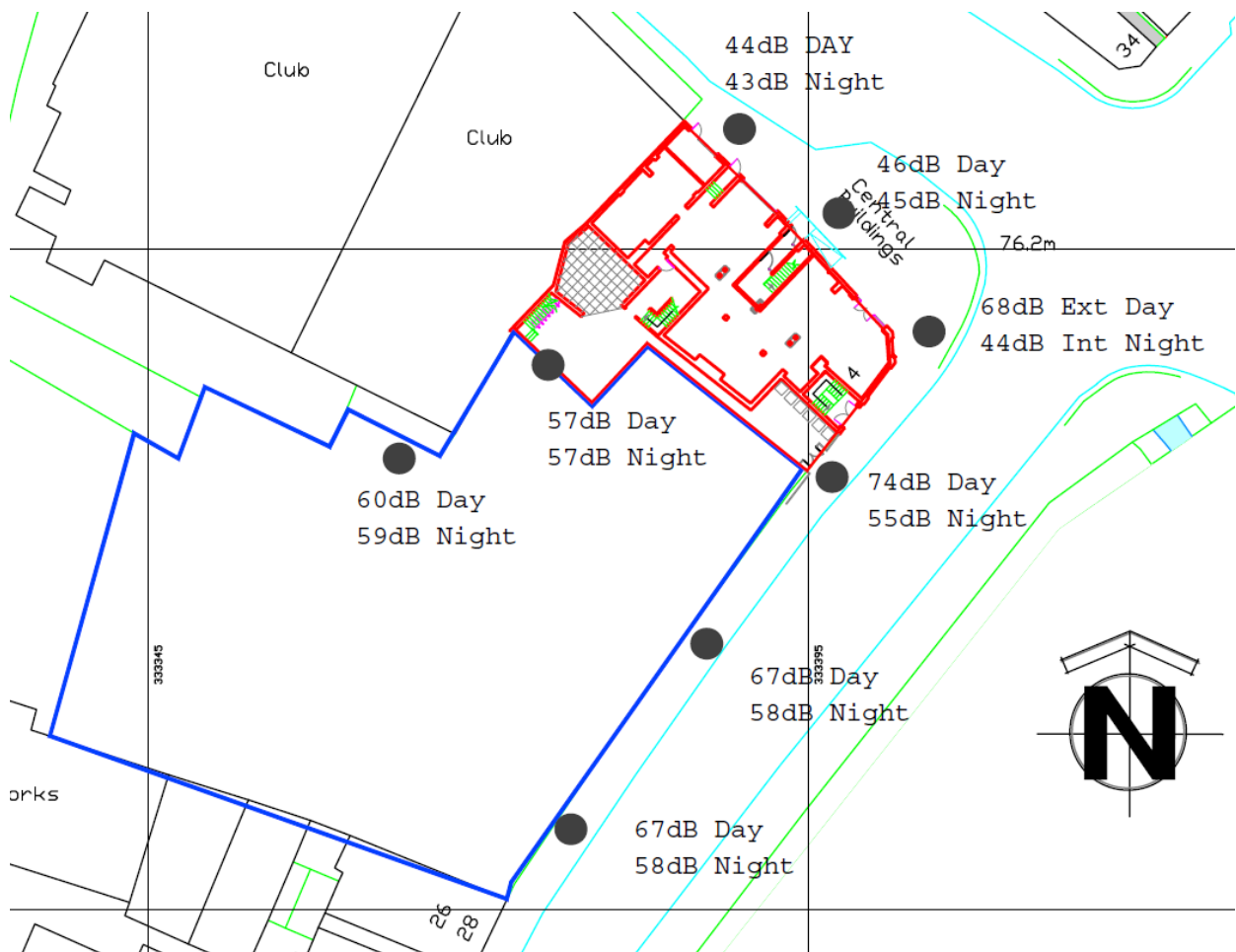
5.0 – Weather Conditions

Dry and warm with Light Winds.

	Before Measurements	After Measurements
Wind speed:	5mph	3mph
Humidity:	64%	64%
Temperature:	18°C	14°C
Barometric pressure:	100.6pa	100.6pa

6.0 – Recommendations

The noise levels are as follows:



As can be seen by the measurements, the noise levels would be far in excess of the BS8233 standards.

For the purpose of the calculations the existing façade of the existing building is assumed to achieve a 30dB Reduction.

During the night time noise levels are more prominent from the bar in the basement and the building and next door. The noise appears to be coming through the existing separating elements between the buildings.

The building is currently bare brick inside with double glazing windows which are not fully sealed reducing the noise reduction achievable.

The guidelines of BS8233:2014 which states the following:

Table 4 Indoor ambient noise levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	—
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	—
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

The glazing specification would need to be upgraded as I believe the windows are currently standard specification of an unknown age with standard open trickle vents. The windows on both side elevations and the front elevation will require an Rw of at least 36dB to ensure that internal noise limits are acceptable during the night time periods.

However mechanical ventilation to the flats will be required as if the windows are opened this would drastically reduce the noise reduction of the windows and cause the noise to be in excess of the BS8233 standards for night time noise levels.

Glazing specification

Windows are to achieve a minimum of 35dB Rw such as the <http://www.pilkington.com/en-gb/uk/products/product-categories/noise-control/pilkington-optiphon#brochures> . This glass is 8 – 16 – 9.1 glass which will provide the following:

Sound reduction index (dB)						
Octaveband Centre Frequency (Hz)						Rw
125	250	500	1000	2000	4000	
24	29	41	47	47	55	36

Further to the glazing, it would be recommended to install acoustic plasterboard to the external walls to help further reduce noise break-in through the walls.

The separating walls and floors in the existing building would also need to be upgraded to a achieve a minimum of 60dB to ensure that noise levels from the bar in the basement and the club to the side are reduced as much as possible.

Floor Upgrade suggestion:

A complex build up and construction of the floor will be required to help mitigate the noise on the first floor from the take-away restaurant below and bar in the basement of the building.

It would be recommended to install the following on the first floor of the building separating the take-away restaurant below.

EXISTING FLOOR

18mm Cement impregnated Chipboard

JCW acoustic cradle system

70mm Battens with 100mm Rockwool RWA45 between

Collecta Screedboard 28 covering

Please note that a 5mm gap must be left between all of the above and the existing walls of the building and sealed with acoustic sealant. This will ensure that no low frequency transfer can happen between the existing structure and the new floor of the building.

The JWC cradle system will reduce low frequency sound by 40dB.

With the remaining upgrade it would be estimated that the low frequency transfer would be minimum 50-60dB reduction.

External Wall Upgrades

All external walls will need have separation from the internal finish to the external wall.

It would be recommended to install a 70mm stud wall on the inside of the building on the first and second floors.

This stud wall should be acoustically separated from the structure of the building by leaving a 15mm Clear cavity from the existing external wall structure. On the first floor of the building, this stud wall should be built onto the new floating floor system so that the wall is separated from the existing structure to avoid the low frequency sound transfer from the floor to the new internal wall.

For the new building, it would be recommended to insulate the external walls of the building with a dense mineral wool insulation to improve the sound reduction of the external walls. However, this may mean having a bigger cavity wall to be able to achieve the required U Values for Part L of the building regulations.

The noise monitoring undertaken reveals that Central Buildings currently experiences internal noise levels from the street and immediately adjacent activities that result in the internal noise level being above the standards required within BS8233. However, the building is presently largely uninsulated from the various noise sources and, therefore, this is not particularly surprising. A series of relatively standard insulation measures, as detailed in this report, incorporated into the conversion will readily achieve the required noise levels for residential accommodation set out in BS8233. Consequently, subject to a condition requiring the specified works to be incorporated into the development, there is no noise related reason why this development should not proceed.

7.0 – On Site Microphone Calibration

Microphone calibration: 114.0 dB 113.9dB = Drift of -0.1dB

(The drift value is within acceptable limits of +/-0.3dB)

8.0 – Results

Time	Reading – LAeq dB	Location Ref
08/06/2018 11:30	67.1dB ~ 67dB	M5 External
08/06/2018 12:40	67.5dB ~ 68dB	M2 External
08/06/2018 13:50	67.4dB ~ 67dB	M4 External
08/06/2018 15:00	73.9dB ~ 74dB	M3 External
16/06/2018 18:30	59.6dB ~ 60dB	M6 External
16/06/2018 19:40	45.7dB ~ 46dB	M1 Internal
16/06/2018 20:45	42.7.6dB ~ 43dB	M8 Internal
16/06/2018 21:59	57.2dB ~ 57dB	M7 External

16/06/2018 23:50	45.1dB ~ 45dB	M1 Internal
17/06/2018 00:52	44.3dB ~ 44dB	M2 Internal
17/06/2018 01:30	43.9dB ~ 44dB	M8 Internal – Top Floor
17/06/2018 02:09	56.7dB ~ 57dB	M7 External
17/06/2018 02:44	59.2dB ~ 59dB	M6 External
17/06/2018 03:15	57.5dB ~ 58dB	M4 External
17/06/2018 03:47	55.4dB ~ 55dB	M3 External

9.0 – Technical Appendix

Class 1 Microphone: Norsonic 140 SLM
Calibrator: Norsonic 1251

SITE DATA:

Please see attached sheets sent with this document.

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CALIBRATION



0789

Certificate of Calibration and Conformance

Certificate No.: U25734

Test object: Sound Level Meter, BS EN IEC 61672-1:2003 Class 1 (Precision) and associated Frequency Analyser BS EN IEC 61260, Class 1
Manufacturer: Norsonic
Type: 140
Serial no: 1405312

Customer: E2 Specialist Consultants Ltd
Address: 3B South Park Way, Wakefield Junction 41 Business Park, Wakefield. WF2 0XJ.
Contact Person: John Ashe.

Method :

Calibration has been performed as set out in CA Technical Procedures TP01 & 02 as appropriate. These are based on the procedures for periodic verification of sound level meters as set out in BS EN IEC 61672-3:2006 and for electrical testing of frequency filters as set out in BS EN IEC 61260. Results and conformance statement are overleaf and detailed results are in the attached Test Report.

	Producer:	Type:	Serial No:	Certificate number
Microphone	Norsonic	1225	168187	25733
Calibrator*	Norsonic	1251	33547	U25732
Preamplifier	Norsonic	1209	15370	Included

Additional items that also have been submitted for verification

Wind shield	Norsonic	Nor1451
Attenuator	None	
Extension cable	None	

These items have been taken into account wherever appropriate.

Environmental conditions:	Pressure:	Temperature:	Relative humidity:
Reference conditions:	101.325 kPa	23.0 °C	50.0 %RH
Measurement conditions:	99.95 ±0.01kPa	22.4 ±0.2°C	48.5 ±2%RH

Date received : 24/05/2017
Date of calibration: 05/06/2017
Date of issue: 05/06/2017

Engineer

Michael Tickner

Supervisor

Darren Batten TechIOA

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CALIBRATION



0789

Certificate number: U25732

Certificate of Calibration and Conformance

Test object: Sound Calibrator
Manufacturer: Norsonic
Type: 1251
Serial no: 33547

Customer: E2 Specialist Consultants Ltd
Address: 3B South Park Way, Wakefield Junction 41 Business Park,
 Wakefield. WF2 0XJ.
Contact Person: John Ashe.

Measurement Results:	Level	Level Stability	Frequency	Frequency Stability	Distortion
1:	114.01 dB	0.01 dB	1000.42 Hz	0.00 %	<0.3 %
2:	114.00 dB	0.01 dB	1000.42 Hz	0.00 %	<0.3 %
3:	114.01 dB	0.06 dB	1000.42 Hz	0.00 %	<0.3 %
Result (Average):	114.01 dB	0.03 dB	1000.42 Hz	0.00 %	<0.3 %
Expanded Uncertainty:	0.10 dB	0.06 dB	1.00 Hz	0.01 %	0.10 %
Degree of Freedom:	>100	4	>100	>100	>100
Coverage Factor:	2.00	3.31	2.00	2.00	2.00

The stated level is relative to 20µPa. The level is traceable to National Standards.

The stated level is valid at reference conditions. The following correction factors have been applied during the measurement: Pressure: 0.0005 dB/kPa Temperature: 0.003 dB/°C Relative humidity: 0.000 dB/%RH Load volume : 0.0003 dB/mm³

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\2017\NOR1251_33547_M1.nmf

Environmental conditions:	Pressure:	Temperature:	Relative humidity:
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	100.206 ± 0.045 kPa	22.3 ± 0.1 °C	47.8 ± 0.8 %RH

Date received for calibration: 24/05/2017
 Date of calibration: 05/06/2017
 Date of issue: 05/06/2017
 Engineer

Supervisor

Michael Tickner

Darren Batten TechIOA

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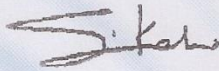
Template UKAS_PE v2.10 DocR Cert-C0001

Certificate of Competence in Environmental Noise Measurement

This is to certify that

John William Matthew Ashe

*has completed a course of instruction approved by the
Institute of Acoustics and designed to enable the candidate
to undertake environmental noise measurements in a
competent manner and has achieved a satisfactory
performance in the written and practical examinations
thereof and that this fact has been recorded in a
Register kept by the Institute for this purpose.*



Education Committee Chairman



Institute Secretary

Date 16 May 2014

Centre Leeds Metropolitan University

Reference Number EK161

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Certificate of Competence in Environmental Noise Measurement

This is to certify that

Luke Edward Murphy

*has completed a course of instruction approved by the
Institute of Acoustics and designed to enable the candidate
to undertake environmental noise measurements in a
competent manner and has achieved a satisfactory
performance in the written and practical examinations
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Education Committee Chairman

Institute Secretary

Date 10 October 2014

Centre Leeds Beckett University

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