



Measurement of Environmental Noise

Report Reference Number: 10330-1

For:

Rhian Williams

Project/Site Address

Caia Farm, Ryecroft Meadow, Old Wrexham Road, Wrexham, Wrexham County, LL12 8UA

Prepared by

John Ashe

Test Date

02nd March 2020

Report Date

12th March 2020

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Measurement Survey
Undertaken By

Richard Stockdale



Report Completed By

John Ashe



2.0 – Objectives

E2 Consultants were instructed by Rhian Williams to prepare a noise assessment. The report has been compiled following a request from the planners and environmental health regarding the change of use from agricultural to a dog exercise/training facility. The business will operate from 7 am to 5:10 pm on weekdays, and 8 am to 5:10 pm on weekends and in summer months operation from 7am to 7pm weekdays and 8am to 6pm on weekends.

The methodology used for this assessment is BS4142 to assess the potential for noise impact on the occupiers of the nearby noise sensitive dwellings following the National Planning Policy Framework Planning Practice Guidelines on Noise and other guidance and if required provide measures to mitigate the noise levels, whether these be managerial controls or structural.

The noise levels measured have been considered and assessed against this national guidance to establish the acceptability of the development.

Details regarding the assessment methodology used, together with the results of the survey undertaken and the conclusions and recommendations, are presented within this report.

To determine noise impact, local planning authorities' decision-making should take account of the acoustic environment and consider:

- If a significant adverse effect is or likely to occur
- Whether or not a good standard of amenity can be achieved.

In line with the noise policy statement for England, this would include if the overall noise exposure is, or would be above or below the significant observed adverse effect levels and the lowest observed adverse effect level for the given situation.

These are listed below:

NOAEL (No observed adverse effect level) – This is the level of noise exposure below which no effect at all on health or quality of life can be detected

LOAEL (Lowest observed adverse effect level) – this is the level of noise exposure above which adverse effect on health and quality of life can be detected

SOAEL (Significant observed adverse effect level) – this is the level of noise above which significant effect on health and quality of life occur

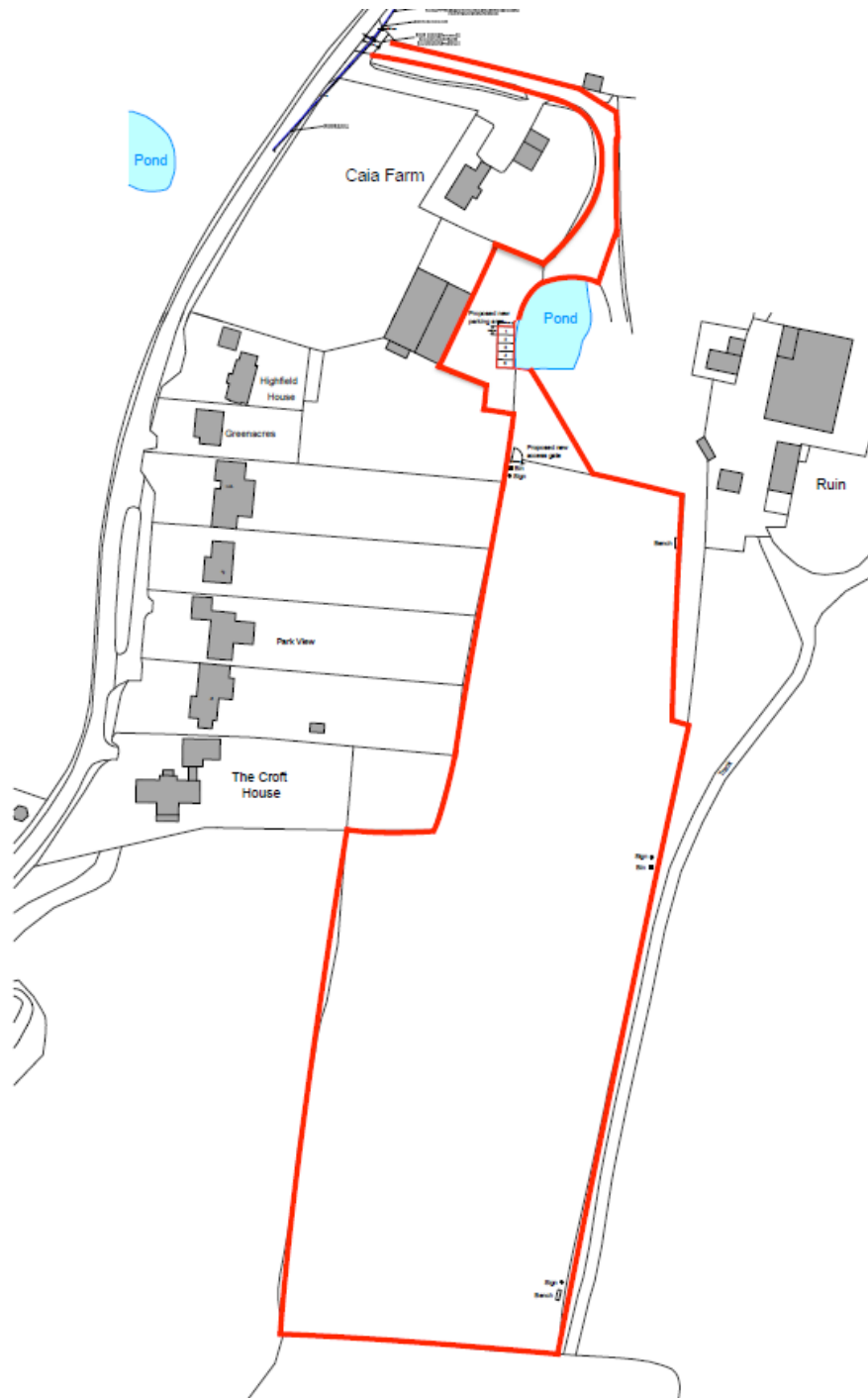
At the lowest, when noise is not noticeable, there is no effect. As noise increases, it will cross the no observed effect level as it becomes noticeable. However, the noise has no adverse effect so long as the exposure is such that it does not cause any change in behavior or attitude. The table outlining the above is seen on the below page

Table 3.1 Guideline “Absolute” Sound Level1							
Absolute Sound Level	Absolute Level:	≤40dB	41 - 45dB	46 - 50dB	51 - 55dB	56 - 60dB	≥60dB
	Daytime Effect:2	NOAEL	NOAEL	NOAEL	LOAEL	SOAEL	SOAEL+
	Evening Effect:3	NOAEL	NOAEL	LOAEL	SOAEL	SOAEL	SOAEL+
	Night-time Effect:4	NOAEL	LOAEL	SOAEL	SOAEL	SOAEL	SOAEL+
	Effect / Impact Description:	No observed effect on health or quality of life.	Sleep disturbance in bedrooms with window open.	Speech intelligibility within living areas with windows open, resulting in moderate annoyance. Greater potential for sleep disturbance and adverse health impact.	Increased potential for sleep disturbance, including significant adverse health effects. Gardens and amenity spaces affected.	Significant adverse health effects likely to all habitable rooms. Occupants unable to open windows due to noise ingress and unable to enjoy garden/amenity areas.	High risk of significant adverse health impact. Unable to use garden and amenity space or have windows open for ventilation.
Mitigation Considerations:		A1 Use design, layout, and landscaping (DLL) to create and preserve areas of amenity and tranquillity to enhance the noise environment.	A2 Protect bedroom facades from noise through DLL. Provide minimum double-glazing with trickle vents to bedrooms.	A3 Protect habitable room facades from noise through DLL with greater protection for bedrooms. Provide higher-spec double-glazing with trickle-vents to all habitable rooms.	A4 Bedroom facades to be protected through DLL to bring below LOAEL. Provide higher-spec double-glazing with trickle vents to all habitable rooms. Protection of gardens and amenity space through DLL and acoustic fencing.	A5 Bespoke assessment of noise mitigation needs, including consideration of alternative to open window ventilation provision to protect internal noise environment and protection of garden/amenity areas through DLL to bring below LOAEL.	A6 Bespoke assessment of noise impact and mitigation, including DLL, protection of building envelope, and provision of alternative amenity space.
Planning Consideration:		No objection	No objection subject to Approved Plans and/or conditions to include satisfactory window specification to bedrooms with facades exposed to LOAEL noise.	No objection subject to Approved Plans and/or conditions to include satisfactory window specification to all habitable rooms with facades exposed to LOAEL noise.	Details of noise mitigation to be supplied as part of planning approval process. Conditions required to implement control measures within the noise report. Refusal if noise report is inadequate.	Details of noise mitigation to be supplied as part of planning approval process. Conditions required to implement control measures within the noise report. Refusal if noise report is inadequate.	Presumption against planning permission being granted, unless detailed noise impact assessment and approved mitigation measures implemented through conditions. Post completion verification of mitigation measures required.

3.0 – Site Description

An assessment has been requested to ensure that the noise levels produced by the use of the land as a dog exercise and training area along with the associated dog barking will not have an adverse impact on the dwellings seen in the site plan below just off Old Wrexham Rd.

The proposal is shown below:



Activities on the site will take place within the hours of 7 am to 5:10 pm during weekdays and between 8 am and 5:10 pm on weekends and in summer months operation from 7am to 7pm weekdays and 8am to 6pm on weekends..

The application site approximately measures 270 meters long and 80 meters wide running North/South along the rear of the dwellings on Old Wrexham road for approximately 125 meters.

It is understood than the area can be booked for sole usage and play sessions organized by the owner of the site. In most instances, during regular operation, it is thought that the field will only be used by 1-2 with 1-2 dogs each at any one time. However, during organized play sessions, there can be up to 14 dogs within the area.

Play sessions are attended by the owner of the business and the owners of sociable dogs. The sessions will be limited to 1 handler per 2 dogs at play sessions to ensure that the dogs are kept under control.

4.0 – Microphone Position

The microphone was placed at the boundary of the nearest dwelling likely to be affected by the noise, as identified in the above image. Measurements had been taken during both the day and night, as shown below.

Measurement Time	Location	Duration	Reading Reference
02/03/2020 12:51 – 15:51	Boundary of Dwellings	3 Hours	200302_0001
The microphone was placed at the nearest dwellings			

5.0 – Uncertainties

The following points are noted to allow for and minimize where possible any uncertainties in the measurements taken.

- 1) A class one microphone has been used for the survey (**Norsonic 140 SLM – serial number 1405312**).
- 2) Weather conditions – 90% cloud cover.

	Before Measurements	After Measurements
Wind speed:	1m/s - NW	2m/s - NW
Humidity:	52%	52%
Temperature:	05°C	06°C
Barometric pressure:	1013mb	1013mb

The weather during the day was noted as cloudy with winds of less than 5m/s with no prevailing directional component.

- 3) Noise levels at the time of the measurements were noted to be relatively constant, with no sudden increases or decreases in noise levels.
- 4) All results seen in this report will be rounded; for example, 82.5 will be rounded up to 83.

6.0 – Recommendations & Results

6.1 Data Collected

The data taken from the site is shown below:

Measurement Time	Location	L _{aeq}	L ₉₀
02/03/2020 12:51 – 15:51	Boundary of Dwellings	51.4dB ~ 51dB	46.8dB ~ 47dB

6.1.1 – Noise generated.

As can be seen in the above measurements, the existing background noise levels for the rear of the dwellings is around average for this type of area.

To predict noise levels at the dwellings on the westerly edge of the proposal, worst-case levels will be used for the survey. Dog barking is associated with territory, boredom, overstimulation, or perceptions of threat. For the most part, these are related to the home environment. When walking outdoors, dogs can bark at one another where they perceive a threat, but this is uncommon. This is because dogs in an outdoor setting revert to an instinctual hunting mode. In this mode, any excessive or unnecessary barking is avoided so that predators or prey are not alerted to the presence.

In this case, the report assumes that barking events are from individual dogs rather than barking in numbers.

An average size dog can produce noise levels of up to 85 to 90dB in a free field setting at 1 meter. As described above, the report intends to take the worst-case scenario so that 90dB will be used as the reference noise.

Additionally, dog barks are impulsive and warrants a penalty of +5dB. So, in this case, the noise level to be used will be 95dB.

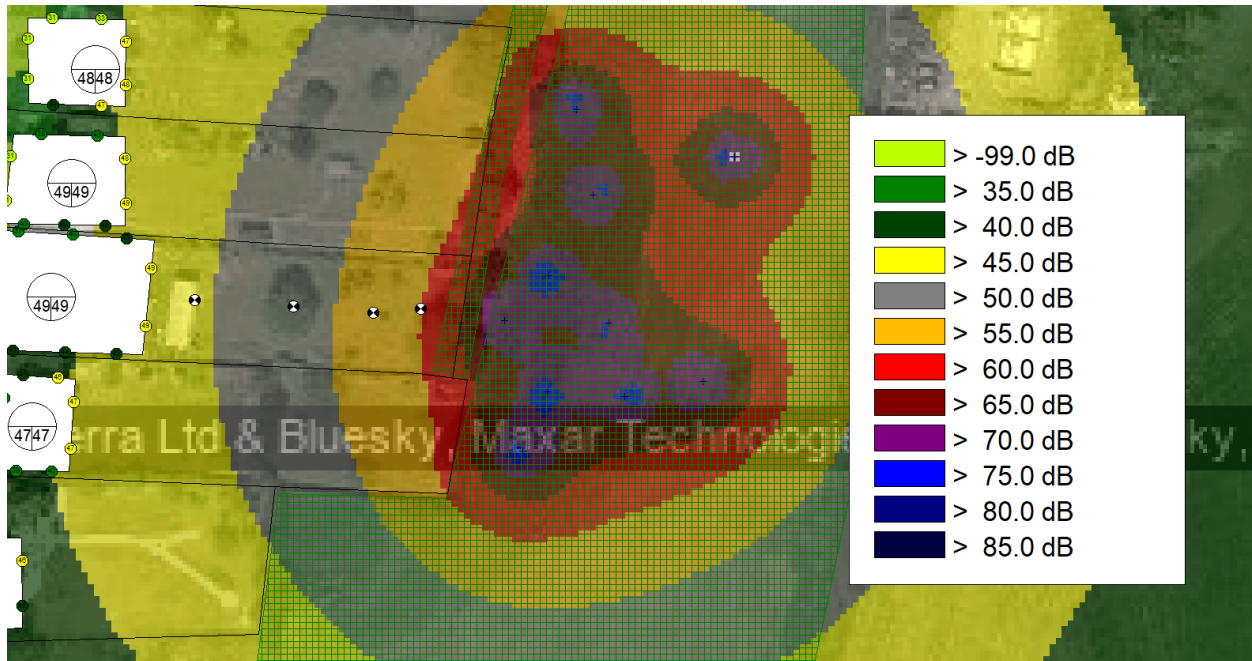
There will be a maximum number of dogs allowed on site at one time which would be 14. However, they will be split across the entire field and not located in a single place. As per the above around 2 in 5 dogs bark when disturbed. Based on the above information there would be around 6 dogs out of the 14 barking at the same time.

This can be calculated by using the logarithmic scale. A doubling of any given sound level (dB) is represented by as a +3dB increase.

A model can be created based on this. And for the purpose of the assessment, 10 dogs barking will be assumed which would be worst case. All 10 dogs are assumed to be on the side of the field closest to the dwellings.

6.1.2 – Model Data

The below screenshot is from the CadnA software showing the input used for the sound power level of the dog barking along with the noise map.



As can be seen in the above, the worst possible location for the barking has been chosen. This location is the nearest to the boundary of the dwellings on the site and the most likely position to cause adverse effects.

As can be seen, the noise levels at the façade of the dwelling at 49dB at the closest dwelling to the dog with noise levels of up to 55dB within the first 8m of the garden.

However, these noise levels can be reduced further by installing an acoustic fence to the boundary of the site. A 2.1m high closed boarded fence would reduce the noise level by a minimum of 10dB within the boundary of the dwelling and would bring the noise to within acceptable levels.

6.1.3 – BS4142 Assessment

A BS4142 assessment cannot be carried out for this type of usage. The use of the standard in relation to sound from barking is explicitly excluded by the methodology and would produce unreliable results and would not be recognized by the noise policy statement for England.

However, a BS4142 assessment will instead be used along with guidance from the noise policy statement.

6.1.4 – Noise Assessment

Based on the noise levels taken from the model above, the noise levels at the façade of the buildings are a maximum of 42dB.

From BS4142, we can predict the internal noise levels within the dwelling by assuming windows open and a maximum reduction of 15dB. This means that the internal noise levels would be 27dB.

BS8233 states that internal noise levels should be the following:

Activity	Location	Good Indoor Ambient Noise Levels	
Resting	Living Room	35 dB Laeq (0700 – 2300)	-
Sleeping (Daying resting)	Bedroom	35 dB Laeq (0700 – 2300)	30dB Laeq (2300 – 0700) 45dB Lamax (2300 – 0700)

The night-time noise levels can be disregarded in this assessment as the development would only be used between the hours of 07:00 and 17:10 and would not fall inside the night-time noise bracket.

However, As stated above, by using the guideline “Absolute” Sound level table 3.1, the day time noise levels within the garden are between NOAEL (No observed adverse effect) and LOAEL (Low observed adverse effect).

Approximately 80% of the garden will be covered under the NOAEL, while the remaining will be fall under LOAEL. This 20% is the furthest away from the property and closest to the development.

This can be mitigated by erecting a close boarded fence at the boundary of the properties, which would reduce the noise level by up to 10dB bringing the noise levels within the last 20% of the garden within the NOAEL parameter.

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 – Technical Appendix

Class 1 Microphone: Norsonic 140 SLM

Calibrator: Norsonic 1251

SITE DATA:

Please see attached sheets sent with this document.

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
www.campbell-associates.co.uk
Phone 01371 871030 Facsimile 01371879106

Certificate of Calibration and Conformance



CALIBRATION



0789

Certificate number: U32459

Test object: Sound Level Meter, BS EN IEC 61672-1:2003 Class 1 (Precision) and associated Frequency Analyser BS EN IEC 61260, Class 1

Producer : Norsonic

Type : 140

Serial No.: 1406414

Customer: E2 Specialist Consultants Ltd

Address: 3B South Park Way,
Wakefield 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.

Tested

	Producer:	Type:	Serial No:	Certificate number
Microphone	Norsonic	1225	226969	32458
Calibrator*	Norsonic	1251	34494	U32457
Preamplifier	Norsonic	1209	20695	Included

Additional items that also have been submitted for verification
Wind shield Norsonic Nor1451 (ø 60mm)
Attenuator -
Extension cable -
These items have been taken into account wherever appropriate.

Instruction manual: Im140_1Ed6R3En Firmware version: v3.0.1842 The test object is a single channel instrument.

Conditions	Pressure	Temperature	Humidity
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	100.58 ±0.04 kPa	22.3 ±0.2 °C	41.9 ±0.7 %RH

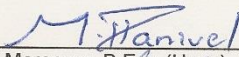
Date received for calibration: 23/07/2019

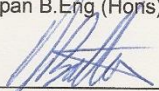
Date of calibration: 31/07/2019

Date of issue: 31/07/2019

Engineer

Supervisor


Palanivel Marappan B.Eng (Hons), M.Sc


Darren Batten Tech IOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to 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.
* The calibrator was complete with any required coupler for the microphone specified.

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CALIBRATION



0789

Certificate number: U32457

Certificate of Calibration and Conformance

Test object: Sound Calibrator
Manufacturer: Norsonic
Type: 1251
Serial no: 34494

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

Measurement Results:	Level	Level Stability	Frequency	Frequency Stability	Distortion
1:	114.11 dB	0.06 dB	1000.34 Hz	0.00 %	0.35 %
2:	114.10 dB	0.06 dB	1000.35 Hz	0.00 %	0.35 %
3:	114.11 dB	0.06 dB	1000.35 Hz	0.00 %	0.35 %
Result (Average):	114.11 dB	0.06 dB	1000.34 Hz	0.00 %	0.35 %
Expanded Uncertainty:	0.10 dB	0.02 dB	1.00 Hz	0.01 %	0.10 %
Degree of Freedom:	>100	>100	>100	>100	>100
Coverage Factor:	2.00	2.00	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\2019\NOR1251_34494_M1.nmf

Environmental conditions:	Pressure:	Temperature:	Relative humidity:
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	100.533 ± 0.040 kPa	22.1 ± 0.1 °C	42.5 ± 0.7 %RH

Date received for calibration: 23/07/2019
Date of calibration: 31/07/2019
Date of issue: 31/07/2019
Engineer

Supervisor

Palanivel Marappan B. Eng(Hons), M.Sc

Darren Batten TechIOA

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Phone: 01371 871030, Facsimile: 01371 879106



CALIBRATION



0789

Certificate of Calibration Floor Tapping Machine

Certificate number: U32450

Manufacturer: Norsonic
Type: 277
Serial no: 2775929

Client: E2 Specialist Consultants Ltd
3B South Park Way
Wakefield Junction 41 Business Park
Wakefield, WF2 0XJ

Contact Name: John Ashe

Method:

This certificate is issued against the requirements of Annex A of both BS EN ISO 16283-2:2015 and 140-6/7:1998 in respect of regular verification and also meet the requirements of UKAS publication LAB23 covering the verification of floor tapping machines used for building acoustics applications.

The machine was inspected for mechanical soundness and tested for electrical safety. It was cleaned and lubricated in accordance with the manufacturers instructions. The cams and hammer guides were inspected to ensure a free fall of the hammers. The mass of each of the hammers were measured in situ along with their curvature and diameter of the impact face. The machine was set up as per the manufacturers specification using the calibration gauge provided (where applicable) and checked for level, then the direction of fall of the hammer set was checked against the requirements of the standard. The time between successive hammer impacts was measured over a 30 second period and the mean and range of successive values calculated.

Environmental Conditions	Temperature	Relative Humidity
Reference Conditions:	23 °C	50 %RH
Measurement Conditions:	22.4 °C	53.5 %RH

Date received: 23 July 2019
Date of Calibration: 31 July 2019
Date of issue: 31 July 2019

Engineer:


Samuel Death - BSc (Hons)

Supervisor:


Darren Batten - Tech IOA

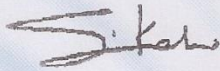
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Certificate of Competence in Environmental Noise Measurement

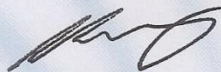
This is to certify that

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

*For the purposes of Credit Transfer or Professional Development this Certificate
may be considered to be equivalent to 25 points or hours*

The Institute of Acoustics Limited, 3rd Floor, St Peter's House, 45-49 Victoria Street, St Albans, Hertfordshire AL1 3WZ
Tel: +44 (0)1727 848195 Fax: +44 (0)1727 850553 email: ioa@ioa.org.uk www.ioa.org.uk

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