Noise impact assessment - rev2

Hambrook School

Site address: Marle Place, 171 Leylands Road, Burgess Hill, RH15 8HY

Local planning authority: Mid Sussex District Council

Planning reference: DM/25/1114

Applicant: Outcomes First Group Ltd

Agent: Sue Hastelow, Space M Studio, The Coach House, 29 Birmingham Road, Whitacre Heath, Warwickshire, B46 2ET

Document Ref: WA/0525/NA-828-rev2

Prepared by: Nick Myerscough MIOA MA

Date: 25/11/2025

walnut
ACOUSTICS
Walnut Acoustics, 3 Furrow Way, Mickleton, Chipping Campden, Gloucestershire, GL55 6TW
tel: 01386 438722 e-mail: nick@walnutacoustics.co.uk

Contents **Page**

1 Introduction and summary

Walnut Acoustics have been instructed to provide a noise impact assessment for a planning application at Hambrook School in Burgess Hill which proposes the following:

Part retrospective application for the proposed installation of play equipment and a retrospective timber framed summer house to the rear (Amended plans received 20.08.2025)

The site had already been attended from Monday 29th to Tuesday 30th January 2024 to survey the area and carry out background noise measurements.

The data from this has been used to inform an assessment of the potential for noise impacts from the proposed rear garden play area at the nearest residential noise sensitive receptors (NSRs) as summarised in the table below.

Noise source	Noise impact assessment at nearest residential NSRs	Mitigation
Rear garden play area *Weekday hours (school terms)* ***0900 to 1500***	Low observed adverse effects are expected at the nearest residential NSR garden amenity area. This is in the context of road noise which is the principal source in the existing ambient and background noise climate. Normal and raised voice noise levels from students in the rear garden play area are assessed to be significantly below both existing ambient noise levels during hours of use, and the WHO criteria level for external amenity areas of 50 dBA. They are also only 1 dB above the minimum measured background noise level measured at this location. Play area normal and raised voice noise levels in living areas of the NSRs with a partially open window are expected to be 9 dB below the BS8233:2014 criteria for indoor ambient noise levels of 35 dBA	A 2 metre high wooden perimeter fence will provide an effective barrier to the nearest NSRs. This will have 400mm of green V-mesh visible at the top. Hours of operation limited to 0900 to 1500 on weekdays during school terms. Only small groups of students (max 10) with dedicated supervision will be using the play area. Usage is not continuous throughout the day.

Table 1: Proposed rear garden play area - noise impact assessments at nearest NSRs and mitigation

The new play area equipment has been reviewed and the various elements proposed are not considered as significant noise sources in themselves, assuming ongoing and effective maintenance to avoid noise from wear and tear leading to potentially annoying metal squeaks and whines etc.

External normal and raised voice noise levels from students using the play area are expected to have the highest potential for adverse effects at the nearest residential noise sensitive receptors (NSRs).

A worst-case scenario of all students using the play area talking with a normal or raised voice has been assessed to be significantly below existing ambient noise levels during hours of use, the WHO criteria level for external amenity areas of 50 dBA, and only 1 dB above the minimum measured background noise level measured at this location.

When assessing play area normal and raised voice noise levels internally in living areas of the NSRs with a partially open window, these are expected be significantly below BS 8233:2014 indoor ambient noise level criteria.

Low observed adverse effects are expected in the nearest residential external garden amenity and indoor living areas. This is in the context of road noise which is the principal source in the existing ambient and background noise climate.

This document should be read in conjunction with all relevant planning documentation provided for this application.

2 Policy, guidance, and standards

World Health Organisation (WHO) – *Guidelines for Community Noise (1999)*

The WHO guidelines advise an internal L_{AFmax} of 45 dB for bedrooms which "*for good sleep…should not be exceeded more than 10-15 times per night*".

WHO guidelines also state that external amenity areas should not be subjected to daytime averaged noise levels of greater than **55dB L_{Aeq}**, and ideally **50dB** or less.

BS 8233:2014 - *Guidance on sound insulation and noise reduction in buildings*

This standard provides criteria for indoor ambient noise levels for residential living spaces which should not be exceeded.

Activity	Location	Day 0700 to 2300 $L_{Aeq, 16hr}$	Night 2300 to 0700 $L_{Aeq, 8hr}$
Resting	Living Room	35 dB	-
Dining	Dining Room	40 dB	-
Sleeping *daytime – resting*	Bedroom	35 dB	30 dB
Sleeping	Bedroom	-	45 dB L_{AFMax}

Table 2: BS 8233:2014 indoor ambient noise levels for habitable rooms in dwellings

3 Site details and operational hours

The rear play area is located to the south of the main school building. It will have the grass area retained as a play area for sporting activities and a series of new play equipment as follows:

- Monkey Bars
- Rope Walk
- Stepping Logs
- Nest Swing
- Tone Up Zone
- Outdoor Gym Equipment - Double Slalom Skier, Health Walker, Sky Stepper and Arm and Pedal Bike
- Trampoline (Set at ground level)
- Timber framed Summer House (provided as part of School Green Grant)

Operational hours (during school term only)

Monday to Friday	0900 to 1500
Saturday to Sunday	Closed

The rear garden play area will not be used continuously throughout the day, but more sporadically. A maximum of ten students with dedicated supervision will be using the play area at one time.

Note: the information above has been provided by the applicant. Further details are available in the planning statement and in other documents submitted as part of this application.

See Appendix 1 for further details on the proposed rear garden play area layout.

4 Measurement details

4.1 Personnel and equipment

Equipment Type	Serial Number	Calibration Date	Calibration Certificate No.
Cirrus Research CR:831C Class 1 Integrating Sound Level Meter	D20437FF	01/06/22	175347
Cirrus Research CR:515 Acoustic Calibrator	56101	26/10/2022	182068

Table 3: Measurement equipment details

Copies of current equipment calibration certificates can be found in Appendix 3.

All testing, calculation and evaluation was conducted by Nick Myerscough of Walnut Acoustics. Nick is a Member of the Institute of Acoustics (MIOA).

Contact Details:

Nick Myerscough, Walnut Acoustics, 3 Furrow Way, Mickleton
Chipping Campden, Gloucestershire, GL55 6TW

t: 01386 438722 m: 07811 382738 e: nick@walnutacoustics.co.uk

4.2 Noise climate

The noise climate in the surrounding area consisted of the following main sources:

- Road noise – local road networks especially Leylands Road and Highlands Drive - principal sources of ambient noise at the measurement location
- distant commercial aircraft noise - assumed Gatwick airport
- bird noise - trees above

4.3 Weather conditions

Measurement	Date	Temperature Range	Windspeed direction	Visibility	Cloud Cover Precipitation
External measurement *Monday - Tuesday*	29/01/2024 to 30/01/2024	6 to 10°C	2 to 5 m/s S to NW	Good to Very Good	100% *No Rain*

Table 4: Weather conditions during measurements

4.4 Topography

Mostly residential with some educational buildings. The terrain around the area of interest is predominantly flat.

4.5 Methodology

Picture 1: noise measurement position to the rear of Hambrook School

A Cirrus Research CR:831C Class 1 sound level meter was used to measure ambient noise levels at the rear of Hambrook school at a position that was considered representative of the noise climate at the two residential NSRs used in this assessment (see pictures 1and 2 for reference).

Care was taken to eliminate external influences on the measurements by the application of a windshield to the sound level meter, and wind speeds and weather conditions were observed for external measurements.

All measurements were taken at an angle of approximately 60 degrees from horizontal with the measuring device between 1.2m to 1.5m above the ground unless otherwise stated.

Calibration was performed before and after each measurement or set of measurements with no notable drift. A drift of up to 0.5dB is considered reasonable and is generally the cause of gradients in variables such as temperature, humidity, and battery power.

5 Measurement summary

Measurement Position *Monday – Tuesday*	**Time period**	**Noise Level dB**
Ambient noise level $L_{Aeq,\ 6hr}$	0900 – 1500	**47**
Background noise Level $L_{A90,\ 6hr}$	0900 – 1500	**42**

Table 5: measured ambient and background noise levels – Monday - Tuesday - levels rounded

The data presented in this summary is extracted from the noise measurements taken during proposed play area operational hours from Monday 29th to Tuesday 30th January 2024.

Measurement Position *Monday – Tuesday* *0900 - 1500*	**Maximum value** **dB**	**Minimum value** **dB**
Ambient noise level $L_{Aeq, 15min}$	53	43
Background noise Level $L_{A90, 15min}$	45	40

Table 6: ambient and background noise measurements - 15-minute max and min - rounded

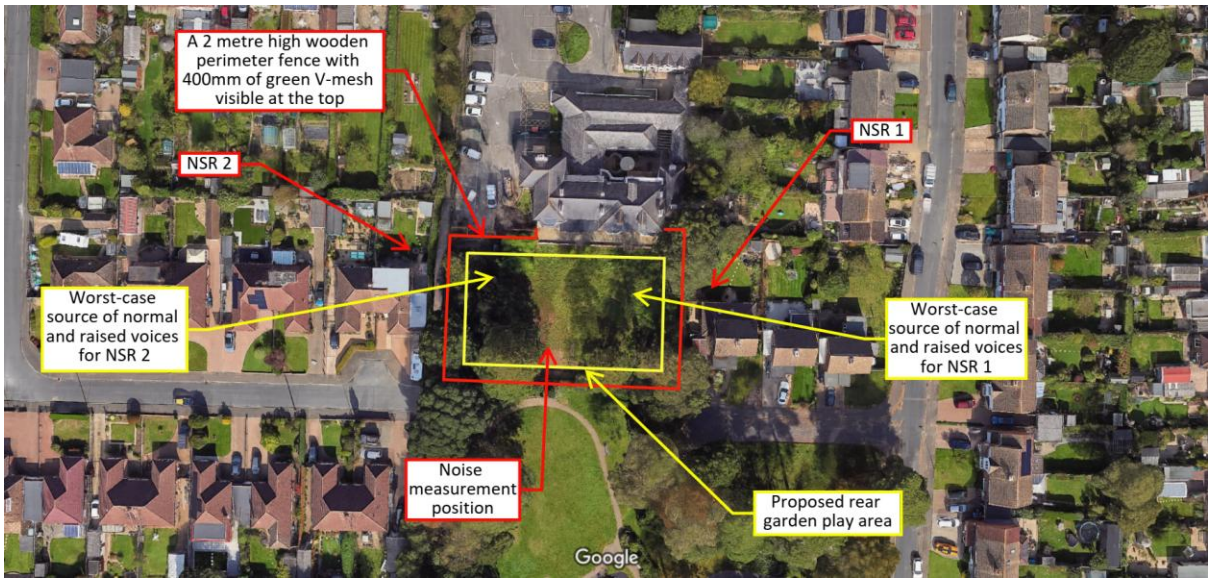
Ambient noise levels $L_{Aeq, 1hr}$	**Measurement Position** *Monday – Tuesday* *0900 - 1500*
0900 - 1000	48.3
1000 - 1100	46.4
1100 - 1200	49.1
1200 - 1300	45.1
1300 - 1400	45.0
1400 - 1500	44.6

Table 7: noise measurement position - ambient noise levels - 1-hour intervals - rounded

Note: the lowest ambient noise levels have been selected from times when multiple data is available.

See Appendix 2 for a detailed measurement summary. Further information on the data presented can be provided on request.

6 Rear garden play area - noise impact assessment



Picture 2: nearest NSRs - measurement position - sources - location of fence and proposed play area

The new play area equipment has been reviewed and the various elements proposed are not considered as significant noise sources in themselves, assuming ongoing and effective maintenance to avoid noise from wear and tear leading to potentially annoying metal squeaks and whines etc.

External normal and raised voice noise levels from students using the play area are expected to have the highest potential for adverse effects at the nearest residential noise sensitive receptors (NSRs).

The proposed rear garden play area has been assessed over a 1-hour period at the NSRs detailed in the table below and indicated in picture 2 above.

NSR	Location	NSR *Description*	Distance to worst-case source location metres
1	Highlands Drive	Residential	15
2	Wyberlye Road	Residential	15

Table 8: NSRs – location, description, distance to worst-case source location

This assessment assumes that normal and raised voices are the most significant noise sources and are continuous for a one hour period to provide a robust assessment.

A 2 metre high wooden perimeter fence with 400mm of green V-mesh visible at the top will be provided to mitigate the potential for adverse noise impacts at the NSRs (see picture 2 for reference).

A worst-case scenario of 10 of the older students talking simultaneously, with 4 of these using raised voices, has been used for the assessments and the sound pressure levels of this at the NSRs are calculated in the table below.

Source	Normal Voices (x6) $L_{p,1m}$ dBA	Raised Voices (x4) $L_{p,1m}$ dBA	Total SPL dBA	Recommended 2m boundary fence attenuation to NSRs	Distance to NSRs m	Distance Correction dB	Sound Pressure Level at NSRs dBA
Rear garden play area	65.2	72.5	**73**	- 8	15	-24	**41**

Table 9: predicted rear garden play area normal and raised voice noise levels at the NSRs

Note 1: the source locations are indicated in picture 2 and are both at 15 metres from the NSRs.

Note 2: The sound pressure level data used in the recreation area assessment comes from widely recognised sources including BS 3382-3:2012 Section 6.1: Sound power spectrum of normal speech. A Unisex normal voice is assumed as 57.4 dBA at 1m in the free-field and a raised voice is assumed as 66.5 dBA at 1m.

Note 3: propagation distance correction assumes point source propagation of the voices.

Note 4: the perimeter fencing provides a predicted 8 dB of attenuation of source noise levels at the NSRs. The level of attenuation will reduce from the play area sources as they move further from the NSRs, but this will be offset by the reduction in sound levels through propagation over the extra distance.

A worst-case location for a group of students (the maximum of ten) all using normal or raised voices for a 1-hour period has been used for each NSR in the assessments below. See picture 2 for these locations.

There are no specific assessment guidelines for play area noise and the potential for impacts on nearby noise sensitive residential receptors.

For the purposes of these assessments, comparisons of the calculated voice noise levels have been made to existing ambient and background noise levels, and WHO guidance for acceptable daytime external noise levels in residential amenity areas (50 dBA). For indoor living areas a comparison to BS 8233:2014 criteria for indoor ambient noise levels is made.

External garden amenity areas at the nearest NSRs

Source *Location*	Rear garden play area voice noise levels in NSR garden amenities $L_{Aeq, 1hr}$	Compared to existing 1 hour ambient noise levels, minimum background noise and WHO criteria	Impact assessment	Action
Rear garden play area *Worst-case location for max group of students relative to NSR 1*	**41 dBA**	4 to 8 dB below daytime ambient noise levels during usage hours. 1 dB above the minimum measured background noise level 9 dBA below WHO criteria levels of 50 dBA	Low observed adverse effects in context of local climate with principal road noise source	No additional measures required
Rear garden play area *Worst-case location for max group of students relative to NSR 2*	**41 dBA**	4 to 8 dB below daytime ambient noise levels during usage hours. 1 dB above the minimum measured background noise level 9 dBA below WHO criteria levels of 50 dBA	Low observed adverse effects in context of local climate with principal road noise source	No additional measures required

Table 10: noise impact assessment - rear garden play area voice noise - NSR garden amenity area

Note: see tables 6 and 7 in the measurement summary section for the 1-hour ambient and minimum background noise levels measured on site.

Normal and raised voice noise levels from the rear garden play area are assessed to be significantly below both existing ambient noise levels during hours of use, and the WHO criteria level for external amenity areas. They are also only 1 dB above the minimum 15 minute background noise level measured at this location.

Low observed adverse effects are expected at the nearest residential NSR garden amenity areas. This is in the context of road noise which is the principal source in the existing ambient and background noise climate.

Indoor living areas at the nearest NSRs - BS 8233:2014 assessment

Source *Location*	**BS 8233:2014 assessment** *Indoor ambient noise level in living rooms - daytime criteria of 35 dBA with a partially open window*
Rear garden play area *Worst-case location for max group of students relative to NSR 1*	Internal normal and raised voice noise level of 26 dBA **9 dB below criteria**
Rear garden play area *Worst-case location for max group of students relative to NSR 2*	Internal normal and raised voice noise level of 26 dBA **9 dB below criteria**

Table 11: BS 8233 indoor criteria and assessment - NSR indoor living areas - BS 8233

Note: a partially open window is assumed to give a façade sound reduction value of 15 dB

When assessing rear garden play area normal and raised voice noise levels internally in living areas of the NSRs with a partially open window, these are expected be significantly below the BS 8233:2014 indoor ambient noise level daytime criteria of 35 dBA.

7 Conclusion

Low observed adverse effects are expected in the nearest residential external garden amenity and indoor living areas. This is in the context of road noise which is the principal source in the existing ambient and background noise climate. The key mitigation points are as follows:

- A 2 metre high wooden perimeter fence with 400mm of green V-mesh visible at the top will be provided to create an effective barrier to the nearest NSRs.
- Hours of operation limited to 0900 to 1500 on weekdays during school terms.
- Only small groups of students (max 10) with dedicated supervision will be using the play area.
- Usage is not continuous throughout the day.

Appendix 1: Proposed site layout

Appendix 2: Noise measurement summary

Rear of Hambrook School - proposed MUGA - data during hours of use

Project name	Hambrook School – Burgess Hill
Author name	Nick Myerscough – Walnut Acoustics
Location	External - proposed MUGA

Instrument configuration

Measurement start	29/01/2024 12:19:51	
Measurement stop	30/01/2024 15:37:42	
Measurement elapsed time [HH:MM:SS]	1 day(s) 03:17:35	
Unit type	CR:831C	
Unit S/N	D20437FF	
Integration period	15 m	
Range	20dB to 90dB	
Calibration drift	0 dB	
Mic field correction	Free	
Windscreen	ON	
Description	Profile	Value
Filter	1	A
Detector	1	Fast

Date	Time	Run Time	LAeq	LAmax	LA10	LA90
Monday						
29/01/2024	12:30	00:15:00	43.4	54.0	45.0	40.0
29/01/2024	12:45	00:14:59	47.4	65.1	49.4	41.2
29/01/2024	13:00	00:14:59	46.7	65.4	45.6	40.4
29/01/2024	13:15	00:15:01	44.9	65.1	45.9	41.3
29/01/2024	13:30	00:14:59	45.4	59.0	47.3	41.6
29/01/2024	13:45	00:14:59	45.9	66.7	48.2	41.9
29/01/2024	14:00	00:15:04	45.3	62.7	47.8	41.3
29/01/2024	14:15	00:15:01	44.2	55.7	46.9	40.2
29/01/2024	14:30	00:15:00	44.9	64.7	46.9	40.2
29/01/2024	14:45	00:14:59	45.6	59.5	48.8	40.6
29/01/2024	15:00	00:14:59	47.1	63.4	47.6	41.3
29/01/2024	15:15	00:14:59	46.1	63.0	47.5	40.8
29/01/2024	15:30	00:14:59	45.3	62.4	47.4	40.8
29/01/2024	15:45	00:15:00	46.7	63.0	49.2	41.9
29/01/2024	16:00	00:15:00	46.5	71.8	46.6	41.7
29/01/2024	16:15	00:14:59	46.2	60.7	48.4	42.5

Date	Time	Run Time	LAeq	LAmax	LA10	LA90
Tuesday						
30/01/2024	08:30	00:14:59	48.5	61.4	50.1	45.7
30/01/2024	08:45	00:15:01	49.1	68.0	50.4	45.4
30/01/2024	09:00	00:15:00	46.9	65.2	48.0	44.1
30/01/2024	09:15	00:14:59	49.2	69.2	49.8	44.6
30/01/2024	09:30	00:15:00	49.3	73.3	51.2	43.9
30/01/2024	09:45	00:14:59	47.5	60.6	48.9	44.0
30/01/2024	10:00	00:15:00	44.9	62.0	45.8	43.0
30/01/2024	10:15	00:15:00	48.2	69.8	50.2	42.9
30/01/2024	10:30	00:14:59	45.3	58.3	46.3	43.1
30/01/2024	10:45	00:15:01	46.4	60.2	47.3	43.2
30/01/2024	11:00	00:15:01	53.1	72.8	52.7	42.9
30/01/2024	11:15	00:15:00	45.4	62.0	45.8	42.3
30/01/2024	11:30	00:15:00	45.7	62.5	46.2	41.5
30/01/2024	11:45	00:14:59	46.7	62.7	47.7	42.5
30/01/2024	12:00	00:15:00	47.2	64.7	48.1	43.0
30/01/2024	12:15	00:15:01	43.9	56.6	44.8	42.4
30/01/2024	12:30	00:15:01	44.9	60.9	46.1	42.6
30/01/2024	12:45	00:15:00	44.9	61.1	46.2	41.4
30/01/2024	13:00	00:15:00	46.8	63.2	49.0	41.9
30/01/2024	13:15	00:15:02	43.3	55.9	44.6	41.2
30/01/2024	13:30	00:15:01	44.6	65.3	44.5	41.4
30/01/2024	13:45	00:15:01	44.6	58.7	45.5	42.4
30/01/2024	14:00	00:15:01	44.3	51.6	45.3	42.5
30/01/2024	14:15	00:14:59	44.6	59.6	45.5	42.1
30/01/2024	14:30	00:14:59	45.3	68.4	45.5	41.7
30/01/2024	14:45	00:14:59	45.0	59.3	46.5	42.4
30/01/2024	15:00	00:15:02	44.5	56.9	45.7	42.4
30/01/2024	15:15	00:14:59	44.9	66.5	45.3	41.7

Appendix 3: Measurement equipment calibration certificates

CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research plc**

DATE OF ISSUE **01 June 2022** CERTIFICATE NUMBER **175347**

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2
Approved signatory
R.Thomas
Electronically signed:

Sound Level Meter : IEC 61672-3:2006

Instrument information

Manufacturer: Cirrus Research plc Notes:
Model: CR:831C
Serial number: D20437FF
Class: 1
Firmware version: 04.00

Test summary

Date of calibration: 01 June 2022

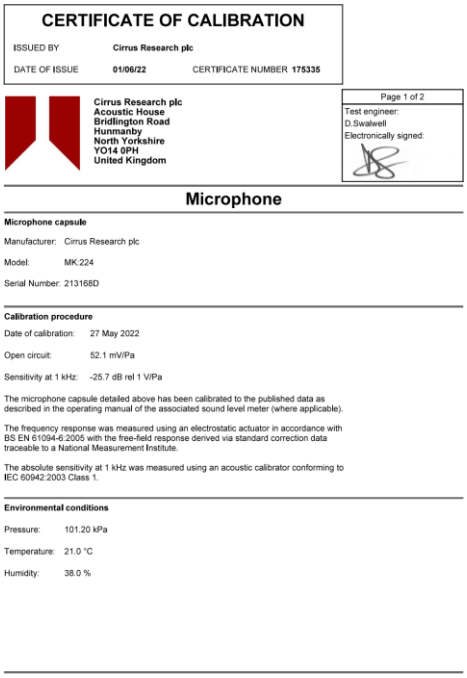
The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
Periodic tests were performed in accordance with procedures from IEC 61672-3:2006.

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.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2002 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002 and because the periodic tests of IEC 61672-3:2006 cover only a limited subset of the specifications in IEC 61672-1:2002.

Notes

This certificate 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 results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.



CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research plc**

DATE OF ISSUE **01/06/22** CERTIFICATE NUMBER **175335**

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2
Test engineer:
D.Swallwell
Electronically signed:

Microphone

Microphone capsule

Manufacturer: Cirrus Research plc
Model: MK:224
Serial Number: 213168D

Calibration procedure

Date of calibration: 27 May 2022
Open circuit: 52.1 mV/Pa
Sensitivity at 1 kHz: -25.7 dB rel 1 V/Pa

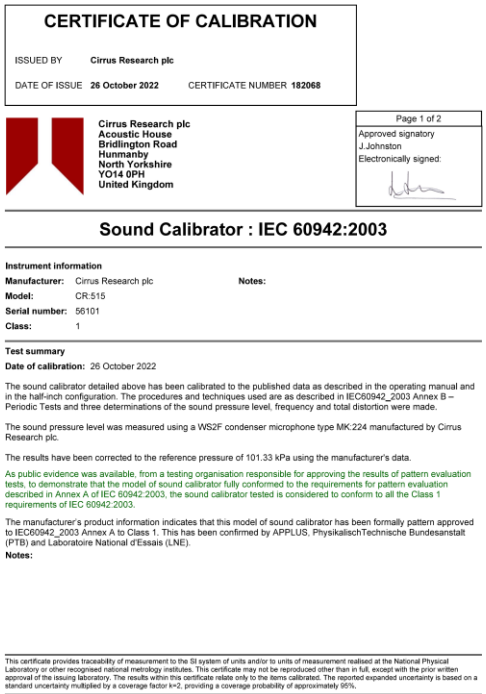
The microphone capsule detailed above has been calibrated to the published data as described in the operating manual of the associated sound level meter (where applicable).

The frequency response was measured using an electrostatic actuator in accordance with BS EN 61094-6:2005 with the free-field response derived via standard correction data traceable to a National Measurement Institute.

The absolute sensitivity at 1 kHz was measured using an acoustic calibrator conforming to IEC 60942:2003 Class 1.

Environmental conditions

Pressure: 101.20 kPa
Temperature: 21.0 °C
Humidity: 38.0 %



CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research plc**

DATE OF ISSUE **26 October 2022** CERTIFICATE NUMBER **182068**

Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2
Approved signatory
J.Johnston
Electronically signed:

Sound Calibrator : IEC 60942:2003

Instrument information

Manufacturer: Cirrus Research plc **Notes:**
Model: CR:515
Serial number: 56101
Class: 1

Test summary

Date of calibration: 26 October 2022

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

As public evidence was available, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the Class 1 requirements of IEC 60942:2003.

The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC60942_2003 Annex A to Class 1. This has been confirmed by APPLUS, PhysikalischTechnische Bundesanstalt (PTB) and Laboratoire National d'Essais (LNE).

Notes:

This certificate 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 results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

Appendix 4: Glossary of terms

Ambient Noise: Total sound level in a given situation at a given time usually composed of sounds from many sources near and far.

Assessment Level: the difference between a rating level and the background noise level in a BS 4142 assessment.

Attenuation: A reduction in the intensity (and level) of a sound signal.

Background Noise Level: The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval T, measured using the time weighting F, and quoted to the nearest number of whole decibels.

Decibel (dB): a unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 Pa, the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.

dBA: decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dBA broadly agree with people's assessment of loudness. A change of 3 dBA is the minimum perceptible under normal conditions, and a change of 10 dBA corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).

Distance Correction: a theoretical measure of how levels from sound sources reduce over distance through propagation.

Free Field:
1. A free sound field is a field in a homogeneous, isotropic medium free from boundaries. In practice it is a field in which the effects of the boundaries are negligible over the region of interest. The actual pressure impinging on an object (e.g., a microphone) placed in an otherwise free sound field will differ from the pressure which would exist at the point with the object removed, unless the acoustic impedance of the object matches the acoustic impedance of the medium.

2. An environment in which there are no reflective surfaces within the frequency region of interest.

3. A region in which no significant reflections of sound occur.

4. [BS 4142] suggests that free-field environmental noise measurements need to be made at least 3.5m from any reflecting structure.

$L_{A90,T}$: the A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142:2019 it is used to define background noise level.

$L_{Aeq,T}$: the A-weighted equivalent continuous sound level - the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T).

L_{Amax} : the highest A weighted noise level recorded during a noise event. The time weighting used (F or S) should be stated.

Rating Level : The specific noise level plus any adjustment for the characteristic features of the noise in a BS 4142 assessment

Residual Noise : The ambient noise remaining at a given position in a given situation when the specific noise level is suppressed to a degree such that it does not contribute to the ambient noise.

Specific noise source : The noise source under investigation for a BS 4142 assessment.

Specific noise level: the A-weighted equivalent continuous sound level of the noise source under investigation for a BS 4142 assessment.

Steady Noise: Noise that gives fluctuations over a range of not more than 5 dB on a sound level meter set to frequency weighting A and time weighting S.

Appendix 5: Disclaimer

Recommendations in this report are for acoustics purposes only, and it is the responsibility of the client, project manager, construction company, or architect to ensure that all other requirements are met including (but not limited to) structure, fire, and Building Controls.

The calculations within this report are based upon sourced and/or calculated data. Complex flanking transmission paths through structures can lead to excessive vibration transmission. Also, build quality can greatly affect final sound levels and Walnut Acoustics takes no responsibility for the integrity of any physical work carried out. All reasonable and practicable installation techniques should be employed with noise reduction in mind including the use of isolation and anti-vibration materials in the mounting of all parts of any mechanical systems.

The opinions and interpretations presented in this report represent our best technical interpretation of the data made available to us. However, due to uncertainty inherent in the estimation of all parameters, we cannot, and do not, guarantee the accuracy or correctness of any interpretation. We shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, cost, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents, or employees.

The findings and opinions expressed are relevant to the dates of the site works and should not be relied upon to represent conditions at substantially later dates. If additional information becomes available which may affect our comments, conclusions or recommendations, the author reserves the right to review the information, reassess any new potential concerns and modify our opinions accordingly.

Except for the provision of professional services on a fee basis, Walnut Acoustics does not have a commercial arrangement with any person or company involved in the interests that are the subject of this report.

Walnut Acoustics cannot accept any liability for the correctness, applicability, or validity for the information they have provided, or indeed for any consequential costs or losses in this regard. Our efforts have been made on a “best endeavours” basis, and no responsibility or liability is warranted or accepted by Walnut Acoustics.

All data and mathematical content in this report has been checked thoroughly and is believed to be accurate at the time of issue. Errors and Omissions excepted.