CONABEARE ACOUSTICS

ENVIRONMENTAL ACOUSTIC IMPACT ASSESSMENT

2 Ainger Road
Primrose Hill
London
NW3 3AR

Reference : CS8720-01
Revision : Original
Status : Planning
Issue Date : 15th December 2023

Prepared By:

Stuart Metcalfe

Stuart Metcalfe MIOA

CLIENT:

Mr & Mrs Dunmall
2 Ainger Road,
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CONABEARE ACOUSTICS

Revision & Changes Log

Revision	Date	Comments/Summary of changes	Amended By:

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CONABEARE ACOUSTICS

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1 Introduction

Conabeare Acoustics Limited have been commissioned by Mr and Mrs Dunmall to undertake an Acoustic Survey and BS4142:2014 assessment in relation to noise emissions of proposed plant at 2 Ainger Road, Primrose Hill, London NW3 3AR for planning purposes.

The Survey was undertaken by Stuart Metcalfe MIOA who has been practicing in Building Services Acoustics and Noise Control Engineering for in excess of 30 years, is a Member of the Institute of Acoustics (MIOA) and is a Director at Conabeare Acoustics Ltd.

2 Acoustic Criteria

BS4142:2014 Methods for rating and assessing industrial and commercial sound.

BS4142:2014 gives a method for rating sound from industrial and commercial sources affecting people inside or outside dwellings or premises used for residential purposes.

An initial estimate of the significance of the sound from the industrial/commercial nature can be assessed by subtracting the measured background noise level from the rating level (this is the specific sound level of the source with any corrections or penalties for distinctive acoustic characteristics).

Typically, the greater the difference, the greater the magnitude of the impact.

The site is located within the London Borough of Camden demise which has adopted the National Planning Policy Guidelines and as such References and evaluations are to be made to the National Planning Policy Framework 2012 (NPPF) and the Noise Policy Statement for England 2010 (NPSE).

There are several key phrases within the NPSE aims and these are discussed below. “Significant adverse” and “adverse”

NOEL – No Observed Effect Level - This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level - This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level - This is the level above which significant adverse effects on health and quality of life occur.

This Camden requirement for noise exposure are detailed in the Local Plan Appendix 3: Noise thresholds which is reproduced thus;

Industrial and Commercial Noise Sources

A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion).

Table C: *Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)*

Existing Noise sensitive receptor	*Assessment Location*	*Design Period*	*LOAEL (Green)*	*LOAEL to SOAEL (Amber)*	*SOAL (Red)*
*Dwellings***	*Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)*	*Day*	*'Rating level' 10dB* below background*	*'Rating level' between 9dB below and 5dB above background*	*'Rating level' greater than 5dB above background*
*Dwellings***	*Outside bedroom window (façade)*	*Night*	*'Rating level' 10dB* below background and no events exceeding 57dB$_{LAmax}$*	*'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB $_{LAmax}$*	*'Rating level' greater than 5dB above background and/or events exceeding 88dB$_{LAmax}$*

**10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.*

***levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.*

The periods in Table C correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The Council will take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS:4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require a NR curve specification of NR35 or below, dependant on the room (based upon measured or predicted Leq,5mins noise levels in octave bands) 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area.

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3 Plant Location and Measurement Position

The site is located on Ainger Road in the Primrose Hill District in North West London.

The site is bordered by Ainger Road to the West and Erskine Road to the North.

The closest sound sensitive façades are the adjacent premises at 1 and 3 Ainger Road at a distance of approximately 5 metres from the proposed plant location without direct line of sight.

Fig. 1 - View of Property Looking East

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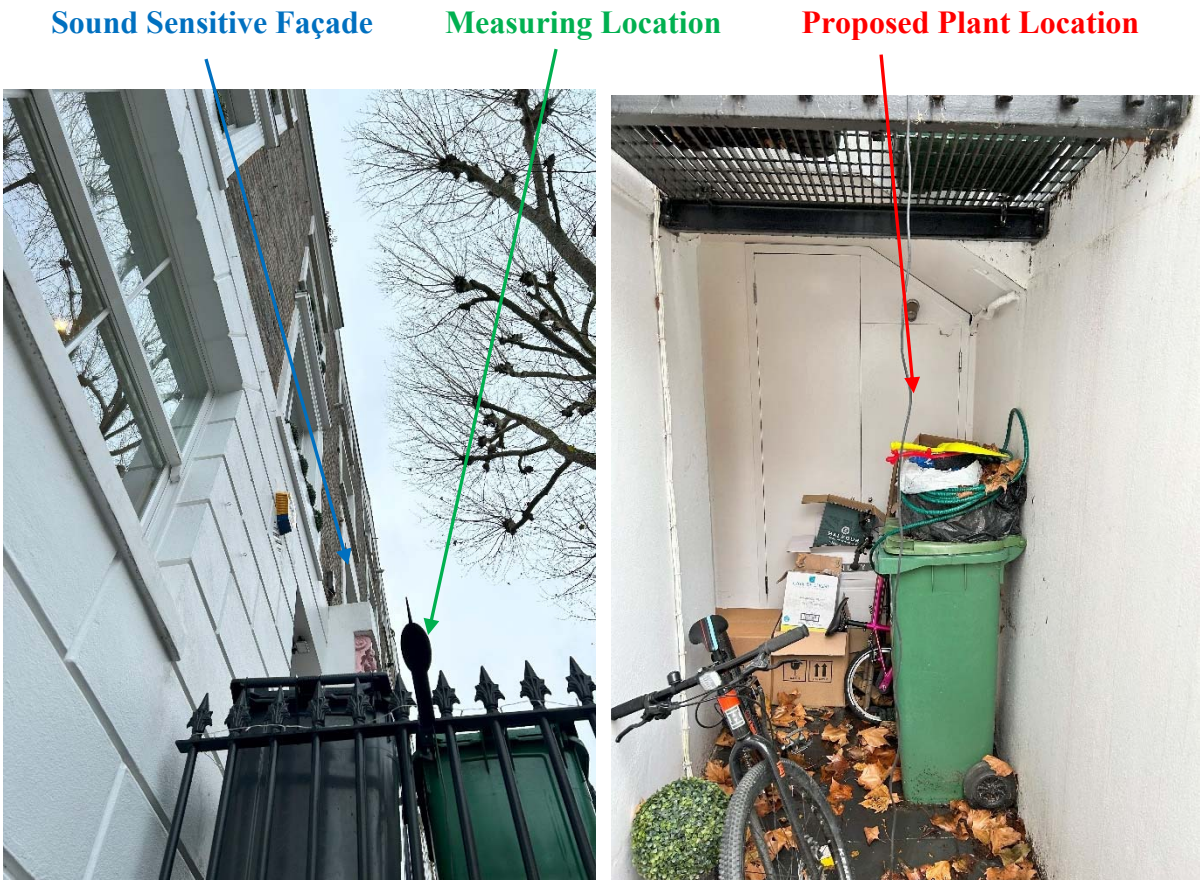
Fig 2 – Measuring Location showing Sound Sensitive Façade and Plant Location



4 Existing Noise Climate

The area is generally residential premises with transportation noise from the area being adjudged to be the dominant background noise source during the survey period.

5 Noise Survey

5.1 Measurements

The Survey commenced at approximately 09:55 hours on Thursday 7th December 2023 until approximately 09:35 hours on Friday 8th December 2023.

The Analyser was programmed to record 15 minute sampling periods over the survey duration.

The microphone was located on a railing at approximately 2.0 metres above, and at a minimum of 1m from, a reflecting plane.

The measurements and their interpretation are in accordance with BS 7445: Parts 1 and 2. All readings are Sound Pressure Levels (Lp) in dB (re 20µPa).

5.2 Weather during Survey Period

The weather was cold and mostly dry throughout the measuring period with some showers. The weather did not, in our opinion, adversely influence the readings obtained.

5.3 Instrumentation

The instrumentation used was a Type 1 Larson Davis LxT Sound Expert Sound Level Analyser confirming to IEC 651-1979 Type 1, EN60651 Type 1 and IEC 804-1985 Type 1, EN60804 Type 1.

- **Larson Davis LxT Sound Level Analyser, Serial Number 05588.**
- **Larson Davis PRMLxT1L Preamplifier, Serial Number 055664.**

The Sound Analyser and Preamplifier were calibrated on 6th November 2023, Certificate Number 16245.

The additional following equipment was also used

- **Larson Davis type CAL200 Calibrator, Serial Number 17720 calibrated on 8th November 2023, Certificate Number 16246.**
- **Extension Cable**

Field calibration checks were made using the Calibrator and no significant drift was noted against the Calibration level of 114.0dB ± 0.2dB at 1000Hz ± 0.2%.

5.4 Survey Results

The following is a summary of the Background Noise Levels (L_{A90}) levels recorded in Daytime, Evening and Night-time Periods

- $L_{A90,15min}$ 42.3dB(A) between 07:00 hours to 19:00 hours.
- $L_{A90,15min}$ 37.6dB(A) between 19:00 hours to 23:00 hours.
- $L_{A90,15min}$ 35.4dB(A) between 23:00 hours to 07:00 hours.

6 Assessment Methodology: BS4142:2014+A1:2019

The BS 4142:2014+A1:2019 methodology involves predicting or measuring the specific sound level from the source in question and applying rating penalties for acoustic character features such as tonality, impulsivity or irregularity.

This rated sound level is then compared to the existing typical L_{A90} background sound level. Impacts are assessed as follows:

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

It is also considered appropriate to consider other pertinent sources of guidance. The following sections consider absolute criteria advocated by both the World Health Organisation: 1999: "Guidelines for Community Noise" and BS 8233:1999: "Sound insulation and noise reduction for buildings – Code of practice".

World Health Organisation: 1999: "Guidelines for Community Noise"

This document provides a review of the effects of noise and a description of the principles of the WHO health criteria and guidelines for Community Noise.

The effects of noise in dwellings are identified as sleep disturbance, annoyance and speech interference. For bedrooms, the critical effect is sleep disturbance. The indoor guideline value for continuous noise in bedrooms is 30 dB L_{Aeq}. To enable casual conversation indoors during the daytime, the sound level of the interfering noise should not exceed 35 dB L_{Aeq}.

Table 1 of the document summarises the guideline values for community noise in specific environments and includes the noise indices to be adopted. Significantly, the corresponding time base to be used for the assessment is also included.

The relevant extracts of Table 1 are reproduced thus:

Specific environment	Critical health effect(s)	LAeq [dB]	Time base [hours]	LAmax fast [dB]
Dwelling, indoors	Speech intelligibility & moderate annoyance daytime & evening	35	16	45
	Sleep disturbance, night-time	30	8	

This level should be a cumulative level from all plant running normally and makes allowance for any tonal or intermittent noise from the plant.

BS8233:2014

BS 8233: 2014 – "Guidance on sound insulation and noise reduction for buildings" provides information on achieving internal acoustic environments appropriate to their functions.

As part of this document, recommendations are given to the internal noise levels which are commensurate with achieving acceptable resting, dining and sleeping conditions within residential properties. The values given are generally in terms of an LA_{eq} level although reference is also made with regards to maximum noise levels, although no criterion is specified in this recently revised version of the standard.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35dB $L_{Aeq\ 16\ hours}$	-
Dining	Dining Room	40dB $L_{Aeq\ 16\ hours}$	-
Sleeping	Bedroom	35dB $L_{Aeq\ 16\ hours}$	30dB $L_{Aeq\ 8\ hours}$

It is generally accepted that a partially open window will provide a level difference of 15dB and therefore the guideline levels to achieve 30dBA within a bedroom would indicate a level of 45dBA directly outside a bedroom window would be acceptable.

Noise Change (dBA)	Category
0	No Impact
0.1 to 2.9	Slight Impact
3.0 to 4.9	Moderate Impact
5.0 to 9.9	Substantial Impact
10.0 and above	Severe Impact

7 Noise Assessment

The objective of any specification limiting new noises should therefore be to ensure that sound emission from the new building services plant and any other new sources, in particular, should not materially add to the existing sound climate.

We understand that the plant will operate on a 24 hour basis and would recommend setting a target level at the nearest sound sensitive façades as below;

7.1 Plant Noise Emissions Criteria

- $L_{Aeq,15min}$ 30.0dB – 24 hours.

This level is 5dB(A) below the minimum measured background noise level due to the very low background noise levels to provide LOAEL to SOAEL (Amber) rating.

This level will then provide a level of 20dBA within the residential premises which is below the requirements of both the WHO and BS8233.

This is also below the NR35 stipulated within Camden Council's requirements.

7.2 Proposed Plant

The proposed plant being assessed is as detailed below;

- Unit 01 - 1 number Daikin ERGA08

7.3 Plant Locations

The proposed plant is to be located within the lightwell and under the steps at a distance of approximately 5 metres from the residential façade.

7.4 Plant Noise Levels

The manufacturers sound spectrum is reproduced below.

Item	Model	Level	Sound Level (dB) at Octave Band Centre Frequency (Hz)								
			63	125	250	500	1k	2k	4k	8k	dBA
01	ERGA08	Lp @ 1m	50	53	49	49	43	37	30	22	49
	Heating Only										

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We have detailed the noise levels for the above equipment, to the nearest sound sensitive façade, as well as the proposed mitigating measures, within our calculations as detailed below.

Specific Noise Level

The specific noise level for the plant is 49dB$_{LpA}$.

Acoustic Feature Correction

- We have not allowed for an Acoustic Correction Feature for the sound sensitive façade as the plant is effectively on the same plane.
- We have allowed for two additional reflective surfaces due to the plant location.
- The unit is not considered to be intermittent or tonal in nature as this will supply heating to the residence, so no allowance has been made.

Distance Attenuation

- The distance loss for each airpath is shown on our calculation sheet.

Barrier Attenuation

- There is no direct line of sight between the plant and the residential sound sensitive facades and a line of sight reduction of 5dB has been allowed.

Un-mitigated Noise Levels

The noise level for all items of plant with no mitigating measures, and with all suitable allowances made, is 37dBA.

This level is 2dBA ***above*** the lowest measured Background Level at the nearest noise sensitive façade and will provide *LOAEL to SOAEL* which is an AMBER rating on the Camden requirements chart.

It will therefore be necessary to reduce the noise level by 7dBA to enable the target noise level to be met.

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8 Recommendations

To enable the Target Level to be met the following mitigating measures will be required.

We would recommend that the unit has the airpaths acoustically treated and these mitigating measures will have the following minimum acoustic performance.

Intake Air Attenuator

The condensing unit should have an intake attenuator fitted to the space fitted to allow air to the condensing units which will require the following minimum acoustic performance.

Static Insertion Loss (dB) at Octave Band Centre Frequencies (Hz)

63	125	250	500	1k	2k	4k	8k
5	8	15	23	28	25	18	15

The attenuator will be 900mm long and would need to be sized to give maximum pressure loss to suit the condensing unit requirements – 20Pa maximum.

Discharge Air Acoustic Louvres

The condensing unit should have a discharge acoustic louvre door fitted to allow air from the condensing units which will require the following minimum acoustic performance.

Sound Reduction Index (dB) at Octave Band Centre Frequencies (Hz)

63	125	250	500	1k	2k	4k	8k
5	5	7	12	16	18	15	15

The acoustic louvred door will be 300mm thick and would need to be sized to give maximum pressure loss to suit the condensing unit requirements – 20Pa maximum.

Our calculations as below indicate that if the proposed mitigating measures are introduced then the resulting noise level at the nearest sound sensitive façades will be 24dBA. This level is 11dBA below the measured background level.

The acoustic treatment proposal is detailed on our drawing, CS8720 -100, as included within the addendum below.

9 Conclusion

A background Noise Survey was carried during a typical day and night-time period at a location representative of the nearest sound sensitive receivers.

An assessment in line with BS4142:2014 has been carried out.

The assessment would indicate that the plant with mitigating measures will have an GREEN rating of *LOAEL* as it is more than 10dBA below the measured background level.

In our opinion, the scheme should be acceptable to the Local Authority subject to the proposed mitigating measures being introduced.

CS8720 - 2 Ainger Road, Primrose Hill, London NW3 3AR

- Period result profile -

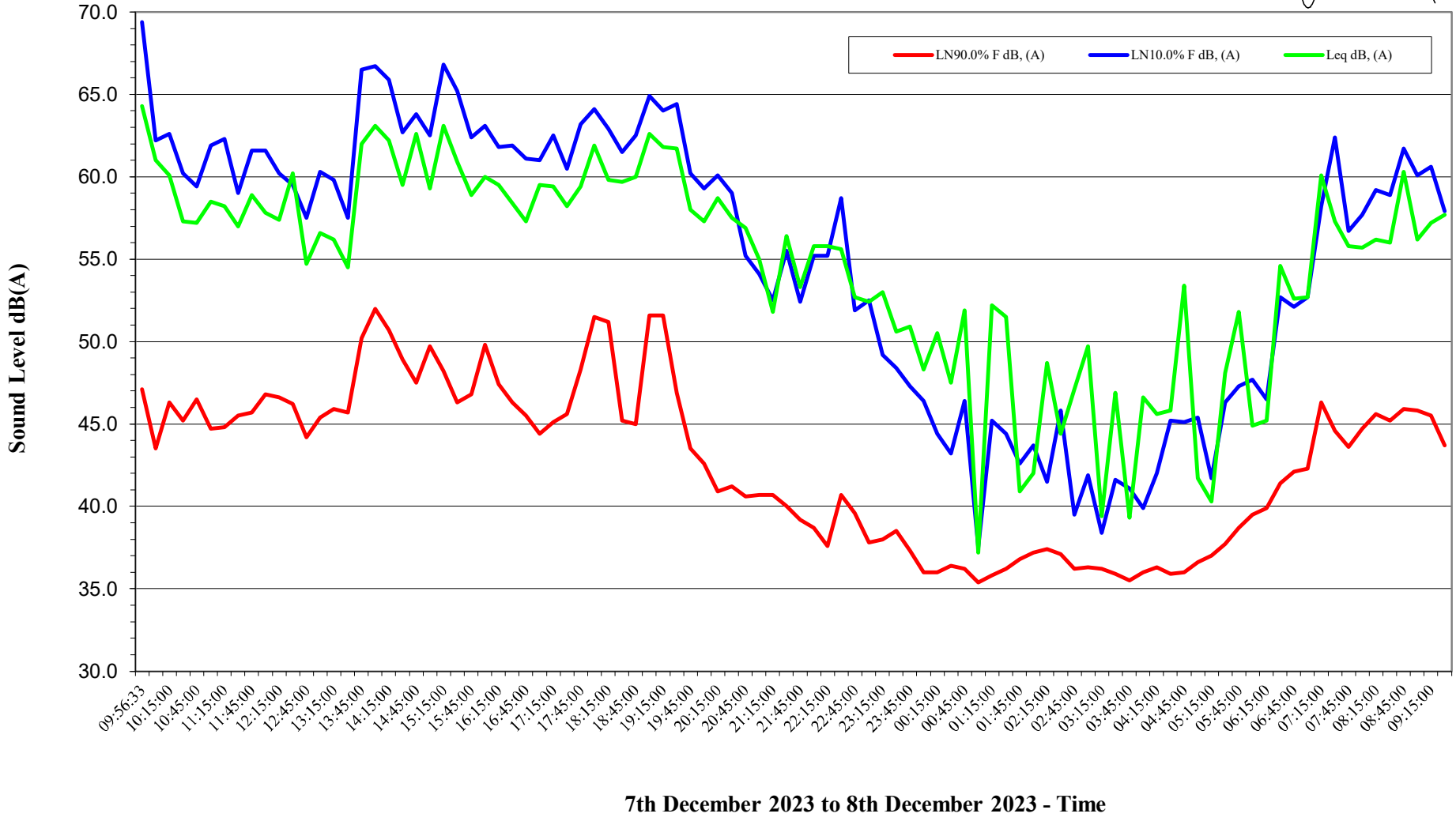
Overload occurred	No
Low battery occurred	No
Pause was used	No
Frequency weighting	A
Band	Broadband
Period time	15 min
Periods too short for LNs	No
First period listed	1 : 96
Measurement Description	
Start	07/12/2023 9:56:33
Stop	08/12/2023 9:34:00
Duration	23:37:27.4
Run Time	23:37:27.4
Pause	0:00:00.0
Pre Calibration	07/12/2022 9:54:15

Period number	Date	Time	LN90.0% F	LN10.0% F	Leq
			dB, (A)	dB, (A)	dB, (A)
1	07/12/2023	09:56:33	47.1	69.4	64.3
2	07/12/2023	10:00:00	43.5	62.2	61.0
3	07/12/2023	10:15:00	46.3	62.6	60.1
4	07/12/2023	10:30:00	45.2	60.2	57.3
5	07/12/2023	10:45:00	46.5	59.4	57.2
6	07/12/2023	11:00:00	44.7	61.9	58.5
7	07/12/2023	11:15:00	44.8	62.3	58.2
8	07/12/2023	11:30:00	45.5	59.0	57.0
9	07/12/2023	11:45:00	45.7	61.6	58.9
10	07/12/2023	12:00:00	46.8	61.6	57.8
11	07/12/2023	12:15:00	46.6	60.2	57.4
12	07/12/2023	12:30:00	46.2	59.5	60.2
13	07/12/2023	12:45:00	44.2	57.5	54.7
14	07/12/2023	13:00:00	45.4	60.3	56.6
15	07/12/2023	13:15:00	45.9	59.8	56.2
16	07/12/2023	13:30:00	45.7	57.5	54.5
17	07/12/2023	13:45:00	50.2	66.5	62.0
18	07/12/2023	14:00:00	52.0	66.7	63.1
19	07/12/2023	14:15:00	50.7	65.9	62.2
20	07/12/2023	14:30:00	48.9	62.7	59.5
21	07/12/2023	14:45:00	47.5	63.8	62.6
22	07/12/2023	15:00:00	49.7	62.5	59.3
23	07/12/2023	15:15:00	48.2	66.8	63.1
24	07/12/2023	15:30:00	46.3	65.2	60.9
25	07/12/2023	15:45:00	46.8	62.4	58.9
26	07/12/2023	16:00:00	49.8	63.1	60.0
27	07/12/2023	16:15:00	47.4	61.8	59.5
28	07/12/2023	16:30:00	46.3	61.9	58.4
29	07/12/2023	16:45:00	45.5	61.1	57.3
30	07/12/2023	17:00:00	44.4	61.0	59.5
31	07/12/2023	17:15:00	45.1	62.5	59.4
32	07/12/2023	17:30:00	45.6	60.5	58.2
33	07/12/2023	17:45:00	48.3	63.2	59.4
34	07/12/2023	18:00:00	51.5	64.1	61.9

Period number	Date	Time	LN90.0% F	LN10.0% F	Leq
			dB, (A)	dB, (A)	dB, (A)
35	07/12/2023	18:15:00	51.2	62.9	59.8
36	07/12/2023	18:30:00	45.2	61.5	59.7
37	07/12/2023	18:45:00	45.0	62.5	60.0
38	07/12/2023	19:00:00	51.6	64.9	62.6
39	07/12/2023	19:15:00	51.6	64.0	61.8
40	07/12/2023	19:30:00	46.9	64.4	61.7
41	07/12/2023	19:45:00	43.5	60.2	58.0
42	07/12/2023	20:00:00	42.6	59.3	57.3
43	07/12/2023	20:15:00	40.9	60.1	58.7
44	07/12/2023	20:30:00	41.2	59.0	57.5
45	07/12/2023	20:45:00	40.6	55.2	56.9
46	07/12/2023	21:00:00	40.7	54.1	55.0
47	07/12/2023	21:15:00	40.7	52.5	51.8
48	07/12/2023	21:30:00	40.0	55.5	56.4
49	07/12/2023	21:45:00	39.2	52.4	53.3
50	07/12/2023	22:00:00	38.7	55.2	55.8
51	07/12/2023	22:15:00	37.6	55.2	55.8
52	07/12/2023	22:30:00	40.7	58.7	55.6
53	07/12/2023	22:45:00	39.6	51.9	52.7
54	07/12/2023	23:00:00	37.8	52.5	52.4
55	07/12/2023	23:15:00	38.0	49.2	53.0
56	07/12/2023	23:30:00	38.5	48.4	50.6
57	07/12/2023	23:45:00	37.3	47.3	50.9
58	08/12/2023	00:00:00	36.0	46.4	48.3
59	08/12/2023	00:15:00	36.0	44.4	50.5
60	08/12/2023	00:30:00	36.4	43.2	47.5
61	08/12/2023	00:45:00	36.2	46.4	51.9
62	08/12/2023	01:00:00	35.4	37.5	37.2
63	08/12/2023	01:15:00	35.8	45.2	52.2
64	08/12/2023	01:30:00	36.2	44.4	51.5
65	08/12/2023	01:45:00	36.8	42.6	40.9
66	08/12/2023	02:00:00	37.2	43.7	42.0
67	08/12/2023	02:15:00	37.4	41.5	48.7
68	08/12/2023	02:30:00	37.1	45.8	44.4
69	08/12/2023	02:45:00	36.2	39.5	47.1
70	08/12/2023	03:00:00	36.3	41.9	49.7
71	08/12/2023	03:15:00	36.2	38.4	39.4
72	08/12/2023	03:30:00	35.9	41.6	46.9
73	08/12/2023	03:45:00	35.5	41.1	39.3
74	08/12/2023	04:00:00	36.0	39.9	46.6
75	08/12/2023	04:15:00	36.3	42.0	45.6
76	08/12/2023	04:30:00	35.9	45.2	45.8
77	08/12/2023	04:45:00	36.0	45.1	53.4
78	08/12/2023	05:00:00	36.6	45.4	41.7
79	08/12/2023	05:15:00	37.0	41.7	40.3
80	08/12/2023	05:30:00	37.7	46.3	48.1
81	08/12/2023	05:45:00	38.7	47.3	51.8
82	08/12/2023	06:00:00	39.5	47.7	44.9
83	08/12/2023	06:15:00	39.9	46.5	45.2
84	08/12/2023	06:30:00	41.4	52.7	54.6
85	08/12/2023	06:45:00	42.1	52.1	52.6
86	08/12/2023	07:00:00	42.3	52.7	52.7
87	08/12/2023	07:15:00	46.3	58.2	60.1
88	08/12/2023	07:30:00	44.6	62.4	57.3
89	08/12/2023	07:45:00	43.6	56.7	55.8

Period number	Date	Time	LN90.0% F	LN10.0% F	Leq
			dB, (A)	dB, (A)	dB, (A)
90	08/12/2023	08:00:00	44.7	57.7	55.7
91	08/12/2023	08:15:00	45.6	59.2	56.2
92	08/12/2023	08:30:00	45.2	58.9	56.0
93	08/12/2023	08:45:00	45.9	61.7	60.3
94	08/12/2023	09:00:00	45.8	60.1	56.2
95	08/12/2023	09:15:00	45.5	60.6	57.2
96	08/12/2023	09:30:00	43.7	57.9	57.7

CS8720 - 2 Ainger Road, Primrose Hill, London NW3 3AR



7th December 2023 to 8th December 2023 - Time

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Glossary of Terms

L_{A90} The sound pressure level in dB(A) which is exceeded for 90% of the time and is taken to be the effective lowest background sound level for the period by such methods of sound rating as that recommended in BS4142:2014. It will also be used as a basis for selecting limiting sound levels from new plant by Local Planning Authorities when setting Planning Consent Conditions.

L_{Aeq} The "equivalent continuous sound level" for the measuring period, defined as the level in dBA which, if held constant over the measuring period, would produce the same amount of sound energy as does the actual varying ambient sound level. It is a measure of the amount of sound energy affecting the site from sources other than new plant or operations.

L_{A10} The sound level exceeded for 10% of the time over the sample period. Originally used as a measure of subjective reaction to traffic noise in particular, it can also be taken as an indication of the practical maximum sound level that the building envelope will have to protect against.

dBA Describes 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 3dBA is the minimum perceptible under normal conditions, and a change of 10dBA corresponds roughly to halving or doubling the loudness of a sound.

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CONABEARE ACOUSTICS

Project: CS8720 - 2 Ainger Road, Primrose Hill, London NW3 3AR
Client : Mr and Mrs Dunmall
Revision: Original
Date : 4th January 2024

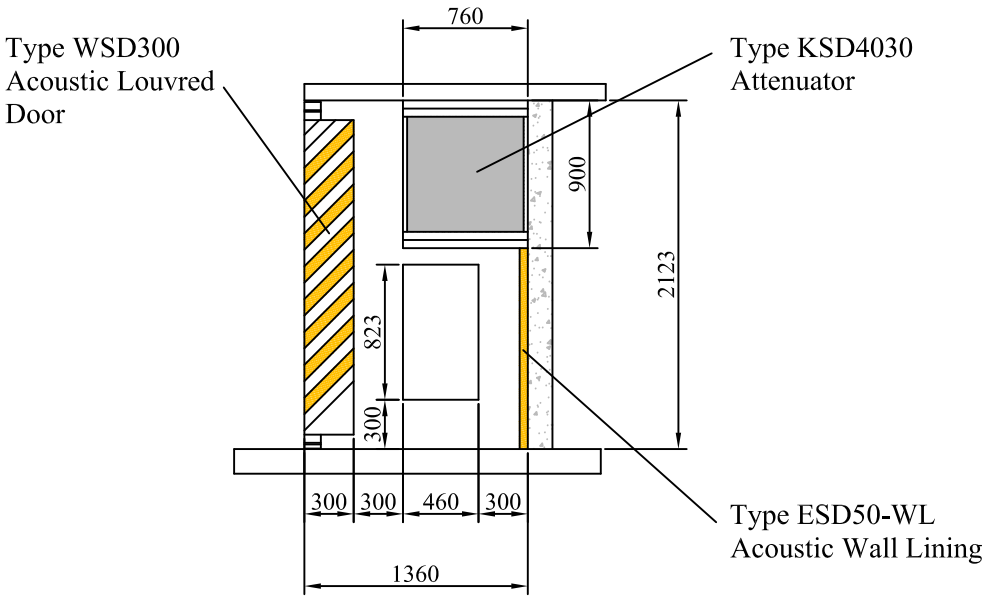
Item **Calculation 01A - Noise To Adjacent Premises - Proposed Plant - Target Level - 30dBA - Without Mitigation**

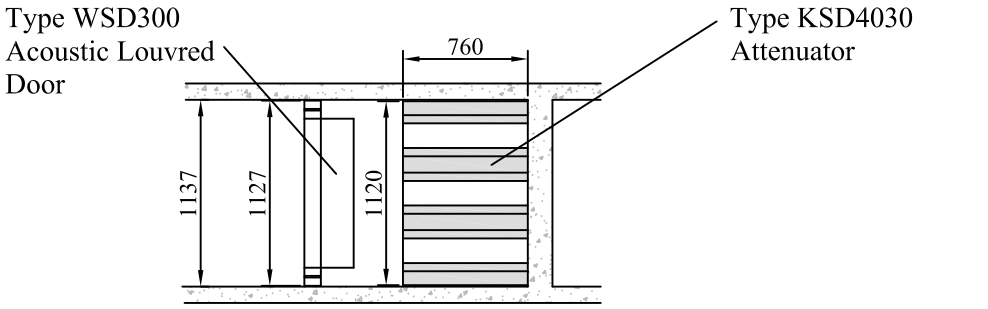
CU01	Atmospheric Noise			63	125	250	500	1k	2k	4k	8k	dBA
	Unit Lp at 1 metre - Daikin ERGA08 - Manufacturers Data (Heating)			**50**	**53**	**49**	**49**	**43**	**37**	**30**	**22**	**49**
	Additional Distance to Listener	4	m	-13	-13	-13	-13	-13	-13	-13	-13	
	Additional Surfaces (2)			6	6	6	6	6	6	6	6	
	Line of Sight Screening			-5	-5	-5	-5	-5	-5	-5	-5	
	Estimated Lp at Listener			**38**	**41**	**37**	**37**	**31**	**25**	**18**	**10**	**37**

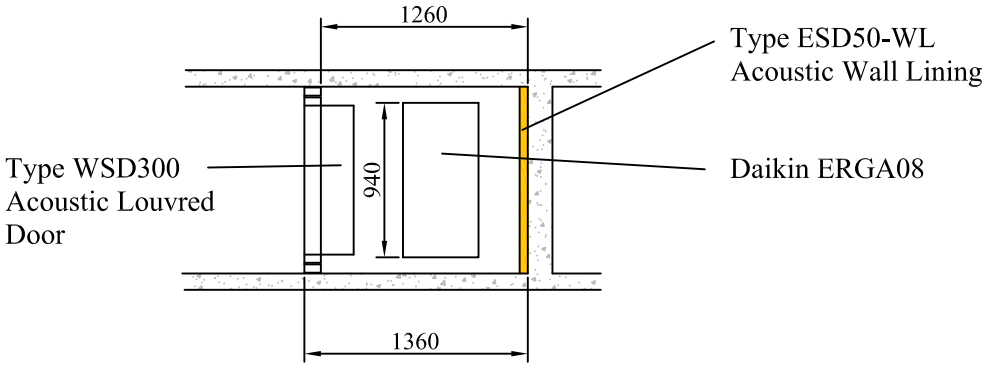
Item **Calculation 02A - Noise To Adjacent Premises - Proposed Plant - Target Level - 30dBA - With Mitigation**

CU01	Atmospheric Noise - Intake			63	125	250	500	1k	2k	4k	8k	dBA
	Unit Lp at 1 metre - Daikin ERGA08 - Manufacturers Data (Heating)			**50**	**53**	**49**	**49**	**43**	**37**	**30**	**22**	**49**
	Terminal Split			**-3**	**-3**	**-3**	**-3**	**-3**	**-3**	**-3**	**-3**	
	Additional Distance to Listener	3	m	-10	-10	-10	-10	-10	-10	-10	-10	
	Additional Surfaces (2)			6	6	6	6	6	6	6	6	
	Line of Sight Screening			-5	-5	-5	-5	-5	-5	-5	-5	
	Directivity - 90 degrees			2	2	1	0	-2	-5	-10	-15	
	Proposed Attenuator Insertion Loss - KSD4030 - 900mm Long			**-5**	**-8**	**-15**	**-23**	**-28**	**-25**	**-18**	**-15**	
	Estimated Lp at Listener - Intake Only			**35**	**35**	**23**	**14**	**1**	**0**	**0**	**0**	**21**

CU01	Atmospheric Noise - Exhaust			63	125	250	500	1k	2k	4k	8k	dBA
	Unit Lp at 1 metre - Daikin ERGA08 - Manufacturers Data (Heating)			**50**	**53**	**49**	**49**	**43**	**37**	**30**	**22**	**49**
	Terminal Split			**-3**	**-3**	**-3**	**-3**	**-3**	**-3**	**-3**	**-3**	
	Additional Distance to Listener	4	m	-13	-13	-13	-13	-13	-13	-13	-13	
	Additional Surfaces (2)			6	6	6	6	6	6	6	6	
	Line of Sight Screening			-5	-5	-5	-5	-5	-5	-5	-5	
	Directivity - 135 degrees			1	-1	-2	-5	-10	-15	-18	-21	
	Acoustic Louvre Sound Reduction Index - WSD300			**-5**	**-5**	**-7**	**-12**	**-16**	**-18**	**-15**	**-15**	
	Estimated Lp at Listener - Exhaust Only			**31**	**32**	**25**	**17**	**2**	**0**	**0**	**0**	**21**
	Combined Lp at Listener			**36**	**37**	**27**	**19**	**5**	**0**	**0**	**0**	**24**







Rev	Ammendment	Date

First Angle Projection unless stated

Scale: 1: @A1

Title: Acoustic Treatment Proposal

Project: 2 Ainger Road, Primrose Hill, London NW3 3AR

Client: Mr and Mrs Dunmall

Drawing Number: CS8720 - 100

Rev.: xxx

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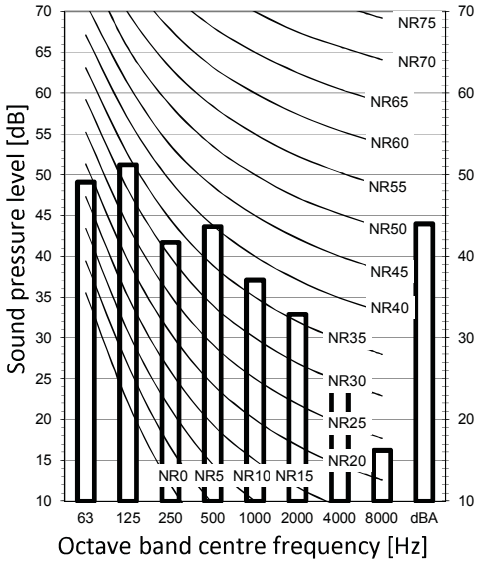
Date:	Drawn By
04-01-2024	sjm
Issue	**Checked By**
Information	xxx

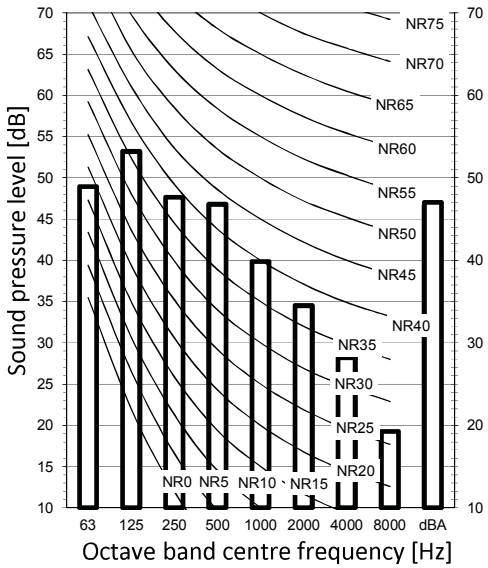
ERGA04-08EV
ERGA04-08EVA

Heating

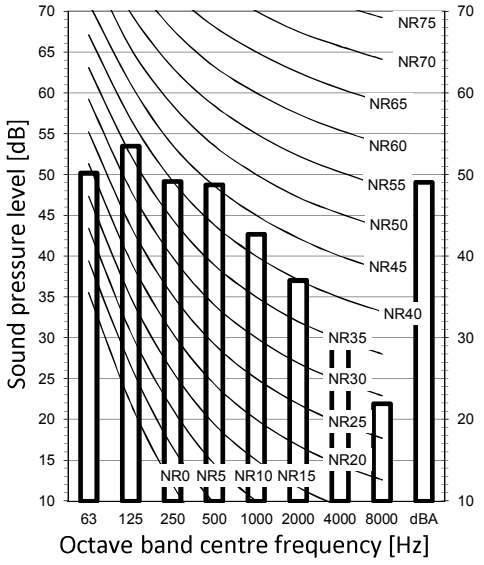
ERGA04*



ERGA06*

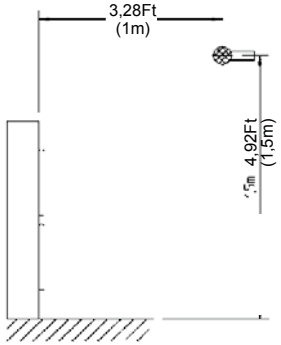


ERGA08*



Notes

1. Data is valid at free field condition.
   Measured in a semi-anechoic chamber
2. Data is valid at nominal operation condition.
3. dBA = A-weighted sound pressure level (A scale according to IEC).
4. Reference acoustic pressure 0 dB = 20 µPa
5. If the sound is measured under actual installation conditions, the measured value will be higher due to environmental noise and sound reflections.



Measuring location (discharge side)

3D111594A

Acoustic Calibration Services Limited
Unit 6H Diamond Industrial Centre
Works Road Letchworth Garden City
Hertfordshire SG6 1LW
Tel: 01462 677 197 Mobile: 0771 886 4944
Email: trevjohnlewis@aol.com

ACSL
Acoustic Calibration Services Limited

CERTIFICATE OF CALIBRATION

Model: LD LxT1L **Serial Number:** 0005588

Organisation: Conabeare Acoustics Limited, 11 Chilton Enterprise Centre Station, Road, Theale, Berkshire RG7 4AA

Job Number: 2963 **Customer Order Reference:** S Metcalfe

The Sound Level Meter was assessed for conformance with International Standard BS EN 61672-3:2006 as modified by TPS 49 Edition 1. The manufacturer claims Class 1 accuracy conformance and it was against these requirements that all the results were evaluated.

The sound level meter was fitted with a **PCB 377B02** Serial No. **304334** measurement microphone and a **LD PRMLxT1L** preamplifier Serial No. **055664.** The microphone was replaced with a suitable input device in order to apply electrical signals to the preamplifier.

The sound level meter passed all tests carried out with no deviations from Class 1 specification, in accordance with the modified BS EN 61672-3:2006.

The meter was adjusted to read correctly in response to a laboratory B&K 4231 sound calibrator, producing a sensitivity reading of **-27.7 dB rel 1V/Pa**. When applying the associated **LD CAL200** sound calibrator serial no: **17720**, and referencing its current certification, the calibration set-up level would be **113.7 dB** when corrected to reference atmospheric pressure.

All ACSL's calibration instrumentation is fully traceable to National Standards. The acoustic references are calibrated by laboratories which are UKAS accredited for the purpose.

Certificate No: **16245**
Date of Issue: **6th November 2023**

Signature:
Print Name: **Trevor Lewis**

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Email: trevjohnlewis@aol.com

ACSL
Acoustic Calibration Services Limited

CERTIFICATE OF CALIBRATION

Model: LD CAL200 **Serial Number:** 17720

Organisation: Conabeare Acoustics Ltd, 11 Chilton Enterprise Centre Station Road, Theale, Berkshire RG7 4AA

Job Number: 2964 **Customer Order Reference:** S Metcalfe

The acoustic calibrator was run for a period of time until a stable level was achieved. The output level was compared to the certified level of the laboratory measurement references. The calibrator was applied to the meter, removed, then reapplied to provide five separate readings, with the average value of these measurements recorded and certified.

The ambient temperature during calibration was **21.4** ± 1°C.
The barometric pressure was **99.5** to **99.6** kPa.
The relative humidity was **49** to **59** %

The sound pressure level output from the Acoustic Calibrator was measured in its half inch configuration using a B&K 4134 microphone. The mean level output of the acoustic calibrator was 113.9 dB at the reference setting and 93.9 dB at the -20dB setting.

The output frequency signal of the acoustic calibrator is 1000Hz.

All ACSL's calibration instrumentation is fully traceable to National Standards.The acoustic references are calibrated by laboratories which are UKAS accredited for the purpose.

Certificate No: **16246** ***Signature:***
Date of Issue: **8th November 2023** ***Print Name:*** **Trevor Lewis**