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REPORT NO. 14123/EN

An Environmental Noise Survey undertaken at Hydro Aluminium Deeside Limited, Wrexham, in accordance with BS4142:1997

Client

Hydro Aluminium Deeside Limited
Bridge Road
Wrexham Industrial Estate
Wrexham
LL13 9PS

FAO: Joel Priest
Date of Survey: 9 July 2014
Date of Report: 4 September 2014

MONITORING RETURNS N. WALES

	INITIALS	DATE
CHECKED Vs AUTHORIZATION	HK	28/10/2014
TRACKING	JB	28.10.14
OK FOR PUBLIC REGISTER		
	JB	EDem

Consultant	Reviewed by
	
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Executive Summary

Cottam Parkinson Consulting (CPC) Ltd. were commissioned to undertake an environmental noise survey at Hydro Aluminium Deeside Ltd., Wrexham. The survey was undertaken in accordance with the company's IPPC Permit and BS4142:1997.

Under the guidance given in BS4142, the results of the survey indicated that the likelihood of complaints, during the day and night time, would be unlikely at the nearest residential property on the Oval. During the daytime, the noise rating level was +6 dB over the background noise level and the night time was +3 dB, these levels are of marginal significance under BS4142.

However, it is considered that should any complaints be made by the residents, it may be due to the sporadic nature of the impact noises that occur during the stripping the pit activity and the loading of the charger.

1 Introduction

Hydro Aluminium Deeside Ltd., Wrexham, operate an aluminium recycling facility, where scrap aluminium is recycled to form aluminium extrusion ingots. Mr Joel Priest, of Hydro Aluminium Ltd., requested that Cottam Parkinson Consulting (CPC) Ltd undertake an annual environmental noise survey to comply with their IPPC Permit.

Section 3.4.3 "Noise and vibration" of the Permit states that, *"The operator shall carry out noise monitoring and assessment exercise on annual basis from the site at the nearest sensitive receptors during day and night as per BS4142:1997"*.

The survey was undertaken according to the methods in BS4142:1997, which assesses whether noise levels from industrial premises are likely to cause complaints from persons living in the vicinity of the site.

In addition, the measurements were compared to a noise rating (NR) curve of 40 for the night time readings and NR curve of 50 for the daytime. NR curves are an alternative method of evaluating the background noise, based on un-weighted sound level measurements in octave frequency bands.

The day and night time assessments were performed on 9 July 2014 by Daniel Cottam of CPC.

2 Measurement Procedure

The measurements were taken using a CEL 490 precision integrating 'real-time' sound level meter (SLM) serial number 035526, which complied with the Type 1 Standard. The SLM was calibrated both prior to and after monitoring to 114dB (1kHz) using a CEL-110/1 acoustic calibrator, serial number 064395. The SLM and the calibrator were last calibrated on the 13 February 2013.

The SLM was attached to a tripod at a height of 1½ metres and was positioned more than 3½ metres from any reflecting surface. A foam windshield was fitted to the microphone to prevent the effects of wind noise. Weather conditions, including wind speed, direction and temperature were noted at all monitoring locations.

In order to perform the BS4142 calculation, daytime readings for the factory not operating were taken a distance away from the factory where the noise generated by Hydro Aluminium was not audible. This position was adjacent to The Oval and behind disused garages off Bridgeway East. It was possible for Hydro Aluminium to shutdown their factory operations for the night time assessment, to enable the background noise to be established.

3 Observations

Daytime – 09/07/14

The noise was measured at approximately ten (10) metres from the boundary fence of the nearest property on The Oval.

Various noise sources were audible from the facility; these included the occasional 'crashing' type noises as the charger was being loaded with scrap aluminium and the very occasional 'chiming' noises as aluminium logs were removed from the casting pit. It was reported that a new insulated steel buffer was present in the casting area to help reduce the chiming noises undertaking the stripping the pit activity.

In addition, noises from scrap material being tipped into external skips was audible at the monitoring location. When this activity occurred, a maximum noise level of 55 dB(A) was recorded. A factory type 'hum' was also noticeable at the location; however, this was not just audible from Hydro's facility but appeared to emanate from other industrial premises on the estate. Persistent traffic was also noticeable on Bridge Road.

The weather was warm, clear and sunny, with a variable breeze (3 to 5 ms⁻¹) and a temperature of 20°C.

Night time – 09/07/14

The main noise source was the audible factory 'hum' coming from the facility. In addition, the chiming noise was also noticeable on one particular occasion which occurred during the stripping the pit exercise. The crashing of scrap aluminium being loaded onto the charger also occurred occasionally during the night time; however, it was not audible during these measurements.

Other noise sources included other factory noise from the industrial estate and occasional traffic on Bridge Road. The weather was clear, with no noticeable wind and a temperature of 15°C.

4 Results

4.1 BS 4142 Assessment

The full results are presented in Appendix 1 of this report.

Daytime readings:

Measured noise (Factory operating)
Residual noise (Factory not operating)

L_{eq} (60 min) = 48 dB(A)
 L_{eq} (30 min) = 46 dB(A)

Calculated specific noise = 44 dB(A)

Night time readings:

Measured noise (Factory operating)
Residual noise (Factory not operating)

L_{eq} (5 min) = 44 dB(A)
 L_{eq} (5 min) = 42 dB(A)

Calculated specific noise = 40 dB(A)

Specific Noise at the Nearest Property

The nearest property was one hundred and eighty five (185) metres from Hydro and the noise monitoring location was one hundred and seventy (170) metres from Hydro, therefore the noise will be reduced by 1 dB, thus giving:

Daytime specific noise: 43 dB(A)
Night time specific noise: 39 dB(A)

Table to show BS4142 calculation

	Day (dB(A))	Night (dB(A))
Specific noise (L_{eq})	43	39
Acoustic feature correction ⁽¹⁾	+5	+5
Rating level	48	44
Background noise level (L_{90})	42	41
BS4142 Difference	+6	+3
Likelihood of complaints	Marginal	Marginal

⁽¹⁾ this is a 5 dB factor that is applied if the noise contains distinct impulse noises e.g. clatters and bangs.

4.2 Noise Rating (NR) Curve

The full results of the noise rating curve conformance are presented in Appendix 3.

During the daytime, the NR curve indicated a noise rating of 41 dB. This conformed to the NR curve of 50 dB.

During the night time, the NR curve indicated a noise rating of 38 dB. This conformed to the NR curve of 40 dB.

5 Conclusion and Discussion

The results of the BS 4142 assessment indicated that, at the nearest property on The Oval, the likelihood of complaints during the daytime and night time would be unlikely. The results indicated a difference of +6 dB and +3 dB over the background noise level during the day and night time respectively; these levels are of marginal significance.

However, it is considered that should any complaints be made by residents, it may be due to the sporadic nature of the impact noises that occur during certain activities on site e.g. the stripping the pit and loading of the charger with scrap aluminium.

6 Recommendations

It would be beneficial for Hydro to investigate the alternative methods of removing logs from the casting pit, such that any impulsive noises e.g. chiming noises from the logs can be reduced during this activity. One possible method could be to remove the logs one at a time from the casting pit.

APPENDIX 1

Results of Noise Measurements

The following tables show the noise measurements taken during the daytime, on 9 July 2014

Table 3 – Daytime readings (Factory in operation)

Position 1 – On boundary of nearest property on The Oval				
Time Period	L _{eq} (60 min)	L ₉₀	L ₁₀	L _{Max}
14.15 – 15.15	47	45	49	67
16.08 – 17.08	48	46	50	69
Noise sources – Hydro factory, occasional chiming of aluminium logs and loading of the charger. Material being tipped into scrap bays in the yard. Traffic on Bridge Road was audible throughout the measurements.				

Table 4 – Daytime readings (Factory NOT in operation)

Position 2 – Behind disused garages on Bridgeway East opposite The Oval				
Time Period	L _{eq} (30 min)	L ₉₀	L ₁₀	L _{Max}
17.40 – 18.10	46	42	47	69
Noise sources – Persistent traffic on Bridge Road				

All noise levels were measured in dB(A).

The following tables show the noise measurements taken during the night time, on 9 July 2014

Table 1 – Night time readings (Factory in operation)

Position 1 – On boundary of nearest property on The Oval				
Time Period	L _{eq} (5 min)	L ₉₀	L ₁₀	L _{Max}
23.33 – 23.38	44	42	45	51
23.39 – 23.44	44	43	45	55
23.45 – 23.50	43	42	44	56
Noise sources: Hydro factory, occasional chiming of aluminium logs and light traffic on Bridge Road				

Table 2 – Night time readings (Factory NOT in operation)

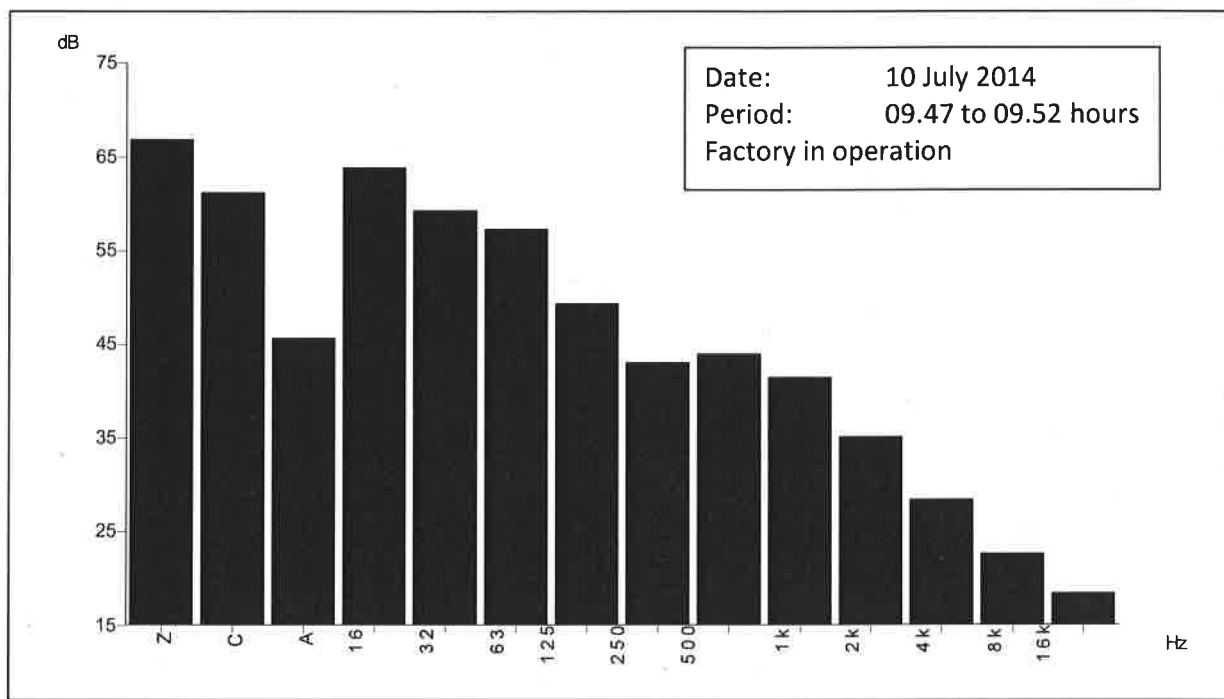
Position 1 – On boundary of nearest property on The Oval				
Time Period	L _{eq} (5 min)	L ₉₀	L ₁₀	L _{Max}
23.03 – 23.08	42	41	43	55
23.09 – 23.14	42	41	43	53
Noise sources – Background noises from other industrial premises on Wrexham Industrial Estate and distant road traffic				

All noise levels were measured in dB(A).

APPENDIX 2

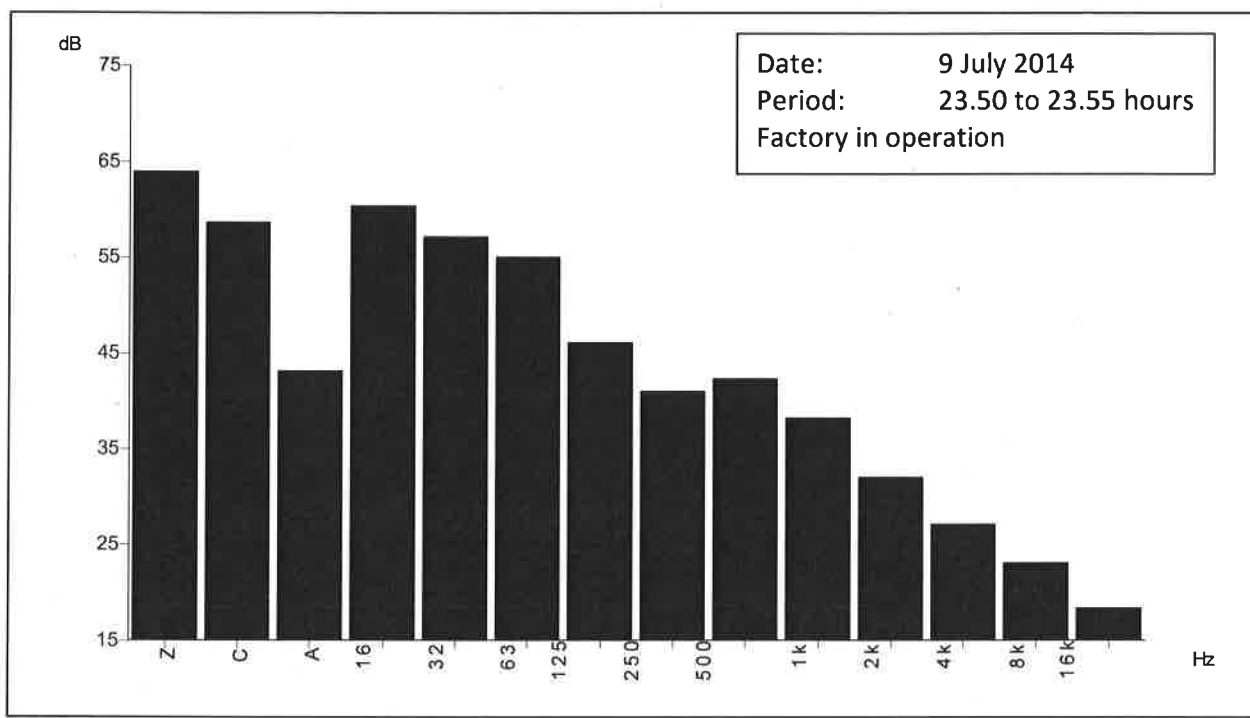
Octave Band Analysis

Figure 1 Octave Band Analysis undertaken at Hydro Aluminium Deeside, during the daytime, on 10 July 2014



OCTAVE BAND CENTRE FREQUENCIES, Hz / dB lin								
31.5	63	125	250	500	1k	2k	4k	8k
59.2	57.2	49.3	43.0	43.9	41.1	35.1	28.4	22.6

Figure 2 Octave Band Analysis undertaken at Hydro Aluminium Deeside, during the night time, on 9 July 2014

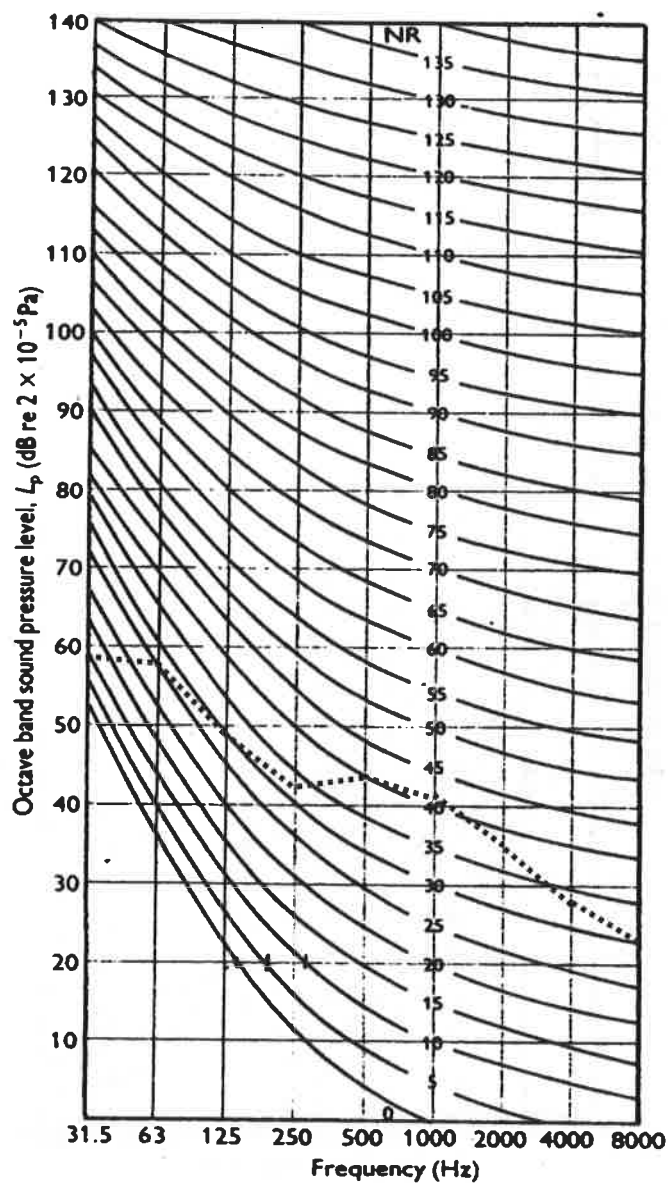


OCTAVE BAND CENTRE FREQUENCIES, Hz / dB lin								
31.5	63	125	250	500	1k	2k	4k	8k
57.1	55.0	46.1	41.0	42.3	38.2	32.0	27.1	23.1

APPENDIX 3

Noise Rating Curves

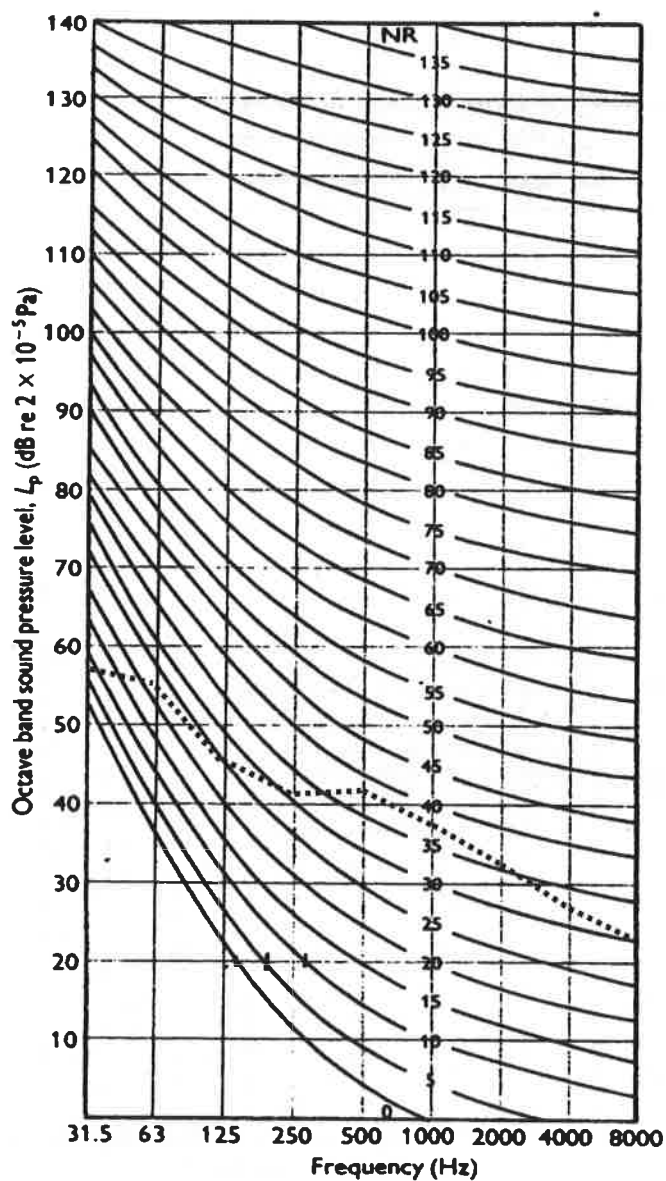
Figure 1 Noise Rating Diagram for the daytime readings with the factory in operation, on 10 July 2014



	OCTAVE BAND CENTRE FREQUENCIES, Hz / dB lin								
	31.5	63	125	250	500	1k	2k	4k	8k
NR 50	89.4	76.0	65.5	58.5	53.5	50.0	47.2	45.2	43.5
Results	59.2	57.2	49.3	43.0	43.9	41.1	35.1	28.4	22.6

Based on Figure 1 above, the estimated noise rating = 41 dB.

Figure 2 Noise Rating Diagram for the night time readings with the factory in operation, on 9 July 2014



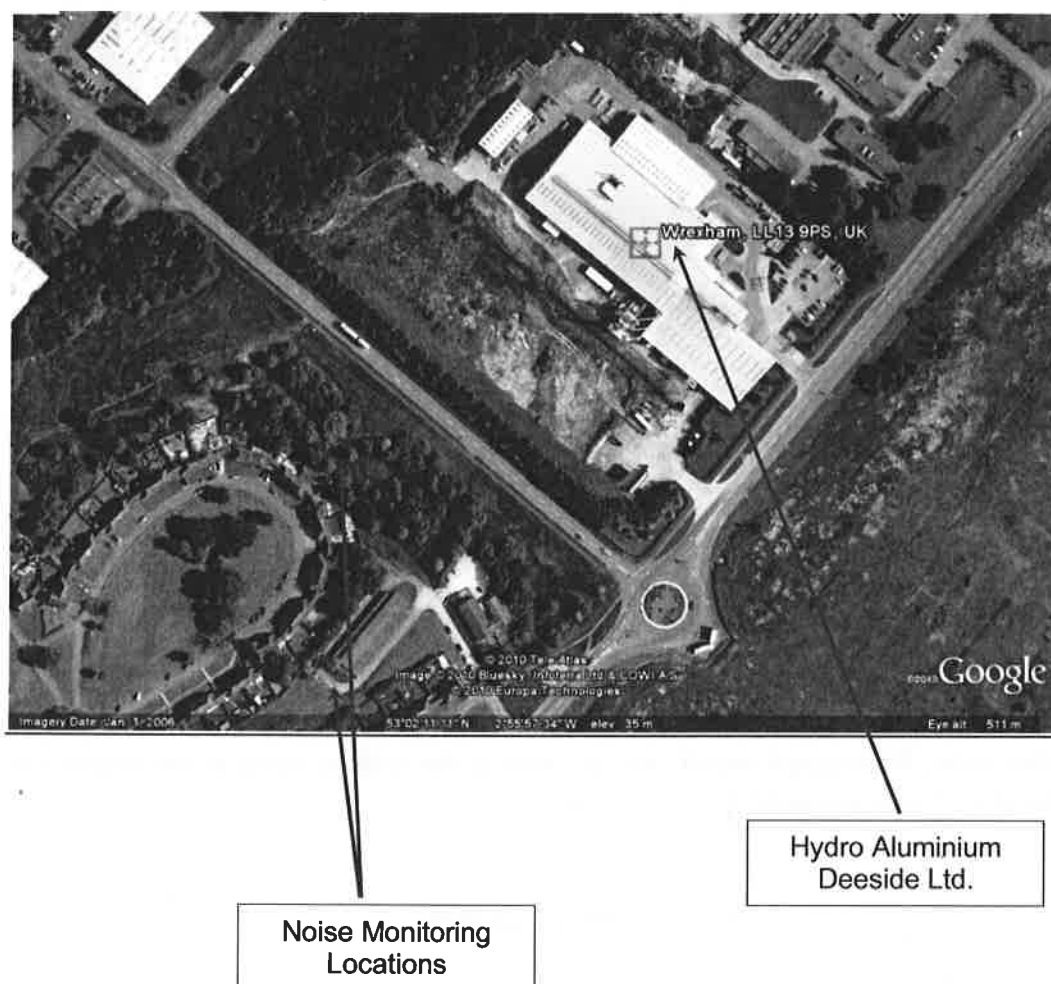
	OCTAVE BAND CENTRE FREQUENCIES, Hz / dB lin								
	31.5	63	125	250	500	1k	2k	4k	8k
NR 40	82.6	67.1	56.8	49.2	43.8	40.0	37.1	34.9	33.2
Results	57.1	55.0	46.1	41.0	42.3	38.2	32.0	27.1	23.1

Based on Figure 2 above, the estimated noise rating = 38 dB.

APPENDIX 4

Noise Monitoring Locations

Photograph showing the monitoring location and the facility



APPENDIX 5

Acoustic Terminology

'A' Weighting

A frequency weighting curve used in sound level meters. The A – weighting curve is used to measure noise to replicate how the human ear would respond to the noise.

Specific Noise Level (L_{eq})

The equivalent continuous A – weighted sound pressure level at the assessment position produced by the specific noise source over a given time interval.

Ambient Noise

The total sound at a given position composed of sound from many sources near and far.

Residual Noise

The ambient noise remaining at the assessment position when the specific noise source is suppressed to a degree that it does not contribute to the ambient noise.

Background Noise Level (L_{90})

This is the 'A' weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of the time.

Calibration Data

Instrument

Calibration

CEL 490.C – Type 1
Integrating Sound Level Meter

Serial No. 035526
Calibrated 13/02/13

CEL 110/1
Acoustic Calibrator

Serial No. 064395
Calibrated 19/02/14