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REPORT NO. 13163/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:

12 and 13 November 2013

Date of Report:

19 December 2013

MONITORING RETURNS N. WALLS

CHECKED Vs AUTHORISATION

TRACKING

OK FOR PUBLIC REGISTER

INITIALS DATE

SL	27.1.14
JB	27.1.14
SR	27.1.14
JB	EDRM

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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 night time would be likely at the nearest residential property on the Oval. During the daytime, the noise rating level was +1 dB over the background noise level, which indicated that complaints would be unlikely at the nearest property.

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 12 and 13 November 2013 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

Night time – 12/11/13

Two particular types of noises were audible from the factory; these included the chiming noises emitted during the 'stripping the pit' activity and crashing of scrap aluminium from loading the charger. These noisy activities occurred sporadically throughout the night and for very short periods only. No on site vehicle noise was audible at the monitoring location.

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 5°C.

Daytime – 13/11/13

The noise was measured at approximately ten metres from the nearest property on The Oval. Various noise sources were audible from the facility; these included occasional clattering noises as the charger was being loaded and typical 'chiming' noises as aluminium logs were removed from the casting pit.

In addition, there was also construction noises from diggers being used on an area of land, on Bridge Road, opposite Hydro Aluminium. These noises were not associated with Hydro.

Other background noise sources included persistent traffic on Bridge Road. The weather was clear and sunny, with a very light breeze ($< 1.0 \text{ ms}^{-1}$) and a temperature of 7°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) = 47 dB(A)
 L_{eq} (30 min) = 46 dB(A)

Calculated specific noise = 40 dB(A)

Night time readings:

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

L_{eq} (5 min) = 42 dB(A)
 L_{eq} (5 min) = 36 dB(A)

Calculated specific noise = 41 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: 39 dB(A)
Night time specific noise: 40 dB(A)

Table to show BS4142 calculation

	Day (dB(A))	Night (dB(A))
Specific noise (L_{eq})	39	40
Acoustic feature correction ⁽¹⁾	+5	+5
Rating level	44	45
Background noise level (L_{90})	43	35
BS4142 Difference	+1	+10
Likelihood of complaints	Unlikely	Likely

⁽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 42 dB. This conformed to the NR curve of 50 dB.

During the night time, the NR curve indicated a noise rating of 36 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 would be unlikely, with a difference of +1 dB over the background noise. The results indicated that during the night time complaints would be likely, with a difference of +10 dB over the background noise.

It is considered that the majority of complaints may be likely from the sporadic impact noises that occur during the stripping the pit and loading of the charger.

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. clanging and chiming noises from the logs can be reduced during this activity.

APPENDIX 1

Results of Noise Measurements

The following tables show the noise measurements taken during the night time, on 12 November 2013

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}
22.58 – 23.03	42	41	44	52
23.04 – 23.09	42	41	43	56
23.10 – 23.15	42	39	44	60
23.18 – 23.23	41	40	43	54
Noise sources: Hydro factory, occasional crashing noises from the charger being loaded and occasional 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}
23.42 – 23.47	38	36	39	58
23.49 – 23.54	36	35	37	49
Noise sources – Background noises from other industrial premises on Wrexham Industrial Estate and distant road traffic				

All noise levels were measured in dB(A).

The following tables show the noise measurements taken during the daytime, on 13 November 2013

Table 3 – Daytime readings (Factory in operation)

Position 1 – On boundary of nearest property on The Oval				
Time Period	Leq (60 min)	L ₉₀	L ₁₀	L _{Max}
10.05 – 11.05	46	43	48	62
11.09 – 12.09	47	44	50	63
12.15 – 13.15	47	43	50	68
Noise sources – Hydro factory, chiming of metal logs, occasional loading of the charger and traffic on Bridge Road				

Table 4 – Daytime readings (Factory NOT in operation)

Position 2 – Behind disused garages on Bridgeway East opposite The Oval				
Time Period	Leq (30 min)	L ₉₀	L ₁₀	L _{Max}
13.28 – 13.58	46	43	50	66
Noise sources – Persistent traffic on Bridge Road				

All noise levels were measured in dB(A).

APPENDIX 2

Octave Band Analysis

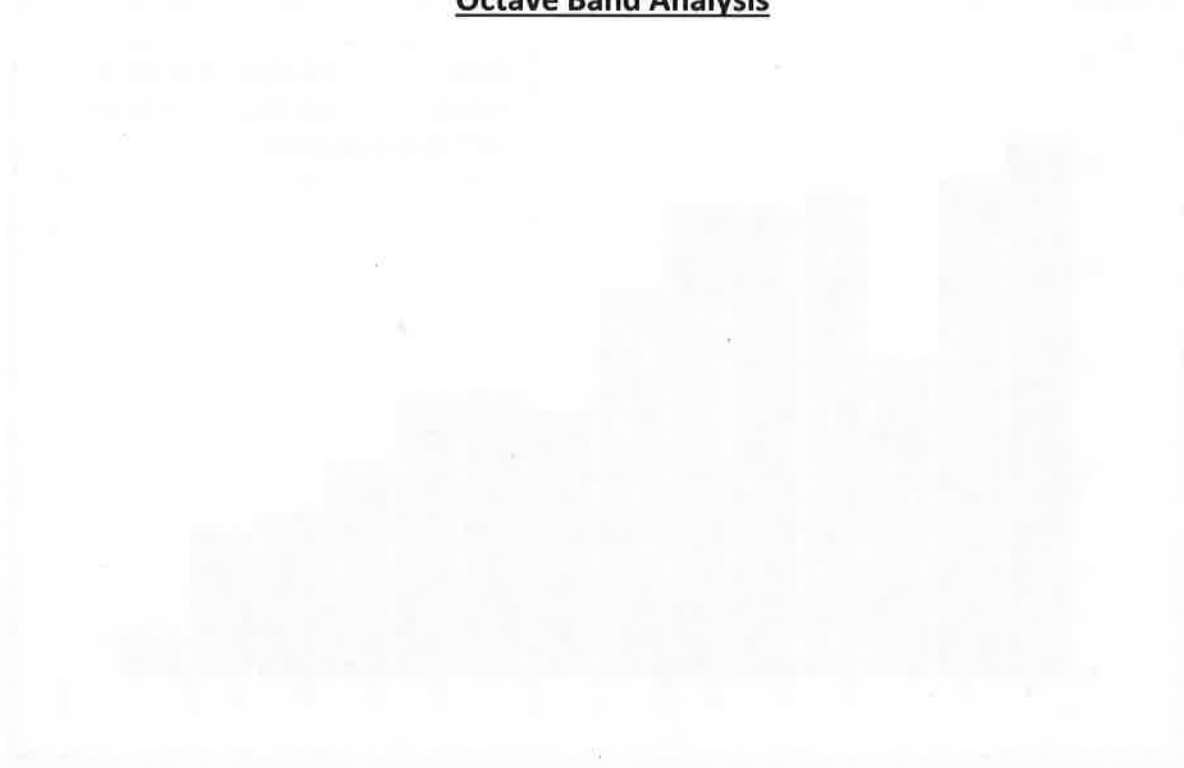
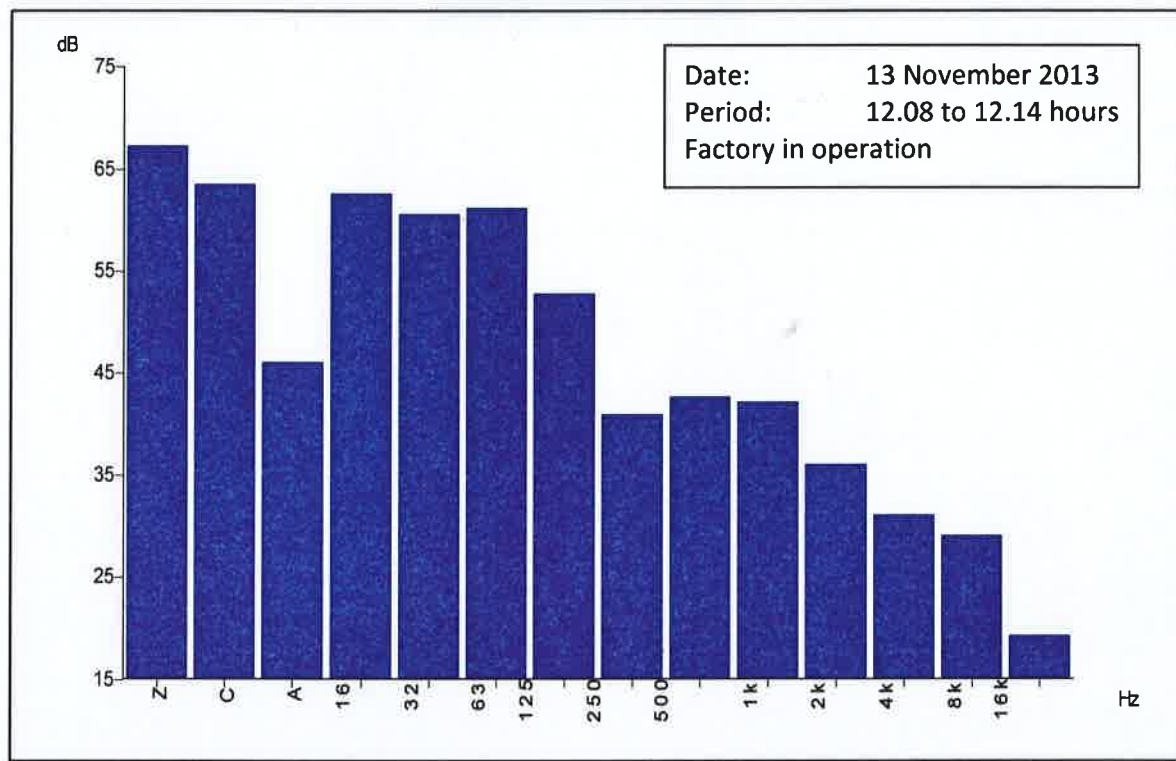
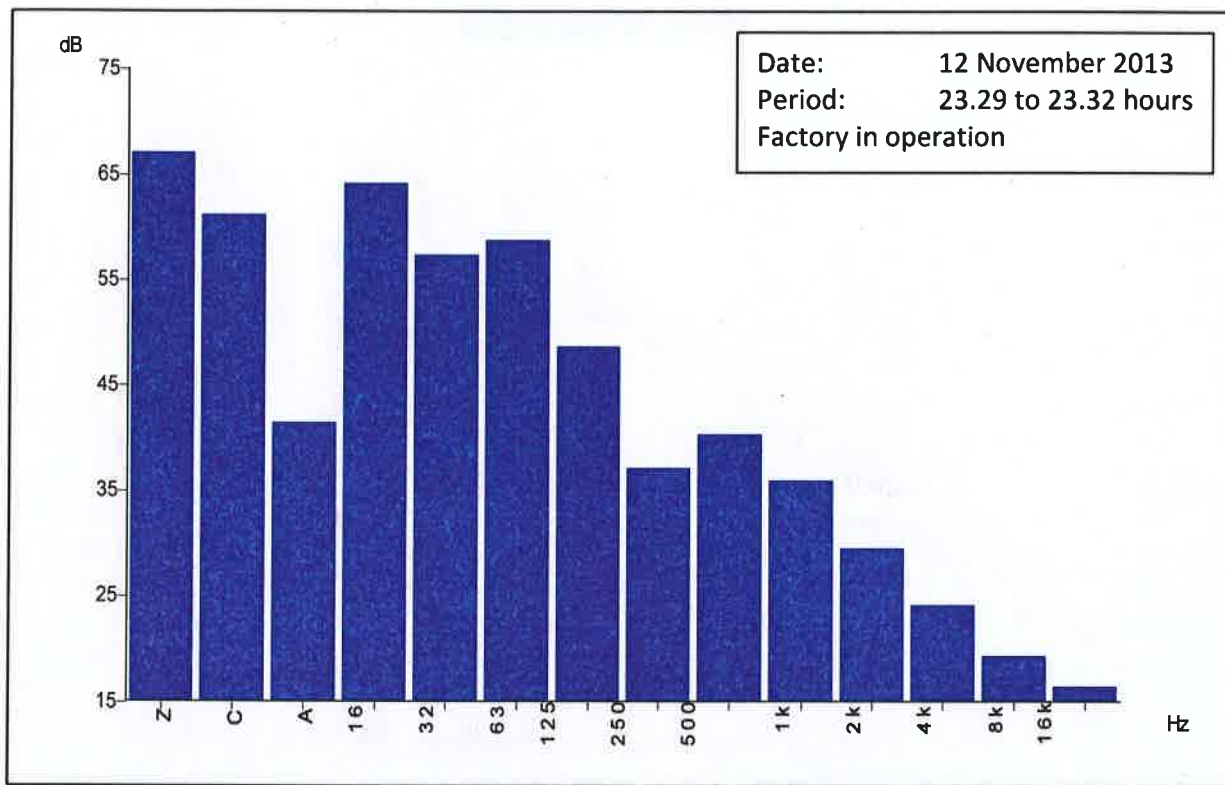


Figure 1 Octave Band Analysis undertaken at Hydro Aluminium Deeside, during the daytime, on 13 November 2013



OCTAVE BAND CENTRE FREQUENCIES, Hz / dB lin								
31.5	63	125	250	500	1k	2k	4k	8k
60.5	61.1	52.7	40.9	42.6	42.1	36.0	31.0	29.0

Figure 2 Octave Band Analysis undertaken at Hydro Aluminium Deeside, during the night time, on 12 November 2013



OCTAVE BAND CENTRE FREQUENCIES, Hz / dB lin								
31.5	63	125	250	500	1k	2k	4k	8k
57.3	58.7	48.6	37.1	40.3	35.9	29.5	24.1	19.3

APPENDIX 3

Noise Rating Curves

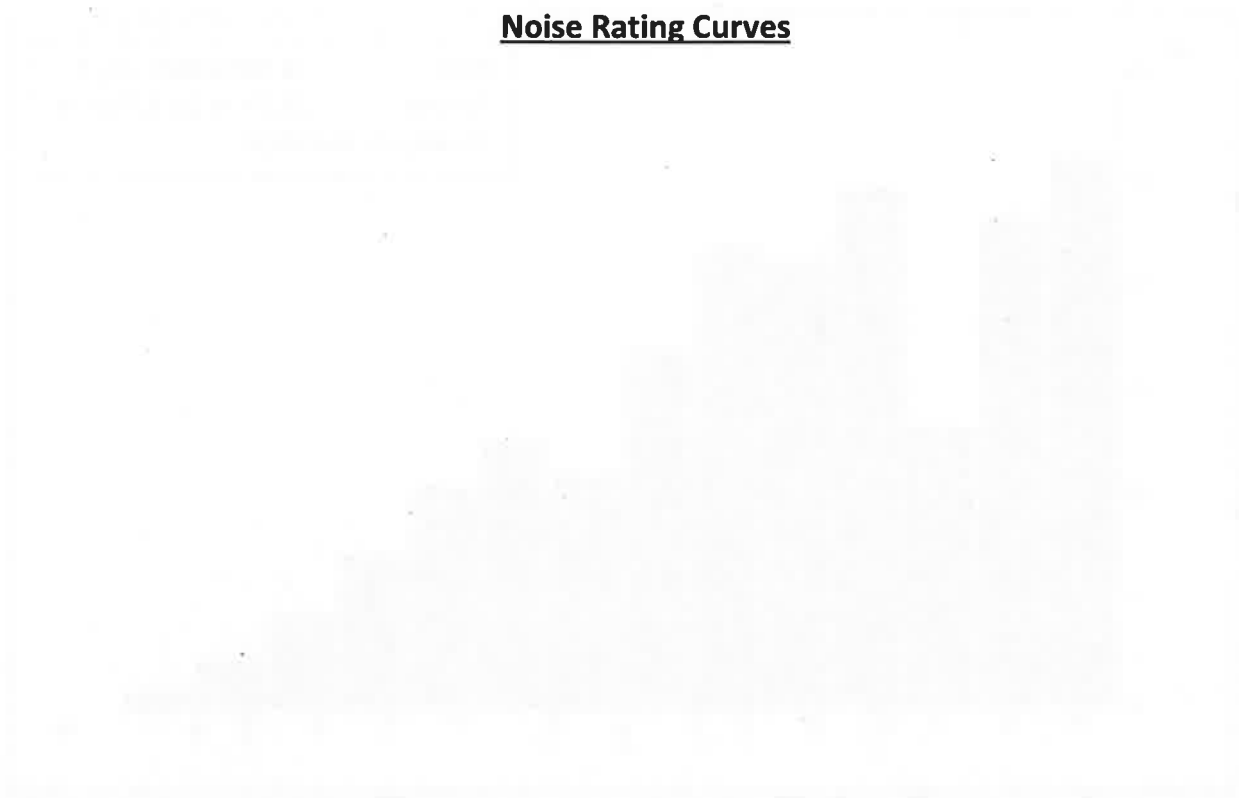
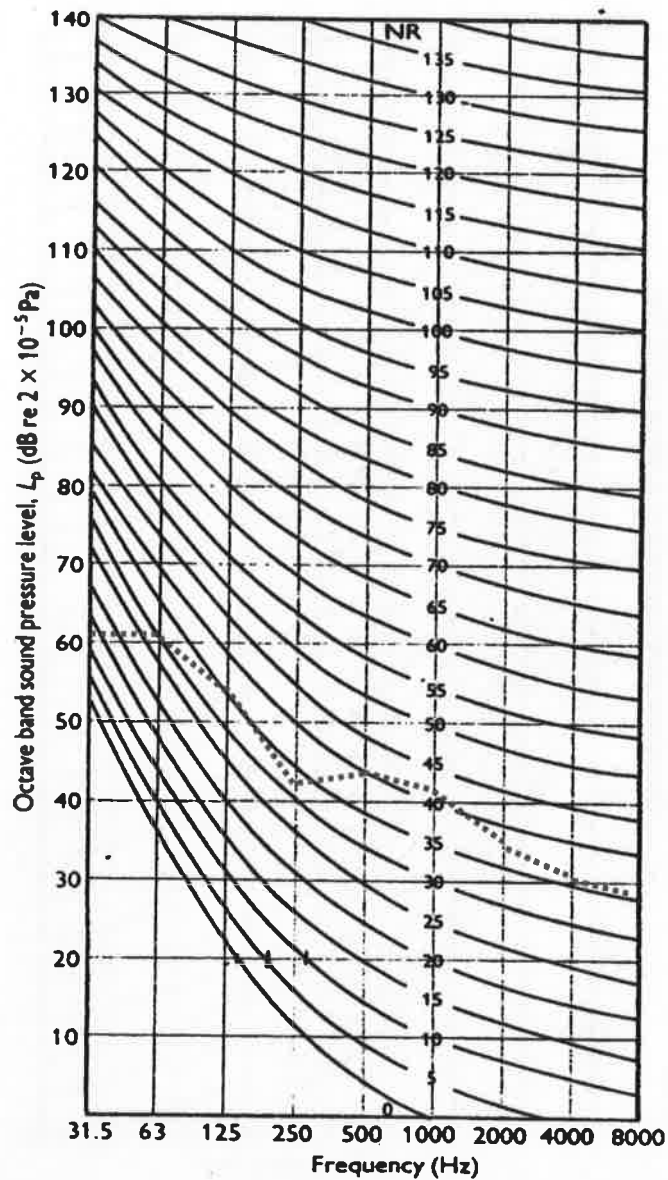


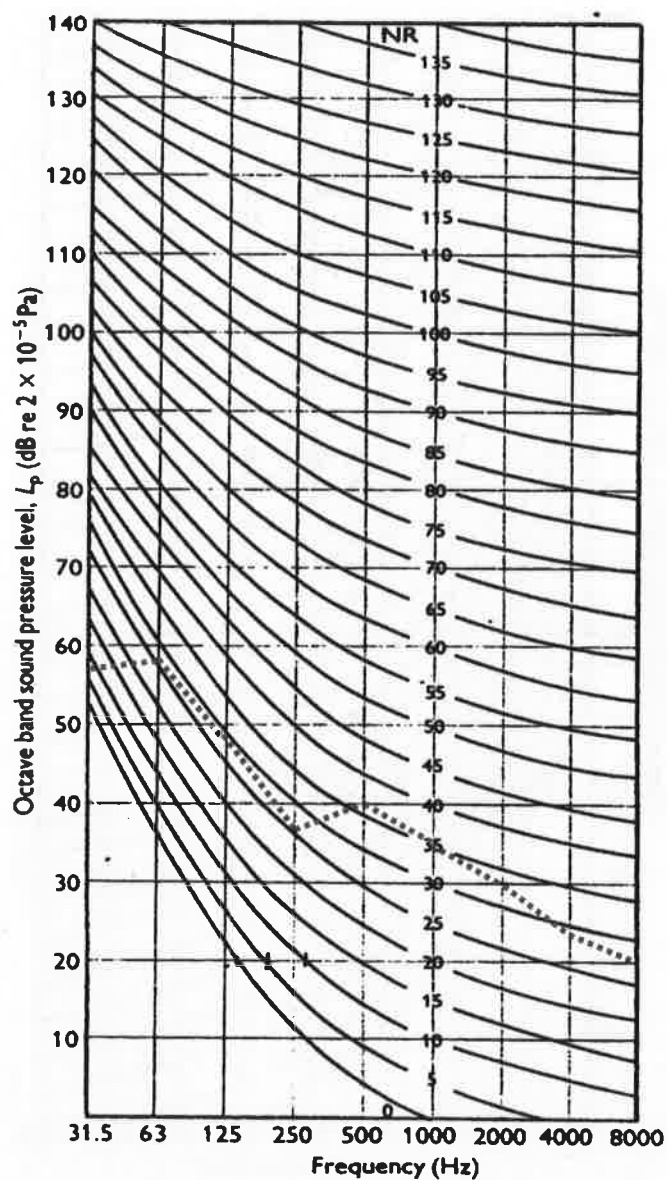
Figure 1 Noise Rating Diagram for the daytime readings with the factory in operation, on 13 November 2013



	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	60.5	61.1	52.7	40.9	42.6	42.1	36.0	31.0	29.0

Based on Figure 1 above, the estimated noise rating = 42 dB.

Figure 2 Noise Rating Diagram for the night time readings with the factory in operation, on 12 November 2013



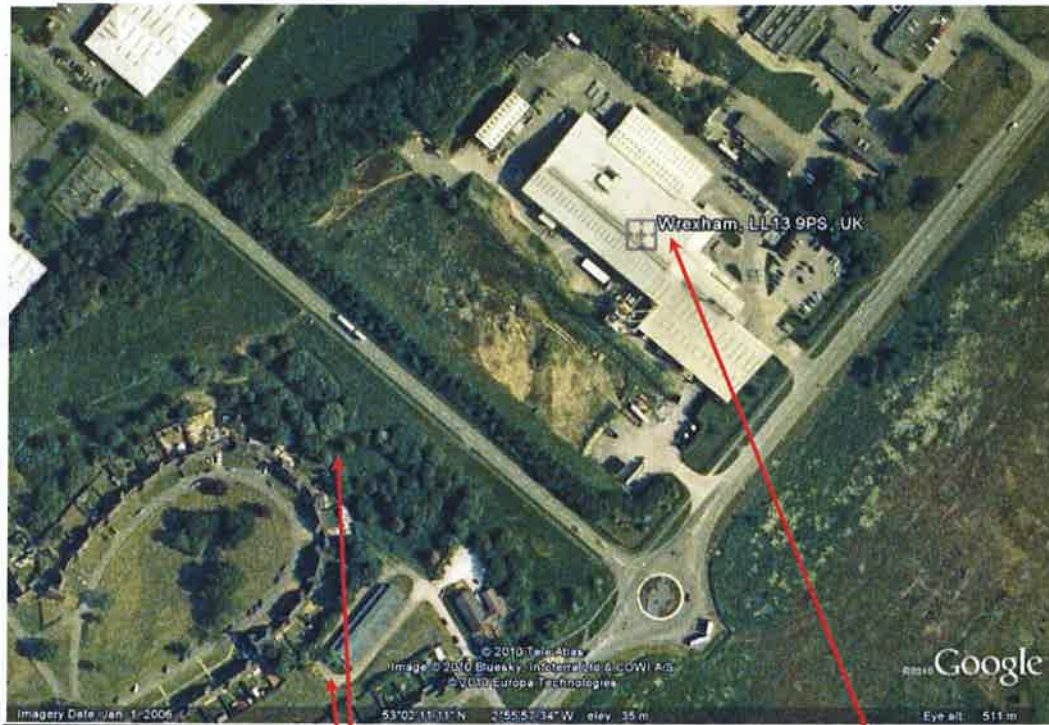
	OCTAVE BAND CENTRE FREQUENCIES, Hz / dB lin								
	31.5	63	125	250	500	1k	2k	4k	8k
NR 40	82.6	67.1	56.8	49.2	43.8	40.0	37.1	34.9	33.2
Results	57.3	58.7	48.6	37.1	40.3	35.9	29.5	24.1	19.3

Based on Figure 2 above, the estimated noise rating = 36 dB.

APPENDIX 4

Noise Monitoring Locations

Photograph showing the monitoring location and the facility



Noise Monitoring
Locations

Hydro Aluminium
Deeside Ltd.

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.