Environmental Noise Assessment

Dairy processing facility:

The Creamery
Aber-Arad
Newcastle Emlyn
SA38 9DQ

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1.0 Introduction

Aether Acoustics is appointed by Dairy Partners Ltd. to carry out an acoustic assessment of the dairy processing plant at The Creamery, Aber-Arad.

This assessment has been carried out in the context of British Standard 4142:2014 +A1:2019 and was requested by Natural Resources Wales (NRW) in regulating the existing Environmental Permit for the facility.

The assessment follows on from Best Available Techniques (BAT) audits previously carried out for the site and refers to data and findings contained in ParkerJones Acoustics BAT Audit report of 16th September 2024.

This assessment is not required in the context of a new or modified source.

The assessment evaluates noise from commercial sources previously identified as making the main contribution to off-site noise levels; in addition, other on-site sources identified as having the potential to contribute to overall noise impact at time of recent surveys would be included as appropriate. As such, this report is not intended as an exhaustive review of all sources associated with the premises.

This report is intended to provide information relating to existing noise from the operation, its current impact at nearby receptors and any further measures which could potentially be adopted to further reduce noise impact. In particular, the report sets out the following details:

- The results of noise surveys undertaken on site and in the vicinity of nearby noise sensitive receptors (NSRs).
- The appropriate assessment criteria and guidance relating to noise in the environment as associated with this kind of operation.
- A noise impact assessment in the context of Standard 4142:2014 +A1:2019 and other guidance relevant to this industry.
- Recommendations on any feasible additional noise mitigation measures (further to the BAT audit) which may be considered to help further reduce noise impact.

2.0 Noise Surveys

2.1 Initial Site Survey

Aether Acoustics carried out its initial noise survey between 7th – 11th January 2026. Weather at the time of the survey was mixed, with periodic rainfall. Where periods of consistent heavy rain occurred, monitoring was suspended. Rainy conditions may have increased the noise contribution of road traffic due to tyre noise on the wet surface.

The manned noise survey was undertaken by Stratton Barrett and covered the periods 13:00 – 14:00hrs on 7th January and 19:00hrs 10th – 10:00hrs on Sunday 11th January 2026.

Measurements were made close to noise sources and at the site boundary / outside nearby residential properties. The fixed monitoring equipment was positioned between 7th – 11th January 2026.

Wind speeds were typically low during the manned survey and were monitored using a handheld anemometer; manned noise measurements were only taken in conditions where local wind speeds were ≤5m/s.

Figure 1 below shows historic weather information for the survey period. It can be seen that overnight wind conditions for 10th – 11th January were predicted to be strong, however locally measured speeds were typically ≤5m/s at 2m height; the location of the premises is generally sheltered by hills.

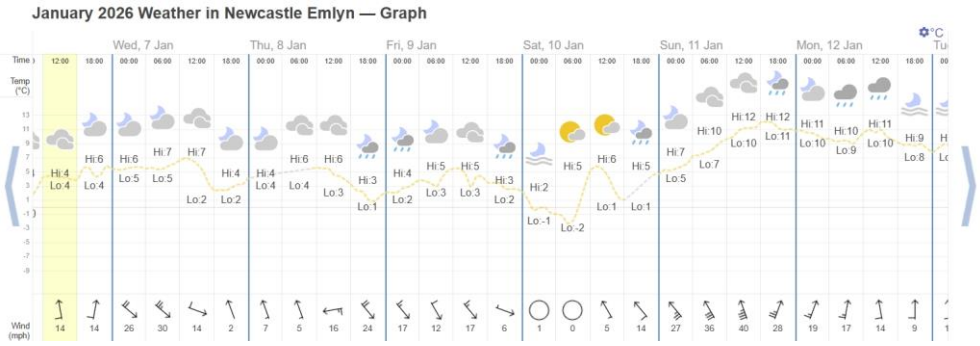


Figure 1: Historic weather information, Aber-Arad area 7th – 11th January 2026

Data from the fixed monitoring location (M1) were analysed in terms of periods where heavy rain could affect measurements; outlying results were filtered from the assessment.

2.2 Further Background Sound Surveys

Background sound levels were measured at representative locations on 20th February 2026 (night-time period) and 7th September 2026 with the aim of assessing repeatability / confirmation of levels measured in the original survey.

Additional measurement locations were used where influence from the Dairy Partners premises was observed to be negligible against other sources (subjectively inaudible). See Section 4.1 below.

Weather at the time of these surveys was clear, with very low wind speeds which were monitored using a hand-held anemometer.

2.3 LNG Fuelling Surveys

Short duration surveys of LNG fuelling from tankers were made on two occasions, 20th June and 12th August 2026. Measurements were taken near to tankers, outside screening barrier and at nearby noise sensitive receptors (NSR 1 and 2).

Weather at the time of these surveys was sunny and dry with very low wind speeds.

2.4 Measurement Procedures

The instrumentation used for the environmental noise surveys consisted of the following equipment:

- Hired environmental measurement kit incorporating a Norsonic NOR 140 Type 1 precision sound level meter and GRAS 40AS outdoor microphone
- In-house Norsonic NOR 140 Type 1 precision sound level meter
- Bruel & Kjaer 4231 calibrator

Laboratory calibration certificates for all equipment are included at the end of this report.

The equipment was calibrated before and after the noise measurements; no significant drift was detected.

Factory operating conditions were described as typical throughout the original survey period.

It was not possible to measure a number of sources during the survey (e.g. boiler house pressure valve release) and as such, measurement data / noise model output from ParkerJones BAT audits have been referenced where necessary.

A fixed unmanned sound level meter was positioned on the South-eastern site boundary (M1 vicinity of NSR 2), and a manned survey took in simultaneous on-site levels as well as at the nearest receptors on Heol Arad (M2 / NSR 4), marked in blue in Figure 1 below:

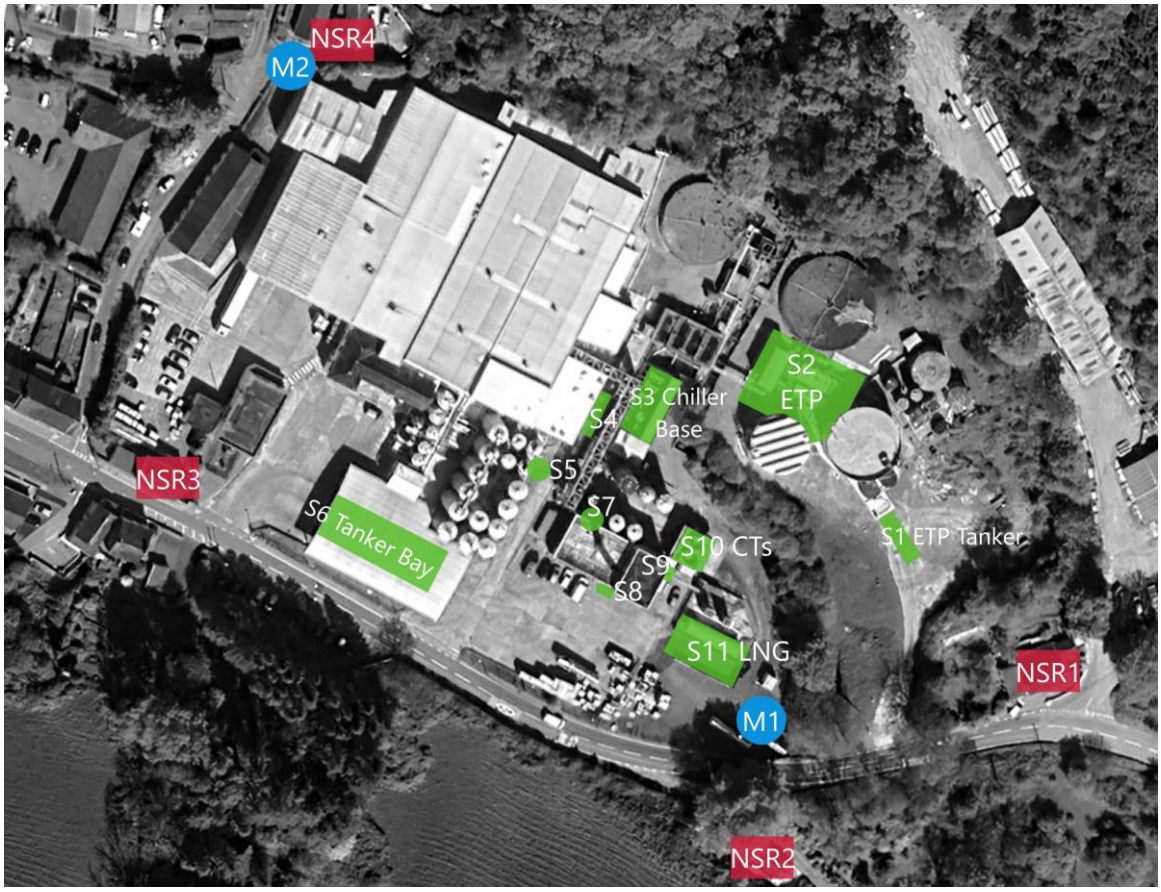


Figure 2: Survey measurement locations numbered on aerial photograph (M1 and M2)

NSR 1:	Dwelling (Pantyronnen) to the south-west of site on B4333
NSR 2:	Dwelling to the south of the site on B4333
NSR 3:	Dwellings next door to the west of site including Fronhelyg
NSR 4:	Dwellings to the north of the main building on Heol Arad

2.5 Summary of Receptor Noise Levels

Full results of the noise levels recorded by Aether Acoustics during the course of the noise survey are included in Appendix B of this report.

The following table summarises the results of receptor vicinity noise measurements in terms of averaged day and night-time statistical levels.

Location	Date	Period & Description	L_{Aeq}	L_{Amax}	L_{A90}	L_{A90} MODE
M1	07/01/26	Daytime 12:00 – 23:00	58	80	49	47
M1	08/01/26	Night-time 23:00 – 07:00	53	82	49	47
M1	08/01/26	Daytime 07:00 – 15:00	60	93	52	52
M1	10/01/26	Daytime evening	54	80	47	47
M1	11/01/26	Night-time 23:00 – 07:00	51	77	48	47
M1	11/01/26	Daytime morning	58	81	50	50
M2	10/01/26	Daytime evening	42	72	38	38
M2	11/01/26	Night-time	40	68	38	38

Table 1A: Summary of survey measurement results (dBA)

Table 1B provides a summary of averaged and statistical levels for night-time where L_{Amax} values are low (suggesting no cars passed the measurement location). The data presented would provide an indication of the typical absolute level from the dairy facility at Location M1 (i.e. without the influence of road traffic).

Location	Date	Period & Description	L_{Aeq}	L_{Amax}	L_{A90}
M1	All	Night-time 00:50 – 03:15 Samples unlikely to contain passing cars (L_{Amax} 49-53dB)	48	53	47

Table 1B: Summary of results, samples with lowest L_{Amax} value (dBA)

2.6 Summary of Main Onsite Source Levels

The following table summarises the results of onsite measurements near specific noise generating plant items / processes. Aether Acoustics (AA) results as well as ParkerJones (PJA) BAT audit measurement data are incorporated.

REF	Data source	Area	External Item / Process	Distance (m)	$L_{Aeq,Tr}$	L_{Amax}
S1	PJA	ETP Effluent collection	ETP tanker pumping @1m	1	84	-
S1A	PJA		ETP tanker idling @1m	1	83	-
S2	AA	Effluent Treatment Plant	ETP area general noise average @12m to south	12	61	62
S3	AA	Chiller base shed	Chillers inside shed	3	85 [T]	87
S3A	AA		Glycol pumps inside shed	2	90 [T]	96
S3B	AA		Outside shed east elevation	2	71 [T]	77
S4	PJA	Main building	Vat room exhausts (east elevation)	1	82	-
S5	PJA		Whey dispatch pump	1	86	-
S6	AA	Tanker Bay	Lorry Idling	2	76	80
S6A	PJA		Transfer pump	1	74	-
S7	PJA	Boiler House	Boiler House Pressure Valve Release	3	≤82	-
S8	AA		Boiler house louvers	2	61	63
S9	AA	Cooling towers	Cooling tower pumps Inside shed (moving mic average)	2	82 [T]	85
S9A	AA		Cooling tower pumps Outside shed	2	61	65
S10	AA		Cooling towers	3	61	66
S11	AA	Liquid Natural Gas Delivery	LNG truck mounted pump	1	88	-
S11A	AA		LNG alarm (truck cab)	1	95 [T]	-

[T] Indicates a potentially tonal source

Table 2: Summary of onsite plant items measurement results and data (dBA)

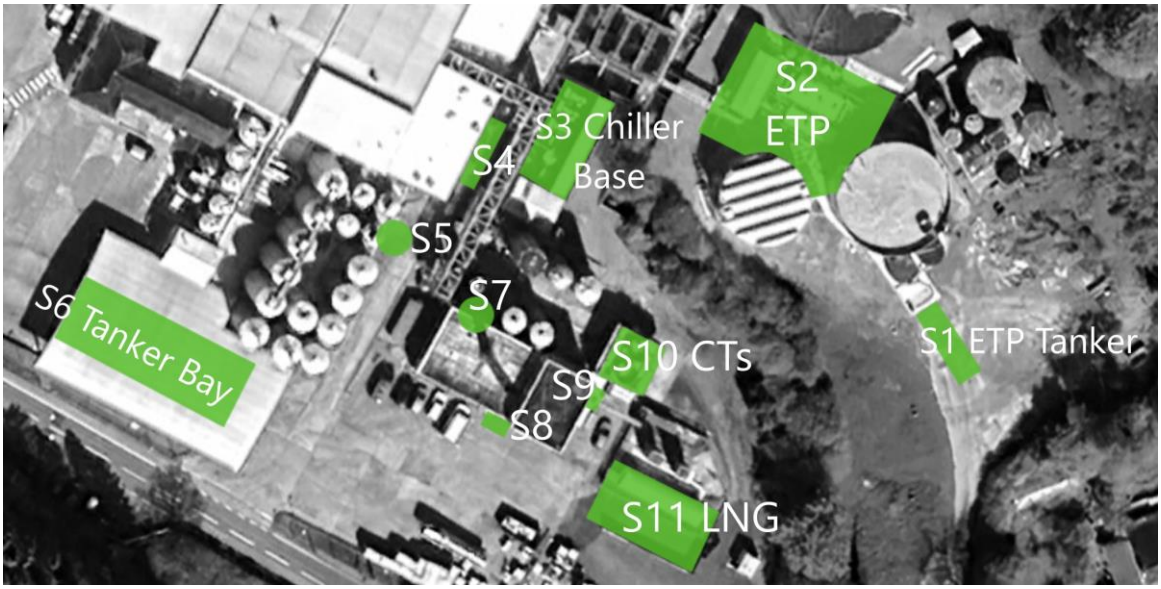


Figure 3: Dominant plant / process items under assessment marked in green on aerial photograph

2.7 Description of the Noise Climate

The noise climate in the vicinity of the site in the absence of The Creamery itself would be typically dominated by road traffic along the B4333 and other local routes.

Natural sources, mainly the Afon Arad River running through the site contributes significantly at NSR 1 and 2.

3.0 Noise Assessment Criteria

In order to assess the potential noise impact of the installation, Aether Acoustics has reviewed the following guidance documents and standards:

- Technical Advice Note 11 (Wales)
- British Standard 4142: 2014 +A1: 2019
- British Standard 8233: 2014
- World Health Organisation Guidelines on Community Noise
- Method implementation document (MID) for BS 4142
- Noise and vibration management: environmental permits
- Noise and Soundscape Plan for Wales 2023-2028

3.1 Technical Advice Note 11 (Wales)

TAN 11 provides supplementary information to the current Planning Policy Wales document (2024). The document summarises the accepted standards and guidance which may be used for noise assessment and includes the following statement:

B17. The likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS 4142: 1990. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the "rating level" defined in BS 4142. This "rating level" should be used when stipulating the level of noise that can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. The Standard states that, 'A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance……In addition, general guidance on acceptable noise levels within buildings can be found in BS 8233: 1987.'

3.2 British Standard 4142: 2014 +A1:2019

British Standard 4142: 2014 “Methods for assessing and rating industrial and commercial sound” describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

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.

The standard states that where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

BS 4142 does not define 'low' in the context of background sound or rating levels. The note to the Scope of the 1997 version of BS 4142 defined very low background sound levels as being less than about 30 dB L_{A90}, and low rating levels as being less than about 35dB $L_{Ar,Tr}$.

ANC Technical Note for BS 4142:2014 +A1:2019 (March 2020) states:

It is likely that where the background and rating levels are low, the absolute levels might suggest a more acceptable outcome than would otherwise be suggested by the difference between the values. For example, a situation might be considered acceptable where a rating level of 30dB is 10dB above a background sound level of 20dB, i.e. an initial estimate of a significant adverse impact is modified by the low rating and background sound levels.

3.3 BS 8233: 2014

BS 8233 provides a code of practice for the sound insulation of a variety of building types affected by general environmental noise. It provides recommendations for control of noise in and around buildings and suggests appropriate internal ambient noise level criteria / limits for a variety of different situations including residential properties.

The following table summarises the noise limits suggested by BS 8233 applying to residential properties.

Activity	Room	Good Design Range $L_{Aeq,T}$ dB	
		07:00-23:00hrs	23:00-07:00hrs
Resting	Living rooms	35	-
Dining	Dining room / area	40	-
Sleeping (or daytime resting)	Bedrooms	35	30

Table 3: Noise limits inside residential properties suggested in BS 8233

3.4 WHO Guidelines on Community Noise

In 1980 the World Health Organisation proposed environmental health criteria for community noise including consideration of noise levels at which sleep disturbance may take place.

The guidance suggests that an internal L_{Aeq} below 30dB is required to preserve the restorative process of sleep. This is equivalent to a free-field level of around 42 to 45dB L_{Aeq} or a façade level of 45 to 48dB L_{Aeq}, assuming open windows.

Section 4.3.1 of the document also defines reasonable outdoor noise limits with the aim of protecting outdoor amenity users from annoyance. In order to protect the majority of people from moderate annoyance, an outdoor limit of 50dBL_{Aeq} from steady, continuous noise is recommended. The document also states:

At night, sound pressure levels at the outside façades of living spaces should not exceed 45dB$_{LAeq}$ and 60dB$_{LAmax}$, so that people may sleep with bedroom windows open.

3.5 Method implementation document (MID) for BS 4142

The MID supplements BS 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound (BS 4142).

Section numbers in the MID follow the clause numbers of BS 4142 and provide supplementary information / clarification for each clause where appropriate.

The MID includes information relating to measurement, obtaining sound levels, rating, assessment and uncertainty.

The document stipulates that BS 4142 must be used to investigate complaints.

3.6 Noise and vibration management: environmental permits

This guidance was produced by UK environment agencies to help holders and potential holders of environmental permits apply for, vary, and comply with their permits.

The guidance covers:

- How the environment agencies will assess noise from certain industrial processes
- What the law says you must do to manage noise and vibration
- Advice on how to manage noise – in particular, how to carry out a noise impact assessment and what operators should include in a noise management plan

3.7 Noise and Soundscape Plan for Wales

The Noise and Soundscape Plan 2023-2028 is Wales's national strategy on soundscapes, meaning the sound environment as perceived or experienced and / or understood by a person or people, in context.

The document provides general guidance on preserving and creating appropriate soundscapes to promote health and wellbeing. The document states:

The Environmental Noise (Wales) Regulations 2006 require our environmental noise action plans to identify "quiet areas in agglomerations" and aim to protect them against an increase in noise.

4.0 Environmental Noise Assessment

This section details a noise impact assessment of the Aber-Arad premises in the context of BS 4142:2014 +A1:2019.

The assessment considers the impact of relevant individual onsite sources identified in Table 2 (S1 – S11) at each noise sensitive receptor location identified in Figure 1 (NSR 1 – 4) in the context of ambient noise levels measured at each receptor location / recommended background sound level (as appropriate).

Noise sources not detailed in Table 2 above have been omitted from the assessment; these have been calculated to make negligible additional cumulative impact at each NSR given the presence of other dominant sources.

4.1 Background Sound Level

Ambient sound levels were measured in the vicinity of NSR2 (M1) and at NSR 4; data are obviously dominated by noise from the Dairy Partners facility. As such, it would not be possible to derive the background sound level for these locations as the factory operates 24hrs / 365 days.

The background sound was measured in accordance with section 8.4 of BS 4142, i.e. *at a location which is not subject to the specific sound and where the residual sound is considered to be comparable to that of the assessment location.*

Representative BSL samples were measured at the following locations (marked in Figure 4):

- B1: 230m away from the nearest fixed onsite source, SE of site on B4333 (track off the main carriageway)
- B2: 800m away from the nearest fixed onsite source, SE of site on B4333 (access layby off the main carriageway)
- B3: Heol-Arad approx. 240m away from the nearest fixed onsite source
- B4: Teifi Business Park grass verge near roadside approx. 100m away from site and well screened by intervening buildings

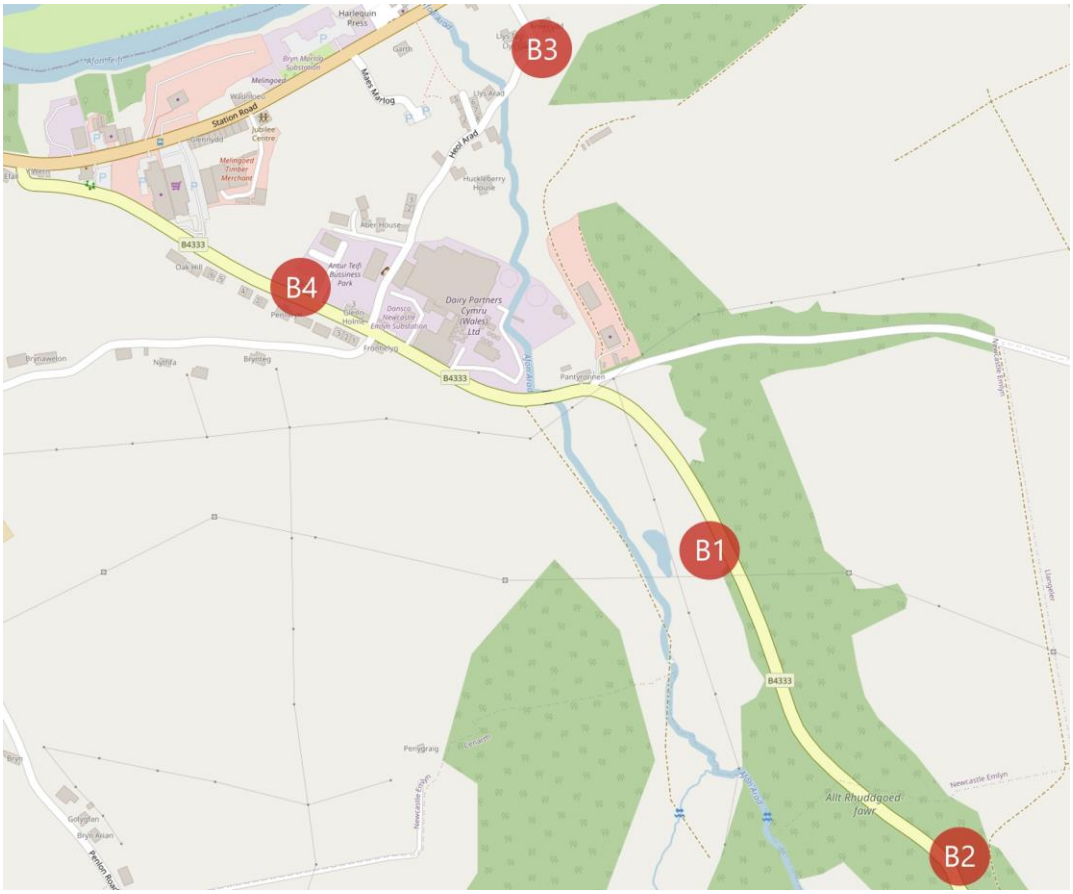


Figure 4: Background sound measurement locations (marked in red)

The following table summarises the day and night-time measured levels:

Location / Time	Description	Comments	L_{Aeq}	L_{Amax}	L_{A90}
B1 Night 23:45 – 01:10	230m away from the nearest fixed onsite source	Tonality of chillers / pumps just audible over residual. 5 no. cars passed	56	85	39
B2 Night 01:10 – 01:40	800m away from the nearest fixed onsite source	Dairy Partners premises not audible, river noise dominant. No cars passed	40	55	39
B3 Night 01:45 – 02:20	Heol-Arad approx. 240m away from the nearest fixed onsite source	Dairy Partners premises not audible, river noise dominant. No cars passed	40	63	40
B4 Day 13:45 – 15:50	Teifi Business Park approx. 4m from roadside	Light afternoon road traffic	60	84	41

Table 4: Background sound measurements away from the Aber-Arad premises

It has not been possible to measure background sound at locations near the river in the absence of influence from the premises.

For daytime periods at noise sensitive locations near the river (i.e. NSR 1 & 2), the noise model output been used to derive an estimated BSL. The octave band model output was subtracted from the averaged L_{90} data for location M1, which includes typical river noise in the vicinity of NSR 2.

The outcome would be an estimated daytime BSL approx. 46dB$_{LA90}$ for locations in the vicinity of the river, based on typical river flow outside the driest summertime period (the survey period at M1 was in January).

A daytime BSL of 41dB may be appropriate for NSR 3, where river noise will be unlikely to significantly influence background levels during the day.

A night-time BSL of 39dBL$_{A90}$ would be put forward for noise sensitive locations near the B4333 (i.e. NSR 1, 2 and 3).

Background levels in the vicinity of NSR 1 & 2 would likely be higher with the contribution of nearby river flow noise, depending on the season. However, the BSL put forward would aim to be sufficiently robust to account for typical summertime periods also.

At NSR 4, constant low level noise break-out from the premises dominates ambient and background sound levels during day and night-time periods. It could be said that noise from the main building is an established part of the soundscape in this area.

As such, a night-time BSL of 38dB$_{LA90}$ would be put forward for noise sensitive locations to the west / north-west of the main building (along Heol Arad). A rating level not exceeding this BSL would result in an internal level approx. 23dBA inside dwellings nearest the premises.

4.2 Tonality Assessment

A number of sources on site have been identified as having measurable tonal qualities.

The BAT audit of 2024 concludes that source tonality is generally either non-distinguishable or not particularly audible offsite at the nearest NSRs, with the exception of chillers and glycol pumps (source S3) and LNG refuelling alarm (occasional, short duration daytime only).

Recent Aether Acoustics measurements of the LNG delivery process highlighted significant tonality in the P88 type LNG tanker fuelling equipment, as detailed below. Tonality was not present in the later survey of P95 / P96 type tanker equipment.

Annex C of BS 4142: 2014 stipulates that, *for a prominent, discrete tone to be identified as present, the time-averaged sound pressure level in the one-third-octave band of interest is required to exceed the time-averaged sound pressure levels of both adjacent one-third-octave bands by some constant level difference.*

The level differences between adjacent one-third-octave bands that identify a tone are:

- *15 dB in the low-frequency one-third-octave bands (25 Hz to 125 Hz);*
- *8 dB in middle-frequency one-third-octave bands (160 Hz to 400 Hz);*
- *5 dB in high-frequency one-third-octave bands (500 Hz to 10kHz);*

4.2.1 Chiller & Glycol Pump Shed

The Aether Acoustics survey highlighted tonality from chillers and glycol pumps, which was measured / discernible in and outside the chiller shed.

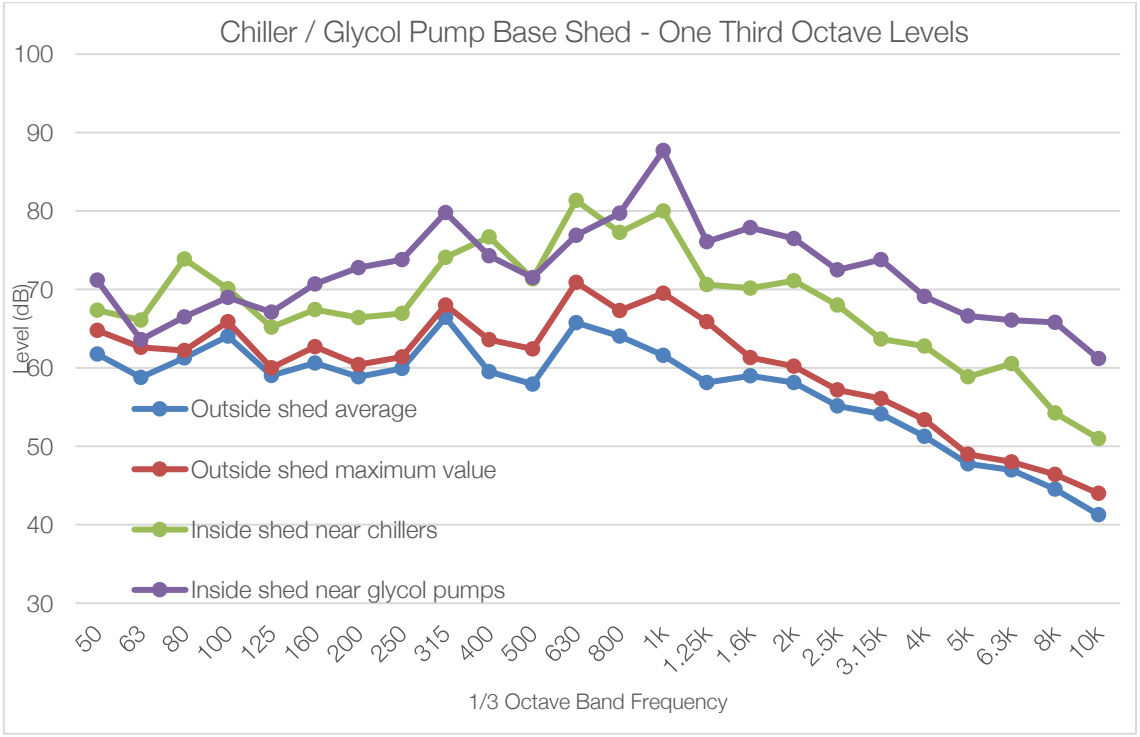


Figure 5: One third octave band levels, chiller / glycol pump base S3

Figure 5 above shows average / maximum value one-third octave band output for measurements made inside and immediately outside the chiller base shed (east elevation).

It can be seen that average and maximum data measured outside the shed ($L_{Aeq,4hrs}$) has distinct spikes in the 315Hz, 630Hz and 1kHz bands. This is confirmed by internal measurements made close to the chillers and glycol pumps, as follows:

- Chillers produce tonality in the 630Hz and 1kHz 1/3 octave bands
- Glycol pumps produce tonality in 315Hz and 1kHz 1/3 octave bands

Levels measured outside the chiller shed would not technically be defined as 'tonal' based on adjacent band criteria detailed in Annex C of BS 4142: 2014. However, tonality from these sources is subjectively perceptible at NSR 1 and NSR 2. The degree of tonality fluctuates significantly over time depending on operating conditions, as shown in Figure 6 below.

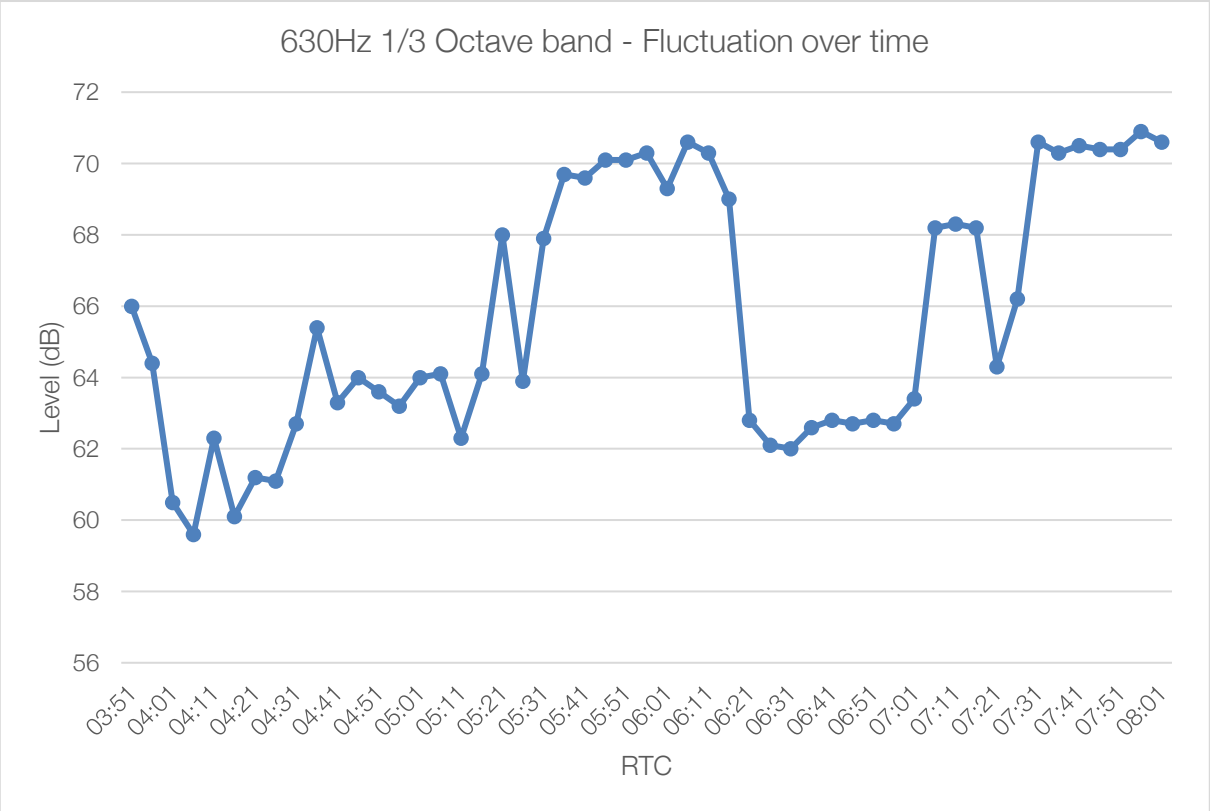


Figure 6: 630Hz level measured at source outside chiller base shed 03:50 – 08:00hrs

4.2.2 LNG Refuelling Lorry

Aether Acoustics carried out further sites visit on 20th July and 12th August 2026 with the aim of confirming LNG fuelling measurements made in the BAT assessment and responding to ongoing complaints specifically related to this activity.

Detailed measurements were made at numerous locations during the 1 – 2hr refuelling periods (which is the typical duration of the process). The key measurement locations can be summarised as follows:

- At 1m distance from the rear of the refuelling lorry (during fuelling) within the soft screen enclosure.
- Where 1m was not possible, at 7m distance outside enclosure but unscreened.
- At 1m distance from the fuelling alarm fitted to the rear of the tanker cab.
- At 5m distance outside the soft screening barrier towards NSR 2.
- Perimeter garden fence of NSR 2 (edge of outdoor amenity space).
- Perimeter garden fence of NSR 1 (equivalent façade location re. source).

Noise levels from the LNG tanker during refuelling were generally constant except for periodic alarms; the following table provides a summary of the measured levels for each site visit.

Location Description – P88	Comments	L_{Aeq}	L_{Amax}	L_{A90}
@1m rear of LNG tanker	Moving mic @1m	88	97	84
@1m fuelling alarm	10sec sample	95	100	81
@5m outside barrier in car park	Tanker pump fully screened	69	77	68
NSR 2 garden perimeter	Road traffic filtered out	62	65	57
NSR 1 equivalent façade incident	Road traffic filtered out	56	62	53

Table 4A: Summary of measurement results, P88 type LNG refuelling delivery of 20/07/26

Figure 7A below details 1/3 octave band levels from the P88 tanker fuelling system at various distances.

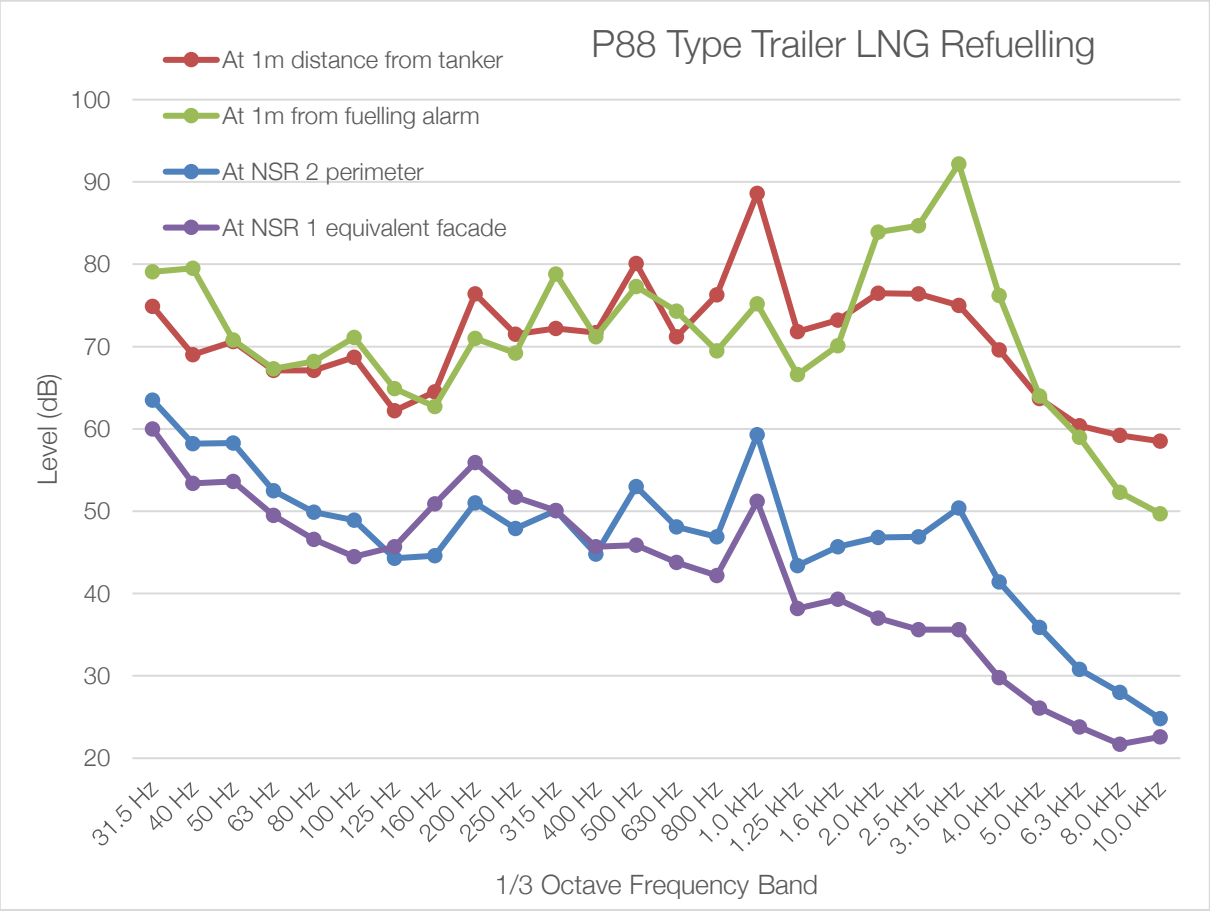


Figure 7A: P88 type LNG refuelling system 1/3 octave band levels for representative periods

Clear tonality in the 1kHz one-third octave band can be identified in the results for the P88 refuelling pump / equipment, both at source and nearest NSRs.

The rating level for the P88 equipment would need to include a tonality penalty of +6dB and as such, the distance corrected rated level at NSR 2 (incident outside habitable rooms) would be approx. 66dBA.

Table 4B summarises results for the later survey of the P95 / 96 type trailer, which was significantly quieter.

Location Description – P95/6	Comments	L_{Aeq}	L_{Amax}	L_{A90}
@approx. 7m from rear of tanker, unscreened	Fixed mic position	65	82	64
@1m fuelling alarm	5sec sample	85	92	78
@5m outside barrier in car park	Tanker pump fully screened	64	69	63
NSR 2 garden perimeter	Road traffic filtered out	55	65	54

Table 4B: Summary of measurement results, P95 / 96 type LNG refuelling delivery of 12/08/26

Figure 7B below details 1/3 octave band levels from the P95 / 96 tanker fuelling system at various distances.

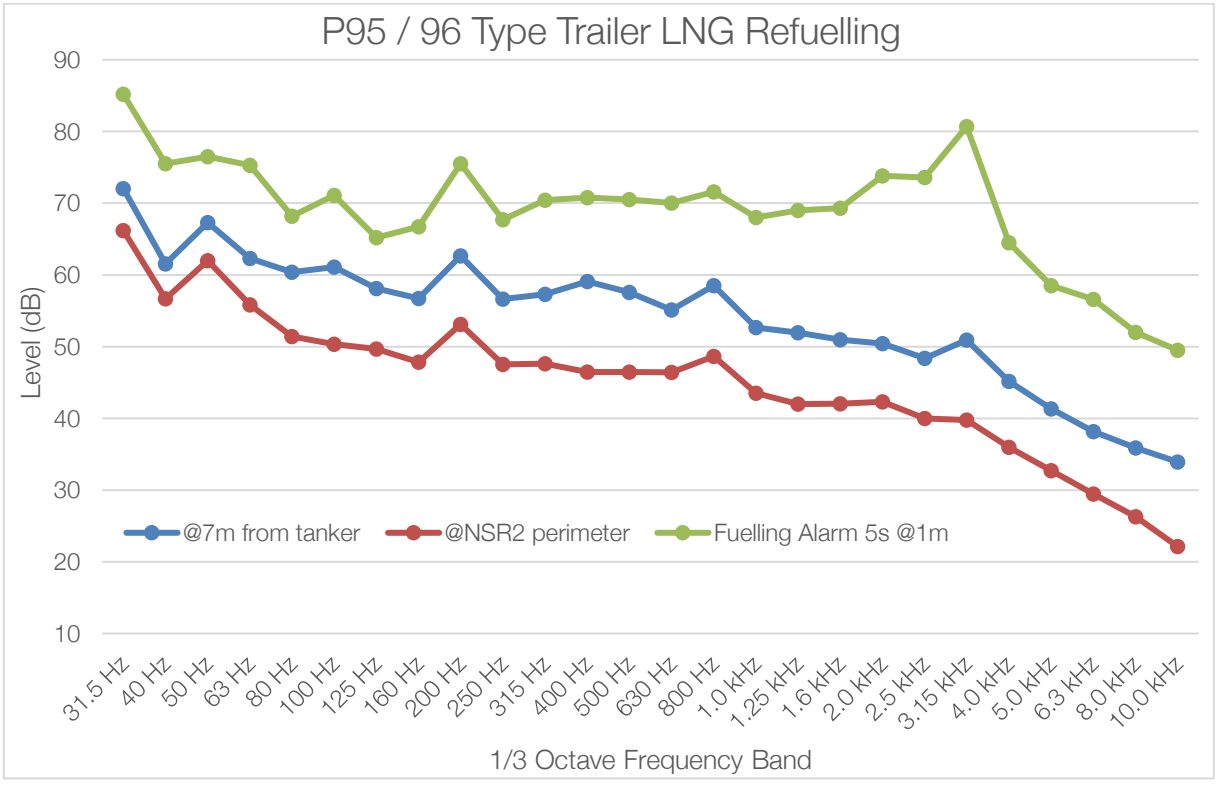


Figure 7B: P95 type LNG refuelling system 1/3 octave band levels for representative periods

The P95/6 type pump is demonstrably quieter and does not present tonality in the context of BS 4142. Figure 7B also shows the spectrum for a typical 5s alarm event (measured at 1m distance from the alarm), which has tonality at the same frequency as the P88 type.

The P95/6 refuelling process would result in a specific level <55dBA in the garden at NSR 2 (periods of no road traffic). Noise from road traffic would typically dominate the L_{Aeq} at this location.

Tonality from the alarm was just perceptible at each NSR, whereas the P88 alarm was clearly perceptible (significantly louder @1m distance).

4.3 Rating Level (BS 4142)

British Standard 4142 methodology includes the potential for penalty corrections when assessing a noise source, to account for impulsivity, intermittency and tonal characteristics. The document states:

Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level.

For tonality of a source, a correction of between 0 dB and +6 dB may be appropriate. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

Chillers and glycol pumps have been identified as subjectively tonal, with potential perception at NSR 1 and NSR 2 (albeit not technically 'tonal' according to Annex C of BS 4142: 2014). A penalty of +2dB (just perceptible) may be appropriate in this case.

A correction of up to +9dB can be applied for impulsivity of a source.

A correction of +3dB can be applied where the intermittency of the source is readily distinctive against the residual acoustic environment.

For the LNG refuelling alarm, penalties for tonality (+2dB) and intermittency (+3dB) may applicable and +5dB has been factored into the assessment to allow for these, based on adoption of the P95 / 96 type refuelling equipment.

A +3dB intermittency penalty has been incorporated into ETP tanker pumping as well as to LNG refuelling.

4.4 Noise Modelling

Further to feedback from NRW, the assessment has been revised to rely on a 3D software noise modelling method rather than the previous spreadsheet-based noise propagation calculations.

The aim would be to provide a sufficient level of comparability between this and previous BAT assessments.

A calibrated inside to outside (break-out) method (emitting façade / roof) has been adopted for several sources including the chiller / glycol pump shed, based on measurement data inside and externally.

Where sound pressure level data have been referenced (PJA), the model has been calibrated to survey measured levels at the specific location as relates each source (point or vertical area source).

The model makes the following assumptions:

- Prevailing South-Westerly wind propagation at 6m/s (typical annual average)
- A ground absorption factor of 0.7 – 1 on grass / unmade areas;
- A ground absorption factor of 0 on roads, buildings, hardstanding etc.
- Source heights representative of those observed during the survey; receptor heights as per typical 1st floor domestic rooms.

Figure 8 below presents the noise contour output (L_{den}) for the 3D model based on typical operation (excludes LNG refuelling and ETP tanker pumping).

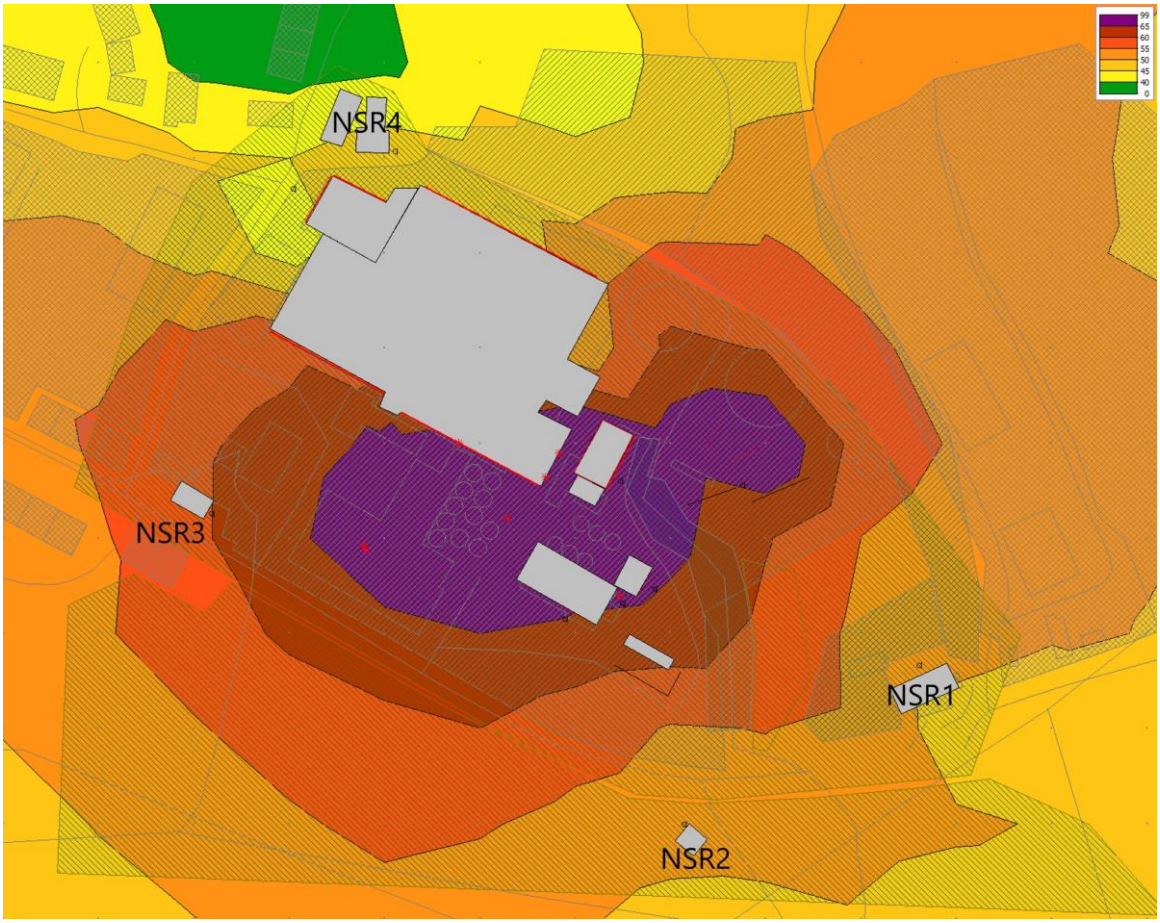


Figure 8: Indicative noise contour map for typical plant operating conditions (L_{den})

4.5 Noise Impact Calculations

The following sections detail noise impact calculations in the context of BS 4142: 2014. Cumulative and individual contribution predictions are based on highest ranked output values from the software noise model.

4.5.1 NSR 1 & 2

Dwellings to the east of the site including Pantyronnen would be most affected by noise from the items detailed in Tables 5A and 5B below. Noise from the listed items is generally constant, with some periodic tonality audible at receptors.

REF	NIGHT-TIME – NSR 1 Item:	Meas. dist.	Specific $L_{Aeq,15mins}$	Meas. to NSR distance	Result @NSR $L_{Aeq,15mins}$
S3	Chiller base shed break-out (façade)	3m	71	90m	40.4
S9	CT pump room break-out	3m	62	78m	29.9
S10	Cooling towers	3m	61	72m	40.8
S4	Vat room exhaust (South)	1m	82	128m	34.5
S2	ETP general	5m	61	65m	25.2
S5	Whey dispatch pump (occasional)	1m	86	115m	36.2
				Cumulative specific level (all modelled sources)	**45.3**
				Character correction (tonal)	+2
				Rating level	**47**
				Background sound level L_{A90}	39
				Rating / BSL comparison	**+8**

Table 5A: Noise impact calculation for NSR 1, Night-time period (15 minutes)

REF	NIGHT-TIME – NSR 2 Item:	Meas. dist.	Specific $L_{Aeq,15mins}$	Meas. - NSR distance	Result @NSR $L_{Aeq,15mins}$
S3	Chiller base shed break-out (façade)	3m	71	95m	29.8
S9	CT pump room break-out	3m	62	61m	27.2
S4	Boiler room louver 1	1m	82	60m	37.8
S4	Boiler room louver 2	1m	82	66m	36.3
S2	ETP general	5m	61	90m	33.0
S10	Cooling towers	3m	62	64m	37.7
S6	Milk tanker lorry (idling)	2m	78	100m	37.6
				Cumulative specific level (all modelled sources)	**44.5**
				Character correction (tonal)	+2
				Rating level	**47**
				Background sound level L_{A90}	39
				Rating / BSL comparison	**+8**

Table 5B: Noise impact calculation for NSR 2, Night-time period (15 minutes)

It can be seen that rating levels at locations to the east of the site (vicinity of the noisiest fixed items) would be up to around 8dB above the prevailing night-time background sound level.

4.5.2 NSR 3

Noise sensitive receptors immediately to the west of the site (NSR 3) including Fronhelyg would be most impacted by milk tanker lorry movement and pumping onsite. In the absence of tanker vehicle noise, general noise levels from the premises at NSR 3 will be similar to those measured at NSR 4.

Tanker lorries were observed accessing the plant from 04:00hrs, however it is understood that milk lorry pumping only occurs during daytime periods.

REF	DAYTIME – NSR 3 Item:	Meas. dist.	Specific $L_{Aeq,15mins}$	Meas. - NSR distance	Result @NSR $L_{Aeq,1hr}$
S6	Milk tanker idling	2m	78	42m	47.4
S4	Vat room exhaust (South)	1m	82	68m	46.9
S5	Whey dispatch pump (occasional)	1m	86	78m	49.8
-	Front façade of main building	N/A	N/A	N/A	28.0
S6A	Transfer pump only	1m	74	42m	34.0
				Cumulative specific level (all modelled sources)	53.1
				Character correction	0
				Rating level	53
				Background sound level L_{A90} (Location B4)	41
				Rating / BSL comparison	+12

Table 5C: Noise impact calculation for NSR 3, Daytime period (1 hour)

It can be seen that rating levels from daytime milk tanker pumping would be higher than the likely BSL at NSR 3 in the absence of the plant (based on the BSL at Location B4).

4.5.3 NSR 4

Dwellings to the north-west of the site on Heol Arad were observed to experience generally constant broadband (subjectively non-intrusive) noise break-out from the west and north elevations of the main building (receptor level around 40dB$_{LAeq,1hr}$ during the night-time survey period).

Periodic air / exhaust outlets were experienced from the premises during the survey and as such a nominal penalty of +3dB has been added to account for potential intermittent character.

The noisiest items on the east side of the site are at a minimum distance approx. 100m from receptors at NSR 4 and are significantly screened by the main factory building. As such it would be recommended that the following assessment would be appropriate:

REF	NIGHT-TIME – NSR 4 Item:	Result @NSR $L_{Aeq,15mins}$
-	Main building – break-out measured at equivalent NSR position	40
	Cumulative specific level	**40**
	Character correction (potential intermittency)	+3
	Rating level	**43**
	Background sound level L_{A90}	38
	Rating / BSL comparison	**+5**

Table 5D: Noise impact calculation for NSR 4, Night-time period (15 minutes)

It can be seen that night-time rating levels from main building noise break-out would be marginally higher than the defined BSL at NSR 4.

4.5.4 Occasional ETP Pumping at NSR 1

Tables 6A and 6B provide impact assessments for periodic tanker pumping activities, i.e. ETP pumping and LNG refuelling. The impact for each activity is assessed at the NSR where the highest rating level would be expected.

REF	DAYTIME – NSR 1 ETP PUMPING Item:	Meas. dist.	Specific $L_{Aeq,T}$	Meas. - NSR distance	Ontime	Result @NSR $L_{Aeq,1hr}$
S1	ETP tanker pumping	1m	84	40m	20 mins in any hour	58
S1A	ETP tanker idling	1m	83	48m	20 mins in any hour	46
					Cumulative specific level, 1-hour	**58**
					Character correction (intermittent)	+3
					Rating level	**61**
					Background sound level L_{A90}	46
					Rating / BSL comparison	**+15**

Table 6A: Noise impact calculation for NSR 1, Daytime period (1-hour) for ETP tanker pumping

The daytime specific level at NSR 1 due to ETP tanker pumping would be around +12dB compared with the BSL; addition of an intermittency penalty would result in a rated difference around +15dB. As such, BS 4142: 2014 would suggest the potential for adverse noise impact during the noisiest single hour.

It should be noted that this activity is carried out on an occasional basis only.

4.5.5 Periodic LNG Refuelling at NSR 1 & 2

This section provides a noise impact prediction for NSR 1 and 2 based on measured levels from the P95/6 tanker equipment (nearfield as well as at the noise sensitive properties during a representative period, see Table 4B above).

Fuelling is understood to occur 3 no. times per week with a filling time up to around 2hrs (minimum of 1hr) and as such the fuelling period would exceed the 1hr assessment time interval.

Pump noise from the LNG tanker is generally constant, with periodic alarms sounding for a few seconds every 2 minutes approx.

REF	DAYTIME: NSR 1 LNG REFUELLING (P95/6 unit) Item:	Measured level @1m	S – R distance approx.	Level @ Garden perimeter	Further distance attenuation	On-time	Result @NSR $L_{Aeq,1hr}$
11	LNG pump	83	60m	N/A	N/A	100%	47
11A	LNG fuelling alarm ≤5s	85	72m	-	-	4%	37
						Cumulative specific level, 1-hour	**47**
						Character correction (alarm only – intermittent +3dB, tonal +2dB)	+5
						Rating level	**52**
						Background sound level L_{A90}	46
						Rating / BSL comparison	**+6**

Table 6B: Noise impact calculation for NSR 1, Daytime period (1-hour) for LNG refuelling process

REF	DAYTIME: NSR 2 LNG REFUELLING (P95/6 unit) Item:	Measured level @1m	S – R distance approx.	Specific Level @ Garden perimeter	Further distance attenuation	On-time	Result @NSR $L_{Aeq,1hr}$
11	LNG pump	83	40m	53	-2dB	100%	51
11A	LNG fuelling alarm ≤5s	85	48m	-	-	4%	41
						Cumulative specific level, 1-hour	**51**
						Character correction (alarm only – intermittent +3dB, tonal +2dB)	+5
						Rating level	**56**
						Background sound level L_{A90}	46
						Rating / BSL comparison	**+10**

Table 6C: Noise impact calculation for NSR 2, Daytime period (1-hour) for LNG refuelling process

The result of the LNG refuelling process assessment would be that the rated level due to intermittency / tonality of the alarm would exceed the BSL by around +3 to +7dB for daytime periods.

5.0 Potential Noise Mitigation Measures

Previous BAT assessments set out detailed advice on potential further mitigation measures in line with Best Available Techniques. Where significant improvements have already been made, no further mitigation measures have been recommended / would be feasible based on cost / benefit analysis.

5.1 Chiller & Glycol Pump Shed

The previous BAT assessment identified the chiller / pump enclosure shed as having potential for further improvement, and Aether Acoustics would back this up and make the following additional observations:

As can be seen in the photograph below, there is a gap running along the top of the timber façade cladding between old and newer roofs, through which noise can easily escape; this could feasibly be improved by filling the gap.

North and West elevations of the shed could potentially be clad to enclose the installation further as relates receptors to the east / south-east. Cladding / screening the chillers towards the West could reduce noise reflection off the façade of the main building.

In-filling gaps by continuing up timber cladding on the east façade (sealed up to the new roof) and uprating other open areas with similar timber cladding could provide a noticeable further reduction at NSR 1 and NSR 2 (nominally 1-2dB and subjectively less tonality).



Figure 7: Photograph of the existing timber shed enclosing chillers and pumps

5.2 LNG Deliveries

Surveys of the LNG delivery process identified that the P88 type refuelling pump / equipment may be causing a significant adverse impact at nearby NSRs. It should be noted that this equipment is not a fixed part of the premises itself and is owned and operated by a third party.

Adoption of the P95 / P96 type trailer would significantly reduce noise impact, and it would be recommended that this equipment is stipulated for all LNG deliveries in future.

Based on the P95/6 equipment, the specific noise level from the pump itself is generally at or below the daytime BSL. As such, the barrier screening already in place would be sufficient.

Relocation of the tanker refuelling alarm (to a location on the lorry which would be behind the screening fence when parked) could potentially reduce alarm audibility at the NSRs (and eliminate the tonal / intermittent penalties from the impact). However, this would be subject to the gas supplier making alterations to its vehicles, which may not be feasible.

5.3 ETP Tanker Pumping

For daytime periods, the rated level from ETP tanker pumping could exceed the BSL by up to around +15dB. The previous BAT assessment recommended the following potential strategies to mitigate this noise source:

Erect a portable screen/barrier at the side of the tanker. The barrier can be lifted into place around the vacuum pump and hydraulic cooler. Alternatively, a more permanent structure could be constructed to form a bay for the tanker to reverse in to. The barrier should break the line of sight from the side of HGV to the residential properties.

- *Position tanker vehicles so that the side where the vacuum pump and hydraulic cooler are facing north-westwards, with the tanker itself acting as a noise barrier, out of sight from residents to the south-east*
- *Install silencers on to vacuum pumps if possible, or replace with quieter alternatives.*

6.0 Uncertainty

Significant potential sources of uncertainty in the assessment can be summarised as follows:

- Background sound levels in general

Limited representative locations away from the premises made assessment of BSLs challenging.

Further background level surveys have been carried out to improve BSL reliability; however, noise from the plant could slightly influence the BSLs adopted in the assessment.

- The effects of river flow on BSLs near NSR 1 and 2

The BSL for NSRs in the vicinity of the river would be subject to significant uncertainty and will differ considerably between winter and summer periods.

The daytime BSL of 46dB$_{LA90}$ has been adopted as representative of most of the year (9 out of 12 months) for a typically rainy location.

A daytime BSL range approx. 44 – 48dB$_{LA90}$ may be likely for NSR 1 and 2, and this may need to be clarified further in future (e.g. during a plant shutdown).

- Sound power / pressure level data from field measurements / previous BAT assessments

Sound power levels used in the software model have been derived from on-site measurements made by Aether Acoustics, as well as single figure values given in previous BAT assessments (which were expanded on / corroborated by historic and on-site measurements).

- Software noise modelling

The noise model has been developed within the scope of work for the project. Further detail may need to be added to the model in future as required, however the output would generally align with the original spreadsheet-based calculations and field measurements.

- Meteorological Conditions

Manned measurements throughout the surveys have been made during periods with no rainfall and generally low wind speeds, monitored locally.

The fixed survey at M1 relied upon reported weather data and the survey did not involve siting of a weather station. As such, some effect of rain / wind on the microphone may influence the data. However, this data has not been heavily relied on in the assessment and outlying recorded levels where rainfall / strong wind would have been likely have been discarded.

7.0 Conclusions

Aether Acoustics has undertaken an environmental noise assessment of the existing dairy processing plant at Aber-Arad. The following table provides a summary of the outcome of the BS 4142 assessment:

Location	Period	Dominant source(s)	Receptor level		BSL L_{A90}	Rating / BSL
			Specific	Rating		
NSR 1	Day	Periodic ETP tanker pumping (unscreened)	58	61	46	+15
NSR 1	Night	External plant items	45	47	39	+8
NSR 2	Day	Periodic LNG refuelling	51	56	46	+10
NSR 2	Night	External plant items	45	47	39	+8
NSR 3	Day	Milk tanker pumping	53	53	41	+12
NSR 3 & 4	Night	Main building noise break-out	40	43	38 - 40	+3 – +5dB

Table 7: Summary of estimated noise impact according to BS 4142: 2014

During night-time periods, rated noise levels from the premises outside the nearest receptors are in the range 43 – 47dBA. Based on the measured / recommended BSL, rating levels would exceed BSL by +3 to +8dBA. In this case, BS 4142: 2014 would suggest the potential for adverse noise impact, depending on the context.

This would imply a potential sensitivity to complaint under certain conditions at night, albeit at lower levels than would suggest significant adverse impact (+10dB).

The daytime noise impact of the operation, including periodic third-party tanker visits significantly exceeds the estimated BSL at the nearest NSRs.

In considering context, ANC Technical Note for BS 4142:2014 +A1:2019 (March 2020) states that the assessor may wish to consider matters such as:

- Legitimacy of the industrial use, e.g. planning permissions or environmental permits;
- Implementation of best practicable means for a given process or activity

The Dairy Partners plant has been an established part of the existing noise climate in Aber-Arad for many years, and in typical operation the premises does not present obvious potential for significant adverse impact.

Comparison of the noise footprint of the plant with a typical BSL for rural locations away from the premises may not give a fair representation of the scenario, given the longstanding presence of the premises.

In general, at night the noise character from the plant is typically broadband, with periodic tonality from the chiller shed (which it may be possible to mitigate further).

BAT assessments have been carried out (with mitigation measures put in place) and notwithstanding the recommendations above it may be asserted that the operator is generally utilising best available techniques.

Specific noise levels from the premises as experienced inside the nearest dwellings (assuming partially open windows) would be in the range 26-32dBA, which would be in line with the 'good' design range for bedrooms at night detailed in BS 8233: 2014 ($\leq$30dB$_{LAeq,8hrs}$).

Recommendations have been made with the aim of improving the sound insulation of the chiller / pump enclosure shed construction.

It would be recommended that the lower noise P95 / 96 LNG refuelling trailer type should be adopted for all future LNG deliveries.

It would be recommended measures to reduce the noise impact of ETP tanker pumping should be followed up, as per the previous BAT assessment.

Appendix A

Calibration Certificates

CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	05 December 2025	CERTIFICATE NUMBER	2025-1206
DATE OF CALIBRATION	05 December 2025		
CALIBRATION INTERVAL	12 months		PAGE 1 OF 2

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER: Jamie Bishop

APPROVING SIGNATORY: Greg Rice

Equipment **B&K 4231, s/n: 2292410**
Description Calibrator - Acoustic - Class 1, Hottinger Bruel & Kjaer UK Ltd
Customer Aether Acoustics
Hen Trecnwc, Glandwr, Whitland, SA34 0YD

Standards
BS EN 60942

Conditions

Atmospheric Pressure	99.6kPa
Temperature	21.7°C
Relative Humidity	39.6%

Calibration Data

Output Level	93.9 dB
Frequency	1000.0 Hz

Calibration Reference Sources

Equipment	S/N	Equipment	S/N
B&K 4134 L	1675305	Druck DPI 141	479
HP 34401	3146A16728	Nor 1253	20848
Stanford DS36	33213	Vaisala HMP23	S2430007

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.
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Hire and calibration of noise and vibration instruments under a BSI ISO 9001 quality management system, Cert No. FS 25913.

CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	25 October 2024	CERTIFICATE NUMBER	2024-1013
DATE OF CALIBRATION	25 October 2024		
CALIBRATION INTERVAL	24 months		PAGE 1 OF 1

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TEST ENGINEER
Jamie Bishop

APPROVING SIGNATORY
Greg Rice

Equipment **Nor 140, s/n: 1405813**
Description Real Time Sound Analyser - class 1, Norsonic AS

Customer Aether Acoustics
Felindyrch, Mynachlog-Ddu, Clunderwen, SA66 7RU

Standards
BS EN 61672 / BS EN 60651 / BS EN 60804

Conditions

Atmospheric Pressure	100.7 kPa
Temperature	20.9 °C
Relative Humidity	55.7 %

Calibration Reference Sources

Equipment	S/N	Equipment	S/N
Druck DPI 141	479	HP 34401	MY41005047
Vaisala HMP23	S2430007		

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
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CERTIFICATE OF CONFORMANCE

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DATE OF ISSUE	25 October 2024	CERTIFICATE NUMBER	2024-1014
DATE OF CALIBRATION	25 October 2024		
CALIBRATION INTERVAL	24 months		PAGE 1 OF 1

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TEST ENGINEER
Jamie Bishop

APPROVING SIGNATORY
Greg Rice

Equipment **Nor 1209, s/n: 15652**
Description Preamplifier - 1/2" with Lemo 1B connector, Norsonic AS

Customer Aether Acoustics
Felindyrch, Mynachlog-Ddu, Clunderwen, SA66 7RU

Standards
Manufacturer Specifications

Conditions

Atmospheric Pressure	100.7 kPa
Temperature	20.9 °C
Relative Humidity	55.7 %

Calibration Reference Sources

Equipment	S/N	Equipment	S/N
Druck DPI 141	479	HP 34401	MY41005047
Vaisala HMP23	S2430007		

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
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CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	25 October 2024	CERTIFICATE NUMBER	2024-1015
DATE OF CALIBRATION	25 October 2024		
CALIBRATION INTERVAL	24 months		PAGE 1 OF 2

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TEST ENGINEER
Jamie Bishop

APPROVING SIGNATORY
Greg Rice

Equipment **Nor 1225, s/n: 208014**
Description Microphone - 1/2" FF high sensitivity, Norsonic AS

Customer Aether Acoustics
Felindyrch, Mynachlog-Ddu, Clunderwen, SA66 7RU

Standards
BS EN 61094

Conditions

Atmospheric Pressure	100.7 kPa
Temperature	20.9 °C
Relative Humidity	55.7 %

Calibration Data

Sensitivity -25.6 dB
52.8 mV/Pa

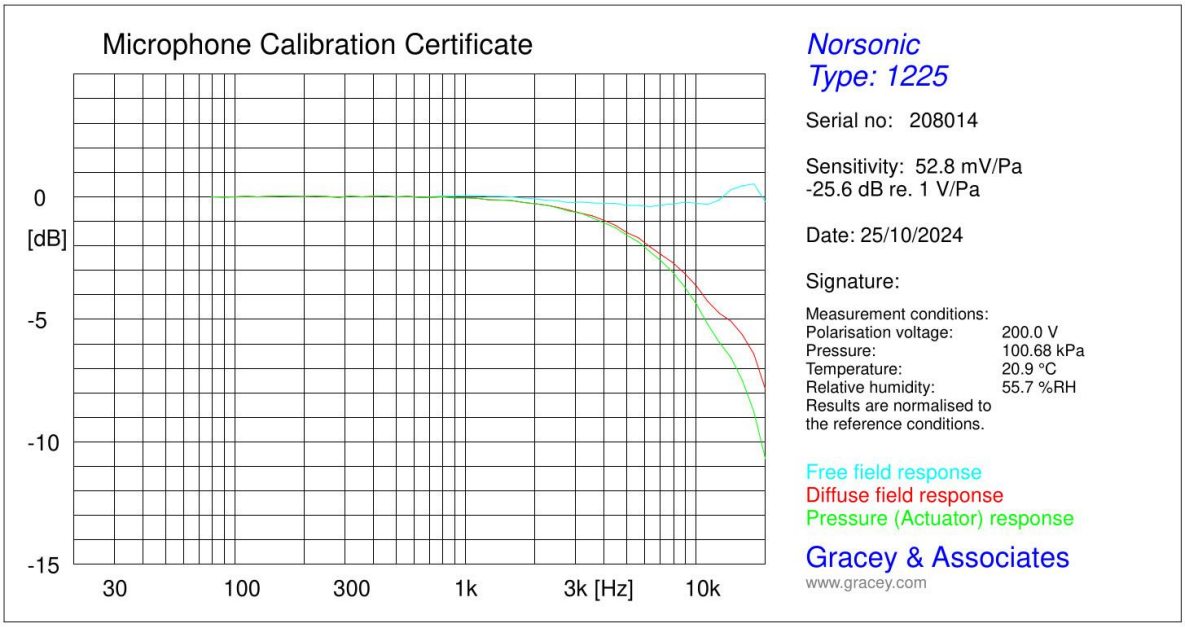
Calibration Reference Sources

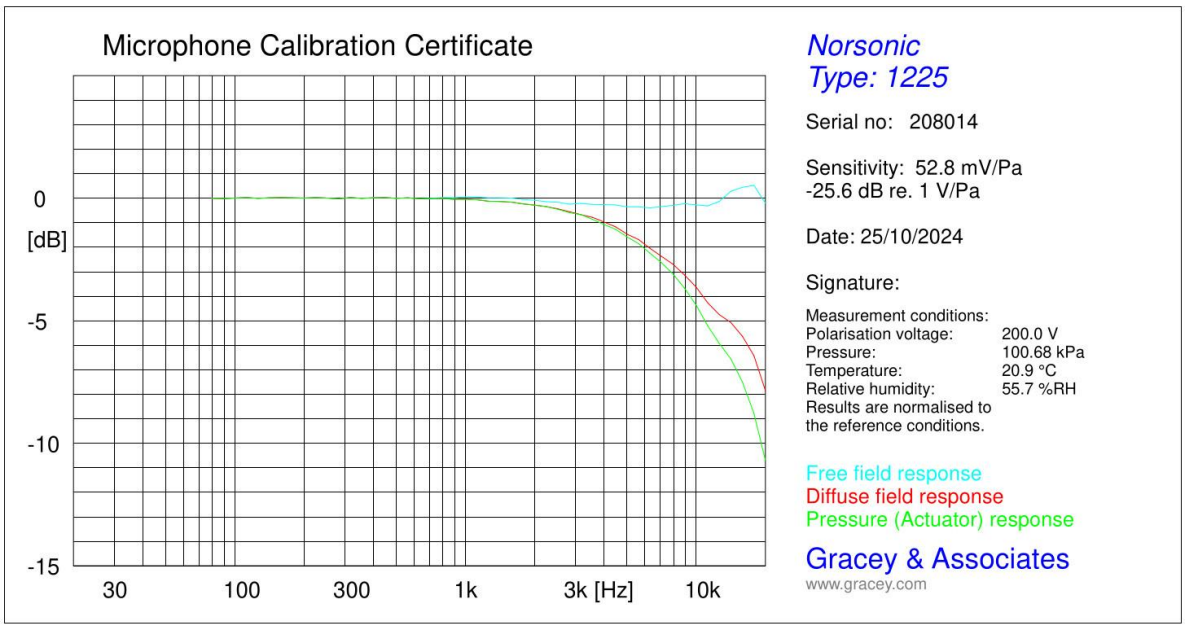
Equipment	S/N	Equipment	S/N
B&K 4134 L	1935995	Druck DPI 141	479
HP 34401	MY41005047	Nor 1253	22456
Stanford DS36	33213	Vaisala HMP23	S2430007

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
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Microphone Calibration Certificate
0
[dB]
-5
-10
-15
30
100
300
1k
3k [Hz]
10k
Norsonic
Type: 1225
Serial no: 208014
Sensitivity: 52.8 mV/Pa
-25.6 dB re. 1 V/Pa
Date: 25/10/2024
Signature:
Measurement conditions:
Polarisation voltage: 200.0 V
Pressure: 100.68 kPa
Temperature: 20.9 °C
Relative humidity: 55.7 %RH
Results are normalised to the reference conditions.
Free field response
Diffuse field response
Pressure (Actuator) response
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Microphone Calibration Certificate
0
[dB]
-5
-10
-15
30
100
300
1k
3k [Hz]
10k
Norsonic
Type: 1225
Serial no: 208014
Sensitivity: 52.8 mV/Pa
-25.6 dB re. 1 V/Pa
Date: 25/10/2024
Signature:
Measurement conditions:
Polarisation voltage: 200.0 V
Pressure: 100.68 kPa
Temperature: 20.9 °C
Relative humidity: 55.7 %RH
Results are normalised to the reference conditions.
Free field response
Diffuse field response
Pressure (Actuator) response
Gracey & Associates
www.gracey.com

Comment:

CERTIFICATE OF CONFORMANCE

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	06 May 2025	CERTIFICATE NUMBER	2025-0445
DATE OF CALIBRATION	06 May 2025		
CALIBRATION INTERVAL	12 months		PAGE 1 OF 1

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER
Jamie Bishop

APPROVING SIGNATORY
Greg Rice

Equipment **GRas 26AF, s/n: 09164**
Description Preamplifier - 1/2" with Lemo 1B, GRAS Sound & Vibration AS
Customer Gracey & Associates

Standards
Manufacturer Specifications

Conditions

Atmospheric Pressure	101.9kPa
Temperature	20.0°C
Relative Humidity	38.9%

Calibration Reference Sources

Equipment	S/N	Equipment	S/N
Druck DPI 141	479	HP 34401	3146A16728
Vaisala HMP23	S2430007		

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.
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CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	06 May 2025	CERTIFICATE NUMBER	2025-0449
DATE OF CALIBRATION	06 May 2025		
CALIBRATION INTERVAL	12 months		PAGE 1 OF 2

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TEST ENGINEER
Jamie Bishop

APPROVING SIGNATORY
Greg Rice

Equipment **GRas 40AS, s/n: 011708**
Description Microphone - 1/2" 90INC, GRAS Sound & Vibration AS
Customer Gracey & Associates

Standards
BS EN 61094

Conditions

Atmospheric Pressure	102.0 kPa
Temperature	20.0 C
Relative Humidity	38.9%

Calibration Data

Sensitivity -28.1 dB
39.3 mV/Pa

Calibration Reference Sources

Equipment	S/N	Equipment	S/N
B&K 4134 L	1675305	Druck DPI 141	479
HP 34401	3146A16728	Nor 1253	20848
Stanford DS36	33213	Vaisala HMP23	S2430007

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
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CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	26 November 2025	CERTIFICATE NUMBER	2025-1202
DATE OF CALIBRATION	26 November 2025		
CALIBRATION INTERVAL	12 months		PAGE 1 OF 1

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TEST ENGINEER
Jamie Bishop

APPROVING SIGNATORY
Greg Rice

Equipment **Nor 140, s/n: 1402924**
Description Real Time Sound Analyser - class 1, Norsonic AS
Customer Gracey & Associates

Standards
BS EN 61672 / BS EN 60651 / BS EN 60804

Conditions

Atmospheric Pressure	101.6kPa
Temperature	21.4°C
Relative Humidity	34.7%

Calibration Reference Sources

Equipment	S/N	Equipment	S/N
Druck DPI 141	479	HP 34401	3146A16728
Vaisala HMP23	S2430007		

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
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CERTIFICATE OF CONFORMANCE

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	26 November 2025	CERTIFICATE NUMBER	2025-1203
DATE OF CALIBRATION	26 November 2025		
CALIBRATION INTERVAL	12 months		PAGE 1 OF 1

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TEST ENGINEER
Jamie Bishop

APPROVING SIGNATORY
Greg Rice

Equipment **Nor 1209, s/n: 12071**
Description Preamplifier - 1/2" with Lemo 1B connector, Norsonic AS
Customer Gracey & Associates

Standards
Manufacturer Specifications

Conditions

Atmospheric Pressure	101.6kPa
Temperature	21.4°C
Relative Humidity	34.7%

Calibration Reference Sources

Equipment	S/N	Equipment	S/N
Druck DPI 141	479	HP 34401	3146A16728
Vaisala HMP23	S2430007		

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.
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CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	26 November 2025	CERTIFICATE NUMBER	2025-1204
DATE OF CALIBRATION	26 November 2025		
CALIBRATION INTERVAL	12 months		PAGE 1 OF 2

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TEST ENGINEER
Jamie Bishop

APPROVING SIGNATORY
Greg Rice

Equipment **Nor 1225, s/n: 08525**
Description Microphone - 1/2" FF high sensitivity, Norsonic AS
Customer Gracey & Associates

Standards
BS EN 61094

Conditions
Atmospheric Pressure 101.6kPa
Temperature 21.4°C
Relative Humidity 34.7%

Calibration Data

Sensitivity -24.9 dB
56.9 mV/Pa

Calibration Reference Sources

Equipment	S/N	Equipment	S/N
B&K 4134 L	1675305	Druck DPI 141	479
HP 34401	3146A16728	Nor 1253	20848
Stanford DS36	33213	Vaisala HMP23	S2430007

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
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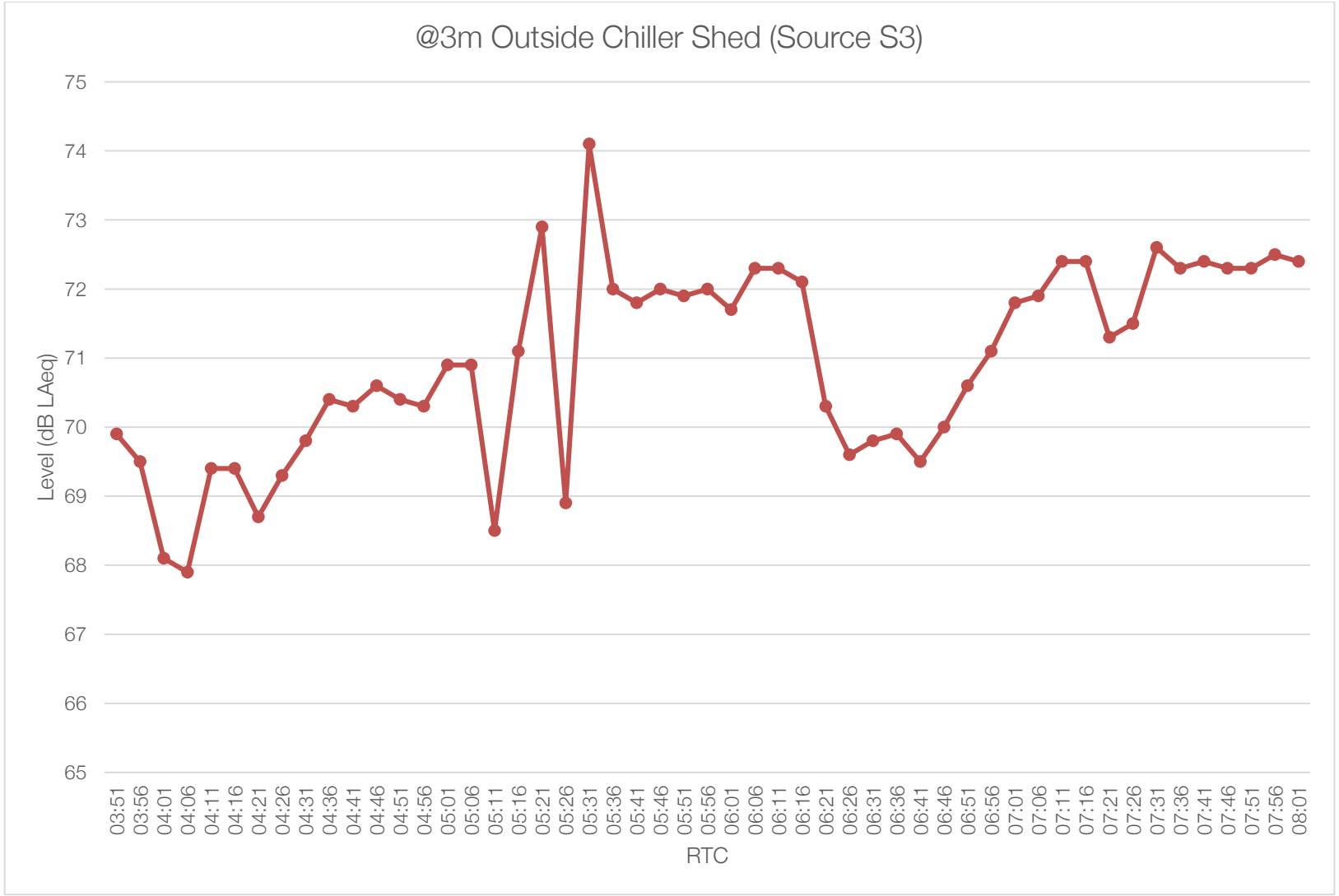
Appendix B

Full Results of Noise Surveys

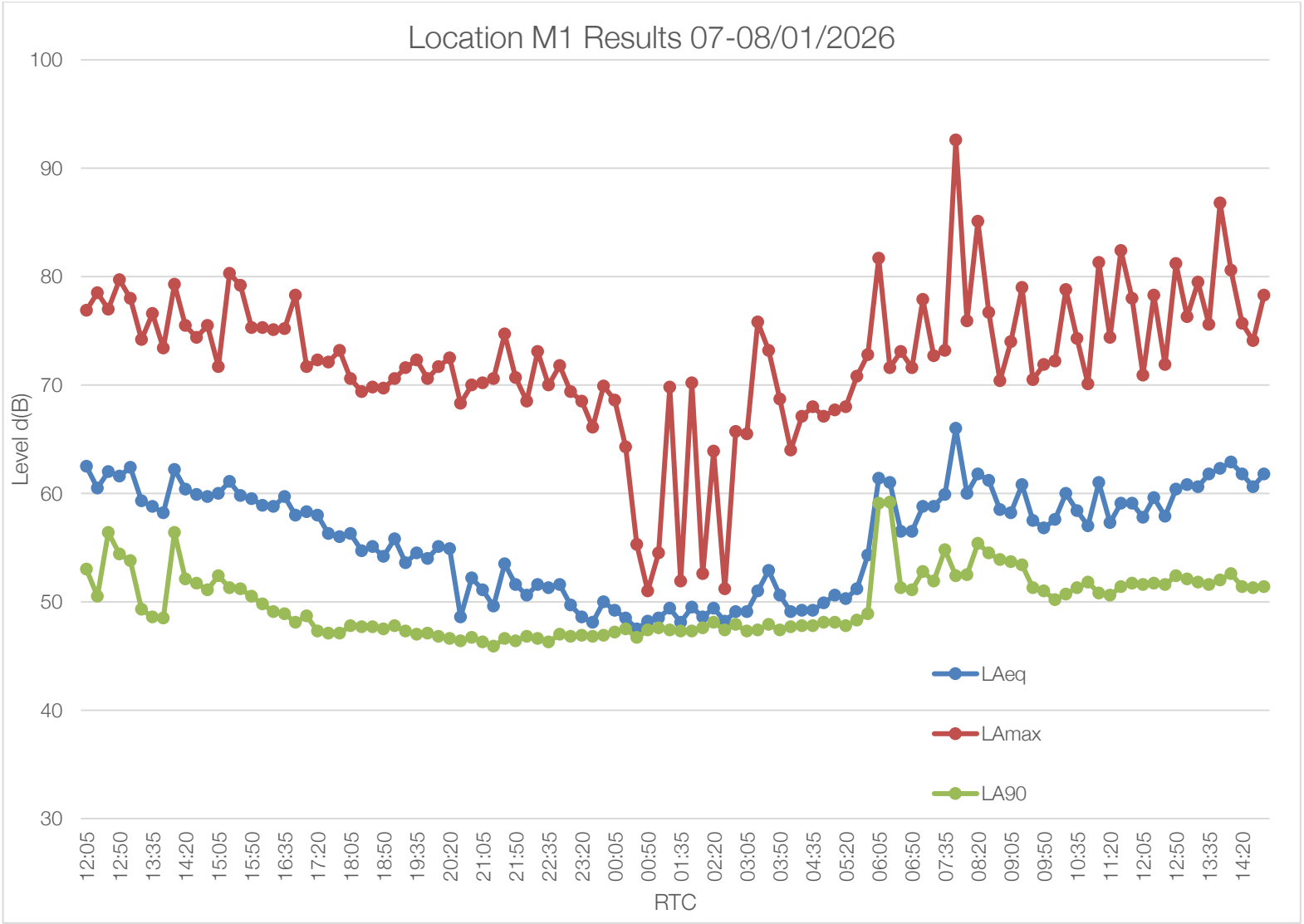
Date / Time RTC	Duration	Location	L_{Aeq}	L_{AFmax}	L_{A10}	L_{A90}
(2026/01/07 13:18:50.00)	(0:0:13.0)	CAL	94	94	94	94
(2026/01/07 13:19:57.00)	(0:0:22.0)	Roller shutter	61	62	62	60
(2026/01/07 13:20:23.00)	(0:0:24.0)	Roller shutter	61	63	62	60
(2026/01/07 13:21:33.00)	(0:0:31.0)	Lorry Idling @2m	75	77	76	74
(2026/01/07 13:22:07.00)	(0:0:30.0)	Lorry Idling @2m	75	77	76	75
(2026/01/07 13:22:41.00)	(0:0:31.0)	Lorry Idling @2m	77	79	78	75
(2026/01/07 13:23:16.00)	(0:0:29.0)	Lorry Idling @2m	78	80	79	76
(2026/01/07 13:25:22.00)	(0:1:0.0)	Cooling Towers	60	62	61	58
(2026/01/07 13:26:29.00)	(0:1:0.0)	Cooling Towers	60	65	61	58
(2026/01/07 13:28:46.00)	(0:1:0.0)	CT pumphouse breakout	60	65	61	59
(2026/01/07 13:29:50.00)	(0:1:0.0)	CT pumphouse breakout	61	63	62	60
(2026/01/07 13:38:57.00)	(0:0:55.0)	CT pumphouse inside	82	85	83	80
(2026/01/07 13:39:56.00)	(0:0:30.0)	CT pumphouse inside	82	85	83	81
(2026/01/07 13:42:33.00)	(0:1:0.0)	Chiller base inside	88	92	90	85
(2026/01/07 13:43:38.00)	(0:1:3.0)	Chiller base inside	88	90	89	86
(2026/01/07 13:45:44.00)	(0:0:50.0)	Chiller base outside	72	76	74	70
(2026/01/07 13:46:38.00)	(0:0:42.0)	Chiller base outside	74	78	77	72
(2026/01/07 13:48:43.00)	(0:0:36.0)	Borehole house o/s shutter	70	71	70	69
(2026/01/07 13:49:22.00)	(0:0:26.0)	Borehole house o/s shutter	70	71	70	69
(2026/01/07 13:53:25.00)	(0:0:36.0)	Milk tanker pump only @1m	66	68	68	65
(2026/01/07 13:54:04.00)	(0:0:28.0)	Milk tanker pump only @1m	68	70	69	66
(2026/01/10 20:55:27.00)	(0:0:28.0)	Outside CT pumphouse	55	58	57	54

(2026/01/10 20:56:04.00)	(0:0:30.0)	Cooling towers	55	58	56	55
(2026/01/10 20:57:23.00)	(0:0:30.0)	Outside chiller base	70	75	72	67
(2026/01/11 08:47:41.00)	(0:0:12.0)	CAL	94	94	94	94
(2026/01/11 09:28:59.00)	(0:0:30.0)	o/s CT pumphouse	62	64	63	62
(2026/01/11 09:29:32.00)	(0:0:30.0)	o/s CT pumphouse	62	64	63	61
(2026/01/11 09:30:13.00)	(0:0:30.0)	Cooling tower	61	65	62	61
(2026/01/11 09:30:46.00)	(0:0:29.0)	Cooling tower	61	66	62	60
(2026/01/11 09:31:44.00)	(0:0:30.0)	inside CT pumphouse	81	82	81	79
(2026/01/11 09:32:18.00)	(0:0:31.0)	inside CT pumphouse	81	84	83	80
(2026/01/11 09:32:51.00)	(0:0:30.0)	inside CT pumphouse	81	83	81	80
(2026/01/11 09:33:23.00)	(0:0:30.0)	inside CT pumphouse	81	82	81	80
(2026/01/11 09:35:47.00)	(0:1:0.0)	ETP top of gantry	71	73	72	69
(2026/01/11 09:36:51.00)	(0:1:2.0)	ETP top of gantry	70	73	72	69
(2026/01/11 09:38:41.00)	(0:1:3.0)	ETP ground level	70	75	72	68
(2026/01/11 09:40:40.00)	(0:0:30.0)	Between silos	60	62	61	59
(2026/01/11 09:41:15.00)	(0:0:30.0)	Between silos	61	62	61	60
(2026/01/11 09:46:14.00)	(0:0:45.0)	Inside chiller base	86	88	87	86
(2026/01/11 09:47:02.00)	(0:0:45.0)	Inside chiller base	87	93	89	86
(2026/01/11 09:48:26.00)	(0:1:11.0)	Near tonal pump	90	96	93	85
(2026/01/11 09:54:23.00)	(0:1:0.0)	Chillers	85	88	86	84
(2026/01/11 09:55:36.00)	(0:1:0.0)	Chillers	85	87	86	84

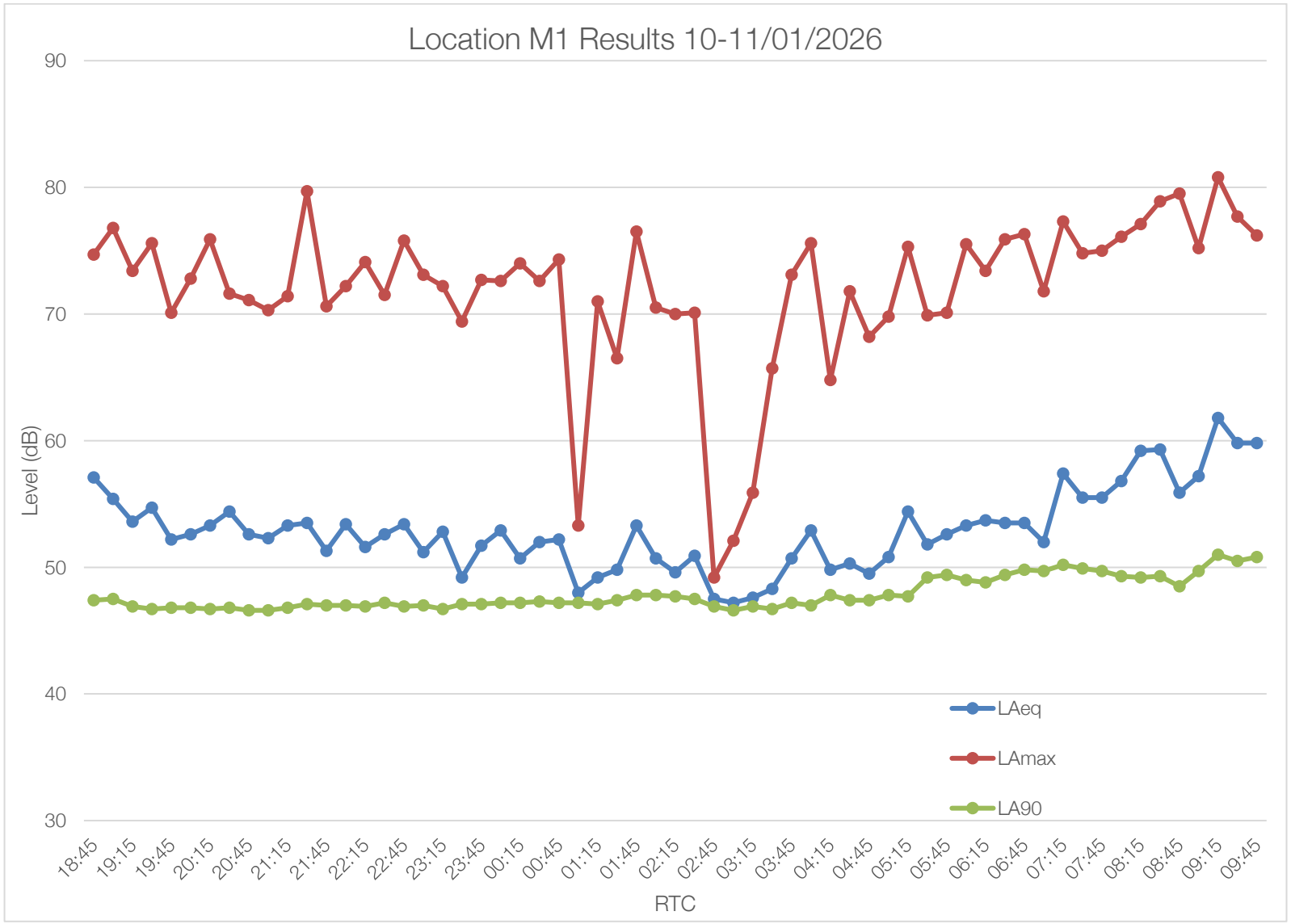
Appendix B1: Results of Plant Item Measurements



Appendix B2: Chiller Shed Break-out Overnight Survey



Appendix B3: Location M1 Fixed Monitoring Results 07-08/01/2026



Appendix B4: Location M1 Fixed Monitoring Results 10-11/01/2026

Date	Duration	Location	LAeq	LAFmax	LA10	LA90
(2026/02/20 00:28:31.00)	(0:5:0.0)	B1	58	82	43	38
(2026/02/20 00:33:34.00)	(0:5:0.0)	B1	38	41	39	37
(2026/02/20 00:38:36.00)	(0:5:0.0)	B1	40	63	40	38
(2026/02/20 00:43:39.00)	(0:5:0.0)	B1	40	44	41	39
(2026/02/20 00:48:41.00)	(0:5:0.0)	B1	40	45	41	39
(2026/02/20 00:53:44.00)	(0:5:0.0)	B1	39	49	40	39
(2026/02/20 00:58:47.00)	(0:5:0.0)	B1	39	45	40	38
(2026/02/20 01:03:50.00)	(0:5:0.0)	B1	55	80	43	38
(2026/02/20 01:11:52.00)	(0:5:0.0)	B2	40	55	40	39
(2026/02/20 01:16:55.00)	(0:5:0.0)	B2	39	46	40	38
(2026/02/20 01:21:57.00)	(0:5:0.0)	B2	40	41	39	39
(2026/02/20 01:26:00.00)	(0:5:0.0)	B2	40	44	40	39
(2026/02/20 01:31:13.00)	(0:5:0.0)	B2	40	42	40	39
(2026/02/20 01:36:37.00)	(0:5:0.0)	B2	40	47	40	39
(2026/02/20 01:48:48.00)	(0:5:0.0)	B3	40	49	40	39
(2026/02/20 01:53:00.00)	(0:5:0.0)	B3	42	63	41	39
(2026/02/20 01:58:03.00)	(0:5:0.0)	B3	40	41	40	40
(2026/02/20 02:03:05.00)	(0:5:0.0)	B3	41	61	40	40
(2026/02/20 02:08:08.00)	(0:5:0.0)	B3	40	42	41	40
(2026/02/20 02:13:10.00)	(0:5:0.0)	B3	40	41	40	40
07/09/2026:						
13:44	(0:5:0.0)	B4	60	75	64	44
13:49	(0:5:0.0)	B4	63	82	66	42
13:54	(0:5:0.0)	B4	60	74	65	41
13:59	(0:5:0.0)	B4	61	79	65	41
14:04	(0:5:0.0)	B4	56	80	58	39

14:09	(0:5:0.0)	B4	58	72	63	39
14:14	(0:5:0.0)	B4	59	75	63	43
14:19	(0:5:0.0)	B4	56	73	61	43
14:24	(0:5:0.0)	B4	63	84	65	41
14:29	(0:5:0.0)	B4	62	80	65	41
14:34	(0:5:0.0)	B4	60	77	65	42
14:39	(0:5:0.0)	B4	56	72	62	38
14:44	(0:5:0.0)	B4	59	79	63	40
14:49	(0:5:0.0)	B4	60	77	64	40
14:54	(0:5:0.0)	B4	62	76	65	43
14:59	(0:5:0.0)	B4	62	80	65	43
15:04	(0:5:0.0)	B4	58	71	63	43
15:09	(0:5:0.0)	B4	60	76	64	42
15:14	(0:5:0.0)	B4	63	82	65	42
15:19	(0:5:0.0)	B4	58	71	63	40
15:24	(0:5:0.0)	B4	59	74	64	41
15:29	(0:5:0.0)	B4	63	81	65	41
15:34	(0:5:0.0)	B4	60	76	63	42
15:39	(0:5:0.0)	B4	61	77	65	44

Appendix B4: Background Sound Measurements, February and September 2026