

Supplementary Technical Note to Noise Report dated February 2018

Land North of Water Lane, Angmering, West Sussex

Noise Issues Raised by Arun District Council

Further to the consultation response from Arun District Council (ADC) Environmental Health, provided on 7th June 2018 regarding Noise at the Land North of Water Lane, Angmering, West Sussex the following issues were raised that required additional noise measurements and assessment:

- Noise from Industrial Units off Dappers Lane affecting residential properties on western boundary of the Development site.
- Noise from A280 affecting residential properties on eastern boundary of the Development site

This Technical Note provides supplementary noise measurements and noise assessments in addition to the measurements and assessment provided in the Phlorum Noise Report dated February 2018.

Liaison with ADC

Discussions were held with ADC on 12th June 2018 and the following tasks were requested:

1. A noise survey at the nearest proposed residential adjacent to the existing light industrial units, farm businesses and cattery in Dappers Lane over the same hours of operation as the units.
2. ADC confirmed that the IMMI noise contour model meets the concerns raised regarding noise from the A280. However, ADC requested some short term noise measurements adjacent to the A280 to supplement the noise model.
3. Confirmation that there will not be any amplified sound from the pitches (PA, tannoy, loud speakers etc).
4. Review of the layout of 'outdoor living areas' directly adjacent to Water Lane.

The noise survey was completed on 27/28 June 2018 and queries were raised with ADC in an email dated 3rd July 2018. Following discussions with ADC on 8th August 2018 a written response to the Phlorum email was received on 10th August 2018 and this included the following noise target for industrial noise:

Although this Department has no formal policy as to the level of noise which may be permissible from industrial units as these may affect residential dwellings, the requirement in this case will be that the level of noise experienced by these new dwellings shall be 5dB below the existing measured ambient noise level LA90 (determined using the guidance of BS 4142 : 2014 Rating for industrial noise affecting mixed residential and industrial areas). For the purpose of the assessment the Authority will accept 07:00- 23:00 hours as covering the night time period.

It should be noted that BS4142:2014 is entitled 'Methods for rating and assessing industrial and commercial sound' and not as stated in the above paragraph by ADC.

Noise Survey

Industrial Units off Dappers Lane

A noise survey was undertaken on 27/28 June 2018 to consider noise from the industrial units off Dappers Lane and the traffic noise from the A280. A further noise survey was undertaken on 8th August 2018 to consider the noise at the small industrial units located behind Culberry Nursery.

Noise measurements were taken 20m from the boundary of S G Tanks between 1215 to 1700 hrs on 28 June 2018 and these are shown in Table 1. The noise measurement location is shown on Figure 1.

Table 1: Noise Levels at Site 1, 20m from S G Tanks, dB(A)

Date	Time	Leq	LMax	L10	L90		
28-Jun-18	12:15:00	57.2	69.9	60.6	49.8		
28-Jun-18	12:30:00	54.8	73.9	56.5	50.2		
28-Jun-18	12:45:00	55.6	73.1	58.0	49.9		
28-Jun-18	13:00:00	55.7	75.1	57.6	50.4		
28-Jun-18	13:15:00	55.9	66.9	59.0	49.8		
28-Jun-18	13:30:00	55.3	76.7	56.9	50.6		
28-Jun-18	13:45:00	53.1	72	54.7	49.7		
28-Jun-18	14:00:00	55.6	69.9	58.8	50.3		
28-Jun-18	14:15:00	56.1	68.6	59.0	50.8	1215-1500	
28-Jun-18	14:30:00	56.9	69.7	60.7	49.6	L90	Leq
28-Jun-18	14:45:00	54.4	69.6	55.8	49.0	50.0	55.6
28-Jun-18	15:00:00	53.1	61.5	55.2	50.3		
28-Jun-18	15:15:00	53.5	68.7	55.6	49.9		
28-Jun-18	15:30:00	53.4	69.2	55.3	50.2		
28-Jun-18	15:45:00	52.7	67.8	54.4	49.6		
28-Jun-18	16:00:00	53.9	67.7	57.1	49.2		
28-Jun-18	16:15:00	53.7	63.6	56.3	49.8	1500-1700	
28-Jun-18	16:30:00	53.9	62.7	56.1	50.5	L90	Leq
28-Jun-18	16:45:00	53.7	63.8	56.1	50.3	50.0	53.5

Following discussions with representatives of S G Tanks it was confirmed that the noisiest activity at the site (tank cleaning and welding) took place between 1130-1500 hours. The noise from S G Tanks was observed to be intermittent but clearly audible at the measurement location. Between 1500-1700 hours the site was generally quiet with 1 lorry delivery, occasional car repair noise including some metal grinding activity. A generator unit operated intermittently next to the paint shop unit and produced a short term noise level of $L_{Aeq,1 \text{ min}}$ 58.7 dB at a distance of 12m.

Other noise sources at Site 1 included road traffic from the A280 and Water Lane, aircraft noise, wind noise and birdsong.

Noise measurements were taken at Site 2 on 27/28 June 2018 as shown on Figure 1, adjacent to the existing industrial units. Noise levels were taken from 2215 to 1700 hours and are summarised in Table 2. The full set of results are shown graphically in Figure 2.

Table 2: Summary of Noise Levels at Site 2, dB(A)

Leq	LMax	L10	L90		Time Period
52.9	65.2	54.4	50.1	day	0700-1700
50.0	63.0	50.8	45.7	night	2300-0700

The only noise observed from the adjacent industrial units at site 2 was from an individual car mechanic and this was intermittent and did not affect the baseline noise levels at the measurement location. The dominant noise source was from road traffic from the A280 and Water Lane. Other sources included aircraft noise, wind noise and birdsong.

Baseline Noise from A280

As requested by ADC a noise survey was undertaken adjacent to the A280 at Site 3. The noise measurement location was in a free-field location, 1.5m above the ground and approx. 60m from the nearside carriageway. A summary of the day and night-time noise levels on 27/28 June 2018 are shown in Table 3 and the full set of results are shown graphically in Figure 3.

Table 3: Summary of Noise Levels at Site 3, dB(A)

Leq	Lmax	L10	L90		Time Period
57.9	66.5	55.3	39.6	day	0700-1715
54.0	68.8	60.1	53.9	night	2300-0700

The dominant noise at Site 3 was from road traffic on the A280. Other noise sources included traffic on Water Lane, trees rustling in the breeze and birdsong.

The weather conditions on 27/28 June consisted of hot and sunny conditions with daytime temperature of 27°C and a light north-easterly breeze of 2m/s.

Small Industrial Units Near Culberry Nursery

It was observed that there was very little activity from the small industrial units located behind Culberry Nursery during both the survey on 28 June and on 8 August 2018. There was occasional metal grinding noise that occurred intermittently and lasted for a few minutes at a time. Other noise sources included distant road traffic noise, wind noise, birdsong and occasional horns from the nearby racing circuit.

To determine the noise levels from the grinding activity, noise levels were taken 3m from the boundary of the development site approx. 5m from the grinding noise at site 4 (see Figure 1). The grinding took place outside of the industrial unit and occurred intermittently between 1245-1345. There was no noise from the industrial units between 1345-1440 hrs.

Table 5 – Noise Levels at Site 4

Time	Leq	Lmax	L90	Time	Leq	L90
12:45:00	52.5	69.5	45.1	1245-1345	56.8	45.6
12:50:00	60.5	71.2	47.1			
12:55:00	58.1	70.1	44.9			
13:00:00	59.7	74.9	44.3			
13:05:00	56.7	71.5	44.8			
13:10:00	60.9	69.9	48.4			
13:15:00	50.1	71.1	45			
13:20:00	56.6	69.6	44.6			
13:25:00	54.7	69.1	46.5			
13:30:00	51.2	73.3	46.7			
13:35:00	49.3	62.4	44.2			
13:40:00	50.4	62	45.3	Time	Leq	L90
13:45:00	49.9	56.7	45.2	1345-1440	50.0	45.1
13:50:00	51.1	59	47			
13:55:00	47.8	54.9	43.3			
14:00:00	49.9	60.6	45.3			
14:05:00	50.5	60.7	45.9			
14:10:00	51.1	63.8	45.8			
14:15:00	49	60.8	44.9			
14:20:00	49.9	63.2	44.8			
14:25:00	50.3	59.5	44			
14:30:00	48.2	56.2	43.5			
14:35:00	51.1	62.2	46.1			

The weather on 8 August 2018 consisted of part cloudy conditions with a light south-westerly breeze and a temperature of 19°C.

The noise equipment used for the noise surveys is listed in Appendix 1 and all equipment was calibrated both before and after the noise surveys and no drift was observed.

Noise Assessment

Boundary with S G Tanks - Site 1

The impact of the industrial/commercial noise at the units located off Dappers Lane including S G Tanks has been assessed against BS4142:2014.

During the noise survey the operators of S G Tanks stated that the unit was operating with the noisiest activity at the site (tank cleaning and welding) taking place between 1130-1500 hours. The noise measurements during this period have been used to assess the noise effects at the proposed residential properties. The noise from other units was observed to be intermittent and was included in the noise measurements between 1130-1500.

The assessment has used the highest measured hourly noise level in the period when S G Tanks was operational of $L_{Aeq,1\text{ hr}}$ 59.9 dB (1215-1315 hrs). As the commercial noise is intermittent and there was no noise from S G tanks from 1430 hrs onwards, the background noise level used for the assessment is the lowest measured 15 min noise level after 1430

hours of $L_{A90, 15 \text{ mins}}$ 49.2 dB. The residual noise level when S G Tanks was not in operation was taken from the measurements between 1500-1600 hrs with a level of $L_{Aeq, 1 \text{ hr}}$ 53.2 dB.

A BS4142 assessment has been undertaken at a distance of 20m from the industrial boundary with no mitigation measures, as shown below.

BS4142 Assessment at 20m from Industrial Boundary	
Ambient Noise Level at 20m, $L_{s(20m)}$	$L_{Aeq,T}$ 55.9 dB
Residual Noise Level at 20m, $L_{r(20m)}$	$L_{Aeq,T}$ 53.2 dB
Specific Noise Level at 20m, $L_{s(20m)}$	$L_{Aeq,T}$ 52.6 dB
Background noise level (lowest 15 min)	$L_{A90,T}$ 49 dB
Impulsivity Correction (sound is not tonal but is clearly perceptible)	+6 dB
Rating Level	(53+6) = 59 dB
Excess of rating over background level	(59-49) = +10 dB

BS4142 states that a difference of around 10 dB (as shown above in the assessment without mitigation measures) or more is likely to be an indication of a significant adverse impact, depending on the context. Furthermore, ADC have requested a BS4142 assessment level of -5dB, which indicates that significant noise mitigation measures are required to meet the ADC target.

The optimum noise mitigation measures are considered to be a combination of acoustic barriers and distance attenuation. The noise only occurs in the daytime period and therefore the assessment is taken at ground floor level where the residents are likely to be located and where BS4142 states that the noise for the assessment should be measured.

Assuming a 2m high barrier on the boundary of the development site the nearest residential properties would need to be located no closer than 48m from the boundary with S G Tanks to achieve the ADC BS4142 target of -5 dB.

It should be noted that during discussions with the S G Tanks operators (both with Phlorum and ADC) it was stated that the noisy activities may be located further from the development boundary in a new building. If this occurs, the noise impact on the residential development would be significantly reduced.

Boundary near St Deny's Nursery - Site 2

During the 4 separate site visits to the industrial units located near St Deny's Nursery there has been no significant noise observed from the nearby industrial units. ProPG: Planning & Noise states in para 2.41 that where industrial noise is present on the site but is not dominant its contribution may be included in the noise level used in the consideration of Internal Noise Level Guidelines.

The noise levels at site 2 have therefore been assessed against the guidance in BS8233:2014, which has been undertaken in the February 2018 Noise Report.

Traffic Noise from A280 – Site 3

ADC requested a noise survey adjacent to the A280.

The noise measurements at approx. 60m from the nearside carriageway were $L_{Aeq,16\text{ hr}}$ 58 dB in the daytime and $L_{Aeq,8\text{ hr}}$ 54 dB at night. The nearest proposed residential properties to the A280 are approx. 145m from the A280 and will be significantly lower than those measured at a distance of 60m.

The IMMI noise model predicted baseline noise levels (for the year 2015) of $L_{Aeq,16\text{ hr}}$ 50 dB at the nearest proposed residential properties to the A280. The measured daytime noise levels at site 3 equate to $L_{Aeq,16\text{ hr}}$ 54 dB at 145m which represent the nearest residential properties.

The noise model also includes the screening effects of the proposed intervening industrial area and it is considered that the measured and predicted daytime noise levels provide a good correlation.

The maximum noise levels at night were measured at site 3 and an analysis of the results shown in Figure 3 indicate that the 10th highest maximum noise level was $L_{Amax,f}$ 67.2 dB. Based on these night-time measurements the 10th highest maximum noise level at the nearest proposed residential properties to the A280 is $L_{Amax,f}$ 60 dB, which meets the requirements of the WHO Community Noise Guidelines and BS8233:2014 for night-time maximum noise levels.

Small Industrial units – Site 4

Daytime noise measurements were taken at Site 4 whilst the grinding noise was taking place. The measurements were taken 3m from the boundary and approx. 5m from the grinding noise.

A BS4142 assessment has been undertaken at a distance of 18m from the grinding noise, which represents the nearest proposed residential property with no mitigation measures, as shown below.

BS4142 Assessment at 18m from Grinding Noise	
Ambient Noise Level at 5m, $L_{s(5m)}$	$L_{Aeq,T}$ 56.8 dB
Residual Noise Level at 5m, $L_{r(5m)}$	$L_{Aeq,T}$ 50.0 dB
Specific Noise Level at 5m, $L_{s(5m)}$	$L_{Aeq,T}$ 55.8 dB
Specific Noise Level extrapolated to 18m, $L_{s(18m)}$	$L_{Aeq,T}$ 44.7 dB
Background noise level	$L_{A90,T}$ 45 dB
Tonal Correction where grinding is clearly perceptible	+6 dB

Rating Level	$(45+6) = 51 \text{ dB}$
Excess of rating over background level	$(51-45) = +6 \text{ dB}$

BS4142 states that a difference of around 5 dB is likely to be an indication of an adverse impact, depending on the context. Furthermore, ADC have requested a BS4142 assessment level of -5dB, which indicates that noise mitigation measures are required to meet the ADC target.

Acoustic barriers have been considered to reduce the impact of the metal grinding activity noise and the barrier would be located on the boundary of the residential development site. The noise only occurs in the daytime period and therefore the assessment is taken at ground floor level where the residents are likely to be located and where BS4142 states that the noise for the assessment should be measured.

With a 2.5m high acoustic barrier on the boundary of the development site, the BS4142 assessment reduces to -5 dB at nearest residential properties and would achieve the ADC BS4142 target of -5 dB.

Summary of Noise Mitigation Measures

1. A 2m high acoustic barrier should be located on the boundary of the development site between S G Tanks and the nearest proposed residential properties. The properties would need to be located no closer than 48m from the boundary with S G Tanks.
2. A 2.5m high acoustic barrier should be located on the boundary of the development site between the location of the external grinding noise and the nearest residential properties.
3. ADC have specified that the barriers should be constructed from either abutting panels not less than 22mm thick, with joints sealed by cover strips not less than 22mm thick and strip endings not less than 25% over adjacent panels or not less than 100mm thick brick or rendered blockwork.

Other Issues

The ADC email dated 7th June 2018 raised the issue of noise from public address system, tannoy or loud speakers in the sports area and the height of acoustic barriers close to Water Lane.

There will be no public address system, tannoy or loud speakers in the sports area and so no noise assessment is required.

With regard to acoustic barriers the ADC response stated that:

It is accepted that a 2m high acoustic barrier as proposed (paragraph 5.18, page 13) will be suitable for properties facing the A27. However, the proposal to provide a 3m high acoustic barrier (paragraph 5.19, page 14) in the case of residential units north of Water Lane (receptor positions 13 to 17) may be untenable given that these properties are expected to be only 5m from the roadside and overshadowing that might therefore

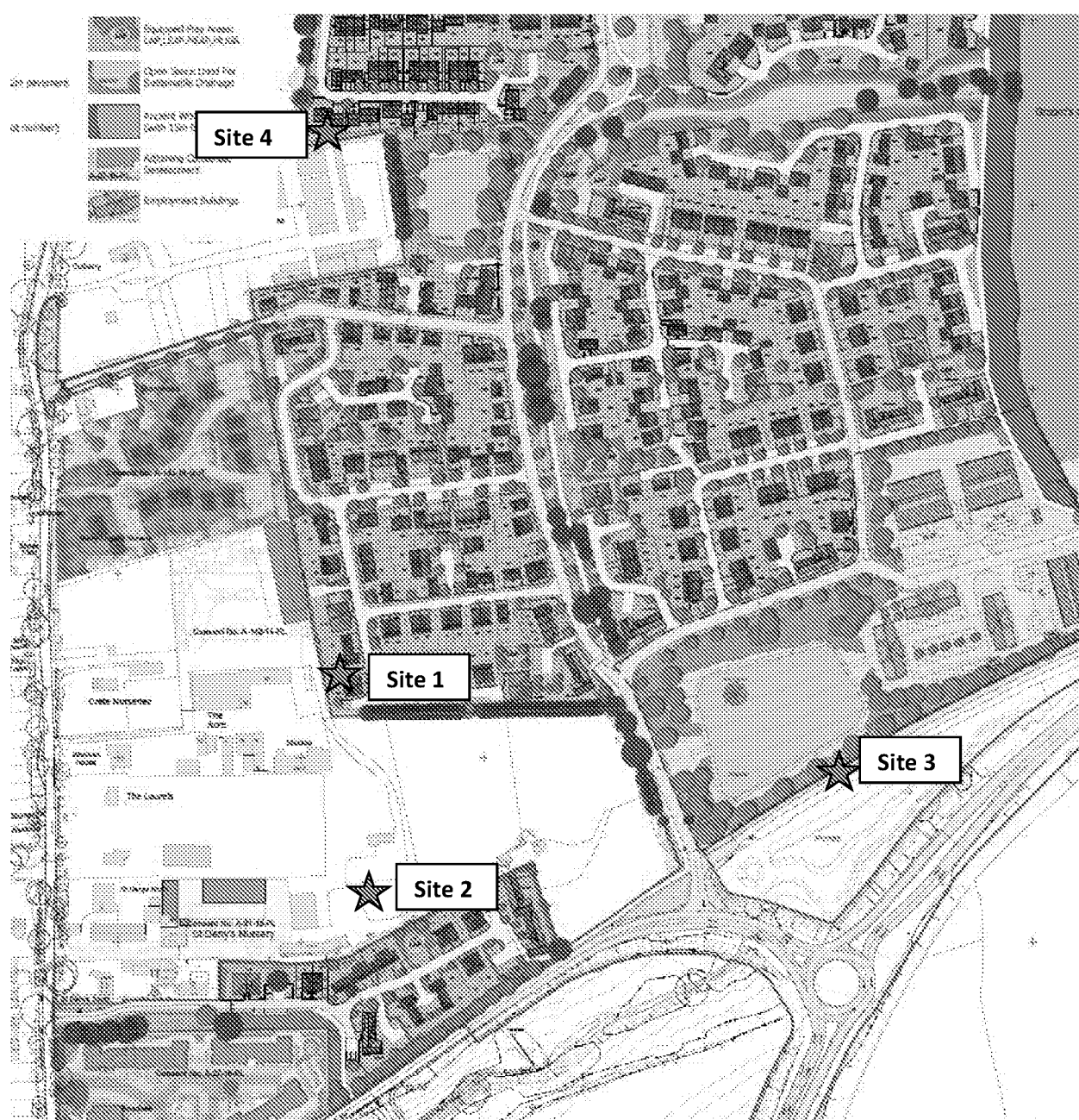
occur. This fact might be offset were it possible to provide an alternative rear garden but bearing in mind that a suitable barrier may also provide acoustic attenuation for any habitable room to the ground floor

In response to the comments on a 3m high barrier a cross section through Water Lane and the proposed development has been provided by Pro Vision in Appendix 2, which indicate that a 3m high acoustic barrier is acceptable with regard to 'overshadowing'.

Conclusions

This Supplementary Technical Note to the Noise Report dated February 2018 provides additional noise measurements and assessments as requested by ADC. Appropriate noise mitigation measures have been specified in the Supplementary Technical Note to meet the targets for industrial/commercial noise provided by ADC.

Figure 1 – Noise Measurement Locations



 **Noise Measurement Locations**

Figure 2 – Noise Levels at Site 2

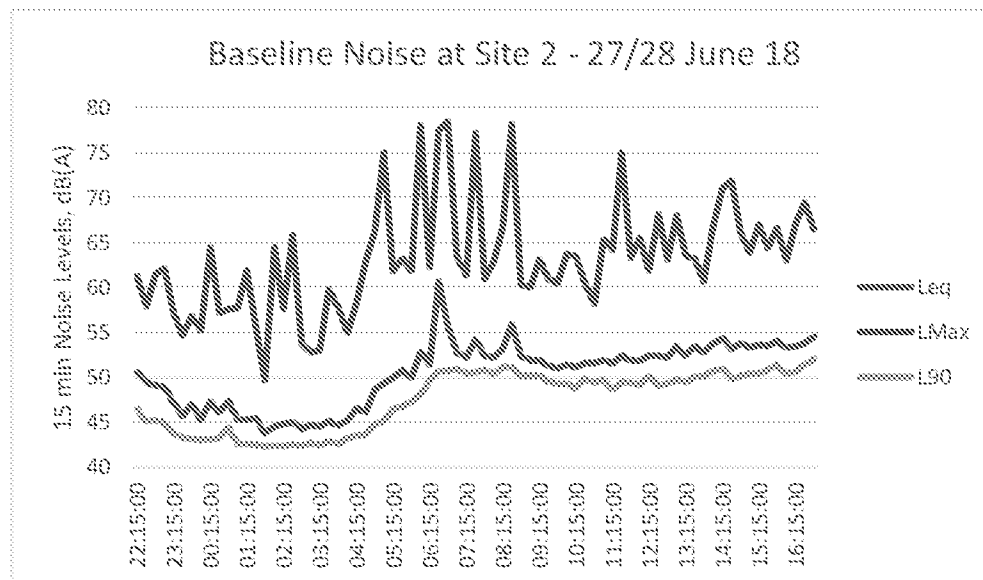
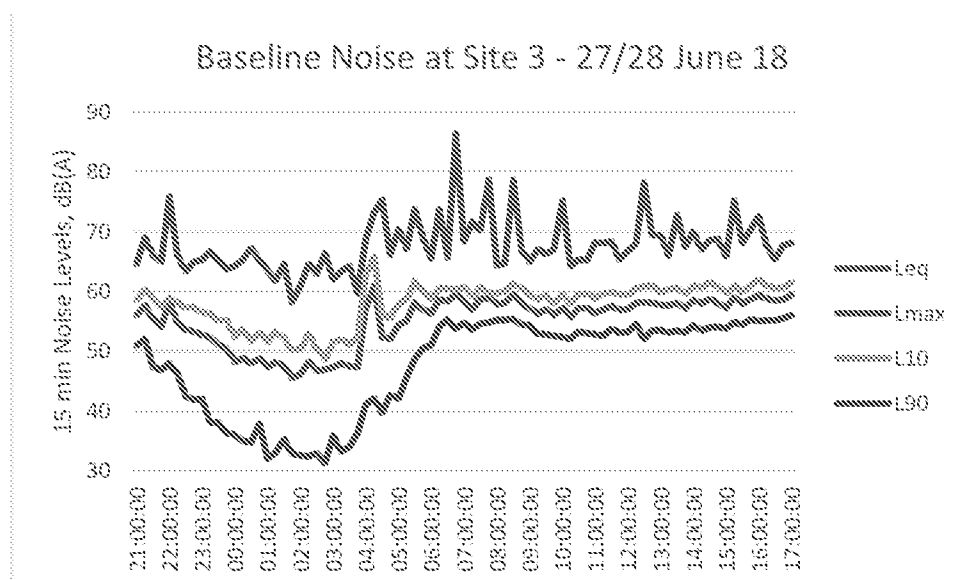


Figure 3 – Noise Levels at Site 3



Appendix 1 – Noise Equipment

Noise Equipment	Serial Number	Cal Due Date	Mic	Pre-amp
LD824	A1420	5/8/18	SN98045	SN1925
LD824	A1419	21/6/20	SN31817	SN2732
LD820	A1350	21/6/20	SN37024	SN1568
LD820	A1144	21/6/20	SN31825	SN2054
Cal 200	3055	9/8/18	-	

Appendix 2 – Cross Section Across Water Lane

For illustrative purposes

