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ADUR DISTRICT COUNCIL

PROPOSED OPERATION OF AIR SOURCE HEAT PUMPS AT SHOREHAM CENTRE, 2 POND ROAD, SHOREHAM-BY-SEA, WEST SUSSEX

BS 4142 SOUND ASSESSMENT

DECEMBER 2021

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FINAL REPORT

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1. INTRODUCTION

1.1.1 Southdowns Environmental Consultants Ltd (Southdowns) was commissioned in November 2021 by Adur District Council to undertake a sound assessment of the operation of proposed Air Source Heat Pumps (ASHPs) at the Shoreham Centre, Shoreham-by-Sea in West Sussex.

1.1.2 The sound assessment has been prepared to accompany a planning application for the proposed operation of the ASHPs.

1.1.3 Following guidance presented in the Sussex Planning Noise Advice Document [1], the assessment method has adopted the principles of BS 4142:2014+A1:2019 [2].

1.1.4 The sound levels, guidance and assessment criteria are summarised in Section 2 of this report. The existing site and proposed development are described in Section 3. The noise survey undertaken on site is described in Section 4, and the survey results are presented in Section 5. The sound modelling is described in Section 6. The sound assessment is presented in section 7, and the conclusions of the assessment are presented in Section 8. Figures and tables referred to in the report are presented in Appendices A and B, respectively. Equipment calibration certificates are provided in Appendix C.

Statement of Competency (Requirement of BS 4142 Clause 5)

1.1.5 The baseline sound measurements were obtained by Sam Geering (MIOA) who also authored this report and undertook the calculations. Ryan Webb (AMIOA) checked the calculations, with the report reviewed by Alex Mabey (MIOA).

1.1.6 Sam Geering and Ryan Webb have supported a number of sound assessments involving report authoring, sound measurements and calculations. They have both completed the Institute of Acoustics' 'Competence in Environmental Noise Measurement' course. Sam has completed an MSc in Environmental and Architectural Acoustics at Southbank University. Alex Mabey has over 15 years' experience of work in the field of environmental sound assessment and has worked on many different projects where assessment in accordance with the principles of BS 4142 was required.

2. SOUND LEVELS AND CRITERIA

2.1 Sound Levels

2.1.1 Noise and sound are measured on a logarithmic scale in decibels (dB) because of the ears' sensitivity to a wide range of pressure changes. The sound pressure level (SPL) of a signal is denoted by the symbol L_p and defined by the equation $L_p = 10 \log (p/p_o)^2$ where p is the root mean square pressure of the signal and p_o is the reference sound pressure (2×10^{-5} Pa).

2.1.2 The human auditory system is capable of detecting sounds over a frequency range of 20 Hz to 20 kHz. Because the ear is most sensitive to sounds with frequencies between 1 and 5 kHz, an A-weighting network is used to reflect the differential sensitivity of human hearing to sounds of different frequency. The A-weighting sound pressure level, L_{pA}, is measured on a scale defined by the dB(A).

2.1.3 Community response to environmental noise sources is dependent on both acoustic and non-acoustic factors. The acoustic factors include absolute sound level, changes or exceedances of background or ambient levels as well as the characteristics, time, duration and frequency of noise. National and local planning guidelines for noise assessment are set out below.

2.1.4 The dB(A) level is commonly used for the measurement and assessment of environmental noise due to the relationship between the subjective impression of the auditory strength of a sound, otherwise known as loudness, and the A-weighted sound pressure level of that sound. A change in 3 dB is the minimum perceptible change in event noise levels under normal everyday listening conditions, whilst a 10 dB increase or decrease in the sound pressure level of a steady sound generally corresponds to a perceived doubling or halving of loudness.

2.1.5 An indication of the range of sound pressure levels commonly found in the environment is given below:

Location	L_p dB(A)
Normal threshold of hearing	-10 to 20
Music halls and theatres	20 to 30
Living rooms and offices	30 to 50
Inside motor vehicles	50 to 70
Industrial premises	70 to 100
Burglar alarms at 1 m	100 to 110
Jet aircraft on take-off	110 to 130
Threshold of pain	130 to 140

2.1.6 The $L_{A90,T}$ *background* sound level is defined by the A-weighted sound pressure level of the ambient sound exceeded for 90% of a given time interval, T. This provides a measure of the lower levels of a fluctuating sound and is normally defined separately for day and night-time periods. Other percentiles are also sometimes used to describe the levels of ambient sound exceeded for different periods of time. The $L_{A50,T}$ and $L_{A10,T}$ sound levels denote the level of ambient sound exceeded for 50 and 10% of the time T, respectively whilst the $L_{Amax,F}$ sound level denotes the maximum instantaneous sound level in any given period of time obtained using the FAST time weighting.

2.1.7 The equivalent continuous sound pressure level is denoted by the symbol $L_{Aeq,T}$ and is defined as the notional steady sound which, at a given position over a defined period of time, T, has the same A-weighted acoustic energy as the actual fluctuating sound. This average sound level is used in the UK for the measurement of noise from most sources including industry, construction, railways, and aircraft and is widely used for the measurement of ambient sound, which comprises sound from all sources in the environment.

2.2 National Noise Policy and Planning Policy Framework

Noise Policy Statement for England (NPSE)

2.2.1 The Noise Policy Statement for England (March 2010) [3], sets out the long term vision of Government noise policy.

2.2.2 The vision of the NPSE is to 'Promote good health and a good quality of life through the effective management and control of noise within the context of Government policy on sustainable development'. This vision is supported by three key aims:

- avoid significant adverse impacts on health and quality of life;
- mitigate and reduce to a minimum other adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.

2.2.3 The NPSE applies to most forms of noise, including environmental noise, neighbour noise and neighbourhood noise, but not occupational noise in the workplace.

2.2.4 The NPSE has adopted the following concepts to help consider whether noise is likely to have a 'significant adverse' or 'adverse' impact on health and quality of life:

NOEL – No Observed Effect Level

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

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

2.2.5 The NPSE goes on to state that:

"it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

National Planning Policy Framework

2.2.6 The Government's National Planning Policy Framework (NPPF) was published in March 2012 and was last revised in July 2021 [4]. The document sets out the Government's planning policy for England and how it should be applied. The NPPF replaced a number of planning policy guidance documents, including the now archived Planning Policy Guidance 24: Planning and Noise.

2.2.7 The NPPF sets out the Government's planning policy for England and how it should be applied. The NPPF replaced a number of planning policy guidance documents, including the now archived Planning Policy Guidance 24: Planning and Noise.

2.2.8 The NPPF defines the Government's planning policy for England and sets out the framework within which local authorities should prepare their local and neighbourhood plans, reflecting the needs and priorities of their communities.

2.2.9 The main references to noise in the NPPF are found in paragraphs 174 and 185, where it states that:

" 174. Planning policies and decisions should contribute to and enhance the natural and local environment by:…

" preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.;…

" 185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."*

2.2.10 In the preparation of local plans, the NPPF specifies that local planning authorities should:

"set out criteria or requirements to ensure that permitted and proposed operations do not have unacceptable adverse impacts on the natural and historic environment or human health, taking into account the cumulative effects of multiple impacts from individual sites and/or a number of sites in a locality;

when developing noise limits, recognise that some noisy short-term activities, which may otherwise be regarded as unacceptable, are unavoidable to facilitate minerals extraction;"

Planning Practice Guidance - Noise

2.2.11 Planning Practice Guidance (PPG) on noise [6] was issued in March 2014 and last updated in July 2019. This web-based guidance advises local planning authorities to take into account the acoustic environment, and in doing so consider the following:

- whether or not a significant adverse effect is occurring or likely to occur;
- whether or not an adverse effect is occurring or likely to occur; and
- whether or not a good standard of amenity can be achieved.

2.2.12 The PPG includes examples of how to recognise when noise could be a concern and provides example outcomes to which the Observed Effect Levels can apply. The PPG noise exposure hierarchy is presented overleaf in Table 2.1, based on the likely average response, along with example outcomes.

2.2.13 While it is acknowledged that planning and nuisance regimes are separate entities, the hierarchy table does provide useful information regarding how the concept of SOAELs and LOAELs, introduced through the NPSE, could be applied and does allow for subjective observations to be considered in the context of potential effect levels. The presence of an “Effect Level” does not infer whether a nuisance is or is not present.

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other psychological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

TABLE 2.1: PLANNING PRACTICE GUIDANCE NOISE EXPOSURE HIERARCHY

2.2.14 The PPG guidance states that “where external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.”

2.3 Local Noise Criteria

2.3.1 The proposed development lies within the administrative area of Adur District Council (ADC). ADC and other Sussex local authorities have developed guidance on the assessment of noise in response to the introduction of the NPPF and other associated national noise planning policy. This guidance is described in Planning Noise Advice Document: Sussex which was last updated in July 2021.

2.3.2 The information in the Planning Noise Advice Document aims to provide advice for developers and their consultants when making a planning application in East and West Sussex.

2.3.3 The aims of the guidance document include:

- to complement the noise policy aims set out in the NPSE;
- to provide clear and consistent guidance to developers on the level of information that will be required to be submitted with planning applications for noise generating developments or noise sensitive developments;
- to provide existing standards that should be referred to when undertaking noise assessments; and
- to highlight the points that need to be considered and addressed prior to making a planning application.

2.3.4 The Advice Document states that for noise generated by a site of an industrial or commercial nature then:

"1) The rating level of the plant should, where practicable, be no greater than the existing background levels, when measured in accordance with BS 4142.

2) Where background levels are very low, discussion should be had with the LPA on the objectives to be agreed.

3) Apply the indoor ambient noise levels in Tables 4 and 6 of BS 8233.

4) Apply the WHO 2009 Community Noise guidelines for outdoor amenity areas"

2.3.5 For new noise sensitive development near to existing industrial/commercial noise sources, the guidance document states that:

"6.6.1. Careful consideration will need to be given to proposals that are likely to site new noise sensitive developments near to existing industrial, commercial, entertainment premises, airfields air ports and sea ports.

6.6.2. The 'agent of change' principle, the principle by which a person or business introducing a new land use is responsible for managing the impact of that change will apply. The National Planning Policy Framework 2019 Para 182 states: "Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities."

6.6.3. There is no protection offered in law to existing premises from nuisance complaints made by new residents. This may result in formal action being taken against these premises if a statutory nuisance is established or civil action at common law for nuisance.

6.6.4. Where it is apparent to the LPA that existing noise from an existing industrial, commercial, entertainment premises, places of worship, sports clubs, airfields, airports and sea ports is likely to cause unreasonable or adverse effects to new residents, the development is unlikely to be supported unless the applicant (or 'agent of change') provides clear evidence that adequate noise attenuation to the existing noise sources can and will be provided. The applicant (or 'agent of change') will be required to provide a detailed noise mitigation plan with their acoustic assessment.

6.6.5. In some circumstances, legal agreements can be entered into, whereby the developers provide the necessary measures to attenuate the existing noise through appropriate techniques including re-engineering the source to reduce emissions, adequate acoustic enclosure / sound proofing or re-locating the noise source."

2.4 British Standard BS 4142:2014+A1:2019

2.4.1 Guidance on the rating and assessing of sound of an industrial and/or commercial nature is contained in British Standard BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'.

2.4.2 The standard states that:

2.4.3 "*This standard is applicable to the determination of the following levels at outdoor locations:*

a) rating levels for sources of sound of an industrial and/or commercial nature; and

b) ambient, background and residual sound levels

for the purposes of:

1) investigating complaints;

2) assessing sound from existing, proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature; and

3) assessing sound at proposed new dwellings or premises used for residential purposes."

2.4.4 The determination of sound amounting to a nuisance is beyond the scope of BS 4142:2014+A1:2019.

2.4.5 The significance of sound of an industrial and/or commercial nature depends upon the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs.

2.4.6 Typically, the greater the difference between rating level and background sound level, the greater the magnitude of the impact. BS 4142 provides the following guidance when assessing the difference in the rating level and background sound assessment level:

- a difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- a difference of around +5 dB is likely to be an indication of an adverse impact, depending on context; and
- the lower the rating level is relative to the measured background sound level, the less likely it is that the specific 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.

2.4.7 Certain acoustic features can increase the significance of the impact over that expected from a basic comparison between specific sound level and the background sound level. These features include tonality and impulsivity, as well as additional characteristics and intermittency of the sound.

2.4.8 Where appropriate, a rating penalty for sound based on a subjective assessment of its characteristics should be established. In other circumstances an objective appraisal of tonal and/or impulsive characteristics may be appropriate.

2.4.9 Although BS 4142:2014+A1:2019 was derived from previous editions of the standard, many aspects have been introduced, or developed, since the previous edition. As such, differences may exist in the results obtained through the application of this standard compared to its predecessors. These differences may be attributable, in part, to changes in the assessment of acoustical features, differences in establishing representative background sound levels, and/or the application of context to the results.

3. SITE DESCRIPTION AND DEVELOPMENT PROPOSAL

3.1 Site Description

3.1.1 The Shoreham Centre is a community venue in Shoreham-by-Sea.

3.1.2 A car park is located immediately to the west of the venue. Further west beyond the car park are the closest residential receptors which are located along John Street. Residential properties are also located to the south along North Street.

3.1.3 Shoreham Health Centre and Shoreham Library are located to the east of the venue.

3.1.4 The A27 is situated approximately 1.3km to the north of the venue.

3.1.5 The runway of Brighton City Airport is situated approximately 1.5km to the west of the venue.

3.1.6 The London, Brighton and South Coast Railway is located approximately 40m from the venue at its nearest point.

3.1.7 The main sources of sound observed during a weekday daytime visit to site were traffic movements on the local road network, rail traffic on the nearby Southern railway line and air traffic associated with Brighton City Airport.

3.1.8 A figure showing the location of the Shoreham Centre and the immediate surrounding area is presented in Figure A1 of Appendix A.

3.2 Proposed Development

3.2.1 The proposed development includes the installation and operation of 6 no. Air Source Heat Pumps (ASHPs).

3.2.2 The proposed location of the ASHPs is shown in Figure A2 of Appendix A.

3.2.3 The ASHPs will be located outside of the western façade of the Shoreham Centre between the building and the car park.

4. SOUND MEASUREMENTS

4.1 Sound Monitoring

4.1.1 Continuous unattended sound monitoring was carried out on site over a period of 9-days to measure the diurnal variation in the sound environment over weekday and weekend periods.

4.1.2 Attended short term sound measurements were obtained outside the nearest residential properties to the proposed location of the ASHPs to observe the principle sources of sound affecting the daytime ambient sound environment.

4.2 Continuous Unattended Sound Monitoring

4.2.1 Continuous unattended sound measurements were made between 15:30 hrs on Thursday 2nd December 2021 and 16:45 hrs on Friday 10th December 2021 at the location labelled as LT1 in Figure A3 in Appendix A .

4.2.2 LT1 was located in the north-west corner of the Shoreham Centre car park near to the residential receptors on John Street. The monitor was installed at 1.5m above local ground in free-field conditions.

4.2.3 The sound measurements were undertaken using a Class 1 Rion NL-32 precision integrating sound level meter fitted with a weatherproof windshield. The sound level meter was powered by gel cell batteries and stored inside a weatherproof security box. Field calibration checks were performed before and after the survey using a Rion NC-74 Class 1 Acoustic Calibrator to generate a level of 94.0 dB at 1 kHz.

4.2.4 Consecutive 15-minute broadband measurements of sound indices which included $L_{Amax,F}$, $L_{Aeq,15min}$, $L_{A10,15min}$ and $L_{A90,15min}$ sound levels were measured over the 9-day monitoring period.

4.3 Attended Sound Monitoring

4.3.1 Short-term attended sound measurements were obtained on Thursday 2nd December 2021 between 15:15 and 18:00 hrs at 3 no. monitoring locations labelled as ST1, ST2 and ST3 on Figure A3 of Appendix A. All measurements were undertaken in free-field conditions.

4.3.2 Attended sound measurements were obtained using a Rion NL-52 sound level meter fitted with a windshield and mounted on a tripod to elevate the microphone 1.5 m above local ground.

4.3.3 The NL-52 sound level meter was configured to measure broadband A-weighted levels which included $L_{Amax,F}$, $L_{Aeq,15min,}$ $L_{A10,15min}$ and $L_{A90,15min}$ levels over 15-minute intervals.

4.3.4 The clock on the attended sound level meter was synchronised with the unattended sound level meter.

4.3.5 The attended sound level meter was calibrated before and after the survey using a Rion NC-74 Class 1 Acoustic Calibrator to generate a calibration level of 94.0 dB at 1 kHz. No notable drift in the field calibration checks was observed between the commencement and completion of the survey work.

4.3.6 Calibration certificates for all monitoring equipment are presented in Appendix C.

4.4 Weather Conditions

4.4.1 Weather during the attended monitoring on Thursday 2nd December 2021 was clear and dry. Average wind speeds were below 2 ms^{-1}. The air temperature was around 6°C, with approximately 46 % relative humidity.

4.4.2 A log of meteorological data obtained for the unattended monitoring period from a weather station in Shoreham-by-Sea has been obtained from the Wunderground website (https://www.wunderground.com) and is summarised in Table B1 of Appendix B.

4.4.3 The weather during the unattended monitoring period was changeable with some periods of wet and windy weather.

4.4.4 The sound levels monitored during the periods where there was rainfall have been excluded from the analysis of the survey dataset. The periods where sound data have been excluded are shaded in grey in Table 5.1 shown overleaf and shaded grey in Table B2 of Appendix B.

5. SOUND SURVEY RESULTS

5.1 Unattended Sound Survey Results

5.1.1 The results of the unattended sound survey at LT1 are presented graphically on Figure A4 of Appendix A and tabulated in full in Table B2 of Appendix B. The unattended sound monitoring results at LT1 are summarised below in Table 5.1. Daytime $L_{Aeq,16hr}$ and night-time $L_{Aeq,8hr}$ ambient sound levels presented in the table have been calculated using logarithmic averaging, whilst mean $L_{Amax,F}$ and $L_{A90,T}$ sound levels have been calculated using arithmetic averaging.

Day of Meas.	Date	Sound Levels, dB re. 2 x 10^{-5} Pa.					
		Daytime (07:00 - 23:00 hrs)			Night-time (23:00 - 07:00 hrs)		
		$L_{Amax,F}$	$L_{Aeq,16hr}$	$L_{A90,T}$	$L_{Amax,F}$	$L_{Aeq,8hr}$	$L_{A90,T}$
Thurs.	02-Dec-21	72 (65-86)	55 (49-59)	46 (39-51)	63 (45-82)	50 (36-59)	38 (32-49)
Fri.	03-Dec-21	72 (63-90)	56 (45-64)	45 (36-52)	62 (42-80)	49 (34-57)	37 (30-51)
Sat.	04-Dec-21	72 (66-86)	55 (50-60)	47 (42-52)	61 (47-72)	47 (39-52)	39 (35-44)
Sun.	05-Dec-21	70 (59-90)	54 (44-65)	46 (35-50)	58 (45-79)	47 (34-58)	35 (29-42)
Mon.	06-Dec-21	72 (66-82)	55 (48-62)	48 (41-57)	59 (43-75)	48 (34-54)	38 (32-47)
Tues.	07-Dec-21	73 (66-88)	59 (51-65)	51 (46-58)	65 (50-76)	51 (43-57)	45 (41-51)
Wed.	08-Dec-21	72 (65-85)	55 (49-60)	48 (43-51)	62 (45-79)	49 (38-58)	39 (36-48)
Thurs.	09-Dec-21	73 (65-84)	56 (51-62)	49 (45-55)	67 (51-77)	50 (40-56)	41 (37-48)
Fri.	10-Dec-21	74 (66-87)	57 (54-63)	50 (48-52)	-	-	-
Mean Values		72 (70-74)	56 (54-59)	48 (45-51)	62 (58-67)	49 (47-51)	39 (35-45)
Mean Values (exc. adverse weather)		72 (70-74)	55 (54-57)	47 (44-50)	61 (58-68)	48 (47-50)	38 (35-41)

TABLE 5.1: SUMMARY OF UNATTENDED SOUND MONITORING RESULTS AT LT1

Notes:[1] grey highlight indicates data contains omitted measurements due to adverse weather or unrepresentative events occurring during period.

5.1.2 The results of the unattended sound monitoring at LT1, excluding periods of adverse weather, show daytime ambient sound levels ranging between 54 and 57 dB $L_{Aeq,16hr}$, with a mean level of 55 dB $L_{Aeq,16hr}$ obtained over the 9-day monitoring period.

5.1.3 Mean daytime background sound levels ranged between 44 and 50 dB $L_{A90,16hour}$ (when arithmetically averaged across the 16-hour daytime periods). The overall mean daytime background sound level measured over the 9-day monitoring period was 47 dB $L_{A90,16hour}$.

5.1.4 During the night-time periods, mean ambient sound levels measured at LT1 ranged between 47 and 50 dB $L_{Aeq,8hr}$ with an overall mean value of 48 dB $L_{Aeq,8hr}$ obtained over the 9-day monitoring period.

5.1.5 Mean night-time background sound levels ranged between 35 and 41 dB $L_{A90,8hour}$ (when arithmetically averaged across the 8-hour night-time period). The overall mean night-time background sound level measured over the 9-day monitoring period was 38 dB $L_{A90,8hour}$.

5.2 Attended Sound Survey Results

5.2.1 The results of the attended sound monitoring are presented in Table B3 of Appendix B and summarised below in Table 5.2.

Monitoring Location	Start Time	Dur. (mins)	Sound Levels, dB re. 2 x 10^{-5} Pa.			
			$L_{Amax,F}$	$L_{A10,T}$	$L_{Aeq,T}$	$L_{A90,T}$
ST1	15:15	15	73.5	61.3	58.0	49.8
	16:12	15	85.0	61.6	58.2	49.0
	17:05	15	79.1	63.4	60.2	48.7
ST2	15:37	15	77.5	61.1	57.7	46.8
	16:30	15	76.1	61.7	58.0	46.3
	17:24	15	72.9	61.6	57.6	46.0
ST3	15:54	15	75.7	61.9	59.0	50.6
	16:47	15	74.3	57.4	56.1	49.2
	17:45	15	75.3	59.0	57.3	49.4

TABLE 5.2: ATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND DECEMBER 2021

5.2.2 Observations made during the attended survey indicate that the ambient $L_{Aeq,T}$ sound levels were primarily governed by sound from local road traffic movements and air traffic associated with Brighton City Airport.

Derivation of Background Sound Level

5.2.3 The results of the unattended sound monitoring provide an indication of the diurnal variation in sound levels at LT1, while the short-term attended sound measurements provide an indication of the variation in sound levels between the unattended monitoring position and attended monitoring locations at ST1, ST2 and ST3.

5.2.4 Modal statistical analysis of the background $L_{A90,T}$ sound levels measured at LT1 are presented in Figure A5 of Appendix A. The sound levels measured during the periods of adverse weather have been excluded from the modal analysis. Using this statistical analysis at LT1, a daytime background sound level of 49 dB $L_{A90,1hr}$ and a night-time of 37 dB $L_{A90,1hr}$ have been adopted as background sound assessment levels.

5.2.5 A comparison of the background $L_{A90,T}$ sound levels measured at the ST attended locations with the $L_{A90,T}$ sound levels measured at LT1 in the same 15 minute periods is presented in Table 5.3.

Survey Location	Background Sound Level, dB $L_{A90,15min}$		
	15:15 hrs	16:30 hrs	17:75 hrs
LT1	50.2	49.2	48.6
ST1	49.8	-	-
ST2	-	46.3	-
ST3	-	-	49.4
Level Difference (ST minus LT)	*-0.4*	*-2.9*	*+0.8*

TABLE 5.3: COMPARISON OF BACKGROUND SOUND LEVELS MEASURED AT LT1 AND THE ATTENDED LOCATIONS (ST1 – ST3)

5.2.6 During daytime periods it was observed that the $L_{A90,T}$ background sound levels were governed by localised sound sources, such as local road traffic. During the night-time however the background sound levels are likely to be governed by more distant sound sources, such as traffic on the A27, which would lead to less of a variation in the $L_{A90,T}$ sound levels in the vicinity of the Shoreham Centre compared to the daytime period. As such, whilst the difference in the coincident $L_{A90,T}$ sound levels has been used to derive the background sound levels for the daytime BS 4142 assessment, for the night-time assessment period the modal $L_{A90,T}$ level measured at LT1 has been adopted for all receptor positions.

5.2.7 The resulting background sound assessment levels derived at each receptor for the BS 4142 assessment are presented in Table 5.4.

Receptor ID	Address	Representative Monitoring Location	Background Sound Assessment Levels, dB $L_{A90,T}$	
			Daytime (07:00-23:00 hrs)	Night-time (23:00-07:00 hrs)[1]
R1	3 Southdown Road	ST1	49	37
R2	63 John Street	ST1	49	37
R3	57 John Street	ST1	49	37
R4	45 John Street	ST2	46	37
R5	43 John Street	ST2	46	37
R6	44 John Street	ST3	50	37
R7	11 North Street	ST3	50	37
R8	7 North Street	ST3	50	37

TABLE 5.4: BACKGROUND SOUND ASSESSMENT LEVELS

Note: [1] Night-time background sound levels derived from modal analysis of the LT1 measurement results.

6. SOUND MODELLING

6.1 Sound Model Calculations

6.1.1 A sound model has been constructed to calculate the propagation of sound away from the ASHPs and to calculate the sound levels likely to affect nearby sound sensitive receptors.

6.1.2 The sound modelling has been undertaken using SoundPLAN. SoundPLAN is a propriety software package which allows the calculation of sound levels using acoustical ray-tracing techniques through implementing the prediction procedure details in ISO 9613-2: 1996 [6].

6.1.3 ISO 9613-2 provides a method of calculation for predicting the attenuation of sound during propagation outdoors. The environmental sound propagation from source to receiver position is calculated based upon the following acoustic algorithm:

$$L_{fT}(DW) = L_W + D_C - A$$

where:

Lft(DW)	=	equivalent continuous downwind octave-band sound pressure level at a receiver location, representing a worse case assessment;
Lw	=	octave-band sound power level of the sound source, where available, otherwise overall dB(A) level used;
Dc	=	directivity correction;
A	=	octave-band attenuation that occurs during propagation from the sound source to the receiver. A = Adiv + Aatm + Agr + Abar +Amisc;
Adiv	=	attenuation due to geometrical divergence;
Aatm	=	attenuation due to atmospheric absorption;
Agr	=	attenuation due to the ground effect;
Abar	=	attenuation due to a barrier; and
Amisc	=	attenuation due to miscellaneous other effects.

6.2 Model Assumptions

6.2.1 Principal features of the surrounding area included in the modelling such as buildings and other intervening structures have been based on Ordinance Survey mapping, site plans and supplemented with onsite observations. Residential building heights have been calculated based on the observed number of floors, with the assumption of 2.5 m in height per floor level, an additional 2.5m for any roof space and an initial floor height of 1.5 m. Site building heights have been estimated from the site visits and using Google images.

6.2.2 The topography of the surrounding area has been modelled using contour data with a spatial resolution of 1m as supplied by Department of Environment, Food & Rural Affairs (DEFRA).

6.2.3 Ground absorption has been estimated from satellite imagery with default absorption being modelled as soft. Areas such as roads and bodies of water have been modelled as hard reflective ground.

6.2.4 Calculation receptors have been selected to represent the nearest residential properties to the Shoreham Centre. The calculation receptors are labelled as R1 to R8 on Figure A6 of Appendix A and listed in Table 6.1 overleaf.

Receptor ID	Address	Receptor Type
R1	3 Southdown Road	Residential
R2	63 John Street	Residential
R3	57 John Street	Residential
R4	45 John Street	Residential
R5	43 John Street	Residential
R6	44 John Street	Residential
R7	11 North Street	Residential
R8	7 North Street	Residential

TABLE 6.1: CALCULATION RECEPTOR LOCATIONS

6.2.5 As required in the BS 4142 assessment methodology, free-field sound levels have been calculated 1m from the façade of each receptor.

6.3 Modelled Sound Sources

6.3.1 The ASHPs have been modelled at the locations indicated on Figure A2 of Appendix A.

6.3.2 Each ASHP has been modelled as a point source at a height of 1.7m.

6.3.3 The sound source of the ASHPs has been modelled to reproduce the frequency spectrum and $L_{Aeq,T}$ values presented in the ASHP manufacturer's (Mitsubishi/Ecodan) technical datasheet. The frequency spectrum and $L_{Aeq,T}$ levels are presented in Table B4 of Appendix B.

6.3.4 During daytime hours, all ASHPs have been modelled to be operational in a worse-case 1-hour period.

6.3.5 During night-time hours, 4 no. units are understood will operate during a worse 15-minute period. The 4 no. ASHPs located closest to the residential receptors on John Street have been modelled as operational in the night-time assessment period.

6.4 Modelled Structures

6.4.1 A 1.5m wall has been modelled around the perimeter of the car park.

7. SOUND ASSESSMENT

7.1 BS 4142 Assessment

7.1.1 The method for predicting the significance of sound of an industrial and/or commercial nature in accordance with the principles of BS 4142:2014+A1:2019 is based on a comparison of the equipment rating level ($L_{Ar,T}$) with the background $L_{A90,T}$ assessment sound level at a residential receptor location.

7.1.2 The $L_{A90,T}$ background sound level is the sound level exceeded for 90 % of the time in the absence of any sound from the specific source of interest. The background sound levels used for this assessment are presented in Table 5.4.

BS 4142 Assessment

7.1.3 BS 4142 indicates that certain acoustic features such as tonality, impulsivity and intermittency can increase the significance of impact over that expected from a basic comparison between the specific $L_{Aeq,T}$ sound level and the background $L_{A90,T}$ sound level. Where such features are present at the assessment location, a character correction should be added to the specific sound level to obtain the rating level for comparison with the background sound assessment level.

7.1.4 The corrections that can be applied to account for acoustical features in the specific sound level at the receptor are summarised in Table 7.1.

Acoustic Feature	Description	Character Correction, dB
Tonality	Just perceptible Clearly perceptible Highly perceptible	+2 +4 +6
Impulsivity	Just perceptible Clearly perceptible Highly perceptible	+3 +6 +9
Intermittency	Intermittency is readily distinctive against the residual acoustic environment.	+3
Other sound characteristics	Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment.	+3

TABLE 7.1: BS 4142 CORRECTIONS FOR ACOUSTIC FEATURES

7.1.5 An acoustical feature correction of +4 dB has been applied to the specific sound levels calculated at the receptor locations to account for the potential tonality in the sound generated by the ASHPs. This assumption is based on the frequency information shown in the ASHP's datasheet where there are peaks in the sound pressure levels at 250Hz and 4kHz which are c. 6 dB higher than their respective adjacent frequency bands.

7.1.6 The calculated rating levels associated with the use of the ASHPs at the receptor locations are presented in Table 7.2 for the daytime periods, along with a comparison of the rating levels with the receptors' relevant background sound assessment level.

Rep ID	Address	BS 4142 Sound Level Assessment				
		Specific Sound Level, $L_{Aeq,1hr}$[1,2]	Acoustic Feature Correction, dB	Rating Level, $L_{Ar,\ 1hr}$	Background Sound Level, $L_{A90,1hr}$	Excess of Rating Over Background, dB
R1	3 Southdown Road	18	+4	22	49	-27
R2	63 John Street	31	+4	35	49	-14
R3	57 John Street	31	+4	35	49	-14
R4	45 John Street	30	+4	34	46	-12
R5	43 John Street	29	+4	33	46	-13
R6	44 John Street	31	+4	35	50	-15
R7	11 North Street	30	+4	34	50	-16
R8	7 North Street	24	+4	28	50	-22

TABLE 7.2: DAYTIME BS 4142 SOUND ASSESSMENT

Notes:
[1] Specific and Rating Levels calculated at a free-field location, 1.5 m above local ground.
[2] where multiple facades may be exposed to the specific sound, the façade with the highest calculated Specific Sound Level is presented.

7.1.7 The level differences presented in Table 7.2 show the daytime rating levels are calculated to fall below the daytime $L_{A90,1hr}$ background sound assessment by 12 dB or more.

7.1.8 According to BS 4142, where the rating level does not exceed the background sound level then this provides an indication of a specific sound source having a low impact, depending on the context.

7.1.9 The rating levels calculated at the receptors during the night-time period, along with a comparison of the rating levels with the relevant background sound assessment level are presented below in Table 7.3.

Rep ID	Address	BS 4142 Sound Level Assessment				
		Specific Sound Level, $L_{Aeq,15min}$[1, 2]	Acoustic Feature Correction, dB	Rating Level, $L_{Ar,15min}$	Background Sound Level, $L_{A90,15min}$	Excess of Rating Over Background, dB
R1	3 Southdown Road	25	+4	29	37	-8
R2	63 John Street	29	+4	33	37	-4
R3	57 John Street	29	+4	33	37	-4
R4	45 John Street	29	+4	33	37	-4
R5	43 John Street	27	+4	31	37	-6
R6	44 John Street	30	+4	34	37	-3
R7	11 North Street	29	+4	33	37	-4
R8	7 North Street	23	+4	27	37	-10

TABLE 7.3: NIGHT-TIME BS 4142 SOUND ASSESSMENT

Notes:
[1] Specific and Rating Levels calculated at a free-field location, 4.0 m above local ground; and
[2] where multiple facades may be exposed to the specific sound, the façade with the highest calculated Specific Sound Level is presented.

7.1.10 The level differences presented in Table 7.3 show the night-time rating levels are calculated to fall below the night-time $L_{A90,15min}$ background sound assessment level by 3 dB or more.

7.1.11 According to BS 4142, where the rating level does not exceed the background sound level then this provides an indication of a specific sound source having a low noise impact, depending on the context.

Context

7.1.12 When considering the significance of an impact, BS 4142 advises that the context of the impact should be taken into account. The context of the impact should consider factors such as: the absolute level of sound; the character and level of the residual sound compared to the character and level of the specific sound; the sensitivity of the receptor; and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

7.1.13 Excluding periods of adverse weather, the lowest daytime baseline ambient $L_{Aeq,15min}$ sound levels measured at LT1 ranged from 44 dB to 54 dB $L_{Aeq,15min}$.

7.1.14 The highest calculated specific sound level of 31 dB $L_{Aeq,15min}$ presented in Table 7.2 falls 13 dB below the lowest ambient $L_{Aeq,15min}$ level of 44 dB measured during the daytime period.

7.1.15 Excluding periods of adverse weather, the lowest night-time baseline ambient $L_{Aeq,15min}$ sound levels measured at LT1 ranged from 34 dB to 40 dB $L_{Aeq,15min}$.

7.1.16 The highest calculated specific sound level of 30 dB presented in Table 7.3 falls 4 dB below the lowest ambient $L_{Aeq,15min}$ level of 34 dB measured during the night-time period.

Uncertainty

7.1.17 BS4142 requires the potential uncertainty in measurements and calculations to be taken into account when considering the findings of an assessment. The following areas of uncertainty are associated with this particular noise assessment:

- the modelled numbers of each type of equipment and their locations is based upon information provided by Adur District Council representatives and the equipment supplier Mitsubishi/Ecodan; and

- rounding has been used in the derivation of the background sound levels and calculations, to avoid an impression of precision to decimal places. Rounding has been to integer values with 0.5 being rounded up on completion of the statistical analysis.

7.1.18 The outdoor propagation calculations are based on ISO 9613-2 1996. This states that calculations are made with attention restricted to downwind conditions of propagation. Other limitations include meteorological and non-material factors such as wind speeds being limited up to 5 ms^{-1}. It is also noted in ISO 9613-2 1996 that the estimated errors for octave-band sound pressure levels, calculated under the same conditions as the broadband calculation, may be somewhat larger than the errors for A-weighted broadband sources. Between 0-100 m and 100-1000 m the estimated accuracy is displayed in Table 7.4.

Height	**Distance**	
	0 < d < 100 m	**100m < d < 1000 m**
0 < h < 5 m	+/-3 dB	+/-3 dB
5m < h < 30 m	+/-1 dB	+/-3 dB

TABLE 7.4: ESTIMATIONS OF UNCERTAINTY IN ISO 9613-2

Notes: h – mean height of source and receiver;
d – distance between source and receiver; and
estimates made from situations where there are no effects due to reflection or attenuation due to screening.

8. CONCLUSIONS

8.1.1 A sound assessment has been undertaken to accompany a planning application for the proposed operation of 6 no. Air Source Heat Pumps at the Shoreham Centre in Shoreham-by-Sea.

8.1.2 Unattended sound monitoring has been undertaken over a period of 9 days to establish a measure of the existing background $L_{A90,T}$ and ambient $L_{Aeq,T}$ sound levels outside the nearest residential properties to the proposed location of the heat pumps.

8.1.3 Attended sound monitoring was also carried out during a weekday daytime period to make observations of the primary sources of sound governing the sound environment in the immediate vicinity of the site.

8.1.4 The sources of sound noted during the attended survey were traffic movements on the local road network, rail traffic on the nearby Southern railway line and air traffic associated with Brighton City Airport.

8.1.5 A sound model has been developed to calculate sound levels generated by the proposed operation of the ASHPs at the nearest residential receptors to the ASHPs' proposed location. The resulting sound levels have been assessed using the principles of the BS 4142:2014+A1:2019 assessment methodology.

8.1.6 Daytime sound levels have been modelled assuming 6 no. ASHPs will be operating continuously during a 1-hour daytime (07:00 – 23:00 hrs) assessment period.

8.1.7 Night-time sound levels have been modelled assuming 4 no. ASHPs will be operating during a 15-minute night-time (23:00 – 07:00 hrs) assessment period.

8.1.8 Daytime rating levels calculated at the receptor locations fall below the corresponding background sound level by at least 12 dB. This provides an indication that the proposed operation of the ASHPs should have a low noise impact during daytime operating hours.

8.1.9 Night-time rating levels calculated at the receptor locations fall below the corresponding background sound level by at least 3 dB, which also indicates that the proposed operation of the ASHPs should have a low noise impact- during night-time operating hours.

8.1.10 The calculated rating levels achieve the standard sound criterion detailed in the Sussex Planning Noise Advice Document for plant rating levels not to exceed background sound levels, by 3 dB or more. Based on the sound modelling and the associated calculation assumptions, specific noise control measures have therefore not been investigated given the rating levels are calculated to fall below the background sound assessment levels.

9. REFERENCES

1. Sussex Local Authorities. Planning Noise Advice Document: Sussex. March 2021.

2. British Standards Institution. BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'. 2019.

3. Department for Environment, Food and Rural Affairs (DEFRA). Noise Policy Statement for England (NPSE). March 2010

4. Ministry of Housing, Communities & Local Government. National Planning Policy Framework. July 2021.

5. Department for Environment, Food and Rural Affairs (DEFRA). Planning Practice Guidance – Noise. 2014 and July 2019.

6. International Standard ISO 9613-2: 1996: Acoustics – Attenuation of sound during propagation outdoors. Part 2: General method of calculation.

APPENDIX A: FIGURES

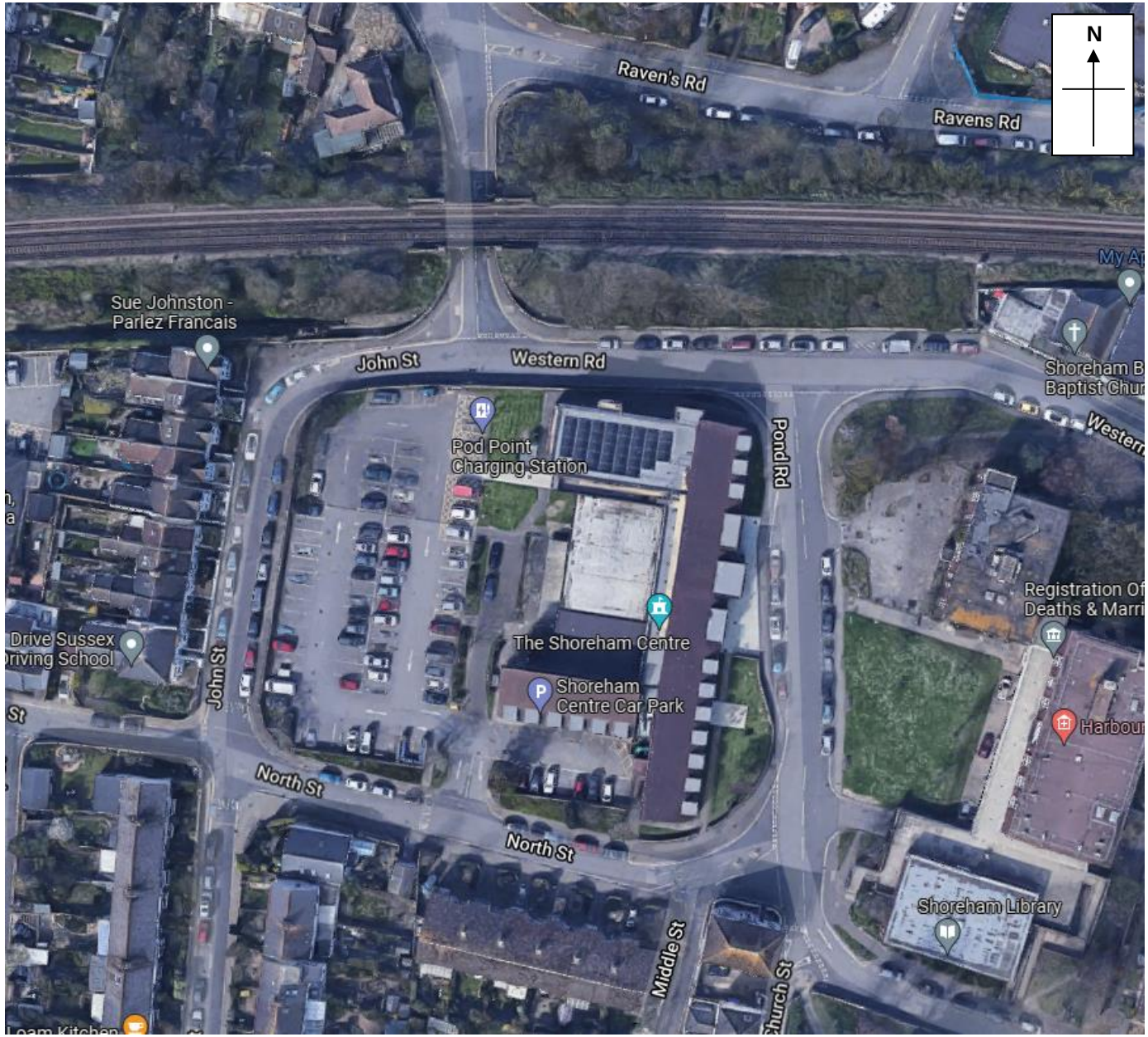

FIGURE A1: SHOREHAM CENTRE AND THE IMMEDIATE SURROUNDING AREA

Note: Aerial mapping taken from Google maps. Imagery ©2021 Google



FIGURE A2: PROPOSED LOCATION OF 6 NO. AIR SOURCE HEAT PUMPS AT SHOREHAM CENTRE

Note: Aerial mapping taken from Google maps. Imagery ©2021 Google



FIGURE A3: SOUND MONITORING LOCATIONS

Note: Aerial mapping taken from Google maps. Imagery ©2021 Google

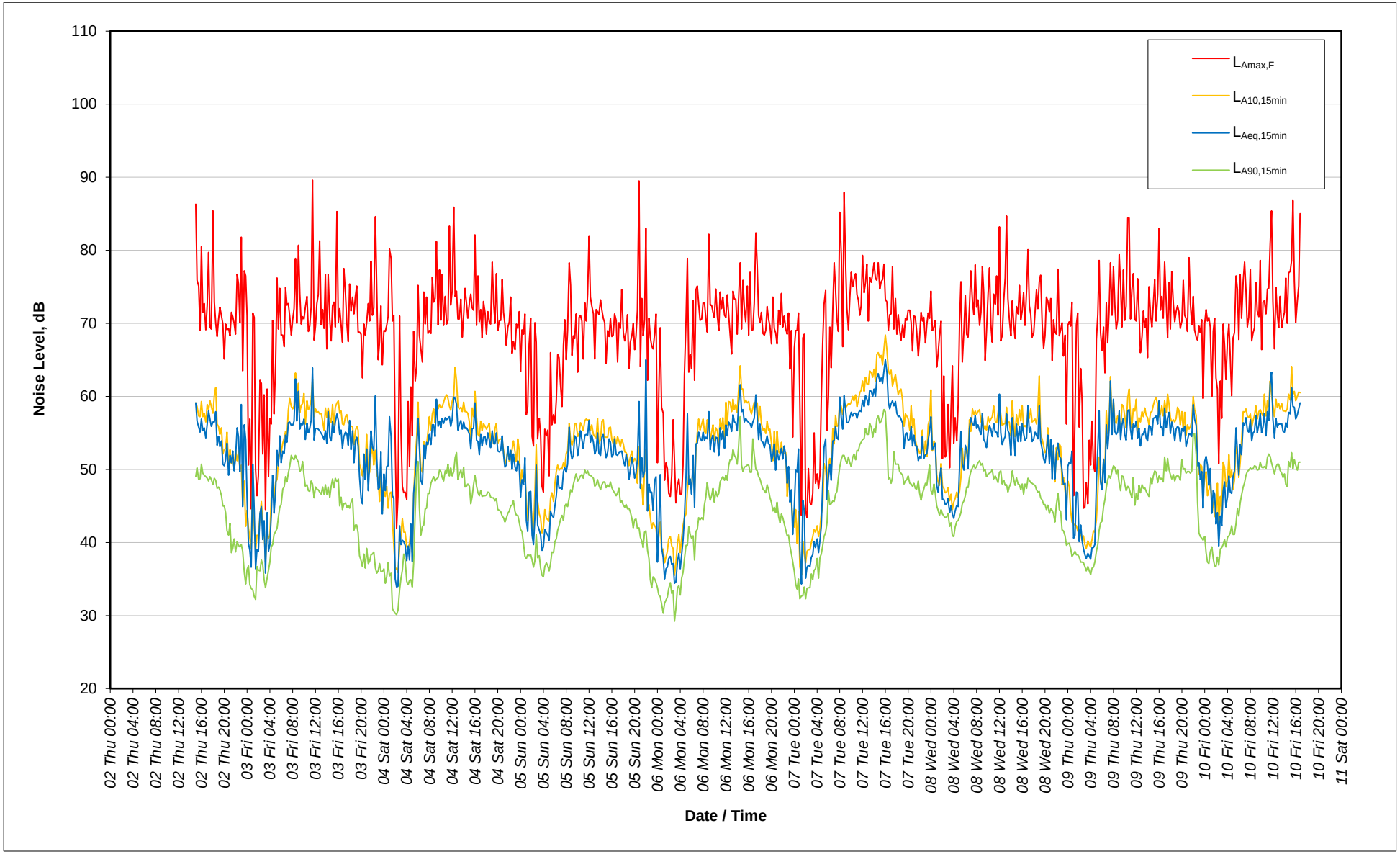

FIGURE A4: UNATTENDED SOUND MONITORING RESULTS AT LT1

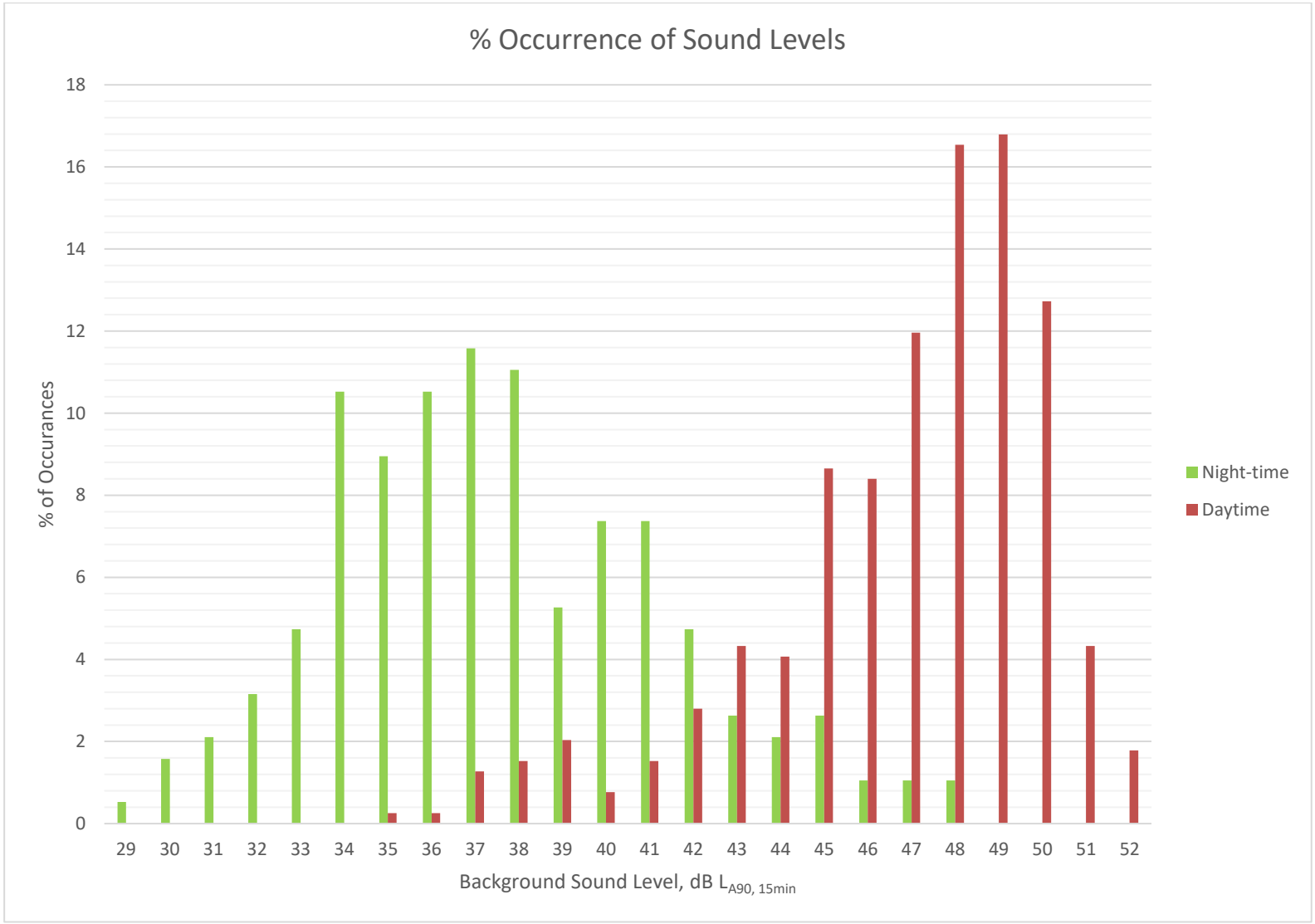

FIGURE A5: HISTOGRAM OF BACKGROUND $L_{A90,T}$ SOUND LEVELS MEASURED AT LT1

Note:
- *Daytime period is 07:00 – 23:00 hrs*
- *Night-time period is 23:00 – 07:00 hrs*
- *Data is exclusive of adverse data periods*



FIGURE A6: CALCULATION RECEPTOR LOCATIONS

Note: Aerial mapping taken from Google maps. Imagery ©2021 Google

APPENDIX B: TABLES

Day	Date	Temperature (°C)			Humidity (%)			Wind Speed (ms^{-1})		Precipitation (mm)
		Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Max.	Tot.
Thursday	02-Dec-21	5.3	2.6	9.3	88	68	95	0.7	5.4	7.4
Friday	03-Dec-21	7.3	1.1	11.1	92	82	96	0.6	5.5	4.6
Saturday	04-Dec-21	6.5	4	9.1	84	63	97	0.5	4.5	4.3
Sunday	05-Dec-21	6.1	4.9	7.3	84	78	89	1.5	8.2	0.8
Monday	06-Dec-21	5.3	2.6	9.3	88	68	95	0.7	5.4	7.4
Tuesday	07-Dec-21	6.1	-0.1	9.6	88	74	96	1.6	9.3	28.7
Wednesday	08-Dec-21	7.9	5.9	9.8	73	62	86	1.4	7.3	0.8
Thursday	09-Dec-21	7.3	3.4	9.7	84	69	96	0.6	4.6	8.6
Friday	10-Dec-21	6.3	3	9.2	80	67	64	1.6	7.9	1.0

TABLE B1: WEATHER RECORD OBTAINED FOR SURVEY PERIOD

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
02/12/21	15:00	86.3	59.1	59.1	49.0
02/12/21	15:15	75.9	58.6	56.6	50.2
02/12/21	15:30	75.1	57.3	55.8	48.6
02/12/21	15:45	69.0	57.2	55.1	48.7
02/12/21	16:00	80.5	59.3	56.9	50.7
02/12/21	16:15	71.5	57.2	55.3	49.5
02/12/21	16:30	72.7	57.7	55.7	49.2
02/12/21	16:45	69.1	56.5	54.3	49.0
02/12/21	17:00	72.5	58.9	56.2	48.8
02/12/21	17:15	79.7	58.2	58.0	48.4
02/12/21	17:30	69.5	59.4	56.9	49.0
02/12/21	17:45	69.2	58.6	55.9	48.6
02/12/21	18:00	85.4	57.7	56.5	47.9
02/12/21	18:15	72.9	60.1	56.5	48.8
02/12/21	18:30	70.0	61.2	57.9	48.5
02/12/21	18:45	68.2	56.2	53.3	47.4
02/12/21	19:00	70.5	55.9	54.5	47.6
02/12/21	19:15	72.2	54.8	53.1	47.2
02/12/21	19:30	71.0	55.7	53.9	46.4
02/12/21	19:45	69.9	52.1	50.7	45.0
02/12/21	20:00	65.1	52.7	50.5	45.0
02/12/21	20:15	69.9	52.9	51.3	44.1
02/12/21	20:30	69.1	55.1	53.6	41.6
02/12/21	20:45	69.3	50.4	49.2	41.0
02/12/21	21:00	68.3	52.7	51.9	42.6
02/12/21	21:15	71.5	50.8	50.9	38.6
02/12/21	21:30	70.9	51.3	52.5	39.2
02/12/21	21:45	70.0	50.3	49.8	40.5
02/12/21	22:00	68.5	52.6	51.6	38.7
02/12/21	22:15	76.7	51.2	55.7	40.1
02/12/21	22:30	75.4	52.5	54.4	39.6
02/12/21	22:45	70.1	50.0	49.7	39.4
	Arith. Average	72.4	55.4	54.2	45.6
	Log. Average	76.4	56.6	54.9	47.0
	Minimum	65.1	50.0	49.2	38.6
	Maximum	86.3	61.2	59.1	50.7
02/12/21	23:00	81.8	50.6	58.9	39.7
02/12/21	23:15	63.5	45.1	44.9	38.8
02/12/21	23:30	77.2	48.4	56.1	35.9
02/12/21	23:45	76.5	42.2	54.1	34.3
03/12/21	00:00	71.0	44.4	46.0	36.3
03/12/21	00:15	50.6	42.0	39.9	36.8
03/12/21	00:30	56.9	40.6	38.9	34.2
03/12/21	00:45	44.6	39.1	36.6	33.7
03/12/21	01:00	71.4	49.6	50.7	33.5

TABLE B2: UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Note: Highlighted cells indicate periods of data excluded

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
03/12/21	01:15	70.8	42.3	44.4	32.6
03/12/21	01:30	50.0	38.8	36.4	32.2
03/12/21	01:45	46.4	41.0	39.0	36.7
03/12/21	02:00	49.1	40.9	38.8	36.2
03/12/21	02:15	62.2	43.5	44.0	36.1
03/12/21	02:30	61.8	45.6	44.9	37.6
03/12/21	02:45	52.1	42.7	40.4	37.0
03/12/21	03:00	60.2	41.8	43.0	34.9
03/12/21	03:15	44.5	37.3	35.8	33.8
03/12/21	03:30	61.0	41.7	44.1	35.1
03/12/21	03:45	49.0	40.6	38.8	36.2
03/12/21	04:00	57.0	40.9	39.7	37.3
03/12/21	04:15	56.2	46.2	43.7	39.4
03/12/21	04:30	70.4	46.4	49.2	39.7
03/12/21	04:45	57.6	45.9	44.0	41.1
03/12/21	05:00	64.6	48.3	47.0	41.5
03/12/21	05:15	76.2	48.6	52.6	41.9
03/12/21	05:30	69.2	51.1	50.5	43.5
03/12/21	05:45	74.8	52.4	54.6	44.8
03/12/21	06:00	68.4	52.3	50.9	45.2
03/12/21	06:15	68.4	53.6	52.5	47.3
03/12/21	06:30	66.8	54.3	52.2	47.6
03/12/21	06:45	74.9	55.2	54.7	49.0
	Arith. Average	62.7	45.4	45.9	38.4
	Log. Average	71.4	48.3	50.2	41.2
	Minimum	44.5	37.3	35.8	32.2
	Maximum	81.8	55.2	58.9	49.0
03/12/21	07:00	72.5	54.4	53.7	48.3
03/12/21	07:15	72.7	58.1	56.4	49.5
03/12/21	07:30	71.0	59.7	56.5	50.4
03/12/21	07:45	68.4	58.6	56.0	51.9
03/12/21	08:00	70.5	58.3	56.0	51.5
03/12/21	08:15	72.0	58.7	56.6	51.3
03/12/21	08:30	78.9	63.2	62.4	51.9
03/12/21	08:45	70.0	59.5	56.6	51.4
03/12/21	09:00	80.7	61.8	60.7	51.0
03/12/21	09:15	74.0	57.8	55.5	49.7
03/12/21	09:30	69.9	58.8	56.3	50.0
03/12/21	09:45	70.9	59.0	56.1	51.1
03/12/21	10:00	70.6	60.4	56.9	49.2
03/12/21	10:15	72.2	56.2	54.1	47.7
03/12/21	10:30	73.7	59.4	56.3	47.9
03/12/21	10:45	68.9	58.2	55.0	47.1
03/12/21	11:00	69.6	58.6	55.6	47.0
03/12/21	11:15	72.2	59.5	56.7	48.4

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Note: Highlighted cells indicate periods of data excluded

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
03/12/21	11:30	89.6	62.4	63.9	48.0
03/12/21	11:45	67.7	57.2	54.0	46.1
03/12/21	12:00	69.6	58.3	55.6	47.6
03/12/21	12:15	72.7	57.8	55.6	47.3
03/12/21	12:30	73.9	57.9	55.5	47.2
03/12/21	12:45	81.3	57.6	55.3	46.9
03/12/21	13:00	69.8	57.7	54.9	46.6
03/12/21	13:15	71.9	56.6	54.6	47.6
03/12/21	13:30	69.3	55.4	54.1	46.6
03/12/21	13:45	76.7	58.4	55.3	47.9
03/12/21	14:00	66.5	57.1	53.6	46.6
03/12/21	14:15	76.7	58.4	57.9	47.6
03/12/21	14:30	70.5	57.1	54.4	46.2
03/12/21	14:45	67.6	56.4	53.9	47.7
03/12/21	15:00	72.4	58.9	56.6	48.7
03/12/21	15:15	72.9	56.1	55.0	47.5
03/12/21	15:30	69.5	58.5	56.5	48.8
03/12/21	15:45	85.3	59.1	57.6	48.3
03/12/21	16:00	70.1	59.4	56.7	48.7
03/12/21	16:15	72.0	57.7	54.8	45.0
03/12/21	16:30	69.8	58.0	55.4	46.2
03/12/21	16:45	67.4	56.2	52.9	44.5
03/12/21	17:00	77.5	56.1	54.5	45.3
03/12/21	17:15	74.1	57.2	55.1	45.4
03/12/21	17:30	70.0	57.5	54.9	44.8
03/12/21	17:45	67.5	56.3	53.3	45.1
03/12/21	18:00	75.4	56.4	56.7	44.7
03/12/21	18:15	71.7	55.9	52.7	45.5
03/12/21	18:30	73.6	55.9	55.3	46.0
03/12/21	18:45	71.3	53.4	50.9	41.7
03/12/21	19:00	73.7	55.3	53.9	42.4
03/12/21	19:15	75.1	55.9	54.4	42.4
03/12/21	19:30	68.8	55.4	53.2	41.3
03/12/21	19:45	68.8	50.7	49.0	38.2
03/12/21	20:00	68.5	50.0	46.0	37.5
03/12/21	20:15	62.5	49.1	45.3	36.7
03/12/21	20:30	69.9	51.4	52.1	38.4
03/12/21	20:45	68.4	50.6	48.6	36.5
03/12/21	21:00	70.1	54.8	52.8	39.2
03/12/21	21:15	72.7	49.3	47.1	37.1
03/12/21	21:30	70.3	49.6	50.9	37.4
03/12/21	21:45	78.5	52.0	55.3	38.3
03/12/21	22:00	71.1	53.1	53.0	38.4
03/12/21	22:15	72.1	50.6	52.6	38.7
03/12/21	22:30	84.6	52.6	60.1	36.5
03/12/21	22:45	74.4	49.2	51.5	35.8

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
	Arith. Average	72.4	56.4	54.7	45.4
	Log. Average	76.5	57.5	55.9	47.2
	Minimum	62.5	49.1	45.3	35.8
	Maximum	89.6	63.2	63.9	51.9
03/12/21	23:00	65.0	48.9	47.3	36.1
03/12/21	23:15	67.5	45.6	47.5	37.1
03/12/21	23:30	72.4	50.4	52.4	36.0
03/12/21	23:45	64.3	44.3	43.9	36.0
04/12/21	00:00	69.0	47.0	49.4	36.4
04/12/21	00:15	68.9	46.3	47.1	34.4
04/12/21	00:30	69.7	47.7	50.4	35.3
04/12/21	00:45	70.9	44.7	50.5	37.2
04/12/21	01:00	80.2	46.7	57.2	35.4
04/12/21	01:15	78.9	46.9	54.5	35.8
04/12/21	01:30	70.3	43.0	46.4	30.9
04/12/21	01:45	71.1	39.6	46.0	30.6
04/12/21	02:00	53.6	36.3	35.0	30.3
04/12/21	02:15	41.9	36.5	33.9	30.1
04/12/21	02:30	46.3	35.9	34.0	30.7
04/12/21	02:45	71.0	39.4	42.3	33.5
04/12/21	03:00	55.2	41.1	39.7	35.1
04/12/21	03:15	47.7	43.3	40.3	36.2
04/12/21	03:30	46.8	41.4	40.1	38.4
04/12/21	03:45	46.9	41.4	39.6	37.6
04/12/21	04:00	45.9	39.4	37.5	34.7
04/12/21	04:15	59.3	39.2	39.5	34.2
04/12/21	04:30	50.4	39.9	37.6	34.8
04/12/21	04:45	61.3	42.1	42.5	34.9
04/12/21	05:00	54.6	38.6	37.4	33.9
04/12/21	05:15	68.9	46.3	46.8	37.2
04/12/21	05:30	62.1	51.5	49.2	44.5
04/12/21	05:45	64.1	54.3	52.4	49.6
04/12/21	06:00	75.2	59.2	57.0	51.1
04/12/21	06:15	68.3	53.7	53.0	44.7
04/12/21	06:30	66.6	50.2	48.5	41.0
04/12/21	06:45	64.7	49.6	47.9	42.2
	Arith. Average	62.5	44.7	45.2	36.7
	Log. Average	70.4	48.8	49.4	40.9
	Minimum	41.9	35.9	33.9	30.1
	Maximum	80.2	59.2	57.2	51.1
04/12/21	07:00	74.3	53.8	53.3	42.4
04/12/21	07:15	69.9	53.1	51.4	44.6
04/12/21	07:30	73.6	53.3	53.7	44.7
04/12/21	07:45	68.6	55.1	53.4	46.7

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Note: Highlighted cells indicate periods of data excluded

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
04/12/21	08:00	69.0	57.2	54.8	46.7
04/12/21	08:15	68.6	55.4	53.4	48.1
04/12/21	08:30	76.3	57.6	56.1	48.6
04/12/21	08:45	72.9	58.3	56.1	49.0
04/12/21	09:00	73.4	56.4	54.5	48.4
04/12/21	09:15	81.2	59.5	59.6	48.7
04/12/21	09:30	69.8	58.3	55.9	48.9
04/12/21	09:45	77.3	58.9	56.6	49.9
04/12/21	10:00	70.4	58.4	55.7	49.7
04/12/21	10:15	76.7	58.6	57.0	48.9
04/12/21	10:30	69.7	59.2	56.3	48.4
04/12/21	10:45	73.7	59.9	57.1	49.8
04/12/21	11:00	69.9	60.2	56.8	49.5
04/12/21	11:15	70.4	59.7	57.0	50.7
04/12/21	11:30	83.3	58.7	57.2	49.1
04/12/21	11:45	72.5	58.1	55.9	50.2
04/12/21	12:00	74.4	59.3	56.8	49.1
04/12/21	12:15	85.9	60.1	59.9	49.7
04/12/21	12:30	73.7	64.0	59.7	51.6
04/12/21	12:45	74.4	62.1	58.9	52.3
04/12/21	13:00	70.6	58.6	55.4	48.6
04/12/21	13:15	70.6	58.3	56.1	49.4
04/12/21	13:30	73.3	58.5	56.7	49.9
04/12/21	13:45	68.1	57.9	55.5	48.9
04/12/21	14:00	71.1	59.2	56.5	50.3
04/12/21	14:15	74.8	57.9	55.6	47.6
04/12/21	14:30	72.9	57.9	55.7	47.7
04/12/21	14:45	70.7	57.7	55.4	48.0
04/12/21	15:00	72.8	56.5	54.8	47.7
04/12/21	15:15	74.0	54.2	52.8	45.3
04/12/21	15:30	72.1	58.4	55.6	46.3
04/12/21	15:45	71.8	57.2	55.6	47.9
04/12/21	16:00	82.1	60.7	59.1	49.2
04/12/21	16:15	69.7	57.1	54.0	47.7
04/12/21	16:30	76.5	54.8	53.8	46.8
04/12/21	16:45	70.2	54.5	52.0	46.4
04/12/21	17:00	71.9	56.6	54.8	47.1
04/12/21	17:15	68.0	55.3	53.2	46.3
04/12/21	17:30	73.0	56.3	54.4	46.4
04/12/21	17:45	71.4	55.9	54.5	46.4
04/12/21	18:00	68.5	55.5	53.4	46.5
04/12/21	18:15	71.6	55.9	55.0	46.9
04/12/21	18:30	70.2	56.3	54.1	46.8
04/12/21	18:45	69.9	54.0	53.0	46.2
04/12/21	19:00	78.4	54.9	55.3	46.1
04/12/21	19:15	72.9	53.5	53.6	46.1

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
04/12/21	19:30	70.0	55.6	53.5	45.7
04/12/21	19:45	76.8	56.3	55.0	46.0
04/12/21	20:00	69.0	53.6	52.5	44.5
04/12/21	20:15	70.4	54.1	52.4	44.4
04/12/21	20:30	70.4	54.2	52.6	44.2
04/12/21	20:45	76.0	54.1	54.6	43.6
04/12/21	21:00	71.5	52.6	52.1	43.4
04/12/21	21:15	69.9	50.7	50.3	42.8
04/12/21	21:30	67.0	51.3	50.6	43.3
04/12/21	21:45	69.5	52.7	53.1	44.0
04/12/21	22:00	70.2	51.1	51.3	44.3
04/12/21	22:15	73.6	51.4	52.6	45.0
04/12/21	22:30	65.9	52.7	50.0	45.1
04/12/21	22:45	67.5	53.9	52.1	45.7
	Arith. Average	72.4	56.5	54.8	47.2
	Log. Average	74.9	57.3	55.4	47.8
	Minimum	65.9	50.7	50.0	42.4
	Maximum	85.9	64.0	59.9	52.3
04/12/21	23:00	66.4	52.4	50.3	44.2
04/12/21	23:15	69.9	51.1	49.8	43.7
04/12/21	23:30	69.3	54.2	51.2	43.7
04/12/21	23:45	71.6	52.6	50.5	42.8
05/12/21	00:00	63.4	47.7	46.2	41.8
05/12/21	00:15	69.1	49.9	48.6	41.5
05/12/21	00:30	68.5	48.3	47.9	39.8
05/12/21	00:45	71.3	49.4	51.6	38.1
05/12/21	01:00	57.5	45.7	43.0	37.8
05/12/21	01:15	58.6	43.0	41.5	38.3
05/12/21	01:30	67.1	46.5	46.9	38.2
05/12/21	01:45	70.7	45.4	47.0	38.3
05/12/21	02:00	54.5	42.9	41.0	37.6
05/12/21	02:15	53.2	41.6	39.7	36.6
05/12/21	02:30	70.1	46.7	43.4	37.5
05/12/21	02:45	67.4	53.4	50.6	41.1
05/12/21	03:00	54.2	45.7	42.4	37.9
05/12/21	03:15	57.0	43.9	41.7	38.2
05/12/21	03:30	54.7	43.3	41.0	36.5
05/12/21	03:45	47.7	41.3	38.9	35.5
05/12/21	04:00	46.9	41.9	39.4	35.3
05/12/21	04:15	55.5	44.5	41.8	36.7
05/12/21	04:30	54.6	43.3	41.3	37.2
05/12/21	04:45	55.4	43.1	41.0	36.8
05/12/21	05:00	49.1	42.9	40.3	36.1
05/12/21	05:15	66.0	46.0	44.3	37.1
05/12/21	05:30	56.1	46.8	43.7	38.7

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Note: Highlighted cells indicate periods of data excluded

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
05/12/21	05:45	57.5	45.6	43.4	38.6
05/12/21	06:00	56.3	48.1	45.0	40.1
05/12/21	06:15	59.5	49.7	46.4	40.5
05/12/21	06:30	65.7	50.6	49.1	41.7
05/12/21	06:45	65.3	49.9	47.4	42.3
	Arith. Average	60.9	46.8	44.9	39.1
	Log. Average	65.7	48.4	46.6	39.8
	Minimum	46.9	41.3	38.9	35.3
	Maximum	71.6	54.2	51.6	44.2
05/12/21	07:00	61.8	50.1	47.5	43.1
05/12/21	07:15	58.6	50.1	47.3	43.7
05/12/21	07:30	67.0	50.9	49.7	43.0
05/12/21	07:45	70.5	50.4	50.2	45.0
05/12/21	08:00	65.0	52.2	49.6	45.3
05/12/21	08:15	69.0	52.4	50.7	44.9
05/12/21	08:30	78.3	56.3	55.8	46.1
05/12/21	08:45	75.2	54.0	52.5	47.2
05/12/21	09:00	65.6	53.3	51.4	46.9
05/12/21	09:15	68.3	54.0	51.9	47.9
05/12/21	09:30	67.9	56.3	54.6	48.7
05/12/21	09:45	71.3	56.3	54.3	49.4
05/12/21	10:00	63.3	54.5	51.9	48.4
05/12/21	10:15	70.8	54.9	53.2	48.7
05/12/21	10:30	71.1	56.4	55.3	49.1
05/12/21	10:45	70.3	56.0	54.1	49.3
05/12/21	11:00	65.1	55.3	52.9	48.8
05/12/21	11:15	72.8	56.7	54.7	49.9
05/12/21	11:30	70.3	56.9	54.8	49.5
05/12/21	11:45	74.0	56.7	54.7	49.8
05/12/21	12:00	81.9	56.8	56.7	49.2
05/12/21	12:15	73.6	55.3	53.7	49.2
05/12/21	12:30	72.4	56.1	54.7	49.0
05/12/21	12:45	71.3	54.8	53.7	48.8
05/12/21	13:00	65.1	54.5	52.1	47.7
05/12/21	13:15	71.9	54.3	52.6	47.9
05/12/21	13:30	71.6	57.0	55.0	48.6
05/12/21	13:45	71.2	53.5	52.2	47.8
05/12/21	14:00	73.2	54.1	51.9	47.2
05/12/21	14:15	71.8	56.6	54.4	47.9
05/12/21	14:30	70.7	56.8	54.8	48.3
05/12/21	14:45	70.1	54.4	53.0	48.3
05/12/21	15:00	64.5	54.4	51.6	47.5
05/12/21	15:15	69.0	54.4	52.4	47.9
05/12/21	15:30	68.2	55.7	54.2	47.6
05/12/21	15:45	70.7	55.8	53.7	48.3

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
05/12/21	16:00	68.2	54.1	51.7	47.5
05/12/21	16:15	68.4	53.5	52.0	47.1
05/12/21	16:30	71.3	54.5	54.2	46.8
05/12/21	16:45	70.4	53.5	52.0	46.4
05/12/21	17:00	64.7	54.5	51.9	46.8
05/12/21	17:15	70.1	53.9	52.3	47.4
05/12/21	17:30	69.3	53.1	52.4	45.5
05/12/21	17:45	74.6	54.1	52.5	45.7
05/12/21	18:00	68.7	53.5	51.2	45.1
05/12/21	18:15	67.6	52.4	50.5	44.8
05/12/21	18:30	68.9	52.3	52.0	45.2
05/12/21	18:45	71.2	51.8	51.0	44.6
05/12/21	19:00	63.8	50.5	48.6	44.7
05/12/21	19:15	67.4	51.7	49.9	44.2
05/12/21	19:30	68.3	52.5	51.6	43.3
05/12/21	19:45	70.0	51.0	50.5	42.0
05/12/21	20:00	66.4	51.5	48.8	43.1
05/12/21	20:15	68.3	51.2	49.5	43.2
05/12/21	20:30	71.8	48.1	51.3	41.9
05/12/21	20:45	89.5	53.1	59.3	42.0
05/12/21	21:00	64.1	48.1	47.4	40.7
05/12/21	21:15	73.4	47.9	51.6	40.2
05/12/21	21:30	68.3	45.1	48.9	39.3
05/12/21	21:45	70.5	50.0	49.8	41.4
05/12/21	22:00	83.0	52.8	65.0	41.6
05/12/21	22:15	62.2	44.4	44.3	38.9
05/12/21	22:30	70.7	45.2	48.0	37.8
05/12/21	22:45	68.1	43.5	46.8	34.9
	Arith. Average	69.9	53.1	52.2	45.8
	Log. Average	74.8	53.9	53.7	46.7
	Minimum	58.6	43.5	44.3	34.9
	Maximum	89.5	57.0	65.0	49.9
05/12/21	23:00	66.9	41.9	46.9	33.8
05/12/21	23:15	66.5	42.7	44.4	35.3
05/12/21	23:30	68.6	42.3	48.5	35.0
05/12/21	23:45	71.3	41.9	49.0	34.5
06/12/21	00:00	50.9	39.5	37.3	33.8
06/12/21	00:15	60.6	40.8	42.1	32.8
06/12/21	00:30	69.4	42.8	49.3	32.6
06/12/21	00:45	58.5	38.9	39.4	31.6
06/12/21	01:00	57.7	39.1	37.9	30.3
06/12/21	01:15	48.5	37.2	35.0	31.7
06/12/21	01:30	50.9	38.0	36.4	32.1
06/12/21	01:45	50.1	38.8	36.6	32.5
06/12/21	02:00	46.7	40.5	37.8	33.7

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
06/12/21	02:15	46.3	40.8	38.1	34.5
06/12/21	02:30	49.2	39.5	37.0	33.0
06/12/21	02:45	56.8	39.2	37.1	33.4
06/12/21	03:00	51.2	35.5	34.4	29.2
06/12/21	03:15	45.4	37.1	34.6	30.9
06/12/21	03:30	47.8	39.9	37.4	33.8
06/12/21	03:45	48.7	41.1	38.5	34.1
06/12/21	04:00	46.6	38.6	36.4	32.8
06/12/21	04:15	46.6	40.6	38.3	35.1
06/12/21	04:30	50.6	42.3	40.3	35.9
06/12/21	04:45	63.0	43.4	43.4	37.7
06/12/21	05:00	70.4	43.9	49.1	39.6
06/12/21	05:15	78.9	47.1	57.6	39.6
06/12/21	05:30	63.3	49.1	47.9	42.2
06/12/21	05:45	65.7	47.9	48.7	41.1
06/12/21	06:00	63.8	47.3	46.6	40.6
06/12/21	06:15	73.1	50.7	51.9	40.9
06/12/21	06:30	62.2	46.8	44.8	37.6
06/12/21	06:45	74.6	52.4	53.5	41.5
	Arith. Average	58.5	42.1	42.4	35.1
	Log. Average	67.8	44.4	47.2	36.7
	Minimum	45.4	35.5	34.4	29.2
	Maximum	78.9	52.4	57.6	42.2
06/12/21	07:00	75.1	55.0	53.6	41.8
06/12/21	07:15	72.6	56.9	55.1	43.4
06/12/21	07:30	70.4	55.4	54.3	43.1
06/12/21	07:45	70.6	56.2	53.9	43.4
06/12/21	08:00	72.8	56.9	55.1	43.1
06/12/21	08:15	72.8	55.2	54.0	45.2
06/12/21	08:30	70.7	54.9	54.4	46.2
06/12/21	08:45	68.8	56.8	54.2	48.2
06/12/21	09:00	82.2	55.9	57.9	46.6
06/12/21	09:15	72.5	53.9	52.7	45.8
06/12/21	09:30	72.5	55.1	54.2	46.4
06/12/21	09:45	71.5	56.1	54.7	47.4
06/12/21	10:00	70.8	53.9	52.4	45.5
06/12/21	10:15	74.7	55.7	54.4	47.0
06/12/21	10:30	71.0	55.3	54.3	46.3
06/12/21	10:45	69.0	53.5	51.9	46.7
06/12/21	11:00	74.3	56.9	55.7	48.3
06/12/21	11:15	72.0	55.5	54.1	48.7
06/12/21	11:30	73.6	57.1	55.3	49.0
06/12/21	11:45	71.1	54.2	52.9	48.5
06/12/21	12:00	70.8	59.2	56.1	49.2
06/12/21	12:15	73.9	56.0	54.6	48.5

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
06/12/21	12:30	71.2	59.3	56.5	50.5
06/12/21	12:45	68.6	59.2	56.1	51.3
06/12/21	13:00	65.8	57.9	55.2	51.3
06/12/21	13:15	74.4	59.6	57.5	52.7
06/12/21	13:30	73.3	58.2	56.5	51.9
06/12/21	13:45	73.3	58.9	56.4	51.6
06/12/21	14:00	68.5	57.8	55.3	50.7
06/12/21	14:15	73.2	60.8	58.8	53.1
06/12/21	14:30	78.3	64.2	61.6	57.2
06/12/21	14:45	69.2	61.0	57.9	50.6
06/12/21	15:00	75.9	61.0	58.2	49.7
06/12/21	15:15	72.1	59.1	56.5	50.3
06/12/21	15:30	70.2	59.5	57.0	50.4
06/12/21	15:45	75.1	59.1	56.6	50.6
06/12/21	16:00	68.4	59.3	56.4	50.6
06/12/21	16:15	77.0	58.2	56.3	49.6
06/12/21	16:30	69.1	57.6	55.7	49.6
06/12/21	16:45	69.1	58.4	56.5	54.2
06/12/21	17:00	72.7	59.2	57.0	52.0
06/12/21	17:15	82.4	58.6	60.2	50.0
06/12/21	17:30	77.9	59.1	57.2	49.8
06/12/21	17:45	71.1	56.6	54.1	49.0
06/12/21	18:00	70.1	58.6	56.2	48.7
06/12/21	18:15	71.5	56.3	53.9	48.0
06/12/21	18:30	68.6	55.4	53.7	47.3
06/12/21	18:45	68.4	55.6	53.0	47.1
06/12/21	19:00	69.0	54.9	53.8	46.8
06/12/21	19:15	72.3	56.6	54.6	47.9
06/12/21	19:30	70.6	55.4	53.5	47.2
06/12/21	19:45	69.7	55.5	53.4	46.2
06/12/21	20:00	67.2	53.5	51.1	45.4
06/12/21	20:15	73.6	51.2	51.9	44.3
06/12/21	20:30	69.3	55.2	53.5	44.8
06/12/21	20:45	68.7	51.5	49.9	44.1
06/12/21	21:00	67.2	55.2	52.6	45.5
06/12/21	21:15	71.8	52.4	51.3	43.5
06/12/21	21:30	69.8	52.2	52.0	42.7
06/12/21	21:45	74.1	53.7	52.9	43.9
06/12/21	22:00	69.5	52.1	51.4	43.4
06/12/21	22:15	71.0	52.2	53.2	42.6
06/12/21	22:30	69.2	52.3	51.8	41.7
06/12/21	22:45	68.5	46.3	48.1	40.9
	Arith. Average	71.7	56.3	54.7	47.6
	Log. Average	73.3	57.2	55.4	48.9
	Minimum	65.8	46.3	48.1	40.9
	Maximum	82.4	64.2	61.6	57.2

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Note: Highlighted cells indicate periods of data excluded

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
06/12/21	23:00	71.4	48.8	50.4	41.0
06/12/21	23:15	63.7	47.0	45.5	39.5
06/12/21	23:30	69.0	45.6	47.2	38.5
06/12/21	23:45	54.4	43.2	41.1	37.4
07/12/21	00:00	66.6	42.1	44.9	36.0
07/12/21	00:15	69.0	44.5	49.9	34.3
07/12/21	00:30	69.0	39.9	49.6	33.6
07/12/21	00:45	71.4	44.2	52.8	35.0
07/12/21	01:00	59.1	36.7	39.0	32.3
07/12/21	01:15	43.7	35.6	34.3	32.7
07/12/21	01:30	68.0	40.1	45.8	32.7
07/12/21	01:45	68.5	38.4	44.4	33.9
07/12/21	02:00	44.3	37.2	35.1	32.3
07/12/21	02:15	43.4	38.8	36.6	33.7
07/12/21	02:30	50.1	39.0	36.9	33.8
07/12/21	02:45	45.4	39.0	36.7	33.8
07/12/21	03:00	45.2	40.0	38.0	35.7
07/12/21	03:15	46.7	40.8	38.3	34.9
07/12/21	03:30	55.0	41.8	40.1	36.2
07/12/21	03:45	48.1	41.4	39.3	36.4
07/12/21	04:00	49.4	42.3	40.5	37.8
07/12/21	04:15	47.4	40.8	38.6	35.1
07/12/21	04:30	49.2	41.8	40.2	37.9
07/12/21	04:45	59.5	44.0	42.2	38.4
07/12/21	05:00	67.2	44.7	47.8	39.5
07/12/21	05:15	72.6	50.8	53.0	40.8
07/12/21	05:30	74.5	49.9	54.2	41.4
07/12/21	05:45	55.4	48.0	45.9	42.7
07/12/21	06:00	59.9	50.5	48.9	47.1
07/12/21	06:15	69.5	51.5	50.7	45.2
07/12/21	06:30	63.9	49.8	48.5	45.3
07/12/21	06:45	72.0	55.6	53.9	45.7
	Arith. Average	59.1	43.6	44.1	37.5
	Log. Average	66.8	46.6	47.7	39.9
	Minimum	43.4	35.6	34.3	32.3
	Maximum	74.5	55.6	54.2	47.1
07/12/21	07:00	78.3	53.5	54.0	45.6
07/12/21	07:15	74.6	57.4	55.9	46.6
07/12/21	07:30	70.5	55.9	54.3	47.0
07/12/21	07:45	68.9	56.0	54.1	48.8
07/12/21	08:00	85.2	59.5	59.9	50.3
07/12/21	08:15	79.3	58.5	57.0	51.4
07/12/21	08:30	66.8	57.5	55.5	51.9
07/12/21	08:45	87.9	59.0	60.1	51.9

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Note: Highlighted cells indicate periods of data excluded

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
07/12/21	09:00	79.0	58.4	58.3	51.3
07/12/21	09:15	72.1	58.7	56.4	50.8
07/12/21	09:30	69.1	59.0	56.4	51.7
07/12/21	09:45	73.6	58.9	57.1	50.9
07/12/21	10:00	77.0	59.2	57.8	50.4
07/12/21	10:15	75.0	60.0	57.3	51.6
07/12/21	10:30	76.0	59.4	57.7	52.1
07/12/21	10:45	76.8	60.2	57.7	51.3
07/12/21	11:00	73.9	58.6	57.0	52.6
07/12/21	11:15	73.2	59.4	57.7	52.5
07/12/21	11:30	71.1	60.5	58.1	53.4
07/12/21	11:45	72.4	60.8	57.9	53.7
07/12/21	12:00	79.3	62.1	59.5	54.1
07/12/21	12:15	74.2	60.7	58.6	54.2
07/12/21	12:30	75.6	62.6	60.1	55.6
07/12/21	12:45	78.1	61.7	59.6	54.8
07/12/21	13:00	70.3	61.6	58.8	54.8
07/12/21	13:15	76.3	63.5	60.8	56.3
07/12/21	13:30	75.6	63.2	60.7	55.8
07/12/21	13:45	76.8	62.6	60.0	54.4
07/12/21	14:00	78.3	63.7	61.0	55.5
07/12/21	14:15	76.1	62.0	60.0	55.0
07/12/21	14:30	75.9	65.7	62.5	56.9
07/12/21	14:45	78.3	66.0	63.1	57.3
07/12/21	15:00	74.7	65.3	62.0	56.3
07/12/21	15:15	75.7	65.6	62.5	56.6
07/12/21	15:30	76.0	64.3	61.8	57.2
07/12/21	15:45	78.1	66.5	63.5	58.2
07/12/21	16:00	73.3	68.4	65.0	57.9
07/12/21	16:15	72.9	66.3	63.2	53.7
07/12/21	16:30	69.0	63.6	59.2	48.7
07/12/21	16:45	71.2	63.0	58.3	48.9
07/12/21	17:00	71.3	63.6	59.0	48.1
07/12/21	17:15	77.8	61.4	59.4	48.9
07/12/21	17:30	69.2	62.2	58.7	52.4
07/12/21	17:45	73.4	63.0	59.3	50.7
07/12/21	18:00	68.5	61.5	57.7	50.7
07/12/21	18:15	71.2	60.2	57.2	50.7
07/12/21	18:30	69.1	60.8	57.3	49.7
07/12/21	18:45	67.7	61.0	56.9	49.5
07/12/21	19:00	69.8	59.4	56.3	49.2
07/12/21	19:15	68.1	55.9	52.9	48.0
07/12/21	19:30	70.7	57.6	54.8	48.4
07/12/21	19:45	70.4	57.3	55.0	48.6
07/12/21	20:00	71.8	56.9	54.0	49.1
07/12/21	20:15	71.8	55.4	54.1	48.1

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Note: Highlighted cells indicate periods of data excluded

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
07/12/21	20:30	70.1	58.7	55.9	48.0
07/12/21	20:45	66.2	55.7	53.2	47.7
07/12/21	21:00	71.0	56.9	54.7	48.1
07/12/21	21:15	70.9	54.1	53.2	47.4
07/12/21	21:30	68.9	53.2	53.2	47.3
07/12/21	21:45	65.5	52.8	51.2	48.4
07/12/21	22:00	68.2	52.2	51.8	46.7
07/12/21	22:15	71.5	52.7	51.5	45.8
07/12/21	22:30	70.3	55.4	54.5	46.7
07/12/21	22:45	70.8	51.7	51.5	47.3
	Arith. Average	73.3	59.8	57.6	51.3
	Log. Average	76.1	61.4	58.7	52.7
	Minimum	65.5	51.7	51.2	45.6
	Maximum	87.9	68.4	65.0	58.2
07/12/21	23:00	67.3	53.9	52.0	48.1
07/12/21	23:15	69.8	51.8	52.1	47.8
07/12/21	23:30	71.4	56.1	54.0	49.3
07/12/21	23:45	70.7	56.9	55.2	50.6
08/12/21	00:00	74.4	60.9	57.2	47.1
08/12/21	00:15	69.0	52.5	52.7	46.6
08/12/21	00:30	69.5	53.9	53.1	48.0
08/12/21	00:45	70.4	53.4	53.6	46.6
08/12/21	01:00	64.0	49.3	47.8	45.0
08/12/21	01:15	65.8	48.3	46.9	44.4
08/12/21	01:30	68.3	47.8	48.7	43.7
08/12/21	01:45	70.3	50.8	50.2	44.5
08/12/21	02:00	51.5	47.7	45.9	43.9
08/12/21	02:15	62.8	47.4	45.9	43.6
08/12/21	02:30	51.7	46.8	45.2	43.4
08/12/21	02:45	52.4	46.9	45.3	43.5
08/12/21	03:00	58.9	47.5	46.0	44.0
08/12/21	03:15	50.2	45.7	44.1	42.2
08/12/21	03:30	58.1	46.6	45.0	42.7
08/12/21	03:45	64.2	44.5	43.9	40.9
08/12/21	04:00	53.6	45.5	43.3	40.8
08/12/21	04:15	57.1	46.0	44.3	42.1
08/12/21	04:30	53.9	46.9	45.1	42.9
08/12/21	04:45	58.9	46.2	44.9	43.0
08/12/21	05:00	69.9	47.0	50.3	43.5
08/12/21	05:15	75.7	48.9	55.2	44.1
08/12/21	05:30	64.7	52.9	50.7	45.3
08/12/21	05:45	69.0	50.1	49.9	45.7
08/12/21	06:00	73.8	52.1	53.3	46.4
08/12/21	06:15	68.5	52.8	52.6	47.6
08/12/21	06:30	68.1	51.6	50.1	47.5

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Note: Highlighted cells indicate periods of data excluded

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
08/12/21	06:45	72.2	56.8	55.6	48.9
	Arith. Average	64.6	50.2	49.4	45.1
	Log. Average	68.7	52.3	51.2	45.8
	Minimum	50.2	44.5	43.3	40.8
	Maximum	75.7	60.9	57.2	50.6
08/12/21	07:00	77.2	55.2	57.1	49.7
08/12/21	07:15	73.1	58.3	56.2	50.2
08/12/21	07:30	71.2	57.5	56.0	50.6
08/12/21	07:45	78.0	58.0	57.4	50.1
08/12/21	08:00	72.2	57.5	55.6	50.4
08/12/21	08:15	73.2	57.9	56.1	50.9
08/12/21	08:30	69.7	58.2	55.3	51.2
08/12/21	08:45	71.5	56.5	54.8	50.6
08/12/21	09:00	77.8	57.4	57.7	50.8
08/12/21	09:15	74.2	55.5	54.1	49.8
08/12/21	09:30	64.9	56.0	53.7	50.0
08/12/21	09:45	68.9	55.4	53.0	49.0
08/12/21	10:00	74.1	57.2	55.1	49.4
08/12/21	10:15	77.6	56.5	56.0	49.5
08/12/21	10:30	69.8	56.9	55.5	49.6
08/12/21	10:45	67.4	57.2	54.5	50.0
08/12/21	11:00	74.0	58.7	56.3	48.7
08/12/21	11:15	72.6	56.6	55.1	49.1
08/12/21	11:30	76.5	56.4	55.1	48.7
08/12/21	11:45	71.1	57.7	54.4	48.2
08/12/21	12:00	83.2	59.5	60.3	49.6
08/12/21	12:15	67.6	57.5	55.0	49.8
08/12/21	12:30	68.3	56.0	53.4	48.0
08/12/21	12:45	73.2	56.2	54.1	48.5
08/12/21	13:00	76.2	56.3	54.5	47.8
08/12/21	13:15	84.7	58.5	57.6	47.9
08/12/21	13:30	73.4	56.4	55.3	46.9
08/12/21	13:45	70.6	56.5	54.9	47.6
08/12/21	14:00	68.3	54.6	51.9	48.2
08/12/21	14:15	73.1	59.4	57.1	49.8
08/12/21	14:30	70.0	56.4	54.9	48.7
08/12/21	14:45	67.9	54.5	51.9	47.8
08/12/21	15:00	72.3	57.5	56.2	48.9
08/12/21	15:15	71.3	56.1	53.8	48.0
08/12/21	15:30	75.2	58.2	55.9	47.9
08/12/21	15:45	70.5	56.6	53.8	47.2
08/12/21	16:00	71.7	58.7	56.3	48.0
08/12/21	16:15	74.2	55.8	54.9	46.6
08/12/21	16:30	69.7	56.0	54.0	48.0
08/12/21	16:45	74.6	55.7	54.3	47.4

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
08/12/21	17:00	80.1	58.2	58.7	48.8
08/12/21	17:15	72.4	57.0	55.0	48.5
08/12/21	17:30	71.2	58.3	55.8	48.2
08/12/21	17:45	68.1	56.5	53.8	48.1
08/12/21	18:00	68.7	56.7	54.2	47.9
08/12/21	18:15	71.7	56.9	55.1	47.8
08/12/21	18:30	74.6	56.2	54.7	47.2
08/12/21	18:45	72.0	58.4	54.2	46.9
08/12/21	19:00	75.7	62.8	58.7	47.0
08/12/21	19:15	76.6	54.8	53.9	46.1
08/12/21	19:30	69.6	54.1	52.7	45.8
08/12/21	19:45	66.6	53.2	51.4	45.2
08/12/21	20:00	68.3	52.3	50.9	45.2
08/12/21	20:15	73.6	52.6	52.4	44.5
08/12/21	20:30	73.1	55.7	54.7	45.1
08/12/21	20:45	71.6	51.8	50.8	44.0
08/12/21	21:00	73.4	54.1	54.1	44.6
08/12/21	21:15	64.9	51.3	48.7	44.4
08/12/21	21:30	70.5	52.6	53.3	43.9
08/12/21	21:45	68.8	48.3	48.7	42.8
08/12/21	22:00	68.5	53.0	52.1	45.1
08/12/21	22:15	77.4	51.3	53.6	46.7
08/12/21	22:30	68.3	53.5	51.8	44.5
08/12/21	22:45	69.1	53.1	51.5	44.2
	Arith. Average	72.3	56.1	54.5	47.8
	Log. Average	74.5	56.7	55.0	48.3
	Minimum	64.9	48.3	48.7	42.8
	Maximum	84.7	62.8	60.3	51.2
08/12/21	23:00	70.1	47.9	49.8	41.7
08/12/21	23:15	65.5	48.9	47.9	41.6
08/12/21	23:30	68.4	47.1	48.1	40.9
08/12/21	23:45	56.2	45.1	43.1	39.6
09/12/21	00:00	69.7	48.4	50.4	39.8
09/12/21	00:15	70.2	47.7	51.0	39.9
09/12/21	00:30	69.6	44.4	50.8	39.2
09/12/21	00:45	72.9	42.8	52.5	38.1
09/12/21	01:00	46.4	42.5	40.6	38.4
09/12/21	01:15	57.2	42.4	41.0	38.8
09/12/21	01:30	69.8	42.3	46.9	38.3
09/12/21	01:45	71.4	41.6	46.7	38.3
09/12/21	02:00	55.8	41.1	40.1	38.0
09/12/21	02:15	63.8	41.2	42.4	37.3
09/12/21	02:30	59.1	40.3	40.2	37.3
09/12/21	02:45	44.7	40.9	39.1	37.2
09/12/21	03:00	44.8	39.7	38.3	36.7

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
09/12/21	03:15	48.2	39.2	37.8	36.1
09/12/21	03:30	45.3	40.2	38.5	36.7
09/12/21	03:45	54.0	39.7	38.1	36.1
09/12/21	04:00	50.6	39.4	37.7	35.6
09/12/21	04:15	56.6	40.4	39.3	36.5
09/12/21	04:30	50.6	41.6	39.3	36.6
09/12/21	04:45	49.7	41.4	39.7	37.3
09/12/21	05:00	67.8	43.1	48.3	38.8
09/12/21	05:15	71.2	46.7	52.9	39.7
09/12/21	05:30	78.6	51.7	58.0	41.7
09/12/21	05:45	68.7	48.5	48.3	42.7
09/12/21	06:00	66.3	47.4	47.2	42.9
09/12/21	06:15	69.5	51.3	51.4	44.9
09/12/21	06:30	63.2	49.9	48.2	45.9
09/12/21	06:45	72.8	58.0	56.1	47.5
	Arith. Average	61.5	44.5	45.3	39.4
	Log. Average	68.6	47.5	49.1	40.6
	Minimum	44.7	39.2	37.7	35.6
	Maximum	78.6	58.0	58.0	47.5
09/12/21	07:00	67.3	54.9	52.8	48.6
09/12/21	07:15	71.7	56.2	55.4	49.1
09/12/21	07:30	78.3	62.7	62.1	48.8
09/12/21	07:45	71.1	56.2	54.8	49.8
09/12/21	08:00	77.8	59.5	59.6	50.5
09/12/21	08:15	72.5	56.5	55.2	50.3
09/12/21	08:30	69.2	56.3	54.8	49.4
09/12/21	08:45	70.4	57.3	55.1	49.9
09/12/21	09:00	79.4	56.6	58.0	48.1
09/12/21	09:15	75.1	55.1	54.1	47.1
09/12/21	09:30	69.5	58.9	56.1	49.1
09/12/21	09:45	77.3	58.6	57.0	49.0
09/12/21	10:00	70.4	57.3	54.8	48.0
09/12/21	10:15	72.4	55.7	54.0	47.1
09/12/21	10:30	84.4	59.8	58.0	47.7
09/12/21	10:45	84.4	61.0	58.2	47.4
09/12/21	11:00	70.6	57.4	55.5	46.7
09/12/21	11:15	74.5	55.7	54.1	46.1
09/12/21	11:30	76.8	58.3	56.2	48.9
09/12/21	11:45	70.5	58.0	55.8	45.1
09/12/21	12:00	70.3	59.6	56.6	46.7
09/12/21	12:15	76.1	55.3	54.3	45.9
09/12/21	12:30	71.4	57.1	55.6	47.8
09/12/21	12:45	66.0	56.5	53.2	46.8
09/12/21	13:00	68.2	57.9	54.8	47.9
09/12/21	13:15	71.7	57.2	54.8	47.4

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
09/12/21	13:30	69.4	58.4	55.6	47.5
09/12/21	13:45	70.7	57.4	54.3	47.0
09/12/21	14:00	65.3	57.1	53.9	46.6
09/12/21	14:15	75.0	56.1	56.0	46.3
09/12/21	14:30	71.1	57.8	55.9	48.8
09/12/21	14:45	69.5	57.9	54.7	48.0
09/12/21	15:00	72.6	58.8	57.0	49.1
09/12/21	15:15	76.0	59.5	57.1	49.8
09/12/21	15:30	70.3	59.8	57.3	49.6
09/12/21	15:45	74.0	58.9	56.2	48.2
09/12/21	16:00	83.0	57.2	59.4	49.1
09/12/21	16:15	71.8	57.6	55.7	48.7
09/12/21	16:30	73.7	58.7	55.9	48.8
09/12/21	16:45	70.7	57.3	54.6	48.3
09/12/21	17:00	78.4	59.4	58.4	51.7
09/12/21	17:15	72.9	57.8	55.7	49.8
09/12/21	17:30	68.0	60.3	57.1	51.5
09/12/21	17:45	75.6	59.0	57.8	50.0
09/12/21	18:00	69.2	57.1	54.9	49.3
09/12/21	18:15	77.1	56.5	56.5	48.7
09/12/21	18:30	72.6	56.8	55.5	49.3
09/12/21	18:45	70.2	56.5	53.9	48.4
09/12/21	19:00	71.6	57.0	55.5	49.0
09/12/21	19:15	72.4	58.5	55.9	49.2
09/12/21	19:30	71.6	58.1	55.7	49.0
09/12/21	19:45	69.3	56.1	53.8	48.5
09/12/21	20:00	70.3	57.9	55.6	51.3
09/12/21	20:15	75.9	55.3	55.2	50.0
09/12/21	20:30	71.1	57.8	55.9	50.1
09/12/21	20:45	70.7	54.7	53.1	49.5
09/12/21	21:00	68.9	56.1	54.0	49.7
09/12/21	21:15	79.0	55.5	54.9	49.7
09/12/21	21:30	72.6	55.9	54.8	49.5
09/12/21	21:45	69.8	56.7	54.5	49.8
09/12/21	22:00	73.7	60.0	58.9	54.8
09/12/21	22:15	69.1	58.2	56.9	54.9
09/12/21	22:30	68.1	57.4	56.0	52.0
09/12/21	22:45	67.7	51.6	50.5	45.5
	Arith. Average	72.6	57.5	55.7	48.8
	Log. Average	75.1	57.8	56.1	49.3
	Minimum	65.3	51.6	50.5	45.1
	Maximum	84.4	62.7	62.1	54.9
09/12/21	23:00	69.6	49.3	50.9	41.3
09/12/21	23:15	68.7	50.7	48.6	40.8
09/12/21	23:30	70.5	50.4	49.7	40.6

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Note: Highlighted cells indicate periods of data excluded

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
09/12/21	23:45	59.7	46.9	44.7	40.3
10/12/21	00:00	70.0	48.7	51.1	40.8
10/12/21	00:15	71.9	49.7	51.8	38.6
10/12/21	00:30	70.3	46.4	50.6	37.3
10/12/21	00:45	70.8	47.2	47.8	37.1
10/12/21	01:00	69.5	47.9	50.1	38.7
10/12/21	01:15	60.0	46.1	44.0	39.4
10/12/21	01:30	68.9	45.2	47.1	37.8
10/12/21	01:45	70.7	43.6	46.6	36.8
10/12/21	02:00	62.5	43.4	42.5	36.7
10/12/21	02:15	61.0	48.1	44.1	38.0
10/12/21	02:30	50.8	41.5	39.5	36.9
10/12/21	02:45	62.1	46.3	43.6	39.1
10/12/21	03:00	57.0	44.5	42.3	39.3
10/12/21	03:15	69.9	51.0	47.0	39.7
10/12/21	03:30	67.0	50.3	48.3	40.4
10/12/21	03:45	62.3	47.6	44.8	39.4
10/12/21	04:00	67.8	48.5	46.3	40.7
10/12/21	04:15	69.9	52.0	49.1	40.9
10/12/21	04:30	65.3	48.9	46.9	41.3
10/12/21	04:45	60.1	49.9	46.7	42.3
10/12/21	05:00	68.0	47.3	49.0	41.1
10/12/21	05:15	68.7	48.5	49.8	41.1
10/12/21	05:30	76.5	53.2	55.7	42.6
10/12/21	05:45	74.6	51.9	52.3	44.7
10/12/21	06:00	67.8	48.9	49.2	43.6
10/12/21	06:15	76.7	50.9	53.4	45.4
10/12/21	06:30	70.7	53.9	52.0	46.5
10/12/21	06:45	75.8	57.9	56.4	47.6
	Arith. Average	67.3	48.6	48.2	40.5
	Log. Average	70.2	50.0	49.8	41.5
	Minimum	50.8	41.5	39.5	36.7
	Maximum	76.7	57.9	56.4	47.6
10/12/21	07:00	78.4	57.8	56.0	48.2
10/12/21	07:15	74.5	58.3	57.1	49.2
10/12/21	07:30	69.5	57.3	55.4	49.7
10/12/21	07:45	70.8	57.1	55.1	49.9
10/12/21	08:00	77.4	57.6	56.8	50.2
10/12/21	08:15	67.6	55.8	53.9	50.0
10/12/21	08:30	68.7	56.7	55.0	50.1
10/12/21	08:45	69.4	57.4	55.2	50.5
10/12/21	09:00	75.6	58.7	57.4	50.4
10/12/21	09:15	71.7	56.9	55.0	49.9
10/12/21	09:30	70.9	57.9	56.1	50.0
10/12/21	09:45	78.6	58.2	57.7	51.0

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Note: Highlighted cells indicate periods of data excluded

Date of Meas.	Start Time	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.			
		$L_{Amax,F}$	$L_{A10,15\ min}$	$L_{Aeq,15\ min}$	$L_{A90,15\ min}$
10/12/21	10:00	66.4	57.7	55.0	50.3
10/12/21	10:15	72.9	57.3	55.8	50.2
10/12/21	10:30	73.1	60.3	57.7	50.4
10/12/21	10:45	71.3	57.3	54.6	50.1
10/12/21	11:00	74.7	59.4	57.9	51.6
10/12/21	11:15	74.8	58.6	56.7	52.1
10/12/21	11:30	80.8	62.1	61.7	51.8
10/12/21	11:45	85.4	60.3	63.3	50.9
10/12/21	12:00	73.0	58.8	56.9	50.2
10/12/21	12:15	66.5	57.2	54.3	49.4
10/12/21	12:30	74.9	59.6	57.0	50.3
10/12/21	12:45	71.4	58.5	55.8	50.7
10/12/21	13:00	69.4	59.0	56.2	50.7
10/12/21	13:15	73.7	58.3	56.2	49.9
10/12/21	13:30	69.4	59.0	56.3	49.5
10/12/21	13:45	70.6	58.0	55.2	48.9
10/12/21	14:00	71.5	58.0	55.1	49.4
10/12/21	14:15	76.2	57.9	56.4	47.9
10/12/21	14:30	70.0	58.3	55.8	47.7
10/12/21	14:45	76.9	60.3	57.8	51.1
10/12/21	15:00	77.1	59.5	57.6	50.3
10/12/21	15:15	78.6	64.1	61.2	52.3
10/12/21	15:30	86.8	60.3	58.6	50.1
10/12/21	15:45	75.8	60.7	58.5	51.3
10/12/21	16:00	70.1	59.4	56.9	50.6
10/12/21	16:15	73.1	60.0	57.5	49.9
10/12/21	16:30	75.1	60.6	58.3	51.0
10/12/21	16:45	85.0	60.5	59.1	51.0
	Arith. Average	73.9	58.8	56.9	50.2
	Log. Average	77.3	59.1	57.4	50.3
	Minimum	66.4	55.8	53.9	47.7
	Maximum	86.8	64.1	63.3	52.3

TABLE B2 (CTD): UNATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND TO FRIDAY 10TH DECEMBER 2021

Note: Highlighted cells indicate periods of data excluded

Monitoring Location	Date of Meas.	Start Time	Dur. (mins)	Measured Sound Levels, dB re. 2 x 10^{-5} Pa.				Comments
				$L_{Amax,F}$	$L_{A10,T}$	$L_{Aeq,T}$	$L_{A90,T}$	
ST1	2nd Dec	15:15	15	73.5	61.3	58.0	49.8	8 no. Plane overhead, light wind, pedestrians talking, traffic from nearby junction, train accelerating, ~35 no. car passes by monitor.
ST2		15:37	15	77.5	61.1	57.7	46.8	1 no plane overhead, passing traffic, distant hammer, pedestrians/school children, traffic on junction, 2 no. train passes, ~30 no car passes by monitor.
ST3		15:54	15	75.7	61.9	59.0	50.6	Distant road noise, train pass-by. ~30 no. car passes by monitor
ST1		16:12	15	85.0	61.6	58.2	49.0	1 no. Plane overhead, helicopter, traffic from nearby junction, train pass-by, ~30 no. car passes by monitor.
ST2		16:30	15	76.1	61.7	58.0	46.3	Distant traffic, bird noise, pedestrians, 2 no. train passes, ~35 no car passes by monitor.
ST3		16:47	15	74.3	57.4	56.1	49.2	Local traffic, train pass-by, 1 no. plane overhead, ~15 no. car passes by monitor
ST1		17:05	15	79.1	63.4	60.2	48.7	Local traffic, train pass-by, 1 no. plane overhead, ~20 no. car passes by monitor
ST2		17:24	15	72.9	61.6	57.6	46.0	Local traffic, train pass-by, 1 no. plane overhead, ~ 20. car passes by monitor
ST3		17:45	15	75.3	59.0	57.3	49.4	Local traffic, train pass-by, 1 no. plane overhead, pedestrians, ~ 10 no. car passes by monitor

TABLE B3: ATTENDED SOUND SURVEY RESULTS, THURSDAY 2ND DECEMBER 2021

Source	1/1-Octave Band Frequency Sound Pressure Levels, dB(lin) re. 2 x 10^{-5} Pa.								dB $L_{Aeq,T}$
	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
Air Source Heat Pump	62	56	63	56	48	46	52	44	59

TABLE B4: ASSUMED REFERENCE SOUND PRESSURE LEVELS FOR AIR SOURCE HEAT PUMPS
Note: Sound pressure levels re 1 m.

APPENDIX C: NOISE MONITORING CALIBRATION CERTIFICATES

CERTIFICATE OF CALIBRATION

Date of Issue: 25 February 2020

Certificate Number: TCRT20/1118

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

CUSTOMER	Southdowns Environmental Consultants Limited Suite A3 16 Station Street Lewes East Sussex BN7 2DB
ORDER No	X_EQUIPMENT/399 Job No TRAC20/02069
DATE OF RECEIPT	20 February 2020
PROCEDURE	Calibration Engineer's Handbook section 3
IDENTIFICATION	Sound level meter Rion type NL-32 serial No 00630460 connected via extension lead type EC-04 and preamplifier type NH-21 serial No 08158 to a half-inch microphone type UC-53A serial No 311838 fitted with a foam windshield type WS-03.
CALIBRATED ON	25 February 2020
PREVIOUS CALIBRATION	Calibrated on 18 February 2019, Certificate No. TCRT19/1129 issued by this laboratory.

This certificate provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

FIGURE C1: UNATTENDED MONITOR CALIBRATION CERTIFICATE – NL-32 SN 00630460

CERTIFICATE OF CALIBRATION

Certificate Number
TCRT20/1118

The sound level meter was set to frequency weighting A and adjusted to read correctly in response to a laboratory sound calibrator. This reading took into account manufacturers' information on the free-field response of the sound level meter when fitted with the windshield.

The sound level meter was then tested, and its overall sensitivity adjusted as required.

An acoustic calibration at 1kHz was performed by application of a standard sound calibrator, whilst the tests at 125Hz and 8kHz were performed by the electrostatic actuator method.

RESULTS

The sound level meter was found to conform to the type 1 requirements of BS EN 60651:1994* and BS EN 60804:1994* for those tests carried out.

The self-generated noise recorded was:

10.5 dB (A) 16.4 dB (C) 23.2 dB (Lin)

The expanded level uncertainty of the Laboratory's 1 kHz sound calibrator used during this verification is ± 0.10 dB.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with the *Guide to the Expression of Uncertainty in Measurement* published by the International Organisation for Standards (ISO).

All measurement data are held at ANV Measurement Systems for a period of at least six years.

The case reflection factors have been taken as zero, since an extension lead has been used for this verification.

The reference range, linearity range and primary indicator range specified by the manufacturer have been used. *See note 5 Below.*

The Rion NL-32 sound level meter design has successfully undergone pattern evaluation at Physikalisch-Technische Bundesanstalt (PTB). It was found to meet the requirements of BS EN 60651* and BS EN 60804* and was granted pattern approval as a Type 1 sound level meter.

No component of uncertainty for manufacturer-specified corrections has been included in the uncertainty budget and, in accordance with amendments to the standards, the measured values obtained during the verification have not been extended by any measurement uncertainty when assessing conformance to each standard.

FIGURE C1 (CTD): UNATTENDED MONITOR CALIBRATION CERTIFICATE – NL-32 SN 00630460

CERTIFICATE OF CALIBRATION

Certificate Number
TCRT20/1118

NOTES

*1 BS EN 60651:1994 and BS EN 60804:1994 were formerly numbered BS 5969:1981 and BS 6698:1986 respectively.

2 No suitable microphone frequency response information was supplied with the instrument. It was therefore measured by this laboratory using the electrostatic actuator method.

3 The instrument was tested with integral software as received.

4 The NL-32 does not have a "max hold" function available when operating with time weighting I. The results recorded for the test of time weighting I are therefore the highest instantaneous reading shown on the display. Whilst these results meet the requirements of the standard, those for response to a single tone burst in particular may give a misleading impression of the accuracy of time weighting I on this instrument.

5 The specifications given in the standard English-language handbook for the NL-32 is incomplete. An addendum to the handbook based on the PTB tests has been provided by Rion, and this revised specification has been used for the purposes of the present verification. For information, extracts from the addendum have been appended as page 4 of this certificate.

FIGURE C1 (CTD): UNATTENDED MONITOR CALIBRATION CERTIFICATE – NL-32 SN 00630460

CERTIFICATE OF CALIBRATION

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The following data supplied by Rion are included for completeness:

Addendum to the NL-32 Instruction Manual

Errata (page 133):

- Total range: 23 to 137 dB(A).
- Linearity range (on 30 - 120 dB reference range): 99 dB (28 to 127).

Additional information

- Primary indicator range (on 30 - 120 dB reference range): 32 - 111 dB, allowing a crest factor of 10 for Impulse time weighting.
- Pulse range: > 63 dB
- Measurement range for various LEVEL settings: See table below.

Measurement ranges				
Measurement range for various "LEVEL" range settings (dB) * Frequency weighting A-, C- and Lin.				
"LEVEL" Setting (dB)	Time weighting			Leq
	Fast/Slow	Impulse	Peak	
20 - 80	23 - 80 **	23 - 70 **	50 - 90	23 - 87 **
20 - 90	23 - 90 **	23 - 80 **	50 - 100	23 - 97 **
20 - 100	23 - 100 **	23 - 90 **	50 - 110	23 - 107 **
20 - 110	23 - 110 **	23 - 100 **	50 - 120	23 - 117 **
30 - 120	28 - 120 **	28 - 110 **	50 - 130	28 - 127 **
40 - 130	38 - 130	38 - 120	50 - 140	38 - 137
* For time weighting Fast and Slow a crest factor 3, and for time weighting Impulse a crest factor 10, is taken into account. ** The lower limit of the measurement range is 30 dB(C) for C-weighting and 35 dB(Lin) for Lin weighting.				

END R 3

FIGURE C1 (CTD): UNATTENDED MONITOR CALIBRATION CERTIFICATE – NL-32 SN 00630460

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 27 August 2020 **Certificate Number: UCRT20/1828**

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	Southdowns Environmental Consultants Limited Suite A3 16 Station Street Lewes East Sussex BN7 2DB			
Order No.	X_EQUIPMENT/522			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	00643063
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	43091
	Rion	Microphone	UC-59	06844
	Rion	Calibrator	NC-74	34536109
		Calibrator adaptor type if applicable		NC-74-002
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49 *Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*			
Type Approved to IEC 61672-1:2002	YES	Approval Number	21.21 / 13.02	
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003			
Date Received	27 August 2020	ANV Job No.	UKAS20/08469	
Date Calibrated	27 August 2020			

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	15 August 2019	UCRT19/1911	0653

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

FIGURE C2: ATTENDED MONITOR CALIBRATION CERTIFICATE – NL-52 SN 00643063

CERTIFICATE OF CALIBRATION	Certificate Number UCRT20/1828
UKAS Accredited Calibration Laboratory No. 0653	Page 2 of 2 Pages

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter NL-42 / NL-52		
SLM instruction manual ref / issue	11-03		
SLM instruction manual source	Manufacturer		
Internet download date if applicable	N/A		
Case corrections available	Yes		
Uncertainties of case corrections	Yes		
Source of case data	Manufacturer		
Wind screen corrections available	Yes		
Uncertainties of wind screen corrections	Yes		
Source of wind screen data	Manufacturer		
Mic pressure to free field corrections	Yes		
Uncertainties of Mic to F.F. corrections	Yes		
Source of Mic to F.F. corrections	Manufacturer		
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes		
Specified or equivalent Calibrator	Specified		
Customer or Lab Calibrator	Lab Calibrator		
Calibrator adaptor type if applicable	NC-74-002		
Calibrator cal. date	19 August 2020		
Calibrator cert. number	UCRT20/1789		
Calibrator cal cert issued by	0653		
Calibrator SPL @ STP	94.02	dB	Calibration reference sound pressure level
Calibrator frequency	1001.89	Hz	Calibration check frequency
Reference level range	25 - 130	dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	23.46	23.38	± 0.30 °C
Humidity	58.1	55.4	± 3.00 %RH
Ambient Pressure	99.88	99.77	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.2	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±				0.10	dB

Self Generated Noise — This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	13.9	dB	UR	17.9	dB	UR	22.6	dB	UR
Uncertainty of the electrical self generated noise ±					0.12		dB		

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

…… END ……

Calibrated by: C. Hirlav R 3

Additional Comments The results on this certificate only relate to the items calibrated as identified above.
None

FIGURE C2 (CTD): ATTENDED MONITOR CALIBRATION CERTIFICATE – NL-52 SN 00643063

CERTIFICATE OF CALIBRATION

Date of Issue: 14 January 2021 **Certificate Number: TCRT21/1020**

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	Southdowns Environmental Consultants Limited Suite A3 16 Station Street Lewes East Sussex BN7 2DB
Order No.	X_Equipment/587
Test Procedure	Procedure TP 1 Calibration of Sound Calibrators
Description	Acoustic Calibrator

Identification	*Manufacturer*	*Instrument*	*Model*	*Serial No.*
	Rion	Calibrator	NC-74	34625621

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

ANV Job No.	TRAC21/01013	
Date Received	13 January 2021	
Date Calibrated	14 January 2021	
Previous Certificate	*Dated*	09 January 2020
	Certificate No.	TCRT20/1016
	Laboratory	ANV Measurement Systems

This certificate provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

FIGURE C3: ACOUSTIC CALIBRATOR CALIBRATION CERTIFICATE – NC-74 SN 34625621

CERTIFICATE OF CALIBRATION

Certificate Number
TCRT21/1020
Page 2 of 2 Pages

Measurements

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below. It is corrected to the standard atmospheric pressure of 101.3 kPa (1013 mBar) using original manufacturers information.

Test Microphone	*Manufacturer*	*Type*
	Brüel & Kjær	4134

Results

The level of the calibrator output under the conditions outlined above was

93.97 ± 0.10 dB rel 20 µPa

Functional Tests and Observations

The frequency of the sound produced was	1001.85 Hz	±	0.13 Hz
The total distortion was	1.02 %	±	6.9 % of Reading

During the measurements environmental conditions were

Temperature	24	to	25	°C
Relative Humidity	30	to	37	%
Barometric Pressure	100.2	to	100.3	kPa

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with the Guide to the Expression of Uncertainty in Measurement published by the International Organisation for Standards (ISO).

The uncertainties refer to the measured values only with no account being taken of the ability of the instrument to maintain its calibration.

A small correction factor may need to be applied to the sound pressure level quoted above if the device is used to calibrate a sound level meter which is fitted with a free-field response microphone. See manufacturers handbook for details.

…… END ……

Note:

Calibrator adjusted prior to calibration?	NO	
Initial Level	N/A	dB
Initial Frequency	N/A	Hz

Additional Comments
None

Calibrated by: B. Bogdan R 2

FIGURE C3 (CTD): ACOUSTIC CALIBRATOR CALIBRATION CERTIFICATE – NC-74 SN 34625621