Werin Medical Centre – DA Acoustic Assessment

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1 INTRODUCTION

Pulse White Noise Acoustics Pty Ltd (Pulse White Noise Acoustics) has been engaged by Robert Snow Architect (c/o Hopkins Consultants Pty Ltd) to undertake a Noise Impact Assessment (NIA) for the proposed Werin Medical Centre (WMC) for the Werin Aboriginal Corporation. The proposed WMC will be located on Lot 1 DP 1085815 and Lot 4 DP 38266, with street addresses 8 to 14 Lake Road, Port Macquarie.

This NIA supports the Statement of Environment Effects (SEE) submission requested by the Port Macquarie Hastings Council for Application 210.2021.15. A Pre-Lodgement Meeting Advice for Application 210.2021.15 was issued by Port Macquarie Hastings Council dated 23 February 2021 and item 13 within that document stipulates the noise related requirements for the development.

This NIA makes references to applicable noise requirements outlined in the following documents:

- Pre-Lodgement Meeting Advice for Application 210 2021.15 issued by Port Macquarie Hastings Council dated 3 May 2021, Item 13;
- Port Macquarie Hastings Council Development Control Plan 2013;
- Port Macquarie Hastings Council Masterplan 2010 Addendum Report;
- Noise Policy for Industry (EPA, 2017)

This assessment has been conducted based on the Robert Snow Architect Pre-lodgement plan set Rev D drawings. All drawings have been provided in Appendix B of this report.

1.1 Site Location

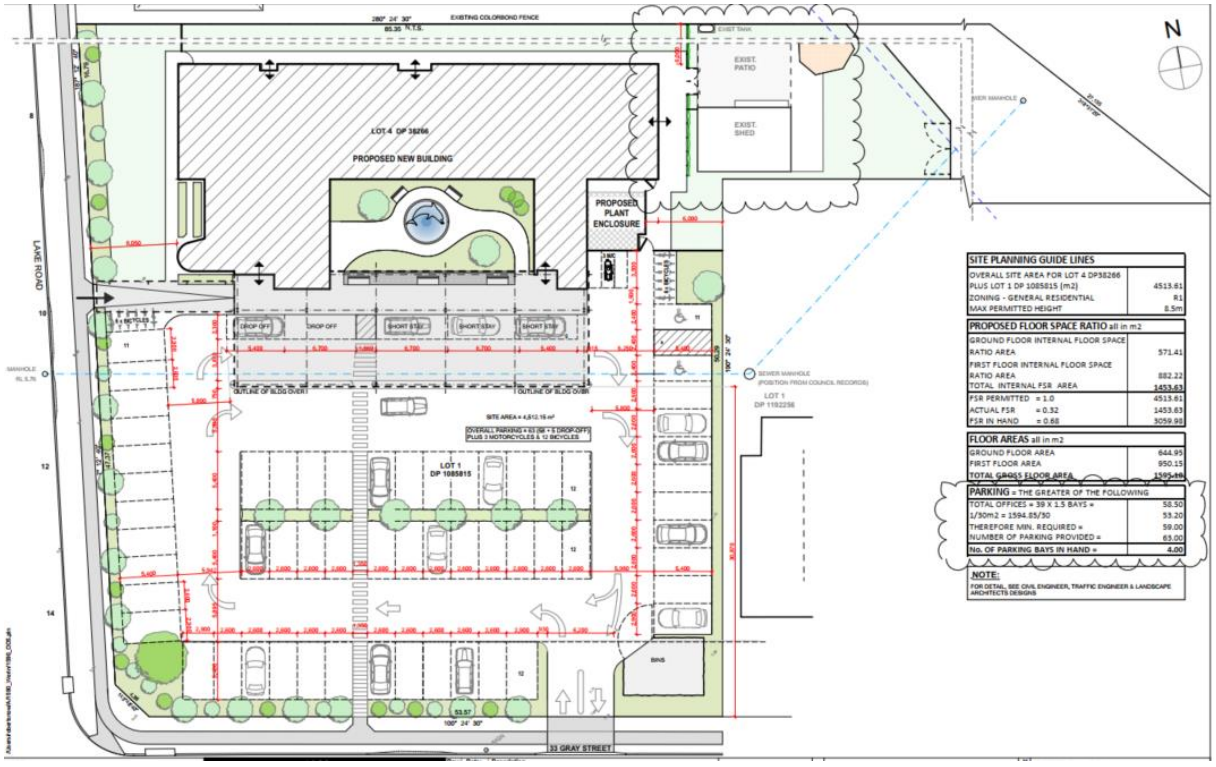
The project site is located on the corner of Lake Road and Gray Street in Port Macquarie. The proposed WMC development is an amalgamation of Lot 1 DP 1085815 and Lot 4 DP 38266 with street addresses of 8 to 14 Lake Road Port Macquarie.

The proposed WMC site is bounded by Lake Road to the west, Gray Street to the south, and by adjoining residential properties to the north and east. Areas surrounding the site are predominantly residential receivers zoned R1 General Residential under Port Macquarie-Hastings Local Environmental Plan (LEP) 2011.

The proposed development site is shown in Figure 1 and the proposed development is shown in Figure 2 below.

Figure 1 Proposed development site

Figure 2 Proposed development – General Arrangement Site Plan



1.2 Project Description

The proposed development is the Werin Medical Centre. There are currently multiple buildings on site which are proposed to be demolished. A new two storey building will be constructed in the northern half of the site with outdoor garden/meeting areas to be located along the northern boundary and the north-eastern corner. The southern half of the site will predominantly be an expansion of the existing on-site carparking. Vehicle access onto the site will be via Lake Road (ingress only) and Gray Street.

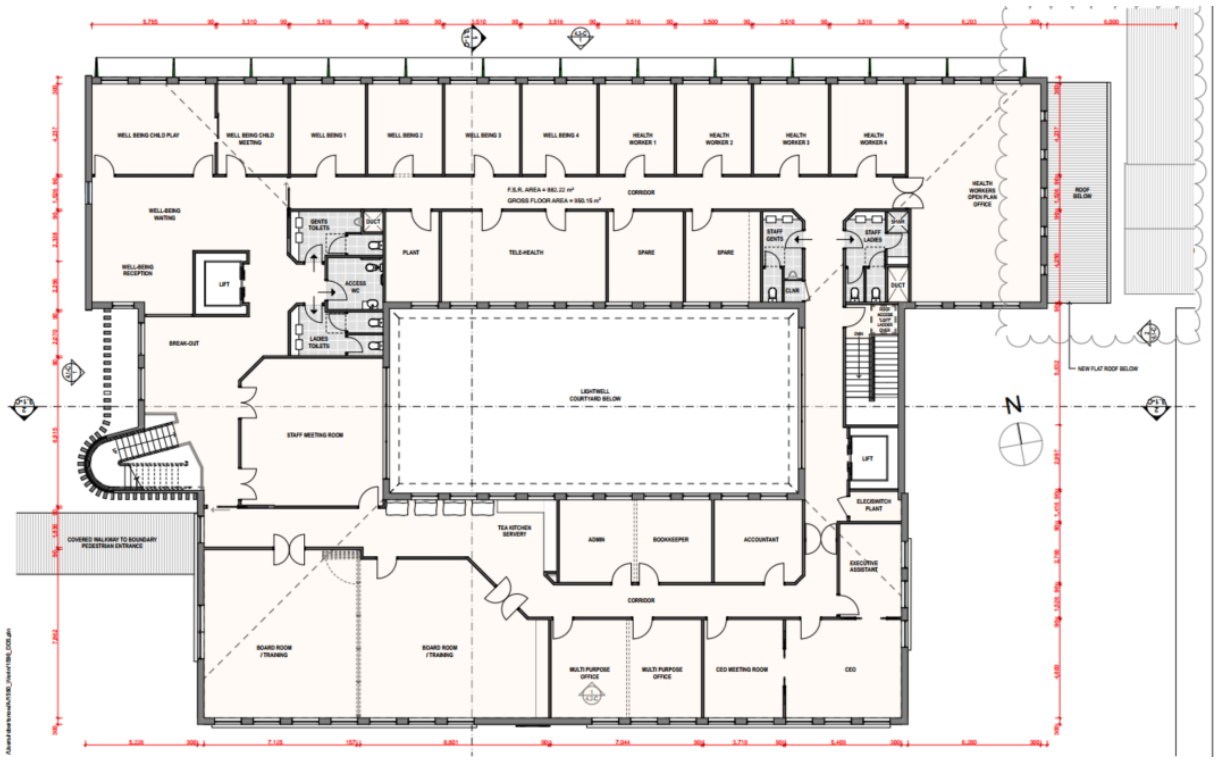
The propose WMC development includes the following spaces.

- Reception and waiting areas
- Medical consultation rooms and treatment rooms
- Board rooms and training rooms
- Open plan and private offices
- Amenities and storerooms
- Outdoor garden area
- On grade car parking

Figure 3 and Figure 4 present the general arrangement plans for ground floor and first floor, respectively.

Figure 3 General arrangement plan – Ground floor

Figure 4 General arrangement plan – First floor



2 NEAREST SENSITIVE RECEIVERS

2.1 Nearby sensitive receivers

Potential noise sensitive receiver locations are located in the vicinity of the proposed development. As shown in Figure 5, residential receivers are located along Lake Road and Gray Street, Port Macquarie. The receptors utilised for noise predictions in this report are listed in Table 1 and presented in Figure 5.

Figure 5 Location of Considered Receivers

Table 1 - Nearest Potentially Affected Receivers

Receptor ID	Address	Type of Receiver
R1	6 Lake Road	Residential
R2	7, 11-17 Lake Road	Residential
R3	16 Lake Road, 32-34 Gray Street	Residential
R4	29-31 Gray Street	Residential
C1	9 Lake Road – Connect Hearing Hearing Aid Shop	Commercial

3 EXISTING ACOUSTIC ENVIRONMENT

3.1 Noise Descriptors and Terminology

Environmental noise constantly varies in level with time. Therefore, it is necessary to measure noise in terms of quantifiable time periods with statistical descriptors. Typically, environmental noise is measured over 15-minute periods and relevant statistical descriptors of the fluctuating noise are determined to quantify the measured level.

Noise (or sound) consists of minute fluctuations in atmospheric pressure perceivable by human hearing. Noise levels are expressed in terms of decibels, abbreviated as dB or dBA, the "A" indicating that the noise levels have been frequency weighted to approximate the characteristics of normal human hearing. Because noise is measured using a logarithmic scale, 'normal' linear arithmetic does not apply, e.g. adding two sound sources of equal values result in an increase of 3 dB (i.e. 60 dBA plus 60 dBA results in 63 dBA). A change of 1 dB or 2 dB in the sound level is difficult for most people to detect, whilst a 3 dB – 5 dB change corresponds to a small but noticeable change in loudness. A 10 dB change roughly corresponds to a doubling or halving in loudness.

The most relevant environmental noise descriptors are the L_{Aeq}, L_{A1}, L_{A10} and L_{A90} noise levels. The L_{Aeq} noise level represents the "equivalent energy average noise level". This parameter is derived by integrating the noise level measured over the measurement period. It represents the level that the fluctuating noise with the same acoustic energy would be if it were constant over the measured time period.

The L_{A1}, L_{A10} and L_{A90} levels are the levels exceeded for 1%, 10% and 90% of the sample period. These levels can be considered as the maximum noise level, the average repeatable maximum and average repeatable minimum noise levels, respectively.

Specific acoustic terminology is used in this assessment report. An explanation of common acoustic terms is included in Appendix A.

3.2 Unattended Acoustic Monitoring

3.2.1 Monitoring Details

To determine the background noise levels at nearby receivers, long term unattended noise monitoring was conducted at one logging location on site. The approximate logging location is shown in Figure 5.

As per Table A1 of the Noise Policy for Industry (NPfI), the noise logger was placed in the vicinity of the reasonably most or potentially most affected residential receiver location. The location of the noise sensitive receivers is also shown in Figure 5.

3.2.2 Monitoring Instrumentation

Instrumentation used for the noise survey comprised the equipment tabled below.

Table 2 – Monitoring Equipment

Measurement location	Equipment type	Serial Number
Logging location	Svan 971	103360

Calibration of the noise loggers was checked prior to and following the measurements. Drift in calibration did not exceed ±0.5 dBA. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

3.2.3 Monitoring Results

Charts presenting summaries of the measured daily noise data are attached in Appendix B. These charts, representing each 24-hour period, show the L_{A1}, L_{A10}, L_{Aeq} and L_{A90} noise levels measured over 15 minute time periods.

Logging was conducted from Friday 15 April 2022 to Friday 29 April 2022. The measurement results have been filtered to remove data affected by adverse weather conditions, such as excessively windy or rainy time periods, as recorded by the nearest Bureau of Meteorology weather station at Port Macquarie Airport (AWS 060168). Detailed noise logging results are shown in Appendix B.

The noise logger was located on the eastern site boundary, as shown in Figure 5 above. A photo of the noise logging location is also shown in Figure 6 below.

Figure 6 Location of noise logger on eastern residential boundary

The measured background noise data of the logger was processed in accordance with the recommendations contained in the NSW Environment Protection Authority's (EPA) *Noise Policy for Industry* (NPfI).

The Rating Background Noise Level (RBL) is the background noise level used for assessment purposes at the nearest potentially affected receiver. It is the 90th percentile of the daily background noise levels during each assessment period, being day, evening and the night. The RBL $L_{A90\ (15minute)}$ and L_{Aeq} noise levels are presented in the table below for the unattended logging. The measured noise levels are considered to be representative of the levels to be expected at the nearest and most affected residence to the proposed development.

Table 3 – Measured ambient noise levels in accordance with the NSW NPfI

Measurement Location	Daytime[1] 7:00 am to 6:00 pm		Evening[1] 6:00 pm to 10:00 pm		Night-time[1] 10:00 pm to 7:00 am	
	L_{A90}[2]	L_{Aeq}[3]	L_{A90}[2]	L_{Aeq}[3]	L_{A90}[2]	L_{Aeq}[3]
Logger Location	40	49	37	50	33	44

Note 1: For Monday to Saturday, Daytime 7:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 7:00 am. On Sundays and Public Holidays, Daytime 8:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 8:00 am

Note 2: The L_{A90} noise level is representative of the "average minimum background sound level" (in the absence of the source under consideration), or simply the background level.

Note 3: The LAeq is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

4 ACOUSTIC CRITERIA

This assessment has been undertaken to satisfy the requirements listed below.

4.1 Port Macquarie Hastings Council Pre-Lodgement Meeting Advice

Condition 13 of the Pre-Lodgement Meeting Advice within the Port Macquarie Hastings Council requires the following:

> *"Given the surrounding residential uses, a noise assessment is required. The assessment should have regard to any plant equipment noise/air conditioners etc."*

4.2 NSW Noise Policy for Industry

In NSW, the control of noise emissions is the responsibility of Local Government and the NSW Environment Protection Authority (NSW EPA). In October 2017, the NSW EPA released the *Noise Policy for Industry* (NSW NPfI). The purpose of the policy is to ensure that noise impacts associated with particular industrial developments are evaluated and managed in a consistent and transparent manner. The policy aims to ensure that noise is kept to acceptable levels in balance with the social and economic value of industry in NSW.

The NSW NPfI criteria for industrial noise sources have two components:

- Controlling the intrusive noise impacts for residential receivers in the short-term; and
- Maintaining noise level amenity of particular land uses for residents and sensitive receivers in other land uses.

The project noise trigger level is derived from the more stringent value out of the project intrusiveness noise level and the project amenity noise level.

4.2.1 Intrusive Noise Impacts (Residential Receivers)

The NSW NPfI states that the noise from any single source should not intrude greatly above the prevailing background noise level. Industrial noises are generally considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (L_{Aeq}), measured over a 15-minute period, does not exceed the background noise level measured in the absence of the source by more than 5 dB(A). This is often termed the Intrusiveness Criterion.

The 'Rating Background Level' (RBL) is the background noise level to be used for assessment purposes and is determined by the methods given in the NSW NPfI. Using the rating background noise level approach results in the intrusiveness criterion being met for 90% of the time. Adjustments are to be applied to the level of noise produced by the source that is received at the assessment point where the noise source contains annoying characteristics such as tonality or impulsiveness.

4.2.2 Protecting Noise Amenity (All Receivers)

To limit continuing increases in noise levels, known as "background creep", the maximum ambient noise level within an area from industrial noise sources should not normally exceed the acceptable noise levels specified in Table 2.2 of the NSW NPfI. That is, the ambient L_{Aeq} noise level should not exceed the level appropriate for the particular locality and land use. This is often termed the Amenity Criterion.

The amenity assessment is based on noise criteria specified for a particular land use and corresponding sensitivity to noise. The cumulative effect of noise from industrial sources needs to be considered in assessing the impact. These criteria relate only to other continuous industrial-type noise and do not include road, rail or community noise. If the existing (measured) industrial-type noise level approaches the criterion value, then the NSW NPfI sets maximum noise emission levels from new sources with the objective of ensuring that the cumulative levels do not significantly exceed the criterion.

4.2.3 Area Classification

The NSW NPI characterises the "Suburban Residential" as an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the following characteristic: evening ambient noise levels defined by the natural environment and human activity.

For the considered receptors in the suburban area, the recommended amenity noise level is shown in Table 4 below. When the existing noise level from industrial noise sources is close to the recommended "Amenity Noise Level" (ANL) given above, noise from the new source must be controlled to preserve the amenity of the area in line with the requirements of the NSW NPI.

Table 4 - NSW NPfI – Recommended L_{Aeq} Noise Levels from Industrial Noise Sources

Type of Receiver	Indicative Noise Amenity Area	Time of Day[1]	Recommended Amenity Noise Level ($L_{Aeq, period}$)[2]
Residence	Suburban	Day	55
		Evening	45
		Night	40
Commercial Receiver	-	When in use	65

Note 1: For Monday to Saturday, Daytime 7:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 7:00 am. On Sundays and Public Holidays, Daytime 8:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 8:00 am

Note 2: The L_{Aeq} is the energy average sound level. It is defined as the steady sound level that contains the same amount of acoustical energy as a given time-varying sound.

4.2.4 Project Trigger Noise Levels

The intrusive and amenity criteria for industrial noise emissions derived from the measured data are presented in below.

The amenity and intrusive criterion are nominated for the purpose of determining the operational noise limits for noise sources associated with the development which can potentially affect noise sensitive receivers.

For each assessment period, the project trigger noise levels are the lower (i.e. the more stringent) of the amenity or intrusive criteria. The project trigger noise levels are shown in bold text in the table below.

Table 5 - External noise level criteria in accordance with the NSW NPI

Location	Time of Day	Project Amenity Noise Level, $L_{Aeq, period}$ [1] (dBA)	Representative Background Noise level $L_{A90, 15\ min}$ (RBL) [2] (dBA)	Measured $L_{Aeq, period}$ Noise Level (dBA)	Intrusive $L_{Aeq, 15\ min}$ Criterion for New Sources (dBA) [3]	Amenity $L_{Aeq, 15\ min}$ Criterion for New Sources (dBA) [3, 4]
Residence (Suburban)	Day	50	40	49	**45**	53
	Evening	40	37	50	**42**	43
	Night	35	33	44	**38**	38
Commercial Receiver R6	When in Use	60	-	-	**-**	**63**

Note 1: Project Amenity Noise Levels corresponding to "suburban" areas, equivalent to the Recommended Amenity Noise Levels minus 5 dBA

Note 2: L_{A90} Background Noise or Rating Background Level, including L_{A90} Background Noise or Rating Background Level based on the assumed minimum rating of the EPA NPfI.

Note 3: Project Noise Trigger Levels are shown in bold

Note 4: According to Section 2.2 of the NSW NPI, the LAeq, 15 minutes is equal to the LAeq, period + 3 dB

4.2.5 Sleep Disturbance

An accurate representation of sleep disturbance impacts on a community from a noise source is particularly difficult to quantify mainly due to differing responses of individuals to sleep disturbance – this is found even within a single subject monitored at different stages of a single night's sleep or during different periods of sleep.

In addition, the differing grades of sleep state make a definitive definition difficult, and even where sleep disturbance is not noted by the subject, factors such as heart rate, mood and performance can still be negatively affected.

An assessment of sleep disturbance should consider the maximum noise level or $L_{A1(1\ minute)}$, and the extent to which the maximum noise level exceeds the background level and the number of times this may happen during the night-time period. Factors that may be important in assessing the extent of impacts on sleep include:

- How often high noise events will occur;
- Time of day (normally between 10.00pm and 7.00am); and
- Whether there are times of day when there is a clear change in the existing noise environment (such as during night periods).

Section 2.5 of the EPA NPfI provides the following criteria:

- $L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater.

5 OPERATIONAL ACOUSTIC ASSESSMENT

This section of the report details the assessment of potential noise generated as part of the proposed development. The assessment of potential noise impacts from various sources of noise on the site are detailed in the following sections.

5.1 Mechanical Services Equipment

Detailed selections of the proposed mechanical plant and equipment to be used on the site are not available at this time. All future plant and equipment are to be acoustically treated to ensure the noise levels at all surrounding receivers comply with noise emission criteria detailed within this report. Experience with similar projects indicated that it is both possible and practical to treat all mechanical equipment such that the relevant noise levels are achieved.

Details of the required mechanical services equipment and acoustic treatments to ensure the relevant noise level criteria is achieved will be reviewed by suitably qualified acoustic consultant and provided as part of the CC submission of the project.

Experience with similar projects indicates that the acoustic treatment of the proposed mechanical equipment to be installed on the project is both possible and practical.

5.2 Car parking operational noise emission

On grade car parking for 63 vehicles (58 bays + 3 short stay = 61 plus 2 drop off) for the patrons visiting the medical centre is located in the southern half of the proposed site. Ingress into the car park is on Lake Road and Gray Street and egress out of the car park is via Gray Street only.

Noise emissions associated with typical car parking activities include car pass-bys, car door slamming, engine starting. Car park activities noise emission over a 15-minute period is to be assessed to comply with the established NPfI project trigger noise levels at the nearby noise sensitive receivers.

The nearest noise sensitive receivers are the residences identified as R1 (see Table 1 and Figure 5), sandwiched between the east and west blocks of the development. Compliance at this nearest receiver means compliance at other further receivers would also likely be achieved.

The following worst-case scenario assumptions have been adopted in the assessment of car park activities noise emission from each of the east and west blocks of the development over a 15-minute period.

- Daytime - 10 x vehicles manoeuvring in the car park with maximum speed of 10km/h, sound power level of 84 dBL_{Aeq}
- Daytime - 10 x car door slamming at maximum sound power level of 92 dBL_{Amax}
- Evening - 2 x vehicles manoeuvring in the car park with maximum speed of 10km/h, sound power level of 84 dBL_{Aeq}
- Evening - 2 x car door slamming at maximum sound power level of 92 dBL_{Amax}

Based on the above assumptions, the following values were used in the calculations to determine the predicted noise levels at the receivers.

- The car source levels is taken to be a sound power level of 84 dB,
- The daytime assessment is calculated for 10 cars arriving / departing over the same 15 minute period (**10 dB increase** in level for 10 vehicles)

- The duration of each car parking / leaving event is assumed to be 10 seconds in the parking lot over a 15 minute assessment time period (resulting in a **loss of 20 dB**).

- The attenuation of the 1.8m barrier fence is providing approximately **17 dB of attenuation** at mid frequencies for a source height of 0.5m in front of the fence, a receiver height of 1.5m and a distance of 1m from the fence, with a fence height of 1.8m.

- The distance loss is calculated for a distance of 2m between source and receiver, with propagation assumed to be hemispherical, with a source directivity of 3dB (resulting in **14 dB attenuation**)

- Resulting in an overall noise level from the carparking (arrivals and leaving) of LAeq,15min **43 dB**.

A similar procedure to the above was followed for the car door slamming resulting in a noise level of LAeq,15min level of **41 dB**.

The combined overall noise level of carparking activity, based on the assumptions identified above, gives a LAeq,15min level of **45 dB** (i.e. 43 dBA + 41 dBA).

The results of the carparking noise assessment are given in Table 6 below.

Table 6 - Car Parking Noise Assessment

Noise source	Receiver	Minimum distance (m)	Predicted noise levels, dBA $L_{eq,\ 15mins}$	NPfI criteria, dBA $L_{eq,\ 15mins}$	Meets criteria?	Noise mitigation treatment required?
Car parking activities	R4	1m	45	Day - 45	Yes	Yes (with implementation of acoustic treatment below)
			38	Evening - 42	Yes	No

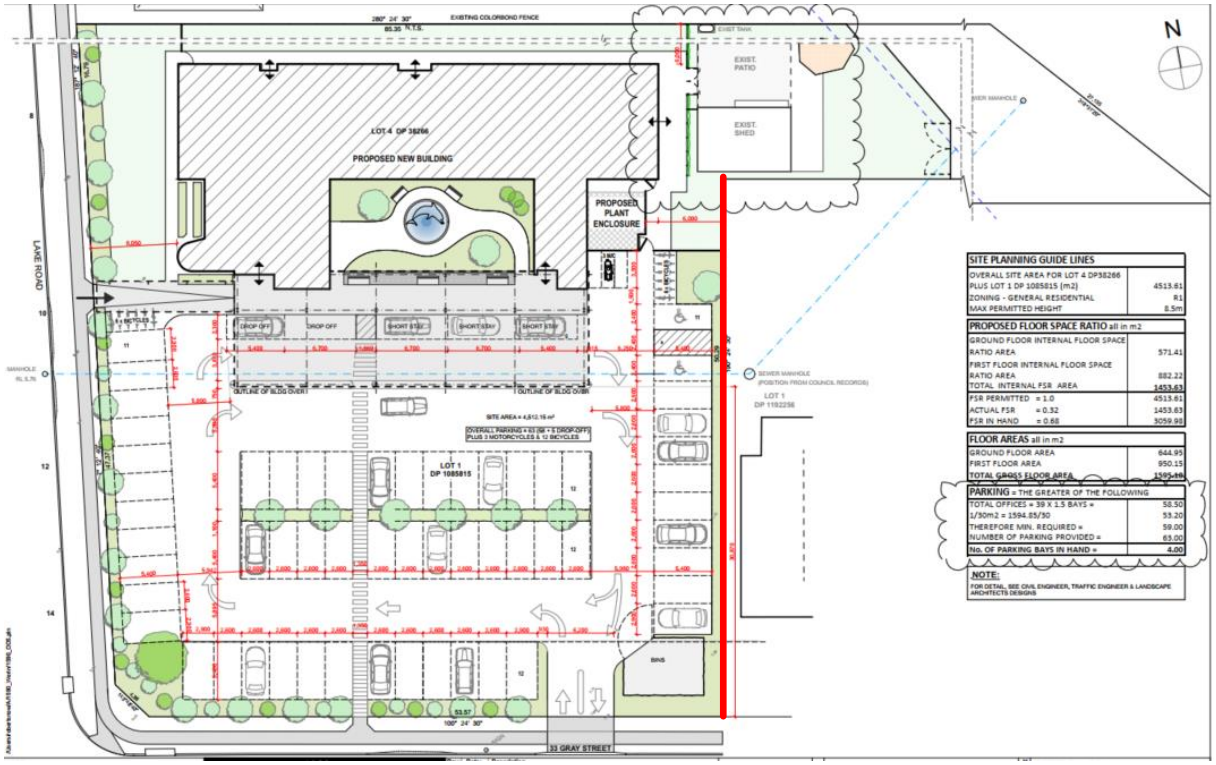
5.2.1 Noise mitigation recommendations

Due to the close proximity of the receivers in R4, the following noise mitigation treatment recommendation will be required to achieve the daytime criteria.

- A 1.8m high solid noise barrier must be constructed on the boundaries separating the east and west blocks from the receivers in R1. See Figure 7 below indicating conceptually the extent of the noise barrier shown in red.

- The noise barrier shall be constructed without any gaps or perforations and have a minimum surface mass of 10 kg/m^2. An acceptable construction is a typical lapped and capped timber boundary fence or other approved alternative. Final details of the noise barrier will be reviewed and approved by suitably qualified acoustic consultant and provided as part of CC submission.

Figure 7 Acoustic Barriers to Carpark Area



5.3 Waste and Garbage Collections

Noise resulting from the removal of waste and garbage from the site, including garbage trucks and the like will be undertaken in accordance with council's waste management requirements. Garbage collection by private contractors will be limited to the daytime period so as to avoid causing sleep disturbance.

Noise resulting from the collection of waste from the site will include intermittent collection using approved waste collection vehicles. The noise impact resulting from the site will be similar to noise levels currently experienced by exiting receivers from exiting waste collection services and vehicle movements on surrounding roadways.

5.4 Noise Impact on Local Roads

Based on the proposed car parking included on the east and west blocks, an assessment for the potential of noise impact resulting from the additional vehicles using the site has been undertaken.

As part of this assessment, it has been assumed that the use of the carparking areas will include a maximum of 50% of the detailed carparking spaces being refreshed in any given day or early evening period. It is not expected that the carparking spaces will be used during night-time hours as the medical centre is unlikely to be operating during night-time period.

To generate an increase of 2 dB on local road traffic noise, existing traffic volumes would need to increase by approximately 60% as a result of the proposed development's operations. Based on the location of the site, it is expected that the traffic volume generated by the development will be significantly less than 60% of the existing traffic flow.

Therefore, it is expected that the increase on existing traffic noise levels, due to the development's traffic generation, will be less than 2 dB on local roadways from traffic movements resulting from use of the site and will be acoustically acceptable.

6 CONCLUSIONS

Pulse White Noise Acoustics has undertaken a noise impact assessment for proposed Werin Medical Centre (WMC) for the Werin Aboriginal Corporation. The proposed WMC will be located on Lot 1 DP 1085815 and Lot 4 DP 38266, with street addresses 8 to 14 Lake Road, Port Macquarie.

This NIA is to address noise related requirements stipulated in item 13 of the Pre-Lodgement Meeting Advice for Application 210.2021.15 which was issued by Port Macquarie Hastings Council dated 3 May 2021, as part of the Statement of Environment Effects (SEE) submission as requested by the Council.

External noise emission criteria from the site have been established and detailed in accordance with the NSW Environmental Protection Authorities *Noise Policy for Industry*. The future design and treatment of all building services associated with the project can be acoustically treated to ensure all noise emissions from the site comply with the established project specific EPA NPfI noise criteria.

Noise associated with the operation of the proposed car park has also been assessed. Noise mitigation treatment has been provided to ensure that on-site vehicle noise can comply with the established NPfI noise criteria.

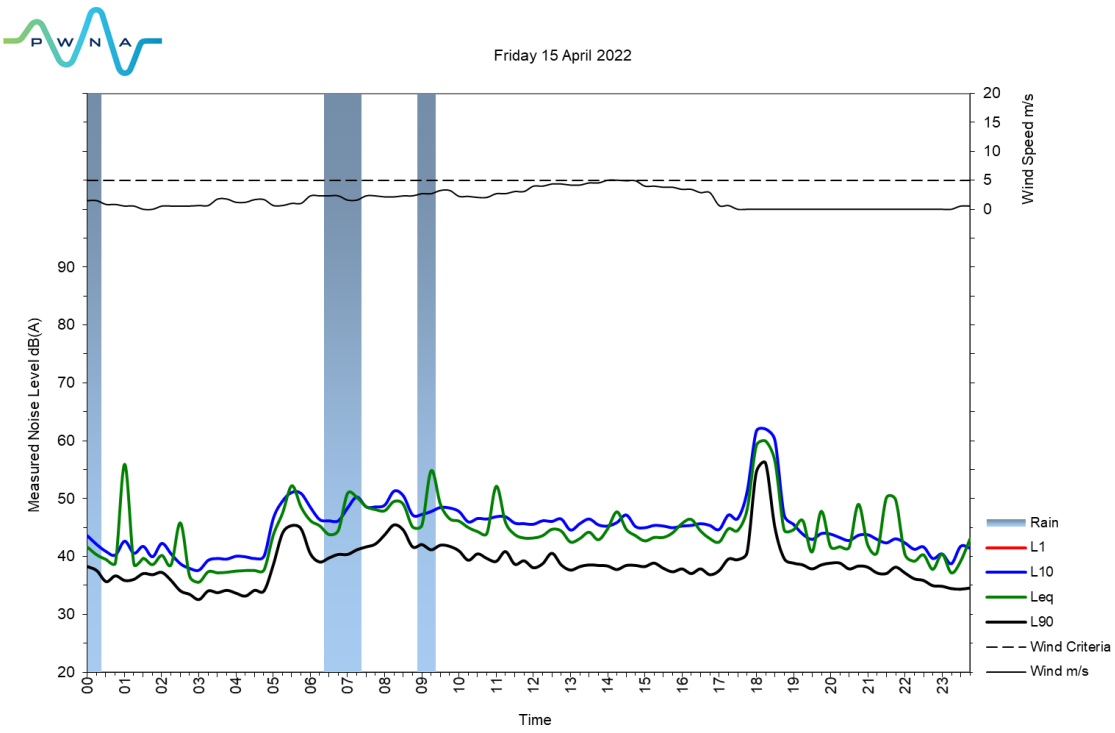
APPENDIX A: ACOUSTIC TERMINOLOGY

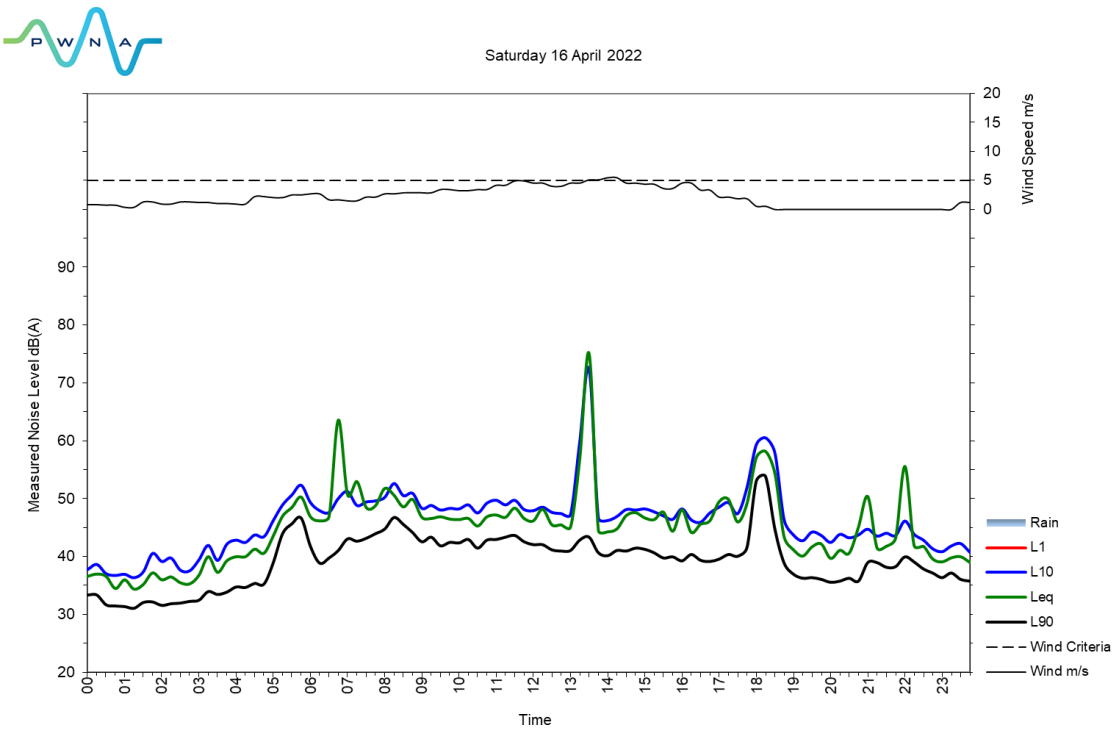
The following is a brief description of the acoustic terminology used in this report.

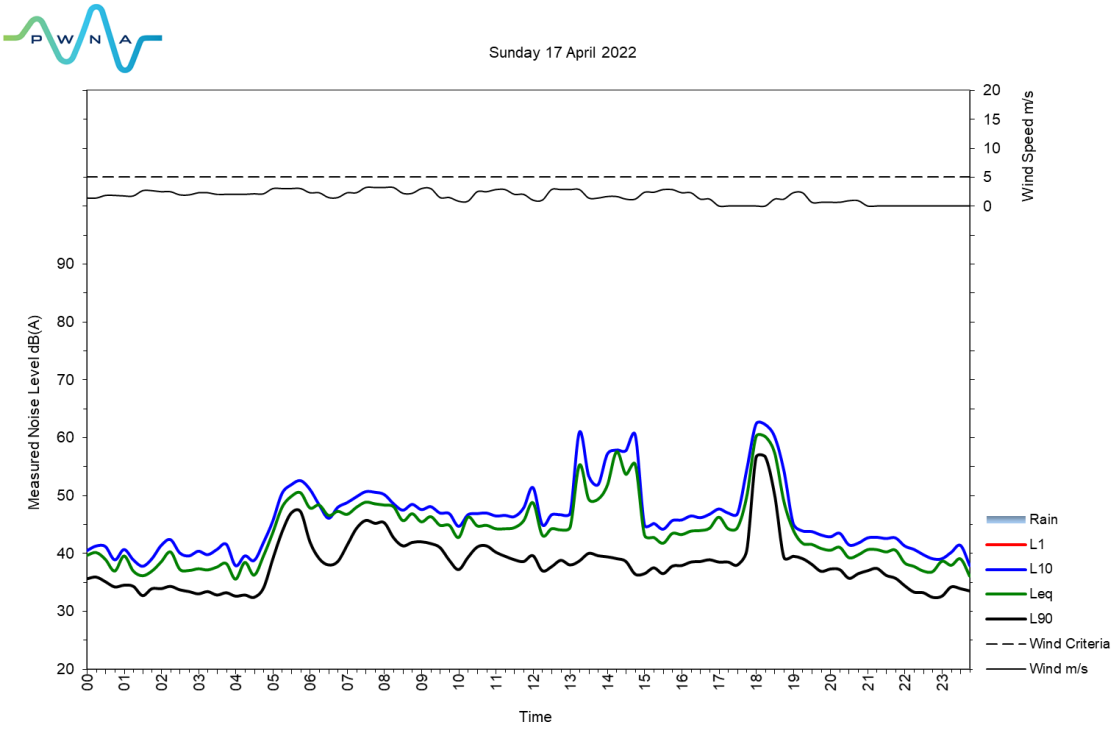
Ambient Sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.
Audible Range	The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits.
Character, acoustic	The total of the qualities making up the individuality of the noise. The pitch or shape of a sound's frequency content (spectrum) dictate a sound's character.
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. The following are examples of the decibel readings of every day sounds; 0dB the faintest sound we can hear 30dB a quiet library or in a quiet location in the country 45dB typical office space. Ambience in the city at night 60dB Martin Place at lunch time 70dB the sound of a car passing on the street 80dB loud music played at home 90dB the sound of a truck passing on the street 100dB the sound of a rock band 115dB limit of sound permitted in industry 120dB deafening
dB(A)	A-weighted decibels The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on
LMax	The maximum sound pressure level measured over a given period.
LMin	The minimum sound pressure level measured over a given period.
L1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L10	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L90	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
Leq	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
dB (A)	'A' Weighted overall sound pressure level

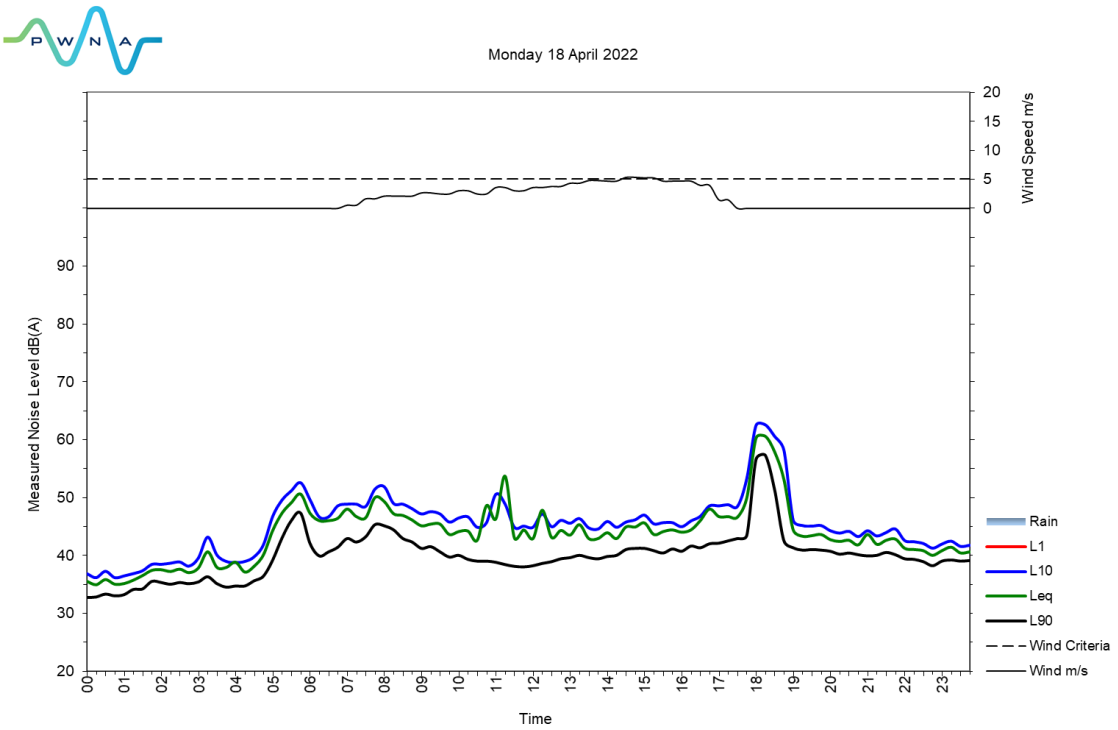
Sound Pressure Level, LP dB	A measurement obtained directly using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the rms sound pressure to the reference sound pressure of 20 micro Pascals.
Sound Power Level, Lw dB	Sound power level is a measure of the sound energy emitted by a source, does not change with distance, and cannot be directly measured. Sound power level of a machine may vary depending on the actual operating load and is calculated from sound pressure level measurements with appropriate corrections for distance and/or environmental conditions. Sound power levels is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 picoWatt

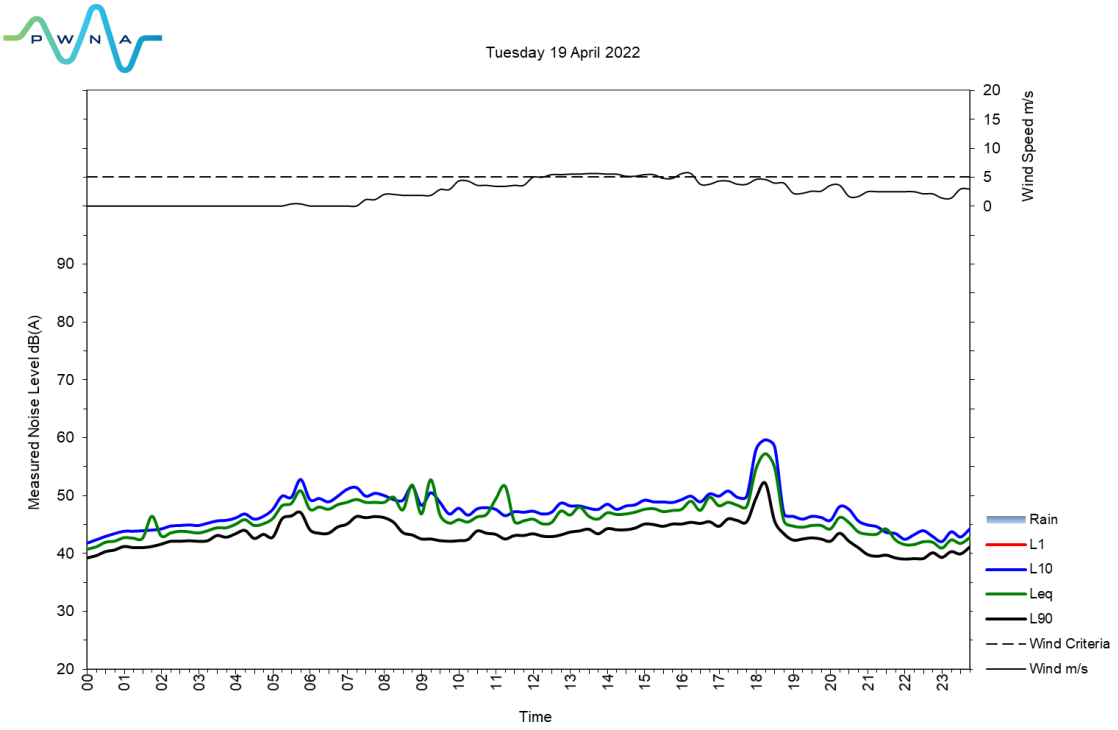
APPENDIX B: UNATTENDED NOISE LOGGING

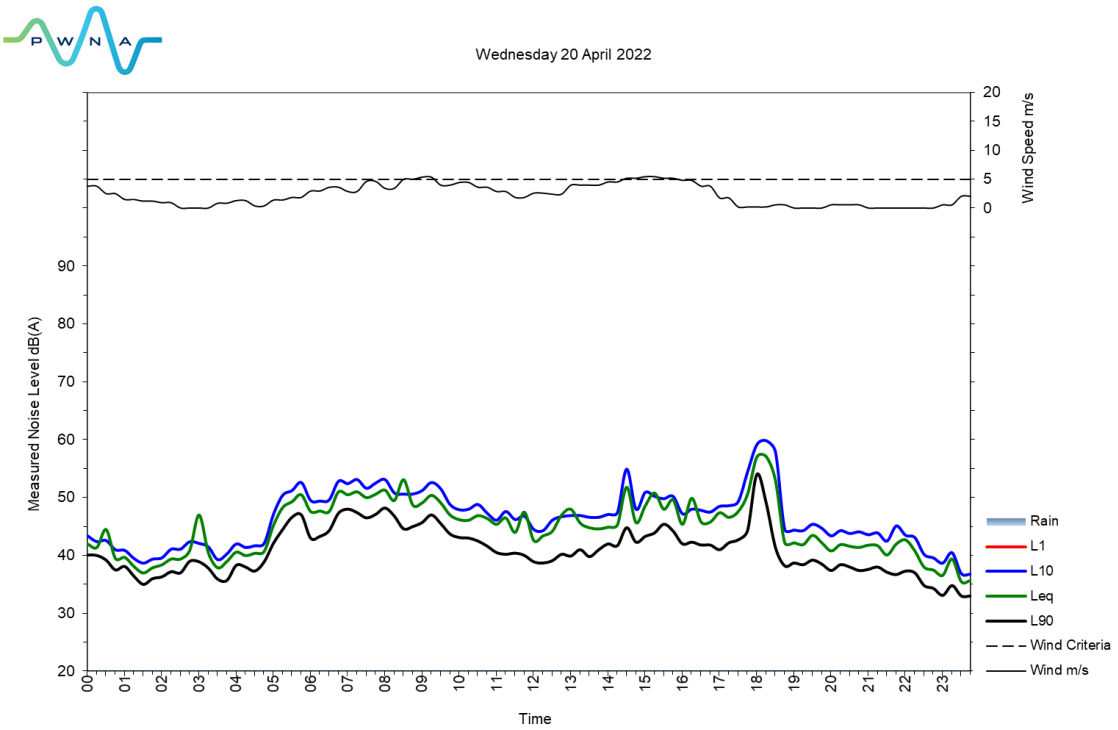


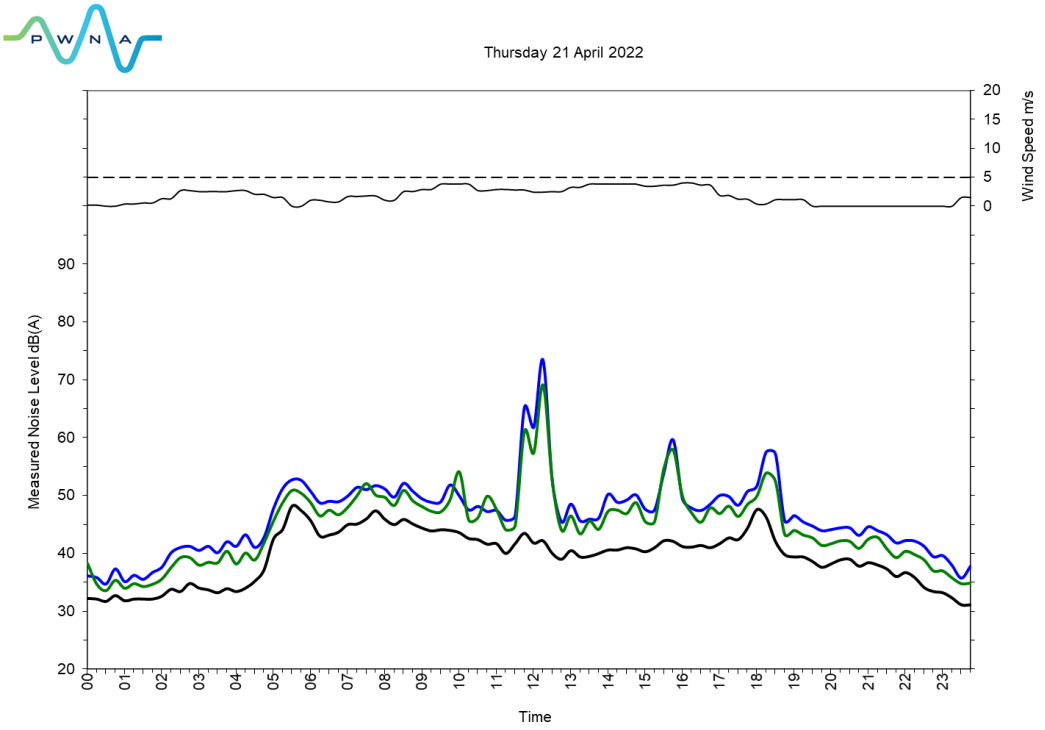


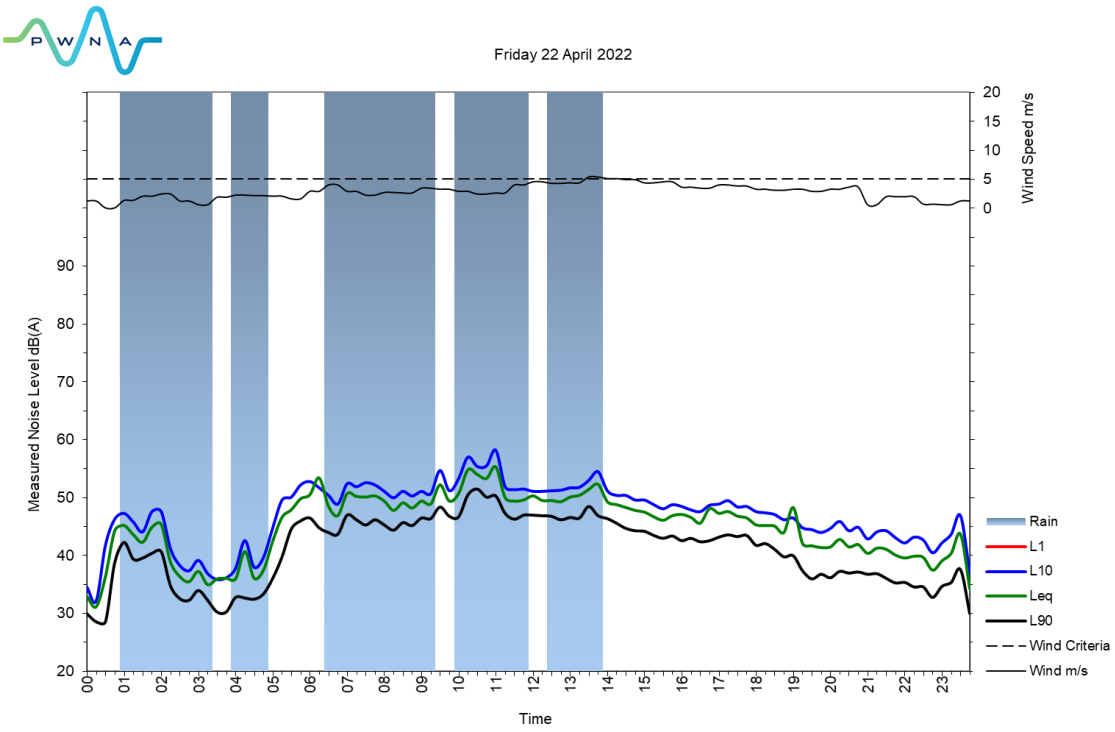

Sunday 17 April 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s

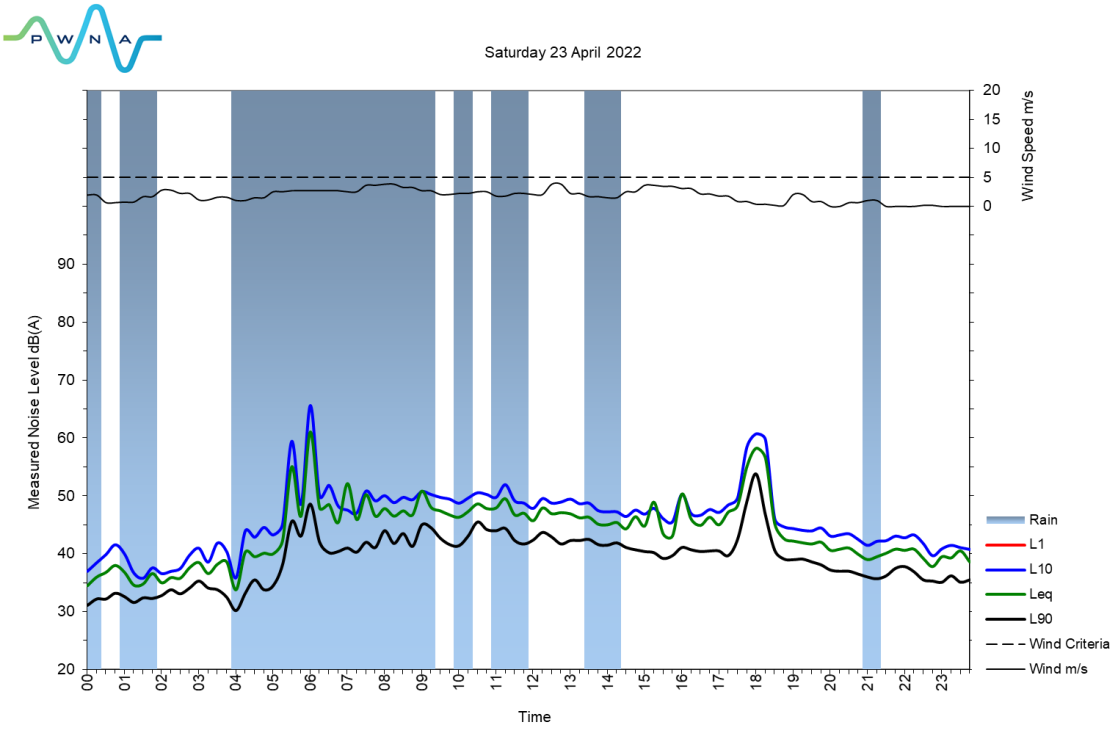

Monday 18 April 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s

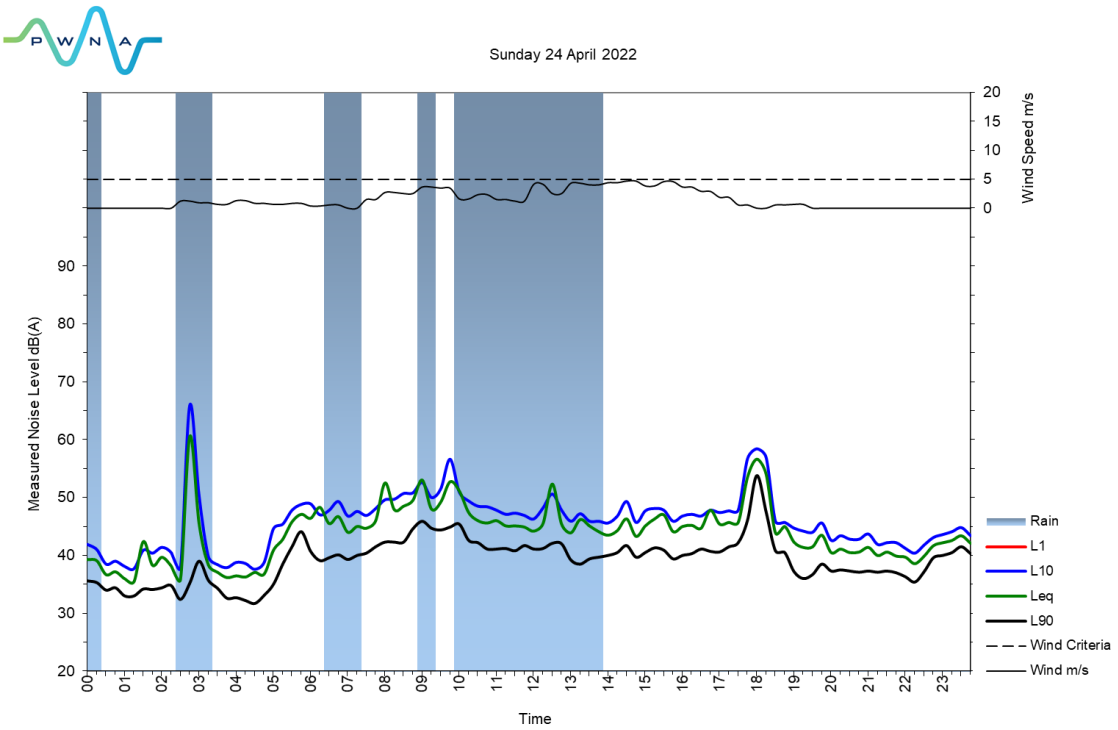

Tuesday 19 April 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s

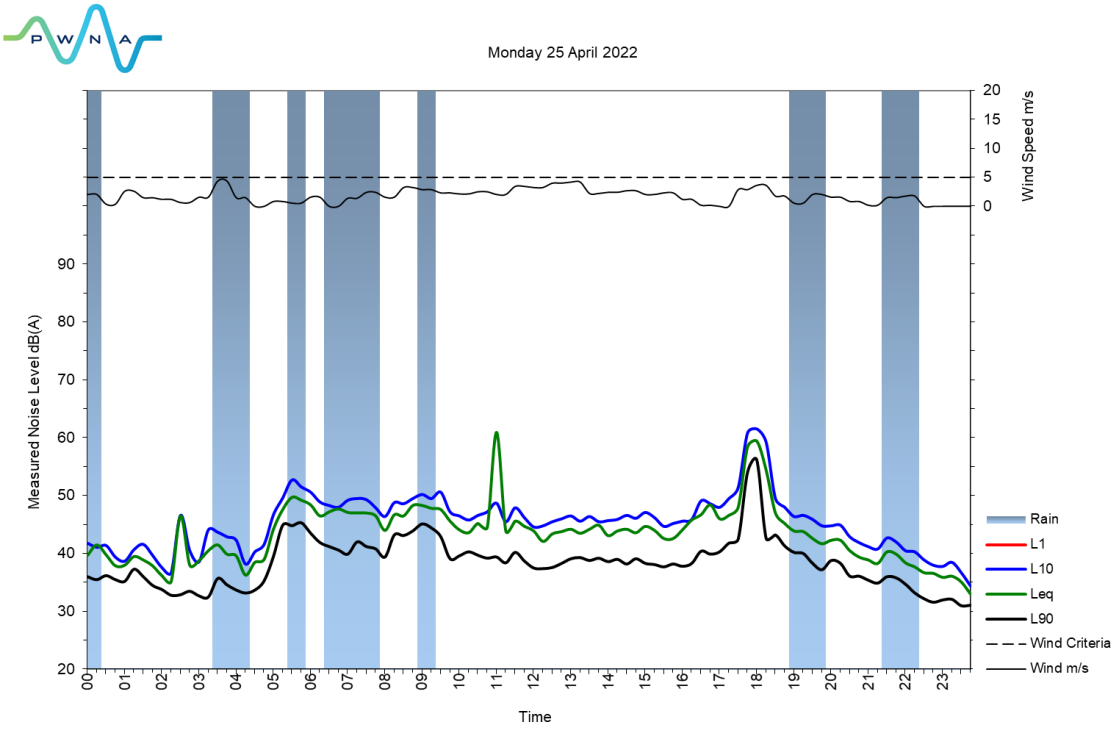

Wednesday 20 April 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s

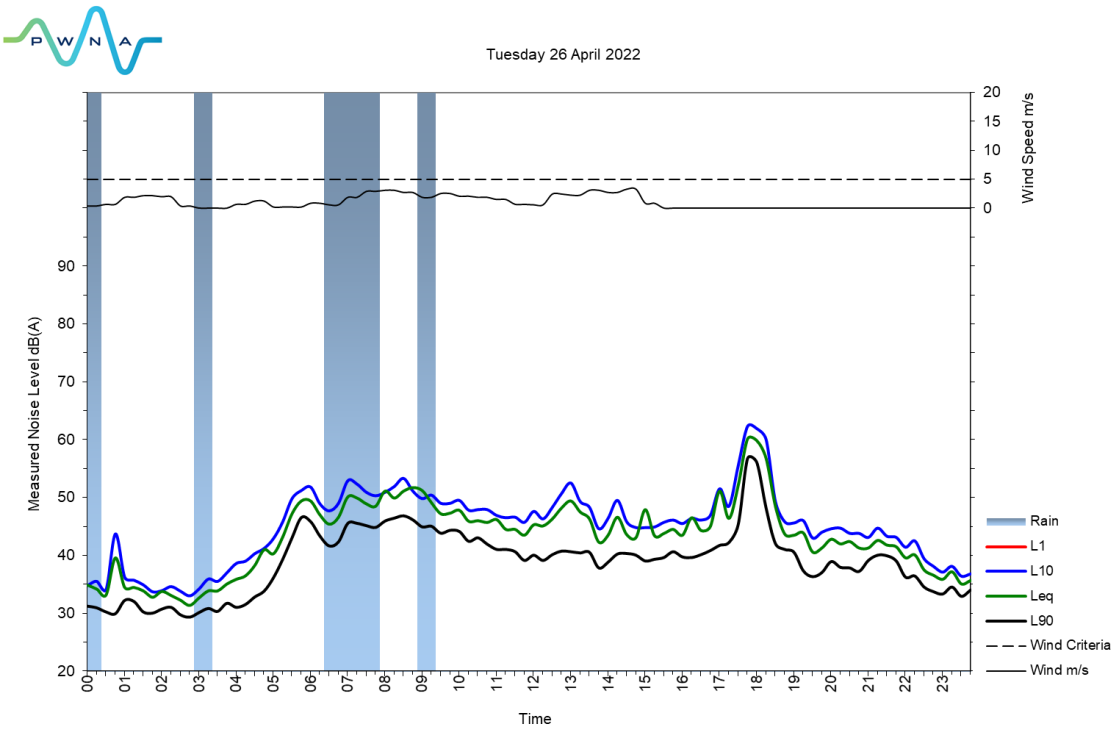

Thursday 21 April 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time

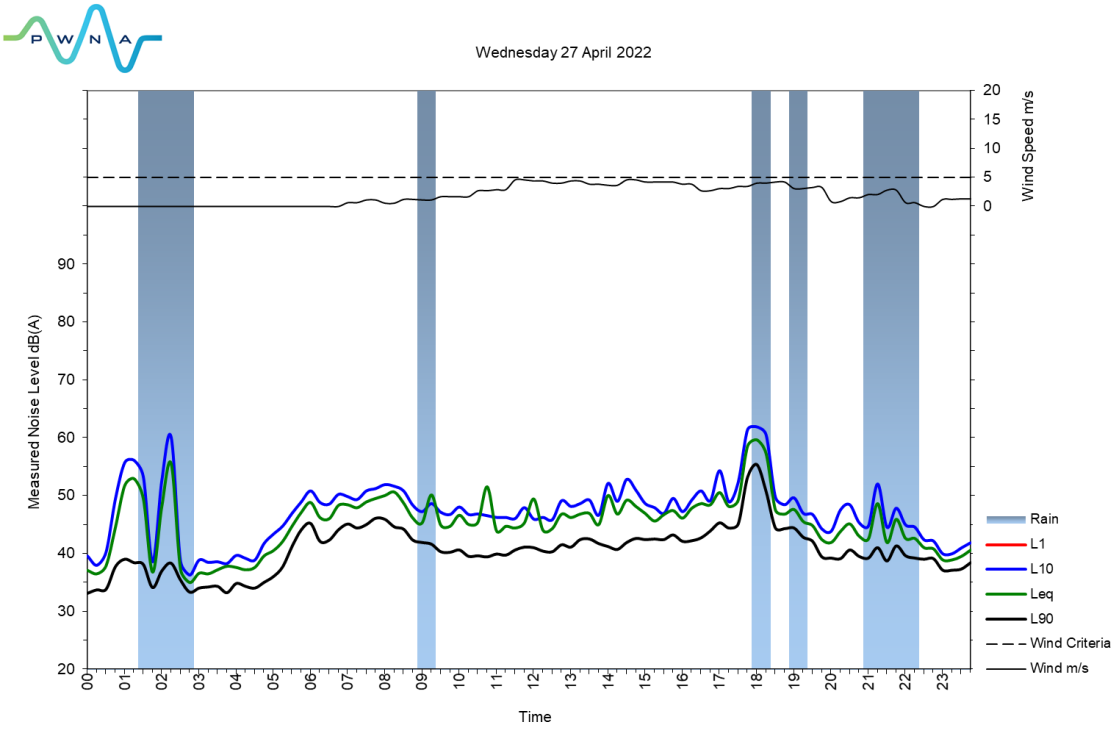

Friday 22 April 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s

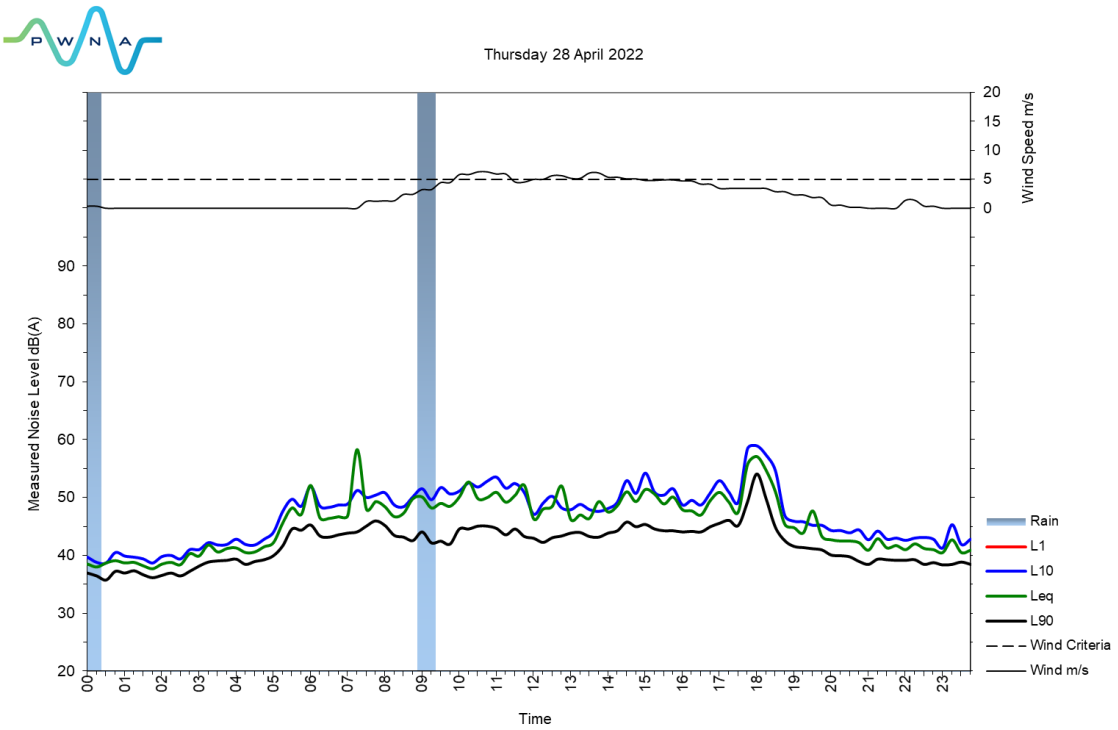

Saturday 23 April 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s


Sunday 24 April 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s


Monday 25 April 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s


Tuesday 26 April 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s


Wednesday 27 April 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s


Thursday 28 April 2022
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s