River Street Community Precinct

DA Acoustic Assessment

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CONTENTS

Figures

Tables

1 INTRODUCTION

Pulse White Noise Acoustic Pty Ltd (PWNA) has been engaged by Nimbus Architecture + Heritage to undertake an acoustic assessment of the proposed redevelopment of the River Street Community Precinct located at the end of Wharf Street, Maclean at 48 River Street, Maclean.

The report assesses the potential road traffic noise intrusion impacts on the development and noise emissions on nearby receivers from the use of the auditorium and meeting rooms, mechanical plant, vehicle parking and any additional traffic. This report will discuss the acoustic criteria which have been adopted as well as the outcome of the assessment.

A list of acoustic terminology used in this report is included in Appendix A of this report.

1.1 Relevant Guidelines

Acoustic criteria which have been adopted in this assessment include requirements from the local and state authorities and in the absence of any applicable criteria from these bodies, Australian and International Standards will be utilised.

Noise intrusion into the development will be controlled by the requirements of the Clarence Valley Local Environmental plan 2011 (LEP) and the Clarence Valley Council Development Control Plan 2011 (DCP) as well as Australian New Zealand Standard AS/NZS 2107:2016 *'Acoustics–Recommended design sound levels and reverberation times for building interiors'* has been adopted.

Furthermore, the noise emission impacts from the proposed development on the adjacent residences are regulated by the Clarence Valley Local Environmental plan 2011 (LEP) and the Clarence Valley Council Development Control Plan 2011 (DCP)

1.2 Proposed Development

The proposed development includes:

- Basement Carpark
- Auditorium
- Audio Visual control room
- Entry lobby/foyer
- Stage and back-stage access area
- Dressing rooms and stage workshop
- Kitchen and Bar/Café
- Elevator
- Male/female/accessible amenities

Architectural drawings for the proposed development, which have been used in our assessment, are prepared by Nimbus Architecture + Heritage.

2 SITE DESCRIPTION AND SURROUNDING RECEIVERS

The site is bounded by the following:

- Existing single story residential dwellings located to the north of the project site across River Street,
- Existing Telstra and Post office building bounding the eastern boundary of the project site,
- Existing commercial buildings located across River Street to the north of the project site,
- Existing Centrelink, Service NSW and local council building located on the southern boundary of the site at the end of wharf Street,

The nearest noise receivers to the development have been detailed below:

Receiver 1: Existing single story residential dwellings located north of the project site at 263 River Street, Maclean.

Receiver 2: Existing residential receiver located southwest of the project site at 4 Wharf Street, Maclean.

Receiver 3: Existing residential receiver located southwest of the project site at 2 Wharf Street, Maclean.

Receiver 4: Existing residential receiver located adjacent of the project site at 4 Short Street, Maclean.

Receiver 5: Existing Telstra building located at the north-western boundary of the site situated at end of Wharf Street.

Receiver 6: Existing Post office building located at the north-western boundary of the site situated at 44 River Street, Maclean.

Receiver 7: Existing Commercial buildings adjacent to the project site on River Street, Maclean

Receiver 8: Existing Centrelink, service NSW and local council building located on the southern boundary of the project site.

Receiver 9: Existing Salvation army building located on the northern side of the project site cross River Street.

Receiver 10: Existing Maclean courthouse buildings located on the north-western side of the project site.

A site map has been provided below which identifies the site, the surrounding receivers and monitoring locations; see Figure 1.

Figure 1 Site Map, Measurement Locations and Surrounding Receivers – Sourced from SixMaps NSW

3 NOISE DESCRIPTORS AND TERMINOLOGY

Environmental noise constantly varies in level with time. It is therefore necessary to measure environmental noise in terms of quantifiable time periods and 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 capable of detection by human hearing. Noise levels are expressed in terms of decibels, abbreviated as dB or dB(A), 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' arithmetic does not apply, e.g. adding two sources of sound of an equal value results in an increase of 3dB (i.e. 60 dBA + 60 dBA = 63 dBA). A change of 1 dB or 2 dB in the level of a sound 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 LAeq, LA1, LA10 and LA90 noise levels. The LAeq noise level represents the "equivalent energy average noise level". This parameter is derived by integrating the noise level measured over the measurement period and is equivalent to a level that would have been experienced had the fluctuating noise level remained constant during the measured time period.

The LA1, LA10 and LA90 levels are the levels exceeded for 1%, 10% and 90% of the sample period. These levels are sometimes thought of as the typical 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 as Appendix A.

4 EXISTING NOISE ENVIRONMENT

Onsite monitoring has captured noise levels associated with environmental noise.

4.1 Unattended Noise Monitoring

An unattended noise survey was conducted between 2nd of February 2023 and the 14th of February 2023 at the location shown in Figure 1 above. All data in the graphs presented in Appendix B have not been corrected (i.e., raw data is presented).

Instrumentation for the survey comprised one Rion NL-42 sound level meter (serial number 998081). Calibration of the loggers was checked prior to and following the measurements. Drift in calibration did not exceed ±0.5 dB. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

Charts presenting summaries of the measured daily noise data are attached in Appendix B. The charts present each 24-hour period and show the L_{A1}, L_{A10}, L_{Aeq} and L_{A90} noise levels for the corresponding 15-minute periods. This data has been filtered to remove periods affected by adverse weather conditions based on weather information.

Based on the unattended noise measurements, the results of the survey have been presented below.

4.1.1 Results in accordance with the NSW EPA Noise Policy for Industry (NPI) 2017 (RBL's)

In order to assess the acoustical implications of the development at nearby noise sensitive receivers, the measured background noise data of the logger was processed in accordance with the NSW EPA's Noise Policy for Industry (NPI, 2017).

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 night. RBL $L_{A90\ (15minute)}$ and L_{Aeq} noise levels are presented in Table 1 below. Data affected by adverse meteorological conditions and by spurious and uncharacteristic events have been excluded from the results, and also excluded from the data used to determine the noise emission criteria. Meteorological information has been obtained from the Yamba Pilot Station, NSW (ID 058012) which is located within 16km. Levels presented below are processed results with extraneous weather events removed.

Table 1 Measured Ambient Noise Levels corresponding to the NPI's Assessment Time Periods

Measurement Location	Daytime[1]		Evening[1]		Night-time[1]	
	L_{A90}[2] (dBA)	L_{Aeq}[3] (dBA)	L_{A90}[2] (dBA)	L_{Aeq}[3] (dBA)	L_{A90}[2] (dBA)	L_{Aeq}[3] (dBA)
48 River Street, Maclean (See Figure 1 above)	32 (35 [4])	51	25 (30 [4])	51	22 (30 [4])	48

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 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.

Note 4 Measured rating background noise levels will be amended to be equal to the minimum assumed rating background noise levels as outlined in Table 2.1 of the NSW EPA NPI 2017.

5 ACOUSTIC CRITERIA

5.1 Noise Intrusion Acoustic Criteria

5.1.1 Clarence Valley Council – Local Environmental Plan

A review of the current Clarence Valley Local Environmental Plan 2011 (LEP), the document does not contain any applicable building envelope acoustic criteria for the development application. As such in the absence of any applicable requirements, objectives listed in Australian New Zealand Standard AS/NZS 2107:2016 *'Acoustics– Recommended design sound levels and reverberation times for building interiors'* standard will be adopted.

5.1.2 Clarence Valley Council – Development Control Plan (DCP) 2011

A review of the Clarence Valley Council Development Control Plan (DCP) 2011, document does not contain any relevant quantitative building acoustic criteria in relation to the development application. As such in the absence of any applicable requirements, objectives listed in Australian New Zealand Standard AS/NZS 2107:2016 *'Acoustics– Recommended design sound levels and reverberation times for building interiors'* standard will be adopted.

5.1.3 Australian / New Zealand Standard AS/NZS 2107:2016 Acoustics - Recommended design sound levels and reverberation times for building interiors - (AS/NZS 2107:2016)

Recommended ambient noise levels and reverberation times for internal spaces are given in a number of publications including Table 1 of Australian / New Zealand Standard 2107:2016 "Acoustics - Recommended design sound levels and reverberation times for building interiors". Unlike the previous version of this Standard, this latest edition recommends a range with lower and upper levels (rather than "satisfactory" and "maximum" internal noise levels) for building interiors based on room designation and location of the development relative to external noise sources. This change has occurred due to the fact that sound levels below 'satisfactory' could be interpreted as desirable, but the opposite may in fact be the case. Levels below those which were listed as 'satisfactory' can lead to inadequate acoustic masking resulting in loss of acoustic isolation and speech privacy.

Internal noise levels due to the combined contributions of external noise intrusion and mechanical ventilation plant should not exceed the maximum levels recommended in this Standard. The levels for areas relevant to this development are given in Table 2 below. The mid to maximum points of the internal noise level ranges are generally adopted as the internal design noise criteria for the combined effect of mechanical services and external noise intrusion. In this report we will confine our recommendations to dBA levels, however, where the background noise appears to be unbalanced, AS/NZS 2107:2016 provides direction in terms of suitable diagnostic tools that can be used to assess the spectrum distribution of the background noise.

Table 2 Recommended Design Sound Levels

Type of Occupancy/Activity	Design sound level range dBA ($L_{Aeq,t}$)	Project Design Noise Level [1] dBA ($L_{Aeq,t}$)
Auditorium	"See note 3" (Note 3 from AS/NZS 2107 reads: "*Specialist advice should be sought for these spaces*")	PWNA professional opinion: • External noise sources (i.e., road traffic etc.): **30dBA** • Building services (i.e. plant): **35dBA**
Multi-purpose	40 - 45	45
Kitchen/Bar	<50	<50
Toilets	<55	<55
Basement	65	65
Function Room	40 - 45	45
Workshop	<60	<60
Dressing	<50	<50
Storeroom	<50	<50
Box Office	40 – 45	45
AV Room	<40	<40
Corridors	40 – 50	<50

Note 1 Overall recommended level for mechanical services noise and intrusive noise, combined (doesn't apply to Auditorium).

Section 6.18 of AS/NZ 2107:2016 notes that the presence of discrete frequencies or narrow band signals may cause the sound level to vary spatially within a particular area and be a source of distraction for occupants. Where this occurs, the sound level shall be determined as the highest level measured in the occupied location(s).

If tonal components are significant characteristics of the sound within a measurement time interval, an adjustment shall be applied for that time interval to the measured A-weighted sound pressure level to allow for the additional annoyance. If the background sounds include spectral imbalance, then the RC (Mark II) levels indicated in the Standard should be referenced (see also Appendix D of AS/NZ 2107:2016 for additional guidance).

5.2 Noise Emission Criteria

5.2.1 Clarence Valley Council – Local Environmental Plan

A review of the Clarence Valley Council Local Environmental Plan (LEP) 2011, the document does not contain any applicable noise emission criteria for commercial developments. As such in the absence of any applicable requirements, objectives listed in NSW EPA NPI 2017 detailed below will be adopted.

5.2.2 Clarence Valley Council – Development Control Plan (DCP) 2011

A review of the Clarence Valley Council Development Control Plan (DCP) 2011, the document does not contain any applicable noise emission criteria for commercial developments. As such in the absence of any applicable requirements, objectives listed in NSW EPA NPI 2017 detailed below will be adopted.

5.2.3 NSW EPA Noise Policy for Industry (NPI) 2017

In NSW, the control of noise emissions is the responsibility of Local Government (Council) and the NSW Environment Protection Authority (NSW EPA).

Noise Policy for Industry (NSW NPI 2017) which provides a framework and process for determining external noise criteria for the assessment of noise emission from industrial developments. The NSW NPI criteria for industrial noise sources have two components:

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

5.2.3.1 Intrusive Noise Impacts (Residential Receivers)

The NSW NPI 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 (LAeq), 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 NPI. 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.

5.2.3.2 Protecting Noise Amenity (All Receivers)

To limit continuing increases in noise levels, 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 NPI. That is, the ambient LAeq noise level should not exceed the level appropriate for the particular locality and land use. This is often termed the 'Background Creep' or 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 NPI sets maximum noise emission levels from new sources with the objective of ensuring that the cumulative levels do not significantly exceed the criterion.

5.2.3.3 Area Classification

The NSW NPI characterises the "Suburban" noise environment as an area with an acoustical environment which shows the following:

> *"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."*

The residential area surrounding the proposed development falls under the "Suburban" area classification. For residential receivers in an suburban area, the recommended amenity criteria are shown in Table 6 below.

Table 3 NSW NPI – Recommended LAeq 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]
Residential	Suburban	Day	55
		Evening	45
		Night	40

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.

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.

Where existing road traffic noise is high enough to render stationary industrial noise sources effectively inaudible, the ANL can be modified so that the amenity criteria is not unduly stringent in an environment where road traffic noise is the dominant source of environmental noise. If all the conditions below are satisfied, the ANL becomes LAeq, traffic minus 15 dBA. The conditions are:

- The road traffic noise is the dominant noise source.
- The existing noise is 10dB(A) or more above the acceptable ANL for the area.
- It is highly unlikely the road traffic noise levels would reduce in the near future.

5.2.3.4 Maximum Noise Level Event (Sleeping Disturbance)

The potential for sleep disturbance from maximum noise level events from premises during the night-time period needs to be considered. Sleep disturbance is considered to be both awakenings and disturbance to sleep stages. Section 2.5 of the NPI states the following:

Table 4 Sleep disturbance noise trigger levels

Receiver	Sleep Disturbance Trigger Levels (10:00pm to 7:00am)	
	$L_{Aeq,15\ minute}$	L_{AFmax}
Residential Receivers	Greater than 40 dB(A) or RBL plus 5dB, whichever is greater	52dB(A) or RBL plus 15dB, wherever is the greater

Where night-time noise level from the proposed development/premises is predicted to exceed the sleep disturbance trigger levels, a detailed maximum noise level event assessment should be undertaken.

5.2.3.5 Project Specific External Noise Emission Criteria

The intrusive and amenity criteria for industrial noise emissions, derived from the measured data, are presented in Table 5. These criteria are nominated for the purpose of determining the operational noise limits for mechanical plant associated with the development which can potentially affect noise sensitive receivers.

For each assessment period, the lower (i.e., the more stringent) of the amenity or intrusive criteria are adopted. These are shown in bold text in Table 5.

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

Location	Time of Day [1]	Project Amenity Noise Level, $L_{Aeq,\ period}$ [2,4] (dBA)	Measured $L_{A90,\ 15\ min}$ (RBL) [3] (dBA)	Measured $L_{Aeq,\ 15\ min}$ [4] (dBA)	Intrusive $L_{Aeq,\ 15\ min}$ [4] Criterion for New Sources (dBA)	Amenity $L_{Aeq,}$ [4] $_{15\ min}$ Criterion for New Sources (dBA) [6]
Surrounding Residences (Suburban)	Day	50	35 [7]	51	**40**	53
	Evening	40	30 [7]	51	**35**	43
	Night	35	30 [7]	48	**35**	38

Note 3 For Monday to Saturday, Daytime 7:00 am – 6:00 pm; Evening 6:00 pm – 10:00 pm; Night-time 10:00 pm – 1:00 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 – 7:00 am.

Note 4 Project Amenity Noise Levels corresponding to "Suburban" areas, equivalent to the Recommended Amenity Noise Levels minus 5 dBA.

Note 5 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 6 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.

Note 7 Project Noise Trigger Levels are shown in bold.

Note 8 According to Section 2.2 of the NSW NPI, the $L_{Aeq,}$ 15 minutes is equal to the $L_{Aeq,}$ period + 3 dB.

Note 9 As per Table 1 all measured RBL's were below the minimums as outlined in the NSW NPI. As such the minimums have being adopted.

5.2.4 NSW DECCW - NSW Road Noise Policy (RNP) 2011

For existing residences and other sensitive land uses affected by additional traffic on existing roads, the NSW Road Noise Policy states that for noise associated with increased road traffic generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB during both day and night-time periods. An increase of 2 dB represents a minor impact that is considered barely perceptible to the average person.

5.3 Construction Noise and Vibration Objectives

5.3.1 Construction Noise

5.3.1.1 NSW EPA Interim Construction Noise Guideline (ICNG) – DECC 2009

Noise criteria for construction and demolition activities are discussed in the Interim Construction Noise Guideline (ICNG). The ICNG also recommends procedures to address potential impacts of construction noise on residences and other sensitive land uses. The main objectives of the ICNG are summarised as follows:

- Promote a clear understanding of ways to identify and minimise noise from construction works;
- Focus on applying all "feasible" and "reasonable" work practices to minimise construction noise impacts;
- Encourage construction to be undertaken only during the recommended standard hours unless approval is given for works that cannot be undertaken during these hours;
- Streamline the assessment and approval stages and reduce time spent dealing with complaints at the project implementation stage; and
- Provide flexibility in selecting site-specific feasible and reasonable work practices in order to minimise noise impacts.

The ICNG contains a quantitative assessment method which is applicable to this project. Guidance levels are given for airborne noise at residences and other sensitive land uses.

The quantitative assessment method involves predicting noise levels at sensitive receivers and comparing them with the Noise Management Levels (NMLs). The NML affectation categories for residential receivers have been reproduced from the guideline and are listed in the table below.\

Table 6 NMLs for quantitative assessment at residences

Time of Day	Noise Management Level $L_{Aeq(15minute)}$ [1,2]	How to Apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm	"Noise Affected Level" RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{Aeq(15minute)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be

No work on Sundays or public holidays		carried out, the expected noise levels and duration, as well as contact details.
	"Highly Noise Affected Level" 75 dBA	The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences. 2. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dB	• A strong justification would typically be required for works outside the recommended standard hours. • The proponent should apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practices have been applied and noise is more than 5 dB above the noise affected level, the proponent should negotiate with the community.

Note 1 Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Note 2 The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term RBL is described in detail in the NSW Noise Policy for Industry (EPA 2017).

5.3.1.2 Construction Traffic Noise Criteria

For existing residences and other sensitive land uses affected by additional traffic on existing roads, the NSW Road Noise Policy (RNP) states that for noise associated with increased road traffic generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB during both day and night-time periods. An increase of 2 dB represents a minor impact that is considered barely perceptible to the average person.

5.3.2 Construction Vibration

5.3.2.1 Vibration Criteria – Building Contents and Structure

The vibration effects on the building itself are assessed against international standards as follows:

- For transient vibration: British Standard BS 7385: Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration" (BSI 1993); and
- For continuous or repetitive vibration: German DIN 4150: Part 3 – 1999 "Effects of Vibration on Structure" (DIN 1999).

5.3.2.2 British Standard BS 7385 Part 2 – 1993 "Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration"

For transient vibration, as discussed in standard BS 7385 Part 2-1993, the criteria are based on peak particle velocity (mm/s) which is to be measured at the base of the building. These are summarised in Table 7 and illustrated in Figure 2.

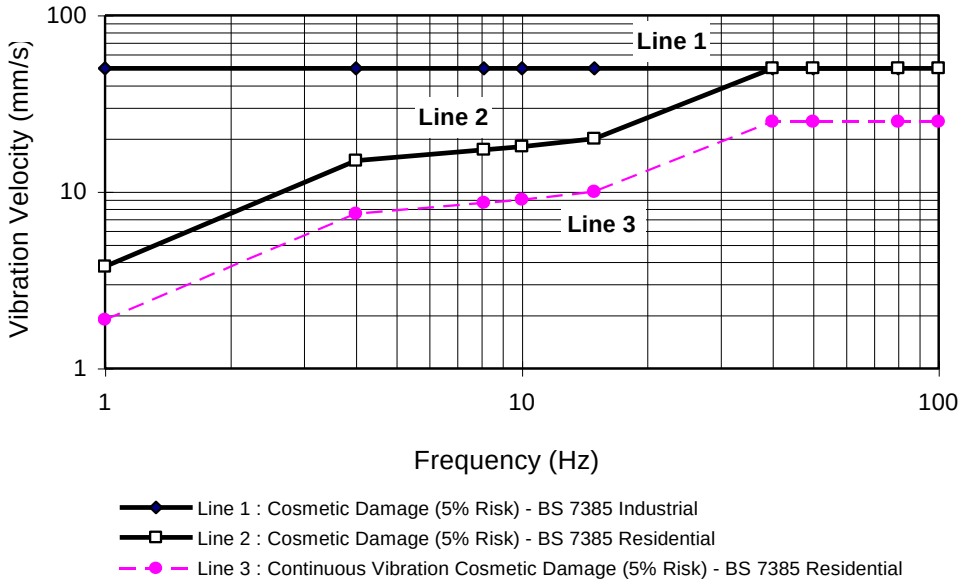
Table 7 Transient vibration criteria as per standard BS 7385 Part 2 - 1993

Line in Figure 2	Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
		4 Hz to 15 Hz	15 Hz and Above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Standard BS 7385 Part 2 – 1993 states that the values in Table 7 relate to transient vibration which does not cause resonant responses in buildings.

Where the dynamic loading caused by continuous vibration events is such as that results in dynamic magnification due to resonance (especially at the lower frequencies where lower guide values apply), then the values in Table 7 may need to be reduced by up to 50% (refer to Line 3 in Figure 2).

Figure 2 BS 7385 Part 2 – 1993, graph of transient vibration values for cosmetic damage



In the lower frequency region where strains associated with a given vibration velocity magnitude are higher, the recommended values corresponding to Line 2 are reduced. Below a frequency of 4 Hz where a high displacement is

associated with the relatively low peak component particle velocity value, a maximum displacement of 0.6 mm (zero to peak) is recommended. This displacement is equivalent to a vibration velocity of 3.7 mm/s at 1 Hz.

The standard also states that minor damage is possible at vibration magnitudes which are greater than twice those given in Table 7, and major damage to a building structure may occur at values greater than four times the tabulated values.

Fatigue considerations are also addressed in the standard and it is concluded that unless calculation indicates that the magnitude and number of load reversals is significant (in respect of the fatigue life of building materials) then the values in Table 7 should not be reduced for fatigue considerations.

5.3.2.3 German Standard DIN 4150 Part 3 – 1999 "Effects of Vibration on Structure"

For continuous or repetitive vibration, standard DIN 4150 Part 3-1999 provides criteria based on values for peak particle velocity (mm/s) measured at the foundation of the building; these are summarised in Table 8. The criteria are frequency dependent and specific to particular categories of structures.

Table 8 Structural damage criteria as per standard DIN 4150 Part 3 – 1999

Type of Structure	Peak Component Particle Velocity, mm/s			
	Vibration at the foundation at a frequency of			Vibration of horizontal plane of highest floor at all frequencies
	1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz[1]	
Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
Structures that, because of their sensitivity to vibration, do not correspond to those listed in lines 1 and 2 and are of great intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

Note 1 For frequencies above 100Hz, at least the values specified in this column shall be applied.

5.3.3 Ground-Borne Noise Criteria

According to the NSW EPA Interim Construction Noise Guideline (ICNG) 2009, the criteria for ground-borne noise at residences is defined as follows:

- Maximum internal noise levels of 40 dB LAeq(15mins) between 6:00pm and 10:00pm.

It is noted that the ground borne criteria will apply for construction works undertaken outside of standard hours. That is, work conducted during the evening period Monday to Friday between 6:00pm and 7:00pm only.

6 ACOUSTIC ASSESSMENT

Assessment of each of the noise element associated with the proposal is outlined below.

6.1 Building Envelope Assessment

Preliminary façade acoustic treatments based on the external levels from surrounding roads and other environmental noise as discussed in section 4 above are provided below.

6.1.1 Glazing Constructions

The recommended sound transmission loss requirement required to satisfy the specified internal noise level criteria outlined above are summarised below.

Please note for windows, this performance is not only subject to the glazing selection but also to the construction of the window frame and the frame seal selection. Therefore, it is recommended that the window manufacturer should confirm that the required sound insulation can be achieved. It is anticipated that the window system should comprise Q-Lon (or equivalent) or fin seals with deep C channels as part of the window track (i.e., Performance levels outlined below need to be achieved with glazed panels + frame + seals).

Table 9 In-Principle Glazing Recommendations.

Occupancy Area [1]	Facade	Minimum Glazing System Rating Requirements [1 2]	Indicative Construction [1 2]
River Function Room / Foyer	All Facades	Rw (C;Ctr): 35 (-1;-3)	Windows/Doors with min. 10.38mm Laminate.
Toilets (All	All Facades	Rw (C;Ctr): 27 (-1;-3)	Windows/Doors with min. 4mm Float.
Auditorium Corridor (North)	All Facades	Rw (C;Ctr): 35 (-1;-3)	Windows/Doors with min. 10.38mm Laminate.
Wings	All Facades	Rw (C;Ctr): 45 (-1;-3)	Windows/Doors with min. 10.38mm Laminate + 50mm Airgap + 6.38mm Laminate
Workshop	All Facades	Rw (C;Ctr): 45 (-1;-3)	Windows/Doors with min. 10.38mm Laminate + 50mm Airgap + 6.38mm Laminate
Multipurpose	All Facades	Rw (C;Ctr): 35 (-1;-3)	Windows/Doors with min. 10.38mm Laminate.

Note 2 *These are preliminary selections will be confirmed in the detailed design stage once the layouts and façade orientations are finalised.*

Note 3 Façade performance requirements which are listed above are also provided for noise emission control. In these cases, a detailed assessment showing noise emission compliance will still be achieved must be required before a change in performance selection.

6.1.2 External Roof Construction

External roofs are proposed to be constructed from a lightweight roofing system, as such the following acoustic construction is recommended.

Table 10 Recommended Light Weight External Roof Construction

Occupancy Area	External Lining	Truss System	Internal Lining
Auditorium, Wings, Workshop River Function Room/Foyer	Roof Sheeting (equal to Colorbond)	Minimum 150mm airgap between outside lining and internal lining + 75mm thick 14kg/m3 glasswool insulation	2 x 13 mm Fire Rated Plasterboard (or equal)
All other spaces	Roof Sheeting (equal to Colorbond)	Minimum 150mm airgap between outside lining and internal lining + 75mm thick 14kg/m3 glasswool insulation	1 x 13 mm Standard Plasterboard **OR** 6mm Fibre Cement Sheeting

Note 1 *These are preliminary selections will be confirmed in the detailed design stage once the layouts and façade orientations are finalised.*

Note 2 Façade performance requirements which are listed above are also provided for noise emission control. In these cases, a detailed assessment showing noise emission compliance will still be achieved must be required before a change in performance selection.

If penetrations through any external skin are required, all gaps remaining in the penetration are to be filled with an acoustic grade sealant which provides an equal or better performance to the system being penetrated.

6.1.3 External Wall Construction

External walls which are constructed from masonry or concrete will be acoustically sufficient and will not require additional treatment. However, for external walls which are proposed to be constructed from a lightweight cladding system, as such the following acoustic construction is recommended.

Table 11 Recommended Light Weight External Wall Construction

Occupancy Area	External Lining	Studwork System	Internal Lining
Auditorium, Wings, Workshop River Function Room/Foyer	Light Weight Cladding or Colorbond Sheet	Minimum 92mm Studwork + 75mm thick 14kg/m3 glasswool insulation	2 x 13 mm Fire Rated Plasterboard (or equal)
All other spaces	Light Weight Cladding or Colorbond Sheet	Minimum 92mm Studwork + 75mm thick 14kg/m3 glasswool insulation	1 x 13 mm Standard Plasterboard **OR** 6mm Fibre Cement Sheeting

Note 1 *These are preliminary selections will be confirmed in the detailed design stage once the layouts and façade orientations are finalised.*

Note 2 Façade performance requirements which are listed above are also provided for noise emission control. In these cases, a detailed assessment showing noise emission compliance will still be achieved must be required before a change in performance selection.

If penetrations through any external skin are required, all gaps remaining in the penetration are to be filled with an acoustic grade sealant which provides an equal or better performance to the system being penetrated.

6.2 Engineering Services Assessment

Mechanical/refrigeration systems are proposed to be installed; each are discussed below:

1. Kitchen Exhaust System
2. Air Conditioning Plant
3. Toilet Exhaust System.

At this stage of the project the exact selections of the mechanical equipment to be installed are not known. However, to ensure the proposed layouts and locations for the systems are acoustically acceptable a "Proof of Concept" assessment is conducted below. The assumptions for fan selections detailed below are preliminary recommendations. Mounting the fans on vibration isolators and balancing them in compliance with Australian Standard 2625 *"Rotating and Reciprocating Machinery – Mechanical Vibration".*

For the kitchen exhaust systems, it is anticipated that the physical fans would be installed within the dwellings discharge to the façade through a façade louvre or ducted to the roof. From our experience and assumption of typically noise levels associated with the system isolation of the fan from the base building structure with a correctly sized vibration isolator is recommended. Other standard mechanical components will be sufficient.

Regarding the toilet exhaust systems, it is envisioned that the systems would discharge to the façade of to the dwelling or ducted to the roof. From our experience and assumption of typically noise levels associated with the system isolation of the fan from the base building structure with a correctly sized vibration isolator is recommended. Other standard mechanical components will be sufficient.

With regards to air conditioning plant, the final location of the plant is not known at this stage. From our experience and assumption of typically noise levels associated with the system the following acoustic treatment would be required.

- Isolation of the condenser plant from the base building structure with correctly sized vibration isolator.

Air conditioning plant is to include a night operation mode activated between 10:00pm and 7:00am in which provides a minimum 4-5dBA noise reduction.

Note: Prior to the issue of the Construction Certificate the recommended acoustic treatments for the engineering services should be reviewed to ensure final selections and mechanical airflow requirements are achieved.

However, on the assumption the recommended treatments outlined above are installed, compliance will be achieved.

6.3 Activity Noise Assessment (Community Use)

In undertaking this assessment, we have assumed the following parameters:

- No more than 304 people in the Auditorium at any one time (equal to a full house), staff not included.
- For Foyer area it is also assumed 304 people at any one time (equal to a full house), staff not included.
- Facades of the Auditorium are closed during an event. Façade constructions as per the recommendations in section 6.1.
- With regards to the operable elements of the River Function room the following is noted:
    - Façade constructions as per the recommendations in section 6.1.
    - At 100% Occupancy (304 patrons) during daytime period between 7:00 am to 6:00 pm, window open area to be no more than 8 square meters or 6% of the total façade area.
    - At 75% Occupancy (228 patrons) during daytime period between 7:00 am to 6:00 pm, window open area to be no more than 10 square meters or 7% of the total façade area.

- At 50% Occupancy (152 patrons) during daytime period between 7:00 am to 6:00 pm window open area to be no more than 15 square meters or 11% of the total façade area.
- At 25% Occupancy (76 patrons) during daytime period between 7:00 am to 6:00 pm window open area to be no more than 30 square meters or 22% of the total facade area.

6.3.1 Assumed Source Noise Levels

To undertake this assessment, it is assumed that a single person speaking with a raised voice has a Sound Power Level (Lw) of 76 dBA. This has been formulated in accordance with the published noise levels. Additionally, we assumed that one in three are talking at any one time which is a relatively conservative calculation.

With regards to the Auditorium, it has been assumed that amplified music will be up to 95dBA L_{Aeq} Sound Pressure Level (SPL). Background music is assumed to be playing with the River Function Room/Foyer with a Sound Pressure Level (SPL) of 60dBA L_{Aeq} when windows are open.

6.3.2 Predicted Noise Levels

Noise emission calculations for the combination of patron noise and amplified music are provided below. Predicted noise levels to the surrounding residential receivers are based on a full capacity (as a worst-case scenario).

Table 12 Predicted Noise Levels – Activity Noise

Receiver Location	Predicted Noise Level dBA $L_{Aeq(15\text{-}min)}$	Period of Operation	Criteria dBA $L_{Aeq(15\text{-}min)}$	Compliance
Receiver 1	≤30	Day	40	**Yes**
		Evening	35	**Yes**
		Night	35	**Yes**
Receiver 2	≤30	Day	40	**Yes**
		Evening	35	**Yes**
		Night	35	**Yes**
Receiver 3	≤30	Day	40	**Yes**
		Evening	35	**Yes**
		Night	35	**Yes**
Receiver 4	≤30	Day	40	**Yes**
		Evening	35	**Yes**
		Night	35	**Yes**

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 – 1:00 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 – 7:00 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.

Refer to section 6.3.3 below the for the required management controls to ensure compliance as per above.

6.3.3 Assessment Results and Recommendations

Predicted noise levels from the operation of the venue in full operation with amplified music between (all patrons and background music) has been predicted. To ensure compliance is achieved, the following recommendations must be implemented:

In undertaking this assessment, we have assumed the following parameters:

- No more than 304 people in the Auditorium at any one time (equal to a full house), staff not included.
- For Foyer area it is also assumed 304 people at any one time (equal to a full house), staff not included.
- Facades of the Auditorium are closed during an event. Façade constructions as per the recommendations in section 6.1.
- With regards to the operable elements of the River Function room the following is noted:
    - Façade constructions as per the recommendations in section 6.1.
    - At 100% Occupancy (304 patrons) during daytime period between 7:00 am to 6:00 pm, window open area to be no more than 8 square meters or 6% of the total façade area.
    - At 75% Occupancy (228 patrons) during daytime period between 7:00 am to 6:00 pm, window open area to be no more than 10 square meters or 7% of the total façade area.
    - At 50% Occupancy (152 patrons) during daytime period between 7:00 am to 6:00 pm window open area to be no more than 15 square meters or 11% of the total façade area.
    - At 25% Occupancy (76 patrons) during daytime period between 7:00 am to 6:00 pm window open area to be no more than 30 square meters or 22% of the total facade area.
- Recommended hours of operation:
    - 7:00am – 12:00am (seven days)
- With regards to the Auditorium, it has been assumed that amplified music will be up to 95dBA L_{Aeq} Sound Pressure Level (SPL).
- Background music is assumed to be playing with the River Function Room/Foyer with a Sound Pressure Level (SPL) of 60dBA L_{Aeq} when windows are open.
- All doors and windows are to remain shut after 10:00pm and not opened before 7:00am, regardless of the patron numbers.
- A contact number must be displayed for the purposes of receiving any complaints if they arrive.
- Signs must be displayed at all exits reminding patrons to be mindful of noise when leaving the venue.

On the assumption the recommendations outlined are incorporated compliance with the acoustic project criteria outlined in section 5 above will be achieved.

6.4 Noise Impacts on Surrounding Roadways

Noise impacts associated with the proposed development along River Street and are to be assessed in accordance with the NSW EPA Road Noise Policy (RNP) 2011.

The peak hour movements outlined for this project will not exceed the local roads requirement by 2dBA at a residential receiver as summarised in the NSW EPA RNP. As such the NSW EPA RNP suggests that a 2dBA increase would be barely perceptible to the average person and therefore considered acoustically acceptable.

6.5 Construction Noise and Vibration Impacts

As the project is still in a planning phase, a detailed Construction Noise and Vibration Management Plan (CNVMP) cannot be undertaken at this stage as there several unknown variables. As such it is recommended that a DA Condition be implemented recommending that a CNVMP be prepared prior to the issue of a Construction Certificate. The plan should be undertaken based on the noise and vibration objectives outlined above.

7 CONCLUSION

Pulse White Noise Acoustic Pty Ltd (PWNA) has been engaged by Pulse White Noise Acoustics to undertake an acoustic assessment of the proposed development of the River Street community Precinct at 48 River Street, Maclean.

- Operational management of the opening area of the front Foyer need to be in place to minimise the amount of the noise impact to nearby residential receivers. Recommendation of the façade opening area stated in section 6.3.3 need to be implemented to achieve compliance.
- Minimum acoustic performances and associated indicative constructions for the building envelope have been provided in section 6.1 of this report. The recommended treatments have been provided to ensure compliance with the objectives presented in section 5.
- To control noise impacts at external receivers, recommended indicative treatments for major engineering services have been provided in section 6.3.3. From our review we have formulated the following opinion:
    - At these stages of the project the exact selections/locations of plant items are not known. A preliminary assessment, however, has been carried out using our experience with similar types of developments and the typical plant items installed in each type of plant room.
    - From this review we recommend the selection of high-performance acoustic treatment to ensure that the operation of the plant items comply with the project criteria. Therefore, it is recommended that prior to the issue of a Construction Certificate (CC) a detailed acoustic assessment is undertaken to ensure all cumulative noise from engineering services (including the roof plant room) comply with the requirements as listed above.
- A peak hour increase proposed for the number vehicles associated with the development will not exceed a 2dBA increase at a residential receiver as summarised in the NSW EPA RNP to be barely perceptible to the average person and therefore considered acoustically acceptable.
- Prior to the issue of the Construction Certificate, it is recommended that a Construction Noise and Vibration Management Plan (CNVMP) be undertaken to formulate relevant compliance with the objectives detailed above.

For any additional information please do not hesitate to contact the person below.

Regards,

Matthew Furlong
Principal Acoustic Engineer
PULSE WHITE NOISE ACOUSTICS PTY LTD

APPENDIX A. APPENDIX TERMINOLOGY

Sound power level	The total sound emitted by a source
Sound pressure level	The amount of sound at a specified point
Decibel [dB]	The measurement unit of sound
A Weighted decibels [dB(A])	The A weighting is a frequency filter applied to measured noise levels to represent how humans hear sounds. The A-weighting filter emphasises frequencies in the speech range (between 1kHz and 4 kHz) which the human ear is most sensitive to, and places less emphasis on low frequencies at which the human ear is not so sensitive. When an overall sound level is A-weighted it is expressed in units of dB(A).
Decibel scale	The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. A 3 dB increase in the sound pressure level corresponds to a doubling in the sound energy. A 10 dB increase in the sound pressure level corresponds to a perceived doubling in volume. Examples of decibel levels of common sounds are as follows:
	0dB(A) Threshold of human hearing 30dB(A) A quiet country park 40dB(A) Whisper in a library 50dB(A) Open office space 70dB(A) Inside a car on a freeway 80dB(A) Outboard motor 90dB(A) Heavy truck pass-by 100dB(A) Jackhammer/Subway train 110 dB(A) Rock Concert 115dB(A) Limit of sound permitted in industry 120dB(A) 747 take off at 250 metres
Frequency [f]	The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high pitched sound and a low frequency to a low pitched sound.
Ambient sound	The all-encompassing sound at a point composed of sound from all sources near and far.
Equivalent continuous sound level [L_{eq}]	The constant sound level which, when occurring over the same period of time, would result in the receiver experiencing the same amount of sound energy.
Reverberation	The persistence of sound in a space after the source of that sound has been stopped (the reverberation time is the time taken for a reverberant sound field to decrease by 60 dB)
Air-borne sound	The sound emitted directly from a source into the surrounding air, such as speech, television or music
Impact sound	The sound emitted from force of one object hitting another such as footfalls and slamming cupboards.
Air-borne sound isolation	The reduction of airborne sound between two rooms.
Sound Reduction Index [R] *(Sound Transmission Loss)*	The ratio the sound incident on a partition to the sound transmitted by the partition.
Weighted sound reduction index [R_w]	A single figure representation of the air-borne sound insulation of a partition based upon the R values for each frequency measured in a laboratory environment.
Level difference [D]	The difference in sound pressure level between two rooms.
Normalised level difference [D_n]	The difference in sound pressure level between two rooms normalised for the absorption area of the receiving room.
Standardised level difference [D_{nT}]	The difference in sound pressure level between two rooms normalised for the reverberation time of the receiving room.
Weighted standardised level difference [$D_{nT,w}$]	A single figure representation of the air-borne sound insulation of a partition based upon the level difference. Generally used to present the performance of a partition when measured in situ on site.
C_{tr}	A value added to an R_w or $D_{nT,w}$ value to account for variations in the spectrum.

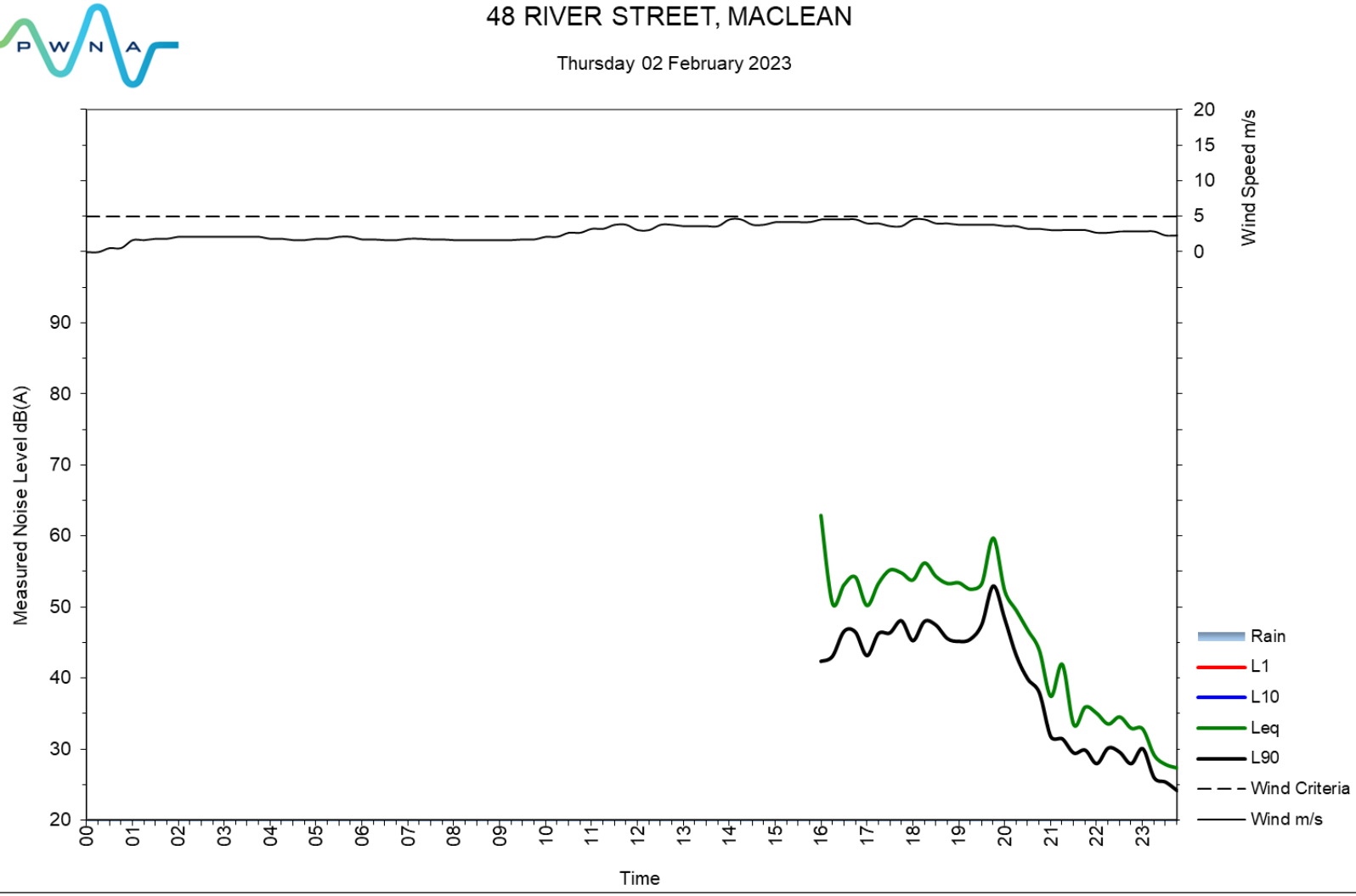
Impact sound isolation	The resistance of a floor or wall to transmit impact sound.
Impact sound pressure level [L_i]	The sound pressure level in the receiving room produced by impacts subjected to the adjacent floor or wall by a tapping machine.
Normalised impact sound pressure level [L_n]	The impact sound pressure level normalised for the absorption area of the receiving room.
Weighted normalised impact sound pressure level [$L_{n,w}$]	A single figure representation of the impact sound insulation of a floor or wall based upon the impact sound pressure level measured in a laboratory.
Weighted standardised impact sound pressure level [$L'_{nT,w}$]	A single figure representation of the impact sound insulation of a floor or wall based upon the impact sound pressure level measured in situ on site.
C_I	A value added to an L_{nW} or $L'_{nT,w}$ value to account for variations in the spectrum.
Energy Equivalent Sound Pressure Level [$L_{A,eq,T}$]	'A' weighted, energy averaged sound pressure level over the measurement period T.
Percentile Sound Pressure Level [$L_{Ax,T}$]	'A' weighted, sound pressure that is exceeded for percentile x of the measurement period T.
Speech Privacy	A non-technical term but one of common usage. Speech privacy and speech intelligibility are opposites and a high level of speech privacy means a low level of speech intelligibility. It should be recognised that acceptable levels of speech privacy do not require that speech from an adjacent room is inaudible.
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
Noise Reduction	The difference in sound pressure level between any two areas. The term "noise reduction" does not specify any grade or performance quality unless accompanied by a specification of the units and conditions under which the units shall apply
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.
Background Sound Low	The average of the lowest levels of the sound levels measured in an affected area in the absence of noise from occupants and from unwanted, external ambient noise sources. Usually taken to mean the LA90 value
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.
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.

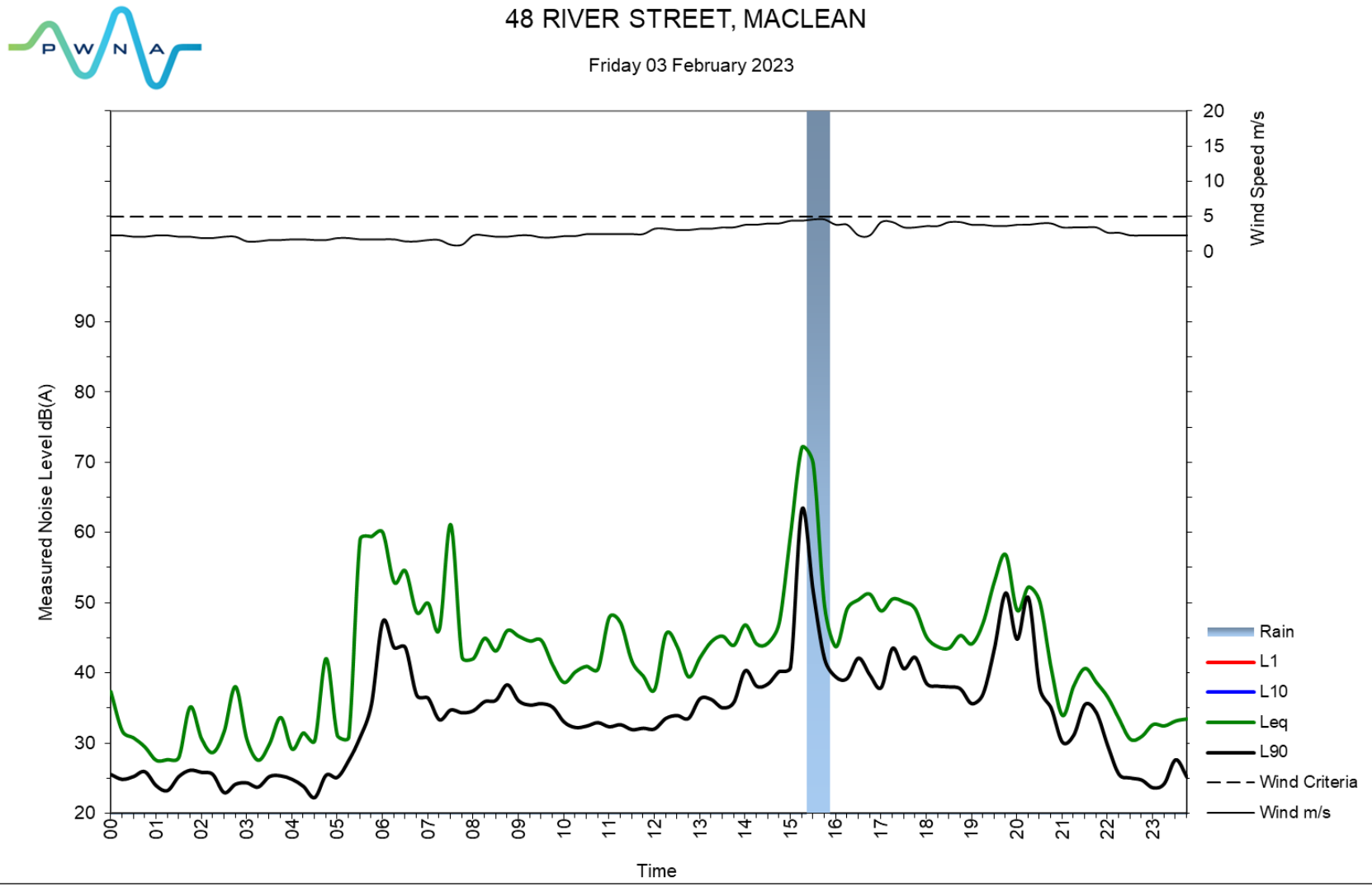
APPENDIX B – UNATTENDED NOISE MONITORING

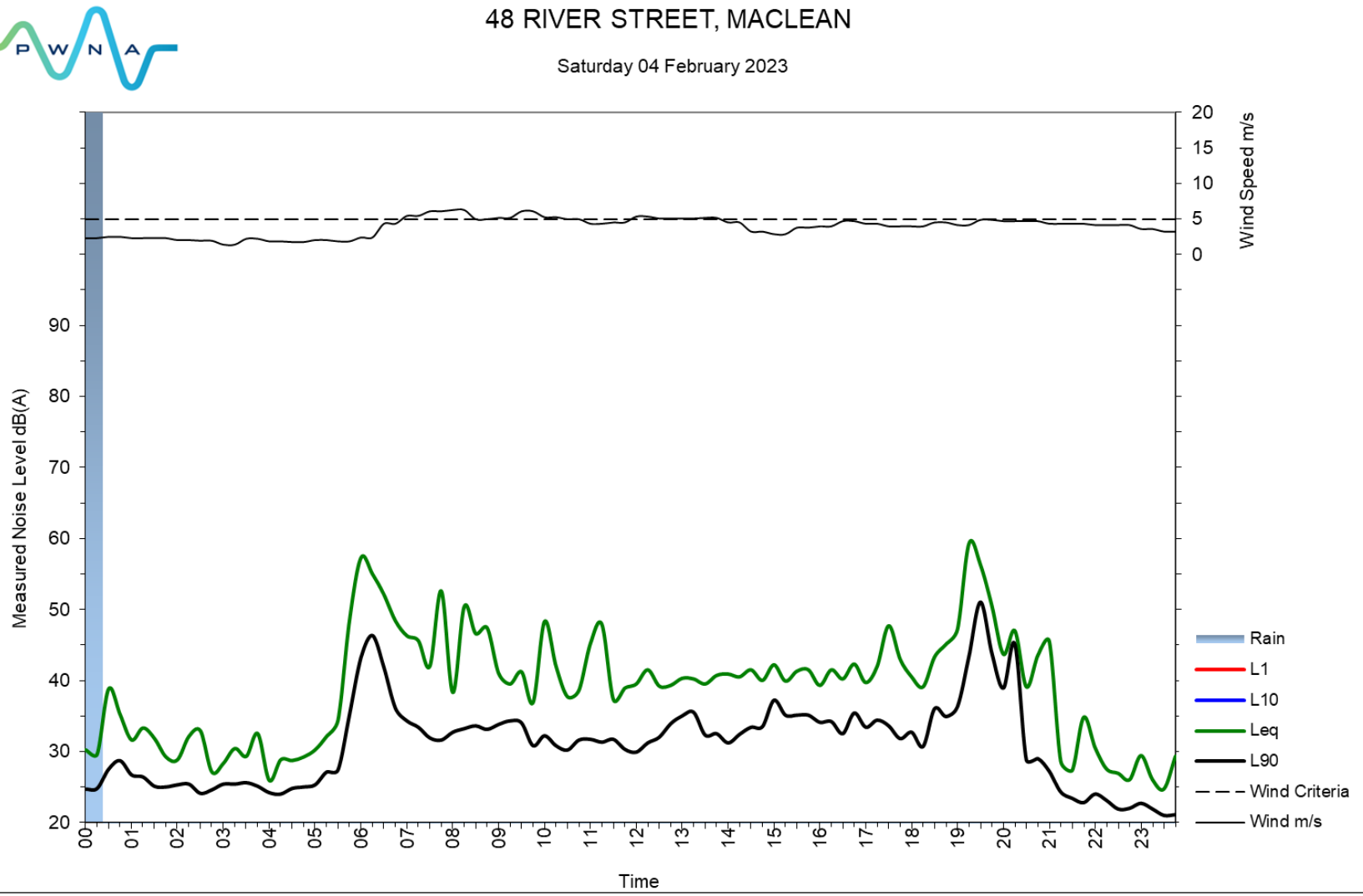
Weather Station: Yamba Pilot Station, NSW

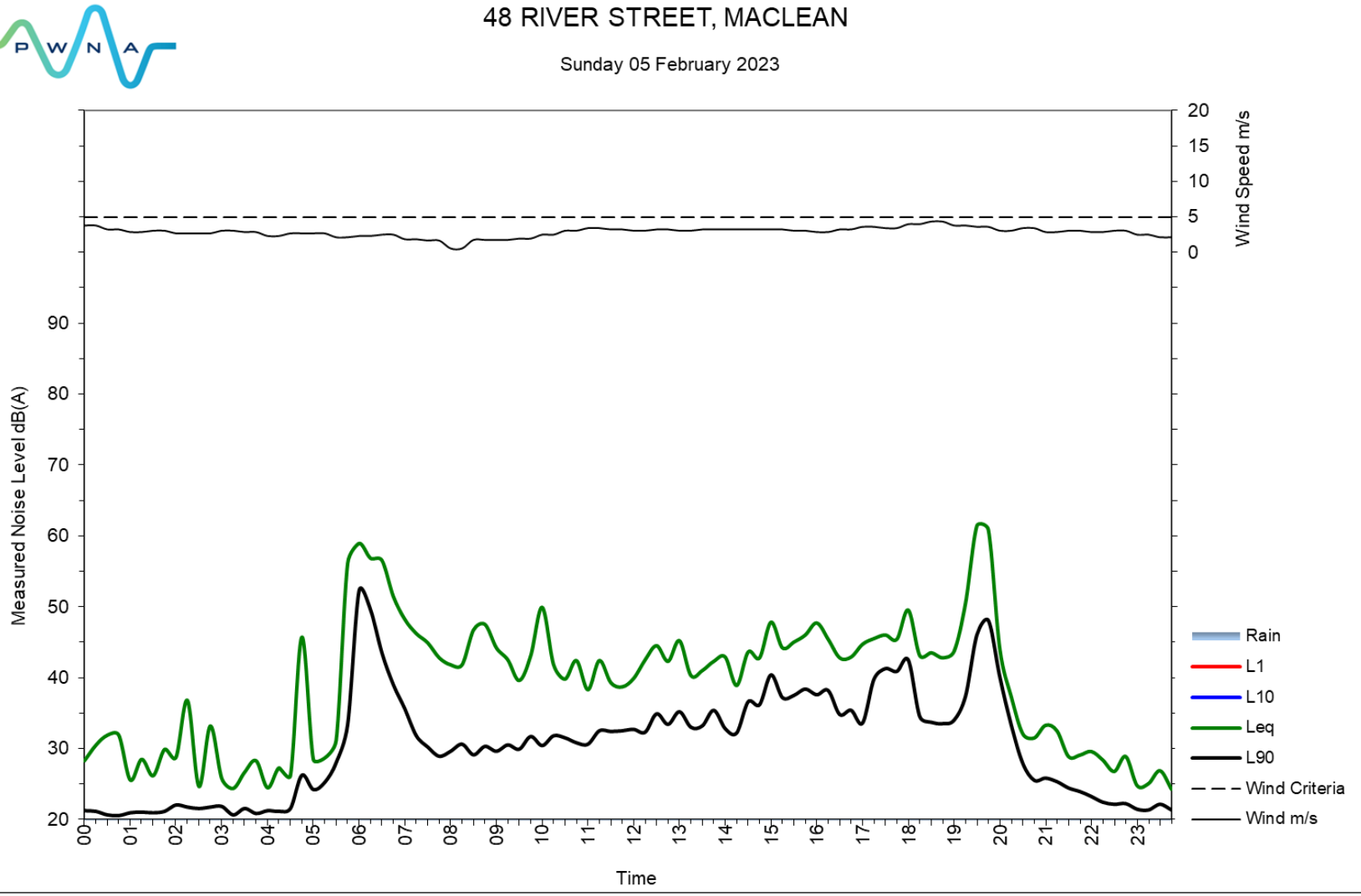
Weather Station ID: 058012

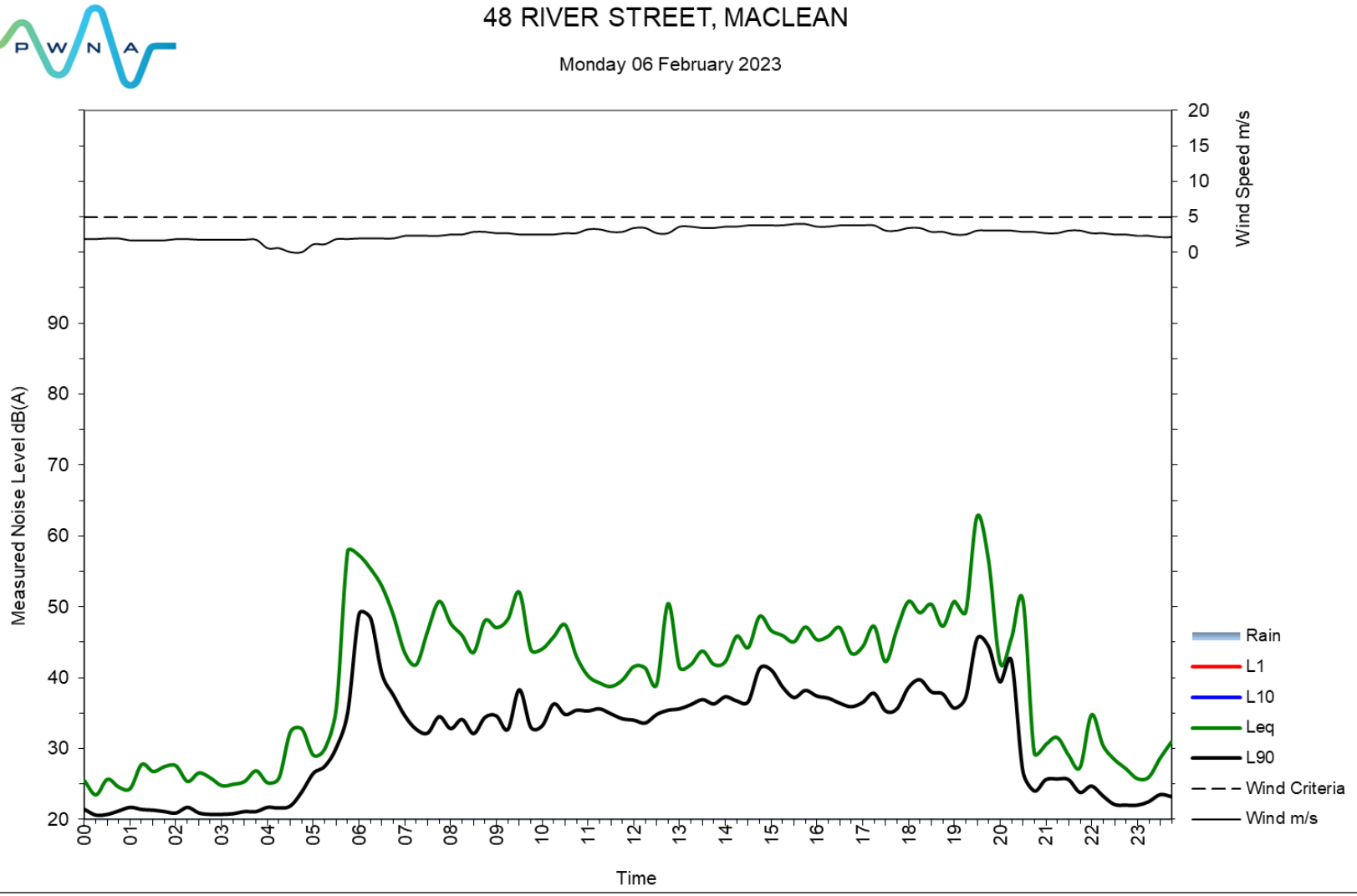
Co-Ordinates: Lat: -29.4333s, Lon: 153.3633E, Height: 27m AMSL

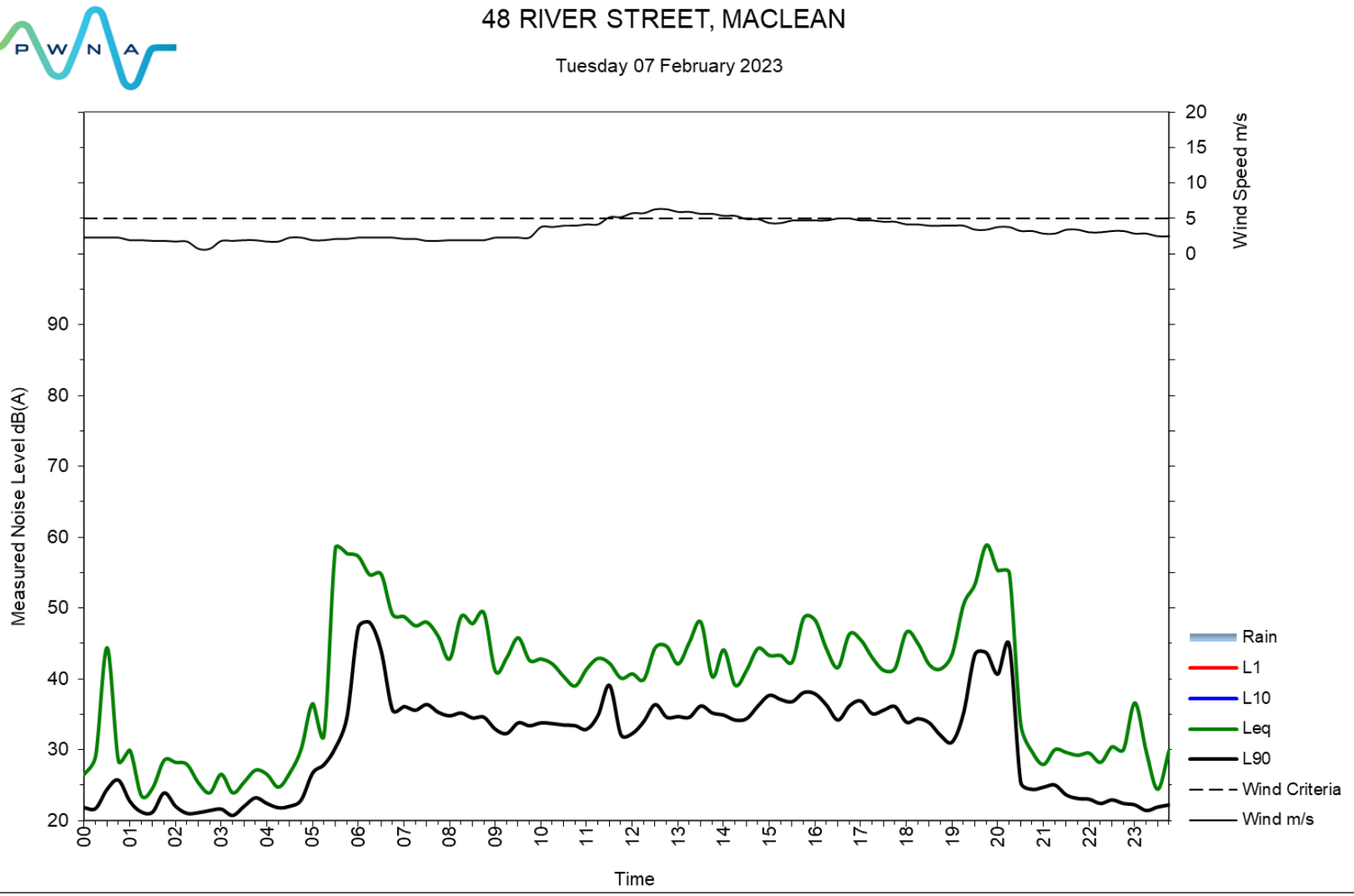

48 RIVER STREET, MACLEAN
Thursday 02 February 2023
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s

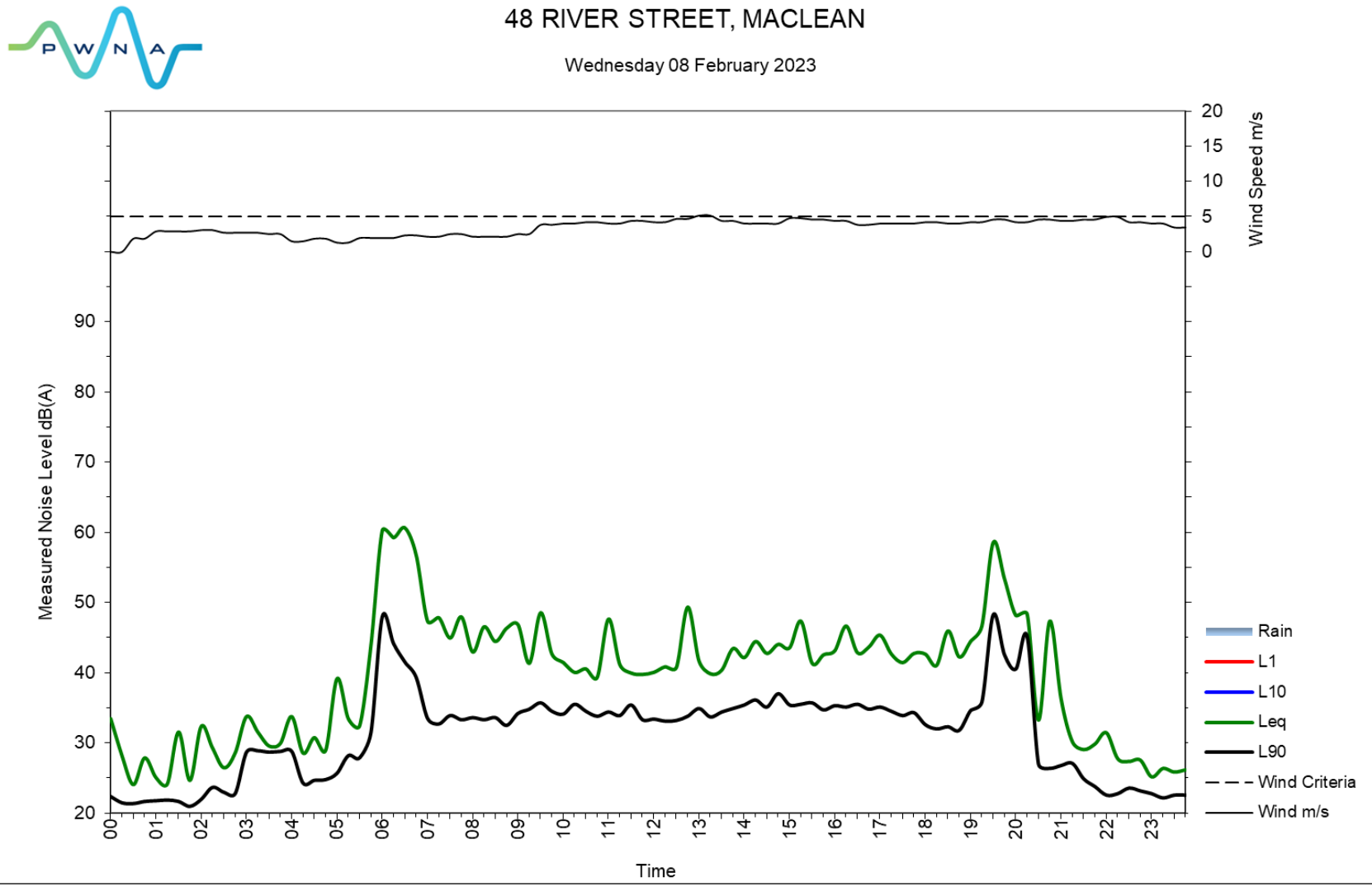

48 RIVER STREET, MACLEAN
Friday 03 February 2023
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s

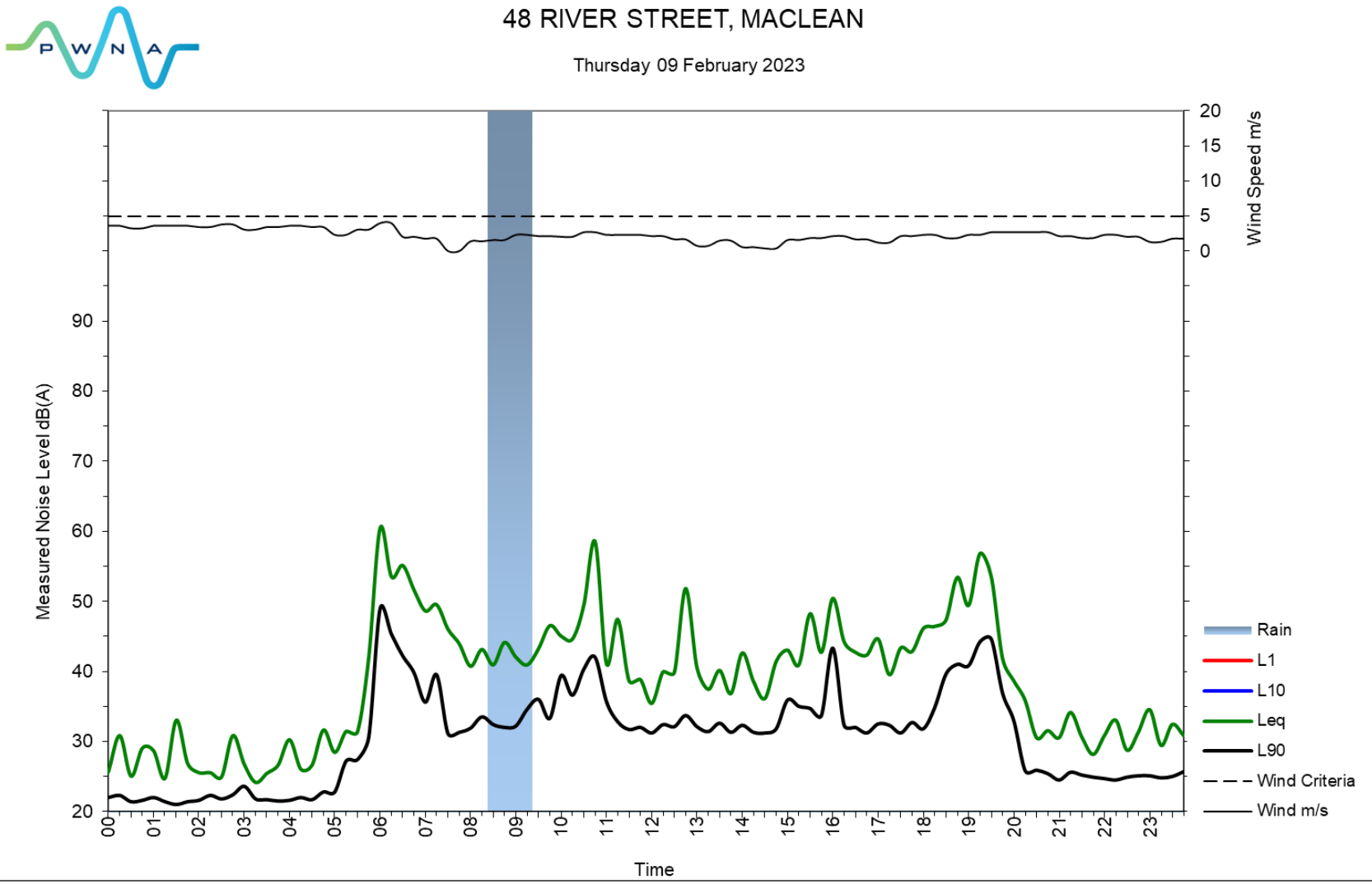

48 RIVER STREET, MACLEAN
Saturday 04 February 2023
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s


48 RIVER STREET, MACLEAN
Sunday 05 February 2023
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s


48 RIVER STREET, MACLEAN
Monday 06 February 2023
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s


48 RIVER STREET, MACLEAN
Tuesday 07 February 2023
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s


48 RIVER STREET, MACLEAN
Wednesday 08 February 2023
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s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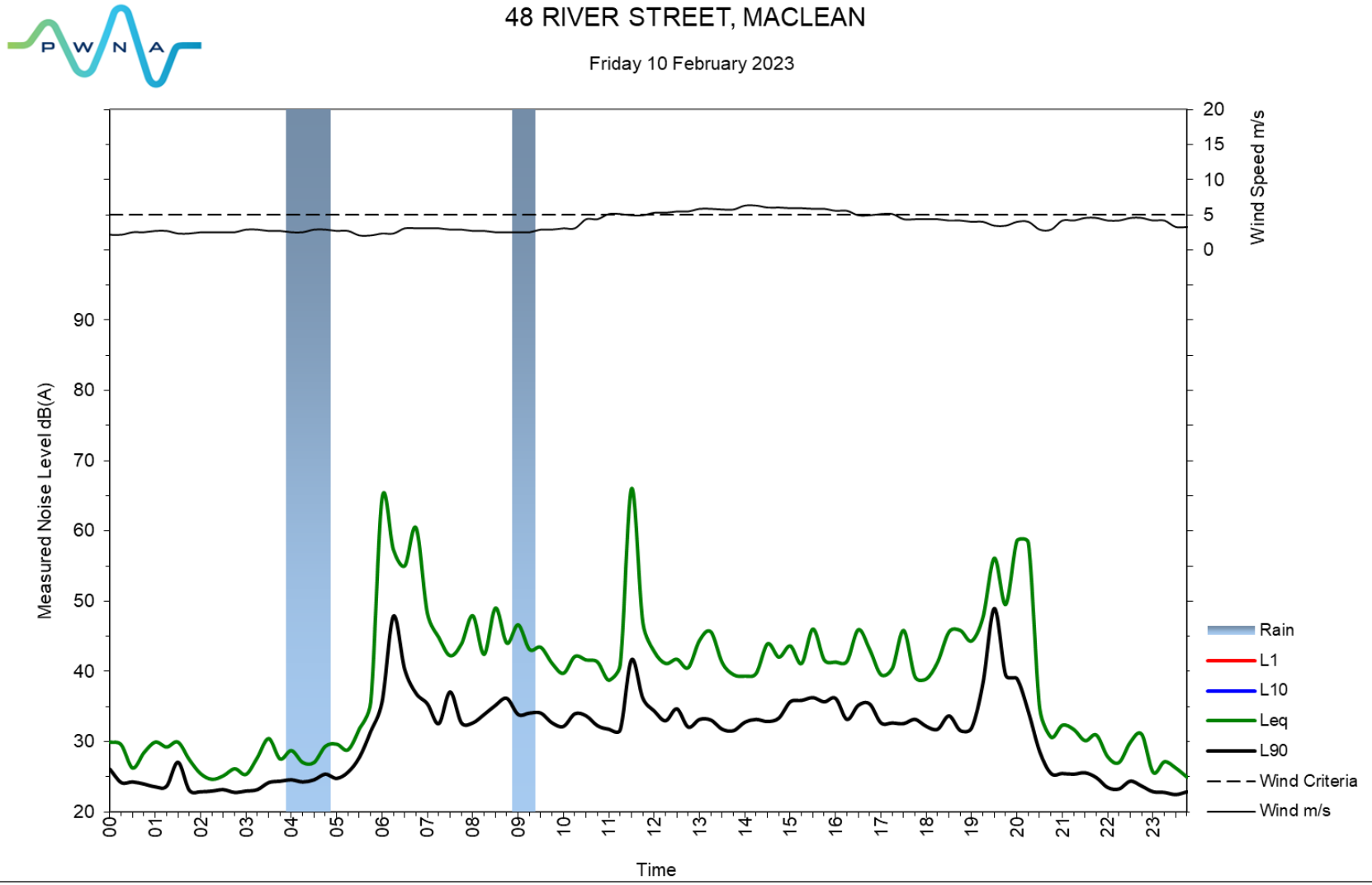
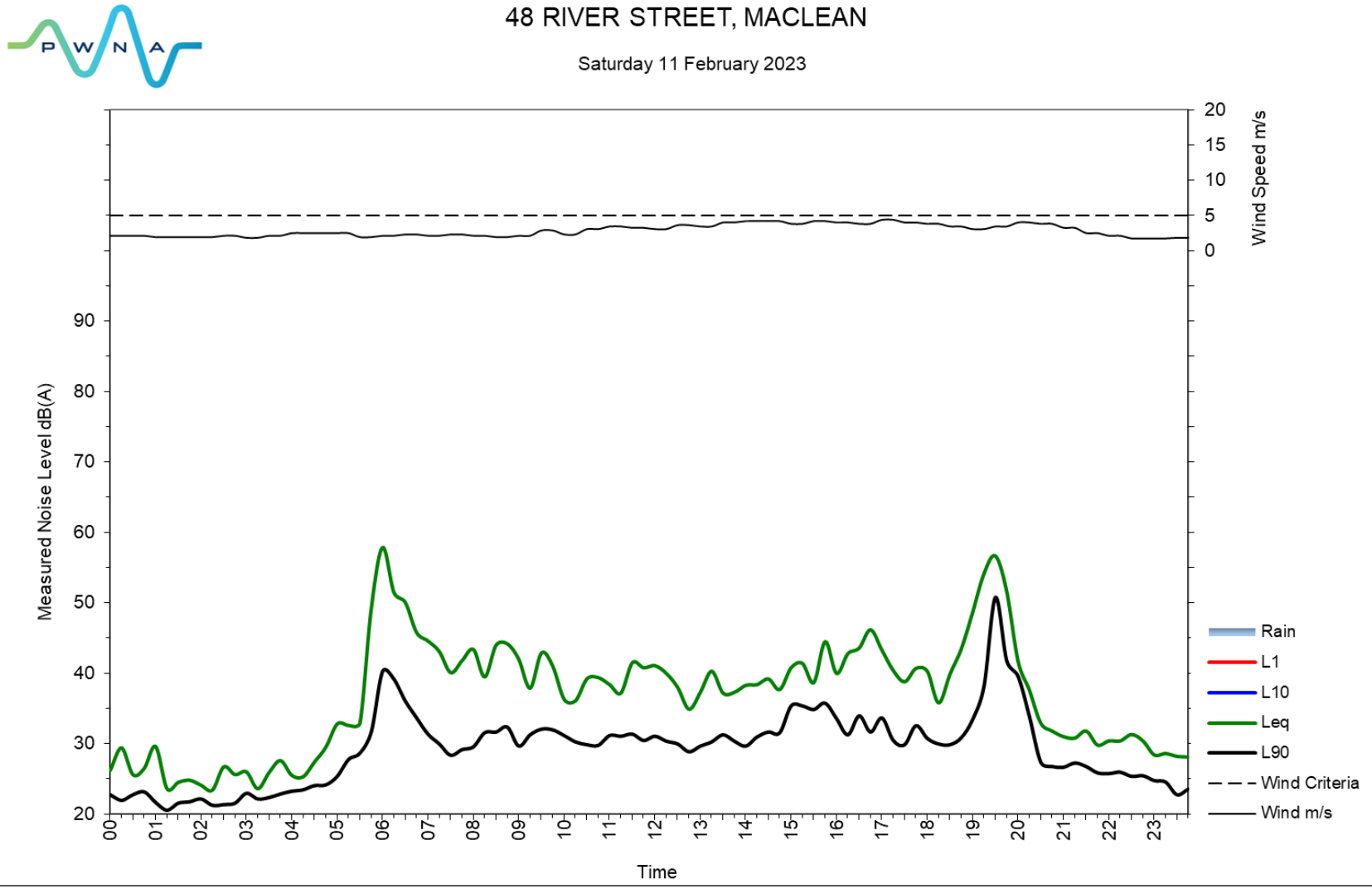
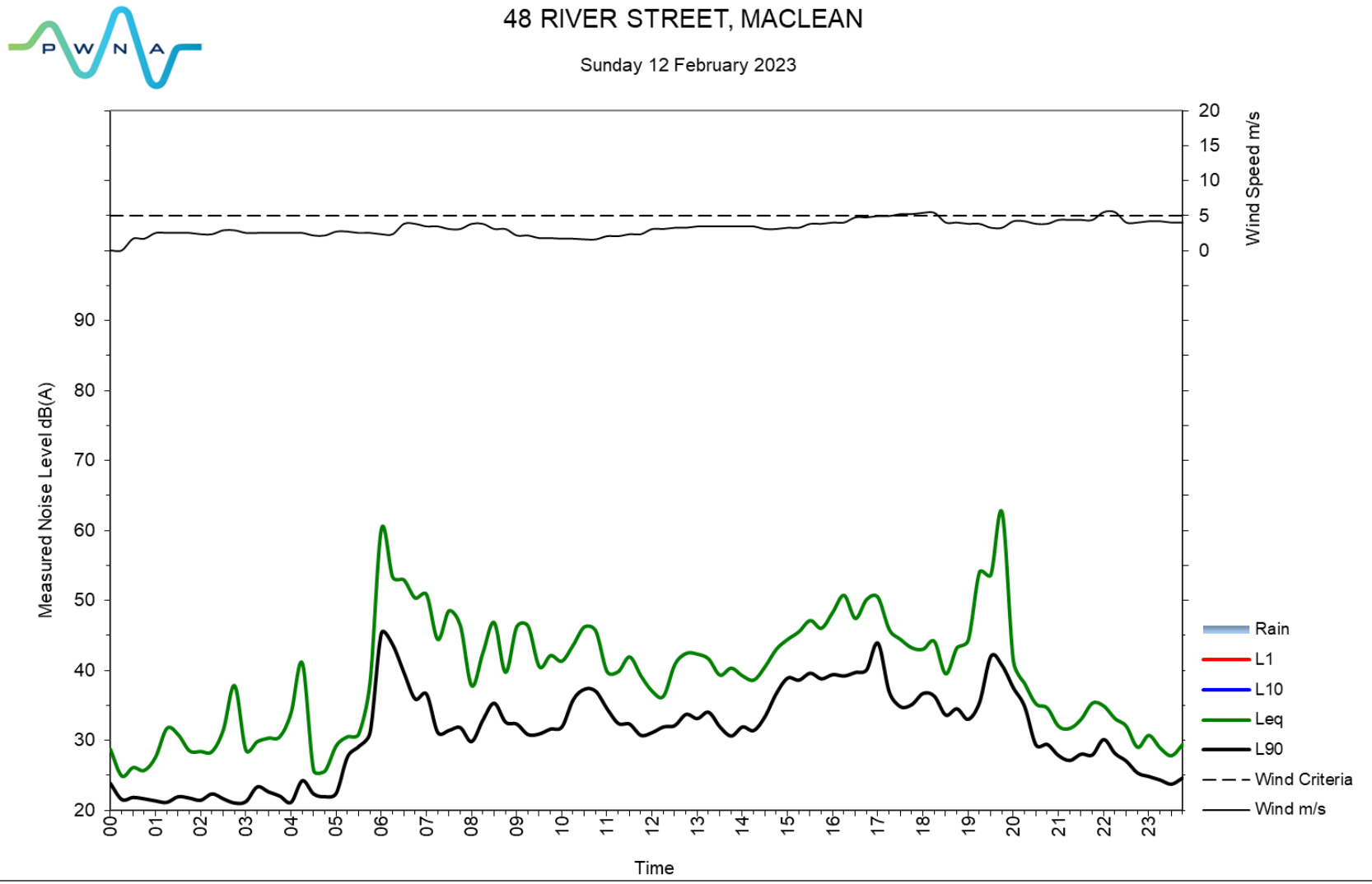
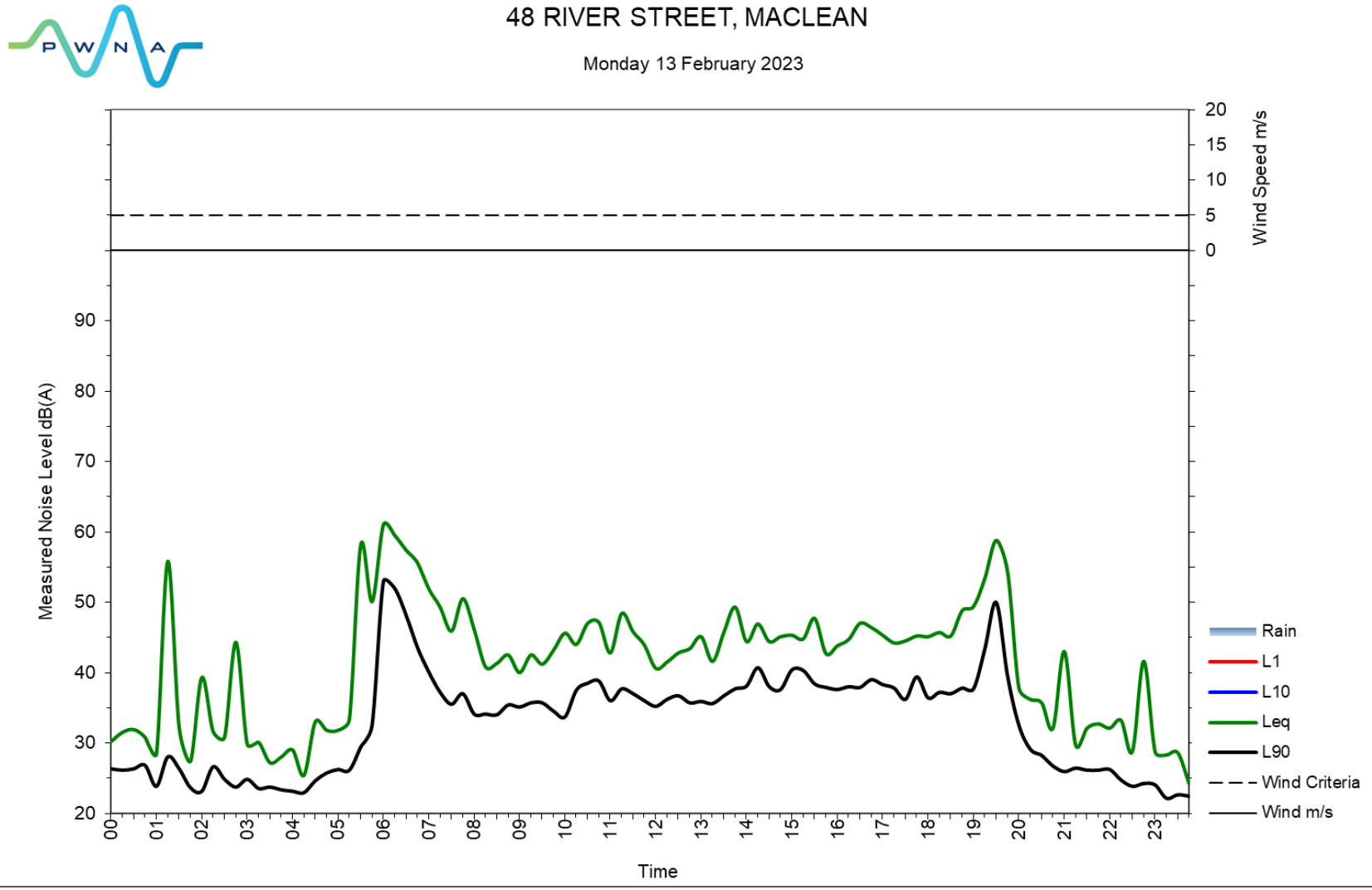
Thursday 09 February 2023
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s


48 RIVER STREET, MACLEAN
Friday 10 February 2023
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s


48 RIVER STREET, MACLEAN
Saturday 11 February 2023
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s


48 RIVER STREET, MACLEAN
Sunday 12 February 2023
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s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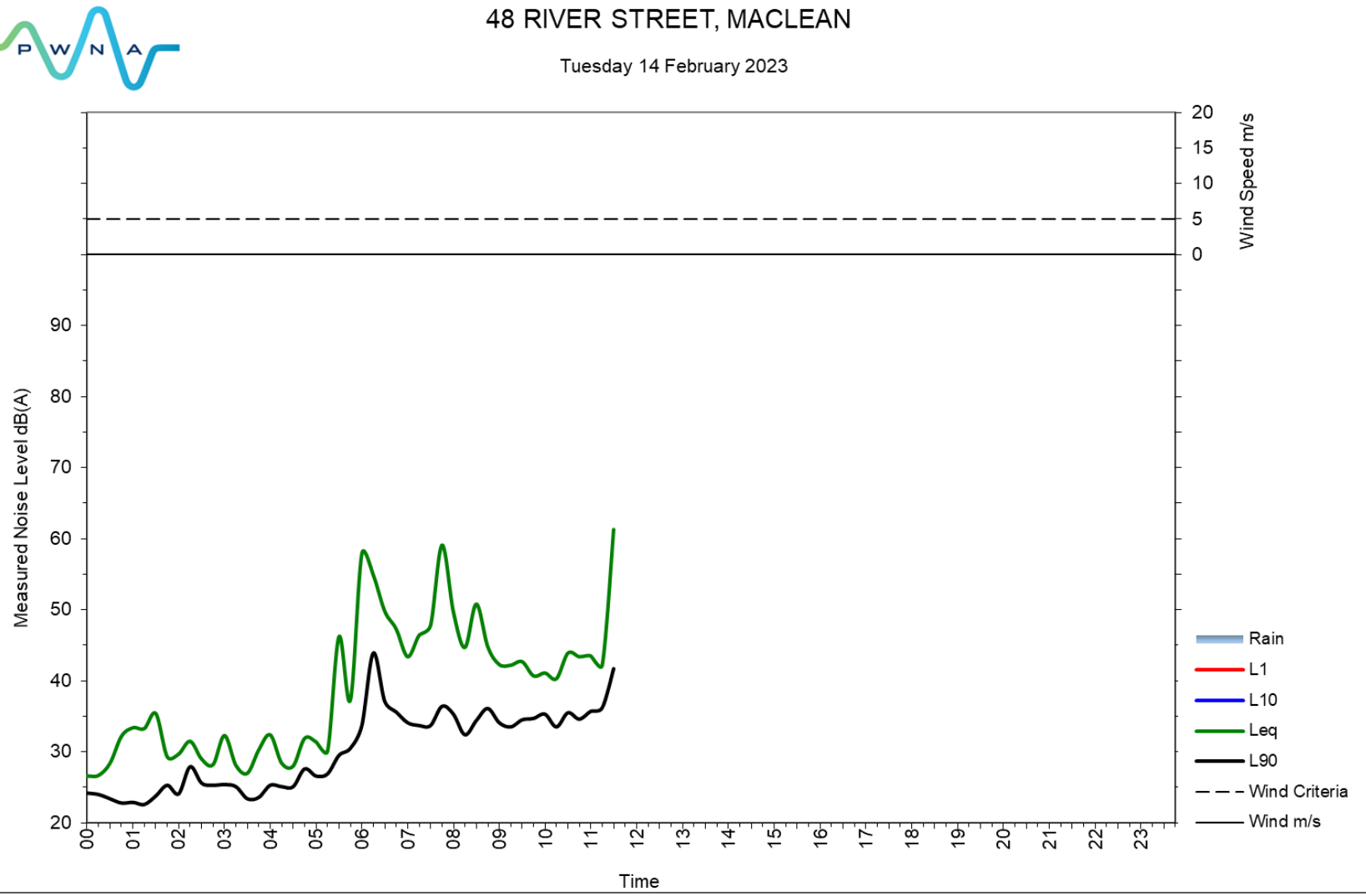
Monday 13 February 2023
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s


48 RIVER STREET, MACLEAN
Tuesday 14 February 2023
Measured Noise Level dB(A)
Wind Speed m/s
Time
Rain
L1
L10
Leq
L90
Wind Criteria
Wind m/s