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ENVIRONMENTAL NOISE ASSESSMENT

PROPOSED WORKSHOP 10 VERNALLAN WAY, LESMURDIE WA 6076

Ref: MACD0001.2019 – 10 Vernallan Way, LESMURDIE WA 6076
Environmental Noise Assessment
27th February 2020

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INTRODUCTION

Acoustics & Audio Production has been engaged to undertake an environmental noise assessment for the proposed operation of a home business workshop, and is located at 10 Vernallan Way, LESMURDIE WA 6076. The intent of this environmental noise assessment is to demonstrate that the development will be able to meet the requirements of the Environmental Protection (Noise) Regulations 1997 for the entirety of its operation.

This assessment considers the following:

- Noise associated with:
 - Machinery lathe operation;
 - Repairing firearm components; and
 - Operation of hand tools and gauges.

- Existing ambient noise levels received at the identified nearest noise sensitive receivers.

This assessment will focus on the associated noise impact on the nearest receivers under a ‘worst case scenario’ setting while the site is utilising the noisiest equipment simultaneously.

PROJECT DESCRIPTION

The proposed site is located at 10 Vernallan Way, LESMURDIE WA 6076, and is intended to be used as a machining/firearm repair workshop. The proposed site is intended to be operated in 2 hours sections with which include carrying out machining jobs on a manual lathe, repairing firearm components and using hand tools and gauges. The applicant is intending to be a sole trader; therefore, all equipment is intended to be used on an individual bases for the task at hand.

The intended operating hours of the workshop is as follows:

Days	Time Period
Monday to Friday	9am to 1pm



*Figure 1: Site Location (10 Vernallan Way, LESMURDIE WA 6076)
(Source City of Kalamunda - Intramaps)*

ACOUSTIC ENVIRONMENT

The site is located at 10 Vernallan Way, LESMURDIE WA 6076, approximately 300m from Lesmurdie Road; which is identified as a minor road with traffic volumes below 16,000 vpd. The surrounding area consists residential zoning with the nearest noise sensitive receivers located directly adjacent to the proposed site at 6 and 18 Vernallan Way, LESMURDIE WA 6076.

RECEIVERS & NOISE MONITORING PROCEDURES

The nearest noise sensitive receiver locations were identified as the following:

1. (R1) 6 Vernallan Way, LESMURDIE WA 6076;
2. (R2) 18 Vernallan Way, LESMURDIE WA 6076;
3. (R3) 19 Vernallan Way, LESMURDIE WA 6076;
4. (R4) 17 Vernallan Way, LESMURDIE WA 6076;
5. (R5) 15 Vernallan Way, LESMURDIE WA 6076;
6. (R6) 13 Vernallan Way, LESMURDIE WA 6076;
7. (R7) 11 Vernallan Way, LESMURDIE WA 6076;
8. (R8) 9 Vernallan Way, LESMURDIE WA 6076;
9. (R9) 7 Vernallan Way, LESMURDIE WA 6076; and
10. (R10) 5 Vernallan Way, LESMURDIE WA 6076.

These locations have been chosen as representative of the nearest noise sensitive receivers. Refer to Figure 2 below for site location(s).



Figure 2: Noise sensitive receiver locations, site location and noise monitoring location.

EQUIPMENT

The following equipment was used to record existing ambient noise levels:

- Cirrus CR171 Type 1 Sound Level Meter
- Cirrus CR515 Acoustic Calibrator

Both the Cirrus Sound Level Meter and Acoustical Calibrator hold current NATA Laboratory Certification and had been field calibrated before and after the noise-monitoring period. No significant drift from the reference signal was recorded. Laboratory certificates may be provided upon request.

NOISE MONITORING

A Cirrus CR171 Type 1 Sound Level Meter was used at the boundary of the noise sensitive premises identified in figure 2. The purpose of this was to measure the existing ambient noise levels currently experienced at the noise sensitive receivers' locations.

The monitor was located in a free field position, with the microphone approximately 1.4m above the ground surface level (see figure 2 for monitoring locations). Noise monitoring was conducted generally in accordance with Australian Standard AS1055:1997 *Acoustics - Description and measurement of environmental noise*.

MEASURED NOISE LEVELS

Table 1 below, shows measured existing ambient noise levels from the attended noise survey conducted at the locations identified in Figure 2 above.

Table 1 – Measured Ambient Noise Levels dB(A) the noise sensitive locations

Location	Measured Level (dB)				
	L _{Aeq}	L _{A10}	L _{A1}	L _{A(max)}	L _{A90}
M1	41.1	43.0	46.0	55.4	37.7
M2	40.9	42.7	46.1	55.6	37.1

METEOROLOGICAL DATA

The following meteorological conditions were present during the onsite monitoring conducted on Tuesday 24th February 2020.

Table 2 – Meteorological Conditions

Parameter	Result
Temperature (°C)	32°C
Wind Speed (m/s)	4.8m/s
Wind Direction	East South East
Humidity (%)	45%

NOISE CRITERIA

This assessment is based on the requirements stipulated in the Environmental Protection (Noise) Regulations 1997 in order to ensure that the nearest noise sensitive receivers are protected from unreasonable noise associated with proposed development.

ENVIRONMENTAL PROTECTION (NOISE) REGULATIONS 1997

The allowable noise levels at the surrounding noise sensitive areas are determined by the *Environmental Protection (Noise) Regulations 1997*. Regulations 7 & 8 stipulate that the allowable external noise levels determined by the calculation of an influencing factor (Table 3.2), which is then added to the base levels (see Table 3.3 below).

Table 3.1 – Baseline Assigned Outdoor Noise Level

Description	Time of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Noise Sensitive Premises	0700 – 1900 hours Monday to Saturday	45 + IF	55 + IF	65 + IF

Note: L_{A10} is the noise level exceeded for 10% of the time.
L_{A1} is the noise level exceeded for 1% of the time.
L_{Amax} is the maximum noise level.
IF is the influencing factor.

Table 3.2 – Influencing Factor Calculation

Description	450m Radius	100m Radius	Influencing Factors
Commercial	0%	0%	0dB
Industrial	0%	0%	0dB
Major Roads	Nil	Nil	0dB
Secondary Roads	Nil	Nil	
Sports Venues	Nil	Nil	
Total Influencing Factor = 0dB			

Based on the information in Table 3.2, no influencing factor is applied to the base line assigned noise levels for all of the noise sensitive receivers identified with the applicable assigned outdoor noise levels identified in Table 3.3 below.

Table 3.3 – Applicable Assigned Outdoor Noise Level

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Noise Sensitive Premises	0700 – 1900 hours Monday to Saturday	45	55	65

METHODOLOGY

Computer modelling SoundPlan 8 was used with the algorithms CONCAWE selected to predict the noise emissions. Input data used within the model are:

- Meteorological Information; and
- Topographical Data; and
- Ground Absorption Data; and
- Source Sound Levels.

METEOROLOGICAL INFORMATION

Meteorological information used in the table below is considered to represent the 'worst case' conditions for sound propagation. With wind speeds greater than those shown, noise levels may be further enhanced; however, it is likely that wind, vegetation and traffic noise will become the dominant noise source at those levels.

Table 5 – Meteorological Conditions

Parameter	Day (0700 -1900)	Night (1900 – 0700)
Temperature (°C)	20	15
Wind Speed (m/s)	4	3
Wind Direction	All	All
Humidity (%)	50	50
Pasquil Stability Factor	E	F

Note: The acoustical modelling software allows for simultaneous modelling of wind in all directions.

TOPOGRAPHICAL DATA

The existing topography was modelled at 2 meters and based on the survey information compiled.

GROUND ABSORPTION

Ground absorption varies from a value of 0 to 1, 0 representing an acoustically reflective ground (e.g. water and bitumen) and 1 representing acoustically absorbing surface such as grass. In this case, a ground absorption value of 0.9 is used.

SOURCE SOUND LEVELS

Source sound levels used within the modelling are based on technical data acquired from similar previous investigations and are listed below in Table 6 below. All noise levels have been corrected for impulsiveness or tonality as per the Australian Standard AS 1055:1997 – 'Acoustics – Description and measurement of environmental noise'.

Table 6 – Source Sound Pressure Levels dB(A) @ 1m

Noise Source	1m from Source - Noise Level SPL dB(A) L_{Aeq}
Machining Lathe	76*
Air compressor	85*
Jewellers Hammer	84***
Drill Press	74*

* Denotes 5dB correction for tonality as per AS 1055

*** Denotes 10dB correction for impulsiveness as per AS 1055

Note: No HVAC / Air-conditioning unit is utilised within this establishment, with cooling provided via floor fans, based on the low noise output of the fans they have not been considered in this assessment.

RESULTS

Based upon the location of onsite activities in relation to the noise sensitive premises, we predict the following noise impact levels (as shown in Table 7 below). Using the acoustical software SoundPlan 8, acoustical modelling was carried out under a worst-case scenario of noise emissions. This was carried out using topographical data with all sound source levels simultaneously present under the assumption that all the recommendations within this report are implemented.

We have assumed the nearest noise sensitive receivers would have their windows open. The predicted levels have then been assessed against the assigned outdoor levels, as stipulated in the *Environmental Protection (Noise) Regulations 1997*. The assessment has been based on the L_{A10} day-time assessment criteria, as this is considered the most stringent noise criterion for the site based on the sites intended operating hours and represents a noise level that is not to be exceeded for more than 10 percent of the time.

Table 7: Predicted L_{A10} dB(A) Noise Impact Levels Post Implementation of Recommendations.

Location	Scenario	Calculated noise levels to be received under a 'worst case scenario' all occurring simultaneously		Day-time (0700 to 1900hrs)	Compliance
		Time	L_{A10}	Assigned outdoor noise level target L_{A10} SPL dB(A)	
R1	All windows and doors open	Day	45	45	Yes
R2	All windows and doors open	Day	43	45	Yes
R3	All windows and doors open	Day	29	45	Yes
R4	All windows and doors open	Day	26	45	Yes
R5	All windows and doors open	Day	25	45	Yes
R6	All windows and doors open	Day	24	45	Yes
R7	All windows and doors open	Day	25	45	Yes
R8	All windows and doors open	Day	25	45	Yes
R9	All windows and doors open	Day	27	45	Yes
R10	All windows and doors open	Day	29	45	Yes

Note: penalties for tonality and impulsiveness have been applied to the assessed values.

As shown in the table above, the calculated noise levels to be received at all the nearest noise sensitive locations identified within this report from the full operation of the proposed site under a 'worst case scenario' setting, were found to comply with Assigned Outdoor Noise Criteria (as stipulated in the *Environmental Protection (Noise) Regulations 1997*) throughout the entirety of the time.

The assessment of the potential noise associated with the site has been based on both previous investigations of similar activities, technical data and the existing noise levels experienced. This assessment assumes the simultaneous operation of all activities occurring within the proposed site, providing a worst-case scenario noise environment. Any relevant shielding / transmission loss and penalties for "intrusiveness" was considered in this assessment.

We make note that by achieving compliance at the locations identified within this report, compliance to the *Environmental Protection (Noise) Regulations 1997* assigned outdoor noise levels is expected to be achieved at all other premises located further away from the proposed workshop.

ASSESSMENT

The assessment of the site was undertaken, and it was found that attaining compliance to the Environmental Protection (Noise) Regulations 1997 is achievable. We recognise that the main sources of noise are from the machining lathe, air compressor and hammer.

Noise levels from all noise sources identified in this report occurring simultaneously have been calculated to fall within the day-time period assigned outdoor noise criterion, on the assumption the recommendations put forth in this report is fully implemented.

The calculated results have been based on various factors such as: the distance of the noise sources from receivers, the implementation of the recommendations put forth within this report, existing acoustical screening, predicted noise levels and the existing background noise levels measured.

Intrusive penalties have been applied to the assessed values. As such, with the incorporation of the recommendations put forth within this report, the predicted noise levels are calculated to be compliant with the day-time assigned outdoor noise level.

RECOMMENDATIONS

The following recommendations are to be implemented in order to ensure compliance to the assigned outdoor noise levels is achieved at all times.

- Window glazing increased to a minimum 6mm – 12mm – 6mm insulated glazing unit (IGU)
- All windows and doors are to be closed during workshop operation
- External wooden door increased to 40mm solid core with full perimeter seals and a drop-down seal to ensure an airtight seal is achieved when closed;
- Roller door be fitted with a full perimeter seal and threshold seal on the ground to ensure an airtight seal is achieved when closed;
- All airgaps within the workshop are to be airtight sealed with a weatherproof non-hardening silicon-based sealant;
- Air compressor to be installed on vibration dampening mounts, fitted into a noise enclosure and located within the workshop;
- Minimum R3.0 insulation fitted within ceiling space, with which is void of airgaps;
- Machining Lathe to be fitted on vibration dampening mounts;
- Drill press to be fitted on vibration dampening mounts;
- Utilise rubber tipped hammers instead of hard metal tipped hammers;
- Hammering metal to be conducted on rubber mats at all times.

CONCLUSION

An environmental noise assessment was conducted for the proposed change of use development located at 10 Vernallan Way, LESMURDIE WA 6076; and it considered the following:

- The potential noise effect of the proposed site, to the nearest noise sensitive receivers while under a 'worst case scenario' by which noise levels from machinery lathe, drill press, air-compressor, hammer hits; all occurring simultaneously.

Based on the information assessed the proposed site has been found to be able to achieve compliance to the day-time assigned outdoor noise criterion, providing the recommendations or equivalent measures are in place.

On the condition that the recommendations detailed in this report are implemented, general compliance to the Environmental Protection (Noise) Regulations 1997 is expected to be achieved during its operation.

I trust the above meets your requirements on the matter. Should you have any queries do not hesitate to contact our office.

Regards,



Ian Burman
Noise Officer: 14009

ACOUSTICS & AUDIO PRODUCTION