

K&W MOTOR SERVICE

47 RANDELL STREET SLACKS CREEK QLD 4127



NOISE IMPACT ASSESSMENT

Commissioned by:	Somerville Consultants
Date:	23 April 2026
Project number:	6644
Version:	V.0
Author:	Mathew Dyer

DOCUMENT INFORMATION				
Author: Mathew Dyer		Reviewed by: Ross Palmer		
Date: 29 April 2026		Date: 29 April 2026		
VERSION HISTORY				
Version	Description	Date	Author	Approved by
V.1	Final	29/04/2026	Mathew Dyer	Ross Palmer
DOCUMENT DISTRIBUTION				
Copy	Name/Company	Hard Copy	Electronic Copy	
01	Somerville Consultants	☐	☒	
02		☐	☐	
03		☐	☐	
04		☐	☐	
05		☐	☐	

EXECUTIVE SUMMARY

Somerville Consultants has engaged Palmer Acoustics to respond to a show cause notice issued by the Logan City Council (LCC) request (26-8-25 MCUC/70/2025) in which they require:

Acoustic Information 3.2. Provide a noise assessment report to demonstrate compliance with Planning scheme policy 3—Environmental management 3.2 Emission and immission standards Logan Planning Scheme 2015. The report must include: 3.2.1. Measured background noise levels of the surrounding area in accordance with the EPA Noise Measurement Manual 2000. The background noise levels require measurement during the expected hours of operation (a minimum 72-hour period which must be calibrated/correlated with appropriate on-site noise monitoring observations/samples and include separate weekend monitoring if the proposed use is to be over this period); and 3.2.2. Detailed information on the potential noise impacts and sources associated with the proposed development (eg. proposed operating hours, noise from vehicle movements (including any heavy vehicles), car park use, noise from plant, equipment etc). Include details of anticipated noise levels and when applicable, the adjustments for tonality and/or impulsiveness. Include all calculations in the report; and 3.2.3. The site layout and how noise impacts can be addressed through site design. Include any noise attenuation measures to eliminate and/or minimize noise impacts.

Advice Note: *The noise impact assessment report must be prepared in accordance with Planning Scheme Policy 3 – Environment, and the Department of Environment and Heritage Protection’s Noise Measurement Manual (2013). Adjustments for tonality and impulsiveness to be included in accordance with AS1055.1-1997 Acoustics - Description and measurement of environmental noise. As per AS1055.1, depending on the onset rates and level differences of impulse noises, an adjustment of up to 10dB will be required to assess the impacts of impulse noises. Also, the cumulative noise levels at the boundary of the premises must comply with Council’s noise limits*

After conducting spot measurements of individual activities, we conclude:

- Noise from the roller doors south – second closest and closest to the adjoining property still exceed the allowable limits.
- Work **outside** the garage such as grinding or the use of pneumatic tools exceed the allowable limits.
- Spray booth fully enclosed – Sensitive receptor shielded from compressor

Recommendations

- No works conducted over the weekends,
- No works conducted before 7 am or past 7 pm of each weekday.
- Garage doors to be replaced with acoustically treated rollers to minimise clanging(impact) Rw 30.
- Works **outside** the garage is to be restricted to electronics, standard cord/cordless drills (not to be used for the removal/replacing of Lugnuts) and other small hand tools.
 - No Pneumatic tools
 - No Grinding/Cutting
 - Spray/priming
 - Excessive hammer to be completed inside the northern part of the garage

Additional spare car parts at the rear of the property is not thrown in a manner that may cause a noise impact. Parts should instead be placed in the unused portion of the garage as storage.

CONTENTS

1.0	INTRODUCTION	1
2.0	OPERATIONAL HOURS	1
2.1	Existing site and surroundings	2
3.0	EQUIPMENT AND PROCEDURES	3
3.1	Measurement Procedures	3
3.2	Instrumentation	3
4.0	AMBIENT NOISE LEVELS	5
5.0	NOISE EMISSION CRITERIA	6
5.1	LOGAN CITY COUNCIL – LOGAN PLANNING SCHEME 2015V9.2	6
	(i) <i>Mixed use code</i>	6
6.0	NOISE EMISSIONS	7
	MODELLING	8
6.2	Discussion	11
7.0	CONCLUSIONS	11
7.1	Recommendations	12
	APPENDIX A: CALCULATIONS	13
	APPENDIX B: PHOTOS ON SIITE	3

1.0 INTRODUCTION

Somerville Consultants has engaged Palmer Acoustics to respond to a show cause notice issued by Logan City Council (LCC) - (26-8-25 MCUC/70/2025) in which they require:

Acoustic Information 3.2. Provide a noise assessment report to demonstrate compliance with Planning scheme policy 3—Environmental management 3.2 Emission and immission standards Logan Planning Scheme 2015. The report must include: 3.2.1. Measured background noise levels of the surrounding area in accordance with the EPA Noise Measurement Manual 2000. The background noise levels require measurement during the expected hours of operation (a minimum 72-hour period which must be calibrated/correlated with appropriate on-site noise monitoring observations/samples and include separate weekend monitoring if the proposed use is to be over this period); and 3.2.2. Detailed information on the potential noise impacts and sources associated with the proposed development (eg. proposed operating hours, noise from vehicle movements (including any heavy vehicles), car park use, noise from plant, equipment etc). Include details of anticipated noise levels and when applicable, the adjustments for tonality and/or impulsiveness. Include all calculations in the report; and 3.2.3. The site layout and how noise impacts can be addressed through site design. Include any noise attenuation measures to eliminate and/or minimize noise impacts.

Advice Note: *The noise impact assessment report must be prepared in accordance with Planning Scheme Policy 3 – Environment, and the Department of Environment and Heritage Protection’s Noise Measurement Manual (2013). Adjustments for tonality and impulsiveness to be included in accordance with AS1055.1-1997 Acoustics - Description and measurement of environmental noise. As per AS1055.1, depending on the onset rates and level differences of impulse noises, an adjustment of up to 10dB will be required to assess the impacts of impulse noises. Also, the cumulative noise levels at the*

This report is to provide mitigation measures that:

- Remedy the effect of the offence in a stated way and comply with A0 -10 of the assessment benchmark 6.2.10 – Mixed use zone code with outliers acceptable emission standards for general amenity
- Provide a program that shows how compliance with the enforcement notice will be achieved.

2.0 OPERATIONAL HOURS

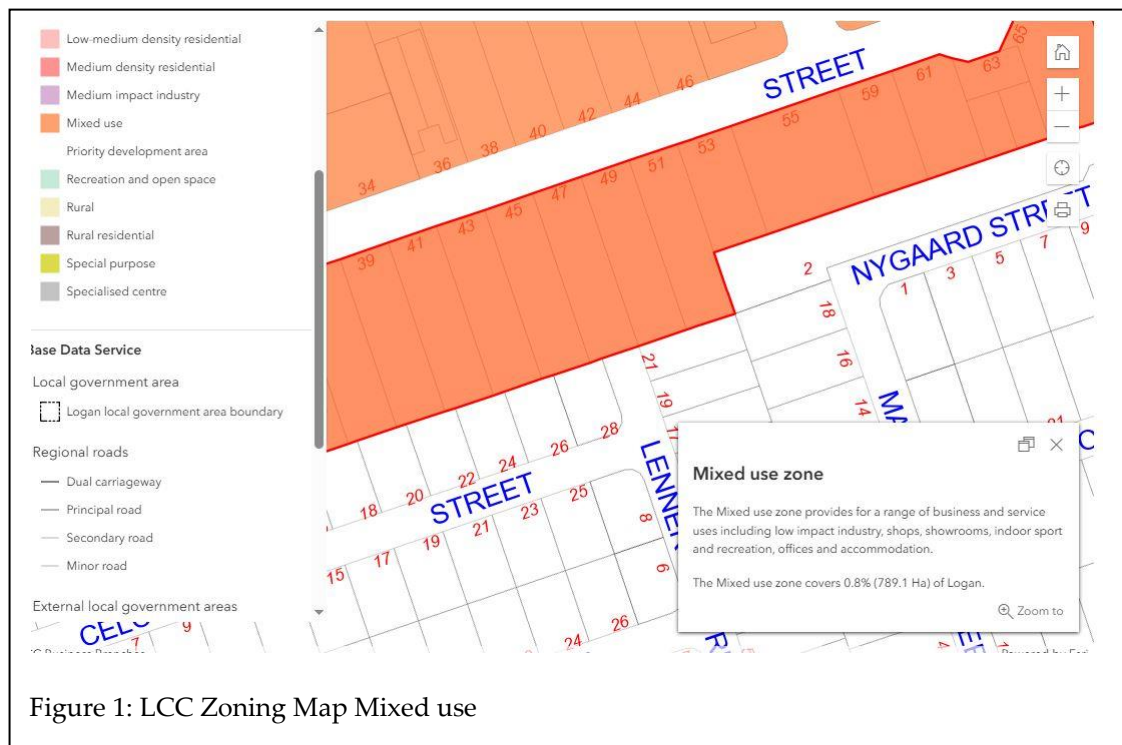
Current operating hours

8:30am – 5:00pm Monday – Friday

Closed – Saturday/Sunday

2.1 Existing site and surroundings

47 Randall Street Slack Creek QLD 4127 is a mixed use Zone and labelled as an Enterprise Precinct under the Logan City Council interactive mapping/planning scheme 2015v9.2.



The Enterprise Precinct allows for low impact and medium impact industries – K&W Motor Service and offers the following:

- A) Repairing and servicing motor vehicles, mechanical components, radiators, electrical components, exhaust, suspension and air conditioning

Considered – Zone Enquiry Report

The activities (land uses) listed below may also meet the intended outcomes of the Mixed use zone. However, these activities will require a development application to be lodged with Logan City Council for assessment against the applicable benchmarks in the Logan Planning Scheme 2015 V9.2 with TLPI 1/2024.

Medium impact industry

PO6

A medium impact industry:

- a. is limited to a spray painting workshop involving the spray painting of motor vehicles in a booth;
- b. is not located in the Abattoir precinct or Retail/commerce precinct;
- c. complies with the immission and emission standards of the [Planning scheme policy 3 - Environmental management](#).



3.0 EQUIPMENT AND PROCEDURES

3.1 Measurement Procedures

Ambient noise levels were measured over a 4-day period commencing Friday, 21 April 2026. The measurement location (ML1) is shown in figure 2. The logger was set to record 15-minute statistics over the logging period. The weather during the logging period was mostly fine.

3.2 Instrumentation

The following instruments were used to measure the ambient noise levels:

- BSWA Noise Logger #2 (serial number 600010)
- B & K 4230 Calibrator #2 (serial number 1638750)

Spot measurements were taken with the:

- B & K Type 2250 1/3 octave band Sound Level Meter (Serial No. 2728498)
- B & K 4231 Calibrator (serial number 2153030)

The sound level measuring equipment was field checked before and after the measurements and was found to be within 0.2 of the reference signal 94dB at 1000Hz. The equipment used in this assessment has a current calibration certificate from a NATA accredited calibration laboratory.



4.0 AMBIENT NOISE LEVELS

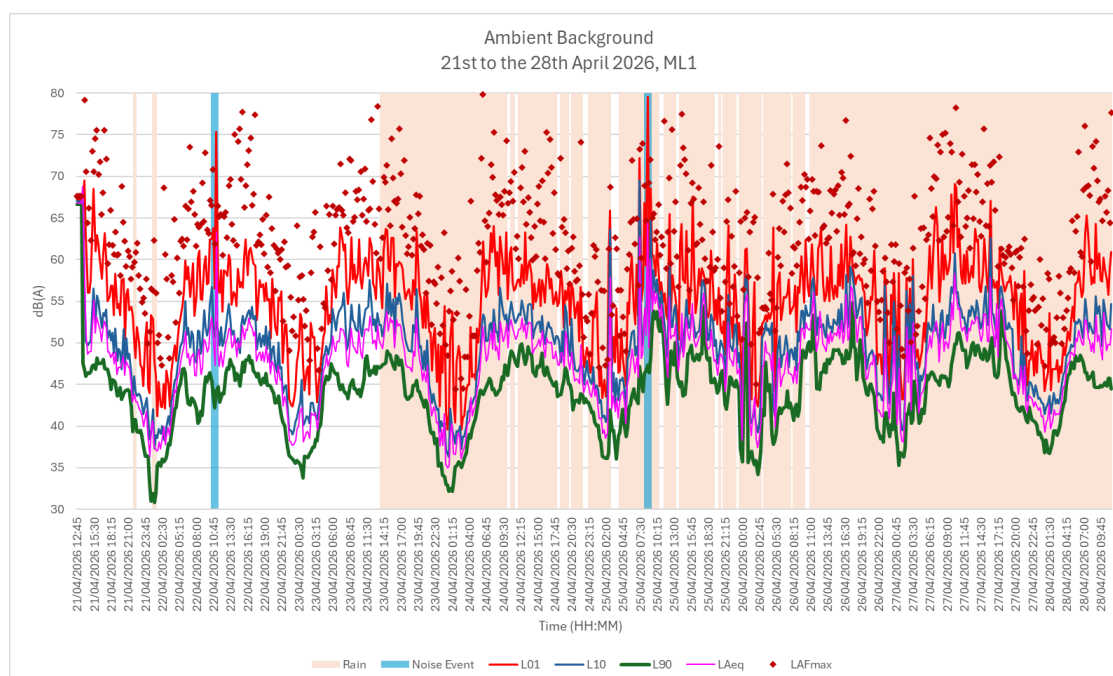
The ambient levels measured at ML1 are presented in Table 1. ML1 is located 4.7m from the eastern boundary and 2.5m.

Our measurements showed a substantial spike on Wednesday 11:30am, Thursday 1:30pm. This requires further investigation as the timing appears to be reasonable consistent and cannot be confirmed that it is generated from 47 Randell Street Slacks Creek.

Rain affected the majority of the data from the 24th to the 28th April – to determine the RBL the ABL amalgamation of Tuesday – Wednesday was used.

Table 1: Measured Ambient Noise Levels ML1

Time	Measured Noise Levels ¹ dB(A) ²					
	L _{Amax} ³	L _{A01} ⁴	L _{A10} ⁵	L _{A90} ⁶	L _{Aeq} ⁷	RBL ⁸
Day: 7 am to 6 pm	68	59	52	46	50	44
Evening: 6 pm to 10 pm	NA	NA	NA	NA	NA	NA
Night: 10 pm to 7 am	NA	NA	NA	NA	NA	NA



¹ Average noise levels throughout the period, with the exception of L_{A90} which is the average below the median noise levels for the period.

² dB(A) decibels, A-weighted

³ L_{Amax} refers to the maximum a-weighted sound pressure level occurring during the sampling period

⁴ L_{A01} for a specified time interval, means the A-weighted sound pressure level that is equalled for 1% of the interval

⁵ L_{A10} for a specified time interval, means the A-weighted sound pressure level that is equalled or exceeded for 10% of the interval

⁶ L_{A90} refers to the noise level exceeded 90% of the time period, commonly referred to as the background noise level

⁷ L_{Aeq} for a specified time interval, means the time average A-weighted sound pressure level, within the meaning given by AS1055.1 for the interval

⁸ RBL refers to the Rating Background Level as defined in BCC Planning Scheme

5.0 NOISE EMISSION CRITERIA

5.1 Logan City Council – Logan Planning Scheme 2015v9.2

(i) Mixed use code

Amenity	
General emissions	
PO10 Development protects the intended amenity for the zone and precinct of an adjoining premises by having regard to: - noise emissions; - air emissions; - light emission; - radiation emissions; - vibration emissions.	AO10 Development complies with the following emissions standard of Planning scheme policy 3 - Environmental management: - Table 3.2.1.1 - Noise emission standards for the protection of residential amenity where adjoining a premises in a zone specified in 3.2.1(1)(a) of Planning scheme policy 3—Environmental management; - Table 3.2.1.2 - Noise emission standards for the protection of general amenity where adjoining a premises in a zone specified in 3.2.1(1)(b) of Planning scheme policy 3 - Environmental management; - Table 3.2.2.1 - Air emission standards; - Table 3.2.3.1 - Light emission standards; - section 3.2.4 - Radiation emission standards; - Table 3.2.5.1 - Preferred weighted rms value for continuous and impulsive vibration acceleration (m/s²) 1/80Hz.

The performance outcomes and emission limits are presented in Table 3.2.1.1 of the code; partially extracted as below.

Measurements to be taken at the boundary of premises.

Table 3.2.1.1 -Noise emission standards for the protection of residential amenity

Noise type	Time period	Monday to Saturday	Sunday and public holidays
Non-steady sound*	Day 7:00am -6:00pm	$L_{Aeq,adj,T} \leq L_{A90} + 5$ dB(A)	$L_{Aeq,adj,T} \leq L_{A90} + 5$ dB(A)
	Evening 6:00pm to 10:00pm	$L_{Aeq,adj,T} \leq L_{A90} + 5$ dB(A)	$L_{Aeq,adj,T} \leq L_{A90} + 5$ dB(A)
	Night 10:00 -7:00am	$L_{Aeq,adj,T} \leq L_{A90} + 0$ dB(A) and $L_{Amax} \leq 60$ dB(A)	$L_{Aeq,adj,T} \leq L_{A90} + 0$ dB(A) and $L_{Amax} \leq 60$ dB(A)
Continuous noise*	Anytime	$L_{A90,T} + 0$ dB(A)	$L_{A90,T} + 0$ dB(A)

Editor's note - as defined in AS1055.1-1997 Acoustics -Description and measurement of environmental noise.*

Note -Adjustments for tonality and impulsiveness to be included in accordance with AS1055.1-1997 Acoustics -Description and measurement of environmental noise

Table 3.2.1.2 -Noise emission standards for the protection of general amenity

Note -Adjustments for tonality and impulsiveness to be included in accordance with AS1055.1-1997 Acoustics - Description and measurement of environmental noise.

Table 3.2.1.2 -Noise emission standards for the protection of general amenity

Noise type	Time period	Monday to Saturday	Sunday and public holidays
Non-steady sound *	Day 7:00am -6:00pm	$L_{Aeq,adj,T} \leq L_{A90} + 10$ dB(A)	$L_{Aeq,adj,T} \leq L_{A90} + 5$ dB(A)
	Evening 6:00pm to 10:00pm	$L_{Aeq,adj,T} \leq L_{A90} + 10$ dB(A)	$L_{Aeq,adj,T} \leq L_{A90} + 5$ dB(A)
	Night 10:00pm -7:00am	$L_{Aeq,adj,T} \leq L_{A90} + 5$ dB(A) and $L_{Amax} \leq 80$ dB(A)	$L_{Aeq,adj,T} \leq L_{A90} + 5$ dB(A) and $L_{Amax} \leq 80$ dB(A)
Continuous noise*	Anytime	$L_{A90,T} + 5$ dB(A)	$L_{A90,T} + 5$ dB(A)

6.0 NOISE EMISSIONS

Numerous activities and equipment being used was observed and spot measurements were taken using the B&K2250 class 1 sound level meter.

Sound Character AS1055 –

1. Noise impacts at sensitive uses or sensitive zones can be greater where the source noise has any of the following characteristics:
 - a. tonality;
 - b. impulsiveness;

Tonality:

Shall be defined to occur if the level difference is as follows:

- (a) For the low-frequency range of one-third octave frequency bands **31.5 Hz to 125 Hz**,
if the difference **>15 dB.**
- (b) For the mid-frequency range of one-third octave frequency bands **160 Hz to 400 Hz**,
if the difference **>8 dB.**
- (c) For the mid- to high-frequency range of one-third octave frequency bands **500 Hz to 16 kHz**, if the difference **>5 dB.**
If these values are exceeded, a 5 dB penalty shall be applied as an adjustment to the time.

Impulsiveness:

E2.3 Onset

The part of the positive slope of the time history of LAF where the gradient exceeds 10 dB/s.

NOTE: The starting point of an onset is the point where the gradient first exceeds 10 dB/s. The end point of an onset is the first point after the starting point where the gradient decreases to less than 10 dB/s. Irregularities (on the onset) shorter than 50 ms are left out of account.

Table 2: Activities and equipment

ML	Noise source	Distance	Duration	LAeq	Tonal Y/N	Impulse Y/N	LAeq adj
2	New - Garage Door Close	2 metres	33 sec	72.5	N	Y	78
2	New - Garage Door Open	2 metres	35 sec	73.8	N	Y	79
3	Air Compressor	5.5 metres	1 min	75	Y	N	80
4	Lug Nuts	1.7 metres	10 sec	79.1	N	Y	84
5	Car Hoist	1.5 metres	10 sec	80.5	N	Y	86
6	Angle Grinder	2 metres	26 sec	79.3	N	Y	74
7	Garage door closed	2 metres	23 sec	72.4	N	Y	72
8	Garage door closed	2 metres	23 sec	75.6	N	Y	81

MODELLING

Pen3d was used to model the following spot locations, additional factors such as all garage doors were open, the concrete facades of the neighbour building and where the works were being carried out.

Table 3: Results

ML	Noise source	Steady/Non-Steady	LAeq adj	Distance R1 Fence (Approx)	LAeq @ ML1 Boundary	Noise Barrier	LAeq adj	Limit (Day) RBL +5	Pass Y/N
2	New - Garage Door Close	Continuous	78	15m	65	-6	59	49	N
2	New - Garage Door Open	Continuous	79	15m	66	-6	60	49	N
3	Air Compressor*	Continuous	80	45m	<45	-6	<45	49	Y
4	Lug Nuts	Non-steady	84	30m	75	-6	69	49	N
5	Car Hoist*	Non-steady	86	51m	<45	-6	<45	49	Y
6	Angle Grinder	Non-steady	74	50m	58	-6	52	49	N
7	Garage door closed	Continuous	72	51m	<45	-6	<45	49	Y
7	Garage door closed	Continuous	81	51m	49	-6	<45	49	Y

- Current noise barrier 1.8m high – gaps were observed

Additional Activities

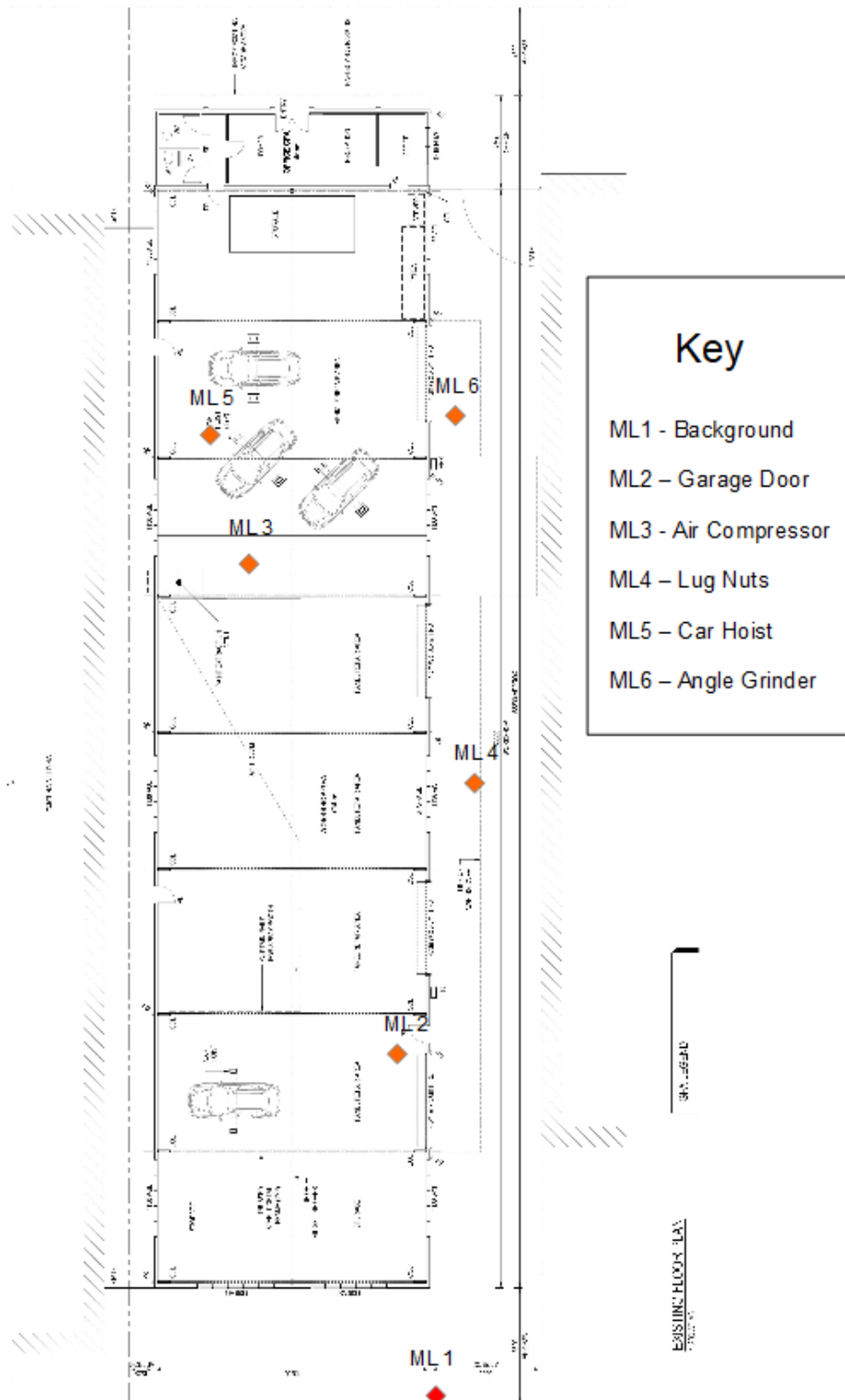
Spray booth – fully enclosed, compressor is hidden to one side and shielded away from the residence.
Hammering and general impacts – Non steady throughout the garage, pneumatic drills are only used in the northern part of the workshop.

Activities covered by the Logan City Council Show Cause Notice: 68098

Table 2 - Saturday 22 June 2024 Noise Events Summary

Noise type and sound description	Marker	Sound level (L _{Aeq})	Amount above allowable limit (48dB(A))	Total sample time (T)	No. of samples
Non-steady sound Banging, hammering, tool dropping, impulsive, Hammering is tonal at times	Marker 4	59 dB _{adj} *	11 dB(A)	13mins 9 sec	60
Non-steady sound Pneumatic tool (Drill, nail gun), impulsive	Marker 5	55 dB _{adj} *	7dB(A)	10mins 30 sec	73
Non-steady sounds Buffer or grinder Machine, tonal	Marker 6	51 dB _{adj} *	3dB(A)	2min 42 sec	2
Garage roller door, tonal at times	Marker 7	59 dB	11dB(A)	58 sec	2
Air hose/spray gun	Marker 9	46 dB	0	1min 36 sec	4

* adjusted for impulsive or tonal characteristic. Banging and hammering was adjusted for both impulsive and tonal characteristics, plus 10dB.



Site View of ML locations in relation to the sensitive receptor



6.2 Discussion

The main points of issue are the garage doors to the south and works being conducted outside the garage. Since the initial assessment undertaken by Logan City Council (Saturday 22nd of June 2024), the following has changed:

- No works are conducted over the weekends,
- No works are conducted before 7am or past 7pm of each weekday
- Garage door was replaced, but with a similar design
- The CnC cutter is no longer used/currently inoperable,
- The most southern part of the garage is no longer used. See photos **Appendix B**.
- Closest garage door to the sensitive receptor remains closed.
- The back area is now not used for any works except storage.

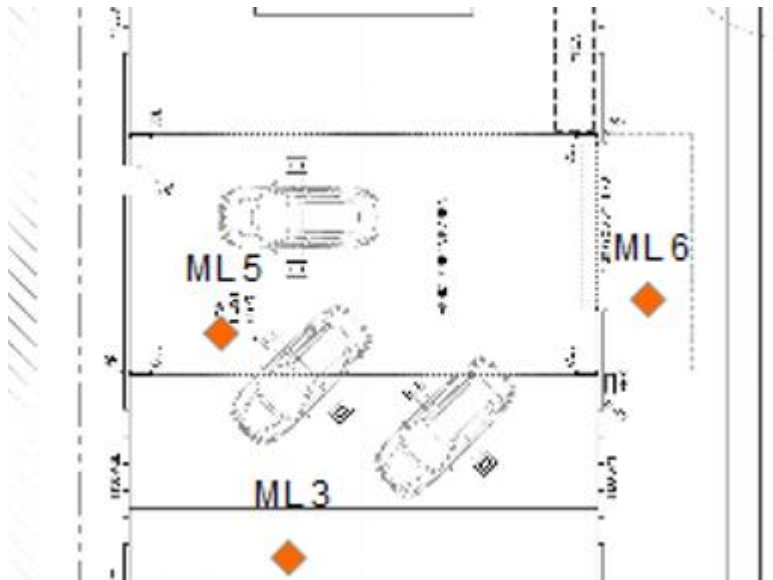
7.0 CONCLUSIONS

Based on our assessment, we conclude:

- Noise from the roller doors south – second closest and closest to the adjoining property still exceed the allowable limits.
- Work **outside** the garage such as grinding or the use of pneumatic tools exceeds the allowable limits.
- Spray booth must be fully enclosed – Sensitive receptor shielded from compressor

7.1 Recommendations

- No works conducted over the weekends,
- No works conducted before 7 am or past 7 pm of each weekday.
- Garage doors to be replaced with Rw 30 acoustically treated rollers to minimise clanging (impact).
- Works **outside** the garage are to be restricted to electronics, standard cord/cordless drills (not to be used for the removal/replacing of Lugnuts) and other small hand tools.
 - No Pneumatic tools
 - No Grinding/Cutting
 - Spray/priming
 - Excessive hammer and Pneumatic tools to be completed inside the **northern** part of the garage as per below.



Additionally spare car parts at the rear of the property are not to be thrown in a manner that may cause noise. We recommended that the parts instead be placed in the unused portion of the garage for storage.

Author:



Mathew Dyer – MSS025025
Acoustic Consultant

Reviewed by:



ROSS H. PALMER CPEng RPEQ 3534
Principal Engineer

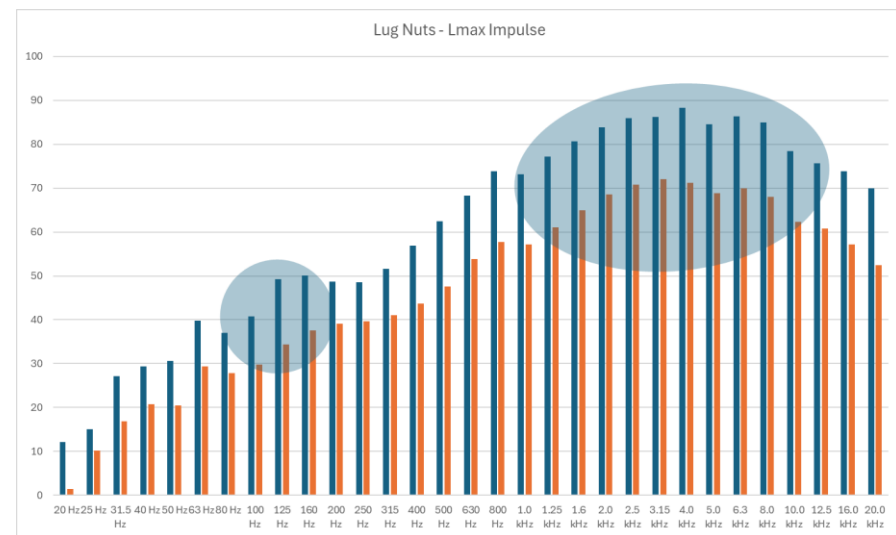
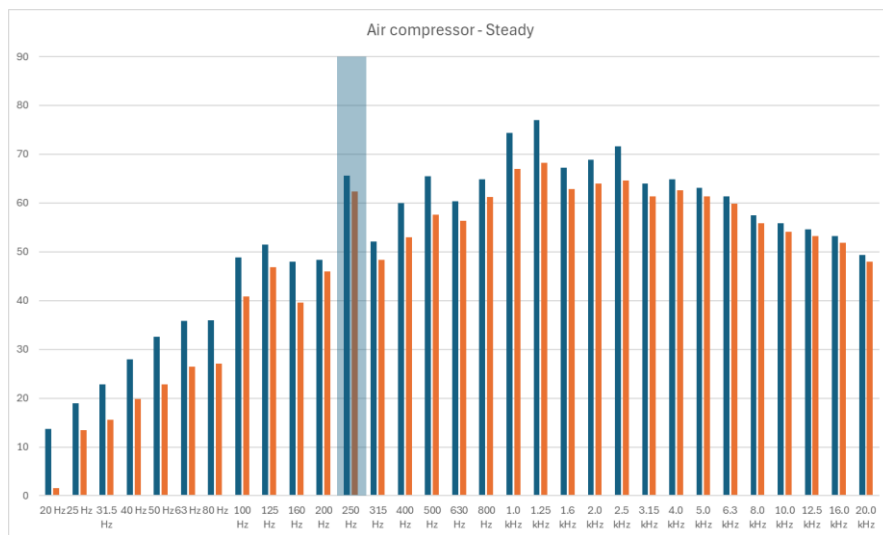
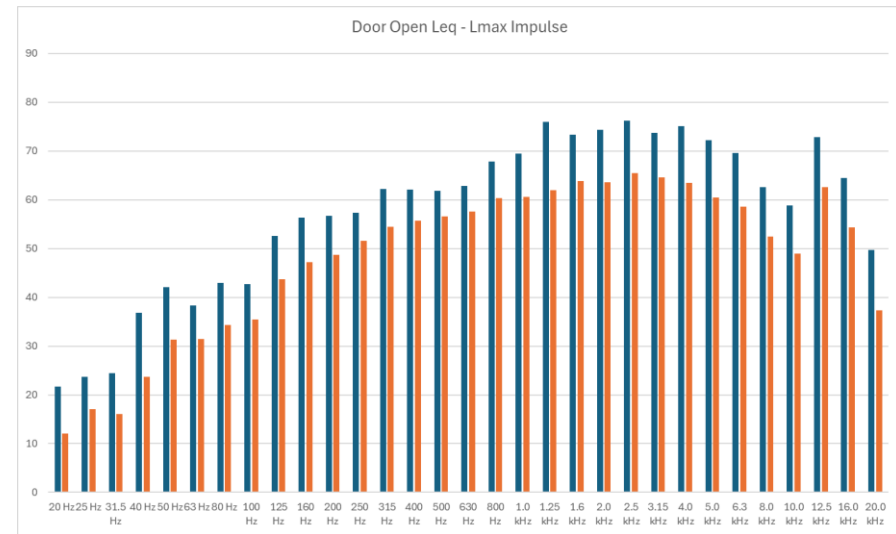
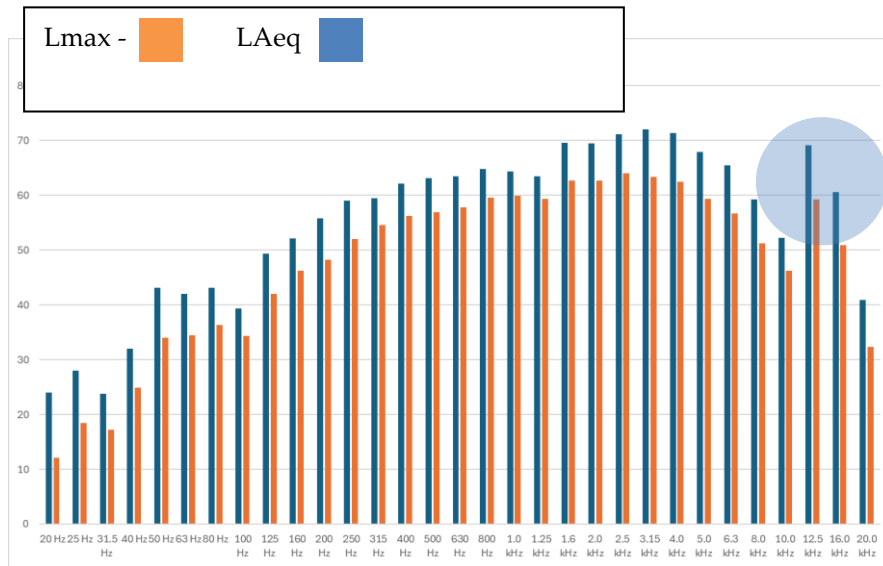
APPENDIX A: CALCULATIONS

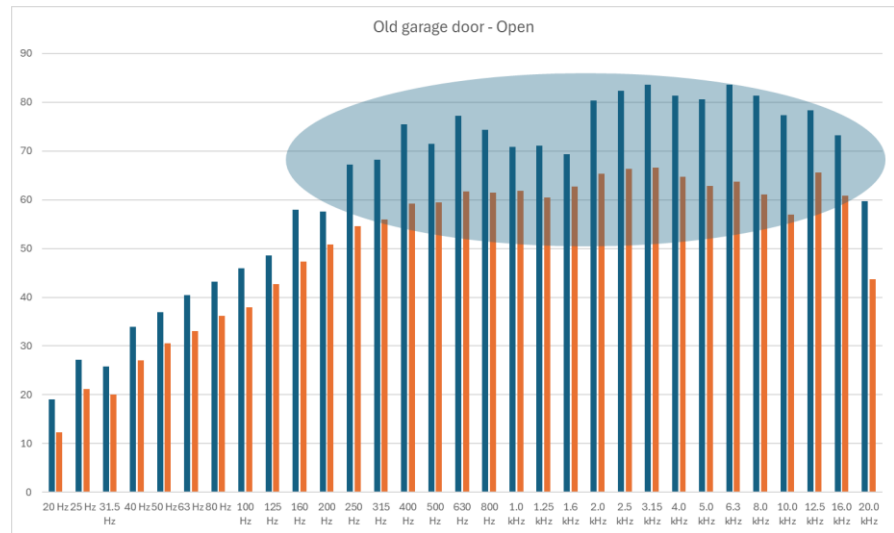
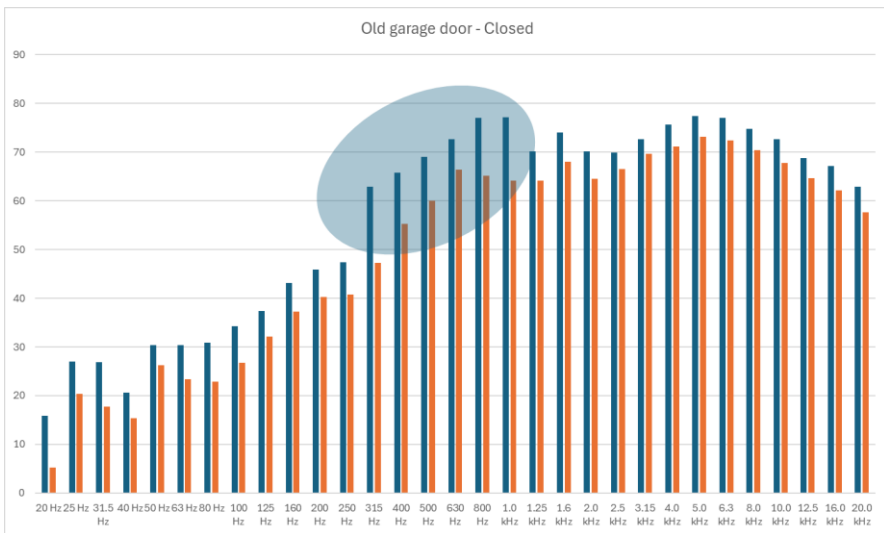
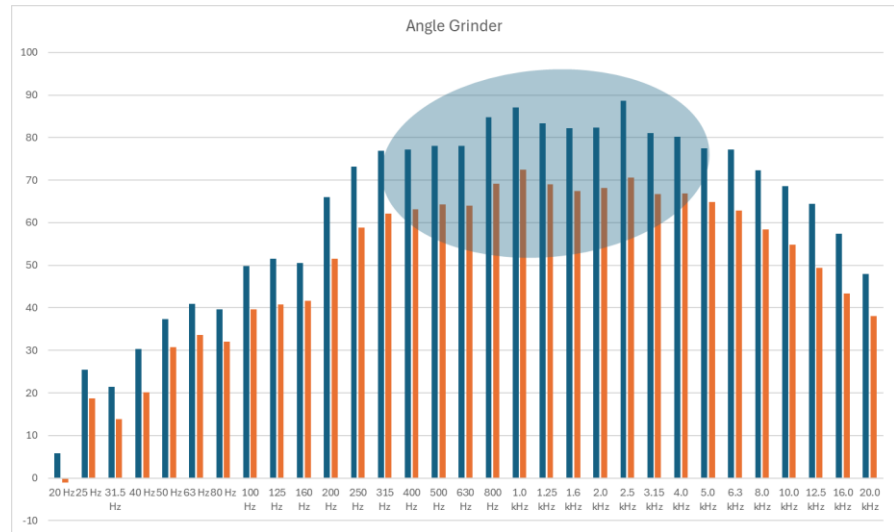
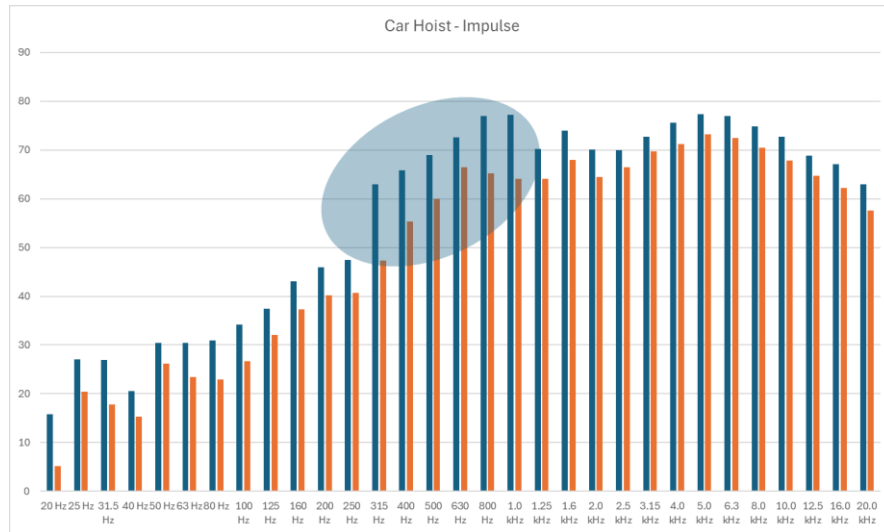
		File	Date	Duration	LAeq	Lamax
ML2	Garage Door close	NOR140_8169003_260414_0001.NBF	(2026/04/14 12:10:01.00)	(0:0:9.0)	73	80
ML2	Garage Door open	NOR140_8169003_260414_0002.NBF	(2026/04/14 12:10:43.00)	(0:0:33.0)	74	84
ML3	Air compressor	NOR140_8169003_260414_0003.NBF	(2026/04/14 12:16:17.00)	(0:0:60.0)	75	81
ML4	Lug nuts	NOR140_8169003_260414_0004.NBF	(2026/04/14 12:27:17.00)	(0:0:10.0)	79	95
ML5	Car hoist	NOR140_8169003_260414_0005.NBF	(2026/04/14 12:31:00.00)	(0:0:20.0)	81	86
ML6	Angle grinder	NOR140_8169003_260414_0006.NBF	(2026/04/14 12:36:02.00)	(0:0:26.0)	79	94

Converting Z-weighted to A-weighted and then from 1/3 OCT to 1/1 OCT

		25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	10.0 kHz	12.5 kHz	16.0 kHz	20.0 kHz
		-40.4	-39.4	-34.6	-30.2	-26.2	-22.5	-19.1	-16.1	-13.4	-10.9	-8.6	-6.6	-4.8	-3.2	-1.9	-0.8	0	0.6	1	1.2	1.3	1.2	1	0.5	-0.1	-1.1	-2.5	-4.3	-6.6	-9.3
		Lamax																													
M12	Garag Door close	28	23.8	32	43.1	42	43.1	39.4	49.4	52.1	55.8	59	59.5	62.1	63.1	63.5	64.8	64.4	63.5	69.6	69.5	71.1	72	71.4	67.9	65.5	59.3	52.3	69.1	60.6	40.9
M12	Garag Door cpen	23.7	24.4	36.8	42.1	38.3	42.9	42.7	52.6	56.4	56.7	57.3	62.2	62.1	61.9	62.9	67.9	69.5	76	73.3	74.3	76.2	73.7	75.1	72.2	69.6	62.6	58.8	72.8	64.5	49.7
M13	Air compressor	19	22.8	27.9	32.6	35.8	35.9	48.8	51.5	48	48.4	65.6	52.1	60	65.5	60.4	64.9	74.3	77	67.2	68.9	71.6	64	64.9	63.1	61.4	57.5	55.9	54.6	53.2	49.4
M14	Lug nuts	15	27.2	29.4	30.6	39.8	37	40.8	49.3	50.1	48.7	48.6	51.6	56.9	62.4	68.3	73.8	73.2	77.2	80.6	83.9	86	86.2	88.3	84.5	86.3	84.9	78.4	75.6	73.9	69.9
M15	Car hoist	27	26.9	20.6	30.4	30.4	30.9	34.2	37.4	43.1	45.9	47.4	62.9	65.8	69	72.6	77	77.2	70.2	74	70.1	69.9	72.7	75.6	77.4	77	74.8	72.7	68.8	67.1	62.9
M16	Angle grinder	25.4	21.4	30.3	37.3	40.9	39.7	49.8	51.6	50.5	66	73.2	76.9	77.2	78	78	84.8	87.1	83.3	82.2	82.4	88.6	81.1	80.2	77.4	77.2	72.3	68.6	64.4	57.4	48
M17	Garage	30.1	31.1	35.1	35.1	36	38.9	45	48.7	54.4	57.1	57.4	61.7	63.2	63.6	64.6	66.2	65.3	65.3	68.1	68.7	71.1	70.2	68.2	66	66.4	64	58	76.4	71.8	53.8
M17	Garage	27.2	25.8	33.9	37	40.4	43.2	46	48.6	58	57.6	67.2	68.2	75.5	71.5	77.2	74.3	70.9	71.1	69.4	80.3	82.3	83.6	81.4	80.6	83.6	81.4	77.3	78.4	73.2	59.7
		25 Hz	31.5 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1.0 kHz	1.25 kHz	1.6 kHz	2.0 kHz	2.5 kHz	3.15 kHz	4.0 kHz	5.0 kHz	6.3 kHz	8.0 kHz	10.0 kHz	12.5 kHz	16.0 kHz	20.0 kHz
M12	Garag Door close	18.4	17.2	24.9	34	34.5	36.3	34.4	42	46.2	48.3	52	54.6	56.3	56.9	57.8	59.6	59.9	59.4	62.7	62.7	64	63.4	62.5	59.4	56.7	51.2	46.2	59.3	50.9	32.3
M12	Garag Door cpen	17.1	16	23.7	31.3	31.4	34.3	35.4	43.7	47.2	48.7	51.6	54.4	55.7	56.6	57.6	60.3	60.6	62	63.9	63.6	65.5	64.6	63.5	60.5	58.6	52.4	49	62.6	54.3	37.3
M13	Air compressor	13.4	15.6	19.8	22.8	26.5	27.1	40.8	46.8	39.6	46	62.4	48.3	53	57.6	56.3	61.2	67	68.2	62.8	64	64.6	61.4	62.6	61.4	59.8	55.9	54.1	53.2	51.8	48
M14	Lug nuts	10.2	16.8	20.7	20.5	29.4	27.9	29.8	34.4	37.5	39.1	39.7	41.1	43.7	47.6	53.8	57.7	57.1	61	65	68.5	70.8	72	71.2	68.9	70	68	62.3	60.8	57.1	52.4
M15	Car hoist	20.4	17.8	15.3	26.2	23.4	22.9	26.7	32.1	37.3	40.2	40.7	47.3	55.3	60	66.4	65.2	64.1	64.1	68	64.5	66.5	69.7	71.2	73.2	72.4	70.4	67.8	64.7	62.2	57.6
M16	Angle grinder	18.7	13.9	20.2	30.7	33.6	32.1	39.7	40.8	41.7	51.6	58.9	62.2	63.1	64.3	64	69.2	72.5	69	67.4	68.2	70.6	66.7	66.8	64.9	62.8	58.4	54.8	49.4	43.4	38.1
M17	Garage	24.1	22.4	26.2	29.1	30.2	34.1	36.8	42.1	45.1	48	51.4	54.8	55.7	56.5	58.1	59.3	60.1	59.1	62.1	63.5	64.1	63.3	61.7	58.5	55.6	52.3	47.2	59.4	54.4	36.2
M17	Garage	21.2	20	27	30.6	33.1	36.2	37.9	42.7	47.3	50.8	54.6	55.9	59.2	59.4	61.7	61.4	61.8	60.4	62.7	65.3	66.3	66.6	64.7	62.8	63.7	61.1	57	65.6	60.8	43.7
		1/3 to 1/1																													
Location		Frequency	31.5	63	125	250	500	1000	2000	4000	8000	16000	Total																		
M12	Garag Door c	26	40	48	57	62	64	68	67	58	60	72																			
M12	Garag Door c	25	37	49	57	61	66	69	68	60	63	74																			
M13	Air compress	22	31	48	63	61	71	69	67	62	56	75																			
M14	Lug nuts	22	32	40	45	55	64	73	76	73	63	79																			
M15	Car hoist	23	29	39	49	68	69	71	76	75	67	80																			
M16	Angle grinder	23	37	46	64	69	75	74	71	65	51	79																			
M17	Garage	29	36	47	57	62	64	68	66	58	61	72																			
M17	Garage	29	39	49	59	65	66	70	70	66	67	76																			
Frequency		Distance	31.5	63	125	250	500	1000	2000	4000	8000	16000	Swt																		
M12	Garag Door close	2 metres	43	57	65	74	79	81	85	84	75	77	89																		
M12	Garag Door cpen	2 metres	42	54	66	74	78	83	86	85	77	80	91																		
M13	Air compressor	5.5 metres	47	56	74	88	86	97	94	92	88	82	100																		
M14	Lug nuts	1.7 metres	38	47	55	60	70	79	89	91	88	78	95																		
M15	Car hoist	1.5 metres	37	44	53	63	62	84	86	91	90	81	96																		
M16	Angle grinder	2 metres	40	54	62	81	85	92	91	88	81	67	96																		
M17	Garage	2 metres	46	53	64	74	78	81	85	83	74	77	89																		
M17	Garage	2 metres	45	55	66	76	82	83	87	87	83	84	92																		

POINT CALCULATIONS						
Pen3D2000 V1.9.5						
Environmental Calculations						
All point and line sources included. Line source segmentation angle: 10 degrees. Calcula						
Noise level results are the logarithmic addition of all the noise sources						
Noise level results incorporate the incoherent ground reflection algorithm						
Meteorology :						
	Wind speed 0.0 (m/s)	Wind direction 0	Mast height 10.0 (m)			
	Temperature 20.0 (C)	Temperature Gradient 0.0 (C/100m)	Hu			
	Surface Roughness of terrain 0.023000000 (m)	Zero plane offs				
Receptor	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
SR1	512112.8	6944281	1.5		54.7	59.7
Source	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	dB+5 Toan
compresser	512075.4	6944318	1		11.5	16.5
Garage Door 1	512092.6	6944306	2		50.4	55.4
Garage Door 0002	512093.8	6944303	2		51.4	56.4
Lug Nut	512092.1	6944311	0.3		46.7	51.7
Angle grinder	512085.9	6944328	0.3		32.1	37.1
Car Hoist	512076.3	6944324	0.3		26.4	31.4
Receptor	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
ML1 - Boundary	512102.2	6944283	1.5		70.3	75.3
Source	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
compresser	512075.4	6944318	1		12.7	17.7
Garage Door 1	512092.6	6944306	2		59.8	64.8
Garage Door 0002	512093.8	6944303	2		61	66
Lug Nut	512092.1	6944311	0.3		69.8	74.8
Angle grinder	512085.9	6944328	0.3		53.4	58.4
Car Hoist	512076.3	6944324	0.3		-11.9	-6.9
Receptor	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
ML2	512090.3	6944306	1.5		80.9	
Source	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
compresser	512075.4	6944318	1		18.6	23.6
Garage Door 1	512092.6	6944306	2		79.8	84.8
Garage Door 0002	512093.8	6944303	2		74.4	79.4
Lug Nut	512092.1	6944311	0.3		32.1	37.1
Angle grinder	512085.9	6944328	0.3		-0.4	4.6
Car Hoist	512076.3	6944324	0.3		-8.1	-3.1
Receptor	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
ML4	512091.9	6944314	1.5		89.2	94.2
Source	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
compresser	512075.4	6944318	1		19.6	24.6
Garage Door 1	512092.6	6944306	2		69.8	74.8
Garage Door 0002	512093.8	6944303	2		66.6	71.6
Lug Nut	512092.1	6944311	0.3		89.2	94.2
Angle grinder	512085.9	6944328	0.3		62.7	67.7
Car Hoist	512076.3	6944324	0.3		36	41
Receptor	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
ML3	512081	6944320	1.5		77.1	
Source	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
compresser	512075.4	6944318	1		76.8	81.8
Garage Door 1	512092.6	6944306	2		62.7	67.7
Garage Door 0002	512093.8	6944303	2		61.2	66.2
Lug Nut	512092.1	6944311	0.3		25.1	30.1
Angle grinder	512085.9	6944328	0.3		6	11
Car Hoist	512076.3	6944324	0.3		41.7	46.7
Receptor	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
ML5	512074.5	6944325	1.5		77.4	82.4
Source	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
compresser	512075.4	6944318	1		53.2	58.2
Garage Door 1	512092.6	6944306	2		9.4	14.4
Garage Door 0002	512093.8	6944303	2		5.9	10.9
Lug Nut	512092.1	6944311	0.3		21.5	26.5
Angle grinder	512085.9	6944328	0.3		4.3	9.3
Car Hoist	512076.3	6944324	0.3		77.4	82.4
Receptor	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
ML6	512086.2	6944330	1.5		80.1	85.1
Source	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
Compressor	512075.4	6944318	1		47.5	52.5
Garage Door 1	512092.6	6944306	2		60	65
Garage Door 0002	512093.8	6944303	2		58.9	63.9
Lug Nut	512092.1	6944311	0.3		73.4	78.4
Angle grinder	512085.9	6944328	0.3		78.8	83.8
Car Hoist	512076.3	6944324	0.3		63.8	68.8
Receptor	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
ML7	512080.9	6944332	1.5		71.3	76.3
Source	X Posn	Y Posn	Height		Noise Level	
	(m)	(m)	(m)		(dB(A))	
Compressor	512075.4	6944318	1		47.4	52.4
Garage Door 1	512092.6	6944306	2		41.5	46.5
Garage Door 0002	512093.8	6944303	2		40.5	45.5
Lug Nut	512092.1	6944311	0.3		52.8	57.8
Angle grinder	512085.9	6944328	0.3		69.7	74.7
Car Hoist	512076.3	6944324	0.3		65.7	70.7





APPENDIX B: PHOTOS ON SIITE

