

SOUTHERN HIGHLANDS REGIONAL SHOOTING COMPLEX

HILL TOP, NSW

NOISE COMPLIANCE REPORT MAY 2022

RWDI # 2204102

18 May 2022

SUBMITTED TO

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Version	Status	Date	Prepared By	Reviewed By
A	Final	18 May 2022	Peter Thang	Neil Gross

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

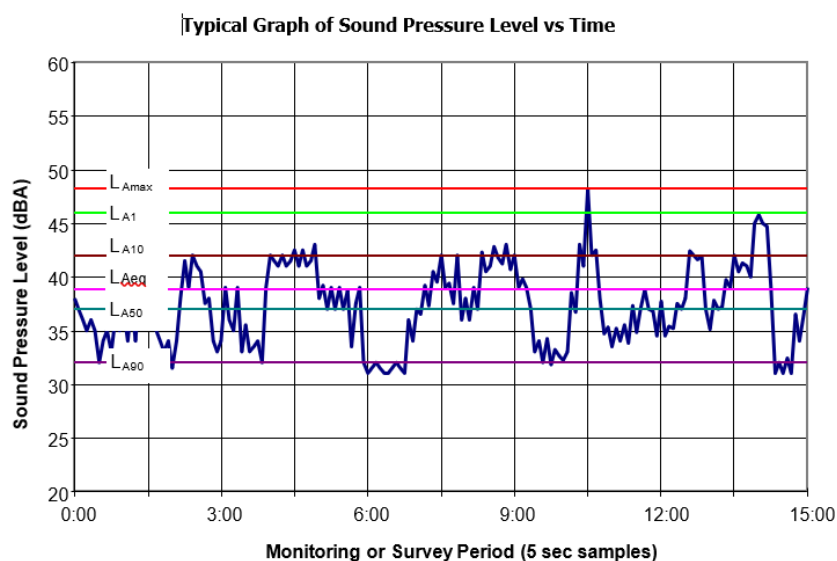




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1 INTRODUCTION

This report summarises the results of the attended compliance noise monitoring of the Southern Highlands Regional Shooting Complex (SHRSC), completed on 7 May 2022 between 1.00pm and 3.30pm.

As part of its Conditions of Approval (MP 06_0232 MOD 5), the SHRSC must complete attended noise monitoring quarterly in the first 12 months of operation and annually thereafter. This report has been prepared for the first annual compliance monitoring session of the 50m, 500m, and 800m ranges.

Noise compliance was determined based on the methodology outlined in the NSW EPA document "Target Shooting Ranges: Application Note for Assessing Noise Compliance" (EPA Application Note).

Condition A9 also stipulates the Firearm Noise Limits and states the following:

The noise from firearms or use of the site must not exceed LZpeak 75dB at the following locations:

- a) At the south-western end of Rocky Waterholes Road, Hill Top (representing residences at 1, 2 and 4 Rocky Waterholes Road); and*
- b) At Nattai Road, Hill Top, adjacent to the western entrance to the Wattle Ridge Farm (representing the existing residence).*

The assessment of noise compliance from the Southern Highlands Regional Complex shall be undertaken in accordance with the EPA's Target Shooting Ranges: Application Note for Assessing Noise Compliance (2015).

2 PROJECT DESCRIPTION

The SHRSC is located on Wattle Ridge Road, Hilltop, NSW. The complex is situated within the Nattai National Park. The complex currently consists of a 50m range, a 500m range, and an 800m range. The range currently only operates on weekends between 10.00am and 5.00pm.

The nearest residential receivers include Wattle Ridge Farm, located approximately 2.5km to the north-west, and Hilltop township located approximately 3km to the south-east. No notable topographical shielding is present between the range and receivers.

Figure 2-1 below presents the location of the three ranges relative to the nearest residential receivers.

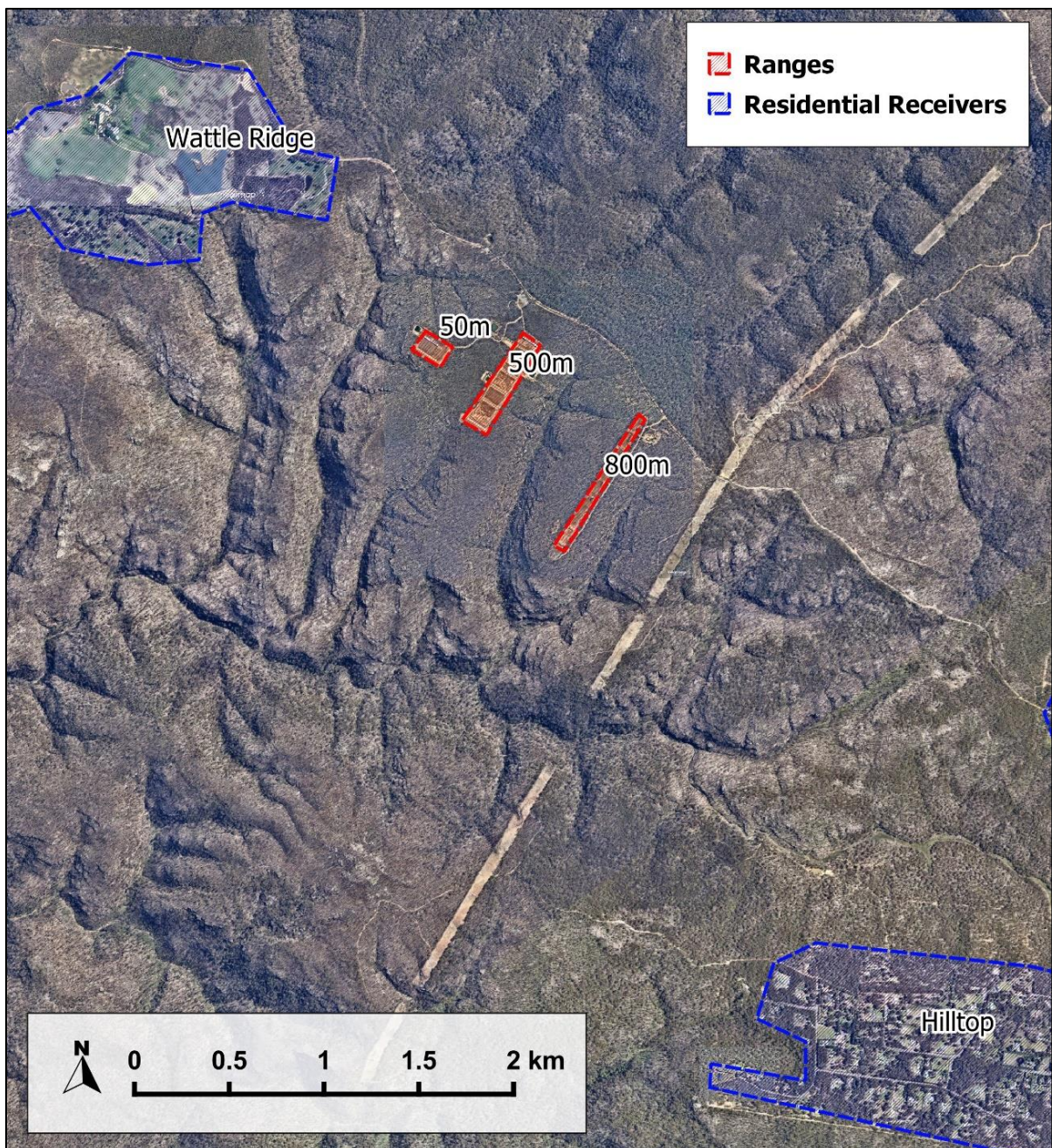


Figure 2-1 Site Overview and Nearest Receivers

3 NOISE ASSESSMENT

3.1 Methodology

Attended monitoring was completed on 7 May 2022 between 1.00pm and 3.30pm. On the day of monitoring all three ranges were scheduled for use. **Appendix A** provides information relating to the calibre and number of rounds used on the day of monitoring (10.00am – 5.00pm). This information was collected by and provided by the Office of Sport.

Monitoring was conducted over two sessions, 1.00pm to 2.00pm at Location L2 and 2.20pm to 3.30pm at Location L1.

Measurements were conducted using an NTI XL2 sound level meter. This meter conforms to Australian Standard 1259 Acoustics – Sound Level Meters as a Type 1 Precision Sound Level Meter which has an accuracy suitable for field and laboratory use. The calibration of the meter was checked before and after the measurements with a Brüel & Kjær Type 4231 sound level calibrator and no significant drift was noted.

All equipment has been laboratory calibrated within the previous two years in accordance with our in-house Quality Assurance Procedures.

The sound level meter was set to measure LzPeak levels in accordance with EPA's Application. Noise compliance was determined by the manual method described in the Application note. The sound level meter is capable of logging noise level at 100 millisecond increments with audio in case further post processing is required.

Noise monitoring locations were selected to be consistent with Condition A9 of the Consent Conditions. ARL NGARA's were also installed at the rear of the three ranges to allow for confirmation of the timing and number of shots fired from each range during the monitoring period.

A Davis Vantage Pro2 weather station was installed on the 800m range (L5).

Figure 3-1 presents monitoring locations relative to the site and receivers and **Table 3-1** summarises the attended monitoring information. Photos of the monitoring set up are shown in **Appendix C**.

Table 3-1 Summary of Monitoring Setup

Location No.	Location	Equipment	Serial No.
L1	Wattle Ridge Farm	NTI XL2	A2A-16735-E0
L2	Rocky Waterhole	NTI XL2	A2A-16735-E0
L3	50m	ARL NGARA	87807C
L4	500m	ARL NGARA	8780F2
L5	800m	ARL NGARA	878092

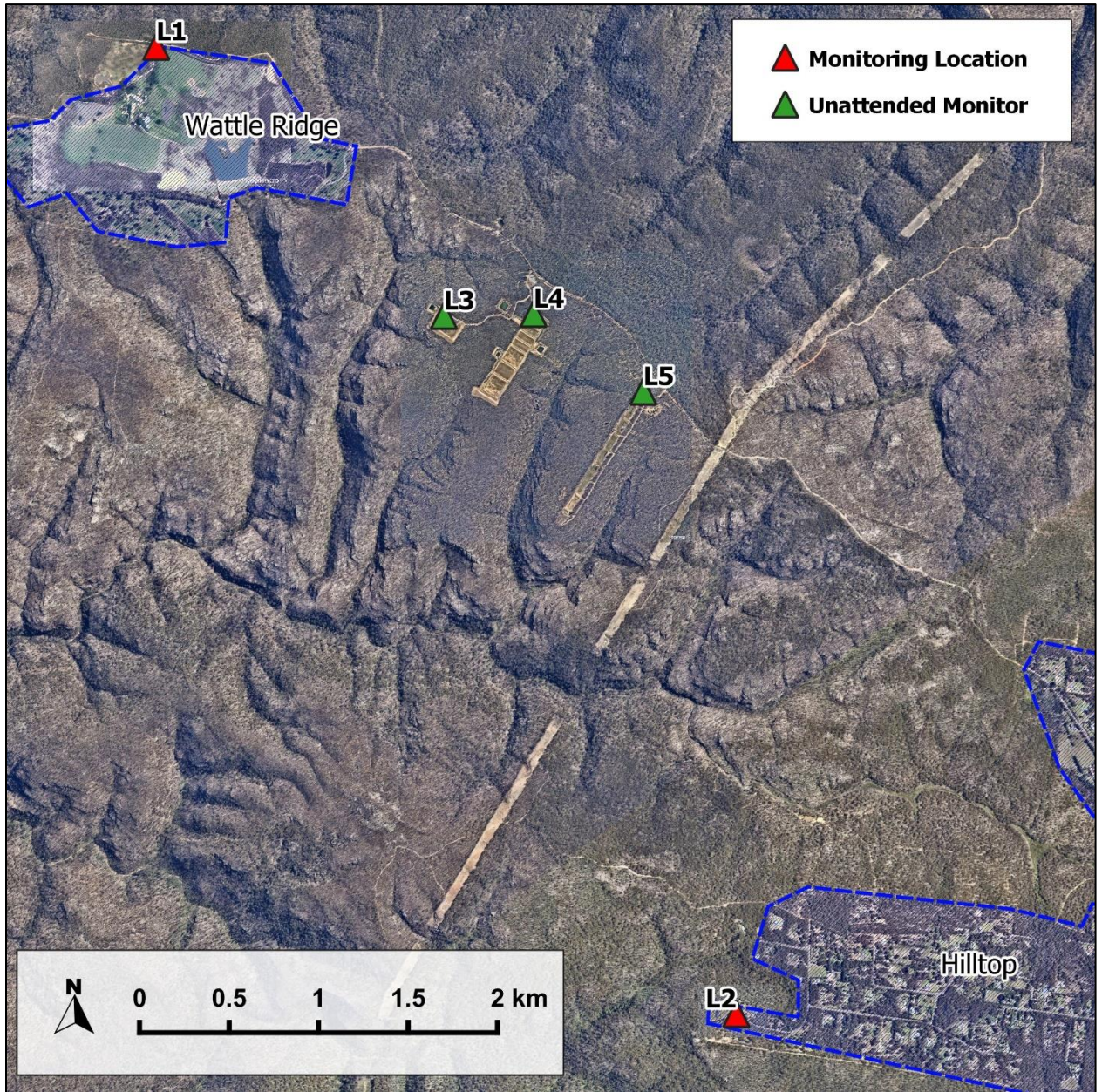


Figure 3-1 Noise Monitoring Locations



3.2 Noise Monitoring Results and Discussion

Table 3-2 summarises monitoring results from both monitoring sessions. **Table 3-3** summarises the number of shots fired on range during the monitoring period, these were estimated by reviewing the data from the noise loggers installed on each of the ranges. The recorded noise levels at the assessment locations are presented in **Appendix B**.

Table 3-2 Receiver Noise Monitoring Results - L_{zPeak} dB

Location	No. of Shots Measured	Category		Final Noise Level dBZ
		A	B	
L1 Wattle Ridge	Not Audible	-	-	-
L2 Rocky Waterhole	40	13	27	67

Note: Final Noise Level determined as per the EPA Application Note, where:
if there are greater than 50 Category A shots, the final noise level is the arithmetic average of Category A shots.
if there are less than 50 Category A shots, the final noise level is the arithmetic average of all Category A and B shots.

Table 3-3 Estimated Number of Shots on Range

Session	Range	Number of Shots
1.00pm-2.00pm	50m	37
	500m	253
	800m	43
2.20pm-3.30pm	50m	54
	500m	266
	800m	28

Note: **Appendix C** presents time slices for each of the on-range noise monitors.

At the Rocky Waterhole monitoring location, the general noise environment consisted of noise from rustling of nearby trees from occasional gusts with some intermittent noise from birds, insects, nearby vehicles, and aircraft. Noise from nearby residents were intermittent throughout the monitoring period. Recorded shots were measured in periods where there was no extraneous noise from wind or nearby residents. It is to be noted that for both monitoring locations, where shots were audible but not measurable due to extraneous noise, the L_{zPeak} level did not rise above the ambient level.

At the Wattle Ridge monitoring location, the ambient noise environment generally consisted of noise from rustling of nearby trees from occasional gusts with some intermittent noise from birds, insects, and aircraft. Shots were not audible at this location throughout the entire monitoring period of 2.20pm to 3.30pm. Review of noise levels from the on-range monitors confirmed that more than 30 shots were fired during the monitoring period.



The arithmetic average of the received shot levels is below the LzPeak 75dBZ criteria when measured at both monitoring locations. On this basis, noise from firearms from the SHRSC complies with relevant noise limits when assessed at locations stipulated in Condition A9 of the consent conditions.

4 CONCLUSION

RWDI has conducted noise monitoring of the operation of 50m, 500m, and 800m ranges at the Southern Highlands Regional Shooting Complex. Monitoring was conducted on 7 May between 1.00pm and 3.30pm. The results of the noise monitoring determined that the operation of the three ranges complies with relevant criteria when assessed at residential receivers and satisfies all conditions of consent relating to noise.



APPENDIX A

FIREARM CALIBRE RECORDS

STUDY TYPE: NOISE COMPLIANCE REPORT MAY 2022
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Calibre	No of Shots
50 m	
9mm	48
.38spc	100
500 m	
0.17	70
0.22	500
0.223	490
6.5	630
22-250	60
260	10
270	110
30-30	40
0.308	815
300	140
300wm	50
22wmr	100
0.6	30
0.62	20
243	90
303	40
7mm	50
6mm	45
45-70	20
284	45
222	30
0.303	86
800 m	
<i>Stats incomplete as SHRC sheet does not stipulate calibre used.</i>	
0.308/7.62	72
6mm	
.223/5.56	



APPENDIX B

NOISE MEASUREMENT RESULTS



Rocky Waterhole Noise Monitoring Data

No.	Pre-Shot L _{zPeak}	Shot L _{zPeak}	Difference	Category
1	62	65	3	B
2	63	65	2	B
3	65	66	1	B
4	67	69	2	B
5	66	67	1	B
6	61	64	3	B
7	66	67	1	B
8	66	69	3	B
9	66	69	3	B
10	61	65	4	A
11	59	62	3	B
12	55	59	4	A
13	63	64	1	B
14	60	66	6	A
15	66	69	3	B
16	63	65	2	B
17	65	66	1	B
18	66	68	2	B
19	65	67	2	B
20	68	70	2	B
21	62	66	4	A
22	63	65	2	B
23	63	64	1	B
24	66	70	4	A
25	65	68	3	B
26	61	70	9	A
27	62	68	6	A
28	65	66	1	B
29	62	68	6	A
30	65	67	2	B
31	63	65	2	B
32	63	67	4	A
33	62	68	6	A
34	66	69	3	B

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No.	Pre-Shot L _{zPeak}	Shot L _{zPeak}	Difference	Category
35	65	70	5	A
36	62	65	3	B
37	63	66	3	B
38	69	71	2	B
39	61	65	4	A
40	63	69	6	A
Total no. of Category A Shots				13
Total no. of Category B Shots				27
Average of Category A Shots				67 dBZ
Average of Category A Shots and Category B Shots				67 dBZ
Final Noise Level				67 dBZ



APPENDIX C

ON-RANGE NOISE PROFILES

