

# SOUTHERN HIGHLANDS REGIONAL SHOOTING COMPLEX

ENVIRONMENTAL IMPACT  
TECHNICAL REVIEW OF NOISE IMPACT ASSESSMENT

ACOUSTICS AND AIR

REPORT NO. 08084  
VERSION A

WILKINSON  MURRAY

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TECHNICAL REVIEW OF NOISE IMPACT ASSESSMENT

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VERSION A**

**MARCH 2008**

**PREPARED FOR**

HILL TOP RESIDENTS ACTION GROUP INC

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ACOUSTICS AND AIR

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## EXECUTIVE SUMMARY

A technical review of the noise assessment contained in the GHD Environmental Impact Assessment of Southern Highlands Regional Shooting Complex has been conducted by Wilkinson Murray. It has been determined that the assessment is inadequate as detailed in the following section.

### ***Director General Requirements (DGR)***

The DGR noise requirements for the project are: "*Noise impacts associated with the future proposal (e.g. noise from gun fire) should be assessed against NSW DECC (EPA) guidelines and other relevant legislation.*"

The assessment has been limited to ECNM construction and shooting range guidelines, which are no longer endorsed by the NSW DECC. Whilst these guidelines are of relevance, consideration has not been given to other relevant shooting range guidelines, including:

- NSW DECC - Noise Guide for Local Government - 2007
- NSW DECC – Industrial Noise Policy – 2000
- National Acoustics Laboratory (NAL) - Community Response to impulsive noise - A survey around Holsworthy Army Range - National Acoustics Laboratory 1981
- Victorian EPA - Interim Gunshot Noise Guidelines - 1991
- International Standards Organisation - ISO - 17201-4:2006 Acoustics - Noise from Shooting Ranges Part 4: Prediction of shooting range sound

### **Noise Impacts Assessed in the Environmental Assessment**

An assessment of construction and shooting range noise impact on residences has been included in the GHD assessment.

No assessment of traffic noise has been conducted at residences along the access route.

In addition there is no assessment of the impact of noise on recreational activities (including bushwalking) or fauna.

Noise from mechanical plant, including diesel generators, on the site has also not been assessed.

### **Adequacy and Appropriateness of Data Sets**

A review of data indicates the following:

- Monitoring of background noise is considered acceptable.
- The presented distances from site to the nominated measurement locations are incorrect.
- Operator-attended measurements of gunshot noise in surrounding receiver areas are questionable. The results lack consistency, which raises the question of their validity in any assessment.
- No site meteorological data is provided to describe the prevailing wind and temperature inversion conditions to be used in any assessment.

- Noise levels of construction equipment are provided, and are considered acceptable.

### **Assessment Methodology and Conclusions**

A review of the noise assessment and associated conclusions has found the following.

Construction noise criteria appear acceptable. However, predicted noise levels are considered unacceptable as the stated distances to surrounding receivers are incorrect and hence the resultant noise levels predicted at residences are low. Therefore the conclusions based on the construction noise predictions cannot be considered reliable. Construction noise levels should be recalculated based on actual distances, so the magnitude of any impact can then be determined

In the case of shooting noise, the criteria in the assessment have not taken account of all relevant guidelines, particularly the issue of cumulative noise impact. Further, no prediction of shooting noise has been conducted.

The measured noise level of gunshots would be acceptable provided the results were consistent and reliable. However there is an inconsistency in the measured results which calls into question the validity of the noise measurements.

It is considered that any noise assessment should be taking into account distances, topography and meteorological conditions.

Therefore, as a result of the above findings, the conclusions of the assessment are considered invalid as there is no adequate demonstration that future gun noise has been addressed.

### **Mitigation Measures**

No specific noise mitigation measures have been recommended. Recommendations to measure noise once the facility is operational and then implement noise control measures where necessary are considered inappropriate, as the purpose of any assessment is to determine mitigation measures or risk prior to approval and construction of a facility.

The proposal to mitigate after completion is not considered practical as construction machinery will have left the site.

### **Recommendations and Conclusions**

It is reasonable to conclude that there is insufficient information presented in the noise section to warrant approval of this facility on acoustic grounds. Based on this review, Wilkinson Murray recommends that approval for this development should not be granted in the absence of a more comprehensive assessment.

Therefore it is recommended that the issues identified in this review be addressed by further assessment by the proponent. In particular the following issues need to be addressed.

- Distance irregularities.
- Assessment of the noise traffic and mechanical services at surrounding residences
- Assessment of construction and operation on recreational activities and fauna.
- The cumulative noise impact of shooting based on relevant guidelines and taking into account topographical and prevailing weather conditions.

## 1 INTRODUCTION

An environmental impact assessment has been prepared by GHD Pty Ltd on behalf of NSW Sport and Recreation (an agency of the NSW Department of the Arts, Sport and Recreation), which is proposing to construct and operate a regional recreational shooting complex at Hill Top in the NSW Southern Highlands. The facility is proposed to be known as the "Southern Highlands Regional Shooting Complex".

Wilkinson Murray has been engaged by the Hilltop Residents Association to conduct a technical review of the noise assessment component of the GHD submission. The review been based on the following GHD documents:

- NSW Sport and Recreation - Southern Highlands Regional Shooting Complex - Environmental Assessment - February 2008 - Volume 1 Environmental Assessment
- NSW Sport and Recreation - Southern Highlands Regional Shooting Complex - Environmental Assessment - February 2008 - Volume 2 Appendices

In particular the review has assessed the adequacy of "Appendix F - Noise assessment" with respect to the following aspects:

- Director General's Requirements
- Relevant State, National or International Guidelines or Standards
- Methodology
- Data Sets
- Impacts - are EA conclusions able to be made given the methodology, data, analysis and standards that should be applied?
- Adequacy of proposed 'mitigating measures'

## 2 DIRECTORS GENERAL REQUIREMENTS

The NSW Department of Planning's Director General has stipulated the following requirement with respect to Noise and Vibration.

### ***Acoustics & Noise***

*Noise impacts associated with the future proposal (e.g. noise from gun fire) should be assessed against NSW DECC (EPA) guidelines and other relevant legislation.*

In establishing appropriate assessment criteria GHD has relied solely on the Environmental Noise Control Manual which was published by the former EPA of NSW (Now Department of the Environment and Climate Change, DECC). It should be noted that the current DECC "Noise Guide for Local Government" states:

*The EPA's Environmental Noise Control Manual can no longer be considered to contain current information on noise management. The manual is no longer in print, is not being updated, is not actively supported by the DEC, and has been superseded by other DEC policy documents, including this Guide.*

*However, it may still be a useful source of information for councils developing a policy or dealing with a particular noise issue. The noise guidelines and technical notes found in the manual from Chapter 150 onwards are either contained in this Guide or are no longer relevant. Chapters 152 'Motor Sport', 158 'Domestic Air Conditioners', 159 'Lawful Sporting Activities' and 162 'Open Air Entertainment' from the manual have been incorporated into the case studies in this Guide; Chapter 175 'Gas scare guns' has been superseded by the draft South Australian guidelines ([http://www.environment.sa.gov.au/epa/pdfs/bird\\_scarers.pdf](http://www.environment.sa.gov.au/epa/pdfs/bird_scarers.pdf)) and chapters 171 and 174 cover policy areas are under revision. The most relevant technical notes and data sheets (from Chapter 200 onwards) from the manual have been retained in the appendixes of this Guide. Other technical matters are best referenced through text books on the subject.*

The noise assessment relies on Chapter 171 of the ECNM for assessment of construction noise and Chapter 164 for assessment of Target Shooting Ranges. In the case of construction noise the use of Chapter 171 is consistent with current practice. However in the case of gunshot noise, assessment based solely on the old EPA guideline is considered inadequate. Whilst the construction guideline is under review, there is no update or proposed update of the Chapter 164 by the DECC.

In addition, the use of Chapter 164 does not address the cumulative noise impact of the multiple ranges proposed for the site. It is considered that the following additional current guidelines should be used or referenced in the assessment. These are detailed in the following sections:

### **NSW DECC - Noise Guide for Local Government - 2007**

This document gives guidance on the approach for noise control of facilities including shooting ranges.

### **NSW DECC – Industrial Noise Policy – 2000**

Guideline for control on industrial noise sources. In this case the guideline is applicable for noise emissions associated with buildings and associated facilities, particularly noise from any diesel generators and services plant.

**National Acoustics Laboratory (NAL) - Community Response to impulsive noise - A survey around Holsworthy Army Range - National Acoustics Laboratory 1981**

This document includes an assessment reaction to gunshot noise response with respect to the frequency and level of the noise. It is based, in part, on the Hornsby Rifle Range study conducted by NAL.

**Victorian EPA - Interim Gunshot Noise Guidelines - 1991**

This current guideline utilises the "Hornsby Rifle Range Study" conducted by the National Acoustics Laboratory. The methodology takes into account the frequency of events.

**International Standards Organisation - ISO - 17201-4:2006 Acoustics - Noise from Shooting Ranges Part 4: Prediction of shooting range sound**

An international standard specifying a method of prediction of gunshot noise using Sound Exposure Level (SEL). This standard can be used to take into account factors such as distance, topography and meteorological conditions.

### **3 NOISE IMPACTS ASSESSED IN THE ENVIRONMENTAL ASSESSMENT**

An assessment of construction noise and shooting range noise impact on residences has been included in the GHD noise assessment.

#### **3.1 Traffic Noise**

Whilst a traffic assessment has been conducted, this does not cover any potential for increased traffic noise associated with the facility. Any assessment should be conducted with respect to DECC guidelines for peak hour traffic flows past residents on access routes to the site.

#### **3.2 Bushwalking and Fauna**

It is understood that there are bushwalking areas in the vicinity of the site. An assessment should be conducted of the impact of noise associated with the facility on this and other recreational pursuits in the area. Further, there is no impact assessment of construction or operational noise on site fauna.

#### **3.3 Mechanical Services Noise**

Mechanical services, including air conditioning and a diesel generator, are likely to be required to service the proposed facilities on site. Noise criteria established in accordance with the DECC INP should be established for the project. In particular the need for any noise controls associated with diesel generators should be identified.

## 4 ASSESSMENT METHODOLOGY AND CONCLUSIONS

### 4.1 Location of Residences

It is noted that the reported distances from the site to surrounding residences are both incorrect and inconsistent. For example whilst locations A4 and B4 are shown as the same location in Figures 5 and 6 their description varies as follows;

**Attended location 4 (A4):** Also known as 'Wattle Ridge'. Located north west of the site at the end of Wattle Ridge Road, approximately 3.1 km from the testing discharge site. Monitoring was undertaken in a cleared paddock along the boundary adjoining the shooting facility site, approximately 1.6 km from the residence.

**Attended location 4 (B4):** Wattle Ridge property, located north west of the site at the end of Wattle Ridge Road, approximately 5 km from the testing discharge site. Monitoring was undertaken at the site entrance, being the closest accessible point to the residence.

A review of the site with respect to this location indicates that, in fact, location 4 is approximately 2.1 km from the existing range whilst the Wattle Ridge residence is approximately 1.1 km from location 4.

These distances are inconsistent with the background monitoring location L3 which indicates the following distances:

**Logger 3 (L3):** Also known as "Wattle Ridge". Located approximately 1.5km northwest of the existing Hilltop Rifle Range at the end of Wattle Ridge Road. Monitoring was undertaken in a cleared paddock along the boundary of the shooting facility site, approximately 800 m from the residence that is situated to the west of the boundary.

### 4.2 Construction Noise

Construction noise criteria are based on measured ambient noise levels at surrounding receivers. These noise goals are considered acceptable and should be included in any Construction Environmental Management Plan.

It would appear that predictions of construction noise are based on distance attenuation alone. Therefore predicted construction noise should be revised based on the correct distances from the construction site.

It is noted that the predicted noise levels are based on plant noise levels which are considered "best practice" noise emission levels. Therefore noise management procedures should be adopted in any Environmental Management plan to ensure that construction equipment is maintained in good condition.

### 4.3 Shooting Noise

The use of measured gunshot noise levels can be an acceptable assessment approach provided the results of measurements are consistent, reliable and adjusted to account the site location. However an apparent inconsistency occurs in that the measured results of gunshot which calls into question the validity of the presented noise measurements.

Reported linear peak hold noise levels associated with the 308 rifle are highest at the Wattle Ridge site (Location A4, B4) and lowest at the Rocky Water Holes Road site (Location A1, B1).

The reverse occurs when the SR98 sniper rifle is tested. No explanation for this apparent inconsistency is proposed. As both these rifles have supersonic muzzle velocities the results are questionable.

In addition we note that the new range will be in the order of 1 km close to the Wattle Ridge residence. The impact of this reduced distance should be should be quantified along with any adverse impact of adverse weather conditions.

Therefore as a result of the above issues and omissions the conclusions of the assessment considered invalid. There is no adequate demonstration that future gun noise has been addressed.

## 5 MITIGATION MEASURES

In this case of construction noise, mitigation measures consistent with general good practice are presented. These should be incorporated into a site management plan.

In the case of operational noise no specific noise mitigation measures have been recommended. Possible mitigation measures consisting of acoustic design measures at the ranges, restriction of firearms to be used on site, and restriction of the use of certain firearms to specific ranges, should be determined at approval stage when the regulatory mechanism and conditions can be attached to any approval.

The proposal to mitigate after completion is not considered practical as construction machinery will have left the site.

## 6 RECOMMENDATIONS AND CONCLUSION

As a result of the review based on the EIS provided by GHD we consider that the assessment does not adequately address the issue of noise impact at residences, particularly in the area of operation noise. Further, the impact of noise on recreational activities in the National Park or Fauna has not been addressed.

There appears to be a significant inconsistency associated with distances to surrounding receivers which will affect the predicted resultant noise levels associated with construction and operation of any proposed facility.

In the case of operational noise associated with the facility the measured noise of gunshots is not conclusive. Further, factors such as distance, topographical and meteorological conditions have not been included in the assessment. As a result of this review the impact of the proposed facility on the acoustic amenity of surrounding residences has not been adequately addressed.

It is reasonable to conclude that there is insufficient information presented in the noise section to warrant approval of this facility on acoustic grounds. Based on this review, Wilkinson Murray recommends that approval for this development should not be granted in the absence of a more comprehensive assessment.

Therefore it is recommended that the issues identified in this review be addressed by further assessment by the proponent. In particular the following issues need to be addressed.

- Distance irregularities.
- Assessment of the noise traffic and mechanical services at surrounding residences
- Assessment of construction and operation on recreational activities and fauna.
- The cumulative noise impact of shooting based on relevant guidelines and taking into account topographical and prevailing weather conditions.

### Note

All materials specified by Wilkinson Murray Pty Limited have been selected solely on the basis of acoustic performance. Any other properties of these materials, such as fire rating, chemical properties etc. should be checked with the suppliers or other specialised bodies for fitness for a given purpose.

### Quality Assurance

We are committed to and have implemented AS/NZS ISO 9001:2000 "Quality Management Systems – Requirements". This management system has been externally certified and Licence No. QEC 13457 has been issued.

### AAAC

This firm is a member firm of the Association of Australian Acoustical Consultants and the work here reported has been carried out in accordance with the terms of that membership.

Version	Status	Date	Prepared by	Checked by
A	Final	19 March 2008	Brian Clarke	Rob Bullen