BBC
CONSULTING PLANNERS

15 July 2011 Our ref: DHB/08025

Director General
Department of Planning
23-33 Bridge Street
SYDNEY NSW 2000

Dear Sir,

re: Application to Modify Approval to Southern Highlands Regional Shooting Complex (MP 06_0232 - Mod 4)

We write on behalf of the Hill Top Residents Action Group Inc (HTRAGI) in relation to the exhibition of an application to modify the approval to MP 06_0232 for the Southern Highlands Regional Shooting Complex granted for the second time by the Minister for Planning on 1 March 2010 (the approval). The modification application was lodged by NSW Sport and Recreation (now the Office of Communities) on 13 May 2011 seeking to modify the approval in the following manner:

1. Change the terms of condition A9 by increasing the allowable noise limits changing the way noise is measured and the possible sensitive receptor locations at which noise is measured;
2. Change the terms of condition A6(d) to increase the period between completion of the compliance testing required by condition A6 and posting the results of the testing from 7 days to 30 days;
3. Change the terms of condition D4 by deleting the requirement for acoustic shelters at the 800 metre range;
4. Changing the terms of condition A6(c) by removing the requirement for further quarterly noise compliance monitoring.

As required by the conditions of the approval, the proponent has undertaken noise monitoring of the use of the range and has found that the use of the range results in noise levels that do not comply with condition A9 that requires certain noise limits to be met. The proponent's response to this is simple – change the noise limit and the way it is measured so that the non-compliance disappears. This is an extraordinary response from a proponent now known as the Office of Communities and one that the residents of Hilltop object strongly to. After taking the benefit of the consent, the proponent no longer wishes to abide by the terms of the consent and, without any consideration of whether the facility actually causes

annoyance to the residents of Hilltop, seeks to change a burdensome element of the consent by changing the noise limit and the way it is measured in the condition to ensure compliance with the condition.

HTRAGI objects to the proposed modifications under points 1, 3 and 4 for the reasons given below.

1. A9 Firearm Noise Limits

Condition A9 states:

> ***A9 Firearm Noise Limits***
>
> *The noise from firearms or use of the site must not exceed 75dB(L) peak hold at the boundary to any existing private property with a residential dwelling, or where this is more than 30 metres from a dwelling, at the most affected location within 30 metres of the dwelling. This is to apply during prevailing weather conditions.*

The approval does not make reference to the source of the limit. However this can be linked directly to the criteria in Chapter 164 of the Environmental Noise Control Manual (ENCM) adopted by the then State Pollution Control Commission (SPCC) in May 1985. The instrument of approval issued by the Minister for Planning on 1 March 2010 grants approval to the project subject to conditions (including condition A9) and the Statement of Commitments contained in Schedule 3 of the approval. The Statement of Commitments includes the following commitments:

- *Noise Monitoring would be undertaken in different climatic conditions to confirm allowable operational usage in accordance with Chapter 164 the DECC's Environmental Noise Control Manual.*
- *The noise impacts, including traffic noise, of any proposal to increase site usage would be subject to detailed investigation once the new ranges have been built. This would involve noise measurements, at the nearest sensitive receivers, of all firearms (recreational and military) used and fired in their respective ranges. Measurement results may trigger additional measures such as:*
  - *» Altering the acoustic design at the ranges;*
  - *» Restriction of firearms used on the site; and*
  - *» Restriction of the use of certain firearms to specific ranges.*
- *Monitoring any new firearm with a potential to be louder than existing firearms used and proposed to be used on site to ensure it does not affect the allowable maximum site usage.*
- *Undertaking noise monitoring annually to confirm compliance with Chapter 164 of the DECC's Environmental Noise Control Manual.*

The application seeks to modify this condition in the following terms:

> ***Modified Condition of Approval A9 - Firearm Noise Limits***
>
> - *The noise from firearms or use of the existing 800m range must not exceed 85dB(Lin) Peak Hold at the boundary to any existing private property with the residential dwelling, or where this is more than 30m from a dwelling, at the*

most affected location within 30m of the dwelling or an equivalent position when access to the property is not available;

- *The noise from firearms or use of the new ranges must not exceed 75dB(Lin) Peak Hold at the boundary to any existing private property with the residential dwelling, or where this is more than 30m from a dwelling, at the most affected location within 30m of the dwelling or an equivalent position when access to the property is not available; and*
- *For the purpose of this Condition, the noise limit associated with the existing range and new ranges is a logarithmic average of the measured levels. Such monitoring is to occur under still wind or light wind conditions so as to avoid the sound level meters recording wind rather than noise from the rifle range.*

1.1 Background to Condition A9

In attaching Condition A9 to the approval, the Minister had available to him the analysis in the proponent's EA, comments of the DECC in relation to noise impacts, the views of the Independent Expert Panel particularly its independent noise expert, the assessment of the officers of the Department of Planning and the Director General.

The proponent now suggests that, as a result of the non-compliance with condition A9, the appropriate noise limit and the way it is measured as defined in the ENCM is wrong and should be changed thereby ensuring compliance.

This submission suggests that the condition in its present form is appropriate and reasonable in accordance with the adopted criteria in Chapter 164 of the ENCM and compliance is necessary to ensure that the amenity of existing residents is not adversely affected by the project.

Condition A9 was included in the approval after consideration of impacts and reports including the following information which was before the Minister at the time of the approval:

- Environmental Assessment Report (EA) including a *Noise Assessment* prepared by GHD dated January 2008;
- Additional noise testing undertaken by Norman Disney Young (NDY) at the request of the Independent Expert Panel appointed by the Minister to assess certain aspects of the proposal including noise impacts. These tests were reported in the NDY report *Noise Impact Assessment for Shooting Range* dated 15 July 2008;
- The proponent's Preferred Project Report (PPR) including a revised Statement of Commitments;
- Submissions from the Department of Environment and Climate Change on the EA;
- The report of the Independent Expert Panel to the Minister;
- The report of the Director-General to the Minister;

Environmental Assessment of February 2008 ("the EA")

The proponent's EA addresses the key environmental assessment requirements relating to the proposal at Chapter 10. Noise is identified as a key issue having regard to the potential impact of noise from the complex on residential amenity.

The noise assessment undertaken at chapter 10.6 and in Appendix F of the EA sets out all test monitoring results, appropriate criteria and the predictions of noise emanating from the project were it to be approved as advanced by the proponent. The noise criteria advanced by the proponent in support of the project is a criteria identified as "dB (Lin) Peak Hold" as required by Chapter 164 of the ENCM.

Independent Expert Panel and DECC Submission

On 2 May 2008, the Minister appointed a panel of experts to consider and advise on any relevant environmental considerations concerning the project. The panel included an independent noise expert, Mr Najah Ishac. The panel's terms of reference included the consideration of noise impacts associated with the proposal.

HTRAG made a detailed submission to the panel at the public hearing at Hill Top on 30 May 2008. Its submission included, amongst other things, a detailed report from its noise consultant.

The DECC also made a submission at the public hearing supporting the proponent's adoption and use of Chapter 164 of the ENCM as the appropriate document against which to evaluate the noise impacts from the proposed shooting complex. In this respect, the panel report at section 2.3, page 12, noted the following comments from the DECC:

> *The Panel notes that DECC submission made the following comments on the noise assessment presented with the Environmental Assessment (February, 2008):*
>
> - *DECC supports the sensitive receiver locations identified;*
> - *DECC supports the background noise assessment;*
> - *DECC supports the use of Chapter 164 of the Environmental Noise Control Manual (ENCM) as the appropriate document against which to evaluate the noise impacts from the proposed shooting complex;*
> - *The discussion on meteorological conditions was accepted;*
> - *The observations about civilian firearms was agreed to;*
> - *A question was raised in respect of the readings for military sniper fire;*
> - *The assessment of use of the facility according to the noise readings was accepted;*
> - *The lack of likely construction noise impact was accepted; and*
> - *There was support for compliance monitoring of noise emissions from the complex, with the suggestion that noise levels be taken at several different locations between the noise source and receivers.*

In respect of noise criteria, paragraph 2.5.2 of the panel report states in part, as follows:

> *"2.5.2 Shooting Range Noise Criteria*

> *At the time of writing this report specific noise regulations or guidelines for shooting ranges or firearms noise were not current. The guidelines used in the EA and subsequent noise assessment (undertaken on behalf of the proponent under instruction from the panel) is that promulgated in the former EPA's Environmental Noise Control Manual (ENCM). The ENCM was last published in 1994, however the relevant chapter (chapter 164) relating to target shooting ranges is dated 1985)."*
>
> *DECC in its submission supports the application of chapter 164 of the ENCM, as does the panel as the most relevant guidance document for New South Wales shooting ranges. The guidelines are summarised below*.
>
> *This guideline specifies criteria for assessing the effect on nearby residences of pistol, rifle or gun club shooting ranges when the propellant is explosive. Criteria may be used for guideline and less stringent figures could be used if site details and topography are very favourable.*
>
> *Measurements should be made at the worst affected location and consideration should be given to any neighbouring vacant land zoned as residential.*
>
> *Peak Hold (Lin) readings are taken at the most affected residential boundaries. The number of days and nights usage of the range should be limited to correspond with the measured level as shown in the table on page 164-2."*

The panel made recommendations to the Minister which included a request for further information to address noise concerns raised at the public hearing on 30 May 2008. The recommendation included the obtaining of further noise assessments to be prepared by an independent acoustic consultant, namely NDY.

The NDY report also adopts a dB (Lin) Peak Hold criteria (without any logarithmic averaging) and concluded that noise levels at residences are shown to reach up to 75dB(L) Peak Hold.

Proponent's Preferred Project Report

The proponent's PPR makes several references to the appropriateness of the use of the criteria in the NSW EPA ENCM because it is the most current guideline available in NSW. It also makes several references to independent noise assessment having been completed which confirms results in the EA.

The proponent also commits as follows:

> *Noise Monitoring would be undertaken in different climatic conditions to confirm allowable operational usage in accordance with Chapter 164 the DECC's Environmental Noise Control Manual.*

Director General's Assessment Report and recommendations of February 2010

The Director General's assessment report relating to the proposal is a detailed document which addresses at length, the issue of noise associated with the proposed Regional Shooting Complex.

The Department of Planning prepared its assessment report on the project application in February 2010 recommending approval of the application subject to conditions including

conditions setting noise limits for firearms use. The recommendation set out in the assessment report relating to noise is as follows:

> *"Noise from firearms must not exceed 75dB(L) peak hold at the boundary of any existing private property with a residential dwelling."*

The Minister considered the Director General's report of February 2010 together with the Department's assessment report on the project application and granted approval imposing condition A9. Section 5.3 of the DG's recommended that the use of the 800m range must comply with 75dB(L).

The Minister's approval is also subject to the Statement of Commitments made by the proponent. The Statement of Commitments clearly embraces an operational noise criteria based upon chapter 164 of the DECC's Environmental Noise Control Manual, and provides options for mitigation should noise levels exceed 75 dB(L) such as altering the acoustic design at the ranges, restriction of firearms used on the site and restriction of the use of certain firearms to specific ranges.

It is clear throughout the entirety of the assessment process relating to the project that all acoustic experts were of the same mind in respect of the most appropriate noise criteria relating to the Regional Shooting Complex, i.e. a criteria of dB(L) peak hold without reference to logarithmic averaging and a maximum noise level that does not exceed *75dB(L) Peak Hold at the boundary to any existing private property within a residential dwelling or where this is more than 30 metres from a dwelling, at the most affected location within 30 metres of the dwelling. This is to apply during prevailing weather conditions*.

1.2 Compliance Testing

Condition A6(c) of the approval requires attended noise monitoring of the use of the 800m range to confirm that noise levels comply with the appropriate limits. This testing has been undertaken and reported on four occasions:

a. June 2010 in a report by GHD;

b. 24 November 2010 in a report by The Acoustic Group (AG);

c. 8 February 2011 in a report by The Acoustic Group;

d. 28 February 2011 in a report by The Acoustic Group.

These reports confirm that the complex consistently operates in breach of the condition A9 of the approval with recordings up to 8dB(L) above the maximum of 75dB(L) peak hold.

1.3 Proponent's Current Position

Notwithstanding the considerable analysis in the proponent's EA, the comments of the DECC, the views of the Independent Expert Panel, the independent noise expert, the assessment of the officers of the Department of Planning and the Director General and the determination of the Minister, the proponent's response to the non-compliance with condition A9 is to change the noise limit.

Rather than altering operations to restrict firearms used on the site by reducing the number of days per week shooting is permitted, rather than altering the acoustic design at the ranges and rather than restricting the use of certain firearms to specific ranges, all as required by the proponent's statement of commitments, the proponent seeks to change the accepted noise limit so that that there is compliance.

This submission suggests that the condition in its present form is appropriate and reasonable to ensure that the amenity of existing residents is not adversely affected.

1.4 Use of Logarithmic Averaging

The proponent's proposed condition suggests that Chapter 164 of the ENCM requires the use of a logarithmic average of noise measurements.

This matter is addressed in the expert report prepared by Dr Renzo Tonin on behalf of the HTRAGI contained in Attachment 1.

The application to modify the approval states in part:

> *It has also come to the Office of Communities (Sport and Recreation) attention that the application of the Chapter 164 Guidelines utilised a logarithmic average of the noise levels to accord with socio-acoustic survey material for rifle ranges. The use of an absolute maximum level does not accord with Environmental Protection Authority practice, whilst a logarithmic average (rather than an arithmetic average) uses the EPA/DECCW 'Leq' concept (i.e. equivalent continuous sound pressure level).*

The Acoustic Group report accompanying the application dated 31 August 2011 states that the Chapter 164 guidelines were in practice modified to consider an energy average of the individual shots attributed to the different classifications of fire arms.

The proponent suggests that a logarithmic average of individual noise measurements from range use should be used to obtain a maximum noise measurement to compare with the 75db(L) criteria included in condition A9 and derived from the ENCM.

Chapter 164 of the ENCM is contained in Attachment 2. Also contained in Attachment 2 is a memo from the Environment Protection Authority dated 25 January 1993 stating that arithmetic average is used rather than energy averaging (logarithmic averaging) as now proposed by the proponent. Further the memo stipulates the number of noise measurements required to determine a noise level that is representative of the fire arm being used.

The advice from the EPA is clear and unambiguous. The use of a logarithmic averaging is not accepted as part of the methodology in applying the criteria in Chapter 164 of the ENCM. Noise measurements of each fire arm being used are required.

If the logarithmic averaging process as proposed by Mr Cooper is adopted, the average noise level would be reduced by the inclusion of inaudible gun shots. This could mean that noise in excess of 10dB(L) above existing limits in condition A9 would be experienced by residents.

This position has been confirmed in the advice of Dr Renzo Tonin contained in Attachment 1. Dr Tonin concludes that:

> *I therefore conclude that if the logarithmic averaging advocated in the Cooper Reports is adopted, the resulting noise levels would represent an unacceptable impact on the residents in the immediate vicinity of the subject development.*

It is noted that the application contains no assessment of the increase in noise annoyance experienced by residents since the regional shooting complex commenced operations following approval.

The modification request should be refused in this regard.

1.5 Why the 800 m range used in accordance with the approval should not be considered an 'existing range'

The applicant asserts, in part, that the 800m range currently in operation should be considered to be an existing range as referred to in Chapter 164 of the ENCM and thus be allowed a higher noise threshold. This assertion should be rejected because:

- the nature of use of the 800m range under the approval is significantly different to the previous use under a development consent from the Council;
- the range opened after the introduction of Chapter 164 of the ENCM and thus at no time was an existing range;
- Chapter 164 clearly states that alterations to existing ranges should incorporate a movement towards the "Future Range" figures whenever possible.

The Cooper report dated 31 August 2011 accompanying the application states that:

> *Based on previous EPA assessment/approvals for existing rifle range complexes that had been expanded by the provision [of] additional ranges/disciplines, one considers the existing operations as an existing category under the guidelines with the additional ranges/disciplines considered in terms of the future range classification.*

The approval allows an intensity of use of the existing range that is significantly different to that under the previous consent under which the range operated and which has ceased to have effect. The conditions of development consent under which the existing range operated allowed the use of the range on Saturdays and Sundays only with typical monthly usage by 96 shooters. There were limits on the events and the weapons used. Changes to firearms categories and sizes of weapons permissible have occurred in 2002, 2005 & 2007. Under the approval, the character of use has changed from a very small local range used at weekends only for limited clubs to a regional shooting complex used by a large number of clubs for 4 days a week plus additional special events with the only limit on use (as identified by the proponent in the PPR) being the number of firing points.

Attachment A to the application states (last paragraph) that in general terms, the fire arms in use since 1987 have remained constant to date. However, current licensing arrangements, in conjunction with the approval for a regional shooting complex, allows a much wider range

of firearms including Army firearms. The nature of use has altered substantially, and can alter further as a consequence of the approval.

Furthermore, it is incorrect to assert that there have been no complaints from residents. Council advises that there have been a number of complaints in relation to noise from the use of the range.

The existing range commenced operation in accordance with a consent granted in 1986. This was after the commencement of Chapter 164 of the ENCM and thus this range cannot be considered to be an existing range in any circumstance. Mr Cooper incorrectly asserts on page 2 of his report dated 31 August 2011 accompanying the application to modify the approval that *the subject complex has been in existence since 1982*. It was never approved as a complex at that time as it commenced use in 1987 after consent was granted in 1986.

Further Chapter 164 clearly states that alterations to existing ranges should incorporate a movement towards the "Future Range" figures whenever possible. This should apply to the present situation where additional facilities are provided and additional use of the 800m range is proposed as part of a regional shooting complex of State significance.

The modification to increase the noise limit for the existing range to 85db(Lin) peak hold should be refused.

1.6 Appropriate Response to GHD 2007 Report and Additional Testing

The proponent states (Attachment A, page 1 of the application) that the noise limitation of 75dB(L) peak hold incorporated into condition A9 would *appear to relate to the initial 2007 GHD test results (confirmed by NDY).* There is no justification for this assertion. The noise limitation in condition A9 is derived directly from Chapter 164 of the ENCM. This clearly states that a future range that operates for 4 days in any week (as requested by the proponent and as allowed by condition A7) must have measured noise levels at the most affected residential boundary of less than 75dB(L) peak hold.

In this regard the provisions of condition A9 need to be seen in the context of condition A7 which states that all outdoor ranges shall not operate more than 4 days per week. On the grounds that the applicant proposes to operate no more than 4 days a week, Chapter 164 of the ENCM requires a maximum noise level of 75dB(L) peak hold.

Should the proponent wish the maximum in condition 9 to increase to 85dB(L) peak hold, condition A7 should also be amended to allow shooting for 2 days a week only.

Whether the GHD 2008 report included in the EA predicted noise from firearms to be less that the actual measured noise is irrelevant to the application of the relevant noise criteria determined in accordance with the ENCM. It is wrong, and of no relevance, to assert that GHD in 2007/2008 failed to accurately record, measure, identify and report the range of noise levels. What they did was try to predict the noise from a future project were it to be approved. The criteria in condition A9 is derived not from these measurements but from the ENCM.

As pointed out in the report in Attachment 1 prepared by Dr Tonin, the noise assessment in the GHD 2008 report accompanying the EA predicted noise impacts based on the 100m firing point measurements and assumed this was the worst case situation. We now know, based on the summary of the available data presented in Figures 1-3 of Dr Tonin's report, that the noise levels from gun fire are much higher than originally predicted, at least at three of the four locations tested. There is inherent uncertainty in predictive noise levels which is documented in the Director General's Report:

> *Given the increase in use of the 800m range from 2 to 4 days per week, and that it is the closest range to existing residences, it is considered reasonable for noise monitoring to be undertaken for the use of this range. Therefore it is recommended that attended noise monitoring be undertaken on the first 3 occasions of use of the 800m range for 4 days per week, from the date of this approval, and thereafter, quarterly in the first twelve months of operation (aligned with each season) and annually thereafter to confirm noise levels from firearms measured at residences comply with appropriate limits (ie 75dB(L) peak hold). The monitoring must include that of the noisiest firearms being used on the 800m range.*

In the event that noise levels do not comply with condition A9 then, consistent with proponent's undertakings, this would trigger the introduction of noise mitigating measures in accordance with the following commitment given in the proponent's Submissions Report:

> *The noise impacts, including traffic noise, of any proposal to increase site usage would be subject to detailed investigation once the new ranges have been built. This would involve noise measurements, at the nearest sensitive receivers, of all firearms (recreational and military) used and fired in their respective ranges. Measurement results may trigger additional measures such as:*
>
> *» Altering the acoustic design at the ranges;*
>
> *» Restriction of firearms used on the site; and*
>
> *» Restriction of the use of certain firearms to specific ranges.*

It is considered that the noise limit in condition A9 is appropriately derived from, and is consistent with, Chapter 164 of the ENCM having regard to the stated usage figures of the proponent. There is no justification for adopting a different criteria or adjusting the way the criteria is to be implemented to artificially achieve compliance in this case.

Where project noise exceeds the criteria, the approach universally adopted in NSW is to modify the project so as to reduce the noise received at sensitive receptors, or if that cannot be done, to buy out the receptors. That approach is reflected in the Statement of Commitments which requires modification by introducing noise barriers or by using other means to reduce noise and its associated annoyance if project noise exceeds the criteria. That possibility was foreseen - indeed, it may have been likely - and the solution to it is contained in the conditions themselves. For that reason, it is unnecessary to change the criteria simply because noise in excess of it is generated by the range.

Modification of the condition has not been justified and should be refused.

1.7 Practical Consequences of Failure to Comply with Guidelines

The modification application states as follows in the second page of Attachment A:

The practical outcome of the failure by GHD to accurately record, measure, identify and report the range of noise levels generated on that range is the imposition – through Condition of Approval A9 - of an operating noise limit that effectively reduces the 800m range to four firing points (100m through to the 400m firing points). Certain firearm discharges from the remaining four firing points will, in all likelihood, exceed the outright 75dB (L) peak hold limit, reducing not insignificantly the extent of shooting disciplines that can be enjoyed on the range.

Further the proponent asserts that:

an unintended consequence that the condition of Approval A9 noise limit could operate to effectively eliminate certain disciplines from a number of firing points on the 800m range

This assertion also does not stand up to scrutiny. There is a range of other methods available to deal with the non-compliance required by the approval through the proponent's Statement of Commitments. This situation was specifically anticipated by the approval with measures included to deal with the situation. These include:

- altering operations to restrict firearms used on the site by reducing the number of days per week shooting is permitted;
- altering the acoustic design at the ranges by introducing more barriers for example; and
- and restricting the use of certain firearms to specific ranges.

In the event that the Minister had known of the noise levels measured in the testing required by the approval at the time the project application was determined, he would have had other options available. He could have rejected the proposal or approved it subject to conditions requiring additional noise mitigation measures to be put in place or imposing more restrictive constraints on the operating times or design of the facility in order to comply with the criteria in Chapter 164 of the ENCM. In our view the Minister would not have changed the criteria as now requested by the proponent.

The Director General's report states that the use of high powered firearms on the 800m range as proposed would be loud and notes that the use of this range must comply with 75dB(L) peak hold.

1.8 Change to Measurement Location

Condition A9 currently requires the noise from firearms to be measured *at the boundary to any existing private property with a residential dwelling, or where this is more than 30 metres from a dwelling, at the most affected location within 30 metres of the dwelling*.

The application seeks to modify this aspect of the condition so that noise from firearms is to be measured *at the boundary to any existing private property with the residential dwelling, or where this is more than 30m from a dwelling, at the most affected location within 30m of the dwelling* ***or an equivalent position when access to the property is not available***;

We are advised that access to all monitoring positions is readily available upon request which has been the case to date. There is no reason why this should change as it would introduce another unwanted variable into the interpretation of the measurements and comparison with previous measurements. There is no justification for this change and it should be refused.

1.9 Criteria Should not be Changed

The above assessment provides compelling grounds as to which the application should be refused and condition A9 retained in its present form.

If the Minister or his delegate is contemplating changing the criteria from that included in Chapter 164 of the ENCM, approval should not be granted until such time as all relevant investigations and community and stakeholder consultation has been undertaken to enable the State government and its relevant agencies to determine and adopt an alternative noise criteria for shooting ranges, including regional shooting complexes.

Departure from the ENCM criteria would only be acceptable to increase impacts on surrounding residents where the national interest justified it eg during wartime. There could be no conceivable argument of national interest here. If a new method of assessment is to be adopted, as urged by Mr Cooper, then new noise goals and criteria will be necessary, properly based on socio-acoustical surveys or national standards, which seek to achieve the purpose of noise assessment - to produce a respectful amenity for residents having regard to ambient conditions.

Indeed, to change the criteria now would be a concession that the project was approved on an entirely false premise which would legally jeopardise the validity of the approval and entitle if not compel the Minister for Planning to require the submission of a fresh project application rather than to modify an approval which has been granted on a false premise.

2. Condition of Approval A6(d) - Attended Noise Monitoring 800m Range

No objection is raised to the proposition that the results of the noise monitoring are made available by posting on the website and made available to the Department of Planning and Infrastructure and Council to allow for public access within 30 days of the completion of the noise testing. Thus this condition should be modified to read:

> *Compliance monitoring results for the shooting complex to be posted within 30 days of the completion of noise monitoring tests on a website and submitted to the Department of Planning and Infrastructure and Council to allow for public access to this information*

3. Condition of Approval D4 – Acoustic Shelter at 800m Firing Point

Condition D4 requires as follows:

> *Acoustic shelters shall be provided for the existing range (at the 800m firing point) and the new outdoor ranges. The shelters shall be constructed of an acoustically absorptive material and in accordance with the measures outlined in the detailed plans provided in the Preferred Project Report.*

The modification sought in the application is to vary this condition by deleting the requirement to construct an acoustic shelter at the 800m firing point of the 800m range.

Available noise testing suggests that acoustic shelters or acoustic barriers or mounding are required for other firing positions on the 800mm range.

It is considered that the barrier will provide some benefit for residents and park users and consequently should remain a requirement.

Reference should be made to the Interim Operational Management Plan approved by the Department of Planning in May 2010 which clearly indicates that the 800m range will be used 4 days a week including military use on two consecutive days per week and increased use of 800m range by increased membership of constituent clubs of SHRSC Inc.

4. Condition of Approval A6(c) – Deletion of Testing

The proponent, the Office of Communities seeks agreement from the Department of Planning and Infrastructure to conduct the next quarterly testing in January 2012 and annually thereafter. The proponent also requests the removal of any further obligation by Communities NSW to comply with condition A6(c) of future monitoring.

Condition A6(c) requires as follows:

> *(c) Attended noise monitoring to be undertaken on the first 3 occasions of use of the 800m range from the date of this approval, thereafter, quarterly in the first twelve months of operations (aligned with each season) and annually thereafter to confirm noise levels from firearms measured at residences comply with appropriate limits. The monitoring must include that of the known noisiest firearms being used on the 800m range.*

This is not justified. The non-compliance with condition A9 shown in the quarterly testing to date and summarised in Section 2 of the Renzo Tonin report in Attachment 1, shows that it is premature to reduce the frequency of testing. Indeed, given the uncertainty in noise measurement results and the fact that noise measurements from the use of facility since approval exceed the predicted noise levels at the time approval was granted, testing should be intensified and undertaken with a greater degree of scrutiny and include the known nosiest firearms used on the 800m range.

5. Compliance

The monitoring undertaken in compliance with condition A6 of the approval establishes that the operation of the 800m range is in breach of condition A9 of the approval. Such a breach is also a breach of section 75D of the EP&A Act. In this respect the Acoustic Group report of 31 August 2010 states at p15 as follows:

> *"At the present time the big bore range should not be permitted to utilise any firing positions greater than 400m so as to maintain compliance with the conditions of consent."*

It is also noted that the following condition of the approval has not been met to our knowledge:

- Condition A11(a) requiring a report to be prepared for each year of operation by an independent auditor. In this regard it is submitted that such an auditor should not be in the employ of the proponent or shooters organisations.

There have been on-going breaches of the conditions of approval which need to be rectified.

6. Referral to the PAC

In view of the seriousness of this application and the implications it has for dismissing the otherwise commonly applied noise criteria included in Chapter 164 of the ENCM, it is imperative that this application be referred to the Planning Assessment Commission for determination with a request that further advice be sought from an independent noise expert such as Mr Najah Ishac, a member of the Minister's Independent Expert Panel.

We request that these matters be taken into consideration in determining this application to modify the approval.

Yours faithfully
BBC Consulting Planners

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ATTACHMENT 1

Report by Renzo Tonin & Associates

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SOUTHERN HIGHLANDS REGIONAL SHOOTING COMPLEX

APPLICATION FOR MODIFICATION, CONDITIONS A9, A6 & D4 - ACOUSTIC REPORT OF RENZO TONIN

TF403-01F05 (REV 0) ACOUSTIC REPORT

15 JULY 2011

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DOCUMENT CONTROL

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1 INTRODUCTION

I am the managing director of Renzo Tonin & Associates (NSW) Pty Ltd of Level 1, 418A Elizabeth Street, Surry Hills NSW 2010.

I have practiced as a consulting engineer in acoustics for 32 years, 28 years as principal of my firm. I was awarded a B.Sc. (Hons) in 1973 and a PhD in acoustics in 1976. I am a member of the professional societies listed in the Annexure B.

I have not been engaged on a contingency fee basis and, with the exception of the experience in the next paragraph, do not act for any shooter association and hence have no conflict of interest.

I was involved in 2002 in measuring noise levels associated with a proposed firing range at the Far South Coast Shooting Complex at Narooma. This experience particularly related to the difficulties associated with identifying firing noise in the presence of wind, a matter which is relevant to this report.

I am retained by Pikes Lawyers on behalf of the Hill Top Resident Action Group concerning the application of Communities NSW to modify the Minister's approval dated 1st March 2011 for a Regional Shooting Complex at Hill Top on the Southern Highlands.

The application for modification seeks to modify the Minister's approval in the following terms:

i) Amend condition A9 to impose new noise limits for the firearms use;

ii) Modify condition A6(d) relating to noise monitoring for the 800m range; and,

iii) Delete condition D4 relating to the provision for acoustic shelters for the 800m range.

I have been requested to advise whether the matters set out in the reports prepared by Mr Cooper of The Acoustic Group and the matters set out in the Application are acceptable. In particular, I am to comment in respect of the logarithmic averaging method proposed by Mr Cooper as to whether this is an acceptable method of calculating noise impact from the rifle range.

I have prepared this report as an independent expert and not as an advocate for my client. This report complies with the requirements of Division 2 of Pt 31 of the Uniform Civil Procedure Rules and the Expert Witness Code of Conduct in Schedule 7 of the Uniform Civil Procedure Rules.

The following pertinent documents have been supplied to me, however this list is not exhaustive;

i) GHD Environmental Assessment dated February 2008 ("**GHD EA**")

ii) Norman Disney Young Report dated 15 July 2008 ("**NDY Report**")

iii) Director General's Report incorporating the IHAP Reported dated February 2010 ("**Director General's Report**")

iv) Minister's approval dated 1 March 2010 ("**Minister's Approval**")

v) Compliance noise monitoring report of GHD dated June 2010 ("**GHD 2010 Report**")

vi) The Acoustic Group report dated 31 August 2010 ("**Cooper Report 1**")

vii) The Acoustic Group report dated 27 October 2010 ("**Cooper Report 2**")

viii) The Acoustic Group report dated 24 November 2010 ("**Cooper Report 3**")

ix) The Acoustic Group report dated 8 February 2011 ("**Cooper Report 4**")

x) The Acoustic Group report dated 28 February 2011 ("**Cooper Report 5**")

xi) Application for modification from Communities NSW to the Department of Planning dated 13 May 2011 ("**Application**")

xii) Noise Control Guideline on Shooting Noise Memo EPA dated 25th January 1993 ("**EPA Memo**").

I record that I have not visited the site.

I have approached my brief by examining, for each of the three proposed modifications, the contentions associated with those modifications. Each contention is extracted from the Application, numbered sequentially and discussed in turn.

I have not considered contentions which appear to relate to the Minister's original decision, for example, the contention that the existing 800m range has been in operation since 1987, is an "existing" range pursuant to Chapter 164 of the Environmental Noise Control Manual ("**SPCC Guideline**") and should therefore attract a higher noise limit. I wish to make it clear that the existing range issue involves factual issues and interpretation that are best addressed by a planner.

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001.

2 CONSOLIDATION OF GUN FIRE NOISE MEASUREMENTS

Detailed results of measured gunfire noise are contained in the GHD EA, GHD 2010 Report, and Cooper Report 3,4 and 5. The assessment locations are the nearest residential dwellings referred to in Figure 5 of the GHD EA as locations A1, A2, A3 and A4. Four other locations shown in Figure 6 are denoted as B1, B2, B3 and B4 at which military rifles were tested. For the purpose of my report, I have not differentiated between the corresponding A and B locations noting that they are either identical or close in proximity.

All measurements in the reports noted above were conducted of firing at the existing 800m range at the various firing positions denoted 100m, 200m, 300m, 500m and 800m. The results of firing noise levels are presented in tabular form in each of the referenced reports.

I have prepared Figures 1-4 in order to gain a better understanding of the range of gunfire noise levels measured at each residential location for each firing position. Each figure represents the cumulative total of reported measurements at each location for each firing position. In these figures the legend along the abscissa axis (i.e. the horizontal axis) denotes the following:

- **GHD EA** means the GHD EA
- **GHD** means the GHD 2010 Report
- **Cooper** means the Cooper Report 3,4 and 5.

The reference to 100m, 200m etc means the firing positions at 100m, 200m etc respectively on the 800m range.

Tables 1-4 include a list of firearms used for each of the measurement sets together with the calculated logarithmic average of the measured noise levels (advocated in the Cooper Reports) for each firing position. The column marked "% Above" denotes the percentage of noise measurements which exceed the logarithmic average value. For example, in Table 1 first row, the logarithmic average of the 100m GHD EA levels is 58.5dB Lin Peak and 13% of all the measured noise levels reported in the GHD EA for that firing position exceed that value.

Prior to making detailed observations about these figures, it is important to note that in Figure 2, I have omitted the measurements reported in Cooper Report 4 as being wind affected (denoted in parentheses in Appendix C of that report). By "wind affected" I mean that the microphone is responding to the pressure of the wind (which is inaudible but registers on the meter) rather than the sound of the shots. It is also apparent from examination of the scatter in the latter portion of the "500m Cooper" set in Figure 2 that some of the other measurements must also be wind affected. This set of data is therefore ignored in my detailed observations.

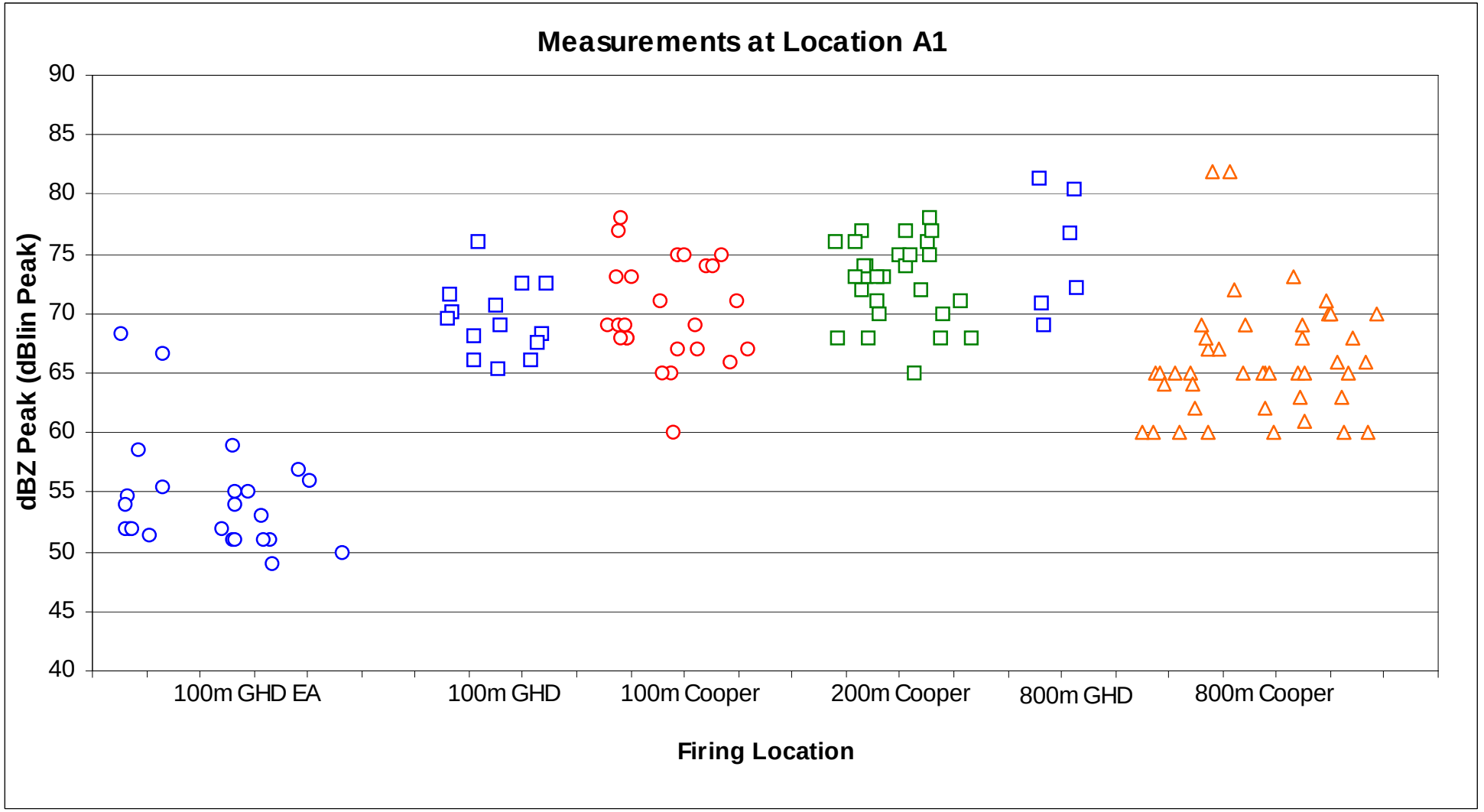

Figure 1: Gunfire Noise Levels Measured at Residential Location A1

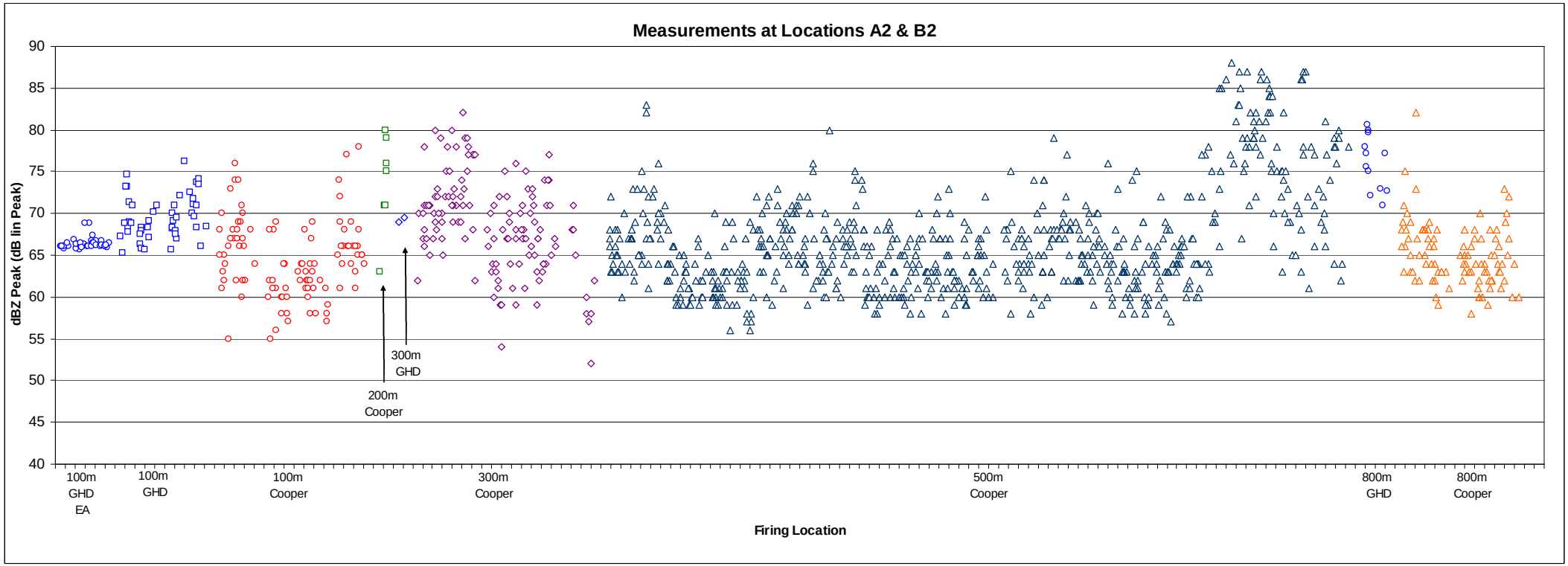

Figure 2: Gunfire Noise Levels Measured at Residential Location A2 and B2

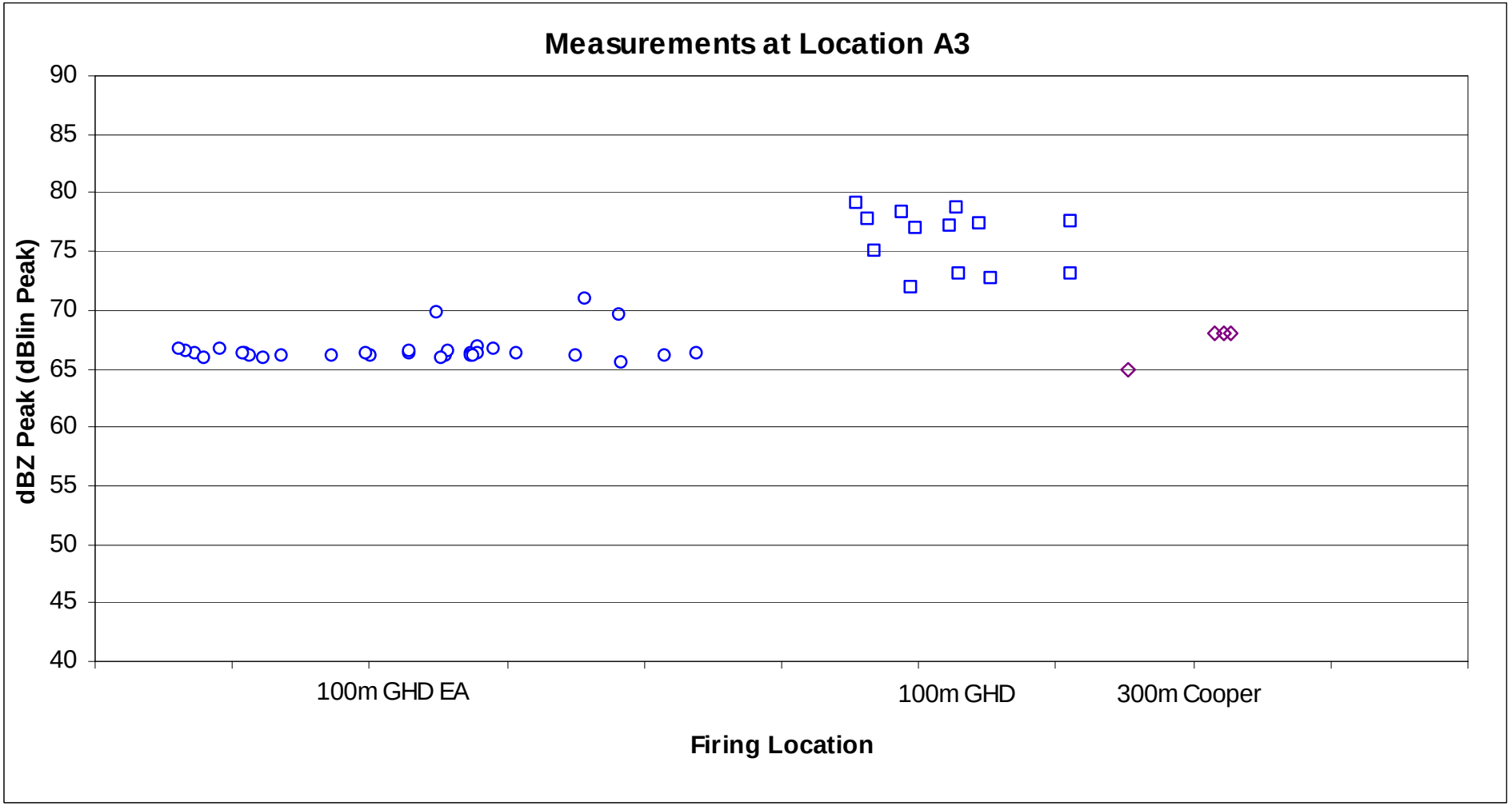

Figure 3: Gunfire Noise Levels Measured at Residential Location A3

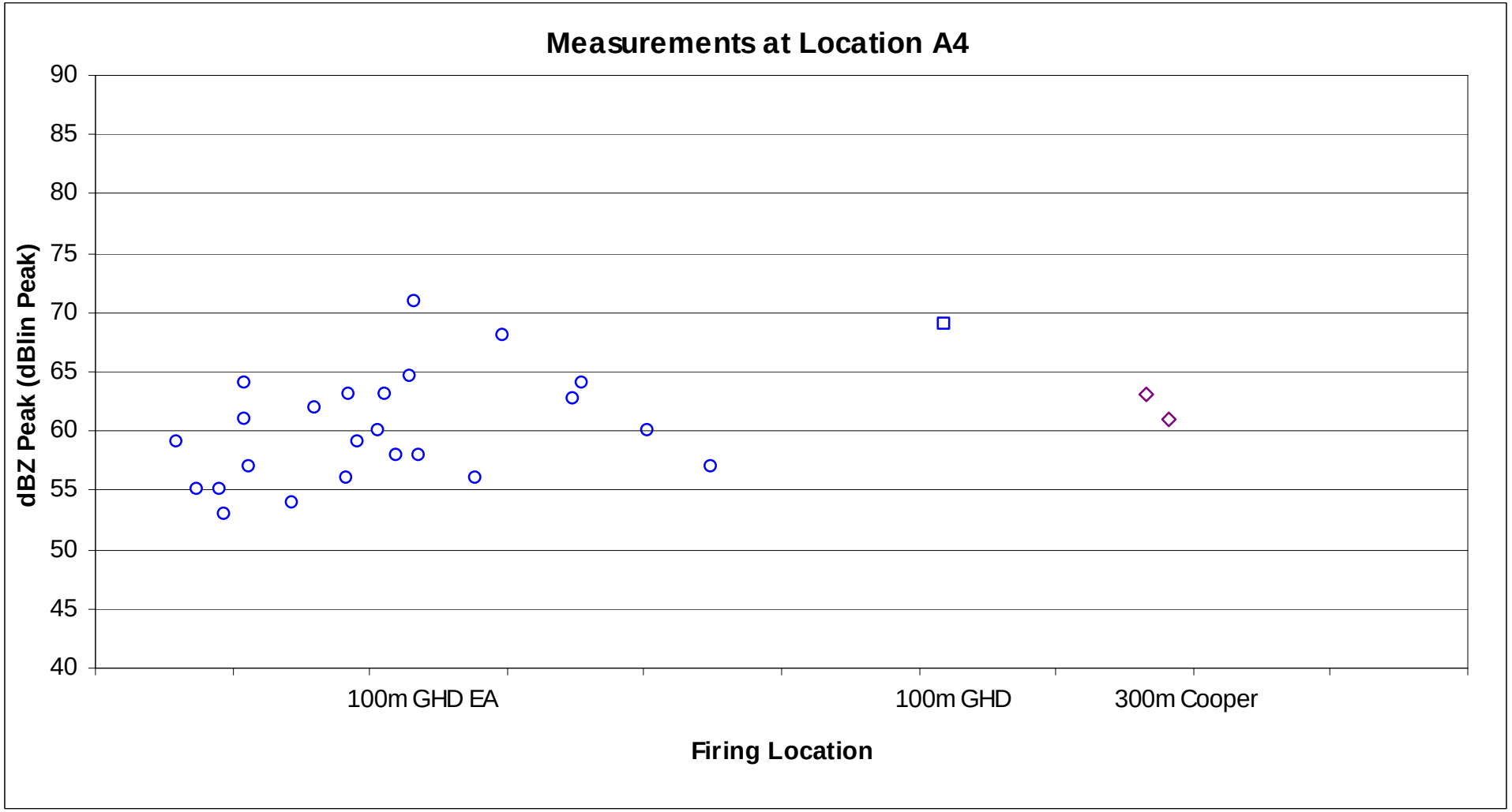

Figure 4: Gunfire Noise Levels Measured at Residential Location A4

Table 1 Description of Firearms and Noise Analysis at Location A1

Consultant	Firing Position	Gun Type	Log Av	% Above
GHD EA	100m	Shotguns – 2 x 12 gauge shotgun, 1 x 20 gauge shotgun Rifles – 4 x .308 rifles, 1 x .310 mm rifles Pistols – 1 x 44 revolver, 1 x 357 Magnum	58.5	13%
GHD	100m	1 x 0.22 G shotgun, 4 x 0.303 rifles, 1 x 7.62 rifle, 1 x 6.5 rifle, 1 x 0.22 Rimfire rifle	70.6	32%
Cooper	100m	Centrefire	72.0	35%
Cooper	200m	Full Bore (.303, .308 and .223), .22,.250	73.9	45%
GHD	800m	0.308 rifle 0.223 rifle	77.4	37%
Cooper	800m	Shotgun, Centrefire, Service Rifle	70.8	10%

Table 2 Description of Firearms and Noise Analysis at Location A2 and B2

Consultant	Firing Position	Gun Type	Log Av	% Above
GHD EA	100m	Shotguns – 2 x 12 gauge shotgun, 1 x 20 gauge shotgun Rifles – 4 x .308 rifles, 1 x .310 mm rifles Pistols – 1 x 44 revolver, 1 x 357 Magnum	66.4	31%
GHD	100m	4 x 0.303 rifles	70.4	34%
Cooper	100m	Rimfire	67.5	26%
Cooper	200m	Full Bore (.303, .308 and .223), .22,.250	76.0	34%
GHD	300m	16 G shotgun 7.62 Nato rifle 0.22 Rimfire rifle	69.3	49%
Cooper	300m	Full Bore (.303, .308 and .223)	72.1	22%
Cooper	500m	Full Bore (.303, .308 and .223)	67.4	23%

Note: Cooper 500m value ignores wind affected levels

Table 3 Description of Firearms and Noise Analysis at Location A3

Consultant	Firing Position	Gun Type	Log Av	% Above
GHD EA	100m	Shotguns – 2 x 12 gauge shotgun, 1 x 20 gauge shotgun Rifles – 4 x .308 rifles, 1 x .310 mm rifles Pistols – 1 x 44 revolver, 1 x 357 Magnum	66.8	12%
GHD	100m	3 x 0.303 rifles, 1 x 6.5 rifle	76.7	59%
Cooper	300m	Full Bore (.303, .308 and .223)	67.4	73%

Table 4 Description of Firearms and Noise Analysis at Location A4

Consultant	Firing Position	Gun Type	Log Av	% Above
GHD EA	100m	Shotguns – 2 x 12 gauge shotgun, 1 x 20 gauge shotgun Rifles – 4 x .308 rifles, 1 x .310 mm rifles Pistols – 1 x 44 revolver, 1 x 357 Magnum	62.6	31%
GHD	100m	4 x 0.303 rifles	69.0	0%
Cooper	300m	Full Bore (.303, .308 and .223)	62.1	44%

The first observation to be made in examining the data is the wide range of measured noise levels even for the same firing position. For example, in Figure 1, the noise levels of the three measurements at the 100m position range from 50dB to over 75dB, a difference of 25dB. In Figure 2, the range for the 100m position is from 55dB to over 75dB, a difference of 20dB.

There is insufficient information provided in the reports to explain whether this difference is a consequence of the type of firearm tested. Examination of the list in the tables above shows a wide range of equipment was tested.

The second observation is that, at least for Figures 1-3, the GHD EA noise levels for the 100m position (the only position tested) are significantly lower than the range in the GHD 2010 Report and in the Cooper reports. The scatter in the noise levels in the GHD EA 100m measurements in Figures 2 and 3 is also much lower than the scatter in the GHD and Cooper measurements.

The third observation is that the 800m firing position does not necessarily produce the highest noise levels. At Location A2/B2, for example, the highest noise levels are produced at the 200m and 300m firing positions. In fact, at the 800m firing position, there are only three firings exceeding 75dB Lin Peak which in my opinion, for the reasons stated in the next section, makes that firing position probably compliant with Condition A9.

The fourth and final observation is that if the limit in condition A9 of the Minister's Approval is an absolute limit, then there are demonstrated exceedences at all firing positions and, with the exception of a small number of firings (and ignoring the wind affected data in Figure 2 previously referred to) the exceedence amounts to approximately 5dB.

These observations will be referred to in the subsequent sections of this report.

3 CONDITION OF APPROVAL A9 - (FIREARM NOISE LIMITS)

Condition of Approval A9 currently provides as follows:

The noise from firearms or use of the site must not exceed 75dB(L) peak hold at the boundary to any existing private property with a residential dwelling, or where this is more than 30 metres from a dwelling, at the most affected location within 30 metres of the dwelling. This is to apply during prevailing weather conditions.

The modification sought in the Application is as follows:

- *The noise from firearms or use of the existing 800m range must not exceed 85dB(Lin) Peak Hold at the boundary to any existing private property with the residential dwelling, or where this is more than 30m from a dwelling, at the most affected location within 30m of the dwelling or an equivalent position when access to the property is not available;*
- *The noise from firearms or use of the new ranges must not exceed 75dB(Lin) Peak Hold at the boundary to any existing private property with the residential dwelling, or where this is more than 30m from a dwelling, at the most affected location within 30m of the dwelling or an equivalent position when access to the property is not available; and*
- *For the purpose of this Condition, the noise limit associated with the existing range and new ranges is a logarithmic average of the measured levels. Such monitoring is to occur under still wind or light wind conditions so as to avoid the sound level meters recording wind rather than noise from the rifle range.*

I now turn to each of the contentions raised in the Application in respect of the proposal to modify this condition.

3.1 Contention 1: GHD Environmental Noise Assessment was Flawed

I understand that the proposition advanced by the Application is *inter-alia* that the GHD EA was flawed because the measured and predicted noise levels from gunfire were significantly lower that what is now evident in the recent testing by GHD and Cooper. The Application states as follows:

It is clear to the Office of Communities (Sport and Recreation) that the initial 2007 GHD noise assessment - subsequently confirmed by NDY - has underestimated the range of firearm noise levels generated at varying firing points on the existing 800m multi-purpose range.

Reference to Figures 1-3 indicates this observation is correct. However, this does not necessarily make the GHD EA flawed triggering a re-evaluation of the noise conditions. Rather,

it triggers, because of Condition A2, the commitments made in Section 4 of the Submissions Report. [1]

The noise impacts, including traffic noise, of any proposal to increase site usage would be subject to detailed investigation once the new ranges have been built. This would involve noise measurements, at the nearest sensitive receivers, of all firearms (recreational and military) used and fired in their respective ranges. Measurement results may trigger additional measures such as:

» Altering the acoustic design at the ranges;

» Restriction of firearms used on the site; and

» Restriction of the use of certain firearms to specific ranges.

Condition A9 must therefore be read together with these commitments. The Cooper Reports have omitted any reference to Condition A2 and the commitments which throw light on how A9 is to be implemented.

Instead, the Cooper Reports criticise the GHD noise assessment. The purpose of a noise assessment is to derive noise criteria specific to the project taking into account generally accepted noise goals which are set out in, for example, the Industrial Noise Policy, Noise Guide for Local Government, Australian Standards, Council policy, legislation and common law principles. It is not to back fit noise criteria around the maximum noise likely to be generated by a project, but that appears to be the approach implicit in the Cooper Reports.

Where noise from the project exceeds the criteria, the approach universally adopted in NSW is to modify the project so as to reduce the noise received at sensitive receptors, or if that cannot be done, to buy out the receptors. That approach is reflected in the Statement of Commitments which requires alterations to the acoustic design at the ranges, such as the introduction of noise barriers, and other restrictions if noise levels exceed the criteria. For that reason, it is unnecessary to change the criteria simply because noise in excess of it is generated by the range. That possibility was presumably foreseen - indeed, it may have been likely - and the solution to it is contained in the conditions themselves.

It is not unusual in my experience for developments to commence operation and find the resulting noise levels or environmental impacts exceed the predictions in the environmental assessment. In those cases, noise mitigation works were undertaken to make the developments comply. A classic example is the notorious Sydney Third Runway EIS which triggered an enormous public outcry including a Senate enquiry.[2] In that instance, the ANEF noise exposure limits were not increased but instead dwellings, churches and schools were

[1] GHD Submissions Report July 2008 Page 67

[2] 1995 Senate Inquiry into Aircraft Noise "Falling on Deaf Ears?"

acoustically insulated and the air traffic was redistributed to create a more equitable noise sharing arrangement to lessen those impacts.

Now turning to the subject proposal, the Director General's Requirements state the following was required in respect of acoustics and 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.

The noise assessment in the GHD EA examined noise impacts based on the 100m firing point measurements and assumed this was the worst case situation. We now know based on the data presented in Figures 1-3 that the noise levels from gun fire are much higher than originally predicted, at least at three of the four residential locations tested.

Presumably that possibility was foreseen and the work prescribed in condition A6 was contemplated for the purpose of minimising that risk.

The uncertainty in the noise levels is documented in the Director General's Report: [3]

Given the increase in use of the 800m range from 2 to 4 days per week, and that it is the closest range to existing residences, it is considered reasonable for noise monitoring to be undertaken for the use of this range. Therefore it is recommended that attended noise monitoring be undertaken on the first 3 occasions of use of the 800m range for 4 days per week, from the date of this approval, and thereafter, quarterly in the first twelve months of operation (aligned with each season) and annually thereafter to confirm noise levels from firearms measured at residences comply with appropriate limits (ie 75dB(L) peak hold). The monitoring must include that of the noisiest firearms being used on the 800m range.

In the event that noise levels do not comply with condition A9 then, consistent with proponent's undertakings, this would trigger the introduction of noise mitigating measures in accordance with the commitment given in Section 4 of the proponent's Submissions Report referred to earlier.

In my opinion, this commitment does not only apply to the new firing ranges proposed on the site but to any increase in site usage including the intensification of use of the 800m range.

Given the observation in the previous section that a 5dB noise reduction is necessary to comply with condition A9, I am of the opinion this could be achieved by the installation of conventional acoustic barriers or acoustic shelters which in any event is contemplated in Condition D4 for the 800m firing point. A noise reduction of 5dB is not an insurmountable target and should be achievable in my opinion.

[3] Director General's Report Pg 22

Finally, it is my view that even if the Minister had known of the information in Figures 1-4, he would have had two options available – either to reject the proposal or to approve it subject to noise mitigation measures being adopted or imposing more restrictive constraints in the operating hours in order to comply with the SPCC Guidelines.

In my opinion, the option of now setting a noise limit in excess of the Minister's Approval should only be contemplated if all other reasonable and feasible measures have been exhausted. In the event of that occurring, any application should be delayed until the revised criteria are developed and accepted. Clearly, this is not contemplated in the Application.

It is therefore my opinion that Contention 1 should fail for these reasons.

3.2 Contention 2: Imposition of Condition A9 Reduces 800m Range to 400m

The modification application states as follows in the second page of Attachment A:

The practical outcome of the failure by GHD to accurately record, measure, identify and report the range of noise levels generated on that range is the imposition – through Condition of Approval A9 - of an operating noise limit that effectively reduces the 800m range to four firing points (100m through to the 400m firing points). Certain firearm discharges from the remaining four firing points will, in all likelihood, exceed the outright 75dB (L) peak hold limit, reducing not insignificantly the extent of shooting disciplines that can be enjoyed on the range.

This contention is not consistent with the observations made in the previous section. Those observations are that noise levels from the 800m firing point are not the highest, in fact the 200m and 300m firing points produce higher noise levels.

In any event, ameliorative measures are readily available to reduce noise emissions from the site.

This contention must therefore fail.

3.3 Contention 3: Use of Logarithmic Averaging Not Absolute Maximum Level

The third contention is stated as follows: [4]

It has also come to the Office of Communities (Sport and Recreation) attention that the application of the Chapter 164 Guidelines utilised a logarithmic average of the noise levels to accord with socio-acoustic survey material for rifle ranges. The use of an absolute maximum level does not accord with Environmental Protection Authority practice, whilst a logarithmic average (rather than an arithmetic average) uses the EPA/DECCW 'Leq' concept (i.e. equivalent continuous sound pressure level).

[4] Modification Application - Attachment A Pg 3

This contention relates to whether the SPCC Guideline should be interpreted as implying an absolute noise limit or averaging of the noise levels.

It was established in the previous section that the range of measured noise from gunfire is in the order of 20-25dB for the different receptor locations. The issue is whether the SPCC Guideline relates to the maximum noise level or an average of the noise levels measured from the mixed use of the site or an average of specific firearms at specific firing locations.

The EPA Memo at point 2 states that arithmetic averaging should be used. In point 3, the number of measurements is to be "sufficient to determine a noise level that is representative of the type of firearm being used". I interpret this to mean that the averaged noise level should be of each specific firearm at a specific firing location and not of a mixture of firearms at mixed firing locations. The average noise level of the loudest firearm at any specific firing location should therefore comply with the limit.

The EPA Memo also states that "measured levels that are clearly not representative should be excluded". I interpret this to mean that abnormally high or abnormally low noise levels that are not close to the arithmetic average should be excluded. I understand that the EPA Memo contemplates that the variation in the noise levels measured for each firearm at each firing location ought to be within a narrow range to enable the averaging to include only "representative" noise levels. As stated in the EPA Memo, *"this relies on the person conducting the assessment having a level of acoustic expertise"*.

I therefore interpret condition A9 to mean that non-regular or limited exceedences of the limit may nevertheless be compliant.

The EPA Memo further states at point 2 that of the alternatives – arithmetic averaging or energy averaging – the former should be used.

In the Cooper Reports, the concept of logarithmic averaging is advanced and involves the averaging of all measurements including inaudible measurements. This includes the logarithmic averaging of a mixture of firing equipment, a concept which I believe the EPA Memo does not endorse.

In my opinion, the reason can be seen by reference to the last column in Tables 1-4 of the previous section. This column shows the percentage of noise measurements which lie above the logarithmic average value proposed in the Cooper Reports. The median of the numbers in the last column is 32% which means that about one third of all measurements will have a greater noise level than the logarithmic value adopted in the Cooper Reports. I have determined from Figures 1-4 that these exceedences are in the range 5-10dB above the logarithmic average which is a significant exceedence.

I therefore conclude that if the logarithmic averaging advocated in the Cooper Reports is adopted, the resulting noise levels would represent an unacceptable impact on the residents in the immediate vicinity of the subject development.

Furthermore, the assessments in the Cooper Reports are insufficient for the following reasons:

i) they do not have regard to the prevailing wind conditions (as required in Condition A9) and how those wind conditions may in certain circumstances impact on noise from the use of the range; and,

ii) they do not identify the firearm associated with each shot to determine a "representative" level as required in the EPA Memo.

If a new method of assessment is to be adopted, as urged by Mr Cooper, then new noise goals and criteria will be necessary, properly based on socio-acoustical surveys or national standards, which seek to achieve the purpose of noise assessment - to produce an acceptable level of amenity for residents having regard to ambient conditions

For these reasons it is my opinion that the modification sought to Condition A9 should fail.

4 CONDITION OF APPROVAL A6 (D) — ATTENDED NOISE MONITORING 800M RANGE

Conditions A6(c) and (d) require as follows:

(c) Attended noise monitoring to be undertaken on the first 3 occasions of use of the 800m range from the date of this approval, thereafter, quarterly in the first twelve months of operations (aligned with each season) and annually thereafter to confirm noise levels from firearms measured at residences comply with appropriate limits. The monitoring must include that of the known noisiest firearms being used on the 800m range.

(d) Compliance monitoring results for the shooting complex to be posted within 7 days on a website and submitted to the Department of Planning and to Council to allow for public access to this information.

The modification sought in the Application is to allow thirty days from the completion of testing for the lodgement of reports.

I have no objection to this.

5 CONDITION OF APPROVAL D4 - ACOUSTIC SHELTERS

Condition D4 requires as follows:

Acoustic shelters shall be provided for the existing range (at the 800m firing point) and the new outdoor ranges. The shelters shall be constructed of an acoustically absorptive material and in accordance with the measures outlined in the detailed plans provided in the Preferred Project Report.

The modification sought in the Application is to vary this condition by deleting the requirement to construct an acoustic shelter at the 800m firing point of the 800m range.

The observations in Section 2 of this report are that an acoustic shelter at the 800m firing point is probably not required.

However, it is also an observation that acoustic shelters or acoustic barriers or moundings are required for other firing positions.

I conclude that the proposed amendment to Condition D4 is premature given the extent of the identified noise non-compliances.

6 CONDITION OF APPROVAL A6(C) – FREQUENCY OF NOISE MONITORING

Although not specifically identified in the application for modification, the supporting letter to the Department also requests the removal of any further obligation by Communities NSW to comply with condition A6(c) of future monitoring. This is set out at the last page of Communities NSW's letter to the Department and states as follows:

"Additional matters for consideration

(a) The office of Communities confirm that attended noise monitoring was carried out in June 2010 (over three days), October 2010 and January 2011 of the 800m range. A strict reading of the terms of condition A6(c) would require another attended noise monitoring test in April 2011 under the quarterly monitoring regime and then annually.

We believe the compliance noise testing on the 800m multi purpose range should now avert to an annual test."

Condition A6(c) requires as follows:

(c) Attended noise monitoring to be undertaken on the first 3 occasions of use of the 800m range from the date of this approval, thereafter, quarterly in the first twelve months of operations (aligned with each season) and annually thereafter to confirm noise levels from firearms measured at residences comply with appropriate limits. The monitoring must include that of the known noisiest firearms being used on the 800m range.

In my opinion, given the exceedences of condition A9 demonstrated in section 2 above, it is premature to reduce the frequency of testing. I therefore cannot support this proposition.

7 CONCLUSION

I have completed an assessment of the application by Communities NSW to modify the Minister's approval dated 1st March 2011 for a Regional Shooting Complex at Hill Top on the Southern Highlands.

In respect of each proposal, I conclude as follows:

i) The proposed amendment to modify Condition A9 in respect of new noise limits for the firearms use cannot be supported because there is a commitment from the applicant to apply noise mitigation measures in the event that noise levels are demonstrated not to comply;

ii) I have no objection to the proposal to amend condition A6(d) relating to the time limit for publication of results for tests at the 800m range;

iii) The proposed amendment to delete condition D4 relating to the provision for acoustic shelters for the 800m range is not supported and is premature given the extent of the identified noise non-compliances; and,

iv) Given the exceedences of condition A9 demonstrated in this report, I am of the opinion that it is premature to reduce the frequency of testing.

I therefore conclude, with the exception of Condition A6(d), there is no merit in the proposal by Communities NSW to modify the Minister's approval dated 1st March 2011 for a Regional Shooting Complex at Hill Top on the Southern Highlands.

APPENDIX A - GLOSSARY OF ACOUSTIC TERMS

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient Noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment Period	The period in a day over which assessments are made.
Assessment Point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background Noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 115dB Limit of sound permitted in industry 120dB Deafening
dB(A):	A-weighted decibels. The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
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.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound Absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound Level Meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound Pressure Level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound Power Level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

APPENDIX B - CURRICULUM VITAE RENZO TONIN

RENZO TONIN

Ph.D. (Mech Eng), B.Sc (Hons.) University of Adelaide

DIRECTOR

PROFESSIONAL MEMBERSHIP

F.I.E.Aust. NPER, RPEQ, NATA Accredited Signatory, M.A.S.A., M.A.A.S.

APPOINTMENTS

Senior Honorary Research Associate - Woolcock Institute of Medical Research

Standards Committee AV-002 Acoustics – Instrumentation and Measurement Techniques.

PROFESSIONAL EXPERIENCE

- 1982 - Director and Principal, Renzo Tonin & Associates Pty Ltd
- 1979-1982 - Associate Director and Sydney Office Manager, Vipac & Partners Pty Ltd
- 1976-1978 - Post graduate studies, University of Adelaide Mechanical Engineering Department

1 RELEVANT EXPERIENCE

Dr Tonin's belief that high technology acoustics and dynamics engineering should form part of every day consulting has found acceptance with many clients. This is reflected in a strong company growth rate from private practice in November 1982 to one of the largest consulting companies specialising in acoustics engineering today.

His sponsored studies encompass such diverse activities as radio and TV studios, commercial buildings, ships, motor vehicles, trains, industrial complexes, power stations, product development, material handling plant, machine health monitoring, coal washeries, public buildings and auditoria.

His special interest is in the use of computer technology to solve problems in the fields of acoustics and dynamics.

He is a contributing author to the book "Environmental Modeling" which is a publication designed to bring together current expertise on modeling of the environment using computer based techniques.

His doctorial thesis addressed the use of laser 3D holography for the study of vibration. A distinguished international journal honored his work in this field by presenting one of his papers as a featured article.

His sponsored studies include the following;

ROADS AND MOTORWAYS

M5 and M5 East EIS, M4 motorway, Silverwater Road Extension, Princes Highway - Oak Flats to Dunmore EIS, Tomerong Bypass EIS, F2 Castlereagh Freeway, Phillip Parkway EIS, Liverpool to Hornsby Highway Strategy Study, Elizabeth Drive Upgrade, Western Sydney Orbital and Badgery's Creek Highway, M2 Motorway Noise Barriers, Albury Wodonga National Highway, M4 Western Motorway Via-Duct, Church Street to James Ruse Drive, Granville.

RAILWAYS AND ROLLING STOCK

Epping to Chatswood Rail Line (ECRL); Very Fast Train (VFT); Perisher SkiTube; Tangara double-deck train acoustics; assessment and design of noise and vibration isolation systems of multiple suburban and inner city residential and commercial developments alongside or above railway lines and railway tunnels.

PUBLIC HEARINGS AND INQUIRIES

Possum Brush Quarry Inquiry, Mt Arthur South Inquiry, Rix's Creek Inquiry, F2 Castlereagh Freeway Inquiry, Bulga Mine Inquiry, Mt Flora Quarry Hearing, Cleary Bros Sand Mine Hearing.

SOUND SYSTEM DESIGN

Sydney Entertainment Centre, Darling Harbour Convention Centre and Exhibition Halls, Darling Harbour Park Sound System, Baulkham Hills Entertainment Centre, Sydney Sports Stadium, Hallstrom Park Sports Complex, Homebush Sports Centre, NSW.

GOVERNMENT BUILDINGS

Sydney Entertainment Centre sound reinforcement system, the Glebe Remand Centre floating floor project, Applied Arts & Sciences Stage II expansion, Geological & Mining Museum, the Mint and Barracks building refurbishment, Sydney Football Stadium and the Darling Harbour Development.

HOTELS

Observatory Hotel, Sydney Hilton, Sydney Regent, Ritz/Carlton, Sheraton Hyde park, Country Comfort Central, World Square, Hyde Park Plaza, Sheraton Hobart, Campbell St Hotel, Novotel Darling Harbour, Bullecourt place, La Galleria Kings Cross, Bayswater Hotel, Park Hyatt, Parramatta Hotel, Sheraton Airport Central, Chatswood Connection.

COMMERCIAL TOWERS

QV1 development Perth, Robt Jones Tower Auckland NZ, 135 King St, Australia Square refurbishment, Landmark, 545 Kent St, Metroplaza North Sydney, Airport Central Commercial, Chatswood Connection, Chatswood Interchange, 45 Clarence St.

APARTMENT/RESIDENTIAL

Raleigh Park, Quay West, Frenchs Forest, Port Jackson Tower, HighGate Kent St, Northborne Ave Canberra, Crown Street Apartments, Crown Gardens, Villa Development, 19-21 George St North Strathfield, Mark Foys Warehouse Apartments, Frenchs Forest Medium Density, Linda St Hornsby, Camden Retirement Village, The Elan, 37 Glen St Milsons Point, Hawthornden Estate, Rockwall Apartments, Pavilion On The Harbour.

2 AWARDS

- Australian Acoustical Society Award for Excellence in Acoustics 1988 . "New Studios for Radio 2EA"
- Australian Acoustical Society Award for Excellence in Acoustics 1992. "Victoria Barracks 2nd Military District Band Practice Facility"

3 BOOKS

- Environmental Modeling - Vol 1. Chapter 7. Environ-mental Noise Modeling. P Zannetti ed. Computational Mechanics Publications. 1993.

4 PUBLICATIONS

1. Time-Averaged Holography For The Study of Three-Dimensional Vibrations. Journal of Sound and Vibration (1977) 52 (3), 315-323.
2. General Theory of Time-Averaged Holography for the Study of Three- Dimensional Vibrations at a Single Frequency. Journal of the Optical Society of America (1978) 68 (7), 924-931.
3. Analysis of 3-D Vibrations from Time-Averaged Holograms. Applied Optics (1978) 17 (23), 3713-3721. (Featured Article).
4. Free Vibration of Circular Cylinders of Variable Thickness. Journal of Sound and Vibration (1979) 62 (2), 165-180.
5. Determination of Ambient Noise Levels in the Presence of a Disturbing Noise Source Using a Directional Microphone. 10th International Congress on Acoustics (1980).
6. Acoustic Requirements to Curb Rain Noise from Metal Deck Roofs. Bulletin Acoustics Australia (1985) 13 (1), 16.
7. Estimating Noise Levels from Petrochemical Plants, Mines and Industrial Complexes. Acoustics Australia (1985) 13 (2), 59-67.
8. Application of Modelling Techniques to Resolving a Dynamics Problem in a Building Structure. The First Australasian MSC Users Conference, June 1987.
9. Vibration Isolation of Impacts in High-Rise Structures. The Second Australasian MSC Users Conference, Nov 1988.
10. Future Noise and Vibration Control Methods for Building Services. 2nd CIBSE Australian Conference, Nov 26-28, 1991.
11. Acoustic and Vibration Insulation in Buildings. Building Science Forum of Australia Seminar. 'Insulation, Thermal, Acoustic'. Aug 25, 1993.

12. ENM Windows - Environmental Noise Model. Euro-noise '95 Software for Noise Control Conference. Lyon, France 21-23 March 1995.
13. Modelling Virtual Noise for the Real Environment. Noise & Vibration Worldwide. June 1995. pp 10-12.
14. A Method of Strategic Traffic Noise Impact Analysis. Proceedings of Internoise 96, August 1996, Liverpool UK, pp 2395-2400.
15. ENM Windows – Environmental Noise Model. Air & Waste Management Association's 90th Annual Meeting & Exhibition, Toronto, Ontario, Canada, 1997.
16. Validation of Environmental Noise Model (ENM Windows). Acoustics Australia Vol 25 (1997) No 2 pp 75-79.
17. Acoustical Research in Australia. Acoustics Australia Vol 25 (1997) No 2 pp 49-63 (contributing editor).
18. Heavy Vehicle Noise Reduction Study. Fifth International Congress on Sound and Vibration, Adelaide, South Australia, Dec, 1997, *P Karantonis, N Ishac and R Tonin*.
19. Comparison of Occupational Noise Exposure Results Acquired from an In-Ear Probe Tube and an Artificial Ear, for Users of Tele-Communication Headsets. Seventh International Congress on Noise as Public Health Problem, 'Noise Effects '98', Sydney, NSW, November 1998, *P Karantonis and R Tonin.*
20. Occupational Noise Management - Educating the Workforce. Australian Acoustical Society Conference Nov 1999. Pages 71-88. *N Koolik, D Eager, R Tonin*
21. Sensitivity of Frequency Response to Type of Tubing, 11 AWES Workshop, Darwin 2004, *A.W.Rofail, R.Tonin and D.Hanafi*
22. The BCA 2004 – A Plan For The Future. *(Invited Paper)* Australian Acoustical Society, Acoustics 2004 Proceedings, November 2004.
23. What is offensive noise? A case study in NSW. Acoustics Australia 38(1) 2010
24. Offensive Noise in Planning & Enforcement: Is there a Difference? Environmental Law News (55) 2010

ATTACHMENT 2

Chapter 164 of ENCM and Associated Memo

CHAPTER 164

NOISE CONTROL GUIDELINE

TARGET SHOOTING RANGES

Air rifle and air pistol competitions are not scheduled since the projectile is not propelled by an explosion.

Such competitions are usually held indoors and seldom present a noise problem. They are lawful sporting activities and the EPA is the responsible authority for any noise investigation.

This guideline specifies criteria for assessing the effect on nearby residences of pistol, rifle or gun club shooting ranges when the propellant is explosive. Criteria may be used for guideline and less stringent figures could be used if site details and topography are very favourable.

Measurement should be made at the worst affected location and consideration should be given to any neighbouring vacant land zoned as residential.

Note that any premises used for competitive shooting where the propellant is explosive are scheduled premises under the Act.

Times of Day Restrictions

Daytime operation is considered as being from 10 a.m. to 5 p.m. Night operation normally extends from 5 p.m. to 10 p.m. To cater for special events such as state or national championships or charity shoots, the EPA may consider an extension of the times on both nights in one weekend provided such events occur no more than two or three times a year.

Restricted Number of Days

Peak Hold (Linear) readings are taken at the most affected residential boundary. The number of days and nights usage of the range should be limited to correspond with the measured level as shown in the table on page 164-2.

A concession has been made in the case of existing ranges and is included in the table. This may be subject to future review by the EPA.

Alterations to existing ranges should incorporate a movement towards the "Future Range" figures whenever possible.

	RESIDENTIAL LEVEL dB (Lin) Peak Hold										
	60	65	70	75	80	85	90	95	100	105	over 105
	MAXIMUM USAGE Days (Nights) per wk										
Existing Range Daytime Use	7	7	7	7	7	7	5	4	3	2	1
Existing Range Night-time Use	3	3	2	2	2	1	-	-	-	-	-
Future Range Daytime Use	7	5	5	4	3	2	1	-	-	-	-
Future Range Night-time Use	3	2	1	-	-	-	-	-	-	-	-

Environment Protection Authority

TO	Regional Managers	**DATE**	25 January 1993
CC	DANT, N&T staff		
FROM	Head Noise Investigations	**FILE**	708022
SUBJECT	Noise Control Guideline on Shooting Noise		

PURPOSE

To advise Regional staff of how the Noise Control Guideline on Target Shooting Ranges should be interpreted.

CURRENT POSITION

1. **If measured level is between levels contained in table which days per week band should be used?**

   The days per week band that applies is the one where the measured level is less than the noise level shown. For example a measured level of 72 dBL for existing range daytime use would fall into the 75 dBL column with 7 days allowed.

2. **Is an arithmetic or energy averaging technique used to determine the measured noise level?**

   Arithmetic averaging is used.

3. **How many measurements are required to determine a final noise level?**

   The number of noise measurements should be sufficient to determine a noise level that is representative of the type of firearm being used. In the past assessments have been based on up to 50 shots. In determining the final noise level, measured levels that are clearly not representative should be excluded. This relies on the person conducting the assessment having a level of acoustic expertise.

The above advice was prepared in response to a request from the National Acoustics Laboratory and in the interest of consistency has been prepared for issuing to all affected staff.

FUTURE ACTIONS/RECOMMENDATIONS

Please forward this on to your staff who may be involved with assessing noise from targe shooting ranges.