Dear Ms Dudley-Bestow

CHURCHILL PLACE COURTS – PROPOSED DEVELOPMENT / REDEVELOPMENT NOISE EMISSION ASSESSMENT

1 INTRODUCTION

Acoustic Dynamics is engaged by the Blue Mountains City Council (BMCC) to assess the noise impact at the nearest potentially affected residential receivers resulting from the intended change of use from tennis courts into netball/basketball/multi-use courts at the subject development at Churchill Place, Springwood, NSW.

Acoustic Dynamics understands that BMCC requires submission of an acoustic assessment report for the change of use of the former tennis courts to netball/basketball/multi-use courts.

The nearest sensitive receivers (NSRs) include the residences at 1 to 7 Plateau Road, Springwood, all adjoining the northern boundary of the subject site, and the residences at 6 to 14 Churchill Street west of the subject site across Churchill Street, Springwood. The location of the subject site and the NSRs are shown in the location map and aerial photo presented as Appendix A.

This report is prepared based on information provided by BMCC, and presents results from the unattended noise monitoring carried out between Tuesday 27 April 2010 and Thursday 6 May 2010, analysis and any recommendations to mitigate noise emission from the subject premises where required. Operator attended noise measurements were also undertaken of similar activities representative of the proposed use at the subject site at Wyatt Park, Auburn, on the evening of Monday 3 May 2010.

2 RELEVANT NOISE CRITERIA

Further to the information provided above, Acoustic Dynamics advises that noise emission from the intended change of use at the subject premises to netball/basketball/multi-use courts and the associated noise generating activities must comply with the relevant legislation and Council criteria.
Responsibility for the control of environmental noise emission in NSW is vested in the Local Council and the NSW Department of Environment, Climate Change and Water (NSW DECCW, formerly known as the NSW EPA). Guidelines for the determination of amenity criteria are contained within the DECCW’s Industrial Noise Policy (INP). In addition to these guidelines, some Council have specific noise criteria, against which, certain noise sources must be assessed. In section 2 of this document, we explain acoustic terms and symbols used to describe noise. The origin and applicability of each acoustic criterion is set out. Detail of the relevant applicable noise criteria is also provided.

2.1 Noise Descriptors and Definitions

Noise is a variation in sound pressure at audible frequencies. In addition to such rapid frequency variations, the **overall level of noise almost always varies with time**. To describe a noise environment, more than one descriptor is necessary to show both a level and how the noise ranges about that level. By sampling sound levels at a measurement location eight times per second, a great deal of data is generated. To reduce that data to useful information, the levels exceeded for different percentages of the total period are calculated. The statistical descriptor $L_{A10}$ measures the A-weighted noise level exceeded for 10% of the sample time. The statistical values measured for this noise survey are the $L_{A10}$ and $L_{A90}$ noise levels. The background measurement period chosen was 15 minutes.

The "A-weighting" refers to a prescribed amplitude versus frequency curve used to "weight" noise measurements, to represent the frequency response of the human ear. Put more simply, the human ear is less sensitive to noise at some frequencies than it is to noise at other frequencies. The A-weighting is an attempt to measure a result with a single overall number to represent how we subjectively hear different frequencies at different levels.

2.2 Audibility, Identification and Annoyance

It is important to realise that the acceptability of a given noise depends on both its character and the character of the background sound. The many parameters that influence noise character also influence how identifiable, audible and of course, annoying is the noise under investigation. It is often unstated that the number marking the marginal difference at the acceptable/unacceptable boundary depends a great deal on noise character (as well as which descriptors are used, as described in section 2.1).

In this assessment of environmental noise, Acoustic Dynamics has considered the character of the noise under investigation which is compared against the character of the background noise. A trained professional’s judgement is required to assess audibility, identifiability and the potential for annoyance. The assessment in this report is made using the measured noise descriptors with descriptions of the noise under investigation and background noise character.

2.3 Blue Mountains City Council Noise Criteria

Acoustic Dynamics has conducted a review of relevant documents and guidelines of Blue Mountains City Council, which yield no applicable criteria to be adopted for this assessment.
2.4 DECCW’s Environmental Noise Criteria for Public Places and Sporting Activities

Acoustic Dynamics has conducted a review of the DECCW (formerly known as the EPA) documents and found no specific criteria for the assessment of noise from sporting facilities within its current documents. The EPA’s Environmental Noise Control Manual (ENCM), which has now been superseded, provides the following noise criteria regarding noise from public places and sporting activities. The method of assessing noise from public places and sporting activities is described on page 53-2 of the Environmental Noise Control Manual (ENCM) as follows:

“...the condition usually adopted is that the intrusive noise ($L_{A10}$ measured for a period of not less than 15 minutes when the noise is being emitted), at the nearest affected residence, should not exceed the background noise ($L_{A90}$) by more than 5 dB(A).

*Note*

- Some greater tolerance might be considered, and intrusive noise up to 10 dB(A) above background might be allowed where the activity has social merit and is of unique or infrequent occurrence, but in all cases the figures should be used for guidance and varied according to local conditions where necessary.”

Although superseded and not strictly applicable, in lieu of a suitable alternative, Acoustic Dynamics has adopted the background noise level plus 10 dB criterion, as detailed in the EPA ENCM for guidance.

2.5 DECCW’s Environmental Noise Criteria for Sleep Disturbance

The DECCW has in the past investigated overseas and Australian research on sleep disturbance. The method of assessing noise for sleep disturbance still relies on the old DECCW method described here. The DECCW states on page 19-3 of its Environmental Noise Control Manual (ENCM):

“Noise control should be applied with the general intent to protect people from sleep disturbance. To achieve this, the $L_1$ level of any specific noise source should not exceed the background noise level ($L_{90}$) by more than 15 dB(A) when measured outside the bedroom window.”

Further to the above information, based on the ambient background noise monitoring conducted, excluding weather affected data (as per the guidelines of the NSW DECCW’s INP), the following sleep disturbance criterion was determined:

| Sleep Disturbance Criterion | 30 dB(A) ($L_{A90}$) + 15 dB(A) = 45 dB(A) |

Acoustic Dynamics understands that the booking schedule for the proposed courts is not to extend beyond the times of 9am to 9pm on weekdays and 9am to 7pm on weekends. Hence the sleep disturbance criterion does not apply for this project.
2.6 Legislation Requirements

In addition to the relevant noise criteria set down by the DECCW (detailed above), noise emission from the subject site must also comply with the requirements of the relevant legislation, being the Protection of the Environment Operations (POEO) Act 1997, and the Protection of the Environment Operations (Noise Control) Regulation 2008.

The POEO Act 1997 requires that the subject site must not generate “offensive noise”.

Offensive noise is defined as follows:

“**offensive noise**” means noise:

(a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:

(i) is harmful to (or is likely to be harmful to) a person who is outside the premises from which it is emitted, or

(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or

(b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances, prescribed by the regulations.”

3 NOISE MEASUREMENT STANDARDS

All measurements were conducted in general accordance with Australian Standard –1997, “Acoustics - Description and Measurement of Environmental Noise Part 1: General Procedures”. Acoustic Dynamics’ sound measurements were carried out using precision sound level meters conforming to the requirements of AS 1259-1990 “Sound Level Meters”.

The survey instrumentation used during the survey is set out in Table 3.1.

<table>
<thead>
<tr>
<th>Type</th>
<th>Serial Number</th>
<th>Instrument Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2260</td>
<td>2413547</td>
<td>Brüel &amp; Kjaer Modular Precision Sound Level Meter</td>
</tr>
<tr>
<td>4189</td>
<td>2607949</td>
<td>Brüel &amp; Kjaer 12.5 mm Prepolarised Condenser Microphone</td>
</tr>
<tr>
<td>4231</td>
<td>1730737</td>
<td>Brüel &amp; Kjaer Acoustic Calibrator</td>
</tr>
<tr>
<td>ARL-EL-316</td>
<td>16-306-020</td>
<td>Acoustic Research Laboratories Noise Logger</td>
</tr>
</tbody>
</table>

The reference sound pressure levels were checked prior to and after all measurements using the relevant acoustic calibrator and remained within acceptable limits.
4 SITE SURVEY AND NOISE MONITORING RESULTS

A survey of the subject site, and adjacent residential receiver locations was conducted on Tuesday 27 April 2010 and an unattended noise logger was deployed at the location representative of the existing acoustic environment at the nearest potentially affected residential receivers to the subject site.

A noise logger was deployed at the southern boundary of 5 Plateau Place residence adjacent to the subject courts to measure noise levels between Tuesday 27 April and Thursday 6 May 2010. Note should be made that at the logger location, noise emission from nearby road traffic made some contribution to the measured noise levels.

Operator-attended background noise measurements were taken at the site on Tuesday 27 April and Thursday 6 May 2010 to supplement unattended background noise monitoring data collected. The prevailing weather conditions during the operator-attended noise measurements were generally calm and did not influence the noise measurements taken. The results of the operator-attended noise measurements concurred with the data collected by the noise logger.

The following table presents the processed (calculated) noise data at the nearest sensitive (residential) receivers (NSR's) obtained from the unattended noise logger data. The results from the unattended noise logger are also presented graphically within Appendix B.

Table 4.1 Measured Unattended Noise Levels and Resulting Criteria

<table>
<thead>
<tr>
<th>Location</th>
<th>Time of Day</th>
<th>Measured $L_{Aeq}$</th>
<th>Measured $L_{A90}$ RBL (Background Noise Level)</th>
<th>Background ($L_{A90}$) + 10 dB Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Boundary of 5</td>
<td>Daytime (9am to 6pm)</td>
<td>53 dB(A)</td>
<td>43 dB(A)</td>
<td>53 dB(A)</td>
</tr>
<tr>
<td>Plateau Place, Springwood</td>
<td>Evening (6pm to 9pm)</td>
<td>50 dB(A)</td>
<td>42 dB(A)</td>
<td>52 dB(A)</td>
</tr>
<tr>
<td></td>
<td>Night-time (10pm to 7am)</td>
<td>49 dB(A)</td>
<td>30 dB(A)</td>
<td>40 dB(A)</td>
</tr>
</tbody>
</table>

Note: 1) Statistical noise levels between 9am and 6pm were used as it is not anticipated for the subject netball/basketball/multi-use courts to be used before 9am
2) Statistical noise levels between 6pm and 9pm were used as it is not anticipated for the subject netball/basketball/multi-use courts to be used beyond 9pm

In addition to noise measurements undertaken at the subject site, Acoustic Dynamics carried out operator attended noise measurements representative of the noise emitted from activities proposed on the subject site. Acoustic Dynamics undertook operator attended noise measurements of various scenarios associated with uses of outdoor netball courts at Wyatt Park, Auburn on the evening of Monday 3 May 2010. The following table presents a summary of the various measured noise levels of representative activities associated with the use of netball courts. Note should be made that near-field measurements were also undertaken of specific/isolated netball related noise source events/activities.
Table 4.2 Measured Noise Levels of Various Netball Associated Activities

<table>
<thead>
<tr>
<th>Description of Noise Sources</th>
<th>Distance from Noise Source</th>
<th>Measured L_{Aeq}</th>
<th>Measured L_{A10}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training session on 3 adjacent courts – coaches’ raised voices dominant, occasional ball bounce (no blowing of whistles)</td>
<td>10m</td>
<td>61 dB(A)</td>
<td>64 dB(A)</td>
</tr>
<tr>
<td>Netball competition games on 3 adjacent courts – frequent whistle blowing along perimeter of courts</td>
<td>10m</td>
<td>72 dB(A)</td>
<td>72 dB(A)</td>
</tr>
</tbody>
</table>

Acoustic Dynamics advises that during our attended noise measurements, whistle blowing were the highest noise level events and were relatively frequent during competition games. The maximum noise levels of whistle blowing events ranged from 76 dB(A) when measured at far end of court and 93 dB(A) when measured at the near end of the court. Noise levels from the whistle blowing events were observed to be relatively consistent on each occasion, when the event occurred at the same relative location.

Acoustic Dynamics was advised by BMCC that there are whistles available with a restricted mouth piece to reduce the noise emission level of the whistle. These whistles are commonly known as MUGA (Multi Use Game Area) whistles. Acoustic Dynamics has been provided with some MUGA whistles (“Tornado”) together with a general official referee whistle (“Thunderer”) and have carried out noise level measurements of the use of these whistles at representative distances to verify whether the use of such whistles will reduce the noise impact of whistles at the nearest residential receivers.

Table 4.3 Measured Noise Levels of Various Whistle Blows

<table>
<thead>
<tr>
<th>Description of Noise Sources</th>
<th>Distance from Noise Source</th>
<th>Measured L_{Amax}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whistle blows measured at near end of court during competition games at Wyatt Park, Auburn on 3 May 2010</td>
<td>10m</td>
<td>93 dB(A)</td>
</tr>
<tr>
<td>ACME Tornado MUGA Pea-less Whistle blown with low strength</td>
<td>10m</td>
<td>77 dB(A)</td>
</tr>
<tr>
<td>ACME Tornado MUGA Pea-less Whistle blown with medium strength</td>
<td>10m</td>
<td>85 dB(A)</td>
</tr>
<tr>
<td>ACME Tornado MUGA Pea-less Whistle blown with hard strength</td>
<td>10m</td>
<td>87 dB(A)</td>
</tr>
<tr>
<td>ACME Thunderer Official Referee Whistle blown with low strength</td>
<td>10m</td>
<td>80 dB(A)</td>
</tr>
<tr>
<td>ACME Thunderer Official Referee Whistle blown with medium strength</td>
<td>10m</td>
<td>88 dB(A)</td>
</tr>
<tr>
<td>ACME Thunderer Official Referee Whistle blown with hard strength</td>
<td>10m</td>
<td>91 dB(A)</td>
</tr>
</tbody>
</table>

In addition to the above measurements, Acoustic Dynamics undertook operator attended noise measurements representative of noise emitted from the use of four tennis courts to establish the likely noise levels generated from the existing tennis courts at Churchill Place when it was in operation. Acoustic Dynamics carried out various scenarios associated with uses of tennis courts at four adjacent tennis courts at North Sydney with similar layout to the existing Churchill Place courts on the evening of Thursday 20 May 2010 which included group coaching and competitions on four courts simultaneously.
Table 4.4 Measured Noise Levels of Various Tennis Associated Activities

<table>
<thead>
<tr>
<th>Description of Noise Sources</th>
<th>Distance from Noise Source</th>
<th>Measured $L_{Aeq}$</th>
<th>Measured $L_{A10}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group coaching session on 2 adjacent courts – coaches' and players voices, ball and racquet impact noise</td>
<td>10m</td>
<td>57 dB(A)</td>
<td>60 dB(A)</td>
</tr>
<tr>
<td>Tennis competition doubles games on 4 adjacent courts – frequent ball and racquet impact (“pop”) noise</td>
<td>10m</td>
<td>58 dB(A)</td>
<td>59 dB(A)</td>
</tr>
</tbody>
</table>

The highest maximum noise levels associated with the use of the tennis courts were noise from the impact (“pop” sound) of the ball and the racquet. The maximum noise levels of ball and racquet impact noise during the measurements ranged between 72 dB(A) and 85 dB(A) and these were observed to be relatively consistent on each occasion, when the event occurred at the same relative locations.

5 NOISE EMISSION ASSESSMENT AND RECOMMENDATIONS

Based on the information provided by the BMCC, and the measurements of the representative noise levels associated with netball activities, Acoustic Dynamics has conducted noise modelling and calculations to determine predicted noise emission levels at the nearest receiver locations at 1 to 7 Plateau Road, Springwood, resulting from the use of the proposed netball/basketball/multi-use courts.

The southern boundaries of the nearest potentially affect receivers at 1 to 7 Plateau Road are approximately 10m to 15m from the perimeter of the proposed netball/basketball/multi-use courts.

Table 5.1 Predicted Noise Levels at NSRs from Various Uses

<table>
<thead>
<tr>
<th>Location</th>
<th>Period &amp; Background ($L_{A90}$ + 10 dB Criterion [dB(A)])</th>
<th>Predicted $L_{A10(15 mins)}$ at Boundary of NSR (Complies with Criterion? [√/x])</th>
<th>Predicted $L_{A10(15 mins)}$ at 1m from Facade of NSR (Complies with Criterion? [√/x])</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Daytime 53</td>
<td>Training¹</td>
<td>Competition²</td>
</tr>
<tr>
<td>1 Plateau Road</td>
<td></td>
<td>49 [√]</td>
<td>58 [x]</td>
</tr>
<tr>
<td>3 Plateau Road</td>
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<td>62 [x]</td>
</tr>
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<td>65 [x]</td>
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<tr>
<td>7 Plateau Road</td>
<td></td>
<td>51 [√]</td>
<td>60 [x]</td>
</tr>
<tr>
<td></td>
<td>Evening 52</td>
<td>Training¹</td>
<td>Competition²</td>
</tr>
<tr>
<td>1 Plateau Road</td>
<td></td>
<td>49 [√]</td>
<td>58 [x]</td>
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<tr>
<td>3 Plateau Road</td>
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<td>5 Plateau Road</td>
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<td>56 [x]</td>
<td>65 [x]</td>
</tr>
<tr>
<td>7 Plateau Road</td>
<td></td>
<td>51 [√]</td>
<td>60 [x]</td>
</tr>
</tbody>
</table>

Note: 1) Predicted noise levels for training sessions is based on the assumption that no whistle is used during training; and
2) Predicted noise levels for competition sessions is based on the assumption that whistle is used during competition.
Note should be made that the noise levels presented in Table 5.1 above are 15 minute $L_{A10}$ noise levels. Maximum ($L_{A\text{max}}$) or peak noise levels resulting from short duration or instantaneous events are likely to be higher than the levels presented, however assessment of the absolute magnitude of these is not appropriate, particularly given the existing noise environment is dominated by local and distant traffic.

Acoustic Dynamics advises that the above calculated noise emission levels are conservatively based on the $L_{A10}$ statistical noise levels during training sessions and competition sessions at the boundaries and 1m from facades of the nearest potentially affected receivers.

Due to the low background noise environment at the locality, and the close proximity of the nearest potentially affected receivers, it is not practical (or appropriate) to adopt a more stringent criterion for the proposed netball/basketball/multi-use courts, hence the background noise level plus 10 dB criterion, as detailed in the EPA ENCM, has been adopted for guidance. In addition, BMCC have indicated that the proposed netball/basketball/multi-use courts are likely to provide community benefit and have significant social merit.

Acoustic Dynamics advises that noise emission resulting from the use and operation of the proposed netball/basketball/multi-use courts must be adequately managed to minimise any adverse impacts on the nearest receivers. Accordingly, Acoustic Dynamics recommends development of a management plan incorporating measures to protect the acoustic amenity of the surrounding area and implementation of such a management plan by the BMCC.

The management plan should outline policies and procedures to ensure noise emission resulting from the use of the proposed netball/basketball/multi-use courts is kept to a minimum, and should include:

1. Limiting the number of evening bookings (6:00pm to 9:00pm) to a maximum of three (3) weekday evenings per week;
2. Restricting evening bookings to training activities without the use of whistles;
3. Allowing competition including the use of whistles on one weekday evening only, however the competition (use of whistles) must cease by 8:00pm;
4. Limiting competition activities with the use of whistles to daytime bookings (9:00am to 6:00pm) on any weekday or on Saturdays only;
5. A maximum period of three (3) continuous hours for competition games during daytime hours (9:00am to 6:00pm) with a minimum two (2) hour respite period between each three hour competition period;
6. Allowing bookings between 9:00am and 9:00pm on weekdays and between 9:00am and 7:00pm on weekends; and
7. Sound amplification systems, sirens or air-horns must not be installed or used on the courts at any time.
Acoustic Dynamics advises that incorporation of the above recommendations will minimise the noise impact resulting from the use of the proposed netball/basketball/multi-use courts. Such a management plan should provide adequate respite to adjacent receivers.

Acoustic Dynamics understands that the existing tennis courts had been in operation for many years prior to their closure. With the exception of the obvious difference between the hitting of a tennis ball (an impulsive “pop”), the blowing of a whistle (a “shrill”) or the bouncing of a ball, noise emission associated with intense use of the four (4) tennis courts is unlikely to be dissimilar in character to the noise emission associated with the use of the courts for netball/basketball/multi-use. Similarities include general short bursts of running and use of occasional raised voices on courts. Table 4.2 (netball) and Table 4.4 (tennis) indicate noise emission associated with tennis, is around 4 dB lower than noise emission associated with netball activities (without use of whistles).

As there is significant noise emission level variation between the measured whistle blasts and also the measured hitting of tennis balls, and as this depends upon the individual undertaking the subject activity, it is difficult to assess and compare the annoyance of whistle blasts to the hitting of balls. Note is made however, that the loudest measured whistle blasts are around 8 dB higher than the loudest impact of a tennis ball with a racquet. Never-the-less note should also be made that the hitting of a tennis ball has a wider frequency spectrum than the higher, narrow frequency spectrum of a whistle blast. Further to this, lower frequency noise, such as the hitting of a tennis ball, is more difficult to mitigate/attenuate and is therefore likely to be a more penetrating noise source than a whistle blast when heard within neighbouring dwellings.

Further to Acoustic Dynamics’ measurements of various types of whistles, including the noise restricted MUGA whistles, Acoustic Dynamics advises that the noise level difference between the noise restricted MUGA whistles and a general official referee whistle is a reduction of 3 dB to 4 dB. However, the characteristic of the tone of the MUGA whistle is a “sharp” air sound compared to the “shrill” of the general referee whistle. Hence, Acoustic Dynamics advises that there is unlikely to be significant or noticeable benefit by limiting the use of whistles to only the noise restricted MUGA whistles.

As the proposed development is for multi-use courts, Acoustic Dynamics understands various sports may be undertaken on the courts. Such sports may include netball, basketball or other court sports. The subject sport being played will not significantly alter the received noise emission level. The received noise emission level is largely dependant upon:

- The number of participants;
- The location of the activity on the courts;
- The nature of the individual participants / observers (ie. are they vocal or passive?);
- The intensity of the activity (ie. training or competition); and
- The use of whistles.

Acoustic Dynamics understands that BMCC is considering locating the subject courts several meters further south from the boundaries of the adjacent northern residences than the current locations of the tennis courts. Locating the courts around 2 meters further south, is likely to result in noise level reduction of around 2 dB at the boundaries of the northern residences. Such a reduction has not been applied to the predicted noise levels in Table 5.1.
Acoustic Dynamics advises that the proposal to increase vegetation (addition of trees) between the subject courts and northern residential boundaries is unlikely to provide noticeable acoustic benefit. However, trees and increased vegetation can provide significant psycho-acoustical benefit to nearby receivers.

Note should be made that this assessment does not consider the acoustic effect of any roof structure over the proposed courts. Acoustic Dynamics understands a detailed acoustical investigation would be carried out if such development is proposed.

6 CONCLUSION

Acoustic Dynamics has conducted an assessment of potential noise emission resulting from the proposed change of use of the existing four (4) tennis courts at Churchill Place, Springwood, to three (3) netball/basketball/multi-use courts. Noise emission resulting from the use of the proposed netball/basketball/multi-use courts includes the use of whistles during competition games, ball bounces and raised voices of participants, coaches or observers.

Acoustic Dynamics has undertaken an investigation of various sports, including training and competition and provides results of this analysis within the sections above. An investigation of different types of whistles is also presented.

**Acoustical Assessment**

Acoustic Dynamics advises that our investigations, noise measurements, calculations and findings with regard to acoustical impact should be considered in context along with the “social merit” of the proposal. Acoustic Dynamics’ analysis indicates that noise emission resulting from the use of the proposed netball/basketball/multi-use courts, following the incorporation of recommended acoustic management measures detailed in section 5, is likely to cause a marginal increase (impact) in noise levels at the nearest affected receivers but is expected to be considered acceptable and unlikely to result in offensive noise as defined by the POEO Act 1997.

Please do not hesitate to contact us on 02 9908 1270 should you require further clarification or information.

Yours Faithfully

ACOUSTIC DYNAMICS

Leo Tsui

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<th>Prepared</th>
<th>Checked</th>
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Appendix A
Location Map & Aerial Photo

Location Map
Location of 4 Existing Tennis Courts Proposed to be Replaced with 3 Multi-Use Courts

Aerial Photo
Nearest Residential Receivers
Proposed Multi-Use Courts
Appendix B
Unattended Noise Logger Data

Statistical Ambient Noise Levels
5 Plateau Road Springwood - Thursday 29 April 2010

Statistical Ambient Noise Levels
5 Plateau Road Springwood - Friday 30 April 2010
Appendix B

Unattended Noise Logger Data

Statistical Ambient Noise Levels
5 Plateau Road Springwood - Saturday 1 May 2010

Statistical Ambient Noise Levels
5 Plateau Road Springwood - Sunday 2 May 2010