ACOUSTICS AND AIR

BATHURST HARNESS RACING

TRACK RELOCATION

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VERSION A

JULY 2012

PREPARED FOR

JOSS CONSTRUCTION
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BATHURST NSW 2795

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Wilkinson Murray is an independent firm established 50 years ago originally as Carr & Wilkinson. In 1976 Barry Murray joined founding partner Roger Wilkinson and the firm adopted the name which remains today. From a successful operation in Australia, Wilkinson Murray expanded its reach into Asia by opening a Hong Kong office early in 2006. 2010 saw the introduction of our Queensland office and 2011 the introduction of our Orange office to service a growing client base in these regions. From these offices, Wilkinson Murray services the entire Asia-Pacific region.

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GLOSSARY OF ACOUSTIC TERMS

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

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

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

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

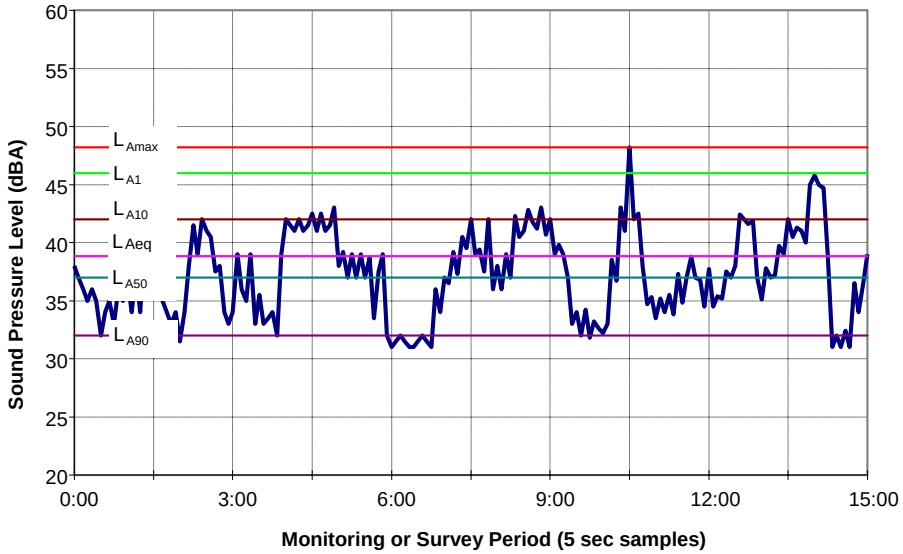
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

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

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

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

Typical Graph of Sound Pressure Level vs Time



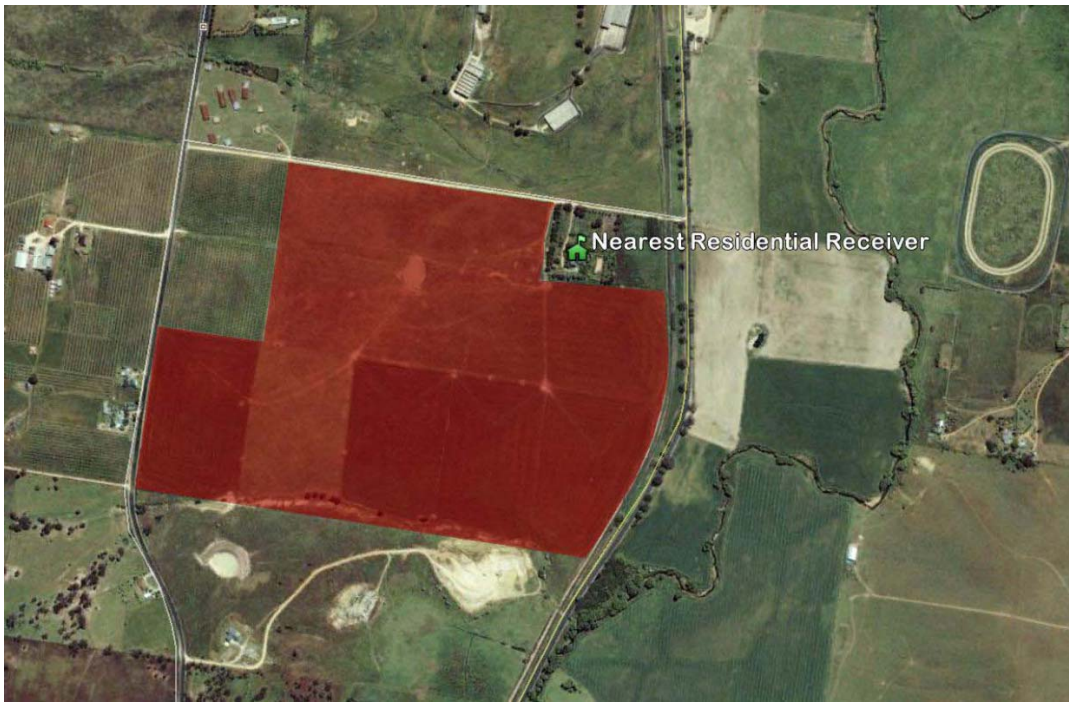
1 INTRODUCTION

This report presents an assessment of the potential noise impact associated with the proposed relocation and subsequent construction of a new harness racing track on land bordered by Ethelton Avenue and College Road in Bathurst, NSW. The harness racing track currently operates at Bathurst Showground. The new facility will operate at intermittent intervals between the hours of 7.00am and 10.00pm, any day of the week. Figure 1-1 shows the proposed site and surrounding location.

This assessment considers the following issues:

- Operational Noise
  - Noise generated by the Horse racing;
  - Noise emitted from the PA system during race meets; and
  - Noise generated by road traffic entering, exiting and moving around the complex.

Figure 1-1 Bathurst Harness Club Racing Site and Surrounding Residences



This acoustic assessment consists of the following:

- Measurement of existing noise levels at the existing nearest residential receiver of the proposed site;
- Determination of site specific criteria;
- Measurement of noise levels typical of a race meeting at the existing Bathurst Harness racing track;
- Noise modelling of the proposed new facility, to determine the potential impacts on adjacent noise sensitive receivers;
- Assessment of potential noise emissions against the established criteria; and
- Recommendations for noise control measures where necessary.

2 DEVELOPMENT DESCRIPTION

The proposed site for the new Bathurst Harness Racing Club trotting track is bound by College Road to the west and Ethelton Avenue to the north-east, with the train line to the east. Nearby noise sensitive receivers include the following:

- North: 23 Ethelton Avenue located to the north, north-east of the site, the closest of all the receivers;
- East: 226 Gormans Hill Road is the closest residential receiver to the east of the site;
- South: 233 College Road to the south-west and slightly shielded from the sight by the adjacent ridge line; and
- West: 146, 170, 182 College Road all residential receivers.

Figure 2-1 shows the proposed location of the trotting track and the major buildings associated with it. Nearby residential receivers are highlighted in yellow.

Figure 2-1 Proposed Layout showing Surrounding Residential Receivers

3 EXISITNG AMBIENT NOISE LEVELS

Unattended noise monitoring was conducted between 12 and 18 March 2012. The noise logger was located on the western boundary of the property at 23 Ethelton Avenue, the nearest potentially affected residential receiver.

The noise monitoring equipment used for the noise measurements consisted of an ARL EL215 Noise Logger set to A-weighted, fast response, continuously monitoring each 15-minute period. This equipment is capable of monitoring and storing noise various level descriptors for later detailed analysis.

From the background noise levels (L_{A90}) the Rating Background Levels (RBL's) were determined using methodology as recommended by the *INP*. OEH considers the RBLs to represent the background noise level. The equipment calibration was checked before and after the survey and no significant drift was noted.

Table 3-1 summarises the results, for the measured daytime, evening and night time noise levels. Detailed charts are available on request.

Table 3-1 Ambient Noise Levels

Time Period[1]	Noise Levels (dBA)	
	L_{Aeq}	RBL
Day	49	38
Evening	52	45
Night	48	38

Note: (1) Daytime 7.00am–6.00am; Evening 6.00pm–10.00pm; Night 10.00pm-7.00am

The two descriptors are defined below:

- **$L_{Aeq,Period}$** – The overall L_{Aeq} noise level measured over the assessment period; and
- **RBL** – Rating Background Level (L_{A90}) is a measure of typical background noise levels which are used in determining noise criteria.

4 OPERATIONAL NOISE CRITERIA

This section of the report discusses noise criteria for the assessment of operational noise which includes:

- Public address system;
- Harness racing activities; and
- Movement of vehicles into, out of, and within the complex.

To assist Council in assessing developments the Environment Protection Authority (EPA) has prepared the *Noise Guide for Local Government (NGLG)*. The *NGLG* suggests that council's develop an intrusiveness criterion that limits the permissible level of noise from commercial or industrial premises to no more than the background noise plus 5dBA when measured over a 15-minute period ($L_{Aeq\ (15\ minute)}$).

The time periods for which intrusive criteria are applied are daytime (7.00am-6.00pm), evening (6.00pm-10.00pm) and night time (10.00pm-7.00am).

The background level is the Rating Background Noise Level (RBL) which is determined from measurement of L_{A90} noise levels, in the absence of noise from the source. Table 4-1 shows the intrusive noise criteria for the project.

Table 4-1 Relevant Intrusiveness Noise Criteria

Time Period	RBL	Intrusiveness Criterion
		$L_{Aeq,15min}$
Day	38	43
Evening	45	50
Night	38	43

Note: (1) Daytime 7.00am–6.00am; Evening 6.00pm–10.00pm; Night 10.00pm-7.00am

For consistency, a blanket criterion of 43dBA has been applied for all periods.

5 NOISE MODELLING

Continuous and semi-continuous noise associated with the Bathurst Harness Racing Club is generated by the public address system and the racing itself. The facility will operate at intermittent intervals between the hours of 7.00am and 10.00pm, any day of the week.

Intermittent noise may also be generated by vehicles accessing the facility; however, this is not considered to be an issue.

Noise sources that contribute significantly to the 15-minute and longer term L_{Aeq} noise levels are presented in Table 5-1. These have been adjusted to 15-minute L_{Aeq} levels.

Table 5-1 Measured Source Noise levels

Item	Sound Pressure Level at 25m, L_{Aeq} (dBA)	Sound Pressure Level at 30m, L_{Aeq} (dBA)
Public Address System	52	-
Harness Racing	-	58

Site related noise emissions were modeled using CadnaA noise prediction software. A representative 3-dimensional model of the site and adjacent residential receivers was constructed.

Factors that are addressed in the modeling are:

- Site specific sound level emissions and locations;
- Screening effects from buildings;
- Receiver locations;
- Noise attenuation due to geometric spreading;
- Ground absorption; and
- Atmospheric absorption.

6 NOISE PREDICTIONS

Noise modelling was completed for a worst-case scenario, which was considered to be a race event with continuous announcements and commentating over the pubic address system. Relative noise levels were predicted at the following potentially worst-affected residential receivers listed below in order of proximity to the site:

- 23 Ethelton Avenue;
- 146 College Road;
- 170 College Road;
- 182 College Road;
- 233 College Road; and
- 226 Gormans Hill Road.

Table 6-1 presents the predicted levels for each of the residential receivers.

Table 6-1 Night Time Predicted Noise Levels

Receiver Location	Predicted Noise Level (dBA)	Criteria	Comply (Y/N)
23 Ethelton Avenue	47	43	N
146 College Road	31	43	Y
170 College Road	34	43	Y
182 College Road	33	43	Y
233 College Road	34	43	Y
226 Gormans Hill Road	31	43	Y

During all time periods, the noise levels meet the criteria at all but one receiver; 23 Ethelton Avenue. The criterion at this receiver is exceeded by 4dB. As a result, some mitigation measures will be required to control noise emissions associated with the new facility at this residence. Potential options are provided in the Section 7.

7 RECOMMENDATIONS

It is recommended that a barrier be erected in the form of a dirt bund or noise wall to attenuate the noise to within the noise criterion. The minimum height of the barrier should be between 3.5m and 4m. Figure 7-1 and Figure 7-2 outline two barrier location options which are depicted using a thick black line to the south and west of the residential property at 23 Ethelton Avenue.

Figure 7-1 Option 1 – Recommended Location of Noise Barrier

Figure 7-2 Option 2 – Recommended Location of Noise Barrier

It is also suggested that a directional public address system be installed where possible, and that the loud speakers be pointed away from the residential receiver at 23 Ethelton Avenue.

8 CONCLUSION

Wilkinson Murray has conducted a noise assessment of the proposed new Bathurst Harness Racing Club facility bordered by Ethelton Avenue and College Road in Bathurst, NSW.

Operational noise impacts associated with the proposal are predicted to be within the intrusiveness criteria recommended by the NSW *Industrial Noise Policy* at all but one receiver.

Mitigation options have been provided. Ensuring all recommendations are undertaken, operation of the facility should comply with the recommended noise criteria for day, evening and night time.