



## **Riverside at Tea Gardens**

### ***Construction Noise Assessment***

For Crighton Properties Pty Ltd

July 2008

0043707 FINAL

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Environmental Resources Management Australia Pty Ltd Quality System

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# 1 CONSTRUCTION NOISE ASSESSMENT

## 1.1 INTRODUCTION

Noise emissions associated with bulk earth works, particularly in relation to the construction of the fresh stormwater quality management and detention ponds at the proposed Riverside Estate, Tea Gardens have the potential to impact on the acoustic amenity of several adjacent residential receptors.

ERM have completed an acoustical assessment to determine the extent of noise impacts associated with these construction activities. *Figure 1.1* presents a locality plan identifying the proposed stormwater quality management ponds. This assessment focuses on existing residences in the northern section of Leeward Circuit, Tea Gardens, as identified on *Figure 1.1*.

This assessment has been prepared with reference to the Department of Environment and Climate Change (DECC) NSW Industrial Noise Policy (INP, 2000) and the Environmental Noise Control Manual (ENCM).



#### Legend

- Riverside at Tea Gardens Site Boundary
- Proposed Stormwater Ponds
- Attended Measurement Location (residence)
- Assessed Distances of Construction Works

**Figure 1.1**  
**Locality Plan**

Client:	Crighton Properties Pty Ltd		
Project:	Environmental Assessment Riverside at Tea Gardens		
Drawing No:	0043707hv_EA_river_noise_01		
Date:	01/07/08	Drawing size:	A4
Drawn by:	JD	Reviewed by:	OM
Source:	Crighton Properties Concept Plan March 08		
Scale:	Refer to Scale Bar		



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A number of technical terms used in this report describe various noise levels. These terms are explained in *Table 2.1*.

**Table 2.1**      *Glossary of Terms*

Term	Description
ABL	Assessment Background Level (ABL) is defined in the INP as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured $L_{90}$ statistical noise levels.
dB(A)	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(LinPeak)	The peak sound pressure level (not RMS) expressed as decibels with no frequency weighting.
L1	The noise level exceeded for 1 % of a measurement period.
L10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
L90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
Leq	<i>The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.</i>
Lmax	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment.
Temperature inversion	A positive temperature gradient. A meteorological condition where atmospheric temperature increases with altitude to some height.



The DECC's current guidelines for construction are described below and apply to residential receivers only:

### 3.1.1 *Working Hours*

The primary objective of the DECC is to limiting audible construction working hours to:

- Monday to Friday - 0700 hours to 1800 hours
- Saturday - 0800 hours to 1300 hours
- No work on Sundays or Public Holidays
- Noise Levels

To determine the likelihood of impact, the provide noise level based criteria. DECC guidelines set out methods for determining construction criteria associated with proposed developments. *Table 3.1* summarises the construction noise criteria with respect to the rating background noise level (RBL) based on duration that applies to nearest sensitive receivers.

***Table 3.1 Construction Noise Goals***

Construction Period	Acceptable LA10 Noise Level <sup>1</sup>
4 weeks and under	Background LA90 plus 20 dBA
4 weeks to 26 weeks	Background LA90 plus 10 dBA
Greater than 26 weeks	Background LA90 plus 5 dBA

For a cumulative period of exposure to noise from construction activity of up to four (4) weeks in duration, the LA10 (15minute) noise level emitted by the works, when measured at a residential receiver, should not exceed the LA90 (15minute) RBL by more than 20 dBA.

For a cumulative period of exposure to noise from construction activity of between 4 weeks and 26 weeks duration, the LA10 (15minute) noise level emitted by the works, when measured at a residential receiver, should not exceed the LA90 (15minute) RBL more than 10 dBA.

For a cumulative period of exposure to noise from construction activity in excess of 26 weeks duration, the LA10 (15minute) noise level emitted by the works, when measured at a residential receiver, should not exceed the LA90 (15minute) RBL by more than 5 dBA.

#### 4.1 ATTENDED NOISE MONITORING RESULTS

To gain an understanding of the existing noise environment ERM conducted attended noise monitoring during calm clear weather conditions to ascertain dominate ambient noise sources and to quantify existing noise contributions. Fifteen minute noise measurements were undertaken using a Brüel and Kjær Type 2250 one-third octave integrating sound level meter (see results in *Table 4.1*). Calibration of the instrument was undertaken using a Brüel and Kjær type 4231 calibrator.

**Table 4.1** *Attended Noise Survey Results – 4 April 2008*

Monitoring Location Time	Primary Noise Descriptor (dBA ref 20µPa)					Observations, Description of Noise Emissions (dBA)
	L <sub>Amax</sub>	L <sub>A1</sub>	L <sub>A10</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>	
Opposite 52 Leeward Circuit, Tea Gardens 10:38 am	66	51	44	43	38	Distant Road Traffic (Myall Street) 30 to 40 Birds 36 to 48 Wind 37 to 40
1. Meteorological conditions at the time of the survey were calm and clear. (Temp 20°C, Wind Speed 2m/s NW)						

#### 4.2 CONSTRUCTION NOISE CRITERIA

The construction phase of this project is expected to occur for a period of between 4 weeks and 26 weeks duration.

Therefore in accordance with the DECC guidelines, the construction noise goals are set to background plus 10 dBA (L<sub>A90</sub> + 10dBA). Therefore, the following noise criteria shown in *Table 4.2* for construction apply. It should be noted that the DECC rarely set noise limit based restrictions for construction sites. Therefore, the construction limits should be seen as an indicative goal for the development.



**Table 4.2**      ***Construction Noise Goals (between 4 weeks to 26 weeks construction period)***

Location	Project Specific Noise Criteria L10(15minute)
All Receivers	48 dBA
1. Construction may only occur between the hours of 7.00 am and 6.00 pm Monday to Friday, and 8.00 am to 1.00 pm Saturdays. For all other times construction noise must be inaudible at the receiver.	

### 5.1 PROPOSED CONSTRUCTION OPERATIONS

Several items of mobile construction plant and equipment are proposed to be used during construction of the stormwater management and detention ponds associated with the Riverside Estate.

The noise assessment calculated the received L10 noise levels at nearby sensitive receptors. It should be noted that this assessment has assumed that all plant and equipment operate simultaneously. In practice, such an operating scenario would be unlikely to occur and the results should therefore be considered conservatively high. Where relevant, modifying factors in accordance with Section 4 of the INP have been applied to calculations.

Table 5.1 presents the items of plant along with the overall sound power level (SWL) adopted in this assessment.

**Table 5.1** Sound Power Levels (SWL) of Construction Plant

Proposed Mobile Items	Sound Power Level (dB(A))
CAT D9N Dozer	113
CAT 825 Compactor	110
Volvo A30 Haul Truck	105
Volvo A40 Haul Truck	105
CAT 631 Scraper	111
Komatsu PC300 Excavator	103
Komatsu PC450 Excavator	105
Note : Sound power levels were obtained from the ERM database of noise sources.	

### 5.2 RESULTS

Construction noise impacts were assessed from two distances representing the near and far distances of construction positions of the stormwater quality/detention ponds from residences within Leeward Circuit, Tea Gardens. Results for both distances are represented as highest (at 40 metres) and lowest (at 280 metres), additionally, plant was assessed at the existing ground surface at the same level as nearby residences and when at lower levels when in the base of the proposed ponds (up to 3.5 m below current ground surface levels). The results of the assessment for both scenarios are presented in Table 5.2.

**Table 5.2**      **Calculated Construction Noise Emissions**

Receptor	Highest L10 Noise Impact dB(A)	Lowest L10 Noise Impact dB(A)	Construction Noise Criteria L10 dB(A)
Leeward Circuit, Tea Gardens.	76	45	48

Calculations of noise emissions associated with the construction of the Riverside stormwater quality/detention ponds identify that the construction noise criteria would be exceeded when plant items are stripping the surface soils, although would reduce significantly when are at lower depths within the lower areas of the proposed ponds. To minimise the potential acoustic impacts of construction activities on nearby residences, it is recommended that the management and mitigation activities (described in *Chapter 6*) be implemented as part of the construction process.

To minimise the impacts of construction noise emissions on nearby residences in Leeward Circuit, Tea Gardens during construction of the Riverside stormwater quality/detention ponds, it is recommended the following mitigation and management procedures be implemented:

- where practical, pushing topsoil or fill to form earth mounds between the construction site and residences during initial stripping. Barrier calculations identify that noise levels may be reduced by up to 15 dBA if a 3.5 metre earth mound is established between the sources and residences;
- where agreement can be reached negotiated agreements between developers and residents in close proximity to the proposed works should be established;
- where possible barriers should be placed nearest to plant and equipment to maximise barrier attenuation;
- maximise the offset distance between noisy plant items and nearby noise sensitive receivers;
- avoiding any coincidence of noisy plant working together in close proximity simultaneously near to sensitive receivers;
- minimising the occurrence of consecutive days works in the same locality;
- orienting noisy plant or equipment away from sensitive areas;
- carrying out loading and unloading away from noise sensitive areas, if loading near sensitive receivers acoustic enclosures or barriers of a suitable height should be constructed to minimise the noise impacts;
- where noise complaints arise, monitor construction noise levels to quantify potential impact at most sensitive residences; and
- the contractor must take reasonable steps to manage and control noise from all plant and equipment. Examples of appropriate noise management and control may include installation of acoustic silencers, low noise mufflers and alternatives to reversing alarms.

## **CONCLUSION**

ERM has completed a noise impact assessment for the proposed construction activities associated with of proposed stormwater quality management ponds adjacent to residence situated in Leeward Circuit, Tea Gardens, NSW.

Noise levels associated with construction are likely to be above the relevant construction noise criteria during initial stages, although when operations are at lower levels within the proposed ponds noise levels would reduce significantly. To minimise impacts on residences during construction, management and mitigation strategies provided in this assessment would significantly reduce impacts on nearby residences.

## ***REFERENCES***

**Environment Protection Authority of NSW** (1994), Environmental Noise Control Manual (ENCM).

**Environment Protection Authority of NSW** (January 2000), Industrial Noise Policy.

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