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Attention: Sari Eru

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PROJECT: **Three Kings Quarry**
Noise Compliance Assessment

REPORT NO.: 2000295A 004

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1.0 INTRODUCTION

Marshall Day Acoustics Ltd (MDA) has carried out a noise survey at two monitoring positions adjacent to Three Kings Quarry, Mt Eden on 11 February 2009. Winstone Aggregates is required to undertake two noise surveys per year, at two identified monitoring positions, as part of the Environmental Management Plan for the Quarry, in order to determine compliance with the noise rules for the site.

2.0 NOISE PERFORMANCE STANDARDS

The quarry is zoned *Business 7* in the City of Auckland District Plan Isthmus Section – Operative 1999. The closest dwellings are located immediately to the west of the quarry in Fyvie Avenue. The noise rule that relates to quarry operations is:

"Noise Control at the Residential Interface

The L_{10} noise level and maximum level (L_{max}) arising from any activity measured at or within the boundary of any residential zoned property shall not exceed the following limits:

<i>Monday to Saturday</i>	<i>7.00 am – 10.00 pm</i>	<i>L_{10} 55 dBA</i>
<i>Sunday and Public Holidays</i>	<i>9.00 am – 6.00 pm</i>	
<i>At all other times</i>		<i>L_{10} 45 dBA</i>
		<i>L_{max} 75 dBA, or background (L_{95}), plus 30 dBA whichever is the lower</i>

The above noise levels shall be measured and assessed in accordance with the requirements of the NZS 6801:1991 "Measurement of Sound" and NZS 6802:1991 "Assessment of Environmental Sound" or their replacement."

3.0 MEASUREMENTS

3.1 General

Measurements were completed at each of the two measurement positions on 11 February 2009. The first was at the Fyvie Avenue position between 1.30 pm and 2.05 pm and the second was at the Graham Breed Drive position between 3.00 pm and 3.30 pm. These positions are the same as in all previous compliance measurements of this type and are shown on Figure 1 attached.

Noise measurements were carried out using a Bruel Et Kjaer 2250 sound level meter, which satisfies the requirements for a Type 1 sound level meter according to IEC 651. Measurements were carried out and assessed generally in accordance with the relevant New Zealand Standards.

The weather was fine with 6/8 octa cloud cover and a slight south-westerly breeze (approximately 1.5-3 m/s).

3.2 Operations and Equipment

The following equipment was observed as operating on the site during the measurement of noise levels. Details were confirmed by the quarry operators following completion of the noise survey.

- 1 x Komatsu WA480-6 wheel loader, loading trucks and moving crushed aggregate from the mobile crusher to the stockpile areas.
- 1 x Hyundai 210 LC-7 excavator extracting rock from the quarry face and loading it into the mobile crusher.
- 1 x Terex Pegson 4242SR Mobile Crusher.
- 1 x Caterpillar D8N bulldozer.
- Sprinkler system.
- Water cart (water truck).

The quarry has since confirmed that all operations were as per normal during the measurement period.

3.3 Results

The measured noise levels are presented in Table 1 below.

Table 1 – Measured Noise Levels

Measurement Position	Duration	dB _A L ₁₀	Noise Sources ⁽¹⁾
Fyvie Avenue	10 minutes	52 ⁽²⁾	Caterpillar D8N bulldozer, Pegson 4242SR Crusher, Komatsu WA480-6 wheel loader, Hyundai 210LC-7 excavator, occasional voices from houses on Fyvie Ave, Cicada noise (constant).
Grahame Breed Drive	10 minutes	47	Caterpillar D8N bulldozer, Pegson 4242SR Crusher, Komatsu WA480-6 wheel loader, Hyundai 210 LC-7 excavator, occasional bird sounds, distant traffic Mt Albert Rd, background noise from Foodtown.

Notes to Table 1:

- (1) Dominant noise source(s) underlined.
- (2) Cicada noise contribution removed from measurement.

3.4 Discussion

3.4.1 Grahame Breed Drive

In terms of activity from the quarry, the most audible noise source at this position was the water cart while driving up and down the quarry haul road.

There was no direct line-of-sight to the mobile crusher, the Hyundai excavator or the D8N Bulldozer at this the measurement position due to the quarry terrain (Refer Photo 1 below) which provided shielding from the noise generated by these machines.



Photo 1 – View from Grahame Breed Drive

Ambient noise sources (i.e. not associated with the quarry activity) included occasional bird sounds, distant traffic noise from the surrounding road network and some background noise from the rear of the nearby Foodtown supermarket. These events, where practicable, were paused out to minimise their impact on the quarry measurements, and are considered to have no significant effect on the survey result.

The measured level of 47 dBA L_{10} readily complies with the relevant noise rule.

3.4.2 Fyvie Avenue

The noise from the quarry at the Fyvie Avenue measurement position was dominated by the Caterpillar D8N bulldozer which was working approximately 185 metres from the measurement position (Refer photos 2 and 3). A view of the quarry plant from the fence line, near this measurement position, is shown in Photo 2 below.

Ambient noise sources included occasional distant voices from people at houses in Fyvie Avenue and constant Cicada noise. There was no direct line of sight to the mobile crushing plant or excavator as they were both operating at the lowest level of the quarry behind raised terrain in the centre of the quarry (Refer Photo 2).



Photo 2 – View from fence line, Fyvie Ave

Photo 3 overleaf shows the location of the crushing plant, excavator and bulldozer in operation.

The adjusted noise level of 52 dBA L_{10} (i.e. the measured noise level adjusted to exclude noise contribution from cicada noise) complies with the relevant noise criterion of 55 dBA L_{10} .



Photo 3 – View of Quarry Looking Towards Graham Breed Drive

4.0 CONCLUSIONS

Marshall Day Acoustics has completed noise monitoring at the two nominated monitoring positions as required by the Environmental Management Plan for the Three Kings Quarry.

Typical operations at the site (i.e. loader, mobile crusher, excavator used to load the crusher, bulldozer, water cart and sprinklers) resulted in noise levels which complied with the relevant noise rules for the site.

FIGURE 1 – MEASUREMENT POSITIONS

