

APPENDIX 4:

**ACOUSTIC ASSESSMENT REPORT
(DESIGN ACOUSTICS)**

10 May 2010

Kawerau District Council
Private Bag 1004,
Kawerau 3169

Attention: Chris Jensen

Dear Sir

Re: 2010 Noise Survey in the Kawerau District

As requested, we have completed noise monitoring in the Kawerau District and the results are set out below.

We also take this opportunity to provide some background information which may assist you when setting noise limits for the District.

1.0 Noise Measurements and Results

A noise logger was set up at various locations throughout the District between 19 and 28 April 2010. Where possible, the same location was used as previous noise surveys. The noise logger measured and recorded various descriptors of the ambient noise environment and recorded the levels every fifteen minutes.

The measurement locations were as follows:

Site 1: 8 Massey Street
Site 2: 3 Windley Place
Site 3: 294 River Road
Site 4: 11 Pollen Street
Site 5: 2B River Road
Site 6: 7-8 Manukorihi Drive

Apart from Site 6 (Industrial zone) all sites are within the Residential Zone.

The noise logger was left at each site to obtain a representative sample of the ambient noise environment during daytime and night time. The monitoring was undertaken under clear weather conditions, and generally avoided the effects of high winds and heavy rain. However the weather conditions were variable and as such, the levels are 'snapshots' of the existing ambient noise environment at each location, under a range of meteorological conditions. Some night time measurements were abandoned due to heavy rain.

Graphs of the measured levels (using L95, Leq, L10 and Lmax descriptors) at each location are attached. A summary of the measured daytime and night time levels (range and average L95 and L10 values) are shown in the following Table 1:

Table 1: Kawerau District Environmental Noise Summary - April 2010

Site	Address	Day Time 7am to 10pm		Night 10pm to 7am	
		Range and Average L95 levels	Range and Average L10 levels*	Range and Average L95 levels	Range and Average L10 levels*
1	8 Massey Street	35-49 dBA, average 39 dBA	44-56 dBA, Average 49 dBA	34-48 dBA, average 35 dBA	40-52 dBA, Average 46 dBA
2	3 Windley Place	31-44 dBA, average 35 dBA	35-53 dBA, Average 46 dBA	31-38 dBA, average 33 dBA	32-50 dBA, Average 42 dBA
3	294 River Road	26-48 dBA, average 34 dBA	50-64 dBA, Average 58 dBA	25-33 dBA, average 27 dBA	28-52 dBA, average 43 dBA
4	11 Pollen Street	26-40 dBA, average 32 dBA	32-57 dBA, average 45 dBA	26-39 dBA, average 32 dBA	30-46 dBA, average 39 dBA
5	2B River Road	50-52 dBA, average 51 dBA	62-65 dBA, average 63dBA	n/a	n/a
6	7-8 Manukorihi Drive	51-60 dBA, average 55 dBA	61-75 dBA, average 68 dBA	n/a	n/a

Note: L10 average values are logarithmic averages.

For your information, the following table 2 is provided for comparison of the latest survey with the results of earlier noise surveys in the residential areas:

Table 2: Comparison of Latest Survey with Previous Surveys

Period	Descriptor	Survey Nov. 1994	Survey December 1994	Survey Nov/Dec 2000	Latest Survey April 2010
Daytime 7am to 10pm	L95 range	32-53 dBA (average 42 dBA)	--	36-48 dBA (average 41 dBA)	26-52 dBA (average 38 dBA)
	L10 range	44-72 dBA (average 58 dBA)	--	51-62 dBA (average 57 dBA)	32-65 dBA (average 57 dBA)
Night time 10pm to 7am	L95 range	26-42 dBA (average 32 dBA)	--	31-42 dBA (average 35 dBA)	25-48 dBA (average 32 dBA)
	L10 range	29-58 dBA (average 51 dBA)	34-52 dBA	47-56 dBA (average 52 dBA)	28-52 dBA (average 43 dBA)

We note from Table 2 above that the latest survey is consistent with previous surveys in that:

- From the latest survey, the average L95 value for the daytime period (38 dBA) is similar to previous surveys (41-42 dBA).
- From the latest survey, the average L10 value for the daytime period (57 dBA) is similar to previous surveys (57-58 dBA).
- From the latest survey, the average L95 level during night time (32 dBA) is similar to previous surveys (32-35 dBA)

However, during night time, the average L10 level of 43 dBA for the latest survey is significantly lower than previous surveys (51-52 dBA). We are unsure of the reasons for this. One possibility is that there is a seasonal effect – we note that all of the previous surveys were carried out in Nov/Dec and the latest was in April. During the summer/Christmas period there may be more insect noise and other activity (such as road traffic) during night time hours, compared with the cooler month of April.

2.0 Guidelines for Setting Noise Limits

2.1 NZ Noise Standards

Section 16 of the RMA requires that occupiers of land shall have a duty to avoid unreasonable noise, and shall adopt the best practicable option to ensure that noise does not exceed a reasonable level.

As such, Territorial Authorities need to specify reasonable noise limits in their District Plans, to control noise (protect residential amenity for example) and provide certainty on environmental outcomes. There can be a balance between setting noise limits that control noise adequately but which are not overly stringent. For example, noise limits in an industrial area could be so stringent that the manufacturer sets up in another area, thereby dampening economic activity in the District.

There are three documents which are important for inclusion in Noise Rules in District Plans. These are the NZ Acoustic Standards:

- NZS6801:2008 'Acoustics – Measurement of Environmental Sound'. This sets out equipment requirements, measurement locations, weather conditions etc. for measuring noise in the environment.
- NZS6802:2008 'Acoustics – Environmental Noise'. This document sets out, in quite some detail, the procedures for assessing environmental noise (averaging of noise levels, correcting for background noise, identifying whether the noise contains special audible characteristics etc). This document uses the Leq measurement descriptor (instead of L10 which was typically used when setting noise limits throughout NZ). The two measurement descriptors are similar, representing 'average maximum' noise levels. In general, for many environmental noise sources, measured L10 levels are 2-3 dBA higher than the Leq levels.

- NZS6803:1999 'Acoustics- Construction Noise'. This document specifies noise limits and other information for the measurement and assessment of construction noise. Construction noise is a temporary activity and is tolerated at higher levels than other noise sources.

2.2 Guideline Upper Limits/ 'Background Plus' Approach for Residential Zones

NZS6802: 2008 provides some guidance for setting noise limits. This includes Guideline residential upper noise limits of:

- 55 dB $L_{Aeq15min}$ for the Daytime Period
- 50 dB $L_{Aeq15min}$ for the Evening Period (if an evening 'shoulder' period is desirable)
- 45 dB $L_{Aeq15min}$ (and 75 dB LAFmax) for the Night time Period

Note the above are 'upper' noise limits and may not protect the majority of the community from adverse noise effects, especially in areas where ambient noise levels are low.

We note also that the earlier 1991 version of NZS6802 (clause 4.2.1) provided guidance on setting noise limits, in that the L10 noise limit should not exceed the background (L95) noise level by more than 10 dBA. While this 'background plus' approach has not been included in the latest 2008 version of NZS6802, based on the latest noise survey (average L95 values) as per Table 2 above, this would result in the following Leq/L10 noise limits:

	Existing L95	Noise Limit: Existing L95+10 dBA
Daytime	38 dBA	38+10= 48 dBA
Night time	32 dBA	32+10= 42 dBA

Noise limits are almost always specified in 5 dBA increments, and the above would therefore be rounded up/down to become noise limits of 50 dBA Leq/L10 during daytime and 40 dBA Leq/L10 during night time. In this regard, a '50/40' (day/night) noise rule is often adopted throughout NZ to protect the acoustical amenity of residential areas, and the above 'background plus 10 dBA' approach would support these noise limits in the Kawerau District.

In relation to industrial areas, we consider that the ambient noise measurements taken at Manukorihi Drive (average 55 dBA L95 and 68 dBA L10) would support a noise limit between industrial sites of 65-70 dBA (Leq/L10).

2.3 Tauranga City Plan Review

Tauranga City is currently reviewing its District Plan. Attached are extracts relating to proposed Noise Rules which we consider contain reasonable noise limits, updated to incorporate the latest versions of the NZ Noise Standards.

We comment on the attachments as follows:

Attachment A: Sets out Objectives and Policies for noise.

Attachment B: Sets out proposed noise rules, using the Leq descriptor, for Residential, Rural and Commercial/Industrial Zones. Note that for the Commercial/Industrial zone, two sets of noise limits apply:

- 4.5.2.3 (a) to control noise from activities on these sites, which is received at more noise sensitive Residential/Rural sites.
- 4.5.2.3 (b) to control noise between sites within the Commercial/Industrial zones.
- 4.5.2.3 (c) to control noise issues arising from residential activities eg (apartments) which are constructed within Commercial zones.

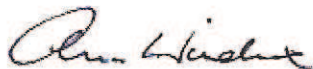
Attachment C: Specifies that noise from construction shall comply with NZS6803:1999.

The above information could be a useful starting point when developing the Noise Rules for future versions of the Kawerau District Plan.

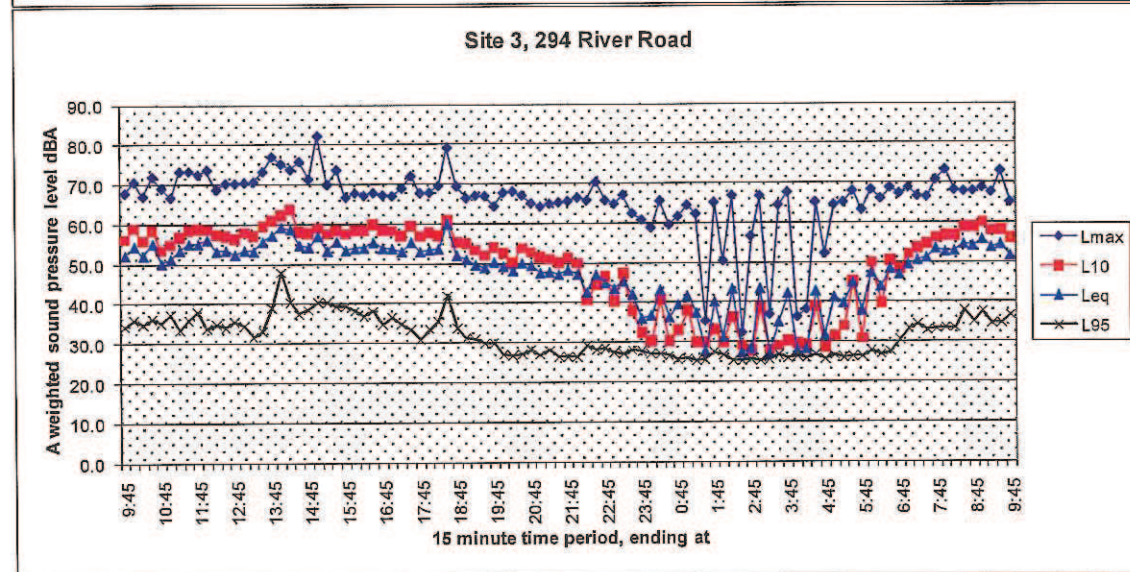
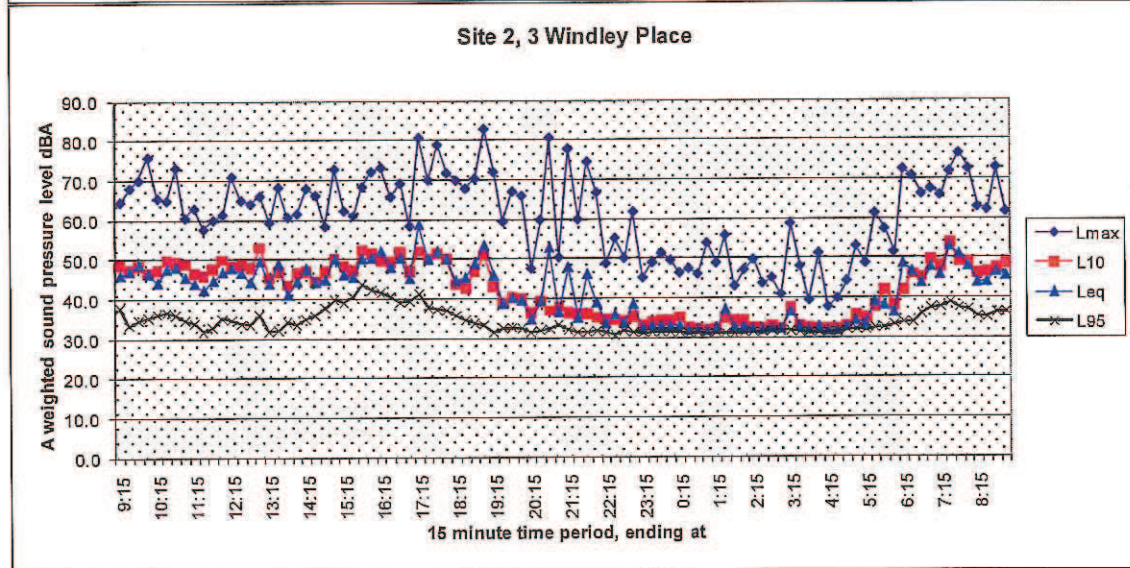
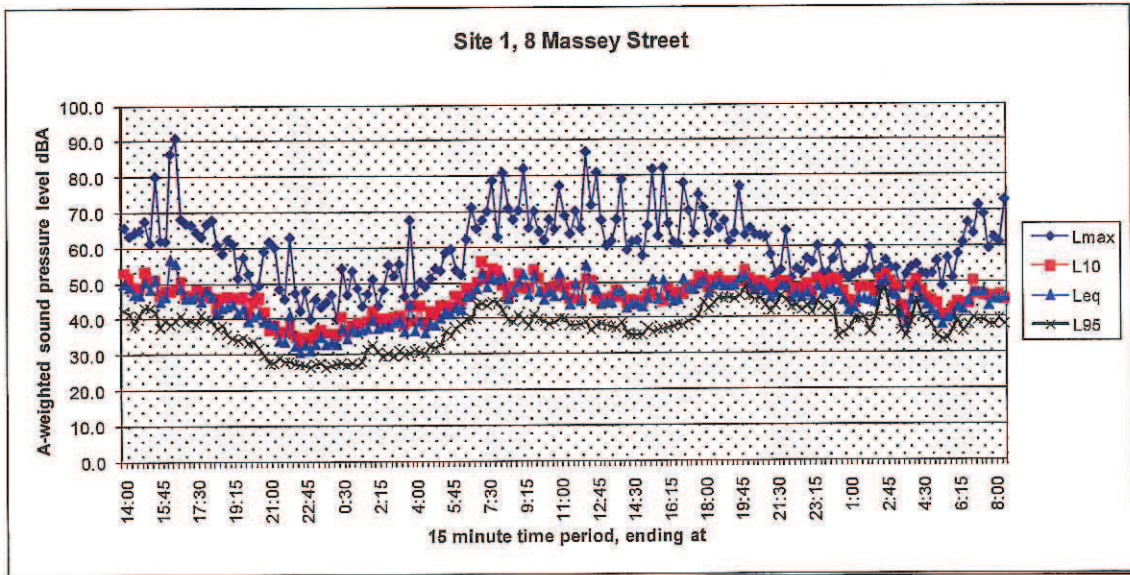
We trust this information is satisfactory. We are grateful for the assistance provided by the Council's EHO Mr Manuel Loffley, who set up the noise logger at the various locations.

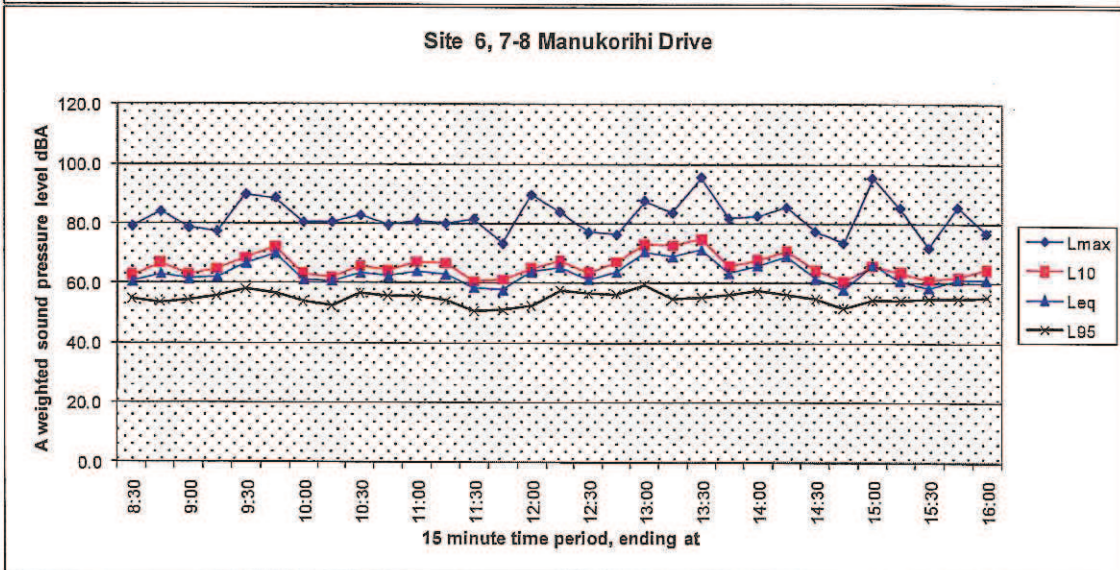
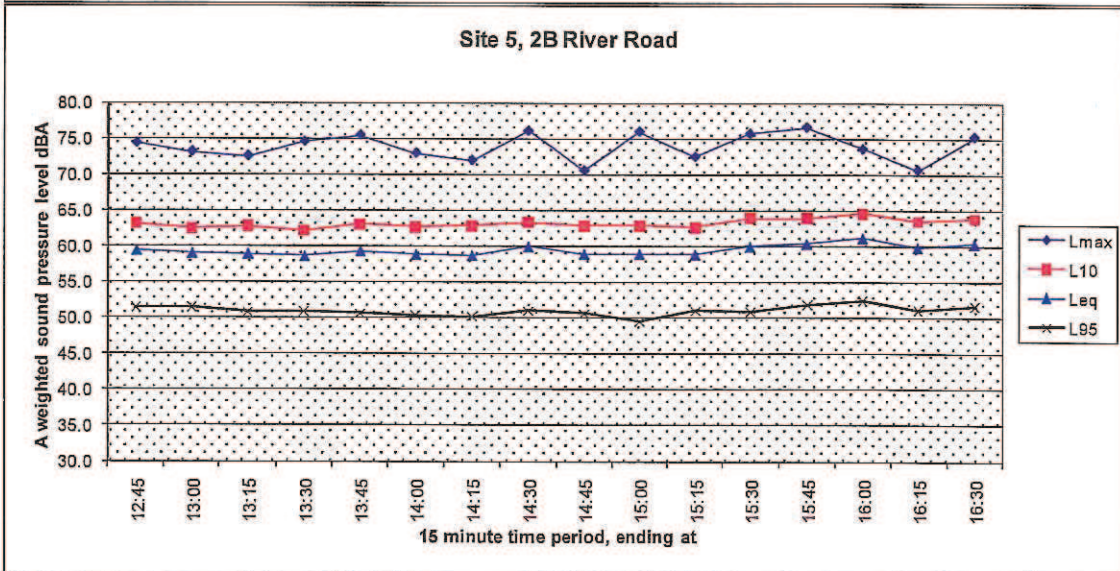
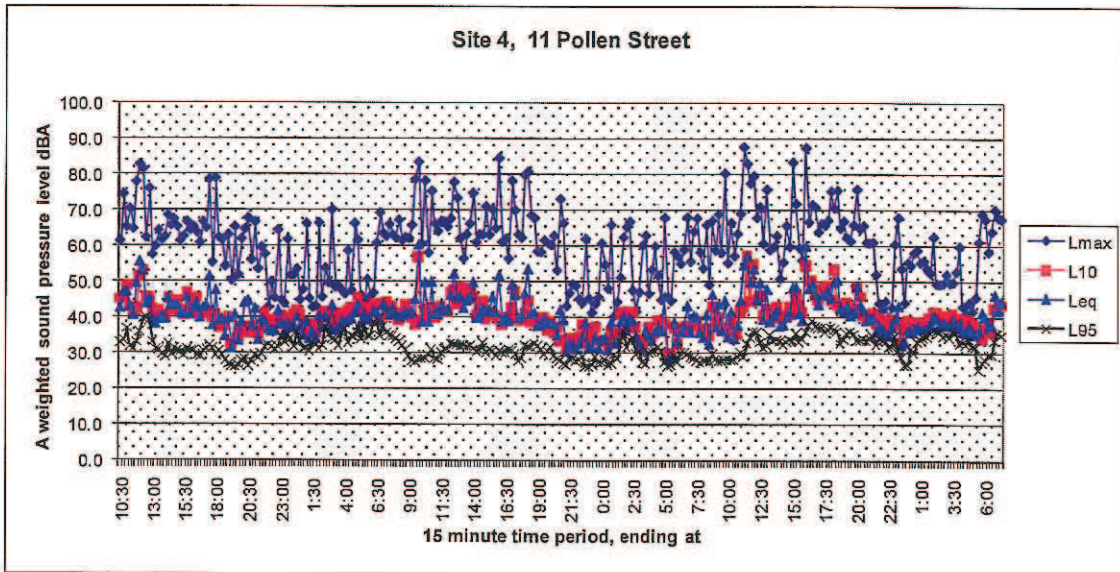
Please do not hesitate to contact us if you have any questions.

Yours faithfully,
Design Acoustics Ltd



Tony Windner
Director





Glossary of Terminology

- dB(A)** A-weighted sound level, a measurement of sound level which has its frequency characteristics modified by a filter, to approximate the frequency response of the human ear.
- L95** The sound level which is equalled or exceeded for 95% of the measurement period. L95 is often used in NZ as the descriptor for 'background noise' and is the average minimum noise level (noise levels are at/above the L95 sound level for 95% of the time).
- Leq** The time averaged sound level (on a logarithmic/energy basis). The 2008 version of NZS6802 adopts LAeq15min as the descriptor for measuring environmental noise. This is the A weighted sound level (dB(A) using the Leq descriptor, measured over a 15-minute measurement period.
- L10** The sound level which is equalled or exceeded for 10% of the measurement period. The L10 is often used in NZ as the descriptor when measuring intrusive noise and for comparison with L10 noise limits. It is the average maximum noise level (noise levels are at/above the L10 sound level for 10% of the time).
- Lmax** The maximum sound level recorded during the measurement period.



4.5 PURPOSE OF NOISE PROVISIONS

Noise is an environmental effect that has the potential to cause annoyance and affect health. It is often identified as a nuisance in the local *environment* and is a frequent cause of complaints, often related to reverse sensitivity.

Ambient noise levels vary across *the City* which is reflective of a varied built *environment* that includes an airport, port, strategic road *infrastructure* and mix of residential, rural, commercial and *industrial activities*. Noise emission is an intrinsic part of the operation and function of these activities

As these activities all generate their own noise levels, *the City Plan* recognises and identifies the level of noise that is considered reasonably acceptable for the day-to-day operation of these activities for the zone in which they are located.

4.5.1 Objectives and Policies for Noise

4.5.1.1 Objective – Noise

The generation of noise is reasonable for the nature and scale of individual activities and minimises annoyance and disturbance on surrounding activities and *sensitive zones*.

4.5.1.1.1 Policy – Noise from Non-Residential Activities

By ensuring *non-residential activities* and roadside *cabinets* do not generate noise levels normally considered unacceptable in *sensitive zones*, or create noise levels which are unreasonable for occupiers of adjoining or adjacent properties.

4.5.1.1.2 Policy – Mitigation of Cumulative Noise Effects at Tauriko

By ensuring that activities carried out in the *Commercial Zones* and *Industrial Zones* at Tauriko avoid the creation of cumulative adverse effects on *residential activities* in the surrounding area.

4.5.1.1.3 Policy – Rural Noise and Disturbance

By ensuring that noise generated in the Rural Zone is consistent with the type of rural land uses that could be reasonably expected to occur in that zone.

4.5.1.1.4 Policy – Airport and Port Noise

By providing for the day-to-day operations of airport and *port activities* through recognising their specific noise generating characteristics, while ensuring that noise does not adversely affect the amenity of surrounding land uses.

4.5.1.2 Objective – Reverse Sensitivity

To avoid noise-sensitive activities where they will be located in existing high-noise environments and the adverse effects of that noise cannot be reasonably mitigated.

Attachment A (cont.)



4.5.1.2.1 Policy – Reverse Sensitivity: Residential Activities in Business Zones

By ensuring that *residential activities* provided for in the *Commercial Zone* are acoustically designed and constructed to mitigate noise received from *non-residential activities* in that zone.

4.5.1.2.2 Policy – Reverse Sensitivity: Activities in Proximity to the Port and Airport

By ensuring that the location of noise-sensitive activities, and extensions to those activities, are managed or avoided where they are likely to be situated in a location that could affect the day-to-day operations of port and airport activities through reverse sensitivity.

Attachment B



4.5.2 Permitted Activity Rules

Note: For noise associated with temporary activities refer to Rule 4.6.1.
 Note: Where an activity does not comply with a Permitted Activity Rule it shall be considered a Restricted Discretionary Activity unless stated otherwise.

4.5.2.1 Residential Zones and Rural-Residential Zone

*

- a) Activities on sites within these zones, excluding a residential activity or helicopter landing and takeoff associated with hospital emergencies, shall not exceed the following noise levels within the boundary of any other site in any zone other than a Commercial Zone or Industrial Zone:

daytime:	50 dBA Leq
night-time :	40 dBA Leq and 70 dBA Lmax

- b) Sound levels shall be measured in accordance with NZS 6801:2008 Acoustics - Measurement of Sound and assessed in accordance with NZS 6802:2008 Acoustics - Environmental Noise, or any superseding codes of practice and/or standards.

4.5.2.2 Rural Zones

*

- a) Activities on sites within this zone, excluding activities of a limited duration that are accepted rural management practices, shall not exceed the following noise levels, within the boundary of any site in any zone other than a Commercial Zone or Industrial Zone, or at any point within the notional boundary of any dwelling not on the subject site:

daytime	55 dBA Leq
night-time	45 dBA Leq and 75 dBA Lmax

or '50/40' as above would also be acceptable.

- b) Sound levels shall be measured in accordance with NZS 6801:2008 Acoustics - Measurement of Sound and assessed in accordance with NZS 6802:2008 Acoustics - Environmental Noise, or any superseding codes of practice and/or standards.

4.5.2.3 Commercial and Industry Zones

*

- a) Activities in these zones, other than aircraft operations, shall not exceed the following noise levels within the boundary of any site within a Residential, Rural-Residential or Urban Marae Community Zone, or Rural Zone:

Control Hours	daytime	night-time
Commercial Zones	50 dBA Leq	40 dBA Leq and 70 dBA Lmax
Industrial Zone	55 dBA Leq	45 dBA Leq and 70 dBA Lmax
Port Industry Zone	See Rule 4.5.2.5 - Port Industry Noise for noise limit rules	

or '50/40' as above would also be acceptable.

Attachment B. (cont.)



- b) The noise level from activities on a site in the Commercial Zone or Industrial Zone shall not exceed the following limits, within the boundary of any other site in the Commercial Zone or Industrial Zone:

At any time	65 dBA Leq
night-time	85 dBA Lmax



- c) Every residential building within the Commercial Zone shall be designed, sited and constructed to ensure noise from non-residential activities that complies with the limits in Rule 4.5.2.3 a) – Commercial and Industry Zone will not exceed 35 dBA Leq 24 hours in bedrooms and 40 dBA Leq 24 hours in all other habitable rooms.

Where mechanical ventilation is required the combined noise level from the mechanical ventilation system shall not exceed the limits of this rule.

The internal noise level received from a business activity shall be calculated assuming that the external façade noise levels are those of the relevant limits of Rule 4.5.2.3 a) – Commercial and Industry Zone and Rule 4.5.2.3 c) – Commercial and Industry Zone.

- d) An acoustic design report prepared by a suitably qualified and experienced engineer shall be provided, demonstrating compliance with Rule 4.5.2.3 c) – Commercial and Industry Zone.
- e) Approved Occupational Safety and Health (OSH) safety devices are exempt from compliance with the noise limits of these rules during the daytime only.
- f) Sound levels shall be measured in accordance with NZS 8801:2008 Acoustics - Measurement of Sound and assessed in accordance with NZS 8802:2008 Acoustics - Environmental Noise, or any superseding codes of practice and/or standards.

4.5.2.3.1 Special Noise Control Limits for Courtney Road

Notwithstanding Rule 4.5.2.3 a) and c) – Commercial and Industry Zone, the noise level from activities on Lots 1, 2, 3, 4, 49 DPS2174 shall not exceed the following noise limits within the boundary of any Suburban Residential Zoned site:

Control Hours	Noise Level
0700 to 1800	55 dBA Leq
1800 to 0700	40 dBA Leq and 75 dBA Lmax

4.5.2.3.2 Special Noise Controls for Bethlehem Commercial Plan Area

- a) Notwithstanding Rule 4.5.2.3 a) and c) – Commercial and Industry Zone the noise level from all activities shall not exceed the following limits:

i) Within the boundary of any Residential Zone:

Control Hours	Noise Level
daytime	50 dBA Leq
night-time	40 dBA Leq and 70 dBA Lmax

Attachment C.



- b) Cabinets located within the *Road Zone* that do not adjoin any:
- i) *Sensitive Zone*;
 - ii) *Outstanding Natural Features and Landscape*;
 - iii) *Important Amenity Landscape*; or
 - iv) *Special Ecological Area*
- shall not exceed the following limits within the *boundary* or any other *site*:

Any time	60 dBA <i>Leq</i>
Night-time	65 dBA <i>Lmax</i>

- c) Sound levels shall be measured in accordance with *NZS 6801:2008 Acoustics - Measurement of Sound* and assessed in accordance with *NZS 6802:2008 Acoustics - Environmental Noise*, or any superseding codes of practice and/or standards.

4.5.2.12 Construction Noise



- a) *Construction noise* from a *site* in any zone within the *City* shall not exceed the limits recommended in, and shall be measured and assessed in accordance with, *NZS 6803:1999 Acoustics Construction Noise*; and
- b) For *construction activities* being undertaken:
- i) From 20 December – 10 January (inclusive); and
 - ii) Within the *Mount Maunganui* area from *Adams Avenue* to *Grace Avenue*
- noise levels shall not exceed *Rule 4.5.2.1 – Residential Zones and Rural-Residential Zone*.

4.5.3 Restricted Discretionary Activity Rules

The following are *Restricted Discretionary Activities*:

- a) The erection of or extensions to existing or new *residential activities*, *schools* and *tertiary education premises* and *health centres* between the *Air Noise Boundary* and the *Outer Control Boundary* as shown on *Diagram 3, Section 7, Plan Maps (Part B)*;
- b) Activities that do not comply with *Rule 4.5.2 – Permitted Activity Rules*.

4.5.3.1 Restricted Discretionary Activities – Matters of Discretion and Conditions

The *Council* restricts the exercise of its discretion to the following matters:

- a) The sensitivity of the receiving *environment* to the effects of the noise and the effects that noise will have on potential receivers, especially where the affected activity has a component where people need to sleep or concentrate;
- b) The character of the locality or activities within the zone (including traffic and pedestrian activity) and level of background noise;
- c) The location of the activity in relation to any nearby *residential activities* and the extent to which the noise generated will affect the amenity values of those surrounding *residential activities*;