

Project: TUAKAU STRUCTURE PLAN
ACOUSTIC ASSESSMENT

Prepared for: Waikato District Council
Private Bag 544
Ngaruawahia 3742

Attention: Jane Macartney

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1.0 INTRODUCTION

Marshall Day Acoustics (MDA) has been engaged by the Waikato District Council to provide acoustical advice relating to the development of the Tuakau Structure Plan (attached as Appendix 2) in accordance with our scope of work and fee proposal dated 9 June, 2015.

In summary, this advice relates to the general location of the proposed zonings, the potential reverse sensitivity considerations relating to three noisy activities in the area, the relevance of the existing Pokeno Structure Plan acoustic rules and comment on the rules of the former Manukau City relating to the operation of the airport for the insulation of dwellings, and general advice relating to the relevance and content of the noise rules as they currently exist in the Proposed Auckland Unitary Plan.

2.0 ZONES – POSITIONAL RELATIONSHIP

2.1 Acoustic Principles

In principle it is desirable for noisy activities, such as industrial, to be geographically well separated from noise-sensitive activities, e.g. residential, in order to provide noise attenuation due to distance.

This separation benefits both types of activity, noise-sensitive activities by ensuring that there will be little noise impact from nearby noisy activity, enabling relatively stringent noise limits to be applied, thus ensuring a good standard of acoustic amenity is maintained.

Land zones for potentially noisy activity, such as industrial, will also benefit by the avoidance or reduction of reverse-sensitivity effects of locating in close proximity to noise-sensitive zones, and permitting the use of relatively permissive noise limits as they apply to adjacent sites, thus allowing such activities to operate without undue restriction.

The arrangement of zones to achieve satisfactory separation of noisy and noise-sensitive activities can be accomplished by the graduation of adjacent zones between noisy and noise-sensitive, e.g. heavy industrial adjacent to light industrial proceeding through business, commercial, community to residential zones. Alternatively, separation can also be achieved by means of intervening low occupancy lands such as open space, reserve or rural zoned land. Sometimes, in practice, separation is implemented by means of major road or rail corridors, although this is not an ideal methodology as such corridors can be, and typically are, significant noise sources themselves making them inappropriate to abut noise-sensitive activities.

2.2 Tuakau Structure Plan

Examining the proposed Tuakau Structure Plan (TSP) in light of the acoustic principles set out above, the following issues are noted;

- (i) North of the existing rail line the proposed zonings of residential, rural residential, buffer area (rural zone) and Gully Area Overlay are largely acoustically compatible being non noisy or noise-sensitive zonings.
- (ii) There are two 'Future Recreation and Reserve' areas shown (north of rail line). Passive recreation activities are generally acceptable adjacent to residential areas. Active recreation with organised sport, proximate to residential has the potential for conflict due to noise generated by organised sport. This has become an issue of concern and in some cases, appeals to the Environment Court, in the greater Auckland area in the last few years with the intensification of use of sports fields as the result of the installation of sand carpeting, artificial turf and lighting.

It is recommended that some form of development/management plans should be formulated to address these potential conflicts, which are typically dominated by noise (and glare) impacts. MDA can provide more detailed recommendations in relation to noise control for both residential and active recreation zones if needed.

(iii) Business Zones.

The proposed or existing business zoned areas can be considered in two categories; the main central business area and the smaller suburban areas of which six are shown on the Structure Plan. For the central business zone, south of the rail line, this is buffered quite well by Mixed Use Overlay areas in which it is assumed there will be provision for residential activity. This arrangement can be satisfactorily addressed by appropriately graduated noise controls.

The adjacent Light Industrial zone to the east is considered generally compatible with the Business zone, subject to appropriate noise limits for noise received in the Business zone sites.

(iv) This Light Industrial Zone appears to be separated from Residential by existing Recreation, Rural Residential and Gully Area Overlay which should have suitably less stringent noise limits for the control of industrial activity noise to residents in the Rural Residential zone and apply at 'notional boundaries' rather than on entire rural residential sites, as is normal practice.

(v) The Business Zone north of the rail line adjoins Residential and Rural Residential areas. In order for Business activities not to be overly restricted the noise limits applying in the immediately adjacent Residential and Rural Residential sites should be of lesser stringency than for other Residential sites, typically 55 dBA daytime and 45 dBA night-time.

(vi) The Industrial zone immediately south of the rail line adjoins a strip of Rural Residential and Gully Overlay. It is considered that this strip could provide a suitable buffer separation to the residential land to the west, provided that no residential or other noise-sensitive use, not wholly contained in a suitably acoustically insulated building, is permitted within, e.g. a child care centre having outdoor play areas would not be permitted.

(vii) The land in the southern part of the TSP to the north of the Waikato River is shown as zoned Industrial, Light Industrial and existing recreation, with a small area to the south and east of Lapwood Road zoned Rural Residential.

It is considered that the industrial and recreational zones are reasonably compatible and with the adjacent rural zone. However, the small Rural Residential area is potentially problematic as this could unduly restrict the adjacent industrial activity and introduce reverse sensitivity issues into what is otherwise an industrial area; rural generally being seen from an acoustical perspective as an industrial use. It is recommended that this Rural Residential zoning be reconsidered. It is noted that there are existing residences on the eastern side of River Road, opposite the (existing) Light Industrial area. There is some potential for adverse noise impact and noise limits should reflect the circumstances.

(viii) An aggregate extraction zone is shown in River Road on the TSP approximately 800 metres south-east of the intersection with Lapwood Road. The extraction of rock and its subsequent processing is a significantly noisy activity. However, it is noted that there are no residences in close proximity to this site and this circumstance should be maintained. The nearest existing dwellings are approximately 450 to 500 metres distant and it is strongly recommended that any new dwellings should not be permitted any closer than 500 metres from the mineral extraction site unless an acoustical assessment has been undertaken which demonstrates that outdoor residential amenity standards would not be adversely affected.

3.0 EXISTING NOISE GENERATING SITES

It is understood that there are three particular activities within the TSP area which are known to be significant noise generators; Lavalva Farm, motorcross track and TTT Products. These are considered individually below for their acoustical significance and recommendations for noise control measures provided where appropriate.

3.1 La Valla Farm, 139 Dominion Road

The La Valla Estate has a consent to operate a conference and event facility with accommodation, subject to conditions including those for noise control purposes. MDA has reviewed the acoustical assessment report prepared for the consent application and the associated noise conditions of consent imposed. These are considered satisfactory for the intended activities and it is recommended that the noise conditions should be incorporated into the TSP if this is appropriate for planning purposes.

It is observed that the outdoor noise events would have some limited noise impact on residents in the vicinity, but these events are restricted in number and overall the activities and noise levels generated are assessed as being generally acceptable.

3.2 Pukekohe Motorcycle Club – Geraghty-Maber Road

The Pukekohe Motorcycle Club (PMC) has a consent issued under the Town & Country Planning Act dated March 1984, to operate a site in Geraghty-Maber Road for the purposes of trail and motocross race meetings. There are no noise limit conditions pertaining to the consent but there are limitations on numbers and times of events as follows:

- Race days: 10 in one year (10.00am – 5.30 pm)
- Practice days – 1 per week (2 hrs duration until 7.00pm)

In summary this means that significant noise may be emitted from the PMC site on 62 days per year; 10 days for 7.5 hours and 52 days for two hours. The nearest residences are 350 – 560 metres distant to the closest parts of the track. In a worst case circumstance with a full field of 40 motor cycles the nearest residents could receive noise levels of up to 80 decibels (at 350 metres) and up to 75 decibels (at 550 metres). During typical racing circumstances with fewer motor cycles spread out over the tracks, noise levels are likely to be 5 – 8 decibels lower. 55 dB is at the upper limit of acceptability for residential daytime in a rural area and 75 - 80 decibels would be generally unacceptable and very likely to cause disturbance and complaint from residents.

It is understood that noise from PMC activity has been the cause of complaint to the former Franklin District Council from residents in Percy Graham Drive and Geraghty Maber Road.

The PMC site is outside the TSP area and is surrounded by rurally zoned land. The nearest dwellings to the site in the TSP area are those in the western end of Percy Graham Drive, more than 700 metres from the eastern edge of the PMC site. The noise level from motor cycle activity from this location is estimated to be up to 75 decibels, an unacceptable level for residential areas.

If, however, in the future the area north of Percy Graham Drive should be extended to the north or west, residential sites could be as close as 270 metres from the PMC site and the noise effects would be greater, up to 80 decibels, and potentially unacceptable and likely to result in noise complaints from residents. It is recommended before rezoning this land Residential or Rural Residential, a comprehensive acoustical assessment should be undertaken to more accurately determine the potential PMC noise effects on this land.

3.3 TTT Products

The TTT Products sawmill is located at 105 Bollard Road to the south of the rail line. The TSP proposes a residential zone on the north side of the rail line but with a gully area overlay extending approximately 250 metres to the north opposite the TTT site.

MDA has reviewed the Hegley Acoustic Consultants (HAC) report dated December 2008 which addresses the potential impact of noise from the industrial activities located on the south side of the NIMT on a proposal to develop a residential subdivision on the southern side of Dominion Road extending southwards to within approximately 300 metres of NIMT. It is understood that there is an air quality buffer zone extending 250 metres from the northern edge of the TTT site. HAC finds that this land would be suitable for residential purposes, taking into consideration noise from the industrial activity and the NIMT to the south. Noise limits recommended by HAC for Industrial noise received on this land, if zoned residential, are 50 dB L_{Aeq} daytime and 40 dB L_{Aeq} and 70 dB L_{Amax} night-time, based on the existence of the 300 metre buffer area. MDA generally concurs with the findings of the HAC report in this regard and considers that a 250 or 300 metre buffer is appropriate to maintain satisfactory acoustic amenity in this area.

4.0 APPLICABILITY OF POKENO STRUCTURE PLAN NOISE RULES

4.1 Road Traffic Noise

The Pokeno Structure Plan (PSP) contains noise rules requiring the acoustic insulation of dwellings constructed in the vicinity of the Waikato Expressway and the NIMT. Consistency with this provision in the PSP with the TSP would be desirable if existing and future traffic flows warrant this. The following table 1 shows existing¹ and future traffic flows^(for 2025) and major roads.

Table 1: Traffic Noise Levels Major Roads

Road	Existing traffic volume ⁽¹⁾	Traffic volume 2025 ⁽²⁾	2025 Noise Level	
			Vehicle Speed km/ph	dB L_{Aeq} 24 hrs
Buckland Road	8000	10400	60	64
			100	67
River Road	4940	6422	60	62
			75	63
Harrisville Road	3400	4420	60	60
			100	64
Whangarata Rd	3210	4173	60	60
			100	63

Notes: (1) Existing traffic volumes from Aecom – Integrated Transportation Assessment – 18/6/2015

(2) Future traffic volumes: existing plus 3% p.a. (non compounding) for 10 years

Calculated noise levels based on:

- Road surface: English chip
- Gradient: Nil
- Heavy Vehicles: 7%
- Dwelling facades at 15m from edge of carriageway
- Ground absorption fraction: 0.5

Traffic noise levels are appropriately assessed in accordance with the provision of New Zealand Standard NZS 6806:2010 *Acoustics – Road traffic noise – New and altered roads*. This Standard primarily applies to the alteration of existing, and construction of new roads and provides a

methodology and criteria for determining if traffic noise mitigation is required by the road constructor. NZS 6806 has been adopted by NZTA and Auckland Council in the Proposal Auckland Unitary Plan.

Notwithstanding that the Standard is primarily intended for the purpose of mitigation measures by road builders, typically NZTA or a territorial local authority, it does provide a useful determination as to whether mitigation for noise sensitive buildings is appropriate. The relevant criterion in the circumstances of TSP is that applicable to 'altered road', i.e. existing roads which is 64 dB L_{Aeq} (24 hours) at the façade of a dwelling. It can be seen from Table 1 this criterion is exceeded only in Buckland Road where the speed limit is 100 kph with a predicted level of 67 dB L_{Aeq} for the year 2025.

It is recommended therefore, that Rule 27A 6.1 Noise of the PSP, should be applied only to that section of Buckland Road where the speed limit is 100 per hour, and for dwellings or other noise-sensitive activities within 50 metres of the near side edge of Buckland Road. The traffic noise level is predicted to be less than 67 dB L_{Aeq} beyond 50 metres from the road for the year 2025. If the speed limit on the relevant section of Buckland Road was reduced to 50 kph the imposition of Rule 27A.6.1 would not be needed. By way of explanation it is noted a limit of 50 kph will result in average vehicle speeds approaching 60 kph.

4.2 Rail Noise

It is also recommended that Rule 27A.6.2 (b) (Rail Noise) should be adopted on the basis of consistency with the PSP and because it is the same rail line which passes through Pokeno and therefore carry the same volume of rail traffic.

4.3 Specification of Building Insulation

The TSP could contain a provision whereby compliance with the internal noise criteria is accepted based on the dwelling being constructed in accordance with a standard specification (acceptable solution) which could be included as an appendix to the TSP. It is noted that this type of provision is contained in some other District Plans.

Discussion with MDA colleagues has revealed that the 'acceptable solution' methodology is not considered an advantageous provision for the following reasons:

- (a) An 'acceptable solution' would, to be generally effective need to address a reasonable worst case circumstance for noise exposure to transport noise. Essentially this would mean a dwelling close to the transport corridor with significant areas of glazing in the facade facing the corridor. If the 'acceptable solution' was adopted by a constructor, this would have the effect of making all those dwellings with lesser noise exposure, which would be most of them, being over-designed for acoustical insulation, thus resulting in unnecessary expense in building construction and the provision of mechanical ventilation.
- (b) On the other hand, for example, if the 'acceptable solution' was designed to address an average noise exposure circumstance, then about half the dwellings would be 'under designed' resulting in exposure to unacceptable internal noise levels, whilst the other half would be over designed causing unnecessary expenditure.
- (c) An acceptable solution document would need to be quite detailed and tend to limit building construction materials (brick and tile), and constrain window sizes. The effect of these constraints would cause dwellings to be of similar appearance and distance from the road. This may be seen as undesirable from an urban design perspective.

Taking all relevant factors into consideration the retention of Rule 27A.6.1.4 as referred to in paragraph 4.1, without the option of compliance being by means of an 'acceptable solution', is recommended.

However, if WDC should decide to pursue the 'acceptable solution' option MDA can provide a detailed design specification for this purpose.

5.0 PROPOSED AUCKLAND UNITARY PLAN (PAUP) PROVISIONS

MDA has been involved in detailed submissions to the PAUP in relation to the content and structure of the noise provisions. There are a number of updating matters, including alignment with relevant New Zealand Standards and formatting of the rules which are relevant to the TSP. These matters have been included and are shown in the 'track changes' version of the PSP provisions which are attached as Appendix 1.

These issues include:

- Expression of noise limits as dB L_{Aeq} to align with New Zealand and International Standards
- Expression of noise limit time frames in terms of the 24 hour clock to align with New Zealand and International Standards
- Correction of; 'levels' to 'limits'
- Change of; 'achieve' to 'comply'
- Amend where needed; 'at the boundary' to 'within the boundary'
- In reference to NZ Acoustical Standards, deletion of ultra viries and redundant provisions
- Deletion of L_{max} limits for daytime periods

6.0 SUMMARY AND CONCLUSIONS

MDA has examined the Tuakau Structure Plan in relation to the proposed noise provisions. Consideration has been given to the relative locations of the various land use zones, existing noisy activities, the relevance of the PSP noise rules, suitability of a standard design for house acoustic insulation, traffic and rail noise provisions and the updating and structure of the rules to align with current practice and standards.

Recommendations are made for amendment of the PSP noise provisions for adoption in the TSP.

APPENDIX 1: ‘TRACK CHANGES’ VERSION OF PSP PROVISIONS

27A.6 PERFORMANCE STANDARDS FOR ALL ACTIVITIES – RESIDENTIAL 2 ZONE

27A.6.1 NOISE

1. The NOISE level from activities within a site shall not exceed the following limits when measured within the boundary of SITE ZONED Residential 2 ~~shall not exceed:~~

Area	The noise level measured within the boundary of a site within the area described in column 1 of this table shall not exceed the following limits:		
	7.00am – 10.00pm <u>0700 – 2200 hrs</u>	10.00pm – 7.00am <u>2200 – 0700 hrs</u>	
	(dB <u>A</u> L_{Aeq})	(dB <u>A</u> L_{Aeq})	dB <u>A</u> L_{Amax}
High Background Noise Area (refer to planning maps)	55	45	75
All other areas	50	40	70

~~Except that the~~These NOISE limits do not apply to construction NOISE, or NOISE generated by the operation and maintenance of the State Highway, and may be exceeded by intermittent NOISE associated with normal HOUSEHOLD activity e.g. lawn mowing undertaken at reasonable times during the day.

2. HABITABLE ROOMS in a DWELLING HOUSE or RESIDENTIAL BUILDING that is within ~~the area shown on 50 metres of the nearside edge of Buckland Road where the posted speed limit is 100 kmph, and withinmetres of the NIMT rail line~~ the planning maps as “Background Noise Area” and “High Background Noise Area” shall be designed and constructed such that:
 - a) The noise level resulting from traffic shall not exceed:
 - ~~45 dB~~A L_{Aeq} ~~dB~~ L_{Aeq} (24 hour) in any habitable room; and
 - ~~35 dB~~A L_{Aeq} ~~dB~~ L_{Aeq} (9 hour) from 10.00pm to 7.00am in any bedroom.
 - b) The noise level resulting from trains shall not exceed:
 - ~~35 dB~~A L_{Aeq} ~~dB~~ L_{Aeq} (1 hour) in bedrooms; and
 - ~~45 dB~~A L_{Aeq} ~~dB~~ L_{Aeq} (1 hour) in any habitable rooms.
 - c) The internal NOISE levels shall be achieved with ventilation windows open and with any mechanical ventilation required to ventilate the rooms in accordance with the Building Code, ~~switched on~~ operating.

The requirements of Rule 2 a), b), and c) above shall not apply to any dwelling house or residential building constructed in accordance with the requirements of the ‘Standard Acoustic Specification’ contained in Appendix (x).

3. Acoustic design in relation to Rule 27A.6.1.2 shall be based on the traffic flows predicted for the road 10 years after the construction of the BUILDING.

4. Compliance with Rules 27A.6.1.2 shall be demonstrated by the provision of an acoustic design report from a suitably qualified ~~an~~ and experienced acoustic engineer confirming that the BUILDING to be constructed is designed to ~~achieve~~ comply with the above NOISE ~~levels~~ limits.
5. The NOISE standards do not apply to the construction or maintenance of BUILDINGS or the DEVELOPMENT of land.
6. The NOISE levels shall be measured and assessed in accordance with the requirements of NZS 6801:2008 Measurement of Environmental Sound and NZS 6802:2008 Environmental Noise respectively, ~~or any standards that supersede these standards~~ ^[s1].
7. ~~The NOISE shall be measured by a sound level meter complying with the International Standard IEC 651 (1979) Sound Level Meters, Type 1 or any standard that supersedes that standard~~ ^[s2].

Explanation

To ensure a good acoustic environment and to support residential amenity and wellbeing, maximum allowable levels of NOISE are applied to the zone.

Some residential areas are adjacent to State Highway 1, other roads and the NIMT rail corridor, which are expected to be sources of elevated background noise. In order to ensure that residents do not suffer adverse effects in relation to their health, safety and amenity from exposure to unacceptable noise levels and to ensure efficient operation of the networks, the rules require acoustic treatment of DWELLING HOUSES or RESIDENTIAL BUILDINGS (in addition to other methods) in these locations (refer to the planning maps).

29.6 PERFORMANCE STANDARDS FOR ALL ACTIVITIES – BUSINESS ZONE

29.6.1 NOISE

A. ~~No activity within the zone shall cause the following sound levels to be exceeded, for the stated times, at or~~ The noise level from activities within a site shall not exceed the following limits within the boundary of any other SITE, where that other SITE is:

1. **NOT ZONED** BUSINESS ZONE:

Time/hours	"dB L₁₀L_{Aeq}" (defined)	"dB L_{max}L_{Amax}" (defined)
0700 to 1900	50 dBA	75 dBA
1900 to 2200	45 dBA	75 dBA
All other times	40 dBA	65-75 dBA

2. ZONED BUSINESS AND IS **WITHIN** the 'BUSINESS CENTRES' shown on the planning maps.

Time/hours	L₁₀ dB -L_{Aeq} (defined)	L_{max} dB -L_{Amax} (defined)
At all times	55 dBA	75 dBA _[s3]
<u>2200 – 0700</u>		75 dBA

3. ZONED BUSINESS ZONE BUT IS OUTSIDE THE 'BUSINESS CENTRES' shown on the planning maps:

Time/hours	L₁₀ (defined) dB L _{Aeq}	L_{max} (defined) L _{Amax}
At all times	60-70 dBA	75 dBA _[s4]

Noise shall be measured and ~~monitored~~ assessed in accordance with NZS 6801:2008 Acoustics- Measurement of Environmental Sound and NZS 6802:2008 Acoustics – Environmental Noise.

Explanation: All business activities have a duty to keep noise levels within reasonable limits. Noise levels must not reduce the pleasantness of nearby properties. These levels set a benchmark by which the acceptability of any noise might be considered. Where these levels are not being achieved the influence of many other factors will need to be considered, such as traffic noise and general background noise levels due to the range of activities in the locality.

Conversely, where these noise levels are being achieved there may still be a potential nuisance situation due to the frequency, duration or type of noise that is being generated.

OR:

B. In an identified area (including: Pokeno Structure Plan Area)

i ~~No activity within the zone shall cause the following sound levels to be exceeded, for the stated times, as or~~ The noise levels from activities within a site shall not exceed the following limits within the boundary of any other SITE, where that other SITE is:

NOT ZONED BUSINESS

Area	The noise level measured within the boundary of a sit within the area described in column 1 of this table shall not exceed the following limits:		
	7.00am–10.00pm <u>0700 – 2200 hrs</u>	10.00pm–7.00am <u>2200 – 0700 hrs</u>	
	(dBA L_{eq}) <u>dB L_{Aeq}</u>	(dBA L_{eq}) <u>dB L_{Aeq}</u>	dBA L_{max} <u>dB L_{Amax}</u>
High Background Noise Area (refer to planning maps)	55	45	75
All other areas	50	40	70

ZONED BUSINESS

7.00am–10.00pm <u>0700 – 2200 hrs</u>	10.00 pm – 7.00am <u>2200 – 0700 hrs</u>	
(dBA L_{eq}) <u>(dB L_{Aeq})</u>	(dBA L_{eq}) <u>(dB L_{Aeq})</u>	dBA L_{max} <u>dB L_{Amax}</u>
60	50	75

- ii Clause b(i) above does not apply to construction noise.
- lii The NOISE levels shall be measured and assessed in accordance with the requirements of NZS 6801:2008 Measurement of Environmental Sound and NZS 6802:2008 Environmental Noise respectively, ~~or any standards that supersede these stands~~ [s5].

29C.6 PERFORMANCE STANDARDS FOR ALL ACTIVITIES – LIGHT INDUSTRIAL ZONE

29C.6.1 NOISE

1. ~~No activity within~~The noise level from activities within a site in the Light Industrial zone shall ~~cause the following NOISE levels to be exceeded, for the stated times, at or~~not exceed the following limits when measured within the boundary of any other SITE, where the other site is:

a) Light Industrial Zone

65 ~~dB A~~ L_{eq} ~~dB~~ L_{Aeq}

b) Residential, Residential 2, Rural Residential or Village or the notional boundary of any existing dwelling house in the Rural Zone (Note: the notional boundary is defined as 20 metres from any side of a dwelling house)~~or the legal boundary where this is closer to the dwelling~~:

Area	The noise level measured within the boundary of a site within the area described in column 1 of this table shall not exceed the following limits:		
	7.00am – 10.00pm <u>0700 – 2200 hrs</u>	10.00 pm – 7.00am <u>2200 – 0700 hrs</u>	
	(dB A) L_{eq} dB L_{Aeq}	(dB A) L_{eq} dB L_{Aeq}	dB A L_{max} dB L_{Amax}
High Background Noise Area (refer to the planning maps)	55	45	75
All other areas	50	40	70

c) Business Zone

7.00am – 10.00pm <u>0700 – 2200 hrs</u>	10.00 pm – 7.00am <u>2200 – 0700 hrs</u>	
(dB A) L_{eq} dB L_{Aeq}	(dB A) L_{eq} dB L_{Aeq}	dB A L_{max} dB L_{Amax}
60	50	75

d) Industrial 2 Zone

70 ~~dB A~~ L_{eq} ~~dB~~ L_{Aeq}

2. Clause 1 above does not apply to construction noise.

3. The NOISE levels shall be measured and assessed in accordance with the requirements of NZS 6801:2008 Measurement of Environmental Sound and NZS 6802:2008 Environmental Noise respectively, ~~or any standard that supersedes those standards~~^[s6].

~~4. The NOISE shall be measured by a sound level meter complying with the International Standard IEC (1979): Sound Level Meters, Type 1 or any standard that supersedes that standard~~^[s7].

Explanation

The main purpose of the noise controls is to protect Residential and Business Zones from the adverse effects of intrusive noise. As well as providing noise protection on Residential and Business Zone boundaries, it is also appropriate that some acoustic control is provided between sites within the Light Industrial Zone itself.

29B.5 PERFORMANCE STANDARDS FOR ALL ACTIVITIES – INDUSTRIAL ZONE 2

29B.5.1 NOISE

1. ~~No activity~~Activities on a site within the zone shall ~~cause not exceed~~ the following NOISE levels ~~to be exceeded, for the stated times, at or limits~~ within the boundary of any other SITE, where the other SITE is:

a) Industrial 2 Zone:

70 ~~dB A_{L_{eq}} dB L_{Aeq}~~

b) Residential, Residential 2, Rural-Residential, Village or within the notional boundary of any existing dwelling house as of 18 December 2008 in the Rural Zone (Note: the notional boundary is defined as 20 metres from any side of a dwelling house) ~~or the legal boundary where this is closer to the dwelling~~:

Area	The noise level measured within the boundary of a site within the area described in column 1 of this table shall not exceed the following limits:		
	7.00am – 10.00pm 0700 – 2200 hrs	10.00 pm – 7.00am 2200 – 0700 hrs	
	(dB A_{L_{eq}})(dB L_{Aeq})	(dB A_{L_{eq}})(dB L_{Aeq})	dB A_{L_{max}} dB L_{Amax}
High Background Noise Area (refer to planning maps)	55	45	75
All other areas	50	40	70

c) Business Zone:

7.00am – 10.00pm 0700 – 2200 hrs	10.00 pm – 7.00am 2200 – 0700 hrs	
(dB A_{L_{eq}})(dB L_{Aeq})	(dB A_{L_{eq}})(dB L_{Aeq})	dB A_{L_{max}} dB L_{Amax}
60	50	75

d) Light Industrial Zone

65 ~~dB A_{L_{eq}} dB L_{Aeq}~~

2. Clause 1. Above does not apply to construction noise.

3. The NOISE levels shall be measured and assessed in accordance with the requirements of NZS 6801:2008 Measurement of Environmental Sound and NZS 6802:2008 Environmental Noise respectively, ~~or any standards that supersede these standards~~^[s8].

4. ~~The NOISE shall be measured by a sound level meter complying with the International Standard IEC (1979). Sound Level Meters, Type 1 or any standard that supersedes that standard~~^[s9].

Explanation

The main purpose of the noise controls is to protect Residential and Business Zones from the adverse effects of intrusive noise. As well as providing noise protection on Residential and Business Zone

boundaries it is also appropriate that some acoustic control is provided between sites within the Industrial 2 Zone itself.

APPENDIX 2: TUAKAU STRUCTURE PLAN

