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15 Noise, Vibration and Glare

15.1 Rule Statement

District plan noise rules must recognise that virtually all activities produce some noise, and there is a need to provide a balance between the noise producer and the noise receiver. Noise and vibration are directly linked, and vibration standards are also found in this Chapter.

Historically, noise rules and New Zealand's environmental noise standards have often been based upon existing noise levels in an area. This approach is now disappearing, as it is recognised that if there is to be development in an area, noise rules must provide an appropriate level of amenity for the developed area, whilst at the same time allowing noise generating activities to generate reasonable levels of noise. The assumption that new dwellings and/or business can be introduced into an area and somehow still maintain a noise level consistent with an undeveloped area is generally impractical. The purpose of the district plan's noise limits is to allow development while controlling noise to an appropriate level.

The plan uses the "Leq" descriptor for the assessment and measurement of environmental noise levels and for the specification of noise limits in district plans. Leq is used in the most recent versions of all relevant environmental acoustic standards. It is the energy average of noise during a specified period, and is commonly known as the average noise level. "Lmax" controls are also used during night-time hours, to limit the short duration "peak" noise levels that are correlated with sleep disturbance.

The plan's rules for Town Centre, Business and Industrial zones contain requirements for residential units in these zones to be acoustically insulated against intrusive noise from external sources. This is to help avoid complaints from future residents about business activities inhibiting otherwise legitimate activity in such zones.

Noise control boundaries have been calculated around the District's hydro electric power generating facilities on the Waikato River and the key industrial sites at Kinleith, Lichfield and Tirau. This approach gives certainty to the surrounding residents about future noise levels, and flexibility to the industrial operator in planning future development and alterations. Acoustic insulation will also be required for residential buildings inside these control boundaries, to recognise the higher than usual noise levels and give the residents concerned an adequate standard of amenity.

A number of activities have been identified as requiring exemption from the standard noise limits, often because they vary widely throughout the year and are temporary and transient. Strict compliance with standard noise rules may not be practicable, reasonable or enforceable. Such activities are required to comply with alternative noise limits specified in Table A2.

Poorly designed and directed lighting can cause a nuisance for neighbours, including sleep disturbance, and affect traffic safety. Glare sources such as security lighting and illuminated signage in all zones will therefore be required to meet specified glare standards.

15.2 Anticipated Environmental Results

The noise rules are intended to achieve the following anticipated environmental results:

- Commercial and industrial zone noise rules which allow intended activities to take place
- Safeguarding the amenity levels of Residential, Rural Residential and Rural zones from intrusive noise and glare, particularly at night
- Avoiding reverse sensitivity issues arising from potentially noise sensitive activities such as dwellings being developed in business and industrial zones, or near other noise generators.

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The noise, vibration and glare rules are a method to implement the objectives and policies contained within Chapter 4 (Objectives and Policies for the District's Towns), Chapter 5 (Objectives and Policies for the District's Rural Areas), and Chapter 7 (Objectives and Policies for the District's Infrastructure and Development).

15.3 Noise Limits

15.3.1 Zone-Based Noise limits

Noise from any activity (but excluding those listed in Table A2) shall not exceed the following limits in Table A1 when measured at or within the following receiving zones.

Table A1			
Proposed Receiving Zone	Noise Limits, dB		Notes
	Daytime	Night-time	
	On any day: 7am to 10pm	At all other times:	
Residential Zones: Tokoroa Putaruru Tirau Arapuni Village	50dB LAeq	40dB LAeq 70dB LAmax	
Rural and Rural Residential Zones	50dB LAeq	40dB LAeq 70dB LAmax	To be measured and assessed within the notional boundary
Tokoroa Neighbourhood Retail Zone	55dB LAeq	45dB LAeq 75dB LAmax	-
Town Centre Zones: Tokoroa Putaruru Tirau	60dB LAeq	55dB LAeq 70dB LAmax	- Octave band noise levels should not exceed: 75dB Leq(1 minute) at 63Hz 65dB Leq(1 minute) at 125Hz
Business Zones: Tokoroa Putaruru	65dB LAeq	60dB LAeq 75dB LAmax	Octave band noise levels should not exceed: 75dB Leq(1 minute) at 63Hz 65dB Leq(1 minute) at 125Hz
Industrial Zone and Electricity Generation Zone	75dB LAeq	70dB LAeq 80dB LAmax	

15.3.2 Specific Activity Noise limits

Table A2			
Activity	Noise Controls		
Construction Noise	Comply with the provisions of NZS6803:1999 – Construction Noise		
Temporary Activities,	At or within receiving zones	LAeq, dB	LAmax, dB
Temporary Film Making	0630-0730hrs	60	70
	0730-1800hrs	75	90
	1800-2000hrs	70	85
	2000-0630hrs	40	60
Vehicles and mobile machinery associated with rural production	Exempt providing they are of limited duration and not in a fixed location and are vehicles and mobile machinery associated with rural production activities and S16 and S17 of the RMA have been satisfied. Examples include farm and forestry harvesting, spraying and planting machinery.		

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<p>Mineral exploration, mining and quarrying</p>	<p>Shall comply with the relevant zone noise limits at the specified measurement and assessment position for those zone(s), except that blasting noise and all vibration shall comply with the following:</p> <ul style="list-style-type: none"> • Occur only between 7am and 7pm; and • No more than 2 events per hour, with a maximum of 8 events per day; and • Overblast pressure incident on houses or habitable buildings (but excluding houses or habitable buildings within the property containing the mine or quarry) shall not exceed 115dB LZpeak; and • Ground borne vibration shall not exceed the limits specified in DIN4150-2:1999 and Part 3:1999.
<p>Community Events</p>	<ol style="list-style-type: none"> 1. Events held between 7am and 10.30pm, where the event and pre event rehearsal do not individually exceed 3 hours in duration, shall not exceed a noise limit of 80dB LAeq(1 hour) within relevant adjacent zone(s). Octave band noise levels at houses, dwellings or habitable buildings shall not exceed: 95dB Leq (1 minute) at 63Hz 85dB Leq (1 minute) at 125Hz 2. Events that do not meet the duration or hours specified in 1 above, but do not exceed 12 hours per day over a two day period shall not exceed a noise limit of 70dB LAeq(1 hour) within relevant adjacent zone(s). Octave band noise levels at houses, dwellings or habitable buildings shall not exceed: 85dB Leq (1 minute)at 63Hz 75dB Leq (1 minute) at 125Hz 3. Events that do not meet the duration or hours specified in 1 or 2 above shall comply with the zone noise limits at the specified measurement and assessment position for those zone(s).
<p>Helicopters</p>	<p>Shall comply with the provisions of NZS6807:1994 – Noise Management And Land Use Planning For Helicopter Landing Areas.</p>
<p>Wind turbine generators with swept area greater than 80m²</p>	<p>Shall comply with NZS 6808: 2010 Acoustics – Wind farm noise</p>
<p>Audible bird scaring devices</p>	<p>Noise from audible explosive bird scaring devices shall only be operated between sunrise and sunset, and shall not exceed 100dB LZpeak, when measured within the notional boundary of any rural zoned site, or within the site boundary of any residential zoned site.</p> <p>Discrete sound events of a bird scaring device including shots or audible sound shall not exceed 3 events within a 1 minute period and shall be limited to a total of 12 individual events per hour.</p> <p>Where audible sound is used over a short or variable time duration, no event may result in a noise level greater than 50dB SEL when assessed at the notional boundary of any rural zoned site, or within the site boundary of any residential zoned site.</p> <p>A legible notice is fixed to the road frontage of the property on which is the device is being used, giving the name, address and telephone number of the person responsible for the operation of any such device(s).</p>
<p>Dwellings/ occupancies/ habitable spaces in zones other than Residential and Rural</p>	<p>A dwelling or occupancy or habitable space is permitted in zones other than Residential and Rural if the total internal noise level in any habitable room does not exceed 35dB LAeq(24 hours) while at the same time complying with the ventilation requirements of clause G4 of the New Zealand Building Code. The total noise level shall include all intrusive noise and mechanical services. In determining the external noise level, an assumption that the noise incident upon the noise sensitive facade is from at least three separate activities simultaneously generating the maximum allowable noise level for that zone. Compliance with the above must be confirmed in writing by a suitably qualified and experienced acoustic consultant.</p>

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Frost fans	<p>Noise generated by frost fans shall not exceed 55dB LAeq (15min) when assessed within the notional boundary of any other rural zoned site, or within the site boundary of any residential zoned site.</p> <p>A legible notice is fixed to the road frontage of the property on which it is being used, giving the name, address and telephone number of the person responsible for its operation.</p>				
Atiamuri, Whakamaru, Maraetai, Waipapa, and Arapuni Electricity Generation Core Sites	<p>Noise from these sites shall not exceed 45dB LAeq(15 minutes) when measured at the relevant noise control boundary shown in Figs 1 to 5.</p> <p>The noise limits shall not apply to sirens, circuit breakers and hydro spills associated with the Electricity Generation Core Sites.</p>				
Well drilling within Electricity Generation Core Sites	<p>Noise from drilling activities for the purpose of observation wells within Electricity Generation Core Site shall not exceed the following limits, for up to 30 days, when measured within the notional boundary of any rural zoned site or within the site boundary of any residential zoned site:</p>				
	Hours	LAeq, dB	LAmaz, dB		
	0700-2200	70	85		
	2200-0700	60	75		
Kinleith Industrial Sites, and Lichfield and Tirau Dairy Factory Sites	<p>Noise from these sites shall not exceed 45dB LAeq(15 minutes) when measured at the relevant noise control boundary shown in Figs 6 to 8.</p>				
Emergency response	<p>Exempt providing activity is in response to an emergency. All non-emergency related activities shall comply with the relevant zone standards.</p>				
Temporary military exercises undertaken without weapons firing	At the notional boundary to any building housing a noise sensitive activity	LAeq dB	LAmaz dB		
	0630-0730hrs	60	70		
	0730-1800hrs	75	90		
	1800-2000hrs	70	85		
	2000-0630hrs	40	60		
Temporary military exercises undertaken with weapons firing and/or the use of explosives	<p>1. Notice is provided to the Council at least 48hours prior to the commencement of the activity, specifying whether the activity involves live firing and/or the use of explosives, or firing of blank ammunition; the location of the activity and the boundaries within which the activity will take place, and distances to buildings housing noise sensitive activities; and the timing and duration of the activity.</p>				
	<p>2. Compliance with the noise standards below:</p>				
	Live firing of weapons and/or use of explosives	Time (Monday to Sunday) 0700-1900hrs	<p>Separation distance required between the point of firing and the notional boundary to any building housing a noise sensitive activity</p> <table border="1" data-bbox="1143 1717 1443 1908"> <tr> <td data-bbox="1143 1717 1297 1908">At least 1500m</td> <td data-bbox="1297 1717 1443 1908">Less than 1500m if conditions a) and c) below are complied with</td> </tr> </table>		At least 1500m
At least 1500m	Less than 1500m if conditions a) and c) below are complied with				

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		1900-0700hrs	At least 4500m	Less than 4500m if conditions b) and c) below are complied with
	Firing of blank ammunition	0700-1900hrs	At least 750m	Less than 750m if conditions a) and c) below are complied with
		1900-0700hrs	At least 2250m	Less than 2250m if conditions b) and c) below are complied with
Conditions to be complied with if minimum separation distances for temporary military exercises undertaken with weapons firing and/or the use of explosives cannot be met:				
Condition	Time (Monday to Sunday)	Noise level at the notional boundary to any building housing a noise sensitive activity		
a)	0700-1900hrs	Peak sound pressure level of 120 dBC		
b)	1900-0700hrs	Peak sound pressure level of 90 dBC		
c)	<p>The activity is undertaken in accordance with a Noise Management Plan prepared by a suitably qualified expert and provided to Council at least 15 working days prior to the activity taking place. The Noise Management Plan shall, as a minimum, contain:</p> <ul style="list-style-type: none"> • A description of the site and activity including times, dates, and nature and location of the proposed training activities. • Methods to minimise the noise disturbance at noise sensitive receiver sites such as selection of location, orientation, timing of noisy activities to limit noise received at sensitive receiver sites. • A map showing potentially affected sites on which noise sensitive activities are based and predicted peak sound pressure levels for each of these locations. • A programme for notification and communication with the occupiers of affected sites on which noise sensitive activities are located prior to the activities commencing, including updates during the event. • A method for following up any complaints received during or after the event, and any proposed de-briefing meetings with Council. 			

15.3.3 Internal Design Sound Levels

Buildings for noise sensitive activities sited:

- within a noise control boundary shown in Figs 1 to 8, or
- located within 80m (measured from the nearest painted edge of the carriageway) of a State Highway in an area with a 100km/h speed limit, or
- located within 80m of land that is subject to a notice of requirement for a State Highway (refer to Appendix A),

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shall be constructed to comply with the following standards in Table A3:

Table A3		
Internal Design Sound Levels (based on AS/NZ 2107:2000 Recommended design levels and reverberation times for building interiors)		
Type of occupancy/activity	Recommended Internal Design Sound Levels dBA Leq(24hr)	
	Satisfactory	Maximum
Residential Buildings		
-Bedrooms	35 (see note)	40
-Other habitable rooms	40 (see note)	45
Travellers' Accommodation - Bedrooms	35	40
Places of Assembly, education and childcare facilities, health and veterinary services	35	45
Educational Buildings (Teaching spaces)	35	45
Office buildings (general office space)	40	45

Compliance with Table A3 shall be confirmed in writing by a suitably qualified and experienced acoustic consultant.

Note:

- Although AS/NZ 2107:2000 recommends 30dBA as the satisfactory internal design sound level for bedrooms, such standards may be technically difficult and costly to achieve in high noise areas. 35 dBA Leq(24hr) is therefore acceptable.

15.3.4 Internal Design Sound Levels for Putaruru Urban Growth Cells 1 to 4 – Railway Activities

Noise Sensitive Activities within Putaruru Urban Growth Cells 1 to 4 located within 100m of a Rail Network Boundary shall meet Rule 15.3.4.1 below:

15.3.4.1 Indoor railway noise

- a) Any new building or alteration to an existing building that contains an activity sensitive to noise:
 - i) Shall be designed, constructed and maintained to achieve design noise levels resulting from the railway that do not exceed the maximum values in Table A4;

Table A4 – Internal Noise Limits		
Building Type	Occupancy/activity	Maximum railway noise level, dB <i>L</i>_{Aeq(1h)}
<i>Residential</i>	<i>Sleeping spaces</i>	<i>35dB</i>

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	<i>All other habitable spaces</i>	<i>40dB</i>
<i>Education</i>	<i>Lecture rooms/theatres, music studios, assembly halls</i>	<i>35dB</i>
	<i>Teaching areas, conference rooms, drama studios, sleeping areas</i>	<i>35dB</i>
	<i>Libraries</i>	<i>45dB</i>
<i>Health</i>	<i>Overnight medical care wards</i>	<i>40dB</i>
	<i>Clinics, consulting rooms, theatres, nurses' stations</i>	<i>45dB</i>
	<i>Places of worship, marae</i>	<i>35dB</i>

b) Mechanical ventilation

If windows must be closed to achieve the design noise levels in clause (a)i), the building shall be designed, constructed and maintained with a mechanical ventilation system that:

(i) For habitable rooms for a residential activity, achieves the following requirements:

- provides mechanical ventilation to satisfy clause G4 of the New Zealand Building Code; and
- is adjustable by the occupant to control the ventilation rate in increments up to a high air flow setting that provides at least 6 air changes per hour; and
- provides relief for equivalent volumes of spill air;
- provides cooling and heating that is controllable by the occupant and can maintain the inside temperature between 18°C and 25°C; and does not generate more than 35 dB LAeq(30s) when measured 1 metre away from any grille or diffuser

(ii) For other spaces, is as determined by a suitably qualified and experienced person.

15.3.4.2 Acoustic Report

A report shall be prepared by a suitably qualified and experienced acoustic consultant and submitted to the council demonstrating compliance with Rule 15.3.4.1 above (as relevant) prior to the construction or alteration of any building containing an activity sensitive to noise. In the design:

- (a) Railway noise is assumed to be 70 LAeq(1h) at a distance of 12 metres from the track, and must be deemed to reduce at a rate of 3 dB per doubling of distance up to 40 metres and 6 dB per doubling of distance beyond 40 metres;
- (b) Railway noise spectrum at 12 m shall be assumed to be:

Table A5: Train noise octave band data for calculation

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Octave Band Centre Frequency (Hz)							
63	125	250	500	1000	2000	4000	dBA
78	72	69	66	66	63	58	70

(Submission 4.5 – KiwiRail)

15.4 Measurement and Assessment - Noise

- (a) Noise shall be measured and assessed using the following standards:
- NZS 6801:2008 Acoustics – Measurement of Environmental Sound
 - NZS 6802:2008 Acoustics – Environmental Noise
 - NZS 6803:1999 Acoustics – Construction Noise
 - NZS 6805:1992 Airport Noise Management and Land Use Planning
 - NZS 6806: 2010 Acoustics – Road traffic Noise: New and altered roads
 - NZS 6807:1994 Noise Management and Land Use Planning for Helicopter Landing Areas
 - NZS 6808: 2010 Acoustics – Wind farm noise
- (b) Noise levels shall be measured and assessed in accordance with the relevant Standard(s).
- (c) Where a scenario arises where the standards above are not best suited in assessing the noise source or receiver of interest, Council may through the resource consent process agree to the use of alternative standards.

15.5 Alternative Noise Measurement Position

Alternative measurement location(s) to those specified above may be appropriate where acoustic standards suggest an alternative measurement location, or on a case by case basis as may be agreed through the resource consent process. This shall be discussed and agreed with appropriate Council staff. Any reports submitted to Council shall describe the use of an alternative measurement position and the reasons for its use.

15.6 Measurement and Assessment - Vibration

- (a) Vibration from any activity (excluding mineral exploration, mining and quarrying, as specifically provided for in Rule 15.3.2 Table A2, shall be measured and assessed in accordance with the following standards:
- AS 2670.1-2001 Evaluation of human exposure to whole-body vibration – General requirements
 - AS 2670.2-1990 Evaluation of human exposure to whole-body vibration - Continuous and shock-induced vibration in buildings (1 to 80 Hz)
 - DIN 4150-3:1999 Effects of vibration on structures
- (b) Where a scenario arises where the standards above are not best suited in assessing the vibration source or receiver of interest, Council may through the resource consent process agree to the use of alternative standards.

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15.7 Lighting and Glare

Effects of lighting are calculated using the procedure in NZS 6701:1983 Sections 6 and 7. For any light received at a residential, rural residential or rural property a comparison of the light generated at the source and the component having an effect on the receiver with a threshold increment (TI) of 20% or greater is deemed to be glare.

In addition the effect from the source shall not exceed an absolute increment on the ambient level of light specified in the following clauses:

- a) At no time between the hours of 7.00am and 10.00pm shall any outdoor lighting be used in a manner that causes an added illuminance in excess of 125 lux, measured horizontally or vertically at the boundary of any Residential, Rural Residential or Rural zoned site adjoining
- b) At no time between the hours of 10.00pm and 7.00am shall any lighting be used in a manner that causes:
 - i) An added illuminance in excess of 10 lux measured either horizontally or vertically at the glazing of a habitable room of an adjoining dwelling within a Residential, Rural Residential or Rural Zone
 - ii) An added illuminance in excess of 20 lux measured either horizontally or vertically at any point along the boundary of a property zoned residential, rural residential or rural.

Where measurement of any added illuminance cannot be made because any person refuses to turn off lighting, measurements may be made in locations of a similar nature that are not affected by such lighting.
- c) Rules 15.7a) and 15.7b)ii) above shall not apply to any lighting from sites in the Industrial zone, or from normal intermittent agricultural practices such as harvesting, measured at sites that are not zoned Residential.
- d) All lighting on any site adjoining a Residential, Rural Residential, or Rural zoned site shall be selected, located, aimed, adjusted and screened to ensure that glare resulting from the lighting does not exceed a TI of 20%
- e) Lighting of traffic access and parking areas shall be selected, located, aimed, adjusted and screened to ensure that stray light effects resulting from vehicles are mitigated.
- f) No building shall be constructed and/or left unfinished and/or clad in any protective material or cover which could reflect sufficient light to detract from the amenities of the neighbourhood or cause discomfort to any person resident in the locality. Material used in the construction or cladding or protection of a building from which discomfort glare is likely to occur should have a reflective value not greater than 20%
- g) Development on all properties adjacent to State Highways should be undertaken in such a way that the emission of light from these properties does not adversely affect the safety of drivers on State Highways in accordance with NZTA policy

Where lighting and glare may affect the safe and efficient operation of any road, including a State Highway, consideration shall be given to Australian Standard 4287-1997 Control of Obtrusive Effects of Outdoor Lighting

- h) Signage shall be constructed to comply with the following levels of luminance:
 - Daytime – 25 lux
 - Night-time – 10 lux

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Luminance levels shall be measured vertically or horizontally anywhere along the affected site boundary in accordance with professional illumination engineering practice or any relevant NZ Standard.

- i) No light source used for illuminating a sign, except for neon and side-emitting fibre optics, shall be visible to motorists on any road or road reserve

Rules a) to h) above specifically exclude the lighting and glare effects generated from street lighting, and from Christmas lights and similar temporary festive illuminations.

Any activity that cannot comply with these provisions will require restricted discretionary resource consent.

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