Wanganui District Plan - Phase 6
District Wide Rules

Review of District Plan Noise and Vibration Provisions

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Wanganui District Plan – Phase 6 – District Wide Rules
Review Of Noise and Vibration Provisions

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Wanganui Second Generation District Plan Noise and Vibration Provisions Review

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1 Purpose

This report sets out a review of noise and vibration matters by **Malcolm Hunt Associates** undertaken on behalf of **Wanganui District Council** [the Council] as Phase 6 of Council's *Shaping Wanganui* project which is a review of the existing provisions of the District Plan. Phase 6 includes review of district-wide matters which includes environmental noise and vibration matters[1].

Environmental noise ranks highly on the list of potential environmental pollutants that may affect the quality of the environment and is a matter that individual and communities are becoming increasingly aware of. A number of studies [see Section 7] have reported effects of environmental noise and vibration on people and communities. Guidelines issued by agencies such as the World Health Organization are available to guide in the assessment of these effects. Adherence to such guidelines forms an important public health "anchor" to the recommendations set out below for the revised District Plan. The review also provides an opportunity to update the relevant technical standards for the measurement and assessment of environmental noise and vibration, including adopting best practice and improving the way the District Plan addresses potential reverse sensitivity adverse effects associated with noise and vibration.

Council has a specific duty to mange noise and its effects within the Wanganui District under .s31 of the Resource Management Act [RMA]. Apart from noise Council has wider statutory responsibilities of stewardship and protection of the environmental, social, economic and cultural wellbeing of present and future generations within the District, and its statutory responsibilities in relation to the Treaty of Waitangi and tāngata whenua. These are all factors the revised District Plan seeks to address.

The overall aim is to enhance existing District Plan noise and vibration provisions in a manner that supports rather than undermines the District's social, economic and environmental vision, and to ensure that adverse impacts are avoided, or appropriately mitigated. This includes seeking to minimise impacts on parties potentially affected by noise and those who may be indirectly affected by people's reaction to noise [reverse sensitivity effects].

2 Background

Section 31 of the RMA outlines the Council's functions which should achieve the integrated management of the effects of the use, development or protection of land and associated natural and physical resources of the District. The responsibilities for environmental management are largely delivered through Council's regulatory planning and enforcement channels. The District Plan has a key role in this regard.

[1] Environmental noise includes sounds experienced outdoors or indoors from everyday sources such as factories and roading networks. It excludes effects experienced in an occupational setting, such as in a place of work.

It is important Council periodically review the District Plan, as set out within s.79[1][c]5 of the Act, which envisages a review every 10 years. The Operative Plan was made operative on 27 February 2004. This review of noise and vibration provisions forms part of Council's *Shaping Wanganui* review process, and is intended to assist the Council in meeting its obligations under both s.31[1][a] and s.79[1][c] of the Act.

It is important to note that while certain guidance is provided within NZ Standards and guidelines, each Council sets their own permitted baseline noise limits. Thus, noise limits and District Plan provisions may vary between different districts. Within each district permitted sound level limits may also vary for different zones [i.e. residential, commercial and industrial zones] reflecting the carrying sensitivity to the effects of noise.

3 Limitations

When drafting new District Plan provisions, some key questions need to be asked, such as;

'*Does this policy/objective/ rule achieve the Act's purpose?'* and
'Is the proposed policy/objective/rule the most appropriate way to achieve the Act's purpose?'

Council must also assess the risks of acting or not acting on the recommended changes or new or altered policy and objectives. In recommending below certain technical Standards and approaches for managing noise and vibration effects in the District Plan [including appropriate limits] we have kept in mind the above questions, however there may be wider planning issues we are not aware of. As our review has not detected any major deficits in the operative Plan, there are no wholesale recommended changes. Rather the recommendations represent a technical update with one or two added provisions to deal with emerging issues [such as reverse sensitivity issues].

The review does not include any comment or input from public consultation. That is a separate stage in the process that follows a technical review of District Plan noise and vibration provisions. The consultation phase is important as the District Plan should reflect the views and values of the District community.

Also, this review does not set out specific drafting or wording recommendations for the revised district plan. These are planning matters [however certain recommendations of a relevant NZ Standard, NZS6802:2008 *Acoustics – Environmental Noise* does provide wording guidance for Council's planners in this regard].

4 Definition of Noise

Acoustics is the science of sound. Noise in its simplest definition may be defined as 'unwanted sound'. Physically there is no unique distinction between sound and noise. Psychologically, sound is a sensory perception originating as a mental event evoked by physiological processes in the auditory system.

Noise is defined as unwanted sound affecting people and their subjective perceptions of the environment, particularly within residential sites where it affects a significant portion of the population and influences people's perceptions of amenity and quality of the local environment.

5 Resource Management Act

The RMA embraces sustainable management of natural and physical resources, focusing on the effects that land use activities have on the receiving environment. The environment involves people and communities and their ability to provide for their social and cultural well being as well as for their health and safety.

The RMA focuses on managing the effects of activities rather than regulating the activities themselves. The RMA adopts an enabling approach which seeks only to intervene where activities are likely to result in unacceptable environmental impacts, such as where unreasonable or excessive noise may affect people and the environment.

A key aim of the Act is to "*promote the sustainable management of natural and physical resources*". Sustainable management involves balancing the use of resources with the need to protect the environment and to provide for the needs of future generations. To achieve this the RMA sets up mechanisms to control the effects that activities may have on the environment, including noise and vibration.

Under the Resource Management Act [RMA] noise is defined as including vibration. The effects of vibration are *usually* not a major concern; however this is an environmental effect that arises from time to time [mainly due to passing heavy vehicles on a road or from industrial type activities]. Noise control rules are included in most District Plans and Regional Coastal Plans, as provided for in the Second Schedule of the Act.

Apart from limits on noise set out within District Plans mandated by the Act, ***Section 16*** of the RMA imposes a “general duty” on noise makers to control noise at source which is a key consideration when seeking to manage the effects of noise. Section 16 places a general duty on all occupiers to adopt the best practicable option to ensure noise emitted from any site does not exceed a reasonable level. What constitutes a "reasonable level" is not prescribed by the Act. Often the District Plan permitted day time and/or night time noise limits serve as a guide as to what represents a reasonable level.

6 The Wanganui District

Wanganui District is centred on the Wanganui River, with the Wanganui township being located near the river mouth. **Figure 1** below illustrates an aerial photo of the district and surrounding areas.

Statistics New Zealand have recorded a resident population of 42,640 based on the 2006 census. The latest projections from Statistics New Zealand are for the district’s population to continue to decline slowly over the next couple of decades [a projected population of approx 43,000 in 2011, ~42,000 in 2021 and ~40,000 by 2031].

The 2006 Census also showed that Wanganui’s top five industries were:

- ≠ Manufacturing;
- ≠ Health care and social assistance;
- ≠ The retail trade;
- ≠ Education and training;
- ≠ Construction.

The majority of people in the Wanganui District live in the urban city itself, meaning the remaining population are located in outlying towns and settlements.

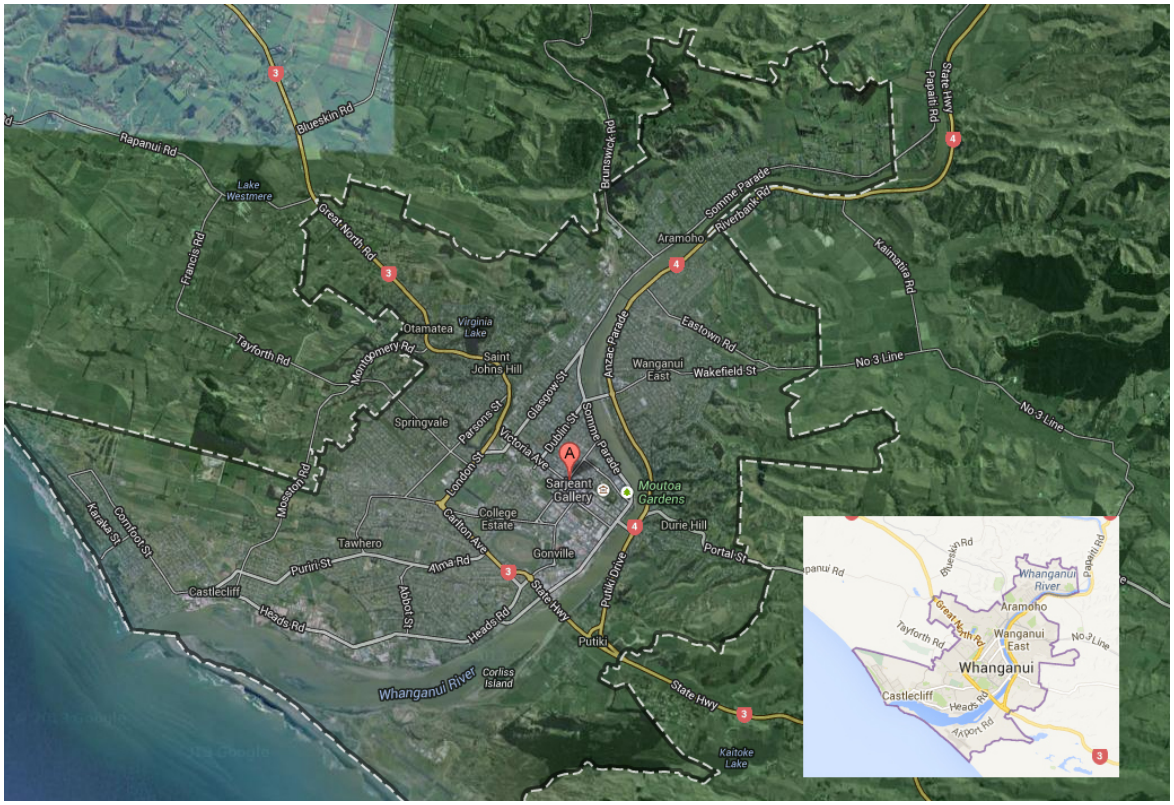


Figure 1: Aerial photo of Wanganui and surrounding areas. Bottom left inset = Boundary of Wanganui District. Middle Inset = Boundary of Wanganui District in regards to surrounding wider Districts.

The Wanganui District has many parks, open spaces, buildings and places that are valued for their natural, scientific, cultural, historical, heritage, visual and amenity qualities. These values are difficult to quantify in monetary terms, however the aural qualities of these living zones, parks and open spaces often define people's views on the quality of their local environment.

Commonly there are conflicts between the desire to protect and enhance environmental values and the objective of providing for socio-economic wellbeing. The District Plan has a key role in balancing these competing aims. Noise provisions within the District Plan need to set out clearly how the effects on the environment of legitimate activities such as commercial undertakings, rural or industrial activities need to be accommodated whilst also protecting against the adverse effects caused by noise and vibration, particularly within sensitive receiver sites. Measures to address these issues, in as far as they relate to the effects of noise and vibration, are set out within the recommendations below.

7 Supporting Documents

This acoustic review is not zero-based. The review has considered a number of existing background documents and supporting reviews including but not limited to the following list of background publications;

- *Existing Operative Wanganui District Plan [first generation version of District Plan];*
- *Existing Operative Wanganui District Plan Maps;*
- *Background documents including but not limited to Councils s.32 analysis and related data and documents such as the Annual Plan 2013/2014;*
- *Guidelines for Community Noise edited by Birgitta Berglund, Thomas Lindvall, Dietrich H Schwela. World Health Organization 1999*

- *Guidelines for Night Noise Guidelines for Europe' [NNGfE]. World Health Organization Regional Europe Office. World Health Organization Regional Europe Office 2009*

- *World Health Organization Burden Of Disease From Environmental Noise - Quantification Of Healthy Life Years Lost In Europe. World Health Organisation.*

- *Standards New Zealand – Acoustic standards [various, as discussed below].*

This review has also considered a number of background articles and research papers including but not limited to the following;

a) *Noise Exposure and Public Health Willy Passchier-Vermeer and Wim F. Passchier, Environmental Health Perspectives, Vol 108, Supplement l, March 2000;*

b) *Noise Exposure And Public Health Passchier-Vermeer W, Passchier WF [2000]. Environ. Health Perspect. 108 Suppl 1: 123–31;*

c) *Exposure-response relationships for transportation noise Miedema HM, Vos H. J Acoust Soc Am. 1998 Dec;104[6]:3432–3445;*

d) *Noise sensitivity as a factor influencing human reaction to noise. Job RF Soames. Noise & Health. 1999;1[3]:57–68;*

e) *Synthesis of social surveys on noise annoyance. Theodore J. Schultz. J. Acoust. Soc. Am. Volume 64, Issue 2, pp. 377-405 [1978]; [29 pages].*

8 Effects of Noise

8.1 Overview

To date, research into the effects of environmental noise have been based on the annoyance it causes to humans, or the extent to which it disturbs various activities undertaken by people. This is because annoyance is most commonly expressed reaction by those exposed to intrusive sound in the environment. At a biological level, noise is considered a nonspecific stressor that may cause adverse health effects on humans in the long term. Epidemiological studies suggest a higher risk of cardiovascular diseases, including high blood pressure and myocardial infarction [heart attacks], in people chronically exposed to high levels of road or air traffic noise[2]. In many cases noise occurring in the environment is simply intrusive, interfering with listening to television or radio or affecting the enjoyment of quiet outdoor areas around in the home or in parks or reserves.

The effects of environmental noise are usually expressed in terms of:

- Annoyance;

- Speech interference - high levels of noise can make normal speech difficult to hear

- Performance - some noises can make concentration difficult and interfere with tasks such as learning, checking fine details [such as any job with a large mathematical component or where the meaning of words is critical] or work where small, precise, movements or intense concentration is required;

[2] *WHO Burden Of Disease From Environmental Noise - Quantification Of Healthy Life Years Lost In Europe.* World Health Organisation, Geneva, 2011.

- Mental health [including noise-induced stress-related effects];

- Sleep disturbance - in addition to fatigue and mental health effects, disrupted sleep patterns can leave people irritable, change their behaviour, and reduce their ability to work or perform tasks.

There is sufficient scientific evidence that exposure to environmental noise can induce hypertension and ischemic heart disease, annoyance, sleep disturbance, and decreased learning performance in the classroom. However for effects such as changes in the immune system and birth defects, the evidence is limited [WHO 1999].

There have been no new findings in respect of the threat that environmental noise poses to human health and welfare since the District Plan was first published. Most public health impacts of environmental noise were identified as far back as the 1960's with research in more recent times concentrating on the elucidation of the mechanisms underlying the known effects, such as noise induced cardiovascular disorders and the relationship of noise with annoyance and non- acoustical factors modifying health outcomes[3].

The Ministry of Health [MoH] monitors protection of public health from environmental noise through reporting by *National Environmental Noise Service* [NENS] which it funds. NENS has been closely involved in developing and revising various New Zealand acoustic standards, including NZS 6802, a key Standard guiding on the assessment of noise referred to within the District Plan, and within the discussion below. Thus to reasonably provide for the protection of health and amenity, recommendations for managing environmental noise should adhere to the guidance set out within NZS6802.

8.2 Vulnerable Groups

Standards of acceptable levels of environmental noise are essentially derived from observations and studies on the effects of noise on "normal" or "average" populations. The participants of these investigations and studies are usually selected from the general population. Vulnerable groups of people are typically underrepresented in such studies [WHO 1999] including but not limited to;

- People with decreased personal abilities [old, ill, or depressed people];
- People with particular diseases or medical problems;
- People dealing with complex cognitive tasks, such as reading acquisition;
- Young children.

It is for this reason that noise rules and guidelines designed to protect against the adverse effects of noise on people should consider catering for both the young and old, as well as typical residences which are traditionally the places where people live, rest and relax. Hospitals, aged-care facilities, pre-schools, schools, universities and polytechs' fall within the definition of noise sensitive land uses identified for protection within NZS6802:2008 *Acoustics – Assessment of Environmental Noise*.

The issue of adjusting downwards [lowering] district-wide noise limits in order to cater for vulnerable subgroups in the general population has been investigated. In setting the balance for sustainable management of noise in the environment there is a need to consider the response of the average person to noise. To impose a restrictive standard in order that the most vulnerable groups are protected to a high standard will impose costs and restrictions on people's legitimate economic, cultural and social who are otherwise adequately protected at levels suited to the majority of the population.

8.3 Night Time Noise

[3] *Noise Exposure and Public Health Willy Passchier-Vermeer and Wim F. Passchier, Environmental Health Perspectives, Vol 108, Supplement l, March 2000.*

The following table describes effects of different levels of night time noise on the population's health with noise levels measured as $L_{night,outside}$ [Ref. WHO *Night Noise Guidelines For Europe* 2009];

Average night noise level over a year, $L_{night,outside}$	**Health effects observed in the population**
Up to 30 dB	Although individual sensitivities and circumstances may differ, it appears that up to this level no substantial biological effects are observed. $L_{night,outside}$ of 30 dB is equivalent to the no observed effect level [NOEL] for night noise.
30 to 40 dB	A number of effects on sleep are observed from this range: body movements, awakening, self-reported sleep disturbance, arousals. The intensity of the effect depends on the nature of the source and the number of events. Vulnerable groups [for example children, the chronically ill and the elderly] are more susceptible. However, even in the worst cases the effects seem modest. $L_{night,outside}$ of 40 dB is equivalent to the lowest observed adverse effect level [LOAEL] for night noise.
40 to 55 dB	Adverse health effects may be observed among the exposed population. People may have to adapt their lives to cope with noise at these levels at night. Vulnerable groups are more affected.
Above 55 dB	The situation is considered increasingly dangerous for public health. Adverse health effects occur frequently, a sizeable proportion of the population is highly annoyed and sleep-disturbed. There is evidence that the risk of cardiovascular disease increases.

These considerations of the effects of night time noise have been included within the recommendations developed within NZ Standards' for the management of noise in the environment.

8.4 NZ Recommendations for Night Time Noise

Night time noise limits in New Zealand based on $L_{Aeq\ (15\ min)}$ and L_{AFmax} are adopted in most New Zealand District Plans. By limiting the 15 minute sound level to 40 or 45 dB during night time, the 9 hour L_{Aeq} sound level would mostly measure well below 40 dB, except where transportation noise has an effect [transportation noise is largely unregulated by the Wanganui District Plan]. Thus the WHO *Night Time Noise Guidelines* criteria $L_{night,outside}$ are mostly met within New Zealand urban areas away from transportation sources. There is insufficient evidence that the effects observed at levels during night time below 40 dB $L_{night,outside}$ are harmful.

9 New Zealand Acoustic Standards

The current Operative Wanganui City Plan makes reference to a number of acoustic standards for the assessment and measurement of general environmental noise. Such standards ensure a repeatable and reliable result when assessing compliance, and are key to Council's ability to monitor and enforce noise standards in the District Plan. Standards are developed by expert committees with consensus required before being formally approved by the Standards Council in accordance with the Act. New Zealand Standards do not have the status of a regulation on their own. To be adopted as such they need to be cited as a means of compliance in a statutory document such as in a District Plan or within a condition of Resource Consent.

Acoustic standards can be viewed as the 'backbone' of District Plan noise provisions. Standards New Zealand have published sixteen past and current New Zealand Standards guiding on the measurement

and assessment of environmental noise and are well respected however only the most recent versions should be considered for inclusion within the District Plan review.

The most recent versions of the relevant acoustic Standards should be referenced in the District Plan reflecting the requirements of Part 3 of the RMA which sets out requirements for the incorporation of documents by reference in District Plans. This section states that all material incorporated by reference in a plan has legal effect as part of that plan. Information included by reference that expires or is revoked only ceases to have legal effect if the Plan is changed in accordance with Part 1 of Schedule 1. This means that even if the standards referred to in the Plan are superseded by new standards, a plan change would be required to require the use of the new standards in resource consent applications.

It is considered inconsistent with best practice, current literature and science if the most recent current New Zealand acoustic standards were not followed within the proposed District Plan.

The New Zealand acoustic standards series have since the 1977 versions provided recommended criteria or noise limits for the protection of Health and Amenity for "normal" or "average" populations. These recommended guideline limits are provided as guideline residential upper noise limit values using L_{AFmax} and L_{Aeq} in the latest 2008 version of NZS6802:2008 *Acoustics – Assessment of Environmental Noise*. NZS6802:2008 *Acoustics – Assessment of Environmental Noise* sets out the recommended Guideline Residential Upper Noise Limits. A daytime level of 55 dB $L_{Aeq(15\ min)}$ is set while a night time level of 45 dB $L_{Aeq(15\ min)}$ and 75 dB L_{AFmax} is set for the protection of health and amenity. Such limits when adhered to provide “reasonable” protection of health and amenity. The 2008 version of the standard introduced an evening time frame with limits between the day and night limits if Local Authorities wished to incorporate such in their rules.

The recommended guideline limits are provided as guideline only with NZS6802:2008 warning against setting low noise limits which cannot be properly measured and assessed within the context of existing modest or high ambient sound levels [See, NZS6802:2008Clause 8.6.3]. It is for these reasons NZS6802:2008 the standard states such limits when adhered to provide “reasonable” protection of health and amenity. The 2008 version of the standard introduced an evening time frame with limits between the day and night limits which has emerged as best practice, ensuring the decibel limit recognised the ambient sound climate in residential areas. The following is an extract from Section 6 of NZS6802:2008;

> ***8.6.2*** *As a guideline for the reasonable protection of health and amenity associated with use of land for residential purposes, the noise limits in table 3 should generally not be exceeded at any point within the boundary of a residential site, for example, at any point within the notional boundary of a rural dwelling.*
>
> ***Guideline residential upper noise limits***
>
> | | |
> |---|---|
> | *Daytime[1]* | *55 dB $L_{Aeq(15\ min)}$* |
> | *Evening[1,2]* | *50 dB $L_{Aeq(15\ min)}$* |
> | *Night-time[1]* | *45 dB $L_{Aeq(15\ min)}$* |
> | *Night-time[1] L_{max}* | *75 dB L_{AFmax}* |
>
> *NOTE–*
> *[1] The definition of times of day are a matter for the relevant local authority and should recognise that a period of not less than 8 hours needs to be provided for sleep to ensure at least the minimum acceptable degree of health protection.*
>
> *[2] Inclusion of an evening period and its hours of application are a matter for the relevant local authority.*
>
> *[3] This clause is not framed as a consent condition, rule or national environmental standard and should not be quoted for those purposes.*

Thus, the generally followed approach in New Zealand is to apply daytime limits of 50 to 55 dB $L_{Aeq(15\ min)}$ while a night time limits of 40 to 45 dB $L_{Aeq(15\ min)}$ and 70 to 75 dB L_{AFmax} are generally applied within residential receiving environments for the protection of health and amenity. The standard does allow

local authorities to consider making noise limits more or less stringent to suit their particular circumstances and requirements.

9.1 Superseded New Zealand Acoustic Standards

The following eight New Zealand standards are considered to be outdated or are ***superseded***:

NZS 6801:1977 Methods of Measuring Sound NZS 6802:1977 Assessment of Noise in the Environment	Superseded Superseded
NZS 6801:1991 Measurement of Environmental Noise NZS 6802:1991 Assessment of Environmental Noise	Superseded Superseded
NZS 6801:1999 Acoustics–Measurement of Sound NZS 6802:1999 Acoustics – Assessment of Environmental Sound	Superseded Superseded
NZS 6803*P*:1984 The Measurement and Assessment of Noise From Construction, Maintenance and Demolition Work.	Superseded
NZS 6808:1998 Acoustics – The Assessment and Measurement of Sound From Wind	Superseded

9.2 Current New Zealand Acoustic Standards

The following eight New Zealand standards are considered to be most recent and technically appropriate standards for environmental acoustics in New Zealand:

NZS 6801:2008 Acoustics –Measurement of Environmental Sound NZS 6802:2008 Acoustics –Environmental Noise	Current Current
NZS 6803:1999 Acoustics – Construction Noise	Current
NZS 6805:1992 Airport Noise Management and Land Use Planning	Current
NZS 6806:2010 Acoustics – Road Traffic Noise – New and Altered Roads	Current
NZS 6807:1994 Noise Management and Land Use Planning for Helicopter Landing Areas	Current
NZS 6808:2010 Acoustics –Wind Farm Noise	Current
NZS 6809:1999 Acoustics – Port Noise Management and Land Use Planning	Current

9.3 International Standards

Standards New Zealand represents New Zealand as members of the International Organization for Standardisation [ISO] and the International Electro technical Commission [IEC]. Through New Zealand's membership of these organisations we are able to share our expertise and knowledge in a number of areas, and ensure that New Zealand interests are considered. Where possible, New Zealand standards are based on international standards. Utilising the current New Zealand acoustic standards for environmental noise takes account of relevant areas of international standards, that is international standards have been researched and where relevant included or referenced within current new Zealand acoustic standards.

9.4 National Environmental Noise Standards

The Wanganui City Plan is a mandatory document and its contents must give effect to and *cannot* be inconsistent with the provisions of documents prepared at the regional and national level. New Zealand Standard should not be confused with a 'National Environmental Standard' [NES]. NES are specific regulations issued under Sections 43 and 44 of the RMA and apply nationally providing methodologies or requirements to environmental matters, although they may prescribe technical standards where appropriate. Although a New Zealand Standard and a NES are different, they have common goals, that being to provide consistent approach and process throughout New Zealand – the key difference being that for NESs, each regional, city or district council must enforce the same standard without variation,

whereas New Zealand Standards can be adopted in whole or in part, and can vary between regulators.

At the time of preparing this chapter there was one NES relating to noise but in the specific context of telecommunications facilities that is NZS 6801:2008 and NZS 6802:2008 are cited in Clause 9[4] of the Resource Management Act [National Environmental Standards for Telecommunication Facilities] Regulations 2008 which is a National Environmental Standard].

10 Operative District Plan

Key players in the management of noise in the District are:

- The noise producers;
- Regulatory authorities, in this case Wanganui Council;
- The noise receivers;

The Council has the primary responsibility for managing the effects of land uses, including noise, mandated by the Resource Management Act 1991. *Part IV* of the Act places a mandate on Council, through the District Plan, to ensure the noise environment is managed in the most sustainable way and that adverse effects of noise generating activities are avoided, remedied or mitigated.

As highlighted above, the key sections of the RMA with particular relevance to noise effects are:

- S2. Interpretation;
- S5. Purpose;
- S7[c]. Protecting amenity;
- S16. General duty to avoid unreasonable noise;
- S17. Duty to avoid, remedy, or mitigate adverse effects;
- S31. Functions of territorial authorities under this Act.

Council control noise effects through such methods as;

- Provisions within district plan;
- Conditions attached to resource consents;
- Enforcement proceedings including: Abatement notices, enforcement orders and; excessive noise direction notices.

The over-riding requirement is for the noise-maker[s] to recognise the general duty to avoid unreasonable noise. Usually this entails both physical precautions and management based methods. The specific level of control is set out in detail in noise standards which are included within the plans zone standards for each zone [land use].

As set out above, the District Plan is a key instrument for the control of adverse environmental effects, including noise and vibration. The currently operative Wanganui District Plan is divided in into 16 Chapters, which have 10 supporting Appendices and maps.

The following is a summary to the 7 main zone types with sub zones set out under the Operative Plan:

- Chapter 3 -Rural Environment;

- Chapter 4 - Residential Environment;
- Chapter 5- Commercial Environment;
- Chapter 6- Industrial Environment;
- Chapter 7- Natural Environment [including Reserves and Open Space Zone];
- Chapter 8- Recognition and Reduction of Hazards;

Sustainable management is defined in the Resource Management Act for the purposes of preparing and administering a District Plan. It addresses the following questions:

- ***Integrated management -*** *One of the functions of the Wanganui District Council under the RMA is to prepare a District Plan. This is to provide for the integrated management of the effects of the use, development or protection of land and associated natural and physical resources of the District Integrated management also requires decision-making to take into account the full range of values/wellbeing's: economic, social, cultural and environmental.*

- ***Zones -****The Wanganui District Plan recognises significant and distinctive amenity and physical characteristics of different parts of the District. Examples of physical characteristics include landscape features, vegetation and the nature and scale of development and the amenity.*

- ***Evaluation of Alternatives*** *- Section 32 of the RMA requires Councils to evaluate and justify District Plan objectives, policies and methods as necessary, appropriate and effective in promoting sustainable management. The Wanganui District Plan includes objectives, policies and methods. Additional information on evaluation and justification is contained in working papers and documentation of the discussions at workshops which form part of the public consultation and Plan preparation/change process.*

10.1.1 'Appendix D – Noise' Operative District Plan

'Appendix D - Noise' of the Operative Plan provides background information on noise issues and refers to Standards for the measurement and assessment of noise as follows;

≠ *New Zealand Standard 6801:1999 Acoustics - Measurement of Environmental Sound.*

≠ *New Zealand Standard 6802:1999 Acoustics - Assessment of Environmental Noise*

≠ *New Zealand Standard 6803 P: 1984 The Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work.*

≠ *New Zealand Standard 6805:1992 Airport Noise Management and Land Use Planning.*

≠ *New Zealand Standard 6806:1993 Road Traffic Sound.*

≠ *New Zealand Standard 6807: 1994 Noise Management and Land use*

≠ *Planning for Helicopter Landing Areas*

Despite the above reference to 1999 versions of NZS6801 and 6802, Section 1.2 makes reference to the 1991 versions of these two standards, where it states: ***"The New Zealand Noise Standards, particularly NZS 6802:1991 Assessment of Environmental Sound, are nationally based standards which give guidance to the measurement of noise and the appropriate levels at which to control noise effects.***

They have been used as basic guidance documents on the approach to noise in this Plan".

Confusingly Appendix D refers to both the 1991 and 1999 versions of New Zealand Standard 6801and 6802. As set out below, these standards have now been superseded and are no longer considered technically appropriate.

The plan also recommends New Zealand Standard 6803P: 1984 *The Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work*. This provisional standard is also superseded.

Reference in Section 1.4 is made to 'New Zealand Standard 6806:1993 *Road Traffic Sound'*. It is noted that no such standard has ever existed. No Standard was published to deal with "Road Traffic Sound". NZS 6806:2010 *Acoustics – Road Traffic Noise – New and Altered Roads* is the correct designation for a recently published standard dealing with noise from new roading projects or where roading designations are to be altered. There remains no New Zealand standard for the assessment of noise or vibration from the existing roading network, whether state highway or Council controlled road.

Reference to NZS6805:1992 *Airport Noise Management and Land Use Planning* and NZS 6807:1994 *Noise Management and Land Use Planning for Helicopter Landing Areas* are appropriate to retain in the revised District Plan as these two versions remain current.

Noise standards are also identified within other sections of the operative Plan. For example ***Natural Environment Chapter 7*** which reference New Zealand Standard NZS 6801:2008 "*Acoustics – Measurement Of Environmental Sound* and New Zealand Standard NZS 6802:2008 "*Acoustics – Environmental Noise* within special activity noise controls for events in Springvale Park and Cooks Gardens.

In summary, the operative District Plan makes reference to a number of acoustic standards for the assessment and measurement of environmental noise. There is a need to promote consistency and "standardisation" in the way that all Standards are used within the Plan. This can be achieved within a new "definitions" section where both the relevant technical terms can be defined, and the relevant Standards referred to. By defining a term such as "Noise Emission Level" within the definitions section of the revised Plan and inserting this term into each relevant noise rule, the definitions section can be used as the vessel to contain all relevant references to NZ Standards. This approach has found some favour in other District Plans and avoids repetitive references to the relevant Standards within each rule.

The following provides a discussion on the status of standards and recommendations in this regard for the revised Plan.

10.1.2 Operative District Plan Noise Rules

A noise rule will generally have the component of a permitted **limit**[s] and related assessment **time** frames meaning day, night or even evening shoulder periods if relevant. The rule should also have details on how to firstly **measure** and then **assess** the noise which is normally a reference to an appropriate acoustic **standard**. The rule will also importantly have permitted noise descriptors related to each level such as L_{A10} dB and L_{AFmax} dB. As discussed below, there examples where noise limits in the operative Plan use the L_{eq} noise descriptor. For example Chapter 7 Natural Environment Rule 7.5.1 [b][i] references L_{10} and the second part of the rules using 7.5.1 [b][i] and[ii] using L_{eq}.
It is further noted in some places the there are various technical typographical errors, for example using L_{eg} instead of L_{eq} that is the noise descriptor refers to a 'g' when it should be a 'q' being drafted as L_{Aeq}.

The Operative District Plan makes reference to L_{A10} noise descriptor or metric. The current L_{A10} descriptor has been known to be a reasonably good predictor of annoyance experienced by people and

communities and could be determined using the older analogue sound level meters.

The L_{A10} noise limits of the Operative District Plan apply to specific day and night time periods. Under the 2008 version of NZS6802 it is recommended to also apply a limit for the evening period [such as 7pm to 10pm] and this is included within recommendations below.

The operative Plan adopts the L_{AFmax} unit for controlling single sound events at night time. This is an appropriate approach to controlling potential sleep disturbing sounds, however the actual limit is based on a L_{A95} 'background plus' method. Setting a variable L_{AFMax} limit based on the background sound level[4] is no longer considered appropriate within the more recommended 2008 NZ Standards.

A summary of the permitted activity noise standards of the operative District Plan are set out as follows;

Zone Type	Daytime Limit	Night time or Other Limit	Assessment Location
Chapter 3 **Rural Environment** **Rural A and Rural B**	7am to 6pm **55 dBA**[L_{10}]	All other times **45** dBA L_{10} L_{max}: the lower of L_{95} background sound plus 30 dBA or **75 dBA**	when measured within **20 metres of any dwelling**
Chapter 3 **Rural Settlement**	7am to 6pm **50 dBA**L_{10}	All other times **40** dBA L_{10} L_{max}: the lower of L_{95} background sound plus 30 dBA or **75 dBA**	when measured within **20 metres of any dwelling**
Chapter 4 **Residential Environment**	7am to 6pm **50 dBA**L_{10}	All other times **40** dBA L_{10} L_{max}: the lower of L_{95} background sound plus 30 dBA or **75 dBA**	when measured on, or within, the boundary of any other site zoned for **residential** purposes
Chapter 5 **Commercial Arts**	At all times **65 dBA** L_{10}	All other times L_{max}: the lower of L_{95} background sound plus 30 dBA or **80 dBA**	when measured at or within the boundary of any site or at the **outside wall of any building** on any other site
Chapter 5 **Commercial Arts**	7am to 6pm **55 dBA** L_{10}	6pm to 7am **45** dBA L_{10} L_{max}: the lower of L_{95} background sound plus 30 dBA or **70 dBA**	when measured at or within the boundary of any site in the **Residential zone**
Chapter 5 **Commercial Arts**	**Residential use** Noise Insulation $D_{nT,w}+ C_{tr} > 30$ dB		
Chapter 5 **Commercial Riverfront**	At all times **65** dBA L_{10}	All other times L_{max}: the lower of L_{95} background sound plus 30 dBA or **80 dBA**	when measured at or within the boundary of any site or at the **outside wall of any building** on any other site
Chapter 5 **Commercial Riverfront**	7am to 6pm **55** dBAL_{10}	6pm to 7am **45** dBA L_{10} L_{max}: the lower of L_{95} background sound plus 30 dBA or **70 dBA**	when measured at or within the boundary of any site in the **Residential zone**
Chapter 5 **Commercial Riverfront**	**Residential use** Noise Insulation $D_{nT,w}+ C_{tr} > 30$ dB		

[4] *Under recommended 2008 NZ Standards, the background sound level is defined using the L_{A90} rather than the L_{A95} unit previously referred within the 1999 Standards.*

Chapter 5 **Commercial Central**	At all times **65** dBA L_{10}	All other times L_{max}: the lower of L_{95} background sound plus 30 dBA or **80 dBA**	when measured at or within the boundary of any site or at the **outside wall of any building** on any other site
Chapter 5 **Commercial Central**	7am to 6pm **55** dBAL_{10}	6pm to 7am **45** dBA L_{10} L_{max}: the lower of L_{95} background sound plus 30 dBA or **70 dBA**	when measured at or within the boundary of any site in the **Residential zone**
Chapter 5 **Commercial Central**	**Residential use** Noise Insulation $D_{nT,w}+ C_{tr} > 30$ dB		
Chapter 5 **Commercial Outer**	7am to 10pm **65 dBA** L_{10}	10pm to 7am **55 dBA** L_{10} L_{max}: **70 dBA** or L_{95} background sound level plus 30dBA, whichever is the lower	when measured at the **site boundary**
Chapter 5 **Commercial Outer**	7am to 6pm **55 dBA** L_{10}	6pm to 7am **45 dBA** L_{10} L_{max}: **70 dBA** or L_{95} background sound level plus 30dBA, whichever is the lower	when measured on any land zoned for **residential purposes**
Chapter 5 **Commercial Neighbourhood**	7am to 6pm **55 dBA** L_{10}	6pm to 7am **45 dBA** L_{10} L_{max}: **70 dBA** or L_{95} background sound level plus 30dBA, whichever is the lower	when measured on any land zoned for **residential purposes**
Chapter 5 **Commercial Neighbourhood**	Any habitable room in a building used for a Residential Activity shall meet the following requirements. Noise in Habitable rooms at all times shall not exceed **35 dBA L_{10}.** If this standard cannot be meet with doors and windows open then forced air ventilation or air-conditioning is required.		
Chapter 6 **Industrial**	7am to 10pm **65 dBA** L_{10}	10pm to 7am **55 dBA** L_{10} **75 dBA** L_{max}: or L_{95} background sound level plus 30 dBA, whichever is the lower	Sound **from** manufacturing zone when measured within the boundary of any land zoned **central commercial, outer commercial or neighbourhood commercial**
Chapter 6 **Industrial**	7am to 6pm **55 dBA** L10	6pm to 7am **45 dBA L_{10}** **85 dBA** L_{max} or L_{95} background sound level plus 30 dBA, whichever is the lower	Sound **from** manufacturing zone when measured on any land zoned for **residential or rural**
Chapter 7 **Natural Reserves and Open Space**	7.00am to 10.00pm **50 dBA** L_{10}		Residential zone boundary
Chapter 7 **Natural**	7.00am to 10.00pm	10.00pm to 7.00am **40 dBA**	at or beyond any other boundary

Reserves and Open Space	**60 dBA** L_{10}		
Chapter 8 **Recognition and Reduction of Hazards Hillside Protection**	7am to 6pm **50 dBA** L_{10}	All other times **40 dBA** L_{10} L_{max}: the lower of L_{95} background sound plus 30 dBA or **70 dBA**	when measured on, or within, the boundary of any other site zoned Residential.

Chapter 7
Natural Environments
Springvale Park:

7.5 PERFORMANCE STANDARD

7.5.1 Noise.

a. Sound emissions (including public address systems) shall not exceed the following limits:

7.00am to 10.00pm	50dBA (L10) at or beyond any Residential zone boundary
7.00am to 10.00pm	60dBA (L10) at or beyond any other boundary
10.00pm to 7.00am	40 dBA (L10) at or beyond any boundary

b. In the defined circumstances the following noise limits will apply to events:

Springvale Park:

i. For up to five days per calendar year, but a maximum of two days consecutively,

8.00am to 12.30am	55dB L_{Aeq} at or beyond any Residential Zone boundary
	65 L_{eq} at 63Hz
	55 L_{eq} at 125Hz
8.00am to 12.30am	60dB L_{Aeq} at or beyond any other zone boundary
	70 L_{eq} at 63Hz
	60 L_{eq} at 125Hz
12.30am to 8.00am	40dB L_{Aeq} at or beyond any other zone boundary
	50 L_{eq} at 63Hz
	40 L_{eq} at 125Hz

ii. and for up to 10 days per calendar year.

8.00am to 11.00pm	55dB L_{Aeq} at or beyond any Residential Zone boundary
	65 L_{eq} at 63Hz
	55 L_{eq} at 125Hz
8.00am to 11.00pm	60dB L_{Aeq} at or beyond any other zone boundary
	70 L_{eq} at 63Hz
	60 L_{eq} at 125Hz
11.00pm to 8.00am	40dB L_{Aeq} at or beyond any other zone boundary
	50 L_{eq} at 63Hz
	40 L_{eq} at 125Hz

Chapter 7
Natural Environments
Cook Gardens

Cooks Gardens

i. for up to six days per calendar year.

8.00am to 11.00pm	55dB L_{Aeq} at or beyond any Residential Zone boundary
	65 L_{eq} at 63Hz
	55 L_{eq} at 125Hz
8.00am to 11.00pm	60dB L_{Aeq} at or beyond any other zone boundary
	70 L_{eq} at 63Hz
	60 L_{eq} at 125Hz
11.00pm to 8.00am	40dB L_{Aeq} at or beyond any other zone boundary
	50 L_{eq} at 63Hz
	40 L_{eq} at 125Hz

Noise shall be measured and assessed in accordance with the following standards:

- New Zealand Standard NZS 6801:2008 "Acoustics – Measurement of environmental sound"
- New Zealand Standard NZS 6802:2008 "Acoustics – Environmental Noise.

C. For any event generating noise above the standard limits, a Management Plan must be prepared and submitted to Council* at least one week prior to the event.

d. Compliance with exceptions to the standard noise limits for the Reserves and Open Space zone must be confirmed for each event by either an approved Council officer or suitably qualified and experienced acoustic consultant at the expense of the event organiser. A report detailing the results of noise monitoring for each event shall be provided to the Customer Services Manager, by the event organiser, within one week of the event.

e. For each venue a list of potentially affected residents shall be identified, with those parties shall be advised at least seven days before any event occurs, and the hours of operation shall be included in addition to contact details of a person responsible for the management of the event.

f. Crowd noise from people in a park or reserve is considered a reasonable and acceptable effect of the use of recreation reserves, and as such shall not be controlled using rules in this Plan.

Recommendations for the revised Plan set out below are based on a similar approach to that of the operative Plan, adjusting to the more recent Standards whilst retaining rational set of decibel limits applicable within each chapter of the operative Plan. Section 10.5.1 below discusses the Chapter 7 noise limits applying at Springvale Park and Cooks Gardens which represent an acceptable approach to controlling the unique sound sources usually present at concerts and events [including amplified music sounds]. The wording of these noise rules needs to be amended for technical reasons however they reasonably constrain overall noise effects in the surrounding area whilst also controlling potentially problematic bass frequencies in the 63 Hz And 125 Hz bands[5]. These controls are recommended to be retained [subject to technical changes described below in Section 10.5.1] as they fulfil a specific niche and already refer to the recommended versions of NZ standard NZS6801 and NZS6802.

10.1.3 Vibration

[5] *Low frequency sounds propagate significant distances and can penetrate buildings and readily affect indoor spaces even with windows closed.*

The current Operative District Plan makes reference to the same vibration standard in a number of places, an example of which is set out below from Rule 3.5.3:

> ***3.5.3 Vibration.***
>
> ***No activity shall cause a vibration considered offensive or objectionable. In assessing whether vibration is offensive or objectionable, the limits set in NZS 2631: 1985-1989, Parts 1 - 3 shall apply.***

The vibration Standard referenced [NZS 2631: 1985-1989] appears to be NZS/ISO 2631-2:1989 *"Evaluation of human response exposure to whole body vibration – Part 2: Continuous and Shock Induced Vibrations in Buildings [1 to 80 Hz]*".

Recommendations for a replacement Standard guiding on ground vibration effects are set out in Section 11 below.

10.1.4 Sound Insulation

The current Operative District Plan makes reference to sound insulation requirements under Chapter 5 'Commercial Central' Zone only. The rules apply to any habitable room in a building used for a Residential Activity within the zone. The following is a sample of the rule using Rule 5.5.2 Residential use.

> ***a. Noise Insulation***
>
> ***Any habitable room in a building used for a Residential Activity within the Arts and Commerce zone shall be protected from noise arising from another site, either within the same building or outside the building by ensuring that the external sound insulation level achieves the following minimum performance standard:***
>
> ***$D_{nT,w}$+ C_{tr} > 30 dB***
>
> ***Compliance with this performance standard shall be achieved by ensuring habitable rooms are designed and constructed in a manner that:***
>
> - ***accords with the schedule of typical building construction set out in Appendix D - Noise; or***
> - ***accords with an acoustic design certificate signed by a suitably qualified acoustic engineer stating the design as proposed will achieve compliance with the above performance standard.***

Appendix D of the Plan however does not contain a schedule as currently referenced. There is also reference in some of the rules for example Rule 5.9.6 to a sound insulation construction standard "reference A4" which also does not appear to exist. Apart from fixing this omission, the above approach to prescribing acoustic insulation appears acceptable and should be retained.

A suitable recommendation for a schedule to include within a new version of Appendix D is set out as follows;

Noise Insulation Construction Schedule

The schedule describes the minimum requirements necessary to achieve an external sound insulation level of DnT,w + Ctr > 30 dB.

Building Element	Minimum Construction Requirement

External Walls of Habitable Rooms	Stud Walls: • Exterior cladding:	20 mm timber or 9mm compressed fibre cement sheet over timber frame (100 mm x 50 mm). ∗
	• Cavity infill:	Fibrous acoustic blanket (batts or similar of a minimum mass of 9 kg/m^3) required in cavity for all exterior walls. Minimum 90 mm wall cavity.
	• Interior lining:	One layer of 12 mm gypsum plasterboard. Where exterior walls have continuous cladding with a mass of greater than 25 kg/m^2 (e.g. brick veneer or minimum 25 mm stucco plaster), internal wall linings need to be no thicker than 10 mm gypsum plasterboard.
	• Combined superficial density:	Minimum not less than 25 kg/m^2 being the combined mass of external and internal linings excluding structural elements (e.g. window frames or wall studs) with no less than 10 kg/m^2 on each side of structural elements.
	Mass Walls:	190 mm concrete block, strapped and lined internally with 10 mm gypsum plaster board, or 150 mm concrete wall.
Glazed Areas of Habitable Rooms	Glazed areas up to 10% of floor area	6 mm glazing single float
	Glazed areas between 10% and 35% of floor area	6 mm laminated glazing
	Glazed areas greater than 35% of floor area	Require a specialist acoustic report to show conformance with the insulation rule.
	Frames to be aluminium window frames with compression seals.	
Skillion Roof	Cladding:	0.5 mm profiled steel or 6 mm corrugated fibre cement, or membrane over 15mm thick ply, or concrete or clay tiles.
	Sarking:	17mm plywood (no gaps).
	Frame:	Minimum 100 mm gap with fibrous acoustic blanket (batts or similar of a mass of 9 kg/m^3).
	Ceiling:	Two layers of 10mm gypsum plaster board (no through ceiling lighting pementrations unless correctly acoustically rated.) Fibrous acoustic blanket (batts or similar of a minimum mass of 9 kg/m^3.)
	Combined superficial density:	Combined mass of cladding and lining of not less than 25 kg/m2 with no less than 10 kg/m2 on each side of structural elements.
Pitched roof (all roofs other than skillion roofs.)	Cladding:	0.5 mm profiled steel or tiles, or membrane over 15mm thick ply.
	Frame:	Timber truss with 100 mm fibrous acoustic blanket. (batts or similar of a minimum mass of 9 kg/m3) required for all ceilings.
	Ceiling:	12 mm gypsum plaster board.
	Combined superficial density:	Combined mass with cladding and lining of not less than 25 kg/m2.
Floor areas open to outside	Cladding:	Under-floor areas of non-concrete slab type floors exposed to external sound will require a cladding layer lining the underside of floor joists of not less than 12 mm ply
	Combined superficial density:	Floors to attain a combined mass not less than 25 kg/m2 for the floor layer and any external cladding (excluding floor joists or bearers.).
External door to habitable rooms	Solid core door (min 25kg/m^2) with compression seals (where the door is exposed to exterior noise.)	

Notes:

∗ The table refers to common specifications for timber size. Nominal specifications may in some cases be slightly less than the common specifications stated in the schedule for timber size.

In determining the insulating performance of roof/ceiling arrangements, roof spaces are assumed to have no more than the casual ventilation typical of the jointing capping and guttering detail used in normal construction

of temporary events with Springvale Park and Cooks Garden, the rules reference the latest 2003 standards and set criteria across the audible frequency range targeting low frequency noise from base

sounds at 63 Hz and 125 Hz.

The rule is be drafted for assessment of amplified sound stating "including public address systems", however the way the rule is currently drafted captures and includes ALL sound emissions which would be problematic in actual field measurement and assessment.

There also appears to be serious grammatical errors, as noted above, for example Rule 7.5.1 [b][1] references '65 L_{eg} at 63Hz' when this should read L_{eq}. Further confusion is added here with the first part of the rule 7.5.1 [a] using L_{10} and the second part of the rules using 7.5.1 [b][i]and[ii] using L_{eq}. The use of L_{Aeq} noise descriptor is technically appropriate for amplified sound the use of L_{A10} is not.

We recommend retaining these rules, subject to technical editing.

10.1.6 Exclusions - Appendix D Noise

Section 1.5 of Appendix D sets out certain types of sounds are excluded from control via the District Plan noise rules. These are set out as follows;

A. ***Wanganui Airport operations, including aircraft being operated during, or immediately before or after, flight, except where specifically provided for.***

B. ***Vehicles being driven on a road [within the meaning of Section 2[1] of the Transport Act 1962], or within a site as part of, or compatible with, a normal residential activity.***

C. ***Trains.***

D. ***Sounds generated by construction, maintenance and demolition activities shall be assessed and controlled by reference to New Zealand Standard NZS 6803P:1984 Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work.***

E. ***Crowd noise at a park, reserve or any land zoned as recreation, racecourse, conservation and amenity or showground's.***

F. ***Noise with an impulsive sound such as gunfire and blasting.***

G. ***Livestock noise in the Rural zone.***

H. ***Non-commercial boating activities on the Wanganui River.***

The exclusion of 'trains' is imprecise and should refer to all sounds arising from within the designated rail corridors whether generated by locomotive sources or rolling stock.

Rule 4.5.1 "Performance Standards for Residential environments" excludes emergency sirens from the permitted rules '***shall not apply to emergency sirens'.*** This exclusion is not cross referenced to Appendix D. Rule 4.5.1 also excludes noise from temporary military training [limited via District Wide Rule 10.8 of the Operative Plan]. This exemption should in fact apply at all noise sensitive receiver sites in the district, including those zoned or located in residential environments.

10.1.7 Section 10 District Wide Provisions

Section 10 sets out District wide provisions which include at Section 10.2.2 the following statement;

"***Activities shall comply with the noise standards for the zone in which they are situated***

except that sound emissions are to be measured at the outside wall of any dwelling unit on an adjoining site".

This is a non-sensical statement. Under the recommendations of NZS6801 and NZS6802 noise effects are assessed primarily within any residentially zoned site, or within the 20 metre notional boundary to rural dwellings. Rule 10.9.4 states "***Flying activities shall be in compliance with civil aviation regulations or in agreement with the local controlling authority***" however it is doubtful if Council has any powers to control the operation of aircraft in the air, including for noise control purposes.

10.2 Ambient Noise Surveys

Appendix D Section 1.3 refers to surveys of noise conducted in the District. These results indicated "***that traffic was the biggest source of environmental noise. Wanganui's manufacturing/commercial area activities, individually, are not big noise sources; however, collectively, due to their proximity to residential interfaces, are potential noise polluters."*** While no specific district wide survey has been conducted by Council in recent years, the above description of ambient sound sources in the District [and their prominence] is considered to remain valid.

10.3 Noise Complaint Information

Council operates a noise control service that respond to complaints of unreasonable or excessive noise from the general public. Generally there are two 'types' of noise complaints dealt with by Council under the procedures provided for within the RMA. These two groups of complaints are 'excessive' noise complaints and complaints of unreasonable noise. Excessive noise complaints arise after hours and are usually in relation to parties or social events mostly involving amplified sound sources. Deciding whether a complaint of excessive noise is valid requires a judgement of a Noise Control Officer. Measurements of sound do not need to be conducted.

Complaints of on-going noise from commercial or industrial sites or other facilities are received by Council during either the daytime or night time and may involve the measurement of compliance with noise limits specified in the District Plan or within resource consent conditions. These complaints are investigated by Council officers operating under enforcement provisions of the Act. It is under these circumstances that District Plan permitted activity noise rules are relied upon to ensure both that the rules 'work" effectively [are enforceable] and that the nominated limits are sufficient to ensure noise effects are reasonably limited with significant adverse noise effects avoided where compliance is achieved.

10.4 Review Summary

Our review of operative Wanganui District Plan's noise provisions indicate some inconsistencies in the exempted sources, the way in which noise limits are applied across different zone types with some ambiguous wording in parts that may lead to uncertainty, possibly affecting the enforcement of the rules if tested. The Plan prescribes noise limits and relevant NZ Standards inconsistently. Basing the applicable L_{AFMax} limit on the background sound levels gives rise to significant uncertainty around the degree of protection afforded to sleep during night time at noise sensitive receiver sites. Below, this has been remedied by setting specific decibel limits for L_{AFMax} single event sounds received at sensitive receiver sites.

As above, many aspects of the existing provisions of the operative Plan appear acceptable and is retained within the recommendations below. In some cases technical editing is recommended to accord with the most recent Standards or to conform with best practice.

11 Recommendations for Proposed Plan

The following section sets out recommended changes that are made with the overriding aim to ensure the District Plan noise provisions are in line with the current best practice. The focus is on the different zones and related noise rules being made standardised and easier to interpret for both Council and other users of the District Plan.

There are a range of factors which determine noise effects in various zones these include:

- **Time of day**
  The District Plan noise limits are set lower for night time reflecting people's increased sensitivity to noise during these hours. The current District Plan sets different time internals

- **Level of sound**
  The sound levels can range from loud sounds [exceeding the normal ambient sound level by 10 dBA or more] through to relatively low-level sounds. The level of sound depends on various factors and will change with the different types of noise sources across the different zones in the district.

- **Type of sound**
  The types of sounds can range from amplified music outside a cafe through to sounds from farm equipment in the rural zone or a person mowing their lawns. The types of sound in the residential area such as lawn mowers will be different from that found in rural areas which may include agricultural equipment or amplified sound being only three examples of many.

It is noted that the final wording of the recommended noise rules below needs to be considered by Council in the context of any wider changes likely for other parts of the District Plan. The recommendations below are based around technical updates/enhancement to the existing rule.

Further changes are likely to occur once Council review the recommended changes in respect to the assessment provided in this report. The recommendations focus on the existing rules and technical enhancements of the rules for the zones and related appendices based on the most appropriate national noise standards and best practice existing at the time of preparing this document.

11.1 New Zealand Standards

The District Plan currently references both the 1991 and 1991 versions of NZS6801/02. The following provides an overview to changes under the current 2008 standards and rational for adopting such standards which are viewed as technically superior and robust for the assessment and measurement of environmental noise.

NZS 6801 sets out quantities to be used for the description of sound in community environments and describes procedures for the consistent measurement of these sound descriptors. The standard specifically states that the standard's methods and procedures for the measurement of sound are intended to be applicable from all sounds, individually or in combination. NZS6802 sets out procedures for the consistent assessment of noise for compliance with noise limits. The standard includes sound from rail yards not attributable to vehicle on rails and sound from airport activities except from aircraft taxiing and in-flight plus light aircraft flight and ground movements not at airports which are outside the scope of this standards. Where sound from transportation or construction is part of ongoing day to day sound emissions it shall be assessed using NZS 6802. The standard excludes sound where the source is within the scope of and subject to the application and hence the appropriate standard shall be adopted for such sources. The introduction and use of 2008 standards is considered the most suitable and technically acceptable standards for the assessment and measurement of general environmental noise.

Recommendation:
Adopt NZS 6801:2008 Acoustics –Measurement of Environmental Sound
Adopt NZS 6802:2008 Acoustics –Environmental Noise for the assessment of sound.
Remove any reference to 1999 standards.

11.1.1 L_{Aeq} and L_{AFmax}

One of the main consequences of updating NZS 6801 and NZS 6802 to 2008 standards is a change in measurement descriptors or noise metrics. Background sound level [previously L_{A95}] was changed to L_{A90} in the 1999 version. The change was an update consistent with international usage in BS4142:1997[6] and ISO 1996-2:2007. The 1999 revision replaced the L_{10} descriptor with L_{Aeq}, technically referred to in the 1999 and 2008 versions as the 'time average sound level', being denoted as $L_{Aeq[t]}$. What is vital about the $L_{Aeq[t]}$ is the measurement or assessment period [t] is required by both the 1999 and 2008 versions to be stated. The current L_{10} descriptor was originally adopted as it was demonstrated to have a reasonably good correlation with the degree of annoyance experienced by a typical person and was easy to calculate. Furthermore L_{10} could be determined from analogue sound level meters by the visual mean maxima estimation method acceptable at the time.

The introduction of L_{Aeq} in the 1999 and now 2008 standard is considered to be on a 'firmer foundation' and appropriate as international research had shown that the L_{Aeq} descriptor has a greater degree of correlation to noise annoyance than L_{10}, and for this reason was widely accepted as being the preferred noise descriptor for use in environmental noise standards and noise limits. Furthermore the L_{Aeq} level, being unrelated to the statistical variation in sound levels, is more readily predicted, which is a considerable advantage over L_{10}. As noted above, by its very nature, L_{Aeq}, is related to a specific time interval and will only provide a valid description of a sound environment if the measurements cover the range and variability of that sound environment. It is generally accepted that the difference would typically be 2-3 dB for "common" sounds but may be much larger for some specific situations. In the case of simple constant sound sources with a fixed spectrum, such as a fixed speed fan, all descriptors would be treated as the same, that is $L_{10} = L_{eq} = L_{90} = L_{max}$. For more complex variable sound sources such as wind farm sounds or the sounds of passing road traffic, the difference between L_{Aeq} and L_{90} for the same reference time interval is around 2.5 dB at receiver locations when all data with extraneous measurement noise is removed.

A key difference between the 1999 version and the 2008 version is the standardisation of a reference time interval at 15 minutes. This standard reference time interval of 15 minutes in NZS6802:2008 effectively deals with the issue of averaging measured sound levels [which can be averaged by not more than 5 dB during daytime, but not at all during night time]. For night time it is recommended to adopt an L_{Aeq} limit in addition to a single event limit based on the L_{AFmax} sound level. Note: L_{Amax} should not be confused with the descriptor L_{peak}[7].

Recommendation:
Adopt L_{Aeq} and L_{Amax} noise descriptors
Adopt correct notional as 'value-unit-descriptor' i.e. **55 dB $L_{Aeq\ (15\ min)}$, 45 dB $L_{Aeq\ (15\ min)}$** and **70 dB L_{AFmax}**

11.2 Other 'Specialist' New Zealand Acoustic Standards

NZS 6801:2008 Acoustics – Measurement of Environmental Sound and NZS 6802:2008 Acoustics – Environmental Noise only deals with 'general' environmental noise sources and does not as a rule cover

[6] *BS 4142:1997 -- Method for rating industrial noise affecting mixed residential and industrial areas*
[7] *Peak level is measured utilising the C-frequency weighting or Z-frequency weighting to limit the measurement to the audio-frequency range. Also, peak level is a not a Root Mean Square [RMS] value and should not be confused with the RMS value L_{AFmax}.*

transportation noise or other specialist sources such as wind farms, seaports, heliport, aircraft or trains.

The following NZ acoustic Standards are also considered for inclusion in the revised District Plan in addition NZS 6801:2008 Acoustics – Measurement of Environmental Sound and NZS 6802:2008 Acoustics –Environmental Noise

11.2.1 NZS 6803:1999 Acoustics – Construction Noise

The operative District Plan refers to the provisional 1984 Construction Standard NZS6803 P:1984 *The Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work. A more recent Standard,* NZS 6803:1999 *Acoustics – Construction Noise* is the technically appropriate standard for construction noise assessment nowadays. NZS 6803 does not apply to vibration or blasting, noise induced hearing loss, or effects of noise upon wildlife, stock, or domestic animals. NZS 6803 also does not apply to 'emergency works' as defined in the Resource Management Act 1991.

It is noted that NZS6803: 1999 makes reference to measurement of construction noise levels using NZS 6801:1999. Whilst appropriate when NZS6803:1999 was published, we recommend that it would be more technically appropriate to ensure measurements are conducted in accordance with NZS6801:2008.

Recommendation:
Adopt NZS 6803:1999 *Acoustics – Construction Noise for the assessment of construction noise*
Remove any reference to superseded standards New Zealand Standard 6803 P:1984 The Measurement and Assessment of Noise from Construction, Maintenance and Demolition Work.

11.2.2 NZS6805:1992 Airport Noise

The Plan currently references NZS 6805:1992 *Airport Noise Management and Land Use Planning.* NZS 6805:1992 Airport is adopted as a basis for managing both aircraft noise arising from the use of airports, while also providing guidance on land use planning controls to deal with effects of aircraft noise on noise sensitive activities establishing within noise affected areas surrounding airports.

NZS6805 is the most current and technically appropriate standard for the assessment of airport and aerodrome noise in the District. NZS6805 only applies to noise resulting from aircraft operations and excludes sound from aircraft taxiing and in-flight which are within the scope of NZS 6802.

NZS 6805 defines an airport or aerodrome as an area of land or water intended or designed to be used whether wholly or partly for the landing, departure and surface movement of aircraft and includes buildings and areas used in connection with the airport. The words "airport" and "aerodrome" are synonymous under the standard. Overall the standard is designed to provide guidance for making rules in District Plans and Designations and managing airport noise. Non-flight related noise is outside the scope of the standard, being subject to NZS 6802. NZS 6805:1992 promotes land use planning which uses the Air Noise Boundary to set long term limits on total noise emitted by aircraft activities at airports. It is recommended in this Standard that the controls are implemented via District Plan policies and rules. Planning instruments are envisaged that provide for efficient aviation activity at the airport and the need to protect community health and welfare, consistent with the RMA. The formal determination of airport planning involves the public process set out in the First Schedule of the RMA.

The Standard is referred to within the District Plan and no changes are required in relation to the referencing of the standard.

Phase 5 of the District Plan review has considered airport noise associated with Wanganui Airport. Two specific documents have been reviewed as part of this project. The documents we have reviewed are;

A *Wanganui Airport Plan Review - Noise Control Boundaries - Assessment of Noise Effects – Marshall Day Acoustics Rp 001 r01 2012055A dated 13 November 2013*

B *Wanganui District Council District Plan Review - Phase 5 - Section 32 Report - Proposed Plan Change 35 - [Airport Enterprise Zone and Air Noise Overlays] Prepared by WDC Policy Team Dated March 2013*

The results of the review including comments and recommendations in relation to management of aircraft noise within the revised Wanganui District Plan are included in ***Appendix A*** attached.

Recommendations:
Update Plan to take account of *New Zealand Standard 6805:1992 Airport Noise Management and Land Use Planning* as per the recommendations of Appendix A, attached. To give effect to the main finding of the attached review the following recommendations are made with respect to the most appropriate and efficient method for Council to control adverse effects associated with noise from aircraft using Wanganui Airport;

Amend Policy 6.3.9 (Plan Change 35) as follows;

6.3.9 Airport operating requirements

Require airport flight operations generated by Wanganui Airport to be conducted to achieve air noise of no more than 65DdB Ldn at the Air Noise Boundary (ANB) ~~and 55dB Ldn at the Outer Control Boundary (OCB)~~.

In addition Proposed rule 10.15.1 should be amended as follows;

10.15.1 Air Noise Overlays

a. Air Noise resulting from the operation of the Wanganui Airport shall not exceed a Day/Night(Ldn) level of~~:~~
~~i. 65dBA outside the Air Noise Boundary and~~
~~ii. 55dBA outside the Outer Control Boundary.~~

Aircraft engine testing is proposed to be controlled using an LAeq limit determined over an exceedingly long averaging time. It is noted to be long enough to permit extraordinary high sound levels if this occurred for a duration shorter than 9 hours, such as 30 minutes. Even shorter duration, high level sounds may arise which could result in adverse effects. The following amendments are recommended for Rule 6.7.3(a) (i), (ii) and (iii):

i. Between the hours of 7am and 10pm, noise generated by aircraft engine testing and measured at the notional boundary of <u>any rural dwelling or within the boundary of any residentially zoned</u> site ~~zoned for residential or rural use~~ shall not exceed 55 dB LAeq(~~15 hours~~ <u>2 hours</u>); and;
ii. All aircraft engine testing shall be scheduled to take place between 7am and 10pm and only essential unplanned engine testing shall take place outside those hours.
iii. Noise from essential engine testing shall not exceed the following noise levels at the notional boundary of any site zoned rural or residential (excluding the land identified as designation D45) where no limit will apply:

Time Period	***Engine Testing Noise Level***
All days 10.00 pm to 7.00 am	*55 dB LAeq(~~9 hours~~ <u>2 hours</u>)*
All days 10.00 pm to 7.00 am	*<u>75</u>~~80~~ dB LAFmax*

11.2.3 NZS6806:2010 Traffic Noise From New or Altered Roads

The Plan currently incorrect references *New Zealand Standard 6806:1993 Road Traffic Sound. No such Standard exists.*

NZS 6806:2010 *Acoustics - Traffic Noise – Noise From New or Altered Roads* provides guidance on methods and criteria to measure, assess, and mitigate noise arising from new or altered roads. It is mainly intended to be applied within the planning process when Notices of Requirements are received by Council in relation to a new or existing roading designation. The standard only applies to new and altered roads of scale and state highways and generally not recommended to apply to low volume roads. NZS 6806:2010 establishes methods for ascertaining the "best practicable option" [BPO] to mitigate the effects of noise from new or altered roads. This Standard does not impose any specific noise standard. The assessment method seeks to ensure noise effects are mitigated in accordance with the RMA duty to adopt the BPO when specific thresholds are exceeded.

Recommendation:
Adopt *NZS6806:1993 Acoustics - Traffic Noise – Noise From New or Altered Roads.*
Remove any reference to '*New Zealand Standard 6806:1993 Road Traffic Sound*'

11.2.4 Helicopter Landing Areas

The operative Plan references *NZS 6807: 1994 Noise Management and Land use Planning for Helicopter Land Areas* provides guidance on controlling of noise from sites used as helicopter landing areas. The approach of NZS 6807:1994 is to assess helicopter noise on a 24 hour basis [using L_{dn}] with a separate consideration of the maximum levels due to any night time operations [using L_{AFmax}]. The standard allows for a relaxation of the limits by 5 dB where the area is affected by high background sound levels.

This Standard is said to specifically take into account the distinctive character of helicopter noise and the nature of helicopter operations chiefly being able to depart or arrive on a vertical slope, enabling helicopters to be much closer in proximity to noise sensitive sites. The airport noise standard NZS 6805 is inappropriate for assessment of helicopter landing areas, as is NZS 6802 which is not recommended for transportation noise of any sort.

Under Section 9 the RMA it is within the powers of Council to control the movement of aircraft in the air for the purposes of managing the effects of aircraft noise in the vicinity of landing areas. However the RMA does empower Council to control noise from overflying aircraft when aircraft are *en route* to a destination and not in the vicinity of the landing area. In these situations *Section 29A* of the Civil Aviation Act 1990 can be used by Civil Aviation Authority [CAA] to control noise from overflying aircraft. NZS6807:1994 is recommended to be adopted within the revised plan as this Standard represents best practice for the control or noise from helicopter landing areas. This Standard is designed to protect noise sensitive sites within all types of zones however it is not designed to be applied to sites where less than four landings are proposed during daytime within any month.

NZS6807 is the most technically appropriate standard for the assessment of noise from helicopter landing areas in the District. The Standard is referred to within the District Plan and no changes are required in relation to the referencing of the standard however drafting around the adoption under Appendix D Noise is recommended so that it is clear that the scope of this standard is required for the assessment of helicopter landing areas.

Recommendation:
Update Plan to take account of *New Zealand Standard 6807: 1994 Noise Management and Land use Planning for Helicopter Land Areas*.
Update Appendix D to clarify the scope of this standard

11.2.5 NZS 6808:2010 Acoustics – Wind Farm Noise

There is currently no reference to wind turbine noise in the District Plan. NZS 6808 provides guidance on the prediction, measurement and assessment of these sound sources, with the stated purpose being to aid both wind farm development and Local Authority planning procedures by providing a suitable method for the measurement and assessment of sound from wind turbine generators. The Standard generally applies to wind farms consisting of wind turbines with a swept rotor area greater than 200m^2 [for example, individual blade lengths greater than approximately 8m]. Although there are considerable possibilities for wind farms to be located within the district [especially on exposed coastal sites] there are no current wind farms under consideration. However it is recommended that in order to 'future proof' the revised District Plan should refer to NZS 6808:2010 *Acoustics Wind Farm Noise* for the measurement and assessment of sound from wind turbine generators and wind farms.

Recommendation:
Adopt reference to NZS 6808:2010 *Acoustics – Wind Farm Noise*

11.3 Zone Noise Rules

The Operative Plan sets out a range permitted noise limits for various zones. These relate to noise emissions from sources on the sites located in the zone under consideration. They control noise levels received in sites within that zone and within any adjacent sites [where applicable]. The Plan currently uses outdated L_{10} for day and night time and background plus for night time sleep protection. It is recommended that permitted sound limits generally be retained providing amendments are made in respect of:

- The current references to L_{10} be replaced with $L_{Aeq(15\ min)}$
- The times for day time and night time remain unchanged [7 am to 10pm] however an evening shoulder period is recommended in order to better control potential noise effects during the period 7pm to 10pm.
- Night time noise limit be set at L_{AFmax} 75 dB rather than a variable limit depending upon the background sound level [as found within the operative plan].

It is recommended that each of the rules across all zones be redrafted to reflect the above recommendations.

Noise limits are intended to control noise produced within one site and received in adjacent site within the same zone, however the following also apply:

1. Where noise is produced from a site within one zone and received within a site in another zone, the applicable noise limits are those determined by the zoning of the site on which the noise is received source(s) are located.
2. In rural areas, noise controls are based around sound levels measured at or within the 20 metre notional boundary to the dwelling (as opposed to site boundaries used within nosie rules for other types of zones).

The following are *examples* of recommended drafting for these types which should be applied across all rules.

Recommendation: Examples of a noise rule for permitted rural activities;

Rural
Noise emission levels from permitted activities shall not exceed the following limits at any point within the notional boundary of any dwelling unit, other than a dwelling unit on the same site as the activity or at any point within any residentially zoned site;

7.00am to 7.00pm [Daytime] *50 dB $L_{Aeq\ (15\ min)}$*

7.00pm to 10.00pm [Evening]	*45 dB $L_{Aeq\ (15\ min)}$*
10.00pm to 7.00am [Night time]	*40 dB $L_{Aeq\ (15\ min)}$*
10.00pm to 7.00am [Night time]	*75 dB L_{AFmax}*

The term "noise emission level" is recommended to be defined within the revised Plan as meaning a level of noise measured and assessed in accordance NZS6801:2008 and NZS6802:2008.

As discussed further below there is no definition in the Operative Plan for notional boundary which needs to be addressed.

Recommendation: Examples of a noise rule for permitted activities in Residential Zones;

Residential
Noise emission levels shall not exceed the following limits at any point within a site in the Residential Zone, other than the site on which the activity is based, or at any point within the notional boundary of any rural dwelling;

7.00am to 7.00pm [Daytime]	*55 dB $L_{Aeq\ (15\ min)}$*
7.00pm to 10.00pm [Evening]	*45 dB $L_{Aeq\ (15\ min)}$*
10.00pm to 7.00am [Night time]	*40 dB $L_{Aeq\ (15\ min)}$*
10.00pm to 7.00am [Night time]	*75 dB L_{AFmax}*

Recommendation: Examples of a noise rule for permitted activities in Commercial Zones;

Commercial Riverfront
Noise emission levels shall not exceed the following limits at any point within any site zoned Commercial Riverfront other than the site on which the activity is based;

At all times	*65 dB $L_{Aeq\ (15\ min)}$*
10.00pm to 7.00am [Night time]	*85 dB L_{AFmax}*

Noise emission levels shall not exceed the following limits at any point within a site in the Residential Zone, other than the site on which the activity is based, or at any point within the notional boundary of any rural dwelling;

7.00am to 7.00pm [Daytime]	*55 dB $L_{Aeq\ (15\ min)}$*
7.00pm to 10.00pm [Evening]	*45 dB $L_{Aeq\ (15\ min)}$*
10.00pm to 7.00am [Night time]	*40 dB $L_{Aeq\ (15\ min)}$*
10.00pm to 7.00am [Night time]	*75 dB L_{AFmax}*

For Industrial sites, the following is recommended;

Recommendation: Examples of a noise rule for permitted activities in Industrial [Manufacturing] Zones;

Industrial [Manufacturing]
Noise emission levels shall not exceed the following limits at any point within any site zoned Industrial Manufacturing other than the site on which the activity is based;

7.00am to 10.00pm [Daytime]	*65 dB $L_{Aeq\ (15\ min)}$*
10.00pm to 7.00am [Night time]	*55 dB $L_{Aeq\ (15\ min)}$*

10.00pm to 7.00am [Night time]	*75 dB L_{AFmax}*

Noise emission levels shall not exceed the following limits at any point within a site in the Residential Zone, other than the site on which the activity is based, or at any point within the notional boundary of any rural dwelling;

7.00am to 7.00pm [Daytime]	*55 dB $L_{Aeq\ (15\ min)}$*
7.00pm to 10.00pm [Evening]	*45 dB $L_{Aeq\ (15\ min)}$*
10.00pm to 7.00am [Night time]	*40 dB $L_{Aeq\ (15\ min)}$*
10.00pm to 7.00am [Night time]	*75 dB L_{AFmax}*

These noise rule wording recommendations should include a comment that these noise standards are to be read alongside, and are subject to, the provisions of Appendix D - Noise.

Recommendation:
Adopt recommendations as set out above

11.4 New "Noise Section"

It is recommended that an equivalent to Appendix D be included in the revised Plan. This section can itemise the relevant NZ Standards as follows;

To ensure a consistent approach to the measurement and assessment of noise effects sound emissions shall be measured and assessed in this District Plan in accordance with the following;

- *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*
- *NZS 6809:1999 Acoustics – Port Noise Management and Land Use Planning*

The term "Noise Emission Level" should be defined consistent with the following:

a) *Construction noise shall be assessed in accordance with NZS 6803:1999 Acoustics – Construction Noise*

b) *Noise from wind turbines shall be assessed in accordance with NZS6808:2010 Acoustics – Wind Farm Noise.*

c) *Noise from helicopter landing areas shall be assessed using NZS6807:1994 Noise Management and Land Use Planning for Helicopter Landing Areas.*

d) *Noise emitted from aircraft using the airport shall be assessed using NZS 6805:1992 Airport Noise Management and Land Use Planning*

e) *Within the Rural Zones, noise arising from livestock or from operation of mobile agricultural equipment associated with primary production [e.g. tractors, harvesters, and farm vehicles] is exempt from compliance with the noise limits for permitted activities in the rural Environment. This exemption does not apply to any fixed motors or equipment.*

f) *Noise from typical indoor and outdoor activities on any residentially zoned site that is commensurate with the nature and scale of activities associated with a household unit shall be exempt from complying with noise standards for permitted activities. Sounds from any fixed plant noise sources such pumps or motors on residentially zoned sites are not exempt from noise performance standards for the Residential Zone.*

g) *Gas guns and Avian Distress Alarms employed as audible bird scaring devices are exempt from the above limits but shall comply with the specific noise rule for this activity.*

h) *Vehicles on public roads or trains on rail lines [including at railway yards, railway sidings or stations and level crossing warning devices].*

i) *Non-commercial private gatherings, spontaneous social activities and children's play. For the avoidance of doubt, this exemption does not apply to commercial childcare facilities.*

j) *Any warning device used by emergency services for emergency purposes.*

k) *Noise from fixed plant that is used solely for emergency purposes. Examples of such equipment are standby generator sets that are used to supply electricity only at times of electrical supply failure, or for plant used only during life threatening situations such as smoke fans or sprinkler pumps and is not used to generate power for the national grid.*

l) *Noise from military training activities conducted on any site for not more than 72 hours within any six month period. Military training activities taking place on any site for longer time periods are required to comply with District Plan requirements for temporary activities.*

m) *Crowd noise at any park, reserve or any land zoned as recreation, racecourse, conservation and amenity or showground's.*

n) *Noise with an blasting or air blast activity*

o) *Non-commercial boating activities on any River*

p) *Wanganui Airport aircraft operations pertaining to aircraft being operated during, or immediately before or after, flight*

q) *Vehicles being driven on a road [within the meaning of Section 2[1] of the Transport Act 1962], or within a site as part of, or compatible with, a normal residential activity*

r) *Trains, other than when being tested [when stationary], maintained, loaded, or unloaded.*

In addition to the above, the revised District Plan requires definitions for noise descriptors. This includes:

Notional Boundary - A line 20 metres from the wall of a habitable building used for residential purposes. If the site boundary is closer than 20 metres to the building at any point, the site boundary is to be treated as the notional boundary at that point."

Habitable room: A space used for activities normally associated with domestic living, but excludes any bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, clothes-drying room, or other space of a specialised nature occupied neither frequently nor for extended periods. As per NZ Building Code.

As recommended further below definitions around sound insulation will also need to be addressed

within the Plan.

Recommendation:
Adopt above definitions, exemptions, etc.

11.5 Reverse Sensitivity – External Sound Insulation

The term "*Reverse Sensitivity"* refers to the vulnerability of an established activity to objection from a sensitive land use establishing nearby. Specific situations have been identified where reverse sensitivity issues may realistically arise and where new District Plan provisions can be implemented to enhance sustainability.

It is noted that the Operative Plan also sets limits for internal spaces such as Rule 5.13.4 [b] which states that:

> ***Any habitable room in a building used for a Residential Activity shall meet the following requirements.***
>
> ***Noise in Habitable rooms at all times shall not exceed 35 dBA L_{10}.***
> ***If this standard cannot be meet with doors and windows open then forced air ventilation or air-conditioning is required***

This rule is not enforceable. There is no way of determining how effective the insulation performance standard is. Further the rule cannot be realistically enforced. The rule is based on an internal level using the L_{10} noise metrics which is not recommended for such situations and is inconsistent with best practice.

It is recommended that Rule 5.13.4[b] be deleted and be replaced with an improved method for specifying minimum acoustic insulation standards for buildings termed Standardised Level Difference or DnT,w [AS/NZS 1276.1:1999 *Acoustics - Rating of sound insulation in buildings and of building elements: Airborne sound insulation*] which has been adopted within many District Plans in recent times to replace the familiar indoor decibel limit method currently used in various Plans for specifying insulation requirements. The $D_{nT,w}$ approach for specifying the acoustic performance of the building envelope avoids commonly experienced difficulties in determining how much sound reduction the building envelope should achieve and can be easily verified and tested in the field [verifying compliance being a major problem within indoor maximum decibel limit type insulation standards]. The term "external sound insulation level" is used in the existing Plan for the protection of habitable spaces it is recommended that a number of minor changes are made to these rules so that they are robust and enforceable. The purpose of the rule is helpful however it is recommended that the rules be redrafted so as to read:

> ***Any habitable space within a new or altered building shall be designed and specified to achieve an insulation rating of no less than $D_{nTw} + C_{tr} >30$ for the external building envelope of each habitable room when verified and tested in accordance with the following Standards:***
>
> ***ISO717-1:1996 [8] Acoustics – Rating of Sound Insulation in Buildings & Building Elements using spectrum No.2 [A-weighted traffic noise spectrum].***
>
> ***ISO 140-5:1998 Acoustics - Measurement Of Sound Insulation In Buildings And Of Building Elements Part 5: Field Measurements Of Airborne Sound Insulation Of Facade Elements And Facades.***

8 This Standard is also known as AS/NZS1276.1:1999 *Acoustics-Rating of sound insulation in buildings and of building elements Part 1: Airborne sound insulation*

Compliance with this performance standard shall be achieved by ensuring habitable rooms are designed, specified and constructed in a manner that:

- ***An acoustic design certificate is provided to Council by a suitably qualified and experienced acoustic engineer [suitable to Council] which confirms when built to the recommended design and specification will achieve the minimum acoustic insulation standard of $D_{nTw} + C_{tr} > 30$ for the external building envelope of each habitable room***

OR

- ***Accords with the exact construction specification and schedule[9] as set out in Appendix D – Noise [noting no substitute of material types or specifications from this schedules shall be permitted]***

If the above standard cannot be met with openable doors and windows then mechanical air ventilation shall be required in accordance with provisions of the New Zealand Building Code G4 – Ventilation.

Ventilation is an important consideration. Indoor sound targets will not be achieved in rooms with open windows whether they are acoustically insulated or not. This does not replace any mandatory requirement for ventilation under the Building Code, but ensures an alternative source of air is provided for bedrooms with openable windows. Opening windows are preferred and permissible so far as they do not compromise the overall sound insulation rating. Mechanical ventilation of habitable spaces with non opening windows should be provided in accordance with provisions of the New Zealand Building Code G4 in a manner which does not compromise the overall sound insulation rating i.e. where bedrooms with operable windows are required this shall be allowed for in the assessment such that is does not compromise the overall sound insulation rating:

Recommendation:
Redraft all sound insulation rules as recommended above.
Remove any reference to noise provisions which require internal sound levels being archived i.e. *Rule 5.13.4[b]*

11.6 Airblast and Air over Pressure

Vibration and Airblast noise are two different types of 'effects' and are produced as a side- effect from construction or other activity such as blasting or weapons explosions. Accordingly air blast overpressure and vibration effects on people or structures should be treated separately. Airblast noise can be described as the pressure wave that radiates out from the blasting area of an explosion hence 'noise' from explosives or 'blasting' is often described as "airblast" noise. Airblast can however also be a potential effect for special military activities such as detonations or blasting from construction activities for example. Section 8.1.4 of NZS 6803:1999 states that noise from explosives is a special case and that the practice of good blasting should be adopted with the provisions of such documents as 2187.2-2006 Explosives - Storage and use, is referenced by NZS 6803:1999. AS 2187.2 provides a table with limits to avoid structural damage and to maintain human comfort. Again NZS 6803 also does not specifically assess air-blast noise.

The measurement of blast noise [air blast] from explosives related to mining, quarry, mineral processing or construction activity shall be carried out in accordance with Appendix J of Part 2 of Australian Standard AS 2187.2: 1993

Blast noise [air blast] from explosives related to mining, quarry, mineral

[9] An example of an appropriate construction schedule is presented above, on page 21 of this report.

processing or construction activity shall not exceed a peak overall sound pressure level of 128 dBZ

Blast noise [air blast] shall be measured at any point within the notional boundary of any dwelling unit, other than dwelling unit on the same site as the activity

Neighbouring sites shall be advised of pending blasts, at least 48 hours and again at least one hour before any such blast

The limit of particle velocity [peak particle velocity] from blast noise [airblast] measured on any foundation of an adjacent occupied building not connected with the site, or suitable location adjacent to the building, shall not exceed 25mm/second for commercial buildings or 10mm/second for dwellings and buildings of similar design.

Activity Status: It is recommended that activities not complying with the permitted District Plan rules for airblast are Discretionary Activities.

11.7 Noise from Temporary Military Training

The nature and diversity of military training exercises mean these activities will not always be able to comply with noise limits for permitted activities set out in the District Plan. These activities are usually short lived on any site. The following recommendations are made in order to ensure adverse effects arising from military training exercises are avoided, remedied or mitigated.

Recommendation:
Adopt the following means of controlling noise effects are recommended;
1. Noise from military training activities conducted on any site for not more than 72 hours within any six month period are exempt from the permitted activity noise standards for each zone.
2. Military training activities taking place on any site for longer time periods are required to comply with District Plan requirements for temporary activities.

Activity Status: It is recommended that activities not complying with the permitted District Plan rules for temporary military operations are Discretionary Activities.

11.8 Vibration

Vibration may cause nuisance or annoyance. A common misunderstanding is that the Construction Noise Standards NZS6803 covers vibration; however Section 1.4 of NZS 6803 specifically states that the standard "does *not* cover vibration". Vibration is in fact a separate expert field for both assessment and measurement.

The Operative Plan currently has the same rule for vibration throughout, that is the rules reference NZS/ISO 2631-2:1989 "*Evaluation of human response exposure to whole body vibration – Part 2: Continuous and Shock Induced Vibrations in Buildings [1 to 80 Hz]*.

The 1989 Standard provides limits for continuous vibrations however this 1989 Standard has been superseded in 2003 by an informative standard which contains no vibration limits.

As there are no relevant NZ standards setting our recommended vibration limits and assessment methodologies, we recommend no vibration Standard be employed. Rather, the issue is dealt with via the nuisance provisions of the Health Act 1956 and the "general duty" of Section 16 of the RMA which requires the adoption of the best practicable option".

If necessary specialist advise can be sought to measure and assess vibration however we do not recommend any specific standard be incorporated in the revised District Plan.

Recommendation:
Remove any reference to 'NZS 2631: 1985-1989, Parts 1 – 3'
Replace with a "general duty" to avoid vibration at sensitive receiver sites by requiring the adoption of the BPO

11.9 Temporary and Special Events Noise

The Operative District Plan sets out performance standards for event noise and required management methods. It is recommended that the permitted limits under Section 7.5 are retained but noise metrics changed to L_{Aeq} with reference to NZS6801/02:2008.

It is also recommended that Section 7.5.1 is redrafted to read as follows:

> ***Sound emissions levels from any activities [including amplified sound] measured in accordance with NZS 6801:2008 and assessed in accordance with NZS 6802:2008 shall not exceed the following noise limits at or within the boundary of any other site zoned for residential purposes***
>
> | | |
> |---|---|
> | ***7.00am to 10.00pm [Daytime]*** | ***50 dB $L_{Aeq\ (15\ min)}$*** |
> | ***10.00pm to 7.00am [Night time]*** | ***40 dB $L_{Aeq\ (15\ min)}$*** |
>
> ***Sound emissions levels from any activities [including amplified sound] measured in accordance with NZS 6801:2008 and assessed in accordance with NZS 6802:2008 shall not exceed the following noise limits at or any other site other than sites zone residential purposes***
>
> | | |
> |---|---|
> | ***7.00am to 10.00pm [Daytime]*** | ***60 dB $L_{Aeq\ (15\ min)}$*** |
> | ***10.00pm to 7.00am [Night time]*** | ***40 dB $L_{Aeq\ (15\ min)}$*** |

Springvale Park

For events at Springvale Park the following noise limits shall apply:

1. ***For up to five calendar days per year but for no more than 2 consecutive days sound emission levels from any activities [including amplified sound] measured in accordance with NZS 6801:2008 and assessed in accordance with NZS 6802:2008 shall not exceed the following noise limits;***

   A. at or within the boundary of any site zoned for residential purposes:

8.00am to 12.30am	***55 dB $L_{Aeq(15\ min)}$***
	65 dB $L_{Aeq\ (15\ min)}$ at 63 Hz
	55 dB $L_{Aeq\ (15\ min)}$ at 125 Hz
12.30am to 8.00am	***40 dB $L_{Aeq(15\ min)}$***
	50 dB $L_{Aeq\ (15\ min)}$ at 63 Hz
	40 dB $L_{Aeq\ (15\ min)}$ at 125 Hz

   B. Within any other site other site

8.00am to 12.30am	***60 dB $L_{Aeq(15\ min)}$***
	70 dB $L_{Aeq\ (15\ min)}$ at 63 Hz
	60 dB $L_{Aeq\ (15\ min)}$ at 125 Hz
12.30am to 8.00am	***40 dB $L_{Aeq(15\ min)}$***
	50 dB $L_{Aeq\ (15\ min)}$ at 63 Hz
	40 dB $L_{Aeq\ (15\ min)}$ at 125 Hz

2. ***For up to ten calendar days per year sound emission levels from any activities [including amplified sound] measured in accordance with NZS 6801:2008 and assessed in accordance with NZS 6802:2008 shall not exceed the following noise limits;***

   A. at or within the boundary of any site zoned for residential purposes:

8.00am to 11pm	***55 dB $L_{Aeq(15\ min)}$***
	65 dB $L_{Aeq\ (15\ min)}$ at 63 Hz
	55 dB $L_{Aeq\ (15\ min)}$ at 125 Hz
11pm to 8.00am	***40 dB $L_{Aeq(15\ min)}$***
	50 dB $L_{Aeq\ (15\ min)}$ at 63 Hz
	40 dB $L_{Aeq\ (15\ min)}$ at 125 Hz

   B. Within any other site other site

8.00am to 11pm	***60 dB $L_{Aeq(15\ min)}$***
	70 dB $L_{Aeq\ (15\ min)}$ at 63 Hz
	60 dB $L_{Aeq\ (15\ min)}$ at 125 Hz
11pm to 8.00am	***40 dB $L_{Aeq(15\ min)}$***
	50 dB $L_{Aeq\ (15\ min)}$ at 63 Hz
	40 dB $L_{Aeq\ (15\ min)}$ at 125 Hz

Similar amendments should be made to the noise provisions applying to activities at Cook Gardens [retaining existing restrictions on the number of events, etc.]. These are set out as follows;

Cooks Gardens

1. ***For up to six calendar days per year sound emission levels from any activities [including amplified sound] measured in accordance with NZS 6801:2008 and assessed in accordance with NZS 6802:2008 shall not exceed the following noise limits;***

A. at or within the boundary of any site zoned for residential purposes:

8.00am to 11pm	***55 dB $L_{Aeq(15\ min)}$***
	65 dB $L_{Aeq\ (15\ min)}$ at 63 Hz
	55 dB $L_{Aeq\ (15\ min)}$ at 125 Hz
11pm to 8.00am	***40 dB $L_{Aeq(15\ min)}$***
	50 dB $L_{Aeq\ (15\ min)}$ at 63 Hz
	40 dB $L_{Aeq\ (15\ min)}$ at 125 Hz

B. Within any other site other site

8.00am to 11pm	***60 dB $L_{Aeq(15\ min)}$***
	70 dB $L_{Aeq\ (15\ min)}$ at 63 Hz
	60 dB $L_{Aeq\ (15\ min)}$ at 125 Hz
11pm to 8.00am	***40 dB $L_{Aeq(15\ min)}$***
	50 dB $L_{Aeq\ (15\ min)}$ at 63 Hz
	40 dB $L_{Aeq\ (15\ min)}$ at 125 Hz

It is also recommended that Noise management requirements of Parts C to G of Section 7.5 of the operative Plan be redrafted to read as follows:

C] Any event unable to comply with the above permitted limits, shall prepare an Operational Noise Management Plan [NMP]. The NMP shall be prepared by a suitably qualified and experienced acoustic consultant suitable to Council as set out [<u>where relevant</u>]:

- *Predicted sound pressure levels at closest noise sensitive sites, including duration and frequency levels are expected to be above permitted levels*
- *Method of predicted sound pressure levels*
- *Program of events*
- *Description of activity including layout and position of noise sources on site*
- *Description of sound sources including auxiliary sound sources*
- *hours of operation;*
- *Proposed Management methods in line with the 'Best Practical Option' [BPO] defined under the RMA and related sections of the Act including s.16 and s.17 requirements*
- *third party users and suppliers of amplified equipment;*
- *calibration of sound sources including electric amplified sound sources;*
- *Sound level sampling and measurements*
- *Noise monitoring procedures;*
- *Community consultation and liaison including a list of potentially affects residential sites;*
- *Handling and protocols during event regarding noise complaints;*
- *reporting of measurements of sound;*
- *Review of the Noise Management Plan.*
- *Any other details requested by Council*

D] Any event unable to comply with the above permitted limits shall provide written advice to potentially affected residents identified within the NMP. This written advice shall be delivered to the affected parties no earlier than seven working days before and no later than 3 working days before any event occurs. The written advice shall provide information on community liaison and person responsible for management of the event.

E] No less than 10 working days following the conclusion of the event a written acoustic assessment report prepared by a suitable qualified and experience acoustic consultant suitable to Council shall be submitted to Council for all aspects of the activity covering all days of the event including details of sound checks, compliance monitoring during the event and any other relevant information such as a record of noise complaints.

F] Crowd noise from people is exempt from the above rules.

11.10 Bird Scaring Devices - Gas Guns

In order to ensure consistency with the controls over noise emitted from gas guns commonly employed in horticulture, the following recommendations are made to ensure the effects of these bird protection measures remain reasonable at noise sensitive sites in the area.

The operation of gas guns for the purpose of bird scaring shall be permitted provided that:

I. The gas gun device shall be located so that the maximum number of devices does not exceed one device per four hectares of land in any single land holding, except that in the case of a single land holding less than four hectares in area, one device shall be permitted.

II. The device shall only be operated between 6.30 am and 8 pm on any day.

III. The operation of the device shall be controlled so that the maximum number of discharges per time period does not exceed 6 within any 60 minute period.

IV. Sound emitted from the device shall not exceed L_{AE} 75 dB measured within the notional boundary of any rural dwelling or at any point within a residential zone. Sound levels shall be measured in accordance with NZS6801:2008 *Acoustics – Measurement of Sound*.

V. No device shall be placed in such a manner that any public place receives noise exceeding exceed L_{AE} 90 dB measured in accordance with NZS6801:2008 *Acoustics – Measurement of Sound*.

11.11 Land Based Primary Production – Avian Distress Alarms

Avian distress alarms emit a constant type sound. The following controls are recommended:

The operation of avian distress alarms for the purpose of bird scaring shall be permitted provided that:

I. The device is used in conjunction with a Bird Management Plan for the property. The purpose of the bird management plan is to set out how the grower manages bird populations while also managing adverse effects [including noise] on the surrounding environment adopting integrated bird scaring and management strategies.

II. The device shall only be operated between 6.30 am and 8 pm on any day.

III. Sound emitted from the device shall not exceed $L_{Aeq(15\ min)}$ 50 dB when measured within the notional boundary of any rural dwelling or at any point within a residential zone;

IV. Sound levels shall be measured in accordance with NZS6801:2008 *Acoustics –*

Measurement of Sound.

V. No device shall be placed in such a manner that in any public place receives noise exceeding exceed L_{Amax} 80 dB measured in accordance with NZS6801:2008 *Acoustics – Measurement of Sound*.

11.12 Telecommunications Equipment

Telecommunications systems consist of a core network for carrying signals between locations, and access networks linking the core to individual users and customers. As noted above a National Environmental Standard [NES] has been approved by the government to assist in the implementation of its telecommunication objectives. The NES includes controls over noise from telecommunications cabinets located in road reserves. This NES has been recommended to be included within the revised District Plan to ensure consistent standards are applied to these fixtures. Pursuant to s43B of the Resource Management Act 1991, no rule or resource consent shall be more stringent than the national environmental standards for telecommunications facilities.

It is recommended to Adopt the form of the noise rule consistent with the NES for telecommunications equipment i.e. *Noise from telecommunications cabinets located in road reserves shall be a permitted activity provided that the noise emission levels comply with Clause 9 of the Resource Management [National Environmental Standards for Telecommunication Facilities] Regulations 2008.*

11.13 Noise from Emergency Services

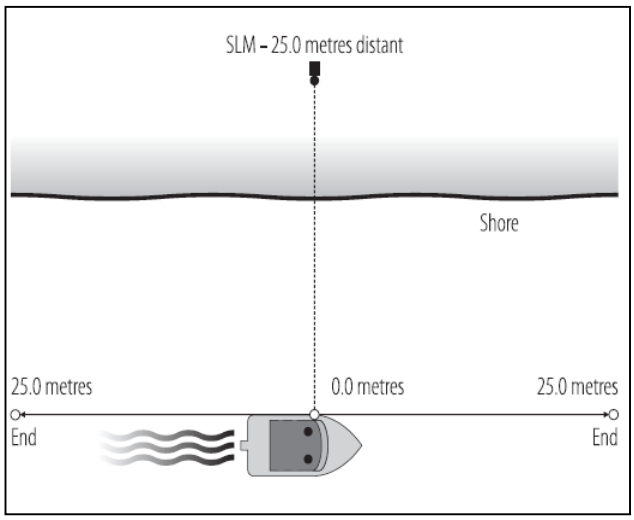
There are references within the Operative Plan, for example Rule 4.5.1 Performance Standards for Residential environments where the plan states the permitted rules '***shall not apply to emergency sirens'.*** Recommendations for exemptions are made above in relation to emergency services siren noise.

11.14 Commercial Watercraft Noise Sources

The Operative Plan currently exempts noise emissions from any '***Non-commercial boating activities on the Wanganui River'.*** No amendments are recommended for noise emitted by non commercial craft.

Watercraft noise is <u>not</u> covered by any existing New Zealand standard however guidelines exist. An efficient method to limit noise from boating activities undertaken by commercial operators is for the noise emission levels of powered watercraft be limited by way of a permitted activity noise performance standard included within the revised District Plan.

This would require each boat used for commercial operations to possess an acoustic certificate certifying the boat has been tested and complies with a specified level of noise emission. This is the approach adopted within the Queenstown Lakes District Plan. ***Appendix 2*** of the Queenstown Lakes District Plan sets out a procedure for the drive-by test at 25 metres, reproduced as follows;



The Queenstown Lakes District Plan prescribes a noise test procedure requiring "wide open throttle" with L_{max} sound levels to be measured at 25 metres. The maximum A weighted limits are

77 dB L_{ASmax} for vessels to be operated between the hours of 0800 to 2000;
67 dB L_{ASmax} for vessels to be operated between the hours of 2000 to 0800.

It is noted a definition of "commercial boating activities" will be required. The following is recommended;

Recommendation:
Commercial boating activities shall mean activities involving the use of the surface of water for boating operations undertaken for hire or reward by means of any type of powered vessel or equipment designed to be used for flotation and navigation on or through the surface of water, and includes any aircraft whilst such aircraft is on the surface of the water. Craft or boating craft shall have the same meaning.

12 Summary

The operative District Plan noise and vibration provisions have been reviewed and recommendations made for the relevant provisions for the revised Wanganui District Plan currently under development.

Recommendations for the revised Plan are based on a similar approach to that of the operative Plan, adjusting to the more recent Standards whilst retaining rational set of decibel limits applicable within each chapter of the operative Plan.

The above recommendations are based around technical updates/enhancement to the existing District Plan measures. The aim has been to enhance existing District Plan noise and vibration provisions in a manner that supports rather than undermines the District's social, economic and environmental vision, and to ensure that adverse impacts are avoided, or appropriately mitigated. This includes seeking to minimise impacts on parties potentially affected by noise and those who may be indirectly affected by people's reaction to noise [reverse sensitivity effects].

Malcolm Hunt Associates
13 October 2015

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Appendix A:

MHA Recommendations For District Plan Airport Noise Provisions

Recommendations & Comments Based On:

A. *Wanganui Airport Plan Review - Noise Control Boundaries - Assessment of Noise Effects* – Marshall Day Acoustics Rp 001 r01 2012055A dated 13 November 2013

B. *Wanganui District Council District Plan Review - Phase 5 - Section 32 Report* - Proposed Plan Change 35 - [Airport Enterprise Zone and Air Noise Overlays] Prepared by WDC Policy Team Dated March 2013

Wanganui District Plan – Phase 6 – District Wide Rules

Review of Noise and Vibration Provisions

MalcolmHuntAssociates
noise and environmental consultants

Airport Noise –Comments Following Review Of:

C Wanganui Airport Plan Review - Noise Control Boundaries - Assessment of Noise Effects – Marshall Day Acoustics Rp 001 r01 2012055A dated 13 November 2013

D Wanganui District Council District Plan Review - Phase 5 - Section 32 Report - Proposed Plan Change 35 - [Airport Enterprise Zone and Air Noise Overlays] Prepared by WDC Policy Team Dated March 2013

Support:

Fully support the thrust which is to provide for the existing and additional land use activities on the land surrounding the Wanganui Airport which is considered entirely in accordance with the sustainable management philosophy of the RMA. In addition, the Plan Change seeks to protect the operation of the airport by managing activities in the vicinity which are sensitive to airport noise which is supported as best practice in this area.

Support the use of NZS 6805:1992 *Airport Noise Management and Land Use Planning* and the projection of future aircraft noise in the vicinity of the airport based on a 30 year growth scenario [noting that the validity of the input data and the veracity of the predicted L_{dn} contours themselves shall remain for MDA to justify – thus, we have no comments on the shape or location of the actual noise boundaries].

Comments:

Noise Control at Two Locations?

It is not necessary under NZS6805;1992 to ascertain compliance of airport noise at BOTH the Air Noise Boundary [ANB] and the Outer Control Boundary [OCB]. NZS6805 Clause 1.4.4 [implementation] and Clause 1.7 [Airport Noise Management] only requires aircraft noise to be restricted to L_{dn} 65 dBA at the ANB. Also, NZ Standard NZS6805 only requires noise abatement to be implemented when noise exposure exceeds L_{dn} 65 dBA at the ANB [clause 1.7.3].

NZS6805:1992 does not intend that the OCB be used to regulate aircraft noise. The OCB is supposed to have a land use planning function only. Aircraft noise exposure is much more difficult to measure at the OCB location as this lies further from flight paths with lower levels of aircraft noise [compared to the ANB], with an increase in the problem of avoiding other types of sounds when undertaking measurements. It is not necessary to assess compliance at both ANB and OCB to give full effect to NZs6805:1992. There are difficulties in monitoring compliance by attempting to do so.

See recommendations on page 27 of the main report

Provision For Noise Sensitive Activities in OCB

Generally support the premise that new activities sensitive to aircraft noise be a non-complying activity in the OCB not prohibited. However the plan provisions classify new Aircraft Hanger Dwellings established in the OCB as discretionary which is contrary to proposed Rule 10.14.2 which classifies establishing activities Sensitive to Aircraft Noise in the OCB as a non-complying activity. This appears internally conflicting within the Plan and appears inconsistent with the approach of NZS6805:1992.

Acoustic Insulation Specification

Support the requirement for acoustic mitigation as mitigation measure, however it is the method of specifying this insulation that is inconsistent with best practice in relation to the underlined text of the currently proposed insulation rule wording "acoustic insulation to ensure that noise does not exceed L_{dn} 40 dBA in any habitable room with all doors and windows shut."

Issue 1: Use Of Measured Indoor L_{dn} Level

- Clause 6.2.1 1 of NZ Standard NZS6801:2008 *Acoustics – Measurement of Environmental Sound* recommends "*Measurement of sound received inside a building is not recommended if the sound source is outside the building*" This Standard refers to ascertaining acoustic performance of buildings housing noise sensitive activities using the ISO140 series of Standards e.g. ISO 140 *Acoustics – Measurement of sound insulation in buildings and of building elements - Part 5: Field measurements of airborne sound insulation of façade elements and façades*. These preferred type of ratings guide directly on the amount of sound reduction to be achieved by the building envelope, which is what Council's and users of the insulation rule need to know.

- In addition, NZS6802:2008 sets out best practice for managing noise at section 8.3 which refers to specifying insulation a in accordance with ISO 140-5:1998 and ISO 717-1:1996, both of which are widely used to specify acoustic performance of the building envelope [which is preferred as opposed to the proposed wording which sets indoor decibel limit for aircraft noise to be complied with].

- By specifying acoustic insulation using indoor decibel limits [as proposed] Council has no certainty reasonable indoor acoustic standards are achieved in practice because there are no standardised guidance provided in the District Plan or elsewhere on the amount of external sound level against which the building must act, consequently there is no guidance provided to building owners, engineers or architects on how well the building envelope needs to perform acoustically.

- A key area for Council is assessing compliance [where necessary] once the acoustically insulated building has been constructed. If compliance with indoor sound limits is to be checked, it seems logical that indoor measurements should be performed. However the airport noise contours anticipate growth in aircraft noise over 30 years. On what day should the measurement be performed, now or in 30 years time. Also, in practice there are major problems with sound measurements taken indoors as the sound meter cannot distinguish between outdoor sounds generated from road traffic, sounds from aircraft flying or engine testing. In reality, compliance checking against insulations Standards specified using an indoor Ldn decibel limit are clumsy and neither practical nor workable.

- One of the major problems using decibel limits that apply indoors when specifying insulation is the

potential inequity associated with risks of non-compliance. This risk appears to be wholly left with Council and the person or persons designing or building the building. The noise maker does not have to promote any specific standard of building to be achieved, unlike say where a certain standard of thermal insulation is required. This appears poor practice as it means the airport company responsible for making the noise in the first place have provided little or no assistance to building owners or designers, yet under the RMA it is the person who creates the noise that has a duty of care to manage noise emissions in accordance with the Best Practicable Option. Part of this duty should be to advise those parties lawfully establishing noise sensitive activities nearby as to the degree of noise attenuation that will be required in a new building to address the nature and scale of the anticipated noise emissions.

ISSUE 2: Windows & Door Closed

- Best practice is to address sound rating of the habitable room against external noise whilst dealing with sound entering the habitable rooms via ventilating windows, where these windows are the means by which the space is ventilated. NZS6801:2008 recommends at Clause 6.2.2 that acoustic insulation be assessed with windows open where ventilation relies on open windows. It is no longer appropriate to cause the occupants to choose between noise from outdoors or adequate ventilation of the indoor space.

Engine Testing Noise Limit

ISSUE 1: Noise Unit

The proposed wording regulates noise from aircraft engine testing using Daytime: LAeq[15 hours] and Night time: LAeq[9 hours]. These "long term" LAeq averaging periods of 15 and 9 hours are inconsistent with the recommendations of NZs6802:2008 which require and allow for elevated single noise events that may unreasonably disturb sleep or communications/ amenity during daytime. For example, the 15 hour and 9 hour Leq levels are equivalent to;

DAYTIME $L_{Aeq\ [15\ hour]}$ 55 dB is equivalent to:	
102 dB for	1 sec
92 dB for	10 seconds
75 dB for	10 minutes
67 dB for	1 hour
55 dB for	15 hours

NIGHT TIME $L_{Aeq\ [9\ hour]}$ 45 dB is equivalent to:	
90 dBA for	1 sec*
80 dBA for	10 seconds
62 dBA for	10 minutes
55 dBA for	1 hour
45 dBA for	9 hours

Note* It is noted this 1 second sound level would be non-compliant with the proposed night time single limit of L_{AFmax} 80 dB.

The proposed L_{AFmax} limit of 80 dB exceeds the recommendations for night time single event sounds found within NZS6802:2008 which recommends a limit of no greater than 75 dB as a guideline for the reasonable protection of health and amenity associated with use of land for residential purposes.

Overall, the proposed engine testing rule allows the L_{Aeq} sound level to be averaged over a too longer time period, potentially allowing high levels of single events of engine testing noise at residential sites with potential adverse effects.

The recommended wording below are based on 2 hour L_{Aeq} periods [which restricts the ability to generate high levels for short time periods, as above] while the night time L_{AFmax} limit is lowered to achieve conformance with the night time recommendations of NZS6802:2008.

See recommendations on page 27 of the main report

No person shall start or run an aircraft propulsion engine for the purposes of aircraft engine testing unless carried out in compliance with the following maximum noise levels within the notional boundary to any dwelling in the rural zone or within the boundary of any residentially zoned site:

Monday to Sunday 7.00am to 10.00 pm	*55 dBA $L_{eq[2\ hours]}$*
All other times	*45 dBA $L_{eq[2\ hours]}$*
All days 10 pm to 7 am	*75 dBA L_{max}*

ISSUE 2: Noise Assessment Location

Engine testing noise is proposed to be regulated according to the amount of this noise received "...*at the notional boundary of any site zoned rural*". This should be changed to "...*at the notional boundary of any dwelling in the rural zone*" in order to be consistent with NZ Standards and "best practice".

See recommendations on page 27 of the main report

[End]