

# Assessment and regulation of environmental noise – an Australian and New Zealand comparison

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## ABSTRACT

A substantial portion of the work undertaken by acoustic consultants in both Australia and New Zealand involves the assessment of noise in the environment – be it from general industry, commerce, domestic, road/rail/aircraft traffic or a myriad of other sources. This paper provides a brief comparison of both statutory regulations and general duties of care applicable in the two countries. The paper also investigates the implications these have not only on the approach to objective assessment of environmental noise, but also a comparison of the impact on the various parties involved in the process – the generator of the noise, the receiver of the noise, and the requirements and responsibilities of the acoustic consultant.

## INTRODUCTION

This paper is intended to provide an overview of the approach to environmental noise taken by Australia and New Zealand. It is *not* intended to be an intense scrutiny of either country's environmental noise policies; rather, it will explore the differences and similarities uncovered between the two countries, and possible implications of these.

This paper is also not a technical comparison. It includes as much the author's personal observation and opinion as it does direct comparison of actual policies.

The author acknowledges that the approach taken here is by necessity a generalisation, and that there will be exceptions to many of the generalisations made. Specific examples of policies and procedures will, however, be introduced by way of illustration.

The ultimate aim is to engender thought and discussion, and to make people think twice about the implications of the rules and guidelines which so many of us involved with environmental noise take for granted in our day-to-day working and personal lives.

### Exclusions

This paper is not intending to address all sources of environmental noise. The following are excluded from the paper due to the vast body of discussion which would otherwise be required :

- Traffic (road, rail, aircraft) noise
- Wind farms
- Music noise
- Specific environmental sources – gas guns, bird scarers, frost fans
- Construction noise
- Occupational noise

## COMMONALITIES

### Community / Individual health

It is worth briefly stepping back to see the bigger picture which is often forgotten when dealing with the details of environmental rules and guidelines. It should be remembered that the reason for having such rules and guidelines is to pro-

tect and preserve the health and wellbeing of individuals, and even more broadly, of communities.

Irrespective of the specific rules or processes for noise assessment, those who make, enforce and apply the rules are driven by the same ideal. All these entities are really aiming to establish an approach which is in the best interest of the individuals or communities which they are serving.

Therefore, rather than argue about what the differences are, perhaps we should be concentrating on what the differences mean for those affected by the rules and guidelines in place.

### Importance of noise sensitive areas

The approach taken by both countries is that the amenity of private residences, and the provision of appropriate educational facilities, is of the highest importance with respect to control of environmental noise.

It is recognised that the individual's ability to relax in their private home is crucial to their personal wellbeing, and ultimately, that of the general community. Similarly, the ideal that education is paramount to personal and community growth is acknowledged by the stance taken that students should be safeguarded from external disruption to their learning.

To this end, most Australian and New Zealand noise policies are directed at preservation of appropriate noise levels in "noise sensitive areas", incorporating permanent residential, educational, hospitals and residential health care facilities, generally having the more stringent noise criteria and often having regard to internal noise levels as well as external.

The degree to which environmental noise impacting other activities is addressed – such as temporary accommodation, social, commercial and industrial premises – varies more significantly, possibly reflecting the diversity of physical and economic environments in which such premises are situated. For example, commercial areas may be described in Australian noise policies by a single noise criterion applicable for any commercial area, or may be separated into areas with different uses such as mixed commercial/residential, or commercial/industrial; or by type of commercial premises such as shopping precinct as distinct to a business precinct.

## Noise from proposed development

Although the practical government of environmental noise is by different parties of the two countries (as discussed later in this paper), the process for assessment of potential noise impacts from proposed developments is quite similar. Generally, the process of development application (Australia) or resource consent (New Zealand) requires that the proponent demonstrates that the development achieves the defined noise criteria for the area and does not constitute a significant loss of amenity to adjoining receivers, before the development will be approved.

The issue of “reverse sensitivity” is also gaining strength in both Australia and New Zealand – noise sensitive developments proposed for locations where the existing environmental noise may be significant, are increasingly being required to show that their design provides for a suitable level of amenity for future occupants. This is becoming apparent particularly for residential developments adjacent significant roads or in inner city areas.

### Defined rules

The obvious commonality in approach between Australia and New Zealand is the fact that each has developed sets of formalised rules, standards, conditions and regulations. While this seems an overly simplistic observation, the importance of having such systems in place warrants revisiting.

All parties involved need consistency.

Those exposed to environmental noise need to know that they are all treated equally, that nobody receives preferential treatment if the same rules and conditions apply to all.

Those generating noise need to know what is expected of them, and need a common guide as to how to show responsibility to the community.

Those enforcing and applying environmental noise rules need to know that they are acting without bias by working within a set of rules which represent the best interests of the community in general.

### Overriding legislation vs. guidelines

Finally, it is useful to recognise that both Australian and New Zealand environmental noise is governed at two levels – an overriding piece of legislation supported in practice by a regulated authority. Although the exact roles of each of these vary between the two countries, the general approach is common.

In Australia, the various state Environment Protection Acts outline the general duties of care and legislative framework for (amongst other things) environmental noise, while specific regulations are given in a series of policy, guideline or regulation documents which are themselves enforceable but subject to interpretation by the relevant state government.

In New Zealand, the Resource Management Act is the defining document which outlines the general requirements for the protection and sustainable management of the environment, including (amongst other things) environmental noise; the city, regional and district councils are responsible for setting and enforcing the environmental noise rules within their district and regional plan documents.

In both countries, the regulatory documents refer to the provisions of the overriding legislative document and will default to the higher authority when required.

## DIFFERENCES

### Who sets the rules

The first major difference noted between the environmental noise policies of Australia and New Zealand is who generates them.

As described briefly above, in Australia the specific regulations are generally determined by the state government environmental department (particularly WA, SA, Qld, Vic, NSW). Hence there is only a small number of documents which describe the general environmental noise criteria and assessment guidelines for the entire country.

New Zealand, on the other hand, has its environmental noise policies defined by each and every city, regional and district council. This results in around seventy different documents, each with its own unique layout, criteria and methods.

On face value, the Australian system appears to be the simpler and more cohesive approach, having a single document and set of rules covering an entire state, such that all similar noise-generating premises within that state are required to achieve to the same environmental noise criteria, and every similar receiving premises can demand (and expect) the same level of amenity.

By comparison, the New Zealand approach appears fragmented and disjointed, with dozens of differing documents with dozens of differing criteria for the same receiver type, all within a very much smaller country. The documents themselves are so varied that to extract the noise criteria and guidelines for any given location is no mean feat.

However, this could be seen from a different perspective – that of connection with the community.

Although each Australian state has a single document with a single set of guidelines, the state government for each is such a large body with such a vast responsibility that it cannot possibly anticipate the implications of the single set of criteria on all the situations in which they might apply. For example, the application of a “commercial” area classification in a small country town is likely to have quite different implications for environmental noise than a “commercial” classification in a large city. Special areas or circumstances may be difficult to accommodate with a generic policy.

For the New Zealand situation, however, a council area is much smaller, and the council therefore has the ability to provide guidelines and criteria which are better suited to specific activities within the community. For example, a regional town might wish to maintain a rural character for its town centre, and the council is able to impose appropriate environmental noise requirements to achieve this which are different to a standard “commercial” town centre in another town also within its jurisdiction.

The responsibilities of the Australian state government environmental bodies are far-reaching, and therefore the ability to make sweeping environmental noise reforms is within their capabilities. For the New Zealand case, change can only be made at council level, and the benefits of a reform will be felt no further than the council boundaries.

In this respect, however, the council-regulated environmental noise may be advantageous, in that change is likely to be easier to make – the process of change for a large state government is more cumbersome and protracted than that for a much smaller council governance.

## Complaints

The onus of responsibility for responding to complaints and addressing general issues of environmental noise in New Zealand also rests on the shoulders of the relevant council. In general, councils have a 24-hour complaints line, attended during normal working hours by council staff, and by contractors outside these hours.

Staff attend complaints sites, assess whether the complaint is valid (i.e. whether the relevant criteria are exceeded or the annoyance is justifiable), and take action if required, usually an order to cease operation of the offending source. This is apparently equally applicable to domestic, commercial or industrial noise sources. The police may become involved if the action requires confiscation of equipment.

As they are alerted directly to any issues arising from complaints, the council is likely to have a good idea of what is happening within its boundaries, and where its energies might best be spent in terms of abatement and control. The speed of response to a complaint may be reasonably fast given that the response comes from a local organisation. There may be, however, the potential for personal involvement of the council staff as both the source and receiver are members of the local community.

The point of contact for environmental noise complaints in Australia is quite varied but is generally separated into three main complaint types. For domestic noise such as dogs barking the offended party may contact their local council; "people" noise such as loud parties, revving cars etc are usually addressed directly to the police; all other noise sources, be they industrial, commercial or other domestic such as lawnmowers or air conditioners, are referred to the state government environmental body. The environmental body is then responsible for the issuing of abatement or cessation orders, and also seeing them through to resolution.

The environmental bodies, seeing a significant proportion of complaints, are in a position to have a good overview of recurring issues affecting its population, and therefore identify where policy development for areas beyond only noise control might be of value. However, being a state body, its resources are required to serve a vastly greater number of issues than would be seen by a council, and may therefore be somewhat stretched. It must also be in a position, both in terms of its responsibilities and also of its political standing, to respond to all issues equally and without bias.

## RULES AND DESCRIPTORS

This paper has, until now, been somewhat of an overview to the approach to environmental noise taken by Australia and New Zealand. However, the use of the developed policies in carrying out an environmental noise assessment is typically objective, and so we now delve into the specific rules and descriptors used in the two countries.

### Location / zone

Most of the noise rules relate back to location – the siting of the source, the position of the receiver, and the locality in which the two exist.

Generally, the New Zealand environmental noise policies refer to the zoning of the receiver location in defining the applicable criteria – noise levels to be achieved by the generator of the noise are defined by the zoning of the affected property, and are to be met at the property boundary.

The Australian noise policies vary somewhat in the wording of the rules and calculation of criteria in relation to location, however in general the noise criteria are defined by the existing use of the area in which the receiver is located, rather than strictly by the zone it is in.

The implication of this difference is most striking where a noise sensitive premises is located in an area of mixed use – for example if a residence were located immediately adjacent a commercial zone. Under most New Zealand policies the "residential zone" criterion would still apply; however, under most Australian policies, the influence of adjacent non-residential uses would have an impact on the noise criteria to be applied, with the criteria level somewhat relaxed.

### Influence of existing noise environment

Following on from this idea of influence from adjoining zones, the consideration of existing noise environment is also treated differently between the two countries.

In general, the existing noise environment is not considered in defining the criterion noise levels to be achieved at the boundary of a noise sensitive property in New Zealand.

Most of the Australian noise policies, on the other hand, make specific reference to existing background noise levels in the area in which the receiver is located. The method in which this is applied, however, varies for a direct "background plus" approach, to an assessment of background levels in terms of low, neutral or high with respect to an assumed background level. The approach in WA is slightly different – it does not allow for measuring background noise but its assessment method takes into account areas of existing high-noise use such as industry, local transport corridors etc.

Generally, this background-related criterion is used to provide for a realistic noise criterion where existing noise levels are already high with respect to the scheduled criterion level; it may also be used to justify a more stringent criterion where the existing noise environment is very quiet and to apply a scheduled criterion is considered likely to affect the existing amenity of noise sensitive receivers in the area.

### Time frames

As well as the provision for zone or land use, both Australia and New Zealand differentiate between time periods when defining appropriate environmental noise criteria.

However, this is where significant variations arise, not just between the two countries but within each country.

The simplest distinction which is made is between day time and night time. Generally, the day is defined as being between 7am and 10pm, but this varies from anywhere from 6am to 9am for the beginning of the day, and from 6pm to midnight for the end of the day.

The more complex division is to include a shoulder period, most often referred to as the "evening" period. This is generally defined as being between 6pm and 10pm, however this also varies, in some instances incorporating Sundays and/or public holidays.

Although the issue of time-dependent environmental noise rules carries such a range of approaches across the two countries, it appears that the council-driven arrangement of New Zealand allows specific neighbourhood requirements to be considered.

## Descriptors

When browsing through the relevant environmental noise documents, another significant difference becomes apparent – the descriptor used to define ambient and imposed noise levels.

Essentially, for general environmental noise assessment, New Zealand uses the  $L_{A10}$  descriptor, and Australia the  $L_{Aeq}$  descriptor. (The main exception to this is that Western Australian noise regulations refer not to the  $L_{Aeq}$  but instead to both an  $L_{A10}$  and an  $L_{A1}$  descriptor.)

This discrepancy appears to raise significant questions about the validity of each descriptor – for example :

- Over what period of assessment is the  $L_{Aeq}$  to be determined in order to provide a representative average?
- Over what period is the  $L_{A10}$  to be measured to be meaningful and to correctly capture the noise source?
- How are short-term noise sources adequately accounted for with an  $L_{Aeq}$  descriptor?
- When calculating the noise impact from a site with multiple sources, how can the statistical  $L_{A10}$  source outputs be summed to provide an overall noise level?

## Sleep disturbance

It should be noted that both countries utilise the  $L_{Amax}$  descriptor for assessment of short-term noise levels on sleep disturbance.

Most of the New Zealand environmental noise rules specifically include an  $L_{Amax}$  criterion value, although it is not always identified as being related to sleep disturbance.

On the other hand, the Australian noise policies (with the exception of Western Australia) do not include any  $L_{Amax}$  criterion values, nor do they specifically address sleep disturbance. It is, however, becoming common practice to refer to the World Health Organisation (WHO) guidelines for sleep disturbance in assessment of the impact of environmental noise sources on residential amenity.

## Reference to Standards

Australian noise policies generally refer briefly to the relevant standard for environmental noise measurement (AS 1055.1 – 1997). However, most reiterate the preferred methods within the text of the documents rather than expect that, in using the policy, the standard is independently referred to.

By comparison, most New Zealand noise rules include little in the way of measurement method; rather, they point directly to the relevant national standards for environmental noise measurement. In particular, the manner in which noise character is to be accounted for is addressed within the standards.

The implications of this is that, despite there being dozens of individual city, regional and district council noise regulations, the method for measurement and assessment of envi-

ronmental noise in New Zealand is well defined and consistent throughout the country.

## SUMMARY

A brief investigation has shown that there are many differences between the Australian and New Zealand approach to assessment of environmental noise – who sets the rules, how complaints are dealt with, where the rules are applied, when the rules are applicable. However, the overview shows that, despite these many differences, the ultimate aim of both countries is to best represent the noise environment under assessment and to protect the amenity of those affected by environmental noise.

## REFERENCES

- Auckland City Council, City of Auckland – District Plan – Isthmus Section, 1999 (updated 2006)
- Australian Standard AS1055.1 – 1997 Acoustics – Description and measurement of environmental noise, Part 1: General procedures
- Berglund, Lindvall & Schwela, 1999, *Guidelines for Community Noise*, World Health Organisation, Geneva
- Christchurch City Council, *Christchurch City Plan*, 2005
- Dunedin City Council, *Dunedin City District Plan*, 2006
- Department of Environmental Protection, Western Australian Environmental Protection (Noise) Regulations, 1997
- Environment Protection Authority Victoria, State environment protection policy (control of noise from commerce, industry and trade) No. N-1, 1989, Victoria Government Gazette
- Franklin District Council, *Franklin District Plan*, 2000
- Hamilton City Council, *Proposed District Plan*, 2006
- Hastings District Council, *Hastings District Plan*, 2003 (updated 2005)
- Opotiki District Council, *Opotiki District Council District Plan*, 2005
- New South Wales Department of Environment and Conservation, *New South Wales Industrial Noise Policy*, 2000
- New Zealand Standard NZS 6801:1991, Acoustics - Measurement of Environmental Sound
- New Zealand Standard NZS 6802:1991, Acoustics - Assessment of Environmental Noise
- North Shore city Council, *District Plan*, 2002 (updated 2005)
- Papakura District Council, *Papakura District Plan*, 1999
- Porirua City Council, *Porirua City District Plan*, 1999
- Queensland Environmental Protection Agency / Queensland Parks and Wildlife Service, *Guidelines – Noise : Planning for Noise Control*, 2004
- Rotorua District Council, *Rotorua District Plan*, 1996
- Stratford District Council, *Stratford District Plan*, 1997
- Taupo District Council, Taupo Proposed District Council Plan, 2005
- The South Australian Government Gazette, Environmental Protection (Industrial Noise) Policy 1994, 1994
- The South Australian Government Gazette, Environmental Protection (Machine Noise) Policy 1994, 1994
- Waikato District Council, *Waikato District Plan*, 1995
- Wellington City Council, *Wellington City District Plan*, 2000