

ON ENVIRONMENTAL NOISE IMPACT ASSESSMENTS: AN ALBERTA PERSPECTIVE

Corjan Buma, M.Sc., P.Eng.

aci Acoustical Consultants Inc., #107, 9920 – 63 Avenue, Edmonton, AB, T6E 0G9
corjanb @ aciacoustical.com

1. INTRODUCTION

“Is it realistic, let alone workable, to expend (possibly-great) effort in compiling a set of guidelines on environmental noise impact assessments, applicable on a national scale, in Canada? The population density ranges from one person per hundreds of kilometres to thousands per one square kilometre, and the range on human experience and expectations is no less divergent.” The challenge is acknowledged, but consider the following ...

2. THE RECEPTOR

100+ years’ experience with quantifying human response to auditory stimuli has yielded some very consistent and specific results. For example, (a) a 40-dBA, non-tonal ambient sound in a residential yard is acceptable to most people (b) a 30-dBA broadband ambient but with prominent 60-Hz tone would likely be deemed “annoying” by most (c) 50-STC is statistically acceptable to most people as suite-to-suite airborne sound isolation in a multi-unit building and (d) it’s “noise” when I haven’t been invited to the party. The Fletcher-Munson curves are an early example and all modern academic research an on-going affirmation of the high degree of uniformity in human response to noise. Acknowledging that there are always exceptions for any number of reasons, there is high consistency in how humans respond to noise.

This underlies virtually all noise legislation/guidelines/safety-codes worldwide to date. The EU has drafted its Noise-Control Directive and mandated that all Europe be noise-mapped by 2007. The WHO has extensive documentation casting noise as a health effect. Even the National Building Code of Canada requires a **rated** STC-50 between adjacent suites in a multi-unit building and a **rated** STC-55 between suite and higher-noise area. Similarly, CMHC has set an L_{eq} -24hr of 55 dBA as its criterion in outdoor residential amenity space.

3. IN THE CROSS-HAIRS: “ALBERTA”

Considering the experience with environmental noise in Alberta provides good examples of chaos and success.

In Alberta the energy sector is the only industry where specific legislation has been compiled on a provincial basis governing environmental noise. Other over-riding provincial legislation permits regional jurisdictions to draft noise legislation as they see fit and even defers to such legislation, especially if this more stringent. As to this type of community noise legislation: many towns and municipalities have gotten as specific as “do-not-annoy-your-neighbor” legislation, while the legislation of some urban areas actually requires meeting certain sound level metrics. Over against that, a late-90’s re-write of one City’s “Noise Bylaw” was declared by a Court-of-Law as being insufficiently specific, while in another, a meeting in early-2004 between Consultants and City-Administrative staff disclosed a profound resistance to updating the Noise Bylaw from its current 1970’s formulation. (In the latter example, it was indicated that the current formulation is strongly preferred because it allows the City-representative conducting a measurement the discretion to declare a result in compliance or in violation of the Noise Bylaw.)

One example involving urban traffic noise legislation: if the Administration of an urbanized area decides to institute “trigger” legislation, typically, the trigger sound level is set so high (e.g. 24-hour L_{eq} sound level of 65 dBA) that action need not be taken “in our lifetime” (this particular example being for introducing noise-attenuation devices along existing roadways adjacent to existing communities).

As a few industry noise examples: a sawmill, because it is not involved in generating or processing “energy”, is not governed by the provincial (energy-) noise directive. However, when that sawmill decides to add a co-generation unit, the new co-gen unit is required to comply with the energy-noise directive. The energy-noise directive was early on, by collective decision, chosen to be a “receptor-based” directive. Thus, on the assumption of a residence at some distance from an energy-facility, the resultant sound level at the residence due to the facility may not exceed a context-dependent specific value (typical default of 40 dBA, night-time L_{eq}). Further, in the absence of residences the facility owner must design for 40 dBA at 1.5 km. However, if an agricultural representative (i.e. farmer) decides, because of good weather, to continue harvesting operations within 200 meters of a village boundary such that the resultant L_{eq} -Night within the first row of homes is in the speech-interference range (60+ dBA), there is no provincial

noise legislation governing such activity (whether the regional do-not-annoy legislation applies across a boundary would necessitate involving legal advice). As one final example, in an area with multiple types of heavy industry, compliance with noise legislation is required of a refinery but not of an equal-or-larger chemical plant to which some not-yet-processed energy by-products are pipe-lined.

The intent thus far in this section has been to underscore a few very real examples of existing discrepancies in noise legislation. Interestingly, Alberta's energy industry has quite cooperatively participated in establishing and promoting this legislation, in spite of there being an "un-level playing field". True, there are enough instances where resolution over noise between industry and land-owner has been difficult to achieve. Sometimes resolution has been achieved only by adjudication by Provincial representatives or in the form of a land-owner choosing to move away in frustration. However, in the majority of cases the energy industry has introduced engineered noise control to achieve compliance. Experience has shown that of all the "tweaks" introduced in updating the Directive since 1988, the Permissible Sound Level grid has not been adjusted (suggesting this grid assesses typical human response quite adequately). Further, Consultants routinely apply the methodology of the energy-based noise Directive as a design tool in all manner of non-energy application. Those administering the energy-noise Directive report being frequently contacted as to whether it can be enforced in other areas. Alberta's energy noise directive is a good example of a legislative noise management tool that has achieved a high degree of success in balancing the needs of one industry with residents' quality-of-life.

4. TOWARDS NATIONAL ENIA-GUIDELINES

Given that we human receptors generally respond to noise in the same way, and given the example of a successful legislative noise management tool, it is considered that there is merit in establishing a national base-line by means of environmental noise impact assessment guidelines. Some deemed advantages are: (a) nation-wide consistency (b) more-level playing field (all industries treated alike) (c) function as a target in setting basic sound levels (similar to aspects of National Building Code) and methodology to achieve them (d) assist towards a better-informed and more-equally informed public (e) provide a tool for other levels of government to set their own context-specific criteria (f) ...

In developing such a set of Guidelines it is suggested to consider, among others, at least the following items (no prioritization implied). (1) Whether environmental noise is (implied to be) an issue of quality-of-life vs. health; while these are related the latter would require a more conservative approach. (2) How much latitude to allow for

differences of context (provincial vs. regional; rural vs. urban; pristine vs. more-developed) and receptor sensitivity (do the Guidelines assume only "typical human hearing"? do they allow for differences in human hearing? do they reference noise impacts on wildlife and/or domestic animals?). (3) Is pre- or post-commissioning noise monitoring suggested, recommended or required? (4) What tolerance on instrumentation (defer only to commonly-accepted standards? frequency of re-certification of equipment? re-certification to what degree? on-site calibration?)? (5) If on-site noise monitoring is conducted, what are the limits on atmospheric conditions to obtain valid data? are weather-data a required part of a noise monitoring? is a different approach required in winter vs. in summer? (6) Operation vs. construction phases of a project. (7) Fixed-asset vs. associated-traffic noise levels permitted. (8) To what degree do the Guidelines constitute "legislation"? (9) What guidance is there to a proponent on absence-of-complaint developments vs. a specified complaint situation? (10) To whom does a noise-affected person complain? (11) Is there a grading of type-of-assessment: do some applications require only a broadband analysis, some a logged-spectral analysis and some a spectral analysis with audio-recording? (12) How do the Guidelines account for low frequency noise ("LFN"), both as to the reduced human sensitivity for and reduced tolerance of LFN? (13) Why do we want/need a set of specifically-Canadian Guidelines: why not just adopt a WHO, ISO or American Guideline? (14) When is computer-modeling suggested, recommended or required? which software is acceptable? (15) Are there certain circumstances that require "grand-fathering"? (16) Do the Guidelines reference associated non-noise social issues? (experience repeatedly shows that noise is often used as an easy front for other issues). (17) Establish clearly what noise metrics are used and why. etc.

REFERENCES

Alberta Energy and Utilities Board (1999). "ID99-8 Noise Control Directive" and "Guide G38 User Guide" (available at www.eub.gov.ca)

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