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Office of the Director

PROPOSED COMMUNITY NOISE CONTROL REGULATIONS
FOR OAHU (CHAPTER 44B)

Statement for the Department of Health
Public Hearing, May 16, 1975

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This statement is presented on behalf of the Environmental Center with the approval of the Center Director. It does not, however, represent an institutional position of the University of Hawaii or the Department of Mechanical Engineering.

Part 342-42, Hawaii Revised Statutes, specifically provides that the Director of Health shall "prevent, control, and abate" excessive noise in Hawaii. Section 342-41 defines excessive noise as sound which "... endangers human health, welfare or safety, animal life, or property or which unreasonably interferes with the comfortable enjoyment of life and property ... ."

Taken in its entirety, the subject draft regulation (hereafter called draft) will make it difficult, if not impossible, for the Director to meet the statutory requirements with respect to community noise. The purpose of this statement is to identify and discuss some necessary changes and additions to the draft.

The Department of Health has a difficult task. No simple, easy-to-implement regulation is likely to succeed. On the one hand are the legitimate desires of many people for relief from noise levels that unreasonably interfere with their comfortable enjoyment of life and property. On the other hand are the many people whose livelihoods or whose enjoyment of life and property depend upon the operation of devices which create sounds of various types. The real problem is not to eliminate noisy operations nor to let them all continue without change. It is to find a balance. The sole criterion that ultimately applies is "what is in the public interest." This, in turn, can only be a matter of judgment. Chapter 342, Hawaii Revised Statutes, clearly places the responsibility for making such judgments with the Director of Health.
A successful regulation must be based on a viable philosophy of noise control. Another way of saying this is that the process by which the public interest is to be judged should be identified before a regulation is placed in effect, not afterwards. In this reviewer's opinion, the major deficiencies in the subject draft result from absence during its preparation of a carefully articulated philosophy of noise regulation. The draft creates the impression that its parts were patched together from a number of sources rather than being carefully assembled to achieve the required objectives.

There are two major philosophies of noise regulation. They involve two quite different ways for judging what is in the public interest.

One philosophy is based primarily on the concept that most existing activities are essential to the public interest. The reasoning is that they should therefore be allowed to continue without interruption except where the noise levels created are clearly high enough to elicit significant public reaction. The result is that standards for excessive noise are initially set high (i.e. they are lax), and sound levels are allowed to increase until the public becomes aroused. Regulations based on this philosophy have the advantage of administrative simplicity. They have the disadvantage that they do not protect the public health and welfare.

Taken as a whole, the subject draft is of the type just discussed. The definition of excessive noise (Sec. 2.17) makes the proposed standards in Tables 1(A) and 1(B) inoperative. The statement on ambient noise immediately following Table 1(B) has the same effect. They make the draft ineffective.

Another philosophy is to set standards for excessive noise on the basis of their impact on people (and other living creatures). Hearing loss, speech interference, and sleep interference are the primary effects of excessive noise. Emphasis in setting standards is placed on protecting the public health and welfare. Application of this philosophy is likely to result in setting stringent standards for excessive noise. Administrative machinery is required to allow relief to those whose activities produce excessive noise, where these activities are in the public interest. This relief is allowed by HRS Sections 342-6 (Permits) and 342-7 (Variances).

The careful development of procedures and conditions for granting permits and variances is a vital part of the administrative machinery required to make a noise regulation effective. By means of these procedures and conditions, the Director can reasonably be expected to discharge his statutory obligation to judge what is in the public interest. They allow him to consider the rights of all in reaching a decision. The stringent standards remain untouched. It is their application that is relaxed where and when the public interest is served by doing so.

It is important to realize that adoption of a strict standard is not equivalent to a prohibition of excessive noise. A strict standard is simply a mechanism which identifies what is allowable without special consideration. For activities which create noise in excess of strict standards, both noise producers and noise receivers are placed on public notice that their legitimate claims will be subject
to an administrative action. The purpose of this action is to find a compromise which best meets the needs of people in both groups.

The draft is totally silent on the use of permits, and mentions variances only briefly in Sec. 3i. It therefore does not adequately provide for this important mechanism in abating and controlling noise. It is worth noting that the existing Chapter 44A of Public Health Regulations, "Vehicular Noise Control for Oahu," has identified procedures and conditions for granting permits and what amounts to variances. This material could be used, with minor modifications, in revising the draft.

A regulation which can be successfully used to prevent, control, and abate community noise is necessarily complicated. There are several conflicting and interrelated requirements that must be considered in identifying what is in the public interest. These requirements relate primarily to (a) the character of community noise, (b) the protection of public health and welfare, (c) the costs to noise producers, receivers, and monitoring agencies, and (d) the methods and equipment available to monitor, prevent, control, and abate noise. Although the draft does address some aspects of these requirements, it does not, in this reviewer's opinion, sufficiently distinguish and articulate them.

The character of community noise is set by the sound emission characteristics of all audible noise sources. These emission characteristics are of two general types: steady and random.

Steady noise sources are characterized by sound levels which fluctuate only by small amounts during the time the source operates or which occur in repeatable patterns. Examples are electrical transformers, air conditioning equipment, and internal combustion engines operated at constant speed. Steady noise sources can be further distinguished as being in a fixed location or as mobile (e.g. lawn mowers). In all cases, it is possible to identify maximum noise level specifications for such equipment by type and some aspect of performance (e.g. power rating).

The U.S. Environmental Protection Agency has initiated a program to identify appropriate and reasonable noise level standards for various products pursuant to its mandate under the Noise Control Act of 1972. Under the terms of this Act, the Administrator of the EPA is required to certify those that are low-noise emission products. The Act provides that certified low-noise emission products shall be acquired for use by the Federal Government where the procurement costs are no more than 25 percent greater than the least expensive product for which they are certified substitutes. The draft should be amended to take advantage of the Federal program and to require similar implementation at the State and County levels in Hawaii for all noise sources that can be characterized as steady.

The sound levels emitted by many sources important to community noise vary from instant to instant so much that they can best be described by statistical measures. Examples are wind and surf noise, people talking, and noise from many passing vehicles. The average sound level is usually called $L_{50}$, the sound level exceeded 50% of the time. $L_{95}$ is that exceeded 90% of the time; and $L_{10}$ that exceeded only 10% of the time. In a typical suburban residential community, one might have an $L_{50}$ of 51 dBA, with an $L_{95}$ of 45 dBA and an $L_{10}$ of 70 dBA. The expected normal span of sound levels for about 59 minutes of each hour is thus about 25 dBA.
To try to impose a standard for excessive noise in the form of a maximum sound level, such as 60 dBA (Table 1(A)) thus ignores the statistical nature of normally acceptable noise in a community. The draft attempts to bypass this problem by exempting some kinds of random noise source (e.g., Sec. 3b, 3g, 3h, and 4k) and by clarifying applicability of the excessive noise standards to another (e.g., Sec. 31).

The reviewer assumes that the primary responsibility of the State Department of Health is to protect the public health and welfare. He assumes that the Department is concerned with the legitimate needs of the people of the State for economic benefits, but that the Department will not knowingly place public health and welfare in jeopardy for any reason.

Whenever protagonists of economic development and environmental conservation meet, there will always be areas of dispute. The range of noise levels which can be allowed while protecting the public health and welfare is one of these areas.

We are fortunate that the U.S. Environmental Protection Agency has recently published "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety."* For outdoor activities, the levels identified in this document can be summarized as follows:

<table>
<thead>
<tr>
<th>Effect</th>
<th>Level</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hearing loss</td>
<td>( L_{\text{eq}}(24) \leq 70 \text{ dBA} )</td>
<td>All</td>
</tr>
<tr>
<td>Speech interference and annoyance</td>
<td>( L_{\text{dn}} \leq 55 \text{ dBA} )</td>
<td>Where people spend widely varying amounts of time or outside populated residences.</td>
</tr>
<tr>
<td>&quot;</td>
<td>( L_{\text{eq}}(24) \leq 55 \text{ dBA} )</td>
<td>Where people spend limited amounts of time, such as school yards, playgrounds, etc.</td>
</tr>
</tbody>
</table>

There is a very important difference between the levels identified by the EPA and those identified in the subject draft regulation: the EPA levels are energy equivalent levels, those in the draft are maximum levels. The principal effect of this difference is that energy equivalent levels allow automatically for the characteristics of steady and random noises.

For a steady noise, \( L_{\text{eq}} \) and \( L_A \) (sound level, A weighted) are the same. Thus the EPA levels are 5 dB \( \text{eq} \) more stringent for steady noise than the 60 dBA levels in Table 1(A) of the draft regulation.

It is pertinent to note that an \( L_{\text{eq}} \) of 55 dBA for steady noise is about 5 dB less stringent than the corresponding existing noise performance standard in the Comprehensive Zoning Code of the City and County of Honolulu, while the

60 to 65 dBA levels in Table 1(A) of the draft regulations are about 10 to 15 dB less stringent. The draft regulation thus attempts to make legal sources of noise that are about two to three times as loud as those currently allowed in Honolulu. This can hardly be said to allow the Director to fulfill the statutory requirement that he abate noise!

For random noise, the energy equivalent level is usually about 3 to 4 dB less than $L_{10}$. Adoption of an energy equivalent level as a standard will allow instantaneous noise levels higher than the standard for something more than 10% of the time. Thus if $L_{eq} = 55$ dBA is adopted, levels higher than 55 dBA could legally occur about 7 to 12 minutes out of each hour. Because of the way in which the energy equivalent level is calculated, the allowed duration decreases rapidly as the level increases. The important point is that the use of an energy equivalent level as a standard would allow for the statistical distribution of the random components of community noise, where maximum levels such as those in Tables 1(A) and 1(B) of the draft do not.

Cost are exceedingly important in noise control. There are two kinds of cost, however. There are those that can be translated directly into dollars, and there are those where another coin must be used.

Both noise producers and noise receivers are familiar with the first category. Noise producers must often purchase and maintain low-noise emission products. Noise receivers must often purchase air conditioning units or new homes to find the quiet they want. It is worth noting, that the adoption of stringent noise standards creates business opportunities and creates jobs as well as modifying, existing opportunities and jobs. The economic development picture is not one-sided.

Non-dollar costs are also important. Loss of hearing and annoyance are two examples. Another is the loss of educational opportunities to students in Hawaii's open-air schools as a result of speech interference in classrooms. I have personally seen a classroom on Dillingham Boulevard where the sound level created by traffic noise was about 70 dBA. The students were clustered in the middle of the room about a teacher who was shouting to be heard. The draft has two very important sections (4g and 4i) which address this problem. They should be expanded so that they apply to all areas affected, including dwellings. Section 4g also should be based on the design capacity of a highway, not just the traffic expected during the first two years of operation.

Any regulation, to be effective, must be written with an eye to the procedures and equipment available and necessary for enforcement. The regulation should be written to make noise control not only possible, but effective and efficient. The draft appears to be written with the concept in mind that any determination of excessive noise level will be made with a standard sound level meter. Section 6 is so written that it does not allow the use of more sophisticated equipment. In the reviewer's opinion, this is an unnecessary restriction on enforcement. At the very least, impact or impulse meters should be specified to measure impulsive sounds.
The reviewer feels that octave band analysis should be used where stationary equipment creating steady noise is involved. Such products often have pure tone components that can be especially annoying. Sound level meters can always be used for monitoring and for screening possible violations. The specifications in the Comprehensive Zoning Code of the City and County of Honolulu are appropriate. The specification on equipment should allow the use of newly-developed methods and instruments for obtaining statistical distributions of sound level and for obtaining energy equivalent sound level.

The following comments on specific sections of the draft form a summary. The comments are not exhaustive.

Sec. 1. Purpose. The purpose should be expanded to "define levels of environmental noise requisite to protect public health and welfare with an adequate margin of safety and to provide for the prevention, control, and abatement of noise in excess of such levels."

Sec. 2.15. Economically reasonable. The objective should be to create incentives to retire old equipment. After 5 years, 50% should be a criterion, not 20%.

Sec. 2.17. Excessive noise. As mentioned earlier, this definition makes the entire regulation inoperative. Standards for excessive noise should be carefully identified. Then activities that create excessive noise should be allowed under controls identified either in a special section of the regulation or by permit or variance.

Sec. 2.30. Property line (boundary). This section really deals with a property surface, not a property line. It could be more clearly written.

Sec. 2.33. Sound Level Meter. Expand to include IEC 179.

Table 1(A), p. 5. Taking into account that the Comprehensive Zoning Code of the City and County of Honolulu has been in effect for almost six years (since August 27, 1969), the maxima specified in this table are surprisingly lax. For example, noise from air conditioning systems measured as greater than about 50 dBA would probably violate the CZC provisions during the daytime in any district except industrial. The standards in Table 1(A) would allow such noise emissions to increase by 10 to 15 dB! Such an increase in allowable noise levels in Honolulu is not justified. Part of the problem lies in trying to use one set of maximum noise levels for all kinds of noise. The problem can be greatly diminished by using energy equivalent levels as standards. Thus a day-night energy equivalent level $L_{dn} = 55$ dBA would limit steady noise to 55 dBA during the daytime and to 45 dBA during the nighttime hours. At the same time, a twenty four hour energy equivalent level $L_{eq(24)} = 70$ dBA in industrial zones would allow transient sounds characteristic of such zones in excess of 70 dBA.

Table 1(B), p. 6. The above comments apply with minor modification. The restriction on noise in industrial zones to 65 dBA maximum is an unwarranted restriction on industrial activity. An $L_{eq(24)} = 70$ dBA is appropriate.

p. 6, 1st paragraph after Table 1(B). As mentioned earlier, this paragraph makes the regulation inoperative. It allows an unending sequence of new noise sources
to be added, one at a time. After each is added, it then provides part of the ambient with respect to which another source can be added.

p. 6, 3rd paragraph after Table 1(B). Impact or impulse meters should be used for such sounds. Sound level meters can be used for monitoring and screening.

Sec. 3b. Not all daytime activities should be exempted. Limits and controls should be placed on the sound levels they are allowed to create. There should be a special section for such activities. Permits should be required for activities such as carnivals and outdoor concerts (rock, classical, or other). Variances should be required for the operation of sound-producing outdoor facilities.

Sec. 3c. No routine activity should be exempted. Permits should be used as necessary.

Sec. 3i. Although the minimum requirements under which a variance can be issued are specified in HRS Section 342-7, the regulation should include a specific section for noise applications. Permits and variances should be used to grant controlled relief from specific provisions of the regulation. The mere possession of a variance should not exempt anyone from the entire regulation.

Sec. 3k. Flight-related aircraft noise and the noise from ground operations at an airport should be treated separately. For example, night-time noise from engine overhaul operations should be controlled. A separate chapter of Public Health Regulations should be prepared for aircraft operations.

Sec. 4b, Construction. Until low noise equipment becomes more widely known and available, a curfew regulation appears to be the only reasonable way to compromise between the legitimate need for economic development and the legitimate need of people for quiet. A standard tourist complaint is about construction noise in the evening, night, and early morning. This section should be modified to specify reasonable noise levels greater than the standards during the allowed time periods. Because construction noise has both steady and random components the specification should be in terms of an energy equivalent level.

Sec. 4d, Agricultural operations. These important operations must be allowed to continue, but those that create excessive noise should be regulated. As with construction noise, a curfew on operations which create excessive noise is probably the best compromise currently available. The level of 100 dBA allowed by Sec. 4d2 next to a residential property line should not be allowed for more than a few minutes in any day-time period. As a minimum, operations should be subject to an $L_{eq} = 70$ dBA just for adequate protection against hearing loss. A reasonable section should be prepared. Permits and variances should be used to allow operations in exceptional cases.

Sec. 4g, Highway noise. This is an outstanding section. It should be modified so that the sound level is based on the design capacity of the highway. Standard methods are available to estimate such noise levels. It should be extended to cover dwellings.
Sec. 4i, Schools etc. This is another outstanding section.

Sec. 4k, House maintenance and hobbies. This section is far too broad. Some limits should be placed (i.e., $L_{eq} = 70$ dBA). For example, the draft would allow continuous flying of gasoline-powered model aircraft at any location as well as radios, hi-fi, and music played at any sound level.

Sec. 6a, Certification, 2nd paragraph. A regulation is not the place to specify the qualifications of an instructor for a course. This paragraph should be removed.

Sec. 6b, Measuring instrument. The proper place to define "sound level meter" is in Sec. 2.33. All that is needed here is to say that a sound level meter shall be used. As mentioned earlier, other instruments should also be allowed.

Sec. 8b, Other laws etc. It is possible that some other statutes, such as Act 164(1974), Relating to Unreasonable Noise, can be used beneficially in controlling noise. Such statutes should be allowed to remain in effect. Alternatively, applicable portions could be adopted in the regulation.

Missing Section, Publication. The results of the Department's efforts should be made readily available to the public annually. Section 14 of "Vehicular Noise Control for Oahu," Chapter 44A, Public Health Regulations, should be added to the subject draft.

This review leaves unsaid many things that should be said. But it is too long already, and this is a good place to stop.