

Appendix 11

Sample Moratorium Ordinances

Escambia, Florida

*Appendix: 11-A Sample Moratorium Resolutions***2001—001033**

BCC

Escambia County

Aug. 16, 2001 Page 1**ORDINANCE NO. 2001- 43**

AN ORDINANCE OF ESCAMBIA COUNTY, FLORIDA ESTABLISHING A TEMPORARY MORATORIUM ON THE PROCESSING OF APPLICATIONS FOR AND THE ISSUANCE OF DEVELOPMENT PERMITS AND DEVELOPMENT ORDERS FOR CONSTRUCTION IN SPECIFIED PORTIONS OF THE ACCIDENT POTENTIAL ZONES I AND 2 INCLUDING CLEAR ZONE ESTABLISHED FOR NAVAL AIR STATION PENSACOLA IN ESCAMBIA COUNTY, FLORIDA AS TO RESIDENTIAL USES ONLY; PROVIDING FOR EXEMPTIONS FOR CERTAIN COMPATIBLE AGRICULTURAL COMMERCIAL, RECREATIONAL OR INDUSTRIAL USES; PROVIDING FOR THE DURATION OF SUCH MORATORIUM; PROVIDING FOR EVERABILITY AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the Escambia County Board of County Commissioners enthusiastically supports the mission of the United States Navy at Naval Air Station Pensacola; and

WHEREAS, the presence of the United States Navy at Naval Air Station Pensacola provides jobs and income which contribute to the stability of the local economy thereby benefiting the entire County; and

WHEREAS, urbanization of land adjacent to the Naval Air Station Pensacola may have unwanted effects on the military installation when development of land adjacent to an installation is incompatible with its activities; and

WHEREAS, in extreme cases incompatible development or encroachment can contribute to closure of an installation because incompatible development, or encroachment, is one of the criteria used by the Department of Defense to determine which military installation will be closed; and

WHEREAS, negative impacts of Naval Air Station Pensacola on adjacent communities, which include noise and the potential for accidents incidental to training and military operations, may adversely affect the health and safety of the citizens within areas 2of incompatible development and encroachment; and

WHEREAS, the County created the Air Installation Compatible Use Zone (AICUZ) Task Force Committee to study the problem of encroachment and make recommendations to the Board of County Commissioners; and

WHEREAS, the most recent studies conducted jointly by Naval Air Station Pensacola and Escambia County have identified both existing and potential incompatible development or encroachment in the Airport Environs areas surrounding Naval Air Station Pensacola; and

WHEREAS, the AICUZ Task Force Committee has formally recommended certain changes to the Airport Environs Overlay Zoning Districts to reduce and prevent future encroachment; and

WHEREAS, the County has accepted this recommendation and begun to draft these changes; and

WHEREAS, it is anticipated that the changes cannot be completed until late September 2001, and

WHEREAS, residential use has been identified as clearly incompatible in the clear zone and accident potential zone (APZ) 1 depicted on Exhibit "1" to this Ordinance; and

WHEREAS, the AICUZ Task Force Committee has recommended the immediate cessation of new residential development in certain portions of the established clear, APZ and noise zones specifically identified in Exhibit "I" to this Ordinance.

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF ESCAMBIA COUNTY, FLORIDA:

Section 1. DECLARATION OF MORATORIUM; EXEMPTIONS.

1.1. The above recitations are hereby adopted and incorporated by reference herein as the factual basis which necessitates this action.

1.2. The Board of County Commissioners hereby declares that processing of applications for, and the issuance of, building permits, master plans, preliminary plats, site plans, planned unit developments or development applications or permits for residential development or construction in the specified portions (red hatched areas) of APZ-1 and 2 (including the clear zone) shown on the attached Exhibit "1," shall temporarily cease immediately upon the effective date of this ordinance, for the period hereinafter set forth in Section 2.

1.3. The moratorium imposed by this ordinance shall not apply to those residential projects which have undergone development review and received all necessary development approvals prior to the effective date of this ordinance or to individual parcels of record which are part of an approved residential subdivision.

1.4. The moratorium imposed by this Ordinance shall not apply to certain agricultural, commercial, recreational or industrial uses in the subject areas provided that such uses are “2,” which is attached hereto and incorporated herein and further provided that such use is not prohibited in the airport environs zone or the underlying zone in which the property lies.

Section 2. DURATION OF MORATORIUM.

2.1. The moratorium imposed by this Ordinance shall automatically expire no more than ninety (90) days from the effective date hereof, unless prior to such expiration the Board of County Commissioners, after holding a public hearing, finds and determines that it is necessary to extend the moratorium for a limited and specified additional time period or upon the adoption of the necessary text and map amendments to the Land Development Code to prevent further incompatible development in the designated areas described in attached Exhibit “1,” whichever occurs first.

Section 3. SEVERABILITY.

If any section, sentence, clause or phase of this Ordinance is held to be invalid or unconstitutional by any Court of competent jurisdiction, then said holding shall in no way affect the validity of the remaining portions of this Ordinance.

Section 4. EFFECTIVE DATE.

The Ordinance shall become effective upon filing with the Department of State.
DONE AND ENACTED this 16th day of _____, 2001.

BOARD OF COUNTY COMMISSIONERS
ESCAMBIA COUNTY FLORIDA

By _____
Chairman

ATTEST: _____

CLERK OF THE CIRCUIT COURT

Deputy Clerk

ENACTED: _____

FILED WITH THE DEPARTMENT OF STATE: _____

EFFECTIVE: _____

Appendix: 11-B – Escambia County, Florida 2nd Moratorium Order

Verified By: _____ ORDINANCE NO. 2003-24.

AN ORDINANCE OF ESCAMBIA COUNTY, FLORIDA ESTABLISHING A TEMPORARY MORATORIUM ON THE PROCESSING OF APPLICATIONS FOR AND THE ISSUANCE OF DEVELOPMENT PERMITS AND DEVELOPMENT ORDERS AUTHORIZING RESIDENTIAL DEVELOPMENT IN SPECIFIED PORTIONS OF THE AREA ADJACENT TO THE BOUNDARY OF NAS PENSACOLA AS WELL AS SPECIFIED PORTIONS OF THE ACCIDENT POTENTIAL ZONES AND NOISE ZONES PREVIOUSLY ESTABLISHED FOR NAS PENSACOLA IN ESCAMBIA COUNTY, FLORIDA; PROVIDING FOR EXEMPTIONS FOR CERTAIN COMPATIBLE AGRICULTURAL, COMMERCIAL, RECREATIONAL AND INDUSTRIAL USES; PROVIDING FOR EXEMPTIONS FOR REMODELING; PROVIDING FOR THE DURATION OF SUCH MORATORIUM; PROVIDING FOR ALLEVIATION OF HARDSHIP; PROVIDING FOR SEVERABILITY AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, on August 15, 2002 the County amended the Transportation Element of the Escambia County Comprehensive Plan 2000, as amended, to include an objective and policies relating to naval aviation facilities development compatibility; and

WHEREAS, on October 25, 2002 the Department of Community Affairs found such plan amendment to be in compliance; and

WHEREAS, these amendments to the Comprehensive Plan mandate protection of NAS Pensacola's aviation mission from incompatible development; and

WHEREAS, The Navy has provided information to the County relative to imminent encroachment of incompatible development in the vicinity of NAS Pensacola as a result of impending changes to their mission; and

WHEREAS, as a result of this change in its mission, certain airport overlay zoning districts allow for uses and densities, which may result in encroachment of incompatible land uses, contrary to Objective 8.E.2 and Policy 8.E.2.2 of the Escambia County Comprehensive Plan, adjacent to the boundary of NAS Pensacola; and

WHEREAS, the Board of County Commissioners has a responsibility to balance private property rights as well as the prevention of encroachment of incompatible development, which may jeopardize the aviation of NAS Pensacola, and

WHEREAS, the second JLUS/AICUZ process to identify encroachment issues and solutions – between the County and officials of NAS Pensacola as required by Policy 8.E.2.4 of the Escambia County Comprehensive Plan is in progress and is expected to be completed within the next few months; and

WHEREAS, specific authority for the Board of County Commissioners to adopt this ordinance includes, but is not limited to, Article VIII, Section 1 (f) of the Florida Constitution of 1968 and Section 125.01(1)(g), Florida Statutes.

WHEREAS, on May 27, 2003, a legal advertisement was placed in a newspaper of general circulation in the County notifying the public of this proposed ordinance and of the public hearing to be held in Commission Chambers approximately seven days following such advertisement; and

WHEREAS, on June 15, 2003, a second legal advertisement was placed in the aforesaid newspaper notifying the public of the second public hearing to be held approximately five days following such advertisement; and

WHEREAS, two public hearings were held pursuant to the published notices described above at which hearings parties in interest and all others had an opportunity to be and were, in fact, heard; and

WHEREAS, the Board of County Commissioners heard testimony and evidence received from officials of NAS Pensacola that development encroachment will negatively affect the future of the mission of NAS Pensacola as well as testimony and evidence received from property owners and prospective purchasers as to the hardship resulting from the moratorium.

NOW THEREFORE, BE IT ORDAINED BY THE BOARD OF COUNTY COMMISSIONERS OF ESCAMBIA COUNTY, FLORIDA:

Section 1. DECLARATION OF MORATORIUM; EXEMPTIONS.

1.1. The above recitations are hereby adopted and incorporated by reference herein as the factual basis which necessitates this action.

1.2. The Board of County Commissioners hereby declares that processing of applications for, and the issuance of, building permits, master plans, preliminary plats, site plans, planned unit developments or development applications or permits for residential development or construction in the specified portions (red hatched areas) of the lands immediately adjacent to the boundary of NAS Pensacola, of APZ-1 and 2 (including the clear zone) and noise zones shown on the attached Exhibit “A” shall temporarily cease immediately upon the effective date of this ordinance, for the period hereinafter set forth in Section 2.

1.3. The moratorium imposed by this ordinance shall not apply to those residential projects which have undergone development review and received all necessary development approvals prior to the effective date of this ordinance or to individual parcels of record which are part of an approved residential subdivision.

1.4. The moratorium imposed by this ordinance shall not apply to certain agricultural, commercial, recreational or industrial uses in the subject areas provided that such uses are deemed normally compatible or clearly compatible in accordance with Exhibit "B" which is attached hereto and incorporated herein, and further provided that such use is not prohibited in the airport environs zone or the underlying zone in which the property lies.

1.5. This moratorium imposed by this ordinance is not intended to affect nor shall it affect: (a) The processing of any application for development permit or the issuance of development order or development permits, including building permits, for expansion or renovation of any lawful use or development already in existence as of Tuesday, May 27, 2003, as long as said orders or permits do not change the use of the property in existence on that date, or (b) the processing of any application for development permit, etc., for the expansion or renovation of any existing vacant building that re-establishes the last identified lawful conforming use of the property.

Section 2. DURATION OF MORATORIUM.

2.1. The moratorium imposed by this ordinance shall automatically expire no later than December 31, 2003, unless prior to such expiration the Board of County Commissioners, after holding a public hearing, finds and determines that it is necessary to extend the moratorium for a limited and specified additional time period **or** upon the adoption of any necessary text or map amendments to the Land Development Code to prevent further encroachment of incompatible development in the designated areas described in attached Exhibit "A" dated May 2003, whichever occurs first.

Section 3. ALLEVIATION OF HARDSHIP.

3.1. The Board of County Commissioners may authorize exceptions to the moratorium imposed by this ordinance when it finds, based upon substantial competent evidence presented to it, that deferral of action on an application for development permit and the deferral of the issuance of a development order for the duration of the moratorium would impose extraordinary hardship on a landowner or developer.

3.2. A request for an exception based upon extraordinary hardship shall be filed with the County Administrator or designee, by the landowner, or the developer with the consent of the landowner, and shall include a recitation of the specific facts that are alleged to support the claim of extraordinary hardship, and shall contain such other information as the County Administrator shall prescribe as necessary for the Board of County Commissioners to be fully informed with respect to the application. A copy of the application shall promptly be forwarded to the Commanding Officer of NAS Pensacola.

3.3. A public hearing on any request for an exception for extraordinary hardship shall be held by the Board of County Commissioners at the first regular meeting of the Board of County Commissioners that occurs after the expiration of the period for publication of notice of the request for an exception.

3.4. Notice of the filing of a request for an exception, and the date, time, and place of the hearing thereon shall be published once at least ten (10) days prior to the hearing in a newspaper of general circulation within the limits of Escambia County, Florida.

3.5. In reviewing an application for an exception based upon a claim of extraordinary hardship, the Board of County Commissioners shall consider the following criteria:

- a. The extent to which the applicant has, prior to Tuesday, May 27, 2003, received County permits or approvals for the proposed development.
- b. The extent to which the applicant has, prior to Tuesday, May 27, 2003, made a substantial expenditure of money or resources in reliance upon permits or other approvals of the County directly associated with physical improvements on the land, such a grading, installation of utility infrastructure or any other public improvement.
- c. Whether the applicant, prior to Tuesday, May 27, 2003, has contractual commitments in reliance upon permits or other approvals by the County to complete a structure(s).
- d. Whether the applicant, prior to Tuesday, May 27, 2003, has in reliance upon permits or other approvals of the County incurred financial obligations to a lending institution which, despite a thorough review of alternative solutions, the applicant cannot meet unless development proceeds.
- e. Whether the moratorium will expose the applicant to substantial monetary liability to third persons; or would leave the applicant completely unable, after a thorough review of alternative solutions, to earn a reasonable investment backed expectation on the property.

3.6. The Board of County Commissioners shall consider the following non-exclusive factors under the criteria set forth in subsection 3.5 above:

1. The history of the property;
2. The history of any development on the property;
3. The history of the property's Future Land Use Map classification;
4. The history of the property's zoning;

5. Any change in development when property ownership changed; and

6. The present size, notice and use of the property.

3.7. At the conclusion of the public hearings and after reviewing the evidence and testimony placed before it, the Board of County Commissioners shall act upon the request either to approve, deny or approve in part or deny in part the request.

Section 4. SEVERABILITY.

If any section, sentence, clause or phrase of this Ordinance is held to be invalid or unconstitutional by any Court of competent jurisdiction, then said holding shall in no way affect the validity of the remaining portions of this Ordinance.

Section 5. EFFECTIVE DATE.

The Ordinance shall become effective upon filing with the Department of State.

DONE AND ENACTED this 24th day of June, 2003.

BOARD OF COUNTY COMMISSIONERS
ESCAMBIA, COUNTY, FLORIDA

By: _____
Chairman

ATTEST: _____
CLERK OF THE CIRCUIT COURT

Deputy Clerk

ENACTED: _____

FILED WITH THE DEPARTMENT OF STATE: _____

EFFECTIVE: _____

Appendix 12

Noise and its Effects on the Environment

Source: Horsham Township, PA. “Horsham Township Joint Land Use Study.” Prepared for the Horsham Township Joint Land Use Advisory Board by Wyle Acoustics Group, Arlington, VA. December 2001.

Appendix 12

Discussion of Noise and Its Effect on the Environment

E.1 NOISE

E.1.1 General

Noise, often defined as unwanted sound, is one of the most common environmental issues associated with aircraft operations. Of course, aircraft are not the only sources of noise in an urban or suburban surrounding, where interstate and local roadway traffic, rail, industrial, and neighborhood sources also intrude on the everyday quality of life. Nevertheless, aircraft are readily identifiable to those affected by their noise and are typically singled out for special attention and criticism. Consequently, aircraft noise problems often dominate analyses of environmental impacts.

Sound is a physical phenomenon consisting of minute vibrations which travel through a medium, such as air, and are sensed by the human ear. Whether that sound is interpreted as pleasant (for example, music) or unpleasant (for example, aircraft noise) depends largely on the listener's current activity, past experience, and attitude toward the source of that sound. It is often true that one person's music is another person's noise.

The measurement and human perception of sound involves two basic physical characteristics _ intensity and frequency. Intensity is a measure of the acoustic energy of the sound vibrations and is expressed in terms of sound pressure. The higher the sound pressure, the more energy carried by the sound and the louder the perception of that sound. The second important physical characteristic is sound frequency which is the number of times per second the air vibrates or oscillates. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches.

The loudest sounds which can be detected comfortably by the human ear have intensities which are 1,000,000,000,000 times larger than those of sounds which can just be detected. Because of this vast range, any attempt to represent the intensity of sound using a linear scale becomes very unwieldy. As a result, a logarithmic unit known as the decibel (abbreviated dB) is used to represent the intensity of a sound. Such a representation is called a sound level.

A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically.

However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example:

$$\begin{aligned}60 \text{ dB} + 60 \text{ dB} &= 63 \text{ dB, and} \\80 \text{ dB} + 80 \text{ dB} &= 83 \text{ dB.}\end{aligned}$$

The total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

$$60.0 \text{ dB} + 70.0 \text{ dB} = 70.4 \text{ dB.}$$

Because the addition of sound levels behaves differently than that of ordinary numbers, such addition is often referred to as “decibel addition” or “energy addition.” The latter term arises from the fact that what we are really doing when we add decibel values is first converting each decibel value to its corresponding acoustic energy, then adding the energies using the normal rules of addition, and finally converting the total energy back to its decibel equivalent.

An important facet of decibel addition arises later when the concept of time-average sound levels is introduced to explain Day-Night Average Sound Level. Because of the logarithmic units, the time-average sound level is dominated by the louder levels which occur during the averaging period. As a simple example, consider a sound level which is 100 dB and lasts for 30 seconds, followed by a sound level of 50 dB which also lasts for 30 seconds. The time-average sound level over the total 60-second period is 97 dB, not 75 dB.

The minimum change in the sound level of individual events which an average human ear can detect is about 3 dB. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness, and this relation holds true for loud sounds and for quieter sounds. A decrease in sound level of 10 dB actually represents a 90 percent decrease in sound intensity but only a 50 percent decrease in perceived loudness because of the nonlinear response of the human ear (similar to most human senses).

Sound frequency is measured in terms of cycles per second (cps), or hertz (Hz), which is the preferred scientific unit for cps. The normal human ear can detect sounds which range in frequency from about 20 Hz to about 15,000 Hz. All sounds in this wide range of frequencies, however, are not heard equally well by the human ear, which is most sensitive to frequencies in the 1000 to 4000 Hz range. In measuring community noise, this frequency dependence is taken into account by adjusting the very high and very low frequencies to approximate the human ear's lower sensitivity to those frequencies. This is called “A-weighting” and is commonly used in measurements of community environmental noise.

Sound levels measured using A-weighting are most properly called A-weighted sound levels while sound levels measured without any frequency weighting are most properly called sound levels. However, since most environmental impact analysis

documents deal only with A-weighted sound levels, the adjective “A-weighted” is often omitted, and A-weighted sound levels are referred to simply as sound levels. In some instances, the author will indicate that the levels have been A-weighted by using the abbreviation dBA or dB(A), rather than the abbreviation dB, for decibel. As long as the use of A-weighting is understood to be used, there is no difference implied by the terms “sound level” and “A-weighted sound level” or by the units dB, dBA, and dB(A).

In this document all sound levels are A-weighted sound levels and the adjective “A-weighted” has been omitted.

Sound levels do not represent instantaneous measurements but rather averages over short periods of time. Two measurement time periods are most common – one second and one-eighth of a second. A measured sound level averaged over one second is called a slow response sound level; one averaged over one-eighth of a second is called a fast response sound level. Most environmental noise studies use slow response measurements, and the adjective “slow response” is usually omitted. It is easy to understand why the proper descriptor “slow response A-weighted sound level” is usually shortened to “sound level” in environmental impact analysis documents.

A.1.2 Noise Metrics

A “metric” is defined as something “of, involving, or used in measurement.”” As used in environmental noise analyses, a metric refers to the unit or quantity which quantitatively measures the effect of noise on the environment. Noise studies have typically involved a confusing proliferation of noise metrics as individual researchers have attempted to understand and represent the effects of noise. As a result, past literature describing environmental noise or environmental noise abatement has included many different metrics.

Recently, however, various federal agencies involved in environmental noise mitigation have agreed on common metrics for environmental impact analysis documents, and both the Department of Defense and the Federal Aviation Administration have specified those which should be used for federal aviation noise assessments. These metrics are as follows.

A.1.2.1 Maximum Sound Level

The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level, for short. It is usually abbreviated by ALM, Lmax or LAmx .

The maximum sound levels of typical events are shown in Figure E-1. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other common activities.

A.1.2.2 Sound Exposure Level

Individual time-varying noise events have two main characteristics – a sound level which changes throughout the event and a period of time during which the event is heard. Although the maximum sound level, described above, provides some measure of the intrusiveness of the event, it alone does not completely describe the total event. The period of time during which the sound is heard is also significant. The Sound Exposure Level (abbreviated SEL or LAE) combines both of these characteristics into a single metric.

Sound Exposure Level is a logarithmic measure of the total acoustic energy transmitted to the listener during the event. Mathematically, it represents the sound level of the constant sound that would, in one second, generate the same acoustic energy as did the actual time-varying noise event. Since aircraft overflights usually last longer than one second, the Sound Exposure Level of an overflight is usually greater than the maximum sound level of the overflight.

Note that sound exposure level is a composite metric which represents both the intensity of a sound and its duration. It does not directly represent the sound level heard at any given time, but rather provides a measure of the net impact of the entire acoustic event. It has been well established in the scientific community that Sound Exposure Level measures this impact much more reliably than just the maximum sound level.

Because the Sound Exposure Level and the maximum sound level are both A-weighted sound levels expressed in decibels, there is sometimes confusion between the two, so the specific metric used should be clearly stated.

A.1.2.3 Day-Night Average Sound Level

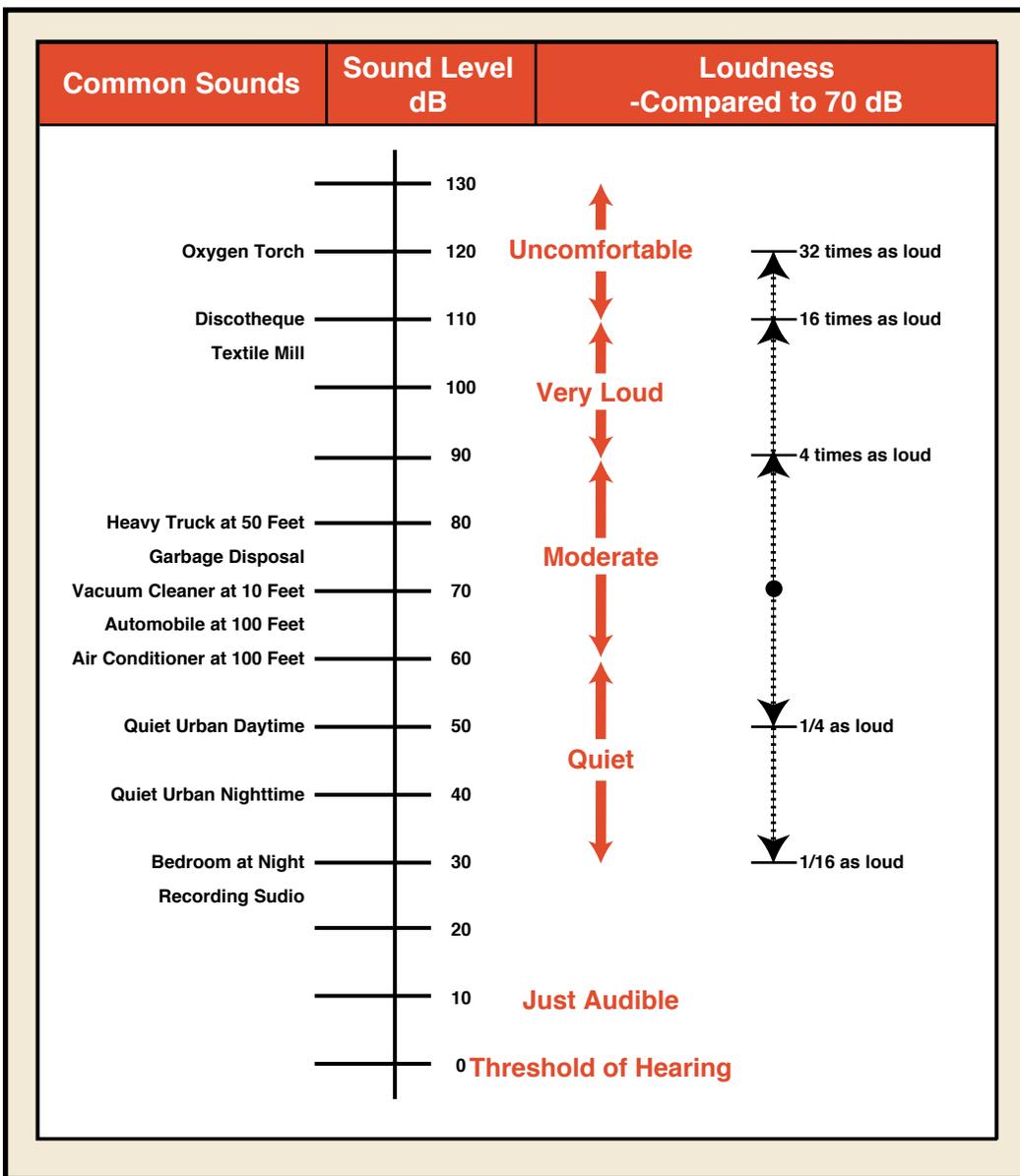
Time-average sound levels are measurements of sound levels which are averaged over a specified length of time. These levels provide a measure of the average sound energy during the measurement period.

For the evaluation of community noise effects, and particularly aircraft noise effects, the Day-Night Average Sound Level (abbreviated DNL or L_{dn}) is used. Day-Night Average Sound Level averages aircraft sound levels at a location over a complete 24-hour period, with a 10-decibel adjustment added to those noise events which take place between 10:00 p.m. and 7:00 a.m. (local time) the following morning. This 10-decibel “penalty” represents the added intrusiveness of sounds which occur during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically about 10 dB lower than during daytime hours.

Ignoring the 10-decibel nighttime adjustment for the moment, Day-Night Average Sound Level may be thought of as the continuous A-weighted Sound Level which would be present if all of the variations in sound level which occur over a 24-hour period were smoothed out so as to contain the same total sound energy.

Day-Night Average Sound Level provides a single measure of overall noise impact, but does not provide specific information on the number of noise events or the individual sound levels which occur during the day. For example, a Day-Night Average Sound Level of 65 dB could result from a very few noisy events, or a large number of quieter events.

Figure E-1
Typical A-Weighted Sound Levels of Common Sounds



Source: Handbook of Noise Control, C.M. Harris, McGraw-Hill Book Co., 1979, and Ref. E5.

As noted earlier for Sound Exposure Level, Day-Night Average Sound Level does not represent the sound level heard at any particular time, but rather represents the total sound exposure. Scientific studies and social surveys which have

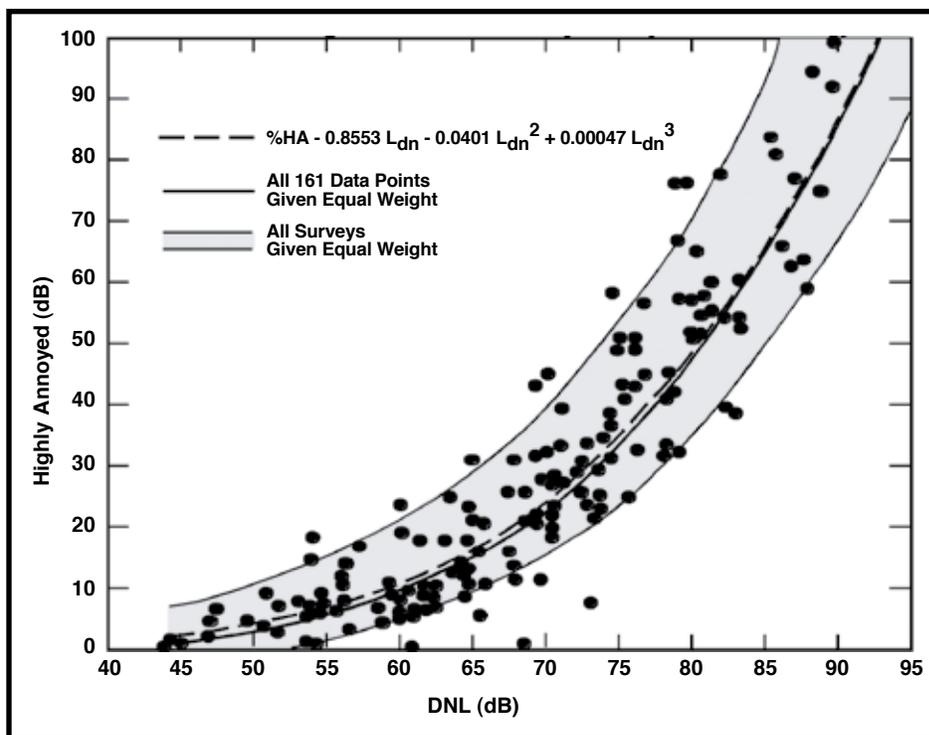
been conducted to appraise community annoyance to all types of environmental noise have found the Day-Night Average Sound Level to be the best measure of that annoyance. Its use is endorsed by the scientific community (References E1 through E5).

There is, in fact, a remarkable consistency in the results of attitudinal surveys about aircraft noise conducted in different countries to find the percentages of groups of people who express various degrees of annoyance when exposed to different levels of Day-Night Average Sound Level. This is illustrated in Figure E-2, which summarizes the results of a large number of social surveys relating community responses to various types of noises, measured in Day-Night Average Sound Level.

Reference E6, from which Figure E-2 was taken, was published in 1978. A more recent study has reaffirmed this relationship (Reference E7). In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. The correlation coefficients for the annoyance of individuals are relatively low, however, on the order of 0.5 or less. This is not surprising, considering the varying personal factors which influence the manner in which individuals react to noise. Nevertheless, findings substantiate that community annoyance to aircraft noise is represented quite reliably using Day-Night Average Sound Level.

Figure E-2

Community Surveys of Noise Annoyance. (Ref. E-6)



This relation between community annoyance and time-average sound level has been confirmed, even for infrequent aircraft noise events. Reference E8 reported the reactions of individuals in a community to daily helicopter overflights, ranging from one to 32 per day. The stated reactions to infrequent helicopter overflights correlated quite well with the daily time-average sound levels over this range of numbers of daily noise events.

The use of Day-Night Average Sound Level has been criticized recently as not accurately representing community annoyance and land-use compatibility with aircraft noise. Much of that criticism stems from a lack of understanding of the basis for the measurement or calculation of L_{dn} . One frequent criticism is based on the inherent feeling that people react more to single noise events and not as much to “meaningless” time-average sound levels.

In fact, a time-average noise metric, such as L_{dn} , takes into account both the noise levels of all individual events which occur during a 24-hour period and the number of times those events occur. As described briefly above, the logarithmic nature of the decibel unit causes the noise levels of the loudest events to control the 24-hour average.

As a simple example of this characteristic, consider a case in which only one aircraft overflight occurs in daytime during a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The Day-Night Average Sound Level for this 24-hour period is 65.5 dB. Assume, as a second example, that ten such 30-second overflights occur in daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The Day-Night Average Sound Level for this 24-hour period is 75.4 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of those events. This is the basic concept of a time-average sound metric, and specifically the Day-Night Average Sound Level.

E.1.2.4 Onset-Rate Adjusted Day-Night Average Sound Level

Aircraft operations along low-altitude Military Training Routes (MTRs) and in Military Operating Areas (MOAs) and Restricted Areas/Ranges generate a noise environment different from other community noise environments. Overflights can be highly sporadic, ranging from many (e.g., ten per hour) to few (less than one per week). This situation differs from most community noise environments in which noise tends to be continuous or patterned.

Individual military overflight events also differ from typical community noise events, because of the low-altitude and high-air-speed characteristics of military aircraft. These characteristics result in aircraft that exhibit a rate of increase in sound level (onset rate) of up to 30 dB per second. The Day-Night Average Sound Level metric is adjusted to account for the “surprise” effect of the onset rate of

aircraft noise on humans with an adjustment ranging up to 11 dB added to the normal Sound Exposure Level (Reference E9). Onset rates between 15 to 150 dB per second require an adjustment of from 0 to 11 dB, while onset rates below 15 dB per second require no adjustment. The adjusted Day-Night Average Sound Level is designated as Onset-Rate Adjusted Day-Night Average Sound Level (abbreviated L_{dnr}). Because of the sporadic occurrences of aircraft overflights along MTRs, in MOAs and Restricted Areas/Ranges, the number of average daily operations is determined from the calendar month with the highest number of operations in each area. This monthly average is denoted L_{dnmr} .

E.2 NOISE EFFECTS

E.2.1 Hearing Loss

Noise-induced hearing loss is probably the best defined of the potential effects of human exposure to excessive noise. Federal workplace standards for protection from hearing loss allow a time-average level of 90 dB over an 8-hour work period, or 85 dB averaged over a 16-hour period. Even the most protective criterion (no measurable hearing loss for the most sensitive portion of the population at the ear's most sensitive frequency, 4000 Hz, after a 40-year exposure) suggests a time-average sound level of 70 dB over a 24-hour period. Since it is unlikely that airport neighbors will remain outside their homes 24 hours per day for extended periods of time, there is little possibility of hearing loss below a Day-Night Average Sound Level of 75 dB, and this level is extremely conservative.

E.2.2 Nonauditory Health Effects

Nonauditory health effects of long-term noise exposure, where noise may act as a risk factor, have never been found to occur at levels below those protective against noise-induced hearing loss, described above. Most studies attempting to clarify such health effects have found that noise exposure levels established for hearing protection will also protect against any potential nonauditory health effects, at least in workplace conditions. The best scientific summary of these findings is contained in the lead paper at the National Institutes of Health Conference on Noise and Hearing Loss, held on 22–24 January 1990 in Washington, DC:

The nonauditory effects of chronic noise exposure, when noise is suspected to act as one of the risk factors in the development of hypertension, cardiovascular disease, and other nervous disorders, have never been proven to occur as chronic manifestations at levels below these criteria (an average of 75 dBA for complete protection against hearing loss for an eight-hour day). As presented at the 1988 International Congress on Noise as a Public Health Problem, most studies attempting to clarify such health effects did not find them at levels below the criteria protective of noise-induced hearing loss, and even above these criteria, results regarding such health effects were ambiguous. Consequently, one comes to the conclusion that establishing and enforcing exposure levels protecting against noise-induced hearing loss would not only solve the noise-induced hearing loss problem

but also any potential nonauditory health effects in the work place. (Reference E10; parenthetical wording added for clarification.)

Although these findings were directed specifically at noise effects in the work place, they are equally applicable to aircraft noise effects in the community environment. Research studies regarding the nonauditory health effects of aircraft noise are ambiguous, at best, and often contradictory. Yet, even those studies which purport to find such health effects use time-average noise levels of 75 dB and higher for their research.

For example, in an often-quoted paper, two UCLA researchers apparently found a relation between aircraft noise levels under the approach path to Los Angeles International Airport (LAX) and increased mortality rates among the exposed residents by using an average noise exposure level greater than 75 dB for the “noise-exposed” population (Reference E11). Nevertheless, three other UCLA professors analyzed those same data and found no relation between noise exposure and mortality rates (Reference E12).

As a second example, two other UCLA researchers used this same population near LAX to show a higher rate of birth defects in 1970–1972 when compared with a control group residing away from the airport (Reference E13). Based on this report, a separate group at the U.S. Centers for Disease Control performed a more thorough study of populations near Atlanta’s Hartsfield International Airport (ATL) for 1970–1972 and found no relation in their study of 17 identified categories of birth defects to aircraft noise levels above 65 dB (Reference E14).

In summary, there is no scientific basis for a claim that potential health effects exist for aircraft time-average sound levels below 75 dB.

E.2.3 Annoyance

The primary effect of aircraft noise on exposed communities is one of annoyance. Noise annoyance is defined by the U.S. Environmental Protection Agency as any negative subjective reaction on the part of an individual or group (Reference E3). As noted in the discussion of Day-Night Average Sound Level above, community annoyance is best measured by that metric.

It is often suggested that a lower Day-Night Average Sound Level, such as 60 or 55 dB, be adopted as the threshold of community noise annoyance for airport environmental analysis documents. While there is no technical reason why a lower level cannot be measured or calculated for comparison purposes, a Day-Night Average Sound Level of 65 dB:

1. provides a valid basis for comparing and assessing community noise effects,

2. represents a noise exposure level which is normally dominated by aircraft noise and not other community or nearby highway noise sources, and
3. reflects the FAA's threshold for grant-in-aid funding of airport noise mitigation projects.

The U.S. Department of Housing and Urban Development also established a Day-Night Average Sound Level standard of 65 dB for eligibility for federally guaranteed home loans.

For this environmental study, levels of Day-Night Average Sound Level equal to and greater than 65 dB were used for assessing community noise impact.

E.2.4 Speech Interference

Speech interference associated with aircraft noise is a primary cause of annoyance to individuals on the ground. The disruption of routine activities such as radio or television listening, telephone use, or family conversation gives rise to frustration and aggravation.

The quality of speech communication is also important in classrooms, offices, and industrial settings and can cause fatigue and vocal strain in those who attempt to communicate over the noise. Research has shown that “whenever intrusive noise exceeds approximately 60 dB indoors, there will be interference with speech communication” (Reference E5).

Indoor speech interference, per Reference E3, can be expressed as a percentage of sentence intelligibility among two people speaking in relaxed conversation approximately 1 meter apart in a typical* living room or bedroom. The percentage of sentence intelligibility is a non-linear function of the (steady) indoor background A-weighted sound level as shown in Figure E-3. This curve was digitized and curve-fitted for the purposes of this appendix. Such a curve-fit yields 100 percent sentence intelligibility for background levels below 57 dB and yields less than 10 percent intelligibility for background levels above 73 dB. Note that the function is especially sensitive to changes in sound level between 65 dB and 75 dB. As an example of the sensitivity, a 1 dB increase in background sound level from 70 dB to 71 dB yields a 14 percent decrease in sentence intelligibility.

Sleep disturbance is another source of annoyance associated with aircraft noise. This is especially true because of the intermittent nature and content of aircraft noise, which is more disturbing than continuous noise of equal energy and neutral meaning.

Sleep disturbance can be measured in either of two ways. “Arousal” represents awakening from sleep, while a change in “sleep stage” represents a shift from one of four sleep stages to another stage of lighter sleep without awakening. In general, arousal requires a higher noise level than does a change in sleep stage.

In terms of average daily noise levels, some guidance is available to judge sleep disturbance. The U.S. Environmental Protection Agency identified an indoor DNL of 45 dB as necessary to protect against sleep interference (Reference E3). Assuming a conservative structural noise insulation of 20 dB for typical dwellings, 45 dB corresponds to an outdoor DNL of 65 dB as minimizing sleep interference.

In June 1997, the Federal Interagency Committee on Aviation Noise (FICAN) reviewed the sleep disturbance issue and presented a sleep disturbance dose-response prediction curve (Reference E15), which was based on data from field studies in References E16 through E19, as the recommended tool for analysis of potential sleep disturbance for residential areas. Figure E4 shows this curve which, for an indoor Sound Exposure Level of 60 dB, predicts that a maximum of approximately 5 percent of the residential population exposed are expected to be behaviourally awakened. FICAN cautions that this curve should only be applied to long-term adult residents.

Figure E-3
Percent Sentence Intelligibility (Ref. E3)

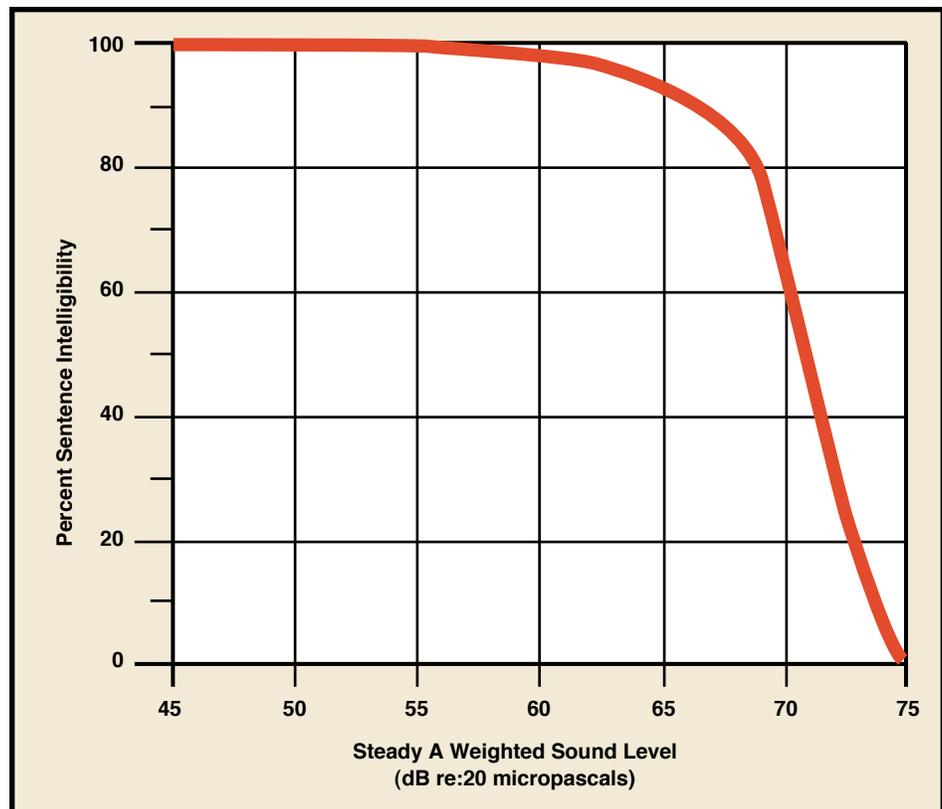
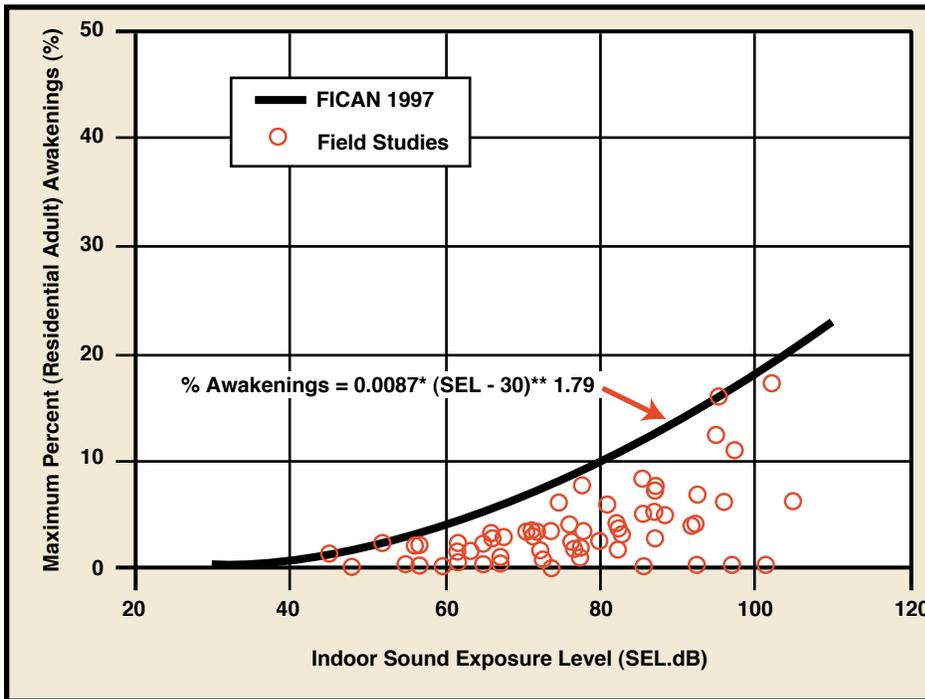


Figure E-4
Sleep-Disturbance Dose-Response Relationship



E.2.6 Noise Effects on Domestic Animals and Wildlife

Animal species differ greatly in their responses to noise. Each species has adapted, physically and behaviorally, to fill its ecological role in nature, and its hearing ability usually reflects that role. Animals rely on their hearing to avoid predators, obtain food, and communicate with and attract other members of their species. Aircraft noise may mask or interfere with these functions. Secondary effects may include nonauditory effects similar to those exhibited by humans – stress, hypertension, and other nervous disorders. Tertiary effects may include interference with mating and resultant population declines.

Many scientific studies regarding the effects of noise on wildlife and some anecdotal reports of wildlife “flight” due to noise are available. Few of these studies or reports include any reliable measures of the actual noise levels involved.

In the absence of definitive data on the effect of noise on animals, the Committee on Hearing, Bioacoustics, and Biomechanics of the National Research Council has proposed that protective noise criteria for animals be taken to be the same as for humans (Reference E16).

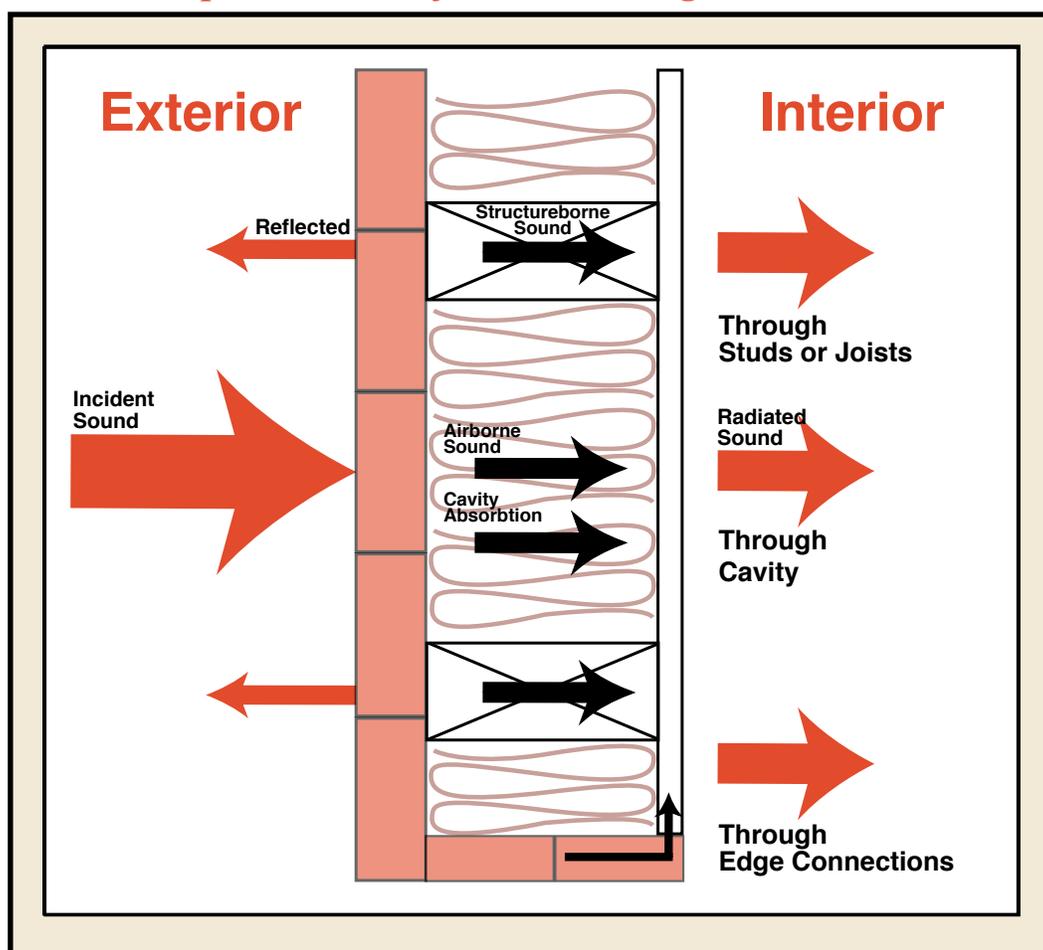
E.2.7 Effects on Noise-Induced Vibration Structures and Humans

The sound from an aircraft overflight travels from the exterior to the interior of the house in one of two ways: through the solid structural elements and directly

through the air. Figure E-5 illustrates the sound transmission through a wall constructed with a brick exterior, stud framing, interior finish wall, and absorbent material in the cavity. The sound transmission starts with noise impinging on the wall exterior. Some of this sound energy will be reflected away, and some will make the wall vibrate. The vibrating wall radiates sound into the airspace, which in turn sets the interior finish surface vibrating, with some energy lost in the airspace. This surface then radiates sound into the dwelling interior. As the figure shows, vibrational energy also bypasses the air cavity by traveling through the studs and edge connections.

Normally, the most sensitive components of a structure to airborne noise are the windows and, infrequently, the plastered walls and ceilings. An evaluation of the peak sound pressures impinging on the structure is normally sufficient to determine the possibility of damage. In general, at sound levels above 130 dB, there is the possibility of structural damage. While certain frequencies (such as 30 hertz for window breakage) may be of more concern than other frequencies, conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components (Reference E20).

Figure E-5
Pictorial Representation of Sound Through Built Construction



In terms of average acceleration of wall or ceiling vibration, the thresholds for structural damage (Reference E18) are:

- 0.5 m/s/s – is the threshold of risk of damage to sensitive structures (i.e., ancient monuments, etc.).
- 1.0 m/s/s – is the threshold of risk of damage to normal dwellings (i.e., houses with plaster ceiling and walls).

Noise-induced structural vibration may also cause annoyance to dwelling occupants because of induced secondary vibrations, or “rattle”, of objects within the dwelling – hanging pictures, dishes, plaques, and bric-a-brac. Loose window panes may also vibrate noticeably when exposed to high levels of airborne noise, causing homeowners to fear breakage. In general, such noise-induced vibrations occur at sound levels above those considered normally compatible with residential land use. Thus assessments of noise exposure levels for compatible land use should also be protective of noise-induced secondary vibrations.

In the assessment of vibration on humans, the following factors determine if a person will perceive and possibly react to building vibrations:

1. Type of excitation: steady state, intermittent, or impulsive vibration.
2. Frequency of the excitation. ISO 2631-2 (Reference E21) recommends a frequency range of 1 to 80 Hz for the assessment of vibration on humans.
3. Orientation of the body with respect to the vibration.
4. The use of the occupied space (i.e., residential, workshop, hospital).
5. Time of day.

Table E-1 lists the whole-body vibration criteria from Reference E21 for one-third octave frequency bands from 1 to 80 Hz.

Table E-6***Vibration Criteria for the Evaluation of Human Exposure to Whole-Body Vibration***

Frequency (Hz)	RMS Acceleration (m/s/s)		
	Combined Criteria Base Curve	Residential Night	Residential Day
1	0.0036	0.0050	0.0072
1.25	0.0036	0.0050	0.0072
1.6	0.0036	0.0050	0.0072
2	0.0036	0.0050	0.0072
2.5	0.0037	0.0052	0.0074
3.15	0.0039	0.0054	0.0077
4	0.0041	0.0057	0.0081
5	0.0043	0.0060	0.0086
6.3	0.0046	0.0064	0.0092
8	0.0050	0.0070	0.0100
10	0.0063	0.0088	0.0126
12.5	0.0078	0.0109	0.0156
16	0.0100	0.0140	0.0200
20	0.0125	0.0175	0.0250
25	0.0156	0.0218	0.0312
31.5	0.0197	0.0276	0.0394
40	0.0250	0.0350	0.0500
50	0.0313	0.0348	0.0626
63	0.0394	0.0552	0.0788
80	0.0500	0.0700	0.1000

Source: Reference E18.

E.2.8 Noise Effects on Terrain

It has been suggested that noise levels associated with low-flying aircraft may affect the terrain under the flight path by disturbing fragile soil or snow structures, especially in mountainous areas, causing landslides or avalanches. There are no known instances of such effects, and it is considered improbable that such effects will result from routine, subsonic aircraft operations.

E.2.9 Noise Effects on Historical and Archaeological Sites

Because of the potential for increased fragility of structural components of historical buildings and other historical sites, aircraft noise may affect such sites more severely than newer, modern structures. Again, there are few scientific studies of such effects to provide guidance for their assessment.

One study involved the measurements of sound levels and structural vibration levels in a superbly restored plantation house, originally built in 1795, and now situated approximately 1,500 feet from the centerline at the departure end of Runway 19L at Washington Dulles International Airport (IAD). These measurements were made in connection with the proposed scheduled operation of the supersonic Concorde airplane at Dulles (Reference E22). There was special concern for the building's windows, since roughly half of the 324 panes were original. No instances of structural damage were found. Interestingly, despite the high levels of noise during Concorde takeoffs, the induced structural vibration levels were actually less than those induced by touring groups and vacuum cleaning.

As noted above for the noise effects of noise-induced vibrations of normal structures, assessments of noise exposure levels for normally compatible land uses should also be protective of historic and archaeological sites.

E.3 REFERENCES

- E1. "Sound Level Descriptors for Determination of Compatible Land Use," American National Standards Institute Standard ANSI S3.23-1980.
- E2. "Quantities and Procedures for Description and Measurement of Environmental Sound, Part 1," American National Standards Institute Standard ANSI S12.9-1988.
- E3. "Information on Levels of Environmental Noise Requisite to Protect the Public Health and Welfare With an Adequate Margin of Safety," U.S. Environmental Protection Agency Report 550/9-74-004, March 1974.
- E4. "Guidelines for Considering Noise in Land-Use Planning and Control," Federal Interagency Committee on Urban Noise, June 1980.
- E5. "Federal Agency Review of Selected Airport Noise Analysis Issues," Federal Interagency Committee on Noise, August 1992.
- E6. Schultz, T.J., "Synthesis of Social Surveys on Noise Annoyance," J. Acoust. Soc. Am. 64, 377-405, August 1978.
- E7. Fidell, S., Barger, D.S., and Schultz, T.J., "Updating a Dosage-Effect Relationship for the Prevalence of Annoyance Due to General Transportation Noise" J. Acoust. Soc. Am. 89, 221-233, January 1991.
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- E9. Stusnick, E., and Bradley, K.A., "The Effect of Onset Rate on Aircraft Noise Annoyance. Volume 2: Rented Home Experiment," AL/OE-TR-1993-0170, October 1992.
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- E15. "Federal Interagency Committee on Aviation Noise (FICAN) Effects of Aviation Noise on Awakenings From Sleep," June 1997.
- E16. Pearsons, K.S., Barber, D.S., and Tabachick, B.G., "Analyses of the Predictability of Noise-Induced Sleep Disturbance," USAF Report HSD-TR-89-029, October 1989.
- E17. Ollerhead, J.B., Jones, C.J., Cadous, R.E., Woodley, A., Atkinson, B.J., Horne, J.A., Pankhurst, F., Reyner, L., Hume, K.I., Van, F., Watson, A., Diamond, I.D., Egger, P., Holmes, D., and McKean, J., *Report of a Field Study of Aircraft Noise and Sleep Disturbance*, London: Department of Safety, Environment and Engineering, 1992.
- E18. Fidell, S., Pearsons, K., Howe, R., Tabachnick, B., Silvati, L., and Barber, D.S., "Noise-Induced Sleep Disturbance in Residential Settings," AL/OE-TR-1994-0131, Wright Patterson AFB, OH, Armstrong Laboratory, Occupational & Environmental Health Division, 1994.
- E19. Fidell, S., Howe, R., Tabachnick, B., Pearsons, K., and Sneddon, M., "Noise-Induced Sleep Disturbance in Residences Near Two Civil Airports," Langley Research Center, 1995.
- E20. von Gierke, H.E., and Ward, W.D., "Criteria for Noise and Vibration Exposure," *Handbook of Acoustical Measurements and Noise Control*, Third Edition, 1991.

E21. “Evaluation of Human Exposure to Whole-Body Vibration – Part 2: Continuous and Shock-Induced Vibration in Buildings (1 to 80 Hz)”, International Organization for Standardization, Standard 2631-2, February 1989.

E22. Wesler, J.E., “Concorde Operations At Dulles International Airport,” NOISEXPO ‘77, Chicago, IL, March 1977.

(Footnotes)

* “Typical” is defined as a room with about 300 sabins of sound absorption which, according to Reference E3, is representative of living rooms and bedrooms.

Appendix 13

Sample Land Use Compatibility Zoning Code

Source: Federal Aviation Administration Advisory Circulars 150/190-4, “A Model Zoning Ordinance to Limit the Height of Objects Around Airports” and 150/5020-1. “Noise Control and Compatibility Planning for Airports;” United States Government, Federal Interagency Committee on Urban Noise, “Guidelines for Considering Noise in Land Use Planning and Control,” USAF – AICUZ Reports, MacDill AFB and Homestead AFB, and USN AICUZ Reports, NAS Pensacola and NAS Cecil Field were used as the guides for the model by the Florida Department of Transportation.

Source: Florida Department of Transportation, Office of Public Transportation, Aviation Office. “Airport Compatible Land Use Guidance for Florida Communities.” 1994.

[COUNTY/MUNICIPALITY] COMPREHENSIVE AIRPORT ZONING ORDINANCE

AN ORDINANCE REGULATING AND RESTRICTING THE HEIGHT OF STRUCTURES AND OBJECTS OF NATURAL GROWTH; REGULATING THE USE OF LAND; AND ESTABLISHING MODES OF CONSTRUCTION FOR STRUCTURES WITHIN NOISE IMPACTED AREAS IN PROXIMITY OF [AIRPORT(S) NAME]; PROVIDING AN EFFECTIVE DATE AND REPEALING ALL ORDINANCES OR PROVISIONS IN CONFLICT HEREWITH.

BE IT ORDAINED BY THE [COUNTY OR MUNICIPALITY GOVERNING BODY], FLORIDA, IN LAWFUL SESSION ASSEMBLED AS FOLLOWS:

This Ordinance is adopted pursuant to the authority conferred by Sections 333.03, and [125.01 or 166.021 and 163.3177(7)(b)] Florida Statutes.

It is hereby found that:

- Airspace obstructions have the potential for being hazardous to aircraft operations as well as to persons and property on the ground in their vicinity;
- Airspace obstructions may affect land use in their vicinity and may reduce the size of areas available for taking off, maneuvering and landing of aircraft at an airport;
- Certain other land uses in the vicinity of airports also have the potential for being hazardous to normal aircraft operations or to increase the potential for personal injury and property damage in the event of an aircraft accident;
- Noise resulting from the normal operation at airports may be an annoyance or objectionable to residents in the surrounding community; and
- To permit these conditions to exist would impair or destroy the utility of [AIRPORT(S) NAME] and the public investment therein.

Accordingly, it is declared that:

- The creation or establishment of an airspace obstruction hazardous to the operation of aircraft or which reduces the size area available for such operations is a public nuisance and an injury to the region served by the [AIRPORT(S) NAME]; and thus,
- It is necessary in the interest of the public health, public safety and general welfare that the creation of airspace obstructions and the use of land incompatible with airport operations within certain zones be prevented; and
- The prevention of these obstructions and incompatible land uses should be accomplished, to the extent legally possible, by the exercise of the police power without compensation; and

- That preventing the creation or establishment of obstructions and incompatible land uses as well as their elimination, removal, alteration, or mitigation, to include marking and lighting of existing obstructions, are public purposes for which the [COUNTY/CITY] may raise and expend public funds and acquire land or interest in land.

I. DEFINITIONS

As used in this Ordinance, unless the context otherwise requires:

- A. ACCIDENT POTENTIAL ZONE (APZ)- Specified areas adjacent to and along each extended runway centerline at a military airfield that defines the probable impact area should an aircraft accident occur.
- B. AIRPORT OVER FLIGHT ZONE - A specified area underlying the fixed, recurring flight paths for aircraft taking off or landing at a civil airport. Aircraft routinely must operate at low altitude, climb from or descend to the runway along these paths. Should an aircraft accident occur, it is statistically most likely to be located in this area.
- C. AIRPORT - An area of land or water designed and set aside for the landing and taking off of aircraft, utilized or to be utilized in the interest of the public for such purpose and validly licensed by the State in the Public Airport category or operated by the federal government in the interest of national defense which includes:
[AIRPORT NAME(S)]
- D. AIRPORT ELEVATION - See: ESTABLISHED AIRPORT ELEVATION.
- E. AIRPORT OBSTRUCTION - any structure or object of natural growth or use of land which would exceed the federal obstruction standards as contained in 14 CFR Part 77 or which obstruct the airspace required for the flight of aircraft in taking-off, maneuvering or landing at an airport or may otherwise interfere with the taking-off, maneuvering or landing of aircraft.
- F. AIRPORT REFERENCE POINT (ARP) - The approximate geometric center of a civil airport's runways expressed by its latitude and longitude.
- G. AIRSPACE OBSTRUCTION or OBSTRUCTION TO NAVIGABLE AIRSPACE - any structure, existing or planned, or any object of natural growth which would exceed federal obstruction standards as contained in 14 CFR Part 77, ss 77.21, 77.23, 77.25, 77.28 or 77.29.
- H. AIRSPACE HEIGHT - The height limits as established in all zones set forth in this Ordinance. Above Mean Sea Level (AMSL) elevation shall be the datum unless otherwise specified.

- I. AIRPORT NOISE ZONES or AIRPORT NOISE IMPACTED ZONES - Areas within specific airport generated noise impact Ldn contour lines in which land use should be limited to activities that are not noise sensitive, or where appropriate noise level reduction measures for construction of certain buildings are required for land uses which may be otherwise acceptable.
- J. AVIGATION EASEMENT - The assignment of a right to an airport proprietor to a portion of the total benefits of the ownership of real property. The selected rights may be granted or may be purchased.
- K. CLIMB GRADIENT - An aircraft instrument departure procedure requiring adherence to a minimum climb slope or grade expressed in feet per nautical mile.
- L. DECISION HEIGHT - The height at which a pilot must decide, during an Instrument Landing System (ILS) approach, to either continue the approach or to execute a missed approach.
- M. ESTABLISHED AIRPORT ELEVATION - The highest point on the airport's or airfield's landing surface measured in feet above Mean Sea Level (MSL or AMSL).
- N. Ldn - A day/night 24-hour average sound level measurement, expressed in decibels, obtained after addition of 10 decibels to sound levels occurring during the night time period from 10 PM to 7 AM. See: YEARLY DAY-NIGHT AVERAGE SOUND LEVEL (YDNL).
- O. MINIMUM DESCENT ALTITUDE (MDA) - The lowest AMSL altitude to which descent is authorized on final approach or during circling-to-land maneuvering in execution of a Standard Instrument Approach Procedure (SIAP) where electronic glide slope is not provided.
- P. MINIMUM ENROUTE ALTITUDE (MEA) - The lowest published altitude between radio fixes that assures acceptable navigational signal coverage and meets obstruction clearance requirements between those fixes.
- Q. MINIMUM OBSTRUCTION CLEARANCE ALTITUDE (MOCA) - The lowest published altitude between radio fixes on Federal VOR airways, off-airway routes, or route segments that meets obstruction clearance requirements for the entire route segment and assures acceptable navigational signal coverage only within 22 miles of a VOR.
- R. MINIMUM VECTORING ALTITUDE (MVA) - The lowest AMSL altitude at which aircraft operating on Instrument Flight Rules (IFR) will be vectored by a radar controller, except when otherwise authorized for radar approaches, departures or missed approaches.

- S. NOISE REDUCTION (NR) or NOISE LEVEL REDUCTION (NLR) - Reduction in sound level transmission between locations or rooms for the expressed purpose of lessening or mitigating the impact of noise in one of the locations. The term Sound Level Reduction (SLR) can imply the same function. See: SOUND LEVEL REDUCTION (SLR).
- T. NONCONFORMING USE - Any pre-existing structure, object of natural growth or use of land which is inconsistent with the provisions of this Ordinance, or amendments thereto.
- U. NON-PRECISION INSTRUMENT RUNWAY- A runway having an instrument approach procedure utilizing air navigation facilities with only horizontal guidance, or area type navigation equipment, for which a straight-in non-precision instrument approach procedure has been approved or planned, and for which non-precision instrument approach facilities are planned or indicated on an appropriate civil or military airport planning document.
- V. NONSTANDARD TAKE-OFF MINIMUMS - Conditions of existing weather required for take-off at an airport which exceed the standards prescribed in Federal Aviation Regulations Part 91.
- W. OCCUPIED ROOMS - Rooms within enclosed structures which are or may reasonably be expected to be used for human activities which involve speech communication; education or instruction; sleeping; eating; listening to live, recorded or broadcast music or speech; or the regular use of telephones or other audio transmitting devices.
- X. OTHER THAN UTILITY RUNWAY - A runway designed for and intended to be used by all types of aircraft including those having gross weights greater than 12,500 pounds.
- Y. PRECISION INSTRUMENT RUNWAY - A runway having an instrument approach procedure utilizing an Instrument Landing System (ILS), Microwave Landing System (MLS), or a Precision Approach Radar (PAR) including a runway for which such a system is planned and is so indicated on an approved civil or military airport layout plan; other FAA planning documents, or comparable military service planning documents.
- Z. PERSON - Individual, firm, partnership, corporation, company, association, joint stock association, or political body including the trustee, receiver, assignee, administrator, executor, guardian or other representative.
- AA. QUALIFIED ACOUSTICAL CONSULTANT - A person having sufficient training and experience in the science and technology of acoustics and knowledge of construction methods and materials to be qualified to evaluate the adequacy of acoustical designs, materials and methods of construction for the attenuation of noise.

- BB. RUNWAY - A defined area on an airport prepared for landing and takeoff of aircraft along its length.
- CC. SITE SPECIFIC ANALYSIS (SSA) - The analysis of a proposed land use in a designated airport noise-impacted area to determine compliance with the [COUNTY/MUNICIPALITY] Land Use Plan, the [COUNTY/MUNICIPALITY] Noise Zone Map and the Land Use Guidance Chart in order to recommend the type of construction needed to meet the Noise Level Reduction requirements.
- DD. SOUND ABSORPTION - Capacity of materials and furnishings to absorb sound. For the purposes of this Ordinance, the sound absorption is equal to 0.05 times the room volume in cubic feet divided by the measured reverberation time in seconds determined with an active band of noise centered at 500 Hertz.
- EE. SOUND LEVEL - The quantity in decibels measured by an instrument satisfying the requirements of American Standard Specification for Type I Sound Level Meters. The sound level shall be the frequency weighted sound pressure level obtained with the frequency weighting "A" and the standardized dynamic characteristic "SLOW".
- FF. SOUND LEVEL REDUCTION - A measurement standard for the reduction in sound level transmission, expressed in decibels (db), between two designated locations for a stated sound frequency band. It is used to evaluate the effectiveness of or to establish requirements for techniques to limit sound transmission to prevent or mitigate undesirable impacts. See: NOISE LEVEL REDUCTION (NLR).
- GG. STRUCTURE - Any object, constructed or installed by man, including but not limited to: antennas, buildings, cranes, overhead transmission lines, smoke stacks, towers and utility poles.
- HH. UTILITY RUNWAY - A runway that is constructed for and intended to be used only by aircraft of 12,500 pounds maximum gross weight and less.
- II. VISUAL RUNWAY - A runway intended solely for the operation of aircraft using visual approach procedures with no instrument approach procedure planned or indicated on an approved civil or military airport layout plan, or by any other planning document submitted to the FAA by competent authority.
- JJ. YEARLY DAY-NIGHT AVERAGE SOUND LEVEL(YDNL) - A 365-day averaged, day-night average sound level measurement expressed in decibels. The symbol used for YDNL is also L_{dnl}. YDNL is the metric designated to define airport noise impact for Noise Programs conducted under the provisions of 14 CFR Part 150. See: L_{dnl}

KK. ZONING ADMINISTRATOR - The administrative office or agency responsible for administering and enforcing the requirements of this Ordinance within [COUNTY/MUNICIPALITY NAME] or within each political subdivision that adopts this ordinance. The Zoning Administrator in [COUNTY/MUNICIPALITY NAME] is [AGENCY/OFFICE TITLE].

LL. ZONING BOARD OF ADJUSTMENT - The executive body or agency having the statutory authority and responsible to hear and decide appeals from any order, requirement, decision or determination made by the Zoning Administrator in enforcing this Ordinance; to hear and decide special exceptions and to hear and decide variances to the requirements of this Ordinance within [COUNTY/MUNICIPALITY NAME] or within each political subdivision that adopts this Ordinance. The Zoning Board of Adjustment in COUNTY/MUNICIPALITY NAME(S)] is [BODY/AGENCY TITLE(S)].

II. OVERLAY ZONES AND LIMITATIONS

The purpose of this section is to establish limitations on the height of objects and uses of land to prevent the creation of obstructions hazardous to aeronautical operations or which could increase the risk to the public's health, safety or well-being in the event of an aviation accident or which would otherwise impair the full utility and operating capacity of [AIRPORT(S) NAME]. The section creates specific zones for three separate purposes providing height restrictions conforming to varying obstruction standards; land use limitations based on sensitivity to aviation generated noise and land use based on increased risk of injury, hazard to health or property damage in the event of an aircraft accident.

A. OBSTRUCTION HEIGHT ZONES

Zone sizes and height limitations established in this section conform to the standards for determining obstructions to air navigation of 14 CFR Part 77, ss 77.23.

1. CIVIL AIRPORTS

There are hereby created and established certain zones which include all of the land lying beneath the primary, approach, transitional, horizontal and conical surfaces as they apply to a particular airport. Such zones are shown on the Airport Height and Safety Zones attached to this Ordinance and made a part hereof as Appendix [1]. An area located in more than one of the described zones is considered to be only in the zone with the more restrictive height limitation. The various zones are hereby established and defined as follows:

- a. PRIMARY ZONE An area longitudinally centered on each runway, extending to each end for turf or sod runways or extending 200 feet beyond each end for paved runways. The width of the zone will be as specified for the most precise approach existing or planned for either end of that runway as follows:

[AIRPORT NAME(S)]

- (1) Precision Instrument Runway(s) [n/n], [n/n], and [n/n]: 1,000 feet.
- (2) Other than Utility, Non-precision Instrument Runway(s) [n/n], [n/n], and [n/n]: 500 feet.
- (3) Utility, Non-precision Instrument Runway(s) [n/n], [n/n], and [n/n]: 500 feet.
- (4) Other than Utility, Visual Runway(s) [n/n], [n/n], and [n/n]: 500 feet.
- (5) Utility, Visual Runway(s) [n/n], [n/n], and [n/n]: 250 feet.

PRIMARY ZONE HEIGHT No object or structure will be permitted within a primary zone that is not part of the landing and take-off facilities and is of a greater elevation AMSL height than the nearest point of the runway centerline.

- b. **APPROACH ZONE** An area longitudinally centered on the extended runway centerline and extending outward from the end of the PRIMARY ZONE. The approach zone is designated for each runway based upon the type of approach available or planned for that runway end.

- (1) **APPROACH ZONE WIDTHS** The inner edge of the approach zone is the same width as the PRIMARY ZONE. The outer width of the approach zone is prescribed for the most precise approach existing or planned for that runway end expanding uniformly outward to a width of:

[AIRPORT NAME(S)]

- (a) Precision Instrument Runway(s) [n], [n] and [n]: 16,000 feet.
 - (b) Other than Utility, Non-precision Instrument Runway(s) [n], [n] and [n]: 3,500 feet.
 - (c) Utility, Non-precision Instrument Runway(s) [n], [n] and [n]: 2,000 feet.
 - (d) Other than Utility, Visual Runway(s) [n], [n], and [n]: 1,500 feet.
 - (e) Utility, Visual Runway(s) [n], [n], and [n]: 1,250 feet.
- (2) **APPROACH ZONE LENGTHS** The approach zone extends for a horizontal distance of:

[AIRPORT NAME(S)]

- (a) Precision Instrument Runway(s) [n], [n], and [n]: 50,000 feet.
 - (b) Other than Utility, Non-precision Instrument Runway(s) [n], [n], and [n]: 10,000 feet.
 - (c) Utility, Non-precision Instrument Runway(s) [n], [n] and [n]: 5,000 feet.
 - (d) Other than Utility, Visual Runway(s) [n], [n], and [n]: 5,000 feet.
 - (e) Utility, Visual Runway(s): [n], [n], and [n]: 5,000 feet.
- (3) **APPROACH ZONE HEIGHTS** No object or structure will be permitted within an approach zone, beginning at its intersection with the end of the PRIMARY ZONE, having a height greater than the runway end elevation, the height above the runway end elevation increasing with horizontal distance outward as follows:

[AIRPORT NAME(S)]

- (a) Precision Instrument Runway(s) [n], [n], and [n]: one (1) foot vertically for every fifty (50) feet horizontally for the first 10,000 feet increasing to one (1) foot vertically for every forty (40) feet horizontally for an additional 40,000 feet.
 - (b) Other than Utility, Non-precision Instrument Runway(s) [n], [n], and [n]: one (1) foot vertically for every thirty four (34) feet horizontally.
 - (c) Utility, Non-precision Instrument Runway(s) [n], [n] and [n]: One (1) foot for every twenty (20) feet horizontally.
 - (d) Other than Utility, Visual Runway(s) [n], [n], and [n]: One (1) foot vertically for every twenty (20) feet horizontally.
 - (e) Utility, Visual Runway(s) [n], [n], and [n]: one (1) foot vertically for every twenty (20) feet horizontally.
- c. **HORIZONTAL ZONE** An area surrounding each public use airport with the outer boundary constructed by swinging arcs of specified radii from the center of each PRIMARY ZONE end for each airport runway then connecting adjacent arcs by tangents. The arc radii for each runway end will have the same arithmetic value and will be the highest value determined for either end of that runway. When a smaller arc is encompassed by the tangent connecting larger arcs, the smaller shall be disregarded in determining the zone boundary. The radius of each runway arc is:

[AIRPORT NAME(S)]

- (1) Precision Instrument Runway(s) [n/n], [n/n], and [n/n]: 10,000 feet.
- (2) Other than Utility, Non-precision Instrument Runway(s) [n/n], [n/n], and [n/n]: 10,000 feet.
- (3) Other than Utility, Visual Runway(s) [n/n], [n/n] and [n/n]: 5,000 feet.
- (4) Utility, Non-precision Instrument Runway(s) [n/n], [n/n] and [n/n]: 5,000 feet.
- (5) Utility, Visual Runway(s) [n/n], [n/n] and [n/n]: 5,000 feet.

HORIZONTAL ZONE HEIGHT No object or structure will be permitted in the horizontal zone that has a height greater than 150 feet above the airport elevation.

- d. CONICAL ZONE An area extending outward from the periphery of the HORIZONTAL ZONE for a distance of 4,000 feet.

CONICAL ZONE HEIGHT No object or structure will be permitted in the conical zone that has a height greater than 150 feet above the airport elevation at its inner boundary with permitted height increasing one (1) foot vertically for every twenty (20) feet of horizontal distance measured outward from the inner boundary to a height 350 feet above airport elevation at the outer boundary.

- e. TRANSITIONAL ZONE An area extending outward from the sides of each PRIMARY ZONE and APPROACH ZONE connecting them to the HORIZONTAL ZONE and an area outward 5,000 feet horizontally or until intersection with the CONICAL ZONE from the side of that portion of the APPROACH ZONE of a Precision Instrument Runway extending through and beyond the CONICAL ZONE.

TRANSITIONAL ZONE HEIGHT No object or structure will be permitted within the transitional zone greater in height than the PRIMARY ZONE or APPROACH ZONE at their adjoining boundary lines increasing at a rate of one (1) foot vertically for every seven (7) feet horizontally, with the horizontal distance measured at right angles to the runway centerline and extended centerline, until the height of the slope matches the height of the HORIZONTAL ZONE or the height of the CONICAL ZONE and for a horizontal distance of 5,000 feet from each side of that part of the APPROACH ZONE for a Precision Instrument Runway extending beyond the CONICAL ZONE.

2. MILITARY AIRFIELDS

There are hereby created and established certain zones which include all of the land lying beneath the primary, clear zone, approach clearance, inner horizontal, conical, outer horizontal and transitional surfaces as they apply to a particular military airfield. Such zones are shown on the Airport Height and Safety Zones attached to this Ordinance and made a part hereof as Appendix [1]. An area located in more than one of the described zones is considered to be only in the zone with the more restrictive height limitation. The various zones are hereby established and defined as follows:

- a. PRIMARY ZONE An area longitudinally centered on each runway with the same length as the runway. The width of the primary zone is [2,000 feet or at older established bases, reduced to the former criteria].

PRIMARY ZONE HEIGHT No object or structure will be permitted within a primary zone that is not part of the landing and take-off facilities and is of a greater elevation AMSL height than the nearest point of the runway centerline.

- b. CLEAR ZONE An area beginning at each end of each PRIMARY ZONE extending outward for 1,000 feet. The width of the clear zone is the same as the PRIMARY ZONE.

CLEAR ZONE HEIGHT No object or structure will be permitted within the first 200 feet of a clear zone that is not part of the landing and take-off facilities and is of a greater elevation AMSL height than the nearest point of the runway centerline. No object or structure will be permitted within the remaining 800 feet of a clear zone that is not part of the landing and take-off facilities and is of a greater elevation AMSL height than those heights prescribed in the following paragraphs c. and g. for the APPROACH CLEARANCE ZONE and TRANSITIONAL ZONE.

- c. APPROACH CLEARANCE ZONE An area symmetrically spaced about each runway centerline extended, beginning 200 feet beyond each end of the PRIMARY ZONE and extending outward for 50,000 feet. The width of the approach clearance zone is the same as the PRIMARY ZONE, uniformly flaring to 16,000 feet at 50,000 feet distance.

APPROACH CLEARANCE ZONE HEIGHT No object or structure will be permitted within the approach clearance zone beginning 200 feet from the runway end, having a height greater than the runway end elevation at its centerline, the height above the runway end increasing with horizontal distance outward one (1) foot vertically for every fifty (50) feet horizontally until reaching a height 500 feet above the established airport elevation, then remaining at this AMSL elevation until a distance 50,000 feet from the beginning point is reached.

- d. INNER HORIZONTAL ZONE An area around each military airfield constructed by scribing an arc of 7,500 feet about the end of each runway at its centerline and interconnecting the arcs by tangents.

INNER HORIZONTAL ZONE HEIGHT No object or structure will be permitted in the inner horizontal zone that has a height greater than 150 feet above the established airport elevation.

- e. CONICAL ZONE An area extending outward from the periphery of the INNER HORIZONTAL ZONE for a distance of 7,000 feet.

CONICAL ZONE HEIGHT No object or structure will be permitted in the conical zone that has a height greater than 150 feet above the established airport elevation at its inner boundary with permitted height increasing one (1) foot vertically for every twenty (20) feet of horizontal distance measured outward from the inner boundary to a height 500 feet above the established airport elevation at the outer boundary.

- f. OUTER HORIZONTAL ZONE An area extending outward from the outer periphery of the airfield's CONICAL ZONE for a distance of 30,000 feet.

OUTER HORIZONTAL ZONE HEIGHT No object or structure will be permitted in the outer horizontal zone that has a height greater than 500 feet above the established airport elevation.

- g. TRANSITIONAL ZONES Areas extending outward from the sides of the PRIMARY ZONE, the first 200 feet of the CLEAR ZONE and the APPROACH CLEARANCE ZONE connecting them to the INNER HORIZONTAL ZONE, the CONICAL ZONE and the OUTER HORIZONTAL ZONE.

TRANSITIONAL ZONE HEIGHT No object or structure will be permitted within the transitional zone greater in height than the PRIMARY ZONE, the CLEAR ZONE and the APPROACH CLEARANCE ZONE at their adjoining boundary lines increasing at a rate of one (1) foot vertically for every seven (7) feet horizontally, measured perpendicular to the runway centerline or centerline extended, until the transitional zone height matches the height of the INNER HORIZONTAL ZONE, the CONICAL ZONE or the OUTER HORIZONTAL ZONE.

3. OTHER HEIGHT LIMITATIONS

Outside of the zones established in paragraphs 1. and 2. above, no object or structure will be permitted within [COUNTY/MUNICIPALITY NAME] whose height would:

- a. Exceed 500 feet above ground level at its site.
- b. Cause an existing MDA, MOCA, MVA, or a decision height to be raised.
- c. Impose either the establishment of restrictive minimum climb gradients or nonstandard takeoff weather minimums for any runway at [AIRPORT(S) NAME].

B. AIRPORT NOISE ZONES, BOUNDARIES AND REQUIREMENTS

{AIRPORTS w/o FAR PART 150, AICUZ PROGRAM or EQUIVALENT NOISE STUDIES}

1. NOISE IMPACT ZONES There are hereby created and established three (3) overlay land use noise zones: Zone A, Zone B, and Zone C. Such Zones are shown on the Airport Noise Impacted Zones for [COUNTY/MUNICIPALITY] attached to this ordinance and made a part hereof as Appendix [2]. The noise zones contained herein are based on projected yearly averaged, 24-hour day/night average noise level (YDNL) impact projections arising from aircraft flight operations at [AIRPORT(S) NAME] through the year 20[nn].
 - a. ZONE A: That area commencing at the outermost boundary of the airport and extending outward there from to a boundary indicated on the Noise Zone Map as “B”. The outer boundary of Noise Zone A approximates a projected yearly averaged, 24-hour day/night average noise level(YDNL) contour of 75 Ldfl.
 - b. ZONE B: That area commencing at the boundary indicated on the Noise Zone Map as the outer boundary of Noise Zone A and extending outward there from to the boundary indicated on the Noise Zone Map as “C”. The outer boundary of Noise Zone B approximates a projected yearly averaged, 24-hour day/night average noise level(YDNL) contour of 70 Ldn.
 - c. ZONE C: That area commencing at the outer boundary indicated on the Noise Zone Map as the outer boundary of Noise Zone B and extending outward there from to the furthestmost boundary indicated on the Noise Zone Map. The outer boundary of Noise Zone C approximates a projected yearly averaged, 24-hour day/night average noise level (YDNL) contour of 65 Ldn.

{AIRPORTS w/o NOISE IMPACT STUDIES}

1. AIRPORT NOISE IMPACT ZONE There is hereby created and established an overlay land use noise zone for [COUNTY/MUNICIPALITY]. The zone is shown on the Airport Noise Impacted Zone attached to this ordinance and made a part hereof as Appendix [2]. The noise impact zone was created by outlining

an area *[beneath the standard VFR traffic pattern and buffer airspace established in FAA Order 7400.2C AND/OR measuring one-half the length of the longest runway on either side of and at the end of each runway]* which underlies the majority of recurring flight paths aircraft will use operating at **[AIRPORT(S) NAME]**. This zone shall be considered to have an existing and projected yearly averaged, 24-hour day/night average noise level (YDNL) impact of *[70 Ldn to 75 Ldn]* for land use purposes.

2. LEGAL DESCRIPTION OF NOISE ZONE BOUNDARIES

- a. Zone A applies to an area encompassing a projected yearly averaged, 24-hour day/night average noise level (YDNL) impact of 75 Ldn and above **[Example: entirely within the -NAME AIRPORT BOUNDARY- in - NAME COUNTY/MUNICIPALITY- Florida, and surrounding Runways [n/n], [n/n]] and [n/n] at various depths.]**
- b. Zone B applies to an area encompassing a projected yearly averaged, 24-hour day/night average noise level (YDNL) impact of 70 Ldn to 75 Ldn surrounding the **[AIRPORT NAME]** in **[COUNTY/MUNICIPALITY]**, more particularly described as follows: *[As appropriate or necessary for legal sufficiency]*
- c. Zone C applies to an area encompassing a projected yearly averaged, 24-hour day/night average noise level (YDNL) impact of 65 Ldn to 70 Ldn surrounding the **[AIRPORT NAME]** in **[COUNTY/MUNICIPALITY]**, more particularly described as follows: *[As appropriate or necessary for legal sufficiency]*

[OR]

[For airports without noise impact studies: That area surrounding the AIRPORT NAME(S) Runways [n/n], [n/n] and [n/n] in [JURISDICTION], etc., as appropriate or necessary for legal sufficiency

3. PERMITTED AND RESTRICTED ACTIVITIES All land uses shall be permitted in the several noise zones as provided in the Aviation Compatible Land Use Chart attached to this Ordinance and made a part hereof as Appendix [3]. Those activities and land uses not specifically listed in the Chart are permitted or restricted in the appropriate zones based on their similarity to noise tolerance and compatibility with normal airport operations as exhibited by the activities and land uses which are listed in the Chart at Appendix [3].
4. NOISE IMPACT ZONE SOUND LEVEL REDUCTION REQUIREMENTS These provisions shall apply to the construction, alteration, moving, repair, replacement and use of any use of any building or occupied permanent structure within **[COUNTY/MUNICIPALITY]** located within any noise impacted zone

defined in this Ordinance. Additions, alterations, repairs, and changes of use or occupancy in all buildings and structures shall comply with these provisions.

a. APPLICATION

- (1) EXISTING BUILDINGS - General buildings or structures to which additions, alteration, or repairs are made shall comply with all the requirements of this Ordinance except as specifically provided below:
 - (a) When additions, alterations, or repairs within any three year period exceed 50 percent of the value of an existing building or structure, such buildings or structures shall be made to conform to the requirements of this Ordinance.
 - (b) Alterations or repairs not exceeding 50 percent of the value of an existing building or structure and which are nonstructural may be made with the same materials of which the building or structure is constructed.
 - (c) Not more than 50 percent of the roof covering of any building or structure shall be replaced in any three year period unless the next roof covering is made to conform to the requirements of this Ordinance.
 - (d) Buildings in existence at the time of the passage of this Ordinance may have their existing use or occupancy continued if such use or occupancy was legal at the time of passage provided such continued use does not jeopardize life or health.
- (2) MOVED BUILDINGS - Buildings or structures moved into or within [COUNTY/MUNICIPALITY] shall comply with applicable provisions of this regulation.
- (3) NEW BUILDINGS - Newly constructed buildings or structures shall comply with the applicable provisions of this regulation before permanent occupancy is permitted.

- b. DESIGN REQUIREMENTS - The Noise Level Reduction (NLR) requirements of the Aviation Compatible Land Use Chart at Appendix [3] may be achieved by any suitable combination of building design, choice of building materials and construction techniques in accordance with established architectural and acoustical principles. The reduction requirements shall apply to all occupied rooms having one or more exterior walls or ceilings, when furnished in accordance with the intended final usage of the room. Recommended Construction Methods and Materials Lists for NLR are shown at Appendix [4] of this ordinance.

- c. VALIDATION - Calculations to validate if sound level reduction meets requirements of this regulation may use the assumed Outside Noise Spectrum Graph shown in Appendix [5] attached to and made part of this regulation. Calculations shall take into account the area of exposed room surfaces, the sound transmission loss characteristics of exposed room surfaces, and the amount of sound absorption in the room. For rooms in residential structures, it can be assumed that the ratio of the sound absorption in each room to the room floor area is as follows:

Octave Frequency Band, Hz	Sound absorption Floor Area
63	0.30
125	0.50
250	0.75
500 and higher	1.00

In the calculations, allowance shall be made for a decrement of at least two decibels for sound leaks and flanking sound transmission paths.

C. PUBLIC SAFETY AND WELFARE

1. AIRCRAFT OVER FLIGHT AND ACCIDENT POTENTIAL ZONES

- a. ZONE DEFINITION: There are hereby created and established certain zones underlying those recurring, fixed flight paths for aircraft taking off and landing at [AIRPORT(S) NAME]. Of necessity, aircraft must routinely operate at low altitude and climb from or descend to the runway along these paths. The potential site of an aircraft accident, should one occur, is statistically most significant in these zones thus the risk of injury to people or damage to property on the ground that could result from such an accident is greatest.

(1) CIVIL AIRPORTS' AIRCRAFT OVER FLIGHT ZONES: The PRIMARY ZONE, APPROACH ZONE (limited to the inner 10,000 feet) and the adjoining TRANSITIONAL ZONES, described in paragraphs [A, I., a., A, I., b and A, I., d.] above and shown on the Airport Height and Safety Zones attached at Appendix [1].

(2) MILITARY AIRFIELD(S), ACCIDENT POTENTIAL ZONES(APZs) APZ(s) [A, B, and C] described in the [NAME(S)] Air Installation Compatible Use Zoning(AICUZ) Study and shown on the Airport Height and Safety Zones attached at Appendix [1].

[Minimum requirements of Ch 333, FS, ss 333.03, (3).]

(1) CIVIL AIRPORTS The PRIMARY ZONE and the APPROACH ZONE extending outward until the zone height reaches 50 feet above the runway end height described in paragraphs [A, 1., a. and A, 1., b.] above and shown on the Airport Height and Safety Zones attached at Appendix [1].

(2) MILITARY AIRFIELDS The PRIMARY ZONE and the CLEAR ZONE described in paragraphs [A, 2., a. and A, 2., b.] above and shown on the Airport Height and Safety Zones attached at Appendix [1].

- b. PERMITTED AND RESTRICTED ACTIVITIES All land uses shall be permitted in the several zones as provided in the Aviation Compatible Land Use Chart attached to this Ordinance at Appendix [3]. Activities and land uses not specifically listed are permitted or restricted based on their similarity for potential injury to people, risk to the public health and/or increased property damage should such activity or use be subjected to an aircraft accident as is exhibited by those activities and land uses listed in the Chart at Appendix [3].

2. IN-FLIGHT VISUAL OR ELECTRONIC INTERFERENCE

Notwithstanding any other provisions of this Ordinance, no use may be made of land or water within any zone established by this Ordinance in such manner as to interfere with the operation of an airborne aircraft. The following special requirements shall apply to each permitted use:

- a. All lights and illumination used in conjunction with streets, parking, signs or uses of land and structures shall be arranged and operated in such manner that is not misleading to or obscure pilots vision during critical take-off or landing stages of flight or be otherwise dangerous to aircraft occupants or flight operations at an airport covered in this Ordinance.
- b. No use of high energy beam devices is permitted where the energy transmission is not fully contained within a building or some type of absorbing or masking vessel.
- c. No operations from any type shall produce smoke, glare or other visual obscuration within [3] statute miles of any usable runway at an airport covered in this Ordinance.
- d. No operations from any type shall produce electronic interference with navigation signals or radio communication between aircraft, the airport, or an air traffic control facility.

3. AIRCRAFT BIRD STRIKE HAZARD

Waste disposal and other facilities which store, handle or process organic or any other material that foster or harbor the growth of insects, rodents, amphibians or other organisms will result in significant bird population increases above the normal background. These type facility operations increase the potential for aircraft bird strike resulting in damage to aircraft and injury to occupants. These uses are incompatible if located within the vicinity of any airport described in this Ordinance through the application of the following criteria:

- a. Facilities located within 10,000 feet of any runway used or planned to be used by turbine powered aircraft.
- b. Facilities located within 5,000 feet of any runway used only by conventional piston engine powered aircraft.
- c. Any facility located so that it places the runways and/or approach and departure patterns of an airport between bird feeding, water or roosting areas.
- d. Facilities outside the above perimeters but still within the lateral limits of any of the zones described in Paragraphs [A., 1. and 2.] above will be reviewed on a case-by-case basis.

D. DETERMINATION OF BOUNDARIES

In determining the location of boundaries for land use compatibility established by Paragraphs [A., B., and C.] above and depicted on the map[s] accompanying and made a part of these regulations, the following rules shall apply:

1. Where boundaries are shown to follow streets or alleys, the centerline of such streets or alleys, as they exist at the time of adoption of these regulations shall be the zone boundary; or
2. Where boundaries are shown to enter or cross platted blocks, property lines of lots as they exist at the time of adoption of these regulations shall be the zone boundary; or
3. Notwithstanding the above, where boundaries are shown on any platted lot provisions of the more restricted zones shall apply; or
4. Where boundaries are shown on unsubdivided property less than 10 acres in area, provisions of the more restricted zone shall apply; or
5. Where boundaries are shown on unsubdivided property ten (10) or more acres in area, the location shall be determined by the scale shown on the map unless dimensions are given on the map.

E. INDEPENDENT JUSTIFICATION

The purpose of the overlay zoning adopted through this Ordinance is to provide airspace protection and land use compatible with continuation of normal and routine operation of those airports covered without endangering the public health, safety and welfare. Each of the three zoning aspects requires independent justification in order to promote the public interest in health, safety and general welfare. No structure or use may be permitted in any zone unless it conforms to the specific height, noise impact sensitivity and public safety limitations at its site as set forth in Paragraphs [A., B. and C.] of this section.

F. NONCONFORMING USES

1. The requirements prescribed by this Ordinance shall not be construed to necessitate the removal, lowering, alteration or other changes of any existing structure or tree not conforming to the requirements as of the effective date of this Ordinance. Nothing in this Ordinance shall be construed to require the sound conditioning or other changes or alteration of any preexisting structure not conforming to requirements of this Ordinance as of its effective date or to otherwise interfere with the continuance of any such preexisting nonconforming use.
2. Nothing herein contained shall require any change in the construction or alteration which was begun prior to the effective date of this Ordinance, and is diligently pursued and completed within two (2) years thereof.
3. Before any nonconforming structure or tree may be replaced, substantially altered or repaired, rebuilt or allowed to grow higher or to be replanted, a permit must be secured from the Zoning Administrator.
4. No permit shall be granted that would allow the establishment or creation of an obstruction hazardous to aircraft operations or permit a nonconforming structure or tree or nonconforming use to be made or become higher or become a greater obstruction to air navigation than it was as of the effective date of this regulation.
5. Whenever the Zoning Administrator determines that a nonconforming use or nonconforming structure or tree has been abandoned or that the cost of repair, reconstruction or restoration exceeds the value of the structure or tree, no permit shall be granted that would allow said structure or tree to be repaired, reconstructed, restored or replanted except by a conforming structure or tree.
6. The cost of removing or lowering any tree not conforming to the requirements of this Ordinance shall be borne by the proprietor of the airport affected by the nonconforming tree.

G. FUTURE USES

No change shall be made in the use of land, and no structure shall be altered or otherwise established in any zone created by this Ordinance except in conformance with the requirements of this section.

III ADMINISTRATIVE PROCESSES

A. ADMINISTRATION AND ENFORCEMENT

It shall be the duty of the Zoning Administrator to administer and enforce the requirements prescribed herein within the territorial limits over which [COUNTY/ MUNICIPALITY] has jurisdiction through the permitting process. Permits shall be requested by use of the [APPLICATION FORM TITLE OR NUMBER] attached at Appendix [6]. Temporary or conditional permits pending completion of review, comment or approval by any other local, state or federal agency shall not be issued. In the event that the Zoning Administrator finds any violation of the requirements contained herein, the Zoning Administrator shall give notice to the person responsible for such violation in writing. Such notice shall indicate the nature of the violation and the necessary action to correct or abate the violation. A copy of said notice shall be sent to the Board of Adjustment. The Zoning Administrator shall order discontinuance of any work being done; or shall take any or all other action necessary to correct violations and obtain compliance with all the provisions of this Ordinance.

1. PERMITS

- a. HEIGHT ZONES. No building or structure, located within the lateral boundaries of the Airport Height and Safety Zones shown in Appendix [1] of this Ordinance, may be constructed, erected, moved to or repaired, altered or modified resulting in an increase in height, unless a building permit has been issued by the Zoning Administrator. No permit shall be issued unless the Federal Aviation Administration has reviewed the proposed construction or alteration and issued a written Determination of the proposal's effect on navigable airspace where such prior notification under Title 14, Code of Federal Regulations, Part 77 is required.

Notification is required for any temporary or permanent building or structure, whose height is proposed to exceed:

- (1) 200 feet above ground level at its site; OR,
 - (2) A slope increasing one (1) foot vertically for every one hundred (100) feet horizontally for a distance of 20,000 feet from the nearest point of the nearest runway at any airport covered by this Ordinance.
- b. NOISE ZONES. No building or structure, for which a NLR 25, NLR 30, or NLR 35 is required by the Aviation Compatible Land Use Chart at Appendix [3] of this Ordinance may be constructed, altered, moved to, demolished, or repaired unless a

building permit has been issued by the Zoning Administrator. No permit shall be issued unless construction plans and specifications for the building or structure reflect methods and materials either as recommended in Appendix [4] of this Ordinance or an acceptable alternative source and the combination of design, materials and methods will result in a sound level reduction for the applicable room(s) at least as great as the NLR value specified in Appendix [3] for the particular usage involved.

(1) APPROVAL OF METHODS OF CONSTRUCTION

- (a) The Zoning Administrator may approve any method of construction provided for in the Recommended Construction Methods and Materials Lists attached to this Ordinance at Appendix [4]; that the proposed design is satisfactory and that it complies with the NLR requirements of the Aviation Compatible Land Use Chart at Appendix [3].
- (b) The Zoning Administrator may require certified professional documentation or other appropriate data be submitted as evidence or proof to substantiate any claims made as to the sound level reduction performance of submitted construction methods.

(2) VERIFICATION AND ENFORCEMENT

- (a) The Zoning Administrator may, prior to granting final approval of the finished building construction, require, at the expense of the owner, field tests by a Qualified Acoustical Consultant to verify the sound level reduction (SLR) of the building.
- (b) For the purpose of standardization, to vary the noise level reduction requirements the verification field test may use the aircraft noise prevailing outside the building and will employ the following procedures:
 - i Using the noise signal generated by an individual aircraft operation (fly-over event), outside and inside noise levels may be measured simultaneously. The difference between the maximum noise levels outside and inside the room for the fly-over event should be taken as the measured SLR for the flyover event, provided that the maximum inside noise level exceeds, by at least seven decibels, the background noise level of the absence of the flyover.
 - ii The SLR should be determined for at least four flyover events for each room tested. The resulting SLR value assigned to the room would be the arithmetic average of the individual flyover event SLR values.

- iii For occupied rooms in residential structures, the inside noise level should be measured with a single microphone four feet above the floor near the center of the room.
- iv For other residential structures, the inside noise level should be measured with a single microphone five feet above the floor, either near the center of the room, or eight feet into the room from the exterior wall most directly exposed to the aircraft noise at whichever distance from the exposed wall is smaller. The outside noise level should be measured at an unobstructed location approximately five feet above the elevation of the floor of the room under test and eight feet away from the most directly exposed exterior wall near its center.
- v For structures in which several rooms are to be evaluated the tests need only be conducted in those rooms whose exterior walls are most directly exposed to the aircraft noise source. If noise level reduction requirements are met for these rooms, the tests need not be repeated for rooms of similar construction which are less directly exposed to the flyover event.
- vi For structures where a number of rooms receive nearly equal exposure to aircraft noise, tests need only be conducted in two of the near-identical rooms.
- vii For residential units, tests in two rooms are usually sufficient. One of the rooms tested must be the bedroom most directly exposed to aircraft noise. The other room tested may be either the living room, dining room or family room, whichever is most directly exposed to the aircraft noise source.
- viii When an unfurnished room or a room furnished less than normal is tested, the adjusted sound level reduction shall be computed by adding ten times the logarithm to the base ten of the ratio of the floor area of the room to the sound absorption in the unfurnished room. Such correction however shall not exceed two decibels. The adjusted sound level reduction value shall be used in determining compliance with the NLR requirements. If the sound level reduction is measured in a furnished room, no adjustment in the sound level reduction shall be made.
- ix The inside and outside sound levels may be observed directly by simultaneous readings of two sound level meters. Alternatively, inside and outside may be recorded simultaneously on magnetic tape with SLR determined by analysis of the recorded signals. For either method, each measuring system used must satisfy the requirements for a Type 2 sound level meter according to ANSI S1.4-197 and be

operated in the manner designated by ANSI S1.13-197 (or latest revisions thereof). Additionally, each system used must be calibrated prior to and following the flyover events so their indications are within one decibel, for the same sound level using suitable calibration procedures as specified by the system's manufacturer.

- c. AIRCRAFT OVER FLIGHT AND ACCIDENT POTENTIAL ZONES . Within the lateral boundaries of any Aircraft Over flight or Accident Potential Zone shown in Appendix [1] of this Ordinance, no building, structure, vehicle or vessel may be moved to, parked, moored, constructed, repaired, altered or modified, either permanently or temporarily, unless a building permit has been issued by the Zoning Administrator. No permit shall be issued unless the building, structure, vehicle or vessel conforms with requirements for land use within that safety zone as shown in Appendix [3].

2. CONDITIONS

a. HEIGHT ZONES

OBSTRUCTION MARKING AND LIGHTING - Any permit or variance granted shall as a specific condition, require the owner to mark and light the structure to indicate to aircraft pilots the presence of an obstruction to air navigation. Such marking and lighting shall conform to the specific standards established by Rule Chapter 14-60, Florida Department of Transportation and Federal Aviation Administration Advisory Circular 70/7460-1, as amended, attached at Appendix [7].

b. AIRPORT NOISE ZONES

NOTIFICATION OF POTENTIAL NOISE IMPACT . This notification condition shall apply to property within the various Airport Noise Impacted Zones shown in Appendix [2] including all residential development or non-residential development which could be adversely affected by airport generated noise.

- (1) NOISE ZONE A . No residential development shall be allowed within Noise Zone A.
- (2) NOISE ZONES B and C . Constructive knowledge shall be made available to all purchasers of residential property as provided for in Chapter 475.25,(1),(b), Florida Statutes; Chapter 498.037,(1), Florida Statutes; and Public Law 96-163 (49 USC 2107).
 - (a) Public notice through the use of maps, depicting noise impacted areas shall be available at the [COUNTY/ MUNICIPALITY NAME] Planning and Zoning Department.
 - (b) A listing of all residential property within noise impacted areas annotated as to Noise Zone, shall be made available. The listing will be compiled by the [COUNTY/MUNICIPALITY NAME] Tax Assessor from public records and shall be updated at least once each year. The listing will be used

by title companies, real estate agencies and individuals to determine the Notice required to be given to prospective purchasers of residential property.

- (c) A Disclosure Statement as shown Appendix [8] shall be completed for the sale of all residential property located in Noise Zones B and C and shall be filed with the property deed.
- (3) When the residential occupant(s) or end user of an affected property is not the purchaser, the purchaser must convey the notification condition to these parties. Such notification must be in writing, must be acknowledged by signature of the party(s) and must be accomplished prior to the party occupying or executing a lease, rental contract or any type legally binding obligation to occupy the property. A copy of the occupant(s)'s acknowledgement shall be filed with the property deed.

c. AIRCRAFT OVER FLIGHT/ACCIDENT POTENTIAL ZONES

NOTIFICATION: This notification condition shall apply to all property within the various Aircraft Over flight and Accident Potential Zones shown in Appendix [1] including any new development or use.

- (1) Constructive knowledge shall be made available to all purchasers and users of property as provided for in Chapter 475.25,(1),(b), Florida Statutes; Chapter 498.037,(1), Florida Statutes; and Public Law 96-163 (49 USC 2107).
- (2) Constructive knowledge shall be accomplished in manner and form prescribed in Paragraph A., 2., b., (2), above
- (a) When the end user of any affected property is not the purchaser, the purchaser must convey the notification condition to the user. Such notification must be in writing, must be acknowledged by user signature and must be accomplished prior to the user occupying or making any type legally binding obligation to occupy the property. A copy of the user's acknowledgement shall be filed with the property deed.
- (b) When the affected property also lies partially or entirely within any Airport Noise Impact Zone shown in Appendix [2], notification shall include specific reference to both aircraft over flight/accident potential and airport noise impact.

B. BOARD OF ADJUSTMENT

1. The [COUNTY/MUNICIPALITY] Zoning Board of Adjustment shall have and will exercise the following power on matters relating to areas within their territorial limit of authority:

- a. To hear and decide appeals from any order, requirement, decision, or determination made by the Zoning Administrator in the enforcement of this Ordinance;
 - b. To hear and decide any special exception to the terms of this Ordinance upon which such Board of Adjustment may be required to pass;
 - c. To hear and decide specific variances to requirements, conditions or limitations in this Ordinance.
2. The Board of Adjustment shall adopt rules for its governance in harmony with the provisions of this Ordinance. Meetings of the Board of Adjustment shall be held at the call of the chairman and at such other times as the Board of Adjustment may determine. The Chairman, or in his absence the acting Chairman, may administer oaths and compel the attendance of witnesses. All hearings of the Board of Adjustment shall be public. The Board of Adjustment shall keep minutes of its proceedings showing the vote, indicating such fact, and shall keep records of its examinations, and other official actions, all of which shall immediately be filed in the office of the [County or City] Clerk.
 3. The concurring vote of a majority of the members of the Board of Adjustment shall be sufficient to reverse any order, requirement, decision, or determination of the Zoning Administrator, or to decide in favor of the applicant on any matter upon which it is required to pass under this Ordinance, or to effect variation of this Ordinance.

C. VARIANCES

1. Any person desiring to erect or increase the height of any structure or use his property not in accordance with the requirements of this Ordinance, may apply to the Board of Adjustment for a variance from such requirement.
 - a. At the time of filing, the applicant shall forward a copy of his application for variance by certified mail return receipt requested, to the Florida Department of Transportation, Aviation Office, M.S. 46, 605 Suwannee Street, Tallahassee, Florida 32399-0450.
 - b. The department shall have 45 days from receipt of the application to provide comments to the applicant and the Board of Adjustment after which time that right is waived.
 - c. The Board of Adjustment may proceed with consideration of an application only upon receipt of Department of Transportation comments or the waiver of that right as demonstrated by the applicant's filing a copy of a return receipt showing the 45 days have elapsed.

- d. No application for a variance may be considered unless the applicant shows evidence the requirement for Notice of Construction or Alteration under Title 14, Code of Federal Regulations, Part 77 has been complied with.
 - e. No application for a variance to the requirements of this regulation may be considered by the Board of Adjustment unless a copy of the application has been furnished to the [COUNTY/MUNICIPALITY NAME] Zoning Administrator and the [AIRPORT NAME(S) MANAGER-DIRECTOR TITLE].
2. A variance may be granted by the Board of Adjustment where, owing to conditions peculiar to the property and not the result of the actions of the applicant, a literal enforcement of this Ordinance would result in unnecessary and undue hardship, and would prevent the substantial enjoyment of property rights as shared by nearby properties which do conform to this Ordinance. In granting any variance, the Board of Adjustment may prescribe appropriate conditions, requirements and safeguards in conformity with this Ordinance and the intent hereof including avigation easements if deemed necessary.

D. APPEALS

1. Any person aggrieved, or any taxpayer affected, by any decision of the Zoning Administrator made in the administration and enforcement of this Ordinance, may appeal to the Board of Adjustment.
2. All appeals hereunder must be made within a reasonable time as provided by the rules of the Board of Adjustment, by filing with the Zoning Administrator a notice of appeal specifying the grounds thereof. The Zoning Administrator shall forthwith transmit to the Board of Adjustment, all the papers constituting the record upon which the action appealed was taken.
3. An appeal shall stay all proceedings in furtherance of the action appealed unless the Zoning Administrator certifies to the Board of Adjustment, after the notice of appeal has been filed, that by reason of the facts stated in the certificate, a stay would cause imminent peril to life or property. In such case, proceedings shall not be stayed except by order of the Board of Adjustment on notice to the Zoning Administrator and after due cause is shown.
4. The Board of Adjustment shall fix a reasonable time for hearing appeals, give public notice and due notice to the interested parties and render a decision within a reasonable time. During the hearing, any party may appear in person, by agent or by attorney.
5. The Board of Adjustment may, in conformity with the provisions of this Ordinance, reverse or affirm, in whole or in part, or modify the order, requirement, decision or determination, as may be appropriate under the circumstances.

E. JUDICIAL REVIEW

Any person aggrieved, or any taxpayer affected by any decision of the Board of Adjustment, may appeal to the Circuit Court as provided in _____.

F. PENALTIES

Each violation of this Ordinance or of any regulation, order or ruling promulgated herein shall constitute a misdemeanor of the second degree and be punishable by a fine of not more than ____ dollars or imprisonment for not more than ____ days or both; and each day a violation continues to exist shall constitute a separate offense.

G. CONFLICTING REGULATIONS

Where there exists a conflict between any of the requirements or limitations prescribed in this Ordinance and any other requirements, regulations or zoning applicable to the same area, whether the conflict be with respect to the height of structures or trees; the use of land; or any other matter, the more stringent limitation or requirement shall govern and prevail. The variance to or waiver of any such more stringent limitation or requirement shall not constitute automatic variance or waiver of the less stringent limitations or requirements of this Ordinance.

H. SEVERABILITY

If any of the provisions of this Ordinance or the application thereof to any person or circumstances is held invalid, such invalidity shall not affect other provisions or applications of the Ordinance which can be given effect without the invalid provisions or application, and to this end the provisions of this Ordinance are declared to be severable.

I. EFFECTIVE DATE

This Ordinance shall take effect on adoption by the [COUNTY/MUNICIPALITY COMMISSION] and acknowledgement from _____ of the State of _____ that it has been filed and does hereby repeal all Ordinances or provisions thereof in conflict herewith.

PASSED AND ADOPTED in regular session this the _____ day of _____, 20__