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wholly or partially within the L_{dn} 65 dB boundary.

(b) For those agencies identified in (a) that have land use planning and control authority, the supporting documentation shall identify their geographic areas of jurisdiction.

PART C—MATHEMATICAL DESCRIPTIONS

Sec. A150.201 General.

The following mathematical descriptions provide the most precise definition of the yearly day-night average sound level (L_{dn}), the data necessary for its calculation, and the methods for computing it.

Sec. A150.203 Symbols.

The following symbols are used in the computation of L_{dn} :

Measure (in dB)	Symbol
Average Sound Level, During Time T	L_T
Day-Night Average Sound Level (individual day) ...	L_{dni}
Yearly Day-Night Average Sound Level	L_{dn}
Sound Exposure Level	L_{AE}

Sec. A150.205 Mathematical computations.

(a) Average sound level must be computed in accordance with the following formula:

$$L_{dn} = 10 \log_{10} \left[\frac{1}{86400} \left(\int_{0000}^{0700} 10^{[L_A(t)+10]/10} dt + \int_{0700}^{2200} 10^{L_A(t)/10} dt + \int_{2200}^{2400} 10^{[L_A(t)+10]/10} dt \right) \right] \quad (3)$$

Time is in seconds, so the limits shown in hours and minutes are actually interpreted in seconds. It is often convenient to compute day-night average sound level from the one-hour average sound levels obtained during successive hours.

(c) Yearly day-night average sound level must be computed in accordance with the following formula:

$$L_{dn} = 10 \log_{10} \frac{1}{365} \sum_{i=1}^{365} 10^{L_{dni}/10} \quad (4)$$

where L_{dni} is the day-night average sound level for the i -th day out of one year.

(d) Sound exposure level must be computed in accordance with the following formula:

$$L_{AE} = 10 \log_{10} \left(\frac{1}{t_2 - t_1} \int_{t_1}^{t_2} 10^{L_A(t)/10} dt \right) \quad (5)$$

$$L_T = 10 \log_{10} \left[\frac{1}{T} \int_0^T 10^{L_A(t)/10} dt \right] \quad (1)$$

where T is the length of the time period, in seconds, during which the average is taken; $L_A(t)$ is the instantaneous time varying A-weighted sound level during the time period T .

NOTE: When a noise environment is caused by a number of identifiable noise events, such as aircraft flyovers, average sound level may be conveniently calculated from the sound exposure levels of the individual events occurring within a time period T :

$$L_T = 10 \log_{10} \left[\frac{1}{T} \sum_{i=1}^n 10^{L_{AEi}/10} \right] \quad (2)$$

where L_{AEi} is the sound exposure level of the i -th event, in a series of n events in time period T , in seconds.

NOTE: When T is one hour, L_T is referred to as one-hour average sound level.

(b) Day-night average sound level (individual day) must be computed in accordance with the following formula:

where t_0 is one second and $L_A(t)$ is the time-varying A-weighted sound level in the time interval t_1 to t_2 .

The time interval should be sufficiently large that it encompasses all the significant sound of a designated event.

The requisite integral may be approximated with sufficient accuracy by integrating $L_A(t)$ over the time interval during which $L_A(t)$ lies within 10 decibels of its maximum value, before and after the maximum occurs.

[Doc. No. 18691, 49 FR 49269, Dec. 18, 1984; 50 FR 5064, Feb. 6, 1985, as amended by Amdt. 150-1, 53 FR 8724, Mar. 16, 1988; Amdt. 150-4, 69 FR 57626, Sept. 24, 2004]

APPENDIX B TO PART 150—NOISE COMPATIBILITY PROGRAMS

- Sec. B150.1 Scope and purpose.
- Sec. B150.3 Requirement for noise map.
- Sec. B150.5 Program standards.

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Sec. B150.7 Analysis of program alternatives.

Sec. B150.9 Equivalent programs.

Sec. B150.1 Scope and purpose.

(a) This appendix prescribes the content and the methods for developing noise compatibility programs authorized under this part. Each program must set forth the measures which the airport operator (or other person or agency responsible) has taken, or proposes to take, for the reduction of existing noncompatible land uses and the prevention of the introduction of additional noncompatible land uses within the area covered by the noise exposure map submitted by the operator.

(b) The purpose of a noise compatibility program is:

(1) To promote a planning process through which the airport operator can examine and analyze the noise impact created by the operation of an airport, as well as the costs and benefits associated with various alternative noise reduction techniques, and the responsible impacted land use control jurisdictions can examine existing and forecast areas of noncompatibility and consider actions to reduce noncompatible uses.

(2) To bring together through public participation, agency coordination, and overall cooperation, all interested parties with their respective authorities and obligations, thereby facilitating the creation of an agreed upon noise abatement plan especially suited to the individual airport location while at the same time not unduly affecting the national air transportation system.

(3) To develop comprehensive and implementable noise reduction techniques and land use controls which, to the maximum extent feasible, will confine severe aircraft YDNL values of L_{dn} 75 dB or greater to areas included within the airport boundary and will establish and maintain compatible land uses in the areas affected by noise between the L_{dn} 65 and 75 dB contours.

Sec. B150.3 Requirement for noise map.

(a) It is required that a current and complete noise exposure map and its supporting documentation as found in compliance with the applicable requirements by the FAA, per §150.21(c) be included in each noise compatibility program:

(1) To identify existing and future noncompatible land uses, based on airport operation and off-airport land uses, which have generated the need to develop a program.

(2) To identify changes in noncompatible uses to be derived from proposed program measures.

(b) If the proposed noise compatibility program would yield maps differing from those previously submitted to FAA, the program shall be accompanied by appropriately re-

vised maps. Such revisions must be prepared in accordance with the requirements of Sec. A150.101(e) of appendix A and will be accepted by FAA in accordance with §150.35(f).

Sec. B150.5 Program standards.

Based upon the airport noise exposure and noncompatible land uses identified in the map, the airport operator shall evaluate the several alternative noise control actions and develop a noise compatibility program which—

(a) Reduces existing noncompatible uses and prevents or reduces the probability of the establishment of additional noncompatible uses;

(b) Does not impose undue burden on interstate and foreign commerce;

(c) Provides for revision in accordance with §150.23 of this part.

(d) Is not unjustly discriminatory.

(e) Does not derogate safety or adversely affect the safe and efficient use of airspace.

(f) To the extent practicable, meets both local needs and needs of the national air transportation system, considering tradeoffs between economic benefits derived from the airport and the noise impact.

(g) Can be implemented in a manner consistent with all of the powers and duties of the Administrator of FAA.

Sec. B150.7 Analysis of program alternatives.

(a) Noise control alternatives must be considered and presented according to the following categories:

(1) Noise abatement alternatives for which the airport operator has adequate implementation authority.

(2) Noise abatement alternatives for which the requisite implementation authority is vested in a local agency or political subdivision governing body, or a state agency or political subdivision governing body.

(3) Noise abatement options for which requisite authority is vested in the FAA or other Federal agency.

(b) At a minimum, the operator shall analyze and report on the following alternatives, subject to the constraints that the strategies are appropriate to the specific airport (for example, an evaluation of night curfews is not appropriate if there are no night flights and none are forecast):

(1) Acquisition of land and interests therein, including, but not limited to air rights, easements, and development rights, to ensure the use of property for purposes which are compatible with airport operations.

(2) The construction of barriers and acoustic shielding, including the soundproofing of public buildings.

(3) The implementation of a preferential runway system.

(4) The use of flight procedures (including the modifications of flight tracks) to control

the operation of aircraft to reduce exposure of individuals (or specific noise sensitive areas) to noise in the area around the airport.

(5) The implementation of any restriction on the use of airport by any type or class of aircraft based on the noise characteristics of those aircraft. Such restrictions may include, but are not limited to—

(i) Denial of use of the airport to aircraft types or classes which do not meet Federal noise standards;

(ii) Capacity limitations based on the relative noisiness of different types of aircraft;

(iii) Requirement that aircraft using the airport must use noise abatement takeoff or approach procedures previously approved as safe by the FAA;

(iv) Landing fees based on FAA certificated or estimated noise emission levels or on time of arrival; and

(v) Partial or complete curfews.

(6) Other actions or combinations of actions which would have a beneficial noise control or abatement impact on the public.

(7) Other actions recommended for analysis by the FAA for the specific airport.

(c) For those alternatives selected for implementation, the program must identify the agency or agencies responsible for such implementation, whether those agencies have agreed to the implementation, and the approximate schedule agreed upon.

Sec. B150.9 Equivalent programs.

(a) Notwithstanding any other provision of this part, noise compatibility programs prepared in connection with studies which were either Federally funded or Federally approved and commenced before October 1, 1981, are not required to be modified to contain the following items:

(1) Flight tracks.

(2) A noise contour of L_{dn} 70 dB resulting from aircraft operations and data related to the L_{dn} 70 dB contour. When determinations on land use compatibility using Table 1 of appendix A differ between L_{dn} 65–70 dB and L_{dn} 70–75 dB, the determinations should either use the more conservative L_{dn} 70–75 dB column or reflect determinations based on local needs and values.

(3) The categorization of alternatives pursuant to Sec. B150.7(a), although the persons responsible for implementation of each measure in the program must still be identified in accordance with §150.23(e)(8).

(4) Use of ambient noise to determine land use compatibility.

(b) Previously prepared noise compatibility program documentation may be supplemented to include these and other program requirements which have not been excepted.

PART 151—FEDERAL AID TO AIRPORTS

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