

SECTION 14. NOISE

Statute	Regulation	Oversight Agency
49 U.S.C. 47501-47507 (Aviation Safety and Noise Abatement Act of 1979, as amended) 49 U.S.C. 40101 et seq., as amended by PL 103-305 (Aug. 23, 1994) (The Federal Aviation Act of 1958) The Control and Abatement of Aircraft Noise and Sonic Boom Act of 1968 49 U.S.C. 47101 et seq., as amended by PL 103-305 (Aug. 23, 1994) (The Airport and Airway Improvement Act) 49 U.S.C. 2101 et seq. (Airport Noise and Capacity Act of 1990) 49 U.S.C. 44715 (The Noise Control Act of 1972)	14 CFR part 150 Noise Control and Compatibility Planning for Airports Advisory Circular, 150/5020 14 CFR part 161 Notice and Approval of Airport Noise and Access Restrictions	Federal Aviation Administration

14.1 REQUIREMENTS.

14.1a. For aviation noise analysis, the FAA has determined that the cumulative noise energy exposure of individuals to noise resulting from aviation activities must be established in terms of yearly day/night average sound level (DNL) as FAA's primary metric. The FAA recognizes CNEL (community noise equivalent level) as an alternative metric for California. An initial noise analysis during the environmental assessment process should be accomplished to determine whether further, more detailed analysis is necessary.

14.1b. Permits/Certificates. Not applicable.

14.2 FAA RESPONSIBILITIES.

14.2a. If significant noise impacts are expected, the FAA official must prepare a detailed noise analysis as part of an EIS in accordance with the following requirements. An EIS need not be prepared if the proposed action incorporates mitigation that reduces the noise impact below significant noise impact threshold levels.

14.2b. All detailed noise analyses must be performed using the most current version of the FAA's Integrated Noise Model (INM), Heliport Noise Model (HNM), or Noise Integrated Routing System (NIRS). Use of an equivalent methodology and computer model must receive

prior written approval from the FAA's Office of Environment and Energy (AEE). Precedence evaluation with FAA screening methodologies, e.g., Area Equivalent Method (AEM) and Air Traffic Noise Screening (ATNS), may be appropriate. Use of equivalent screening methodologies must receive prior written approval from AEE. AEE has approved the DOD computer models MR_NMAP and MR_BOOMMAP for use and analysis of Special Use Airspace (SUA).

14.2c. All computer model input data should be collected early in the environmental process and should reasonably reflect current and forecasted conditions relative to the proposed action and alternatives. Unless it can be justified, all noise analyses must be performed using the FAA's INM, HNM, and/or NIRS standard and default data. Modification to standard or default data requires written approval from the Office of Environment and Energy (AEE). Guidance for submitting changes to the INM standard or default data can be obtained from the most current INM User's Guide. This guidance also applies for changes to standard or default NIRS data.

14.2d. Those who prepare EA's and EIS's will provide input documentation with one copy of the INM/HNM/NIRS input files used in the noise analyses and the corresponding case echo reports to the FAA official on electronic media specified by that official. If equivalent methodologies or the use of non-standard or non-default data are approved, a description of the methodology or additional, non-standard, or non-default data must be submitted along with a copy of AEE's approval.

14.3 SIGNIFICANT IMPACT THRESHOLDS. A significant noise impact would occur if analysis shows that the proposed action will cause noise sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure when compared to the no action alternative for the same timeframe. For example, an increase from 63.5 dB to 65 dB is considered a significant impact. Special consideration needs to be given to the evaluation of the significance of noise impacts on noise sensitive areas within national parks, national wildlife refuges and historic sites, including traditional cultural properties. For example, the DNL 65 dB threshold does not adequately address the effects of noise on visitors to areas within a national park or national wildlife refuge where other noise is very low and a quiet setting is a generally recognized purpose and attribute.

14.4 ANALYSIS OF SIGNIFICANT IMPACTS.

14.4a. For proposed actions involving a single airport which result in a general overall increase in daily aircraft operations or the use of larger/noisier aircraft, as long as there are no changes in ground tracks or flight profiles, the initial analysis may be performed using the FAA's Area Equivalent Method (AEM) computer model. The time of day is also part of the equation used in the AEM method. If the AEM calculations indicate that the proposed action would result in less than a 17 percent (approximately a DNL 1 dB) increase in the DNL 65 dB contour area, it may be concluded that there would be no significant impact over noise sensitive areas and that no further noise analysis is required. If the AEM calculations indicate an increase of 17 percent or more, or if the proposed action is such that use of the AEM is not appropriate, then the proposed

action must be analyzed using the INM or HNM to determine if significant noise impacts will result.

14.4b. The determination of significance must be obtained through the use of INM, HNM, or NIRS noise contours and/or grid point analysis along with local land use information and general guidance contained in Appendix A of 14 CFR part 150. Special consideration may need to be given to whether Part 150 land use compatibility categories need adjustment when evaluating the noise impact on properties of unique significance such as national parks, national wildlife refuges, and Tribal sacred sites. For example, Part 150 guidelines are not sufficient to address the effects of noise on some national parks or some parts of national parks. Part 150 land use guidelines are not applicable to determining impacts on wildlife. When instances arise in which aircraft noise is a concern with respect to wildlife impacts, available studies dealing with specific species should be reviewed and used in the analysis.

14.4c. In accordance with the 1992 FICON (Federal Interagency Committee on Noise) recommendations, examination of noise levels between DNL 65 and 60 dB should be done if determined to be appropriate after application of the FICON screening procedure (FICON p.3-5). If screening shows that noise sensitive areas at or above DNL 65 dB will have an increase of DNL 1.5 dB or more, further analysis should be conducted to identify noise-sensitive areas between DNL 60-65 dB having an increase of DNL 3 dB or more due to the proposed action. The potential for mitigating noise in those areas should be considered, including consideration of the same range of mitigation options available at DNL 65 dB and higher and eligibility for federal funding. This is not to be interpreted as a commitment to fund or otherwise implement mitigation measures in any particular area. (FICON p. 3-7).

14.4d. The INM or HNM will be used to produce the following information:

(1) Noise exposure contours at the DNL 75 dB, DNL 70 dB, and DNL 65 dB levels. Additional contours are optional and considered on a case-by-case basis.

(2) Analysis within the proposed alternative DNL 65 dB contour to identify noise sensitive areas where noise will increase by DNL 1.5 dB. Increases of 1.5 dB that introduce new noise sensitive areas to exposure levels of 65 dB or more are included in this analysis.

(3) Analysis within the DNL 60-65 dB contours to identify noise sensitive areas where noise will increase by DNL 3 dB, only when DNL 1.5 dB increases are documented within the DNL 65 dB contour.

14.4e. The noise analysis will be conducted to reflect current conditions and forecast conditions for all reasonable alternatives, including the preferred and no action alternatives. This analysis should include maps and other means to depict land uses within the noise impact area. The addition of flight tracks is helpful in illustrating where the aircraft normally fly. Illustrations shall be large enough and clear enough to be readily understood.

14.4f. Noise monitoring data may be included in an EA or EIS at the discretion of the responsible FAA official. Noise monitoring is not required and should not be used to calibrate the noise model.

14.4g. DNL contours, grid point, and/or change-of-exposure analysis will be prepared for the following:

(1) Current conditions; and

(2) Future conditions both with and without (no action) the proposal and each reasonable alternative. Comparisons should be done for appropriate timeframes. Timeframes usually selected are the year of anticipated project implementation and 5 to 10 years after implementation. Additional timeframes may be desirable for particular projects.

14.4h. If the above comparisons show a DNL 1.5 dB or greater increase over a noise sensitive area exposed to DNL 65 dB or greater as a result of the proposed project or any of its reasonable alternatives (except no action), a level of significant noise impact has been reached.

14.4i. The following information will be disclosed in the EIS for each modeling scenario that is analyzed:

(1) The number of people living or residences within each noise contour at or above DNL 65 dB, including the net increase or decrease in the number of people or residences exposed to that level of noise. (Use of maps that depict locations within a community of noise sensitive areas is recommended.)

(2) The location and number of noise sensitive uses (e.g., schools, churches, hospitals, parks, recreation areas) exposed to DNL 65 dB or greater.

(3) Mitigation measures in effect or proposed and their relationship to the proposal.

14.4j. When a proposed FAA action would result in a significant noise increase and is highly controversial on this basis, the EIS should include information on the human response to noise that is appropriate for the proposal under analysis. Inclusion of data on background or ambient noise may be helpful.

14.5 SUPPLEMENTAL NOISE ANALYSIS.

14.5a. The Federal Interagency Committee on Noise (FICON) report, "Federal Agency Review of Selected Airport Noise Analysis Issues," dated August 1992, concluded that the Day-Night Average Sound Level (DNL) is the recommended metric and should continue to be used as the primary metric for aircraft noise exposure. However, DNL analysis may optionally be supplemented on a case-by-case basis to characterize specific noise effects. Because of the diversity of situations, the variety of supplemental metrics available, and the limitations of

individual supplemental metrics, the FICON report concluded that the use of supplemental metrics to analyze noise should remain at the discretion of individual agencies.

14.5b. Supplemental noise analyses are most often used to describe aircraft noise impacts for specific noise-sensitive locations or situations and to assist in the public's understanding of the noise impact. Accordingly, the description should be tailored to enhance understanding of the pertinent facts surrounding the changes. The FAA's selection of supplemental analyses will depend upon the circumstances of each particular case. In some cases, this may be accomplished with a more complete narrative description of the noise events contributing to the DNL contours with additional tables, charts, maps, or metrics. In other cases, supplemental analyses may include the use of metrics other than DNL. Use of supplemental metrics selected should fit the circumstances. There is no single supplemental methodology that is preferable for all situations and these metrics often do not reflect the magnitude, duration, or frequency of the noise events under study.

14.5c. Supplemental analyses may be accomplished using the various capabilities of INM or NIRS for specific grid point analysis. Noise analyses can be used in combination with geographic information system (GIS) design programs such as AutoCAD and the U.S. Census TIGER databases to determine various population impacts within specified areas.

14.5d. For proposed air traffic or special use airspace actions above 3,000 feet above ground level (AGL), the ATNS or other FAA-approved screening shall be used. The ATNS allows the user to evaluate potential noise impacts resulting from changes in airport arrivals and departures by screening proposed changes to determine whether the change increases the community noise level by 5 decibels or more beneath the aircraft route. Where a proposed change would cause an increase in noise of 5 decibels or greater, FAA considers whether there are extraordinary circumstances that warrant preparation of an environmental assessment.

14.5e. For air traffic airspace actions where the study area is larger than the immediate vicinity of an airport, incorporates more than one airport, or includes actions above 3,000 feet AGL, noise modeling will be conducted using NIRS. For those types of studies, NIRS will be used to determine noise impacts from the ground to 10,000 feet AGL. This noise analysis will focus on the change in noise levels as compared to populations and demographic information at population points throughout the study area. Noise contours will not be prepared for the NIRS analysis. However, NIRS will be used to produce change-of-exposure tables and maps at population centroids using the following criteria:

DNL 60-65 dB	± 3 dB
DNL 45-60 dB	± 5 dB

14.5f. The following metrics have been used in developing supplemental noise analyses for a variety of reasons such as sleep disturbance, speech interference, soundproofing, and analysis for special areas such as national parks:

(1) **SEL (sound exposure level)** - A single event metric that takes into account both the noise level and duration of the event and referenced to a standard duration of one second.

(2) **L_{max} (maximum sound level)** - A single event metric that is the highest A-weighted sound level measured during an event.

(3) **L_{eq} (equivalent sound level)** - A cumulative level of a steady tone that provides an equivalent amount of sound energy for any specific period.

(4) **TA (time above)** - A time-based metric that gives the duration, in minutes, for which aircraft-related noise exceeded a specified A-weighted sound level during a given period.

(5) **SPL (sound pressure level)** - One-third octave band sound pressure levels that form the starting point for all other noise metrics. SPL provides a detailed description of the frequency components of a single complex sound and are used in assessing the effectiveness of soundproofing.

(6) **Audibility** - A time-based metric developed for use in Grand Canyon National Park to evaluate the substantial restoration of natural quiet as mandated by Public Law 100-91.

14.5g. The type and nature of activity potentially impacted should be considered. The FICON report identified sleep disturbance and speech interference as two areas where it is appropriate to consider supplemental metrics. In the case of sleep disturbance, the report referred the reader to a dose-response relationship developed by the US Air Force Armstrong Laboratories. This relationship relates SEL to a percent-awakened number. No provision is made for combining the effects of multiple events. To examine speech interference, FICON recommends using a cumulative A-weighted metric that is limited to the affected time period hours or a Time-above analysis. Additionally, FICON provides a table that relates DNL to speech interference. The guidelines for both sleep interference and communication interference relate the degree of interference to single event indoor noise levels. Refer to FICON for further guidance. In addition, the FAA will consider use of appropriate supplemental noise analysis in consultation with the officials having jurisdiction for national parks, national wildlife refuges, and historic sites including traditional cultural properties where a quiet setting is a generally recognized purpose and attribute that FAA identifies within the study area of a proposed action. Such supplemental noise analysis is not, by itself, a measure of adverse aircraft noise or significant aircraft noise impact. Offices within FAA must consult with and receive approval from AEE in determining the appropriate supplemental noise analysis for use in such cases.

14.6 PROJECTS NOT REQUIRING A NOISE ANALYSIS.

14.6a. No noise analysis is needed for proposals involving Design Group I and II airplanes (wingspan less than 79 feet) in Approach Categories A through D (landing speed less than 166 knots) operating at airports whose forecast operations in the period covered by the EA do not exceed 90,000 annual propeller operations (247 average daily operations) or 700 jet operations (2 average daily operations). These numbers of general aviation (GA) propeller and jet

operations result in DNL 60 dB contours of less than 1.1 square miles that extend no more than 12,500 feet from start of takeoff roll. The DNL 65 dB contour areas would be 0.5 (one-half) square mile or less and extend no more than 10,000 feet from start of takeoff roll. Note that the Cessna Citation 500 and any other jet aircraft producing levels less than the propeller aircraft under study may be counted as propeller aircraft rather than jet aircraft.

14.6b. No noise analysis is needed for proposals involving existing heliports or airports whose forecast helicopter operations in the period covered by the EA do not exceed 10 annual daily average operations with hover times not exceeding 2 minutes. These numbers of helicopter operations result in DNL 60 dB contours of less than 0.10 (one-tenth) square mile that extend no more than 1,000 feet from the pad. Note that this rule applies to the Sikorsky S-70 with a maximum gross takeoff weight of 20,224 pounds and any other helicopter weighing less or producing equal or less levels.

14.7 PART 150 NOISE PROPOSALS. If the proposal requiring an EA or EIS is the result of a recommended noise mitigation measure included in an FAA-approved 14 CFR part 150 noise compatibility program, the noise analysis developed in the program will normally be incorporated in the EA or EIS. The FAA responsible official must determine whether this is sufficient for EA or EIS noise analysis purposes.

14.8 FACILITY AND EQUIPMENT NOISE EMISSIONS. The provisions of the Noise Control Act of 1972 (NCA) (P.L. 92-574), as amended, apply. FAA may use State and local standards as a guide for particular activities if these standards are at least as stringent as Federal standards. The NCA provisions apply to all land uses. FAA should give special attention to noise sensitive sites in developing mitigation (e.g., scheduling machinery operations near hospitals).

14.9 FLIGHT STANDARDS

14.9a. Flight Standards actions that are subject to environmental procedures and assessments include the issuance of an air carrier operating certificate, an operating certificate, the approval of operations specifications or amendments thereto that may significantly change the character of the operational environment of an airport. The person responsible for issuing the certificate or approving the operations specifications is also responsible for assuring the assessment is prepared. Thorough coordination among Flight Standards District Office personnel, the Regional Flight Standards Division and the Regional Noise Abatement Officer is essential. Coordination among regions is expected if an action crosses regional boundaries.

14.9b. In preparing a noise analysis for an assessment, the Flight Standards District Office personnel normally will collect information from the operator that includes airports, types of aircraft and engines, number of scheduled operations per day, and the number of day/night operations. The information should also include the operator's long range plans and operation assumptions that are sufficiently conservative to encompass reasonably foreseeable changes in operations.

14.9c. If the carrier declines to furnish the information, or if the furnished information on operations at the airport does not realistically address night operations (in view of the carrier's proposal and pattern of activity at that airport), or if the information otherwise patently understates the potential operations (when compared with carrier's operations at other airports or with other carrier's operations at that airport), the responsible Federal official will develop an operational assumption which includes night operations and which is otherwise consistent with the typical operations of similar carriers at similar airports. This operational assumption will be used in the environmental assessment after coordination with the affected air carrier. If the air carrier objects to the use of this operational assumption in the assessment, the carrier may specify that a lesser level of operations be used in the assessment, provided that the carrier agrees that this lesser level will serve as a limit on the operations specifications. If the carrier refuses such a limitation, the FAA will include all reasonably foreseeable operations in the assessment. In this situation the assessment shall state the operational assumption was developed solely for the purpose of environmental analyses and that it is not to be viewed as a service commitment by the carrier.

14.9d. If an EIS is required, the affected operator should be advised as soon as possible and should be requested for any additional required information. District Office personnel will coordinate, as necessary, any activity with the operator. The certificate will not be issued or the operations specifications approved until all issues and questions associated with the EIS are fully resolved and the regional Flight Standards Division manager has concurred with the issuance or approval.