

Chapter 43
NOISE IMPACTS

MDT ENVIRONMENTAL MANUAL

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Chapter 43

NOISE IMPACTS

43.1 OVERVIEW

Noise, defined as unwanted or excessive sound, is an undesirable result of the modern way of life. It can be annoying, interfere with sleep, work or recreation and, in extremes, may cause physical and psychological damage. While noise emanates from many different sources, transportation noise is perhaps the most pervasive and difficult source to avoid. Highway traffic noise is a major contributor to overall transportation noise. A broad-based effort is needed to control transportation noise. This effort must achieve the goals of personal privacy and environmental quality while continuing the flow of needed transportation services for a quality society.

Many highway projects can cause noise levels to increase for affected receivers, during project construction and/or from operation of the highway facility. The magnitude of these increases and the impacts they have on affected receivers must be evaluated and addressed in accordance with Federal and State environmental review requirements and noise-specific statutes, regulations and policies.

This Chapter provides guidance on the policies and procedures for analyzing and responding to noise impacts of proposed MDT projects, including the evaluation and implementation of noise abatement measures and documentation and coordination of the noise analysis information.

43.2 LAWS, REGULATIONS AND GUIDANCE

43.2.1 23 USC 109(i) "Standards"

This Part of the *United States Code* (USC), codifies a provision enacted by the *Federal-Aid Highway Act* of 1970 that requires the US Department of Transportation to develop and adopt criteria for highway noise levels compatible with different land uses. The resulting criteria are contained in Title 23 of the *Code of Federal Regulations* (CFR), Part 772 "Procedures for Abatement of Highway Traffic Noise and Construction Noise." See [Section 43.2.3](#).

43.2.2 42 USC 4901-4918 "Noise Control"

These Parts of the USC codify the provisions of the *Noise Control Act* of 1972. They authorize the US Environmental Protection Agency (EPA) to establish noise regulations to control major sources of noise, including transportation vehicles and construction equipment.

43.2.3 23 CFR 772 "Procedures for Abatement of Highway Traffic Noise and Construction Noise"

This FHWA regulation provides procedures for noise studies and noise abatement measures, includes noise abatement criteria and establishes requirements for information to be given to local officials for use in the planning and design of highways approved pursuant to the Federal Highway Code (23 USC). The highway traffic noise prediction requirements, noise analyses, noise abatement criteria and requirements for informing local officials constitute the noise criteria mandated by 23 USC 109(i). All highway projects developed in conformance with this regulation are deemed to be in conformance with the FHWA noise criteria. The regulation is available on the FHWA website.

43.2.4 FHWA "Highway Traffic Noise Analysis and Abatement Policy and Guidance"

This document provides FHWA policies and guidance for the analysis and abatement of highway traffic noise. It includes information and guidance on "Noise Fundamentals," the provisions of 23 CFR 772 "FHWA Noise Regulations," "Highway Traffic Noise Analysis and Documentation," "Highway Traffic Noise Abatement" and other issues associated with highway traffic noise analysis and abatement. It is available on the FHWA website.

43.2.5 FHWA Highway Construction Noise Handbook

This *Handbook* provides guidance on measuring, predicting and mitigating highway construction noise and developing noise criteria. The *Handbook* includes the User's Guide for the FHWA Roadway Construction Noise Model (RCNM) to help users predict construction noise.

43.2.6 23 USC 139 "Efficient Environmental Reviews for Project Decision-Making"

For projects involving preparation of an environmental impact statement and for environmental assessments being prepared in accordance with the FHWA "SAFETEA-LU Environmental

Review Process Final Guidance,” this part of the USC requires that, at appropriate times during the study process, the lead agency or agencies for the project collaborate with agencies serving as participating agencies to determine the methodologies to be used and the level of detail required for assessing impacts, including noise impacts. See [Chapters 11 “Preparing Environmental Documentation,” 13 “Environmental Assessment/FONSI” and 14 “Environmental Impact Statement/ROD”](#) for further guidance on this requirement.

43.2.7 MDT Noise Policy

This 2009 document, available on the MDT website, establishes MDT policy on:

- traffic noise impacts for undeveloped lands where development is planned, designed and programmed;
- date of public knowledge (i.e., the date when the Federal/State governments are no longer responsible for providing noise abatement for new development that occurs adjacent to a proposed highway project);
- informing local officials of potential noise impacts;
- criteria for considering noise abatement measures;
- criteria for determining reasonableness and feasibility of proposed abatement measures;
- consideration of extenuating circumstances; and
- analysis and abatement of construction noise.

43.2.8 MDT Traffic Noise Analysis and Abatement Manual

This 2009 document, referred to as the *MDT Noise Manual* for the remainder of this Chapter, outlines in detail how to conduct traffic noise analyses for MDT projects and provides specifics for evaluating the reasonableness and feasibility of noise abatement. It also provides information on reporting and coordination with local officials.

43.2.9 NCHRP “Guidelines for Selection and Approval of Noise Barrier Products”

This July 2008 report documents the results of a study conducted for the purpose of developing guidance on noise barrier materials and products for use by State DOTs. The report provides recommendations on evaluation and selection procedures for noise barrier materials and products, including applicable standards and specifications. The report is available through the Transportation Research Board website.

43.3 PROCEDURES

43.3.1 Information Gathering

43.3.1.1 Initial Evaluation

The Preliminary Field Review (PFR) is the initial step in the noise analysis and abatement process for a proposed project. The PFR includes preliminary evaluation of the scope of work and potential for social, economic and environmental impacts, including noise impacts. The Design Team (DT) ensures appropriate MDT personnel, including the noise analyst within the Environmental Services Bureau (ESB) are notified of the field review and invited to participate. The ESB Project Development Engineer (PDE) reviews the list of ESB attendees and includes others as necessary to ensure appropriate ESB personnel are in attendance. The noise analyst may participate in the PFR to make a preliminary evaluation of available information on the project scope and the potential for traffic or construction noise impacts associated with the project location.

Following the field review, the DT prepares a PFR Report summarizing the issues discussed during the review. The final PFR Report is distributed for review and comment. Within ESB, the PDE serves as the document champion to coordinate and collect comments from other ESB Sections. The PDE compiles the comments into a PFR review memorandum for signature by the Environmental Services Bureau Chief.

The analyst evaluates whether the project is a “Type I Project” as defined in 23 CFR 772.5(h) (i.e., “a proposed Federal or Federal-aid highway project for the construction of a highway on new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes”) or if it otherwise has the potential for creating a traffic noise impact (e.g., idling vehicles at rest areas, weigh stations).

If it is determined that the proposed project is not a Type I Project and does not involve potential noise issues, the analyst documents the determination on the MDT Initial Site Assessment (ISA) Form for the project; attaches appropriate supporting information; includes the completed Form in the project file and ends information gathering for noise analysis purposes.

If it is determined that the proposed project is a Type I Project or involves potential noise issues, the analyst uses the FHWA Traffic Noise Model (TNM) Version 2.5 Look-Up Tables to conduct a preliminary evaluation of the project’s potential noise levels. The analyst documents the Type I determination and/or recommendations for further noise screening or analysis on the ISA Form for the project and includes a copy, along with the results obtained from the TNM Look-up Tables, in the project file and sends a copy to the Project Manager (PM). The analyst proceeds with gathering information for the preliminary noise screening procedure or detailed noise analysis, as applicable.

43.3.1.2 Information for Preliminary Noise Screening

When a preliminary screening (see [Section 43.3.2.1](#)) of a project is required to determine if a detailed noise analysis is necessary, the analyst refers to the *MDT Noise Manual*.

43.3.1.3 Information for Detailed Noise Analysis

When it is clear that noise impacts will occur on a project, or when the preliminary noise screening procedure determines a detailed noise analysis (see [Section 43.3.2.2](#)) is needed, the analyst gathers information necessary for conducting a detailed noise analysis as described in the *MDT Noise Manual*.

43.3.2 Analysis and Findings

43.3.2.1 Preliminary Noise Screening

The analyst uses the screening criteria in the *MDT Noise Manual* to evaluate the information gathered for the preliminary noise screening procedure and determine the need for further detailed noise analysis.

If it is determined the project does not require a detailed noise analysis, the analyst prepares a brief report or statement explaining the reasons, includes the statement in the project file and provides it for inclusion in the environmental documentation for the project. The analyst provides a copy of the information to the PM and PDE, and/or puts the information into the electronic and hard-copy files for the project..

43.3.2.2 Detailed Noise Analysis

When it is determined a detailed noise analysis is required, the analyst applies the procedures in the *MDT Noise Manual*. A detailed noise analysis involves measuring ambient noise levels at selected receivers, verifying the computer model against ambient noise measurements and traffic counts and modeling design year noise levels using projected traffic volumes for all alignments considered in the environmental document. In accordance with requirements in 23 CFR 772.17, the detailed noise analysis must use the FHWA Traffic Noise Model (FHWA TNM) or other model determined by the FHWA to be consistent with the methodology of the FHWA TNM. Using the procedures and guidance in the *MDT Noise Manual* and the FHWA TNM or other FHWA-approved noise model, the detailed noise analysis identifies locations where traffic noise impacts will occur. FHWA defines a noise impact as occurring when the predicted traffic noise levels approach or exceed the FHWA Noise Abatement Criteria (NAC) (see [Table 43-1](#)) or when the predicted traffic noise levels substantially exceed the existing noise levels. The MDT Noise Policy defines “approach” as 1 dBA less than the NAC for the land-use category involved and defines “substantially exceed” as 13 dBA above existing noise levels.

As a part of the detailed noise analysis, the analyst coordinates with the PM and the PDE to evaluate project modifications to minimize and avoid impacts and evaluates the reasonableness and feasibility of noise abatement measures for traffic noise impacts. The analyst and the PDE work together and involve other MDT personnel in an effort to ensure the design is optimized concerning environmental resource impacts. The analyst evaluates the reasonableness and feasibility of noise abatement measures according to the *MDT Noise Manual*.

Table 43-1 — FHWA NOISE ABATEMENT CRITERIA

Activity Category	Leq (h) dBA	Description of Activity Category
A	57 Exterior	Lands where serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 Exterior	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 Exterior	Developed lands, properties or activities not included in Categories A or B above.
D	—	Undeveloped lands.
E	52 Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

The analyst also identifies land uses or activities affected by noise from construction of the project and determines what measures may be needed in the plans and specifications to minimize or eliminate adverse construction noise impacts. In making the determination of measures to minimize or eliminate adverse impacts, the analyst weighs the benefits achieved and the overall adverse social, economic and environmental effects and costs of the abatement measures.

43.3.2.3 Detailed Noise Analysis Findings

Upon completion of the detailed noise analysis, the analyst prepares a report of the results in accordance with the *MDT Noise Manual*. The report includes the following information:

- identification of traffic noise impacts (including extent of impact in dBA, and comparison of predicted traffic noise levels with the NAC and existing noise levels);
- discussion of impact avoidance and minimization measures and the reasonableness and feasibility of noise abatement measures considered; and
- description of any noise abatement measures proposed for inclusion in the project (including dimensions, estimated costs, decibel reductions, etc.).

The analyst provides the Detailed Noise Analysis Report for incorporation in the project's environmental documentation and provides a copy to the PM and PDE. If the detailed analysis determines there are no reasonable and feasible traffic noise abatement measures for the project, this will end the traffic noise analysis and abatement process for the project; however, further action may be necessary for construction noise impacts; see [Section 43.3.2.4](#).

43.3.2.4 Construction Noise

Based on the evaluation of potential adverse construction noise impacts conducted as a part of the detailed noise analysis, the analyst may need to prepare special provisions for control of noise impacts during project construction (e.g., use of adequate mufflers on construction equipment, limiting work to daylight hours in residential or other noise-sensitive areas, responding to noise complaints). The analyst submits the special provisions to the PM and design team for incorporation in the project plans before they are submitted to the MDT Contract Plans Bureau.

43.3.2.5 Final Noise Abatement Decision

If the detailed noise analysis determines there are reasonable and feasible traffic noise abatement measures for the project, the analyst coordinates with the PDE and the PM to develop information for obtaining public input on the reasonable and feasible abatement measures. The information typically includes descriptions of the abatement measures, visual simulations showing the appearance of the measures in place along the project, depictions of available surface textures and colors, if applicable, and a written survey form for obtaining the views of affected residents.

The noise analyst, PDE and PM accomplish the actions for obtaining public input for noise abatement measures in conjunction with other public involvement measures for the project and provide the results to the noise impact analyst.

Based on the information in the Detailed Noise Analysis Report and the public input received regarding the traffic noise abatement measures, the analyst completes the Noise Abatement Recommendation Worksheet in Appendix A of the *MDT Noise Manual* to document the noise abatement decision. The analyst includes the completed and signed Worksheet in the project file and provides copies to the PM and others involved in the decision process.

The PDE uses information from the preliminary noise screening, Detailed Noise Analysis Report and Noise Abatement Recommendation Worksheet in preparing the environmental documentation for the project. See [Chapters 11 “Preparing Environmental Documentation,” 12 “Categorical Exclusion,” 13 “Environmental Assessment/FONSI” and 14 “Environmental Impact Statement/ROD”](#) for guidance on the presentation of noise impact information in environmental documentation.

43.3.3 Mitigation/Commitments

For projects where noise abatement measures are to be implemented, the analyst reviews the Scope of Work Report, provides written comments to the PDE and coordinates with the PM to ensure the noise abatement measures are accurately reflected in the Report.

The analyst coordinates with the PM and design team to review final project plans and ensures measures for noise impact avoidance, minimization and abatement are accurately reflected. The analyst prepares special provisions associated with the proposed noise abatement measures (e.g., for constructing the abatement measures prior to project construction). The analyst also prepares special provisions for control of noise impacts during project construction,

if necessary. The analyst coordinates with the PDE to ensure any noise mitigation commitments made during the project development process (e.g., the environmental document, public involvement) are accurately reflected in the project plans and specifications. To the extent possible, the PDE and analyst should prepare the contract documents using the *MDT Standard Specifications* to minimize the need for special provisions.

The analyst coordinates with the PDE and PM to ensure all special provisions and details concerning proposed traffic noise abatement measures and special provisions for control of construction noise, if applicable, are incorporated in the final project plans.

Based on specific project commitments, the analyst monitors construction noise for compliance with contract special provisions. The analyst may also conduct post-construction noise measurements to determine the effectiveness of constructed noise abatement measures and documents the results in the project file.