

Maine State Library

Digital Maine

Transportation Documents

Transportation

12-14-2007

Highway Traffic Noise Policy, November 2007 Draft

Maine Department of Transportation

David A. Cole

Jonathan McDade

Follow this and additional works at: https://digitalmaine.com/mdot_docs

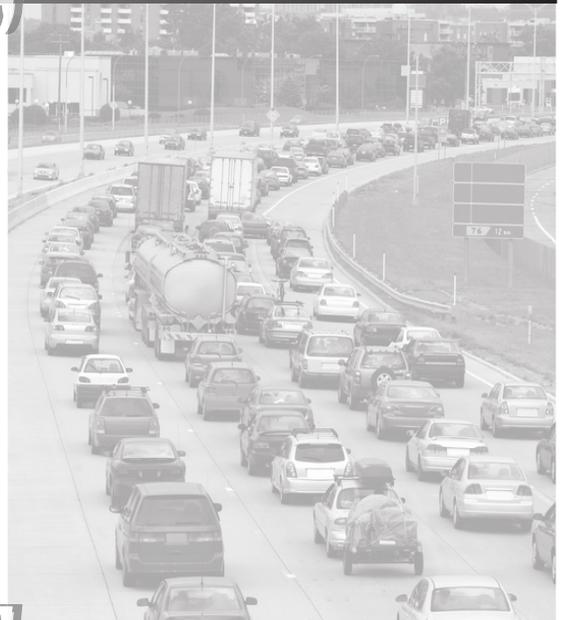
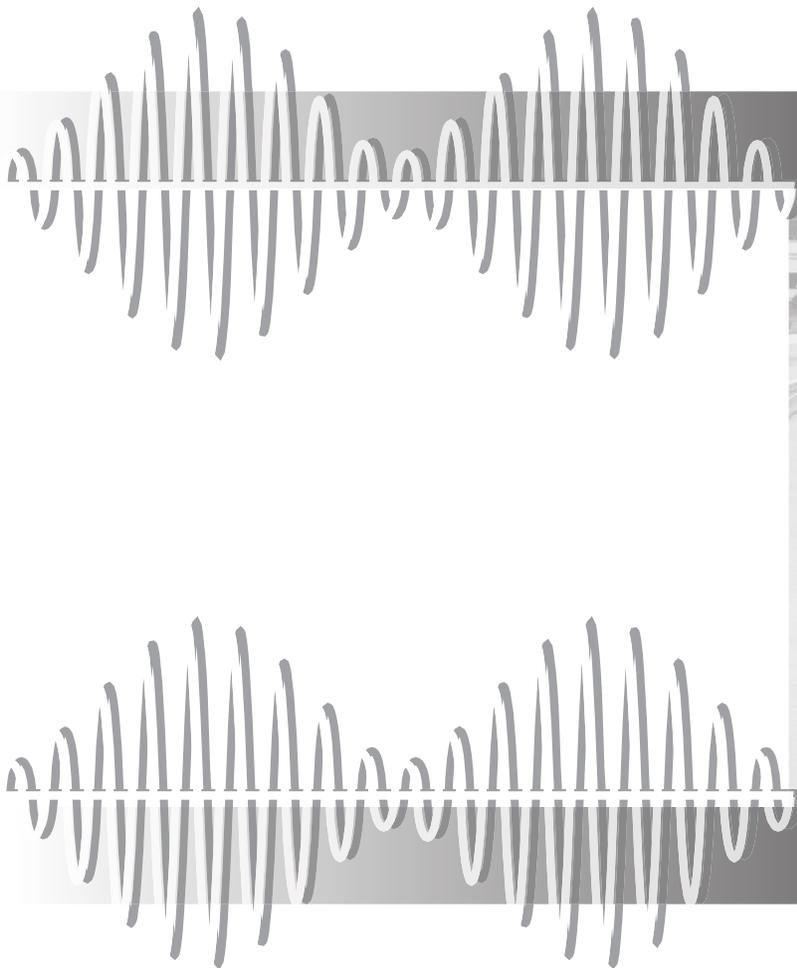
Highway Traffic Noise Policy

DAVID A. COLE

Commissioner,
Maine Department of Transportation

JONATHAN Mc DADE

Division Administrator
Federal Highway Administration



MaineDOT

Highway Traffic Noise Policy

State of Maine

Department of Transportation

Effective: DRAFT

This policy cancels and replaces the previous version of September 23, 1998.

David A. Cole
Commissioner, MaineDOT

Date

Jonathan McDade
Division Administrator, FHWA

Date

CONTENTS

EXECUTIVE SUMMARY	ii
I. INTRODUCTION	1
II. HIGHWAY TRAFFIC NOISE ANALYSIS	1
III. TYPE I PROJECT REQUIREMENTS	3
IV. TYPE II PROJECT REQUIREMENTS	3
V. FEASIBILITY CRITERIA	4
VI. REASONABLENESS CRITERIA	5
VII. LOCAL COORDINATION & COMMUNITY INVOLVEMENT	7
VIII. LOCAL/PRIVATE PROJECTS	7
IX. CONSTRUCTION NOISE	7
APPENDIX A. HIGHWAY NOISE FUNDAMENTALS	9
APPENDIX B. GLOSSARY	12
APPENDIX C. FHWA HIGHWAY TRAFFIC NOISE REGULATION	15

EXECUTIVE SUMMARY

This document serves as the Maine Department of Transportation (MaineDOT) policy on the evaluation and abatement of highway traffic noise impacts. Pursuant to Federal Highway Administration (FHWA) regulation, MaineDOT's highway traffic noise policy was originally adopted in 1998. This policy updates several areas of the 1998 policy including the reasonable cost threshold for abatement and sets a three year timeline for subsequent review.

Noise abatement measures are evaluated in two separate categories. Type I highway noise evaluations are conducted for new highway or capacity adding projects (i.e. additional travel lanes) to existing highways. Type II noise evaluations may be conducted for noise abatement measures along existing highways, under certain circumstances as outlined in Section IV, that are not being undertaken as a part of a highway improvement project¹.

The purpose of a highway traffic noise analysis is to identify impacted land uses (homes, schools, business, etc) and determine the feasibility and reasonableness of abatement measures. The terms "feasibility" and "reasonableness" are terms commonly used in highway traffic noise analysis to determine, among other things, the effectiveness (in terms of noise reduction) and the acceptable cost for any noise abatement measure. All noise abatement measures are evaluated based on the feasibility and reasonableness criteria identified in this policy.

Appropriate land-use strategies along Maine's highways can be an effective means of avoiding highway traffic noise impacts. MaineDOT encourages municipalities to establish appropriate land use controls over undeveloped lands adjacent to highways to prevent the development of incompatible activities along existing highways. Municipalities must have previously adopted an ordinance requiring developers or individuals to include noise abatement in their plans for new development along existing highways before MaineDOT will conduct a Type II noise analysis.

Appendix A provides useful information regarding the basics of sound, the fundamentals of highway traffic noise, and strategies for highway traffic noise abatement and control. Appendix B provides a glossary of specific terms used throughout the policy.

¹ For a complete definition of Type I and II noise projects, please see Sections III. and IV.

I. INTRODUCTION

The MaineDOT will use the following guidelines to determine the need, feasibility, and reasonableness of noise abatement or reduction measures along existing highways or proposed highway construction projects. This policy is based on established principles, practices, and procedures used by federal and state transportation agencies to assess highway-related noise levels.

This policy fully incorporates by reference the requirements of Title 23, Part 772 of the U.S. Code of Federal Regulations (23 CFR 772) and the noise related requirements of the National Environmental Policy Act (NEPA) of 1969. It is applicable to Type I and Type II projects as defined in Sections III and IV. However, the implementation of a Type II program is not required by federal or state statute or FHWA regulation. MaineDOT and FHWA will jointly review this policy every three years and adopt appropriate revisions when necessary. Any changes to this policy that are required as a result of federal or state, statutory, regulatory, or policy changes will be incorporated into this policy and submitted to FHWA for approval within 60 days.

II. HIGHWAY TRAFFIC NOISE ANALYSIS

MaineDOT's Bureau of Planning will perform or oversee the highway traffic noise analysis for both Type I and Type II projects². Requirements for the analysis and abatement of highway construction noise are discussed in Section IX. ***The purpose of a highway traffic noise analysis for either type of project is to identify impacted land uses based on the Noise Abatement Criteria (NAC) and determine the feasibility and reasonableness of abatement measures.***

For Type I Projects, highway traffic noise analysis will be performed for developed lands and undeveloped lands for which development is planned, designed, and programmed. Development will be deemed to be planned, designed, and programmed if a land use³, such as, but not limited to residences, schools, churches, hospitals, or libraries, has received site approval or a building permit from the local agency with jurisdiction prior to the approval of the highway project's environmental document, i.e., the date of approval of the Categorical Exclusion (CE), Finding of No Significant Impact (FONSI) or Record of Decision (ROD). Subsequent to this date, the MaineDOT is not responsible for providing noise abatement for new development. Highway traffic noise analysis for Type II projects will only be performed for development that predated the existence of the highway and has not previously been analyzed as a part of a previous Type I or Type II project.

² For a complete definition of Type I and II noise projects, please see Sections III. and IV.

³ See Appendix B, *Table B-1 Noise Abatement Criteria (NAC)* for a list of land uses and activities

A highway traffic noise analysis will include the following steps.

A. Determination of Existing Noise Levels.

Existing noise levels will be determined throughout the highway traffic noise study area through a combination of Leq noise measurements and computer modeling. The study area is defined as 500' from the current edge of pavement for Type II analyses and 500' from the proposed edge of pavement for Type I analyses. All computer modeling will be done using the most current readily available version of the FHWA Traffic Noise Model (FHWA TNM).

B. Prediction of Future Noise Levels

For Type I projects only, future highway traffic noise levels will be predicted for the design year, usually twenty years in the future, for each alternative under detailed study, including the “no-build” alternative, within the study area.

C. Determination of Impacts

Highway traffic noise impacts will be determined for each Type I or Type II project. Type I project impacts occur when the predicted future highway traffic noise levels approach within 1 dBA or exceed the NAC or when the predicted future highway traffic noise levels exceed the existing levels by at least 15 dBA. Type II project impacts occur when the existing highway traffic noise levels approach within 1 dBA or exceed the (NAC). (See Appendix B, Table B-1 for the NAC)

In determining traffic noise impacts, primary consideration is to be given to exterior areas where frequent human use occurs such as patios, porches, swimming pools, playgrounds, etc. If no exterior areas are present, the interior NAC will be used as the basis of determining noise impacts.

D. Evaluation of Abatement Measures

If a highway traffic noise impact is identified, the following abatement measures will be evaluated:

1. Traffic management measures such as traffic control devices and signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modified speed limits, and exclusive lane designations.
2. Alteration of the highway project's horizontal and vertical alignments.
3. Construction of noise barriers (including landscaping for aesthetic purposes and the acquisition of property rights) within or outside the highway right-of-way.
4. Acquisition of real property or interests therein (predominantly unimproved property) to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise. This measure may be included in Type I projects only.

5. Noise insulation of public use or non-profit institutional structures only, such as, but not limited to churches, schools, hospitals, or libraries.

E. Incorporation of Feasible and Reasonable Criteria

All Type I and Type II noise abatement measures will be evaluated based upon Feasible and Reasonable criteria in Sections V and VI.

F. Selection of Abatement Measures

The last step of the analysis will include selection of the noise abatement measures to be used, if abatement has met all the necessary criteria.

G. Completion of Follow-up Measures

After abatement is complete, follow-up noise measurements will be taken to determine the effectiveness of the abatement and to verify the noise model analysis. MaineDOT will provide the necessary maintenance to ensure the effectiveness of any abatement measure. However, MaineDOT will not maintain the noise insulation of publicly owned buildings, such as schools, or any other noise abatement measures not constructed by MaineDOT.

III. TYPE I PROJECT REQUIREMENTS

A Type I project includes the following types of proposed highway projects: the construction of a highway on new location, or the physical alteration of an existing highway that significantly changes the horizontal or vertical alignment or increases the number of through-traffic lanes. Such federally funded projects require the completion of an approved Environmental Impact Statement, Environmental Assessment, or Categorical Exclusion to satisfy the requirements of the National Environmental Policy Act. As part of this analysis, the need for noise abatement is evaluated for each individual highway project. Noise abatement measures for Type I projects will be funded as part of the proposed highway project.

An area or site must satisfy the following criteria to be eligible for noise abatement for a Type I project:

- A. Noise abatement must be reasonable and feasible as defined in Sections V and VI.
- B. The project must be eligible for federal aid construction funding.

IV. TYPE II PROJECT REQUIREMENTS

Type II or “retrofit” projects are noise abatement projects along existing highways. Any Type II noise abatement project that meets the requirements of this policy will become a candidate project during the development of the Biennial Capital Work Plan.

An area or site must satisfy the following criteria to be eligible for noise abatement for a Type II Project:

- A. Noise abatement must be reasonable and feasible as defined in Sections V and
- B. The project must be eligible for federal aid construction funding.
- C. Abatement will not be considered for any development that was planned, designed, and programmed after the original highway construction project. That is, the granting of a building permit or site approval from the local agency with jurisdiction must have occurred prior to right-of-way acquisition or construction approval of the original highway.
- D. Type II noise abatement will not be considered for highway projects approved after November 28, 1995⁴.
- E. Noise abatement measures will not be approved at locations where such measures were previously determined not to be reasonable and feasible for a Type I or Type II project.

V. FEASIBILITY CRITERIA

Feasibility is defined as the engineering and acoustical ability of abatement measures to provide effective noise reduction. When noise abatement measures are evaluated, feasibility criteria will include the following:

A. Noise Reduction

Can a 7 dBA or greater noise reduction be achieved? Abatement measures are not feasible if a 7 dBA noise reduction cannot be achieved for a majority (greater than 50%) of first row receivers.

B. Safety

Will the barrier, or other measure, create a safety issue? If so, the abatement measures are not feasible. Safety factors that should be considered in the design of the barrier include maintaining a clear recovery zone, redirection of crash vehicles, adequate sight distance, and emergency vehicle access.

C. Barrier Height

The maximum height of a noise barrier allowed under this policy is 20 feet.

D. Other Considerations

Other issues including, but not limited to, maintenance, drainage, snow removal, ROW acquisition and environmental impacts will also be considered when determining the feasibility of abatement. For any other considerations that may arise, MaineDOT will make a feasibility determination based on best engineering

⁴ The National Highway System Designation Act of 1995 (NHS) restricted Federal participation in Type II noise abatement to those projects that were approved before November 28, 1995

practices and anticipated cost. For example, it is possible that a noise barrier, or other abatement measure, may satisfy Parts A, B and C of this Section, but, not be feasible if wetland mitigation, additional ROW acquisition, or substantial fill and drainage were needed to complete the project.

VI. REASONABLENESS CRITERIA

Reasonableness implies that common sense and good judgment have been applied in arriving at a decision. The overall noise abatement benefits must outweigh the overall adverse social, economic, and environmental effects and the costs of the abatement measures. When noise abatement measures are considered, reasonableness criteria will include the following:

A. Maximum Cost of Abatement

The maximum cost of abatement is \$30,000 per benefited receiver. All receivers within the study area, as defined in Section II A, attaining at least a 5 dBA reduction will be counted as "benefited" and included in the cost calculation. For Type II projects, only receivers that preexisted the highway construction will be included in the cost calculation.

For the purposes of developing the total barrier cost, a cost of \$30.00 per square foot will be used, realizing that actual costs will vary. However, additional project costs, not included in the \$30.00 per square foot figure, may occur as a result of unique physical or natural conditions when modeling and designing a noise abatement barrier or other measure. Section V. D of this policy addresses "other considerations" that will be evaluated when determining the feasibility of proposed noise abatement measures. Both the unit cost and cost per benefited receiver will be updated when the policy is reviewed as defined in Section I to reflect actual barrier costs.

The MaineDOT will allow a municipality, or other interested party, to pay the difference above the allowable cost to satisfy this reasonableness criterion. No barrier will be funded by the MaineDOT, regardless of contribution sharing, which does not meet the "Feasibility" requirements. *This provision, cost participation by local municipalities, may be subject to change based upon future FHWA policy amendments or revisions.*

B. Land Use

Prior to conducting a Type II noise analysis, municipalities must have adopted appropriate land use strategies affecting undeveloped lands adjacent to existing highways to manage development of incompatible activities and avoid future public costs associated with mitigating highway traffic noise impacts. Incompatible activities include the most noise-sensitive land uses (such as homes, schools, hospitals, daycare centers, and nursing homes) and, generally correspond to the NAC Activity Categories A & B identified in Appendix B, Table B-1.

MaineDOT defines "appropriate land use strategies" to mean:

1. The municipality has adopted a zoning ordinance, subdivision ordinance, performance standard or other land use management strategy that addresses the manner in which any allowed/permitted activity must be designed, sited or constructed to protect the property or its users from noise impacts that may arise from the adjacent transportation use.
 - (a) For example, the municipality has adopted zoning that restricts development around Interstate highways, freeways, expressways and divided highways to less noise-sensitive uses such as commercial, industrial, or agricultural land uses, or;
 - (b) The locality has adopted an ordinance, building code, or other noise management or abatement strategy that does not allow the proposed new activity to be impacted by adjacent interstate, freeway, expressway and divided highway or approved highway corridor noise levels that approach within 1 dBA or exceed the Noise Abatement Criteria in Appendix B, Table B-1. An approved highway corridor is one in which FHWA has issued a ROD, FONSI, or CE for a specific project.
2. The ordinance must be in effect prior to the municipality's request of MaineDOT for a Type II noise analysis and must require that all noise abatement measures constructed by developers, at a minimum, not allow the proposed new activity to be impacted by adjacent transportation noise levels that approach within 1 dBA or exceed the Noise Abatement Criteria in Appendix B, Table B-1 for each noise sensitive land use. Developers should use the most current version of the FHWA Traffic Noise Model (FHWA TNM) to verify the maximum allowable noise levels.

C. Residents' Desires

A noise barrier will not be considered reasonable if fewer than 75% of the impacted receivers approve of the construction of a noise barrier. In the case of rental or leased properties, the views of the owner of the impacted receiver will be solicited to determine reasonableness. The MaineDOT will establish the approval rate of a noise barrier for impacted receivers by conducting a survey through certified or registered mail and a self-addressed stamped envelop.

D. Extenuating Circumstances

Extenuating circumstances may arise where unique or unusual conditions warrant special consideration of highway traffic noise impacts and/or implementation of abatement measures. Instances of extenuating circumstances could involve: receivers that are extremely noise sensitive, sites where severe noise impacts are predicted, or sites containing unique resources. Extenuating circumstances will be considered on an individual project basis.

VII. LOCAL COORDINATION & COMMUNITY INVOLVEMENT

Coordination with local agencies and community involvement is an important part of highway traffic noise control and the prevention of future impacts. Highway traffic noise impacts can be most effectively reduced through a program of shared responsibility. Local governments should use their power to regulate land development in such a way that particularly noise sensitive land uses are either prohibited from being located adjacent to a highway or that developments are planned, designed, and constructed so that highway traffic noise impacts are minimized.

Upon completion of the highway traffic noise analysis, information shall be provided to local government agencies within whose jurisdiction the highway project is located as to the implications of the project on that particular local community in the future. At a minimum, this will include modeled future highway traffic noise levels for both developed and undeveloped lands in the immediate vicinity of the project. The information will be disseminated through the distribution of highway project environmental documents and noise analysis reports and informational public meetings. The overall goal of this effort will be to prevent future highway traffic noise impacts on currently undeveloped lands and to promote noise compatible planning.

Decisions concerning noise abatement will include involvement from the local community. Impacted receivers input will be solicited for every project for which abatement measures are recommended. Based on the Reasonableness criteria in this policy, a majority (75%) of the owners of impacted receivers must approve the construction of a noise barrier; however, all members of the community at large will be given the opportunity to provide input.

Education will be provided to members of the general public within the scope of public meetings and publications that describe noise, noise-related impacts, highway traffic noise mitigation, and enforcement issues. Various publications are available on the FHWA web site (<http://www.fhwa.dot.gov/environment/noise/index.htm>) that explains many of these concepts.

VIII. LOCAL/PRIVATE PROJECTS

The use of MaineDOT's right-of-way for local/private noise abatement projects is prohibited.

IX. CONSTRUCTION NOISE

The following general steps are to be performed for all Type I and Type II projects:

- A.** Identify land uses or activities which may be affected by noise during construction of the project. Typical land uses or activities affected by construction noise include, but are not limited to, NAC Activity Categories A & B identified in Appendix B, Table B-1. This identification is to be performed during the planning studies and will be documented in the project's CE, EA or EIS.

B. Projects that are anticipated to have substantial construction noise impacts will include a construction noise analysis in the project's CE, EA or EIS document based on the most current version of the FHWA Roadway Construction Noise Model (FHWA RCNM).

C. Determine the measures which are needed in the plans and specifications to minimize or eliminate adverse construction noise impacts to the community. This determination will include a weighing of the benefits achieved and the overall adverse social, economic, and environmental effects and the costs of the abatement measures.

D. Incorporate the needed abatement measures in the plans and specifications.

E. If it is determined that abatement measures are necessary using the criteria in Section IX C., the contractor shall take measures to control the noise created by construction operations and equipment including, but not limited to, equipment used for drilling, pile driving, blasting, excavation, and hauling.

F. All methods and devices employed to minimize construction noise shall be subject to the continuing approval of the MaineDOT project resident.

APPENDIX A. HIGHWAY NOISE FUNDAMENTALS

The Basics of Sound

The decibel (dB) is the unit of measurement for sound. The decibel scale audible to humans spans approximately 140 decibels. A level of 0 decibels corresponds to the threshold of human hearing, while 140 decibels produces a sensation more akin to pain than sound, similar to standing near a jet engine as it takes off. Table A-1 shows sound levels for some common noise sources.

Table A-1 Typical Sound Levels⁵

NOISE SOURCE OR ACTIVITY	SOUND LEVEL dBA
Jet engine at takeoff	140
Fire engine siren	130
Jackhammer	120
Rock Concert	110
Circular Saw	100
Heavy truck or motorcycle	90
Garbage disposal	80
Busy restaurant	70
Normal Speech	60
Background music	50
Bedroom, Bird song	40
Quiet library, soft whisper	30
Quiet basement w/o mechanical equipment	20
Human breathing	10
Threshold of Hearing	0

The decibel scale is logarithmic rather than arithmetic. Consequently, traffic sound levels cannot be added by ordinary arithmetic means. For instance, two noise sources, each producing 90 dBA, will combine to produce 93 dBA, not 180 dBA. In other words, a doubling of the noise source produces only a 3 dBA increase in the sound pressure level. Studies have shown that this increase is barely detectable by the human ear. Furthermore, an increase or decrease of 5 dB would result in a clearly noticeable change in the sound level. A change of 10 dB in the sound pressure level will be perceived by an observer to be a doubling or halving of the sound.

The "A" weighting scale for decibel measurement is widely used in environmental work because it closely resembles the ear's sensitivity to high frequency noise. Therefore the unit of measurement for highway traffic noise becomes dBA. The noise descriptor used for environmental analysis is the equivalent sound level, Leq. The equivalent sound level is the steady sound level that has the same acoustic energy as the time varying sound level over the same time period.

The "A" weighting scale for decibel measurement is widely used in environmental work because it closely

Highway Traffic Noise

Sound can be either desirable or undesirable. Music is an example of desirable sound. Sound generated by motor vehicles traveling along highways is, generally, undesirable and is referred to in this policy as highway traffic noise.

Highway traffic noise is generated by four major sources: engine/drivetrain, exhaust,

⁵ Actual sound levels may vary depending on a number of factors, including the distance between source and receiver, intensity of the particular activity, and the degree of background noise.

aerodynamics, and tire-to-pavement friction. Recent research indicates that tires are the dominant noise source at speeds greater than 20 mph for cars and 30 mph for trucks. Tire sound levels increase with vehicle speed but also depend upon road surface, vehicle weight, tread design and wear. Changes in any of these factors can vary highway traffic noise levels. At lower speeds especially in trucks and buses, the dominant noise source is the engine and related accessories.

The level of highway traffic noise depends on three things: (1) the volume of free flow traffic, (2) the speed of the traffic, and (3) the number of trucks in the flow of traffic. Generally, the loudness of highway traffic noise is increased by heavier traffic volumes, higher speeds, and greater numbers of trucks. The loudness of highway traffic noise can also be increased by defective or modified exhaust systems and other faulty equipment on vehicles. Any condition (such as a steep incline) that causes heavy laboring of motor vehicle engines will also increase highway traffic noise levels. Other physical and environmental factors, such as distance from source to receiver, terrain, vegetation, and natural and manmade obstacles, also affect the loudness of highway traffic noise.

Highway Traffic Noise Strategies

Highway traffic noise can be addressed by a number of different strategies including: motor vehicle control, land use control, highway planning and design, and abatement. The responsibilities for implementing these strategies are shared by all levels of government: federal, state, and local.

Motor vehicle control

The State of Maine requires⁶ that all automobiles (excluding motorcycles) must be equipped with a muffler in good working order and prohibits amplification of exhaust noise above that emitted by the muffler originally installed on the vehicle. However, modifications are allowed if the muffler or exhaust system does not emit noise in excess of 95 decibels. In general, quieter vehicles would bring about a substantial reduction in highway traffic noise along Maine's roads and streets. MaineDOT does not have the authority to regulate motor vehicles. The Environmental Protection Agency (EPA) has issued regulations that limit the noise levels for new trucks with a gross vehicle weight rating (GVWR) of more than 10,000 pounds. In addition, many local governments have passed some form of community noise ordinance.

Land use control

Proper land use control along Maine's highways is an effective means of controlling the impacts of highway traffic noise. FHWA and MaineDOT encourage municipalities to plan, design, and construct new development projects and roadways that minimize potential highway traffic noise impacts. More specifically, municipalities are encouraged to establish building setbacks and vegetative buffer zones along existing highways. Noise-compatible planning encourages the location of less noise-sensitive land uses

⁶MRSA 29-A§ 1912

near highways, promotes the use of berms and open space separating roads from developments, and suggests special construction techniques that minimize the impact of highway traffic noise.

According to FHWA, there are several hundred thousand miles of existing highways in this country bordered by vacant land which may some day be developed. Proper land use control can help to prevent many future highway traffic noise problems in these areas. For more information about noise compatible planning, visit FHWA's website at <http://www.fhwa.dot.gov/environment/comgrwth.htm>.

MaineDOT also requires that local authorities have established appropriate land use controls over undeveloped lands adjacent to highways, prior to the implementation of a Type II noise analysis. See Section VI. B of this policy for a complete list of land use requirements for Type II projects.

Highway planning and design

Early in the highway planning and design stages, MaineDOT evaluates highway traffic noise and construction noise as part of the NEPA process. The purpose of this study is to determine if any of the proposed project alternatives will create noise impacts. MaineDOT will use the procedures outlined in Section II to identify noise impacts (if any) and evaluate potential abatement measures. Any noise abatement measures that satisfy all the requirements of this policy will be implemented as part of a Type I project. Type II projects will compete for funding during the development of the Biennial Capital Work Plan.

Abatement

Noise barrier walls and earth berms are frequently used to provide abatement for highway traffic noise. Noise barriers are solid walls built between the highway and noise-sensitive land uses (such as homes and schools) along the highway. Barriers can be formed from earth mounds along the road (earth berms) or from high, vertical walls. MaineDOT limits noise walls to a maximum of 20 feet in height for safety and structural concerns. Noise walls can be built from a variety of materials, including, but not limited to: wood, concrete, masonry, and metal.

Openings in noise walls for driveways, business entrances, or intersecting streets defeat the effectiveness of noise barriers. In many areas of Maine, homes are scattered too far apart to permit highway noise barriers to be built at a reasonable cost.

See Section II. D of this policy for the list of eligible noise abatement measures.

APPENDIX B. GLOSSARY

Abatement. A reduction in sound levels.

Benefited Receiver. A receiver that is expected to receive a minimum noise reduction of 5 dBA from the proposed abatement measure.

Biennial Capital Work Plan. The Biennial Capital Work Plan is a dynamic document that represents MaineDOT's entire two-year capital program and includes all existing projects in production.

dBA. A-weighted decibel unit used to measure sound that best corresponds to the frequency response of the human ear.

Design Year. The future year used to estimate the probable traffic volume for which a highway is designed. For highway projects, the "Design Year" is determined to be 20 years from the completion date (construction complete) of the proposed project.

Existing Noise Level. The noise, resulting from the natural and mechanical sources and human activity, present in a particular area.

First Row Receiver. A receiver that is directly adjacent to the highway or proposed highway project.

Impacted Receiver. Any receiver which approaches (within 1 dBA) or exceeds the NAC for the corresponding land use category, or any receiver that exceeds existing noise levels by 15 dBA.

Insertion Loss (IL). The actual acoustical benefit derived from the implementation of abatement measures. Insertion loss is calculated by subtracting the sound level with abatement from the sound level without the abatement.

Leq. The equivalent steady - state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period.

Leq (h). The hourly value of Leq.

National Environmental Policy Act (NEPA). Federal legislation that establishes environmental policy for the nation for federally funded projects. It provides an interdisciplinary framework to ensure that decision-makers adequately take environmental factors into account.

Noise Barrier. A natural or man-made object that interrupts the path of sound. A barrier could be a wall, an earth berm, or a combination of both.

Noise. Any unwanted sound.

Noise Abatement Criteria (NAC). FHWA-determined noise levels for various land uses and activities used to identify traffic noise impacts. The NAC are listed in Table B-1.

Table B-1 Noise Abatement Criteria (NAC)

NOISE ABATEMENT CRITERIA (NAC)		
ACTIVITY CATEGORY	Leq(h) dBA	DESCRIPTION OF ACTIVITY CATEGORY
A	57 Exterior	Lands on which 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.

Public Use or Nonprofit Institutional Structure. Any facility either owned by the public or owned by a nonprofit organization.

Highway Traffic Noise Impacts. Impacts which occur when the predicted highway traffic noise levels approach or exceed the noise abatement criteria (Table B-1 - above), or when the predicted highway traffic noise levels substantially exceed the existing noise levels.

Type I Projects. A proposed highway project for the construction of a highway on new location or the physical alteration of an existing highway which substantially changes either the horizontal or vertical alignment or increases the number of through-traffic lanes.

Type II Projects. A proposed project for noise abatement along an existing highway.

Receiver. The technical term used to describe the location of any properties included in the noise analysis.

Severe noise impacts. A severe impact occurs when absolute noise levels reach or exceed 75 dBA Leq or there is an increase of 30 dBA or more over existing noise levels.

Study Area. The study area is defined as 500' from the *current* edge of pavement for

Type II analyses and 500' from the *proposed* edge of pavement for Type I analyses.

Substantial Increase. A 15 dBA increase in noise levels predicted for the design year of a proposed highway project.

APPENDIX C. FHWA HIGHWAY TRAFFIC NOISE REGULATION

23 CF PART 772—PROCEDURES FOR ABATEMENT OF HIGHWAY TRAFFIC NOISE AND CONSTRUCTION NOISE

Section Contents

§ 772.1 Purpose.

§ 772.3 Noise standards.

§ 772.5 Definitions.

§ 772.7 Applicability.

§ 772.9 Analysis of traffic noise impacts and abatement measures.

§ 772.11 Noise abatement.

§ 772.13 Federal participation.

§ 772.15 Information for local officials.

§ 772.17 Traffic noise prediction.

§ 772.19 Construction noise.

Table 1 to Part 772—Noise Abatement Criteria

Appendix A to Part 772—National Reference Energy Mean Emission Levels as a Function of Speed

Authority: 23 U.S.C. 109(h), 109(i); 42 U.S.C. 4331, 4332; sec. 339(b), Pub. L. 104–59, 109 Stat. 568, 605; 49 CFR 1.48(b).

Source: 47 FR 29654, July 8, 1982; 47 FR 33956, Aug. 5, 1982, unless otherwise noted.

§ 772.1 Purpose.

To provide procedures for noise studies and noise abatement measures to help protect the public health and welfare, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways approved pursuant to title 23 U.S.C.

§ 772.3 Noise standards.

The highway traffic noise prediction requirements, noise analyses, noise abatement criteria, and requirements for informing local officials in this regulation constitute the noise standards mandated by 23 U.S.C. 109(i). All highway projects which are developed in conformance with this regulation shall be deemed to be in conformance with the Federal Highway Administration (FHWA) noise standards.

§ 772.5 Definitions.

(a) Design year. The future year used to estimate the probable traffic volume for which a highway is designed. A time, 10 to 20 years, from the start of construction is usually used.

(b) Existing noise levels. The noise, resulting from the natural and mechanical sources and human activity, considered to be usually present in a particular area.

(c) L10. The sound level that is exceeded 10 percent of the time (the 90th percentile) for the period under consideration.

(d) L10(h). The hourly value of L10.

(e) Leq —the equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period.

(f) Leq (h). The hourly value of Leq.

(g) Traffic noise impacts. Impacts which occur when the predicted traffic noise levels approach or exceed

the noise abatement criteria (Table 1), or when the predicted traffic noise levels substantially exceed the existing noise levels.

(h) Type I projects. 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.

(i) Type II projects. A proposed Federal or Federal-aid highway project for noise abatement on an existing highway.

§ 772.7 Applicability.

(a) Type I projects. This regulation applies to all Type I projects unless it is specifically indicated that a section applies only to Type II projects.

(b) Type II projects. The development and implementation of Type II projects are not mandatory requirements of 23 U.S.C. 109(i) and are, therefore, not required by this regulation. When Type II projects are proposed for Federal-aid highway participation at the option of the highway agency, the provisions of §§772.9(c), 772.13, and 772.19 of this regulation shall apply.

§ 772.9 Analysis of traffic noise impacts and abatement measures.

(a) The highway agency shall determine and analyze expected traffic noise impacts and alternative noise abatement measures to mitigate these impacts, giving weight to the benefits and cost of abatement, and to the overall social, economic and environmental effects.

(b) The traffic noise analysis shall include the following for each alternative under detailed study:

(1) Identification of existing activities, developed lands, and undeveloped lands for which development is planned, designed and programmed, which may be affected by noise from the highway;

(2) Prediction of traffic noise levels;

(3) Determination of existing noise levels;

(4) Determination of traffic noise impacts; and

(5) Examination and evaluation of alternative noise abatement measures for reducing or eliminating the noise impacts.

(c) Highway agencies proposing to use Federal-aid highway funds for Type II projects shall perform a noise analysis of sufficient scope to provide information needed to make the determination required by §772.13(a) of this chapter.

§ 772.11 Noise abatement.

(a) In determining and abating traffic noise impacts, primary consideration is to be given to exterior areas. Abatement will usually be necessary only where frequent human use occurs and a lowered noise level would be of benefit.

(b) In those situations where there are no exterior activities to be affected by the traffic noise, or where the exterior activities are far from or physically shielded from the roadway in a manner that prevents an impact on exterior activities, the interior criterion shall be used as the basis of determining noise impacts.

(c) If a noise impact is identified, the abatement measures listed in §772.13(c) of this chapter must be considered.

(d) When noise abatement measures are being considered, every reasonable effort shall be made to

obtain substantial noise reductions.

(e) Before adoption of a final environmental impact statement or finding of no significant impact, the highway agency shall identify:

(1) Noise abatement measures which are reasonable and feasible and which are likely to be incorporated in the project, and

(2) Noise impacts for which no apparent solution is available.

(f) The views of the impacted residents will be a major consideration in reaching a decision on the reasonableness of abatement measures to be provided.

(g) The plans and specifications will not be approved by FHWA unless those noise abatement measures which are reasonable and feasible are incorporated into the plans and specifications to reduce or eliminate the noise impact on existing activities, developed lands, or undeveloped lands for which development is planned, designed, and programmed.

§ 772.13 Federal participation.

(a) Federal funds may be used for noise abatement measures where:

(1) A traffic noise impact has been identified,

(2) The noise abatement measures will reduce the traffic noise impact, and

(3) The overall noise abatement benefits are determined to outweigh the overall adverse social, economic, and environmental effects and the costs of the noise abatement measures.

(b) For Type II projects, noise abatement measures will only be approved for projects that were approved before November 28, 1995, or are proposed along lands where land development or substantial construction predated the existence of any highway. The granting of a building permit, filing of a plat plan, or a similar action must have occurred prior to right-of-way acquisition or construction approval for the original highway. Noise abatement measures will not be approved at locations where such measures were previously determined not to be reasonable and feasible for a Type I project.

(c) The noise abatement measures listed below may be incorporated in Type I and Type II projects to reduce traffic noise impacts. The costs of such measures may be included in Federal-aid participating project costs with the Federal share being the same as that for the system on which the project is located.

(1) Traffic management measures (e.g., traffic control devices and signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modified speed limits, and exclusive lane designations).

(2) Alteration of horizontal and vertical alignments.

(3) Acquisition of property rights (either in fee or lesser interest) for construction of noise barriers.

(4) Construction of noise barriers (including landscaping for aesthetic purposes) whether within or outside the highway right-of-way.

(5) Acquisition of real property or interests therein (predominantly unimproved property) to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise. This measure may be included in Type I projects only.

(6) Noise insulation of public use or nonprofit institutional structures.

(d) There may be situations where severe traffic noise impacts exist or are expected, and the abatement measures listed above are physically infeasible or economically unreasonable. In these instances, noise abatement measures other than those listed in paragraph (c) of this section may be proposed for Types I and II projects by the highway agency and approved by the FHWA on a case-by-case basis when the conditions of paragraph (a) of this section have been met.

[47 FR 29654, July 8, 1982; 47 FR 33956, Aug. 5, 1982, as amended at 61 FR 45321, Aug. 29, 1996; 70 FR 16710, Apr. 1, 2005]

§ 772.15 Information for local officials.

In an effort to prevent future traffic noise impacts on currently undeveloped lands, highway agencies shall inform local officials within whose jurisdiction the highway project is located of the following:

(a) The best estimation of future noise levels (for various distances from the highway improvement) for both developed and undeveloped lands or properties in the immediate vicinity of the project,

(b) Information that may be useful to local communities to protect future land development from becoming incompatible with anticipated highway noise levels, and

(c) Eligibility for Federal-aid participation for Type II projects as described in §772.13(b) of this chapter.

§ 772.17 Traffic noise prediction.

(a) Any analysis required by this subpart must use the FHWA Traffic Noise Model (FHWA TNM), which is described in "FHWA Traffic Noise Model" Report No. FHWA-PD-96-010, including Revision No. 1, dated April 14, 2004, or any other model determined by the FHWA to be consistent with the methodology of the FHWA TNM. These publications are incorporated by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51 and are on file at the National Archives and Record Administration (NARA). For information on the availability of this material at NARA call (202) 741-6030, or go to http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html. These documents are available for copying and inspection at the Federal Highway Administration, 400 Seventh Street, SW., Room 3240, Washington, DC 20590, as provided in 49 CFR part 7. These documents are also available on the FHWA's Traffic Noise Model Web site at the following URL: <http://www.trafficnoisemodel.org/main.html>.

(b) In predicting noise levels and assessing noise impacts, traffic characteristics which will yield the worst hourly traffic noise impact on a regular basis for the design year shall be used.

[47 FR 29654, July 8, 1982; 47 FR 33956, Aug. 5, 1982, as amended at 70 FR 16710, Apr. 1, 2005]

§ 772.19 Construction noise.

The following general steps are to be performed for all Types I and II projects:

(a) Identify land uses or activities which may be affected by noise from construction of the project. The identification is to be performed during the project development studies.

(b) Determine the measures which are needed in the plans and specifications to minimize or eliminate adverse construction noise impacts to the community. This determination shall include a weighing of the benefits achieved and the overall adverse social, economic and environmental effects and the costs of the abatement measures.

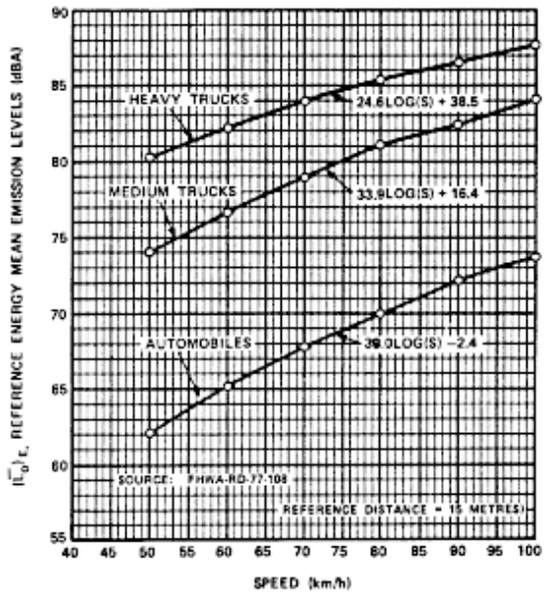
(c) Incorporate the needed abatement measures in the plans and specifications.

Table 1 to Part 772—Noise Abatement Criteria
 [Hourly A-Weighted Sound Level—decibels (dBA)¹]

Activity Category	Leq(h)	L10(h)	Description of activity category
A	57 (Exterior)	60 (Exterior)	Lands on which 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)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D			Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

¹Either L10(h) or Leq(h) (but not both) may be used on a project.

Appendix A to Part 772—National Reference Energy Mean Emission Levels as a Function of Speed



- LEGEND:
1. AUTOMOBILES: ALL VEHICLES WITH TWO AXLES AND FOUR WHEELS.
 2. MEDIUM TRUCKS: ALL VEHICLES WITH TWO AXLES AND SIX WHEELS.
 3. HEAVY TRUCKS: ALL VEHICLES WITH THREE OR MORE AXLES.

National Reference Energy Mean Emission Levels as a Function of Speed