

New Jersey Department of Transportation



TRAFFIC NOISE MANAGEMENT POLICY AND NOISE WALL DESIGN GUIDELINES

Effective July 1, 2011
Supercedes policy of July 2003

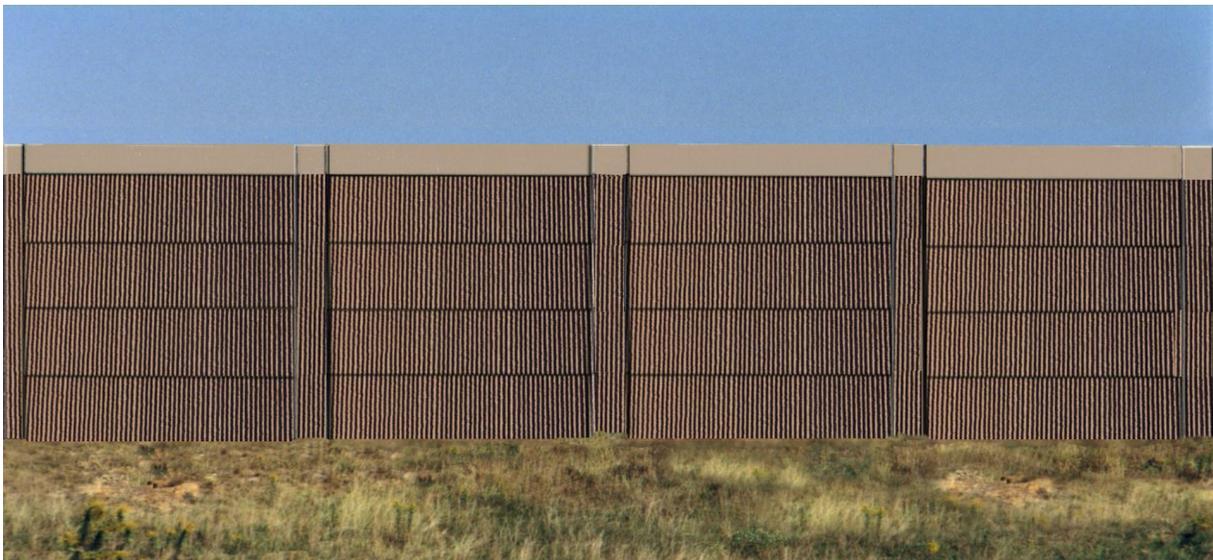


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New Jersey Department of Transportation
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PART - A

TRAFFIC NOISE MANAGEMENT POLICY

1. Preamble

Traffic noise is the most pervasive and most acutely perceived negative impact of transportation on the quality of life for residents living next to our highways. Our roads are the most intensively used in the nation. As our state continues to develop and as we strive to maximize the efficiency of our existing highways, strategies to address traffic noise on the quality of life for our residential and recreational neighbors will be a constant challenge.

Therefore, the Department must adopt a realistic, comprehensive policy which recognizes that noise impacts of traffic growth cannot be eliminated. However, just as we strive to make incremental improvements in the safety and efficiency of our highway network, traffic noise must be managed through a similar incremental, comprehensive approach.

This document was developed in response to FHWA Final Rule; "Procedures for Abatement of Highway Traffic Noise and Construction Noise" published July 13, 2010 and effective July 13, 2011. State agencies must submit their revised noise policies meeting these new requirements to the FHWA for approval by January 13, 2011 and must implement the new policies by July 13, 2011.

This policy will be reviewed at least once every five years to insure the measures included are consistent with economic and regulatory changes.

Copies of this policy are available through the New Jersey Department of Transportation, Division of Environmental Resources, PO Box 600, Trenton New Jersey 08625 or at the following link;

<http://www.state.nj.us/transportation> (Noise Policy Link)

2. Policy

NJDOT will follow a comprehensive approach to manage traffic noise encompassing the following three areas:

- A.** Reducing noise at the source
- B.** Education regarding traffic noise and appropriate land use planning
- C.** Measures to abate traffic noise

A. Reducing noise at the source

- (1) Provide information to the state police and Motor Vehicle Commission to help

insure that vehicles on our highways operate with adequate muffler systems and comply with existing federal noise regulations.

- (2) Integrate the Traffic Noise Management Program with the selection of pavement types for new roadways and for resurfacings, by considering open graded and other noise reducing pavements for NJDOT roadways traversing residential and recreational land use areas. The Department will enter the Federal Highway Administration's Quiet Pavement Pilot Program to further research in this effort. The NJDOT is expected to file its application in July of 2011.

B. Provide information regarding traffic noise and appropriate land use planning.

- (1) Provide information to citizens, legislators and municipal planning and engineering officials regarding;
 - (a) The nature of traffic noise - what it is, what can and cannot be done about it; and, eliminating some common misunderstandings.
 - (b) Encourage local municipalities to include design elements to avoid or mitigate future noise impacts for residential developments that are adjacent to highways.
- (2) Recommend legislation amending the Municipal Land Use Law to require developers to include measures to address traffic noise impacts for new residential developments proposed along state roads.

C. Measures to abate traffic noise

- (1) NJDOT will follow Federal Code 23 CFR 772 in analyzing noise impacts and developing cost effective mitigation measures for all of its projects. The regulations include traffic noise prediction requirements, noise analysis, noise abatement criteria and requirements for informing the community. The regulations apply to all federal aid funded FHWA approved projects whether they are state, local, highway or bridge authorities. The NJDOT will follow this policy for all of its projects regardless of funding. This regulation describes two types of projects, Type I and Type II, for which noise studies are performed and a Type III project for when these studies are not required:

Type I - Noise impact studies for new roadways and significant improvements to existing roadways as defined in 23 CFR 772.5. These studies are a required component of project development and noise impact abatement is an integral part of the project scope. Typically these projects include new roadway alignments, widening that include additional lanes and roadway improvements that incur significant horizontal or vertical changes to roadways.

Type II - Noise impact studies of existing roadways to improve quality of life, where no transportation improvement project is planned. These studies and construction of mitigation are not required to satisfy any Federal mandate.

Type III – Noise impact studies are not required for projects that do not alter the noise environment to a significant degree. Examples of these projects are paving, bridge reconstruction and replacement and projects that do not change the roadway alignment substantially.

- (2) For all Type I and Type II projects the feasibility and reasonableness of noise barriers must be considered. Factors that can affect the construction of noise barriers include safety, utilities, drainage, access and maintenance. All noise barriers that are proposed will be reviewed for their engineering feasibility. Other factors to be considered include the following;
- (a) Noise barriers will be built where they are desired by the community and meet the benefit and cost effectiveness criteria set forth in PART-B “NOISE WALL DESIGN GUIDELINES”.
 - (b) In circumstances where a noise barrier would exceed cost effective criteria, communities will not be allowed to volunteer a monetary or non-monetary contribution (easements, earthen fill material, etc.) in the amount necessary to bring costs to below our ceiling. This is referred to in 23CFR 772 as “Third Party Funding”. However, the community can fund costs for various aesthetic additions to noise barriers that have already been deemed feasible and reasonable with the approval of the Department.
 - (c) When cost effective, include absorbing barrier surface treatments whenever the traffic noise analysis indicates a need.
 - (d) As part of the design process, incorporate methods to enhance the appearance of barriers through architectural treatments and landscaping.
 - (e) Where noise barriers are not feasible and there is a documented need, public *perception* of traffic noise should be considered. When requested by the community and feasible, the Department may incorporate landscaping measures and/or visual screening to reduce the perceived impacts of traffic noise on the quality of life. However, these measures are not considered noise abatement.
 - (f) When feasible, provide open space buffers adjacent to highways.
 - (g) Maintain an inventory of noise barriers constructed by the Department to track location, cost, wall type and other factors. This information will

be included in a nationwide inventory maintained by FHWA. This inventory will be updated periodically when requested by FHWA.

3. Type II Noise Barrier Program

The New Jersey Department of Transportation will be participating in a limited Type II effort. This is necessary because projects to mitigate roadway noise compete directly with projects that are being developed to improve safety on our roads, reduce congestion, to repair aging bridges and roadway infrastructure. Currently five projects remain on the Department's previous Type II program priority list. The Department will limit our Type II program to these projects when funding becomes available. No additional requests will be accepted. The list of projects and their priority ranking are listed in Appendix A.

All Type II projects will be held to the eligibility standards of the Noise Wall Design Guidelines in part B of this policy with the exception that only those noise sensitive areas that existed prior to the highway construction (or had final site plan approval prior to the highway construction) will be considered for noise mitigation.

4. Methodology

All traffic noise analysis conducted by and for the Department will be consistent with 23CFR772 in its approach with regards to methodology, monitoring and modeling. Only the currently approved Federal Highway Administration Traffic Noise Model (TNM 2.5 is the current model) will be used for traffic noise analysis. Since the TNM Look-Up Tables are designed as a screening tool, it cannot be used for traffic noise analysis.

PART – B

NOISE WALL DESIGN GUIDELINES

1. Introduction

Federal Code 23 CFR 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise, is the guiding document for all proposed highway projects that require analysis of, or abatement of, highway traffic noise.

2. Terms

When the following terms are used in this Document, the intent and meaning shall be as follows:

dBA - A-weighted decibel, unit used to measure noise which best corresponds to the frequency response of the human ear.

Department - New Jersey Department of Transportation (NJDOT).

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.

Environmental Document Approval Date - The date of the Record of Decision (ROD), Finding of No Significant Impact (FONSI) or Categorical Exclusion (CE).

FHWA - Federal Highway Administration.

Impacted Receiver - Any receiver which has a loudest hour Leq that approaches (within 1 dBA) or exceeds the Noise Abatement Criteria for the corresponding land use category or exceeds the existing noise levels by 10 dB. See Federal Code 23 CFR 772 for the description of land use categories.

Insertion Loss - The amount of noise reduction provided by a noise barrier.

Leq - A time measure that accounts for the moment-to-moment fluctuations in noise levels due to all sources during that time period.

Leq(h) - The hourly value of Leq.

Noise Abatement - Any measure implemented to reduce highway traffic noise levels that achieves at least 5 dBA reduction. The noise reduction design goal is a reduction of at least 7 dBA.

Noise Abatement Criteria (NAC) - Numerical noise criteria promulgated by the Federal Highway Administration and published in Federal Code 23 CFR 772.

Noise Barrier - A solid structure designed to reduce exterior traffic noise levels at a ground level property adjacent to the highway.

Receiver - Precise location of outdoor activity on any property which is considered to contain noise sensitive land use. A complete list of noise sensitive land uses may be found in Federal Code 23 CFR 772.

Total Noise Barrier cost - Total cost associated with design and construction of noise barriers. Cost includes design, barrier construction, mobilization, landscape, drainage, traffic control, safety items, utilities work, right of way, construction inspection, and all other incidental costs required to construct the barrier.

Type I Noise Barrier - A noise barrier designed to abate traffic noise from the construction of a new highway or the physical alteration of an existing highway, which significantly changes the alignment or increases the number of through traffic lanes. The full definition is in 23 CFR 772.5.

Type II Noise Barrier - A noise barrier designed to abate traffic noise from an existing highway where no other transportation improvement project is planned.

Type III Project – A highway project where no traffic noise analysis is required.

3. Eligibility Criteria for Consideration of Noise Abatement

A. A traffic noise impact is defined as occurring when the predicted traffic noise levels approach (within 1 db), equal or exceed the noise abatement criteria (as shown in the table below) or when the predicted traffic noise levels exceed 10 dBA over the existing noise levels.

Noise Abatement Criteria (NAC) (Source: 23 CFR 772)

Hourly A-Weighted Sound Level - decibels (dBA) (1)

Activity Category	Activity Criteria (2)		Evaluation Location	Activity Description
	Leq(h)	L10(h)		
A	57	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 (3)	67	70	Exterior	Residential
C (3)	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E (3)	72	75	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included

				in A-D or F.
F	---	---	---	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	---	---	---	Undeveloped lands that are not permitted

- (1) Either Leq(h) or Ll0(h) (but not both) may be used on a project.
- (2) The Leq(h) and Ll0(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures.
- (3) Includes undeveloped lands permitted for this activity category.

B. For Type I projects, residential houses or developments must have obtained final building permit and approval prior to the environmental document approval date to be considered in the cost effectiveness evaluation.

For the Type II projects listed in Appendix A, only those noise sensitive areas that existed prior to the highway construction (or had a building permit approved prior to the highway construction) will be considered for noise mitigation.

4. Technical Criteria for Inclusion of Noise Abatement

A. The noise reduction goal shall be to obtain a 7 dBA noise reduction to at least one-half of the first row of residences or the closest area of human use of a noise sensitive area while maintaining the following:

- (1) A minimum of 5 dBA reduction is necessary to at least one-half of the first row of impacted residences or the closest area of human use of a noise sensitive impacted area for a barrier to be approved.
- (2) The design goal of a barrier system will be to achieve the above noise reductions with a wall height that should not exceed 20 feet (6.0 m).

B. The Department will consider a cost of up to \$50,000 per residential dwelling to be cost effective based on the total cost of the noise barrier. Each proposed barrier will be considered individually. Severe noise impacts, with absolute noise levels above 76 dBA or a 20 dBA increase over existing, will be given additional consideration (up to \$55,000 per dwelling) when evaluating cost effectiveness.

Dwellings that receive a 5 dBA reduction but are not noise impacts will be considered as Supplemental Benefits through a one half weighting (\$25,000 per residential dwelling) in the cost effective evaluation.

C. Based on a review of recent projects that contained noise barriers (year 2010), \$70 per square foot shall be used for barriers being incorporated into highway projects (type I), and \$90 per square foot shall be used for noise barrier with a sound absorbing treatment. These costs may change as necessary as part of the periodic

review of barrier cost which takes place at least once every five years.

- D.** The land uses listed in the table above will be evaluated for noise mitigation based on the human use that the area has. When section 4(f) of the USDOT Act of 1966 applies to a specific site, constructive use as it pertains to highway traffic noise needs to be considered. Therefore in cases of section 4(f) sites the provisions of section 4(f) of 23 CFR 774 will be applied.
- E.** All of the areas listed in Table 1, land use category “C”, “D” and “E” serve an important need and the reduction of traffic noise levels for these facilities is highly beneficial. Therefore the Department is committed to the elimination of the traffic noise impacts to these facilities as part of its Type I and Type II projects provided that;
- (1). The barrier meets the Department’s design goal for noise level reduction.
 - (2). In the case of section 4(f) sites, constructive use occurs when the predicted noise level exceeds the NAC and increases at least 3dBA over existing noise levels. Substantial impairment to the 4(f) facility also needs to be considered.
 - (3). The owner/ operator of the facility support the construction of the barrier.
 - (4). The barrier does not exceed the height restriction or other parameters outlined in this section with the exception of the cost per benefit. The Department will use the “equivalent number of residences” method to determine cost effectiveness of category “C”, “D” and “E” land uses. This method identifies a representative lot size of residential development and divides that land area into the noise impacted area of the facility to determine an equivalent number of residences.
 - (5). The barrier must be feasible from an engineering standpoint and cannot affect the use or access to the facility. In addition, the construction of the barrier cannot create a significant environmental impact to the facility or for the project.
- F.** The areas listed in Table 1, land use category “D” are the noise sensitive interior areas of those listed in category “C” that have noise sensitive interior uses. Traffic noise mitigation for category “D” land uses should be considered as part of that for the category “C” use. However, if these mitigation measures are found not to be reasonable or feasible, then and only then, can an indoor analysis be performed. Any mitigation for these interior uses will be limited to public and non-profit institutional buildings and can only be in the form of replacement of doors and windows that are found acoustically poor and where the replacement of such would provide at least the minimum noise reduction in this policy (closed condition).
- G.** No traffic noise mitigation will be considered for areas listed in Table 1, land use

category “F” and “G” and the interior areas of category “E”.

5. Aesthetic Considerations

- A.** In general, architectural treatments and landscaping shall be used to reduce visual impact and deter graffiti.
- B.** The Department shall rely on standardized wall types and designs for typical noise barrier applications.

Specialized or tailored wall systems may be considered by the Department for special situations, when deemed to be cost beneficial.

- C.** In general, the Department shall propose for comments by the community, architectural treatments for proposed noise barriers. Changes in architectural treatments based on input from the community shall be considered by the Department provided that:
 - (1) The cost of the architectural treatments does not increase the cost of the barrier by more than 5%. However, other higher cost architectural treatments may be approved by the Department provided the community pays for the additional costs above the 5% cap associated with the proposed treatment.
 - (2) The cost increase does not exceed cost effectiveness criteria.
 - (3) The architectural treatments do not have any adverse maintenance or safety impacts.
 - (4) The Department will have final approval on any recommendations made by the community.

6. Community Involvement in the Barrier Process

Early communication with the community regarding possible noise abatement is made at the start of the noise study process. Throughout the development of the project, the Department will meet with local officials and affected residents, present information on the nature of highway traffic noise, present and discuss the effects of noise barriers in attenuating traffic noise, and types of noise barriers that may be considered. Specific details, location, length, height, aesthetic treatment, landscaping, maintenance, drainage, safety, etc. of noise barriers being studied will also be discussed.

The Department will survey owners and residents of properties benefited by the noise barrier to determine the community support for the noise barrier in their area. The determination of the community support will be based by simple majority of the responses received by the Department. The Department will not construct any barrier

without the support of the local community based on this poll. In the case of schools, parks, recreation areas and other land uses listed in Category “C” of Table 1, it will be based on the approval of the owners and operators of the facility. In either case if there is no clear consensus, the barrier(s) will not be built.

The Department will then inform the local elected officials of the survey results and request a resolution of support for the abatement proposal based on this survey in order to further document public support for the noise mitigation.

7. Coordination with Local Officials

In an effort to prevent future traffic noise impacts on currently undeveloped lands, at the conclusion of the noise study process, the Department 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.

Appendix A
New Jersey Department of Transportation

Uncompleted Type II barrier projects and their priority

I-80 Elmwood Park and Rochelle Park – MP 60.5 to MP 62.0- The FA for the project was completed and a PIC was held in September of 2005. Both towns supported the construction of the noise barriers. The project went to CPM but was never funded.

I-195 Hamilton (Gropps Lake Area) – MP 1.67 to MP 3.37- The FA was completed for the project and a PIC was held in December of 2007. The Township of Hamilton supported the construction of the barriers. The Project went to CPM but was never funded.

I-80 Par-Troy, Montville, Fairfield and Wayne – MP 44.3 to 53.2- The FA was completed for the project and all of the communities supported the construction of the noise barriers as a result of the May 2007 PIC. The project went to CPM but was never funded.

I-95 Lawrence Twp. – MP 6.6 to MP 7.1- The FA was completed for the project and a PIC was held in October of 2007. The project went to CPM but was never funded. The Township of Lawrence supported the construction of the barrier.

I-78 from I-287 to Plainfield Ave. – MP 31.0 to MP 42.1- The noise analysis was not completed and no PIC was held. The FA for the project was never completed.