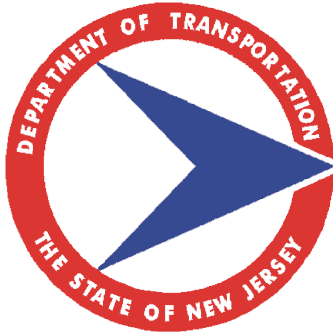


# New Jersey Department of Transportation



## TRAFFIC NOISE MANAGEMENT POLICY AND NOISE WALL DESIGN GUIDELINES

**2003**

(Revised July 10, 2003)



## **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, there will be an ever increasing noise impact on the quality of life for our residential neighbors.

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, to reduce its pervasive impacts on our state's residents.

#### **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 block traffic noise

##### **A. Reducing noise at the source**

- (1) Coordinate with the state police to 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 noise reducing pavements for NJDOT roadways traversing residential land use areas.

##### **B. Education regarding traffic noise and appropriate land use planning**

- (1) Conduct a comprehensive education program for citizens, legislators and municipal planning and engineering officials regarding.

- (a) The nature of traffic noise - what it is, what can be done about it; and, eliminating some common misunderstandings.
  - (b) Designing residential developments adjacent to highways to avoid future noise impacts.
- (2) Propose 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 block traffic noise

- (1) NJDOT will follow Federal Code 23 CFR 772 in analyzing noise impacts and developing cost effective mitigation measures. This regulation describes two sets of circumstances, Type I and Type II, for which noise studies are performed:

Type I - Noise impact studies for new roadways and improvements to existing roadways. These studies are a required component of project development and noise impact abatement is an integral part of the project scope.

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.

- (2) 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”.
- (3) In circumstances where a noise barrier would exceed cost effective criteria, communities will be allowed to volunteer a non-monetary contribution (easements, earthen fill material, etc.) in the amount necessary to bring costs to below our ceiling.
- (4) When cost effective, include absorbing barrier surface treatments whenever an existing residential area is opposite a proposed noise barrier.
- (5) As part of the Governor’s “New Jersey First” vision for including aesthetic enhancements in highway projects, use architectural treatments and context sensitive design in the noise barrier design process.
- (6) Establish a program to enhance the appearance of existing barriers through architectural treatments and landscaping.

- (7) Where noise barriers are not feasible, public *perception* of traffic noise impacts will be addressed, when requested by the community, through landscaping measures and/or visual screening to reduce the perceived impacts of traffic on the quality of life.
- (8) When feasible, provide open space buffers adjacent to highways in accordance with the Governor's Open Space Initiative.

### 3. Type II Noise Program

As a quality of life measure, the Department will evaluate and propose cost effective noise reduction measures for residential properties impacted by highway construction which was not evaluated under the National Environmental Policy Act of 1969 (NEPA) and, therefore, not considered for noise impact mitigation (generally prior to 1975). These communities are contiguous to a finite number of freeway miles and mitigation is currently estimated at \$200 million to address.

- A. The purpose of this program is to address the long standing noise problems of communities which pre-existed the construction of these highways.
- B. Consideration of mitigation for residential development which occurred after highway construction will be on a case by case basis where the development is intermixed, or adjacent to, pre-highway construction and mitigation is incidental to protecting pre-existing homes.
- C. Construction of noise mitigation will require a supporting resolution from the affected community.
- D. The eligibility criteria for the Type II program are:
  - (1) Residential communities located along limited access highways built before traffic noise mitigation was required by NEPA (construction completed during or before 1975).
  - (2) A Type I Noise Study was never completed for the highway section under consideration.
- E. The priority order for conducting noise studies and constructing mitigation is:
  - (1) Ongoing studies.
  - (2) Communities left out of the ongoing Type II Noise Study projects because they declined to cost share.
  - (3) Eligible corridors with previous NJDOT investment in data and analysis.

- (4) Other eligible corridors based on the age and magnitude of the noise problem.
- F.** The Department shall pursue Federal participation in the Type II program with the understanding that Federal participation will be limited as described in Federal Code 23 CFR 772.
- G.** The Department will program funds to address this problem within a finite period. Once completed, *no additional Type II noise mitigation will ever be considered for existing highways.*

## **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 dB) 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.

**L<sub>10</sub>** - The sound level that is exceeded 10 percent of the time (the 90<sup>th</sup> percentile) for the period under consideration.

**L<sub>10</sub> (h)** - The hourly value of L<sub>10</sub>.

**Noise Abatement** - Any measure implemented to reduce highway traffic noise levels that achieves at least 5 dBA reduction.

**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.

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

### 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) 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)

Activity Category	Leq (h)	L <sub>10</sub> (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.

NOTE: Either L<sub>10</sub> (h) or Leq (h) (but not both) may be used on a project.

- B. For Type I projects, residential houses or developments must have obtained final site plan approval prior to the environmental document approval date to be considered in the cost effectiveness evaluation.
- C. Type II projects will follow the same eligibility criteria as Type I projects but will only be considered on interstate and freeway type highways. Residential houses on developments constructed after December 31, 1975 will not be considered in the cost effectiveness evaluation.

#### **4. Technical Criteria for Inclusion of Noise Abatement**

- A. The noise barrier insertion loss (dBA reduction) goal shall be to obtain a 5-10 dB noise reduction.
  - (1) A minimum of 5 dBA reduction is necessary for a barrier to be approved.
  - (2) The design goal of a barrier system will be to achieve the above noise reductions with an average wall height of 16 feet (4.88 m) or less. Wall heights shall not exceed 18 feet (5.49 m) (Wall heights above 18 feet must be approved by the Director of Design Services).
- 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 between non-overlapping breaks in the barrier. Severe noise impacts, with absolute noise levels above 76 dB or a 20 dB increase over existing, will be given additional consideration (up to \$55,000 per dwelling) when evaluating cost effectiveness.

Dwellings that receive a 5 dB 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 current pricing (year 2002) \$50 per square foot (\$538 per square meter) shall be used for barriers being incorporated into highway (type I) projects, and \$60 per square foot (\$646 per square meter) shall be used for stand alone noise barrier (type II) projects.

#### **5. Structural Criteria**

Refer to the current NJDOT Bridges and Structures Design Manual, Section 47 (Noise Barriers).



## **6. 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 2%. However, other higher cost architectural treatments may be approved by the Department, provided the community pays for the additional costs above the 2% 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.

## **7. 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 impacted residents, present information on the nature of highway traffic noise, present the 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 then request a resolution from the local elected officials regarding the abatement proposal. The Department will not construct any barrier without the support of a local government resolution.

## **8. Coordination with Local Officials**

In an effort to prevent future traffic noise impacts on currently undeveloped lands, at the conclusion of the Final Noise Study, 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.