

APPENDIX 5: VTRANS NOISE ANALYSIS AND ABATEMENT POLICY



U.S. Department
of Transportation
**Federal Highway
Administration**

Vermont Division

July 13, 2011

87 State Street
Montpelier, VT 05602
(802) 828-4423
(802) 828-4424
Vermont.fhwa@fhwa.dot.gov

In Reply Refer To:

Mr. Brian Searles, Secretary
Vermont Agency of Transportation
1 National Life Drive
Montpelier, VT 05633-5001

Attention: Mr. John Narowski

Subject: VTrans Noise Analysis and Abatement Policy
2011 Revisions

Dear Mr. Searles:

As you are aware, FHWA promulgated new noise regulations at 23 CFR 772 requiring each state to update their own noise policies by July 13, 2011 to be consistent with the revised FHWA regulations. VTrans submitted a draft update of its noise policy in January, 2011 and the FHWA Vermont Division subsequently worked with Mr. Jeff Ramsey to resolve comments by FHWA Noise Specialists in our Washington, D.C. Headquarters. Based on the revisions, we have been informed by FHWA Headquarters that the 2011 VTrans Noise Analysis and Abatement Policy has been found to be in conformance with the revised FHWA regulations and has been approved for use. Enclosed is a copy of the final version of the policy.

Please be advised that the 2011 VTrans Noise Policy is effective today, July 13, 2011, and must be used to perform noise analyses for all projects. Noise analyses using the July 1997 VTrans Noise policy will no longer be accepted. Please make the updated Noise Policy available on the VTrans web site as well as appropriate contact information. In addition, we suggest that you pass this information along to design consultants and noise specialists that assist VTrans in analyzing highway noise issues and gauge the necessity for providing any training on the changes appearing in the policy. We appreciate the efforts of Mr. Ramsey and others in the VTrans Environmental Section to meet the deadlines imposed by the regulations. If you have any questions please contact this office.

Sincerely yours,

Kenneth R. Sikora, Jr.
Environmental Program Manager

Enclosure



VERMONT AGENCY OF TRANSPORTATION

NOISE ANALYSIS AND ABATEMENT POLICY

Effective July 13, 2011

1. INTRODUCTION

This document contains the Vermont Agency of Transportation (VTrans) noise policy on highway traffic noise and construction noise. This policy describes VTrans' implementation of the requirements of the Federal Highway Administration (FHWA) Noise Standard at 23 Code of Federal Regulations (CFR) Part 772 (see Appendix A). This policy was developed by VTrans and reviewed and concurred with by FHWA.

During the rapid expansion of the Interstate Highway System and other roadways in the 20th century, communities began to recognize that highway traffic noise and construction noise had become important environmental impacts. In the 1972 Federal-aid Highway Act, Congress required FHWA to develop a noise standard for new Federal-aid highway projects. While providing national criteria and requirements for all highway agencies, the FHWA Noise Standard gives highway agencies flexibility that reflects state-specific attitudes and objectives in approaching the problem of highway traffic and construction noise. This policy contains VTrans' policy on how highway traffic noise impacts are defined, how noise abatement is evaluated, and how noise abatement decisions are made.

In addition to defining traffic noise impacts, the FHWA Noise Standard requires that noise abatement measures be considered when traffic noise impacts are identified for Type I Federal projects. Noise abatement measures that are found to be feasible and reasonable must be constructed for such projects. Feasible and reasonable noise abatement measures are eligible for Federal-aid participation at the same ratio or percentage as other eligible project costs.

2. PURPOSE AND SCOPE

VTrans has developed a Noise Analysis and Abatement Policy for the purpose of ensuring statewide uniformity in the analysis of transportation generated noise, the identification of potential impacts of transportation projects, and implementation of noise abatement measures that are determined to be reasonable and feasible; and for the purpose of addressing the requirements of 23 USC 109(1) and 23 CFR § 772.

It is VTrans policy to comply with the procedures for analysis of traffic and construction noise and noise abatement as described in 23 CFR § 772. VTrans has adopted the Noise standards identified in 23 CFR §772.3 and the Noise Abatement Criteria (NAC) defined in Table 1 of Part 772.

This policy shall apply to all Federal or Federal-aid Type I highway construction projects. The development and implementation of a program for Type II projects is not required by Federal law or regulation and VTrans does not have or intend to establish a Type II program as of the date of this policy. Any project that does not meet the definition of a Type I or a Type II project is a Type III project. Type III projects do not normally require noise analysis or consideration of abatement.

3. DEFINITIONS

VTrans has adopted and/or established the following definitions of relevant terms:

- Approach: A predicted noise level that is at or within 1dB (A) below a Noise Abatement Criteria found in Table 1 to Part 772.

- **Benefitted Receptor:** a beneficiary of a noise abatement measure that achieves a noise reduction at or above 5 dB(A).
- **Common Noise Environment:** A group of receptors within the same Activity Category in Table 1, that are exposed to similar noise sources and levels, traffic volumes, composition and speed, and topographic features. Generally common noise environments occur between two or more noise sources, such as between interchanges, intersections, cross-roads, frontage roads, or in contiguous properties along a common frontage.
- **Date of Public Knowledge:** The date of a Programmatic Categorical Exclusion (PACE) determination, or the date of approval of a Categorical Exclusion (CE), a Finding of No Significant Impact (FONSI), or a Record of Decision (ROD) as defined in 23 CFR § 771.
- **Design Year:** The future year used to estimate the probable traffic volumes for which a highway project is designed.
- **Existing Noise Level:** The worst, hourly value, noise level resulting from the combination of natural and mechanical sources and human activity that is usually present in a particular area.
- **Feasibility:** A determination based upon evaluation of the combination of acoustical, physical, and engineering factors and conditions pertinent to a noise abatement measure. Construction of a noise abatement measure is not feasible unless a noise reduction of at least 5 dB(A) for the majority (over 50%) of impacted receptors can be achieved.
- **Impacted Receptor:** A recipient of traffic noise which meets the definition of Traffic Noise Impact.
- **L10:** A sound level that is exceeded 10 percent of the time (the 90th percentile) for a specific time period under consideration, with L10(h) being an L10 value for a specific hour.
- **Leq:** An equivalent steady-state sound level which contains the same acoustic energy as the time-varying sound levels occurring in a specific period of time, with Leq(h) being an Leq value for a specific hour.
- **Multifamily Dwelling:** A residential structure containing more than one residence. Each residence in a multifamily dwelling shall be counted as one receptor when determining impacted and benefitted receptors.
- **Noise Barrier:** A physical obstruction existing or constructed between a noise source(s) and a noise sensitive receptor(s) that lowers the noise level; including stand alone noise walls, noise berms (earth or other material), and combination berm/wall systems.
- **Noise Reduction Design Goal :** The optimum desired dB(A) noise reduction determined by calculating the difference between predicted, future-built, noise levels mitigated by abatement and predicted, future-built, noise levels without abatement. The VTrans noise reduction design goal is to achieve a reduction of at least 7 dB(A) for at least 25 percent of the benefitted receivers in a common noise environment.
- **Permitted:** A proposed land use development that has a specific design which has been approved and issued a land use or construction/building permit by the State or any municipality, indicating a definite commitment and specific plan for development of the involved land.

- **Property Owner:** An individual or group of individuals that holds a title, deed, or other legal proof of ownership of a property or a residence.
- **Reasonableness:** A determination based upon evaluation of the combination of social, economic, and environmental factors and conditions pertinent to a noise abatement measure. It is VTrans policy that construction of a noise abatement measure is reasonable if the cost per benefitted receptor does not exceed \$40,000.
- **Receptor :** A discrete or representative physical location, outdoors at ground level, where human activities, as identified in the land use/activity categories listed in Table 1, occur frequently; generally a residence.
- **Residence:** A dwelling unit; either a single family residence or each residential unit in a multifamily dwelling.
- **Statement of likelihood:** A statement provided in an environmental clearance document based on an analysis of feasibility and reasonableness, concluded with the approval of a final environmental document. A statement of likelihood will only be provided for a Type I project.
- **Substantial Construction:** The granting of a building permit, prior to acquisition of right-of-way or construction approval for a highway project.
- **Substantial noise increase:** As required by 23 CFR § 772.11(f), VTrans defines “substantial noise increase” as an increase, in the design year noise level, of 15 dB (A) above the existing noise level.
- **Traffic Noise Impact :** A design year, built-condition, predicted noise level that approaches/ reaches or exceeds the Noise Abatement Criteria listed in 23 CFR § 772 Table 1; or design year, built-condition, predicted noise level that is a substantial noise increase over existing noise level.
- **Type I Project :** A Federal or Federal-aid highway project which consists of:
 - (1) The construction of a highway on new location; or,
 - (2) The physical alteration of an existing highway where there is either:
 - (i) Substantial Horizontal Alteration [i.e. a project that halves the distance between the existing condition traffic noise source and the future built-condition, closest receptor]; or
 - (ii) Substantial Vertical Alteration [i.e. a project that removes shielding therefore exposing the line-of-sight between the receptor and the traffic noise source; either by altering the vertical alignment of the highway or by altering the topography between the highway traffic noise source and the receptor]; or,
 - (3) The addition of a through-traffic lane(s) [including the addition of a through-traffic lane that functions as a High Occupancy Vehicle (HOV) lane, HO-Toll lane, bus lane or truck climbing lane]; or,
 - (4) The addition of an auxiliary lane [except an auxiliary lane which is a turn lane]; or,

- (5) The addition or relocation of interchange lanes or ramps to an interchange quadrant to complete an existing partial interchange; or,
 - (6) Restriping existing pavement for the purpose of adding a through-traffic lane or an auxiliary lane; or,
 - (7) The addition of a new or substantial alteration of an existing, weigh station, rest stop, ride-share lot, or toll plaza. If a project is determined to be a Type I project under this definition then the entire project area as defined in the environmental document is a Type I project.
- Type II Project: A Federal or Federal-aid highway project for noise abatement on an existing highway. For a Type II project to be eligible for Federal-aid funding, the highway agency must develop and implement a Type II program in accordance with §772.7(e). VTrans has not implemented a Type II program.
 - Type III Project: Any Federal or Federal-aid highway project that does not meet the definitions of a Type I or Type II project is a Type III project. Type III projects do not require a noise analysis under the FHWA noise regulations but may occasionally involve a noise analysis for the purpose of determining project impacts in a NEPA analysis.

4. **APPLICABILITY**

The VTrans Noise Analysis and Abatement Policy shall apply statewide, uniformly, and consistently to all Federal and/or Federal-aid highway projects authorized under Title 23 USC.

5. **PREDICTION OF TRAFFIC NOISE**

It is VTrans policy that all sound level prediction shall be conducted as described in 23 CFR §772.9 using the latest Federal Highway Administration (FHWA) highway Traffic Noise Model (TNM) computer program. Analysis of traffic noise levels shall occur for Type I projects only. VTrans does not have a program for Type II projects and noise analysis is not required for Type III projects.

6. **ANALYSIS OF TRAFFIC NOISE**

It is VTrans policy that all analysis of traffic noise shall be conducted as described in 23 CFR §772.11. Noise analyses for Type I projects may be performed for sound levels within actual or proposed VTrans right-of-way (ROW) limits, adjacent to potentially sensitive receptors or at such locations, beyond actual or proposed VTrans ROW limits, in areas that exhibit frequent human use of the types shown in the Noise Abatement Criteria. In the case of permitted developments, analyses may be performed within VTrans ROW limits or at locations, based upon said development plans, expected to become potentially sensitive receptor sites.

Analyses shall be conducted using the latest TNM (currently TNM 2.5) predictive computer program. A potential noise impact is identified when projected future traffic sound levels approach or exceed the Noise Abatement Criteria or when projected future traffic sound levels substantially exceed existing sound levels. Existing noise levels and future design year noise levels must be analyzed for all build alternatives carried forward for detailed analysis in the NEPA document.

The date of public knowledge for a Federal or Federal-aid highway project shall be the date of a Programmatic Categorical Exclusion (PACE) determination, the date of approval of a Categorical Exclusion (CE), or the date of a Finding of No Significant Impact (FONSI), or Record of Decision (ROD) for the project. Thereafter

VTrans will not be responsible for providing noise analysis or abatement for any development subsequently permitted in proximity to the approved VTrans project.

Analysis of traffic noise shall occur for Type I projects only. VTrans does not have a program for Type II projects and noise analysis is not required for Type III projects.

7. CONSIDERATION OF NOISE ABATEMENT

Consideration of noise abatement shall occur for Type I projects only. VTrans does not have a program for Type II projects and noise abatement is not required for Type III projects.

When potential traffic noise impacts are identified on a Type I project, VTrans will consider and evaluate noise abatement measures and make determinations regarding the feasibility and reasonableness of such measures. VTrans will only provide noise abatement measures which are reasonable and feasible.

Feasibility determinations shall be based upon pertinent acoustical, physical, and engineering factors, including but not limited to:

- Physical and/or topographical constraints of the location: Where are receptors located relative to noise? Is there space for a barrier (berm and/or wall)? Are there reflecting/ interfering surfaces (ledges/buildings/pavements/trees)? Are there other noise sources present, etc.?
- Constructability: How large would the berm and/ or wall have to be? Would the barrier affect natural or cultural resources (impact habitat, obstruct drainage, etc.)?;
- Safety: Will the abatement feature create a substandard design element such as clear zone (AASHTO Roadside Design Guide) or sight distance (AASHTO Policy on Geometric Design or Vermont Design Standards)?;
- Maintenance requirements: Would barrier interfere with snow removal or drainage?;
- Technical constraints: Given constraints, can a barrier be built that will achieve at least a 5 dB(A) highway traffic noise reduction for the majority (over 50%) of impacted receptors? Generally a noise barrier which breaks the line of sight between a noise source and a receptor and extends uninterrupted at eight times the distance between the source and the receptor [4x in each direction perpendicular to the sight line] will provide approximately a 5 dB(A) noise reduction. Each meter of additional barrier height will contribute roughly 1.5 dB(A) of reduction. Typical over-the-road tractor exhaust stacks are about 8 feet above the ground.

Determinations relative to reasonableness shall be based upon pertinent social, economic, and environmental factors including but not limited to:

- Is it possible to achieve a substantial noise reduction? Noise abatement measures may not be reasonable unless a substantial noise reduction can be achieved. Generally, a 3 dB (A) change in noise levels is the margin of perceptibility for a person with normal hearing. A change of 5 dB (A) is readily discernable and a change of 10 dB (A) is generally perceived as a doubling or halving of the noise level. The VTrans noise reduction design goal is to achieve a 7 dB(A) reduction for at least 25 percent of the benefitted receptors in a common noise environment.

- How many potential receptors will benefit? Noise abatement measures may not be economically reasonable if only a very few receptors will benefit. The number of receptors in a project study area are as follows:

NAC Activity Category B: Single family residential units are considered one receptor. Structures that contain multiple residential units (apartments, condominiums, and duplexes) are considered to have one receptor per residential unit.

NAC Activity Categories C, D, and E: A single structure is considered a single receptor. For outdoor noise sensitive land uses (parks, campgrounds, cemeteries, trails, etc.) the number of receptors will be determined by dividing the frontage of the land use by the average lot frontage in the study area.

- Can abatement be achieved at a reasonable cost? Noise abatement measures may not be reasonable if the cost per benefitted receptor is high. It is VTrans policy that construction of a noise abatement measure is reasonable if the cost per benefitted receptor does not exceed \$40,000. For purposes of estimating the cost of highway noise barriers, a figure in the vicinity of \$30 per square foot of installed barrier should be used.
- What are the views of those who would benefit from noise abatement measures? Noise abatement measures may not be reasonable if the majority of benefitted receptors do not desire them. At least 50 percent of benefitted households and property owners surveyed must want the noise abatement measure. Surveys will be conducted in a way that responses can be documented, such as through the use of certified mail.

8. FEDERAL PARTICIPATION

For Type I projects when traffic noise impacts have been identified, Federal funds may be used for implementation of noise abatement measures that have been determined to be feasible and reasonable. In determining the reasonableness of any abatement measure, cost effectiveness will be based solely on Federal and State/Local funding. Third party funding will be allowed only for providing functional or aesthetic enhancements to noise abatement measures in accordance with 23 CFR § 772.13(j).

Federal funds may also be used for noise abatement measures on Type II projects; however, VTrans neither has nor anticipates a Type II program as of the date of this policy. Should VTrans choose to implement a Type II program in the future, then this policy will be revised accordingly and approved by the FHWA prior to authorization and development of any Type II project.

9. INFORMATION FOR LOCAL OFFICIALS

VTrans conducts public meetings and hearings early in the project development process, in order to gather input from effected communities. VTrans informs local officials of all potential environmental impacts of proposed projects, including the scope of potential noise impacts and any proposed mitigation. VTrans solicits input from involved residents during the project development and design process, and the opinions of potentially impacted residents are considered in reaching determinations regarding the reasonableness of noise abatement measures.

VTrans coordinates with regional planning commissions as well as town and municipal governments statewide to encourage the practice of compatible land use development. State and local governments are responsible for ensuring that developments are planned, designed, and constructed so as to avoid or minimize noise impacts. Local governments are responsible for regulating development in such a way that noise sensitive uses are

not permitted in areas adjacent to planned or existing highways. To assist municipalities, VTrans will provide information on future noise levels at developed and undeveloped properties to local officials by providing a copy of the noise analysis performed for any Type I project within their jurisdiction. VTrans will only provide noise abatement measures for developments that are permitted prior to the date of public knowledge of a Federal or Federal-aid project.

10. CONSTRUCTION NOISE

During project development, VTrans will identify any land uses or activities, as defined in the Noise Abatement Criteria, which may be affected by noise from construction of the project. In accordance with 23 CFR §772.19, VTrans will determine whether measures are needed to minimize or eliminate adverse impacts to the community and will incorporate any measures determined to be reasonable and feasible.

11. REVIEW OF NOISE POLICY

This policy shall be reviewed in a manner determined by VTrans at intervals not to exceed 3 years.

APPENDIX A

Table 1 to Part 772—Noise Abatement Criteria
 [Hourly A-Weighted Sound Level_decibels (dB(A)) ¹]

Activity Category	Activity Leq (h)	Criteria ² L10 (h)	Evaluation Location	Activity description
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	none	none		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	none	none		Undeveloped lands that are not permitted.

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

²The Leq (h) and L10 (h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures.

³Includes undeveloped lands permitted for this activity category.