

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/03]**

**FHWA MN Division Guidance  
for Evaluating Traffic Noise Impacts  
of local, federally funded projects  
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**TABLE OF CONTENTS**

I. PURPOSE.....2  
II. APPLICABILITY .....2  
III. FHWA NOISE ABATEMENT CRITERIA, DEFINITIONS, AND POLICY .....3  
IV. NOISE ANALYSIS AND DOCUMENTATION REQUIREMENTS .....7  
V. REFERENCES.....18  
Appendix A. Sample Planning Memo .....20

## **FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/03]**

### **I. PURPOSE**

This guidance is intended to supplement existing noise guidance and is primarily provided for use by local governments on federally funded roadway projects that are exempt from State noise standards. This guidance should also be followed for those local projects that are not currently funded by FHWA but would like to maintain eligibility for federal funds. Compliance with the Federal Highway Administration (FHWA) noise regulation is a prerequisite for the granting of federal funds for the construction or reconstruction of a highway.

### **II. APPLICABILITY**

- A) Exemption from State Noise Standards.** The Minnesota State Noise Standards do not apply to certain roadways outside the cities of Minneapolis and St. Paul. The exemption criteria are found in Minnesota Statutes 2000, Section 116.07 Subdivision 2a. The text of the exemption is provided as follows, with the specific exemption shown in bold text:

Subd. 2a. Exemptions from standards. No standards adopted by any state agency for limiting levels of noise in terms of sound pressure which may occur in the outdoor atmosphere shall apply to (1) segments of trunk highways constructed with federal interstate substitution money, provided that all reasonably available noise mitigation measures are employed to abate noise, (2) an existing or newly constructed segment of a highway, provided that all reasonably available noise mitigation measures, as approved by the commissioners of the department of transportation and pollution control agency, are employed to abate noise, (3) **except for the cities of Minneapolis and St. Paul, an existing or newly constructed segment of a road, street, or highway under the jurisdiction of a road authority of a town, statutory or home rule charter city, or county, except for roadways for which full control of access has been acquired**, (4) skeet, trap or shooting sports clubs, or (5) motor vehicle race events conducted at a facility specifically designed for that purpose that was in operation on or before July 1, 1983. Nothing herein shall prohibit a local unit of government or a public corporation with the power to make rules for the government of its real property from regulating the location and operation of skeet, trap or shooting sports clubs, or motor vehicle race events conducted at a facility specifically designed for that purpose that was in operation on or before July 1, 1983.

**Source:** <http://www.revisor.leg.state.mn.us/stats/116/07.html> and [http://www.dot.state.mn.us/metro/tps/htms/noise/leg\\_stat.html](http://www.dot.state.mn.us/metro/tps/htms/noise/leg_stat.html)

Subdivision 2a (3), highlighted in bold, is the exemption that applies to many local roadway projects, since full control of access has not been acquired for many of these facilities. In applying this exemption, full control of access means that the authority to

## **FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/03]**

control access is exercised to give preference to through traffic by providing access connections with selected public roads only and by *prohibiting crossings at grade* or direct private driveway connections.<sup>1</sup> This guidance is only intended for those projects that meet this exemption criterion.

- B) FHWA Highway Traffic Noise Regulation (23 CFR 772).** The FHWA procedures for abatement of highway traffic noise and construction noise are contained in Title 23 of the United States Code of Federal Regulations Part 772 (23 CFR 772). 23 CFR 772 applies to any proposed Federal or Federal-aid highway project that is on new location, involves significant<sup>2</sup> changes to either the horizontal or vertical alignment, or increases the number of through-traffic lanes. These are known as Type I projects. 23 CFR 772 applies to all federally funded roadway projects that meet the definition of Type I, regardless of their functional classification (e.g. local road, collector, arterial).
- C) Requirements for Type I Projects.** During the planning and design of all Type I highway projects, 23 CFR 772 requires the following: (1) identification of traffic noise impacts; (2) examination of potential mitigation measures; (3) the incorporation of *reasonable and feasible* noise mitigation measures into the highway project; and (4) coordination with local officials to provide helpful information on compatible land use planning and control.

Source: 23 CFR 772, <http://www.fhwa.dot.gov/environment/23cfr772.htm>

### **III. FHWA NOISE ABATEMENT CRITERIA, DEFINITIONS, AND POLICY**

- A) Definition of a Type I Project.** A Type I Project is 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<sup>2</sup> changes either the horizontal or vertical alignment, or increases the number of through-traffic lanes.
- B) Definition of a Traffic Noise Impact.** A traffic noise impact occurs if predicted traffic noise levels approach or exceed<sup>3</sup> the FHWA noise abatement criteria (NAC), or when the predicted traffic noise levels substantially<sup>4</sup> exceed the existing noise levels. In predicting noise levels and assessing noise impacts, traffic characteristics are used which yield the worst hourly traffic noise impact on a regular basis for the design year.

1 The definition of “full control of access” was provided courtesy of Mr. Brian Timerson, MPCA.

2 The term “significant” as used in 23 CFR 772 has no association with “significance” under NEPA.

3 “Approach or exceed” is defined by Mn/DOT as within one dBA or less.

4 The term “substantially exceed” is defined by Mn/DOT as a 5 dBA or more increase.

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/03]**

Typically, the worst levels occur during the peak traffic hour. However, there are cases where the highest sound levels may occur during a period when traffic volumes are lower but the truck mix or vehicle speeds are higher.

**C) FHWA Noise Abatement Criteria.** The FHWA noise abatement criteria are a matrix of land use categories and noise levels associated with traffic noise impacts for each respective land use. The following chart gives the  $L_{10}$  and  $L_{eq}$  action levels by activity category. A description of activities for each category is included to help identify which land use category and noise level is appropriate for a proposed project. Most roadway projects fall under activity category B or C. The  $L_{10}$  value is the sound level that is exceeded 10% of the time, measured over the noisiest one-hour period of the day. This is usually during the hour that has the highest volume of traffic in a 24-hour period. The  $L_{eq}$  is the constant, average sound level, which over a period of time contains the same amount of sound energy as the varying levels of the traffic noise. The  $L_{eq}$  calculation is more complex than the  $L_{10}$  and is usually about 3 dBA less than the  $L_{10}$  under typical traffic conditions. For federal noise analyses in Minnesota, the  $L_{10}$  values, shown in the chart below, are applied in noise analyses.

**FHWA NOISE ABATEMENT CRITERIA**  
**Hourly A-Weighted Sound Level in Decibels (dBA)**

Activity Category	$L_{10}$ (h)	$L_{(eq)}$ (h)	Description of Activity Category
A	60 dBA (Exterior)	57 dBA (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	70 dBA (Exterior)	67 dBA (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals, cemeteries*, trails, and trail crossings.
C	75 dBA (Exterior)	72 dBA (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	No Limit	No Limit	Undeveloped Lands
E	55 dBA (Interior)	52 dBA (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

\*A cemetery should be included in Activity Category B unless it possesses a special importance, such as the Tomb of the Unknown Soldier at Arlington National Cemetery (in which case Category A would be appropriate).

## **FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/03]**

The FHWA NAC are based upon noise levels associated with interference of speech communication and are a compromise between noise levels that are desirable and those that are achievable. These levels should not be viewed as Federal standards or desirable noise levels. In fact, traffic noise impacts can occur below these levels. Consequently, the FHWA NAC should only be used as absolute values which, when approached or exceeded, require the consideration of traffic noise abatement measures. Noise abatement should be designed to achieve a substantial noise reduction.

23 CFR 772 does not require that the noise abatement criteria be met in every instance of a traffic noise impact. Rather, it requires that every *reasonable and feasible* effort be made to provide noise mitigation when the noise abatement criteria are approached or exceeded, or when the predicted traffic noise levels substantially exceed the existing noise levels.

**Source:** “Highway Traffic Noise Analysis and Abatement Policy and Guidance,” FHWA, <http://www.fhwa.dot.gov/environment/polguid.pdf>

**D) Mn/DOT Noise Abatement Policy.** FHWA requires that all State Highway Agencies adopt a written statewide noise policy that clarifies the requirements of 23 CFR 772. The Mn/DOT Noise Policy states that it applies to all Federal-aid highway projects under the jurisdiction of Mn/DOT. Federal-aid highway projects under local jurisdiction must also comply with Mn/DOT’s Noise Policy. The Mn/DOT Noise Policy establishes the noise level that *approaches* the FHWA Noise Abatement Criteria (NAC), a *substantial increase* in noise levels, and a *substantial noise reduction*. The policy also gives criteria for determining *reasonable and feasible* noise abatement measures. These items are discussed as follows.

- 1) **Noise Level Approaching the NAC.** Mn/DOT has defined the level that approaches noise abatement criteria as 1 dBA less than the criterion for each activity category. For example, 69 dBA is considered approaching noise abatement criteria for activity category B and 74 dBA is considered approaching noise abatement criteria for activity category C.
- 2) **Substantial Increase in Noise.** Comparison of the project design year noise levels to the existing (current year) noise levels determines the change in noise levels that are used to determine whether there is a substantial increase. Mn/DOT has defined a substantial increase over existing noise levels as 5 dBA or more.
- 3) **Substantial Noise Reduction.** When noise abatement measures are being considered, FHWA regulations require that every reasonable effort be made to

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

obtain substantial noise reductions. Mn/DOT defines a substantial noise reduction as 5 dBA or more.

- 4) Noise Barrier Reasonable and Feasible Criteria.** Mn/DOT gives criteria that must be met by Type I projects to be considered for construction of a noise barrier. The following are Mn/DOT's criteria for consideration of a noise barrier, as they relate to federal noise abatement requirements:
- a) The receptors shall have predicted future noise levels that approach or exceed the federal NAC, or exceed existing noise levels by 5 dBA or more.
  - b) The cost effectiveness of the barrier shall not exceed \$3250/dBA/residence in 1997 dollars for residential receptors. Mn/DOT may annually adjust this cost effectiveness figure up or down based on changes in the construction price index after 1997.
  - c) A receptor's inclusion in the cost effectiveness calculation shall be contingent on the receptor receiving a minimum 5 dBA reduction due to the construction of the barrier.
  - d) Housing density must be a minimum of 10 per half mile.
  - e) The municipality where affected residents reside supports the installation of a barrier.

**Source:** "Mn/DOT Noise Policy for Type I and II Federal Aid Projects as per 23 CFR 772," [http://www.dot.state.mn.us/metro/tps/htms/noise/mndot\\_noise\\_policy.html](http://www.dot.state.mn.us/metro/tps/htms/noise/mndot_noise_policy.html)

**E) FHWA Noise Abatement Policy.**

- 1) Improve the Noise Environment.** A commonly held viewpoint is that noise abatement should not be necessary for projects that will not change the noise environment - that is, not change the noise levels from those that exist today or not change the noise levels from those that will exist in the future if no project is implemented (e.g., 70 dBA existing and 70 dBA in the future, with or without the project). However, the FHWA noise regulations were developed to specifically address the improvement of situations where existing noise levels are already high (i.e., a traffic noise impact already exists). Thus, noise analyses are required for all Type I projects, even when there is no change in the surrounding noise environment. A parallel can be drawn with highway projects where substandard safety features are upgraded or improved even though the overall goal of the

## **FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

project is not specifically safety-related.

**Source:** “Highway Traffic Noise Analysis and Abatement Policy and Guidance,” FHWA, <http://www.fhwa.dot.gov/environment/polguid.pdf>

- 2) **Implement All Reasonable and Feasible Abatement Measures.** Determining reasonable and feasible noise abatement measures is frequently the most difficult part of the traffic noise analysis for a proposed project. Feasibility deals primarily with engineering considerations (e.g., can a barrier be built given the topography of the location; can a substantial noise reduction be achieved given certain access, drainage, safety, or maintenance requirements; are other noise sources present in the area, etc.). Reasonableness is a more subjective criterion than feasibility. It implies that common sense and good judgment were applied in arriving at a decision. Reasonableness should be based on a number of factors, not just one criterion. For a detailed discussion of the factors that can be taken into account for determining whether an abatement measure is reasonable and feasible, please refer to FHWA’s discussion of reasonableness and feasibility in its “Highway Traffic Noise Analysis and Abatement Policy and Guidance,” located at <http://www.nonoise.org/library/highway/policy.htm#VID>

### **IV. NOISE ANALYSIS AND DOCUMENTATION REQUIREMENTS**

The level of detail and effort in traffic and construction noise analyses for a proposed project should be commensurate with the type of project and its associated impacts and/or issues. The National Environmental Policy Act (NEPA) requires an evaluation of all proposed federally funded projects to determine the potential social, economical and environmental impacts of the project. Under NEPA, projects are divided into three classes of action for environmental review: Class I, Categorical Exclusion (CE), Class II, Environmental Assessment/Finding of No Significant Impact (EA/FONSI), and Class III, Environmental Impact Statement (EIS). If further information is needed regarding what type of environmental analysis is needed for a project or what is required under NEPA, please refer to the following resources:

- “Project Development Manual,” Mn/DOT State Aid for Local Transportation
- “Guidance for Preparing and Processing Environmental and Section 4(f) Documents,” FHWA Technical Advisory T 6640.8A, <http://www.fhwa.dot.gov/////environment/guidebook/vol2/doc7i.pdf>
- Mn/DOT Highway Project Development Process (HPDP) Handbook, <http://www.dot.state.mn.us/tecsup/xyz/plu/hpdp/book1/overview/overview.pdf>

To use the following guidance, three pieces of information are needed: 1) verification that the proposed project is exempt from State Noise Standards, 2) a determination whether the proposed

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

project is a Type I project under the FHWA noise regulation (23 CFR 772), and 3) the level of environmental analysis required for the proposed project (i.e. CE, EA, or EIS). Proceed to all of the applicable sections of this guidance that describe your proposed project. The following chart shows all the applicable sections of this guidance, based upon the type of project and level of environmental analysis.

<b>Proposed Project</b>	<b>Applicable Requirements in Section IV.</b>
CE, Non-Type 1	<a href="#">A</a> and <a href="#">B</a>
EA or EIS, Non-Type 1	<a href="#">A</a> and <a href="#">C</a>
CE, Type 1	<a href="#">A</a> , <a href="#">D</a> , <a href="#">E</a> , <a href="#">F</a> , <a href="#">H</a> , and <a href="#">I</a>
EA or EIS, Type 1	<a href="#">A</a> , <a href="#">D</a> , <a href="#">E</a> , <a href="#">G</a> , <a href="#">H</a> , and <a href="#">I</a>

**A) State Exemption, All Projects (CE, EA, or EIS).** Please include in your environmental documentation a brief statement explaining the project’s exemption from State noise standards and add that an evaluation of noise impacts is still required under federal requirements. The following statement is provided as an example.

“Since the proposed project is on a [City/County]-owned highway without full control of access, it is exempt from Minnesota Noise Standards, per Minnesota Statutes, Section 116.07 Subd. 2a. Potential traffic noise impacts of this project will be evaluated using federal noise criteria.”

**B) Traffic and Construction Noise Analysis, CE, Non-Type I Project.** Most CEs are not Type I projects. Noise analysis is not required for projects that are not Type I projects, except for the rare instance<sup>5</sup> in which the project itself is expected to create a noise impact. Such projects must be dealt with on a case-by-case basis in accordance with NEPA. Also under NEPA, construction noise should be considered and discussed if sensitive receptors<sup>6</sup> are near the project. Reference to applicable noise control specifications or local ordinances may also be appropriate.

5 For example, an instance where the project itself creates a noise impact could be the addition of a turning lane in an area of homes where distance and a natural rise shields homes from existing traffic noise. The project levels out the area and brings traffic closer to the homes, creating a noise impact.

6 Examples of sensitive receptors are churches, schools, day care centers, hospitals, etc.

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

Please use the following prepared statement in the Project Memorandum or check the appropriate box if you are using a checklist.

"The proposed highway project is not on a new location, is not a significant change in horizontal or vertical alignment, and will not increase the number of through lanes, therefore the requirements of 23 CFR 772, federal procedures for abatement of highway traffic noise and construction noise, do not apply."

- C) Traffic and Construction Noise Analysis, EA or EIS, Non-Type I Project.** Noise analysis is not required for projects that are not Type I projects, except for the rare instance<sup>5</sup> in which the project itself is expected to create a noise impact. However, a brief evaluation of noise impacts and mitigation measures should be performed to meet federal NEPA requirements, as outlined in 23 CFR 771.119(b). The objective is to address noise from the standpoint of whether or not there is a significant impact as intended by NEPA.

Construction noise should also be considered and discussed if sensitive receptors<sup>6</sup> are near the project. Reference to applicable noise control specifications or local ordinances may also be appropriate. Please use the following prepared statement in the environmental document. Also, as stated above, please provide a brief evaluation of any potential noise impacts and mitigation measures associated with the project.

"The proposed highway project is not on a new location, is not a significant change in horizontal or vertical alignment, and will not increase the number of through lanes, therefore the requirements of 23 CFR 772, federal procedures for abatement of highway traffic noise and construction noise, do not apply. However, potential noise impacts have been addressed as part of the environmental analysis."

- D) Noise Description, All Type I Projects (CE, EA, or EIS).** Since EAs and EISs are made available to the public for review and comment, the following basic description of noise should be included in these documents. Generally, it is not necessary to include a noise description in a CE document. However, if a noise description is used, please use the description provided to maintain consistency in federal aid projects.

"Noise is defined as any unwanted sound. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels. Decibels (dB) represent the logarithmic increase in sound energy relative to a reference energy level. A sound increase of 3 dB is barely perceptible to the human ear, a 5 dB increase is clearly noticeable, and a 10 dB increase is heard twice

5 For example, an instance where the project itself creates a noise impact could be the addition of a turning lane in an area of homes where distance and a natural rise shields homes from existing traffic noise. The project levels out the area and brings traffic closer to the homes, creating a noise impact.

6 Examples of sensitive receptors are churches, schools, day care centers, hospitals, etc.

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

as loud. For example, if the sound energy is doubled (e.g. the amount of traffic doubles), there is a 3 dB increase in noise, which is just barely noticeable to most people. On the other hand, if traffic increases to where there is 10 times the sound energy level over a reference level, then there is a 10 dB increase and it is heard twice as loud.”

“For highway traffic noise, an adjustment, or weighting, of the high- and low-pitched sounds is made to approximate the way that an average person hears sounds. The adjusted sound levels are stated in units of " A-weighted decibels" (dBA). In Minnesota, traffic noise impacts are evaluated by measuring and/or modeling the traffic noise levels that are exceeded 10 % and 50% of the time during the hour of the day and/or night that has the heaviest traffic. These numbers are identified as the L<sub>10</sub> and L<sub>50</sub> levels. The L<sub>10</sub> value is compared to FHWA noise abatement criteria.”

“The following chart provides a rough comparison of the noise levels of some common noise sources.”

<u>Sound Pressure Level (dBA)</u>	<u>Noise Source</u>
140	Jet Engine (at 25 meters)
130	Jet Aircraft (at 100 meters)
120	Rock and Roll Concert
110	Pneumatic Chipper
100	Jointer/Planer
90	Chainsaw
80	Heavy Truck Traffic
70	Business Office
60	Conversational Speech
50	Library
40	Bedroom
30	Secluded Woods
20	Whisper

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

**Source:** “A Guide to Noise Control in Minnesota,” Minnesota Pollution Control Agency, <http://www.pca.state.mn.us/programs/pubs/noise.pdf> and “Highway Traffic Noise,” FHWA, <http://www.fhwa.dot.gov/environment/htnoise.htm>

**E) Construction Noise Analysis, All Type I Projects (CE, EA, or EIS).** For all Type I projects, 23 CFR 772.19 requires that potential construction noise impacts be addressed in the environmental documentation. The level of effort and detail should be commensurate with the level of environmental documentation (i.e. CE vs. EIS). Please include the following items when addressing construction noise.

- 1) Identify land uses or activities that may be affected by noise from construction of the project.
- 2) Determine the measures 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.
- 3) Identify the abatement measures that will be incorporated into the plans and specifications for the project.

**F) Traffic Noise Analysis, CE, Type I Project.** The following traffic noise analysis shall be conducted for Type I projects that meet CE criteria.

- 1) Identify noise receptors in the vicinity of the project. This includes 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.

\* The Mn/DOT Noise Policy considers future development to be planned, designed and programmed as of the date of plat approval.

- 2) If there are no existing or planned noise receptors, then there are no traffic noise impacts. Conclude the analysis and provide a brief explanation of the basis for no traffic noise impacts. Make sure that local government coordination requirements are met ([Section IV. I](#)).
- 3) Determine existing noise levels. If it is clear that existing noise levels at locations of interest are predominantly due to highway noise, then the existing noise levels may be calculated using a simple application of any FHWA approved traffic noise prediction model (e.g., nomograph, hand-held calculator, microcomputer, etc.). A detailed application of any FHWA approved model (i.e. MINNOISE) can be used if a more accurate determination is necessary.\*\* If existing noise levels are predominantly due to sources other than highway noise, then determine existing noise levels by making field measurements at representative locations.

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

- 4) Predict traffic noise levels for the project design year, both with and without the proposed project (build and “no build”). Predict traffic noise levels using a simple application of any FHWA approved traffic noise prediction model (e.g. nomograph, hand-held calculator, microcomputer, etc.) or, if a more accurate prediction is required, a detailed application of any FHWA approved model.\*\*

\*\* If your proposed project will be reviewed by the Mn/DOT Office Of Environmental Services, please use the MINNOISE traffic noise prediction model. Check with Mn/DOT before proceeding.

- 5) Determine traffic noise impacts by comparing the project design year (i.e. build alternative) noise levels to both the FHWA NAC and the existing (i.e. current year) noise levels. The project has a traffic noise impact if the L<sub>10</sub> approaches or exceeds the applicable FHWA NAC (69-70 dBA residential, 74-75 dBA industrial) or if there is an increase of 5 dBA or more over existing noise levels at any of the receptors. Do not compare the design year noise level to the design year “no-build” noise level. This is done later when considering abatement.
- 6) In your documentation, include the method used to predict traffic noise levels and the assumptions made, including the mix of vehicles (% autos and light trucks, % medium trucks, and % heavy trucks), vehicle speeds, ground cover, and the worst-case hour(s) used (i.e. a.m. peak or p.m. peak traffic). Identify on a project map the location of the noise receptor sites used in the noise analysis and provide noise data in the following table format.

**Existing and Predicted Noise Levels (dBA)**

Receptor	Monitored (L <sub>10</sub> )	Modeled Existing (L <sub>10</sub> )	Future, No-Build Alternative (L <sub>10</sub> )	Future, Build Alternative (L <sub>10</sub> )	FHWA NAC (L <sub>10</sub> )	Difference btwn Build and Existing (L <sub>10</sub> )	Difference btwn No-Build and Existing (L <sub>10</sub> )
R1	66	65	68	<b>69*</b>	70	4	1
R2	68	67	72	72	75	<b>6**</b>	0

\* show dBA approaching or exceeding NAC in bold

\*\* show build vs. existing increase of 5 dBA or more in bold

- 7) Clearly state whether the proposed project will have a traffic noise impact. If there will be no impact, conclude the analysis and provide a brief explanation of the basis for no traffic noise impacts.

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

- 8) For projects with predicted traffic noise impacts, noise abatement measures must be considered ([Section IV. H](#)).

**G) Traffic Noise Analysis, EA or EIS, Type I Project.** For Type I projects that require an EA or an EIS, a noise analysis must be performed for each project alternative under detailed study, including the "no build" alternative. Abatement measures found to be reasonable and feasible must be incorporated in the project. Typically, a noise report is prepared that documents the noise analysis conducted and is provided as an attachment to the EA or the EIS. The EA or EIS itself should contain a brief summary of the important points found in the noise report. The noise analysis shall include the following:

- 1) Identify noise receptors in the vicinity of the project. This includes 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. For an EIS, each noise sensitive area should be briefly described (residences, businesses, schools, parks, etc.), including information on the number and types of activities that may be affected.

\* The Mn/DOT Noise Policy considers future development to be planned, designed and programmed as of the date of Plat Approval.

- 2) If there are no existing or planned noise receptors, then there are no traffic noise impacts. Conclude the analysis and provide a brief explanation of the basis for no traffic noise impacts. Make sure that local government coordination requirements are met ([Section IV. I](#)).
- 3) Determine existing noise levels by making field measurements at representative locations. Measurements must represent the noisiest time of a typical 24-hour period. Noise measurements are only necessary at a few areas representing sensitive locations. In complex projects, such as highly congested facilities where trucks avoid peak automobile travel periods, both a peak traffic period and a non-peak period noise measurement may be required to verify the worst-hour noise levels. If it is clear that existing noise levels at locations of interest are predominantly due to highway noise, then the existing noise levels should also be calculated using the MINNOISE traffic noise prediction model.
- 4) Predict traffic noise levels for the project design year, both with and without the proposed project (build and "no build"). Predict traffic noise levels using the MINNOISE traffic noise prediction model.
- 5) Determine traffic noise impacts by comparing the project design year (i.e. build alternative) noise levels to both the FHWA NAC and the existing (i.e. current year) noise levels. The project has a traffic noise impact if the  $L_{10}$  approaches or exceeds the applicable FHWA NAC (69-70 dBA residential, 74-75 dBA industrial) or if there is an

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

increase of 5 dBA or more over existing noise levels at any of the receptors. In determining impact, do not compare the design year noise level to the design year “no-build” noise level. This is done later when considering abatement.

- 6) In your documentation, include the method used to predict traffic noise levels and the assumptions made, including the mix of vehicles (% autos and light trucks, % medium trucks, and % heavy trucks), vehicle speeds, ground cover, and the worst-case hour(s) used (i.e. a.m. peak or p.m. peak traffic). Identify on a project map the location of the noise receptor sites used in the noise analysis and provide noise data in the following table format for each alternative that evaluated in the EA or EIS.

**Existing and Predicted Noise Levels, Build Alternative 1 (dBA)**

Receptor	Monitored (L <sub>10</sub> )	Modeled Existing (L <sub>10</sub> )	Future, No-Build Alternative (L <sub>10</sub> )	Future, Build Alternative (L <sub>10</sub> )	FHWA NAC (L <sub>10</sub> )	Difference btwn Build and Existing (L <sub>10</sub> )	Difference btwn No-Build and Existing (L <sub>10</sub> )
R1	66	65	68	<b>69*</b>	70	4	1
R2	68	67	72	72	75	<b>6**</b>	0

\* show dBA approaching or exceeding NAC in bold

\*\* show build vs. existing increase of 5 dBA or more in bold

- 7) Clearly state whether the proposed project will have a traffic noise impact. If there will be no impact, conclude the analysis and provide a brief explanation of the basis for no traffic noise impacts.
- 8) For projects with predicted traffic noise impacts, noise abatement measures must be considered ([Section IV. H.](#)).

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

**H) Evaluation of Noise Abatement Measures, All Type I Projects with Traffic Noise Impacts (CE, EA, or EIS).** When traffic noise impacts are predicted for a Type I project, abatement measures must be considered in accordance with 23 CFR 772.

- 1) **Noise Abatement Measures for Consideration.** The following abatement measures, found in 23 CFR 772.13(c), must be considered and addressed in the environmental documentation.
  - a. 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 land designations).
  - b. Alteration of horizontal and vertical alignments.
  - c. Acquisition of property rights (either in fee or lesser interest) for construction of noise barriers.
  - d. Construction of noise barriers (including landscaping for aesthetic purposes) whether within or outside the highway right-of-way.
  - e. Acquisition of real property or interests therein (predominantly unimproved property) to serve as a buffer zone to preempt development that would be adversely impacted by traffic noise.
  - f. Noise insulation of public use or nonprofit institutional structures.
- 2) **Evaluation of Noise Abatement Measures.** Abatement measures that are found to be reasonable and feasible must be incorporated into the project. If a noise abatement measure is found to be feasible, then a determination of its reasonableness must be made. The Mn/DOT Noise Policy ([Section III. D. 4](#)) and the following factors may be used to determine whether an abatement measure is reasonable. In addition, the opinions of the impacted residents must be a major consideration in reaching a decision on the reasonableness of an abatement measure.
  - a. Noise abatement benefits, in terms of the amount of noise reduction provided and the number of people protected.
  - b. Cost of abatement, in terms of total cost and cost variation with the degree of benefits provided.
  - c. Opinions of the impacted residents, in terms of community wishes, aesthetic impacts (e.g., barrier height, material type, etc.), and desire for a surrounding view.

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

As stated previously, this is a major factor in the reasonableness of noise abatement.

- d. Absolute noise levels, in terms of existing noise levels, future traffic noise levels, and the context and intensity of noise levels. For example, if there is a substantial increase in noise levels, but the level is still well below the applicable NAC, this can be factored into the reasonableness of an abatement measure.
  - e. The change in noise levels, comparing the difference between future traffic noise levels and the existing noise levels, and the difference between the future traffic noise levels for the build alternative and the no-build alternative. For example, if future noise levels will be about the same with or without the project, this can be factored into the reasonableness of an abatement measure.
  - f. Development along the highway, in terms of the amount of development that occurred before and after the initial construction of the highway, the type of development (e.g., residential, commercial, mixed, etc.), the extent to which zoning or land use is changing, and the effectiveness of land use controls implemented by local officials to prevent incompatible development.
  - g. Environmental impacts of noise abatement construction, in terms of the effects on the natural environment and the noise reduction during highway construction.
- 3) **Summarize the Noise Analysis.** Summarize the noise analysis by identifying the following items:
- a. Noise abatement measures which are reasonable and feasible and which are likely to be incorporated in the project,
  - b. noise impacts for which no apparent solution is available, and
  - c. how and when local officials, within whose jurisdiction the highway project is located, have been informed of future noise levels (for various distances from the highway improvement) for both developed and undeveloped lands and properties in the immediate vicinity of the project.

This concludes the traffic noise analysis.

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

- I) Prevention of Future Noise Impacts, All Type I Projects (CE, EA, or EIS).** FHWA encourages state and local governments to practice compatible land use planning and control in the vicinity of highways. Local governments should use their power to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. Local government officials need to know what noise levels to expect from a highway and what techniques they can use to prevent future impacts. Such information should also be made available for disclosure in real estate transactions.

To prevent future traffic noise impacts on currently undeveloped lands, 23 CFR 772.15 requires coordination with local government officials, within whose jurisdiction the highway project is located, regarding the potential noise impacts of a proposed Type I project. The appropriate local planning official shall be informed, in writing, of the following:

- 1) 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;
- 2) information that may be useful to local communities to protect future land development from becoming incompatible with anticipated highway noise levels; and
- 3) eligibility for Federal-aid participation for Type II projects as described in 23 CFR 772.13b.

Providing the local planning official a copy of the completed environmental document for the project, along with a letter explaining why the information is being provided, can be used to fulfill this requirement. However, providing a letter that incorporates the pertinent noise information is the preferred approach. A copy of the notification letter should be submitted along with the environmental document to expedite FHWA review and approval. A sample letter is provided in Appendix A.

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

**V. REFERENCES.**

Several of the following documents were used and heavily borrowed from to create this guidance. Some of the documents are listed for additional information beyond the scope of this guidance.

Minnesota Department of Transportation Environmental Analysis and Compliance Section, Noise Analysis Unit. (November 12, 1997). Mn/DOT Noise Policy for Type I and II Federal Aid Projects as per 23 CFR 772.

[http://www.dot.state.mn.us/metro/tps/htms/noise/mndot\\_noise\\_policy.html](http://www.dot.state.mn.us/metro/tps/htms/noise/mndot_noise_policy.html)

Minnesota Department of Transportation, Office of Environmental Services. (May 18, 2000). The Highway Project Development Process...A Project Manager's Guide, Part II, Section D, Subject Guidance: Noise.

<http://www.dot.state.mn.us/tecsup/xyz/plu/hpdp/book2sg/noise/index.html>

Minnesota Pollution Control Agency. (March, 1999). A Guide to Noise Control in Minnesota. <http://www.pca.state.mn.us/programs/pubs/noise.pdf>

Minnesota Statute, M.S. 116.07, Pollution Control Agency Powers and Duties. (2000). <http://www.revisor.leg.state.mn.us/stats/116/07.html>

Title 23, Code of Federal Regulations, Subchapter H - Right-of-Way and Environment, Part 771. (1998). Environmental impact and related procedures.

<http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0771.htm>

Title 23, Code of Federal Regulations, Subchapter H - Right-of-Way and Environment, Part 772. (1998). Procedures for abatement of highway traffic noise and construction noise.

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U.S. DOT, FHWA. (2000). Acoustics and your environment: the basics of sound and highway traffic noise.

U.S. DOT, FHWA. (March 13, 1984). Analysis of highway construction noise.

<http://www.fhwa.dot.gov/legsregs/directives/techadv/t616002.htm>

U.S. DOT, FHWA. (1992). The audible landscape: A manual for highway noise and land use.

U.S. DOT, FHWA. (April, 2000). Highway traffic noise in the United States: Problem and response. <http://www.fhwa.dot.gov/environment/probresp.htm>

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

U.S. DOT, FHWA. Highway Traffic Noise Products (January, 2002).

[http://www.fhwa.dot.gov/environment/ab\\_noise.htm](http://www.fhwa.dot.gov/environment/ab_noise.htm)

U.S. DOT, FHWA. (April, 2001). Keeping the Noise Down, Highway Traffic Noise Barriers. <http://www.fhwa.dot.gov/environment/keepdown.pdf>

U.S. DOT, FHWA. (May, 1996). Measurement of highway-related noise.

U.S. DOT, FHWA, Office of Environment and Planning, Noise and Air Quality Branch. (June, 1995). Highway traffic noise analysis and abatement policy and guidance.

<http://www.fhwa.dot.gov/environment/polguid.pdf>

U.S. DOT, FHWA, Office of Environment and Planning, Noise Team. (April, 2000). Highway traffic noise barrier construction trends.

<http://www.fhwa.dot.gov/environment/bartr98.pdf>

U.S. DOT, FHWA, Office of Environment and Planning, Noise Team. (April, 2000). Summary of Noise Barriers Constructed by December 31, 1998.

<http://www.fhwa.dot.gov/environment/bar98txt.pdf>

U.S. DOT, FHWA, Office of Environment and Planning, Environmental Analysis Division. (June, 1995). Highway Traffic Noise Analyses for Cemeteries, Trails, and Trail Crossings.

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local,  
federally funded projects that are exempt from State Noise Standards [1/31/2003]**

**Appendix A. Sample Planning Memo**

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local,  
federally funded projects that are exempt from State Noise Standards [1/31/2003]**

**MEMORANDUM**

TO: Matt Glaesman, City of Moorhead Planning  
Ken Parke, City of Dilworth

FROM: Bob Martin, Public Works Director   
City of Moorhead

DATE: February 9, 2001

SUBJECT: Land Use Along Proposed 34<sup>th</sup> Street Extension  
4<sup>th</sup> Avenue to CSAH 18  
S.P. 144-135-05

As you know, the City of Moorhead has received funding for the construction of the planned extension of 34<sup>th</sup> Street from 4<sup>th</sup> Avenue north to County State Aid Highway 18 (CSAH 18). This roadway corridor is located on the border between the cities of Moorhead and Dilworth. Environmental studies (including preparation of an Environmental Assessment) and preliminary design are currently underway for this project, and you have been contacted for information/input on this project as part of these studies.

The issue of future traffic noise and its relationship to proposed future land uses along the corridor has been identified in FHWA guidelines as something that should be considered by city staff in planning and approving future development along the corridor. FHWA has requested that we provide you with information that may help you better plan for minimizing noise impacts to adjacent properties along the corridor. The information includes:

- Consideration of highway noise as it relates to future land uses and information on potential noise mitigation
- Results of modeling of future noise levels adjacent to the corridor

Noise and Land Use

Land uses classified within state Noise Area Classification One (NAC-1) or federal Land Use Category B – including residential land use – are those of primary concern with respect to traffic noise, since they are considered to be the most “sensitive” receptors and, therefore, have the lowest regulatory thresholds for noise impacts. City of Moorhead and City of Dilworth comprehensive plans indicate some residential land uses adjacent to the 34<sup>th</sup> Street corridor. Potential noise impacts to future residents should be considered in planning and approving those residential developments. Examples of site plan elements that could reduce noise and visual impacts on residential developments include berms, fencing, vegetative screening and increased setbacks.

**FHWA MN Division Guidance for Evaluating Traffic Noise Impacts of local, federally funded projects that are exempt from State Noise Standards [1/31/2003]**

Page 2 of 2  
SP 144-135-05  
February 9, 2001

Future Noise Levels

Noise modeling for 2020 traffic volumes and conditions at the existing apartments at 4<sup>th</sup> Avenue/34<sup>th</sup> Street was performed as part of the Environmental Assessment studies. Modeling for the 34<sup>th</sup> Street extension "Build" conditions in year 2020 (with no noise walls or other mitigation) indicated that noise levels at outside receptors approximately 75 feet from the centerline of 34<sup>th</sup> Street NW between 4<sup>th</sup> Avenue and 8<sup>th</sup> Avenue were projected to be below state daytime noise standards and below daytime and nighttime federal noise criteria. Peak hour noise levels at this distance from the proposed roadway are projected to be two decibels above state nighttime L<sub>10</sub> standards. [Note: The nighttime peak hour is from 6-7:00 a.m. and is not necessarily indicative of traffic noise levels from 10:00p.m. to 6:00 a.m.] Receptors approximately 140 feet from the centerline of 34<sup>th</sup> Street between 4<sup>th</sup> Avenue and 8<sup>th</sup> Avenue are projected to be below all state noise standards. This indicates that increasing the required building setback distance from 34<sup>th</sup> Street to greater than 75 feet would help to reduce outside noise levels immediately outside future residential units.

Summary

The above information was provided for your consideration of potential measures to minimize future traffic noise impacts on any planned future residential neighborhoods along the proposed 34<sup>th</sup> Street corridor. We hope this information will be useful to you as you plan land uses and approve future development plans along the corridor. Please contact me if you have any questions on the information provided above or questions on any other aspect of the project.

cc: Mary Bieringer, MnDOT  
Rick Brown, SRF