

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

NOISE ANALYSIS AND ABATEMENT GUIDANCE

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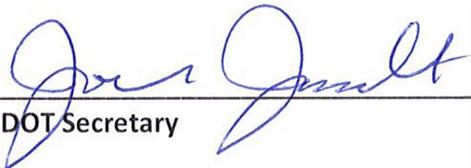
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SDDOT Secretary

11-21-23
Date



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1. INTRODUCTION

Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities, such as sleep, work, speech, or recreation. Noise levels from highway traffic are affected by the volume and speed of traffic, as well as the number of trucks in the flow of traffic. Generally, traffic noise is increased by these factors. Vehicle noise is a combination of the noise produced by the engine, exhaust, and tires.

Public concern about the increase in traffic noise caused by the rapid expansion of the Interstate system and other roadways in the 20th century led to federal legislation in 1970 that authorized the use of federal-aid highway funds for measures to abate and control highway traffic noise. The Federal-Aid Highway Act of 1970 mandated that the Federal Highway Administration (FHWA) develop noise standards for identifying noise impacts and evaluating noise mitigation for federal projects. FHWA prepared standards for the mitigation of highway traffic noise in the planning and design of federally funded projects. These standards comprise Title 23 of the United States Code of Federal Regulations Part 772 – *Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 CFR 772)*. On July 13, 2010, the Federal Highway Administration (FHWA) published a final rule which revised 23 CFR 772. The rule requires that State highway agencies prepare state-specific noise policies/guidance and procedures for applying the revised rule in their state.

This document outlines the South Dakota Department of Transportation's (SDDOT) procedures on how highway traffic impacts are defined, how noise abatement is evaluated, and how noise abatement decisions are made. It is intended to supplement 23 CFR 772 and supersedes SDDOT Noise Analysis and Abatement Guidance, dated July 13, 2011. The document will be reviewed annually and will be updated, as necessary, when FHWA issues new guidance. This document was developed by the SDDOT and was reviewed and approved by FHWA.

2. PURPOSE

The purpose of this document is to outline SDDOT's procedures for applying 23 CFR 772 in an equitable and cost-effective manner in South Dakota. Where FHWA has given flexibility in implementing the standard, this guidance describes the SDDOT's approach to implementation.

Note: Although the guidance in this document may cite a specific criterion or measure, requirements herein may be further modified for a specific project through the application of available industry wide practices and procedures. As such, any specific criterion or measure cited in this document shall not be viewed as a restriction on SDDOT's authority to require further analysis beyond a stated minimum standard.

3. DEFINITIONS

Abatement	Measures used to reduce traffic noise levels. Abatement measures will not be implemented unless determined to be feasible and reasonable.
Approach	1 dB(A) less than the Noise Abatement Criteria (NAC).
Benefited Receptor	The recipient of an abatement measure that receives a noise reduction at or above the minimum threshold of 5 dB(A). Used when making 'reasonable' determinations.
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, traffic mix, speed and features. Generally, common noise environments occur between two secondary noise sources, such as interchanges, intersections and cross-roads.
Date of Public Knowledge	The date of approval of the Categorical Exclusion (CE), the Finding of No significant Impact (FONSI) or the Record of Decision (ROD), as defined in 23 CFR 771.
dB(A)	A-weighted decibel. Decibels as measured by a sound meter with an "A" weighting filter. Using this filter, the sound level meter is less sensitive to very high and very low frequencies, like the human ear.
Design Year	The future year used to estimate the probable traffic volume for which a highway is designed (usually 20 years). It starts once construction is complete and the highway facility is open to traffic.
Existing Noise Levels	The worst noise hour resulting from the combination of natural and mechanical sources and human activity usually present in an area.
Feasibility	The combination of engineering and acoustical factors considered in the evaluation of a noise abatement measure.
Impacted Receptor	A noise-sensitive location for which a traffic noise impact has been calculated.
L₁₀	The sound level that is exceeded 10 percent of the time (the 90th percentile) for the period under consideration.
L_{10(h)}	The hourly value of L ₁₀ .
L_{eq}	The equivalent steady-state sound level that, in a stated period, contains the same acoustic energy as the time-varying sound level during the same time period.
L_{eq(h)}	The hourly value of L _{eq} . (SDDOT Standard)
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 benefited receptors.
Noise Abatement Criteria (NAC)	FHWA has determined noise levels for various activities or land uses which represent the upper limit of acceptable traffic noise level conditions, which are found in 23 CFR 772. These regulations do not require meeting the abatement criteria in every instance; rather, they require highway agencies make every reasonable and feasible effort to

provide noise mitigation when the criteria are approached or exceeded. Compliance with the noise regulations is a prerequisite for using Federal-aid highway funds for construction of Type I projects in South Dakota. (see Appendix 1.)

Noise Barrier	A physical obstruction that is constructed between the highway noise source and the noise receptor(s) that lower the noise level, including standalone 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 from calculating the difference between future build noise levels with abatement, to future build noise levels without abatement. The noise reduction goal shall be at least 7 dB(A).
Permitted	A definite commitment to develop land with an approved specific design of land use activities as evidenced by the issuance of a building permit.
Property Owner	An individual or group of individuals that holds a title, deed or other legal documentation of ownership of a property or residence.
Reasonableness	The combination of social, economic and environmental factors considered in the evaluation of noise abatement measures.
Receiver	A TNM modeling point, at which traffic noise levels are predicted. A receiver at a modeling point may be representative of one or more receptors.
Receptor	A Location or area where dwelling units or other fixed, developed sites of frequent human use occur.
Residence	A dwelling unit. This includes single family residences and multi-family dwellings, including mobile home parks.
Statement of Likelihood	A statement provided in the environmental clearance document based on the feasibility and reasonableness analysis completed at the time of the environmental document is being approved.
Substantial Construction	The granting of a building permit prior to right-of-way acquisition or construction approval for the highway.
Substantial Noise Increase	Along with the NAC defined above, one of two types of highway traffic noise impacts created by a proposed Type I project. SDDOT defines this as an increase in noise levels of at least 15 dB(A) in the design year over the existing ambient noise level.
Traffic Noise Impacts	Design year build condition noise levels that approach or exceed the NAC listed in Appendix 1 for the future build condition; or design year build condition noise levels that create a substantial noise increase over existing noise levels by 15 dB(A).
Type I Project	(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: A project that halves the distance between the edge of the outermost through-traffic lane

and the closest receptor between the existing condition and the future build condition; or,

ii) Substantial Vertical Alteration: A project that removes shielding thereby exposing the line-of-site between the receptor and the traffic noise source. This is done by either 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, as defined in FHWA's Traffic Noise and Abatement Guidance (2011);

(4) Addition to a highway of an auxiliary lane of accumulated length greater than 2500 feet, by new construction or restriping, including lanes that function as passing lanes or continuous access lanes, except for when the auxiliary lane is a turn lane;

(5) The addition of a new interchange or the relocation of interchange lanes, or when ramps are added to a quadrant to complete an existing partial interchange; Restriping existing pavement for the purpose of adding a through-traffic lane or an auxiliary lane; or the addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot or toll plaza.

If a portion of a project is determined to be a Type I project under this definition, then the entire project is defined as a Type I project.

Type II Project

Also called a retrofit project for noise abatement, a Type II project is a proposed 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 section 772.7(e).

Type II programs are voluntary, and SDDOT does not have a Type II program.

Type III Project

A Federal or Federal-aid highway project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a noise analysis.

Worst Noise Hour

The worst noise hour resulting from the combination of natural and mechanical sources and human activity usually present in a particular area. The worst noise hour should be determined via measurements or modeling (the latter applicable only to an existing highway with use of a validated model).

4. NOISE STANDARDS

This document outlines the SDDOT's program to implement the FHWA noise standards found at 23 CFR 772. The standards include traffic noise prediction requirements, noise analyses, noise abatement criteria and requirements for informing local officials.

5. APPLICABILITY

The SDDOT Traffic Noise Analysis and Abatement Procedures and Guidance applies uniformly and consistently to Type I highway projects in the State of South Dakota that receive Federal-aid funds. They include federal projects that are administered by the SDDOT or Local Public Agencies (LPA) (SDDOT will use the definition of Type I projects in this document to determine whether a project is Type I). The SDDOT does not participate in nor fund Type II projects.

If there are any questions about whether a project is subject to this policy or the FHWA Noise Standard at 23 CFR 772, contact the Environmental Supervisor, Administration Program: Phone:(605) 773-3721.

6. TRAFFIC NOISE PREDICTION

The noise analysis process will not be initiated unless the project has been identified as a Type I project. A traffic noise analysis is required for all reasonable build alternatives that have been retained for detailed analysis in the National Environmental Policy Act (NEPA) document. Under 23 CFR 772, a noise analysis is not required for the “No Build” alternative or for any alternative that was rejected as unreasonable during the alternatives screening process.

Pursuant to 23 CFR 772.9, noise analysis on Type I projects in South Dakota must use an approved version of the FHWA Traffic Noise Model (TNM). Average pavement type must be used in the model unless SDDOT substantiates the use of a different pavement type for approval by the FHWA. Noise contour lines may be used for project alternative screening and for land use planning during the Planning/Scoping phases of project development but shall not be used for determining noise impacts on any project.

Traffic noise must be modeled to predict noise for the current conditions and project design year using traffic conditions representing the worst noise hour. SDDOT seeks to analyze representative conditions throughout the year and does not consider variations in seasonal traffic, e.g., tourist season vs. non-tourist season.

Under the revised 23 CFR 772 traffic noise regulation, use of the ‘TNM Look’ program is no longer allowed for screening or other analysis. When traffic noise screening is warranted, SDDOT will retain a qualified consultant or the Environmental Office will perform the traffic noise modeling analysis itself. The traffic noise modeling will be conducted using an approved version of FHWA TNM utilizing the existing and design year traffic noise levels at current project receptor distances from the center of the road.

The screening analysis is a simplified TNM run used when noise impacts are not anticipated. The Low Volume Road Tool (LVRT) or Traffic Noise Screening Tool, both extensions housed within TNM, can be useful tools for assessing noise impacts on low

volume roads. A Screening Noise Analysis will be conducted at the discretion of SDDOT. Worst-case conditions will be used, when applicable, to provide conservative traffic noise estimates. If no traffic noise impacts are identified, traffic noise prediction model printouts will be provided to the nearest municipal or county zoning office for use in future planning considerations. When potential traffic noise impacts are identified through the screening process, FHWA TNM certified SDDOT staff or consultants will conduct a detailed noise analysis for the project.

Screening Analysis

The purpose of the screening analysis is to determine whether or not additional analysis is required for a proposed project. The screening analysis will contain the following:

- A straight-line model design using the latest version of FHWA Traffic Noise Model (TNM) can be used to screen projects that are unlikely to experience noise impacts, such as low-volume roadways. Only roadway(s), receiver(s), and traffic information are required. Model receptor validation is not required. Model conditions will be considered “worst-case” and use higher sound levels than would be expected.
- No elevation or topography data is required for modelling.
- The model shall use Existing and Build Design traffic information with posted speed limits.
- Project receptor distances from the existing and build condition roadways shall be used for receiver points. The simplified existing condition is compared to the future “build” condition to determine whether a significant noise level increase is expected. If the predicted sound levels are within 4 dB(A) of the noise abatement criteria for the corresponding activity category, or if a noise increase of ≥ 13 dB(A) is predicted at a project receiver, a detailed noise analysis will be conducted for the project.
- Modeled roadways should extend 1,500 feet beyond the final receiver(s) perpendicular to the roadway on either side of the project.
- Any relevant non-highway noise source should be considered and may require measurement.

If the screening analysis results indicate no impact and no additional analysis is needed, the results will be summarized within a Noise Screening Report to be archived with the project documentation. If the screening analysis indicates additional analysis is needed, proceed to the steps outlined in Section 7 of this document.

7. ANALYSIS OF TRAFFIC NOISE IMPACTS

For Type I projects, a traffic noise analysis is required for all build alternatives under detailed study in the National Environmental Policy Act (NEPA) process. That is, all reasonable alternatives that have been retained for detailed analysis in the categorical exclusion documentation, environmental assessment, or environmental impact statement, and NOT rejected as unreasonable during the alternatives screening process. For Tier 1 Environmental Impact Statements or other studies that will examine broad corridors, the appropriate scope and methodology of the noise analysis should be discussed with FHWA and other participating agencies early in the project planning process.

A noise study will be conducted for any project determined to be a Type I project as defined in 23 CFR 772.5. If any segment or component of an alternative meets the definition of a Type I project, then the entire alternative is Type I and is subject to the noise analysis requirements. In some cases where noise levels are not anticipated to increase substantially over current levels or where the project is deemed not feasible, SDDOT may elect to use a simplified screening analysis to assess proposed build alternatives. See section on *Screening Analysis above*.

SDDOT requires noise measurement procedures be taken in accordance with *the current version of FHWA's Measurement of Highway-Related Noise* (<https://www.fhwa.dot.gov/ENVIRONMENT/noise/measurement/measure.pdf>). For a noise model to be considered valid, the TNM model must be verified against measurement conditions and be +/- 3 dB(A) of the measured noise levels. If noise measurements fall outside of this range, TNM traffic inputs should be compared to the measured traffic volumes, composition, and speeds recorded during the monitoring events and elevation contours should be reviewed for accuracy. If a review of the modeling inputs does not increase the accuracy of the validation model to within the 3 dB(A) tolerance, field measurements may need to be repeated. Existing noise levels shall be determined by taking field measurements with an American National Standards Institute (ANSI) Type 1 or 2 sound level meter. All acoustic equipment will be calibrated annually by its manufacturer, or other certified laboratory to verify accuracy. Noise equipment calibration dates will be included in the noise analysis and calibration records will be provided upon request. To avoid noise interference from winds, a wind screen must be attached to the microphone during all readings. The microphone should be placed 5' above ground level. Noise measurements should not be taken if the wind velocity is 12 mph or greater. Three readings will be taken at each receiver location for a minimum time interval of 15 minutes. The time of day, length of measurement periods, location of receptors, traffic counts, and weather conditions should be documented for each reading.

The noise analysis will be performed using forecasted traffic volumes for the Design Year (at least 20 years after the year of construction). Peak hour traffic volumes for the Design Year and the future posted speed limits must be used as TNM inputs. Average pavement

shall be used unless SDDOT obtains FHWA approval to use a different pavement type. For additional guidance on using TNM, consult the *TNM User's Guide*.

The noise study area for the build alternatives will be defined from the beginning project construction point to the ending project construction point. The noise study area should be defined by the modeler to include all impacted receptors. The minimum distance to identify receptors is outside edge of the right of way (ROW). In cases where the roadway is above grade, the analysis area may need to be extended to ensure that all impacts are identified. If any segment of an alternative meets the definition of a Type I project, then the entire alternative is a Type I and is subject to the noise analysis requirements.

The noise analysis must have a modeled receiver for each Activity Category (modeling procedure described below) present within the project area. A detailed list of land use types within each Activity Category can be found in Appendix 1: 23 CFR 772 Noise Abatement Criteria.

- Activity Category A: 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.
- Activity Category B: Exterior areas of single-family and multi-family dwellings.
- Activity Category C: 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.
- Activity Category D: Interior evaluation location of 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. Activity Category D facilities are the only one that SDDOT will consider interior noise abatement measures.
- Activity Category E: Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
- Activity Category 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.
- Activity Category G: Undeveloped lands that have been permitted for development on or before the date of public knowledge.

See Appendix 2 for guidance on evaluating land uses within the above Activity Categories.

8. TRAFFIC NOISE IMPACTS

Highway traffic noise impacts occur when the predicted traffic noise levels for the Design Year approach (reach 1 decibel less than) or exceed the NAC contained in 23 CFR 772 (Appendix 1), or when the predicted traffic noise levels substantially exceed the existing noise levels by 15 dB(A), even though the predicted levels may not exceed the NAC.

9. ANALYSIS OF NOISE ABATEMENT MEASURES

When a traffic noise impact is identified on a Type I project, noise abatement measures will be considered and evaluated for feasibility and reasonableness by comparing the costs and effect of the abatement measure against the amount of benefit. The following conditions must be met for noise abatement to be justified and incorporated into project design. Failure to achieve any single element of feasibility or reasonableness will result in the noise abatement measure being deemed not feasible or not reasonable, whichever applies. A report summarizing the findings of the noise analysis should be produced to document impacts and recommendations (see Appendix 5).

Feasibility

When a traffic noise impact is identified on a Type I project, noise abatement will be considered and evaluated for engineering and acoustical feasibility.

Engineering feasibility: Determination that it is possible to design and construct the noise abatement measure. Factors to consider are safety, barrier height, topography, drainage, utilities, and maintenance of the abatement measure, maintenance access to adjacent properties, and access to adjacent properties (i.e. arterial widening projects).

- **Safety:** An abatement measure would not be deemed feasible if for example it causes an excessive restriction of sight distance, continuous shadow causing icing or snow accumulation of the driving lanes, severe drainage problems associated with the barrier, or flood-prone areas.
- **Barrier height:** The design of each proposed barrier will be considered on an individual basis when determining barrier height. The designed height of any proposed barrier may be adjusted based on feasibility and reasonableness considerations. SDDOT will generally not construct barriers higher than 20 feet due to cost effectiveness, and structural and aesthetic considerations.
- **Topography:** If the topography is such that an abatement measure cannot be built, then it will not be deemed feasible.

- Drainage and utilities: A noise abatement measure is not feasible if for example, access to drainage and utilities are not maintained.
- Maintenance of the abatement measure, maintenance access to adjacent properties, and access to adjacent properties: A noise abatement measure is not feasible if for example, access to the abatement measure, side streets, driveway, ramps, etc. is not maintained.

Acoustic Feasibility

A noise abatement measure is considered acoustically feasible when a minimum of 60% of front row receptors directly behind the noise wall (noise wall must extend entirely across receptor's property line) achieve a 5 dB(A) noise reduction. A 5 dB reduction is considered a Benefitted Receptor.

Reasonableness

Reasonableness is a more subjective criterion than feasibility. It implies that common sense and good judgment were applied in arriving at a decision when noise abatement measures are considered. The following three reasonableness criteria must be collectively achieved for an abatement measure to be considered reasonable:

Viewpoints of the Property Owners and Residents of all Benefitted Receptors (Activity Category B Land Uses)

When it is determined that it would be feasible to provide noise abatement for a site, and a preliminary determination has been made that abatement would be reasonable, a public informational meeting will be held, in accordance with SDDOT's Public Involvement Plan, as part of the process for a final determination of whether abatement would be reasonable. This process should not occur too early in the project development to avoid changes to abatement measures.

Cost Effectiveness

Noise barriers that are determined to be feasible to design and construct must also be evaluated for reasonable cost. SDDOT defines cost effectiveness as dollars per benefitted receiver. Based on 2010 construction cost estimates and adjusted for inflation (18.2% cumulative inflation rate 2010-2020, from \$44 ft² and \$21,000), SDDOT will use \$52/ft² for barrier costs and \$25,000 as the cost per benefitted receptor. If the cost per benefitted receptor is more than \$25,000 the abatement measure will not be considered reasonable. The abatement cost guidance will be reevaluated every five years, or sooner, if updated costs become available.

The cost calculations of the noise abatement measure should include all items directly related to the construction of the noise abatement measure. Examples of cost items that

should be included in the estimate include design, right-of-way, drainage modifications, utility relocation, traffic control, retaining walls, landscaping for graffiti abatement and standard aesthetic treatments. To determine whether a cost is attributable to a noise abatement measure, it should be determined whether the cost would be necessary if no noise abatement measure was constructed.

Noise Reduction Goal

A minimum of 40% of benefited receptors must achieve a 7 dB(A) noise reduction for noise abatement to be reasonable.

Voting Process

Benefited property owners and residents will be given an opportunity to vote on noise abatement by ballot (see Appendix 4 for sample ballot). An information packet and a ballot will be sent by certified mail to all benefited property owners and residents, at least 14 days before the date of a noise abatement meeting. The votes will be weighed in the following manner:

- 3 points/ballot for benefited first row property owners (receptors sharing a property line with the highway right-of-way), except owners of multi-family dwellings (see below)
- 1 point/ballot for all other benefited property owners (receptors not sharing a property line with the highway right-of-way)
- 1 point/ballot vote for all occupied residences of multi-family dwellings or residents residing in benefited property not included above
- 1 point/ballot vote per unit in a multi-family residence for property owner of a multi-family dwelling, regardless of first row orientation

After fourteen days from ballot delivery, any unreturned ballots will be subject to a reminder notice issued through email, phone, or mail. After fourteen additional days, all unreturned ballots will not be considered for noise abatement. These guidelines will be clearly stipulated in the certified informational mailing so every voting party will be informed. If the benefited property owners and residents vote to reject construction of a noise barrier, their area will not be reconsidered for future noise abatement unless another Type I project is proposed for the area.

For Activity Categories A, C, D, and E, the views of the property owner or authority having jurisdiction over the property will be considered. Due to the extremely infrequent nature of Category A receptors, they will be handled on a case-by-case basis. Consult SDDOT Noise Abatement Staff for further guidance.

Note – The voting method outlined in this section covers the vast majority of highway projects. In the rare case when extenuating circumstances arise that require unusual or unique considerations be made that are not explicitly covered by these guidelines, project-level decisions will be made in accordance with guidance outlined in Section 13.2.3 of this Highway Traffic Noise Manual.

10. NOISE ABATEMENT MEASURES

The following noise abatement measures may be considered for incorporation into a project to reduce traffic noise impacts. In accordance to 23 CFR 772(13) (c), these abatement measures are eligible for federal funding.

- Construction of noise barriers, including acquisition of property rights, either within or outside the highway right-of-way. When a noise barrier has been determined to be the most effective abatement measure, concrete or composite materials shall be considered. SDDOT will not allow the construction of wood or plastic barriers due to long term maintenance issues.

Acoustically absorptive materials (any surface treatment that absorbs more noise than it reflects) will be provided when the following conditions indicate that the use of reflective materials would cause noise increases in areas not protected by the barriers:

- The ratio of the spacing between new parallel barriers and the average height of the barrier is 15:1 or less,
- Receptors on one side of the highway have a direct line of sight from an area of frequent human use that would benefit from a lowered noise level to a new barrier on the opposite side of the highway.
- Other measures that may be examined for reasonableness include earth berms, buffer zones, traffic management measures, and the alteration of horizontal and vertical alignments.

Noise Abatement Measure Reporting

The SDDOT shall maintain an inventory of all constructed noise abatement measures. The inventory shall include the parameters listed in 23 CFR 772.13(f). A noise barrier report will be saved within the project file for evaluation in the NEPA decision document. be provided to FHWA upon request.

11. NEPA DOCUMENTATION

Prior to CE approval or issuance of a FONSI or ROD for a Type I project, the following information will be included in the NEPA file (see Appendix 5):

- Noise abatement measures that are feasible or reasonable, and are likely to be incorporated into the project
- Noise impacts for which no abatement appears to be feasible and reasonable
- Statement of Likelihood (see Appendix 3)

Information to be listed in the NEPA decision document, should include but is not limited to:

- Identified impacted receptors
- Identified preliminary noise abatement decision
- Identified locations where noise abatement appears reasonable & feasible
- Identified locations and receptors where noise abatement appears infeasible or not reasonable
- Explanation of when the final noise abatement decision will be made

Additional information on NEPA documentation requirements can be found within FHWA-HEP-18-067 (https://www.fhwa.dot.gov/Environment/noise/resources/reviewing_noise_analysis/#toc494123501).

If NEPA re-evaluation is required noise analysis and abatement measures will need to be included in re-evaluation process. The noise re-evaluation will be handled on a case-by-case basis in close coordination with FHWA and SDDOT environmental staff.

12. FEDERAL PARTICIPATION

Federal funds may be used for noise abatement measures on Type I highway projects in South Dakota, when traffic noise impacts have been identified and abatement measures have been determined to be feasible and reasonable pursuant to 23 CFR 772.13(d).

13. THIRD PARTY FUNDING

Third party funding cannot be used to make up the difference in cost between the reasonable cost allowance and the actual cost. For noise barriers that meet the feasibility

and reasonableness standards outlined above in Section 9, third party funding can be used to make functional enhancements, such as absorptive treatment and access doors or aesthetic enhancements.

14. INFORMATION FOR LOCAL OFFICIALS

Local officials will be provided with information on noise compatible planning techniques that can be used to prevent future highway traffic noise impacts. The name of the local official given data, the date of transmittal, and summary of the data transferred should be documented in the NEPA project file. To assist local officials within whose jurisdiction a Type I highway project is located, the SDDOT will provide information on future noise levels for each Activity Category located along the project as defined within (23 CFR 772-17(a)(2)). This will be accomplished by providing a copy of the final noise analysis report to the local official, including the distance to the approach criteria for each land use category on undeveloped lands. The local official will also be provided with an estimation of future noise levels for various distances from the highway (noise contours) Local officials can find information for each land use category on undeveloped lands in 23 CFR 772-17(a)(2). Type II noise compatible land use planning concepts can be found on FHWA's Noise Compatible planning page (https://www.fhwa.dot.gov/ENVIRonment/noise/noise_compatible_planning/federal_approach/land_use/qz02.cfm). Type II projects as defined in 23 CFR 772.15(b) are not eligible for Federal-aid participation.

15. DATE OF PUBLIC KNOWLEDGE

The “Date of Public Knowledge” of the location and potential noise impacts of a Type I project will be the approval date of the environmental document, i.e. CE, FONSI or ROD. SDDOT will not be responsible for providing highway traffic noise abatement for undeveloped lands permitted after the Date of Public Knowledge.

After this date, the federal and state governments are no longer responsible for providing noise abatement measures for new development or lands permitted for development within the noise impact area of the proposed Type I highway project. It is the responsibility of local governments and private landowners to ensure that noise-compatible designs are used for development permitted after the Date of Public Knowledge. SDDOT is not responsible for providing noise abatement for development that occurs adjacent to the proposed highway project that was not permitted as of the date of public knowledge.

If FHWA determines that a project change warrants a re-evaluation of the NEPA document, then the Date of Public Knowledge may coincide with the date of FHWA’s new NEPA decision.

16. CONSTRUCTION NOISE

During construction, contractors will be required to comply with the sound control requirements identified in the SDDOT Standard Specifications for Roads and Bridges, 2015 (Section 7.22). As stipulated in 23 CFR 772.19 for Type I projects, SDDOT and their contractors must:

- Identify land uses or activities that may be affected by noise from construction of the project. The identification is to be performed during the project development studies.
- Determine the measures that are needed in the plans and specifications to minimize or eliminate adverse construction noise impacts to the community. This determination shall include a weighing of the benefits achieved and the overall adverse social, economic, and environmental effects and costs of the abatement measures.
- Incorporate the needed abatement measures in the plans and specifications.

Construction abatement measures will be determined by weighing the duration of the project, benefits achieved, overall adverse social, economic and environmental effects, and cost of abatement measures.

APPENDIX 1: TITLE 23 CODE OF FEDERAL REGULATIONS, PART 772, INCLUDING NOISE ABATEMENT CRITERIA (NAC)

Sec.

772.1 Purpose.

772.3 Noise standards.

772.5 Definitions.

772.7 Applicability.

772.9 Traffic noise prediction.

772.11 Analysis of traffic noise impacts.

772.13 Analysis of noise abatement.

772.15 Federal participation.

772.17 Information for local officials.

772.19 Construction noise.

Table 1 to Part 772--Noise Abatement Criteria

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

Sec. 772.1 Purpose.

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

Sec. 772.3 Noise standards.

The highway traffic noise prediction requirements, noise analyses, noise abatement criteria, and requirements for informing local officials in this regulation constitute the noise standards mandated by 23 U.S.C. 109(1). All highway projects which are developed in conformance with this regulation shall be deemed to be in accordance with the FHWA noise standards.

Sec. 772.5 Definitions.

Benefited Receptor. The recipient of an abatement measure that receives a noise reduction at or above the minimum threshold of 5 dB(A), but not to exceed the highway agency's reasonableness design goal.

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, traffic mix, and speed; and topographic features. Generally, common noise environments occur between two secondary noise sources, such as interchanges, intersections, cross-roads.

Date of Public Knowledge. The date of approval of the Categorical Exclusion (CE), the Finding of No Significant Impact (FONSI), or the Record of Decision (ROD), as defined in 23 CFR part 771.

Design Year. The future year used to estimate the probable traffic volume for which a highway is designed.

Existing Noise Levels. The worst noise hour resulting from the combination of natural and mechanical sources and human activity usually present in a particular area.

Feasibility. The combination of acoustical and engineering factors considered in the evaluation of a noise abatement measure.

Impacted Receptor. The recipient that has a traffic noise impact.

L10. The sound level that is exceeded 10 percent of the time (the 90th percentile) for the period under consideration, with L10(h) being the hourly value of L10.

Leq. The equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period, with Leq(h) being the hourly value of Leq.

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 benefited receptors.

Noise Barrier. A physical obstruction that is constructed between the highway noise source and the 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 from calculating the difference between future build noise levels with abatement, to future build noise levels without abatement. The noise reduction design goal shall be at least 7 dB(A), but not more than 10 dB(A).

Permitted. A definite commitment to develop land with an approved specific design of land use activities as evidenced by the issuance of a building permit.

Property Owner. An individual or group of individuals that holds a title, deed, or other legal documentation of ownership of a property or a residence.

Reasonableness. The combination of social, economic, and environmental factors considered in the evaluation of a noise abatement measure.

Receptor. A discrete or representative location of a noise sensitive area(s), for any of the land uses listed in Table 1.

Residence. A dwelling unit. Either a single-family residence or each dwelling unit in a multifamily dwelling.

Statement of Likelihood. A statement provided in the environmental clearance document based on the feasibility and reasonableness analysis completed at the time the environmental document is being approved.

Substantial Construction. The granting of a building permit, prior to right-of-way acquisition or construction approval for the highway.

Substantial noise increase. One of two types of highway traffic noise impacts. For a Type I project, an increase in noise levels of 5 to 15 dB(A) in the design year over the existing noise level.

Traffic Noise Impacts. Design year build condition noise levels that approach or exceed the NAC listed in Table 1 for the future build condition; or design year build condition noise levels that create a substantial noise increase over existing noise levels.

Type I Project:

- (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. A project that halves the distance between the traffic noise source and the closest receptor between the existing condition to the future build condition; or,
 - (ii) Substantial Vertical Alteration. A project that removes shielding therefore exposing the line-of-sight between the receptor and the traffic noise source. This is done by either 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). This includes the addition of a through traffic lane that functions as a HOV lane, High-Occupancy Toll (HOT) lane, bus lane, or truck climbing lane; or,
- (4) The addition of an auxiliary lane, except for when the auxiliary lane is a turn lane; or,
- (5) The addition or relocation of interchange lanes or ramps added to a 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 a weigh station, rest stop, ride-share lot or toll plaza.

(8) 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 section 772.7(e).

Type III Project. A Federal or Federal-aid highway project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a noise analysis.

Sec. 772.7 Applicability.

(a) This regulation applies to all Federal or Federal-aid Highway Projects authorized under title 23, United States Code. Therefore, this regulation applies to any highway project or multimodal project that:

(1) Requires FHWA approval regardless of funding sources, or

(2) Is funded with Federal-aid highway funds.

(b) In order to obtain FHWA approval, the highway agency shall develop noise policies in conformance with this regulation and shall apply these policies uniformly and consistently statewide.

(c) This regulation applies to all Type I projects unless the regulation specifically indicates that a section only applies to Type II or Type III projects.

(d) The development and implementation of Type II projects are not mandatory requirements of section 109(i) of title 23, United States Code.

(e) If a highway agency chooses to participate in a Type II program, the highway agency shall develop a priority system, based on a variety of factors, to rank the projects in the program. This priority system shall be submitted to and approved by FHWA before the highway agency is allowed to use Federal-aid funds for a project in the program. The highway agency shall reanalyze the priority system on a regular interval, not to exceed 5 years.

(f) For a Type III project, a highway agency is not required to complete a noise analysis or consider abatement measures.

Sec. 772.9 Traffic noise prediction.

(a) Any analysis required by this subpart must use the FHWA Traffic Noise Model (TNM), which is described in "FHWA Traffic Noise Model" Report No. FHWA-PD-96-010, including Revision No. 1, dated April 14, 2004, or any other model determined by the FHWA to be consistent with the methodology of the FHWA TNM. These publications are incorporated by reference in accordance with section 552(a) of title 5, U.S.C. and part 51 of title 1, CFR, and are on file at the National Archives and Record Administration (NARA). For information on the availability of this material at NARA, call (202) 741-6030 or go to http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html. These documents are available for copying and inspection at the Federal Highway Administration, 1200 New Jersey Avenue, SE., Washington, DC 20590, as provided in part 7 of title 49, CFR. These documents are also available on the FHWA's Traffic Noise Model Web site at the following URL: <http://www.fhwa.dot.gov/environment/noise/index.htm>.

(b) Average pavement type shall be used in the FHWA TNM for future noise level prediction unless a highway agency substantiates the use of a different pavement type for approval by the FHWA.

(c) Noise contour lines may be used for project alternative screening or for land use planning to comply with Sec. 772.17 of this part, but shall not be used for determining highway traffic noise impacts.

(d) In predicting noise levels and assessing noise impacts, traffic characteristics that would yield the worst traffic noise impact for the design year shall be used.

Sec. 772.11 Analysis of traffic noise impacts.

(a) The highway agency shall determine and analyze expected traffic noise impacts.

(1) For projects on new alignments, determine traffic noise impacts by field measurements.

(2) For projects on existing alignments, predict existing and design year traffic noise impacts.

(b) In determining traffic noise impacts, a highway agency shall give primary consideration to exterior areas where frequent human use occurs.

(c) A traffic noise analysis shall be completed for:

(1) Each alternative under detailed study;

(2) Each Activity Category of the NAC listed in Table 1 that is present in the study area;

(i) Activity Category A. This activity category includes the exterior impact criteria for 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 for the area to continue to serve its intended purpose. Highway agencies shall submit justifications to the FHWA on a case-by-case basis for approval of an Activity Category A designation.

(ii) Activity Category B. This activity category includes the exterior impact criteria for single-family and multifamily residences. (iii) Activity Category C. This activity category includes the exterior impact criteria for a variety of land use facilities. Each highway agency shall adopt a standard practice for analyzing these land use facilities that is consistent and uniformly applied statewide.

(iv) Activity Category D. This activity category includes the interior impact criteria for certain land use facilities listed in Activity Category C that may have interior uses. A highway agency shall conduct an indoor analysis after a determination is made that exterior abatement measures will not be feasible and reasonable. An indoor analysis shall only be done after exhausting all outdoor analysis options. In situations where no exterior activities are to be affected by the traffic noise, or where the exterior activities are far from or physically shielded from the roadway in a manner that prevents an impact on exterior activities, the highway agency shall use Activity Category D as the basis of determining noise impacts. Each highway agency shall adopt a standard practice for analyzing these land use facilities that is consistent and uniformly applied statewide. (v) Activity Category E. This activity category includes the exterior impact criteria for developed lands that are less sensitive to highway noise. Each highway agency shall adopt a standard practice for analyzing these land use facilities that is consistent and uniformly applied statewide. (vi) Activity Category F. This activity category includes developed lands that are not sensitive to highway traffic noise. There is no impact criteria for the land use facilities in this activity category and no analysis of noise impacts is required. (vii) Activity Category G. This activity includes undeveloped lands. (A) A highway agency shall determine if undeveloped land is permitted for development. The milestone and its associated date for acknowledging when undeveloped land is considered permitted shall be the date of issuance of a building permit by the local jurisdiction or by the appropriate governing entity. (B) If undeveloped land is determined to be permitted, then the highway agency shall assign the land to the appropriate Activity Category and analyze it in the same manner as developed lands in that Activity Category. (C) If undeveloped land is not permitted for development by the date of public knowledge, the highway

agency shall determine noise levels in accordance with 772.17(a) and document the results in the project's environmental clearance documents and noise analysis documents. Federal participation in noise abatement measures will not be considered for lands that are not permitted by the date of public knowledge.

(d) The analysis of traffic noise impacts shall include:

- (1) Identification of existing activities, developed lands, and undeveloped lands, which may be affected by noise from the highway;
- 2) For projects on new or existing alignments, validate predicted noise level through comparison between measured and predicted levels;
- (3) Measurement of noise levels. Use an ANSI Type I or Type II integrating sound level meter;
- (4) Identification of project limits to determine all traffic noise impacts for the design year for the build alternative. For Type II projects, traffic noise impacts shall be determined from current year conditions;

(e) Highway agencies shall establish an approach level to be used when determining a traffic noise impact. The approach level shall be at least 1 dB(A) less than the Noise Abatement Criteria for Activity Categories A to E listed in Table 1 to part 772;

(f) Highway agencies shall define substantial noise increase between 5 dB(A) to 15 dB(A) over existing noise levels. The substantial noise increase criterion is independent of the absolute noise level.

(g) A highway agency proposing to use Federal-aid highway funds for a Type II project shall perform a noise analysis in accordance with Sec. 772.11 of this part in order to provide information needed to make the determination required by Sec. 772.13(a) of this part.

Sec. 772.13 Analysis of noise abatement.

(a) When traffic noise impacts are identified, noise abatement shall be considered and evaluated for feasibility and reasonableness. The highway agency shall determine and analyze alternative noise abatement measures to abate identified impacts by giving weight to the benefits and costs of abatement and the overall social, economic, and environmental effects by using feasible and reasonable noise abatement measures for decision-making.

(b) In abating traffic noise impacts, a highway agency shall give primary consideration to exterior areas where frequent human use occurs.

(c) If a noise impact is identified, a highway agency shall consider abatement measures. The abatement measures listed in Sec. 772.15(c) of this part are eligible for Federal funding.

(1) At a minimum, the highway agency shall consider noise abatement in the form of a noise barrier.

(2) If a highway agency chooses to use absorptive treatments as a functional enhancement, the highway agency shall adopt a standard practice for using absorptive treatment that is consistent and uniformly applied statewide.

(d) Examination and evaluation of feasible and reasonable noise abatement measures for reducing the traffic noise impacts. Each highway agency, with FHWA approval, shall develop feasibility and reasonableness factors.

(1) Feasibility:

(i) Achievement of at least a 5 dB(A) highway traffic noise reduction at impacted receptors. The highway agency shall define, and receive FHWA approval for, the number of receptors that must achieve this reduction for the noise abatement measure to be acoustically feasible and explain the basis for this determination; and

(ii) Determination that it is possible to design and construct the noise abatement measure. Factors to consider are safety, barrier height, topography, drainage, utilities, and maintenance of the abatement measure, maintenance access to adjacent properties, and access to adjacent properties (i.e. arterial widening projects).

(2) Reasonableness:

(i) Consideration of the viewpoints of the property owners and residents of the benefited receptors. The highway agency shall solicit the viewpoints of all of the benefited receptors and obtain enough responses to document a decision on either desiring or not desiring the noise abatement measure. The highway agency shall define, and receive FHWA approval for, the number of receptors that are needed to constitute a decision and explain the basis for this determination.

(ii) Cost effectiveness of the highway traffic noise abatement measures. Each highway agency shall determine, and receive FHWA approval for, the allowable cost of abatement by determining a baseline cost reasonableness value. This determination may include the actual construction cost of noise abatement, cost per square foot of abatement, the maximum square footage of abatement/benefited receptor and either

the cost/benefited receptor or cost/benefited receptor/dB(A) reduction. The highway agency shall re-analyze the allowable cost for abatement on a regular interval, not to exceed 5 years. A highway agency has the option of justifying, for FHWA approval, different cost allowances for a particular geographic area(s) within the State, however, the highway agency must use the same cost reasonableness/construction cost ratio statewide.

(iii) Noise reduction design goals for highway traffic noise abatement measures. When noise abatement measure(s) are being considered, a highway agency shall achieve a noise reduction design goal. The highway agency shall define, and receive FHWA approval for, the design goal of at least 7 dB(A) but not more than 10 dB(A), and shall define the number of benefited receptors that must achieve this design goal and explain the basis for this determination.

(iv) The reasonableness factors listed in Sec. 772.13(d)(5)(i), (ii) and (iii), must collectively be achieved in order for a noise abatement measure to be deemed reasonable. Failure to achieve Sec. 772.13(d)(5)(i), (ii) or (iii), will result in the noise abatement measure being deemed not reasonable.

(v) In addition to the required reasonableness factors listed in Sec. 772.13(d)(5)(i), (ii), and (iii), a highway agency has the option to also include the following reasonableness factors: Date of development, length of time receptors have been exposed to highway traffic noise impacts, exposure to higher absolute highway traffic noise levels, changes between existing and future build conditions, percentage of mixed zoning development, and use of noise compatible planning concepts by the local government. No single optional reasonableness factor can be used to determine reasonableness.

(e) Assessment of Benefited Receptors. Each highway agency shall define the threshold for the noise reduction which determines a benefited receptor as at or above the 5 dB(A), but not to exceed the highway agency's reasonableness design goal.

(f) Abatement Measure Reporting: Each highway agency shall maintain an inventory of all constructed noise abatement measures. The inventory shall include the following parameters: type of abatement; cost (overall cost, unit cost per/sq. ft.); average height; length; area; location (State, county, city, route); year of construction; average insertion loss/noise reduction as reported by the model in the noise analysis; NAC category(s) benefited; material(s) used (precast concrete, berm, block, cast in place concrete, brick, metal, wood, fiberglass, combination, plastic (transparent, opaque, other)); features (absorptive, reflective, surface texture); foundation (ground mounted, on structure); project type (Type I, Type II, and optional project types such as State funded, county

funded, tollway/turnpike funded, other, unknown). The FHWA will collect this information, in accordance with OMB's Information Collection requirements.

(g) Before adoption of a CE, FONSI, or ROD, the highway agency shall identify:

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

(2) Noise impacts for which no noise abatement measures are feasible and reasonable.

(3) Documentation of highway traffic noise abatement: The environmental document shall identify locations where noise impacts are predicted to occur, where noise abatement is feasible and reasonable, and locations with impacts that have no feasible or reasonable noise abatement alternative. For environmental clearance, this analysis shall be completed to the extent that design information on the alternative(s) under study in the environmental document is available at the time the environmental clearance document is completed. A statement of likelihood shall be included in the environmental document* since feasibility and reasonableness determinations may change due to changes in project design after approval of the environmental document. The statement of likelihood shall include the preliminary location and physical description of noise abatement measures determined feasible and reasonable in the preliminary analysis. The statement of likelihood shall also indicate that final recommendations on the construction of an abatement measure(s) is determined during the completion of the project's final design and the public involvement processes.

(h) The FHWA will not approve project plans and specifications unless feasible and reasonable noise abatement measures are incorporated into the plans and specifications to reduce the noise impact on existing activities, developed lands, or undeveloped lands for which development is permitted.

(i) For design-build projects, the preliminary technical noise study shall document all considered and proposed noise abatement measures for inclusion in the NEPA document. Final design of design-build noise abatement measures shall be based on the preliminary noise abatement design developed in the technical noise analysis. Noise abatement measures shall be considered, developed, and constructed in accordance with this standard and in conformance with the provisions of 40 CFR 1506.5(c) and 23 CFR 636.109.

(j) Third party funding is not allowed on a Federal or Federal-aid Type I or Type II project if the noise abatement measure would require the additional funding from the third party to be considered feasible and/or reasonable. Third party funding is acceptable on a Federal or Federal aid highway Type I or Type II project to make functional enhancements,

such as absorptive treatment and access doors or aesthetic enhancements, to a noise abatement measure already determined feasible and reasonable.

(k) On a Type I or Type II projects, a highway agency has the option to cost average noise abatement among benefited receptors within common noise environments if no single common noise environment exceeds two times the highway agency's cost reasonableness criteria and collectively all common noise environments being averaged do not exceed the highway agency's cost reasonableness criteria.

Sec. 772.15 Federal participation.

(a) Type I and Type II projects. Federal funds may be used for noise abatement measures when:

- (1) Traffic noise impacts have been identified; and
- (2) Abatement measures have been determined to be feasible and reasonable pursuant to Sec. 772.13(d) of this chapter.

(b) For Type II projects.

- (1) No funds made available out of the Highway Trust Fund may be used to construct Type II noise barriers, as defined by this regulation, if such noise barriers were not part of a project approved by the FHWA before the November 28, 1995.
- (2) Federal funds are available for Type II noise barriers along lands that were developed or were under substantial construction before approval of the acquisition of the rights-of ways for, or construction of, the existing highway.
- (3) FHWA will not approve noise abatement measures for locations where such measures were previously determined not to be feasible and reasonable for a Type I project.

(c) Noise Abatement Measures. The following noise abatement measures may be considered for incorporation into a Type I or Type II project to reduce traffic noise impacts. The costs of such measures may be included in Federal-aid participating project costs with the Federal share being the same as that for the system on which the project is located.

- (1) Construction of noise barriers, including acquisition of property rights, either within or outside the highway right-of-way. Landscaping is not a viable noise abatement measure.

(2) Traffic management measures including, but not limited to, traffic control devices and signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modified speed limits, and exclusive lane designations.

(3) Alteration of horizontal and vertical alignments.

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

(5) Noise insulation of Activity Category D land use facilities listed in Table 1. Post installation maintenance and operational costs for noise insulation are not eligible for Federal-aid funding.

Sec. 772.17 Information for local officials.

(a) To minimize future traffic noise impacts on currently undeveloped lands of Type I projects, a highway agency shall inform local officials within whose jurisdiction the highway project is located of:

(1) Noise compatible planning concepts;

(2) The best estimation of the future design year noise levels at various distances from the edge of the nearest travel lane of the highway improvement where the future noise levels meet the highway agency's definition of "approach" for undeveloped lands or properties within the project limits. At a minimum, identify the distance to the exterior noise abatement criteria in Table 1;

(3) Non-eligibility for Federal-aid participation for a Type II project as described in Sec. 772.15(b)

(b) If a highway agency chooses to participate in a Type II noise program or to use the date of development as one of the factors in determining the reasonableness of a Type I noise abatement measure, the highway agency shall have a statewide outreach program to inform local officials and the public of the items in Sec. 772.17(a)(1) through (3).

Sec. 772.19 Construction noise.

For all Type I and II projects, a highway agency shall:

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

(b) Determine the measures that are needed in the plans and specifications to minimize or eliminate adverse construction noise impacts to the community. This determination

shall include a weighing of the benefits achieved and the overall adverse social, economic, and environmental effects and costs of the abatement measures.

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

23 CFR 772 Noise Abatement Criteria [Hourly A-Weighted Sound Level decibels (dB(A)) ¹]				
Activity Category	Activity L_{eq(h)}	Criteria² L_{10(h)}	Evaluation Location	Activity Description
A	57	60	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve as 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 sports areas, amphitheatres, 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, office, 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 L_{eq(h)} or L_{10(h)} [but not both] may be used on a project. (L_{eq(h)} SDDOT Standard)

² The L_{eq(h)} and L_{10(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.

APPENDIX 2: GUIDELINES FOR EVALUATING ACTIVITY CATEGORY LAND USES

ACTIVITY CATEGORY A: The designation of Activity Category A lands will be done on a case-by-case basis in consultation with FHWA. FHWA must approve the Category A land use designation prior to initiating a noise analysis.

One receptor should be assigned to each exterior area of frequent human use present within the same land use. If no exterior area of frequent human use is present, no further noise analysis is required. Documentation of this finding should be placed in the project file.

ACTIVITY CATEGORY B: When determining traffic noise impacts for Activity Category B residential land uses, primary consideration will be given to exterior areas of frequent human use. Receivers for single family dwellings, should be located at exterior activity areas such as patios, play areas, back yards, or other areas of frequent human use nearest the roadway.

For multi-family dwellings each dwelling unit with an exterior area of frequent human use should be counted as a receptor. Receptors should be placed at an exterior common areas of frequent human use such as a sitting area, pool, tennis court, or other formalized outdoor activity area. Care should be taken to ensure correct elevations when modeling receiver points such as balconies on multi-story buildings. For multi-family dwellings, receptors may be grouped as a representative point to simplify the modeling run. If no exterior areas of frequent human use are present, no further noise analysis is required. Documentation of this finding shall be placed in the project file.

ACTIVITY CATEGORY C: When determining traffic noise impacts for Activity Category C land uses, primary consideration will be given to exterior areas of frequent human use. The following guidelines should be used when evaluating various Category C land uses:

Parks & Recreation Areas – One receiver should be assigned to each outdoor activity area that is located within the park or recreation area boundary. If the park or recreational area has no discernable formal exterior activity area (trail, camping facility, picnic areas, ball fields, etc.) a minimum of one receptor should be assigned and a receiver placed within 50 feet of the modeled ROW boundary.

Picnic Areas – One receptor should be assigned for each area of clustered tables that are oriented or situated as a single functional area.

Campgrounds – Representative receiver points may be used to for multiple campsites or camping cabins. One receptor should be assigned up to five formal campsites or camping cabins capable of human occupation. Informal campsite areas located within formalized campgrounds should be counted as one collective receptor per separated area.

Sporting Fields – One receptor should be counted for individual seating areas at each formalized sporting field. Less formalized activity areas such as grassy areas of a park or recreation area, which is commonly utilized for informal sporting activity, should be counted as one receptor per area.

Golf Courses – One receptor should be assigned, at each hole (tee-off areas or fairway-green combination) of the golf course that best represents the worst expected traffic noise condition for that hole. Other formal outdoor activity areas that exist within the golf course, such as practice areas, outdoor restaurants, etc., should be evaluated as a separate receptor.

Jurisdictionally Controlled Forests & Other Areas Officially Managed for Outdoor Recreational Activity – Jurisdictionally managed controlled areas are federal lands that have a management plan including defined outdoor activity use. A receptor should be assigned to each identified activity area (trails, camping facilities, picnic areas, etc.). Receivers should be located within the activity managed area boundary for each identified management area that defines outdoor activity areas. If the management area has no discernable activity areas, as defined within this section, a minimum of one generalized receiver should be placed within 50 feet from the boundary of the ROW at the point that best represents the worst expected traffic noise condition, based on professional judgement.

Trails/Trail Crossings – One receptor should be counted for each formal trail crossing regardless of the pathway orientation. The receiver should be placed within 50 feet from the boundary of the ROW on the trail that best represents the worst expected traffic noise condition.

Cemetery – One receptor should be counted for each area of formalized memorial gathering facility. Individual grave sites, access ways and informal activity areas are not considered sensitive receptors; however, each section of the cemetery as defined through consultation with the operator, which may have informal gathering areas, should be assigned one receptor. If there are no formalized or operator defined informal gathering areas, a generalized receiver, representing one receptor, should be placed within the property that best represents the worst expected traffic noise condition.

Section 4(f) Sites – Section 4(f) sites encompass three types of sites: parks and recreation areas, wildlife refuges and historic sites.

- Parks & Recreation Areas – addressed above.
- Wildlife Refuges – Wildlife or waterfowl refuges typically have limited or no human activity area and would therefore not be subject to noise analysis. However, on-site trails or observation areas should be treated under NAC Activity Category C as defined in this section.

- **Historic Sites** – For historic sites that have exterior areas with frequent human use (historic houses), one receptor should be considered for each site with such use. For historic sites without frequent human use, no noise analysis is necessary.

If no outside areas of frequent human use are present on an Activity Category C land use, no further noise analysis is required. Documentation of this finding shall be placed in the project file.

ACTIVITY CATEGORY D: An indoor analysis shall be conducted only after all outdoor analysis options have been exhausted and after a determination has been made that exterior abatement measures will not be feasible or reasonable.

If interior noise levels will be analyzed, a visual inspection of the building construction should be conducted to estimate the noise reduction provided by the building structure. The building noise reduction estimate should be based on the building noise reduction factors found in Table 6 of the FHWA *Highway Traffic Noise: Analysis and Abatement Guidance, December 2011*. It is assumed that windows will be closed in buildings with air conditioning. The estimated building noise reduction factor is subtracted from the predicted design year noise level at the building façade to determine if the interior noise level is likely to approach or exceed the interior NAC. If it has been determined that an interior noise analysis should continue, one receptor should be assigned for, and receiver should be placed at, each interior area of frequent human use closest to the noise source. If no interior areas of frequent human use are present in the building, further noise analysis is not required. Documentation of this finding shall be placed in the project file.

ACTIVITY CATEGORY E: When determining traffic noise impacts for Activity Category E developed lands, primary consideration will be given to exterior areas of frequent human use. A receivers, representing one receptor, should be placed at an outside activity area that best represents the worst expected traffic noise condition. Care should be taken to prevent shielding by objects or buildings. If no exterior areas of frequent human use are present on a Category E land use, no further noise analysis is required. Documentation of this finding shall be placed in the project file.

ACTIVITY CATEGORY F: No highway noise analysis is required for Category F land uses under 23 CFR 772.

ACTIVITY CATEGORY G: Land that is permitted for development (that is, a building permit has been issued on or before the date of public knowledge) shall be analyzed under the Activity Category appropriate for the permitted type of development.

For land that is not permitted for development by the date of public knowledge, the SDDOT will provide information to local officials within whose jurisdiction the Type I highway project is located, as described in Section 14 of this document. The information provided to local officials shall be documented in the project file. Noise abatement for such lands will not be eligible for Federal-aid participation.

APPENDIX 3: STATEMENT OF LIKELIHOOD EXAMPLE

PROJECT _____ PCN ____ COUNTY

Project location

Description of work

Based on noise analysis conducted thus far, the SDDOT intends to install highway traffic noise abatement measures in the form of [identify type of abatement measure] at the following location(s) along the project: _____ .

These preliminary indications of likely abatement measures are based on preliminary design for a barrier cost of \$_____ which will reduce the noise level by ___ dB(A) for ___ residences. If it subsequently develops during final design that these conditions have substantially changed, the abatement measures might not be provided. A final decision of the installation of noise abatement measure(s) will be made upon completion of the project's final design and the public involvement processes.

APPENDIX 4: SAMPLE VOTING BALLOT

[Project Name/Description] may lead to an increase in noise levels in your area. Therefore, as part of the environmental mitigation of the road improvements, your area may qualify for a sound wall. If a majority of benefitted property owners and residents vote in favor of a wall, and all other remaining criteria are met, the environmental mitigation study of the noise indicates your property would benefit from noise abatement measures. Please return this ballot to indicate your vote.

NAME (PLEASE PRINT): _____

PROPERTY ADDRESS (PLEASE PRINT): _____

VOTE FOR ONE:

_____ Accept noise barrier

_____ Reject noise barrier

75% of the votes from returned ballots must be a YES (Accept) vote in order for your area to qualify for noise abatement. If less than 75% of the tallied votes are in favor of the proposed noise barrier, the SDDOT will not reconsider constructing a noise barrier at this location unless another project requiring review is proposed for the area or if there is a re-evaluation on the current project.

After fourteen days from ballot delivery, any unreturned ballots will be subject to a reminder notice issued through email, phone, or mail. After fourteen additional days, all unreturned ballots will not be considered for noise abatement. Voting rules are outlined in the South Dakota Department of Transportation (SDDOT) Noise Analysis and Abatement Policy.

(Signature)

(Date)

The South Dakota Department of Transportation provides services without regard to race, color, gender, religion, national origin, age or disability, according to the provisions contained in SDCL 20-13, Title VI of the Civil Rights Act of 1964, the Rehabilitation Act of 1973, as amended, the Americans with Disabilities Act of 1990 and Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 1994.

APPENDIX 5: TEMPLATE LETTERS AND REPORTS

Template Letter to Local Official

Template Noise Screening Letter Report

Template Noise Report



Planning and Engineering
Environmental Office
700 E Broadway Avenue
Pierre, SD 57501-2586
O: 605.773.4336
dot.sd.gov

Month ##, 20##

Insert Local Official Name
Street Address/PO Box
Town, State, Zip code

RE: **Project #, PCN #####, _____ County**
Location
Work Description

Dear Mr./Ms.:

I have attached a cover letter and copy of the final Noise Analysis Report for **Project XXX, PCN #** (Project). For reference, SDDOT's Noise Analysis & Abatement Guidance is available here: <https://dot.sd.gov/doing-business/environmental/agreements>. The Federal Highway Administration has additional guidance on noise compatible land use planning including:

- Highway Traffic Noise: Analysis and Abatement Guidance, FHWA, December 2011: https://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/revguidance.pdf ; and
- Entering the Quiet Zone: Noise Compatibility Land Use Planning, FHWA, May 2002: https://www.fhwa.dot.gov/Environment/noise/noise_compatible_planning/federal_approach/land_use/quietzone.pdf

The Project includes the addition of **traffic lanes (passing lanes)** [Add what improvement qualifies as A Type I project] the project is considered a Type I Project according to SDDOT Noise Analysis and Abatement Guidance, 2023, and 23 CRF 772, which requires noise analysis to be completed. **The noise analysis did not identify Impacted Noise Receptors along the project corridor.** [Add summary of noise analysis results].

Thank you for your time and assistance with reviewing your respective county permitting information to determine if any newly permitted land uses exist adjacent to the Project. **No additional permitted land use areas were identified in XXXX County/Countries which require additional noise analysis.** [Must coordinate/check permits prior to transmission of report about any adjacent permitting to verify no change in adjacent land use which may impact noise modelling]

I have enclosed a copy of the Noise Analysis Report for your use during future planning near this project to prevent future highway traffic noise impacts. **The report includes estimated noise contours for Activity Category B: Exterior areas of single-family and multi-family dwellings; and Category C: Exterior areas of non-residential lands.** [Add summary of noise categories specific to project]. SDDOT is not responsible for providing noise abatement for development that occurs adjacent to the proposed highway project that was not permitted as of the date of public knowledge. Noise abatement measures for properties developed after the date of public knowledge should be considered by the local government or developer as permits and approvals for these land use changes are considered. Noise abatement measures would be considered for these developments in the future should another Type I project be proposed.

Please contact me with any questions you may have concerning the report or the project in general.

Name

Title

605.773.####

Email Address

Cc: FWHA

Attachments



Planning and Engineering
Environmental Office
700 E Broadway Avenue
Pierre, SD 57501-2586
O: 605.773.4336
dot.sd.gov

Month ##, 20##

RE: Project #, PCN #####, _____ County
Location
Work Description

Project Description: [MODIFY AS NEEDED] Description of Project Work to be Completed from Executive Summary of Scope. Identify brief purpose and need for project. Describe why noise screening analysis was completed, i.e., why the project is considered a Type I project. Including Roadway lanes, each lane width, or Total Lane Width, Shoulder Width

The project is considered a Type I Project as defined in SDDOT Noise Analysis and Abatement Guidance, 2023, in accordance with Title 23 of the Code of Federal Regulations Part 772 (23 CFR 772).

Traffic Noise Analysis: [MODIFY AS NEEDED] Noise levels were computed using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM 3.0). The 2017 average daily traffic (ADT) of 3,938 vehicles per day (vpd), design hour Volume (DHV) of 428 vehicles per hour (vph) and 19% truck traffic (9.5% medium and 9.5% heavy) were used to calculate existing traffic noise levels. 2043 DHV of 600 vph and 19% truck traffic were used to calculate the design year traffic noise levels.

The noise study area to look for noise sensitive receptors extended at least 300’ from the edge of the proposed pavement edge. The noise study area, receptor locations, and design year noise contours are shown in the attached aerial images. The following table summarize the results of the computations:

PCN XXXX Noise Modeling Results

		Existing	Design Year (2043)
Average Daily Traffic		3,938	NA
Design Hourly Volume		428	600
Percent Medium Trucks		9.5%	9.5%
Percent Heavy Trucks		9.5%	9.5%
66 dBA Leq Contour* (Acoustically Soft Sites)	Category B & C**	-	90 feet
71 dBA Leq Contour* (Acoustically Soft Sites)	Category E**	-	45 feet
Receptor 1	Category B	55.7 dBA	57.4 dBA
Receptor 2	Category C	52.0 dBA	53.6 dBA

		Existing	Design Year (2043)
Receptor 3	Category C	50.7 dBA	51.4 dBA
Receptor 4	Category C	50.2 dBA	50.9 dBA
Receptor 5	Category B	49.6 dBA	50.2 dBA
Receptor 6	Category B	47.3 dBA	48.9 dBA
Receptor 7	Category B	47.3 dBA	49.7 dBA
Receptor 8	Category B	46.1 dBA	47.6 dBA
Receptor 9	Category B	42.6 dBA	44.2 dBA
Receptor 10	Category B	41.6 dBA	43.6 dBA

*Distance from the edge of the nearest travel lane.

**Noise Abatement Criteria Activity Category Criteria (Approach value - 1dBA less than the Activity Category Criteria).

Existing and Design Year Highway Traffic Noise: The traffic noise levels at all noise sensitive receptors in the vicinity of the proposed project have been estimated for existing conditions and design year conditions. [MODIFY AS NEEDED] None of the noise sensitive receptors have estimated noise levels approaching or exceeding the noise abatement criteria levels of 23 CFR 772 nor SDDOT Noise Analysis and Abatement Guidance, 2023. None of the noise sensitive receptors are expected to have a substantial increase (15 dbA or more) in noise levels. Therefore, traffic noise impact is not expected to occur.

Traffic Noise Abatement: [MODIFY AS NEEDED] Highway traffic noise impact is not expected to occur at any noise sensitive receptors along the route of the proposed project if it is constructed; therefore, it is not necessary to consider highway traffic noise abatement measures.

Construction Noise Abatement: [MODIFY AS NEEDED] During construction, contractors will be required to comply with the sound control requirements identified in the SDDOT Standard Specifications for Roads and Bridges, 2004 (Section 7 .22). Construction noise abatement will be reviewed on a case-by-case basis. Construction abatement measures will be determined by weighing the duration of the project, benefits achieved, overall adverse social, economic and environmental effects, and cost of abatement measures.

Feasibility and Reasonableness: The content of this section will vary by the results of the noise analysis, the screening effort can result in three recommended options:

1. **No Noise Impacts (no further reporting required), example text** “Based on noise analysis conducted, this Project is not expected to result in noise impact. No further noise analysis is warranted. Therefore, SDDOT does not intend to provide highway traffic noise abatement measures at any location.”
2. **Noise Impacts Identified, but found to be not feasible and reasonable (no further reporting required), example text** “Based on the noise analysis conducted, this Project is expected to result in noise impacts. Noise abatement measures were considered and evaluated for feasibility and reasonableness by comparing the costs and effect of the abatement measure against the amount of benefit. Abatement measures did not meet the thresholds established for feasibility and reasonableness as defined in SDDOT’s Noise Analysis and Abatement Guidance (2023). Therefore, SDDOT does not intend to provide highway traffic noise abatement measures at any location.”
3. **Noise Impacts Identified, are feasible and reasonable (additional full Noise Study Report required), example text** “Based on the noise analysis conducted, this Project is expected to result in noise

impacts. Noise abatement measures were considered and evaluated for feasibility and reasonableness by comparing the costs and effect of the abatement measure against the amount of benefit. Abatement measures did meet the thresholds established for feasibility and reasonableness as defined in SDDOT's Noise Analysis and Abatement Guidance (2023). Further study and reporting is required.”]

If it subsequently develops during final design that these conditions (design year ADT, highway alignment, etc.) have substantially changed, noise impacts will be reevaluated, and abatement measures may be considered if determined to be feasible and reasonable. A final decision of the installation of noise abatement measure(s) will be made upon completion of the project's final design and the public involvement processes.

[insert signature]

Name

Title

605.773.####

Attachments

NOISE STUDY REPORT

PROJECT NAME
PROJECT LOCATION

COUNTY, SOUTH DAKOTA

SUBMITTED ON:
Month Day, Year

SUBMITTED TO:



South Dakota Department of Transportation
700 East Broadway Avenue
Pierre, SD 57501



Federal Highway Administration
South Dakota Division
116 East Dakota Avenue, Suite A
Pierre, SD 57501

SUBMITTED BY:
Consulting Firm
Address
City, State, Zip Code

Table of Contents

List of Tables

List of Figures

All SDDOT Noise Study reports should be prepared using this template, in compliance with 23 CFR 772 and the SDDOT Noise manual, and following FHWA noise report guidance (https://www.fhwa.dot.gov/Environment/noise/resources/reviewing_noise_analysis/#toc494123501)

SUMMARY

The report includes a summary of the results.

INTRODUCTION AND PROJECT DESCRIPTION

Introduction references the FHWA noise regulation and SDDOT noise policy, provides the project name, limits, description and length, and identifies the type of project (I, II or III).

NOISE FUNDAMENTALS

This section outlines the following:

- Characteristics of Noise. Explain the fundamentals of traffic noise and the terminology used in the noise study report.
- Applicable regulations, guidelines, and tools used in analysis
- SDDOT Noise Abatement Criteria and Land Use Categories

NOISE ANALYSIS METHODS

This section includes:

- Applicable noise measurement procedure (i.e., FHWA Noise Measurement Handbook or SHA noise policy).
- Land Use identification methods
- Field noise measurement methods (must be consistent with the SDDOTs noise policy and procedures).
- Existing Condition Model and validation methods
- TMN Model input values and methods

TMN RESULTS

This section includes:

- Existing Conditions and modelling results summary
- Discussion of the measured and modeled noise levels
- Analysis of model validation
- Determination of future noise levels

- Noise impact evaluation
- Proposed noise abatement actions

NOISE ABATMENT EVALUATION

This section should address the following:

- Evaluation of noise abatement measures for all impacted land uses
- Noise barrier design
- Discussion of feasibility
- Discussion of reasonableness
- Noise reduction design goals
- Cost-effectiveness
- Document the viewpoints of benefitted property owners

STATEMENT OF LIKELIHOOD

The statement of likelihood must include:

- A description of the barriers that are preliminarily feasible and reasonable, including the preliminary location and physical description of the likely noise abatement measures, and
- A statement that final decisions regarding noise abatement design and construction will be made based on the project's final design and completion of the public involvement process.

CONSTRUCTION NOISE

Discussion of construction noise including:

- Construction Noise Implications
- Construction Noise Mitigation Strategies

INFORMATION FOR LOCAL OFFICIALS

This section should include:

- Information on noise compatible planning concepts,
- The best estimation of the design year noise levels on the undeveloped lands along the project at various distances from the edge of the nearest travel lane of the highway improvement (typically in the form of noise contour information - see image on right), and
- Information on Type II project eligibility (if applicable).
- Ensure report includes disclosure statement: "SDDOT is not responsible for providing noise abatement for development that occurs adjacent to the proposed highway project"

that was not permitted as of the date of public knowledge. Noise abatement measures for properties developed after the date of public knowledge should be considered by the local government or developer as permits and approvals for these land use changes are considered. Noise abatement measures would be considered for these developments in the future should another Type I project be proposed.”

INDIRECT AND CUMULATIVE EFFECTS

Discussion of noise related indirect and cumulative effects for EAs and EISs

REFERENCES

References

APPENDICES

Can include, but not limited to:

- Field Noise Measurement Data
- TMN Noise Modeling Input Data
- Traffic Projections
- TNM Plan Views
- TMN Noise Modeling Results
- Noise Barrier Feasibility and Reasonableness Results
- Noise Barrier Feasibility and Reasonableness Results