MnDOT GREATER MN STAND-ALONE NOISE BARRIER PROGRAM

7 November 2017

MINNESOTA'S EXPERIENCE WITH HIGHWAY NOISE MITIGATION

The Minnesota Department of Transportation (MnDOT) has been constructing noise walls and barriers during roadway construction projects since the mid-1970's. In 1974, the MN State Legislature directed the Minnesota Pollution Control Agency (MPCA) to adopt state noise standards (M.S. 116.07, Subdivision 2). Federal noise standards specific to highway traffic noise are codified in 23 CFR 772. Both standards are used to determine noise impacts and mitigation in Minnesota.

In 1995, the MN State Legislature directed MnDOT (MN Statute 161.125 *Sound abatement along highways*) to develop a statewide priority list to direct state resources to mitigate traffic noise for locations not adjacent to new roadway construction, when mitigation may be required by federal law. To date, only the Metro District has funded stand-alone noise "retrofit" barriers.

In October 2013, the Office of the Legislative Auditor released the evaluation report: *MnDOT Noise Barriers*[1]. The report recommended that "MnDOT should create a pathway for communities outside of the metropolitan area to become eligible for state-fund noise barrier project."

This document outlines the MnDOT process for stand-alone noise barriers in greater Minnesota.

NOISE ABATEMENT CRITERIA AND STANDARDS

The Federal Highway Administration (FHWA) noise abatement criteria (NAC) differ by the type of land use, apply to all hours of the day and night, and identify where noise abatement should be considered. The FHWA NAC, based on the hourly $L_{eq,}$ is used in Minnesota. The L_{eq} is the sound level in dBA, equivalent to the total sound energy over a stated period of time. The L_{eq} (h) designates the hourly value of the L_{eq}. In effect, the L_{eq} is analogous to a time averaged sound level over a given period of time.

[1] The full audit report is available at http://www.auditor.leg.state.mn.us/ped/2013/mndotnoise.htm

FHWA NOISE ABATEMENT CRITERIA

Activity Category	Activity Criteria1,2 Leq(h) dBA	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B3	67	Exterior	Residential
C3	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	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
E3	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	--	--	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	--	--	Undeveloped lands that are not permitted

Notes
(1) Leq(h) shall be used for impact assessment
(2) Leq(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement
(3) Includes undeveloped lands permitted for this activity category

FEASIBLE NOISE MITIGATION MEASURES

Earthen berms and noise walls, or a combination of the two, are eligible to use as mitigation through this program. Earth berms can be very cost effective but are less common because sufficient land is not commonly available.

Noise walls are normally the most cost effective and constructible form of noise mitigation. However, even noise walls are not effective in all cases because of limitations on controlled highway access and right-of-way.

Application for Stand-Alone Noise Barrier Mitigation

1. Name of governmental authority making application and agreeing to 10% cost share:

2. Interstate/Freeway adjacent to area for which application is being made:

3. Limits of area of application: a map is required; aerial photo is preferred:

Side of Freeways:
(N, S, E, W, Both)

Beginning Point:
(Cross roads, etc.)

Ending Point:

Estimated length of proposed noise barrier (in feet)

4. Are the residential units located in an incorporated area? Yes/No
Note: Only incorporate areas are eligible.

5. Were the majority of the residential units constructed prior to 1997? Yes/No
Note: Only residential areas constructed prior to 1997 are eligible.

6. Which fiscal year are you applying for funding? 2020 ☐ 2021 ☐ Both ☐

7. Number of residential units (homes and/or apartment buildings) adjacent to the highway/freeway:

8. Existing noise level (use MnDOT's Flat Earth Noise Level Estimating Spreadsheet: available at: www.dot.state.mn.us/environment/noise/

9. I certify that all the above information is correct.

Print name and title of local official Date

Signature and title of local official Date

INSTRUCTIONS FOR COMPLETING APPLICATION

FOR STAND-ALONE NOISE BARRIER MITIGATION

1. **Name of governmental authority making application and agreeing to 10% cost share:**

   Name of the township, city, county, etc. applying for a noise mitigation project and accountable for 10 % of total cost of the project. For estimating noise wall costs, use \$36/ ft^2 .

   Example: length of barrier x 20 foot height x \$36

2. **Freeway adjacent to area for which application is being made:**

   Identification number for the limited access freeway thought to be the source of the noise. Per Statute 161.125, stand-alone noise barrier mitigation is available only for limited access freeways or expressways. Note: gaps from driveways, etc., reduce the effectiveness of the noise barriers.

3. **Limits of area of application on a map (required) or aerial photo (preferred):**

   Side of Freeway:

   The side of the freeway along which the noise mitigation is desired. If there are eligible residents on both sides of the freeway, enter "Both."

   Beginning Point:

   A landmark or feature, such as a cross road, distinguishing the beginning point of the area to be mitigated by the potential noise barrier. Mile or reference point is preferred.

   Ending Point:

   See Beginning Point above.

   Estimated length of proposed noise barrier (in feet).

   The estimated length of the proposed noise barrier in feet.

4. **Are the residential units in an incorporated area?**

   Confirm that the residential units are within the official city limits with a governmental authority. Per MN Statute 161.125, stand-alone noise barrier mitigation is available in incorporated areas.

5. **Were the majority of the residential units built prior to 1997?**

   This is a confirmation of the number and location of the dwelling units which were constructed prior to 1997 as documented in County records. MnDOT requires dwelling units to be constructed prior to 1997 as MN Statue 161.125 was passed in 1997.

6. **Number of residential units adjacent to the highway/freeway:**

This is the number of dwelling units immediately adjacent to the freeway; no intervening structures.

7. **Existing noise levels**:

   Existing noise levels must exceed 67.0 dBA L_{eq}
   Use MnDOT's Flat Earth Noise Level estimating spreadsheet available at

   www.dot.state.mn.us/environment/noise.

8. **Signature and Title of local official and Date:**

   Signature and title of the official validating that the included information is accurate and the funding resolution and the mandatory zoning and building regulations are approved. Include copies of official approval documents.

Stand-alone Barrier Project Procedures and Rules

1. Applications will be accepted annually from October 1st through December 31st.

2. Applications not selected will need to resubmit to be considered again for future years.

3. The proposed area must not be adjacent to a future Type I project identified in the 10 year work plan.

4. Existing noise levels must exceed 67.0 dBA L_{eq}.

5. For screening, the applicant can compute this cost by taking the assumed barrier cost (length x 20 feet in height x $36/ sq. ft.) and then dividing that number by the number of homes and/or apartment buildings adjacent to the barrier. MnDOT uses a maximum cost effectiveness value of $78,500 /benefited location.

6. MnDOT will verify the area to decide the number of eligible dwelling units and the approximate the cost of noise abatement. MnDOT will release results of all noise surveys to the applicants.

7. MnDOT will create an eligibility list ranked using both the cost effectiveness of the barrier and the loudness of the noise.

8. MnDOT will propose noise mitigation projects for the highest priority locations from the eligibility list, within the given funding limitation. Final eligibility will be confirmed upon MnDOT completion of a final noise analysis.

9. Projects would typically be constructed 3 years out from the time of selection.

10. All noise mitigation will be designed by MnDOT following MnDOT design specifications.

11. MnDOT will maintain the structural soundness of the noise mitigation structure and will be accountable for the aesthetic quality of the structure on the freeway facing side only. The local governmental authority is required to maintain the resident side of the barrier.

12. If the project meets MnDOT's Noise Policy standards for a stand-alone noise barrier, then local authorities must agree to administer 10% of the total cost of the construction (as noted in the agreement). In addition to 10% of the construction costs, local authorities will be responsible to share contract administration costs. (typically, 8% of overall construction costs).

Failure to comply with all of the above specifications will make the noise mitigation project ineligible for MnDOT funding ("unreasonable").

Definitions

The following definitions are set forth in MnDOT Noise Policy. (See www.dot.state.mn.us/environment/noise/pdf/guidance/noise-glossary.pdf)

Benefited Receptor: The receptor of an abatement measure that receives a noise reduction at or above the minimum threshold of 5 dBA.

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

Impacted Receptor: A receptor that has a traffic noise impact (see definition for traffic noise impacts).

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 Area Classification (State): The Noise Area Classification as identified in Section 4, Table 2, are groupings of land use activities established in the State Noise Rules.

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 Level (A-weighted): The sound pressure level obtained through use of A-weighting characteristics. The unit of measure is the decibel (dB), commonly referred to as dBA when A-weighting is used.

Noise Reduction Design Goal: The desired dBA 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 is 7 dBA (must be achieved at a minimum of one receptor for each proposed barrier to achieve reasonableness).

Noise Sensitive Area: A geographic area containing a collection of noise sensitive receptors that might be protected behind a single noise barrier, such as a continuous neighborhood of homes abutting one side of the highway between two interchanges.

Owner: An individual or entity that is named on the deed of a benefited receptor as an owner, or listed as the owner on tax rolls.

Owner/Resident: An individual or entity that is named on the deed of a benefited receptor as an owner, and resides in that same benefitted receptor.

Reasonableness: The combination of social, economic, and environmental factors considered in the evaluation of a noise abatement measure. MnDOT uses a maximum value of $78,500/Benefited location.

Receptor: An outdoor place where frequent human use occurs and a lowered noise level may be of benefit.

Residence: The official location of a household or dwelling unit. Either a single family residence or each dwelling unit in a multifamily dwelling.

Resident: An individual or entity that resides in or utilizes a benefited receptor via contract (i.e. a legal renter of a benefited residence). This includes a legal renter when a commercial establishment has been determined to be a benefited receptor.

Traffic Noise Impacts Design year build condition noise levels that approach or exceed the FHWA NAC for the design year build condition; or design year build condition noise levels that show a substantial increase over existing noise levels.

Example application

Application for Stand-Alone Noise Barrier Mitigation

1. Name of governmental authority making application:

CITY OF ANYWHERE

2. Highway/Freeway adjacent to area for which application is being made:

HIGHWAY 900

3. Limits of area of application: a map is required; aerial photo is preferred:

Side of Freeways: (N, S, E, W, Both)	NORTH
Beginning Point: (Cross roads, etc.)	1ST AVE
Ending Point:	MAIN ST

Estimated length of proposed noise barrier (in feet): 1,400'

4. Are the residential units located in an incorporated area? (Yes)/No
   Note: Only incorporate areas are eligible.

5. Were the majority of the residential units constructed prior to 1997? (Yes)/No
   Note: Only residential areas constructed prior to 1997 are eligible.

6. Number of residential units (homes and/or apartment buildings) adjacent to the highway/freeway: 13

7. Existing noise level (use MnDOT's Flat Earth Noise Level Estimating Spreadsheet: available at: www.dot.state.mn.us/environment/noise/ 68.5

8. I certify that all the above information is correct.

John Doe — 1/11/11
Print name and title of local official — Date

JOHN DOE — 1/11/11
Signature and title of local official — Date


1st Ave
Potential Noise Wall
Main St
Highway 900