Minnesota Department of Transportation

Noise Report and Modeling Accountability Checklist

Date: May 9th, 2018

This checklist is not an inclusive document that accounts for all projects. However, this checklist outlines the most common items that will be reviewed during MnDOT's review process. This checklist follows guidance set forth in MnDOT Noise Requirements and supporting guidance documents available on MnDOT website: www.dot.state.mn.us/environment/noise/index.html.

State Project Number:	**Consultant personnel responsible for reviewing noise modeling:**
Noise modeling performed by:	**Date:**
Date:	

1.0 General information requirements

X- This item has been completed and verified.
N/A- This item is "not applicable" to this project.

Design Files

	Modeler QA/QC	Reviewer QA/QC	
1.1	☐	☐	Obtained necessary design files, proposed build alignments, lanes, ROW files, typical sections, profiles, cross-sections, etc.
1.2	☐	☐	Obtained digital 3D contours to get roadway, receiver and terrain elevations.
1.3	☐	☐	Obtained parcel information.
1.4	☐	☐	Obtained digital information for below/above ground utility locations, existing/proposed pond locations, wetland locations and other unique features (poor soils as an example) that may cause conflict with potential noise barrier locations.
1.5	☐	☐	Obtained additional data as necessary (Existing and proposed retaining walls, existing noise barriers or berms, GIS layers and supplemental elevation data).
1.6	☐	☐	If not familiar with project area, performed a field visit.

Traffic data

	Modeler QA/QC	Reviewer QA/QC	
1.7	☐	☐	Gathered existing, future no-build, future build daily and peak hourly traffic volumes *(i.e., ramps, roadways).*
1.8	☐	☐	Identify traffic characteristics that would yield the worst noise hour for the design year *(see MnDOT Guidance).*
1.9	☐	☐	State if multiple sets of TNM runs were created/modeled to determine the worst noise hour.
1.10	☐	☐	Were other factors considered for the selection of the worst noise hour?
1.11	☐	☐	Investigated the peak traffic hour
1.12	☐	☐	Investigated the peak truck hour
1.13	☐	☐	Identified posted speeds expected to be on the existing/proposed highways and ramps.
1.14	☐	☐	Determined directional splits for major roadways.
1.15	☐	☐	If managed lane (e.g., MNPASS, Dynamic Shoulder Lanes) obtain traffic data for proposed managed lanes and model as a separate lane.
1.16	☐	☐	Calculate vehicle mix statistics for:

☐ % Autos ☐ % Motorcycles (if available)
☐ % Medium Trucks ☐ % Buses (if available)
☐ % Heavy Trucks

2.0 Noise receptor requirements

	Modeler QA/QC	Reviewer QA/QC	
2.1	☐	☐	Identify noise receptor locations (an individual land use such as a single family home, apartment unit, park, playground or school).

Appropriate Receptor Locations:
• Patios or other exterior areas of frequent human use on the side of a residential structure facing the project for receptor placement.

Inappropriate Receptor Locations:
• Locations too far from receptor structure itself.

		• If no area of frequent human use is available, a receptor is placed at an exterior position approximately 20 feet from the façade of the structure closest to the project location *(if there are multiple apartments, then a receptor per # of ground-level apartments)*.	• A measurement position at the ROW line at the back of the property.
		• For multi-story, multifamily residential buildings, exterior use areas such as upper story balconies can be used if they represent the sole, private exterior use for a specific unit.	• Positions at the front curb or sidewalk of the receptor property.
2.2	☐	☐	Are the various land uses and NAC classifications identified and discussed within project report.
2.3	☐	☐	Identify any historic areas of note in the project area *(verify information with MnDOT Project Manager and MnDOT Cultural Resources Unit).*
2.4	☐	☐	Identify any Section 4f properties where quiet is important *(i.e., campground areas)*.
2.5	☐	☐	Identify any Section 4f properties in the project area. Place appropriate receptors according to area of frequent human use *(see 2017 MnDOT noise requirements).*

3.0 Noise monitoring requirements

	Modeler QA/QC	Reviewer QA/QC	
3.1	☐	☐	Field noise monitoring methodology is clearly defined *(see 2017 MnDOT noise requirements, Appendix B).*
3.2	☐	☐	Conducted field noise measurement to validate model results. Document monitoring data.
3.3	☐	☐	Type of noise meter is documented and pertinent calibration information.
3.4	☐	☐	Collected classified vehicle counts and speeds during noise measurement.
3.5	☐	☐	Number of sites (short-term or long-term) are identified and located on a Figure.
3.6	☐	☐	Table and discussion of ambient noise monitoring results.
3.7	☐	☐	Table and discussion of noise validation results. Explain how noise model was adjusted based on validation results.
3.8	☐	☐	Provide noise monitoring data sheets in Appendix of report.

4.0 Noise modeling requirements

	Modeler QA/QC	Reviewer QA/QC	
4.1	☐	☐	Were existing noise barriers present within the proposed project area?
4.2	☐	☐	If existing noise barriers were present, does project involve replacement with taller barriers, different locations or in-kind replacement.
4.3	☐	☐	Taper the noise walls when entering into the noise model [verify taper/steps with MnDOT Noise Group if necessary]. This will be dependent on barrier material type *(i.e., wood or pre-cast concrete)*.
4.4	☐	☐	Identify necessary lines of sight to show where barriers were not considered and why? *(i.e., what was initially done)*
4.5	☐	☐	Identify existing/future wetlands and/or ponding locations and be sure to not disturb them with proposed noise wall locations.
4.6	☐	☐	Have approximate ground zones been included within the model?
4.7	☐	☐	Identify any concerns about reflections in the project area *(see 2017 MnDOT Noise Requirements).*
4.8	☐	☐	Identify any geographic and/or special features to note in the project area (*i.e., existing berms, or walls, etc*.)
4.9	☐	☐	Verify that no roadway vertical or horizontal alignment changes occurred after the noise modeling was completed *(i.e., earthwork or x-section changes)*.
4.10	☐	☐	Overhead and underground utilities are fully evaluated during plan preparation to ensure wall can be constructed as designed.
4.11	☐	☐	Verify all noise barriers elevations ? *(i.e., no open lines of sight, z-elevations, barriers on structure)*
4.12	☐	☐	Was traffic control/flow addressed within the model? *(i.e., lights, metered ramps and stop signs)*
4.13	☐	☐	Are there any stationary sources within project area? (*i.e., idling trucks at rest areas*)
4.14	☐	☐	Were median barriers considered/modeled?
4.15	☐	☐	Was noise barrier reflection to be considered in this highway corridor? *(section 3.8 of MnDOT noise requirements)*
4.16	☐	☐	Absorptive noise barriers utilized and appropriate values applied to the model?
4.17	☐	☐	Reflective noise barriers utilized and appropriate values applied to the model?
4.18	☐	☐	Was rail or aviation noise considered?
4.19	☐	☐	Were building rows considered? Were buildings modeled as barriers?
4.20	☐	☐	Are all on-structure roadways and barriers identified and correctly modeled?
4.21	☐	☐	Were all receptors modeled at ground level (except balconies)? Were ground levels (z-values) of noise receptors correctly modeled (e.g., subtract 5 feet if using 3PC Geopak because TNM adds this height)?
4.22	☐	☐	Verify modeling extends a minimum of 500 feet (sphere of influence) beyond the designated project limits.

5.0 Noise report	Modeler QA/QC	Reviewer QA/QC	
Title Page			
5.1	☐	☐	Report is appropriately named, with correct project limits, Project number and Submission date.
5.2	☐	☐	Person performing/overseeing the noise analysis is prequalified by MnDOT.
Table of Contents (TOC)			
5.3	☐	☐	Items listed in TOC are accurately numbered, including the Report sections, Tables, Figures, Graphics, and Appendices.
Introduction			
5.4	☐	☐	Discussion of the proposed project should include project limits, number of proposed lanes and/or proposed modification, lane widths, etc.
5.5	☐	☐	Discussion of the history of the project, background, future design year, pertinent project details, including the preferred alternative and other road improvements.
5.6	☐	☐	Project location figure
5.7	☐	☐	Discussion of why noise study was being completed? Type I?
5.8	☐	☐	Additional NEPA documentation (If necessary- documents to support an older ROD or date of public knowledge).
Discussion			
5.9	☐	☐	Are Existing and Future Design years stated.
5.10	☐	☐	Existing noise environment discussion.
5.11	☐	☐	Discussion of state policy and exemptions.
5.12	☐	☐	Sound level metric defined (Leq).
5.13	☐	☐	NAC defined
5.14	☐	☐	Definition of noise impact
5.15	☐	☐	TNM model version defined and program overview description given
5.16	☐	☐	Discussion of the determination and identification of noise impacts.
5.17	☐	☐	Comparison of existing no build and future noise levels for all identified receptors. (Table)
5.18	☐	☐	Alternative abatement measures discussion.
5.19	☐	☐	NAC impact definition provided.
5.20	☐	☐	Substantial increase impact definition provided.
5.21	☐	☐	Is feasibility defined?
5.22	☐	☐	Is reasonableness defined?
5.23	☐	☐	Are noise reduction design goals defined?
5.24	☐	☐	Barrier Documentation? (Discussion of total number of impacts, benefitted receptors, feasibility, reasonability, barrier length, range of panel heights, barrier location, barrier systems, etc.).
5.25	☐	☐	Reason for barrier placement, barrier termini, barrier location (e.g., Line of sight used to determine barrier endpoint).
5.26	☐	☐	All evaluated barriers shown in figures.
5.27	☐	☐	Barriers were optimized to maximize benefits while minimizing cost.
5.28	☐	☐	Table that includes the sound levels, barrier insertion loss for each receptor, barrier name, panel height range, barrier total length and surface area, number of benefitted receptors, wall cost in barrier analysis.
5.29	☐	☐	Does the barrier (system) work independently or is it dependent on another barrier (existing or proposed)?
5.30	☐	☐	Construction noise discussion. *(See sample write-up: http: www.dot.state.mn.us/environment/noise/pdf/guidance/sample-construction-noise-write-up.docx)*
5.31	☐	☐	Are there any developed lands in project area? If so, provide documentation for coordination with local governments and setback guidance information.
5.32	☐	☐	Documentation regarding additional noise wall cost items for cost-effectiveness calculations.
5.33	☐	☐	Was interior noise considered? (*see MnDOT Guidance)*
5.34	☐	☐	Justification for lessening length of barrier post-voting.
Conclusions and Recommendations			
5.35	☐	☐	Summary of noise modeling results
5.36	☐	☐	Summary of noise barrier analysis results
5.37	☐	☐	Summary of proposed barriers, including barrier height, length and location (relative to project roadways), estimated barrier cost, number of benefitted receptors and the range of predicted noise reduction values, confirmation that the proposed barrier meets MnDOT reasonableness and feasibility standards.
5.38	☐	☐	Statement of Likelihood

Appendices			
5.39	☐	☐	Figures (refer to figures mentioned above). Clear, concise and well-labeled figures.
5.40	☐	☐	Noise monitoring field logs.
5.41	☐	☐	Noise level results tables.
5.42	☐	☐	Noise barrier analysis table.
5.43	☐	☐	Other appendices (as necessary)
6.0 Public involvement process (if applicable)			
6.1	☐	☐	Voting process is clearly defined and followed correctly? *(See guidance documents).*
6.2	☐	☐	Discussion of public involvement efforts.
6.3	☐	☐	How many and when will the noise barrier ballots be sent?
6.4	☐	☐	Were there any special abatement commitments/acoustic profiles/aesthetics considerations?
6.5	☐	☐	For federal projects, provide separate FHWA "companion documents" showing individual voting responses and color-coded voting figure. • What were the voting results related to desire for a barrier? • How many ballots were unresponsive? • Summary of barrier voting results? • Was a second solicitation sent?
6.6	☐	☐	For state-funded projects only, include all voting information/procedures/processes within the project files.
7.0 TNM runs			
7.1	☐	☐	Actual TNM runs (electronic files) must be submitted for review with the report.