

Air & Noise

Noise – Assessing Impacts

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OBJECTIVE

Assessing noise impacts will accomplish the following:

- > Document the corridor land use and identify noise sensitive sites within the corridor;
- > Provide baseline noise levels to be used in determining project impacts;
- > Predict future build and no-build sound levels;
- > Predict the effects that the proposed project would have on the noise environment;
- > Identify impacted locations where noise abatement is feasible and reasonable and proposed for inclusion in the project;
- > Identify locations where impacts will occur and abatement is not feasible and reasonable; and
- > Determine the best strategies to reach the impacted residents and/or businesses.

METHODOLOGY

GDOT uses software developed by Federal Highway Administration (FHWA) to estimate traffic-related sound levels associated with the existing (year), no-build (year) and build (year) alternatives using the FHWA Traffic Noise Model (TNM), version 2.5. Further methodology is established by the following:

- > “Highway Traffic Noise Policy and Guidance”, FHWA. 2010 and 2011 (revised);
- > “Measurement of Highway-related Noise”, FHWA. 1996;

- > “Federal Highway Administration’s User’s Guide”, FHWA. 2011; and
- > 23 Code of Federal Regulations (CFR) 772, “Procedures for Abatement of Highway Traffic Noise”, FHWA.

GDOT policy describes the guidance set forth to identify highway noise impacts and abatement measures in compliance with 23 CFR 772:

Highway Noise Abatement Policy for Federal-Aid Projects

GDOT Office of Environmental Services

Additionally, GDOT is developing a toolkit that brings these methodologies together into one resource. The toolkit will include recommendations and methods that customize the modeling procedures for the Georgia traffic environment. This guidebook will offer more information about the toolkit once available.

REQUIRED INFORMATION FOR MODELING

The information described below highlights some standard information and materials needed to evaluate highway noise levels. In general, the Project Manager (PM) or Design Manager should provide MicroStation dgn files, contour and elevation data, current aerial photography, and traffic data.

- The MicroStation files will contain the main roadway for the existing and proposed condition, the centerline, property lines, right-of-way (ROW) limits, structures, and contours.
- The aerial photography will include all structures located typically 500 feet from the build and no build alignment edge of pavement. The noise study area can be smaller or larger (up to 800 feet) based on the characteristics of the project area. Structures will be shown for both sides of the roadway even if the proposed action occurs in only one direction. The aerials will include a current representation of all facilities in the project corridor at the time of the noise evaluation. All applicable land use categories will be noted for receptors located within the noise study area and show structures on all sides of the roadway.
- Type I or II sound level meters that perform in accordance with ANSI S1.4-1983 will be used. Only sound level meters that have a valid certificate of calibration will be used to take readings. The noise descriptor Leq will be used.

- d. Anticipated build and design years should be known, because the Noise Specialist will model the existing, design year build, and design year no build conditions.
- e. Peak hour traffic data used to develop the model must: 1) be approved by the GDOT Traffic Analysis Bureau in the Office of Planning; and 2) must be consistent with the traffic used in the planning and NEPA documents.

Note: Traffic studies may be developed to include traffic in design year plus two. This gives the Noise Specialist flexibility to reassess noise impacts in cases where the project's schedule slips beyond the design year traffic initially assessed for noise impacts

- f. Use of level-of-service traffic data must be approved by the Air and Noise Section Manager.

SOUND LEVEL READINGS

Although GDOT uses FHWA prescribed methodologies, please note the information below.

Noise levels will be measured for all new location projects. This information will be used to establish and document a baseline noise condition in the undeveloped area.

Noise measurements will be made at representative locations, in the vicinity of noise sensitive receptors when traffic volumes would routinely produce the worst noise impact. Readings are taken in locations of frequent human use such as (but not limited to) a playground, patio, or outdoor eating area. Selected sites will exhibit conditions that are typical for the area being evaluated.

Each modeled project will be validated. Existing noise readings will be taken in 15-minute increments, traffic will be counted during the field noise reading and traffic speed will be estimated. The reading timeframe can be adjusted if needed but an explanation will be provided.

Atmospheric conditions at the time of measurement will also be noted.

IDENTIFICATION OF IMPACTS

A noise impact in Georgia is identified in two ways:

1. By comparison to the FHWA Noise Abatement Criterion (NAC). If predicted noise levels (design year build condition) approach within 1 decibel or exceed the FHWA NAC for an activity category as described in 23 CFR 772, Table 1, an impact is noted; and/or
2. By the identification of a substantial increase in noise from the existing condition. A substantial increase in noise as defined in GDOT policy as an increase of 15 decibels or more from the existing noise level to the design year build noise level.

Table 1 – Noise Abatement Criteria

Activity Category	Activity Leq(h)	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.
B	67	Exterior	Residential
C	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.
E	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

[Hourly A-Weighted Sound Level decibels, dB(A)]

NOISE ABATEMENT CONSIDERATION

Where noise impacts occur, abatement measures must be considered for each impacted receptor. Abatement options must be both feasible and reasonable. The evaluation and decision-making process must be documented in the noise analysis. Abatement measures included in 23 CFR 772.15(c) are eligible for federal funding. At a minimum, reflective noise barriers will be considered for the impacted receiver.

Other acceptable traffic noise abatement measures include alterations to the horizontal or vertical alignment; traffic control measures (TCMs); acquisition of land to create a traffic noise buffer, and/or noise insulation of Category D land uses. These abatement measures can be considered any time the project corridor lends itself to the meaningful consideration of noise mitigation in some form other than a barrier.

If an abatement measure other than a noise barrier will be considered, the project team should coordinate with GDOT and FHWA on a case by case bases prior to the submittal of the noise study.

The planting of vegetation or landscaping is not an acceptable abatement measure. Neither is the use of quieter pavements an acceptable noise abatement measure unless and until an approved Quiet Pavement Program is approved by FHWA for Georgia.

Feasibility

When evaluating the appropriateness of noise abatement, feasibility must first be established. The below criteria are considered for each noise abatement measure to evaluate feasibility.

- > **Noise Reduction:** a calculated noise reduction of at least 5 dB(A) must be achievable for a minimum of one impacted receptor. If interior noise impacts are identified for Activity Category D and exterior abatement measures are determined not feasible and reasonable, interior abatement measures will be considered. Each noise receptor which receives a 5 dB(A) reduction (whether classified as impacted or not) is considered to be a benefitted receptor.
- > **Constructability:** a noise abatement measure must be able to be constructed using reliable and common engineering practices.
- > **Safety and Maintainability:** an exterior noise abatement measure should conform to the AASHTO Green Book and Roadside Design Guide and should be accessible to maintenance personnel and not prevent access to other highway appurtenances (e.g., drainage structures). The maximum barrier height that can feasibly be maintained is 30 feet for ground-mounted barriers, with a maximum panel height of 18 feet for wall-mounted barriers and 12 feet for barriers proposed along bridges.
- > **Access:** an abatement measure must allow sufficient access to adjacent properties.

If all of the above requirements are satisfied, noise abatement is considered feasible.

Reasonableness

Reasonableness is only considered after the abatement measure has been determined to be feasible. The below criteria are considered for each feasible noise abatement measure to evaluate reasonableness.

The first two must be satisfied before contacting property owners and residents:

1. **Noise Reduction:** At least one benefitted receptor must receive a minimum noise level reduction of 7 dB(A) – i.e., the noise reduction design goal.
2. **Cost Effectiveness:** Using a \$25 per square foot cost for the required noise barrier, the total cost must not exceed a \$55,000 average allowance per benefitted receptor. The \$25 per square foot cost and the \$55,000 allowance were last evaluated in February 2016 and will be reevaluated at an interval not to exceed five years.

3. **Property Owners and Residents:** The decision to provide abatement will be made in collaboration with the property owner and tenants of a benefitted receptor. The outreach strategy will be customized for maximum effectiveness on each project. The minimum outreach method will be a certified letter survey provided to both property owners and tenants whose facility or home is identified as a benefitted receptor. *A noise barrier will only be constructed if at a minimum 50 percent plus one of the respondents vote in favor of noise abatement.*
 - a. Both property owners and tenants get a vote, and their vote must be returned within 30 calendar days of receipt of the survey to receive consideration. Property owners will receive one vote per unit owned and an additional vote if they reside in the unit, and tenants will receive one vote for the benefitted unit they occupy. For some projects, individual meetings, community meetings, or other outreach efforts may also be utilized to determine a majority consensus.
 - b. The final noise abatement measures cannot be determined until the design plans have sufficiently progressed to a point where the barrier analysis can be conducted; after which, the outreach above can be completed. GDOT will strive for a decision on abatement as soon as possible after this information is available, but no later than the final environmental document required for construction authorization.

If all three of the above requirements are satisfied, noise abatement is considered reasonable.

Where it has been determined that a noise barrier will be both feasible and reasonable, the noise barrier analysis will include a discussion of the following: optimum location, barrier height, top and bottom elevations, barrier length, costs, and anticipated decibel reduction. This information will also be shown on graphics, maps, and tables. Additionally, this information must be coordinated with the project team, including (but not limited to) the PM and the project's roadway/bridge designer(s).

PUBLIC OUTREACH

Noise Abatement Consideration

Final abatement measures cannot be determined until final design or when the plans have progressed to a point where the barrier analysis can be conducted, typically after preliminary design has been completed. If it has been determined that noise abatement measures are feasible and reasonable, the Noise Specialist must solicit public feedback from the benefitted receptors to determine if the noise barrier is desired. A separate guidebook, *Noise – Noise Wall Public Outreach*, discusses GDOT's guidance for public outreach for noise walls.

Construction Noise Outreach

Although public outreach most often occurs prior to a project being constructed, there can be a need to develop and implement an outreach plan for a project under construction. The goal is to ensure quality communication between the affected community, GDOT, and the contractor. The contractor's initial plans for work should be carefully reviewed in construction meetings, and adjustments made to suggested construction noise activities scheduled for early morning or late evening. Once the times and dates of the construction activities are approved, an outreach plan can be developed to inform the public.

The plan should:

- > Begin with clear identification of the location(s) of impacted residents and/or businesses;
- > Contain a strategy to inform the public of construction activities (such as blasting) that are expected to create noise above the usual construction machinery and equipment;
- > Include detailed information for the public on, and advance notice of, what times, what days, how long construction noise will occur;
- > Provide a point of contact at GDOT to receive questions, comments or concerns;
- > Acknowledge complaints within 24 hours and respond to complaints within three days;
- > Map complaint locations;
- > Include a way to maintain a record or summary of complaints received, responses provided and mitigation implemented, if any, to provide to the GDOT, Office of Environmental Services quarterly; and
- > Communicate when the noise activities are complete, and thank residents and businesses for their patience and cooperation.

ADDENDUMS FOR NOISE

The noise study must be reconsidered if the alignment changes to introduce receptors previously not considered for abatement. Also updated traffic data will be requested if five years or more have lapsed since the original noise study. In accordance with Policies and Procedures 4415-11, "A Working Guideline for Highway Noise Barrier Construction," "[i]n order for a residential area to be considered for noise barriers, it must be 'planned, designed, and programmed' before the date of 'public knowledge' of the highway project. In determining the time relationship between residential development and public knowledge, the date a residential area is 'planned, designed, and programmed' means the date the project is permitted. Likewise, the date of 'public knowledge' of the highway project means the date of approval of the Categorical Exclusion, Finding of No Significant Impact, or Record of Decision document."

If the NEPA document has been approved, an updated noise study will be conducted only for alignment changes or traffic increases. Studies updated for traffic increases will only consider those residential areas “planned, designed, and programmed” before the date of “public knowledge” of the highway project.

ASSESSING IMPACTS TO HISTORIC PROPERTIES FOR STATE-FUNDED PROJECTS

For State-funded projects, GDOT developed a policy for the assessment of highway traffic noise and its effects on historic properties. The policy guides Historians through the process of evaluating project types that generate noise and should be considered to have effects to historic properties. It sets forth the parameters used in the Assessment of Effects (AOE) document for historic properties identified under both Section 106 for state-funded project with a federal nexus (such as a Clean Water Act Section 404 permit) and for state-funded project with no federal nexus. The policy also describes that noise abatement in the form of noise barriers will not be recommended for these properties.

Georgia State-funded: Historic Property Noise Policy

GDOT Office of Environmental
Services

State-Funded Projects with a Federal Action

36 CFR Part 800 applies to historic properties located within federal jurisdiction, i.e., the federal nexus. It includes consideration of “Introductions of visual, atmospheric or audible elements that will diminish the integrity of the property’s significant historic features... [36 CFR 800.5 (v)].” Noise effects must be considered for all eligible historic properties in a federally permitted action.

State-Funded Projects without a Federal Action

Under Georgia Code Section 12-16-2 (Environmental Policy Act of 2006 reference in SB 346) audible effects applies when adverse effects are likely, given the project type. The effect of highway noise can diminish the viability of the historic property’s use. Considerations for establishing noise tolerance for state-funded projects are guided by the Noise Control Act of 1972.

Guidebook Revision History

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