

Georgia Department of Transportation

Highway Noise Abatement Policy for Federal-Aid Projects

Effective Date: February 1, 2016

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HIGHWAY NOISE ABATEMENT POLICY FOR FEDERAL-AID PROJECTS

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1. POLICY STATEMENT AND EXECUTIVE SUMMARY

It is the policy of GDOT to comply with federal regulation 23 CFR 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, for all new highway or multimodal construction projects that require Federal Highway Administration (FHWA) approval or are funded with federal-aid highway funds.

The GDOT believes it is necessary to have written procedures and guidelines in place to ensure appropriate and consistent decisions are made on highway projects and to ensure compliance with federal regulations. Some projects do not warrant noise analyses or consideration of noise abatement. Projects such as resurfacings, traffic signal upgrades and other projects designated as Type III projects (see page 7) have no impact on the existing noise environment and therefore will not be evaluated for potential noise impacts and abatement. However, new location and major reconstruction projects, new interchange projects, new rest stops, and other projects designated as Type I projects (see page 6), will be considered for potential noise impacts and abatement.

Once a project has been identified as a Type I project, existing noise levels will either be measured (for new location) or modeled (for existing alignments), and computer models will be created to determine future noise levels based on projected traffic volumes. If these noise levels exceed certain thresholds, the impacted site(s) will be studied further for analysis of noise abatement alternatives.

In order to ultimately provide noise abatement, GDOT must also determine that the noise abatement is both feasible and reasonable to include in the project. In Georgia, noise abatement is typically accomplished by constructing a noise barrier between the highway and adjacent impacted sites. A noise barrier is considered feasible if it would reduce noise levels by 5 decibels (dB(A)) or more at one or more impacted sites, would be no more than 30 feet in height, and would allow appropriate access to adjacent properties. A noise barrier is considered reasonable if certain cost/benefit thresholds are met and a majority of the people receiving a benefit desires the noise barrier. If it is determined to be a feasible and reasonable expenditure of taxpayer money, then the noise barrier will be added to the project plans.

2. PURPOSE

The purpose of this policy is to set forth reasonable, uniform guidelines in order to identify highway noise impacts and abatement measures for GDOT highway projects in compliance with 23 CFR 772. This policy describes GDOT's program to implement 23 CFR 772. Where 23 CFR 772 has given flexibility in implementing the standard, this policy describes GDOT's approach to implementation.

3. DEFINITIONS

The definitions below may vary from the definitions contained in 23 CFR 772 as they have been refined to disclose established criteria for use in Georgia. .

Benefited Receptor: The recipient of an abatement measure that receives a noise reduction at or above the minimum threshold of 5 dB(A).

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 traffic speed; and topographic 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 National Environmental Policy Act (NEPA) document (Categorical Exclusion [CE] determination, the Finding of No Significant Impact [FONSI], or the Record of Decision [ROD]), as defined in 23 CFR part 771. Federal participation in noise abatement measures will not be considered for lands that are not permitted by the date of public knowledge.

Design Year: The future year used to estimate the probable traffic volume for which a highway is designed. (*Georgia highways are typically designed to function for 20 years beyond the year a project is opened to traffic.*)

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.

NEPA Document: The CE, FONSI or ROD as defined in 23 CFR 771.

Noise Abatement Criteria: A numerical impact criteria issued by the FHWA, published in 23 CFR 772 as Table 1 included below:

Table 1 to Part 772 - Noise Abatement Criteria

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

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, 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	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

Source: (Federal Highway Administration) (23 CFR 772)

Note: These sound levels are only to be used to determine impact. These are the absolute levels above which abatement must be considered. Noise abatement is designed to achieve a substantial noise reduction. Noise abatement is not designed to achieve the noise abatement criteria.

Noise Barrier: A structure 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). *[GDOT has selected a design goal of 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 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. [See NAC table in section 3 definitions above.]

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 NEPA document based on the feasibility and reasonableness analysis completed at the time the environmental document is being approved.

Substantial Construction: In Georgia this is defined as the granting of a building permit, prior to approval of the NEPA document.

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

Traffic Noise Impacts: Design year build condition noise levels that approach or exceed the Noise Abatement Criteria (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. A noise level which approaches the NAC is defined as 1 dB(A) less than the applicable NAC value.

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 (high occupancy vehicle (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, except for when the auxiliary lane is a turn lane; or,
- (7) the addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot or toll plaza.

If a project is determined to be a Type I project under this definition then the entire

project area as defined in the NEPA document is a Type I project.

Type II Project: A federal or federal-aid highway project for noise abatement on an existing highway. GDOT does not have a noise abatement program for Type II projects.

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 the preparation of a noise study or abatement of highway noise impacts.

Validation: Process of verifying the accuracy of the traffic noise model inputs by measuring noise levels in the field and comparing the measured levels to the noise levels predicted in the model under the same traffic conditions.

4. APPLICABILITY

This policy applies to all Type I federal-aid highway projects in the state of Georgia authorized under title 23, United States Code. This includes federal-aid projects that are administered by GDOT, Local Public Agencies, and roadways operated by others on behalf of the State of Georgia.

Further, if any segment or component of an alternative meets the definition of a Type I project, then the entire alternative is considered to be Type I and is subject to the noise analysis requirements contained herein.

In accordance with 772.15, federal funds may be used for noise abatement measures when traffic noise impacts have been identified and abatement measures have been determined to be feasible and reasonable pursuant to 772.13(d).

5. ADOPTED CRITERIA

23 CFR 772 requires each state to adopt certain criteria when assessing noise sensitive areas for potential noise abatement. These criteria have been highlighted here for easy reference.

GDOT adopts the following criteria in accordance with 23 CFR:

- 772.11 (c)(2) –Each separate structure of frequent human use within an activity category will be considered a noise receptor. For cemeteries, parks and other category C activities the number of receptors will be defined based on an equivalent number of residences of a lot size typical of the surrounding community. For example, if the nearby residential community’s average lot size is one acre with a highway frontage of 150 feet, the highway frontage area of a public park would be “divided” into similar frontages and lot sizes in order to determine the number of receptors.
- 772.11 (e) - The approach level to be used when determining a traffic noise impact will be 1 dB(A) less than the Noise Abatement Criteria for Activity Categories A to E (see Table 1).
- 772.11 (f) - A substantial noise increase is defined as a 15 dB(A) or more increase over existing noise levels.

- 772.13 (c) (2) - Absorptive treatments in noise barriers will only be considered: 1) when parallel noise barriers are proposed with a distance to height ratio of less than 10:1; or, 2) when there are neighborhoods, impacted by noise, directly opposite of the roadway where abatement is not reasonable for one of the neighborhoods; or, 3) in consultation with FHWA.
- 772.13 (d) (1) (i) - A minimum of 1 impacted receptor must achieve a 5 dB(A) reduction before a noise barrier will be considered feasible.
- 772.13 (d) (1) (ii) – A noise barrier is not considered feasible if it must be greater than 30 feet in height, would pose a safety hazard, or does not allow sufficient access to properties.
- 772.13 (d) (2) (i) – The decision to provide abatement will be made in collaboration with the property owners and residents, including tenants, of a benefited receptor(s). The outreach strategy will be customized for maximum effectiveness on each project. Outreach methods may consist of a first class mailed letter and survey provided to benefited property owners and tenants, public meetings, phone conversations, or any other method based on the project circumstances. A good faith effort to reach benefitted receptors will be made. If there are no or minimal responses (less than 25 percent) then the outreach method utilized will be reviewed to determine if another method would result in increased participation. A noise barrier will only be constructed if at a minimum 50% plus one of the respondents vote in favor of noise abatement. Both property owners and dwellers get a vote and their vote must be returned within 30 calendar days 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 benefited unit they occupy. For some projects, individual meetings, community meetings or other outreach efforts may also be utilized to determine a majority consensus.

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 that is required for construction authorization.

- 772.13 (d) (2) (ii) – In order to determine cost reasonableness, a noise barrier must cost \$55,000 or less per benefited receptor. A \$25 per square foot unit construction cost (post and panels) shall be used when determining cost reasonableness.
- 772.13 (d) (2) (iii) – A 7 dB(A) reduction is the GDOT design goal for a benefited receptor.
- 772.13 (d) (2) (iii) – At least one of the benefited receptors must meet the design goal of 7 dB(A).
- 772.13 (e) – In order to be defined as a benefited receptor, a noise reduction of 5 dB(A) or more must be realized.

6. PROJECT CLASSIFICATION

23 CFR 772 defines three project categories which are used to decide whether or not noise abatement should be considered in a formal study. Each of these project types are defined in Section 3 of this policy.

Only Type I projects are considered for noise study and abatement. GDOT does not fund Type II projects, and noise analyses and abatement are not required for Type III projects.

Noise studies will be prepared for all Type I projects.

A Type I project is generally a project that constructs a new highway or alteration of an existing highway that either significantly changes the roadway alignment or increases the number of through traffic lanes. If any part of a project is classified as Type I, the entire project receives this classification. (See section 3 definitions for a complete definition of Type I projects.)

The addition of an auxiliary lane that serves as a turn lane would classify a project as Type III, rather than as a Type I project, unless other conditions classify the project as type 1, see section 3 definitions.

In addition, a project which exposes a receptor to traffic noise where there are no changes to the roadway is a Type I project. For example, a project that involves the cutting back of a slope that exposes a receptor to an existing highway is a Type I project. The removal of trees from roadside right-of-way is not considered a Type I project, as the alteration of vegetation would not change the noise environment.

7. TRAFFIC NOISE PREDICTION

Noise analysis will be conducted with the current version FHWA Traffic Noise Model (TNM) or other model found acceptable to FHWA, pursuant to 23 CFR 772.9. The traffic noise model will be developed in accordance with the *TNM Users Guide*. Noise analysts should reference *FHWA's Measurement of Highway-Related Noise Guidance or FHWA's Highway Traffic Noise: Analysis and Abatement Guidance* (June 2010, Revised Jan 2011) as needed. TNM roadway elements should be modeled in accordance with FHWA Traffic Noise Model (TNM) Version 2.5 Release notes, and FHWA TNM FAQs: http://www.fhwa.dot.gov/environment/noise/traffic_noise_model/tnm_faqs/.

The existing, design year build, and design year no-build conditions will be modeled. Future noise levels must be predicted for all reasonable build alternatives that have been retained for detailed analysis in the NEPA process. Alternatives rejected during the alternatives screening process will not be considered for traffic noise impacts and noise abatement. Any project that evaluates a broad corridor or Tier I Environmental Impact Statement (EIS) should be coordinated with FHWA to determine the appropriate scope and methodology of the noise analysis early in the project planning process.

FHWA guidance requires that sound level meters be ANSI S1.4-1983, TYPE II or better. Only sound level meters that have a valid certificate of calibration will be used.

Georgia DOT will give priority to exterior areas where frequent human use occurs when determining the location and number of noise sensitive receptors.

Average pavement type will be used for prediction of future noise prediction in TNM. The use of specific pavement types may be selected for modeling the existing condition, when field validations confirm the use of such is more accurate.

Noise contour lines may only be used for screening alternative layouts and for land-use planning purposes and will not be used for determining noise impacts at specific locations. Noise contours shall not be used for determining whether or not a receptor is impacted by highway traffic noise. Noise practitioners should refer to FHWA's *Measurement of Highway-Related Noise Guidance* for more information.

A TNM receiver may be identified with a single label to represent multiple receptors if they share a common noise environment. The TNM receiver will reflect the number of individual receptors represented in the model. The noise report will describe the characteristics of each common noise environment grouping. A representative receptor will be modeled for every activity category present in the project corridor.

The TNM will be used to determine existing noise levels (except on new location) and predict design year noise levels based on traffic characteristics that would yield the "worst" hourly traffic noise levels. For heavily congested urban corridors the "worst" hourly noise levels may not coincide with peak hourly traffic volumes which can result in lower speeds and often has lower truck volumes. Therefore, for the purposes of noise analyses, the design hourly volumes (DHV), peak hour truck volumes, posted speed limit, and a "free flow" worst case condition utilizing a level of service of C will be used to determine noise levels.

In unique situations, traffic noise impact identification may be influenced by seasonal activities (e.g., evaluating hurricane evacuation routes) instead of peak traffic volumes. Coordination should occur during concept development with GDOT's Traffic Analysis Bureau in the Office of Planning, GDOT's Office of Environmental Services, and FHWA.

In all cases, the 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.

8. ANALYSIS OF TRAFFIC NOISE IMPACTS

Every effort will be made to accurately represent the existing and future noise environment of the project corridor. GDOT gives primary consideration to exterior areas of frequent human use.

8.1. Defining the Study Area

For initial project review, an aerial of the project will be obtained. The aerial should include a current representation of all structures in the project corridor at the time of the noise evaluation. The project corridor should be field validated to ensure all structures are shown on the aerial or represented.

The actual limits of the study area are best defined using the noise model (but usually does not extend beyond 500 feet from the project's proposed edge of pavement). Specifically, if the initial model indicates impacts at 500 feet, the study area will be widened until all impacts are identified or the study area extends to 800 feet. Based on studies completed to date, 800 feet is the maximum distance in which FHWA has

validated acoustically soft sites. Noise studies will not be completed beyond 800 feet until it has been shown, by FHWA, that an approved noise model has validation beyond 800 feet for all common acoustic situations.

Geographic Information System (GIS) data can be used to determine elevations and identify receptors when it is necessary to extend the study area beyond available survey data. The presence of potential noise sensitive receptors should be verified in the field when the study area is expanded beyond available survey data.

8.2. Evaluating Existing Conditions

Ambient noise measurements will be used to represent the existing condition on all new location projects. Measurements will be taken at representative locations. This information will be used to establish and document a baseline noise condition in the undeveloped area. Measurements will be taken in accordance with procedures provided in FHWA-PD-96-046 *Measurement of Highway-Related Noise*.

Existing noise readings for projects on an existing alignment will be taken in a minimum of 15 minute increments. Traffic will be counted during the field noise reading and traffic speed will be estimated. Atmospheric conditions at the time of measurement will also be noted.

Existing noise measurements will be made at representative locations when traffic volumes would routinely produce the worst noise impact. Typically, readings are made in locations where people will spend time outside, preferable in areas that contain a permanent fixture for the purpose of outdoor recreation (e.g., patios, decks, porches, grills). Receptors should be placed between the face of the structure and the noise source.

8.3. Model Validation

All noise models for projects which modify existing roadways must be validated using field measurements in accordance with the methodology presented in FHWA-PD-96-046 *Measurement of Highway-Related Noise* to ensure that the model can be used to define existing year and design year noise levels. Field measurements include noise levels as well as corresponding traffic counts.

To validate the model, a comparison is made between the field measurements and the predicted noise levels using the same traffic counts. If the difference between the two is 3.0 dB(A) or less, with no rounding, then the computer model is considered valid.

A minimum of three samples should be taken for each project. If a validation sample exceeds the +/- 3.0 dB(A) goal, an explanation must be reported in the case of each receptor that does not attain this goal. If a majority of validation samples do not attain the validation goal, new samples must be taken to determine if outside factors influenced the initial findings.

8.4. Assigning Activity Categories

Once the study area has been defined and land use categories noted, each property in the study shall be assigned an Activity Category in accordance with Table 1 of 23 CFR 772. The basis for these assignments must be included in the noise study.

Activity Category A: considers exterior activities and relates to lands, as stated in 23 CFR 772, “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.” Some examples of lands that have been designated as Activity Category A as reported in the FHWA report *Highway Traffic Noise: Analysis and Abatement Guidance* includes the Tomb of the Unknown Soldier, a monastery, and an amphitheater. Additional examples and questions about Activity Category A can be found at:

http://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/faq_nois.cfm#D2

A detailed justification must be provided in the noise study for lands designated as Activity Category A, for review and approval by FHWA.

Activity Category B –considers exterior activities for single-family and multifamily residences.

- An individual structure is generally considered a single receptor.
- Each residential unit of a multifamily dwelling (e.g., apartment building, condo) is considered a single receptor.
- Each multi-level dwelling consisting of a single residential unit (e.g., two story condo) is considered one receptor.

It is assumed that each floor of the multifamily dwelling shares a common noise environment. Each floor can be assigned a single TNM receiver, but the noise model must contain and the noise report must disclose the number of residential units represented by the TNM receiver.

When considering a mixed-use development with ground level retail and residential above (e.g. retail establishments on ground level with condos above):

- Each business is considered a single receptor;
- Each residential unit above the businesses is considered a single receptor.

This methodology allows impacts to be identified and considered for both the residential and commercial activity categories that share a common noise environment.

Activity Category C –considers exterior activities for nonresidential public and private facilities which tolerate less noise (e.g., recording studios, amphitheaters, libraries) than the Type E category. Each structure generally will be considered one receptor site for discrete areas of frequent human use such as hospitals, libraries, public meeting rooms, etc.

For cemeteries, parks, and other expansive Category C activities, the number of required receptors will be determined as follows: 1) determine the typical linear highway frontage of residences in the surrounding community; and 2) divide the proposed highway frontage length of the Category C site by the amount determined in step 1 above with any remainder counting as an additional receptor. For example, if the typical residential frontage in the surrounding community is 150 feet and the proposed frontage of a public park is 200 feet, the park would be counted as two receptor sites.

Activity Category D –considers interior impacts for Category C facilities that may have a noise sensitive interior use. Each structure generally will be considered one receptor site for discrete areas of frequent human use such as libraries, public meeting rooms, etc. Hospital patient rooms or classrooms that lack air conditioning and must open windows to cool will be considered one receptor per room.

Abatement measures will be considered to address interior impacts if exterior abatement measures are found to be either unfeasible or unreasonable. 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, Activity Category D shall be used as the basis of determining noise impacts. The interior noise level will be determined by subtracting the exterior noise level from the appropriate building noise reduction factor provided in Table 7 from the [Highway Traffic Noise Analysis and Abatement policy \(PDF 325KB\)](#).

Activity Category E –considers exterior activities for certain commercial and developed lands (e.g., restaurants, offices, hotels) which are less sensitive to highway noise. Each structure will generally be considered one receptor for the purpose of disclosure; however, in cases of single structures housing multiple commercial units, each commercial unit having an exterior area of frequent human use will be considered a separate receptor for abatement consideration (e.g., a strip mall with no exterior uses would be considered one receptor, and a strip mall of multiple commercial units only two of which have exterior uses would be considered two receptors.) In addition, for receptors in this category that contain residential units (e.g. hotels), each room where sleep will occur (e.g. hotel room) with a balcony or ground level patio will be considered one receptor.

Activity Category F –considers activities which are generally not sensitive to highway noise and which no noise analysis is performed or abatement measures considered.

Activity Category G –consists of undeveloped land. TNM modeling would be completed for vacant parcels at 50 feet from the edge of pavement or the right of way line (analyst must disclose which was used), at 100 feet, and at every additional 100 feet (not to exceed 800 feet) until a zone is established that would identify the impact zone for all land use types. Noise analyses performed for Category G properties will only be used to define distances for design year noise levels corresponding to each NAC.

If vacant land is not permitted for development by the date of public knowledge, the noise level information will be provided to appropriate local government office for planning purposes in accordance with 23 CFR 772.17(a).

Permitted, undeveloped land will be assigned an activity category consistent with the permitted future land use and evaluated under that activity category. The date of public knowledge is the date the NEPA document is approved. Per 23 CFR 772.11(vii)(C), federal participation in noise abatement measures will not be considered for lands that are not permitted for development by the date of public knowledge.

8.5. Determining Impacts

Two methods are used to identify traffic noise impacts:

1. When predicted noise levels approach or exceed the NAC of the applicable criterion, defined as 1 dB(A) lower than the NAC; or,
2. When predicted noise levels increase 15 dB(A) or more from existing traffic noise levels resulting in a substantial increase in traffic noise.

8.6. Evaluation of Noise Abatement Measures

8.6.1 Abatement Measures to be Considered:

A study of abatement alternatives will be made for each impacted receptor based on standard evaluation criteria for feasibility and reasonableness. This evaluation will typically begin with consideration of a reflective type barrier. Noise mitigation, however, is not limited to the use of barriers.

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 wall will be considered, the project team should coordinate with GDOT and FHWA on a case by case basis prior to the submittal of the noise study.

Although GDOT is typically not able to acquire land to create buffer zones, it is sometimes possible to relocate an impacted mobile home on its parcel outside of the noise impact zone. For example, if there is sufficient room in the parcel to create a buffer, the mobile home could be relocated farther from the noise source, outside of the noise impact zone. This approach would be made in consultation with the owner of the mobile home. The cost to relocate the mobile home must not exceed the cost effectiveness criteria in Section 8.7.2 below.

Other abatement measures that relate to traffic management measures, alteration of alignments, and acquisition of right-of-way may be considered. The planting of vegetation or landscaping is not an acceptable noise abatement measure since only dense stands of evergreen vegetation at least 100 feet deep will reduce noise levels.

The use of quieter pavements is also not an acceptable noise abatement measure unless and until an approved Quiet Pavement Program is approved by FHWA for Georgia.

A reasonableness study will be performed for any noise abatement measure considered to be feasible. Each criterion for feasibility and reasonableness must be satisfied for a noise abatement measure to be considered feasible and reasonable. If GDOT determines that noise abatement is feasible and reasonable the noise abatement measure will be included in the project to mitigate noise impacts.

8.6.2 Undeveloped Lands

GDOT shall determine if undeveloped land is permitted for development. Building permits must be issued prior to the Date of Public Knowledge for noise abatement to be considered. In Georgia, there are no state laws governing the expiration of building permits; therefore, in many areas permits never expire. In areas where permits expire, permits will be reviewed based on local laws/regulations. In situations where no permit expiration date is indicated on the permit, GDOT shall assume expiration 3 calendar years after the issuance of the permit. Permits older than 3 years will not be considered current unless local law or regulations specify a different time of expiration. No noise mitigation or abatement will be considered unless there is a current building permit.

8.7 Evaluating Feasibility and Reasonableness

Typically, a reflective noise barrier is initially considered for evaluating feasibility.

8.7.1 Feasibility

Wall feasibility is studied for all impacted receptors. Multiple impacted receptors may be behind one noise wall/berm (one type of abatement measure). If abatement is found feasible for any impacted receptor that receptor is also studied to determine if abatement is reasonable. Guidance on an abatement measure that may protect both impacted receptors and benefited receptors is provided below.

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. (Note, an abatement measure may benefit more than one impacted receptor and at no time should it be minimized to only protect one impacted receptor. The minimum is guidance to determine if the abatement measure should be studied for reasonability, section 8.7.2.) 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 benefited 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.
- *Access:* an abatement measure must allow sufficient access to adjacent properties.

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

8.7.2 Reasonableness

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 benefited receptor must receive a minimum noise level reduction of 7 dB(A) – i.e., the noise reduction design goal. The noise reduction design goal must be reached for all impacted receptors, unless it is not cost reasonable or feasible to do so. When designing a wall or earth berm the design should begin with a wall/berm that would reduce noise levels by 7 dB(A) to as many impacted receptors as feasible. If the reasonable cost effectiveness is exceeded (see below) every attempt will be made to design a feasible and cost reasonable wall that reduces as many impacted receptors by 7dB(A) as possible.)

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 benefited receptor. The \$25 per square foot and \$55,000 allowance was defined in January 2015 and will be reevaluated at an interval not to exceed five years. If special engineering techniques are required in order to construct a barrier those costs would also be factored into the \$55,000 allowance for reasonableness.
3. *Property Owners and Residents*: The GDOT's decision to provide abatement will be made in collaboration with the property owner and tenants of a benefited receptor. The outreach strategy will be customized for maximum effectiveness on each project. Outreach methods may consist of a first class mailed letter and survey provided to benefited property owners and tenants (residents), public meetings, phone conversations, or any other method based on the project circumstances. A noise barrier will only be constructed if at a minimum 50% plus one of the respondents vote in favor of noise abatement. Both property owners and dwellers get a vote and their vote must be returned within 30 calendar days, of receipt, to receive consideration. In the case of a residential unit, 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 benefited unit they occupy. All other impacted land uses, identified in 23 CFR 772 – Noise Abatement Criteria, will receive one vote. For some projects, individual meetings, community meetings or other outreach efforts may also be utilized to determine a majority consensus. If no votes were cast on a proposed noise wall a second attempt (utilizing a customized strategy as defined above) to obtain feedback will be utilized. If after multiple attempts no votes have been obtained the reasonableness of wall construction would be determined by GDOT and FHWA.

When tallying votes in favor or against abatement the structures behind a wall are taken into consideration. For example if a continuous wall protects a subdivision, an apartment complex, and a hotel where the apartment complex and hotel vote no but the subdivision votes yes to a noise wall, every attempt would be made to reach a compromise to keep the wall for those desiring it and remove it for those who do not. When it is not possible to put in walls for those that desire it and remove it for those that do not then the majority vote, as mentioned above, would be the determining factor.

The final noise abatement measures cannot be determined until the final 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. Please see below for details on the timing of outreach.

8.7.3 Outreach Based on Contract Type:

Design-Bid-Build Projects

For Design-Bid-Build delivery, final design plans will be available no later than the time of the request to hold the Final Field Plan Review. Once final design is confirmed, and prior to the final NEPA reevaluation for construction, public

outreach will be conducted to determine the desire for the construction of noise barriers.

Design-Build Projects

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.

If a design change is proposed after the NEPA approval that would affect a noise barrier's location or dimensions, then public outreach shall occur no later than the completion of the approved design for the roadway section that includes the noise barrier. Should the noise barrier traverse through two construction phases, the barrier outreach and NEPA may be covered under the latest phase; however, it must be demonstrated that earlier phases would not restrict wall feasibility or reasonableness conclusions reached in NEPA. Construction may begin on roadway section(s) adjacent to a noise barrier after the approval of the final NEPA reevaluation for construction.

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

9 DOCUMENTATION

9.1 The Noise Report

A complete noise report is required whenever the TNM model is used, typically for Type I projects. A noise screening assessment will typically be required for Type III projects

9.2 The NEPA Document

The NEPA document and noise analysis must disclose the number and general location of impacted receptors, discuss any abatement measures considered, discuss where noise abatement has been determined feasible/not feasible and/or reasonable/not reasonable based on current plans, contain a statement of likelihood and disclose the estimated cost of abatement. Additional details about the noise study can be included by reference in the NEPA document. Figures showing the locations of the receivers and receptors modeled, and indicating those that are impacted based on the criteria contained in 23 CFR 772 regulations should be provided. The NEPA document shall also present an analysis for the No-Build design year that shall be discussed as part of the consequences/impacts of the No Build scenario. Mitigation is not required for the No-Build scenario. When the abatement chosen is a noise barrier, the dimensions and estimated cost of each potential noise barrier found to be feasible and reasonable should be provided in the NEPA document and noise study.

The statement of likelihood in the NEPA document must provide information about the location of each impacted receptor. This applies to any scenario below. Appropriate tables or graphics will be included as needed.

The following statement of likelihood should be used when noise abatement is proposed:

“Based on the studies completed to date, (*number*) impacted receptors have been identified and it has been determined that noise abatement is likely, but not guaranteed, at (*number*) locations described as follows: (*brief general description of all anticipated noise abatement locations*). Noise abatement at these locations is based upon preliminary noise analyses and design criteria.

A reevaluation of the noise analysis will occur during final design, should changes warrant such a reevaluation. If during final design it has been determined that conditions have changed such that noise abatement is not feasible and reasonable, the abatement measures might not be provided. The final decision on the installation of any abatement measure(s) will be made upon the completion of the project's final design and the public involvement processes.”

Where noise impacts have been identified but noise abatement is not proposed, the following text should be included in the NEPA document and the noise analysis:

“Based on the studies completed to date, (*number*) impacted receptors have been identified and noise abatement has been considered but found not to be feasible and/or reasonable (as appropriate). (Explain why.) The noise abatement evaluated at these locations is based upon preliminary noise analyses and design criteria.

A reevaluation of the noise analysis will occur during final design, should changes in the design or project noise environment warrant such a reevaluation. If during final design it has been determined that conditions have changed such that noise abatement is feasible and reasonable, the noise abatement will be reconsidered and may be provided based on additional public involvement conducted pursuant to the process outlined in Section 8.7.2 of GDOT's Noise Policy.

The final decision on the installation of any abatement measure(s) will be made upon the completion of the project's final design and the public involvement processes.”

If there are locations in the same project corridor where abatement will and will not work, the text above should be combined as indicated below:

“Based on the studies completed to date using preliminary design criteria, (*number*) impacted receptors have been identified. Noise abatement has been considered for all impacted receptors and found to be feasible and reasonable at (*number*) locations. (Describe and provide a figure that shows these locations.)

(*Number*) wall locations were evaluated for noise abatement but determined not to be reasonable and feasible. (Describe and explain the feasibility or reasonableness determination.)

A reevaluation of the noise analysis will occur during final design should changes in the design or project noise environment warrant such a reevaluation. If during final design it has been determined that conditions have changed, the feasibility and/or reasonableness determinations and decision(s) regarding if and where to

provide abatement will be reconsidered. The final decision on the installation of any abatement measure(s) will be made upon the completion of the project's final design and the public involvement processes conducted pursuant to the process outline in Section 8.7.2 of GDOT's Noise Policy."

9.3 Environmental Reevaluation

The FHWA will be consulted as needed when questions arise about the need to reevaluate the noise analyses.

10 COORDINATION & REPORTING

10.1 Approved Barrier Materials

The GDOT standard operation procedure noise wall materials is to comply with the Roadway Design Policy [Chapter 6.14 Noise Barriers](#) and to utilize qualified materials approved for use in Georgia, which can be found at <http://www.dot.ga.gov/PS/Materials/QPL>. The list of standard specification materials used in Georgia are listed in the Standard Specifications Construction of Transportation Systems Policy section 624 <http://www.dot.ga.gov/PartnerSmart/Business/Source/specs/ss624.pdf>. All other approved materials require the use of a special provision. The preference of GDOT is to construct precast concrete noise walls, except where there are weight constraints (such as on bridges and retaining walls) where a lighter material may be mandated as part of design requirements. However, other approved materials can be considered as part of environmental commitments (e.g., Section 106 National Historic Preservation Act or other mitigation) and to allow flexibility in cases of innovative design/test materials.

In cases of concrete noise walls and precast autoclaved aerated concrete (PAAC) panels, those benefited behind a proposed noise wall will be asked to provide input on noise wall aesthetics. Other materials may also have design options. When options are available, GDOT would ask those benefited for opinions on aesthetic treatments. However, those options may be limited to available patterns and the ability to produce the patterns.

The following steps assume concrete noise walls & PAAC panels when discussing aesthetic treatment options. When the options below exist for other materials they will also be options for the proposed material type. Aesthetic treatment options to concrete walls may slightly increase the cost if patterns are used (see 10.3 below).

Methodology for determining treatments for noise walls fronting the highway:

1. For traditional GDOT projects where weight limitations and/or special mitigation measures are not warranted to mitigate for impacts other than noise, concrete noise walls will be constructed. Non-concrete material may be used in constructing noise walls on top of bridges (lighter weight materials other than concrete), and transparent (clear) walls may also be used in certain limited circumstances (i.e., for community safety reasons, having a clear view of natural resources, etc.). Transparent wall height will vary depending on design limitations, but will not be higher than 30 feet.

2. The highway side of the noise wall (the side facing the highway) will be designed to be consistent with the corridor and project goals as determined by the project team, in coordination with governmental entities when applicable.

3. The highway side of the noise wall will typically consist of the following standardized aesthetic options: (ashlar, brick, rock textured, or plain). However, on case by case basis, an aesthetic theme for the highway side could be utilized (i.e., a regional theme or a gateway theme). The theme for the highway facing side of the noise wall will be determined by GDOT. Input from the local government would also be considered and the GDOT will take other existing local and highway aesthetics into consideration. The public will not be asked to vote on the aesthetic treatment for the highway side of a noise wall. However, the public will be notified of the proposed treatment. Notification would be provided using a variety of public involvement techniques such as but not limited to letters, public meeting, posting to a project website, etc.

Methodology for determining treatments for walls fronting communities (non-highway side):

1. If the noise wall canvas is being utilized for more than noise mitigation, textures for the noise wall facing the non-highway side could consist of the following standardized aesthetic options: ashlar; brick; rock textured; or plain. Other options can be entertained on a case by case basis, for situations such as Section 106 mitigation (which may require coordination with the Georgia State Historic Preservation Officer), community mitigation, etc. In these instances, the texture or decorative finish of the noise wall (non-highway side) will be decided upon based on input from the entire community.

2. **Public Involvement:** When a noise wall has been determined feasible and reasonable, all benefitted property owners and tenants will receive a comment card requesting input on the aesthetic treatment for the community side of the wall (or a combined comment card asking about the desire for a noise wall and aesthetic treatment options). The comment cards may be delivered via US mail and/or during other GDOT public or community meetings. When these meetings are held to discuss noise walls, GDOT will be prepared to provide information on the overall project, as well as for the noise walls. The date(s) and time(s) of meeting(s) will allow for maximum participation. Information will be presented on a meeting handout and aerial layouts of a scale that readily conveys project details.

3. If the noise wall canvas is being utilized for more than noise mitigation (e.g., to mitigate for visual impacts of a highway project), GDOT will continue to work with the community to reach a clear consensus on the aesthetics (only those benefiting from a wall will be asked if they desire a noise wall). If the community does not reach a clear consensus, a majority vote may be considered. In the event of no clear consensus (unless the mitigation is for more than noise),

GDOT will select a treatment from the following standardized aesthetic options (ashlar, brick, rock textured, or plain) on the noise wall finish on the community side of the noise wall, based on comments received.

Examples of approaches that could be used to reach community consensus on noise wall aesthetics (when for more than noise mitigation) include identifying and meeting with community champions, meetings with home owners associations and holding charrettes, or other innovative methods as determined by GDOT. After three attempts if there is still no clear consensus, consultation will occur with FHWA regarding a final decision related to aesthetics. Noise wall voting results will be disclosed to all voters (that provided contact information). Disclosure could take place in a number of ways, such as via a project website, individual mailed letters, e-mails, etc.

Colors:

Colors evoke psychological responses. Harmonious colors tend to soothe; contrasting colors tend to attract the eye; and clashing colors irritate. A noise barrier placed along the highway may evoke similar responses in the motorist, depending upon the colors chosen. The motorist should be directed past a barrier with as little visual disruption as possible because the primary attention of the driver should be on the road ahead and local traffic conditions. The colors chosen for the barrier should reflect and harmonize with the predominant colors of the highway environment in which it is placed. The final color of the concrete barrier will not be painted on the surface of the concrete, but it will be in the original concrete mix. Barrier walls are structures placed in the natural environment. Harmonious colors should be utilized. The so-called earth colors – browns, muted green, and grays of various tones. Therefore, the color of the noise walls will be determined by GDOT to match the corridor while also taking wall maintenance into consideration.

http://www.fhwa.dot.gov/environment/noise/noise_barriers/design_construction/visql/visql04.cfm

10.2 Constructed Mitigation Inventory

In accordance with 23 CFR 772.13(f), GDOT will maintain an inventory of all constructed abatement measures and will supply the same upon FHWA request.

10.3 Enhancements

In accordance with 23 CFR 772.13 (j), third party funding will not be allowed on Type I projects when third party funding is required for the abatement measure to be considered feasible and/or reasonable.

For projects where a standard concrete noise wall is proposed by GDOT (see section 10.1 above) other materials or special design barriers may be used at the request of the Local Public Agency (LPA), provided that the use of these materials meet the feasible and reasonableness goal defined in Section 8.7 of this policy, are constructible, and can be reasonably maintained by the Department or others through a maintenance agreement. Other aesthetic or functional enhancements may also be requested.

These enhancements may be included in the project provided there is a signed agreement between GDOT and the LPA that addresses the proposed enhancements and funding source for all costs above \$25 per square foot multiplied by the area (total sq. ft.) of noise barrier required. No federal funds will be provided by GDOT for any costs beyond the cost of a reasonable barrier wall.

10.4 Information for Local Officials

Once the noise study has been accepted by GDOT’s Office of Environmental Services, the Office of Environmental Services will send notification by letter of estimated future noise levels for undeveloped lands on Type I projects to the local official (or their designee) within whose jurisdiction the highway project is located.

The information provided will include at minimum, an estimation of future design year noise levels at various distances from the edge of the nearest travel lane of the proposed project where future noise levels are within 1 decibel of the corresponding exterior values shown in “Table 1 of 23 CFR part 772 Noise Abatement Criteria.”

GDOT will assist local governments in accordance with 23 CFR 772.17, by providing them information that can help them to be aware of incompatible land uses near state highways. Examples of compatible land uses and incompatible land uses will be provided and disclosure will be made that no Type II program currently exists in Georgia.

11 CONSTRUCTION NOISE

The GDOT recognizes that minimizing construction noise is important; however, in the absence of standardized federal criteria for assessing construction noise impacts related to transportation projects (FHWA Construction Noise Handbook, 2006), it is necessary to primarily rely on the standards and requirements developed by local governments to determine the criteria to which contractors must adhere.

In Georgia, contractors on all highway construction projects are required to adhere to GDOT Standard Specification Section 107.01 – Laws to Be Observed, which states in part, “The Contractor shall at all times observe and comply with all such laws, ordinances, codes, regulations, orders and decrees...” unless the necessary variance is obtained.

In order to further minimize construction noise, GDOT’s Office of Environmental Services will provide the Project Manager and the design team the noise sensitive receptor information as early as possible during project development. This information would be used for the incorporation of construction noise control strategies in the project layout and design. For example, haul roads could be relocated to areas that would minimize construction vehicle noise exposure to noise sensitive receptors. The sequencing of construction activities and techniques could also be developed to minimize construction noise impacts. For example, permanent noise barriers included in project design could be constructed as early as possible, and daytime (or specified) hours could be required for certain activities.

12 NOISE BARRIER REMOVAL REQUESTS

The GDOT does not remove or alter noise walls unless it is required due to a conflict with GDOT projects. Local governments or individuals may request noise walls to be removed or altered, at their own expense. In order to alter a noise wall a noise study must be completed to show that the altered wall would provide noise abatement equal to or better than the existing noise wall. In order to completely remove a noise wall or part of a noise wall without replacing it, a minimum of 75% of citizens receiving a benefit from the existing noise wall must agree to the removal of the wall. In both cases GDOT will work with FHWA for final approval on noise wall alterations/removals. If a noise wall is removed, in part or entirely, GDOT will not reconstruct the noise wall.

13 REFERENCES

13.1 Federal Regulations

- The National Environmental Policy Act (NEPA) of 1969, as amended.
- The Noise Control Act of 1972.
- Title 23: Highways – Part 772 - Procedures for Abatement of Highway Traffic Noise and Construction Noise, US Code of Federal Regulations, amendment from July 13, 2010.

13.2 Federal Guidelines

- *Construction Noise Handbook*, Report FHWA-HEP-06-015, Federal Highway Administration, US Department of Transportation, August 2006.
- *FHWA Highway Traffic Noise website*, <http://www.fhwa.dot.gov/environment/noise/>.
- *Highway Traffic Noise: Analysis and Abatement Guidance*, Federal Highway Administration, US Department of Transportation, June 2010.
- *Highway Traffic Noise Analysis and Abatement Policy and Guidance*, Federal Highway Administration, US Department of Transportation, June 1995.
- *Measurement of Highway-Related Noise*, FHWA-PD-96-046, Federal Highway Administration, US Department of Transportation.
- *Noise Barrier Design Handbook*, Federal Highway Administration, US Department of Transportation, http://www.fhwa.dot.gov/environment/noise/noise_barriers/design_construction/design/design00.cfm
- *Roadway Construction Noise Model (RCNM)*, Federal Highway Administration, US Department of Transportation, http://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/
- *Traffic Noise Model (TNM)*, Federal Highway Administration, US Department of Transportation, http://www.fhwa.dot.gov/environment/noise/traffic_noise_model/.