

Louisiana Department of Transportation and  
Development

Traffic Noise Impact and Abatement Study

US 190 Exit Lane Modifications

SP# H.009125.2

Route: Interstate 12

St. Tammany Parish



February 2012

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**TRAFFIC NOISE ANALYSIS**  
**STATE PROJECT NO.: H.009125.2**  
**US 190 EXIT RAMP WIDENING AND EXTENSION**  
**ROUTE: I-12**  
**PARISH: ST. TAMMANY**

**INTRODUCTION**

The captioned project calls for adding a lane to the exit ramp from I-12 Eastbound onto US 190. The lane is being added to the outside; however no additional right of way will be required. The total length of the project is approximately 4000 feet (0.76 mile).

The proposed project is classified as a Type I Project since additional capacity will be added. Since it is anticipated that federal funding will be used for construction of this project, a traffic noise analysis is mandated by the regulations in the Federal Register under 23 CFR 772. This analysis will be provided to the Federal Highway Administration (FHWA) for approval prior to receiving funding.

This report analyzes noise impacts due to the implementation of the captioned project as well as the projected normal traffic growth. Topics discussed include field measurement, computer modeling and methodology, noise impacts, and abatement methods. Projected noise impacts, based on the data for the existing and proposed conditions, will be discussed. Noise abatement measures are evaluated for areas where impacts are anticipated. Traffic noise impacts are defined by Louisiana Department of Transportation and Development (LADOTD) as noise impacts which occur when the predicted traffic noise levels equal or exceed the LADOTD Noise Abatement Criteria (NAC), or when the predicted traffic noise levels exceed the existing noise levels by 10 dBA. The NAC are presented below in Table 1. If it is determined that there are noise impacts in the project area, then noise abatement methods will be analyzed for reasonability and feasibility. The LADOTD noise abatement policy is provided in Appendix C-1.



**Figure 1: Overhead aerial of project area with labeled roadways.**

## **PURPOSE & SCOPE**

The purpose of the project is to improve traffic flow on the exit ramp. Currently, traffic on the exit ramp can back up to the point where vehicles are in the travel lanes on I-12. A significant portion of the traffic using the exit ramp is heading south on US-190 to utilize the Causeway. The commuters attempting to head north on US-190 are hindered by the commuters heading south. This project proposes to add a lane to the outside of the exit ramp from I-12 to the existing US 190 North/South split (see Figure 2). The purpose of this noise analysis is to examine the noise impacts associated with the addition of the lane to the exit ramp and to examine the reasonability and feasibility of noise abatement methods.



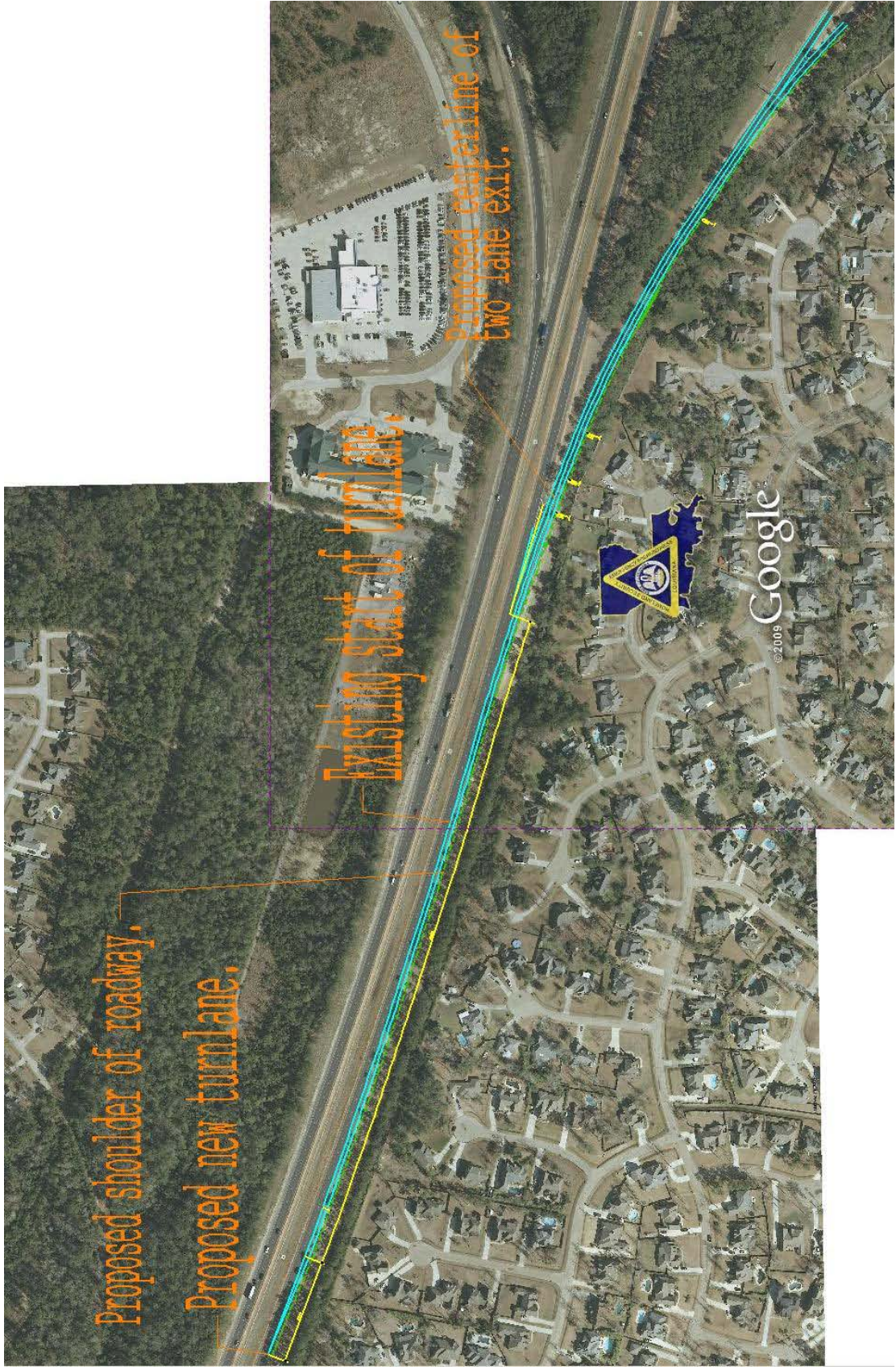


Figure 2: This figure shows the approximate location of the new exit lane.

## **DESCRIPTION OF LAND USAGE**

### **Current Use**

Land usage along the project area consists almost entirely of residential property. There is a community tennis court and pool located near the eastern most portion of the neighborhood. All of the houses in the neighborhood were included in this study, as well as the tennis courts and the pool, and are categorized as Activity Category B.

**Table 1: FHWA's Noise Abatement Criteria**

Activity Category	Activity Leq(H)	Evaluation Location	Activity Description	In LA, impact occurs when noise level is equal to or greater than the values below
A	57	Exterior	Lands where 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	56
B	67	Exterior	Residential (includes undeveloped lands permitted for residential)	66
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. (includes undeveloped lands permitted for these activities)	66
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.	51
E	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F. (includes undeveloped lands permitted for these activities).	71
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.	N/A
G	--	--	Undeveloped lands that are not permitted	N/A

The units for the noise levels are hourly A-weighted sound levels (dBA)

**Future Use**

It is believed that there will continue to be predominantly residential development along the south side of the project area. The neighborhood appears to have reached its build-out

capacity, so that additional houses are not expected to be built in the neighborhood. The Activity Categories should remain B in the future.

## **TRAFFIC NOISE MODEL**

### **Modeling Procedures**

FHWA Traffic Noise Model 2.5 (TNM) was used to analyze the noise impacts following the *FHWA Highway Traffic Noise: Analysis and Abatement Guide* (FHWA 2011) and the *FHWA Traffic Noise Model User's Guide (Version 2.5 Addendum)* (FHWA 2004). Traffic volume and axle distribution were obtained from the Traffic and Planning Section of LADOTD. Traffic was assumed to increase 3% annually. Traffic speed was modeled at 70 mph for automobiles, trucks, motorcycles, and buses on the travel lanes of I-12, 50 mph on the exit ramp before the split, and 40 mph for traffic on the portion heading to US 190 North.

The TNM model combines traffic flow data with a digital representation of the project corridor to predict noise levels. The Average Daily Traffic counts were provided by the LADOTD's Planning and Programming Section. The data included a vehicle classification breakdown for 2008 year and for the future year of 2028. Since the data received from LADOTD did not contain individual lane data, the roadways were modeled as one eastbound lane and one west bound lane. Peak traffic was predicted to be ten percent of the Average Daily Traffic. Since each lane on I-12 is 12' in width, the current two lanes were modeled as a 24' roadway. Exit ramp traffic was assumed to split equally between the branch heading to US 190 North and the branch heading to US 190 South. The exit ramp was modeled as a 12' wide lane and the new lane for the future build scenario was modeled as a lane starting near the intersection of the existing exit lane and I-12 and ending near the exit ramp split.

The neighborhood currently has a wooden fence which appears to act as a barrier. Measurements and elevations of the fence were gathered during the field visit and through LiDAR (Light Detection And Ranging). The noise barrier effect of the fence was confirmed during the validation process. The fence was modeled in the Current, Future No Build, and Future Build scenarios. The noise levels used in this noise analysis are the levels predicted with the barrier because there are no plans to remove the barrier as part of this or any other LADOTD project.

For the TNM model to predict impacts at a certain location there must be a receiver in the area that is exposed to the noise. Two hundred and sixty-nine noise receivers were modeled adjacent to the project area. A list of receivers, current noise levels predicted by TNM and a map of the sites are provided in Appendix C-2.





**Figure 3: Modeling method.**

### **Model Validation**

The existing noise levels were measured on August 2, 2011 using an Integrating Sound Level Meter (Model 820, by Larson\*Davis). This is a Type I sound level meter. The sound level meter was calibrated at the beginning of the trip and rechecked before each measurement. Measurements were taken in fifteen minute intervals and the traffic was manually counted by LADOTD personnel during each interval. The noise measurements were used to represent the hourly Leq and the traffic that was counted during the fifteen minute interval was multiplied by a factor of four to represent hourly traffic volume.

The model was validated by measuring the noise at three locations along the project corridor and comparing the actual measured noise levels to the noise levels predicted by the TNM model. If the measured noise level was within three decibels of the predicted noise level, then the model results will be considered valid. The three measurement locations used for validating the TNM model are near 1144 Hardy Lane, near 1213 Copperman Court, and near 1017 Smoketree Drive. These three locations are shown in Figure 1 within Appendix C-3. Table 2 shows a summary of the validation results and the details of the model validation can be found in Appendix C-3.

**Table 2: TNM Validation Results.**

Site	Time	Measured Leq (dBA)	Predicted Leq (dBA)	Difference (dBA)
Hardy Lane	10:36 am	59.1	57.6	1.5
Copperman Court	11:05 am	55.1	56.5	1.4
Smoketree Drive	11:30 am	54.4	55.5	1.1

**Existing Noise Levels**

This simulation predicts which receivers are currently impacted based on the NAC. For a receiver to be impacted it must meet or exceed the NAC criteria. The TNM Model predicted that currently no receptors are impacted. The noise levels range from 45.1 dBA to 65.2 dBA. It appears that the Interstate does not contribute to the noise environment for most of the receivers south of River Oaks Drive. Appendix C-4 contains the simulation results for the existing noise levels.

**Future No-Build Noise Level**

This simulation predicts which receivers will be impacted if the future predicted traffic is forced to travel on the existing road with no improvements. There will be a total of sixteen receptors impacted for the no-build scenario. These noise levels range from 47.6 dBA to 67.8 dBA. It appears that the Interstate does not contribute to the noise environment for most of the receivers south of River Oaks Drive. The results of the future no-build simulation can be found in Appendix C-5.

**Future Build Noise Level**

This simulation predicts which receivers will be impacted if the future traffic is allowed to travel using the proposed improvements. Only the existing barrier is modeled in this scenario at its current height. There will be a total of twenty impacted receptors. These noise levels ranged from 48.6 dBA to 68.2 dBA. It appears that the Interstate does not contribute to the noise environment for most of the receivers south of River Oaks Drive. The results of the future build simulation can be found in Appendix C-6.

**ANALYSIS OF THE NOISE ABATEMENT METHODS**

**Traffic Management Measures**

Traffic management measures include using traffic control devices, reducing speed limit, restricting vehicle type or time, and assigning a lane for trucks. Generally, installation of new traffic control devices on the Interstate system are not allowed as the Interstate is a free-flow system. Reducing speed limits to reduce noise levels would only be effective if the limits were reduced substantially, which would likely increase traffic congestions and delays. Thus, these measures are not feasible or reasonable.

## **Alteration of Horizontal and Vertical Alignments**

The scope of the project is to widen the existing roadway within the existing right-of-way. Altering the current alignments would most likely result in additional impacts to the subdivision. Also, there would be additional costs associated with purchasing right-of-way since there is limited corridor space available for realignment of the Interstate. This measure is not considered to be feasible or reasonable.

## **Construction of Noise Barriers**

According to the noise abatement criteria set in the LADOTD Highway Traffic Noise Policy, a noise barrier must be both feasible and reasonable before it can be proposed. Feasibility includes concerns such as engineering, maintenance, safety, drainage issues and 75% of the first row of receptors achieving at least a 5 dBA reduction in highway traffic noise. Reasonableness includes achieving the noise reduction design goal, cost effectiveness, and concurrence of benefited receptors. In order to meet the noise reduction goal, at least one receptor must receive an 8 dBA reduction. The community has an existing noise barrier, so the modeled barrier needed to reduce the noise by 8 dBA below the future build scenario (with the existing barrier). Modeled barriers started at 10 feet and increase in height by 2 foot increments. Modeling ceased when it was found a 30 foot tall barrier would not achieve the 8 dBA reduction (at any one receptor) required to be considered reasonable.

## **Noise Insulation of Public Use or Nonprofit Institutional Structures**

No public use or nonprofit institutional structures are located adjacent to the project area; therefore, none were modeled in this analysis.

## **RECOMMENDATIONS FOR FUTURE ZONING**

Approximate locations of the 71 dBA threshold and 66 dBA thresholds are given in order to help the local communities with planning. Under the current conditions, the 66 dBA and 71 dBA thresholds appear to be within existing LADOTD right of way. Under both the Future Build and Future No Build Scenarios, the threshold lines appear to be in the same locations. The 71 dBA threshold is within LADOTD right of way. For the portion of the project located west of I-12 exit ramp “split”, the 66 dBA threshold is approximately 380 feet from the centerline of the Interstate. East of the split, the 66 dBA threshold is located approximately 365 feet from the centerline of the exit lane. The 66 dBA threshold should be used for residences, parks, etc.

## **ANALYSIS OF CONSTRUCTION NOISE**

Construction noise is expected to have temporary impacts upon all of the receptors in the area. The particular receivers of concern are the ones located within 500' of the project centerline. It is recommended that all construction operations be restricted to working hours whenever possible.

Abatement measures should be employed whenever possible. All construction

equipment such as pumps, compressors, generators, bulldozers, cranes, trucks, etc., should be properly muffled and all motor panels should be closed to reduce the noise impacts. Section 107.14 of the Louisiana Standard Specifications for Roads and Bridges, 2006 edition, and the FHWA Highway Construction Noise Handbook (FHWA-HEP-06-015, August 2006) can be referenced for further details on the sources and abatement of construction noise.

## **CONCLUSIONS AND RECOMMENDATIONS**

There are residential receivers located adjacent to the project area that will be impacted by noise due to this project. Barrier analysis performed as part of this noise study found barriers that were feasible however it was not able to find a barrier that achieved the 8 dBA reduction at one receiver necessary for the barrier to be considered reasonable. Therefore, a noise wall will not be built as part of this project.

Construction noise generated as a result of the proposed project will cause temporary impacts to the sensitive receivers. The construction contractor will minimize noise impacts by adhering to the abatement measures stated in Section 107.14 (Environmental Protection) of the Louisiana Standard Specification for Roads and Bridges, 2006 edition.



# **Appendix C-1**



## ***LADOTD Noise Abatement Policy***

**STATE OF LOUISIANA**



**DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT**



**HIGHWAY TRAFFIC NOISE POLICY**

*July 2011*

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## INTRODUCTION

This document contains the Louisiana Department of Transportation and Development's (DOTD) policy on highway traffic noise. This policy describes the implementation of the requirements of the Federal Highway Administration (FHWA) noise regulations for Federal-aid projects found in 23 Code of Federal Regulations Part 772 (23 CFR Part 772).<sup>1</sup> DOTD developed this policy in accordance with FHWA regulations and guidance, and FHWA reviewed and approved this policy for implementation.

In the 1972 Federal-aid Highway Act, Congress required FHWA to develop a noise standard for new Federal-aid highway projects. In accordance with 23 United States Code section 109(i) (23 USC 109(i)), FHWA promulgated noise regulations which applied to Federal-aid projects. In June 1995, FHWA mandated that state transportation agencies adopt a written Highway Traffic Noise Policy consistent with the regulations and their June 1995 guidance. DOTD complied, with its first written policy approved by FHWA in August 1996. Since its initial approval, the DOTD highway traffic noise policy has been revised three times, in 1997, 2004 and 2009. Each revision required FHWA review and approval prior to implementation. On July 13, 2010, FHWA published their new noise regulations in the Federal Register<sup>2</sup> and mandated that state transportation agencies rewrite their noise policies to be consistent with the new regulations. The states were given until January 2011 to submit proposed policies for FHWA review. To assist states in rewriting their policies, FHWA published guidance dated June 2010 and revised January 2011 which can be found on FHWA's web site.<sup>3</sup> The effective date of the new regulations is July 13, 2011.

The policy herein contains information on how highway traffic noise impacts are defined, how noise abatement is evaluated, and how noise abatement decisions are made in Louisiana. **This policy as written assumes that the noise analyst is familiar with the provisions of the Federal regulation on which this policy is based.** If you need further information regarding the policy, contact the DOTD Environmental Section at (225) 242-4502.

## PURPOSE

The purpose of this written policy is to outline DOTD's policy and procedures for compliance with the FHWA Noise regulations found at 23 CFR 772.

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<sup>1</sup> Access CFR regulations from <http://www.gpoaccess.gov/cfr/retrieve.html>

<sup>2</sup> Access Federal Register, Vol. 75, page 39820 from FR Main page at <http://www.gpoaccess.gov/fr/index.html>

<sup>3</sup> Access FHWA noise guidance, regulations, and related material from <http://www.fhwa.dot.gov/environment/noise/>



## DEFINITIONS

Reference is made to the definitions contained in the regulations (23 CFR 772.5). Defined below are some of the terms specifically referenced in the policy or which require additional refinement.

*Benefited Receptor* - a recipient of an abatement measure, whether impacted or not, receiving 5 dBA or more reduction in the noise level as a result of the proposed abatement.

*Common Noise Environment* – a group of receptors within the same Activity Category in Table 1 that are exposed to similar noise sources and levels; traffic volumes, traffic mix, and speed; and topographic features.

*Date of Public Knowledge* - the date of approval of the Record of Decision, Finding of No Significant Impact, or Categorical Exclusion. The date of public knowledge is the date at which the DOTD will no longer be responsible for providing noise abatement for new development which occurs adjacent to the proposed project. Provision of such abatement measures becomes the responsibility of the local communities or private developers.

*Design Year* – the future year used to estimate the probable traffic volume for which a highway is designed. The design year will normally be 20 years from the projected start of project construction.

*Existing Noise Levels* – the worst noise hour, resulting from the natural and mechanical sources and human activity, usually present in a particular area.

*Leq* – the equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as a time-varying sound level during the same period.

*Leq(h)* – the hourly value of Leq.

*Multifamily Dwelling* – A residential structure containing more than one residence. Each residence in a multifamily dwelling shall be counted as one receptor when determining impacted and benefited receptors.

*Noise Reduction Design Goal* – the optimum desired 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 in Louisiana is 8 dBA.

*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 hold a title, deed, or other legal documentation of ownership of a property or a residence.

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

*Residence* – a dwelling unit. Either a single family residence or each dwelling unit in a multifamily dwelling.

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

*Traffic Noise Impacts* – design year build condition noise levels that *approach* or exceed the FHWA Noise Abatement Criteria for the future build condition, or design year build condition noise levels that exceed the existing noise levels by 10 dBA. (*Approach* is defined as 1 dBA less than the FHWA Noise Abatement Criteria.)

*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:
  - (a) 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
  - (b) Substantial Vertical Alteration (a project that removes shielding therefore exposing the line-of-sight between the receptor and the traffic noise source by altering the vertical alignment of the highway or by altering the topography); or
- (3) The addition of a through-traffic lane. This includes the addition of a through-traffic lane that functions as a HOV, HOT, bus, or truck climbing lane; or
- (4) The addition of an auxiliary lane, except for when the auxiliary lane is a turn lane; or
- (5) The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange; or
- (6) Restriping existing pavement for the purpose of adding a through-traffic lane or an auxiliary lane; or
- (7) The addition of a new or substantial alteration of a weight station, rest stop, ride-share lot or toll plaza.

\*Note that if a project is determined to be a Type I project, then the entire project area as defined in the environmental document is a Type I project.

*Type II Project* – a proposed project to provide noise abatement on an existing highway. DOTD does not have a Type II program.

*Type III Project* – a proposed project that does not meet the classification of a Type I or Type II project. Type III projects do not require a noise analysis.

## **APPLICABILITY**

This policy applies to all Federal highway projects in the State of Louisiana; that is, any projects that receive Federal-aid funds or are otherwise subject to FHWA approval.

This policy also applies to the construction of new control of access highways that are funded through DOTD with no FHWA involvement.

Type II programs to provide noise abatement along existing highways are voluntary. DOTD does not have a Type II program; therefore, DOTD will not consider Type II projects.

DOTD will consider and construct barriers when sufficient funds (Federal or State) are appropriated by either State or Federal legislature specific to the construction of a barrier. These legislative mandated barriers may or may not be part of a Type I project. These barriers will be designed in accordance with the legislation as to location, height, and other parameters. If the design parameters are not specified in the legislation, the barrier will be designed to achieve a reasonable noise reduction in accordance with this policy.

This policy shall not prohibit the application of visual screens or security fences. Visual screens and security fences are not eligible for Federal-aid funding as noise abatement.

## **TRAFFIC NOISE ANALYSIS**

The traffic noise analysis will include the steps listed below for each alternative under detailed study. Note that 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 below.

1. **Identification of Existing Land Uses Affected by Noise:** The following types of activities and land uses affected by noise from the highway will be identified for analysis:
  - a. Category A: Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose;
  - b. Category B: residential;
  - c. Category C: active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings;
  - d. Category D: 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. Category E: hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F;
  - f. Category F: agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing; and
  - g. Category G: undeveloped lands that are not permitted.

Justification for the designation of lands as Category A must be submitted to FHWA on a case-by-case basis for concurrence. Justifications will be submitted through the FHWA Division Office to FHWA Headquarters.

2. **Determination of Existing Noise Levels:** The determination of existing noise levels will be made utilizing field measurements of actual noise levels. A log will be kept noting the time of day, meteorological conditions, calibration results, and any unusual ambient noise sources experienced during each measurement.

Noise measurements will be taken utilizing ANSI Type 1 or Type 2 Sound Level Meters used in accordance with the manufacturer's operations manual. Meters are to be calibrated before and after each measurement. Meters should have valid factory calibration certification. Measurements should be done in accordance with the FHWA publication entitled, "Measurement of Highway – Related Noise," dated May 1996.<sup>4</sup>

Noise measurements will be taken in time intervals no shorter than 15 minutes and no longer than one hour unless alternate intervals are given prior approval by DOTD.

Actual traffic counts will be made during each field measurement. These traffic counts will be categorized according to the following vehicle classes:

*Automobiles (A)* – all vehicles with two axles and four wheels designed primarily for transportation of nine or less passengers or transportation of cargo.

*Medium Trucks (MT)* – all vehicles with two axles and six wheels designed for the transportation of cargo.

*Heavy Trucks (HT)* – all vehicles having three or more axles designed for the transportation of cargo.

*Buses (B)* – all vehicles designed to carry more than nine passengers.

*Motorcycles (M)* – all vehicles with two or three wheels and an open-air driver/passenger compartment.

Sites selected for field measurements will receive prior approval of DOTD. These sites will represent noise sensitive receptors in each Activity Category which are likely to be affected by the project. Sites outside of the immediate vicinity of the project may also be chosen to determine the ambient noise levels unaffected by the roadway. For proposed highways on new alignments where no highway currently exists, measurements must be taken at representative receptor locations. Unless specifically approved by DOTD, field measurements will be taken to represent exterior activities only.

Field measurements will be taken at approved sites at peak and off-peak times. Peak hour noise levels will be the hour with the highest noise levels, not necessarily the hour with the highest traffic volumes.

Upon the consent of the Environmental Engineer Administrator, existing noise levels may be determined by utilizing other methodology, including computer models consistent with the current FHWA highway traffic noise prediction model. Traffic characteristics, data, selection of receptor locations, and other input parameters utilized will be at the discretion of DOTD.

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<sup>4</sup> Located on web at <http://www.fhwa.dot.gov/environment/noise/measurement/measure.cfm>



3. **Prediction of Traffic Noise Levels:** Any traffic noise prediction methodology is approved for use in any traffic noise analysis required by this policy if the methodology used at the time the noise study is consistent with the requirements of 23 CFR 772.9.<sup>5</sup>

Report predicted noise levels in the noise report and related documents in the same format as reported by the model used.<sup>6</sup>

To validate model results, it is necessary to compare the noise levels measured in the field to the noise levels predicted by the model using the roadway parameters and traffic data collected in the field. If the modeled results are within 3 dBA of the measured noise levels, no further action is required, and the model can be used to determine future noise levels. If the modeled results are not within 3 dBA of the measured noise levels, then further investigation is warranted into the reason(s) for the discrepancy prior to using the model to determine future noise levels.

In predicting noise levels and assessing noise impacts, traffic characteristics that will yield the worst hourly traffic noise impact on a regular basis for the design year will be used. The period with the highest sound levels may not be at the peak traffic hour but instead, during some period when traffic volumes are lower but the truck mix or vehicle speeds are higher.

Future noise levels will be based on modeling results utilizing data for the design year. This data, including traffic volumes, composition and speed, other reasonably foreseeable development, and the implementation of other transportation projects, will be based on accepted engineering practice and local planning assumptions.

4. **Determination of Traffic Noise Impacts:** Traffic noise impacts occur when the future (predicted, design year, build condition) noise levels *approach or exceed* the FHWA Noise Abatement Criteria, or when the future (predicted, design year, build condition) noise levels exceed the existing noise levels at any sensitive receptor by 10 dBA. FHWA requires that the States define *approach* as at least 1 dBA below their Noise Abatement Criteria.

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<sup>5</sup> The approved model in effect on July 13, 2011, the effective date of the regulations, is FHWA TNM version 2.5. When running the TNM 2.5 model, average pavement type must be used for prediction of future noise levels unless FHWA approves use of another type.

<sup>6</sup> The current approved model, TNM, reports results in tenths, a decimal format (##.#).

**FHWA Noise Abatement Criteria  
Hourly A-weighted Sound Level decibels (dBA)**

ACTIVITY CATEGORY	ACTIVITY LEQ (H)	EVALUATION LOCATION	ACTIVITY DESCRIPTION	IN LOUISIANA, IMPACT OCCURS WHEN NOISE LEVEL <b><u>IS EQUAL TO OR GREATER THAN</u></b> THE VALUES BELOW*
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>56</b>
B	67	Exterior	Residential (includes undeveloped lands permitted for residential).	<b>66</b>
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. (Includes undeveloped lands permitted for these activities).	<b>66</b>
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.	<b>51</b>
E	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F. (Includes undeveloped lands permitted for these activities).	<b>71</b>
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.	<b>n/a</b>
G	-----	-----	Undeveloped lands that are not permitted.	<b>n/a</b>

\*These values are consistent with the FHWA's requirement for consideration of traffic noise impacts 1 dBA below their noise abatement criteria.

The noise analysis must include analysis for each type of receptor present in the study area. Noise contour lines shall not be used to determine noise impacts, but noise contour lines can be used for project alternative screening or for land use planning purposes.

In determining and abating traffic noise impacts, primary consideration is to be given to exterior areas of frequent human use. Examples of possible receptor locations for residential receivers are patios, courtyards, front or back yard, pool areas, etc. Generally, the receptor location which lies between the noise source and the receiver is chosen as the location to model. If the circumstances of a particular receiver are atypical, contact the DOTD Environmental Section Coordinator for guidance.

In determining the number of receptors impacted/benefited, the number will include all dwelling units (i.e., owner-occupied, rental units, mobile homes, etc.). Each unit in a multifamily building is counted as one receptor.

For hotels, motels, offices, and other developed lands, receptor locations will be sited at outdoor areas of frequent human use such as patios, courtyards, pool areas, locations of outdoor seating, etc.

For parks and recreational areas, model each designated use area as a receptor location. For example, the park may have ball fields, basketball courts, playground equipment, tennis courts, picnic area, pool, etc. Each of these specific activity areas would be modeled to determine noise impact at each of these locations.

In those situations where there are no exterior activities to be affected by the traffic noise, or where exterior activities are far from or physically shielded from the roadway in a manner that prevents an impact on exterior activities, the interior criterion, Activity Category D, shall be used as the basis of determining noise impacts. An indoor analysis shall only be done after exhausting all outdoor analysis options. Interior noise level predictions may be estimated by using the information in Table 6 of FHWA's guidance document entitled, "Highway Traffic Noise: Analysis and Abatement Guidance," dated June 2010 and revised January 2011.<sup>7</sup>

When applying the interior criterion, consideration is given to the impact and abatement of interior rooms facing the roadway that are occupied frequently with a use that would benefit from a reduction in noise. For example, a classroom, prayer room, or meeting room would benefit from a reduction in noise, but a storage room or boiler room would not. When determining the cost for reasonableness, one building is one receptor, although multiple rooms may be insulated or provided noise reduction windows.

For Category F, no highway noise analysis is required under 23 CFR 772.

For Category G, if the undeveloped land is not permitted for development by the date of public knowledge, the noise levels are determined in accordance with 23 CFR 772.17(a) and results are documented in the environmental document.

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<sup>7</sup> On-line guidance available at FHWA website,  
[http://www.fhwa.dot.gov/environment/noise/regulations\\_and\\_guidance/analysis\\_and\\_abatement\\_guidance/](http://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/)

5. **Evaluation of Noise Abatement:** When traffic noise impacts are identified, noise abatement shall be considered and evaluated for *feasibility* and *reasonableness*. Traffic noise impacts will be determined and alternative noise abatement measures analyzed by giving weight to the benefits and cost of abatement, and to the overall social, economic and environmental impacts.

In abating traffic noise impacts, primary consideration is given to exterior areas where frequent human use occurs and a lowered noise level would be of benefit.

The noise abatement measures listed below may be incorporated into Type I Federal or Federal-aid projects to reduce traffic noise impacts.

- (1) Construction of noise barriers, including acquisition of property rights, either within or outside the highway right-of-way. Landscaping is not a viable noise barrier;
- (2) Traffic management measures (e.g., traffic control devices and signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modified speed limits and exclusive lane designations);
- (3) Alteration of horizontal and vertical alignments;
- (4) Acquisition of property rights (predominantly unimproved property) to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise;
- (5) Noise insulation of Activity Category D land use facilities listed in Table 1. Post-installation maintenance and operational costs for noise insulation are not eligible for Federal-aid funding.

*Feasibility:*

For a noise barrier to be considered acoustically feasible, 75% of the first row of impacted receptors adjacent to the barrier must achieve at least a 5 dBA reduction in highway traffic noise.

Other feasibility factors that will be considered are safety, barrier height, topography, drainage, utilities, maintenance of the abatement measure, and access to adjacent properties.

DOTD will not build noise barriers that it considers unsafe to the traveling public or adjacent properties. Topography and drainage may impact the design of the barrier or make the barrier unfeasible to construct. Utilities may render a barrier unfeasible when a conflict between the utility and barrier exists and the utility cannot be moved or cannot be moved without creating other insurmountable problems. (Note that the cost to relocate a utility will be added to the cost of the barrier when the relocation is necessary for the construction of the barrier. If this relocation cost is large, the barrier, although feasible, may become unreasonable due to cost.) DOTD must be able to access the barrier for maintenance purposes. If access cannot be obtained, the barrier is unfeasible. When access to adjacent properties must be maintained, a barrier may be unfeasible if it cannot be designed to provide the needed access. Noise barriers

that block existing driveways are considered unfeasible; however, there may be situations whereby the property owners agree in writing to forfeit their access eliminating this concern. Situations may arise whereby access is needed for seasonal activities such as maintenance or management of adjacent properties. These situations will be considered on case by case basis.

Noise barriers on bridges are limited to a maximum height of 14 feet, measured from top of noise barrier to bridge slab. Costs associated with mounting the barrier to the bridge, including the cost to modify the bridge structure to support the barrier, will be added to the cost of the barrier for determining reasonableness.

*Reasonableness:*

For abatement measure to be considered reasonable all of the following three criteria must be met: (a) achievement of the noise reduction design goal, (b) cost effectiveness, and (c) concurrence of benefited receptors.

- (a) Noise Reduction Design Goal: When noise abatement measures are being considered, every effort will be made to obtain a substantial noise reduction of at least 8 dBA. At a minimum, at least one receptor must receive an 8 dBA reduction for the noise abatement system to be reasonable. For noise barriers meeting the abovementioned criteria, the height and length of the barrier will be optimized using the cost/benefited receptor ratio.
- (b) Cost Effectiveness: The cost estimate of the noise abatement measure (including but not limited to the costs of real estate acquisition, construction servitude or utility relocation) should be equal to or less than \$35,000 per benefited receptor. The unit cost used to estimate the cost of likely barriers will be updated regularly (at least every five years) and published on DOTD's web site. *The final analysis regarding cost effectiveness will occur during design when more detail information is available regarding the cost of the barrier system, and*
- (c) Consideration of Viewpoints: As part of the NEPA public involvement process, viewpoints from the community, including benefited receptors, will be solicited for all aspects of the project, including noise impacts and abatement. Public Involvement will be tailored to the project. If no relevant objections to the proposed noise abatement are made at this level of public involvement, this criterion is deemed met and abatement considered reasonable from the viewpoint of benefited receptors. If relevant objections are identified, a follow-up solicitation will occur with property owners and residents of the benefited receptors. The abatement measure will be considered reasonable from the viewpoint of benefitting receptors if 50% or more of the responses received are positive. *Follow-up coordination with benefited receptors may occur during the design stage when more detail information is available regarding barrier design.*

Follow-up Coordination with Benefited Receptors during Final Design

For noise barriers, the most common type of abatement, the Department will contact benefited receptors when the barrier design changes substantially from what was

presented in the NEPA document. The abatement measure will be considered reasonable from the viewpoint of benefitting receptors if 50% or more of the responses received are positive.

To ascertain desires, property owners and residents may be invited to attend a meeting specifically to discuss the proposed barrier, or they may be asked to complete a survey (paper, electronic, phone, etc.). Contact may be made through a variety of means such as in person, letters, flyers left at the receptor site, public notices, web sites, phone calls, emails or other reliable means or combination of means. Names and/or addresses may be obtained from the tax assessor’s roll, clerk of court records, neighborhood associations, local government databases, reliable internet sources, or other reliable sources or combination of sources. Those who do not respond as requested will be deemed as not interested in the barrier. DOTD will give more weight to the desire of the property owner than to the desire of the lessee. (When conflicting responses are received, DOTD will consider the property owner’s response over that of the lessee’s.)

The criteria above must be met collectively for a noise abatement measure to be deemed reasonable. Failure to achieve all criteria collectively will result in the noise abatement measure being deemed not reasonable. **During stage 1 of project development (NEPA stage), the analysis will identify noise abatement measures that are likely to be incorporated into the project’s design. The final determination of any proposed noise abatement measure will be made during the design stage.** During the design stage, only abatement measures identified in stage 1 as likely will be reevaluated for reasonableness. If the decision to provide an abatement measure changes during final design, the Department will inform the public.

The following optional factors are considered when determining justification for additional cost allowances to an already determined reasonable barrier:

- date of development (implementation requires public outreach), Favorable consideration will be given to residential developments that existed prior to the initial construction of the highway. (This factor applies to projects along existing highways and not to new alignments.)

Residential development existed prior to the original construction of the highway	Added to Reasonableness Criteria (b)
No	\$0
Yes	\$2,000

- changes between existing and future build-conditions, Favorable consideration will be given to impacted receptors that experience future build noise levels that are 30 dBA more than future no-build noise levels.

<b>Incremental Increase in Noise Level Between the Future No-build and the Future Build Noise Levels Before Noise Abatement</b>	<b>Added to Reasonableness Criteria (b)</b>
Less than 30 dBA	\$0
30 dBA or greater	\$2,000

- exposure to higher absolute highway traffic noise levels, Favorable consideration will be given to impacted receptors that have predicted future noise levels above 76 dBA

<b>Predicted Future Build Noise Level Before Noise Abatement</b>	<b>Added to Reasonableness Criteria (b)</b>
66-75 dBA	\$0
76-79 dBA	\$1,000
80 dBA or greater	\$2,000

and

- use of noise compatible planning concepts by the local government, Favorable consideration will be given to areas that have noise compatible (relevant to highway noise) zoning requirements in place that include the project area.

<b>Noise compatible zoning in place for study area</b>	<b>Added to Reasonableness Criteria (b)</b>
No	\$0
Yes, in place for 1 to 2 years	\$1,000
Yes, in place for 2 or more years	\$1,500

## **DOCUMENTATION**

The noise study report will document the results of the noise study. This report may be a standalone document incorporated into the NEPA document by reference, or it may be included in the appendix of the NEPA document.

Before adoption of a Final Environmental Impact Statement, Finding of No Significant Impact, or Categorical Exclusion, for Federal-aid projects, the DOTD will identify noise abatement measures which



are both reasonable and feasible and likely to be incorporated in the project. The statement of likelihood included in the environmental document will give the locations and physical description of the noise abatement measures as well as explain that the final recommendation will be determined during final design with input from benefited receptors. The DOTD will also identify noise impacts for which no apparent solution is available.

## **MISCELLANEOUS PROVISIONS**

Third party funding is not allowed if the funding is required to make the abatement measure feasible or reasonable. Third party funding is acceptable to make functional enhancements such as absorptive treatment, access doors, or aesthetic enhancements to a noise abatement measure already determined to be both reasonable and feasible.

DOTD allows the use of either absorptive or reflective barriers. DOTD generally assumes reflective barriers in its noise analyses. This does not preclude the use of absorptive barriers or absorptive treatments. For example, a contractor may be given the option of using any barrier system on the Qualified Products List (QPL)<sup>8</sup> for construction. The QPL includes both reflective and absorptive systems. Therefore, the contract may choose either an absorptive or a reflective system as long as the system is on the QPL. Using an absorptive barrier when a reflective barrier was assumed for modeling purposes is not considered a substantial change in design for the purposes of soliciting viewpoints of benefited receptors. Note that decorative features often requested for visual enhancements may preclude use of absorptive treatments or some QPL barrier systems. If separate absorptive treatments are requested, the cost for the treatment will be added to the cost of the barrier system to determine reasonableness. If the additional absorptive treatment increases the cost above the maximum cost/benefited receptor value, it will not be considered for implementation unless the optional reasonableness factors apply. Use of absorptive barriers or treatments on a project is discretionary.

Cost averaging is used when a common noise environment exists. Common noise environments occur when the traffic mix and speeds are the same. For instance, a common noise environment could occur along a road segment between interchanges on a controlled access highway if the traffic speed is constant. Application requires that no single common noise environment exceeds \$70,000/benefited receptor and that collectively all common noise environments being averaged do not exceed \$35,000/benefited receptor.

**Information for Local Officials:** In an effort to prevent future traffic noise impacts on currently undeveloped lands, DOTD will inform local officials, within whose jurisdiction the highway project is located, of the best estimation of future noise levels for both developed and undeveloped lands or properties in the immediate vicinity of the project and information that may be useful to local communities to limit future land development to that which will be compatible with anticipated highway noise levels.

A copy of the environmental document (with included noise study) and/or noise study report (if one is prepared) will be provided to local officials upon approval of the environmental document. Local

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<sup>8</sup> QPL 69, Noise Reduction Systems (Noise Barriers), can be found at <http://www.dotd.la.gov/highways/construction/lab/qpl/tableofcontents.shtml>

officials or agencies, which may have jurisdiction, include the Mayor's office, city/town/parish council, parish police jury, and metropolitan planning organization, as applicable.

**Construction Noise:** The following general steps are to be performed for all Type I projects:

- a. Identify land uses or activities that may be affected by noise from the construction of the project. The identification is to be performed during the project development studies.
- b. Determine the measures that are needed in the plans and specifications to minimize or eliminate adverse construction noise impacts to the community including alternate designs to keep noise levels to a minimum (e.g. the use of drilled shafts vs. driven piles in noise sensitive areas).<sup>9</sup> This determination will include a weighing of benefits achieved and the overall adverse social, economic, and environmental effects and costs of abatement measures.
- c. Incorporate the needed abatement measures in the plans and specifications, as appropriate.

When practicable, DOTD will construct any permanent noise abatement measures as the first phase of a highway construction project to abate construction noise impacts of subsequent phases of the same project.

**Revision:** DOTD may revise this policy as necessary to keep current with the state-of-the-art technology, legislation, regulation, and guidance, as well as construction cost indices in the fields of highway traffic noise prediction, impact, and abatement.

The unit cost used in the noise analysis for determining reasonableness of noise abatement measures will be updated regularly at least every five years. It is the responsibility of the analyst to ensure that they are using the correct unit cost. Contact the DOTD Environmental Coordinator for more information.

Revisions to this policy affecting Federal or Federal-aid projects must be concurred with by the FHWA prior to adoption.

DOTD and FHWA are not responsible for notification of revisions to this policy. Inquiries as to the latest revision that may be applicable should be made in writing to:

Environmental Engineer Administrator  
Louisiana Department of Transportation and Development  
Post Office Box 94245  
Baton Rouge, Louisiana 70804-9245

**Implementation Plan:** This policy will become effective July 13, 2011. It will apply to all projects started on or after the above effective date, and to all projects currently being evaluated pursuant to NEPA that do not have a completed noise study. A noise study is deemed completed if it was reviewed and commented on by DOTD and/or FHWA and considered final.

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<sup>9</sup> The FHWA Roadway Construction Noise Model (FHWA RCNM) may be used to model construction noise at a sensitive receptor. For highly complex and controversial projects in urban areas, the "Highway Construction Noise: Measurement, Prediction and Mitigation" (HICNOM) method may be used, but requires specific input.

*For noise studies performed under past policies:* If, during later stages of project development, changes occur that affect only a portion of the project requiring a reevaluation of the noise study for that portion, the policy in effect at the time of the original study will be applicable. When these situations arise, DOTD will consult with FHWA Division office on the project specific issues to ensure that FHWA is in agreement.