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16. Abstract

This project will provide to the Texas Department of Transportation and the Texas Transportation Commission information sufficient to make an informed decision regarding the development and implementation of a statewide Type II noise abatement program. It was not the purpose or intent of the project to provide a recommendation or to propose a specific course of action. The project reviewed other states' noise abatement policies and programs for existing highways, estimated the magnitude of the traffic noise impact from existing highways on Texas residences, and described a possible Type II program, including a project prioritization system.

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STATEWIDE TYPE II NOISE ABATEMENT PROGRAM FOR THE TEXAS DEPARTMENT OF TRANSPORTATION

by

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Project Summary Report Number 1754-S

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Statewide Type II Noise Abatement Program for TxDOT

Conducted for the

TEXAS DEPARTMENT OF TRANSPORTATION

in cooperation with the

U.S. DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

by the

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THE UNIVERSITY OF TEXAS AT AUSTIN

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IMPLEMENTATION STATEMENT

This project provided (1) a detailed review of other states' noise abatement policies and programs for existing highways, (2) an estimate of the magnitude of the traffic noise impact from existing highways on Texas residences, and (3) a description of a possible Type II program, including a project prioritization system. The purpose of the project was to provide sufficient information to the Texas Department of Transportation and the Texas Transportation Commission to make an informed decision regarding the possible development and implementation of a statewide Type II noise abatement program. It was not the purpose or intent of the project to provide a recommendation or to propose a specific course of action.

DISCLAIMERS

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration or the Texas Department of Transportation. This report does not constitute a standard, specification, or regulation.

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BIDDING, OR PERMIT PURPOSES

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Research performed in cooperation with the Texas Department of Transportation and the U.S. Department of Transportation, Federal Highway Administration.

EXECUTIVE SUMMARY

The Texas Transportation Commission (the commission), recognizing the importance of environmental mitigation, ordered and authorized funding for a study to explore whether it would be practical to develop and carry out a statewide Type II Noise Abatement Program for the Texas Department of Transportation (TxDOT). Type II highway projects are federal or federal-aid highway projects aimed at noise abatement along existing highways, with such projects not undertaken in conjunction with a highway construction or improvement project. The Federal Highway Administration (FHWA) has placed a number of specific restrictions on Type II noise abatement that must be met for a Type II project to be approved (eligible for federal aid).

The scope of this project involved performing a study and analysis of Type II noise abatement in order to provide sufficient information to TxDOT and the commission to make an informed decision regarding the possible development and implementation of a Type II noise abatement program in Texas. The tasks included an analysis of Type II programs in place at other state highway agencies; an estimate of the overall magnitude and preliminary cost of a statewide Type II program; the development of a rating system to quantify and prioritize projects to provide a basis for the decision-making process; and the development of a method to effectively, efficiently, and equitably administer and carry out a Type II noise abatement program statewide. It was not the purpose or intent of this project to provide a recommendation or to propose a specific course of action.

Information on programs other states have implemented for noise abatement on existing highways was obtained through written questionnaires sent to traffic noise program representatives in all U.S. state departments of transportation (DOTs) and by follow-up telephone interviews. A similar study conducted by the Pennsylvania DOT completed in 1996 was reviewed not only for information on Type II programs in the U.S., but also for ideas on approaching this study.[1]

Fifteen out of fifty state DOTs currently have, at varying levels of activity, Type II noise abatement programs that are approved by the Federal Highway Administration. Seven states that do not have a Type II noise abatement program have constructed one or more retrofit barriers under an informal noise abatement program for existing highways or as special projects. The remaining twenty-eight states do not have a Type II noise abatement program and have not constructed retrofit noise barriers on any existing highways. States that have implemented the largest number (or miles) of Type II noise barriers include California, Colorado, Minnesota, New Jersey, Michigan, Maryland, and Wisconsin. In these states, the technical aspects of identifying, designing, prioritizing, and implementing Type II projects are managed either by the state DOT central office or by the state DOT district offices.

For the twenty-eight states that do not have a Type II noise abatement program and that have not constructed retrofit noise barriers on any existing highways, the reasons most often given included: (1) They considered Type I noise abatement the best way to mitigate

[1] "Statewide Retrofit Noise Abatement Study," Pennsylvania Department of Transportation, May 31, 1996.

the environmental impact of highway noise, or (2) they emphasized that capacity improvement projects are the main priority of the state transportation improvement plan.

Comments on lessons learned received from many states covered a variety of perspectives on Type II programs, giving both positive and negative aspects of the way retrofit noise abatement is treated in their respective state. Comments on positive aspects of having a Type II program included: A properly funded program provides noise abatement to some impacted residents; the program provides a positive means to deal with citizen and legislature concerns; and an established program provides for objective and equitable decisions for construction of noise abatement measures. Comments on negative aspects of having a Type II program include: The program can only serve a limited number of the residents that are impacted by highway noise; program allocated budgets typically are much less than that required for timely construction of projects; a Type II program uses funds that could have been used for other highway improvement projects; residents are often satisfied with, and even prefer alternate measures, such as landscaping, that are much less expensive than Type II projects; a Type II program requires extra staff work, particularly during initial implementation; and Type II construction does not improve highway capacity.

A questionnaire was also sent to the twenty-five Texas Metropolitan Planning Organizations (MPOs) in order to establish their current involvement in traffic noise impact problems and their interest and potential willingness to participate in future Type II noise abatement project prioritization and funding. Overall, the results indicate that most of the MPOs have not become actively involved in traffic noise abatement, either because no complaints were received or because persons submitting traffic noise complaints to MPOs were referred to TxDOT. In one MPO (Austin), complaints concerning traffic noise led to a noise study along two noise-impacted freeways. Most MPOs would prefer that the state fund any noise abatement projects on existing highways; they are not willing to cancel or postpone any current safety or capacity improvement projects to support retrofit traffic noise abatement projects in their areas. Some MPOs indicated that, if citizen interest in traffic noise increases, they might become more involved in traffic noise abatement.

The estimate of the overall magnitude and preliminary cost of a statewide Type II program was performed using a geographical information system (GIS) analysis of Dallas County, and then extrapolating the results to include the largest metropolitan areas statewide. It was determined that nearly 22,000 residences of Dallas County are impacted by highway noise. That equates to approximately fifty-three residences impacted per mile of major highway. Among those residences, nearly 5,000 are in the first row of houses next to the highway. The first-row residences are the most impacted and most likely to benefit from highway noise barriers. It was estimated that, using TxDOT reasonable and feasible guidelines, barriers could be built to benefit slightly over 2,000 first-row residences. This would require 39 miles of barriers. Extrapolating this data for Dallas County to the largest metropolitan counties statewide and subtracting existing and proposed noise barriers, the estimated preliminary mileage total for potential Type II noise barrier sites is 142 miles. Associated costs would be approximately $1,000,000 per mile for noise barrier construction plus an additional 20-30% per mile for site surveys, noise analyses, public involvement, overhead, and administration.

The experiences of states that have a Type II program have shown that the list of potential projects will exceed the number that can be constructed with available funding for at least 10 years. Therefore, for any Type II program to function, it is essential that a prioritization method be developed and implemented. The standard, objective quantity that is used for prioritization is cost effectiveness. A simple formula was developed that weighs current noise level, level of noise reduction possible, and cost per benefited receiver to arrive at a cost-effectiveness number that can be used to rank order potential projects statewide.

Based on information received from the other states and from the Texas MPOs, a program was developed for administration of a Type II program. The main criteria for the program were that it should be fair, consistent, and uniformly applicable statewide. The program consists of four steps. First, a statewide survey must be conducted to determine the location of candidate noise abatement projects. A comprehensive survey of all highways in Texas could require up to 1 year and 2 man-years of effort. If the work is contracted, costs should be on the order of $200,000. Once collected, the data should need only periodic review and updates. Second, a detailed analysis of each candidate project must be conducted to ensure it meets all FHWA and TxDOT criteria. Third, a quantitative means of prioritizing projects should be used to rank the projects. Fourth, projects are selected for implementation. The status of selected projects should be monitored throughout the construction process and follow-up contacts should be made with neighborhood residents. Currently, the Environmental Affairs Division (ENV) of TxDOT is responsible for the statewide noise abatement program for Type I projects. It is logical that ENV should also assume the overall responsibility for any Type II program.

The information gathered from this study indicates both positive and negative aspects of a statewide Type II program. A Type II program does have a limited benefit for the residents that receive noise reduction. Most residents who are impacted by noise on existing highways will not benefit from a Type II program because construction of noise barriers is not feasible and reasonable, the location is not eligible for federal aid, or because of limited funding. Most states do not have a Type II program and only a few have active programs. A Type II program is not required by federal law or regulation and projects compete for funding with other transportation needs statewide.

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CHAPTER 1. INTRODUCTION

On 18 June 1996, the Texas Transportation Commission (the commission) ordered and authorized funding for a study to explore whether it is practical to develop and carry out a statewide Type II noise abatement program for the Texas Department of Transportation (TxDOT). To complete the actions ordered, a project agreement was entered on 26 March 1997 between TxDOT and the Center for Transportation Research (CTR) at The University of Texas at Austin and the Institute for Research in Sciences and Engineering at The University of Texas at San Antonio. This is the final report for that project.

1.1 REASON FOR INITIATION OF PROJECT

The commission has recognized the importance of environmental mitigation through the adoption of Title 43, Texas Administrative Code, Chapter 2, providing environmental policy, review, and public involvement for transportation projects. In accordance with Federal Highway Administration (FHWA) regulation 23 CFR Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise," TxDOT has developed and implemented a traffic noise analysis and abatement program. This program provides for noise abatement in conjunction with federally or state-funded Type I highway projects. Type I highway projects are federal or federal-aid highway projects that involve (1) construction at a new location, (2) the alteration of an existing highway that substantially changes either horizontal or vertical alignment, or (3) an increase in the number of through-traffic lanes. FHWA regulation 23 CFR Part 772 further indicates that a program for Type II highway projects is not required. Type II highway projects are federal or federal-aid highway projects aimed at noise abatement along existing highways (not in conjunction with a Type I highway construction or improvement project). TxDOT has not developed or implemented a Type II program. FHWA policy and guidance further specifies that Type II noise abatement is not eligible for federal aid unless the state DOT develops a statewide FHWA-approved Type II program. The commission noted that TxDOT has received an increasing number of requests from the public and other interested parties for the implementation of Type II noise abatement for traffic noise impacts along existing highways. The commission also recognized that the development and implementation of an effective, efficient, and equitable statewide Type II noise abatement program would require extensive study and analysis.

1.2 PROJECT OBJECTIVES AND TASKING

The scope of this project involved performing a study and analysis of Type II noise abatement in order to provide sufficient data to TxDOT and the commission to make an informed decision regarding the possible development and implementation of a statewide Type II noise abatement program. Towards this goal, several objectives were developed, including:

(1) an analysis of Type II programs in place at other state highway agencies,

(2) an estimate of the overall magnitude and preliminary cost of a statewide Type II program,

(3) the development of a rating system to quantify and prioritize projects to provide a basis for the decision-making process, and

(4) the development of a method to effectively, efficiently, and equitably administer and carry out a Type II noise abatement program statewide.

It was not the purpose or intent of this project to provide a recommendation or to propose a specific course of action.

1.3 FHWA NOISE ABATEMENT CRITERIA (NAC)

The FHWA has developed noise abatement criteria (NAC) that are used to determine when traffic noise impacts occur. The NAC are based on noise levels associated with interference with speech communication. A traffic noise impact occurs in land use activity areas adjacent to a highway project when associated noise levels approach, equal, or exceed the NAC. Approach is defined as 1 decibel (dBA) below the NAC. For example: A residential area with an NAC of 67 dBA would be impacted by traffic noise at 66 dBA or above.

1.4 FHWA OPTIONS FOR NOISE ABATEMENT

The noise abatement measures that would qualify for federal aid as Type II projects include the following:

(1) Use of 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 land designations)

(2) Alteration of horizontal and vertical alignments

(3) Acquisition of property rights (either in fee or lesser interest) for construction of noise barriers

(4) Construction of noise barriers

(5) Noise insulation of public use or nonprofit institutional structures

Among highway research organizations, there is at this time considerable interest in the development and use of "low noise" highway surfaces to decrease the noise level of traffic. It is clear that noise levels do vary with changes in pavement surfaces and that certain surfaces have been identified as having the most promise for lowering noise. However, additional research is required to determine to what extent a particular pavement can consistently reduce noise levels. Under federal guidelines, pavement types or textures cannot now be considered a noise abatement measure.

Nor can landscaping be considered a noise abatement method. Landscaping is sometimes used for aesthetic purposes along a highway right-of-way between the highway and adjacent residential areas. However, under federal guidelines, landscaping (vegetation) is

not considered to be a noise abatement measure. The planting of trees and shrubs along a highway cannot normally provide significant noise reduction.

In the vast majority of cases, the noise abatement measure used is in fact the construction of noise barriers. These barriers can be made from a variety of materials, though reinforced concrete is most prevalent in Texas. The barriers are placed between the highway (noise source) and the place where people (receivers) are impacted by the noise. In order to provide a substantial noise reduction, the barrier also must be long enough and tall enough to block a sufficient portion of the noise traveling to the receivers. Owing to the physics of sound propagation, a barrier has only limited effectiveness, with the primary noise-reduction benefits extending only to those receivers actually shielded by the barrier.

1.5 RESTRICTIONS/EVALUATION CRITERIA FOR TYPE II NOISE ABATEMENT

The Federal Highway Administration (FHWA) has instituted specific Type II noise abatement criteria that must be met for a Type II project to be approved (i.e., made eligible for federal aid). Any noise abatement project must also meet TxDOT's feasible and reasonable criteria. These FHWA criteria, along with TxDOT's "feasible and reasonable" criteria, are addressed below.

(1) Type II noise abatement measures will be approved only for projects that were approved before November 28, 1995, or are proposed along lands where land development or substantial construction predated the existence of any highway. The granting of a building permit, filing of a plat plan, or similar action must have occurred prior to right-of-way acquisition or construction approval for the original highway.

(2) Type II noise abatement measures will not be approved at locations where such measures were previously determined not to be feasible and reasonable for a Type I project.

(3) Type II noise abatement will not be approved unless the state DOT develops a statewide FHWA-approved Type II program.

(4) A Type II noise abatement program based solely on the selection of specific noise abatement projects at the discretion of metropolitan planning organizations is not considered to be a statewide program and, therefore, would not be approved.

(5) Feasible: Noise abatement is considered to be feasible if it will provide a substantial reduction in noise levels. "Substantial reduction" is defined as a reduction in noise levels of at least 5 dBA at impacted receivers. Feasibility deals primarily with engineering considerations.

(6) Reasonable: Noise abatement is considered to be reasonable if it is cost effective and approved by a majority of adjacent property owners. A feasible noise abatement measure is considered to be cost effective if the total cost will not exceed $25,000 for each benefited receiver. In order for a receiver to be counted

as benefited, noise abatement must reduce the noise level at the receiver by at least 5 dBA.

Additional recommended restrictions:

(7) Future Type I projects: Type II noise abatement should not be provided for areas where Type I highway projects are planned, programmed, or anticipated. This is necessary to avoid situations where Type II noise abatement (noise barriers) would have to be removed to accommodate a future highway improvement project and to prevent Type II barriers from constraining future development.

(8) Compatible land use planning: Type II noise abatement should be provided only for areas where the local government agency responsible for approval of development has demonstrated the control of (or has agreed to control) land use activities adjacent to the highway that encourage noise compatible development.

CHAPTER 2. ANALYSIS OF TYPE II PROGRAMS IN PLACE AT OTHER HIGHWAY AGENCIES

The initial task of this project was to collect and evaluate information on programs other states have implemented for noise abatement on existing highways. This effort was carried out by written questionnaires that were sent to all U.S. state department of transportation (DOT) traffic noise program representatives and by follow-up telephone interviews. A similar study conducted by the Pennsylvania DOT in 1996 was reviewed for information on Type II programs in the U.S., and also for ideas on approaching this study. The PennDOT study served as a guide for designing this study and, in particular, for designing the questionnaires (Ref 3).

It is important to note that, by definition (federal regulation 23 CFR 772), the term *Type II* applies only to proposed *federally funded* projects for noise abatement along an existing highway. Projects for noise abatement along an existing highway that are not federally funded will be referred to by the term *retrofit.*

2.1 SURVEY METHODOLOGY

Two different mail-in questionnaires were sent to each state DOT. One questionnaire was for states that either have implemented or are in the process of implementing a Type II noise abatement program. These states were asked to provide information on (1) the reasons for initiating the programs, (2) the implementation of the program, and (3) the lessons learned in the process. The other questionnaire was designed for states that do not have a formal Type II noise abatement program. These states may have implemented one or more retrofit traffic noise abatement projects without a formal Type II program. These states were asked to provide information on (1) the reasons for not initiating a Type II program, (2) what has been done concerning noise abatement on existing highways, and (3) the lessons learned in the process. Tailoring these questionnaires to the two groups proved helpful as a time-saving feature for the respondents and enabled the questions to be accurately phrased for each group. Multiple-choice answers accompanied most of the questions in order to facilitate response and to obtain consistency in the responses; space for write-in answers was provided for the questions requiring specific information unique to the state programs.

Questionnaires were completed and returned by thirty-nine states, thirty-two of which included copies or excerpts of their guideline documents on traffic noise abatement project procedures and/or programs. Telephone interviews were conducted with both the responding individuals and with representatives of the remaining state DOTs that did not return questionnaires. Either by questionnaire or by telephone interview, information on traffic noise abatement was received from all fifty states. The results were compiled to present a comprehensive database on the use of traffic noise abatement on existing highways throughout the United States.

2.2 STATUS OF STATE RETROFIT NOISE ABATEMENT PROGRAMS

Fifteen of the fifty state DOTs currently have, though with varying levels of activity, Type II noise abatement programs that are approved by the Federal Highway Administration. Seven states that do not have a Type II noise abatement program have constructed one or more retrofit barriers under an informal noise abatement program for existing highways or as special projects. The remaining twenty-eight states do not have a Type II noise abatement program and have not constructed retrofit noise barriers on any existing highways. These results are shown in Table 2.1.

TABLE 2.1. RETROFIT NOISE ABATEMENT ACTIVITY STATUS OF ALL 50 STATES

Retrofit Noise Abatement Program Activity	Number of States
Active Type II programs with over 20 miles of barrier construction and a dedicated budget for retrofit noise abatement projects	3 (CA, CO, MN)
Active Type II programs and a dedicated budget for retrofit noise abatement projects but less than 10 miles of barrier construction	2 (OH, UT)
Previously Active Type II programs but currently suspended or drastically reduced	4 (MD, MI, NJ, WI)
Low or no Type II program activity	6 (CT, IA, MA, MO, OR, WA)
Informal retrofit program or special projects	7 (FL, GA, ID, IN, NV, NY, OK)
No Type II/retrofit noise abatement activity	28 (all remaining states)

2.3 SURVEY SUMMARY

For all states that have a Type II program, the program was initiated by the state DOT or by the state legislature in response to complaints received from private citizens or to inquiries from local elected officials. The state DOTs that are currently active or that plan to resume activities on Type II or retrofit traffic noise abatement projects all have policies that differ from one another in administration or procedures. Specifically:

(1) The program and specific projects may be directed and funded by the state legislature (New York).

(2) The program may be supported by dedicated continuing state-funded budgets (California, Colorado, Minnesota, Ohio, and Utah).

(3) Programs may require (or soon will be modified to require) local government or community funding or cost sharing for retrofit noise barrier construction (New Jersey, Michigan, Maryland, Missouri, Oregon, and Washington).

(4) In one state (Florida), implementation of a noise abatement program has been delayed awaiting reconciliation of differences in a proposed program and existing state law concerning following federal guidance on state highway programs.

States that have implemented the largest number (or miles) of Type II noise barriers include California, Colorado, Minnesota, New Jersey, Michigan, Maryland, and Wisconsin. In these states, the technical aspects of identifying, designing, prioritizing, and implementing Type II projects are managed either by the state DOT central office or by the state DOT district offices.

For the states that have a Type II program, project prioritization is determined by a formula designed to indicate the relative noise abatement and cost-benefit merits of the projects. The top-priority projects are then implemented when funding is available. The prioritization formulas generally place emphasis on the existing noise level relative to 67 dBA as the reference level and the estimated reduction in noise to be provided by the planned noise barrier. Specifically:

(1) Age of the noise impacted residential area (i.e., the occupancy time of the residents relative to initial highway construction date) is taken into account by some states in determining the project priority (California, Colorado, Wisconsin).

(2) Two states incorporate the prevailing and design-year highway traffic volume into their prioritization formulas (Ohio, Wisconsin).

(3) Three states use only the prevailing traffic noise level relative to the 67-dBA reference as the basis for their noise abatement project prioritization (Minnesota, New Jersey, Utah).

(4) Three states include the estimated Type II project cost as part of their prioritization formula (California, Colorado, Wisconsin).

(5) One state, California, has had a policy where, if the local government or noise-impacted residential community for which a Type II noise abatement project is planned provides one-third or more of the project cost, the project is placed at the top of the priority list.

(6) In Utah, the priority rating of each project is reviewed annually and projects that were considered but passed over in the previous year are given an incremental upgrade in priority. However, after being passed over four times, the projects receive no further priority upgrades.

(7) None of the states currently having Type II noise abatement programs employ threshold noise reference levels other than the federally established 67 dBA level in qualifying their retrofit noise abatement projects for eligibility and implementation.

(8) For all states, the estimated project cost must satisfy a state-defined cost per residence limit for the number of residences that benefit from the noise abatement measure. This cost criterion is either a fixed amount for all residences receiving more than a set level of noise reduction or, alternatively, is determined using a specified state-determined cost factor times the estimated reduction in noise level to be gained at each residence (Colorado, Minnesota, Ohio). California is considering a formula-based, cost-effectiveness criterion.

The twenty-eight states that do not have a Type II noise abatement program and have not constructed retrofit noise barriers on any existing highways gave several reasons for their policies. Several states emphasized that, although they do not have a Type II program, they are interested in highway noise abatement and often use Type I traffic noise abatement as part of capacity improvement projects (Georgia, Pennsylvania, Virginia). Those states determined that Type I noise abatement was the best way to mitigate the environmental impact of highway noise. Other states emphasized that capacity improvement projects are the main priority of the state transportation improvement plan and little or no noise barrier construction is undertaken. Typically, these were states that are mainly rural and that have no large metropolitan area. Those states determined that, for the limited highway budget, the public priority is to improve transportation through new or improved highways.

2.4 LESSONS LEARNED FROM THE SURVEY CONTACTS ON STATE TYPE II PROGRAM POLICY AND IMPLEMENTATION

Comments on lessons learned received from many states can provide important information for any state considering implementation of a Type II program. The comments covered a variety of perspectives on Type II programs, giving both positive and negative aspects pertaining to the way Type II noise abatement is treated in their respective state. This information ranged from state policy positions and guidelines concerning a Type II noise abatement program, to specific methods by which Type II programs were implemented. Many states responding to the questionnaire and telephone interviews gave similar comments on these aspects of their programs or policy positions. An overview of lessons learned are discussed below:

(1) The majority of traffic noise concerns originate with highway expansion projects. Therefore, attention is focused on Type I noise abatement programs. Many states have concluded that Type I noise abatement projects are adequate for handling a very large majority of all traffic noise impacts. This is equally true for states with and without Type II programs. For this reason, many states have elected not to establish a Type II program.

(2) States commented that residential developments impacted by traffic noise were constructed after the highway in nearly all cases. In those cases, residents were told that noise abatement was unavailable because the highway was in existence before the residence. Such policy is common among the states, given that many states require their programs to follow federal policy.

(3) Limitations in state funding and DOT resources generally prevent the timely implementation of Type II noise abatement projects. Long lists of prioritized Type II projects are the rule in most states. Long or indefinite delays in implementing programmed projects are in conflict with public expectations. Several DOTs commented that it is best to avoid long public lists of projects if they cannot be completed within a reasonable time.

(4) States have found that Type II noise abatement needs are almost exclusively associated with urban highway conditions and are not uniformly distributed in any state. To justify funding for retrofit noise barriers, some states have local municipal government cost-share. In some cases, the lack of local funds (or the unwillingness to provide local funds) has stalled or severely limited implementation of projects. Several states commented that local government or private cost sharing of Type II noise abatement projects helps to ensure that limited resources are applied to problems of highest priority to that community.

(5) For the few states that have a dedicated Type II program budget, the program has been funded on a steady basis and, consequently, construction can be planned with some level of confidence. This has not eliminated long waiting times for most projects. The source of funds is often based on transportation growth factors, such as gasoline tax revenues (and possibly state-issued truck permits, number of licensed vehicles, etc.).

(6) Maintaining an objective and quantifiable prioritized list helps to eliminate attempts to readjust the order of the list by influential offices. The survey of the state DOTs showed the importance of keeping the prioritization system as impartial as possible. Several states also pointed out that no formula could work best for all cases. Some states have found that a final review of the prioritized list must include an overall evaluation by an impartial panel of respected officials. The panel can change the project priority list, but only for the most compelling reasons.

(7) Equity in Type II noise abatement project prioritization is necessary for credible program management and public acceptance. Numerical formulas are widely used to ensure unbiased noise impact site priority assignments. Formula simplicity is very important for ease of understanding and for acceptance of the prioritization process by the public and by state and local officials. Priorities based either exclusively or primarily on sites that have highest excess noise conditions and that have endured such noise impacts for the longest time periods are the most equitable and most easily explained and justified.

(8) Several states have applied decentralization of certain Type II program functions and responsibilities to district highway offices, local MPOs, or local government agencies to help ensure that allocated resources are applied to traffic noise problems of recognized importance and need.

(9) Many states have found that aesthetic improvements, such as landscaping or privacy fences that block direct line of sight from the residence to the highway, are often accepted by residents in lieu of a noise barrier. For that reason, they do not have a Type II program or they have been able to limit construction under their Type II program.

2.5 CONCLUSIONS FROM LESSONS LEARNED

The possible positive aspects of having a Type II program include the following:

(1) If properly funded, the program provides noise abatement to some impacted residents.

(2) The program provides a positive means to deal with concerns expressed by citizens and legislators.

(3) An objective program provides for equitable decisions regarding construction of noise abatement measures.

The possible negative aspects of having a Type II program include the following:

(1) Even if fully implemented, the program can serve only a limited number of the residents that are impacted by highway noise. Type II noise abatement projects cannot be approved in many impacted areas owing to federal restrictions on eligibility and funding.

(2) The allocated budgets for Type II programs typically are much smaller than those required for timely construction of projects. Residents are often upset with long and sometimes indefinite waiting times.

(3) A Type II program uses funds that could have been used for highway improvement projects.

(4) Residents are often satisfied with, and even prefer, alternatives to noise abatement (e.g., landscaping) that are much less expensive than Type II noise barriers.

(5) A Type II program requires additional personnel, particularly during initial implementation.

(6) Type II construction does not improve highway capacity. Noise barriers benefit only the residents in the immediate vicinity of the barriers. Also, land use of areas protected by Type II noise abatement may change (i.e., become commercial), such that the abatement no longer protects a residential area.

2.6 TEXAS METROPOLITAN PLANNING ORGANIZATION (MPO) INPUT COMMENTS

A questionnaire was sent to the twenty-five Texas MPOs in order to establish their current involvement in traffic noise impact problems and their interest and potential willingness to participate in future Type II noise abatement project prioritization and funding. Responses were received from twelve Texas MPOs; the four MPOs that have the largest metropolitan areas (Dallas-Ft. Worth, San Antonio, Houston-Galveston, and Austin) were contacted by telephone for follow-up questions.

The results include the following:

(1) Overall, most of the MPOs have not become actively involved in traffic noise abatement, either because no complaints were received or because persons submitting traffic noise complaints to MPOs were referred to TxDOT.

(2) In one MPO (Austin), complaints concerning traffic noise led to a noise study along two existing noise-impacted freeways. The MPO has considered a plan to construct noise abatement (noise barriers) along sections of the two highways. The plan calls for federal participation, which cannot take place without an FHWA-approved statewide Type II noise abatement program.

(3) Most MPO regional transportation plans contain a section on "land use related to traffic noise levels," though the section normally does not specifically address noise abatement on existing highways.

(4) Most MPOs would prefer that the state fund any noise abatement projects on existing highways and are not willing to cancel or postpone any current safety or capacity improvement projects to support such projects in their areas.

(5) Most MPOs would prefer that the state DOT manage highway noise abatement projects. However, a few MPOs noted that their citizens have become increasingly concerned with traffic noise; the MPOs indicated that in the future they might become more involved in traffic noise abatement. The one MPO leading in this regard is the Austin MPO, which is willing to dedicate some of its federal-aid money to construct two noise barriers on existing highways.

CHAPTER 3. ESTIMATE OF THE OVERALL MAGNITUDE AND PRELIMINARY COST OF A STATEWIDE TYPE II PROGRAM

Estimating the overall magnitude of a statewide Type II program can be divided into three main steps: (1) determining the locations throughout the state that are likely to be impacted by noise; (2) determining which of the impacted and eligible locations could possibly receive a substantial noise reduction, at a reasonable cost, from the construction of a noise barrier; and (3) determining which of the impacted locations meet the FHWA eligibility criteria for Type II projects. Estimates for steps (1) and (2) were completed in this study. Step (3), which requires research into state and county records for each individual location, is beyond the scope of this project.

Using geographical information system (GIS) technology, combined with aerial photography and historical data on barrier construction, it is possible to develop estimates for steps (1) and (2). GIS technology allows information/attributes of specific geographical places or objects, such as a section of a highway, to be used in noise-level calculations. The resulting noise levels can then be visually displayed.

For this study, a GIS analysis was performed for Dallas County. Traffic data and mileage on all state maintained roads were used for the study. Using the estimated magnitude of the noise impact in Dallas County calculated in the GIS analysis, estimates of the noise impact for the other large metropolitan areas could be made. The estimates for the other counties are based on the assumption that the noise impact in Dallas County per roadway mile is representative of the noise impact per roadway mile in other metropolitan counties.

3.1 GIS DEVELOPMENT

The GIS approach was used to display digital ortho-photography with highway data superimposed and aligned with the photography. The photographic display showed images of the area with 0.5-m resolution, which is sufficiently detailed to identify land use of residential properties. The 0.5-m resolution digital orthorectified image files were acquired, on loan, from the North Texas GIS Consortium. A database was created using TxDOT-provided Texas Reference Marker (TRM) data for the entire state (71,147 records), which contained specific information for each section of highway, including, for example, location, functional classification of the highway, average annual daily traffic for both autos and trucks, and vehicle speed. This information was the most recent data in computer database format and was estimated to be from 1994 or 1995. The total miles of state-maintained roadways by functional classification was summed for Bexar, Collin, Dallas, Denton, El Paso, Ft. Bend, Galveston, Harris, Tarrant, and Travis counties. TxDOT provided the Dallas County reference marker MicroStation design files and the project export file for the Intergraph Modular GIS Environment (MGE) for Dallas County. Considerable effort was required to adjust this information to conform to GIS standards. The MGE software was used to dynamically segment the state-maintained roadways in Dallas County to display the noise data.

Additional fields needed for calculation and display of the noise-level contours were added to the database. Noise levels were calculated using FHWA-approved equations, which consider the type, frequency, and speed of the vehicles on the highway (Ref 4). Noise level contours superimposed on the photographs clearly revealed which residences were located within the noise-impacted area. Noise level contours for 66 and 75 dBA are shown in Figure 3.1. These levels were used because 66 dBA is the lowest noise level considered by TxDOT to be an impact for residential areas, while 75 dBA was chosen to represent a severe impact. From the example picture in Figure 3.1, the wide, black, solid lines on the left and right sides of the photo are the 66 dBA contour lines. The entire area between the lines is impacted by highway noise at 66 dB or higher. The figure gives a good example of the level of detail visible in the GIS analysis and the information available for determining possible noise barrier locations.

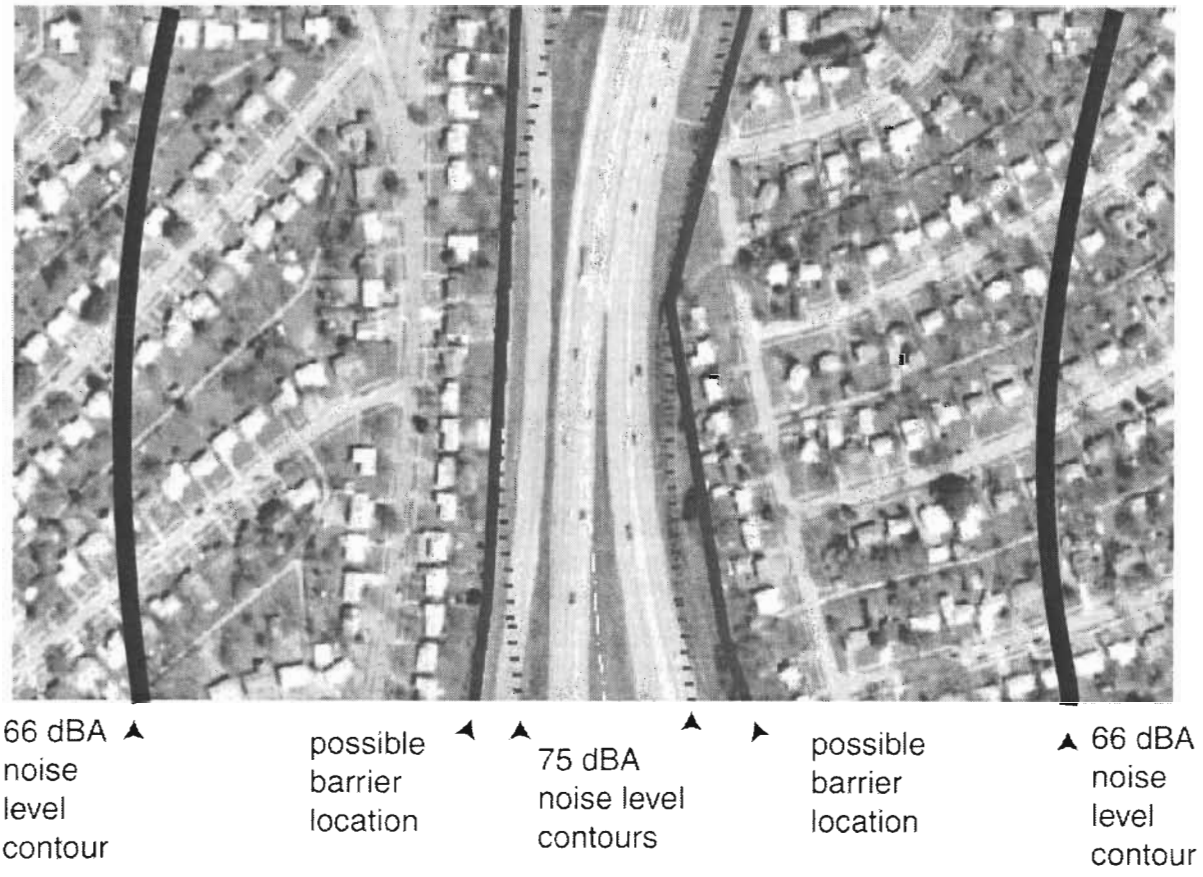

Figure 3.1. Digital orthographic picture with GIS attributes shown. Attributes include 66 and 75dBA contour lines.

3.2 ASSESSMENT FOR DALLAS COUNTY

For all state-maintained roadways in Dallas County, the residences and first-row residences inside the 66-dBA contour were summed. First-row residences are the residences that are alongside the highway and have no intervening buildings. The number of first-row residences is differentiated from the total number of residences inside the 66-dBA contour, since they are most affected by the highway noise and also since they are the residences that can potentially benefit the most from a noise barrier. The number of residences in both the total and first row categories is divided by the total length of urban principal arterial roadways in Dallas County to give a residence per mile number. Thus, for Dallas County, the average number of noise-impacted residences per roadway mile is 52.9. The average number of noise-impacted residences that are in the first row near the roadway per roadway mile is 11.6. These figures reflect the fact that highway noise barriers are more likely to be a reasonable form of noise mitigation in a relatively densely populated area. This number was used to extrapolate the Dallas County data to nine other metropolitan counties in Texas. The results are shown in Table 3.1.

TABLE 3.1 ESTIMATED NUMBER OF RESIDENCES INSIDE THE 66-dBA CONTOUR IN DALLAS COUNTY

Classification	Residences (Res)	Roadway miles (RM)	Res/RM
Total impacted residences	21,911	414.3	52.9
First row residences	4,795	414.3	11.6

Using the aerial photography displayed on a workstation monitor, each section of state-maintained roadway in Dallas County was visually inspected to determine if a Type II noise barrier was potentially feasible and reasonable. The two most common reasons a barrier was determined to be not feasible were (1) the inability to maintain a continuous barrier owing to access roads, and (2) the location of the impacted residences was too far from the right-of-way to receive the required benefit. Reasonableness was determined by the length of barrier required for each benefited receiver. If over 39.6 m (130 feet) of barrier were required for each benefited receiver, the barrier was determined to not meet the reasonableness criterion. There were only three functional roadway classifications in Dallas County where noise barriers were potentially feasible and reasonable. The noise barriers were summed by length for each functional classification and then divided by the total roadway mileage in Dallas County for the functional classification, giving the number for barrier miles per roadway miles shown in Table 3.2.

TABLE 3.2. ESTIMATED POTENTIAL NOISE BARRIER MILES IN DALLAS COUNTY

Functional Classification	Barrier Miles (BM)	Roadway Miles (RM)	BM/RM
Urban Principal Arterial (interstate)	19.4	150.8	0.128
Urban Principal Arterial (other freeway)	5.0	88.6	0.057
Urban Principal Arterial (other)	15.1	175.0	0.086
All Urban Principal Arterial	39.5		

To estimate the number of impacted residences that could benefit from the installation of a noise barrier, the number of first-row residences that are behind the potential barrier locations was determined by manually counting residences in the orthographic display. The total came to 2,243 benefited residences in the first row next to the barriers, as shown in Table 3.4. Divide 2,243 by 39.5 (the total number of potential barrier miles on all urban principal arterial roads in Dallas County) to obtain 56.8, the number of benefited first-row residences per barrier mile. That number was used to estimate the number of benefited residences in the other metropolitan counties.

3.3 EXTRAPOLATION TO LARGE METROPOLITAN AREAS IN TEXAS

The number of impacted residences and the length of noise barriers warranted in the other metropolitan counties were estimated from the Dallas County data. The number of impacted residences per roadway mile number (52.9) was multiplied by the total roadway miles in Bexar, Collin, Denton, El Paso, Ft. Bend, Galveston, Harris, Tarrant, and Travis counties, giving the estimate of impacted residences shown in Table 3.3 below. Using the number of impacted first-row residences per roadway mile number (11.6), the same was done to estimate impacted first-row residences in the other counties.

The barrier miles per roadway mile numbers from Table 3.2 were multiplied by the respective type of roadway miles in Bexar, Collin, Denton, El Paso, Ft. Bend, Galveston, Harris, Tarrant, and Travis counties, giving the estimate of potential barrier miles shown in Table 3.4.

The estimated preliminary mileage total for potential Type II barrier sites in the large metropolitan counties of Texas is 200 miles. Excluding the 58 miles of existing and proposed Type I noise barriers, statewide, the estimate is reduced to 142 miles. Based on the average length of completed Type I noise barrier projects in Texas (2,000 feet), this could equate to more than 300 potential Type II noise barrier projects. There are several other counties that have smaller metropolitan areas or border the ten largest metropolitan counties that have potential for noise barriers that were not analyzed. For example, the only noise barrier constructed in the San Antonio District is in Guadalupe County. However, based on our survey of the other states and on the barrier construction history of Texas, the percentage of potential Type II barrier sites outside the metropolitan counties included in this study would be relatively small. Considering all the other uncertainties involved in the estimates, the calculated total barrier miles need not be adjusted for the possibility of those barrier sites.

TABLE 3.3. ESTIMATION OF IMPACTED RESIDENCES IN TEXAS

	Bexar	Collin	Dallas	Denton	El Paso	Ft. Bend	Galveston	Harris	Tarrant	Travis	Total
Total Roadway Miles (Urban Principal Arterial)	331.5	65.3	414.3	76.2	114.1	60.0	121.6	438.0	398.0	173.9	2,004
Total Impacted Residences (Roadway miles x 52.9)	17,536	3,454	21,911*	4,031	6,634	3,174	6,433	23,170	21,054	9,199	116,594
Total Impacted First - Row Residences (Roadway miles x 11.6)	3,845	754	4,795*	884	1,455	696	1,411	5,081	4,616	2,017	25,564

*Actual count

TABLE 3.4. ESTIMATE OF POSSIBLE BARRIER MILES AND POTENTIALLY BENEFITED RESIDENCES

	Bexar	Collin	Dallas	Denton	El Paso	Ft. Bend	Harris	Galveston	Tarrant	Travis	Total
Miles of Urban Principal Arterial (interstate)	132.7	0	150.8	33.5	29.7	1.3	121.4	21.3	122.2	27.6	
Barrier miles (0.128 BM/RM)	17.0	0	19.4	4.4	3.8	0.2	15.6	2.7	15.7	3.5	82.27
Miles of Urban Principal Arterial (other freeway)	75.6	31.6	88.6	3.3	21.7	19.5	168.6	27.0	76.1	67	
Barrier miles (0.057 BM/RM)	4.3	1.8	5.0	0.2	1.2	1.1	9.6	1.5	4.3	3.8	32.9
Miles of Urban Principal Arterial (other)	123.2	33.7	175	39.4	74.6	39.2	147.8	73.3	199.3	79.4	
Barrier miles (0.086 BM/RM	10.6	2.9	15.1	3.4	6.4	3.4	12.7	6.3	17.2	6.8	84.8
Barrier miles on All Arterial	31.9	4.7	39.5	7.9	11.4	4.7	37.9	10.5	37.2	14.2	199.9
Residences potentially benefited (Barrier miles x 56.8)	1,812	267	2,243*	449	648	267	2,153	596	2,113	807	11,355**

*Actual count

**Reduced to 8,061 when taking into account existing and proposed noise barriers (58 miles)

Also, the potential Type II barrier sites have not been evaluated with respect to the prior-existence criteria for qualifying for federal aid. Determining if the location qualifies for federal aid will require a site-specific investigation of county and highway records.

Estimates of barrier construction costs in Texas are $1 million per mile of barrier for standard construction. It is estimated that the total cost of implementing a statewide Type II program would include an additional 20-30% for each barrier mile because of associated statewide costs for site surveys, detailed noise analyses, public involvement, overhead, and administration (additional full-time employees).

CHAPTER 4. RATING/PRIORITIZATION SYSTEM

Type I highway noise abatement projects are evaluated against standard set criteria as part of a particular highway improvement project. Type II projects, on the other hand, are stand-alone projects that are selected from the pool of eligible project locations. As shown in the previous section, it must be anticipated that the list of potential projects will exceed the number that can be built with available funding. In fact, the Type II programs of other states have shown that the list of potential projects will exceed the number that can be constructed with available funding for at least 10 years. Therefore, for any Type II program to function, it is essential that a prioritization method be developed and implemented. Selection and prioritization of projects, based on objective criteria (as against number of complaints, status of people making the complaints, or undue political pressure), are essential for securing federal funding. The prioritization method is at the heart of a Type II program that is fair, consistent, and uniform statewide.

It is important to note that, unlike most highway projects that provide improvements that benefit the overall transportation system and, consequently, a large number of people, a noise abatement project has no affect on the overall transportation system and benefits only a limited number of people. That is, the benefit is the improvement of the environment by minimizing noise levels, not an improvement in transportation capacity. The goal of the prioritization scheme is to determine a cost-effectiveness value for a noise abatement project. This type of rating system could allow for comparison between noise abatement projects and other environmental improvement projects, and possibly even between noise abatement projects and highway improvement projects.

The standard, objective quantity that is used for prioritization is cost effectiveness. In this case, cost effectiveness can be expressed as a number, hereafter called the *cost-effectiveness factor*. The noise benefit per receiver should take into consideration the severity of the noise and the amount of reduction achieved by the project. As a step toward a simple, easily understandable, and intuitive formula for quantitative ranking of Type II noise abatement projects, the following formula is proposed:

Cost-effectiveness factor = $\boldsymbol{B}$ /cost

$$B = L_{eq\_\Delta} \cdot \left(L_{eq\_P} - 60\right) \cdot V_R$$

where:

B = noise abatement benefit / receiver,

cost = cost of project / number of benefited receivers,

L_{eq_Δ} = noise reduction achieved (average),

L_{eq_P} = present noise level, and

V_R = dollar value of relief / receiver.

The dollar value of relief (V_R) is proposed to be $833. This would give a cost-effectiveness factor of 1 for a noise abatement project that has a present noise level of 66 dBA (the lowest noise level considered an impact), will achieve 5 dBA of noise reduction (the lowest level considered feasible), and will cost $25,000 per benefited receiver (the highest allowable cost considered reasonable). The noise reduction achieved (L_{eq_Δ}) must be at least 5 dBA for the project to be acceptable. Consideration should be given to using 5 in the formula, even if the noise reduction achieved is greater. Setting L_{eq_Δ} to 5 will encourage keeping the barrier cost to a minimum. The dollar value of relief can be adjusted to raise or lower the cost-effectiveness number of Type II projects if they are to be compared with other types of projects. Once an acceptable value is determined, straightforward quantitative comparisons can be made. This should aid TxDOT and the commission in deciding which, if any, Type II projects should be approved.

For clarification it may help to look at two hypothetical, competing projects.

Project A:	present noise level	70 dBA
	noise reduction achieved	6 dBA
	cost / benefited receiver	$23,000
	cost-effectiveness factor	2.17
Project B:	present noise level	68 dBA
	noise reduction achieved	5 dBA
	cost / benefited receiver	$18,000
	cost-effectiveness factor	1.85

Of the two cases, Project A has a higher cost-effectiveness factor and would be placed higher on the prioritized list. Even though Project A costs more per benefited receiver, because of the higher present noise level and the higher noise reduction achievable, Project A has higher cost effectiveness. However, if a maximum of 5 dBA is used for noise reduction achieved, then Project A would have a cost-effectiveness factor of 1.81, or slightly less than Project B. In that case, because of the significantly lower cost of Project B, it would have a higher cost-effectiveness factor and would be placed higher on the prioritized list. Either way, once a set formula is established, prioritizing projects should be reasonably straightforward.

CHAPTER 5. ADMINISTRATION

The following method for implementing a Type II program is based primarily on an assessment of the information received from the other states regarding their experience with Type II noise abatement. In addition, since the MPOs in Texas, especially the MPOs for the larger metropolitan areas, would be affected by the implementation of a Type II program, information was also obtained on their involvement in noise abatement and their input on program design and implementation.

The goal was to develop a program that was fair, consistent, and uniformly applicable statewide. The proposed statewide Type II noise abatement project selection process consists of the four steps shown in Figure 5.1. First, a statewide survey must be conducted to determine the location of candidate noise abatement projects. Second, a detailed analysis of each candidate project must be conducted to ensure it meets all FHWA and TxDOT criteria. Third, a quantitative means of prioritizing projects should be used to rank the projects. Fourth, projects are selected for implementation. Currently, the Environmental Affairs Division (ENV) of TxDOT is responsible for the statewide noise abatement program for Type I projects. It is both logical and prudent that ENV should also assume the overall operation of any Type II program.

5.1 STEP 1: STATEWIDE SURVEY

The initial step in project identification should be a state-directed survey of the entire state highway system to identify locations where the most severe noise levels exist. The noise level where an impact occurs in a residential area is 66 dBA. For this screening a higher noise level should be used in order to identify the most severe impact areas. The preliminary survey of Dallas County has shown that at 50 meters outside the highway right-of-way, noise levels usually exceed 66 dBA but seldom exceed 75 dBA. A distance of 50 meters was chosen to include the first row of residential receivers. Therefore, a reasonable noise level for the initial screening could be 72 dBA at the residence location. Data should be collected only at locations having a lower minimum noise level if additional candidate projects are warranted. In addition, information should be sought from the TxDOT districts concerning their knowledge of noise-impacted locations in their areas. The districts that contain a metropolitan planning area could also seek assistance from the respective MPO. The information gathered by the district office can be compared with the survey data. The use of both sources for the noise-impacted location should help reduce the risk of overlooking any significant noise-impacted location.

A comprehensive survey of all highways in Texas would require more than 2 man-years of effort. If the work is contracted, costs could exceed $200,000. Once collected, the data should need only periodic review and updates. Every effort, therefore, should be made to preserve the survey data and to incorporate them into the highway database maintained by TxDOT.

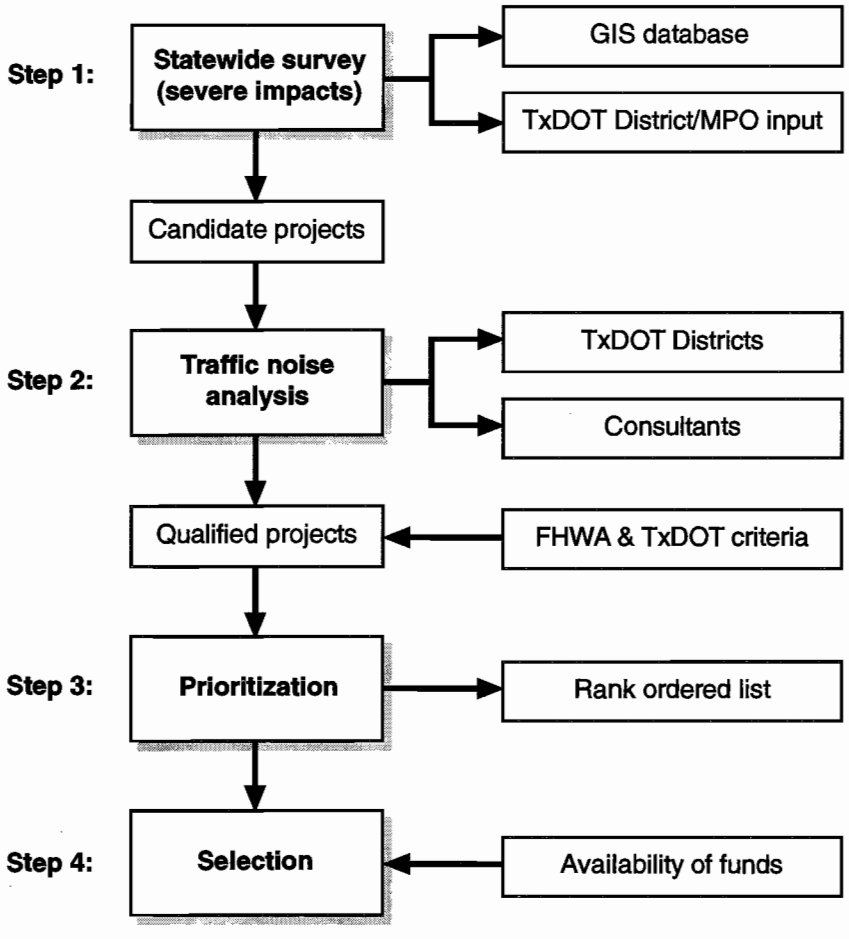

Figure 5.1. Statewide Type II noise abatement program project selection process.

The magnitude of the highway noise impact survey completed as part of this study was such as to represent a good start on the identification of potential barrier locations in Dallas County. As noted earlier, actual potential barrier locations were identified in Dallas County, and estimates of the barrier mileage in other major cities were made. The initial part of the comprehensive survey of all highways in Texas should be undertaken at the state level, by a research or consulting team, and could utilize the GIS technology developed for this study. Similar GIS databases for other Texas metropolitan areas could be developed based on the Dallas model. The technology allows displaying noise level contours at user-specified levels. Thus, as suggested earlier, 72 dBA contours can be displayed and potential barrier locations inside those contours could be identified. From these databases, all potential barrier locations in metropolitan areas could be identified. Any potential barrier locations outside these areas would be identified through the district's knowledge of traffic in its area of responsibility. The districts would then perform a preliminary review of the potential barrier locations to eliminate any locations that would obviously not meet federal restrictions or TxDOT criteria. Districts should take advantage of information available from the applicable

MPO, in particular on determination of when the residential area was established in relation to the highway. Locations that initially appear likely to meet the feasible and reasonable criteria will be retained for further consideration.

5.2 STEP 2: TRAFFIC NOISE ANALYSIS OF POTENTIAL PROJECTS

At this stage, the districts or consultants would perform comprehensive analyses of all candidate locations, with emphasis on existing noise levels and noise barrier evaluation criteria. The results of each analysis would be provided to ENV.

5.3 STEP 3: PROJECT PRIORITIZATION

All statewide candidate projects would be prioritized by ENV according to the prioritization formula described in Chapter 4. Once the projects are prioritized, subjective adjustments and/or outside influences should be avoided to preserve the objectivity of the process.

5.4 STEP 4: PROJECT SELECTION

At this stage TxDOT should compare the prioritized list with the expected available funding. Based on the experience of all the other states that have a Type II program, it is advisable that the list of selected projects within the expected budget be kept no more than a few years. The estimate of available funds per year for Type II projects, especially during the first few years of the program, should be conservative. For example, an estimate of no more than $2 million per year is reasonable for a start-up program. That level of funding should allow for the construction of approximately 10,000 linear feet of noise barriers, or two to ten projects, depending on the size of the barriers in the projects.

5.5 PROJECT REVIEW

Once project selection is completed, the list should be updated with each project status. As construction proceeds on Type II projects, ENV will maintain the list of projects along with their current status. Periodic review of potential projects and their priority should also be performed. Since Type II projects deal with older neighborhoods and existing highways, new Type II project sites would appear only after the initial survey if the site had been previously overlooked. It is expected that such cases would be brought to the attention of TxDOT through citizens or their local representatives' inquiries. Another reason for periodic project review is the possibility that the makeup of the neighborhoods of prioritized projects could change. For example, the predominate function of a site may change from residential to commercial. In such a case, Type II action may no longer be appropriate or even desired by the effected property owners. ENV will maintain the prioritized lists with current project status, perform project reviews as appropriate and, to a reasonable extent, keep the affected residents informed of project status. This additional workload may require an increase in full-time employees within ENV.

CHAPTER 6. IMPLIMENTATION TASKS AND CONSIDERATIONS

This report has defined a Type II noise abatement program and has described the FHWA regulations governing such a program. The status of Type II programs in other states was summarized, identifying at the same time reasons why states have or have not elected to initiate and sustain a Type II program. A survey and analysis of the largest metropolitan counties in Texas was conducted to obtain an estimate of the magnitude of the traffic-noise-impacted areas in the state. Existing FHWA and TxDOT guidelines identifying when a noise barrier project is reasonable and feasible were applied to impacted areas in Dallas County to estimate benefited receivers. The results of that analysis were extrapolated to the largest metropolitan counties in Texas to arrive at a preliminary estimate of the total magnitude of potential Type II projects. An objective method to prioritize Type II projects was proposed. Finally, a brief description of the administration of a Type II program was given.

This information is intended to assist those involved in deciding if TxDOT should have a Type II program. Towards that goal, the required tasks and factors to consider are briefly restated below.

6.1 REQUIRED TASKS IF TYPE II PROGRAM IS INITIATED

(1) The TxDOT noise abatement policy and guidelines must be changed to include Type II noise abatement projects. The change should detail what Type II project prioritization system will be used. The change must be consistent with all applicable FHWA regulations and guidelines and be approved by the FHWA to use federal funding for projects.

(2) The Type II project selection process must be completed. This process could take 2-3 years to complete.

(3) A source and amount of funds must be identified for the administration of a Type II program and construction and maintenance of associated noise barriers.

(4) TxDOT may need to augment personnel in the districts and ENV with additional full-time employees to cover the addition workload associated with the implementation and administration of a Type II program.

6.2 FACTORS TO CONSIDER

(1) A Type II noise abatement program is not required by federal law or regulation. The majority of states do not have a Type II noise abatement program. Only a few states have active Type II programs.

(2) The federal government provides no additional funding for Type II projects. States must use existing federal funds on Type II projects. Therefore, Type II projects must compete for funding with other transportation needs statewide.

(3) Noise barriers constructed under Type II projects benefit only those people in the immediate vicinity of the barrier who receive some substantial noise level reduction.

(4) A formal administrative infrastructure is required to ensure consistent, fair, and uniform application of a statewide program. Staffing requirements will remain indefinitely for proper update and maintenance of the program.

(5) Even if actively implemented, the program will produce only a limited amount of noise abatement for a limited number of impacted residents.

(6) In many cases, even if a noise barrier represents the only technically effective way to reduce traffic noise levels at residential locations, such alternatives as landscaping may be less expensive and more effective in improving relations between TxDOT and impacted residents.

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