

1. Report No. TX-99/3904-2		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle A METHODOLOGY FOR DETERMINING ECONOMIC IMPACTS OF RAISED MEDIANS: DATA COLLECTION FOR ADDITIONAL CASE STUDIES				5. Report Date October 1998	
				6. Performing Organization Code	
7. Author(s) William L. Eisele and William E. Frawley				8. Performing Organization Report No. Report 3904-2	
9. Performing Organization Name and Address Texas Transportation Institute The Texas A&M University System College Station, Texas 77843-3135				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No. Project No. 7-3904	
12. Sponsoring Agency Name and Address Texas Department of Transportation Research and Technology Transfer Office P. O. Box 5080 Austin, Texas 78763-5080				13. Type of Report and Period Covered Research: September 1997 - August 1998	
				14. Sponsoring Agency Code	
15. Supplementary Notes Research performed in cooperation with the Texas Department of Transportation. Research Project Title: Economic Impact of Median Design					
16. Abstract <p>The objective of this four-year research study is to develop and test a methodology to estimate the economic impact of median design. This report summarizes the work performed in the second year. The second year of this study included collecting data from 10 additional case study locations from around the state of Texas. Four of these case studies are located in Houston, two are in Port Arthur, and one each are in McKinney, Longview, Wichita Falls, and Odessa. One of the sites in Port Arthur was selected by the research team where a median was removed and a two-way, left-turn lane (TWLTL) was installed. Each of the other case studies are locations where a raised median has been installed or where one was planned when the data collection was performed.</p> <p>This report discusses each of the sites chosen for the data collection, preliminary observations about the data collection effort, and presents participation rates for each of the sites where either mail-out or personal interviews were performed. In the next year of the research study, these data will be analyzed. In the fourth year of the research effort, additional data collection will be completed to obtain data after the installation of the raised median at the case studies where the pre-construction data was collected.</p>					
17. Key Words Median Design, Economic Impact, Access Management, Raised Median			18. Distribution Statement No restrictions. This document is available to the public through NTIS: National Technical Information Service 5285 Port Royal Road Springfield, Virginia 22161		
19. Security Classif.(of this report) Unclassified		20. Security Classif.(of this page) Unclassified		21. No. of Pages 114	22. Price

**A METHODOLOGY FOR DETERMINING ECONOMIC IMPACTS OF
RAISED MEDIANS: DATA COLLECTION
FOR ADDITIONAL CASE STUDIES**

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**Report 3904-2
Project Number 7-3904
Research Project Title: Economic Impact of Median Design**

**Sponsored by
Texas Department of Transportation**

October 1998

**TEXAS TRANSPORTATION INSTITUTE
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IMPLEMENTATION RECOMMENDATIONS

The Texas Department of Transportation (TxDOT) will be able to implement the results of this project in two ways—as a foundation for additional research studies and in the public planning process. Although this year was used as a data collection year, TxDOT can immediately begin to use some of the results of this research project at public meetings and hearings. At the end of this project, TxDOT will have a thoroughly tested methodology which it can use to collect data relevant to estimating the economic impact of raised medians on adjacent businesses.

TxDOT will be able to implement findings of this research in the near future through communication with concerned parties at public meetings and hearings. These findings stem from the perceptions related by business managers and owners through survey questions and comments. In the first year of the research, these questions revealed many perceptions of business owners concerning economic indicators such as property values, gross sales, or changes in available parking spaces, numbers of employees, or accessibility. Further, many affected individuals expressed some, but not necessarily all, of their concerns at public meetings and hearings early in the construction process. This methodology revealed many of the concerns that business owners and managers have, but had not communicated through previous channels made available by TxDOT. The data collected at the additional case studies identified this year will be analyzed in the next year. With this information, TxDOT will be able to address some concerns early in the project planning, design, and construction phases of the project.

During the past year, the research team continued to refine the methodology on additional case studies. By using the methodology to perform additional case studies, the research team created a larger set of data from various locations. In the third year of the research, the research team and TxDOT will use these data to determine the general patterns of which types and locations (relative to median openings) of businesses are more likely to be impacted by the construction of raised medians. In addition, after the completion of the raised median along Texas Avenue, post-construction data along this corridor will be collected for comparison to pre-construction data to estimate economic impacts along this corridor as well. Ultimately, TxDOT can use the findings of these completed case studies in their planning and design of raised medians.

DISCLAIMER

The contents of this report reflect the views of the authors who are responsible for the opinions, findings, and conclusions presented herein. The contents do not necessarily reflect the official views or policies of the Texas Department of Transportation. This report does not constitute a standard, specification, or regulation.

ACKNOWLEDGMENTS

The research reported herein was performed by the Texas Transportation Institute and sponsored by the Texas Department of Transportation. Mr. Bob Appleton, P.E., of the Texas Department of Transportation's Bryan District, served as the research project director; Mr. Amadeo Saenz, Jr., P.E., of the Pharr District, served as the project coordinator; and Ms. Patricia Crews-Weight, P.E., of the Design Division, served as project advisor.

The authors would like to thank the following individuals from the Texas Department of Transportation for their technical assistance throughout this project:

Mr. Bob Appleton, P.E., Advanced Planning Engineer, Bryan District;
Mr. Phillip Russell, P.E., Director of Transportation Planning and Development, Bryan District;
Mr. Amadeo Saenz, Jr. P.E., District Engineer, Pharr District; and
Ms. Patricia Crews-Weight, P.E., Field Engineer, Design Division.

The authors would also like to thank the following individuals from chambers of commerce and neighborhood/business groups that provided support of the survey administration and the research along the case study corridors in the second year of the study:

Ms. Verna Rutherford, Port Arthur Chamber of Commerce;
Mr. Clark Martinson, Spring Branch Revitalization Association;
Mr. Rick Parsons, Anderson Road Civic Club;
Mr. Leiv Platou, Westbury Area Improvement Corporation;
Mr. Sid Allen, Longview Partnership;
Mr. Ron Mertens, Wichita Falls Board of Commerce and Industry;
Dr. John Martinez, Midwestern State University;
Mr. Mike George, Odessa Chamber of Commerce; and
Ms. Carolyn Tripp, Odessa Chamber of Commerce.

The authors would also like to thank Marie Wildenthal of the Texas Transportation Institute for her professional insight. In addition, the authors would like to thank the following individuals:

Mr. Scott Cothron: interviews;
Mr. Chris Foster: data collection and interview scheduling;
Ms. Michelle Frawley: data collection;
Ms. Jolene Piel: data collection;
Ms. Pam Sullivan: interview scheduling;
Ms. Angie Sjolander: literature review; and
Ms. Carol Waddell: interview scheduling.

TABLE OF CONTENTS

	Page
LIST OF FIGURES	xi
LIST OF TABLES	xii
SUMMARY	xiii
1.0 INTRODUCTION	1
1.1 BACKGROUND	1
1.2 PROJECT OBJECTIVES	2
1.3 RESEARCH METHODOLOGY	3
2.0 RELATED RESEARCH WORK	9
2.1 BACKGROUND	9
2.2 ACCESS MANAGEMENT	10
2.3 SAFETY AND OPERATIONAL IMPACTS OF MEDIANS	11
2.4 EVALUATING ECONOMIC IMPACTS OF LEFT-TURN RESTRICTIONS	15
2.5 SUMMARY	19
3.0 SURVEY AND METHODOLOGY REFINEMENTS	21
3.1 BACKGROUND	21
3.2 SURVEY REFINEMENTS SINCE YEAR ONE OF THE STUDY	21
3.3 METHODOLOGY REFINEMENTS SINCE YEAR ONE OF THE STUDY	25
4.0 CASE STUDIES	29
4.1 BACKGROUND	29
4.2 SITE INVESTIGATIONS	29
4.3 CASE STUDY DESCRIPTIONS	31
4.4 ADDITIONAL SITES OF INTEREST	58
5.0 RESEARCH STUDY SUPPORT	67
5.1 BACKGROUND	67
5.2 AGENCIES AND GROUPS INVOLVED	67
6.0 DATA COLLECTION	69
6.1 BACKGROUND	69
6.2 BUSINESS INFORMATION AND PERCEPTIONS (INTERVIEWS AND MAIL-OUT SURVEYS)	69
6.3 ADDITIONAL DATA COLLECTION	69

TABLE OF CONTENTS (continued)

	Page
7.0 DISCUSSION	71
7.1 BACKGROUND	71
7.2 OBSERVATIONS AND FINDINGS	71
7.3 PROJECT STATUS	75
8.0 REFERENCES	77
APPENDIX A—SAMPLE PERSONAL INTERVIEW BUSINESS IMPACT SURVEY	79
APPENDIX B—SAMPLE PERSONAL INTERVIEW UNDEVELOPED LAND SURVEY	87
APPENDIX C—SAMPLE RESEARCH SUPPORT LETTERS	95

LIST OF FIGURES

Figure	Title	Page
1.	Southbound South Post Oak Road at the Northern End of the Project Limit	33
2.	Southbound South Post Oak Road Illustrating Channelized Median	34
3.	Southbound South Post Oak Road with Strip Development and Median Landscaping	34
4.	Back-to-Back Channelized Median Openings Along South Post Oak Road	35
5.	Eastbound Clay Road at Hollister Road	36
6.	Westbound Clay Road at Hollister Road	37
7.	Typical Median Landscaping Along Clay Road	37
8.	Median Design at the Intersection of Clay Road and Gessner Road	38
9.	Eastbound West Fuqua Road at Hiram Clarke Road	39
10.	White Heather Road Intersection Median Treatment	40
11.	Eastbound West Fuqua Road at Buffalo Speedway	40
12.	Westbound Long Point Road at Hollister Road	42
13.	Eastbound Long Point Road Midway Along Study Corridor	42
14.	Eastbound Long Point Road at Campbell Road	43
15.	Southbound Twin Cities Highway North of Texas 73	44
16.	Southbound Twin Cities Highway at 33 rd Street	45
17.	Southbound 9 th Avenue at Texas 365	46
18.	Southbound 9 th Avenue at Turtle Creek Road	47
19.	Westbound University Drive Near Church Street	48
20.	Eastbound University Drive Near West Street	49
21.	Westbound University Drive Near Graves Street	49
22.	Westbound Loop 281 Near Judson Road	51
23.	Westbound Loop 281 Between Judson Road and Tuttle Road	51
24.	Facing South on Loop 281 West of Tuttle Road	52
25.	Westbound Call Field Road at Kemp Boulevard	54
26.	Westbound Call Field Road Between Faith Road and Rhea Road	54
27.	Westbound Call Field Road at Rhea Road	55
28.	Northbound Faith Road Near Call Field Road	55
29.	Northbound Grant Avenue at 4 th Street	57
30.	A Typical Parallel Parking Configuration Along Grant Avenue	57
31.	Westbound 71 st Street at Memorial Drive	60
32.	Westbound 71 st Street at 69 th Avenue	60
33.	Westbound 71 st Street West of Harvard Avenue	61
34.	Northbound Yale Avenue North of 71 st Street	62
35.	Northbound Georgia Street North of 34 th Street	63
36.	Westbound 34 th Street Just East of Coulter Street	64
37.	Westbound Plains Boulevard at Bell Street	64

LIST OF TABLES

Table	Title	Page
1.	Changes in Methodology From Year One to Year Two	26
2.	Case Study Locations	32
3.	Additional Sites of Interest	59
4.	Participation Rates for Mail-Out Surveys	72
5.	Participation Rates for Personal Interviews	73

SUMMARY

In recent years, transportation agencies have increased construction of raised medians on urban and suburban arterials. In addition to their use for access control, raised medians provide improved traffic operations and safety for a facility by separating opposing traffic flows and removing left-turning vehicles from the through lanes. With respect to access control, raised medians restrict left turns to midblock and intersection median openings. While improving the operations and arterial signal coordination, the economic impacts of restricting these left turns may be felt by owners of businesses and properties adjacent to the arterial. Extensive research has investigated and quantified the costs and benefits of constructing raised medians with respect to initial costs and benefits to motorists in terms of reduced delay and increased safety. Prior to this research effort, however, limited research has been conducted to aid estimating the economic impacts of raised medians on sales and property values for adjacent businesses and undeveloped land.

Many state and local transportation agencies, including the Texas Department of Transportation (TxDOT), have recognized the need to provide answers to the public regarding the pre-, during-, and post-construction impacts of installing raised medians. While the use of raised medians is increasing in urban areas, transportation agencies and the public are interested in learning more about the economic impacts of these projects on businesses and properties. Therefore, TxDOT desires a methodology with which to determine if there are any impacts, positive or negative, on businesses and properties. With such a methodology, TxDOT will be better equipped to estimate the economic impacts that a raised median may have on adjacent businesses and properties. After estimating what, if any, impacts may be expected, TxDOT can provide this information at public meetings and hearings, as well as to keep them informed of anticipated changes.

The objective of this four-year research effort is to develop and test a methodology to estimate the economic impact of median design. In the first year of this study, a methodology was developed and tested on one case study location in College Station, Texas. Data were collected before and during construction along this corridor where a raised median was being installed. In this year of the study, the research team sought additional case study locations to test the methodology. After investigating several potential case study locations, the research team selected 10 sites in the following cities: McKinney, Longview, Wichita Falls, Odessa, Houston, and Port Arthur. All but

three of these case study locations are on sites where a raised median has been installed. At one of the sites in Port Arthur the raised median was removed and a two-way, left-turn lane (TWLTL) was installed. At two of the case study locations, the raised median had not been installed at the time of data collection (i.e., pre-construction data were collected). The third year of the study will be used to analyze the data collected in the additional case study locations identified in the second year, and the final year of the research effort will be used to collect post-construction data along Texas Avenue and complete all analyses.

DATA COLLECTION OBSERVATIONS

Since the second year of the study included only data collection and no data analysis, only preliminary observations are provided in this report regarding the data collection effort. The research team will analyze these data during the next year of the project. Based upon the data collection effort, the following observations can be made:

- The participation rate was consistently higher for personal interviews than for mail-out surveys;
- The data provided by personal interviews tends to be more thorough and the research team could obtain more valuable anecdotal information;
- Mail-out surveys were a beneficial and cost-effective way of obtaining additional data from other sites since they were not as costly as personal interviews; and
- For either personal interviews or mail-out surveys, the letters of support from either the local chamber of commerce or neighborhood/business group appeared to help in gaining the participation of business owners and/or undeveloped land owners in the survey.

CHANGES TO METHODOLOGY

The methodology for estimating the economic impacts of raised medians presented in last year's research report has been slightly modified for application in the data collection for the second year of the study. Table S-1 summarizes the changes to the original methodology.

Table S-1. Changes in Methodology from Year One to Year Two

Year One Methodology	Year Two Methodology	Comments
<ul style="list-style-type: none"> • Identify a site for evaluating economic impacts. 	<ul style="list-style-type: none"> • Identify sites (cities) with potential corridors. 	<ul style="list-style-type: none"> • Change in description to aid understanding.
<ul style="list-style-type: none"> • Identify corridor characteristics including, but not limited to, abutting land uses, street section, and corridor length. 	<ul style="list-style-type: none"> • Identify corridor characteristics. 	<ul style="list-style-type: none"> • Simplified description for better understanding.
<ul style="list-style-type: none"> • Make contact and develop good working relationships with the local chamber of commerce and appraisal district office. 	<ul style="list-style-type: none"> • Contact information/data sources. 	<ul style="list-style-type: none"> • Description reworded to include all useful sources of data and information including the chamber of commerce, appraisal district office, employment commission, state comptroller, and/or neighborhood/business groups.
<ul style="list-style-type: none"> • Inventory businesses and establishments along the subject corridor. 	<ul style="list-style-type: none"> • Inventory the establishments and identify businesses for study. 	<ul style="list-style-type: none"> • Change in description to aid understanding.
<ul style="list-style-type: none"> • Obtain information about businesses including, contact information, property values, and additional relevant information. 	<ul style="list-style-type: none"> • Obtain business information. 	<ul style="list-style-type: none"> • Meaning unchanged. Simplified description for better understanding.
<ul style="list-style-type: none"> • Prioritize businesses to be surveyed. 	<ul style="list-style-type: none"> • Prioritize businesses to be surveyed. 	<ul style="list-style-type: none"> • Only applied directly to personal surveys. For mail-out surveys, all businesses can be sent a survey since costs are minimal.
<ul style="list-style-type: none"> • Collect data from personal interviews set by appointment. 	<ul style="list-style-type: none"> • Collect data. 	<ul style="list-style-type: none"> • Changed to reflect that data collection may occur with either personal interviews or mail-out surveys.
<ul style="list-style-type: none"> • Analyze and summarize data. 	<ul style="list-style-type: none"> • Analyze data. 	<ul style="list-style-type: none"> • Simplified description for better understanding.

1.0 INTRODUCTION

1.1 BACKGROUND

In recent years, transportation agencies have increased construction of raised medians on urban and suburban arterials. In addition to their use for access control, raised medians provide improved traffic operations and safety for a facility by separating opposing traffic flows and removing left-turning vehicles from the through lanes. With respect to access control, raised medians restrict left turns to midblock and intersection median openings. While improving the operations and arterial signal coordination, the economic impacts of restricting these left-turns may be felt by owners of businesses and properties adjacent to the arterial. Extensive research has investigated and quantified the costs and benefits of constructing raised medians with respect to initial costs and benefits to motorists in terms of reduced delay and increased safety. Prior to this research effort, however, limited research has been conducted to aid in estimating the economic impacts of raised medians on sales and property values for adjacent business and undeveloped land owners.

Many state and local transportation agencies, including the Texas Department of Transportation (TxDOT), have recognized the need to provide answers to the public regarding the pre-, during-, and post-construction impacts of installing raised medians. The use of raised medians is increasing in urban areas. Transportation agencies and the public are interested in learning more about the economic impacts. TxDOT requires a methodology with which to determine if such concerns are warranted. With such a methodology, TxDOT will be better informed of the overall economic impact that a raised median may have on adjacent businesses and properties. After estimating what, if any, impacts may be expected, TxDOT can provide this information to the public to keep them informed of anticipated changes.

1.2 PROJECT OBJECTIVES

The objective of this study is to develop and test a methodology to estimate the economic impact of median design. This is being performed by:

- Identifying prior evaluations and practices in the literature related to the effects of median design, as well as identifying other relevant issues and concerns;
- Developing a methodology for evaluating the economic impacts of median design; and
- Evaluating economic impacts at several locations throughout Texas.

In the first year of this study, a methodology was developed and tested on one case study location in College Station, Texas. Data were collected before and during construction along this corridor where a raised median was being installed. In this year, the second of a four-year study, the research team sought additional case study locations to test the methodology for estimating the economic impacts of median design. The second year of the research effort was used to identify and collect data at these additional case study locations. After investigating several potential case study locations, the research team selected 10 sites in the following cities: McKinney, Longview, Wichita Falls, Odessa, Houston, and Port Arthur. These case study locations are discussed in detail in Chapter Four. The third year of the study will be used to analyze the data collected in the additional case study locations identified in the second year, and the final year of the research effort will be used to collect post-construction data along Texas Avenue and complete all analyses.

Currently, TxDOT does not have a method of estimating the economic impacts that result from the construction of a raised median. Developing such a methodology will allow TxDOT engineers and planners to estimate the potential impacts so that the information can be provided to the public, specifically to business owners. Several TxDOT roadway construction projects currently underway, or in the planning stages, would benefit from such a methodology.

1.3 RESEARCH METHODOLOGY

Through the first and second years of this project, researchers have completed eight major tasks to meet the project objectives. An extensive literature review was conducted to provide information on issues related to the effects of constructing different types of medians. Based upon the literature and by working with the project director (PD), a survey instrument has been developed, revised, and administered to businesses and undeveloped land owners whose business is adjacent to a roadway in which a raised median has been, or is being, constructed. One case study evaluated a location where the raised median was removed and the roadway converted back to a TWLTL. The intent of the survey was to assess the effects before, during, and after construction (or removal) of the raised median and/or widening project. The survey was only one portion of the methodology. It is anticipated that this methodology can be used by TxDOT to evaluate similar impacts. This research report documents the completed tasks. The following sections of this chapter further explain each of the work tasks.

1.3.1 Conduct State-of-the-Practice Literature Review

Numerous research and case studies have evaluated the impacts of different median installations. Many of these studies have addressed the traffic-related impacts, such as the operational and safety issues, related to installing or removing different median types. From an economic impact perspective, there have been several case studies that evaluated the impacts on businesses of installing raised medians. Some of the main factors that these evaluations considered were business sales (if available), sales tax information, property values, land use, employment patterns, and parking availability.

Most of the case studies that addressed economic impacts of median design were site-specific, with the researchers unable to apply results to all situations. Some of the factors that appear to restrict findings to site-specific locations include local traffic conditions, the local economy, and land use characteristics that may change over time. For a review of the previous literature, the reader is encouraged to obtain the research report for the first year of this study (1). Chapter Two of this second-year report describes research completed recently as well as other reports of interest.

1.3.2 Identify Existing Methodologies for Estimating Economic Impacts

Two generally accepted practices for estimating the economic impacts of a raised median installation are a before-and-after evaluation and a post-facto evaluation. In the case of a median installation, the before-and-after technique simply involves collecting the same type of site data before and after the median is installed, with a time allowance to account for the initial effects of pre- and post-construction activity. The post-facto technique is used when the median has already been installed and an economic analysis is desired. The pre-construction data is obtained or reconstructed with available data and by surveying persons knowledgeable about the pre-construction period (e.g., business owners, county appraisal offices, and real estate representatives). The post-construction data is collected in the same manner for the post-facto technique as the before-and-after technique. Again, as previously mentioned, there are common economic indicator data available for analyses, and occasionally, attempts are made to first model this data to predict future economic impacts and then to validate the model with actual field data.

The analysis procedure for both techniques are generally similar, with the only major difference being the data collection process. With the post-facto technique, all available pre-, during-, and post-construction data is collected at one time (post-construction period), while the data for the before-and-after technique is collected at two different times, before and after the construction period. As previously noted, in the first year of this research effort along Texas Avenue, data were collected during construction along one portion of the study corridor and before construction along the remainder of the corridor. In two of the sites selected in the second year of the study, data were collected before construction had begun. These sites were Call Field Road in Wichita Falls and Long

Point Road in Houston. If the construction is completed during the research project time frame, the research team will attempt to collect post-construction data along these corridors in the last year of the study. For the other eight additional case studies identified in the second year of the study, data collection was performed after the construction was completed.

1.3.3 Develop Sample Survey Instruments

It was anticipated that from the task outlined in Section 1.3.2 that existing methodologies from past case studies would include the development of a survey(s) to facilitate the gathering of information from business and land owners affected by a median installation. In the first year of the study, researchers identified several surveying techniques. Three types of surveys were identified from past studies for possible use. The first survey was developed to assess the economic impact on businesses adjacent to the median project. For the case study in the first year along Texas Avenue, the survey questions focused on the real impacts during construction (as compared to pre-construction conditions) and perceived impacts after construction. In addition, the survey ascertained such factors as the number of customers, parking spaces, gross sales, employment patterns, and property values. A revision of this survey was used for data collection at the additional sites surveyed in the second year.

The second survey was developed for assessing the economic impact on undeveloped land adjacent to streets where a raised median will be installed. The survey included several of the same perception-type questions as the one oriented toward business owners including property value changes. This survey was also used in the second year of the study at the additional case study locations. The third survey identified was a survey of customers to determine their perceptions of how the median installation will influence their endorsement of businesses along the corridor after installation of the raised median.

Chapter Three discusses two of the three of these survey instruments (business survey and undeveloped land survey) in detail and in the context of the methodology. Appendix A and Appendix B respectively, present these two survey instruments for personal interviews.

1.3.4 Administer Suggested Surveying Techniques

Participants in the survey included business owners/managers and undeveloped land owners adjacent to the corridors of interest. The research team first conducted a “windshield” survey to determine which businesses and land uses were present along the corridors in which the survey was to be administered. Business information (e.g., address and contact name) for each location was then obtained from the chamber of commerce, appropriate neighborhood/business groups, county appraisal district office, and/or telephone directories. Five of the 10 additional case studies identified in the second year were performed with personal interviews similar to Texas Avenue in the first year of the study. For these sites, the research team contacted all businesses by telephone to determine their interest in participating and arranged an interview at each of the locations to administer the survey. Mail-out surveys were sent to business owners/managers and undeveloped land owners along the other five case study sites (or locations) of interest. For all the sites, a letter of support of the research effort was sent, endorsed by the local chamber of commerce or neighborhood association to encourage them to participate in the survey. Finally, reminder cards were sent to the five case studies where mail-out surveys were administered to encourage individuals to return the surveys.

1.3.5 Analyze Survey Results

In the first year of the study, the research team analyzed the property value data obtained from the Brazos County Appraisal District to develop trends over time. The business survey results were analyzed to determine initial perceptions and indications of economic impacts of the raised median installation. With this survey, the researchers evaluated business owners’ perceptions of changes due to the median installation as well as preliminary estimates of impacts of the construction phase on sales and services. This information is available in the research report for the first year of this study. Preliminary observations about the data collection process are reported in Chapter Seven of this report.

1.3.6 Develop Methodology for Estimating Economic Impacts

In the first year of the study, the researchers developed a methodology for estimating the economic impacts of a median design project. This methodology incorporated the experiences of the research team in administering the methodology on one study location in College Station, Texas. Revisions and discussion of this methodology based upon the additional case studies added in the second year are described in Chapter Three.

1.3.7 Identify Corridors on Which to Test Methodology

After the methodology had been developed and tested on the one case study in College Station, Texas, the research team desired to test it on additional case study locations and obtain economic impact data on several corridors. In this task, the research team identified corridors in Texas cities, as well as other states as appropriate, on which the methodology could be tested. Corridors on which medians had been added at least three to five years in the past were desired as they would likely provide the best opportunities for collecting pre- and post-construction data. As mentioned in section 1.2 above, 10 additional case study locations were added. These include sites in the cities of Houston, Port Arthur, McKinney, Longview, Odessa, and Wichita Falls. These sites are described in detail in Chapter Four.

1.3.8 Collect Data from Selected Corridors

In the second year of the research effort, the research team collected all the data necessary to test the methodology at the 10 additional case study locations. This included surveying the businesses and collecting appraisal data.

1.3.9 Organization of Report

This report is organized into eight chapters, as described below:

- **Chapter One, Introduction:** Provides an introduction to the research topic and presents the research objectives and scope.
- **Chapter Two, Literature Review:** Provides a summary of new research and additional case studies related to the assessment of impacts of installing raised medians. Additional literature of significance can be found in Chapter Two of the research report for the first year of the study as well.
- **Chapter Three, Survey and Methodology Refinements:** Provides a description of the revisions made to the methodology based upon the experiences with the additional case studies surveyed in the second year of the study. It also describes the survey instruments used in the study and explains the survey revisions made on the survey for use in the second year based upon the experiences of the research team in administrating the survey in the first year.
- **Chapter Four, Case Studies:** Provides a detailed description of each of the 10 additional corridors selected for study.
- **Chapter Five, Research Study Support:** Provides additional information about the importance of obtaining research study support from local chambers of commerce, neighborhood groups, appraisal district offices, and other agencies.
- **Chapter Six, Data Collection:** Provides discussion of the different types of data collection that can be used for this type of research effort. It also provides more discussion on how the research team decided to perform personal interviews or mail-out surveys for each case study.
- **Chapter Seven, Discussion:** Provides some preliminary observations that resulted from the data collection effort in the second year of the study. Although the second year of the study was primarily used for data collection and not analysis, there were some observations of interest that might be useful in other studies.
- **Chapter Eight, References:** Provides a listing of the references drawn upon by the research team.

2.0 RELATED RESEARCH WORK

2.1 BACKGROUND

In the first year of this research effort, the objective was specified as “develop and test a recommended methodology to estimate the economic impact of median design” (1). This objective is being further pursued with the addition of case studies in the second year of the study. An extensive literature review was performed to evaluate previous methods for estimating the impacts of raised medians. Through the development and administration of personal interviews, the research team was able to begin to evaluate and assess the perceived economic impacts of the raised median installation along the Texas Avenue corridor. Since the post-construction data is yet to be collected in the fourth year of this study, only preliminary results were presented in the year one report. However, the study did note that the personal interview technique seemed to provide valuable quantitative and qualitative data. Some of these results will be further described in a latter section of this chapter. As discussed in the previous chapter of this report, the subsequent years of this research effort will further develop the methodology and evaluate economic impacts at different locations.

As with any transportation improvement project, considerations of safety, mobility, equity, efficiency, and economic impacts are present with median design projects. Generally, the primary goal of a raised median project is to improve the safety and operational characteristics of a roadway. It is relatively easy to determine these types of affects. However, the economic impacts on adjacent businesses from access restrictions are more difficult to quantify. Previous research has shown that the installation of raised medians with left-turn median restrictions can improve both the safety and operational characteristics of a roadway. Since the publication of the first year report, there has been additional literature published and found in the areas of safety, operational, and economic impacts of raised medians that is relevant to the discussion. This chapter will describe this additional literature. For a review of previous literature of significance, the reader is encouraged to review the first research report for this study.

2.2 ACCESS MANAGEMENT

Access management continues to be an important transportation issue in many jurisdictions in Texas and throughout the United States. Previous research has highlighted the importance to create a uniform method for determining access management policies and an Access Code (2). Such Codes exist in many states including Colorado, Florida, and New Jersey. Reference materials produced by the Center for Urban Transportation Research (CUTR) outline 10 ways that communities can manage roadway access at little or no cost. The 10 methods are as follows (adapted from reference 3):

- Lay the foundation for access management in your local comprehensive plan;
- Restrict the number of driveways per lot;
- Locate driveways away from intersections;
- Connect parking lots and consolidate driveways;
- Provide residential access through neighborhood streets;
- Increase minimum lot frontage on major roads;
- Promote a connected street system;
- Encourage internal access to outparcels;
- Regulate the location, spacing, and design of driveways; and
- Coordinate with the Department of Transportation.

The Transportation Research Board (TRB) Access Management Committee (A1D07) is in the process of developing an access management guide. This guide will be designed for use by transportation planning and engineering professionals at various types of agencies. It should serve as a valuable resource for access management issues. Several subcommittees of transportation professionals and researchers are working to develop specific chapters for the guide. It will include several sections of emphasis that will assist transportation professionals in developing, improving, or implementing access management techniques and programs. Completion of the guide is anticipated in the next three to five years.

The fact that many states are developing access management policies, codes, and guidelines highlights the significance and interest in access management. There are also several Internet web pages becoming available for various states and governmental agencies. The importance of access management is further displayed by the fact that the TRB Access Management Committee is developing guidelines to aid states in creating their access management policies and plans.

2.3 SAFETY AND OPERATIONAL IMPACTS OF MEDIANS

The previous section of this chapter has explored the increased importance of access management. The remainder of this chapter will explain literature describing the impacts of raised medians. This section will describe the safety and operational impacts of medians, while the next section will explain the economic impacts of median design.

2.3.1 Florida

One challenge of transportation improvements, including raised median design, is ensuring increased safety and improved operations. This is demonstrated in many raised median studies. One early study evaluated the use of channelized raised median openings to reduce the number of conflicts to four from 16 (4). Conflicts were reduced since the cross-street vehicles were not allowed to turn left onto the major street. This design was found to work best for locations where the median width was 4.7 m (15.5 ft) wide or less for six-lane roadways. The first site had an overall accident reduction of 29 percent while the second location had an overall accident reduction of 22 percent. A control section was also used in the study and experienced an increase in accidents of 47 percent. An opinion survey was administered to business owners, truck drivers, and customers. It was found that 62 percent of business owners along the first site did not experience a change in profits. Ninety-two percent of truckers felt that the facility was safer after the change to channelization, and 58 percent were in favor of the changes. Fifty-seven percent of customers were in favor of this project although they did feel inconvenienced by the need to make U-turns.

A case study conducted by the Transportation Research Center at the University of Florida at Gainesville evaluated the operational and safety impacts of two basic median alternatives—conventional closely spaced direct left turns (CSDLT) and the U-turn/left-turn design (UTLT) at non-signalized intersections (5). Oakland Park Boulevard was rebuilt to a UTLT median design (previously a CSDLT design). Sunrise Boulevard remained a CSDLT design with improvements in median openings. Impacts on operations, volumes, travel times, delays, speed changes, levels of service, accident rates, and changes in left and U-turns were quantified in the pre- and post-construction time frames. In addition, public opinion surveys were conducted through both the commercial and residential districts along both corridors. As a result of the change from a CSDLT median design to a UTLT median design, Oakland Park Boulevard was observed to operate more smoothly than Sunrise Boulevard with a CSDLT median design. The larger taper and storage lengths on Oakland Park Boulevard made the difference in the way the two roadways operated. A reduction in midblock, left-turn, and rear-end accidents were also attributed to the larger lengths. With Sunrise Boulevard remaining a CSDLT median design, the lengths for deceleration lanes between median openings were inadequate and therefore problems in braking maneuvers were seen on this roadway.

This study also included the opinions of the public before and after the median changes. The survey questioned various interest groups on their feelings about safety problems, provision of left-turn storage bays, and reducing median openings by 50 percent. The different groups surveyed included through travelers, truckers, residents, customers, and merchants. Before any improvements were made, overall 70 percent of the respondents agreed that there was a safety problem, 81 percent were in favor of the left-turn storage bays, 55 percent agreed that median openings needed to be reduced, and 58 percent were in favor of closing medians if that resulted in increasing the speed of the roadway. Once this new median design was implemented, another survey was given to the different interest groups. Through-travelers reported a 75 to 80 percent approval rating of the new design. Truckers were in favor of the revisions; however, 42 percent of truckers had to make adjustments in their route and experienced delays. Overall, residents and customers were in favor of the revision although 63 percent of residents and customers performing a U-turn said they were inconvenienced and this affected their decision of where to visit. Merchants responded 60 percent in favor of the median improvements and overall did not experience loss in profit or customers. The

concluding idea of this report is that limiting access at unsignalized intersections can help to reduce turning volumes, increase speed on major roadways, and improve safety. It is also concluded that these types of improvements increase volumes at signalized intersections which emphasizes the need to improve operations at these intersections.

2.3.2 Georgia

Research in Atlanta, Georgia, has also provided insight into TWLTLs and raised medians. On Memorial Drive, a 6.9 km (4.3 mi) two-way, high-volume, six-lane arterial with a left-turn lane, underwent construction to replace the left-turn lane with a raised median (6). Initially, local government requested that TWLTLs be incorporated into upgrading the roadway systems in Georgia. In 1986 the Georgia Department of Transportation contracted with Georgia Tech to develop design criteria for raised curb-medians and TWLTLs. The study reported, that with a 95 percent confidence, raised medians had fewer accidents per million vehicle miles when compared to TWLTLs. From this study, safety information was considered by a major local government body in greater Atlanta. A policy was adopted soon after these findings that stated all new and reconstructed principal and major thoroughfares should be constructed as raised medians and existing TWLTLs should be replaced with a raised median design. After one year of observation following the completion of the median, an estimated 300 accidents and 150 injuries were prevented. The study concluded that there was a 37 percent decrease in total accidents and a 48 percent reduction in the injury rate. Although the median served the purpose for which it was intended, some businesses were negatively impacted by the limited access. In addition, after the median was installed, several convenience-type stores closed.

2.3.3 Iowa

Recent research in Iowa describes two roadways with virtually no access management that were improved to have raised medians and evaluated on the basis of safety, operational, and business vitality impacts of the medians (7). One project in the city of Ankeny was improved from a two-lane undivided roadway to a four-lane facility with a raised median and limited commercial access

driveways. The second project in the city of Clive was improved from an undivided four-lane urban arterial to a divided arterial with a raised median and a continuous TWLTL at the northern and southern ends of the project. The safety impacts of both projects were shown to be favorable. A decline of 15 to 40 percent of the total annual traffic accidents was found for both locations. Accident rates declined 40 percent for both projects as well. The two types of collisions with the most reduction in rate were right-angle crashes and rear-end crashes.

The median projects also were found to improve operations of the traffic facility by at least one level of service (LOS). The Ankeny project LOS went from a C/D rating before improvements to a LOS B after construction. The Clive project LOS was at a rating of D before the median and was at a B/C level of service after the project was complete.

Overall, surveyed motorists felt that the raised median in both areas improved the safety and operation of the roadways. The improved flow of traffic was noted by the Clive roadway users while improved safety was the main consideration of the Ankeny motorists.

The Ankeny and Clive projects described above are part of a larger study being performed at Iowa State University. Additional research on several cases studies is evaluating different access management techniques including driveway treatments, TWLTLs, raised medians at intersections, full raised median treatments (such as Ankeny and Clive described above), and alternate access treatments (8). One of these case studies included the addition of a full raised median along U.S. Highway 65/69 (SE 14th Street) in Des Moines, Iowa. The roadway was previously a four-lane undivided highway. The raised median improved the traffic flow level of service from D to B/C. In addition, the accident rate was reduced almost 50 percent due to the installation of the raised median.

2.3.4 National Cooperative Highway Research Program

Another piece of significant and recent literature is the National Cooperative Highway Research Program Report 395 which evaluates the operational, safety, and access impacts of different midblock left-turn treatments (9). The three types of treatments considered are raised medians, TWLTLs, and undivided cross sections. Guidelines for selecting the treatment type are included in this report and objectives are set to produce a uniform method for selecting the proper left-turn

treatment for urban and suburban roadways. The approach taken was to develop the methodology, collect field data to calibrate the methodology, and then use the methodology to set selection guidelines. Three models were developed using this approach: the operations model, safety model, and access impact model. The operations model predicts delay to left-turn and through movements. The safety model predicts annual accident rates along the street segment in question. The results of the safety model indicated that the raised median had a significantly lower accident frequency than the undivided or TWLTL median treatments.

Finally, the access impact model predicts, by use of an index value, the proportion of business owners who would view a left-turn treatment as having a favorable effect on business. The road user benefit associated with the new treatment was compared with the construction cost of the conversion. Cost-effective arterial conditions were listed in the selection guidelines. The guidelines are sensitive to traffic demands, access point density, the number of traffic lanes, and land use.

2.4 EVALUATING ECONOMIC IMPACTS OF LEFT-TURN RESTRICTIONS

As the economic impacts of transportation improvement projects increases in importance, new information and methodologies are being developed. One piece of literature that has been considered in this research effort that presents such methodologies and discusses the economic impacts of transportation projects is Transportation Research Circular 477 (10). This report provides a comprehensive step-by-step account of the techniques for assessing the economic impacts of this type of project. Many of the techniques and impact measures (e.g., employment rates, property values, and business sales) illustrated in this circular are being utilized in this research effort.

2.4.1 Texas

The first year of this research effort provided some insight into gross sales perceptions of business owners before and during construction along the Texas Avenue corridor in College Station, Texas (1). Although these are preliminary findings and will be evaluated further in the final year of the research effort, they provide valuable insight into business owner perceptions due to raised

median installation. A majority of the responding business owners (67 percent) during construction believe that their gross sales will go down during the construction phase. This demonstrates that there is considerable concern about gross sales during the construction phase. After the median installation, a majority of the business owners (65 percent) believe that gross sales will either increase or remain the same as prior to the construction. Therefore, the construction phase is the most financially difficult stage for the businesses.

The research also evaluated the ranking of important items that customers would consider when selecting a business as perceived by the business owners. The items were customer service, product quality, accessibility to the store, product price, hours of operation, and distance to travel. The results indicated that accessibility to the store generally ranked third or fourth. This indicates that the most important elements used by customers according to business owners to determine what businesses they will endorse, are factors that may be controlled by the business owners themselves (e.g., customer service, product quality, product price).

2.4.2 Florida

Florida is one of several states that has been a leader in studying access management. Early work shows the benefits of considering the customer and business opinions of projects. In the report *“Problem: Roadway Safety Versus Commercial Development Access”* these types of surveys were taken from four major groups affected by the U-turn concept implemented in their area (4). Sixty-two and one-half percent of the business group reported that there was not a change in their profit. Over 63 percent of participants in the residential group felt they were inconvenienced by the use of the U-turn. However, a favorable response of 48 percent was given to the design. Overall, this group felt the new design was safer compared to no improvement. The next group was comprised of truckers who use the facility. Overall, 92 percent of truckers interviewed felt the improvements made the roadway safer, and 58 percent were in favor of this type of access control. Customers of these businesses were asked how they felt about the project and most felt inconvenienced by the change but stated that the roadway was safer and operated more smoothly. Overall, 57 percent of customers surveyed responded favorably to the project.

Another research effort performed to evaluate the economic impacts of median designs has been performed for the Florida Department of Transportation (11). This report was produced after traffic analyses and modeling for median improvements in several counties in Florida were performed and the construction was complete. The analysis evaluated land use changes along these corridors after median improvements. To evaluate any changes in economic status from the post-construction period, tax records, and census data were reviewed. Once these materials were gathered and all appropriate businesses, residences, and other road users were identified, an attitude-oriented survey was mailed to each. Also, a classification system was developed in order to group certain types of business together for a more concise survey of varying situations. The opinion survey provides information about the public's acceptance of different median modifications. From this survey, the relationship between the roadway, land use, economic characteristics, and public opinions was investigated.

The survey response rate was 180 of the 800 drivers (23 percent) and 228 out of 500 business surveys (46 percent). The researchers also measured response by a percentage of the amount of land represented by each business that responded. From the business owner perspective, those surveyed were 45 percent office or 38 percent bank, sit-down restaurant, or retail establishment. During the duration of the median change (2 years), 86 percent of the businesses surveyed had been in business through the full two years. From those surveyed, 64 percent of the businesses had no problem in their normal delivery schedule and operation. Only 69 percent of respondents needed to change a part of their daily schedule as a result of the new median treatment. According to those surveyed, 57 percent of businesses gross sales had either increased (19 percent) or stayed the same (38 percent) within the time of the construction and completion of the median. Overall, for all businesses responding, 69 percent reported only minor or no impact on the operation and volume of their establishment. Overall, 59 percent of respondents did not have a problem with the change.

2.4.3 Georgia

It was found that certain types of businesses were more likely to feel the effects of a median change than were others (6). Following the median treatment in Atlanta, newspapers published

merchant responses to the change. The article stated that several businesses such as a video store, hardware store, and home furnishings store had closed after the project was completed. One convenience store was also reported to have a 50 percent decline in business. The reporters responsible for the article never questioned the specific businesses or the reasons behind their closing. The author goes on to explain that the pattern of closings among these businesses could be because they are supported by selling in large volume. On the other hand, a doctor's office or dental office has a specific clientele and would likely not be affected by the restriction on turning movements. It should also be stated that there were no measures taken to improve access to local businesses and establishments during the construction of the median treatment.

2.4.4 Iowa

The Center for Transportation Research and Education (CTRE) at Iowa State University has recently studied and analyzed the effects of access management on business vitality (8). The research has shown that access management-related projects have not had an adverse effect on the majority of businesses in Iowa and some have even benefitted from the improved corridors. All types of businesses were considered in the case studies and no pattern of decline in business could be linked to any single category. Turnover rate was found to be consistent with the state's average of about 10 percent per year. Businesses in the study areas had significantly higher sales than did their counterparts in comparative communities, and no short-term declines in business could be found in connection with the access management projects.

With respect to the impact of the projects on business vitality, 80 percent of business owners and managers responded with a favorable opinion—the performance of the businesses after construction either increased in sales or stayed the same. Three out of 63 businesses interviewed reported a decrease in sales activity which represents only 5 percent. A relatively small percentage (19 percent) of business owners reported that their customers did complain about the change in access. Another opinion survey was performed with motorists and customers of the businesses in

question. Of the motorists surveyed, 90 to 100 percent responded favorably to the roadway improvements. They felt that the changes made the roadways safer, improved operations, and made driving easier.

Due to the five-year success rate of 50 percent of Iowa businesses, another characteristic of vitality before and after construction must be considered. A “pull” factor indicates whether a business serves those customers within the community or those from outside the community. Pull factors greater than one indicate that a business serves retail needs of persons beyond those living in the local community. Once pull factors were given to retail businesses for different years in the perspective study areas, changes in the retail sales could be evaluated. From this data, it can be concluded that all five case studies showed an increase in total retail sales from 6 to 346 percent.

One of the references previously discussed in section 2.2 assessed the impacts on businesses adjacent to a raised median project and found that the business owner’s opinions are very important (7). Both project areas are considered growing retail sectors and so the impact on business was a significant concern. Ankeny, Iowa, has strong retailers in building materials and food stores while Clive’s main businesses are in apparel, furniture, eating and drinking establishments, specialty stores, and services. The city of Clive also attracted many customers from outside the area with a pull factor of two in 1996. As previously indicated, the pull factor indicates the “market share” of a community in terms of attracting retail sales beyond the local community. In Ankeny, over 90 percent of the business persons surveyed felt the project improved the environment for their businesses and 100 percent of the businesses were in support of the project. Clive had a 60 percent positive response from business owners and a 70 percent support rate. A majority of the customers of the Ankeny businesses (73 percent) did not complain of the ability to access businesses upon completion of the project. However, 50 percent of Clive customers complained about access restrictions (7).

2.5 SUMMARY

This section has discussed the continued importance of access management, safety and operational impacts of medians, and economic impacts of left-turn restrictions. The research discussed in this chapter is from a recently published NCHRP project and experiences from several

states including Texas, Florida, Georgia, and Iowa. The literature is intended to supplement the related research presented in the first year of this study. It is of interest to note that a majority of the business owners surveyed during the case studies referenced here, experienced positive effects on their gross sales after the left-turn restrictions were implemented. Although these experiences are specific to the locations where the studies were performed, they provide valuable insight into the potential economic impacts of left-turn restrictions upon adjacent business owners.

3.0 SURVEY AND METHODOLOGY REFINEMENTS

3.1 BACKGROUND

In the first year of this research effort, a methodology for estimating the economic impacts of raised medians on adjacent business owners was developed and tested on a single case study location in College Station, Texas. Surveys were administered with personal interviews to business owners/managers.

During the past year of this research project, data were collected from 10 case study locations throughout Texas. The research team conducted surveys with both personal interviews and mail-out surveys to, 1) collect as much data as cost-effectively possible and, 2) evaluate the success of different data collection techniques. Changes were incorporated into the survey instrument itself to make questions clearer and to ensure that reliable data were obtained. In addition, some changes are reflected in the methodology. This chapter will discuss the changes in the survey instrument and discuss new clarifications in the methodology as well.

3.2 SURVEY REFINEMENTS SINCE YEAR ONE OF THE STUDY

This section will describe the survey instrument that was used for the data collection, including the different questions asked on the survey and how the survey was revised from the first year. Two surveys were used for the data collection—a business impact survey and an undeveloped land survey. These instruments were both intended to ask questions that would provide insight into the economic impacts of raised median installations on businesses and undeveloped land along the roadway. Appendix A and Appendix B show examples of the business impact survey and undeveloped land survey, respectively, for South Post Oak Road, one of the 10 case studies in the second year of the study.

3.2.1 Business Impact Survey

The business impact survey shown in Appendix A is somewhat different than the survey used in the first year along Texas Avenue. The first year's survey is shown in Appendix A of reference 1. The survey instrument was changed only slightly to ensure consistency with the results of the first year along Texas Avenue, and to aid in the understanding of the survey by participants to ensure reliable data is provided. The experiences of the research team in the survey development are expected to provide valuable insight for others performing similar research. Chapters Six and Seven provide additional information about the survey administration and data collection procedure.

The first visible change from the first and second year versions of the surveys are questions one through three. The first three questions in the survey last year asked business owners if they own or lease the building in which they are conducting business, how long they had been at this location, and whether they had to move their business as a result of the construction along Texas Avenue. It was expected that it would make intuitive sense to break down analyses on different considerations based upon how long businesses may have been in operation and/or whether they are owned or leased. However, due to the limitations in sample sizes, these questions were not as useful as anticipated. In addition, many locations are leased. In the interest of time, the first and third questions were removed, and the second question was rephrased (question number one on the survey in Appendix A).

One question on the original survey asks what the peak period is for business operations before and during the construction phase. It was hypothesized that there may have been a change in hours of peak operation due to the construction, but this was not generally the case according to analyses performed. This question was removed from the revised survey.

The question regarding the percent passerby and planned stop was found to be useful in the first year and this question was used again. For surveys performed after the median was installed, the question asked for the perception of what was the passerby percentage prior to the median installation (question five). In addition, an open-ended question six was added to allow the participant the chance to indicate the reason for any change.

The survey in the first year also included questions in table format asking business owners for perceived changes in several indicators including number of customers, employees, gross sales, and property values along the corridor. There were also similar questions asked in table format about the number of accidents along the corridor, traffic volumes along the corridor, and other economic indicators just mentioned evaluated along the corridor and for the entire city. These questions were rewritten as shown in questions 10 through 18. Some questions were removed including those referring to the number of parking spaces, employment along the corridor, property values along the corridor, and property values for all properties in the area. The question regarding parking spaces did not appear to be significant in the first year of the research as the number of parking spaces was generally not significantly altered. Changes in the number of parking spaces also becomes less of a factor when many stores share large amounts of parking in a shopping center. Employment along the corridor was removed because it can be obtained from the surveys of others along the corridor. Finally, as shown in questions 10 through 18, the format was changed to make them easier to fill out and to hopefully aid in achieving more reliable results.

One question on the original survey referred to whether it was believed that the installation of the raised median would cause the time it takes customers to get to businesses to increase, decrease, or stay the same. It further asked for what percentage of customers for each of these possibilities, and it asked for the number of minutes that would be added if the response was “increase” and subtracted from the trip time if the response was “decrease.” Although some of the data collected in this question was useful, it was often difficult for business owners to provide reasonable estimates of the amount of traffic that would experience an increase, decrease, or remain unchanged. Further, the number of minutes of travel time increase or decrease was also difficult to estimate. Analysis of this question also proved somewhat difficult since the categories were not mutually exclusive, making aggregation difficult. Question seven, which inquires about the likelihood of regular customers patronizing the business to remain about the same, increase, or decrease due to the raised median installation, provided similar data that is much more conducive to aggregate analyses.

Question 19 was added to the survey. The question was originally developed in previous research and was adapted for use in this study (9). It provides a relatively straightforward method to assess congestion, safety, access, business opportunities, customer satisfaction, and delivery convenience impacts. Questions 20 and 21 regarding gross sales have been expanded since the first version of the survey. The actual gross sales values were not requested as they were in the survey in the first year. Generally, it was found in the Texas Avenue study that businesses were more likely, and more comfortable, in providing a range than in providing the actual values. In addition, combining data for analysis of those that answered the question by providing a range and those that gave the actual value can provide inaccurate results. Question 21 was added to indicate from year to year whether, and to what extent, gross sales were up, down, or if they remained the same. Finally, question 22 was also added as an open-ended question to observe what business owners would suggest caused the changes in gross sales. The question was written as open-ended to ensure the respondent was not influenced in their answer of the causes.

Question 23 was also added to determine the extent of the business owner's involvement in the public hearing and public meeting process. This question is intended as an analysis stratified to give the research team a perspective on the responses by knowing the extent of public involvement.

3.2.2 Undeveloped Land Survey

Appendix B contains a copy of the undeveloped land survey. The undeveloped land survey was not used in the first year of the study since the Texas Avenue corridor is highly developed. This survey asks basic questions about when the property was purchased, how much area is located at the site, length of frontage along the street, and if property was lost due to the construction and widening. Questions are also asked in the survey about the land owner's perception of the impact on access of the raised median. Question seven inquires about whether discussion of the raised median installation caused the property to be more or less attractive to potential buyers, while question eight asked if the median installation has affected the potential types of development on the property.

Questions nine and 10 ask about changes in property value due to the raised median installation and/or the widening of the roadway. Questions 12 through 15 are similar to those asked in the business owner survey inquiring about changes in the number of accidents, traffic volumes, gross sales for the entire corridor, and gross sales for all businesses in the adjacent area. Finally, questions 16 through 18 are also the same as those asked in the business impact survey.

3.3 METHODOLOGY REFINEMENTS SINCE YEAR ONE OF THE STUDY

The methodology for estimating the economic impacts of raised medians was outlined in the first report. These steps were determined based upon the literature review, previous studies, and the experiences of the research team in the first year of the project. When selecting sites and performing the survey in the second year, some changes were made to the methodology that are worth noting. These changes are contained in table 1 and are described in this section.

In step three, making contacts can often go beyond the chamber of commerce or the appraisal district office. In larger cities, local neighborhood and/or business groups may be more influential than the local chamber of commerce. Various area groups may also provide support to the research and provide a valuable source of corridor history, additional contacts, and other important information. Chapter Five of this report will further describe the importance of gaining support of the research and refer to some of the letters that were obtained in support of this research effort. Other contacts of importance that can be made at this stage include the State Comptroller's Office where gross sales information can be obtained for different cities. This information can be used as a "control" for comparison of the data obtained in the field. The State Employment Commission can also provide employment rates for different areas for use as a "control" for employment changes that may be noticed along the corridor. Finally, some private companies provide a service of compact discs (CDs) containing appraisal data for larger metropolitan areas. This facilitates the collection of appraisal data.

Table 1. Changes in Methodology From Year One to Year Two

Year One Methodology	Year Two Methodology	Comments
<ul style="list-style-type: none"> Identify a site for evaluating economic impacts. 	<ul style="list-style-type: none"> Identify sites (cities) with potential corridors. 	<ul style="list-style-type: none"> Change in description to aid understanding.
<ul style="list-style-type: none"> Identify corridor characteristics including, but not limited to, abutting land uses, street section, and corridor length. 	<ul style="list-style-type: none"> Identify corridor characteristics. 	<ul style="list-style-type: none"> Simplified description for better understanding.
<ul style="list-style-type: none"> Make contact and develop good working relationships with the local chamber of commerce and appraisal district office. 	<ul style="list-style-type: none"> Contact information/data sources. 	<ul style="list-style-type: none"> Description reworded to include all useful sources of data and information including the chamber of commerce, appraisal district office, employment commission, state comptroller, and/or neighborhood/business groups.
<ul style="list-style-type: none"> Inventory businesses and establishments along the subject corridor. 	<ul style="list-style-type: none"> Inventory the establishments and identify businesses for study. 	<ul style="list-style-type: none"> Change in description to aid understanding.
<ul style="list-style-type: none"> Obtain information about businesses including, contact information, property values, and additional relevant information. 	<ul style="list-style-type: none"> Obtain business information. 	<ul style="list-style-type: none"> Meaning unchanged. Simplified description for better understanding.
<ul style="list-style-type: none"> Prioritize businesses to be surveyed. 	<ul style="list-style-type: none"> Prioritize businesses to be surveyed. 	<ul style="list-style-type: none"> Only applied directly to personal surveys. For mail-out surveys, all businesses can be sent a survey since costs are minimal.
<ul style="list-style-type: none"> Collect data from personal interviews set by appointment. 	<ul style="list-style-type: none"> Collect data. 	<ul style="list-style-type: none"> Changed to reflect that data collection may occur with either personal interviews or mail-out surveys.
<ul style="list-style-type: none"> Analyze and summarize data. 	<ul style="list-style-type: none"> Analyze data. 	<ul style="list-style-type: none"> Simplified description for better understanding.

Additional knowledge has been gained in the prioritization of businesses, step six, as well. In the first year of the study, the surveys were administered through personal interviews along the entire Texas Avenue corridor. During the second year of the study, the research team wanted to obtain as much data as possible from the largest number of sites possible with the available resources.

The best way to accomplish this was to perform the data collection at some sites with personal interviews and some with mail-out surveys. This also allowed the research team to evaluate the data collection method. Mail-out surveys are much less costly to administer, and, therefore, setting priorities is not necessary. When mail-out surveys were used, surveys were sent to all possible business managers/owners and undeveloped land owners along the corridor. Therefore, step seven of collecting data included both personal interviews and mail-out surveys. More discussion about the data collection is contained in Chapter Six.

4.0 CASE STUDIES

4.1 BACKGROUND

The research team identified potential case study corridors on which to test the revised surveys. The attributes, including age, length, and cross section, vary among the case studies the team investigated. Researchers made telephone calls to TxDOT District Offices, Metropolitan Planning Organizations (MPOs), and city planning and public works departments to determine where recent raised median projects are located. This chapter will describe the selected case studies as well as additional locations of interest that may be useful for related future studies.

4.2 SITE INVESTIGATIONS

4.2.1 Site Selection

The research team decided it was necessary to investigate all potential case study corridors to determine their applicability to this project. The process of investigating potential case study corridors included several steps. The first step of the site investigation process was to talk to local officials (TxDOT, MPO, city, etc.) in order to obtain as much preliminary information as possible about each corridor. This information included the type of construction project, the construction time period, the types of abutting development, and the amount of abutting undeveloped land. The research team used this information to rule out corridors that did not fit the parameters established in the refined methodology. Preferable corridors included those that had been constructed within the last six years or so and were primarily abutted by commercial property. The vast majority of the corridors the research team investigated involved the installation of raised medians. However, the team also evaluated median removals in Amarillo, Port Arthur, and La Joya.

4.2.2 Site Visits

At least one researcher visited each corridor to obtain a perspective of the type of development. The only potential corridors not visited were located in La Joya. The research team did not visit these corridors due to the age of the projects. When possible, the researchers visited several corridors on one trip, minimizing travel time and expenses. All of the corridors visited, with the exception of one series of corridors, are located in cities within Texas. The research team also investigated a series of corridors along 1st Street and adjacent intersecting streets in Tulsa, Oklahoma. The researchers looked for corridors with more retail development than residential development, office development, or undeveloped land. The site visits also entailed performing windshield surveys and photographing the corridors.

4.2.3 Windshield Surveys

To get the most detailed information possible during the site visits, the researchers performed windshield surveys of the corridors. In doing so, they recorded the names, addresses, and telephone numbers (when available) from store fronts. The researchers recorded this information by sketching maps of the corridors and noting specific details such as parcel location, site circulation, driveway locations, and median opening locations.

4.2.4 Photographing the Corridors

This business inventory process also included photographing the corridors. Researchers took slides of the roadway cross sections, as well as examples of adjacent businesses. The researchers used the slides as a record of specific attributes of the corridors. The slides provided an opportunity for other members of the research team and interested individuals to get a view of the corridors. Some of the slides appear as figures in this report. The slides will also prove useful in presentations related to this project.

4.3 CASE STUDY DESCRIPTIONS

These case studies include corridors with a variety of business mixes. Most of the corridors are in suburban type areas with shopping centers and strip retail development. One of the corridors, Grant Avenue in Odessa, is located in a central business district. The specific types of development on the individual corridors ranges from completely retail to a mix of office, institutional, and retail. These development mixes drove the numbers of potential survey participants on each corridor. In addition, the cities included in the study are of a variety of population size. The populations range from approximately 25,000 in McKinney to approximately 1.7 million in the city of Houston. Table 2 summarizes several different characteristics of interest for each of the 10 sites.

4.3.1 South Post Oak Road (Houston, Texas)

One of the four locations selected in Houston, Texas was South Post Oak Road from the I-610 extension to South Main Street. The north end project limit includes direct connect access to I-610, the loop freeway around Houston. There were approximately 155 businesses along the corridor. This corridor was reconstructed from a four-lane undivided roadway to a six-lane facility with a raised median. The construction of the median was performed from 1988 to 1990 along the approximately 2.4 km (1.5 mi) corridor. The site was selected since it contains substantial development in the form of several stand-alone businesses as well as strip development. In addition, there were some undeveloped land parcels along the corridor and the effects upon undeveloped land was an interest of the sponsoring agency. This corridor is also unique in that the median locations are channelized to allow turning maneuvers in only one direction. The research team decided to perform in-person survey administration along this corridor since it was rather unique due to these several characteristics.

Photographs in figures 1 through 4 illustrate interesting aspects of the street. Figure 1 is taken just south of the I-610 direct access ramp to South Post Oak Road. This photograph displays the channelized median which allows traffic to turn in only one direction. Note that the “DO NOT ENTER” traffic sign warns southbound drivers along South Post Oak Road not to enter the opening.

Table 2. Case Study Locations

Street Name	City and State	Before Const.	After Const.	Study Limits	Length (km)	Age	Survey Type	Land Use	No. of Establishments
South Post Oak Road	Houston, Texas	Undivided	Raised Median	I-610 to South Main Street	2.4	8	Interview	Retail, Industrial	155
Clay Road	Houston, Texas	Undivided	Raised Median	Hollister Road to Gessner Road	3.6	2	Mail-out	Retail, Industrial, Undeveloped	63
West Fuqua Road	Houston, Texas	Undivided	Raised Median	Hiram Clarke Road to Alameda Road	2.4	9	Mail-out	Retail, Undeveloped	68
Long Point Road	Houston, Texas	Undivided	Raised Median	Campbell Road to Hollister Road	1.1	Within the next year	Mail-out	Retail	41
Twin Cities Highway	Port Arthur, Texas	Raised Median	TWLT	53 rd Street to Griffing Park	3.2	13	Mail-out	Retail, Office	90
9 th Avenue	Port Arthur, Texas	Undivided	Raised Median	Texas 365 to Lake Arthur Drive	2.4	18	Mail-out	Retail, Residential, Undeveloped	66
University Drive	McKinney, Texas	Undivided	Raised Median	U.S. 75 to Texas Highway 5	2.2	6	Interview	Retail, Residential	132
Loop 281	Longview, Texas	Flush Median	Raised Median	Spur 63 to Spur 502	1.0	2	Interview	Retail	65
Call Field Road	Wichita Falls, Texas	Undivided	Raised Median	Kemp Blvd to Lawrence Street	0.5	Under const.	Interview	Retail	55
Grant Avenue	Odessa, Texas	Undivided	Raised Median	2 nd Street to 8 th Street	1.0	6	Interview	Retail, Office	42

Figure 2 shows another illustration of the channelized median design. This photograph also shows the landscaping within the median. Figure 3 also shows the median landscaping, and strip development typical for this corridor. Finally, figure 4 illustrates two back-to-back channelized raised median openings. Also note the truck traffic that is rather significant along this corridor.

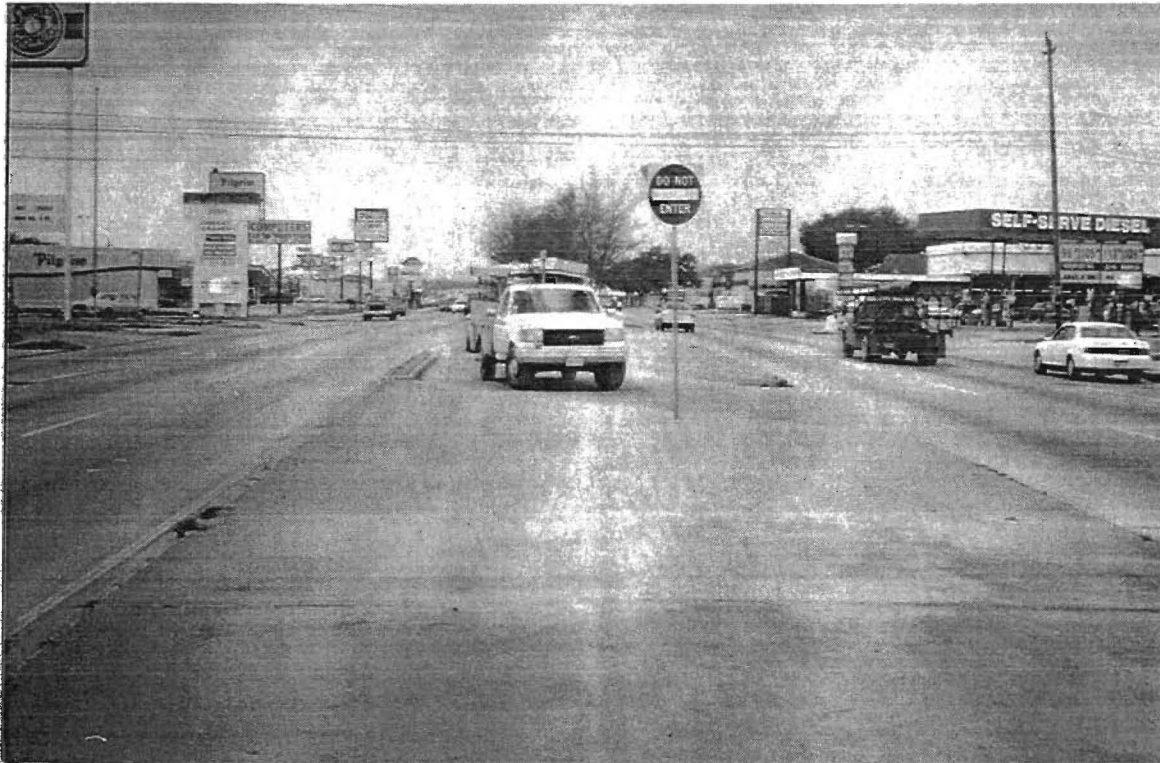


Figure 1. Southbound South Post Oak Road at the Northern End of the Project Limit



Figure 2. Southbound South Post Oak Road Illustrating Channelized Median

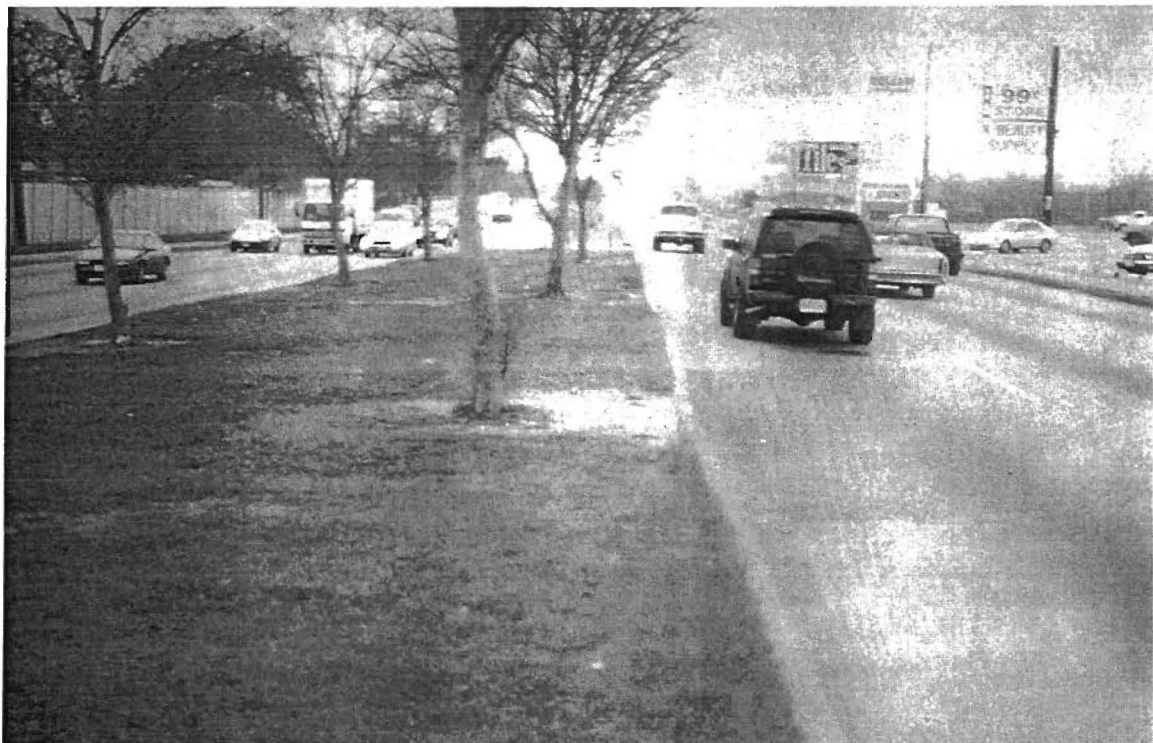


Figure 3. Southbound South Post Oak Road with Strip Development and Median Landscaping

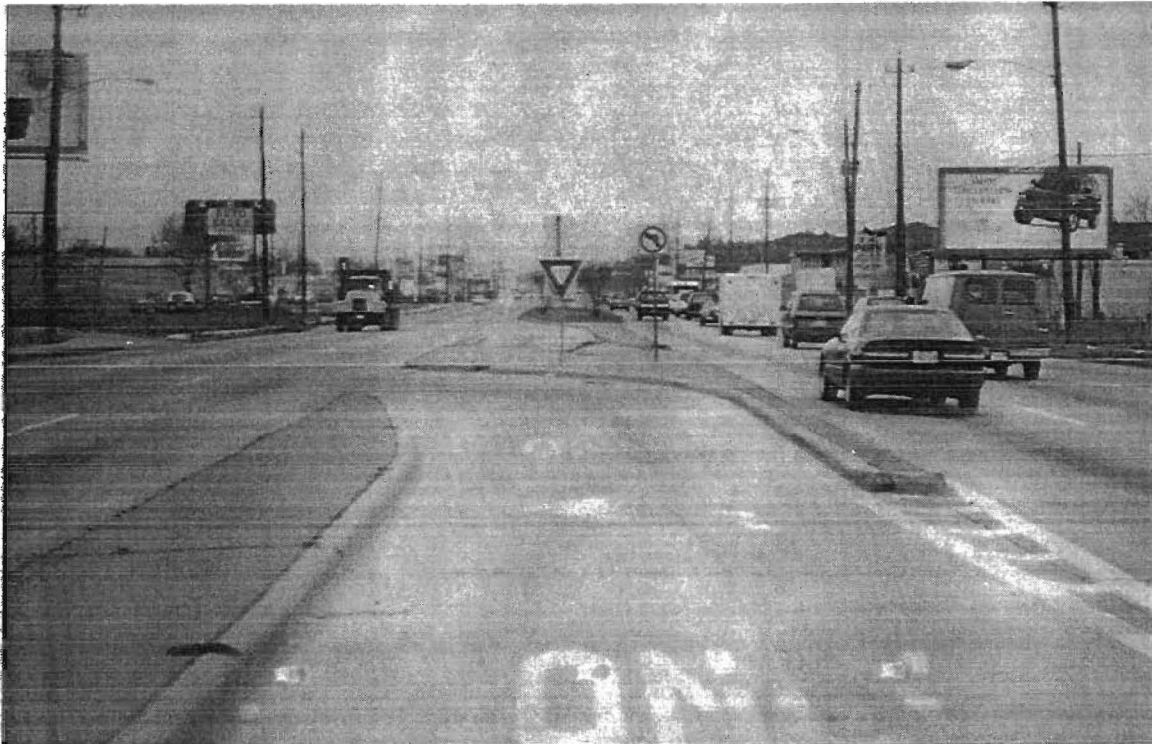


Figure 4. Back-to-Back Channelized Median Openings Along South Post Oak Road

4.3.2 Clay Road (Houston, Texas)

Another location in Houston is the 3.6 km (2.3 mi) segment of Clay Road from Hollister Road to Gessner Road. This east/west street was previously two relatively narrow lanes in each direction and was widened to include the installation of a raised median. This site was attractive to the research team since it was completed relatively recently, with construction from 1994 to 1996.

The corridor contains strip development and some stand-alone businesses. There are approximately 63 businesses along the Clay Road corridor. In addition, there are a lot of undeveloped parcels along the Clay Road segment. The corridor is experiencing growth as large companies move into the area. There are approximately 63 businesses along the Clay Road corridor. The research team decided to perform the survey administration of this corridor with mail-out surveys. Figures 5 through 8 provide more detail of the corridor.

Figure 5 shows the eastern-most end of the east/west roadway case study. This figure also shows the design of the raised median and landscaping. Figure 6 shows the median design at a signalized intersection in a more developed location along the corridor. Figure 7 shows the raised median landscaping along the corridor, and Figure 8 illustrates another example of the median design at an intersection. These pictures also show the relatively large amount of undeveloped land along the corridor.



Figure 5. Eastbound Clay Road at Hollister Road

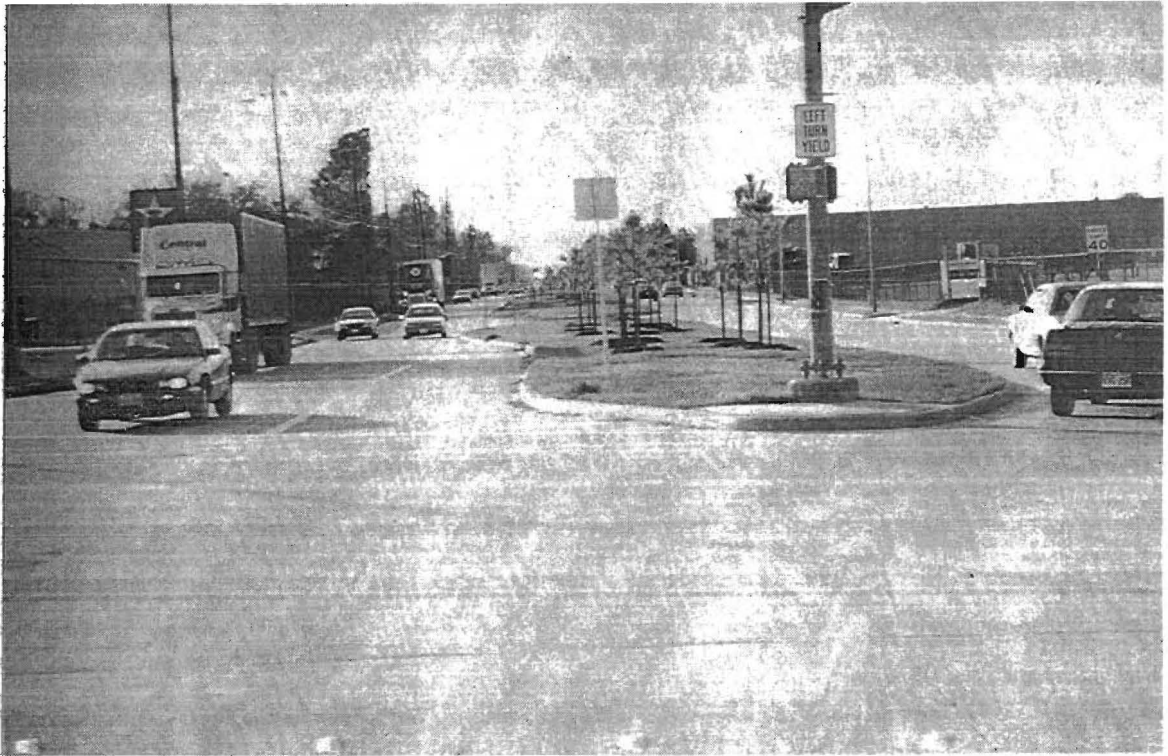


Figure 6. Westbound Clay Road at Hollister Road

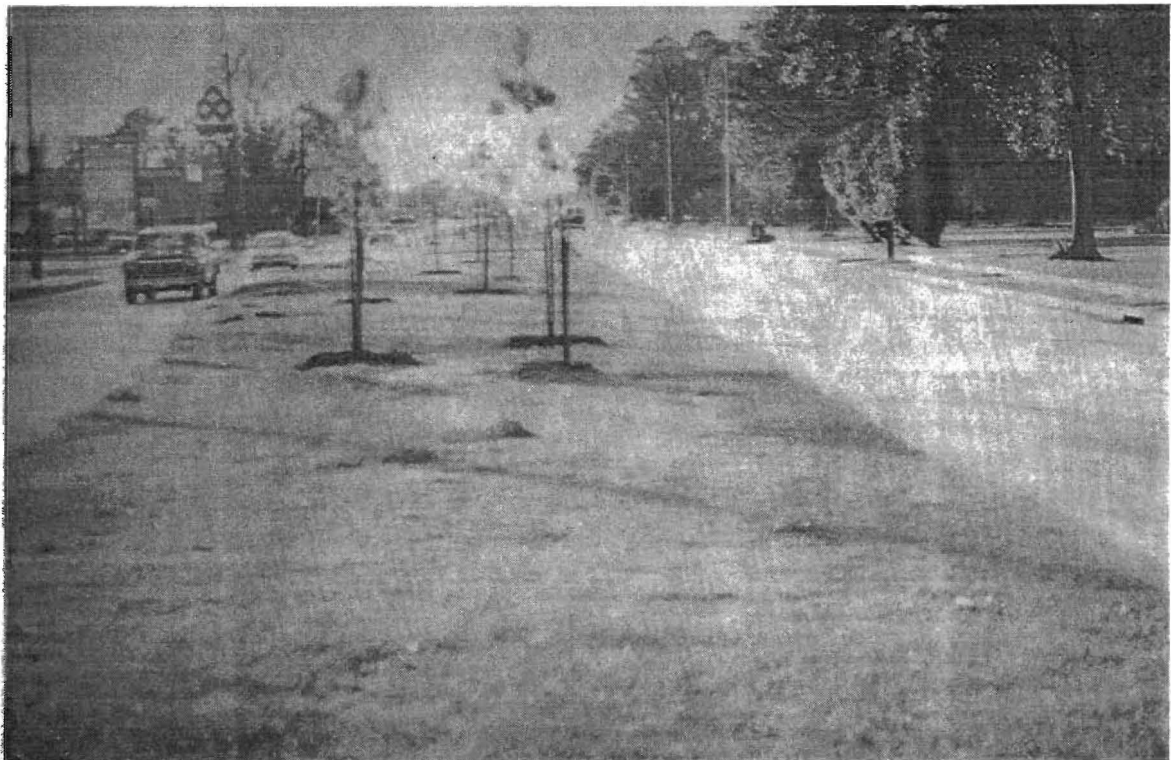


Figure 7. Typical Median Landscaping Along Clay Road



Figure 8. Median Design at the Intersection of Clay Road and Gessner Road

4.3.3 West Fuqua (Houston, Texas)

The West Fuqua corridor was used as a case study for the 2.4 km (1.5 mi) distance from Hiram Clarke Road to Almeda Road. Prior to the installation of the raised median, the traffic was undivided with one lane of traffic in each direction. The construction period lasted from 1987 to 1989 during which a raised median was added and the road was widened. Although this project was not within the ideal time-frame for age, the research team selected it for an additional site for a mail-out survey. The corridor contains significant amounts of undeveloped land as well as strip development and some stand-alone businesses—approximately 70 in all.

The pictures in figures 9 through 11 show interesting aspects of the corridor. Figure 9 is taken looking eastbound on West Fuqua just east of Hiram Clarke Road. This photograph shows the landscaped median, roadway geometry, and adjacent land use. Figure 10 shows the staggered intersection of White Heather Road with West Fuqua Road. The intersection in the foreground

illustrates an unsignalized portion and the respective median treatment while in the background the signalized leg is shown. Figure 11 is taken along eastbound West Fuqua Road at Buffalo Speedway and again shows the median treatment and the roadway geometry along with the large amount of adjacent undeveloped land.

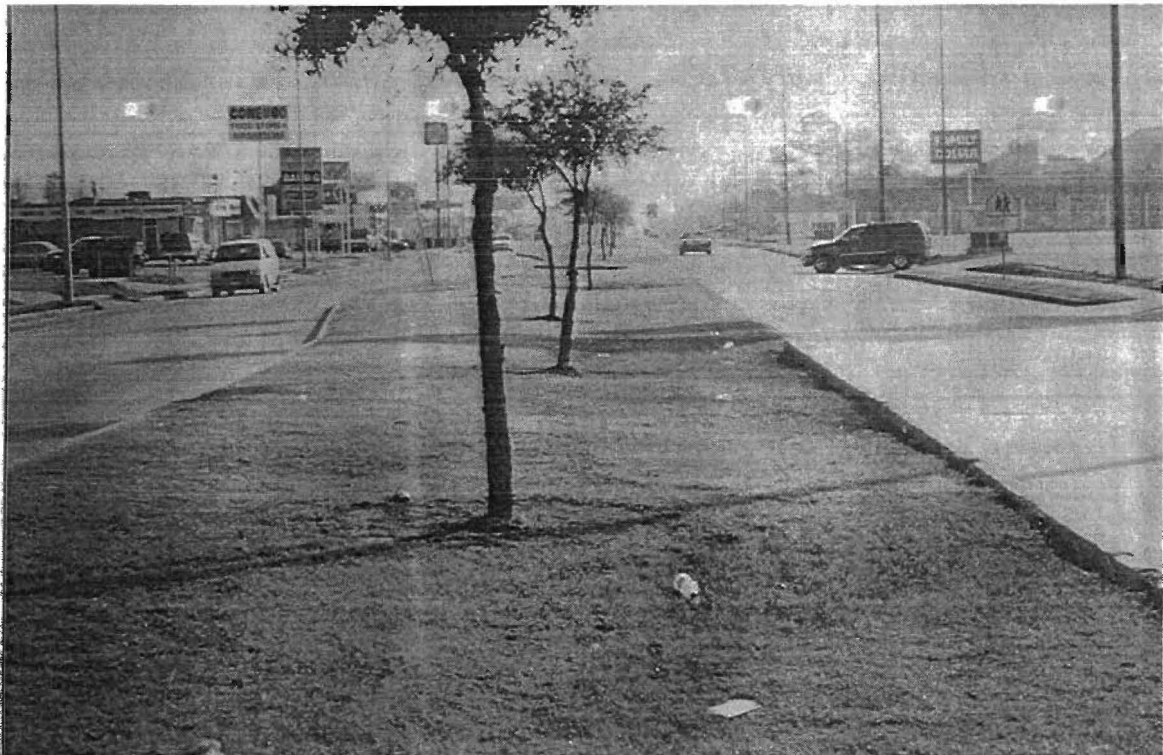


Figure 9. Eastbound West Fuqua Road at Hiram Clarke Road



Figure 10. White Heather Road Intersection Median Treatment



Figure 11. Eastbound West Fuqua Road at Buffalo Speedway

4.3.4 Long Point Road (Houston, Texas)

The fourth case study in Houston, Texas, is along Long Point Road from Campbell Road to Hollister Road. The land use along this 1.1 km (0.7 mi) corridor is mainly strip development and some stand-alone commercial properties. There is no undeveloped property along the corridor. This corridor is undivided with two lanes in each direction. Widening of the roadway to allow for a raised median is being planned. There are approximately 40 businesses along the corridor. This site was selected because the research team was anticipating the ability to obtain both pre-construction, during-construction, and potentially post-construction data within the time frame of the research study. Even if the construction project is not completed within the time frame of the research project, the site was expected to provide valuable insight into the economic impacts of a corridor in which there are near future plans for median installation.

Figures 12 through 14 contain pictures that illustrate the site. Figure 12 is taken westbound along Long Point Road at the Hollister Road intersection. The photograph shows the roadway geometry at the intersection. Figure 13 is taken midway along the corridor at a curve along the roadway. One of the principal reasons behind the installation of the raised median was to improve safety along this horizontal curve segment. Figure 14 is taken eastbound at Campbell. Figures 12 and 14 are the east and west ends of the project, respectively.

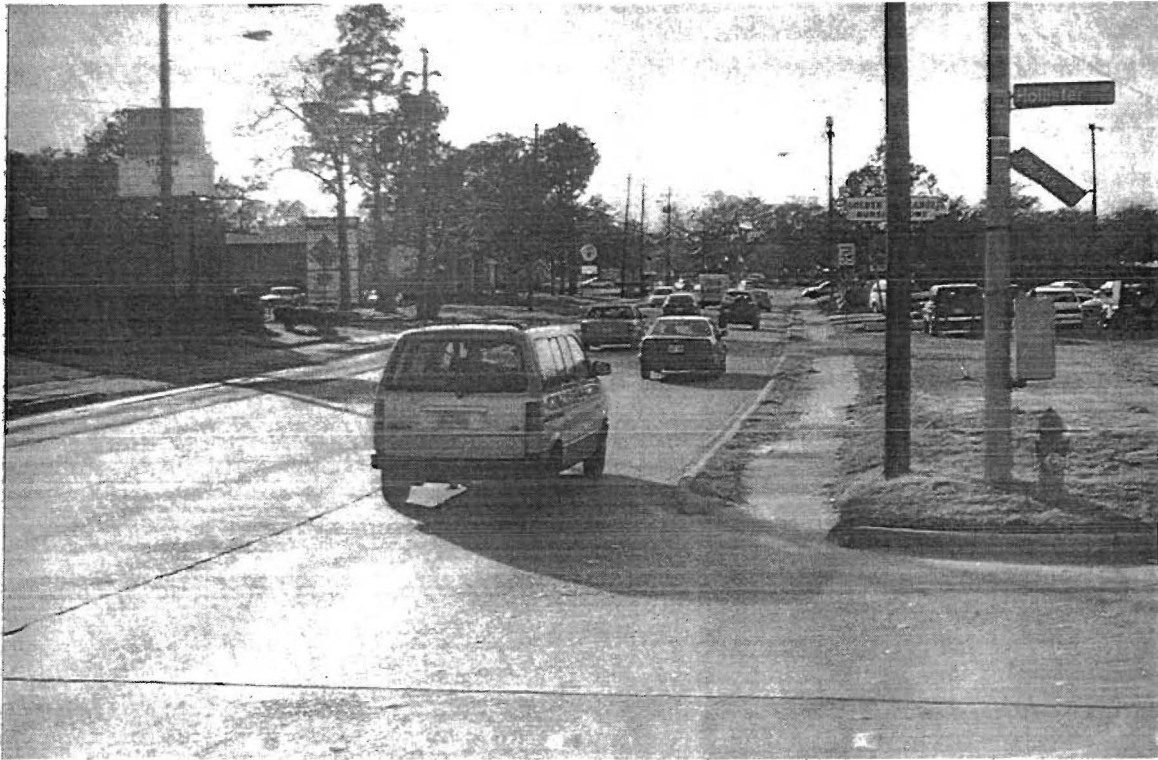


Figure 12. Westbound Long Point Road at Hollister Road

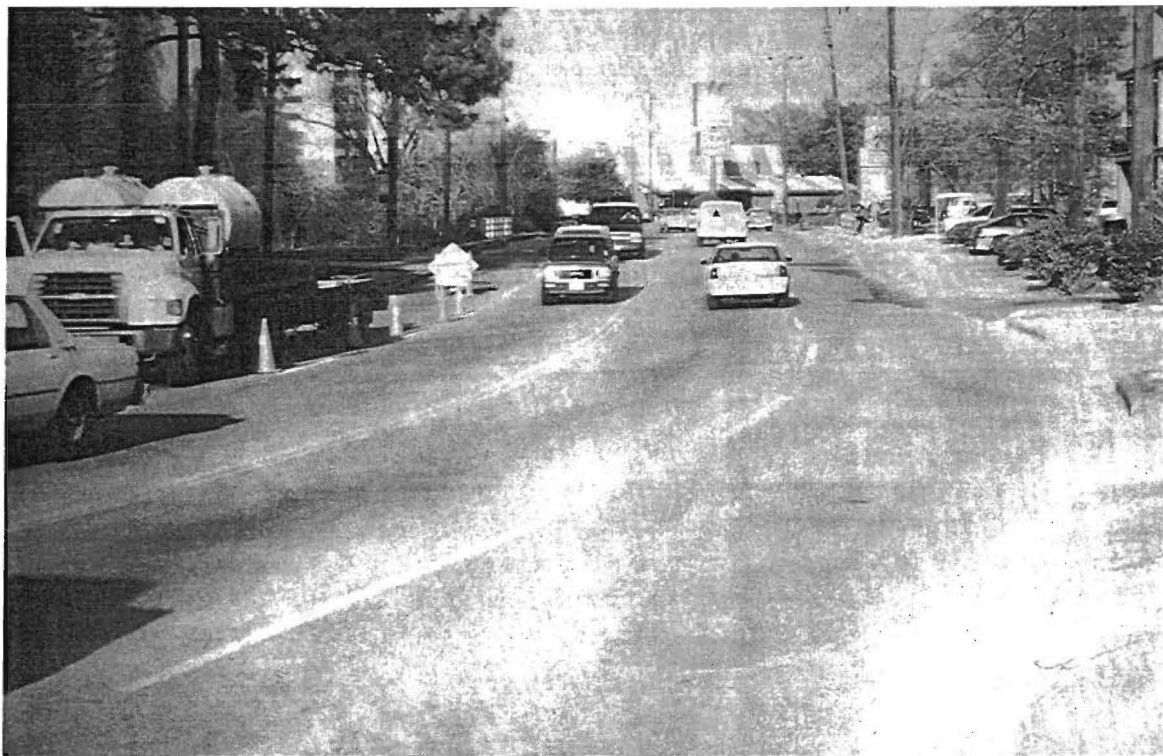


Figure 13. Eastbound Long Point Road Midway Along Study Corridor

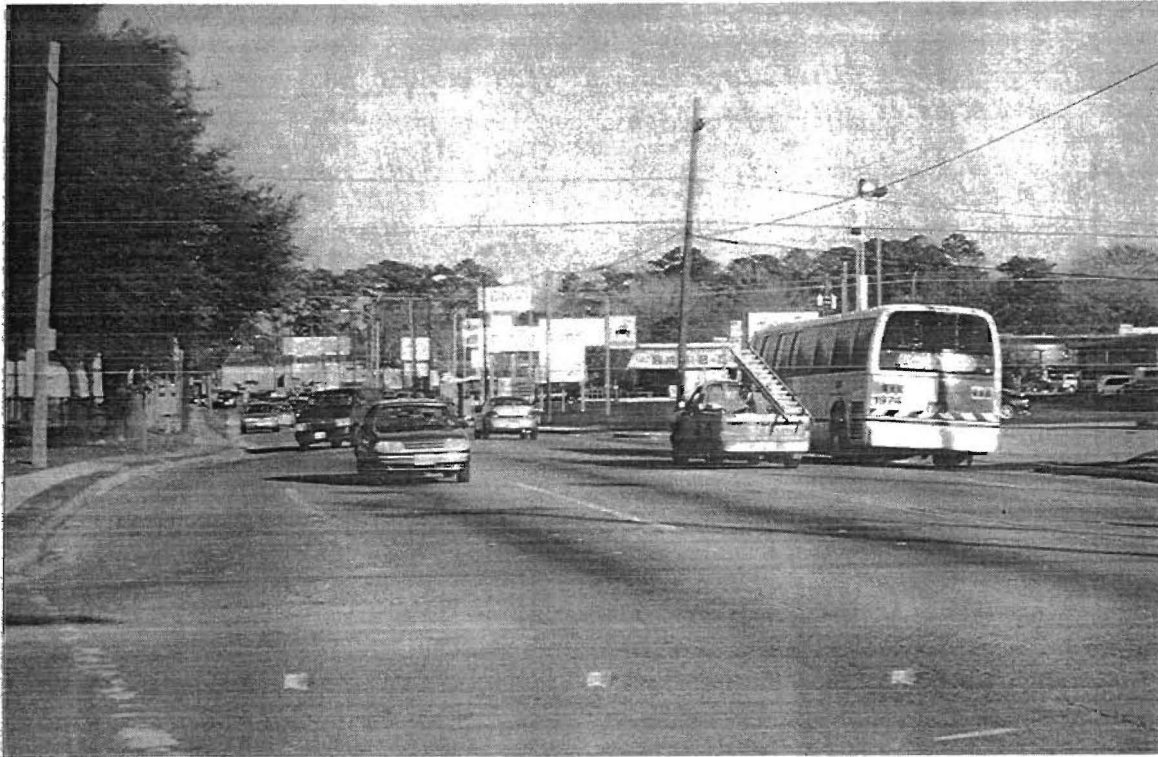


Figure 14. Eastbound Long Point Road at Campbell Road

4.3.5 Twin Cities Highway (Port Arthur, Texas)

Twin Cities Highway (Texas 347) is one of two sites selected for study in Port Arthur, Texas. The 3.2 km (2.0 mi) route being studied is between 53rd Street/Hogaboom Road and Griffing Park Drive/25th Street. This location was of interest to the research team since the raised median was removed along this corridor from 1983 to 1985 and the two-way left-turn lane was put back in the street along this segment. Mail-out surveys were sent to approximately 90 business owners along the corridor which includes mostly strip mall and stand-alone businesses along the fully developed corridor. The research team felt that this location would provide a unique opportunity to obtain economic impact data from a location in which the raised median was removed.

Figures 15 and 16 display some of the interesting features of this case study. Figure 15 shows the cross section of the existing site including the three lanes of traffic in each direction with the two-way, left-turn lane. The photograph is taken north of Texas 73. Looking closely at the TWLTL, one

can see the previous location of the raised median. This photograph shows where a turn-bay was previously located when the raised median was in place. The significant development along this corridor is also illustrated in this figure. Figure 16 is taken southbound at 33rd Street. This photograph shows the adjacent land use along the corridor. The previous raised median location can also be seen in the existing TWLTL at the intersection.



Figure 15. Southbound Twin Cities Highway North of Texas 73

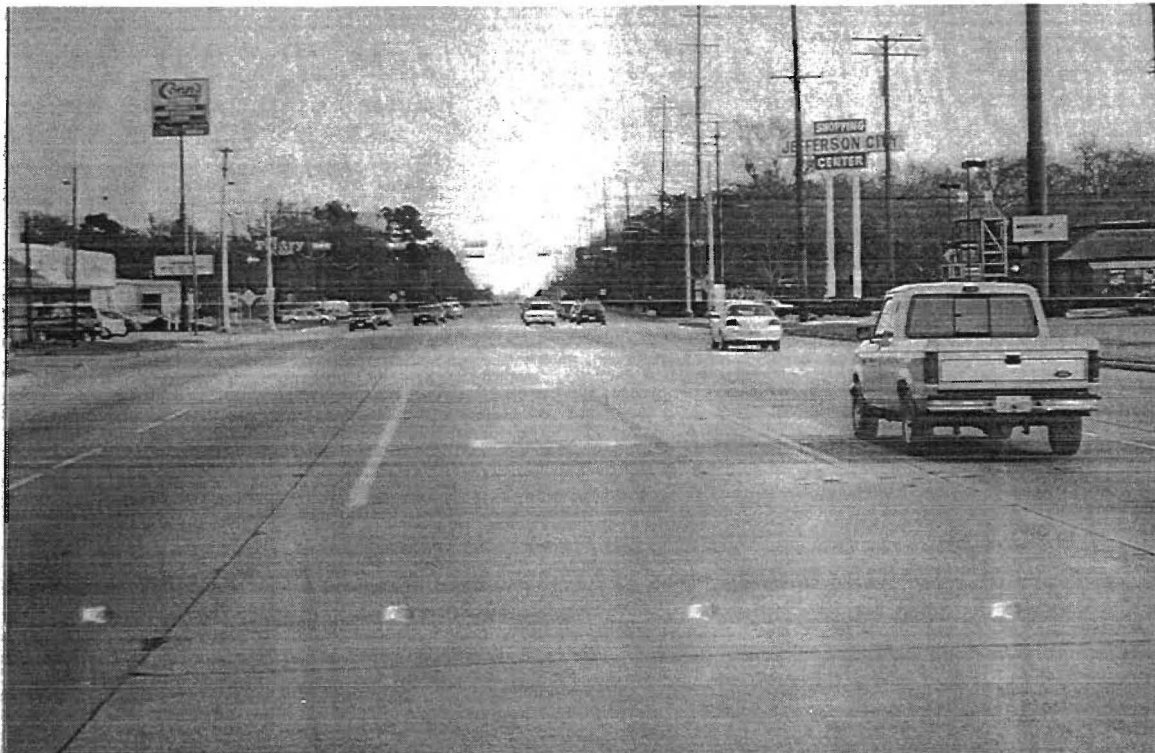


Figure 16. Southbound Twin Cities Highway at 33rd Street

4.3.6 9th Avenue (Port Arthur, Texas)

This is the second location in Port Arthur, Texas, selected by the research team. The corridor is 2.4 km (1.5 mi) from Texas 365 to Lake Arthur Drive, and it contains a mix of land uses including residential, undeveloped land, some strip development, shopping centers, and a few stand-alone businesses. In all, there are approximately 65 businesses along the corridor to which surveys were mailed. The roadway was previously a two-way undivided facility with one lane of traffic traveling in each direction. The raised median and an additional lane of traffic in each direction were added from 1979 to 1980 when the roadway was widened. Although the time frame of this median installation is much older than initially desired by the research team, the research team thought that it would be interesting to investigate the ability to obtain data for an installation of this age. The close proximity to the other Port Arthur location also made this site useful for the study.

Figures 17 and 18 provide illustrations of unique elements of this case study location. Figure 17 is taken southbound on 9th Avenue at Texas 365 (Port Neches Highway) at the northern end of the study corridor. This photograph shows the cross-sectional geometry of the facility including the landscaped median in the background. It is also clear that the southbound lanes were newly constructed during the raised median installation since they appear newer than the northbound lanes. The adjacent land uses including strip development can also be seen on both sides of the roadway. Figure 18 illustrates the median treatments at an intersection along the 9th Avenue corridor. Gas stations are shown on the southeast and southwest corners of the intersection.

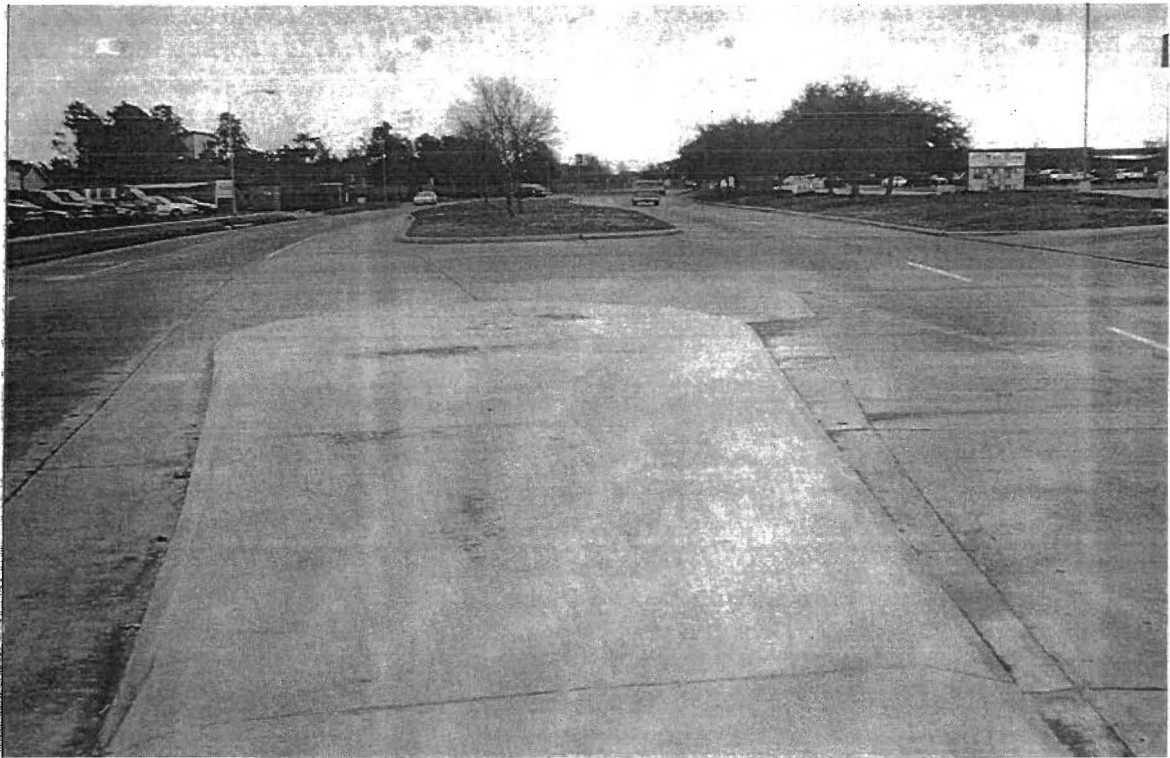


Figure 17. Southbound 9th Avenue at Texas 365



Figure 18. Southbound 9th Avenue at Turtle Creek Road

4.3.7 University Drive (McKinney, Texas)

The University Drive (US Highway 380) corridor in McKinney is approximately 2.2 km (1.4 mi) long and has six travel lanes. McKinney, with a population of approximately 25,000, is located about 50 km (30 mi) north of Dallas and is beginning to show suburban development trends. It is bounded by US Highway 75 (Central Expressway) on the west and Texas Highway 5 (McDonald Street) on the east. University Drive is a gateway to McKinney from US 75. This corridor is the desired age, since the median was completed in late 1992, making it between five and six years old at the time of the study. The raised median on University Drive is fairly basic in design with openings at most street intersections and some private driveway intersections. A variety of land uses exist along the corridor, including an area of relatively newer retail development, two areas of relatively older retail development, and an area transitioning from residential to retail/office development. The retail development at the western end of the corridor is relatively new and in the form of typical strip

shopping centers that include two or three anchor businesses and many smaller specialty stores. Some of these centers also have free-standing outparcel businesses. The center portion of the corridor includes several older houses which have been transformed into various types of businesses. The eastern end of the corridor is comprised of relatively older retail development consisting of smaller strip centers. Researchers recorded 132 total establishments on this corridor.

Figure 19 through 21 show cross sections of University Drive as well as the various types of land development. Figure 19 is on the eastern end of the corridor and presents a typical view of the high density of driveways of the older retail developments. The central portion of the corridor and its area of transition from residential to commercial land uses are presented in figure 20. Figure 21 illustrates the western end of the corridor and its modern shopping centers that have very few driveways.

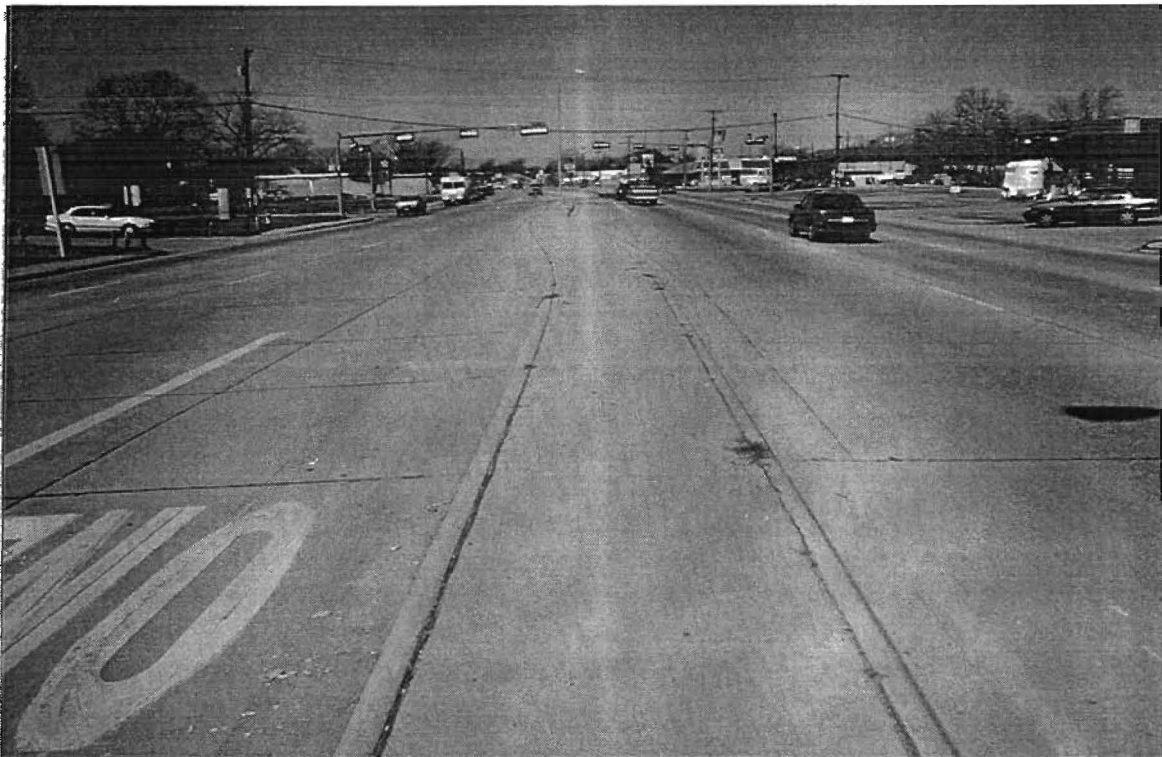


Figure 19. Westbound University Drive Near Church Street



Figure 20. Eastbound University Drive Near West Street



Figure 21. Westbound University Drive Near Graves Street

4.3.8 Loop 281 (Longview, Texas)

The Loop 281 corridor in Longview is approximately 1.0 km (0.6 mi) long and has six travel lanes. Longview is located in eastern Texas, approximately 200 km (125 mi) east of Dallas, and has a population of about 75,000. There are a few nearby small towns and the small city of Marshall is 32.2 km (20 mi) away.

The corridor is bounded on the west by Spur 63 (McCann Road) and on the east by Spur 502 (Judson Road). This segment of the road is abutted completely by retail development, including a regional mall, a few shopping centers, and several free-standing businesses. This corridor has a relatively low driveway density because of the predominant shopping center style development. The median, completed in late 1996, was relatively new at the time of this study. Although it was not in the time frame defined in the methodology, this corridor contains a good mix of retail establishments that fit the methodology's criteria. Therefore, the research team decided to include it in the study.

Loop 281 previously had a flush median on this segment that was similar in width to a TWLTL at the west end and significantly wider at the east end. One of the interviewees referred to the wider end as a "No Man's Land" where automobiles would enter, accelerate, and exit at various haphazard angles and speeds. The wider end of the median now has a left-turn lane adjacent to the travel lanes and pavestone covering the remainder of the area. Several of the businesses along this segment of Loop 281 are located in shopping centers that have additional access from side streets. Therefore, the research team used discretion when targeting businesses to be surveyed. The researchers identified a total of approximately 65 businesses along this corridor.

Figures 22 through 24 show the various attributes of the median along the Loop 281 corridor, including the channelization of left-turn bays and the low-driveway density. The widest portion of the median, located at the western end of the corridor, is shown in figure 22. Figure 23 provides a good illustration of the channelized left-turn bays and how the median gets narrower toward the western end of the corridor. Figure 24 shows an example of how previous left-turn access to and from an individual business was eliminated. There is a median opening just east of this location which provides access to this business, as well as an adjacent shopping center.

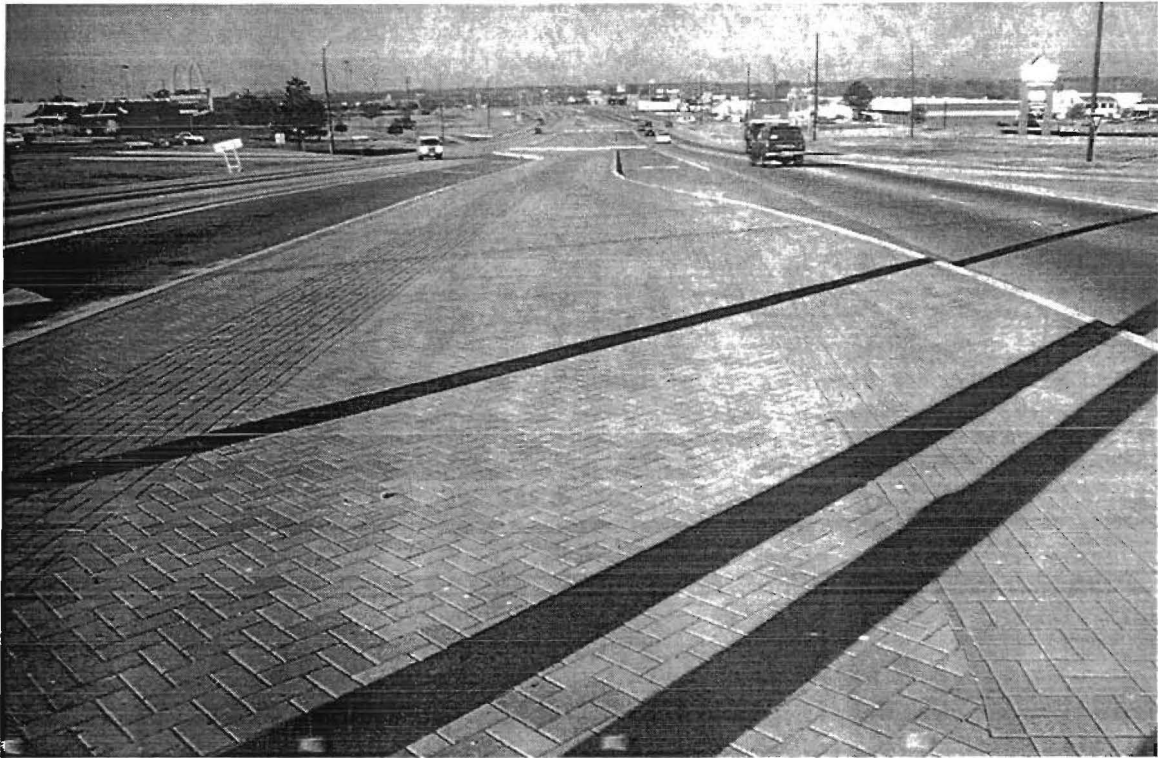


Figure 22. Westbound Loop 281 Near Judson Road



Figure 23. Westbound Loop 281 Between Judson Road and Tuttle Road



Figure 24. Facing South on Loop 281 West of Tuttle Road

4.3.9 Call Field Road (Wichita Falls, Texas)

The Call Field Road corridor, located in Wichita Falls, is approximately 0.5 km (0.3 mi) long. Wichita Falls is about 180 km (110 mi) northwest of Fort Worth, near the Oklahoma border. This corridor is in an older area that has experienced some commercial redevelopment in recent years. The case study segment is almost completely retail, with the main exception being a television station. There are also two streets, Faith Street and Rhea Street, which have T-intersections with Call Field Road that are of interest, due to the businesses located on those streets. Faith Street and Rhea Street also provide additional access to shopping centers and individual businesses which face Call Field Road.

This corridor is one of two (Long Point Road in Houston is the other) on which the median was not yet constructed at the time of this study. Therefore, the research team collected data from these businesses that is based upon their expectations of future impacts. Researchers will collect

post-construction data for this corridor in fiscal year 2000 assuming the construction has been successfully completed.

Faith Street, which intersects Call Field Road near the east end of the corridor, contains one block of retail establishments immediately south of Call Field. For about one year prior to construction, and this study, left turns to and from Faith Street have been prohibited. This prohibition is effected with the posting of signs and, according to interviewees, active police enforcement. The raised median, once installed, will physically prevent these left-turn maneuvers.

Rhea Road actually intersects Call Field Road near the west end of the corridor. This segment of Rhea Road provides secondary access to two shopping centers which abut Call Field Road. This intersection of Rhea Road and Call Field Road is signalized and will remain completely open to all turning maneuvers after the median is completed. There is also a commercial center, whose only access is from Rhea Road, that contains a mix of retail and service businesses. Due to their separation from Call Field Road, and the fact that all left turns will continue to be allowed at the intersection of Rhea Road and Call Field Road, those businesses were not included in the survey.

Lawrence Street has a T-intersection with Call Field Road immediately west of the Rhea Road intersection. However, there are no businesses on Lawrence Street affected by the median project.

Figures 25 through 28 illustrate the Call Field Road corridor, including Faith Street, which intersects Call Field Road, before construction began. Figure 25 shows the eastern end of the corridor, looking west from Kemp Boulevard. The central portion of the corridor, which is characterized by a higher driveway density, is shown in figure 26. Figure 27 presents the signalized intersections with Rhea Road and Lawrence Street. The Rhea Road intersection (from the south/left) is the segment of interest in this study. Figure 28 illustrates Faith Street, which has some retail development and primarily lay-down curb (continual open access to the parking lot), including the sign prohibiting left turns at Call Field Road.



Figure 25. Westbound Call Field Road at Kemp Boulevard



Figure 26. Westbound Call Field Road Between Faith Road and Rhea Road



Figure 27. Westbound Call Field Road at Rhea Road



Figure 28. Northbound Faith Road Near Call Field Road

4.3.10 Grant Avenue (Odessa, Texas)

The Grant Avenue (US Highway 385) study segment is unique in that it is located in the central business district of Odessa, which has a population of approximately 95,000. Grant Avenue (Andres Highway from a point beyond the north end of the case study) is a major north-south street through Odessa. The 1.0 km (0.6 mi) corridor is bounded by 2nd Street (US Highway 80) on the south and 8th Street on the north. The corridor is comprised of a mix of retail and office development, including expansive municipal government and high-rise office buildings. The area has been undergoing a redevelopment process for the past few years, converting older buildings which had been vacant into offices and retail establishments. In fact, the median project was one element of an organized downtown revitalization effort. This corridor previously consisted of four undivided travel lanes and angle parking at the curbs. Installation of the median required that the parking be changed to a parallel configuration, since the project involved no additional right-of-way. As a part of the parking reconfiguration, pairs of parallel parking spaces were separated by eight-foot by eight-foot no parking areas. This feature facilitates easier parallel parking on the street, allowing more vehicles to pull into spaces head-first. The median segments are one block in length, with openings at all street intersections. The southern end of the corridor is comprised of a police station, court house, and parking areas. Immediately to the north is a concentration of attorney offices, mixed with some retail businesses. The central portion of the corridor is comprised primarily of retail businesses, while the northern end is primarily office buildings.

Figures 29 and 30 show the mix of establishments on the Grant Avenue corridor. Figure 29 illustrates the Grant Avenue cross section and the abutting land uses along the northern two-thirds of the corridor. An example of the parallel parking configuration is presented in figure 30.



Figure 29. Northbound Grant Avenue at 4th Street



Figure 30. A Typical Parallel Parking Configuration Along Grant Avenue

4.4 ADDITIONAL SITES OF INTEREST

During this year of the study, the research team also investigated other potential case studies. These locations are discussed in this section, and key characteristics of each location are shown in table 3. For various reasons, these corridors were not included in the methodology testing.

4.4.1 71st Street (Tulsa, Oklahoma)

Over the past several years, the city of Tulsa of population 400,000 has been involved in a project to widen and add raised medians along 1st Street. These medians are being installed in segments of approximately 1.6 km (1.0 mi) each, between principal arterials. The overall series of projects is about 6.4 km (4.0 mi) in length, bounded on the east by Memorial Drive and on the west by Lewis Avenue. The first medians were installed at the intersection of Harvard Avenue and 71st Street from 1993 to 1995. The next segment of the 71st Street project was between Yale Avenue to Harvard Avenue from 1995 to 1997. The segment between Harvard Avenue and Lewis Avenue was under construction at the time of this study. Contract letting for the Sheridan Road to Yale Avenue segment was anticipated to be September 1998, with a May 1999 completion date. The research team will consider using at least one of these segments in a future year of this study.

Figures 31 through 33 illustrate examples of median segments on 71st Street in Tulsa. Figure 31 shows the type of development on 71st Street at Memorial Drive, as well as the construction zone. A typical construction scene and development mix on 71st Street between Memorial Drive and Sheridan Road are presented in figure 32. Figure 33 shows a long segment of 71st Street west of Harvard Avenue. The foreground of figure 33 shows a typical construction scene, while the background shows an older completed median beyond Lewis Avenue.

Table 3. Additional Sites of Interest

Street Name	City and State	Before Const.	After Const.	Age (years)	Length (km)	Land Use	Reason for Not Including
71 st Street	Tulsa, Oklahoma	Undivided	Raised Median	Varies (under construction to 3 years)	6.4	Retail, Undeveloped	Budget Constraints
Yale Avenue	Tulsa, Oklahoma	TWLTL	Raised Median	5	1.6	Retail, Office	Budget Constraints
Various	Amarillo, Texas	Raised Medians	TWLTLs	4 to 6	Varies ¹	Retail	Budget Constraints
Loop 323	Tyler, Texas	Depressed Median	Raised Median	Under Construction	5.0	Retail, Undeveloped	Previously Separated by Depressed Median
Various	La Joya, Texas	Raised Medians	TWLTLs	About 30	Varies ¹	Retail	Age

¹There were numerous segments ranging from very short to significant lengths where medians were removed.



Figure 31. Westbound 71st Street at Memorial Drive

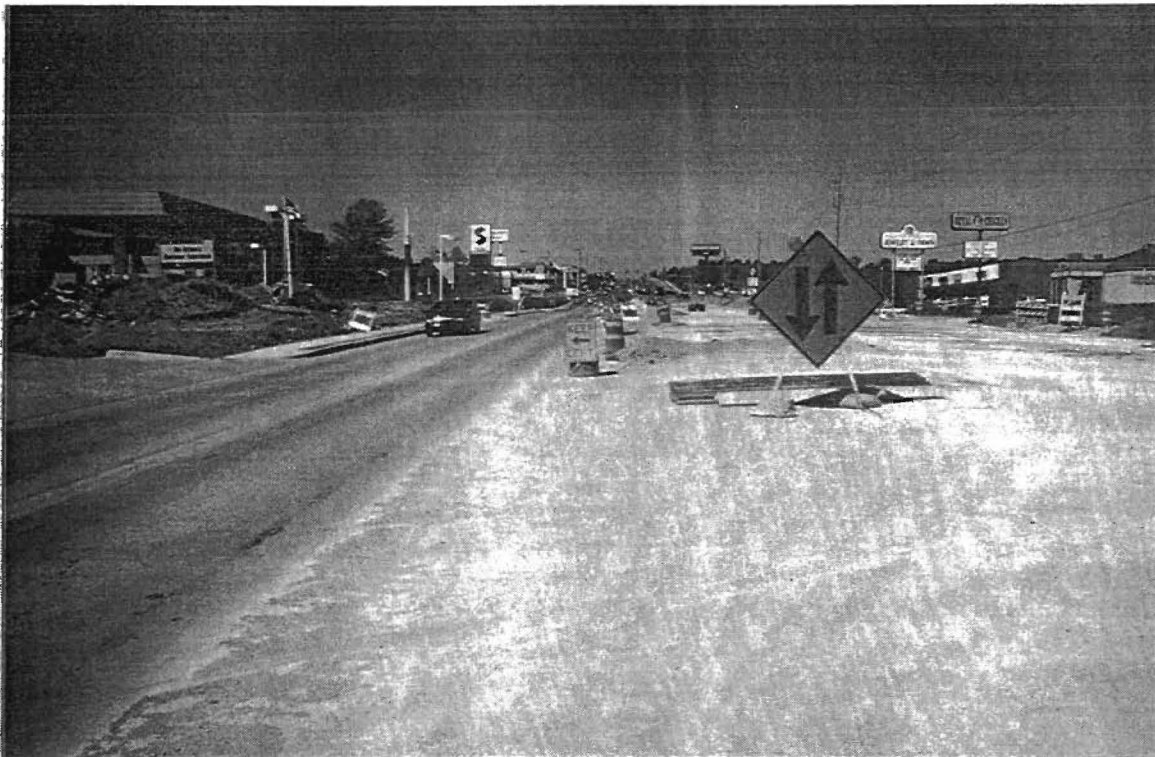


Figure 32. Westbound 71st Street at 69th Avenue



Figure 33. Westbound 71st Street West of Harvard Avenue

4.4.2 Yale Avenue (Tulsa, Oklahoma)

In 1993 the Oklahoma Department of Transportation installed a raised median on Yale Avenue, north and south of 71st Street in Tulsa. This corridor contains a mix of retail and office development as well as some undeveloped land. Yale Avenue also provides additional access to shopping centers which front on 71st Street. The research team may include this corridor in a future year of the study.

Figure 34 illustrates the mix of land uses along Yale Avenue north of 71st Street. There is a significant concentration of retail development on the east side of the street.



Figure 34. Northbound Yale Avenue North of 71st Street

4.4.3 Various Locations (Amarillo, Texas)

A few years ago the City of Amarillo removed numerous medians and portions of medians at various locations. Amarillo is located in the Texas panhandle and has a population of approximately 160,000. As a part of the redefined scope of this study, the research team investigated about 30 sites where partial or complete medians had been removed. In most cases, the removals involved segments of medians at major intersections. It is apparent that such removals were performed to provide more left-turn access to corner lot developments. There are also corridors where entire medians were removed over longer distances. The research team plans to include at least some of these median removal corridors as case studies in a future year of this project.

Figures 35 through 37 illustrate examples of locations where medians have been removed in Amarillo, as well as the abutting land uses. In most of the figures, the locations of the previous medians are visible on the pavement. Figure 35 presents an example of where a portion of a median

was removed just beyond a major intersection. The median removal shown in figure 36 is of a longer distance from the major intersection than some of the examples. Figure 37 shows the remains of a median and the new access available to the adjacent business.



Figure 35. Northbound Georgia Street North of 34th Street



Figure 36. Westbound 34th Street Just East of Coulter Street



Figure 37. Westbound Plains Boulevard at Bell Street

4.4.4 Loop 323 (Tyler, Texas)

During the course of identifying potential case studies, the research team discovered that a raised median was in the process of being installed on Loop 323 in Tyler. Tyler has a population of approximately 80,000 and is located in eastern Texas, about 160 km (100 mi) east of Dallas. The median installation was part of a highway widening project between Texas 31 and Texas 155. This segment of Loop 323 contains a large amount of undeveloped land and a significant amount of retail development. The research team investigated the site, but found out that a large portion of the highway previously had a depressed median. Because a depressed median functions the same as a raised median, being basically non-traversable, the research team did not include Loop 323 in this project.

4.4.5 Various Locations (La Joya, Texas)

The research team investigated a series of median removal projects in La Joya, which is located in southern Texas, west of McAllen. Through this investigation, researchers discovered that these medians were removed as much as 30 or more years ago. For that reason the research team decided not to pursue these corridors as potential case studies for this project.

5.0 RESEARCH STUDY SUPPORT

5.1 BACKGROUND

In the first year of this study, the research team discovered that the survey administration was facilitated by gaining support from the local chamber of commerce in a case study city. Gaining this support from chambers of commerce or appropriate neighborhood/business groups was also desired for the 10 additional case studies obtained in the second year of the research effort. This chapter will describe the agencies and groups involved in supporting the research effort.

5.2 AGENCIES AND GROUPS INVOLVED

Several agencies and groups provided vital support in testing the methodology on the case study corridors. The research team sought and obtained endorsement of the survey instrument and process from chambers of commerce in most of the case study cities. In Houston, chamber of commerce personnel recommended the research team contact neighborhood/business groups for research support and provided contacts. In larger cities such as Houston, neighborhood/business groups provide more support to the research since business owners are tied closer to these associations than to a chamber of commerce. In one of the cities, the chamber of commerce required a presentation to be made to the board of directors. Time constraints prevented such a presentation and no endorsement was obtained.

Generally, a researcher would contact the chamber of commerce and determine who the appropriate person was to write a letter (or sign a letter prepared by the research team) addressed to business owners/managers or undeveloped land owners along the corridor. The research team viewed this step as crucial since it was hypothesized that the businesses would be more willing to participate in a survey if the chambers of commerce endorsed it. The results of this part of the methodology test are presented in Chapter Seven of this report. In all cases, the chambers of commerce were cooperative and all but one of them were able to provide the desired letters. None of the chambers of commerce refused to provide assistance. Appendix C contains two examples of research support

letters. One of them is from the Odessa Chamber of Commerce for Grant Avenue, and the other is from the Spring Branch Revitalization Association for Clay Road in Houston.

Appraisal districts in some of the cities provided significant support in the data collection efforts. They allowed the researchers to use public computer terminals to obtain property value information. The amount and specific types of data available varied among districts. Some of the appraisal districts have more historical data available on their computers than others. In some cases, depending on the age of the project and the amount of historical data available, researchers were able to collect all of the desired data from computers in the appraisal district offices. In at least one case, such minimal data was available on the appraisal district's computer that the research team needed to send a letter requesting additional historical information. To ease the collection of the property value from the appraisal districts for some of the case study locations, the research team obtained compact discs (CDs) from a private company that made this information available. Data were available in this form for larger metropolitan areas.

6.0 DATA COLLECTION

6.1 BACKGROUND

The research team collected various types of data during this test of the methodology. The most obvious data collection was through the survey instruments, but researchers also collected other types of control data. The control data are collected to compare the economic trends on case study corridors to economic trends of the entire community. This comparison provides the research team with the ability to determine if there are other reasons for any changes in economic trends on the corridors other than the installation of the raised median.

6.2 BUSINESS INFORMATION AND PERCEPTIONS (INTERVIEWS AND MAIL-OUT SURVEYS)

The most important aspect of this project is the ability to collect data from business owners and managers regarding issues such as gross sales trends, employment, and their perceptions of impacts. The research team utilized two types of survey techniques during this year of the project, a mail-out survey and an interview survey. Researchers conducted interview surveys on five of the corridors studied in this year of the project and mail-out surveys on five additional corridors. The project budget controlled the number of interview survey corridors since they are more costly to conduct due to travel and staff time requirements. The remainder of the corridor surveys were performed with the mail-out technique because it is a very inexpensive process.

6.3 ADDITIONAL DATA COLLECTION

Property values, unemployment data, and sales tax data are also being collected for the research effort for each case study location. The property value information was collected in this year of the research study effort for each location from the appraisal district office in each respective county. This data will be obtained for use as a control value for comparing the property values along the corridor to trends for the county. For the sites in Wichita Falls, Odessa, and Longview, the

property values were obtained from the county district appraisal office as described in Chapter Five. The property value data for Port Arthur (Jefferson County), McKinney (Collin County), and Houston (Harris County) were obtained from compact discs purchased from a private company.

Unemployment trends have been obtained from the Texas Employment Commission for each city by year to compare the employment trends of businesses along the corridor to the employment trends within a particular city. Therefore, this unemployment data will also serve as control data.

Finally, city sales tax information will be obtained from the State Comptroller's Office for the years and cities of interest. This will provide additional control data by which the corridors in each of these cities may be compared to evaluate any changes in gross sales trends.

7.0 DISCUSSION

7.1 BACKGROUND

The research team spent this year of the research effort primarily on data collection, with analysis of the data to be performed in the next fiscal year. However, the research team did make some preliminary observations and general findings. Most of these observations are related to the process of data collection and survey administration. This chapter of the report discusses the preliminary observations the research team made in reference to the processes involved in collecting the data through two types of survey techniques, interviews and mail-outs.

7.2 OBSERVATIONS AND FINDINGS

The following sections of this report describe several observations and findings about the data collection effort. These discussions will cover participation rates, issues related to mail-out versus personal interviews, and the overall project status. These observations will provide the research team and TxDOT with future implementation of this methodology.

One of the initial considerations of the research team was the ability to obtain valuable data from the business owners (i.e., would business owners be willing to volunteer accurate data?). In addition the research team desired to obtain data from as many respondents as possible. As a result, the team developed two survey instruments—one for interviews and one for mail-outs. Utilizing two types of survey instruments provided useful information with which to compare their effectiveness. Tables 4 and 5 present participation rates for the mail-out surveys and personal interviews, respectively.

To aid in obtaining as much data as possible, given the time and financial constraints of the project, the research team sent mail-out surveys to businesses along five of the case study corridors. This process yielded additional data for the research from different study locations, and provided an opportunity for evaluating different data collection techniques.

Table 4. Participation Rates for Mail-Out Surveys

Street Name	City and State	Number of Parcels		Total Number Sent	Returned Surveys		Participation Rates (Percent)		
		Businesses	Undeveloped Land		Businesses	Undeveloped Land	Businesses	Undeveloped Land	Total
Clay Road	Houston, Texas	61	11	72	8	1	13	9	13
Fuqua Road	Houston, Texas	62	28	90	2	4	3	14	7
Long Point Road	Houston, Texas	35	0	35	6	0	17	N/A	17
Twin Cities Highway	Port Arthur, Texas	90	0	90	5	0	6	N/A	6
9 th Avenue	Port Arthur, Texas	68	23	91	5	3	7	13	9
Totals =		316	62	378	26	8	8	13	9

Table 5. Participation Rates for Personal Interviews

Street Name	City and State	Total Number of Establishments Contacted ¹	Number of Business Participants	Participation Rates (Percent)
Texas Avenue	College Station, Texas	130	95	73
South Post Oak Road	Houston, Texas	50	19 ²	36
University Drive	McKinney, Texas	47	29	62
Loop 281	Longview, Texas	40	22	55
Call Field Road	Wichita Falls, Texas	27	17	63
Grant Avenue	Odessa, Texas	21	15	71
Totals =		315	197	62

¹There were no undeveloped land parcels along any of the corridors except South Post Oak Road. This corridor had three such parcels, but two of them requested a mail-out survey and one was not able to be contacted.

²Nine additional surveys not reflected here were received from the South Post Oak Road businesses. These were from individuals who had requested that they be sent a survey instead of performing a personal interview, or responses to surveys sent to many of the businesses along South Post Oak Road if there was difficulty contacting them.

The participation rates for the five mail-out surveys performed in the second year of the research effort are illustrated in Table 4. This table breaks down the participation rate by corridor and parcel type (e.g., business or undeveloped land). The participation rates ranged from 6 to 17 percent. Overall, the total participation rate for both businesses and undeveloped land was nine percent. It is important to note that surveys were sent to all businesses and undeveloped land owners identified along the corridor during the windshield survey and through the appraisal district data. Therefore, businesses that moved, did not want to participate, or were not likely to be affected by the median were not removed from the mailing list prior to sending the surveys. Since the mail-out surveys were relatively low cost, the time was not taken to remove these individuals from the list. Further, it was possible that some of these establishments may provide additional information of interest. The result is that the participation rates are lower than they would have been had these businesses been removed from the original sample.

It should also be noted that the Spring Branch area is in the process of revitalizing the areas near the Clay Road and Long Point Road corridors in Houston. The Spring Branch Revitalization Association was conducting public hearings discussing the plans for the Long Point Road corridor and also discussing the economic developments and revitalization along Clay Road. The research team was able to attend one such meeting. It is likely that these ongoing and current efforts in this area supported the relatively higher participation rates of these corridors.

Finally, for a very small cost, the research team sent out reminder cards about three to four weeks after the mail-out surveys were originally sent. This reminder did seem to help in obtaining a response from some businesses and undeveloped land owners as a few more surveys were received. It also prompted several individuals to call the research team and thank them for the reminder. Usually these individuals would simply respond that they regretted to inform the researchers that they did not believe their information would be of value since their business had arrived so far after the completion of the raised median. However, this was still useful to the research team because these individuals could sometimes supply anecdotal information of use about the corridor, and it helped in keeping track of what business or undeveloped land owners had participated or not participated.

Table 5, previously presented, displays the participation rates for the personal interviews in the five other case study corridors from this year of the study as well as the original test of the methodology in the first year of the study along Texas Avenue. The participation rates are generally much higher when performing personal interviews than mailing out the surveys. The participation rates range from 36 percent (South Post Oak Road) to 73 percent (Texas Avenue). It is expected that the participation rates along South Post Oak Road could be relatively low because the raised median was installed at least eight years prior to the survey administration. In addition the site was located in a very large city rather than a smaller community where business and undeveloped land owners may be more likely to take time to sit through a personal interview. Along Texas Avenue in College Station, the proximity to the Texas A&M University campus and the fact construction was underway during the research project, are the likely reasons for that higher participation rate.

There were only three undeveloped land parcels along the South Post Oak Road case study location. The land owners for two of these three parcels were contacted, but they requested a survey be mailed to them. Although these surveys were mailed out, unfortunately they were not returned.

Many of the business owners along South Post Oak Road requested that the survey be mailed to them after they were not willing to participate in a personal interview survey. In addition, mail-out surveys were sent to many of the businesses along South Post Oak Road if there was difficulty contacting them. Of these additional surveys mailed out, nine surveys were returned for the South Post Oak Road corridor.

Table 5 contains the number of business establishments that were contacted and the number of businesses that participated in the personal interviews. Some of the business owners that were contacted simply did not want to participate. Numerous owners claimed their businesses were not affected by the median installations. Further, some owners or managers failed to show up for the scheduled interview. The research team recorded this information and will evaluate any possible trends in these responses (e.g., a particular type of business does not want to participate and/or does not feel the median installation would affect their business type) and the impacts on participation rates.

Although the data have not been thoroughly analyzed yet, the research team's preliminary observation is that the personal interviews provide the researcher with more reliable and more useful data than the mail-out surveys. Being with the interviewee reduces confusion about how to answer questions, and, after a comfortable conversation is begun, the business and undeveloped land owners appear likely to provide the best information, data, and first-hand accounts of any economic impacts.

7.3 PROJECT STATUS

This report has summarized the site selection and data collection performed in the second year of this four-year research study. During this past year of research, the research team identified 10 corridors on which to apply the methodology and perform surveys to obtain data about the economic impacts of raised medians. These locations are located in cities throughout Texas. In the third year of the research effort, the research team will analyze the data from these sites. In the final year of the research, the Texas Avenue corridor in College Station, Texas, will be revisited and data will be collected in the post-construction phase since the construction has been completed. This data will be compared with the data collected at this location in the first year of the research effort. In the final

year of the research, the research team will also collect data, if time and financial resources allow, and construction is complete on two of the corridors identified in the second year of the study where pre-construction data was collected. The research team may also perform additional before and after studies on additional corridors.

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APPENDIX A
SAMPLE PERSONAL INTERVIEW
BUSINESS IMPACT SURVEY

Date _____

Texas Transportation Institute

CONFIDENTIAL

Texas A & M University System
College Station, Texas 77843-3135

Code No. _____

**ECONOMIC IMPACT OF MEDIAN DESIGN ALONG SOUTH POST OAK ROAD
(BUSINESS IMPACT SURVEY)**

Houston, Texas

Purpose of Survey

The Texas Transportation Institute (TTI) is studying the economic impact of raised median installation along South Post Oak Road in Houston, Texas, from I-610 to South Main for the Texas Department of Transportation (TxDOT). TxDOT requires the findings of an impartial study to aid in planning median design projects that maximize positive impacts and minimize negative impacts during and after construction, especially on abutting businesses and undeveloped land. **ALL ANSWERS TO THE FOLLOWING QUESTIONS WILL BE HELD CONFIDENTIAL.** Your name or the name of your business will not be used in any way that would identify you.

Thank you very much for your time in filling out this important survey!

1. When did this business begin operations at this location?

Month Year

2. What is the primary type of business?

Durables Retail___ Specialty Retail___ Grocery___ Convenience___
Gas Station___ Conv/Gas Station___ Fast-food Restaurant___ Sit-down Restaurant___
Bar/Tavern___ Hotel___ Medical___ Other Services___
Other___ describe:_____

If both retail sales and service, please provide:
Percent sales ___ Percent service ___

3. Please indicate the location of the nearest median opening. In other words, how do your customers enter/exit your business—at a midblock median opening or through a street intersection?

Midblock___ Street Intersection___

4. What do you believe is the percentage of your customers who are passerby customers and those who intend on stopping at your business? Passerby customers are those customers that are not intending to stop at your particular business (i.e., impulse customers) as opposed to planned stops by customers that had intended on stopping at your business.

Percent passerby traffic___ Percent planned stop___

5. Prior to the median installation, what do you believe was the percentage of your customers who were passerby customers and those that intended on stopping at your business?

Percent passerby traffic___ Percent planned stop___

6. What do you believe is the reason for the difference, if any, in the percentages you reported in questions 4 and 5?

7. Do you believe your regular customers have remained about the same, are more likely, or have been less likely to visit your business due to the raised median?

Less likely More likely Stayed about the same

8. Please rank the following considerations in ascending order from "1" to "6" (with "1" being the most important) that consumers use when selecting a business of your type:

Distance to Travel	Hours of Operation	Customer Service	Product Quality	Product Price	Accessibility to Store
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9. How many people are employed by your business? Please give the average annual number, including working owner and/or manager. Construction years are shown in **bold**.

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Full-time	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___
Part-time	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___

For questions 10 through 18:

- Please give your best estimate of the percentage impact, up or down, on your business.
- If you do not think there was a large change during the construction or if there has not been a large change after the installation, please mark an "X" for "No Change."
- Please place an "X" for "Not Sure" if you are uncertain about what the effect was during construction or is now after the installation.

During and after the construction, has there been a change in:

10. Your number of customers per day?

	During Construction (As compared to Before Construction)	After Installation (As compared to Before Construction)
Percent Increase	_____ %	_____ %
No Change	_____	_____
Percent Decrease	_____ %	_____ %
Not Sure	_____	_____

11. Your number of full-time employees?

	During Construction (As compared to Before Construction)	After Installation (As compared to Before Construction)
Percent Increase	_____%	_____%
No Change	_____	_____
Percent Decrease	_____%	_____%
Not Sure	_____	_____

12. Your number of part-time employees?

	During Construction (As compared to Before Construction)	After Installation (As compared to Before Construction)
Percent Increase	_____%	_____%
No Change	_____	_____
Percent Decrease	_____%	_____%
Not Sure	_____	_____

13. Your gross sales?

	During Construction (As compared to Before Construction)	After Installation (As compared to Before Construction)
Percent Increase	_____%	_____%
No Change	_____	_____
Percent Decrease	_____%	_____%
Not Sure	_____	_____

14. Your property values?

	During Construction (As compared to Before Construction)	After Installation (As compared to Before Construction)
Percent Increase	_____%	_____%
No Change	_____	_____
Percent Decrease	_____%	_____%
Not Sure	_____	_____

15. The number of accidents along the portion of South Post Oak Road where the median was installed?

	During Construction (As compared to Before Construction)	After Installation (As compared to Before Construction)
Percent Increase	_____%	_____%
No Change	_____	_____
Percent Decrease	_____%	_____%
Not Sure	_____	_____

16. The traffic volumes along the portion of South Post Oak Road where the median was installed?

	During Construction (As compared to Before Construction)	After Installation (As compared to Before Construction)
Percent Increase	_____%	_____%
No Change	_____	_____
Percent Decrease	_____%	_____%
Not Sure	_____	_____

17. Gross sales for all businesses along the portion of South Post Oak Road where the median was installed?

	During Construction (As compared to Before Construction)	After Installation (As compared to Before Construction)
Percent Increase	_____ %	_____ %
No Change	_____	_____
Percent Decrease	_____ %	_____ %
Not Sure	_____	_____

18. Gross sales for all other businesses in this area of Houston due to the installation of the raised median?

	During Construction (As compared to Before Construction)	After Installation (As compared to Before Construction)
Percent Increase	_____ %	_____ %
No Change	_____	_____
Percent Decrease	_____ %	_____ %
Not Sure	_____	_____

19. Please indicate below, whether you feel the installation of the raised median has made the following items "Better," "Worse," or about "The Same" as before the median was installed.

	Better	Worse	The Same
a. Traffic Congestion	_____	_____	_____
b. Traffic Safety	_____	_____	_____
c. Property Access	_____	_____	_____
d. Business Opportunities	_____	_____	_____
e. Customer Satisfaction	_____	_____	_____
f. Delivery Convenience	_____	_____	_____

20. Please indicate with an "X" the appropriate range of annual gross sales for each year of this business. This information provides the researchers with a range by which to evaluate the trend in economic activity due to the raised median installation. Construction years are shown in bold.

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Less than \$100,000	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___
\$100,000 to \$250,000	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___
\$250,000 to \$500,000	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___
\$500,000 to \$1,000,000	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___
\$1,000,000 to \$1,500,000	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___
\$1,500,000 to \$2,000,000	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___
\$2,000,000 to \$2,500,000	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___
\$2,500,000 to \$3,000,000	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___
\$3,000,000 to \$3,500,000	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___
\$3,500,000 to \$4,000,000	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___
\$4,000,000 to \$4,500,000	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___
\$4,500,000 to \$5,000,000	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___
More than \$5,000,000	___	___	___	___	___	___	___	___	___	___	___	___	___	___	___

21. Please indicate below the change in percentage of business sales activity that occurred at this business between the years shown. Construction years are in **bold**.
- Please give your best estimate of the percentage impact, up or down, on your business.
 - If you do not think there was a change, please mark an "X" for "No Change."
 - Please place an "X" for "Not Sure" if you are uncertain about what the change was.

	1983-1984	1984-1985	1985-1986	1986-1987	1987-1988	1988-1989	1989-1990
Percentage Increase	_____ %	_____ %	_____ %	_____ %	_____ %	_____ %	_____ %
No Change	_____	_____	_____	_____	_____	_____	_____
Percentage Decrease	_____ %	_____ %	_____ %	_____ %	_____ %	_____ %	_____ %
Not Sure	_____	_____	_____	_____	_____	_____	_____
	1990-1991	1991-1992	1992-1993	1993-1994	1994-1995	1995-1996	1996-1997
Percentage Increase	_____ %	_____ %	_____ %	_____ %	_____ %	_____ %	_____ %
No Change	_____	_____	_____	_____	_____	_____	_____
Percentage Decrease	_____ %	_____ %	_____ %	_____ %	_____ %	_____ %	_____ %
Not Sure	_____	_____	_____	_____	_____	_____	_____

22. What do you believe is the reason for the changes from year to year as you have indicated in question 21.

23. Please indicate the extent of your involvement in the public hearing and public meeting process for this median installation project by placing an "X" next to the appropriate category below.

High (attended several meetings) _____
 Somewhat high involvement _____
 Moderate involvement _____
 Somewhat low involvement _____
 Low involvement _____

24. Please use this space to discuss any additional thoughts you may have about the raised median installation along South Post Oak Road. There is more space available on the next page if necessary.

Once again, thank you very much for your time in completing this important survey!

24. Demeanor of person surveyed:

- Extremely positive
- Positive
- Neutral
- Negative
- Extremely negative

APPENDIX B
SAMPLE PERSONAL INTERVIEW
UNDEVELOPED LAND SURVEY

Date _____

Texas Transportation Institute
Texas A & M University System
College Station, Texas 77843-3135

CONFIDENTIAL
Code No. _____

**ECONOMIC IMPACT OF MEDIAN DESIGN ALONG SOUTH POST OAK ROAD
(UNDEVELOPED LAND SURVEY)**

Houston, Texas

Purpose of Survey

The Texas Transportation Institute (TTI) is studying the economic impact of raised median installation along South Post Oak Road in Houston, Texas, for the Texas Department of Transportation (TxDOT). TxDOT requires the findings of an impartial study to aid in planning median design projects that maximize positive impacts and minimize negative impacts during and after construction, especially on abutting businesses and undeveloped land. ALL ANSWERS TO THE FOLLOWING QUESTIONS WILL BE HELD CONFIDENTIAL. Your name will not be used in any way that would identify you.

Thank you very much for your time in filling out this important survey!

1. Do you own more than one parcel of undeveloped land on South Post Oak Road where the median was installed?

No _____ Yes _____

If yes, please specify the locations of all parcels of land that you own along this portion of South Post Oak Road. Please complete this survey for each parcel of undeveloped land you own.

2. When did you purchase this property?

Month Year
____ _

3. What is the area (square footage or acreage) of the property you own?

_____ Square feet or _____ acres

4. What is the length of your property along South Post Oak Road?

_____ Feet

5. Did you lose some of your property due to the widening of South Post Oak Road?

Yes _____ No _____

If yes, how much? _____ Square feet or _____ acres Not sure _____

6. Do you believe that the installation of the raised median caused the time it takes to access your property to:

Increase _____ Decrease _____ Not Change _____

7. Do you believe that your property is now more attractive or less attractive to potential buyers after the raised median has been installed?

More Attractive _____ Less Attractive _____

8. Do you believe that the addition of the raised median on South Post Oak Road has affected the potential types of development on your property?

Yes _____ No _____

If yes, please explain:

9. Has your property's value per square foot or acre been affected by the installation of a raised median?

Yes _____ No _____

If yes, Up _____ Down _____ Percent Up or Down _____

10. Has your property's value per square foot or acre been affected by the roadway widening and/or loss of property?

Yes _____ No _____

If yes, Up _____ Down _____ Percent Up or Down _____

11. Please indicate the location of the nearest median opening that provides access to your land. In other words, how are your future motorists likely going to enter/exit your land—at a midblock median opening or through a street intersection?

MidBlock_____ Street Intersection_____

For questions 12 through 15:

- Please give your best estimate of the percentage impact, up or down, on your land.
- If you do not think there was a large change during the construction or if there has not been a large change after the installation, please mark an "X" for "No Change."
- Please place an "X" for "Not Sure" if you are uncertain about what the effect was during construction or is now after the installation.

During and after construction, what change do you anticipate in:

12. The number of accidents along the portion of South Post Oak Road where the median was installed?

	During Construction (As compared to Before Construction)	After Installation (As compared to Before Construction)
Percent Increase	_____%	_____%
No Change	_____	_____
Percent Decrease	_____%	_____%
Not Sure	_____	_____

13. The traffic volumes along the portion of South Post Oak Road where the median was installed?

	During Construction (As compared to Before Construction)	After Installation (As compared to Before Construction)
Percent Increase	_____%	_____%
No Change	_____	_____
Percent Decrease	_____%	_____%
Not Sure	_____	_____

14. Gross sales for all businesses along the portion of South Post Oak Road where the median was installed?

	During Construction (As compared to Before Construction)	After Installation (As compared to Before Construction)
Percent Increase	_____%	_____%
No Change	_____	_____
Percent Decrease	_____%	_____%
Not Sure	_____	_____

15. Gross sales for all businesses in the area adjacent to the portion of the South Post Oak Road where the median was installed?

	During Construction (As compared to Before Construction)	After Installation (As compared to Before Construction)
Percent Increase	_____%	_____%
No Change	_____	_____
Percent Decrease	_____%	_____%
Not Sure	_____	_____

16. Please indicate below, whether you feel the installation of the raised median has made the following items "Better," "Worse," or about "The Same" as before the median was installed.

		Better	Worse	The Same
g.	Traffic Congestion	_____	_____	_____
h.	Traffic Safety	_____	_____	_____
i.	Property Access	_____	_____	_____
j.	Business Opportunities	_____	_____	_____
k.	Customer Satisfaction	_____	_____	_____
l.	Delivery Convenience	_____	_____	_____

17. Please indicate the extent of your involvement in the public hearing and public meeting process for this median installation project by placing an "X" next to the appropriate category below.

- High (attended several meetings) _____
- Somewhat high involvement _____
- Moderate involvement _____
- Somewhat low involvement _____
- Low involvement _____

18. Please use this space to discuss any additional thoughts you may have about the raised median installation along South Post Oak Road. Please attach an additional page if necessary.

Once again, thank you very much for your time in completing this important survey!

19. Demeanor of person surveyed:

- Extremely positive
- Positive
- Neutral
- Negative
- Extremely negative

APPENDIX C
SAMPLE RESEARCH SUPPORT LETTERS



Chamber of Commerce

July 20, 1998

Executive Committee

Carolyn Tripp
Chairman

Guy Andrews
Chairman-Elect

Russell N. McInturff
Past Chairman

Ed Barham
Vice Chairman

Raymond Chavez
Vice Chairman

Gary Clark
Vice Chairman

W. R. "Bro" Hill
Vice Chairman

Ron Prince
Vice Chairman

Mike George
CEO/President

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Website:
www.odessachamber.com

e-mail:
info@odessachamber.com
info@odessacvb.com
info@odessaecodev.com

Dear Business Owner and/or Manager:

As you are aware, several years ago the Texas Department of Transportation (TxDOT) installed a raised median on US385 (Grant Avenue) between Business Loop 20 (Second Street) and Eighth Street. One of the purposes of installing the raised median was to facilitate safe traffic flow along the corridor while controlling left-turn maneuvers along Grant Avenue. TxDOT is interested in determining the economic impacts that the addition of the raised median might have on businesses along streets where they have installed raised medians. To gain that insight, TxDOT has contracted with the Texas Transportation Institute (TTI) to develop a methodology that can be used to identify and study these potential impacts. TTI is a research agency within the Texas A&M University System.

There have been limited studies performed regarding the economic impacts of raised medians on businesses. Therefore, this research is pivotal in adding to the foundation of knowledge for determining if there are any economic impacts (positive or negative). One of TTI's major tasks for this project is to prepare surveys and conduct them with representatives of businesses along Grant Avenue. TTI would like to compare retail sales trends, property value trends, and/or rental rate trends over a period of time before the median installation and after the installation. Some of this information can only be accurately obtained from the businesses themselves. Additional questions will relate to other potential business impacts.

The Chamber of Commerce is also interested in the economic impacts a raised median will have on adjacent businesses. Therefore, we are supportive of TxDOT's initiative to study this issue including the survey to be performed by TTI. Staff from TTI will be contacting your business in July or August to schedule time to meet with someone from your business and conduct the survey. The survey interview should take about thirty minutes. Please join us in cooperating when TTI calls to set up an appointment and when they visit with you to conduct the survey.

Thank you for your time and consideration regarding this important issue affecting the Odessa business community. If you have any questions, please feel free to contact me at 915-332-9111, or Bill Frawley (the TTI research supervisor) at 817-277-5503.

Sincerely,

Carolyn Tripp
Chairman

CT:ew



June 11, 1998

SUBJECT: CLAY ROAD MEDIAN SURVEY

Dear Clay Road Business Owner:

Recently, the City of Houston widened Clay Road from the Sam Houston Tollway to Hempstead Road. A raised median was built in the center that was intended to:

- Improve safety;
- Control left turn movements; and,
- Improve traffic flow.

The Texas Department of Transportation (TxDOT) has contracted with the Texas Transportation Institute (TTI) to study the economic impact which the improvement may have had on adjacent businesses. TTI is a research agency within the Texas A&M University System.

The Spring Branch Revitalization Association encourages you to take about thirty minutes to fill out the attached survey. The results will be tabulated by TTI to evaluate gross sales trends, property value trends, employment trends and other potential business impacts. Your prompt response and return in the attached self addressed stamped envelope is greatly appreciated. If you have any questions, please contact me at (713) 621-2011 or Mr. Bill Eisele at TTI, (409) 845-8550.

Sincerely:

Clark Martinson
President, Spring Branch Revitalization Association