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16. Abstract

The objective of this four-year research effort is to develop and test a methodology to estimate the economic impacts of median design. This report summarizes the activities performed in the third year of this project. The primary task in the third year of the project was to analyze the data collected in the second year of the project at 10 additional case study locations. Analysis, discussion, and conclusions are provided in this report regarding key economic variables of interest including employment trends, gross sales, and property values for these 10 case study locations.

The results of this research effort will provide insight to planners, engineers, and researchers investigating the economic impacts of raised median projects. This information is expected to be especially useful in communicating potential impacts to business and property owners prior to construction.

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A METHODOLOGY FOR DETERMINING ECONOMIC IMPACTS OF RAISED MEDIANS: DATA ANALYSIS ON ADDITIONAL CASE STUDIES

by

William L. Eisele, P.E.
Assistant Research Engineer
Texas Transportation Institute

and

William E. Frawley, A.I.C.P.
Associate Research Scientist
Texas Transportation Institute

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TEXAS TRANSPORTATION INSTITUTE
The Texas A&M University System
College Station, Texas 77843-3135

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.

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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 mid-block 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 landowners.

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 project 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 project, 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 the second year of the project, 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. In the third year of the project, the data obtained in the second year were analyzed. In the fourth and final year of the research effort, post-construction data will be collected along Texas Avenue, and the analyses will be completed.

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 landowners 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 two-way left-turn lane (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. This section 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 and second years of this project (1,2).

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 are 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 are 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 is 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 are collected at one time (post-construction period), while the data for the before-and-after technique are 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 project, data were collected before construction had begun. These sites were Call Field Road in Wichita Falls and Long Point Road in Houston. For the other eight additional case studies identified in the second year of the project, 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 landowners affected by a median installation. In the first year of the project, 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. An example of this revised survey instrument is shown in Appendix A for South Post Oak Road in Houston.

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 project at the additional case study locations. An example of an undeveloped land survey used along the Clay Road corridor in Houston is shown in Appendix B. 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.

1.3.4 Administer Suggested Surveying Techniques

Participants in the survey included business owners/managers and undeveloped landowners 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 project. 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 landowners 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 project, 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 project.

1.3.6 Develop Methodology for Estimating Economic Impacts

In the first year of the project, 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. The steps to the methodology are shown in Chapter 2.0.

1.3.7 Identify Additional 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, 10 additional case study locations were added. These include sites in the cities of Houston, Port Arthur, McKinney, Longview, Odessa, and Wichita Falls. The characteristics of these sites are summarized in Chapter 2.0.

1.3.8 Collect and Analyze 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 gross sales and employment trend data. The research team performed the data analysis in the third year on the data obtained in the second year. Chapter 3.0 and subsequent appendices in this report provide these analyses.

1.3.9 Organization of Report

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

- Chapter 1.0, Introduction: Provides an introduction to the research topic and presents the research objectives and scope.

- Chapter 2.0, Methodology, Case Studies, and Data Collection: Provides information regarding the methodology used for the research effort, describes the case study locations selected in the second year of the research effort, and describes the data collection and response rate information.

- Chapter 3.0, Analyses Results: Provides the analysis results of the data collected in the second year of the project.

- Chapter 4.0, Discussion and Conclusions: Provides concluding comments, discussion, and conclusions based upon the research project through the third year.

- Chapter 5.0, References: Provides a listing of the references used in this report.

2.0 METHODOLOGY, CASE STUDIES, AND DATA COLLECTION

2.1 INTRODUCTION

In the first year of this project, 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 the second year of this project, the research team sought additional case study locations on which to test the methodology for estimating the economic impacts of median design. After investigating several potential case study locations, the research team selected sites in the following cities: McKinney, Longview, Wichita Falls, Odessa, Houston, and Port Arthur. The research team identified and collected data at 10 additional case study locations. The third year of the project is being used to analyze the data collected in the additional case study locations identified in the second year. The final year of the research effort will be used to collect post-construction data along Texas Avenue in College Station and complete all analyses.

2.2 METHODOLOGY

The primary purpose of this research project is the development of a methodology to determine if there are any economic impacts on adjacent businesses when a raised median is installed. The research team developed a methodology and tested it on a case study in the first year of the project. After analyzing the procedures and results of that test, the research team revised the methodology and tested it on 10 case studies in the second year of the project. The current methodology, consisting of eight main steps, provides a logical structure by which the user can identify case studies and collect and analyze data. The steps of the methodology are:

- identify sites (cities) with potential corridors;
- Identify corridor characteristics;
- contact sources of information;
- inventory businesses and establishments along the subject corridor;
- obtain information about businesses;

- prioritize businesses to be surveyed;
- collect data by personal interviews; and
- analyze and summarize data.

Details of each step are presented in the first two reports prepared as part of this research effort (1,2). Collecting data by personal interviews is quite labor intensive, but it provides a much greater participation rate than mail-out surveys, as well as higher quality data. The most complex of these steps is the final one, which contains several subsets involved in various aspects of data analysis.

2.3 CASE STUDIES

2.3.1 Background and Selection Criteria

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, metropolitan planning organization, city, etc.) 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 methodology. Preferable corridors included those with medians constructed in the last five years and that 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 looked into median removals in Amarillo and Port Arthur.

2.3.2 Site Investigations

Site Visits

At least one researcher visited each corridor to obtain a perspective of the type of development. 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 71st 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.

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 storefronts. 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.

Photographing the Corridors

The business inventory process also included photographing the corridors. Researchers took slides of the roadway cross sections, as well as examples of adjacent businesses and associated driveways. The researchers used the slides as a record of specific attributes of the corridors. The slides provided an opportunity for members of the research team and other interested individuals to view the corridors.

2.3.3 Corridor Descriptions

The 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 project reflect a variety of population sizes. The populations range from approximately 35,000 in McKinney to approximately 1.8 million in the city of Houston. Table 2-1 summarizes several different characteristics of interest for each of the 11 case studies. The table includes the Texas Avenue corridor from the first year of the research project.

2.4 RESEARCH PROJECT SUPPORT

In the first year of this project, the research team discovered that the survey administration was facilitated by gaining support from the local chamber of commerce in the 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.

2.4.1 Agencies and Groups Involved

Chambers of Commerce

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.

Table 2-1. Case Study Locations.

Street Name	City and Population	Before Constr.	After Constr.	Study Limits	Length (km)	Age	Survey Type	Land Use	Number of Establishments
Texas Avenue	College Sta. 64,119	TWLTL	Raised Median	University Dr. to Dominik Dr.	2.4	Under Constr.	Interview	Retail, University	130
South Post Oak Road	Houston 1,841,064	Undivided	Raised Median	I-610 to South Main Street	2.4	8	Interview	Retail, Industrial	155
Clay Road	Houston 1,841,064	Undivided	Raised Median	Hollister Road to Gessner Road	3.6	2	Mail-out	Retail, Industrial, Undeveloped	63
West Fuqua Road	Houston 1,841,064	Undivided	Raised Median	Hiram Clarke Road to Almeda Road	2.4	9	Mail-out	Retail, Undeveloped	68
Long Point Road	Houston 1,841,064	Undivided	Raised Median	Campbell Road to Hollister Road	1.1	Pre-constr.	Mail-out	Retail	41
Twin Cities Highway	Port Arthur 58,582	Raised Median	TWLTL	53rd Street to Griffing Park	3.2	13	Mail-out	Retail, Office	90
9th Avenue	Port Arthur 58,582	Undivided	Raised Median	Texas 365 to Lake Arthur Drive	2.4	18	Mail-out	Retail, Residential, Undeveloped	66
University Drive	McKinney 34,979	Undivided	Raised Median	U.S. 75 to Texas Highway 5	2.2	6	Interview	Retail, Residential	132
Loop 281	Longview 75,973	Flush Median	Raised Median	Spur 63 to Spur 502	1.0	2	Interview	Retail	65
Call Field Road	Wichita Falls 98,161	Undivided	Raised Median	Kemp Blvd to Lawrence Street	0.5	Pre-constr.	Interview	Retail	55
Grant Avenue	Odessa 95,384	Undivided	Raised Median	2nd Street to 8th Street	1.0	6	Interview	Retail, Office	42

Process to Obtain Support

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 landowners 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. 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.

Appraisal Districts

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 were 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 from a private company that made this information available. Data were available in this form primarily for larger metropolitan areas.

2.5 DATA COLLECTION

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 2-2 and 2-3 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.

2.5.1 Mail-Out Surveys

The participation rates for the five mail-out surveys performed in the second year of the research effort are illustrated in Table 2-2. 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. Surveys were sent to all businesses and undeveloped landowners 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.

Table 2-2. 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%
9th Avenue	Port Arthur, Texas	68	23	91	5	3	7%	13%	9%
Totals =		316	62	378	26	8	8%	13%	9%

Table 2-3. 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%

[1]There 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.
[2]Nine 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.

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 landowners 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 businesses or undeveloped landowners had participated or not participated.

2.5.2 Personal Interview Surveys

Table 2-3, previously presented, displays the participation rates for the personal interviews in the five other case study corridors from this year of the project as well as the original test of the methodology in the first year of the project 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 owners and undeveloped landowners may be more likely to the 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 such a high participation rate.

3.0 ANALYSES RESULTS

3.1 INTRODUCTION

This chapter will present and describe the analyses results obtained from the 10 case study locations. Figure 3-1 illustrates the sequence of data analyses that were performed. There were primarily five components in the analysis as shown in each block of the figure. Supplemental data for each step are shown in the respective appendix listed in Figure 3-1. The sections that follow will describe each of these analyses steps in more detail as well as present the research results.

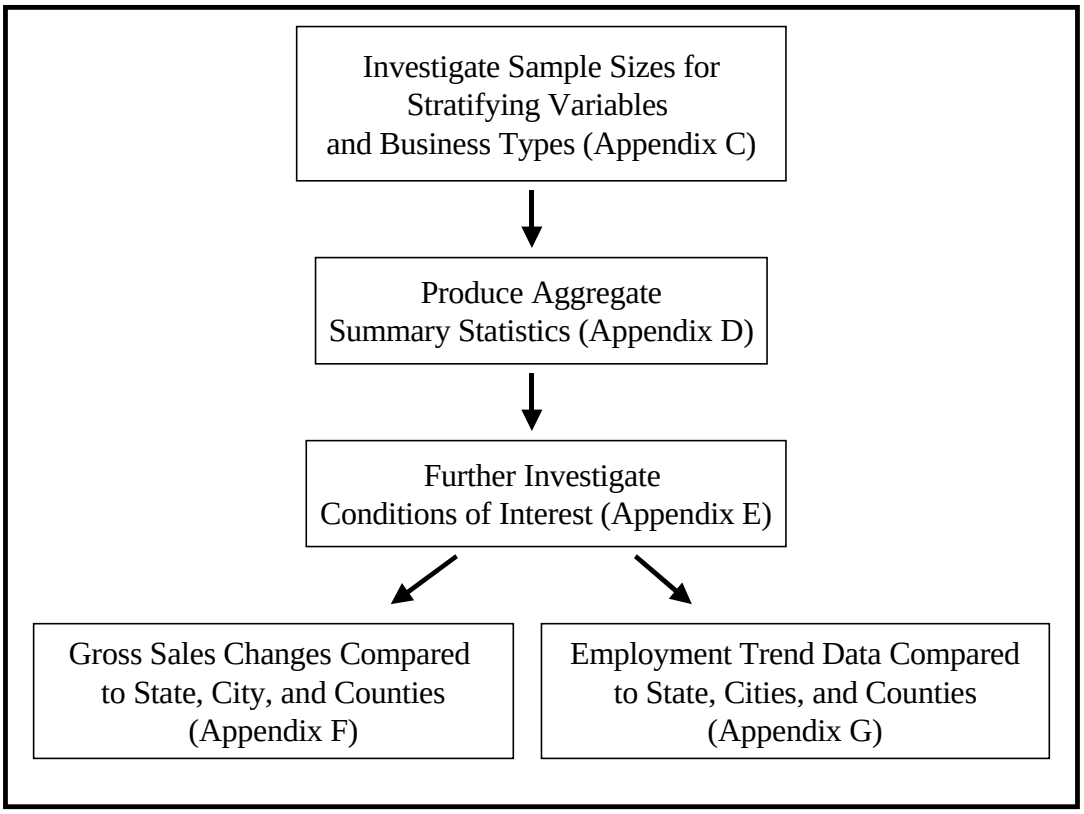

Figure 3-1. Data Analyses Procedure.

3.2 DATA REDUCTION AND QUALITY CONTROL

Ensuring that the data were recorded reliably and consistently from the survey instruments was of importance to the research team. To ensure the reliability, one individual recorded the survey results

into an Excel spreadsheet. The analyses were then performed by reading the data into the statistical software SAS in which all data analyses were performed.

It should be noted that the data obtained in the first year of the project along Texas Avenue in College Station were not incorporated into the analyses that follow. This was because the survey instruments for the Texas Avenue study and the 10 case studies added in the second year were inconsistent. This inconsistency resulted as the survey instrument was changed as the data collection methodology was enhanced. When appropriate, references are made to the results prior to the construction of the raised median in College Station along Texas Avenue from year one of this project. The final year of this research effort will include the completed analysis of the Texas Avenue corridor including the post-construction data.

3.3 SAMPLE SIZES FOR STRATIFYING VARIABLES AND BUSINESS TYPES

The first step of the analysis was to obtain sample size information for the stratifying variables of interest. These stratifying variables included the business type, when the business arrived along the corridor relative to the median installation, whether the business was at a mid-block or street intersection location, if the business was in a shopping center or was a stand-alone establishment, and combinations of these stratifying variables.

The stratifying variable, "when the business arrived along the corridor relative to the median installation," is termed "business group" throughout this report. The four business groups are as defined in Figure 3-2. All the subsequent analysis is performed by breaking up the data into these business groups. For example, the results of those businesses in group one–those present before, during, and after construction–can be compared with those in group two, where the raised median has yet to be installed. Group one includes the sites in McKinney, Longview, Odessa, and South Post Oak Road (Houston), West Fuqua Road (Houston), Clay Road (Houston), and 9th Avenue (Port Arthur). Group two includes the sites in Wichita Falls and Long Point Road (Houston) where the surveys were performed prior to the construction of the raised median. Group three includes data from McKinney, Longview, Odessa, Clay Road (Houston), and 9th Avenue (Port Arthur). Finally, group four data were obtained from McKinney, Longview, Odessa, South Post Oak (Houston),

Fuqua Road (Houston), Clay Road (Houston), and 9th Avenue (Port Arthur). Recall that Twin Cities Highway in Port Arthur is where the median removal was performed, and analyses on that corridor are discussed later in this chapter.

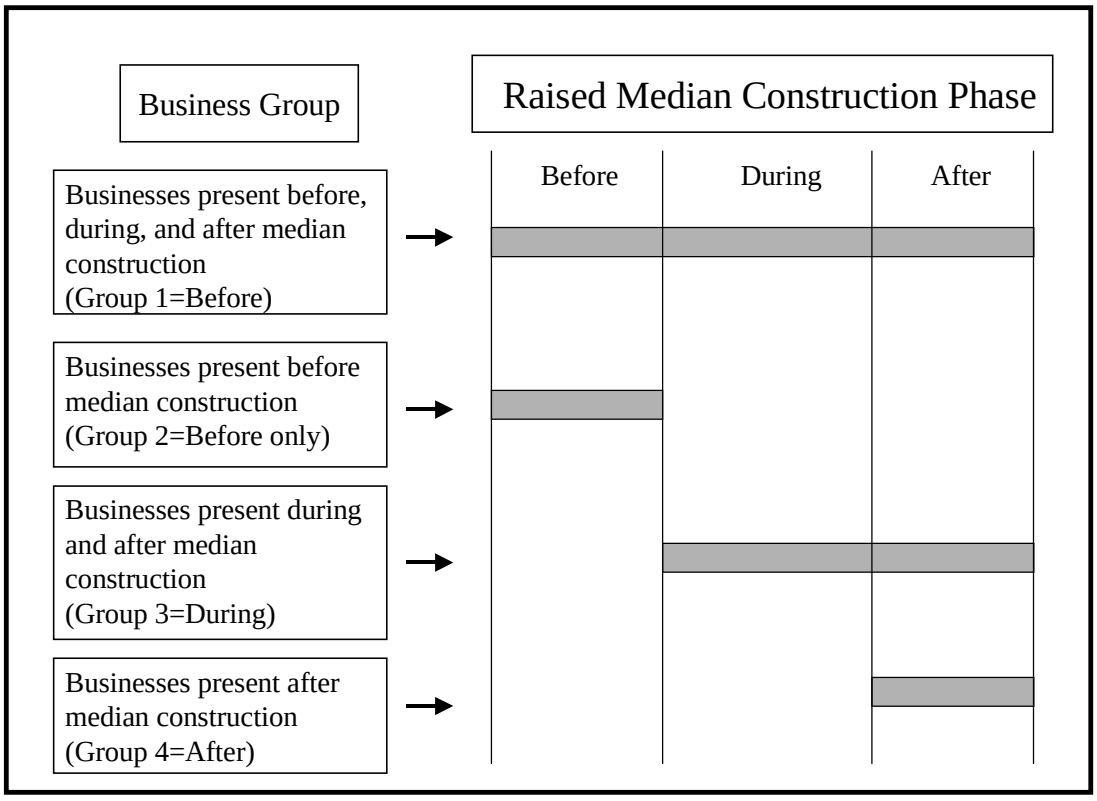

Figure 3-2. Business Groups as Defined by Raised Median Construction Phase.

Table 3-1 illustrates the sample sizes by business group, and shows that there are 129 total business surveys analyzed. The table presents the sample size information by case study corridor.

Table 3-1. Business Group Sample Sizes by Site.

Business Group	McKinney	Longview	Wichita Falls	Odessa	South Post Oak Road	Long Point Road	Fuqua Road	Clay Road	9th Ave	Total
1	10	18	0	8	13	0	1	3	0	53
2	0	0	17	0	0	6	0	0	0	23
3	3	2	0	1	0	0	0	2	1	9
4	12	2	0	5	17	0	1	3	4	44
Totals =	25	22	17	14	30	6	2	8	5	129

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Of particular interest is the amount of sample for each business type. Table 3-2 presents the sample size breakdown for each type of business for the four business groups. Hair salons are the only business type not represented in the 54 observations available for business group one ("before" group). Limited sample size (n=9) is also evident for the "during" business group (group three). It should be noted that there are a total of 133 surveys in the sample shown in Table 3-2 rather than 129 shown in Table 3-1. This difference is due to the four additional surveys for Twin Cities Highway in Port Arthur. Table 3-3 presents the sample size information for each business type by case study location. Appendix C includes additional sample size information by stratifying variables of interest. The reader is encouraged to review Appendix C for additional sample size information including:

- shopping centers and stand-alone businesses by business group;
- personal interviews and mail-out surveys by business group;
- closest business access along the corridor by business group;
- business type by closest access location; and
- business type by building type.

Table 3-2. Sample Sizes for Business Type by Business Group.

Business Group	Durables Retail	Specialty Retail	Grocery	Gas Stations	Fast-food Rest.	Sit-down Rest.	Medical	Auto Repair	Hair Salon	Other Services	Other	Total
1	2	20	1	2	8	4	3	6	0	5	3	54
2	1	8	2	1	1	1	3	1	3	2	0	23
3	1	1	0	1	1	1	1	0	1	2	0	9
4	4	14	2	1	2	7	1	0	2	13	1	47
Totals =	8	43	5	5	12	13	8	7	6	22	4	133

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table 3-3. Sample Sizes for Business Type by Site.

Site	Durables Retail	Specialty Retail	Grocery	Gas Stations	Fast-food Rest.	Sit-down Rest.	Medical	Auto Repair	Hair Salon	Other Services	Other	Total
McKinney	1	4	2	2	7	6	0	0	1	2	0	25
Longview	2	14	0	0	2	4	0	0	0	0	0	22
Wichita Falls	1	8	1	1	1	0	1	0	2	2	0	17
Odessa	2	6	0	0	0	1	1	1	2	1	0	14
South Post Oak Rd.	1	8	0	1	0	1	2	3	0	10	4	30
Long Point Road	0	0	1	0	0	1	2	1	1	0	0	6
Fuqua Road	1	0	0	0	1	0	0	0	0	0	0	2
Clay Road	0	1	0	1	1	0	1	2	0	2	0	8
9th Avenue	0	0	1	0	0	0	0	0	0	4	0	5
Twin Cities Highway	0	2	0	0	0	0	1	0	0	1	0	4
Totals =	8	43	5	5	12	13	8	7	6	22	4	133

3.4 STATISTICAL SIGNIFICANCE OF ANALYSES AND RESPONSE BIAS

The target population for all the corridors included all the businesses and establishments adjacent to the corridors in the project. Random sampling of such a small population would require mathematically involved statistics. However, for this project, it was possible to contact the entire population along the corridor. In spite of this, complete information for the whole population was not obtained because some business managers chose not to answer some or all of the questions. Whether the information obtained from those who chose to respond is representative of the whole population is open to speculation. Respondents themselves selected whether or not to respond to the survey and thus were not chosen at random. Therefore, statistical tests based on random sampling do not answer the question of whether the number of respondents was appropriate for inferences about the whole population. Furthermore, there is an inherent response bias in the collected data since not all businesses completed a survey. Even though the information may not fully represent the whole population, this was the most complete information that was available.

3.5 AGGREGATE SUMMARY STATISTICS

The next step in the analysis shown in Figure 3-1 was to produce aggregate summary statistics of the survey questions of interest. The questions that were investigated include changes in the following:

- passerby traffic;
- relative importance of access;
- raised median installation on regular customers;
- full- and part-time employees, property values, accidents, traffic volume, customers per day, gross sales, gross sales where median installed, and gross sales in the area;
- traffic congestion, traffic safety, property access, business opportunities, customer satisfaction, and delivery convenience; and
- extent of public involvement.

3.5.1 Impacts on Passerby Traffic

Changes in passerby traffic, or "impulse buyers," are often of interest when considering the impacts of raised medians. The usual perception of business owners is that the raised median will restrict the amount of passerby traffic as motorists are required to take a more circuitous route to get to their business. Table 3-4 presents the change in passerby traffic for each business group. It is interesting to note that the passerby traffic percentage is zero for those businesses in group one that were present before, during, and after the raised median installation. Conversely, the perception of those individuals in group two that were present prior to the raised median installation expected an average of a five percent increase in passerby traffic. In addition, those business owners that arrived during the construction phase (group three) indicated a nearly three percent decrease in passerby traffic. Finally, those individuals that arrived after the raised median installation (group four) indicated a perception that passerby traffic would have increased by 12.0 percent, although the change was found to be zero percent with the group one business owners. Appendix D shows additional statistics for each of these business groups including the number of observations, minimum values, and maximum values.

Table 3-4. Percent Change and Sample Size for Passerby Traffic by Business Group.

Business Group	Percent Change Standard Deviation
1	0.0% 33
2	5.0% 5
3	-2.9% 7
4	12.0% 6

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Additional analyses regarding passerby traffic for each business type and business group were also performed. Table E-1 of Appendix E presents this information. For many of the cells, sample sizes are relatively low or even missing. However, for the "before" group businesses (group one), it was observed that fast-food restaurants and other services indicated an increase in passerby traffic. Specialty retail, auto repair, and one gasoline station indicated a decrease in passerby traffic. Sit-down restaurants, medical, one grocery, and one durables retail business indicated no change in passerby traffic.

3.5.2 Impacts on Importance of Access to Customers

Question eight of the survey shown in Appendix A asked business owners to rank "accessibility to store" with other factors including, distance to travel, hours of operation, customer service, product quality, and product price in ascending order that customers use when selecting a business of their type. The results of this analysis by business group are shown in Table 3-5. "Accessibility to store" ranked fourth or lower for each business group. Further, some combination of customer service, product quality, and product price was always first, second, and third. 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 business owners themselves. This was also the finding in the first year of this project when evaluating the results of the Texas Avenue data.

Table 3-5. Relative Importance Ranking of "Accessibility to Store" by Business Group.

Business Group	Distance to Travel	Hours of Operation	Customer Service	Product Quality	Product Price	Accessibility to Store
1	6	5	1	2	3	4
2	6	5	1	2	3	4
3	5	4	2	1	3	6
4	5	6	1	2	3	4

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

There was also interest in further evaluating the ranking of accessibility by business type and business group and in discovering what types of businesses ranked accessibility third or higher. Tables with this information are shown in Appendix E (Tables E-2 and E-3). Findings from these tables include:

- "Accessibility to store" ranked fourth or lower for all conditions except fast-food restaurants where it was ranked third.

- Specialty retail business owners prior to construction (group two) had similar perceptions as those that were present before, during, and after the median installation (group one).

- Sample sizes were limited when stratifying down to whether an establishment was a shopping center or stand-alone business. There was only one observation for those businesses that arrived during the construction of the median (business group three) for specialty retail, fast-food restaurants, and sit-down restaurants, and accessibility was ranked sixth for each.

- Though sample sizes were limited, specialty retail located mid-block and at street intersections as well as sit-down restaurants at street intersections ranked accessibility as first.

3.5.3 Impacts on Regular Customers

Another question of particular interest on the survey was business owners' perceptions of the impacts on regular customers due to the raised median installation. The results of the responses to this question are shown in Table 3-6 for each business group. It is interesting to note that the business owners' perceptions of those individuals that were present prior to construction where construction has not yet begun (group two) indicated a larger percentage of "less likely" (19.0 percent) than those businesses that were present before, during, and after construction (group one) which indicated "less likely" for 6.4 percent. The highest impact was noted for those individuals that arrived during the construction period (22.2 percent).

Table 3-6. Percent and Frequency of Raised Median Installation Impacts on Regular Customers by Business Group.

Business Group	Less Likely	More Likely	Stay About the Same
1	6.4% 3	19.1% 9	74.5% 35
2	19.0% 4	14.3% 3	66.7% 14
3	22.2% 2	11.1% 1	66.7% 6
4	13.3% 4	26.7% 8	60.0% 18

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Analysis was then performed to investigate the impacts on regular customers depending upon whether the business was located at a mid-block or street intersection location, business type, and whether it was located in a shopping center. These results are shown in Appendix E as Tables E-4 and E-5 for review of the reader. Highlights of these tables include:

- The majority (91.6 percent) of mid-block businesses indicated that they felt the number of regular customers would stay the same for group one businesses present before, during, and after the median installation. For group two businesses (before only) this percentage was only 57.1 percent, and there were more that indicated it would be more likely that their regular customers would endorse their business.

- The majority of street intersection businesses from group one believed that their regular customers would "stay the same" at 59.1 percent, and that number was lower than what was expected in the group two business group where it was 81.8 percent. There was an increase in the number of "more likely" responses in the group one business owners.

- For street intersection access locations, the "less likely" responses were more numerous (28.6 percent) for those businesses that arrived during construction relative to mid-block access businesses where no responses were received indicating "less likely."

- Sample sizes were reduced when the analyses were performed by business; however, in general, the by business results are very similar to the totals (i.e., "stay the same" receiving a majority).

- It is difficult to assess the impact of whether a business is located in a shopping center or stand-alone facility, and slightly more than half (12 of 22) of the group one businesses indicating "stay the same" were in shopping centers. For street intersection businesses, a majority were in shopping centers that indicated "stay the same" (11 of 13).

3.5.4 Impacts on Number of Employees, Property Values, Accidents, and Traffic Volume

Impacts upon the number of employees, property values, accidents, and traffic volume were also of interest. Results of these factors by business group are shown in Table 3-7. The "during" column in Table 3-7 indicates the impacts during construction relative to prior to the construction, and the "after" column indicates the impacts after construction relative to prior to the construction. For all business groups, after the construction period there has been at least a small growth in the number of full-time employees. Part-time employees decreased for business groups one and two after construction relative to prior to construction. It also decreased during construction relative to before construction (i.e., "during" group is higher than the "before" group). Property values were indicated as increasing 7.7 percent after the raised median installation by those business owners present before, during, and after the raised median installation (group one), while the perception of the group two businesses was that there would be a decrease. The business owners also generally indicated a decrease in the number of accidents after the median was installed. The group four businesses (after) perceived that the number of accidents was likely higher by 6.7 percent. This is an interesting contrast to the group one business owners that were actually present before, during, and after the median installation. Finally, traffic volumes were indicated as higher after the raised median installation and lower during the construction, relative to before the construction, for all business

groups. Appendix D includes additional statistics related to these parameters including sample size, minimum values, and maximum values. Further analysis related to employee trends is included in a later section of this chapter as well.

Table 3-7. Percent Change and Standard Deviation of Full- and Part-time Employees, Property Values, Accidents, and Traffic Volumes by Business Group.

Business Group	Full-time Employees		Part-time Employees		Property Values		Accidents		Traffic Volume	
	During	After	During	After	During	After	During	After	During	After
1	11.9% 32.5	0.1% 9.5	-2.3% 20.2	-3.3% 12.6	1.8% 11.4	7.7% 17.0	6.6% 27.2	-12.7% 30.4	-13.5% 22.8	37.6% 55.8
2	-0.3% 1.1	0.3% 7.8	-0.2% 0.9	-1.0% 4.9	-8.2% 22.5	-2.3% 11.8	-3.3% 23.0	-13.2% 33.5	-11.1% 25.0	7.9% 20.5
3	-8.3% 20.4	12.5% 30.6	-8.3% 20.4	0.0% 0	-7.0% 15.7	5.5% 8.1	-10.0% 22.4	-15.0% 33.5	-11.7% 31.9	34.2% 19.6
4	0% 0	7.1% 18.9	0.0% 0	6.3% 17.7	-15.6% 22.4	7.7% 12.9	0.0% 0	6.7% 18.6	-21.9% 23.9	37.7% 89.3

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.
Note: The "during" column indicates impacts during construction relative to prior to construction, and the "after" column indicates impacts after construction relative to prior to construction.

3.5.5 Impacts on Customers per Day and Gross Sales

Table 3-8 illustrates the impacts on customers per day and gross sales for the four business groups. "Gross sales where the median installed" refers to a question posed to business owners in which they were asked what they believe was/is the impact of the raised median for all businesses along the corridor where the median was installed. "Gross sales in the area" refers to a similar question that asked about gross sales for all other businesses in the area (not necessarily just the corridor) due to the raised median installation. One can quickly notice from Table 3-8 that the construction phase did seem to impact customers per day and gross sales as evidenced from the values in the "during" columns. Perceptions again seem to indicate a larger expected loss in the group two businesses indicating an 18.6 percent reduction while those that were present before, during, and after the median installation (group one) noted a 10.7 percent reduction. The "before" group also indicated an increase in customers per day and gross sales after the median installation while the "before only"

businesses believed that there would still be a decrease. The "before" group also indicated an increase after the median was installed for all businesses along the corridor where the median was installed and in the community surrounding the roadway improvement. Appendix D provides additional data and statistics related to the information presented in Table 3-8 as well. Additional information about gross sales is presented in a later section of this chapter.

Table 3-8. Percent Change and Standard Deviation of Customers per Day, Gross Sales, Gross Sales Along the Portion Where the Median Was (Will Be) Located, and Gross Sales in the Area.

Business Group	Customers per Day		Gross Sales		Gross Sales Where Median Installed		Gross Sales in the Area	
	During	After	During	After	During	After	During	After
1	-12.1% 29.2	24.4% 119.0	-10.7% 23.1	0.2% 1.3	-15.8% 18.4	9.4% 21.6	10.0% 16.9	1.5% 7.9
2	-9.5% 31.8	-5.9% 10.0	-18.6% 24.8	-0.8% 1.6	-14.2% 17.2	5.4% 22.9	11.8% 14.5	2.7% 6.0
3	-16.7% 25.8	-8.6% 22.7	-20.0% 27.4	-0.1% 1.3	-10.8% 19.6	10.0% 20.0	5.0% 12.2	-6.0% 13.4
4	0.0% 0	50.0% 105.6	0.0% –	0.3% 1.5	-20.4% 17.7	12.9% 18.1	9.5% 13.7	5.9% 13.8

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.
Note: The "during" column indicates impacts during construction relative to prior to construction, and the "after" column indicates impacts after construction relative to prior to construction.

3.5.6 Impacts on Customers per Day, Gross Sales, and Property Values by Business Type

Table 3-9 provides results of analyses for group one businesses that have been present before, during, and after the median installation. The table presents the average percent change, standard deviation, and sample size by business type. The data presented in the table indicate that the construction phase can have impacts upon customers per day, gross sales, and property values for many of the business types interviewed. It is interesting to note that business types such as specialty retail (e.g., clothing stores, bookstores, hobby-related stores, etc.), fast-food restaurants, and sit-down restaurants indicated increasing customers per day, gross sales, and property values after the median

installation. The gas stations, auto repair, and other service businesses indicated decreasing customers per day and gross sales after the raised median was installed.

Table 3-9. Summary of Percent Change, Standard Deviation, and Sample Size for Customers per Day, Gross Sales, and Property Values by Business Type for Businesses Present Before, During, and After Raised Median Installation (Group One).

Business Type	Percent Change in Responses of Interest					
	Customers per Day		Gross Sales		Property Values	
	During	After	During	After	During	After
Durables Retail	15.0% – 1	5.0% 0 2	15.0% – 1	1.0% 0 2	0.0% – 1	17.5% 3.5 2
Specialty Retail	-6.8% 14.7 17	7.8% 13.1 17	-4.2% 14.7 17	0.6% 1.0 18	-1.0% 3.2 10	3.7 17.9 13
Gas Station	25.0% 106.1 2	-5.0% 35.4 2	-25.0% 35.4 2	-1.5% 2.1 2	25.0% 35.4 2	30.0% 28.3 2
Fast-food Restaurant	-33.0% 23.9 5	146.3% 291.8 6	-22.0% 29.3 5	0.2% 1.8 5	-1.7% 12.6 3	16.7% 8.8 6
Sit-down Restaurant	-2.5% 5.0 4	1.3% 2.5 4	-1.0% 8.5 3	0.8% 0.5 4	0.0% 0 3	0.0% 0 2
Medical	-10.0% – 1	0.0% – 1	-10.0% – 1	0.0% – 1	-10.0 – 1	30.0% – 1
Auto Repair	-30.0% 24.5 4	-6.3% 12.5 4	-24.0% 25.1 5	-0.6% 1.3 5	3.3% 5.8 3	3.3% 5.8 3
Other Services	-30.0% 39.7 3	-13.3% 11.5 3	-18.3% 50.1 3	-0.7% 2.1 3	10.0% – 1	15.0% – 1

Note: The "during" column indicates impacts during construction relative to prior to construction, and the "after" column indicates impacts after construction relative to prior to construction.

Tables 3-7 through 3-9 provide aggregate results for each business group for the several economic impact measures of interest. Further analysis was performed that investigated these economic impact measures by stratifying variables of interest such as business type, nearest access location (e.g., mid-block or street intersection), and building type (e.g., shopping center or stand-alone). The results of these analyses are shown in Tables E-6 through E-23 in Appendix E. The interested reader is

encouraged to refer to those tables for additional detail; however, some of the highlights of these analyses are summarized here:

- For mid-block, shopping center, and specialty retail businesses, the number of full- and part-time employees was noted as being reduced after the installation of the raised median. The "before only" businesses of this type also had harsher expectations than experienced by those business owners present before, during, and after the installation of the raised median for property values, accidents, customers per day, and gross sales. These business owners also indicated a decrease in their customers per day during construction yet no change in their gross sales during the construction.

- The three responses for sit-down restaurants located at the street intersection for shopping centers indicated a decrease in accidents, no change in customers per day, and a slight increase in gross sales (0.7 percent) after the installation of the raised median. They also noted decreases in the number of customers per day and gross sales during construction.

- Stand-alone auto repair businesses located mid-block indicated decreases in customers per day and gross sales during and after the construction of the raised median.

- Durables retail, gas stations, fast-food restaurants, medical, hair salons, and other service establishments had only one or two observations; however, results for these locations are also shown in Appendix E.

3.5.7 Impacts on Traffic Congestion, Traffic Safety, Property Access, Business Opportunities, Customer Satisfaction, and Delivery Convenience

Question 19 of the survey in Appendix A asked business owners whether the following were better, worse, or the same since the installation of the raised median: traffic congestion, traffic safety, property access, business opportunities, customer satisfaction, and delivery convenience.

Figures 3-3 through 3-6 present the percentage of each of these potential impacts indicating “better,” “the same,” or “worse” for each business group, respectively. The biggest distinctions can be made between Figure 3-3, showing the impacts of businesses that were there before, during, and after the median installation (group one), and Figure 3-4, showing the indications of business owners from businesses prior to construction. It is interesting to note that the group one businesses in Figure 3-3 generally indicated “worse” at lower percentages than those group two businesses in Figure 3-4. In particular, property access is indicated as "worse" for group one businesses at 22.9 percent while higher at 55.6 percent for group two businesses. Similar results are also noticeable for business opportunities, customer satisfaction, and delivery convenience. A similar trend is also present for traffic congestion, though the percent difference between the two business groups is not as large (12.2 percent for group one and 14.3 percent for group two). It should be noted that traffic safety is indicated as “worse” for 8.2 percent of group one businesses while zero percent felt it would be "worse" prior to construction of the median.

Figure 3-5 presents the data for those businesses that arrived during the construction phase. It is interesting to note that they indicate a similar percentage as group one businesses of property access at 22.2 percent as “worse.” Figure 3-6 presents the results of those businesses that were present after the median was installed. Appendix D presents additional statistics including the sample sizes and percentage of respondents indicating “better,” “worse,” or “the same” for the data presented in Figures 3-3 through 3-6.

Additional analyses were performed for traffic congestion, traffic safety, property access, business opportunities, customer satisfaction, and delivery convenience by business group and business type. These results are illustrated in Appendix E in Tables E-24 through E-34. Some of the more interesting points are made here regarding these results, and the reader is asked to review Appendix E for more details:

- For specialty retail businesses, the “before only” business group indicated “worse” more than the “before” group except for traffic safety. This indicates that the perceptions often indicate more impact than has been experienced by businesses. This is especially true for property access which was indicated as “worse” for 85.7 percent of the “before only” group and 21.1 percent of the “before” group.

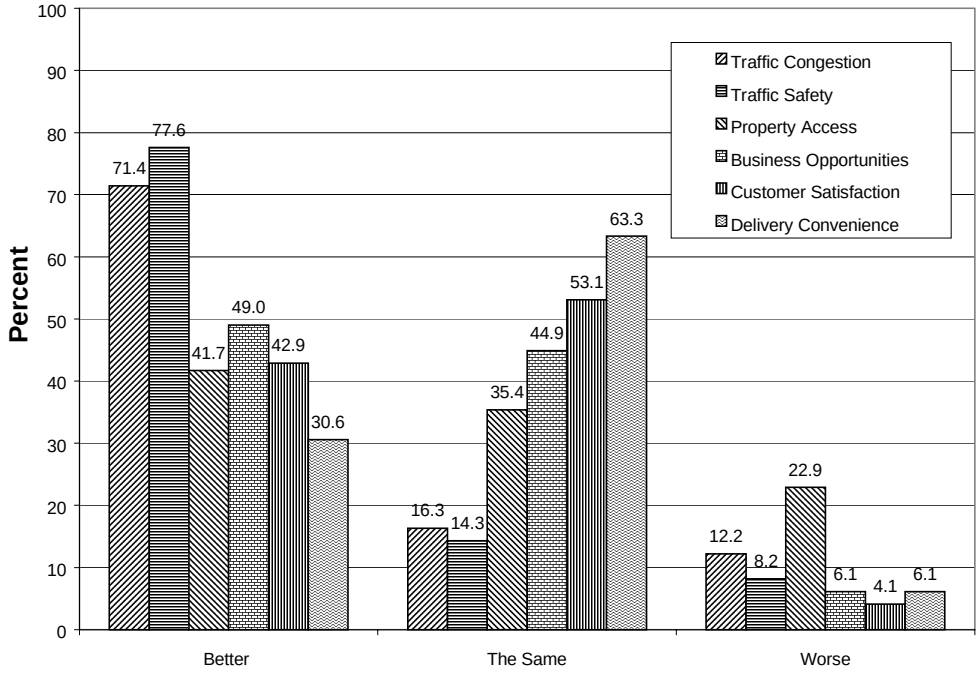

Figure 3-3. Raised Median Impacts of Interest for Group One Businesses.

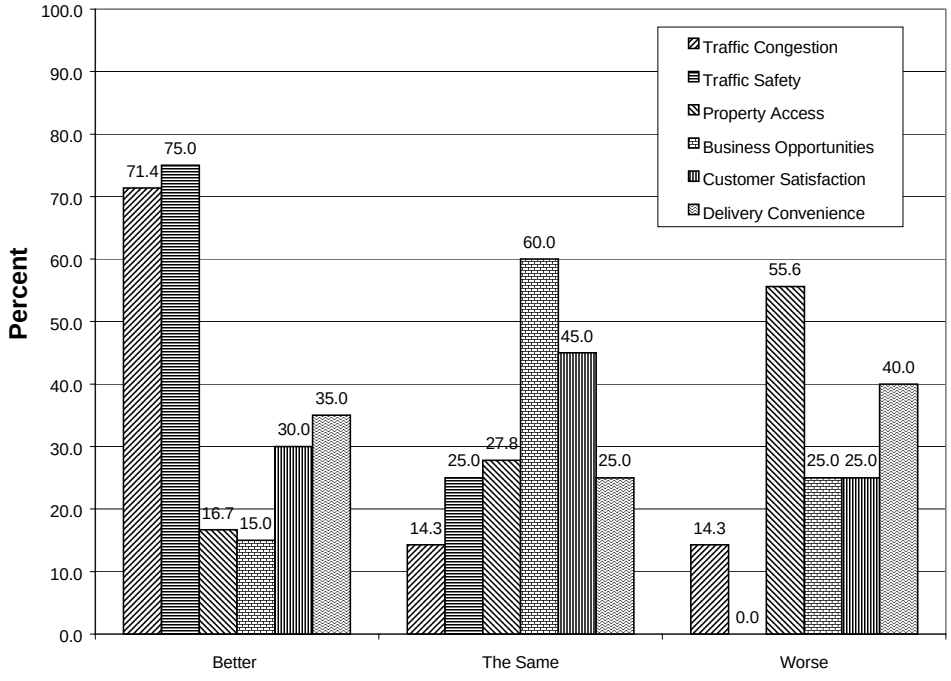

Figure 3-4. Raised Median Impacts of Interest for Group Two Businesses.

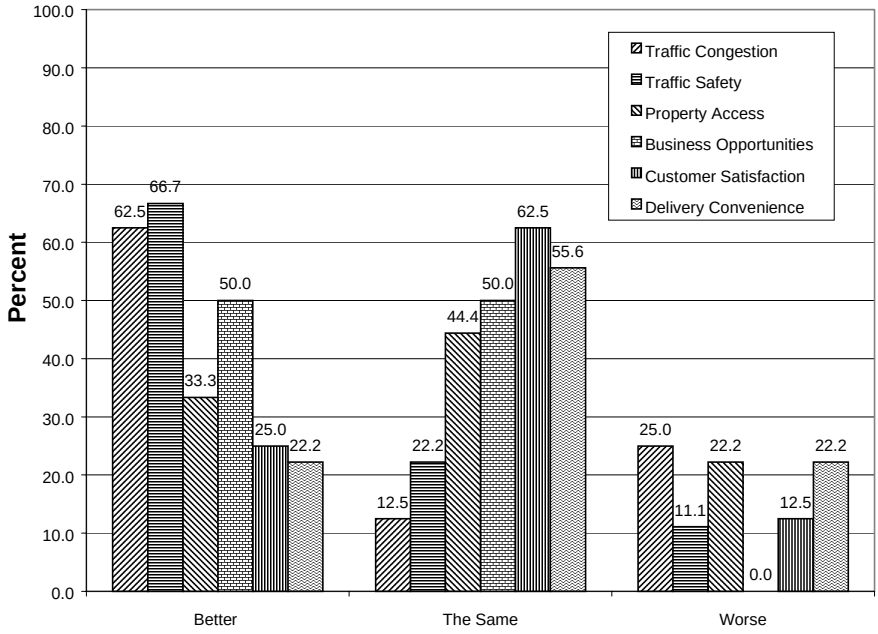

Figure 3-5. Raised Median Impacts of Interest for Group Three Businesses

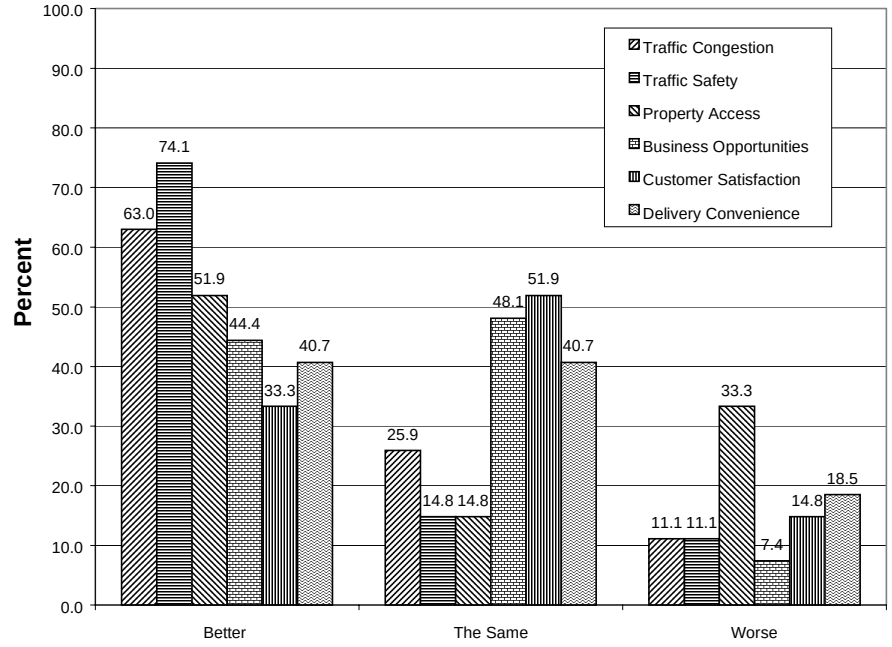

Figure 3-6. Raised Median Impacts of Interest for Group Four Businesses.

- Due to the larger sample sizes in the specialty retail category, results were also produced by stratifying by nearest access location and building type (Table E-25). The results of these tables are similar to those obtained in the aggregate case discussed in the prior bullet point.

- A majority (75.0 percent) of fast-food and sit-down restaurant business owners indicated that the raised median installation resulted in "the same" or "better" access.

- Durables retail, grocery, gas stations, and hair salons had relatively low sample sizes, and the results for these businesses are also provided in Appendix E.

3.6 BUSINESS OWNER'S EXTENT OF PUBLIC INVOLVEMENT

The extent of public involvement during the raised median construction project was also of interest. Table 3-10 illustrates the extent of public involvement by business group. For each of the business groups, "low" was indicated for a majority of the surveys returned or interviews performed. Table E-35 in Appendix E provides additional detail regarding public involvement for group one and two business owners.

Table 3-10. Extent of Public Involvement by Business Group.

Business Group	High	Somewhat High	Moderate	Somewhat Low	Low
1	8.9% 4	6.7% 3	11.1% 5	4.4% 2	68.9% 31
2	20.0% 1	0.0% 0	0.0% 0	0.0% 0	80.0% 4
3	0.0% 0	0.0% 0	0.0% 0	0.0% 0	100.0% 5
4	0.0% 0	0.0% 0	5.0% 1	5.0% 1	90.0% 18

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

3.7 RAISED MEDIAN REMOVAL ANALYSIS

The research team also collected data along Twin Cities Highway in Port Arthur, Texas, where a raised median was removed. This removal was performed from 1983 to 1985. The research team was interested in speaking to the business owners along the Twin Cities Highway corridor to determine the impacts upon their businesses as a result of the raised median being removed. Unfortunately, due to the age of the raised median removal, it was difficult to obtain adequate sample sizes of business owners along the corridor. Further, this corridor was performed as a mail-out survey, which produced lower response rates than the in-person interviews as discussed earlier in this report.

The Twin Cities Highway corridor produced five returned business surveys. One of these survey respondents was present before, during, and after the median installation, yet did not complete a substantial portion of the survey since they were not sure about many of the questions. Three of the surveys were from individuals that arrived along the corridor after the raised median was installed. On one survey, the respondent simply wrote comments on the back. Obviously, it is difficult to draw anything conclusively from these surveys; however, it is interesting to note that one individual felt that the medians should be placed back in along the corridor as they believed that the raised medians would provide a safer corridor for motorists. Another interesting note was made by one business owner that stated the closing of a large "anchor" store in their shopping center impacted their business; however, the reason for the "anchor" store closing is uncertain.

3.8 UNDEVELOPED LAND SURVEY RESULTS

Appendix B presents the survey that was administered by mail to owners of undeveloped land along the corridors where undeveloped parcels exist. A total of eight undeveloped surveys were returned–three from 9th Avenue in Port Arthur, one from Clay Road (Houston), and four from Fuqua Road (Houston).

There were several questions of interest asked in the undeveloped land surveys. Table 3-11 summarizes the responses to these questions for the "before," "during," and "after" undeveloped land groups. The table includes responses to the questions regarding whether the time to access the property changed due to the median installation, if it was more or less attractive, any effects on development possibilities, and also the extent of public involvement. Although sample sizes are rather limited, there is a general indication from the results that the raised median has enhanced the attractiveness of the undeveloped properties. The comments from those responses that indicate a change in the development effects often indicated that it was positive by providing better access and generally looking more attractive. Table 3-12 provides the responses of the undeveloped landowners when asked about traffic congestion, traffic safety, property access, customer satisfaction, and delivery convenience.

Table 3-11. Percent and Sample Size for Time to Access, Attractiveness, Development Affects, and Public Involvement for Undeveloped Land Surveys.

Business Group	Nearest Access	Time to Access				Attractiveness			Development Affects			Public Involvement				
		Increase	Decrease	No Change	Not sure	More	Less	Not sure	Yes	No	Not sure	High	Somewhat high	Moderate	Somewhat low	Low
1	Mid-block	0	0	50.0% 1	50.0% 1	50.0% 1	0	50.0% 1	0	50.0% 1	50.0% 1	0	0	0	0	100.0% 2
1	Street Int.	50.0% 1	0	50.0% 1	0	50.0% 1	50.0% 1	0	0	50.0% 1	50.0% 1	0	0	50.0% 1	0	50.0% 1
3	Not sure	0	0	100.0% 1	0	100.0% 1	0	0	100.0% 1	0	0	0	0	0	0	100.0% 1
4	Not sure	50.0% 1	0	50.0% 1	0	50.0% 1	0	50.0% 1	50.0% 1	0	50.0% 1	0	0	0	50.0% 1	0
4	Street Int.	0	0	100.0% 1	0	100.0% 1	0	0	100.0% 1	0	0	0	0	0	0	100.0% 1

Note: The percentages reported in this table do not always add up to a 100 percent due to missing values for some questions.
Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table 3-12. Percent and Sample Size for Additional Raised Median Impacts of Interest for Undeveloped Land Surveys.

Business Group	Nearest Access	Traffic Congestion			Traffic Safety			Property Access			Business Opportunities			Customer Satisfaction			Delivery Convenience		
		Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same
1	Mid-block	50.0% 1	0	50.0% 1	100.0% 2	0	0	0	50.0% 1	50.0% 1	0	0	50.0% 1	0	0	50.0% 1	0	0	50.0% 1
1	Street Int.	0	50.0% 1	50.0% 1	0	0	100.0% 2	0	50.0% 1	50.0% 1	0	50.0% 1	50.0% 1	0	50.0% 1	50.0% 1	0	50.0% 1	50.0% 1
3	Not sure	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	0	0	100.0% 1	0	0	100.0% 1
4	Not sure	50.0% 1	0	0	100.0% 1	0	0	0	50.0% 1	0	50.0% 1	0	0	50.0% 1	0	0	0	0	50.0% 1
4	Street Int.	100.0% 1	0	0	100.0% 1	0	0	0	0	100.0% 1	0	0	100.0% 1	0	0	50.0% 1	0	0	100.0% 1

Note: The percentages reported in this table do not always add up to a 100 percent due to missing values for some questions.
Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

3.9 ADDITIONAL GROSS SALES ANALYSIS

Appendix F of this report contains additional analysis that was performed to investigate trends in gross sales along the case study corridors compared to the state of Texas averages and the cities and counties of interest. Additional discussion is provided at the beginning of Appendix F that explains the data that are present in the table shown. A couple points of interest from this data include:

- The construction years from 1988 to 1990 appear to have experienced decreasing gross sales along the South Post Oak Road corridor although the city and county did not experience declining gross sales during that time period.

- Around the time of the construction in 1992 along University Drive in McKinney, gross sales seemed to decrease; however, the city and county did not experience decreases during that time period.

- Decreasing gross sales were not experienced along the Longview corridor during the construction phase.

- The Odessa corridor respondents indicated increased gross sales during the construction year of 1992 although the city and county experienced decreasing sales.

- None of the corridors experienced decreasing gross sales after the construction phase except for McKinney, which experienced some decrease in gross sales the year following construction.

- Sample sizes were relatively low for some corridors including Clay Road, Long Point Road, and West Fuqua in Houston and the Port Arthur corridors.

3.10 ADDITIONAL EMPLOYMENT DATA ANALYSIS

Appendix G contains additional analyses that were performed on the employment data collected along the corridors, for the state of Texas, and the cities and counties of interest. Discussion provided at the beginning of Appendix G explains in more detail the contents of the appendix. Important observations from this data include:

- There was always an increase in the number of total employees along several of the corridors including Clay Road (Houston), Long Point Road (Houston), South Post Oak (Houston), University Drive (McKinney), Grant Avenue (Odessa), and 9th Avenue (Port Arthur).

- Those corridors that did experience a decrease in the number of employees only experienced a decrease for one year and not over consecutive years. For those that did experience such a decrease, it did not occur during the construction phase along the corridor.

- Sample sizes were relatively low for West Fuqua Road (Houston) and the two Port Arthur corridors studied.

4.0 DISCUSSION AND CONCLUSIONS

As indicated throughout this report, it should be noted that the sample sizes upon which analyses were performed were often rather small; however, many observations and interesting points may be drawn from this research effort. It should be noted that the observations and percentages reported below for impacts of interest are from surveys administered to business owners. The reader is referred to Chapters 1.0 and 2.0 for further detail regarding the survey administration and data collection. Some of the key points are listed as follows.

- The in-person surveys appear to provide more reliable data than the mail-out surveys, and these survey respondents appreciate the face-to-face opportunity to have their opinions heard. The average response rate for the in-person surveys was also much higher (62.0 percent) than the response rate for the mail-out surveys (9.0 percent).

- When asked to rank order the factors that affect customers endorsing their businesses, business owners generally ranked "accessibility to store" fourth or lower below some combination of customer service, product quality, and product price. It appears 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 to some extent.

- When combining all business types, it was found that 93.6 percent of business owners whose businesses were present before, during, and after the median installation felt that their regular customers would be more likely or stay about the same in likeliness to endorse their business. In contrast, those businesses that were interviewed prior to the installation of the raised median indicated this percentage slightly lower (i.e., indicated more regular customers "less likely") at 81.0 percent. Therefore, for the case studies investigated in this project, the perceptions appear slightly higher than what actually occurred along corridors where business owners were present before, during, and after the median installation.

- There was almost always an increase in the number of total employees along several of the corridors. Those corridors that did experience a decrease in the number of employees only experienced a decrease for one year and not over consecutive years. This decrease often did not coincide with the construction years along the corridor. It was found that business owners were generally quite loyal to employees even during the construction phase.

- Property values were indicated as increasing 7.7 percent after the raised median installation by those business owners present before, during, and after the raised median installation (group one), while the perception of the group two businesses (before only) was that there would be a decrease.

- The construction phase seemed to impact customers per day and gross sales. Perceptions again seem to indicate a larger expected loss in the group two businesses (before only), indicating an 18.6 percent reduction, while those that were present before, during, and after the median installation (group one) noted a 10.7 percent reduction. The "before" group also indicated an increase in customers per day and gross sales after the median installation while the "before only" businesses believed that there would be a decrease. Business types such as specialty retail, fast-food restaurants, and sit-down restaurants indicated increasing customers per day, gross sales, and property values after the median installation. Gas stations, auto repair, and other service businesses indicated decreasing customers per day and gross sales after the raised median was installed.

- The construction phase appears to have the most detrimental impacts on businesses. Suggestions to alleviate these impacts include, 1) ensuring that adequate access is provided to businesses during construction, 2) reduced construction time, and 3) performing construction in smaller roadway segments.

- Overall, public involvement participation was indicated as "low" for 70 percent of the returned business surveys.

One of the greatest challenges to TxDOT staff has been providing information to business and property owners regarding potential economic impacts of raised medians on businesses and properties. TxDOT staff will be able to use the results of this research to explain experiences on these corridors. It will be important for the staff to note that the results of this research will not guarantee any specific economic impacts on particular business or property types but may be used to anticipate general impacts. At a minimum, this information will allow TxDOT staff to discuss these issues with the public using appropriate research data, instead of having to say that they have no idea of what to expect. These results are also anticipated to be of help to other planners, engineers, and researchers investigating these issues or involved in similar median projects. Work in the upcoming final year will provide additional insight when post-construction data collection and analysis are performed along the Texas Avenue corridor in College Station, Texas.

5.0 REFERENCES

1. Eisele, W.L., W.F. Frawley, D.L. Picha, and M.T. Wildenthal. *A Methodology for Determining the Economic Impacts of Raised Medians: Initial Development.* Research Report 3904-1, Texas Transportation Institute, College Station, Texas. October 1997.

2. Eisele, W.L. and W.E. Frawley. *A Methodology for Determining Economic Impacts of Raised Medians: Data Collection for Additional Case Studies.* Research Report 3904-2, Texas Transportation Institute, College Station, Texas. October 1998.

APPENDIX A

Sample Business Impact Survey: Personal Interview for South Post Oak

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
(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 in Houston, Texas, for the Texas Department of Transportation (TxDOT). TxDOT requires the findings of an objective 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. Please take the time to provide thoughtful responses to these survey questions. 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___ Other Services___ Medical___
   Other____ describe:_____
   If both retail sales and service, please provide:
   Percent sales ___ Percent service ___

3. Please indicate the location of the nearest median opening that provides access to your business. In other words, how do your customers enter/exit your business--at a mid-block median opening or through a street intersection?

   Mid-Block____ 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 any difference in the answers you gave 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
___	___	___	___	___	___

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
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 entire portion of South Post Oak 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 entire portion of South Post Oak 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 entire portion of South Post Oak 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 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. Please attach an additional page if necessary.

_____

_____

_____

_____

_____

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

25. Demeanor of person surveyed:

_____ Extremely positive
_____ Positive
_____ Neutral
_____ Negative
_____ Extremely negative

APPENDIX B

Sample Undeveloped Land Survey: Mail-Out for Clay Road

Texas Transportation Institute
Texas A & M University System
College Station, Texas

CONFIDENTIAL
Code No._____

ECONOMIC IMPACT OF MEDIAN DESIGN ALONG CLAY ROAD
(UNDEVELOPED LAND SURVEY)

Houston, Texas

Purpose of Survey

The Texas Transportation Institute (TTI) is studying the economic impact of raised median installation along Clay Road in Houston, Texas, from Beltway 8 to Hempstead for the Texas Department of Transportation (TxDOT). TxDOT requires the findings of an objective 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.

If you did not own your land along this corridor until after the installation of the raised median, your responses, to the best of your knowledge, are still of value to the research effort. If you have any questions about this survey or this research, please contact Bill Eisele at (409) 845-8550 or Bill Frawley at (817) 277-5503.

Thank you very much for your time in filling out this important survey! When you have completed the survey, please return it by mail in the postage paid envelope that is enclosed. Once again, thank you very much!

1. Do you own more than one parcel of undeveloped land on Clay 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 Clay Road. Please complete this survey for each parcel of vacant 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 Clay Road?

   _____ Feet

5. Did you lose some of your property due to the widening of Clay 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 _____ No 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 Clay 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 future motorists likely going to enter/exit your land--at a mid-block median opening or through a street intersection?

Mid-Block____ 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 the construction, has there been a change in:

12. The number of accidents along the portion of Clay 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 Clay 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 Clay 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 Clay 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
1.	Traffic Congestion	_____	_____	_____
2.	Traffic Safety	_____	_____	_____
3.	Property Access	_____	_____	_____
4.	Business Opportunities	_____	_____	_____
5.	Customer Satisfaction	_____	_____	_____
6.	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 Clay Road. There is additional space at the bottom of this page if necessary.

_____

_____

_____

_____

_____

_____

_____

Once again, thank you very much for your time in completing this important survey! Please mail this survey in the postage paid envelope that is enclosed to:

Texas Transportation Institute
Mobility Analysis Program
The Texas A&M University System
College Station, TX 77843-9988

APPENDIX C
Additional Sample Size Information by Stratifying Variables of Interest

Table C-1. Sample Sizes of Shopping Centers and Stand-Alone Businesses by Business Group.

Business Group	Shopping Center	Stand-Alone	Total
1	34	20	54
2	14	9	23
3	6	3	9
4	33	14	47
Totals =	87	46	133

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table C-2. Sample Sizes of Personal Interviews and Mail-Out Surveys by Business Group.

Business Group	Personal Interview	Mail-Out	Total
1	45	9	54
2	17	6	23
3	6	3	9
4	31	16	47
Totals =	99	34	133

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table C-3. Sample Sizes of Closest Business Access Along Corridor by Business Group.

Business Group	Mid-block	Street Intersection	Unknown	Total
1	26	24	1	51
2	7	12	3	22
3	2	7	0	9
4	19	26	0	45
Totals =	54	69	4	127

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table C-4. Sample Sizes for Business Type by Closest Access Location.

Access Location	Durables Retail	Specialty Retail	Grocery	Gas Stations	Fast-food Rest.	Sit-down Rest.	Medical	Auto Repair	Hair Salon	Other Services	Other	Total
Mid-block	3	23	1	1	3	2	4	5	1	9	2	54
Street Int.	5	20	2	4	8	10	4	2	4	10	0	69
Unknown	0	0	1	0	1	1	0	0	1	0	0	4
Totals =	8	43	4	5	12	13	8	7	6	19	2	127

Table C-5. Sample Sizes for Business Type by Building Type.

Building Type	Durables Retail	Specialty Retail	Grocery	Gas Stations	Fast-food Rest.	Sit-down Rest.	Medical	Auto Repair	Hair Salon	Other Services	Other	Total
Shopping Center	4	33	5	0	3	7	8	2	4	17	4	87
Stand-alone	4	10	0	5	9	6	0	5	2	5	0	46
Totals =	8	43	5	5	12	13	8	7	6	22	4	133

APPENDIX D
Additional Detailed Data from Aggregate Summary Statistics

This appendix contains additional detailed data related to aggregate summary statistics as presented in Chapter 3.0. The data are discussed in four sections related to each business grouping as described in the report. These groupings are as follows:

Group One (Before): Businesses present before, during, and after median installation.
Group Two (Before only): Businesses present before the median construction and construction is yet to begin.
Group Three (During): Businesses present during and after median installation.
Group Four (After): Businesses present only after the median has been installed.

The additional data provided related to Tables 3-4, 3-7, and 3-8 include statistics for various variables of interest including sample sizes (N), average (mean), standard deviation, and minimum and maximum values. Additional data are provided in this appendix for Figures 3-3 through 3-6 including sample sizes and percentages of the sample specifying “better,” “worse,” or “the same.”

Additional Detailed Data on Aggregate Summary Statistics for Group One (Before) Businesses

Table D-1. Select Statistics for Several Variables of Interest for Business Group One.

Variable of Interest	N	Mean	Std Dev	Minimum	Maximum
Passerby Traffic	33	0	4.1457810	-15.0000000	10.0000000
Customers Per Day (During)	37	-12.0540541	29.2460310	-75.0000000	100.0000000
Customers Per Day (After)	39	24.3846154	118.9503690	-30.0000000	700.0000000
Full-time Employees (D)	36	11.9444444	32.4978632	-20.0000000	100.0000000
Full-time Employees (A)	37	0.1351351	9.4609201	-33.0000000	28.0000000
Part-time Employees (D)	34	-2.2941176	20.1772891	-100.0000000	50.0000000
Part-time Employees (A)	35	-3.2571429	12.6056543	-67.0000000	0
Gross Sales (D)	38	-10.6578947	23.0584174	-75.0000000	20.0000000
Gross Sales (A)	41	0.1951220	1.2887884	-3.0000000	1.0000000
Property Values (D)	25	1.8000000	11.4455231	-15.0000000	50.0000000
Property Values (A)	31	7.6774194	17.0360150	-50.0000000	50.0000000
Accidents (D)	30	6.6000000	27.1504112	-50.0000000	100.0000000
Accidents (A)	31	-12.7419355	30.3589281	-75.0000000	30.0000000
Traffic Volumes (D)	30	-13.5000000	22.7864903	-65.0000000	50.0000000
Traffic Volumes (A)	33	37.5757576	55.7914814	0	250.0000000
Gross Sales Where Median Installed (D)	33	-15.7878788	18.3962591	-65.0000000	25.0000000
Gross Sales Where Median Installed (A)	31	9.3870968	21.6081426	-25.0000000	100.0000000
Gross Sales In Area Where Installed(D)	22	10.0000000	16.9030851	-20.0000000	65.0000000
Gross Sales In Area Where Installed(A)	18	1.5000000	7.8907988	-15.0000000	20.0000000

Table D-2. Traffic Congestion Statistics for Group One Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	35	71.4	35	71.4
Worse	6	12.2	41	83.7
The Same	8	16.3	49	100.0
Frequency Missing = 4				

Table D-3. Traffic Safety Statistics for Group One Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	38	77.6	38	77.6
Worse	4	8.2	42	85.7
The Same	7	14.3	49	100.0
Frequency Missing = 4				

Table D-4. Property Access Statistics for Group One Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	20	41.7	20	41.7
Worse	11	22.9	31	64.6
The Same	17	35.4	48	100.0
Frequency Missing = 5				

Table D-5. Business Opportunities Statistics for Group One Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	24	49.0	24	49.0
Worse	3	6.1	27	55.1
The Same	22	44.9	49	100.0
Frequency Missing = 4				

Table D-6. Customer Satisfaction Statistics for Group One Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	21	42.9	21	42.9
Worse	2	4.1	23	46.9
The Same	26	53.1	49	100.0
Frequency Missing = 4				

Table D-7. Delivery Convenience Statistics for Group One Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	15	30.6	15	30.6
Worse	3	6.1	18	36.7
The Same	31	63.3	49	100.0
Frequency Missing = 4				

Additional Detailed Data on Aggregate Summary Statistics for Group Two (Before Only) Businesses

Table D-8. Select Statistics for Several Variables of Interest for Business Group Two.

Variable of Interest	N	Mean	Std Dev	Minimum	Maximum
Passerby Traffic	5	5.0000000	11.1803399	0	25.0000000
Customers Per Day (During)	18	-9.5000000	31.8068620	-70.0000000	80.0000000
Customers Per Day (After)	16	-5.9375000	10.0363921	-25.0000000	0
Full-time Employees (D)	19	-0.2631579	1.1470787	-5.0000000	0
Full-time Employees (A)	18	0.2777778	7.7596661	-20.0000000	25.0000000
Part-time Employees (D)	18	-0.2222222	0.9428090	-4.0000000	0
Part-time Employees (A)	17	-1.0000000	4.9497475	-20.0000000	3.0000000
Gross Sales (D)	19	-18.5789474	24.8110992	-80.0000000	5.0000000
Gross Sales (A)	16	-0.8125000	1.5585784	-3.0000000	1.0000000
Property Values (D)	14	-8.2142857	22.4984737	-80.0000000	10.0000000
Property Values (A)	13	-2.3076923	11.8348681	-25.0000000	20.0000000
Accidents (D)	18	-3.3333333	23.0089497	-60.0000000	25.0000000
Accidents (A)	14	-13.2142857	33.4897885	-80.0000000	50.0000000
Traffic Volumes (D)	19	-11.0526316	25.0321431	-50.0000000	50.0000000
Traffic Volumes (A)	17	7.9411765	20.5440703	-15.0000000	80.0000000
Gross Sales Where Median Installed (D)	13	-14.2307692	17.1811614	-50.0000000	0
Gross Sales Where Median Installed (A)	14	5.3571429	22.9098808	-20.0000000	80.0000000
Gross Sales In Area Where Installed (D)	14	11.7857143	14.4923246	0	50.0000000
Gross Sales In Area where Installed (A)	13	2.6923077	5.9914469	0	20.0000000

Table D-9. Traffic Congestion Statistics for Group Two Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	15	71.4	15	71.4
Worse	3	14.3	18	85.7
The Same	3	14.3	21	100.0

Frequency Missing = 2

Table D-10. Traffic Safety Statistics for Group Two Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	15	75.0	15	75.0
The Same	5	25.0	20	100.0

Frequency Missing = 3

Table D-11. Property Access Statistics for Group Two Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	3	16.7	3	16.7
Worse	10	55.6	13	72.2
The Same	5	27.8	18	100.0

Frequency Missing = 5

Table D-12. Business Opportunities Statistics for Group Two Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	3	15.0	3	15.0
Worse	5	25.0	8	40.0
The Same	12	60.0	20	100.0

Frequency Missing = 3

Table D-13. Customer Satisfaction Statistics for Group Two Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	6	30.0	6	30.0
Worse	5	25.0	11	55.0
The Same	9	45.0	20	100.0

Frequency Missing = 3

Table D-14. Delivery Convenience Statistics for Group Two Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	7	35.0	7	35.0
Worse	8	40.0	15	75.0
The Same	5	25.0	20	100.0

Frequency Missing = 3

Additional Detailed Data on Aggregate Summary Statistics for Group Three (During) Businesses

Table D-15. Select Statistics for Several Variables of Interest for Business Group Three.

Variable of Interest	N	Mean	Std Dev	Minimum	Maximum
Passerby Traffic	7	-2.8571429	7.5592895	-20.0000000	0
Customers Per Day (During)	6	-16.6666667	25.8198890	-50.0000000	0
Customers Per Day (After)	7	-8.5714286	22.6778684	-60.0000000	0
Full-time Employees (D)	6	-8.3333333	20.4124145	-50.0000000	0
Full-time Employees (A)	6	12.5000000	30.6186218	0	75.0000000
Part-time Employees (D)	6	-8.3333333	20.4124145	-50.0000000	0
Part-time Employees (A)	7	0	0	0	0
Gross Sales (D)	5	-20.0000000	27.3861279	-50.0000000	0
Gross Sales (A)	7	-0.1428571	1.3451854	-3.0000000	1.0000000
Property Values (D)	5	-7.0000000	15.6524758	-35.0000000	0
Property Values (A)	6	5.5000000	8.0932070	0	20.0000000
Accidents (D)	5	-10.0000000	22.3606798	-50.0000000	0
Accidents (A)	5	-15.0000000	33.5410197	-50.0000000	25.0000000
Traffic Volume (D)	6	-11.6666667	31.8852108	-50.0000000	20.0000000
Traffic Volume (A)	6	34.1666667	19.6001701	10.0000000	55.0000000
Gross Sales Where Median Installed (D)	6	-10.8333333	19.6001701	-50.0000000	0
Gross Sales Where Median Installed (A)	6	10.0000000	20.0000000	0	50.0000000
Gross Sales In Area Where Installed (D)	6	5.0000000	12.2474487	0	30.0000000
Gross Sales In Area Where Installed (A)	5	-6.0000000	13.4164079	-30.0000000	0

Table D-16. Traffic Congestion Statistics for Group Three Businesses.

Traffic Congestion

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	5	62.5	5	62.5
Worse	2	25.0	7	87.5
The Same	1	12.5	8	100.0

Frequency Missing = 1

Table D-17. Traffic Safety Statistics for Group Three Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	6	66.7	6	66.7
Worse	1	11.1	7	77.8
The Same	2	22.2	9	100.0

Table D-18. Property Access Statistics for Group Three Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	3	33.3	3	33.3
Worse	2	22.2	5	55.6
The Same	4	44.4	9	100.0

Table D-19. Business Opportunities Statistics for Group Three Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	4	50.0	4	50.0
The Same	4	50.0	8	100.0

Frequency Missing = 1

Table D-20. Customer Satisfaction Statistics for Group Three Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	2	25.0	2	25.0
Worse	1	12.5	3	37.5
The Same	5	62.5	8	100.0

Frequency Missing = 1

Table D-21. Delivery Convenience Statistics for Group Three Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	2	22.2	2	22.2
Worse	2	22.2	4	44.4
The Same	5	55.6	9	100.0

Additional Detailed Data on Aggregate Summary Statistics for Group Four (After) Businesses

Table D-22. Select Statistics for Several Variables of Interest for Business Group Four.

Variable of Interest	N	Mean	Std Dev	Minimum	Maximum
Passerby Traffic	6	12.0000000	23.8997908	-2.00000000	60.0000000
Customers Per Day (During)	2	0	0	0	0
Customers Per Day (After)	8	50.0000000	105.5935604	-30.0000000	300.0000000
Full-time Employees (D)	3	0	0	0	0
Full-time Employees (A)	7	7.1428571	18.8982237	0	50.0000000
Part-time Employees (D)	3	0	0	0	0
Part-time Employees (A)	8	6.2500000	17.6776695	0	50.0000000
Gross Sales (D)	1	0	.	0	0
Gross Sales (A)	7	0.2857143	1.4960265	-3.0000000	1.0000000
Property Values (D)	9	-15.5555556	22.4227067	-50.0000000	10.0000000
Property Values (A)	11	7.7272727	12.9158113	0	40.0000000
Accidents (D)	6	0	0	0	0
Accidents (A)	12	6.6666667	18.6271226	-20.0000000	50.0000000
Traffic Volumes (D)	8	-21.8750000	23.8952326	-50.0000000	0
Traffic Volumes (A)	11	37.7272727	89.2570344	-20.0000000	300.0000000
Gross Sales Where Median Installed (D)	12	-20.4166667	17.7685029	-50.0000000	0
Gross Sales Where Median Installed (A)	12	12.9166667	18.1481696	-10.0000000	45.0000000
Gross Sales In Area Where Installed (D)	11	9.5454545	13.6847626	0	35.0000000
Gross Sales In Area Where Installed (A)	11	5.9090909	13.7510330	-20.0000000	35.0000000

Table D-23. Traffic Congestion Statistics for Group Four Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	17	63.0	17	63.0
Worse	3	11.1	20	74.1
The Same	7	25.9	27	100.0

Frequency Missing = 17

Table D-24. Traffic Safety Statistics for Group Four Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	20	74.1	20	74.1
Worse	3	11.1	23	85.2
The Same	4	14.8	27	100.0

Frequency Missing = 17

Table D-25. Property Access Statistics for Group Four Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	14	51.9	14	51.9
Worse	9	33.3	23	85.2
The Same	4	14.8	27	100.0

Frequency Missing = 17

Table D-26. Business Opportunities Statistics for Group Four Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	12	44.4	12	44.4
Worse	2	7.4	14	51.9
The Same	13	48.1	27	100.0

Frequency Missing = 17

Table D-27. Customer Satisfaction Statistics for Group Four Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	9	33.3	9	33.3
Worse	4	14.8	13	48.1
The Same	14	51.9	27	100.0

Frequency Missing = 17

Table D-28. Delivery Convenience Statistics for Group Four Businesses.

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Better	11	40.7	11	40.7
Worse	5	18.5	16	59.3
The Same	11	40.7	27	100.0

Frequency Missing = 17

APPENDIX E
Additional Detail for Analyses of Interest

Table E-1. Percent Change, Standard Deviation, and Sample Size of Passerby Traffic for Different Business Types and Business Groups.

Business Group	Durables Retail	Specialty Retail	Grocery	Gas Sta.	Fast-food Rest.	Sit-down Rest.	Medical	Auto Repair	Hair Salon	Other Services
1	0.0% – 1	-0.3% 4.3 16	0% – 1	-10.0% – 1	5.0% 5.0 3	0.0% 0 4	0.0% 0 2	-1.7% 2.9 3	–	2.5% 3.5 2
2	–	–	–	–	–	25.0% – 1	0.0% 0 2	0.0% – 1	0.0% – 1	0.0% 0 2
3	0.0% – 1	–	–	-20.0% – 1	–	0.0% – 1	0.0% – 1	–	0.0% – 1	0.0% 0 2
4	0.0% – 1	29.0% 43.8 2	10.0% – 1	–	–	–	0.0% – 1	–	–	4.0% – 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-2. Relative Importance Ranking of "Accessibility to Store" for Select Business Types and Business Groups.

Business Group	Business Type	Sample Size	Distance of Travel	Hours of Operation	Customer Service	Product Quality	Product Price	Accessibility to Store
1	Specialty Retail	20	6	5	1	2	2	4
1	Fast-food Restaurant	7	4	6	1	1	4	3
1	Sit-down Restaurant	4	5	5	1	2	3	4
1	Auto Repair	5	5	4	1	2	3	6
3	Specialty Retail	8	6	5	2	1	3	4

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-3. Business Type and Closest Access Location for "Accessibility to Store" Rankings of Three or Higher for Group One Businesses.

Business Type	Closest Access Location	"Accessibility to Store" Ranking		
		First	Second	Third
Specialty Retail	Mid-block	2	1	2
Specialty Retail	Intersection	1	1	0
Fast-food Restaurant	Mid-block	0	0	1
Fast-food Restaurant	Intersection	0	1	3
Sit-down Restaurant	Intersection	1	0	0
Other Services	Intersection	0	0	1

Table E-4. Frequency and Sample Sizes for Impacts on Regular Customers from Business Owners Located Mid-Block by Business Group.

Business Type	Group One Businesses (Before)			Group Two Businesses (Before Only)			Group Three Businesses (During)		
	Less Likely	More Likely	Stay the Same	Less Likely	More Likely	Stay the Same	Less Likely	More Likely	Stay the Same
Durables Retail	0	0	100.0% 1 (1)	0	100.0% 1	0	0	0	100.0% 1 (1)
Specialty Retail	0	9.1% 1 (1)	90.9% 10 (8)	25.0% 1 (1)	25.0% 1 (1)	50.0% 2 (2)	0	0	0
Grocery	0	0	100.0% 1 (1)	0	0	0	0	0	0
Gas Station	0	0	100.0% 1	0	0	0	0	0	0
Fast-food Restaurant	0	0	100.0% 2	0	0	0	0	0	0
Sit-down Restaurant	0	0	100.0% 1	0	0	0	0	0	0
Medical	0	0	100.0% 1 (1)	0	0	100.0% 1 (1)	0	0	100.0% 1 (1)
Hair Salon	0	0	0	0	0	0	0	0	0
Auto Repair	25.0% 1	0	75.0% 3 (1)	0	0	100.0% 1	0	0	0
Other Services	0	0	100.0% 2	0	0	0	0	0	0
Total	4.2% 1	4.2% 2 (1)	91.6% 22 (12)	14.3% 1 (1)	28.6% 2 (1)	57.1% 4 (3)	0	0	100.0% 2 (2)

Note: Numbers in parenthesis indicate the number of observations that are from businesses in shopping centers.

Table E-5. Frequency and Sample Sizes for Impacts on Regular Customers from Business Owners Located at a Street Intersection by Business Group.

Business Type	Group One Businesses (Before)			Group Two Businesses (Before Only)			Group Three Businesses (During)		
	Less Likely	More Likely	Stay the Same	Less Likely	More Likely	Stay the Same	Less Likely	More Likely	Stay the Same
Durables Retail	0	0	100.0% 1 (1)	0	0	0	0	0	0
Specialty Retail	0	37.5% 3 (2)	62.5% 5 (4)	33.3% 1 (1)	0	66.7% 2	0	0	100.0% 1 (1)
Grocery	0	0	0	0	0	0	0	0	0
Gas Station	0	100.0% 1	0	0	100.0% 1	0	100.0% 1	0	0
Fast-food Restaurant	40.0% 2	40.0% 2 (1)	20.0% 1	0	0	100.0% 1 (1)	0	0	100.0% 1 (1)
Sit-down Restaurant	0	0	100.0% 3 (3)	0	0	0	100.0% 1 (1)	0	0
Medical	0	0	100.0% 1 (1)	0	0	100.0% 2 (2)	0	0	0
Hair Salon	0	0	0	0	0	100.0% 2 (1)	0	0	100.0% 1 (1)
Auto Repair	0	50.0% 1	50.0% 1 (1)	0	0	0	0	0	0
Other Services	0	0	100.0% 1 (1)	0	0	100.0% 2 (1)	0	100.0% 1	100.0% 1 (1)
Total	9.1% 2	31.8% 7 (3)	59.1% 13 (11)	9.1% 1 (1)	9.1% 1	81.8% 9 (5)	28.6% 2 (1)	14.3% 1	57.1% 4 (4)

Note: Numbers in parenthesis indicate the number of observations that are from businesses in shopping centers.

Table E-6. Percent Change, Standard Deviation, and Sample Size for Full- and Part-Time Employees, Property Values, Accidents, and Traffic Volumes for Durables Retail.

Business Group	Nearest Access	Building Type	Full-time Employees		Part-time Employees		Property Values		Accidents		Traffic Volume	
			During	After	During	After	During	After	During	After	During	After
1	Mid-block	Shopping Center	—	0.0% – 1	—	0.0% – 1	—	15.0% – 1	—	—	—	25.0% – 1
1	Street Intersection	Shopping Center	—	—	—	—	0.0% – 1	20.0% – 1	0.0% – 1	0.0% – 1	-20.0% – 1	20.0% – 1
2	Mid-block	Stand-alone	-5.0% – 1	0.0% – 1	-4.0% – 1	0.0% – 1	0.0% – 1	5.0% – 1	0.0% – 1	-10.0% – 1	0.0% – 1	5.0% – 1
3	Mid-block	Shopping Center	0.0% – 1	75.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	3.0% – 1	0.0% – 1	-50.0% – 1	-10.0% – 1	10.0% – 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-7. Percent Change, Standard Deviation, and Sample Size for Customers per Day, Gross Sales, Gross Sales Where the Median Was (Will Be) Installed, and Gross Sales in the Area for Durables Retail.

Business Group	Nearest Access	Building Type	Customers per Day		Gross Sales		Gross Sales Where Median Installed		Gross Sales in Area	
			During	After	During	After	During	After	During	After
1	Mid-block	Shopping Center	—	5.0% – 1	—	1.0% – 1	-20.0% – 1	0.0% – 1	—	—
1	Street Intersection	Shopping Center	15.0% – 1	5.0% – 1	15.0% – 1	1.0% – 1	-12.0% – 1	8.0% – 1	0.0% – 1	—
2	Mid-block	Stand-alone	-10.0% – 1	0.0% – 1	-5.0% – 1	1.0% – 1	-5.0% – 1	0.0% – 1	5.0% – 1	0.0% – 1
3	Mid-block	Shopping Center	0.0% – 1	0.0% – 1	—	1.0% – 1	-5.0% – 1	10.0% – 1	0.0% – 1	—

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-8. Percent Change, Standard Deviation, and Sample Size for Full- and Part-Time Employees, Property Values, Accidents, and Traffic Volumes for Specialty Retail.

Business Group	Nearest Access	Building Type	Full-time Employees		Part-time Employees		Property Values		Accidents		Traffic Volume	
			During	After	During	After	During	After	During	After	During	After
1	Mid-block	Shopping Center	22.2% 44.1 9	-3.7% 11 9	-4.1% 11.7 8	-8.4% 23.7 8	-1.7% 4.1 6	8.6% 9.0 7	0.8% 4.9 6	-20.0% 38.6 7	1.7% 25.8 6	15.0% 19.4 7
1	Mid-block	Stand-alone	40.0% – 1	2.8% – 1	0.0% – 1	0.0% 0 1	—	—	0.0% – 1	0.0% – 1	-30.0% - 1	250.0% – 1
1	Street Intersection	Shopping Center	33.3% 51.6 6	4.2% 10.2 6	8.3% 20.4 6	-5.5% 13.5 6	0.0% 0 4	-2.4% 27.4 5	20.0% 40 6	1.3% 21.0 4	-14.2% 20.1 6	23.0% 18.2 5
1	Street Intersection	Stand-alone	0.0% 0 2	0.0% 0 2	0.0% 0 2	0.0% 0 2	—	0.0% – 1	50.0% – 1	-9.0% 15.6 2	0 – 1	15.0% – 1
2	Mid-block	Shopping Center	0.0% 0 4	1.3% 18.4 4	0.0% 0 4	-5.0% 10 4	5% 7.1 2	0.0% 20 3	2.5% 5 4	8.3% 37.9 3	-21.3% 22.1 4	-5.0% 8.7 3
2	Street Intersection	Shopping Center	0.0% – 1	—	0.0% – 1	—	—	—	—	—	0.0% – 1	0.0% – 1
2	Street Intersection	Stand-alone	0.0% 0 3	0.0% 0 3	0.0% 0 3	0.0% 0 3	-12.5% 17.7 2	-17.5% 10.6 2	-15% 39.7 3	-30.0% 43.6 3	-8.3% 7.6 3	3.3% 5.8 3
3	Street Intersection	Shopping Center	—	0.0% 0 2	—	0.0% 0 3	-45% 7.1 2	16.7% 20.8 3	0.0% – 1	11.3% 29.5 4	-50% 0 2	15.0% 31.1 4

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-9. Percent Change, Standard Deviation, and Sample Size for Customers per Day, Gross Sales, Gross Sales Where the Median Was (Will Be) Installed, and Gross Sales in the Area for Specialty Retail.

Business Group	Nearest Access	Building Type	Customers per Day		Gross Sales		Gross Sales Where Median Installed		Gross Sales in Area	
			During	After	During	After	During	After	During	After
1	Mid-block	Shopping Center	-3.6% 6.3 7	5.0% 6.5 7	0.0% 8.9 8	0.8% 0.4 9	-9.3% 8.9 7	5.0% 8.4 6	5.8% 9.2 6	-2.0% 4.5 5
1	Mid-block	Stand-alone	1.0% 29.7 2	25.5% 20.5 2	3.0% 18.4 2	1.0% 0 2	-20.0% – 1	40.0% – 1	10.0% – 1	7.0% – 1
1	Street Intersection	Shopping Center	-12.5% 19.4 6	10.0% 13.8 6	-12.5% 19.4 6	0.2% 1.6 6	-23.0% 24.9 5	10.0 9.4 5	14.0% 31.5 5	0.0% 0 3
1	Street Intersection	Stand-alone	-9.0% 8.5 2	-6.5% 4.9 2	-3.0% – 1	0.0% – 1	25.0% – 1	0.0% – 1	—	—
2	Mid-block	Shopping Center	-40.% 29.4 4	-11.3% 13.1 4	-38.8% 29.5 4	-1.3% 2.1 4	-38.3% 20.2 3	0.0% 10 3	13.3% 12.6 3	3.3% 5.8 3
2	Street Intersection	Shopping Center	-8.0% – 1	-20.0% – 1	-8.0% – 1	-3.0% – 1	0.0% – 1	-20.0% – 1	20.0% – 1	20.0% – 1
2	Street Intersection	Stand-alone	2.5% 31.8 2	-2.5% 3.5 2	-13.3% 11.5 3	0.0% 0 2	-17.5% 3.5 2	0.0% 0 2	13.3% 11.5 3	2.5% 3.5 2
4	Street Intersection	Shopping Center	—	52.5% 31.8 2	—	1.0% 0 3	-31.7% 7.6 3	20.0% 22.9 3	11.7% 16.1 3	5.0% 8.7 3

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-10. Percent Change, Standard Deviation, and Sample Size for Full- and Part-Time Employees, Property Values, Accidents, and Traffic Volumes for Gas Stations.

Business Group	Nearest Access	Building Type	Full-time Employees		Part-time Employees		Property Values		Accidents		Traffic Volume	
			During	After	During	After	During	After	During	After	During	After
1	Mid-block	Stand-alone	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	50.0% – 1	50.0% – 1	25.0% – 1	25.0% – 1	-50.0% – 1	100.0% – 1
1	Street Intersection	Stand-alone	-20.0% – 1	-25.% – 1	-100.0% – 1	0.0% – 1	0.0% – 1	10.0% – 1	-25.0% – 1	-25.0% – 1	-65.0% – 1	0.0% – 1
2	Street Intersection	Stand-alone	—	0.0% – 1	—	0.0% – 1	—	—	0.0% – 1	-30.0% – 1	0.0% – 1	15.0% – 1
3	Street Intersection	Stand-alone	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	—	—	—	25.0% – 1	-50.0% – 1	50.0% – 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-11. Percent Change, Standard Deviation, and Sample Size for Customers per Day, Gross Sales, Gross Sales Where the Median Was (Will Be) Installed, and Gross Sales in the Area for Gas Stations.

Business Group	Nearest Access	Building Type	Customers per Day		Gross Sales		Gross Sales Where Median Installed		Gross Sales in Area	
			During	After	During	After	During	After	During	After
1	Mid-block	Stand-alone	100.0% – 1	20.0% – 1	0.0% – 1	0.0% – 1	-50.0% – 1	100.0% – 1	0.0% – 1	0.0% – 1
1	Street Intersection	Stand-alone	-50.0% – 1	-30.0% – 1	-50.0% – 1	-3.0% – 1	-30.0% – 1	-20.0% – 1	30.0% – 1	20.0% – 1
2	Street Intersection	Stand-alone	—	—	—	0.0% – 1	-10.0% – 1	15.0% – 1	10.0% – 1	0.0% – 1
3	Street Intersection	Stand-alone	-50.0% – 1	-60.0% – 1	-50.0% – 1	-3.0% – 1	—	—	—	—

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-12. Percent Change, Standard Deviation, and Sample Size for Full- and Part-Time Employees, Property Values, Accidents, and Traffic Volumes for Fast-Food Restaurants.

Business Group	Nearest Access	Building Type	Full-time Employees		Part-time Employees		Property Values		Accidents		Traffic Volume	
			During	After	During	After	During	After	During	After	During	After
1	Mid-block	Stand-alone	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	—	—	—	—
1	Street Intersection	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	-15.0% – 1	15.0% – 1	—	—	—	—
1	Street Intersection	Stand-alone	0.0% – 1	0.0% – 1	2.5% 3.5 2	-7.0% 9.9 2	10.0% – 1	21.3% 2.5 4	25% 35.4 2	-3.3% 40.4 3	-10.0% 26.5 3	55.0% 33.2 4
2	Street Intersection	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	10.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1
4	Street Intersection	Stand-alone	—	0.0% – 1	—	0.0% – 1	—	15.0% – 1	—	0.0% – 1	—	30.0% – 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-13. Percent Change, Standard Deviation, and Sample Size for Customers per Day, Gross Sales, Gross Sales Where the Median Was (Will Be) Installed, and Gross Sales in the Area for Fast-Food Restaurants.

Business Group	Nearest Access	Building Type	Customers per Day		Gross Sales		Gross Sales Where Median Installed		Gross Sales in Area	
			During	After	During	After	During	After	During	After
1	Mid-block	Stand-alone	-50.0% – 1	-25.0% – 1	-50.0% – 1	-3.0% – 1	-40.0% – 1	-15.0% – 1	—	—
1	Street Intersection	Shopping Center	—	-2.0% – 1	—	—	-25.0% – 1	15.0% – 1	0.0% – 1	10.0% – 1
1	Street Intersection	Stand-alone	-28.8% 25.3 3.4	226.3% 341 4	-15.0% 28.6 4	1.0% – 4	-17.3% 17 4	23.3% 7.6 3	15.0% 7 2	-7.5% 10.6 2
2	Street Intersection	Shopping Center	5.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1
4	Street Intersection	Stand-alone	—	25.0% – 1	—	1.0% – 1	-30.0% – 1	45.0% – 1	10.0% – 1	15.0% – 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-14. Percent Change, Standard Deviation, and Sample Size for Full- and Part-Time Employees, Property Values, Accidents, and Traffic Volumes for Sit-Down Restaurants.

Business Group	Nearest Access	Building Type	Full-time Employees		Part-time Employees		Property Values		Accidents		Traffic Volume	
			During	After	During	After	During	After	During	After	During	After
1	Mid-block	Stand-alone	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	—	-50.0% – 1	-50.0% – 1	-10.0% – 1	10.0% – 1
1	Street Intersection	Shopping Center	0.0% 0 3	0.0% 0 3	0.0% 0 3	0.0% 0 3	0.0% 0 2	0.0% 0 2	16.7% 28.9 3	-50.0% 43.3 3	-13.3% 19.3 3	5.0% -8.7 3
3	Street Intersection	Stand-alone	-50.0% – 1	0.0% – 1	-50.0% – 1	0.0% – 1	-35.0% – 1	20.0% – 1	0.0% – 1	0.0% – 1	-50.0% – 1	50.0% – 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-15. Percent Change, Standard Deviation, and Sample Size for Customers per Day, Gross Sales, Gross Sales Where the Median Was (Will Be) Installed, and Gross Sales in the Area for Sit-Down Restaurants.

Business Group	Nearest Access	Building Type	Customers per Day		Gross Sales		Gross Sales Where Median Installed		Gross Sales in Area	
			During	After	During	After	During	After	During	After
Before	Mid-block	Stand-alone	0.0% – 1	5.0% – 1	0.0% – 1	1.0% – 1	0.0% – 1	1.0% – 1	0.0% – 1	0.0% – 1
Before	Street Intersection	Shopping Center	-3.3% 5.8 3	0.0% 0 3	-1.5% 12 2	0.7% 0.6 3	0.0% 14.1 2	3.5% 4.9 2	30.0% – 1	0.0% – 1
During	Street Intersection	Stand-alone	-50.0% – 1	0.0% – 1	-50.0% – 1	0.0% – 1	-50.0% – 1	50.0% – 1	30.0% – 1	-30.0% – 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-16. Percent Change, Standard Deviation, and Sample Size for Full- and Part-Time Employees, Property Values, Accidents, and Traffic Volumes for Medical Establishments.

Business Group	Nearest Access	Building Type	Full-time Employees		Part-time Employees		Property Values		Accidents		Traffic Volume	
			During	After	During	After	During	After	During	After	During	After
1	Street Intersection	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	-10.0% – 1	-30.0% – 1	0.0% – 1	0.0% – 1	-15.0% – 1	0.0% – 1
2	Street Intersection	Shopping Center	0.0% 0 2	0.0% 0 2	0.0% 0 2	0.0% 0 2	0.0% 0 2	0.0% 0 2	-25.0% 49.5 2	-45.0% 49.5 2	-32.5% 24.7 2	47.5% 46.0 2
3	Mid-block	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	—	0.0% – 1	55.0% – 1
4	Mid-block	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-17. Percent Change, Standard Deviation, and Sample Size for Customers per Day, Gross Sales, Gross Sales Where the Median Was (Will Be) Installed, and Gross Sales in the Area for Medical Establishments.

Business Group	Nearest Access	Building Type	Customers per Day		Gross Sales		Gross Sales Where Median Installed		Gross Sales in Area	
			During	After	During	After	During	After	During	After
1	Street Intersection	Shopping Center	-10.0% – 1	0.0% – 1	-10.0% – 1	0.0% – 1	-20.0% – 1	0.0% – 1	15.0% – 1	15.0% – 1
2	Street Intersection	Shopping Center	0.0% 0 2	0.0% 0 2	0.0% 0 2	0.0% 0 2	0.0% 0 2	40.0% 56.6 2	50.0% – 1	0.0% – 1
3	Mid-block	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1
4	Mid-block	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-18. Percent Change, Standard Deviation, and Sample Size for Full- and Part-Time Employees, Property Values, Accidents, and Traffic Volumes for Auto Repair.

Business Group	Nearest Access	Building Type	Full-time Employees		Part-time Employees		Property Values		Accidents		Traffic Volume	
			During	After	During	After	During	After	During	After	During	After
1	Mid-block	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	—	—
1	Mid-block	Stand-alone	0.0% 0 2	0.0% 0 2	0.0% 0 2	0.0% 0 2	0.0% – 1	0.0% – 1	1.5% 2.1 2	-1.0% 1.4 2	—	20.0% – 1
1	Street Intersection	Shopping Center	0.0% – 1	0.0% – 1	—	—	—	—	—	—	-20.0% – 1	50.0% – 1
1	Street Intersection	Stand-alone	—	—	—	—	10.0% – 1	10.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	75.0% – 1
2	Mid-block	Stand-alone	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	-10.0% – 1	0.0% – 1	20.0% – 1	0.0% – 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-19. Percent Change, Standard Deviation, and Sample Size for Customers per Day, Gross Sales, Gross Sales Where the Median Was (Will Be) Installed, and Gross Sales in the Area for Auto Repair.

Business Group	Nearest Access	Building Type	Customers per Day		Gross Sales		Gross Sales Where Median Installed		Gross Sales in Area	
			During	After	During	After	During	After	During	After
1	Mid-block	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	—	—
1	Mid-block	Stand-alone	-40.0% 17.3 3	-8.3% 14.4 3	-40.0% 17.3 3	-1.0% 1.7 3	-35.0% 21.2 2	-25.0% – 1	—	—
1	Street Intersection	Shopping Center	—	—	0.0% – 1	0.0% – 1	—	0.0% – 1	—	—
1	Street Intersection	Stand-alone	—	—	—	—	0.0% – 1	15.0% – 1	0.0% – 1	0.0% – 1
2	Mid-block	Stand-alone	-20.0% – 1	0.0% – 1	-20.0% – 1	0.0% – 1	-10.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-20. Percent Change, Standard Deviation, and Sample Size for Full- and Part-Time Employees, Property Values, Accidents, and Traffic Volumes for Hair Salons.

Business Group	Nearest Access	Building Type	Full-time Employees		Part-time Employees		Property Values		Accidents		Traffic Volume	
			During	After	During	After	During	After	During	After	During	After
2	Street Intersection	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	3.0% – 1	-20.0% – 1	0.0% – 1	-15.0% – 1	—	5.0% – 1	0.0% – 1
2	Street Intersection	Stand-alone	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	25.0% – 1	0.0% – 1	-35.0% – 1	0.0% – 1
3	Street Intersection	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	-50.0% – 1	-50.0% – 1	—	—
4	Mid-block	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1
4	Street Intersection	Shopping Center	—	—	—	—	—	—	—	35.0% – 1	—	—

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-21. Percent Change, Standard Deviation, and Sample Size for Customers per Day, Gross Sales, Gross Sales Where the Median Was (Will Be) Installed, and Gross Sales in the Area for Hair Salons.

Business Group	Nearest Access	Building Type	Customers per Day		Gross Sales		Gross Sales Where Median Installed		Gross Sales in Area	
			During	After	During	After	During	After	During	After
2	Street Intersection	Shopping Center	-3.0% – 1	0.0% – 1	5.0% – 1	-3.0% – 1	—	—	—	—
2	Street Intersection	Stand-alone	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	-10.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1
3	Street Intersection	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1
4	Mid-block	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1
4	Street Intersection	Shopping Center	—	0.0% – 1	—	—	0.0% – 1	20.0% – 1	0.0% – 1	-20.0% – 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-22. Percent Change, Standard Deviation, and Sample Size for Full- and Part-Time Employees, Property Values, Accidents, and Traffic Volumes for Other Services.

Business Group	Nearest Access	Building Type	Full-time Employees		Part-time Employees		Property Values		Accidents		Traffic Volume	
			During	After	During	After	During	After	During	After	During	After
1	Mid-block	Shopping Center	10.0% – 1	10.0% – 1	—	—	—	—	—	—	—	—
1	Mid-block	Stand-alone	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	—	—	—	—	-50.0% – 1	200.0% – 1
1	Street Intersection	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	10.0% – 1	15.0% – 1	-30.0% – 1	-30.0% – 1	0.0% – 1	20.0% – 1
3	Street Intersection	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	20.0% – 1	20.0% – 1
4	Mid-block	Shopping Center	0.0% 0 2	0.0% – 1	0.0% 0 2	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1
4	Street Intersection	Shopping Center	—	50.0% – 1	0.0% – 1	50.0% – 1	-40.0% – 1	0.0% – 1	—	—	-35.0% – 1	300.0% – 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-23. Percent Change, Standard Deviation, and Sample Size for Customers per Day, Gross Sales, Gross Sales Where the Median Was (Will Be) Installed, and Gross Sales in the Area for Other Services.

Business Group	Nearest Access	Building Type	Customers per Day		Gross Sales		Gross Sales Where Median Installed		Gross Sales in Area	
			During	After	During	After	During	After	During	After
1	Mid-block	Shopping Center	—	—	20.0% – 1	1.0% – 1	—	—	—	—
1	Mid-block	Stand-alone	-45.0% 42.4 2	-20.0% 0 2	-75.0% – 1	-3.0% – 1	—	—	—	—
1	Street Intersection	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	-10.0% – 1	15.0% – 1	—	—
3	Street Intersection	Shopping Center	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1	0.0% – 1
4	Mid-block	Shopping Center	0.0% – 1	0.0% – 1	—	—	0.0% – 1	0.0% – 1	—	—
4	Street Intersection	Shopping Center	—	300.0% – 1	—	1.0% – 1	-25.0% – 1	-10.0% – 1	25.0% – 1	10.0% – 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-24. Percent and Sample Size for Additional Raised Median Impacts of Interest by Business Group for Durables Retail.

Business Group	Traffic Congestion			Traffic Safety			Property Access			Business Opportunities			Customer Satisfaction			Delivery Convenience		
	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same
1	100.0% 2	0	0	100.0% 2	0	0	0	50.0% 1	50.0% 1	50.0% 1	0	50.0% 1	0	0	100.0% 2	0	0	100.0% 2
2	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	0	0	100.0% 1	100.0% 1	0	0
3	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0
4	33.3% 1	33.3% 1	33.3% 1	100.0% 3	0	0	33.3% 1	33.3% 1	33.3% 1	0	33.3% 1	66.7% 2	0	0	100.0% 3	33.3% 1	0	66.7% 2

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-25. Percent and Sample Size for Additional Raised Median Impacts of Interest by Business Group for Specialty Retail.

Business Group	Traffic Congestion			Traffic Safety			Property Access			Business Opportunities			Customer Satisfaction			Delivery Convenience		
	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same
1	68.4% 13	15.8% 3	15.8% 3	84.2% 16	10.5% 2	5.3% 1	42.1% 8	21.1% 4	36.8% 7	47.4% 9	10.5% 2	42.1% 8	47.4% 9	0	52.6% 10	26.3% 5	5.3% 1	68.4% 13
2	62.5% 5	25.0% 2	12.5% 1	50.0% 4	0	50.0% 4	0	85.7% 6	14.3% 1	0	37.5% 3	62.5% 5	25.0% 2	25.0% 2	50.0% 4	25.0% 2	50.0% 4	25.0% 2
3	0	100.0% 1	0	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1
4	57.1% 4	14.3% 1	28.6% 2	71.4% 5	14.3% 1	14.3% 1	57.1% 4	14.3% 1	28.6% 2	71.4% 5	0	28.6% 2	28.6% 2	0	71.4% 5	14.3% 1	14.3% 1	71.4% 5

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-26. Additional Percent and Sample Size for Additional Raised Median Impacts of Interest for Select Business Groups for Specialty Retail.

Business Group	Nearest Access, Building Type	Traffic Congestion			Traffic Safety			Property Access			Business Opportunities			Customer Satisfaction			Delivery Convenience		
		Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same
1	Mid-block, Shopping Center	77.8% 7	11.1% 1	11.1% 1	77.8% 7	11.1% 1	11.1% 1	22.2% 2	22.2% 2	55.6% 5	33.3% 3	0	66.7% 6	44.4% 4	0	55.6% 5	11.1% 1	0	88.9% 8
1	Street Int., Shopping Center	66.7% 4	16.7% 1	16.7% 1	100.0% 6	0	0	66.7% 4	16.7% 1	16.7% 1	50.0% 3	16.7% 1	33.3% 2	50.0% 3	0	50.0% 3	33.3% 2	16.7% 1	50.0% 3
1	Mib-block, Stand-alone	100.0% 2	0	0	100.0% 2	0	0	100.0% 2	0	0	100.0% 2	0	0	100.0 % 2	0	0	100.0% 2	0	0
1	Street Int., Stand-alone	0	50.0% 1	50.0% 1	50.0% 1	50.0% 1	0	0	50.0% 1	50.0% 1	50.0% 1	50.0% 1	0	0	0	100.0% 2	0	0	100.0% 2
2	Mid-block, Shopping Center	50.0% 2	50.0% 2	0	25.0% 1	0	75.0% 3	0	75.3% 3	25.0% 1	0	75.0% 1	25.0% 3	50.0% 2	25.0% 1	25.0% 1	25.0% 1	25.0% 1	50.0% 2
2	Street Int., Shopping Center	0	0	100.0% 1	0	0	100.0% 1	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0
2	Street Int., Stand-alone	100.0% 3	0	0	100.0% 3	0	0	0	100.0% 2	0	0	33.3% 1	66.7% 2	0	0	100.0% 3	33.3% 1	66.7% 2	0

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-27. Percent and Sample Size for Additional Raised Median Impacts of Interest by Business Group for Grocery.

Business Group	Traffic Congestion			Traffic Safety			Property Access			Business Opportunities			Customer Satisfaction			Delivery Convenience		
	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same
1	100.0% 1	0	0	100.0% 1	0	0	0	0	0	0	0	100.0% 1	100.0% 1	0	0	0	0	100.0% 1
2	0	100.0% 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	0	100.0% 1	0	100.0% 1	0	0	100.0% 1	0

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-28. Percent and Sample Size for Additional Raised Median Impacts of Interest by Business Group for Gas Stations.

Business Group	Traffic Congestion			Traffic Safety			Property Access			Business Opportunities			Customer Satisfaction			Delivery Convenience		
	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same
1	100.0% 2	0	0	100.0% 2	0	0	0	50.0% 1	50.0% 1	50.0% 1	50.0% 1	0	50.0% 1	0	50.0% 1	50.0% 1	50.0% 1	0
2	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0
3	100.0% 1	0	0	100.0% 1	0	0	0	100.0% 1	0	0	0	100.0% 1	0	100.0% 1	0	0	100.0% 1	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-29. Percent and Sample Size for Additional Raised Median Impacts of Interest by Business Group for Fast-Food Restaurants.

Business Group	Traffic Congestion			Traffic Safety			Property Access			Business Opportunities			Customer Satisfaction			Delivery Convenience		
	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same
1	75.0% 6	0	25.0% 2	75.0% 6	12.5% 1	12.5% 1	37.5% 3	25.0% 2	37.5% 3	37.5% 3	0	62.5% 5	37.5% 3	12.5% 1	50.0% 4	25.0% 2	12.5% 1	62.5% 5
2	100.0% 1	0	0	100.0% 1	0	0	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1
3	100.0% 1	0	0	100.0% 1	0	0	0	0	100.0% 1	100.0% 1	0	0	0	0	100.0% 1	0	0	100.0% 1
4	100.0% 1	0	0	0	0	100.0% 1	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-30. Percent and Sample Size for Additional Raised Median Impacts of Interest by Business Group for Sit-Down Restaurants.

Business Group	Traffic Congestion			Traffic Safety			Property Access			Business Opportunities			Customer Satisfaction			Delivery Convenience		
	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same
1	50.0% 2	25.0% 1	25.0% 1	75.0% 3	0	25.0% 1	50.0% 2	25.0% 1	25.0% 1	25.0% 1	0	75.0% 3	0	25.0% 1	75.0% 3	0	0	100.0% 4
2	0	0	100.0% 1	0	0	100.0% 1	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0
3	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	0	0	100.0% 1	0	0	100.0% 1
4	40.0% 2	0	60.0% 3	60.0% 3	20.0% 1	20.0% 1	40.0% 2	60.0% 3	0	20.0% 1	20.0% 1	60.0% 3	20.0% 1	40.0% 2	40.0% 2	40.0% 2	20.0% 1	40.0% 2

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-31. Percent and Sample Size for Additional Raised Median Impacts of Interest by Business Group Medical Establishments.

Business Group	Traffic Congestion			Traffic Safety			Property Access			Business Opportunities			Customer Satisfaction			Delivery Convenience		
	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same
1	50.0% 1	0	50.0% 1	50.0% 1	0	50.0% 1	50.0% 1	0	50.0% 1	50.0% 1	0	50.0% 1	50.0% 1	0	50.0% 1	50.0% 1	0	50.0% 1
2	100.0% 3	0	0	100.0% 3	0	0	33.3% 1	0	66.7% 2	33.3% 1	0	66.7% 2	66.7% 2	0	33.3% 1	100.0% 3	0	0
3	0	100.0% 1	0	0	100.0% 1	0	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1
4	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-32. Percent and Sample Size for Additional Raised Median Impacts of Interest by Business Group for Auto Repair.

Business Group	Traffic Congestion			Traffic Safety			Property Access			Business Opportunities			Customer Satisfaction			Delivery Convenience		
	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same
1	50.0% 3	33.3% 2	16.7% 1	50.0% 3	16.7% 1	33.3% 2	50.0% 3	33.3% 2	16.7% 1	66.7% 4	0	33.3% 2	33.2% 2	0	66.7% 4	33.3% 2	0	66.7% 4
2	100.0% 1	0	0	100.0% 1	0	0	0	100.0% 1	0	0	0	100.0% 1	0	0	100.0% 1	0	100.0% 1	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-33. Percent and Sample Size for Additional Raised Median Impacts of Interest by Business Group for Hair Salons.

Business Group	Traffic Congestion			Traffic Safety			Property Access			Business Opportunities			Customer Satisfaction			Delivery Convenience		
	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	100.0% 3	0	0	100.0% 3	0	0	0	100.0% 2	0	0	33.3% 1	66.7% 2	33.3% 1	66.7% 2	0	0	66.7% 2	33.3 1
3	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1
4	50.0% 1	0	50.0% 1	50.0% 1	0	50.0% 1	50.0% 1	0	50.0% 1	50.0% 1	0	50.0% 1	50.0% 1	0	50.0% 1	50.0% 1	0	50.0% 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-34. Percent and Sample Size for Additional Raised Median Impacts of Interest by Business Group for Other Services.

Business Group	Traffic Congestion			Traffic Safety			Property Access			Business Opportunities			Customer Satisfaction			Delivery Convenience		
	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same	Better	Worse	Same
1	100.0% 4	0	0	75.0% 3	0	25.0% 1	75.0% 3	0	25.0% 1	100.0% 4	0	0	100.0% 4	0	0	75.0% 3	0	25.0% 1
2	0	0	100.0% 1	100.0% 1	0	0	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1	0	0	100.0% 1
3	100.0% 1	0	0	100.0% 2	0	0	50.0% 1	50.0% 1	0	100.0% 1	0	0	100.0% 1	0	0	50.0% 1	50.0% 1	0
4	100.0% 6	0	0	100.0% 6	0	0	66.7% 4	33.3% 2	0	50.0% 3	0	50.0% 3	50.0% 3	16.7% 1	33.3% 2	66.7% 4	16.7% 1	16.7% 1

Note: Business Group 1 = businesses present before, during, and after median installation; Business Group 2 = businesses present before the median construction and construction is yet to begin; Business Group 3 = businesses present during and after median installation; and Business Group 4 = businesses present only after the median has been installed.

Table E-35. Percent and Sample Size for Indications of Public Involvement for Group One and Two Business Owners.

Business Group	Group One Businesses (Before)					Group Two Businesses (Before Only)				
	High	Somewhat High	Moderate	Somewhat Low	Low	High	Somewhat High	Moderate	Somewhat Low	Low
Durables Retail	0	50.0% 1	0	0	50.0% 1	0	0	0	0	0
Specialty Retail	0	11.1% 2	16.7% 3	11.1% 2	61.1% 11	0	0	0	0	0
Grocery	0	0	0	0	100.0% 1	0	0	0	0	0
Gas Station	0	0	0	0	100.0% 2	0	0	0	0	0
Fast-food Restaurant	0	0	0	0	100.0% 6	0	0	0	0	0
Sit-down Restaurant	25.0% 1	0	0	0	75.0% 3	0	0	0	0	100.0% 1
Medical	100.0% 1	0	0	0	0	0	0	0	0	100.0% 2
Auto Repair	0	0	33.3% 2	0	66.7% 4	100.0% 1	0	0	0	0
Hair Salon	0	0	0	0	0	0	0	0	0	100.0% 1
Other Services	50.0% 2	0	0	0	50.0% 2	0	0	0	0	0
Other	0	0	0	0	100.0% 1	0	0	0	0	0
Totals =	8.9% 4	6.7% 3	11.1% 5	4.4% 2	68.9% 31	20.0% 1	0	0	0	80.0% 4

APPENDIX F
Gross Sales Percent Change Data

This appendix contains the gross sales percent change data obtained from questions 20 and 21 of the survey for businesses shown in Appendix A. It also contains the gross sales percent change values for the state of Texas, cities, and counties of interest. The construction years for each median project are also provided in the tables for reference. For survey question 20, respondents were asked to provide the range of gross sales for each year. The data for this question were analyzed by providing subsequent numbers to each range every year (i.e., less than $100,000 = 1, $100,000 to $250,000 = 2, and so on). In the tables that follow, the data from these questions are indicated as "from gross sales' range." The four statistics provided for these questions are the percent change (Δ%), mean ($\bar{x}$), standard deviation (SD), and number of observations (n). The mean and standard deviation are based upon the value of the range given (e.g., 1, 2, 3, etc.). To obtain a measure for the general business trend, both the number of businesses and the value of the gross sales range was used in the calculation of the percent change. Therefore, these percent changes and related statistics are weighted by the number of observations as well as the mean value of the gross sales' range. Throughout the table, the percent change value provided in a given year's column is the percent difference between the previous year and the year designated in the column. Data for some years along some corridors were not provided and are designated as "—."

For question 21, respondents were asked to indicate the change in gross sales from year to year. These results are provided for each corridor in the tables that follow as "provided percent changes." The data were analyzed for all respondents (indicated as "all surveys") and for all the respondents whose businesses were located along the corridor before, during, and after construction (indicated as "'before' construction").

Data in the tables that follow also contain gross sales percent changes from year to year for the state of Texas, cities, and counties for comparison to the values obtained from the survey questions number 20 and 21. The values for the state of Texas, cities, and counties of interest were obtained from the Texas Comptroller of Public Accounts. These reports can be obtained from the Internet at http://www.window.state.tx.us for years after 1985. Additional data were obtained through written requests with the Comptroller's office. These data obtained from the Comptroller's office were adjusted with Consumer Price Indexes (CPI) to the year 1997. The CPI values were obtained from the Bureau of Labor Statistics at http://stats.bls.gov/cpihome.htm. Data obtained from the

surveys themselves were not adjusted. For question 20, the data were not adjusted since the responses were given for a rather large range, and adjustments would not significantly alter the results. Adjustment of the values in question 21 was not relevant since the respondents provided direct percent change values rather than dollar amounts.

Table F-1. Percent Change in Gross Sales for the State of Texas.

Year	Percent Change in Sales
1979	-1.4
1980	4.5
1981	3.9
1982	-5.4
1983	0.7
1984	2.9
1985	1.6
1986	-6.0
1987	-2.8
1988	0.9
1989	1.5
1990	2.0
1991	0.2
1992	6.0
1993	5.7
1994	6.6
1995	4.7
1996	6.4
1997	6.2

Table F-2. Gross Sales Percent Change Data.

Houston, Texas																		
Location			**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**
City of Houston			-5.5	-2.5	5.2	-7.3	-11.5	-3.2	0.9	0.7	2.6	-4.5	5.7	1.0	5.0	3.5	22.4	12.9
Harris County			-7.9	-1.2	5.0	-5.7	-9.4	-2.8	1.9	1.0	3.7	-3.3	3.2	1.6	6.4	3.6	4.0	10.7
Post Oak Road (Houston, Texas): Construction years = 1988 to 1990																		
All Surveys	From Gross Sales' Range	Δ% $\bar{x}$ SD n	—	—	0 2.3 1.0 4	0 2.3 1.0 4	10.0 2.0 1.0 5	8.0 1.8 1.0 6	0 1.8 1.0 6	0 1.8 1.0 6	29.6 2.0 0.8 7	20.0 2.1 0.8 8	12.5 2.1 0.9 9	11.1 2.1 1.1 10	42.9 2.5 1.2 12	25.7 2.9 1.2 13	10.3 2.6 12.5 16	18.5 2.9 1.7 17
All Surveys	Provided Percent Changes	Δ% SD n	—	—	5.0 7.1 2	5.0 7.1 2	5.0 7.1 2	5.0 7.1 2	-10.0 14.1 2	-36.7 33.3 3	-28.3 18.9 3	5.0 7.1 2	8.3 7.6 3	7.5 6.5 4	11.0 12.4 5	10.8 6.6 6	12.5 8.8 6	17.5 15.1 8
"Before" Const.	From Gross Sales' Range	Δ% $\bar{x}$ SD n	—	—	0 2.3 1.0 4	0 2.3 1.0 4	8.7 2.0 1.0 5	8.0 1.8 1.0 6	0 1.8 1.0 6	0 1.8 1.0 6	11.1 2.0 0.9 6	0 2.0 0.9 6	0 2.0 0.9 6	0 2.0 0.9 6	0 2.0 0.9 6	51.7 2.6 1.0 7	0 2.6 1.0 7	0 2.6 1.0 7
"Before" Const.	Provided Percent Changes	Δ% SD n	—	—	5 7.1 2	5 7.1 2	5 7.1 2	5 7.1 2	-10.0 14.1 2	-36.7 33.3 3	-28.3 18.9 3	5.0 7.1 2	8.3 7.6 3	8.3 7.6 3	8.3 7.6 3	8.3 7.6 3	10.0 10.0 3	10.0 10.0 3
Clay Road (Houston, Texas): Construction years = 1994 to 1996																		
All Surveys	From Gross Sales' Range	Δ% $\bar{x}$ SD n	—	—	—	—	—	—	—	—	0 1.5 0.7 2	0 1.5 0.7 2	170 2.7 2.1 3	13.6 3.3 3.2 3	30.3 4.3 4.9 3	17.8 3.8 4.9 4	5.3 4.0 5.4 4	25.0 4.0 5.1 5
All Surveys	Provided Percent Changes	Δ% SD n	—	—	—	—	—	—	—	—	0 – 1	0 – 1	0 – 1	0 – 1	0 – 1	0 0 2	0 0 2	0 0 2
"Before" Constr.	From Gross Sales' Range	Δ% $\bar{x}$ SD n	—	—	—	—	—	—	—	—	0 1.5 0.7 2	0 1.5 0.7 2	170 2.7 2.1 3	22.2 3.3 3.2 3	30.3 4.3 4.9 3	9.3 4.7 5.5 3	6.4 5.0 6.1 3	6.0 5.3 6.7 3
"Before" Constr.	Provided Percent Changes	Δ% SD n	—	—	—	—	—	—	—	—	0 – 1	0 – 1	0 – 1	0 – 1	0 – 1	0 – 1	0 – 1	0 – 1

Table F-2. Gross Sales Percent Change Data (continued).

Location			1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Long Point Road (Houston, Texas): Construction year upcoming																		
All Surveys	From Gross Sales' Range	Δ% $\bar{x}$ SD n	—	—	—	—	—	—	—	—	—	—	—	—	0 1.0 – 1	0 1.0 – 1	200.0 1.0 0 3	33.3 1.0 0 4
All Surveys	Provided Percent Changes	Δ% SD n	—	—	—	—	—	—	—	—	—	—	—	—	0 – 0	0 – 0	0 – 0	4.5 6.4 2
"Before" Const.	From Gross Sales' Range	Δ% $\bar{x}$ SD n	—	—	—	—	—	—	—	—	—	—	—	—	0 1.0 – 1	0 1.0 – 1	200.0 1.0 0 3	33.3 1.0 0 4
"Before" Const.	Provided Percent Changes	Δ% SD n	—	—	—	—	—	—	—	—	—	—	—	—	0 – 0	0 – 0	0 – 0	4.5 6.4 2
West Fuqua Road (Houston, Texas): Construction years = 1987 to 1989																		
All Surveys	From Gross Sales' Range	Δ% $\bar{x}$ SD n	—	—	—	—	—	0 2.0 – 1	0 2.0 – 1	0 2.0 – 1	0 2.0 – 1	0 2.0 – 1	0 2.0 – 1	0 2.0 – 1	150.0 2.5 0.7 2	0 2.5 0.7 2	0 2.5 0.7 2	0 2.5 0.7 2
"Before" Constr.	From Gross Sales' Range	Δ% $\bar{x}$ SD n	—	—	—	—	—	0 2.0 – 1	0 2.0 – 1	0 2.0 – 1	0 2.0 – 1	0 2.0 – 1	0 2.0 – 1	0 2.0 – 1	0 2.0 – 1	0 2.0 – 1	0 2.0 – 1	0 2.0 – 1

Table F-2. Gross Sales Percent Change Data (continued).

Location			1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
McKinney, Texas																		
City of McKinney			—	—	—	—	-17.8	-21.2	-6.5	0.3	0.8	2.2	29.4	15.1	10.8	9.0	6.9	32.9
Collin County			—	—	—	—	2.3	2.0	-1.4	6.3	1.7	6.3	19.7	2.1	13.9	1.6	11.8	7.0
University Drive (McKinney, Texas): Construction year = 1992																		
All Surveys	From Gross Sales' Range	Δ% x̄ SD n	—	—	—	—	—	0 13.0 – 1	15.4 7.5 7.8 2	46.7 5.5 5.1 4	36.8 4.3 3.9 7	-4.3 4.8 4.1 6	6.9 4.4 3.9 7	4.5 4.6 3.8 7	60.2 4.3 4.2 12	28.5 3.9 3.6 17	8.9 3.8 3.5 19	10.5 3.8 3.3 21
All Surveys	Provided Percent Changes	Δ% SD n	—	—	—	—	—	—	—	7.0 12.1 3	4.0 6.9 3	29.3 49.7 4	25.5 50.5 4	32.3 47.5 6	24.0 38.3 6	18.8 26.1 13	18.7 24.6 19	18.6 26.1 20
"Before" Const.	From Gross Sales' Range	Δ% x̄ SD n	—	—	—	—	—	0 13.0 – 1	15.4 7.5 7.8 2	46.7 5.5 5.1 4	36.8 4.3 3.9 7	-4.3 4.8 4.1 6	0 4.8 4.1 6	-2.1 4.7 4.2 6	0 4.7 4.2 6	14.2 4.6 3.8 7	6.8 4.2 3.8 8	15.1 4.4 3.4 9
"Before" Const.	Provided Percent Changes	Δ% SD n	—	—	—	—	—	—	—	7.0 12.1 3	4.0 6.9 3	29.3 49.7 4	25.5 50.5 4	19.8 55.0 4	27.3 48.7 4	24.4 42.6 5	21.9 35.6 7	15.0 17.1 7
Longview, Texas																		
City of Longview			—	—	—	—	-4.9	-3.3	0.2	-3.4	3.5	-3.0	5.1	5.0	3.9	6.7	17.5	-4.8
Gregg County			—	—	—	—	-9.4	-4.5	0.6	-2.8	4.3	-3.2	4.9	4.1	5.6	7.3	5.1	-1.4
Loop 281 (Longview, Texas): Construction year = 1996																		
All Surveys	From Gross Sales' Range	Δ% x̄ SD n	—	—	—	—	—	—	—	—	—	29.4 4.4 2.3 5	46.4 4.6 2.0 7	23.0 4.4 2.3 9	6.6 4.2 2.1 11	12.6 4.0 2.1 13	27.5 3.9 1.9 17	8.6 4.0 1.9 18
All Surveys	Provided Percent Changes	Δ% SD n	—	—	—	—	—	—	—	—	—	5.4 9.9 5	9.5 7.7 6	10.5 9.3 8	6.9 9.6 10	95 8.1 13	17.1 13.1 14	15.9 15.1 17
"Before" Constr.	From Gross Sales' Range	Δ% x̄ SD n	—	—	—	—	—	—	—	—	—	29.4 4.4 2.3 5	46.4 4.6 2.0 7	23.0 4.4 2.3 9	16.7 4.2 2.1 11	12.6 4.0 2.1 13	21.2 4.2 1.9 15	2.4 4.3 1.9 15
"Before" Constr.	Provided Percent Changes	Δ% SD n	—	—	—	—	—	—	—	—	—	5.4 9.9 5	9.5 7.7 6	10.5 9.3 8	6.9 9.6 10	9.5 8.1 13	17.1 13.1 14	12.7 12.4 15

Table F-2. Gross Sales Percent Change Data (continued).

Location			1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Wichita Falls, Texas																		
City of Wichita Falls			—	—	—	—	-13.1	-5.0	-1.2	0.7	-3.9	-2.5	4.8	5.2	7.0	0.6	1.7	-4.2
Wichita County			—	—	—	—	-12.5	-5.8	-2.2	2.5	-3.0	-1.9	6.1	5.9	7.3	0.6	2.6	-4.7
Call Field Road (Wichita Falls, Texas): Construction year upcoming																		
All Surveys	From Gross Sales' Range	Δ% $\bar{x}$ SD n	—	—	—	—	—	—	—	—	—	—	—	—	10.0 2.8 3.3 12	10.3 2.8 3.2 13	14.3 3.2 3.2 13	0 3.2 3.2 13
All Surveys	Provided Percent Changes	Δ% SD n	—	—	—	—	—	—	—	—	—	—	—	—	11.5 9.7 8	12.9 10.0 10	13.9 10.2 11	14.3 9.3 12
"Before" Const.	From Gross Sales' Range	Δ% $\bar{x}$ SD n	—	—	—	—	—	—	—	—	—	—	—	—	10 2.8 3.3 12	10.3 2.8 3.2 13	14.3 3.2 3.2 13	0 3.2 3.2 13
"Before" Const.	Provided Percent Changes	Δ% SD n	—	—	—	—	—	—	—	—	—	—	—	—	11.5 9.7 8	12.9 10.0 10	13.9 10.2 11	14.3 9.3 12
Odessa, Texas																		
City of Odessa			—	—	—	—	-18.8	-1.0	2.4	-9.2	2.8	-6.7	-3.6	7.1	1.8	-3.2	21.3	8.4
Ector County			—	—	—	—	-20.0	-0.6	1.2	-7.3	5.5	-6.4	-7.4	6.2	1.2	-2.3	0.8	8.4
Grant Avenue (Odessa, Texas): Construction year = 1992																		
All Surveys	From Gross Sales' Range	Δ% $\bar{x}$ SD n	—	—	—	—	—	13.6 2.3 1.5 4	17.4 1.8 1.3 6	29.6 2.0 1.2 7	5.0 2.1 1.2 7	14.3 2.1 1.2 8	9.5 2.3 1.4 8	0 2.3 1.4 8	2.7 2.1 1.5 9	10.6 1.9 1.4 11	0 1.9 1.4 11	0 1.9 1.4 11
All Surveys	Provided Percent Changes	Δ% SD n	—	—	—	—	0 0 3	1.3 2.5 4	2.6 3.7 5	2.6 3.4 7	2.6 3.4 7	2.6 3.4 7	2.8 3.2 8	0.8 4.3 9	0.8 4.3 9	-0.3 5.3 10	2.0 6.6 11	28.1 85.9 12
"Before" Constr.	From Gross Sales' Range	Δ% $\bar{x}$ SD n	—	—	—	—	—	13.6 2.3 1.5 4	17.4 1.8 1.3 6	29.6 2.0 1.2 7	7.1 2.1 1.2 7	12.0 2.1 1.2 8	9.5 2.3 1.4 8	0 2.3 1.4 8	0 2.3 1.5 8	0 2.3 1.5 8	0 2.3 1.5 8	0 2.3 1.5 8
"Before" Constr.	Provided Percent Changes	Δ% SD n	—	—	—	—	0 0 2	1.7 2.9 3	3.3 3.9 4	3.0 3.5 6	3.0 3.5 6	3.0 3.5 6	3.1 3.2 7	0.9 4.6 8	0.9 4.6 8	0.9 4.6 8	2.1 4.1 8	4.0 6.0 8

Table F-2. Gross Sales Percent Change Data (continued).

Port Arthur, Texas																	
Location			**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**
City of Port Arthur			3.1	-4.6	-7.0	-5.8	-6.9	2.1	-8.7	-5.2	-3.1	-7.2	-2.1	-7.1	5.7	-8.9	-0.7	-0.8
Jefferson County			-1.9	-0.2	-1.2	-7.4	-1.3	-0.8	-3.9	-2.5	1.9	-3.0	-1.0	-2.4	5.1	0.5	0.9	2.3
9th Avenue (Port Arthur, Texas): Construction years = 1979 to 1980																		
All Surveys	From Gross Sales' Range	Δ% $\bar{x}$ SD n	—	—	—	—	—	—	—	—	—	—	—	0 13 – 1	0 13 – 1	45.4 6.3 6.1 3	6.3 6.7 5.7 3	0 6.7 5.7 3
All Surveys	Provided Percent Changes	Δ% SD n	—	—	—	—	—	—	—	—	—	—	—	—	—	—	17.5 3.5 2	25.0 7.1 2
Twin Cities Highway (Port Arthur, Texas): Construction years = 1983 to 1985																		
All Surveys	Provided Percent Changes	Δ% SD n	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	-90.0 – 1

APPENDIX G
Employment Trend Data

This appendix contains information regarding percent change in employees for the state of Texas and the case study cities and counties of interest. The data for the state of Texas, cities, and counties were obtained from the Texas Workforce Commission (TWC). Data for the state and cities are available for the most recent decade only. Data may be obtained from the TWC Internet page at http://www.twc.state.tx.us/lmi/lfs/lfshome.html. Additional data for the counties of interest were obtained from written requests to the TWC.

The values in the state of Texas and city rows in the table that follows represent the percent change from year to year in the average annual total number of employees. There are two numbers in each cell for the county data. The top number of each county data cell represents the percent change from year to year of the total number of employees for retail trade and services categories. The bottom number represents the percent change from year to year of the total number of employees.

Question 9 of the business survey, shown in Appendix A, requests the number of part- and full-time employees by year. The sum for all survey respondents is shown in the table that follows for comparison with the state of Texas, city, and county. In each cell of the rows of data for the case study corridors of interest there are also two numbers. The top number indicates the sum of the number of part- and full-time employees for each year. The bottom number indicates the percent change from year to year. The total number of surveys is also noted in the table as well as the construction year of the median project of interest.

Table G-1. Employment Trend Data

Location	Const. Year	No. of Surveys	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
State of Texas			-	-	-	-	-	-	-	-	1.2	1.8	2.4	3.5	2.4	1.7	2.0
Houston, Texas																	
City of Houston			-	-	-	-	-	-	-	-	1.4	0.5	1.0	2.4	1.8	1.1	2.3
Harris County			-2.8 -5.4	11.7 5.5	0.6 -2.8	-4.3 -8.0	4.5 1.8	5.2 5.1	6.3 5.3	6.8 5.5	-1.9 -0.8	2.0 -0.7	2.7 2.0	3.3 2.7	4.3 2.7	2.9 3.4	4.6 5.1
Clay Road	1994 to 1996	8	-	-	-	-	-	-	5	5 0.0	6 20.0	20 233.3	25 25.0	28 12.0	38 35.8	43 13.2	197 358.1
Long Point Road	Upcoming	4	-	-	-	-	-	-	-	-	-	-	5	5 0.0	5 0.0	20 300.0	23 15.0
West Fuqua Road	1987 to 1989	1	-	-	-	-	-	-	-	-	-	-	-	7	4 -42.9	4 0.0	4 0.0
South Post Oak Road	1988 to 1990	24	54	54 0.0	56 3.7	56 0.0	59 5.4	59 0.0	59 0.0	59 0.0	68 15.3	74 8.8	75 1.4	75 0.0	79 5.3	115 45.6	142 23.5
Longview, Texas																	
City of Longview			-	-	-	-	-	-	-	-	1.7	1.5	0.8	3.4	1.3	0.7	1.5
Gregg County			-	-	-	-	-	-	-	-	-	4.1 2.6	7.7 2.8	3.9 4.4	3.4 3.5	4.3 5.1	5.6 5.1
Loop 281	1996	20	-	-	-	-	-	-	-	15	123 720.0	132 7.3	143 8.3	236 65.0	246 4.2	434 76.4	426 -1.8
McKinney, Texas																	
City of McKinney			-	-	-	-	-	-	-	-	2.2	3.7	6.3	8.5	7.2	7.4	3.9
Collin County			-	-	-	-	21.1 13.6	11.7 9.4	9.4 9.2	8.1 6.5	5.7 5.4	7.0 4.3	9.4 9.9	6.4 8.3	17.0 14.5	6.9 9.9	7.5 7.1
University Drive	1992	22	-	-	-	-	-	2	17 750.0	62 265.0	66 6.5	83 25.8	123 48.2	256 108.1	370 44.5	377 1.9	409 8.5

Table G-1. Employment Trend Data (continued).

Location	Const. Year	No. of Surveys	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Odessa, Texas														
City of Odessa			-	-	-	-	-	2.9	-0.4	0.5	1.7	0.7	0.6	3.5
Ector County			-	-	4.5 -1.1	5.7 -0.4	6.4 7.5	-1.7 -0.8	-1.6 -5.1	6.6 5.1	1.4 0.1	4.3 1.4	0.5 2.6	6.2 6.1
Grant Avenue	1992	13	20	20 0.0	22 10.0	24 9.1	24 0.0	27 12.5	28 3.7	34 21.4	39 14.7	45 15.4	46 2.2	47 2.2
Wichita Falls, Texas														
City of Wichita Falls			-	-	-	-	-	-1.1	0.4	0.4	2.7	3.1	1.5	0.0
Wichita County			-	-	-	-	-	-	-	-	2.2 1.8	4.3 3.1	1.5 0.9	2.5 3.3
Call Field Road	Upcoming	16	-	-	-	-	-	-	-	80	86 7.5	97 12.8	96 -1.0	202 110.4

Table G-1. Employment Trend Data (continued).

Location	Const. Year	No. of Surveys	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Port Arthur, Texas														
Jefferson County			8.3 -0.3	5.1 8.6	5.5 3.8	6.0 13.2	9.3 5.9	-0.7 -1.0	-5.7 -7.4	-2.7 -9.2	0.6 -2.9	0.6 -2.6	-3.6 -6.3	1.3 -2.9
Twin Cities Highway	1983 to 1985	3	-	-	-	-	2	2 0.0	2 0.0	2 0.0	2 0.0	2 0.0	3 50.0	3 0.0
9th Avenue	1979 to 1980	5	-	-	-	-	-	1	1 0.0	1 0.0	1 0.0	1 0.0	1 0.0	1 0.0
			1987	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	
City of Port Arthur			-	-	-	-	5.3	0.3	-2.0	-0.4	0.1	-1.2	1.6	
Jefferson County			2.9 0.2	3.7 3.5	3.0 1.6	4.3 5.8	2.7 4.8	4.4 -1.3	0.4 -1.4	3.2 0.6	-0.3 -0.1	1.9 1.5	4.1 6.0	
Twin Cities Highway	1983 to 1985	3	3 0.0	4 33.3	4 0.0	10 150.0	10 0.0	11 10.0	10 -9.1	13 30.0	15 15.4	16 6.7	21 31.3	
9th Avenue	1979 to 1980	5	1 0.0	1 0.0	1 0.0	1 0.0	1 0.0	56 5,500.0	84 50.0	87 3.6	101 16.1	104 3.0	109 4.8	