

1. Report No. FHWA/TX-11/0-6205-1		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle PEER GROUPING AND PERFORMANCE MEASUREMENT TO IMPROVE RURAL AND URBAN TRANSIT IN TEXAS				5. Report Date September 2010 Published: May 2011	
				6. Performing Organization Code	
7. Author(s) Jeffrey Arndt, Suzie Edrington, Matthew Sandidge, Luca Quadrifoglio, and Judy Perkins				8. Performing Organization Report No. Report 0-6205-1	
9. Performing Organization Name and Address Texas Transportation Institute The Texas A&M University System College Station, Texas 77843-3135  Prairie View A&M University Prairie View, Texas 77446				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No. Project 0-6205	
12. Sponsoring Agency Name and Address Texas Department of Transportation Research and Technology Implementation Office P.O. Box 5080 Austin, Texas 78763-5080				13. Type of Report and Period Covered Technical Report: September 2008–August 2010	
				14. Sponsoring Agency Code	
15. Supplementary Notes Project performed in cooperation with the Texas Department of Transportation and the Federal Highway Administration. Project Title: Benchmarking and Improving Texas Rural Public Transportation Systems URL: <a href="http://tti.tamu.edu/documents/0-6205-1.pdf">http://tti.tamu.edu/documents/0-6205-1.pdf</a>					
16. Abstract Rural and small urban transit systems in Texas will become even more important with predicted changes in population trends. Rural demographic trends indicate growth in the number of persons age 65 and over coupled with a decrease in population density. Small urban area trends indicate substantial population growth and broadened geographic boundaries, yet resources to provide rural and small urban transit are limited. Therefore, transit managers find it is increasingly important to maximize service efficiency and effectiveness. The purpose of this research was to identify peer groups, performance benchmarks, and strategies used by successful transit providers to achieve high performance. The research project identifies peer groups based on the transit environment within which each agency operates, so that agencies can be compared to other operators who face similar environments. Peer group effectiveness and efficiency performance are examined within and between rural and urban peer groups, and high performers are identified for case studies. Through the case studies, key attributes are identified for achieving high operating efficiency and/or effectiveness. Performance strategies are categorized to provide transit providers with transferrable information to improve performance and increase the return on transit investment.					
17. Key Words Benchmarking, Peer Analysis, Public Transportation, Performance Measurement			18. Distribution Statement No restrictions. This document is available to the public through NTIS: National Technical Information Service Alexandria, Virginia 22161 <a href="http://www.ntis.gov">http://www.ntis.gov</a>		
19. Security Classif.(of this report) Unclassified		20. Security Classif.(of this page) Unclassified		21. No. of Pages 146	22. Price



**PEER GROUPING AND PERFORMANCE MEASUREMENT  
TO IMPROVE RURAL AND URBAN TRANSIT IN TEXAS**

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Report 0-6205-1

Project 0-6205

Project Title: Benchmarking and Improving Texas Rural Public Transportation Systems

Performed in cooperation with the  
Texas Department of Transportation  
and the  
Federal Highway Administration

September 2010

Published: May 2011

TEXAS TRANSPORTATION INSTITUTE  
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## **DISCLAIMER**

This research was performed in cooperation with the Texas Department of Transportation (TxDOT) and the Federal Highway Administration (FHWA). The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of FHWA or TxDOT. This report does not constitute a standard, specification, or regulation.

## ACKNOWLEDGMENTS

This project was conducted in cooperation with TxDOT and FHWA.

The authors acknowledge the support and guidance of the TxDOT program coordinator Karen Dunlap of the TxDOT Public Transportation Division; David Merritt, the project director and TxDOT public transportation coordinator; and members of the Project Monitoring Committee: Alfredo Gonzales and Tamara Cope, the TxDOT public transportation coordinators. The authors appreciate the assistance of TxDOT Research and Technology Implementation representatives Duncan Stewart, Sylvia Medina, and Frank Espinosa.

The authors thank Yonggao Yang, assistant professor, of Prairie View A&M University for the literature review and Yao Xing, civil engineering graduate student, of Texas A&M University for assistance in the peer group cluster analysis and peer group recommendation. The authors also thank Lisa Patke of the Texas Transportation Institute for providing assistance in document preparation.

Throughout the project, representatives of the agencies that provide public transportation in Texas gave information and responded to fact-finding questions. Specifically, the authors thank Gerald Payton of Panhandle Community Services; Lynda Woods Pugh of the Ark-Tex Council of Governments; Lisa Cortinas of the Golden Crescent Regional Planning Commission; Gary Rushing and Sandra Webb of the Heart of Texas Council of Governments; Norma Zamora of the Brownsville Urban System; Noel Hernandez of the Concho Valley Transit District; and Brad Underwood of the Texoma Area Paratransit System.

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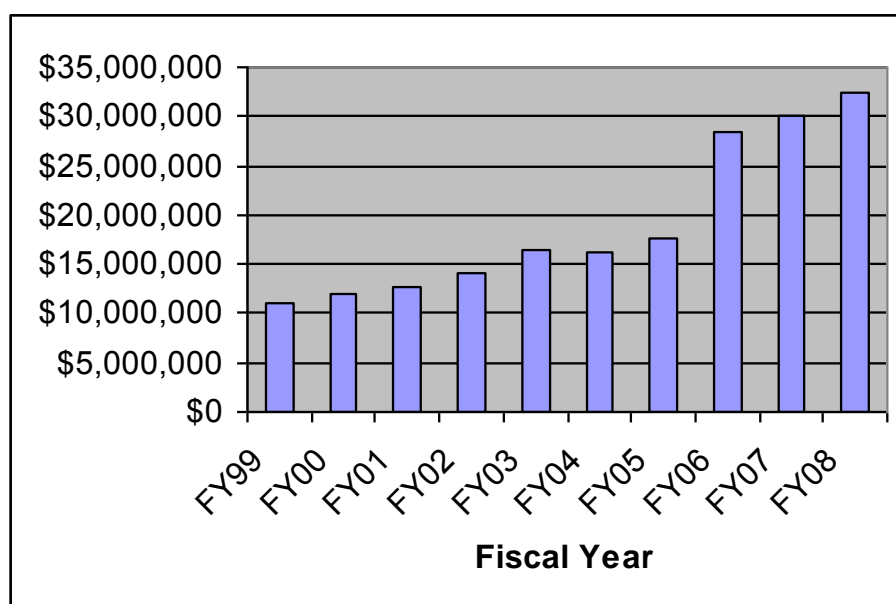
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## CHAPTER 1: INTRODUCTION

Rural transit is the lifeblood of millions of Americans living in non-urbanized areas. Research published by the Transportation Research Board demonstrates that rural transit systems that succeed in serving commute and medical trips need to generate a cost-to-benefit ratio on the federal investment of 3.35.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act—A Legacy for Users (SAFETEA-LU) included substantial increases for rural transit in recognition of the unmet needs of those communities. [Figure 1](#) displays FTA Section 5311 Non-Urbanized (Rural) apportionments for Texas from fiscal years (FY) 1999 to 2008. The jump between 2005 and 2006 reflects the SAFTEA-LU funding increase.



**Figure 1. FTA Section 5311 Rural Transit Funding Apportionments to Texas.**

The majority of Texas' 38 rural transit districts operate demand-response (DR) service; that is, passengers schedule individual rides from specific origins to specific destinations. A vehicle picks up passengers at their origin, usually curbside, and ultimately delivers them to their destination. However, a passenger may share the ride (or a portion of the ride) with another customer. DR services are inherently less productive than fixed-route services, further challenging rural providers to meet growing demand.

A few rural transit districts operate fixed-route (FR) service. FR services run along a pre-established route and stop at pre-established stops pursuant to a published schedule. In rural settings, these fixed-route services are often commuter or express services and may require that customers drive/ride to a fixed stop each morning to catch a non-stop ride to their work location. In some cases, drivers are allowed to deviate from the route slightly to pick up or drop off passengers, a practice often termed flex routing. [Table 1](#) lists rural transit districts offering some fixed-route services in their region.

**Table 1. Rural Transit District with Fixed-Route or Flex-Route Services.**

<b>Rural Transit District</b>	<b>Any DR?</b>	<b>Services</b>
Brazos Transit District	Yes	Commuter service
Capital Area Rural Transportation System	Yes	Fixed-route local services in San Marcos and Bastrop
Cleburne	Yes	Regional express service
Colorado Valley	Yes	Local and/or commuter service (8 locations)
El Paso County	No	Commuter service
Fort Bend County	Yes	Commuter service
South Padre Island	No	Circulator
Webb County Community Action Agency	Yes	Regional express service

Along with diversity of service type, the rural districts vary significantly in other respects. The geographic extent of districts ranges from compact areas like El Paso County and South Padre Island to the expansive area covered by West Texas Opportunities to the west and Brazos Transit District to the east.

## **A PRESENT AND FUTURE CHALLENGE**

Rural transit in Texas will become even more important over the next 20 to 30 years according to demographic trends. The State Demographer’s Office generated projections that indicate the following among statewide trends:

- **Aging.** As the Baby Boomers continue aging and longevity increases, the percentage of the population that is age 65 or over is expected to grow nearly 300 percent over the next 30 years. This will likely also lead to a large increase in the numbers of people with physical or cognitive conditions that preclude them from driving.
- **Rural retirement.** Projections indicate that as people retire, they are expected to leave the large urban centers and settle in the rural areas of the state.
- **Rural population and density.** Although total rural population in Texas is increasing because counties near metropolitan areas and along the border are growing rapidly, the percentage of the state’s population residing in rural areas is expected to decrease over time. In counties in west Texas, the Panhandle, and some counties south of San Antonio, population is declining and migration of seniors is not expected to increase the density of population in rural areas.

In combination, these trends indicate that rural transit providers will face an increase in demand based on demographics. However, they will be challenged to maintain the service effectiveness (passengers per revenue mile) with decreasing population density. In order to meet rising demand, they will need to provide the most efficient service possible, maximizing the miles of service they provide for each dollar they spend (revenue miles per operating cost).

These two factors—passengers per revenue miles and revenue miles per operating cost—also play a role in the amount of federal and state rural funding each provider receives. Rural providers are allocated funds based on relative need and performance. Need is calculated based on weighted population (75 percent) and land area (25 percent); performance is based on equally weighted local contribution per operating expense, passenger per revenue miles, and revenue

miles per operating expense. The funding calculation is weighted 65 percent based on need and 35 percent based on performance. Both need and performance are allocated based on an individual agency's relative position among all rural providers. Each year, the average value of each performance indicator may change. If that average improves, then in order to maintain the same share of funding, an agency must also improve at the same rate.

Since the Texas Transportation Commission updated the funding formula in 2006, rural providers consistently have sought to understand how to interpret their performance indicators, both in terms of a common standard and within the context of other providers. The only peer group that existed was the set of all rural providers. Understandably, many providers wanted to compare their performance to a smaller subset of providers.

The original purpose of this research was to develop peer groups and performance benchmarks as a tool to improve service effectiveness and efficiency for rural transit providers. As researchers shared preliminary information on the formation of rural peer groups, state-funded urban transit providers expressed interest in a similar effort on their systems. These urban systems are facing substantial population growth and broadened geographic boundaries. An expected increase in the number of urbanized areas within the state after Census 2010 will cause funding to be spread even further.

The allocation of state funds to urban transit providers is based on needs and performance, similar to the way rural funding is allocated. The state-funded urban allocation formula differs from the rural allocation formula in the following key respects:

- A portion of the funding is used to support transit in four systems in the Dallas-Fort Worth area that serve only seniors and persons with disabilities (limited eligibility providers).
- In addition to the three performance indicators used to allocate rural transit funding, state-funded urban systems have a fourth indicator—passenger boardings per capita. This indicator would benefit agencies that serve substantial numbers of non-residents such as college students and tourists. Unlike for rural funding allocation, the four performance indicators used to allocate state-funded urban system funding are not equally weighted.
- Performance is weighted 50 percent for urban systems compared to 35 percent for rural systems in calculating funding.

This research effort was expanded to incorporate an analysis of the state-funded urban providers as a result of the interest expressed by these operators.

## ORGANIZATION OF THE RESEARCH REPORT

This research report is organized as follows:

- [Chapter 2](#) contains a review of how other states use transit peer grouping and performance measurement.
- [Chapter 3](#) provides a summary discussion of the clustering analysis technique used to identify peer groups and lists the recommended rural and urban peer groups.
- [Chapter 4](#) examines the performance within and between rural and urban peer groups.
- [Chapter 5](#) contains case studies of agencies that excel in terms of operating efficiency and/or effectiveness and identifies key attributes for success.

[Appendices A](#) and [B](#) contain more detailed information regarding the clustering analysis for rural and urban peer groups, respectively. [Appendix C](#) presents the effectiveness and efficiency measures by transit district. The fact-finding questions for the case study research are included as [Appendix D](#).

## **CHAPTER 2: TRANSIT PEER GROUPING AND PERFORMANCE TRACKING BY OTHER STATES**

Rural and small urban communities throughout the United States have a unique set of characteristics; these same communities have an equally unique set of public transportation service needs. With the demographic projections across the United States indicating that rural and small urban transit needs will continue to increase into the future, it is becoming more important to maximize service for every funding dollar. In so doing, the over-arching goal of this project is to explore performance benchmarks that lead to improving effectiveness and efficiency of rural and small urban transit throughout Texas as well as increase the return on federal and state rural and small urban transit investments.

Chapter 2 provides an overview of the Federal Transit Administration (FTA) federal-aid grant programs designated for small urban and rural areas. This is followed by a discussion of an approach to measuring performance consistently in FTA Section 5307 and FTA Section 5311 programs. The final section presents the results of a national scan conducted on small urban and rural transit systems, which reflect the current state of the practice in terms of improving performance.

### **GOVERNMENTAL STANCE ON FUNDING SMALL URBAN AND RURAL TRANSIT**

Transit, often considered a necessary public service, receives federal, state, and local governmental financial assistance. The transit assistance is explicitly identified in government budgets and appropriations, partly to cover a government-induced gap between expenses and revenues and simultaneously provide sufficient public transportation service to its ridership. In recognition of minimizing this gap as well as meeting a growing need for public transportation services, on August 10, 2005, President George W. Bush signed the SAFETEA-LU legislation. SAFETEA-LU provided \$286.4 billion in guaranteed funding for federal surface transportation programs over a five-year period (FY 2005 through FY 2009) and included \$52.6 billion for federal transit programs. The \$52.6 billion was a 46 percent increase over transit funding guaranteed in the prior authorization, the Transportation Equity Act for the 21st Century (TEA-21).

Moreover, FTA administers an array of transit programs as outlined in Chapter 53, Title 49 of the United States Code (USC). For the purpose of this report, two specific federal-aid-formula-funded transit programs, namely the Urbanized Area (Section 5307) and the Other than Urbanized Areas (Section 5311), commonly known as Rural, are used as the framework to characterize best practices to consider when measuring performance consistently.

## SECTION 5307 AND SECTION 5311 GRANT PROGRAMS

The Section 5307 program makes federal resources available to urbanized areas with populations of 50,000 or more (1). The Section 5311 program provides financial assistance to support public transportation services, which are open to the public on an equal basis, in areas outside an urbanized area. The specific goals of the Section 5311 program are (2):

- To enhance the access of people in non-urbanized areas to health care, shopping, education, employment, public services, and recreation.
- To assist in the maintenance, development, improvement, and use of public transportation systems in rural and small urban areas.
- To encourage and facilitate the most efficient use of all federal funds used to provide passenger transportation in non-urbanized areas through the coordination of programs and services.
- To assist in the development and support of intercity bus transportation.
- To provide for the participation of private transportation providers in non-urbanized transportation to the maximum extent feasible.

Based on the FTA funding authorization for transit systems operating in urban areas and rural areas during FY 2005–FY 2009, Table 2 indicates that the Section 5307 program received an average annual increase of \$131.5 million, or about 3.65 percent increase per year. The Section 5311 program average annual increase was \$53.5 million, or about 21.3 percent increase per year. SAFETEA-LU featured a significant increase in rural transit investment. Table 3 provides a brief overview of major components of each program.

**Table 2. FTA Formula Grant Authorizations FY 2005–FY 2009.**

<b>Basic Urbanized Formula (Section 5307)</b>					
<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>Total</b>
\$3,593 M	\$3,432 M	\$3,570 M	\$3,872 M	\$4,119 M	\$18,586 M
<b>Formula Grants for Other than Urbanized Areas—Rural (Section 5311)</b>					
<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>Total</b>
\$251 M	\$388 M	\$404 M	\$438 M	\$465 M	\$1,946 M

Source: (1)



**Table 3. Federal-Aid Transit Programs (Formula Funded).**

Descriptive Components	Section 5307	Section 5311
Apportionment	<p>Apportioned on the basis of legislative formulas. For urbanized areas with 200,000 in population and over, funds are apportioned and flow directly to a designated recipient selected locally to apply for and receive federal funds. For urbanized areas under 200,000 in population, the funds are apportioned to the governor of each state for distribution. A few areas under 200,000 in population have been designated as transportation management areas and receive apportionments directly.</p>	<p>Under formula grants. Funding is apportioned by a statutory formula that is based on the latest U.S. Census figures to non-urbanized areas. 80% of the statutory formula is based on the states' non-urbanized population. 20% of the formula is based on land area. No state may receive more than 5% of the amount apportioned for land area. FTA adds amounts apportioned based on non-urbanized population according to the growing states formula factors of Title 49, USC, Section 5340 to the amounts apportioned to the states under the Section 5311 program.</p>
Eligible Purposes	<p>Provide capital assistance to transit systems in urbanized areas over 200,000 in population. Provide both capital assistance and operating assistance to transit systems in small urbanized areas with populations from 50,000 to 200,000.</p>	<p>Capital, operating, and administrative purposes.</p>
Eligible Recipients	<p>Public bodies with the legal authority to receive and dispense federal funds. Governors, responsible local officials, and publicly owned operators of transit services are to designate a recipient to apply for, receive, and dispense funds for transportation management areas pursuant to Title 49, USC, Section 5307(a) (2). Generally, a transportation management area is an urbanized area with a population of 200,000 or over. The governor or governor's designee is the designated recipient for urbanized areas between 50,000 and 200,000.</p>	<p>State and local governments, Indian tribes, private non-profit organizations, and public transit operators that provide general public transportation services. Private for-profit providers of service are eligible through purchase of service agreements with a local public body for the provision of public transportation services.</p>

**Table 3. Federal-Aid Transit Programs (Formula Funded) (Continued).**

Descriptive Components	Section 5307	Section 5311
Eligible Activities	<p>Planning, engineering design, and evaluation of transit projects and other technical transportation-related studies; capital investments in bus and bus-related activities such as replacement of buses, overhaul of buses, rebuilding of buses, crime prevention and security equipment, and construction of maintenance and passenger facilities; and capital investments in new and existing fixed guideway systems including rolling stock, overhaul and rebuilding of vehicles, track, signals, communications, and computer hardware and software. All preventive maintenance and some Americans with Disabilities Act (ADA) complementary paratransit service costs are considered capital costs. In these areas, at least 1% of the funding apportioned to each area must be used for transit enhancement activities such as historic preservation, landscaping, public art, pedestrian access, bicycle access, and enhanced access for persons with disabilities. For urbanized areas with populations less than 200,000, operating assistance is an eligible expense.</p>	<p>Capital, operating, and administrative assistance to state agencies, local public bodies, Indian tribes, nonprofit organizations, and operators of public transportation services.</p>
Allocation of Funding	<p>For areas of 50,000–200,000 in population, the formula is based on population and population density. For areas with populations of 200,000 or more, the formula is based on a combination of bus revenue vehicle miles, bus passenger miles, fixed guideway revenue vehicle miles, and fixed guideway route miles as well as population and population density.</p>	<p>Planning, training, and related technical studies are currently funded entirely with federal funds. State administration, planning, and technical assistance activities are limited to 15% of the annual apportionment. States must spend 15% of the apportionment to support rural intercity bus service unless the governor certifies, after consultation with affected intercity bus providers, that the intercity bus needs of the state are adequately met.</p>
Match	<p>The grant recipient must provide match for the non-federal share of any project. The federal share may not exceed 80% of the net project cost for capital projects and not more than 50% of the net project cost (the operating deficit) for operating assistance. The cost of vehicle-related equipment attributable to compliance with the ADA and the Clean Air Act may be eligible for 90% federal share. Projects or portions of projects related to bicycles may also be 90% federal share.</p>	<p>The maximum federal share for capital and project administration is 80% (except for projects to meet the requirement of ADA, Clean Air Act, or bicycle access projects, which may be funded at 90%). For operating assistance, the maximum federal share is 50% of the net operating costs. The local share is 50%, which shall come from an undistributed cash surplus, a replacement or depreciation cash fund or reserve, or new capital.</p>
Funding Availability	<p>The year apportioned plus three years, for a total of four years.</p>	<p>Year apportioned plus two years, for a total of three years.</p>
Data Collection	<p>Report data to the National Transit Database (NTD).</p>	<p>Report data on service levels, fleet, costs, and revenues to the NTD.</p>

Source: (2)

## **PERFORMANCE MEASUREMENT, PEER GROUPS, AND BENCHMARKING**

Evaluation is a vital and important element of any successful business. Levinson reported that business managers monitor programs and conduct evaluations to determine whether goals and objectives are achieved and how well the business is functioning (3). Similarly, in the transit industry, evaluations enable system operations to monitor efficiency, to measure effectiveness, and to generate data that can be used to improve overall service delivery as discussed in the Oluwoye and Gooding pilot study findings (4). Fielding and Smerk and Gerty believe that good transit management practices require regular evaluations of performance (5, 6). Fielding argues that a transit manager who does not measure and monitor performance is merely supervising operations (5). Data from evaluations must be used to identify and remedy problems, to justify budgets and expenditures, to gauge improvements in performance, and to document the system's impact on the community (6). Smerk and Gerty further recommend yearly internal evaluations on key functional areas (e.g., maintenance, finances, and staff performance) and three-year comprehensive evaluations on each aspect of transit management and operation (6).

With regard to the achievement of transit goals and objectives outlined in Section 5307 and Section 5311 programs, evaluations will be essential to the rural and small urban transit system planning process. Regular evaluations for these programs will potentially provide the database to document performance, to provide transit managers with a yardstick or benchmark to improve or plan for future services, and to persuade funding agencies that more money is needed to improve service delivery or to justify the continuation of existing transit service (7).

### **Performance Measures**

Traditionally, small urban and rural transit systems have based their performance measures on readily available data such as cost per mile or cost per trip (7). As passengers expect more and funding continues to tighten and diversify, performance measures are an important input in an agency's decision-making process to improve productivity and quality of service.

#### *Why Measure Performance?*

In an organization as complex as a transit system, there is an enormous variety of statistics and myriad performance measures from which to choose. It is crucial to pick the measurements based on what the agency is trying to evaluate. For instance, the agency may need to measure performance to (7):

- Evaluate a contract provider to ensure competitive performance.
- Decide what service mode is better for a new area.
- Reduce service but have many options as to where.
- Evaluate various expense categories as part of a budget-review process.
- Evaluate results from a previous service or operational change.
- Document the impact of service or its improvement as part of a funding arrangement.
- Convince decision makers that transit service is a vital part of the community.

### *What to Measure?*

According to Radow and Winters, there are generally four ways to measure performance (7). While these are not inclusive, they do outline a useful way of thinking about how a system performs and the different ways to capture its unique attributes. These four categories are as follows:

- Effectiveness measures are those that weigh how much a service is used against how much service is provided (e.g., the number of trips per vehicle hour).
- Efficiency measures are those that focus on how much service is provided as compared to the resources that service requires (e.g., the cost per trip or passengers per vehicle hour).
- Quality measures focus on attributes such as speed, safety, reliability, and comfort.
- Impact measures are results oriented: How is the service affecting the community and region? How much of the population is being served? What share of needs is being met? How does the service increase income or reduce other costs? Nontraditional measures are most likely to be impact measures.

### *Recognizing the Differences between Urban and Rural Transit Systems*

Rural transportation providers face unique challenges. Those identified by Radow and Winters are listed below (7):

- Operating in large geographic areas with low population densities.
- Providing service to rural residents with lower incomes, generally, than those of urban residents.
- Operating demand-response or subscription services.
- Providing transportation service largely to transit-dependent groups (e.g., the elderly, youths, people with low income, or people with disabilities).

Despite these facts, performance measurements used by small urban and rural transit systems are in many agencies the same as those used by major urban systems. Decision makers must be made aware that there are profound differences between small urban, rural, and urban transit. Once the differences between transit systems are made clear, operators must have some performance measures to fill the gap between what is expected and what gives a more accurate picture of the system (7).

### *Information: Where to Get It*

The data used as a basis for identifying performance measures must be consistent. Data should cover a full year of operations since performance can vary greatly from season to season or even month to month. Data that vary widely can inspire suspicion in decision makers. Gathering data can be a problem for many small systems. For transit agencies where the staff often performs many functions simultaneously, a systematic approach to data collection is important. Accurate record keeping and an organized, integrated database may be one of the transit system's most important analytical tools. Poor data collection techniques can lead to unreliable statistics, misleading performance measures, and poor decisions. For a comprehensive review of performance measures, the details of obtaining them, and pros and cons of different measures,

researchers recommend reviewing Transit Cooperative Research Program (TCRP) Report 6, *Users' Manual for Assessing Service-Delivery for Rural Passenger Transportation* (8).

## **Benchmarking**

Before a transit system can evaluate its performance, it needs a benchmark against which it can compare its performance. One type of benchmark is the performance of similar systems in the state or region. The concept of benchmarking was adopted by many private organizations during the mid- to late-1980s as a standard business practice. In business, benchmarking is the process of identifying successful business practices, typically identified through performance measurement, and applying those concepts to another business in order to achieve the same successful results. In addition, a benchmark is more likely to be based on a system's goals and objectives that have in turn been developed based on past performance.

Benchmarking has been used with the public transportation industry since the early 1990s. In March 2008, TCRP published a report entitled *Guidebook for Measuring, Assessing, and Improving Performance of Demand-Response Transportation* (9). This report examined methodologies for assessing services, including conducting trend analysis within an agency, comparing performance to absolute norms or standards, and comparing performance to peer agencies. The guidebook recommends using multiple methodologies in order to assess performance from a variety of aspects. Listed below are three empirical examples of benchmarking used in the transit community.

The Florida Department of Transportation, through the National Center for Transit Research, published a proposed methodology for benchmarking U.S. transit systems in 2004 (10). This study stopped short of providing performance benchmarks, but rather was designed to identify "best in class" agencies as the first step of an overall benchmarking program. Transit agencies were divided into peer groups based on geography and system size only. Since this effort looked nationally, there was not a full understanding (or verification) of the performance data being employed to score individual agencies. While an interesting exercise, the effort does not appear to have been carried forward.

The State of North Carolina is beginning a process of requiring the incorporation of performance measurement and benchmarking among the state's transit providers (11). (North Carolina is one of a handful of states that allocates a portion of transit funds among providers using performance indicators.) The intent of the program is that each transit agency be able to track their performance trend line, compare their performance with the performance of a reasonable peer group, and have a reward/disincentive related to pre-established absolute values of certain indicators. Much of their work, to date, is similar to the Texas Department of Transportation (TxDOT) approach, which focuses on the dispersion of indicator values in identifying agencies with performance at both the high and low ends of the spectrum.

London (Canada) Transit annually provides their governing body a report on their performance that includes a benchmarking element (12). For the fixed-route operation, they have identified a discrete peer group of eight other urban systems with similar populations. Factors that they compare include the following:

- Service hours per capita.
- Passenger trips per capita.
- Passenger trips per revenue hour and per revenue kilometer.
- Direct operating cost per revenue hour.
- Revenue recovery.

Additionally, London (Canada) Transit compares their specialized services (paratransit) to the averages of all such operations across Canada, and factors similar to the aforementioned are compared.

### **Peer Grouping**

The most difficult step in benchmarking is the establishment of the appropriate peer group. Peer groups are groups of systems that are considered sufficiently similar in circumstances so they can be fairly compared.

In 2008, Hendren and Niemeier highlighted a few efforts undertaken to create peer groups for transportation policy and research (13). Fielding (5) clustered 311 transit agencies into five peer groups using size (number of vehicles), peak-to-base operating ratio, and average operation speed to highlight differences in transit agencies and to compare performance between peer groups. A more recent study used 16 variables to distinguish major features characterizing individual states and to develop peer groups (14). The variables used in this cluster analysis included state population, number of drivers, infrastructure miles, vehicle miles traveled, number of bridges, bond retirement, six resource measures, and four fuel tax measures. The limitations of the study were that it relied on one year of data captured in 1993, a relatively small set of variables, a number of controversial resource measures, and no growth variables. Nevertheless, the analysis provided an important platform from which the development of peer groups could be considered.

The selection of an appropriate peer group is driven by the factors being compared. The mode (fixed route and paratransit) of service involved is clearly one of these. Data from a national sample of agencies funded under Section 5311 show that average costs per vehicle are substantially higher for agencies providing primarily fixed-route service than for agencies providing principally demand-response service. By the same token, the average number of trips per vehicle operated is a good deal higher for fixed-route service than for demand-response service (7).

A measure that combines these two is the average cost per passenger trip. For agencies operating more than five vehicles, this average trip cost is substantially less for fixed-route service than for demand-response service. However, for smaller Section 5311 agencies, this is not necessarily true. Where the service area is limited to a town or city (and thus relatively densely populated), fixed-route service is less costly on average. However, where the service area is county wide (or multi-county) and more sparsely settled, demand response appears to be cheaper on average (7).

In addition to the mode of service involved, peer group comparability can also be involved, such as the following factors determined by the literature review conducted as part of the TCRP research (15):

- Size of the transit agency.
- Characteristics of the transit workforce.
- Whether or not administration and overhead are shared with another agency, thus impacting comparable costs (7).
- Target ridership markets (e.g., general public or seniors and people with disabilities).
- Service area characteristics and operating environment (proximity to urban area).
- Type of routing and scheduling used by the transit agency.
- Type of organization operating the transit service (dedicated public transit provider, agency, or private operator).
- Use of vehicles dedicated to transit or non-dedicated vehicles.
- requirement for advance reservation versus immediate service request;
- Use of advanced technology.
- Door-to-door or curb-to-curb service.
- Use of volunteers.
- Whether or not the transit agency provides Medicaid non-emergency transportation.

It is important to determine a basis for selecting common criteria to use when creating a peer group. The criteria could be, for example, those factors that will influence the efficiency and effectiveness of a system.

## **EMPIRICAL STATE OF THE PRACTICE: SECTION 5307 AND SECTION 5311 GRANT PROGRAMS**

To gain a more empirical insight, in 2009, researchers conducted a national survey of public transportation agencies that are responsible for managing Section 5307 and Section 5311 transit systems. Researchers pursued answers to the following four research questions:

- Do states use peer grouping?
- If so, what is the state's process for developing peer groups?
- For what reason(s) do states use peer grouping?
- Do states use performance measures/factors to allocate transit funds?

Table 4 shows how peer grouping and performance measures are used among state departments of transportation (DOTs). Table 5 shows the breakout of states that conduct peer grouping by how the state uses peer groups.

Eight states (Idaho, Indiana, Louisiana, Michigan, Minnesota, Mississippi, Nebraska, and North Carolina) indicated using peer grouping. Of the eight states, 25 percent of the states (Indiana and North Carolina) used peer grouping to assist with funding decisions and performance improvements.

**Table 4. Peer Grouping and Performance Measures.**

Survey Categories	Number of States
<b><i>Conduct Peer Grouping</i></b>	8
-Use in Coordination Plans	1
-Use for Evaluations	3
-Use for Funding Decisions	3
-Use for Performance Improvement	3
<b><i>Use Performance Measures</i></b>	19
-Use in Annual Application Competitive Process	7
-Use for Evaluations	4
-Use in Funding Allocation	8

**Table 5. Use of Peer Groups.**

State	Coordination Plans	Evaluations	Funding Decisions	Performance Improvements
Idaho			x	
Indiana			x	x
Louisiana	x			
Michigan		x		
Minnesota				x
Mississippi		x		
Nebraska		x		
North Carolina			x	x
Totals	1	3	3	3

Table 6 lists how states use performance measures. Performance measures alone are used more broadly than peer groups combined with performance measures. Only eight states reported using performance indicators in allocating transit funds. Further, the degree to which these measures are used in funding allocation varies broadly. For example, Indiana and North Carolina use peer grouping and performance measures as the sole basis for fund allocation. Texas uses performance to determine 50 percent of state funding for qualified urban systems and 35 percent of federal and state funding for rural transit districts.



**Table 6. Usage of Performance Measures.**

State	Annual Application Competitive Process	Evaluations	Funding Allocations
California		x	
Idaho		x	
Indiana			x
Iowa			x
Louisiana			x
Maryland	x		
Massachusetts			x
Michigan	x		
Minnesota			x
Mississippi		x	
New Mexico	x		
North Carolina			x
Ohio			x
Pennsylvania	x		
South Dakota	x		
Texas			x
West Virginia		x	
Wisconsin	x		
Wyoming	x		
Totals	7	4	8

The performance measures used varied from the standard basic efficiency and effectiveness indicators to as few as one indicator, ridership. [Table 7](#) provides a composite snapshot of eight states (Idaho, Indiana, Louisiana, Michigan, Minnesota, Mississippi, Nebraska, and North Carolina) responding to using peer grouping. The two states that resonate from among the eight are Indiana and North Carolina. Both of these states have profiles that are directly aligned with the research questions pursued in the survey, as well as the potential to be considered a best practice leading to improving small urban and rural transit efficiency and effectiveness.

**Table 7. Composite Peer Grouping and Performance Measures State of the Practice.**

State	Peer Grouping Usage			Performance Measures Usage			
	Coordinated Plans	Evaluations	Funding Decisions	Performance Improvements	Annual Application Competitive Process	Evaluations	Funding Allocations
Idaho			x			x	
Indiana			x	x			x
Louisiana	x						x
Michigan		x			x		
Minnesota				x			x
Mississippi		x				x	
Nebraska		x					
North Carolina			x	x			x
Totals	1	3	3	3	1	2	4



## CHAPTER 3: CLUSTERING ANALYSIS

Chapter 3 documents the clustering analysis process used to establish peer groups. The first section of Chapter 3 describes the process and results of selection of rural peer groups. The second section of Chapter 3 shows the results of the application of the same process for the group of state-funded urban agencies. [Appendices A](#) and [B](#) contain detailed data from the multiple iterative calculations conducted as part of the clustering analysis process.

### INTRODUCTION TO THE RURAL CLUSTERING ANALYSIS PROCESS

The purpose of the clustering analysis is to establish reasonable peer groupings of rural transit agencies. These peer groupings are to be based on the transit environment within which each agency operates so that agencies can be compared to other rural operators who face similar environments.

The 37 rural transit agencies are expected to be divided into five to eight peer groups before the performance comparison is carried out within those groups. South Padre Island, the 38<sup>th</sup> rural provider, is excluded from this analysis. The small service area size, use of fixed-route shuttle service, and seasonality of a significant non-resident population are unique from all other rural providers. All the data used in this analysis reflect each provider service area's inherent characteristics, which transit agencies cannot modify..

The following variables used in this analysis are representative of the kinds of data used in other research efforts to define the degree to which development and demographics are conducive to use of transit.

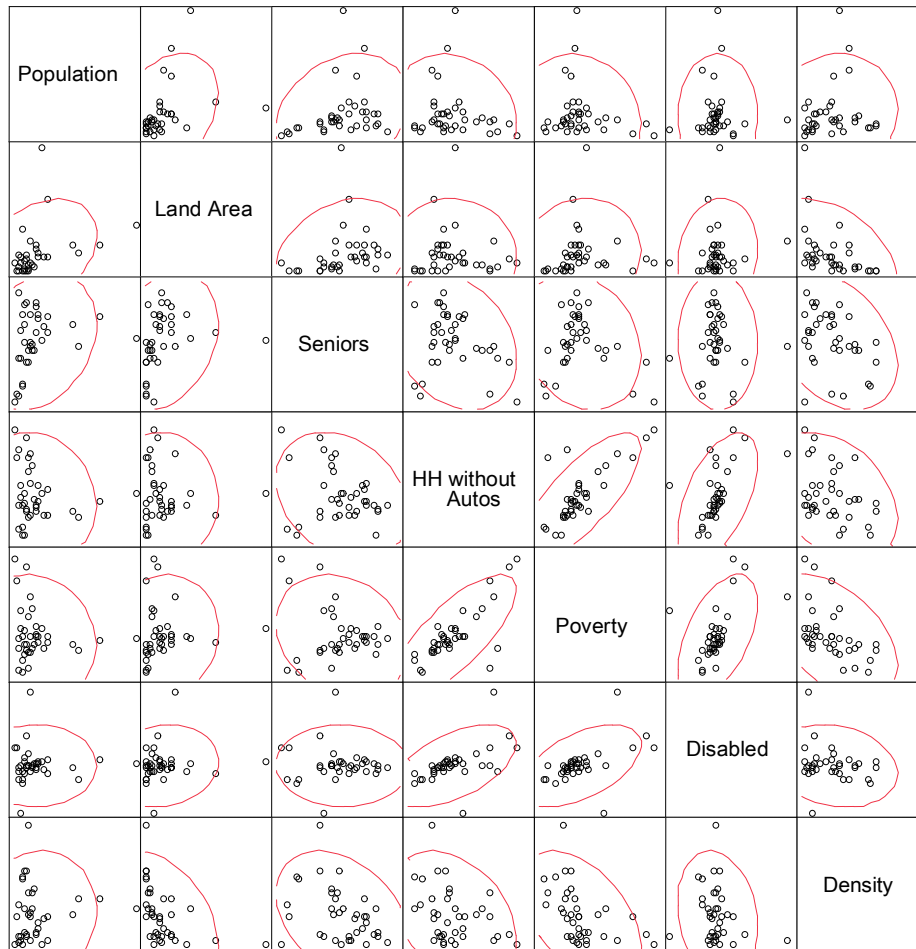
- Population.
- Service area size.
- Service area density.
- Percent of service area population that is age 65 or older.
- Percent of households (HHs) with zero automobiles.
- Percent of population below poverty level.
- Percent of population age 21 to 64 that are disabled.
- Service area located in a border area.
- Service area located within/adjacent to a metropolitan area having a dedicated transit sales tax.

There are two category variables (0/1) that cannot be used in the clustering analysis directly. One is the variable representing whether the area is on the border, and the other represents whether the area is within a metropolitan area.

Therefore, researchers investigated three options in the analysis:

- The first option (C1) is to divide all the agencies into four categories according to those two 0/1 variables and then perform the clustering.
- The second option (C2) is to treat those two 0/1 variables just as other continuous variables and input them into the clustering analysis.
- The last option (C3) is to ignore them in the clustering analysis and see whether there is some relationship between the geographic locations with the clustering results.

The variables are not totally independent from each other. [Figure 2](#) and [Table 8](#) contain plotted correlations between all the continuous variables. The scatter matrix and the correlation coefficient show that the percentage of the people under the poverty level is highly correlated to households without autos. The report contains insight about the correlation between the category variables and some of the continuous variables in a later section.



**Figure 2. Scatter Matrix of Variables.**

**Table 8. Correlation Coefficients between Variables.**

	<b>Pop.</b>	<b>Land Area</b>	<b>% Pop. 65+</b>	<b>% HHs with Zero Autos</b>	<b>% Individuals under Poverty Level</b>	<b>% Disabled Ages 21–64</b>	<b>Density</b>
Population	1.0000	0.3668	0.2531	-0.1477	-0.1506	0.0066	0.0882
Land Area	0.3668	1.0000	0.2703	-0.0452	0.0747	0.1116	-0.4449
% Pop. 65+	0.2531	0.2703	1.0000	-0.2666	-0.2132	-0.0232	-0.3511
% HHs with Zero Autos	-0.1477	-0.0452	-0.2666	1.0000	0.7584	0.5447	-0.3565
% Individuals under Poverty Level	-0.1506	0.0747	-0.2132	0.7584	1.0000	0.5255	-0.4754
% Disabled Ages 21–64	0.0066	0.1116	-0.0232	0.5447	0.5255	1.0000	-0.1830
Density	0.0882	-0.4449	-0.3511	-0.3565	-0.4754	-0.1830	1.0000

**CLUSTERING ANALYSIS PROCESS**

Since the nature of the variables is different, the magnitudes vary greatly. In calculations, the ones with large magnitude would totally overwhelm those with small magnitude. To avoid that, all the variables input into the clustering analysis need to be normalized before the clustering analysis. In this transformation, the measure then represents how far the variable values deviate from the mean.

$$y_{ij} = \frac{x_{ij} - \bar{X}_i}{s_i}$$

where:  $y_{ij}$  is the adjusted  $i$ th variable in  $j$ th case,  $x_{ij}$  is the  $i$ th variable in  $j$ th case,  $\bar{X}_i$  is the mean of the  $i$ th variable, and  $s_i$  is the standard deviation of the  $i$ th variable.

In addition, considering the importance of the social-economic elements' influence on prospective utilization of a transit agency's service, researchers assigned higher weights on two variables— "Percentage of Households without Autos" and "Percentage of Individuals under Poverty Level." Therefore, the values of those two variables are doubled in the following clustering analysis.

For every set of clustering results, researchers listed the component agencies of every cluster, the distance of each case (agency) to the center of the cluster (within-cluster distance), and the distance between the centers of different clusters (between-clusters distance). The first distance is used to measure the similarity within the peer group, while the latter one measures the differences between the clusters. Those agencies far away from their center are more likely to be regrouped when the number of clusters changes. Researchers also calculated the mean and standard deviation of each variable for every peer group as a measurement of that group's characteristics.

Researchers ran analyses for each option—C1, C2, and C3—using varying numbers of clusters. The solution that minimizes the variability within each group and maximizes the variability between groups is defined as the optimal solution.

In C1, all the agencies are first partitioned into four categories according to their geographic locations. Then the K-mean clustering, as described above, is applied to each category to divide those agencies into two clusters. There is only one agency (El Paso County) in the 1/1 category, which means that it is near a metro area and on the border. Therefore, there are a total of seven, not eight, clusters. This methodology does not provide for more groups because of the initial step of pre-dividing agencies into four sub-sets.

For C2 and C3, the number of clusters is set to be five, six, seven, or eight according to the intent established at the beginning of the process. To determine the optimum number of clusters, the sum of the F values in the analysis of variance (ANOVA) is used as the criterion. The formula of an F-test for each variable is:

$$F = \frac{\textit{between group variability}}{\textit{within group variability}}$$

A large F value is an indication of better peer grouping. A large value indicates a high variability between groups, with a low variability within a group.

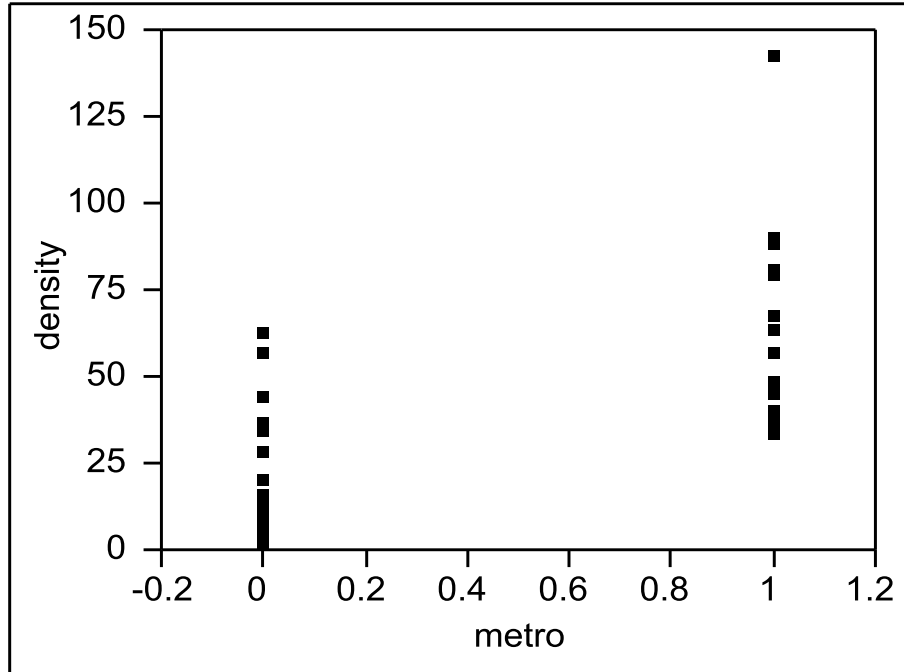
## ANALYSIS OF RESULTS

Each of the options treats the geographic indicators differently. C1 applies the two geographic indicator variables before applying the clustering analysis algorithm. It excludes the influence of geographic location in the clustering analysis itself. C1 compares the similarities and differences of agencies having similar locations instead of among all the study agencies. It excludes the possibility that the areas with different locations may share more similar characteristics. C1 essentially assigned those two variables very high weights.

C2 uses the two geographic category variables just like other continuous variables in the clustering analysis. C2 assigns the geographic variables the same weight as the majority of other variables. The differences between C1 and C2 results are limited to those peer groups containing fewer cases and reflect those cases whose distance to the center of their cluster is relatively larger than their peers. For example, Kilgore is partitioned into a group alone in C1 because its population is significantly higher than that of other areas in the 0/0 category. However, in C2, it is grouped with San Antonio, Austin, and Bryan whose populations are high, too. The comparison means that for most agencies C1 and C2 result in the same clusters. However, C2 appears to provide a greater opportunity for equitable inclusion of all factors.

C3 ignores both geographic variables. In order to assess the impact of ignoring those variables, researchers identified two continuous variables that might act as surrogates for the non-continuous variables. Based on empirical experience, researchers selected “Density” to represent “Metro Area” and “Percentage of Households without Autos” for “Border” to examine the strength of the correlation between each set of variables.

From the plots in [Figure 3](#), the difference of the density in metro areas and non-metro areas is not consistent, with significant overlaps in densities between areas near metropolitan areas and those that are not near metropolitan areas. C3 would not correctly consider the potential impacts of being located near or far from an urban center.



**Figure 3. Density versus Metro Region.**

A second potential issue in the clustering results is the one-case clusters. The objective of clustering is to group all the agencies with their peers to permit comparison of performance indicators. If there is only one agency in a group, there is no opportunity for such a peer comparison.

To attempt to address this issue, researchers performed the C2 clustering, ignoring the percentage of households without autos or population below poverty level for the five to eight cluster cases. [Table 9](#) displays the results. For this alternative set of results, eight is the optimum number of clusters. However, there are still one-case clusters. Therefore, this alternative is not an improvement.

[Appendix A](#) provides detailed data associated with all tested options. C1 and C2 provide two kinds of insight into the characteristics of the study areas. If there is need or requirement to emphasize the role the geographic location plays on the performance, C1 is recommended for the clustering analysis. If location information is of interest but no more important than other considerations, C2 is more appropriate since it assigns the equitable weighting to every variable. C3 is not recommended since it ignores some information.

**Table 9. ANOVA for C2 without HHs without Autos  
or Population below Poverty Level.**

**a. Five Clusters**

Variables	Cluster		Error		F
	Mean Square	df	Mean Square	df	
Population	6.527	4	0.330	33	19.779
Land Area	6.910	4	0.284	33	24.361
Density	5.042	4	0.510	33	9.886
% Pop. 65+	6.065	4	0.386	33	15.710
% Disabled Ages 21–64	4.748	4	0.546	33	8.702
Border	8.577	4	0.082	33	105.079
Metro Region	1.245	4	0.970	33	1.283
Total					187.102

**b. Six Clusters**

Variables	Cluster		Error		F
	Mean Square	df	Mean Square	df	
Population	6.005	5	0.218	32	27.559
Land Area	5.742	5	0.259	32	22.160
Density	4.700	5	0.422	32	11.140
% Pop. 65+	1.891	5	0.861	32	2.197
% Disabled Ages 21–64	5.541	5	0.290	32	19.079
Border	6.861	5	0.084	32	81.516
Metro Region	1.321	5	0.950	32	1.391
Total					202.662

**c. Seven Clusters**

Variables	Cluster		Error		F
	Mean Square	df	Mean Square	df	
Population	4.965	6	0.233	31	21.344
Land Area	4.777	6	0.269	31	17.765
Density	4.011	6	0.417	31	9.615
% Pop. 65+	3.449	6	0.526	31	6.558
% Disabled Ages 21–64	4.728	6	0.279	31	16.972
Border	6.167	6	0	31	∞
Metro Region	5.148	6	0.197	31	26.105
Total					135.565

**d. Eight Clusters**

Variables	Cluster		Error		F
	Mean Square	df	Mean Square	df	
Population	4.314	7	0.227	30	19.015
Land Area	4.808	7	0.111	30	43.145
Density	3.95	7	0.312	30	12.67
% Pop. 65+	3.005	7	0.532	30	5.646
% Disabled Ages 21–64	4.078	7	0.282	30	14.469
Border	5.286	7	0	30	∞
Metro Region	4.412	7	0.204	30	21.654
Total					147.569



The recommended result is C2 with six clusters as the final clustering. For the one-case cluster in C2, researchers recommend merging that one case to a nearby cluster for the performance measurement comparison. [Table 10](#) shows the recommended final clustering.

**Table 10. Final Rural Cluster Results/Peer Groups.**

<b>C2 (Six Clusters)</b>	
<b>Group</b>	<b>Rural Agency</b>
1	Del Rio (Del Rio)
	Kleberg County Human Services (Kingsville)
	Lower Rio Grande Valley Develop. Council (McAllen)
	Rural Economic Assistance League, Inc. (REAL) (Alice)
2	West Texas Opportunities, Inc. (Lamesa)*
3	Ark-Tex Council of Governments (Texarkana)
	Aspermont Small Business Development Center (Aspermont)
	Bee Community Action Agency (Beeville)
	Caprock Community Action Association (Crosbyton)
	Central Texas Rural Transit District (Coleman)
	Colorado Valley Transit (Columbus)
	Concho Valley Council of Governments (San Angelo)
	Golden Crescent Regional Planning Commission (Victoria)
	Heart of Texas Council of Governments (Waco)
	Hill Country Transit District (San Saba)
	Panhandle Community Services (Amarillo)
Rolling Plains Management Corp. (Crowell)	
South East Texas Regional Planning Commission (Beaumont)	
South Plains Community Action Association (Levelland)	
4	Cleburne (Cleburne)
	Collin County Area Regional Transportation (McKinney)
	Community Services, Inc. (Corsicana)
	Fort Bend County
	Greenville Senior Center Resources and Public Transit
	Gulf Coast Center (Galveston)
	Kaufman County Senior Citizens Service (Terrell)
	Public Transit Services (Mineral Wells)
	Services Program for Aging Needs (SPAN) (Denton)
Texoma Area Paratransit System (TAPS) (Sherman)	
The Transit System Inc. (Glen Rose)	
5	Alamo Area Council of Governments (San Antonio)
	Brazos Transit District (Bryan/College Station)
	Capital Area Rural Transportation System (Austin)
	East Texas Council of Governments (Kilgore)
6	Community Action Council of South Texas (Rio Grande City)
	Community Council of Southwest Texas (Uvalde)
	El Paso County
	Webb County Community Action Agency (Laredo)

\* Singleton cluster merged with cluster 5 for further analyses.

## URBAN SYSTEM CLUSTERING ANALYSIS

Researchers applied the clustering selection process, described above for the rural systems, to the state-funded urban systems. Having thoroughly examined the implications and impacts of the three options for consideration of locational parameters (C1, C2, and C3 above) when developing the rural cluster, urban cluster alternatives applied the selected C2 option only. C2 considered the locational data as a variable rather than as an initial screener (C1) or as data to be ignored (C3).

The total number of urban agencies included in the clustering analysis was 27. The total number of urban transit agencies that are eligible for state funds is 30. Researchers identified the four urban transit agencies that are limited eligibility providers (Arlington, Grand Prairie, Mesquite, and Northeast Transportation Services [NETS]) as a peer group and did not include these agencies in further clustering analysis. One transit agency that is not a recipient of state funds was included in the clustering analysis, thus resulting in 27 agencies (Denton County Transportation Authority was included because the service area is similar to other state-funded transit districts). The number of alternatives tested ranges from four clusters to seven clusters. [Table 11](#) displays the results of the ANOVA test for each alternative. [Appendix B](#) contains detailed data associated with all options.

**Table 11. ANOVA Tests of Urban Cluster Alternatives.**

### **a. Four Clusters (7/1/4/15)**

Variables	Cluster		Error		F
	Mean Square	df	Mean Square	Df	
Population	6.138	3	0.373	23	16.446
Land Area (Square Miles)	6.656	3	0.306	23	21.775
Population/Square Mile	3.553	3	0.711	23	5
% Pop. Ages 21–64 Disabled	6.505	3	0.325	23	19.99
% Occupied Housing Units with Zero Autos	2.321	3	0.871	23	2.665
% Pop. Age 65+	6.012	3	0.39	23	15.424
% Pop. below Poverty Level	2.385	3	0.863	23	2.764
% Management, Professional, and Related Occupations	5.485	3	0.458	23	11.965
% Service Occupations	3.202	3	0.756	23	4.234
% Production, Transportation, and Material Moving Occupations	4.193	3	0.627	23	6.686
Border Area	4.472	3	0.591	23	7.572
Metro Area	2.558	3	0.84	23	3.044
Total					117.565

**Table 11. ANOVA Tests of Urban Cluster Alternatives (Continued).**

**b. Five Clusters (8/12/2/4/1)**

Variables	Cluster		Error		F
	Mean Square	df	Mean Square	Df	
Population	4.99	4	0.32	22	15.595
Land Area (Square Miles)	5.379	4	0.249	22	21.579
Population/Square Mile	2.506	4	0.772	22	3.249
% Pop. Ages 21–64 Disabled	4.552	4	0.4	22	11.394
% Occupied Housing Units with Zero Autos	4.865	4	0.343	22	14.198
% Pop. Age 65+	3.164	4	0.652	22	4.852
% Pop. below Poverty Level	4.489	4	0.411	22	10.921
% Management, Professional, and Related Occupations	4.396	4	0.428	22	10.274
% Service Occupations	3.378	4	0.613	22	5.511
% Production, Transportation, and Material Moving Occupations	3.688	4	0.557	22	6.623
Border Area	5.264	4	0.27	22	19.488
Metro Area	2.411	4	0.789	22	3.056
Total					126.74

**Table 11. ANOVA Tests of Urban Cluster Alternatives (Continued).**

**c. Six Clusters (1/15/3/2/4/2)**

Variables	Cluster		Error		F
	Mean Square	df	Mean Square	df	
Population	4.099	5	0.31	21	13.239
Land Area (Square Miles)	4.121	5	0.304	21	13.535
Population/Square Mile	3.573	5	0.435	21	8.214
% Pop. Ages 21–64 Disabled	3.182	5	0.528	21	6.027
% Occupied Housing Units with Zero Autos	4.363	5	0.247	21	17.671
% Pop. Age 65+	2.862	5	0.604	21	4.735
% Pop. below Poverty Level	4.031	5	0.326	21	12.371
% Management, Professional, and Related Occupations	3.374	5	0.482	21	6.995
% Service Occupations	3.27	5	0.507	21	6.447
% Production, Transportation, and Material Moving Occupations	3.027	5	0.565	21	5.359
Border Area	4.608	5	0.189	21	24.422
Metro Area	2.816	5	0.615	21	4.576
Total					123.591

**Table 11. ANOVA Tests of Urban Cluster Alternatives (Continued).**

**d. Seven Clusters (3/6/2/12/1/2/1)**

Variables	Cluster		Error		F
	Mean Square	df	Mean Square	df	
Population	3.847	6	0.196	20	19.624
Land Area (Square Miles)	3.744	6	0.227	20	16.512
Population/Square Mile	3.173	6	0.398	20	7.971
% Pop. Ages 21–64 Disabled	3.197	6	0.391	20	8.177
% Occupied Housing Units with Zero Autos	3.643	6	0.257	20	14.174
% Pop. Age 65+	3.488	6	0.304	20	11.484
% Pop. below Poverty Level	3.06	6	0.432	20	7.083
% Management, Professional, and Related Occupations	3.295	6	0.361	20	9.116
% Service Occupations	2.739	6	0.528	20	5.183
% Production, Transportation, and Material Moving Occupations	3.008	6	0.448	20	6.719
Border Area	3.289	6	0.363	20	9.057
Metro Area	2.33	6	0.651	20	3.58
Total					118.68

The alternative with this largest total score is the five-cluster alternative. This alternative does result in one cluster with a single agency. As with the rural groups, the final urban groups merged the singleton with the nearest cluster, resulting in a net of four clusters. [Table 12](#) displays the selected alternative. Researchers identified the four urban transit agencies that are limited eligibility providers (Arlington, Grand Prairie, Mesquite, and NETS) as an additional urban peer group.

**Table 12. Final Urban Cluster Results/Peer Groups.**

<b>Cluster No.</b>	<b>Name</b>
1	Beaumont Municipal Transit
	City of Port Arthur
	Hill Country Transit District, Temple Division
	Longview Transit
	Texarkana Urban Transit District
	Texoma Area Paratransit System, Inc., Sherman/Denison
	Tyler Transit
	Waco Transit System
2	Brazos Transit District, Bryan/College Station
	City of Abilene, Texas
	City of Amarillo, Amarillo City Transit
	City Transit Management Company, Inc., Lubbock
	Concho Valley Transit District
	Denton County Transportation Authority*
	Golden Crescent Regional Planning Commission, Victoria
	Gulf Coast Center/Connect Transit, Lake Jackson/Angleton
	Gulf Coast Center/Connect Transit, Texas City/La Marque
	Hill Country Transit District, Killeen Division
Midland-Odessa Urban Transit District	
Wichita Falls Transit System	
3	Brazos Transit District, The Woodlands
	Collin County Area Regional Transportation
4	City of Brownsville
	City of Galveston
	City of Harlingen
	Laredo Transit Management Incorporated
5	Hidalgo County combined (McAllen)**

\* The Denton County Transportation Authority does not receive state funds and does not appear in this report after the clustering analysis is discussed.

\*\* Combined with cluster 4 to eliminate single-agency cluster.

## RURAL AND URBAN PEER GROUPING SUMMARY

Researchers conducted the cluster analysis to develop peer groupings for rural and urban transit districts separately. Rural and urban transit districts in Texas differ in service area and delivery characteristics. Researchers recognize the importance of differentiating between rural and urban transit systems. Rural transit districts differ from urban transit districts because rural transit districts typically:

- Operate in large geographic areas with low population densities.
- Operate demand-response services versus fixed-route services.

The cluster analysis provides peer groupings based on the transit environment so that transit districts can be compared to other rural or urban transit districts that face similar environments. [Table 13](#) and [Table 14](#) provide a summary of the rural and urban peer groupings and the environmental factors associated with each transit district.

**Table 13. Rural Peer Groupings and Environmental Data Elements.**

<b>Transit District</b>	<b>Population Density (Population/Square Mile)</b>	<b>% Population with a Disability (Ages 21–64)</b>	<b>% Occupied Housing Units with Zero Autos</b>	<b>% Population Age 65+</b>	<b>% Population below Poverty Level</b>	<b>Border, Major Metro, or Both*</b>
<b>Rural Peer Group 1:</b>						
Del Rio	14.15	5.2	8.3	10.8	25.7	Border
Kleberg County Human Serv. Lower Rio Grande Valley Dev. Council	13.73	19.9	12.3	10.9	25.3	Metro
Rural Economic Asst. League	46.44	21.8	10.6	11.9	26.8	Border
<b>Mean</b>	<b>28.31</b>	<b>18.2</b>	<b>10.3</b>	<b>11.4</b>	<b>25.3</b>	
<b>Rural Peer Group 2:</b>						
Ark-Tex Council of Governments	38.48	24.1	7.9	15.8	15.7	
Aspermont Small Bus. Dev. Center	6.31	21.5	6.1	18.6	15.2	
Bee Community Action Agency	18.72	24.6	7.5	14.9	18.0	
Caprock Community Action Agency	9.82	21.9	7.0	14.1	18.7	
Central Texas Rural Transit District	17.29	22.4	6.1	17.0	15.6	
Colorado Valley Transit	36.37	20.1	8.6	13.7	14.9	
Concho Valley Transit District	3.69	19.9	5.6	16.0	15.6	
Golden Crescent Regional Planning Council	22.62	22.4	8.3	15.6	15.7	
Heart of Texas Council of Governments	30.73	23.0	6.5	16.1	12.9	
Hill Country Transit District	18.67	20.7	5.6	17.4	19.2	
Panhandle Community Services	8.68	19.3	5.1	13.8	13.6	
Rolling Plains Mgmt. Corporation	13.14	22.1	5.8	17.4	12.8	
South East Texas Regional Planning Commission	64.69	21.1	6.9	12.4	10.6	
South Plains Community Act. Agency	15.11	21.4	5.9	13.8	16.6	
<b>Mean</b>	<b>22.50</b>	<b>21.7</b>	<b>6.7</b>	<b>15.5</b>	<b>15.4</b>	

**Table 13. Rural Peer Groupings and Environmental Data Elements (Continued).**

<b>Transit District</b>	<b>Population Density (Population/Square Mile)</b>	<b>% Population with a Disability (Ages 21–64)</b>	<b>% Occupied Housing Units with Zero Autos</b>	<b>% Population Age 65+</b>	<b>% Population below Poverty Level</b>	<b>Border, Major Metro, or Both*</b>
<b>Rural Peer Group 3:</b>						
Cleburne	145.41	21.7	4.9	10.3	9.0	Metro
Collin County Area Regional Transp. Community Services, Inc.	82.03	17.3	3.8	7.7	1.9	Metro
Fort Bend County	70.38	22.7	6.9	11.9	12.3	Metro
Gulf Coast Center	50.72	17.2	3.5	6.5	2.3	Metro
Kaufman Area Rural Transportation	65.43	22.2	11.4	11.9	3.4	Metro
Public Transit Services	92.34	21.2	5.4	10.5	10.2	Metro
Senior Center Res. and Public Transit Services Program for Aging Needs	42.51	20.1	5.1	12.7	9.4	Metro
Texoma Area Paratransit System	91.08	23.5	6.4	12.7	12.4	
The Transit System, Inc.	83.49	15.5	2.8	7.5	6.0	Metro
<b>Mean</b>	<b>76.17</b>	<b>20.1</b>	<b>5.3</b>	<b>11.2</b>	<b>7.8</b>	
<b>Rural Peer Group 4:</b>						
Alamo Area Council of Governments	38.80	21.0	5.6	14.8	12.7	Metro
Brazos Transit District	47.20	22.9	7.5	13.3	14.5	Metro
Capital Area Rural Transp. System	59.49	17.0	4.8	12.2	10.0	Metro
East Texas Council of Governments	58.84	24.3	6.7	15.7	13.8	
West Texas Opportunities	4.33	23.5	7.4	12.9	18.4	
<b>Mean</b>	<b>41.73</b>	<b>21.7</b>	<b>6.4</b>	<b>13.8</b>	<b>13.9</b>	
<b>Rural Peer Group 5:</b>						
Community Action Council South Texas	16.35	32.2	13.6	10.4	42.9	Border
Community Council of Southwest Texas	9.83	47.9	11.8	12.2	31.4	Border
El Paso County	38.51	28.4	11.4	6.6	37.3	Both
Webb County Community Action Agency	5.29	28.4	14.4	5.6	45.8	Border
<b>Mean</b>	<b>17.50</b>	<b>34.2</b>	<b>12.8</b>	<b>8.7</b>	<b>39.3</b>	
<b>Rural Summary:</b>						
Group 1	28.31	18.2	10.3	11.4	25.3	
Group 2	22.50	21.7	6.7	15.5	15.4	
Group 3	76.17	20.1	5.3	11.2	7.8	
Group 4	41.73	21.7	6.4	13.8	13.9	
Group 5	17.50	34.2	12.8	8.7	39.3	

\* Blank cells indicate the rural transit district is not adjacent to the Texas-Mexico border or a major metropolitan area.



**Table 14. Urban Peer Groupings and Environmental Data Elements.**

<b>Transit District</b>	<b>Population Density (Population/Square Mile)</b>	<b>% Population with a Disability (Ages 21–64)</b>	<b>% Occupied Housing Units with Zero Autos</b>	<b>% Population Age 65+</b>	<b>% Population below Poverty Level</b>	<b>Border or Major Metro*</b>
<b>Urban Peer Group 1:</b>						
Beaumont	1,339.9	13.6	12.4	13.4	19.6	
Longview	1,337.4	12.7	7.8	13.6	16.1	
Port Arthur	696.7	14.1	15.8	15.8	25.2	
Sherman	1,749.7	13.9	8.4	16.0	13.8	
Temple	888.8	11.4	10.3	14.6	14.7	
Texarkana	1,402.3	14.2	12.5	15.4	22.0	
Tyler	1,701.0	13.5	9.4	15.1	16.8	
Waco	1,828.1	13.3	10.2	13.3	23.0	
<b>Mean</b>	<b>1,368.0</b>	<b>13.3</b>	<b>10.9</b>	<b>14.7</b>	<b>18.9</b>	
<b>Urban Peer Group 2:</b>						
Abilene	2,244.5	11.3	6.7	12.3	15.6	
Amarillo	1,930.2	11.8	6.7	12.7	14.5	
Bryan	1,602.5	7.0	7.2	6.5	29.4	
Killeen	2,163.4	12.2	5.7	5.0	11.8	
Lake Jackson	2,178.5	11.2	6.7	9.2	12.2	Metro
Lubbock	1,738.3	11.6	7.2	11.1	18.4	
Midland-Odessa	1,800.9	10.1	7.3	12.0	15.7	
San Angelo	1,931.6	12.0	7.6	14.1	15.6	
Texas City	1,646.4	13.0	7.4	12.4	14.0	Metro
Victoria	1,832.2	11.8	8.4	12.3	14.7	
Wichita Falls	1,469.9	1.0	7.6	12.3	13.9	
<b>Mean</b>	<b>1,867.1</b>	<b>11.2</b>	<b>7.1</b>	<b>10.9</b>	<b>16.0</b>	
<b>Urban Peer Group 3:</b>						
McKinney	2,025.4	7.6	4.3	6.8	8.0	Metro
The Woodlands	2,385.6	6.0	3.8	7.5	4.2	Metro
<b>Mean</b>	<b>2,205.5</b>	<b>6.8</b>	<b>4.1</b>	<b>7.2</b>	<b>6.1</b>	
<b>Urban Peer Group 4:</b>						
Brownsville	2,896.1	14.7	13.1	9.2	37.1	Border
Galveston	1,237.8	13.1	17.8	13.4	22.3	Metro
Harlingen	1,689.9	11.6	11.2	15.3	24.9	Border
Laredo	2,252.3	13.0	12.3	7.9	29.6	Border
McAllen	1,539.1	13.1	9.7	10.8	33.1	Border
<b>Mean</b>	<b>1,923.0</b>	<b>13.1</b>	<b>12.8</b>	<b>11.3</b>	<b>29.4</b>	
<b>Urban Summary</b>						
Group 1	1,368.0	13.3	10.9	14.7	18.9	
Group 2	1,867.1	11.2	7.1	10.9	16.0	
Group 3	2,205.5	6.8	4.1	7.2	6.1	
Group 4	1,923.0	13.1	12.8	11.3	29.4	

\* Blank cells indicate the rural transit district is not adjacent to the Texas-Mexico border or a major metropolitan area.

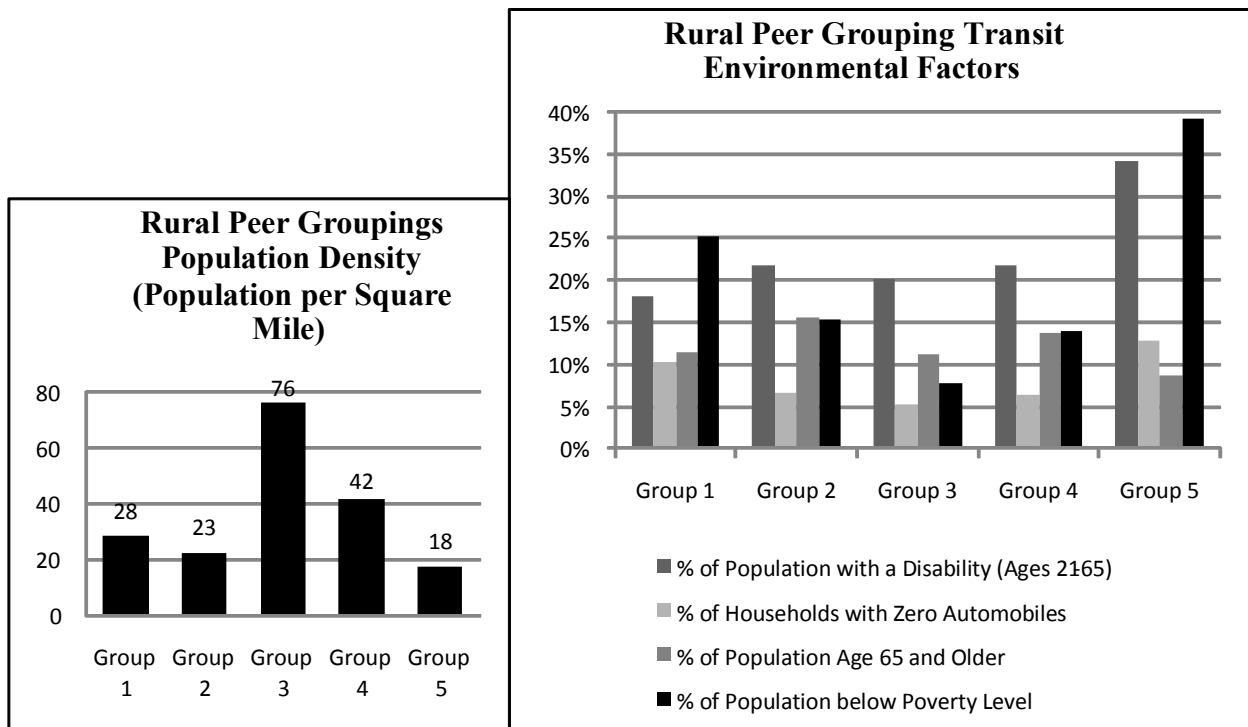
Four transit providers in Texas are designated as “limited eligibility providers”—Arlington, Grand Prairie, Mesquite, and NETS. These transit providers restrict transit eligibility to people age 65 and over as reported by the U.S. Census and people ages 5 to 64 with a U.S. Census defined disability. The four limited eligibility providers in Table 15 are in a separate peer grouping, and performance is compared within the four providers.

**Table 15. Urban Peer Group—Limited Eligibility Providers.**

Limited Eligibility Providers	2000 Total Population	2000	
		Eligible Population*	% Eligible Population
Arlington	335,164	86,396	25.8
Grand Prairie	126,889	37,995	29.9
Mesquite	123,800	34,209	27.6
NETS	313,030	77,713	24.8
<b>Total Limited Eligibility Providers</b>	<b>898,883</b>	<b>236,313</b>	<b>26.3</b>

\*People age 65 and over and people with a disability ages 5 to 64.

Figure 4 displays the transit environmental factor averages for rural peer groupings. Rural Peer Group 3 includes a majority of transit districts that are within or adjacent to a major metropolitan area and has a significantly higher population density than the other rural peer groupings. Rural Peer Group 5 is comprised of all border communities and has a significantly higher percent of persons with disabilities and persons below the poverty level than the other peer groupings. Rural Peer Group 5 also has the highest percent of occupied housing units without automobiles.



**Figure 4. Rural Peer Grouping Transit Environmental Factors.**

Figure 5 displays the transit environmental factor average for urban peer groupings, excluding the peer grouping for limited eligibility providers. The peer group for limited eligibility providers is not included in this comparison because the environmental factors are different from all other urban peer groups.

Urban Peer Group 3 consists of The Woodlands and McKinney and has the lowest transit environmental factors outside of population density. Urban Peer Group 4 has a significantly higher percent of persons below the poverty level than do the other urban peer groupings.

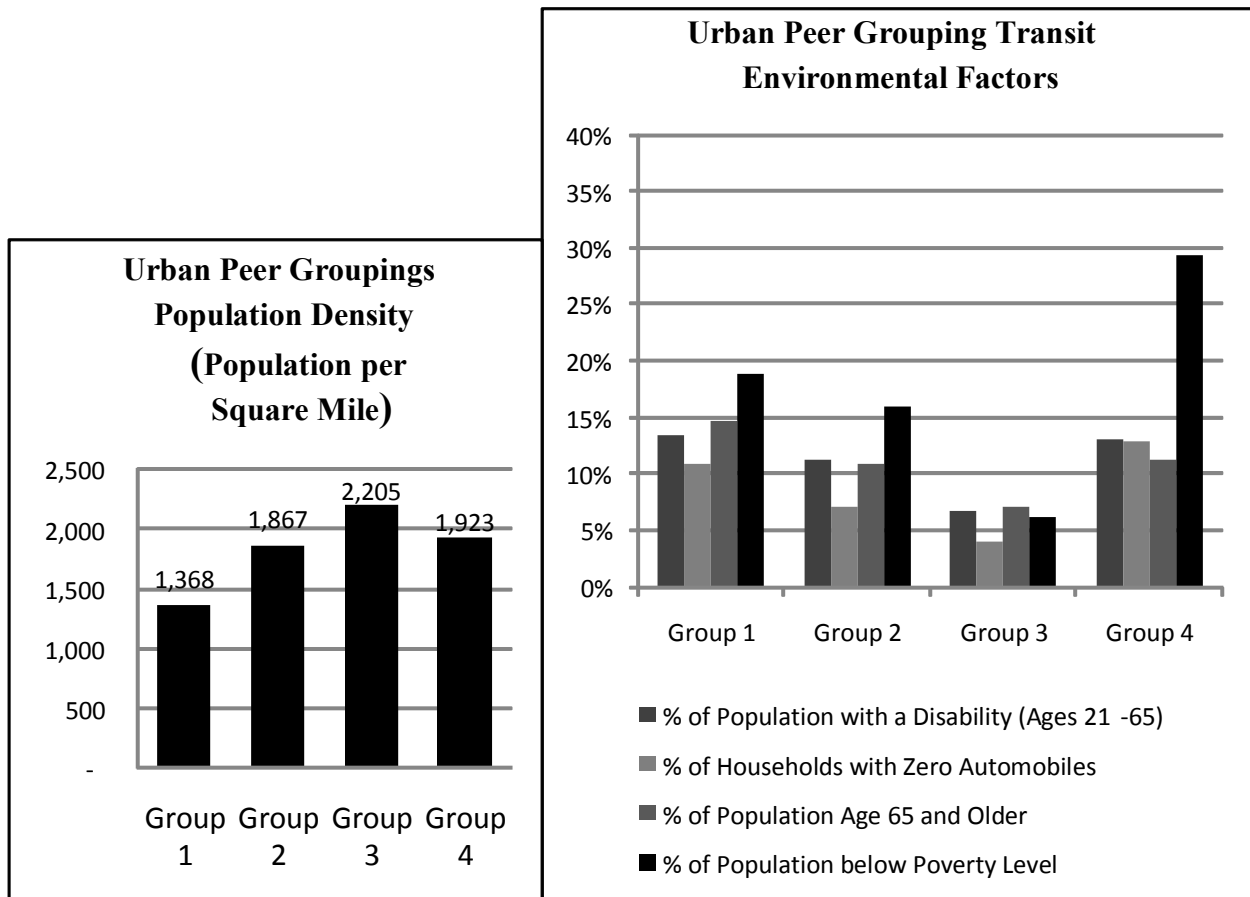


Figure 5. Urban Peer Grouping Transit Environmental Factors.



## CHAPTER 4: PERFORMANCE MEASURES

The purpose of this section is to calculate the effectiveness and efficiency performance measures for each peer group and provide a comparison across peer groups. This section includes a comparison of the peer group performance averages and a comparison of the effectiveness and efficiency performance measures for each transit district by peer group.

### EFFECTIVENESS AND EFFICIENCY MEASURES BY PEER GROUP

Researchers calculated effectiveness and efficiency measures using fiscal year 2009 data for each transit district and calculated the mean (average) and median for each peer group. Effectiveness measures are those that weigh how much a service is used (passengers) against how much service or resources are required (miles, hours, or expenditure). Efficiency measures are those that focus on how much service is provided (miles or hours) as compared to the resources that service requires (expenditure).

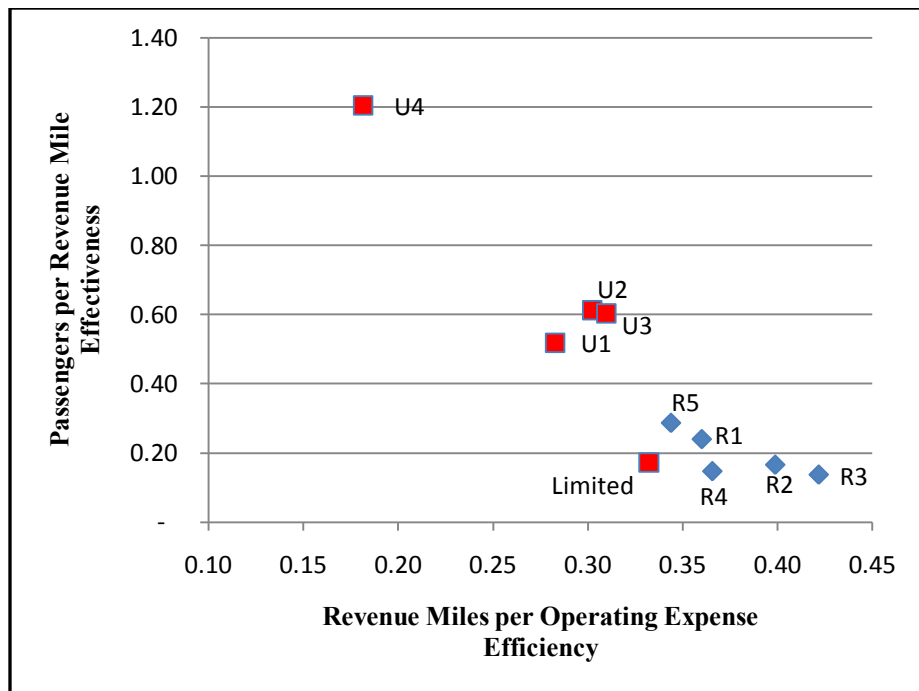
The South Padre Island transit district effectiveness and efficiency measures are not listed because this transit district is an outlier of the rural transit district performance. Because the South Padre Island transit district serves a tourist population and a highly dense service area of 1,424 population per square mile operating a fixed-route circulator, this service environment results in effectiveness measures atypical to rural transit districts.

### Comparison of Average Operating Effectiveness and Efficiency by Peer Group

Table 16 displays the average effectiveness and efficiency performance measures for each peer group, and Figure 6 plots these data. For rural peer groups, the average performance measures are very similar; however, for urban peer groups, one peer group is unusual. Urban Peer Group 4 consisting of Laredo, Brownsville, and McAllen has significantly higher operating effectiveness performance but is offset by lower operating efficiency performance. Urban Peer Groups 3 and 4 have similar population densities but have very different transit environmental demographic factors. Urban Peer Group 4 has a significant percent of population below poverty level.

**Table 16. Peer Group Comparison of Operating Effectiveness and Efficiency.**

Transit District	Operating Efficiency	Operating Effectiveness
	Revenue Miles per Operating Expense	Passenger Trips per Revenue Mile
<b>Rural Peer Groups</b>	<b>Peer Group Average</b>	<b>Peer Group Average</b>
Peer Group 1 (R1)	0.36	0.24
Peer Group 2 (R2)	0.40	0.17
Peer Group 3 (R3)	0.42	0.14
Peer Group 4 (R4)	0.37	0.15
Peer Group 5 (R5)	0.34	0.29
<b>Urban Peer Groups</b>		
Peer Group 1 (U1)	0.28	0.52
Peer Group 2 (U2)	0.30	0.61
Peer Group 3 (U3)	0.31	0.60
Peer Group 4 (U4)	0.18	1.20
Limited Eligibility (Limited)	0.33	0.17



**Figure 6. Peer Group Average Operating Effectiveness and Efficiency.**

## Rural Transit District Effectiveness and Efficiency Measures by Peer Group

### *Rural Peer Group 1*

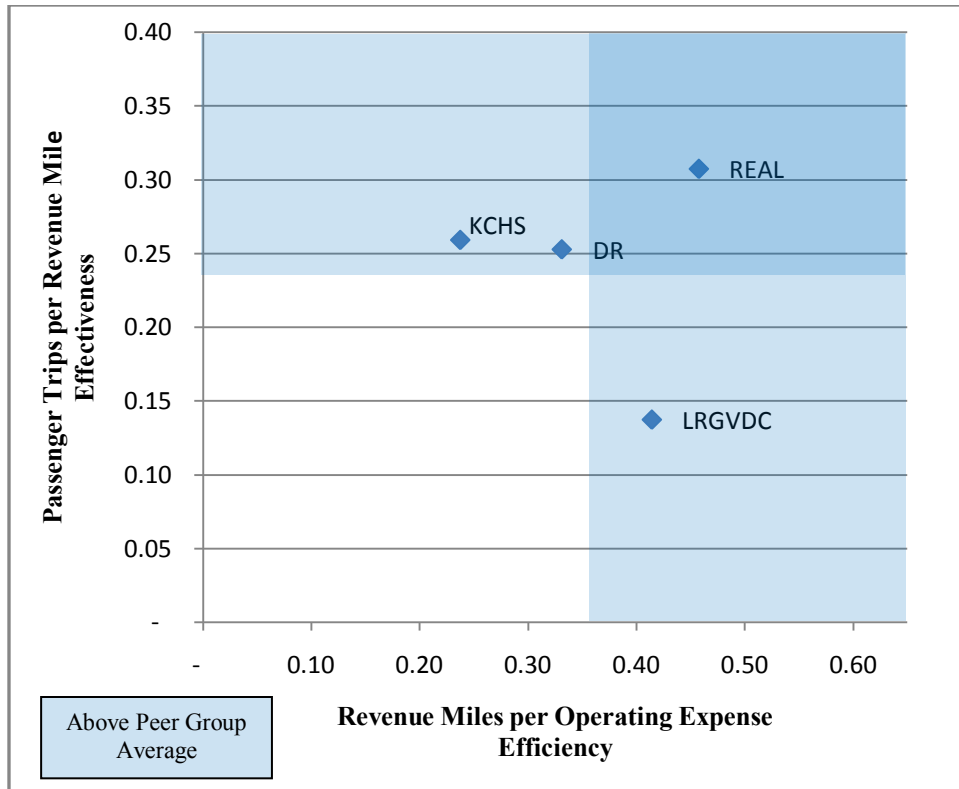
The first rural peer group is comprised of four rural transit districts (Table 17). Table 17 is sorted from the lowest operating expense per passenger trip of \$7.11 to the highest of \$17.58. One transit district in Peer Group 1, Rural Economic Assistance League, has the lowest operating expense per passenger trip and performs above the peer group average in both operational effectiveness and operational efficiency. Figure 7 illustrates those transit districts in Peer Group 1 that perform above the peer average in operating effectiveness and/or operating efficiency measures. Peer Group 1 rural transit districts with high performance in operating effectiveness (above the peer group average) are:

- Rural Economic Assistance League.
- Del Rio.
- Kleberg County Human Services.

Rural Economic Assistance League and the Lower Rio Grande Valley Development Council are the two Peer Group 1 rural transit districts with higher performance (above the peer average) for operating efficiency.

**Table 17. Rural Peer Group 1—Effectiveness and Efficiency Measures.**

<b>Transit District</b>	<b>Code</b>	<b>Operating Efficiency Revenue Miles per Operating Expense</b>	<b>Cost Effectiveness Operating Expense per Passenger Trip</b>	<b>Operating Effectiveness Passenger Trips per Revenue Mile</b>
Rural Economic Assistance League	REAL	0.46	\$7.11	0.31
Del Rio	DR	0.33	\$11.95	0.25
Kleberg County Human Services	KCHS	0.24	\$16.25	0.26
Lower Rio Grande Valley Develop. Council	LRGVDC	0.41	\$17.58	0.14
<b>Peer Group Average</b>		<b>0.36</b>	<b>\$13.22</b>	<b>0.24</b>



**Figure 7. Rural Peer Group 1—Effectiveness and Efficiency Measures.**

*Rural Peer Group 2*

Rural Peer Group 2 is comprised of 14 rural transit districts (see [Table 18](#)). [Table 18](#) is sorted by the lowest operating expense per passenger trip of \$6.01 to the highest of \$54.24. Two transit districts in Peer Group 2, the Ark-Tex Council of Governments and Rolling Plains Management Corporation, perform above the peer group average for both operational effectiveness and operational efficiency. [Figure 8](#) illustrates those transit districts in Peer Group 2 that perform above the peer average for operating effectiveness and/or operating efficiency measures. Peer Group 2 rural transit districts with higher performance (above the peer group average) for operating effectiveness are:

- Ark-Tex Council of Governments.
- Panhandle Community Services.
- Concho Valley Transit District.
- Hill Country Transit District.
- Rolling Plains Management Corporation.



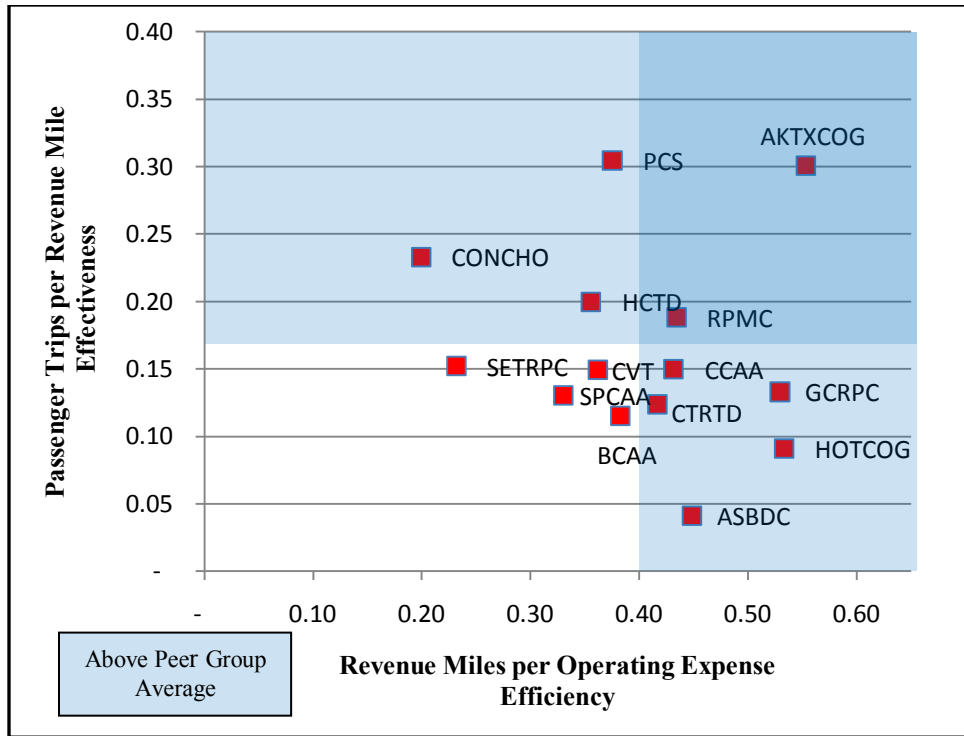
Peer Group 2 rural transit districts with higher performance for operating efficiency are:

- Ark-Tex Council of Governments.
- Heart of Texas Council of Governments.
- Golden Crescent Regional Planning Commission.
- Aspermont Small Business Development Center.
- Caprock Community Action Association.<sup>1</sup>
- Rolling Plains Management Corporation.
- Central Texas Rural Transit District.

**Table 18. Rural Peer Group 2—Effectiveness and Efficiency Measures.**

<b>Transit District</b>	<b>Code</b>	<b>Operating Efficiency Revenue Miles per Operating Expense</b>	<b>Cost Effectiveness Operating Expense per Passenger Trip</b>	<b>Operating Effectiveness Passenger Trips per Revenue Mile</b>
Ark-Tex Council of Governments	AKTXCOG	0.55	\$6.01	0.30
Panhandle Community Services	PCS	0.38	\$8.76	0.30
Rolling Plains Management Corp.	RPMC	0.43	\$12.24	0.19
Hill Country Transit District	HCTD	0.36	\$14.08	0.20
Golden Crescent Regional Planning Comm.	GCRPC	0.53	\$14.21	0.13
Caprock Community Action Assoc.	CCAA	0.43	\$15.47	0.15
Colorado Valley Transit	CVT	0.36	\$18.53	0.15
Central Texas Rural Transit District	CTRTD	0.42	\$19.41	0.12
Heart of Texas Council of Governments	HOTCOG	0.53	\$20.63	0.09
Concho Valley Transit District	CONCHO	0.20	\$21.54	0.23
Bee Community Action Agency	BCAA	0.38	\$22.72	0.12
South Plains Community Action Assoc.	SPCAA	0.33	\$23.22	0.13
South East Texas Regional Planning Comm.	SETRPC	0.23	\$28.38	0.15
Aspermont Small Bus. Dev. Center	ASBDC	0.45	\$54.24	0.04
<b>Peer Group Average</b>		<b>0.40</b>	<b>\$19.96</b>	<b>0.17</b>

<sup>1</sup> Caprock became part of South Plains Community Action Association in 2010.



**Figure 8. Rural Peer Group 2—Effectiveness and Efficiency Measures.**

### *Rural Peer Group 3*

Rural Peer Group 3 is comprised of 11 rural transit districts (see [Table 19](#)). South Padre Island is excluded from the peer group comparisons because the transit district is an outlier as compared to rural transit districts. South Padre Island is a tourist town providing a free-fare circulator fixed route that is atypical of a rural transit district.

[Table 19](#) is sorted by the lowest operating expense per passenger trip of \$11.72 to the highest of \$37.18. One transit district in Peer Group 3, Kaufman Area Rural Transportation, performs above the peer group average for both operational effectiveness and operational efficiency.

[Figure 9](#) illustrates those transit districts in Peer Group 3 that perform above the peer average for operating effectiveness and/or operating efficiency measures. Peer Group 3 rural transit districts with higher performance (above the peer group average) for operating effectiveness are:

- Fort Bend County.
- Community Services, Inc.
- Kaufman Area Rural Transportation.
- Cleburne.

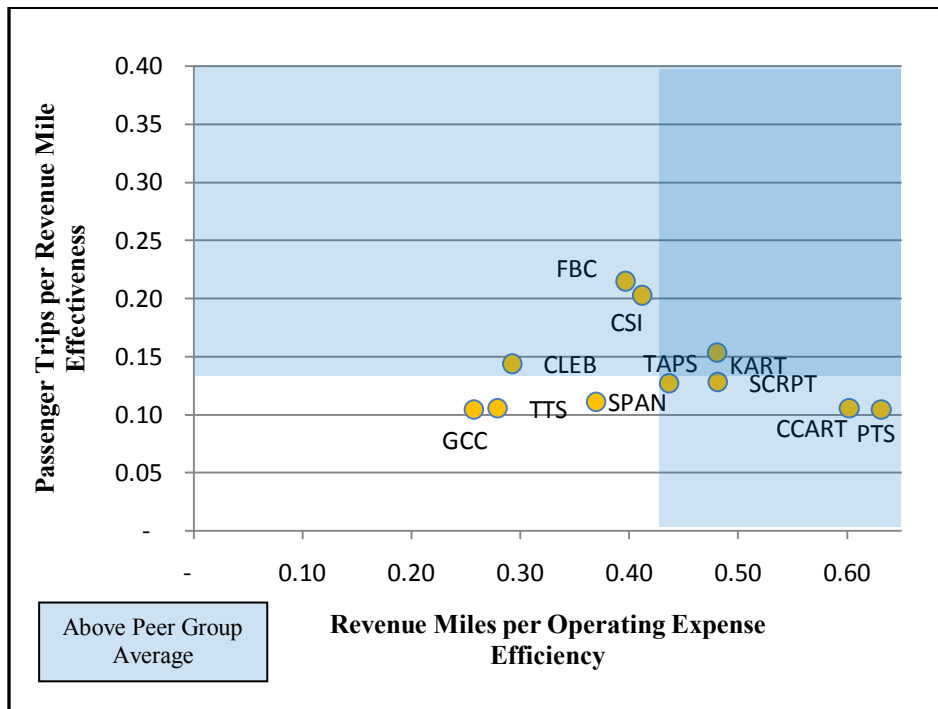
Peer Group 3 rural transit districts with higher performance for operating efficiency are:

- Public Transit Services.
- Collin County Area Regional Transportation.

- Kaufman Area Rural Transportation.
- Senior Center Resources and Public Transit.
- Texoma Area Paratransit System.

**Table 19. Rural Peer Group 3—Effectiveness and Efficiency Measures.**

<b>Transit District</b>	<b>Code</b>	<b>Operating Efficiency Revenue Miles per Operating Expense</b>	<b>Cost Effectiveness Operating Expense per Passenger Trip</b>	<b>Operating Effectiveness Passenger Trips per Revenue Mile</b>
Fort Bend County	FBC	0.40	\$11.72	0.21
Community Services, Inc.	CSI	0.41	\$11.96	0.20
Kaufman Area Rural Transportation	KART	0.48	\$13.55	0.15
Public Transit Services	PTS	0.63	\$15.18	0.10
Collin County Area Regional Transportation	CCART	0.60	\$15.76	0.11
Senior Center Resources and Public Transit	SCRPT	0.48	\$16.23	0.13
Texoma Area Paratransit System	TAPS	0.44	\$18.00	0.13
Cleburne	CLEB	0.29	\$23.75	0.14
Services Program for Aging Needs	SPAN	0.37	\$24.38	0.11
The Transit System, Inc.	TTS	0.28	\$33.92	0.11
Gulf Coast Center	GCC	0.26	\$37.18	0.10
<b>Peer Group Average</b>		<b>0.42</b>	<b>\$20.15</b>	<b>0.14</b>
South Padre Island	SPI	0.41	\$ 2.45	1.45



**Figure 9. Rural Peer Group 3—Effectiveness and Efficiency Measures.**

*Rural Peer Group 4*

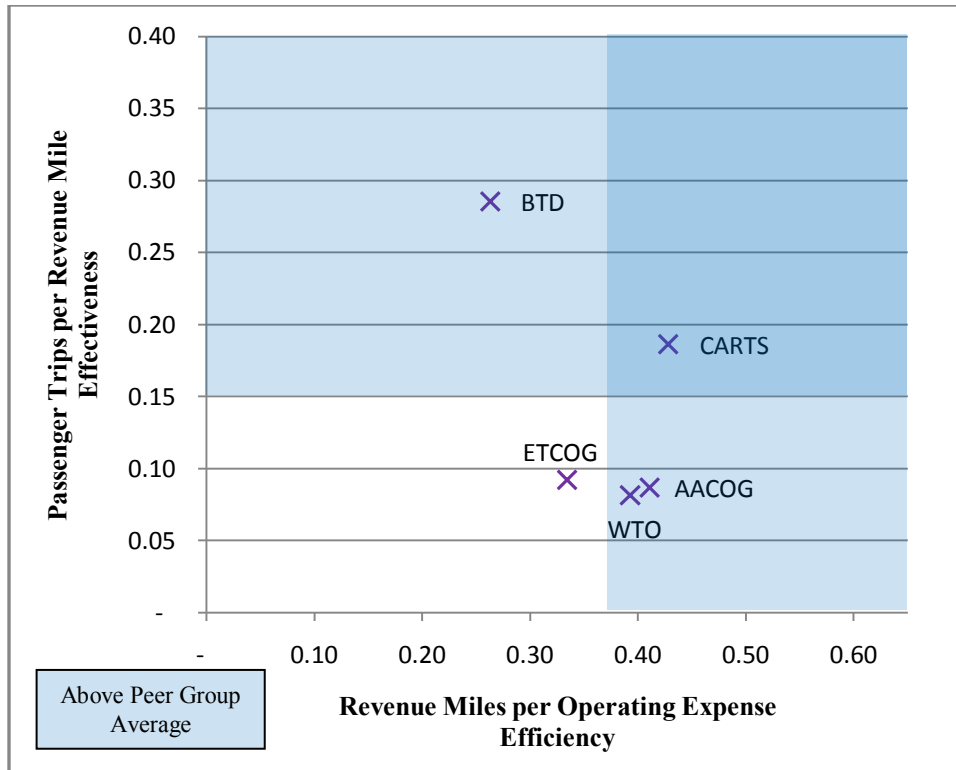
Rural Peer Group 4 is comprised of five rural transit districts (see Table 20). Table 20 is sorted from the lowest operating expense per passenger trip of \$12.53 to the highest of \$32.45. One transit district in Peer Group 4, the Capital Area Rural Transportation System, has the lowest operating expense per passenger trip and performs above the peer group average in both operational effectiveness and operational efficiency. Figure 10 illustrates transit districts in Peer Group 4 that perform above the peer average for effectiveness and/or efficiency measures. Brazos Transit District and the Capital Area Rural Transportation System are the two Peer Group 4 rural transit districts with higher performance for operating effectiveness:

Peer Group 4 rural transit districts with higher performance for operating efficiency are:

- Capital Area Rural Transportation System.
- Alamo Area Council of Governments.
- West Texas Opportunities, Inc.

**Table 20. Rural Peer Group 4—Effectiveness and Efficiency Measures.**

<b>Transit District</b>	<b>Code</b>	<b>Operating Efficiency Revenue Miles per Operating Expense</b>	<b>Cost Effectiveness Operating Expense per Passenger Trip</b>	<b>Operating Effectiveness Passenger Trips per Revenue Mile</b>
Capital Area Rural Transportation System	CARTS	0.43	\$12.53	0.19
Brazos Transit District	BTD	0.26	\$13.34	0.29
Alamo Area Council of Governments	AACOG	0.41	\$28.03	0.09
West Texas Opportunities, Inc.	WTO	0.39	\$31.32	0.08
East Texas Council of Governments	ETCOG	0.33	\$32.45	0.09
<b>Peer Group Average</b>		<b>0.37</b>	<b>\$23.53</b>	<b>0.15</b>



**Figure 10. Rural Peer Group 4—Effectiveness and Efficiency Measures.**

*Rural Peer Group 5*

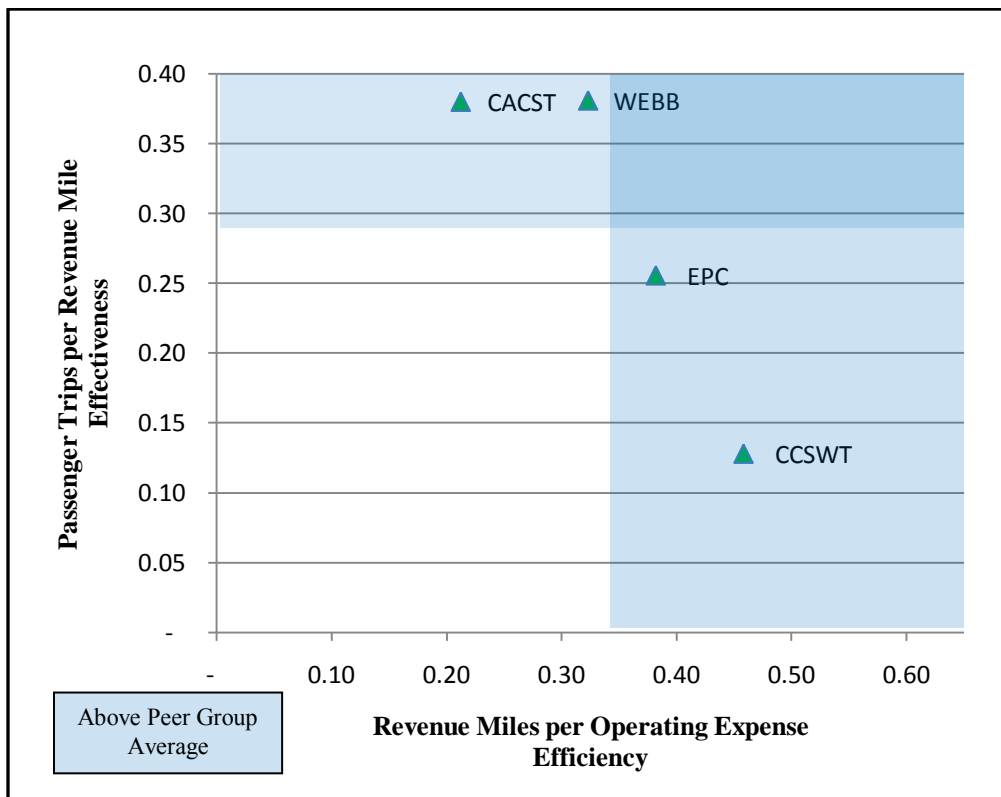
Rural Peer Group 5 is comprised of four rural transit districts (see [Table 21](#)). [Table 21](#) is sorted from the lowest operating expense per passenger trip of \$8.13 to the highest of \$17.06. None of the rural transit districts in this peer group perform above the peer group average for both operational effectiveness and efficiency. The Webb County Community Action Agency has the lowest operating expense per passenger trip.

[Figure 11](#) illustrates those transit districts in Peer Group 5 that perform above the peer average for operating effectiveness or operating efficiency measures. Webb County Community Action Agency and the Community Action County of South Texas are the two Peer Group 5 rural transit districts with higher performance (above the peer group average) for operating effectiveness.

El Paso County and the Community Council of Southwest Texas are the two Peer Group 5 rural transit districts with higher performance (above the peer group average) for operating efficiency.

**Table 21. Rural Peer Group 5—Effectiveness and Efficiency Measures.**

<b>Transit District</b>	<b>Code</b>	<b>Operating Efficiency Revenue Miles per Operating Expense</b>	<b>Cost Effectiveness Operating Expense per Passenger Trip</b>	<b>Operating Effectiveness Passenger Trips per Revenue Mile</b>
Webb County Community Action Agency	WEBB	0.32	\$8.13	0.38
El Paso County	EPC	0.38	\$10.24	0.26
Community Action Council of South Texas	CACST	0.21	\$12.39	0.38
Community Council of Southwest Texas	CCSWT	0.46	\$17.06	0.13
<b>Peer Group Average</b>		<b>0.34</b>	<b>\$11.95</b>	<b>0.29</b>



**Figure 11. Rural Peer Group 5—Effectiveness and Efficiency Measures.**

## Urban Transit District Effectiveness and Efficiency Measures by Peer Group

### *Urban Peer Group 1*

The first urban peer group is comprised of eight urban transit districts (see [Table 22](#)). [Table 22](#) is sorted from the lowest operating expense per passenger trip of \$5.02 to the highest of \$16.60. None of the urban transit districts in Peer Group 1 performs above the peer group average for both operational effectiveness and efficiency. Texarkana has the lowest operating expense per passenger trip.

[Figure 12](#) illustrates those transit districts in Peer Group 1 that perform above the peer average for operating effectiveness or operating efficiency measures. Peer Group 1 urban transit districts with higher performance (above the peer group average) for operating effectiveness are:

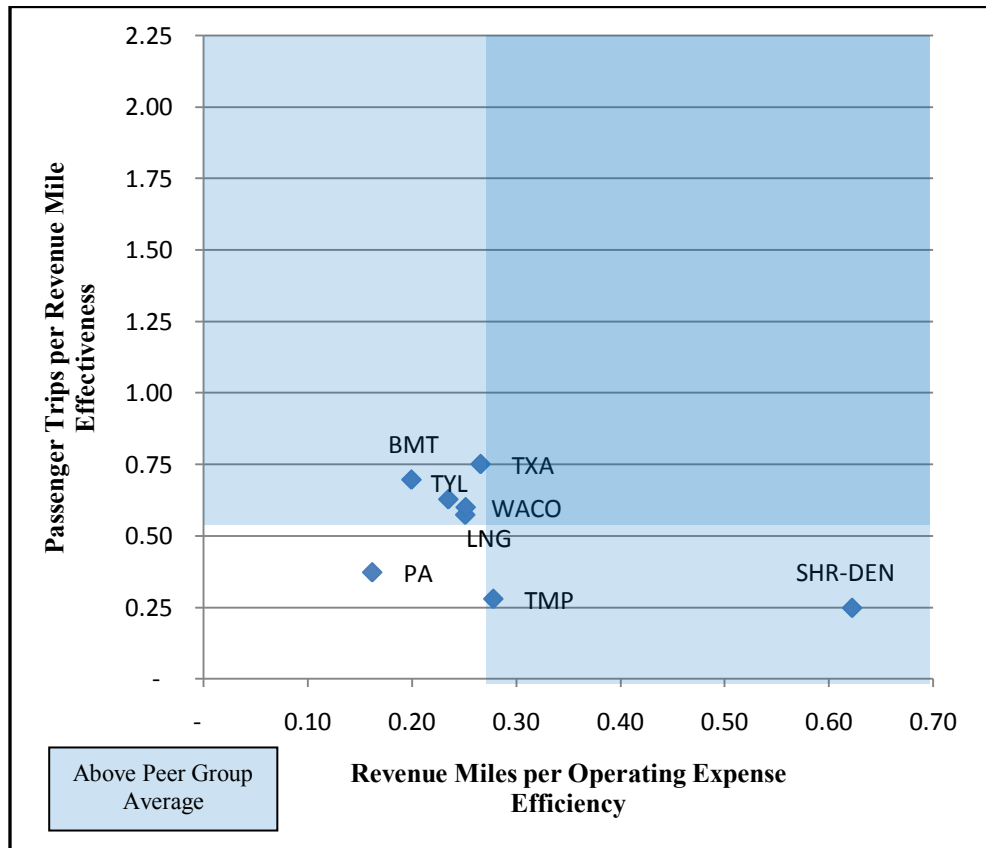
- Texarkana.
- Beaumont.
- Tyler.
- Waco.
- Longview.

The Peer Group 1 urban transit district with a higher performance (above the peer group average) for operating efficiency is Sherman-Denison. Sherman-Denison represents an outlier for operating efficiency, meaning the indicator is significantly higher than that of other transit districts in the peer group.

Sherman-Denison represents higher performance for operating efficiency but lower performance for operating effectiveness (passenger trips per revenue mile). Lower operating effectiveness is because transit service in Sherman-Denison in 2009 was largely demand response (lower productivity per mile of service than fixed route). Other outliers in Peer Group 1 are Port Arthur for low revenue miles per operating expense (cost efficiency) and higher cost per passenger trip (cost effectiveness) and Temple for lower operating effectiveness (passenger trips per revenue mile).

**Table 22. Urban Peer Group 1—Effectiveness and Efficiency Measures.**

Transit District	Code	Operating Efficiency Revenue Miles per Operating Expense	Cost	
			Effectiveness Operating Expense per Passenger Trip	Operating Effectiveness Passenger Trips per Revenue Mile
Texarkana	TXA	0.27	\$5.02	0.75
Sherman-Denison	SHR-DEN	0.62	\$6.46	0.25
Waco	WACO	0.25	\$6.64	0.60
Tyler	TYL	0.23	\$6.79	0.63
Longview	LNG	0.25	\$6.95	0.57
Beaumont	BMT	0.20	\$7.21	0.70
Temple	TMP	0.28	\$12.84	0.28
Port Arthur	PA	0.16	\$16.60	0.37
<b>Peer Group Average</b>		<b>0.28</b>	<b>\$8.56</b>	<b>0.52</b>



**Figure 12. Urban Peer Group 1—Effectiveness and Efficiency Measures.**



### *Urban Peer Group 2*

Urban Peer Group 2 is comprised of 11 urban transit districts (see [Table 23](#)). [Table 23](#) is sorted from the lowest operating expense per passenger trip of \$1.84 to the highest of \$55.02. Two transit districts in Peer Group 2, Abilene and Wichita Falls, perform just above the peer group average for both operational effectiveness and operational efficiency.

[Figure 13](#) illustrates those transit districts in Peer Group 2 that perform above the peer average for operating effectiveness and/or operating efficiency measures. Peer Group 2 urban transit districts with higher performance (above the peer group average) for operating effectiveness are:

- College Station-Bryan.
- Lubbock.
- Abilene.
- Wichita Falls.

Both Texas City-La Marque and Lake Jackson-Angleton represent outliers for low operating effectiveness (passenger trips per revenue mile) and poor cost effectiveness (cost per passenger trip). Outliers are significantly out of line with the performance indicators for other transit districts in the peer group. Low operating effectiveness in Texas City-La Marque and Lake Jackson-Angleton was because transit services were generally demand response and relatively low ridership. Flexible routes were initiated in Texas City-La Marque in 2009 and in Lake Jackson-Angleton in 2010.

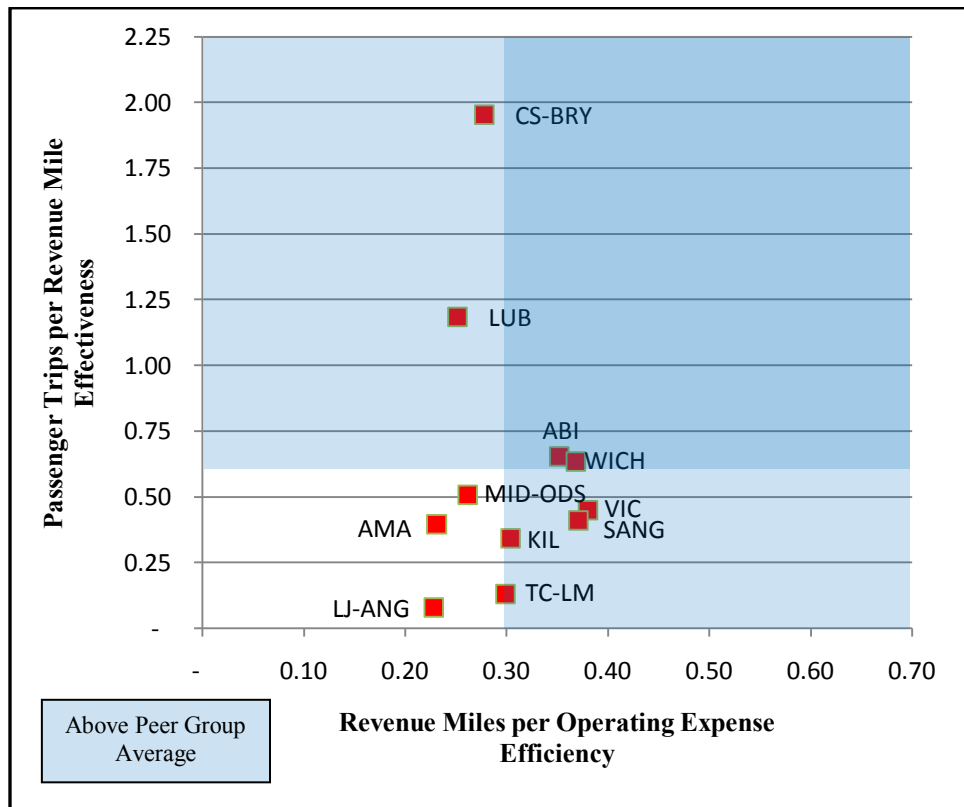
Peer Group 2 urban transit districts with higher performance for operating efficiency are:

- Abilene.
- Wichita Falls.
- Victoria.
- San Angelo.

The average cost per passenger trip for Peer Group 2 is higher because of the costs of Lake Jackson-Angleton and Texas City-La Marque (\$55.02 and \$25.57 per passenger trip, respectively). Both cities represent outliers for cost effectiveness because ridership is low, driving up cost per passenger.

**Table 23. Urban Peer Group 2—Effectiveness and Efficiency Measures.**

Transit District	Code	Operating Efficiency Revenue Miles per Operating Expense	Cost	
			Effectiveness Operating Expense per Passenger Trip	Operating Effectiveness Passenger Trips per Revenue Mile
College Station-Bryan	CS-BRY	0.28	\$1.84	1.95
Lubbock	LUB	0.25	\$3.35	1.19
Wichita Falls	WICH	0.37	\$4.29	0.63
Abilene	ABI	0.35	\$4.34	0.65
Victoria	VIC	0.38	\$5.85	0.45
San Angelo	SANG	0.37	\$6.56	0.41
Midland-Odessa	MID-ODS	0.26	\$7.54	0.51
Killeen	KIL	0.30	\$9.59	0.34
Amarillo	AMA	0.23	\$10.95	0.40
Texas City-La Marque	TC-LM	0.30	\$25.57	0.13
Lake Jackson-Angleton	LJ-ANG	0.23	\$55.02	0.08
<b>Peer Group Average</b>		<b>0.30</b>	<b>\$12.26</b>	<b>0.61</b>



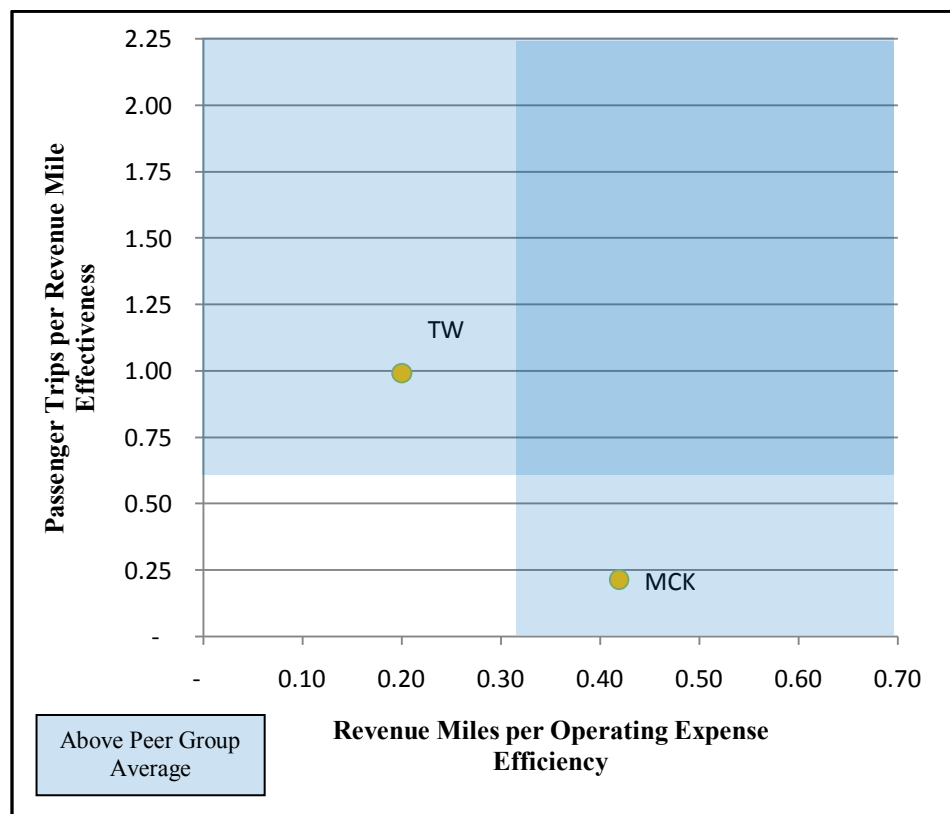
**Figure 13. Urban Peer Group 2—Effectiveness and Efficiency Measures.**

Urban Peer Group 3

Urban Peer Group 3 is comprised of two urban transit districts (see Table 24). As illustrated in Figure 14, The Woodlands performs above the peer average in operating effectiveness and McKinney above the peer average in operating efficiency. The Woodlands operating expense per passenger trip is \$5.04, reflecting the higher passenger trips per revenue mile for The Woodlands Express commuter transit system.

**Table 24. Urban Peer Group 3—Effectiveness and Efficiency Measures.**

Transit District	Code	Operating Efficiency Revenue Miles per Operating Expense	Cost Effectiveness Operating Expense per Passenger Trip	Operating Effectiveness Passenger Trips per Revenue Mile
The Woodlands	TW	0.20	\$5.04	0.99
McKinney	MCK	0.42	\$11.14	0.21
<b>Peer Group Average</b>		<b>0.31</b>	<b>\$8.09</b>	<b>0.60</b>



**Figure 14. Urban Peer Group 3—Effectiveness and Efficiency Measures.**

### Urban Peer Group 4

Urban Peer Group 4 is comprised of five urban transit districts (see Table 25). Table 25 is sorted from the lowest operating expense per passenger trip of \$3.05 to the highest of \$49.51. No transit district in Peer Group 4 performs above the peer group average for both operational effectiveness and operational efficiency.

Figure 15 illustrates those transit districts in Peer Group 4 that perform above the peer average for operating effectiveness or operating efficiency measures. Peer Group 4 urban transit districts with higher performance (above the peer group average) for operating effectiveness are:

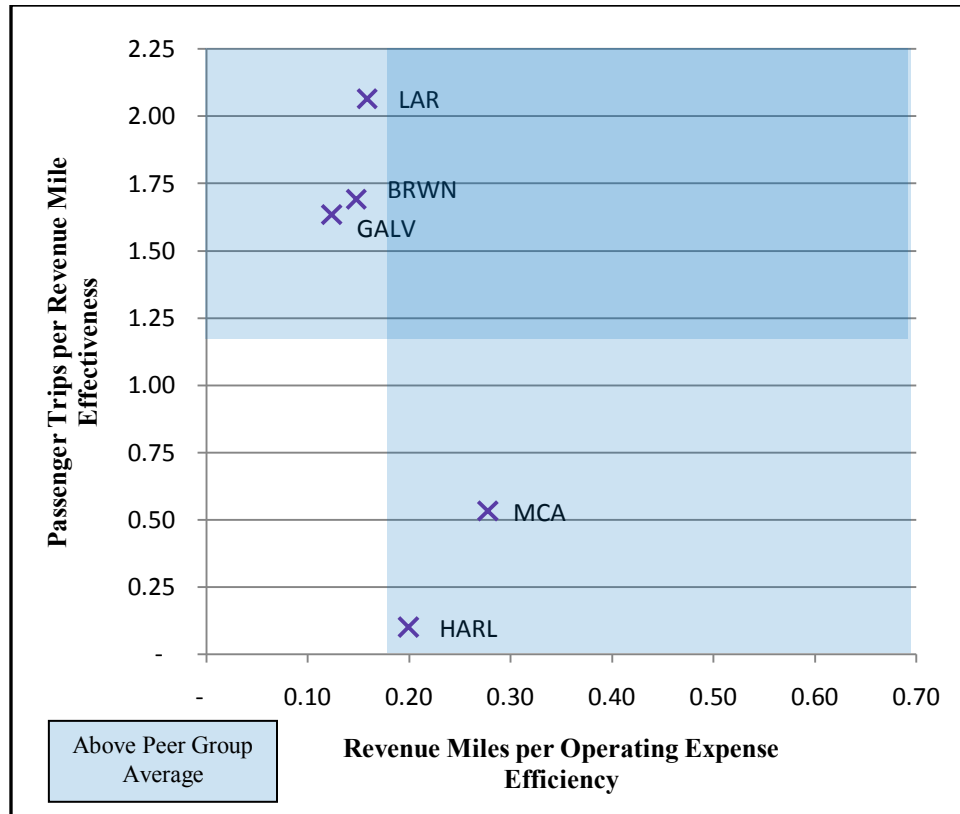
- Laredo.
- Brownsville.
- Galveston.

Harlingen-San Benito represents an outlier for operating effectiveness and cost effectiveness. The passenger trips per revenue mile for Harlingen-San Benito (0.10 passengers per revenue mile) is significantly lower than that of other transit districts in the peer group, and the cost per passenger trip for Harlingen-San Benito (\$49.51 per passenger trip) is significantly higher than that of others in the peer group. Low operating effectiveness is due to minimum levels of transit service and low ridership in the Harlingen-San Benito urban area.

McAllen and Harlingen-San Benito are the two Peer Group 4 urban transit districts with higher performance for operating efficiency.

**Table 25. Urban Peer Group 4—Effectiveness and Efficiency Measures.**

<b>Transit District</b>	<b>Code</b>	<b>Operating Efficiency Revenue Miles per Operating Expense</b>	<b>Cost Effectiveness Operating Expense per Passenger Trip</b>	<b>Operating Effectiveness Passenger Trips per Revenue Mile</b>
Laredo	LAR	0.16	\$3.05	2.06
Brownsville	BRWN	0.15	\$3.99	1.69
Galveston	GALV	0.12	\$4.95	1.63
McAllen	MCA	0.28	\$6.76	0.53
Harlingen-San Benito	HARL	0.20	\$49.51	0.10
<b>Peer Group Average</b>		<b>0.18</b>	<b>\$13.65</b>	<b>1.20</b>



**Figure 15. Urban Peer Group 4—Effectiveness and Efficiency Measures.**

*Urban Peer Group for Limited Eligibility Peers*

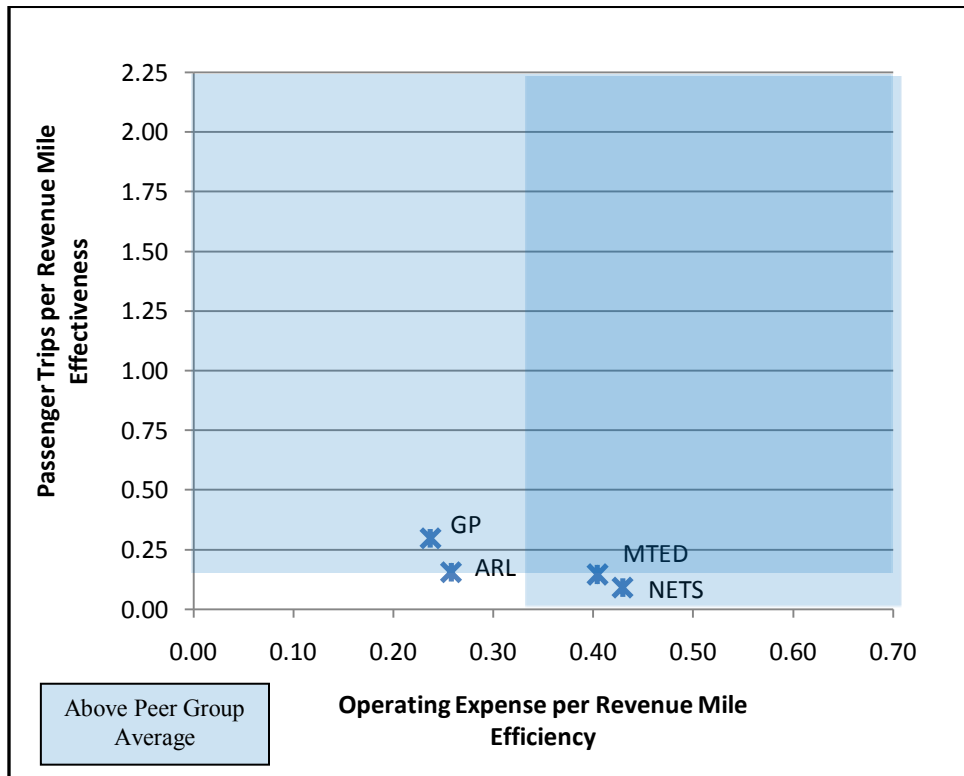
The Urban Peer Group for Limited Eligibility Peers is comprised of four urban transit districts that provide transit service only for seniors and people with disabilities (see [Table 26](#)). [Table 26](#) is sorted from the lowest operating expense per passenger trip of \$14.23 to the highest of \$25.93. No transit district in this Limited Eligibility Peer Group performs above the peer group average for both operational effectiveness and operational efficiency.

[Figure 16](#) illustrates those transit districts in the Limited Eligibility Peer Group that perform above the peer average for operating effectiveness or operating efficiency measures. The Limited Eligibility Peer Group urban transit district with higher performance (above the peer group average) for operating effectiveness is Grand Prairie.

Mesquite and NETS are the two Limited Eligibility Peer Group urban transit districts with higher performance (above the peer group average) for operating efficiency.

**Table 26. Limited Eligibility Urban Peers—Effectiveness and Efficiency Measures.**

Transit District	Code	Operating Efficiency Revenue Miles per Operating Expense	Cost Effectiveness Operating Expense per Passenger Trip	Operating Effectiveness Passenger Trips per Revenue Mile
Grand Prairie	GP	0.24	\$14.23	0.30
Mesquite	MTED	0.40	\$16.99	0.15
Arlington	ARL	0.26	\$24.95	0.16
NETS	NETS	0.43	\$25.93	0.09
<b>Peer Group Average</b>		<b>0.33</b>	<b>\$20.53</b>	<b>0.17</b>



**Figure 16. Limited Eligibility Urban Peers—Comparison to Peer Group Average.**

## COMPARISON OF OPERATING EFFECTIVENESS AND EFFICIENCY ACROSS TRANSIT DISTRICTS

Since the average performance across peer groups did not vary substantially (with the one exception among the urban systems), researchers approached identification of high performers from a total system perspective rather than from a peer group perspective. To compare operating effectiveness and efficiency across all rural transit districts and all urban transit districts, researchers plotted these measures as shown in Figure 17 and Figure 18. To identify those transit districts that are performing at a high effectiveness or a high efficiency level, researchers identified those transit districts with measures above average (as shown in the shaded areas of Figure 17 and Figure 18). Researchers considered these transit districts with either a higher operating effectiveness measure or higher operating efficiency measure (or both) for case study opportunities. Effectiveness and efficiency measures by transit district are summarized in Appendix C.

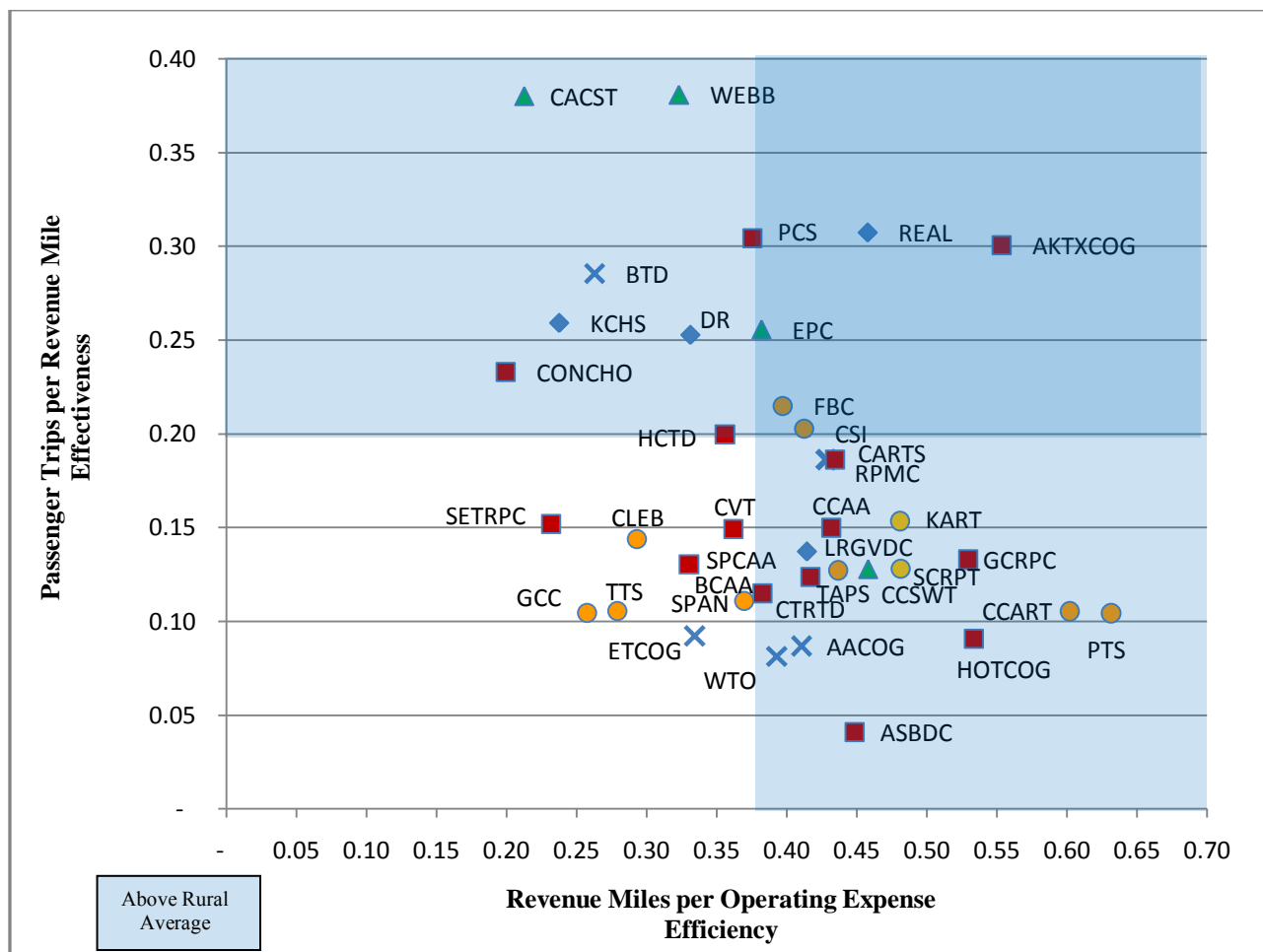
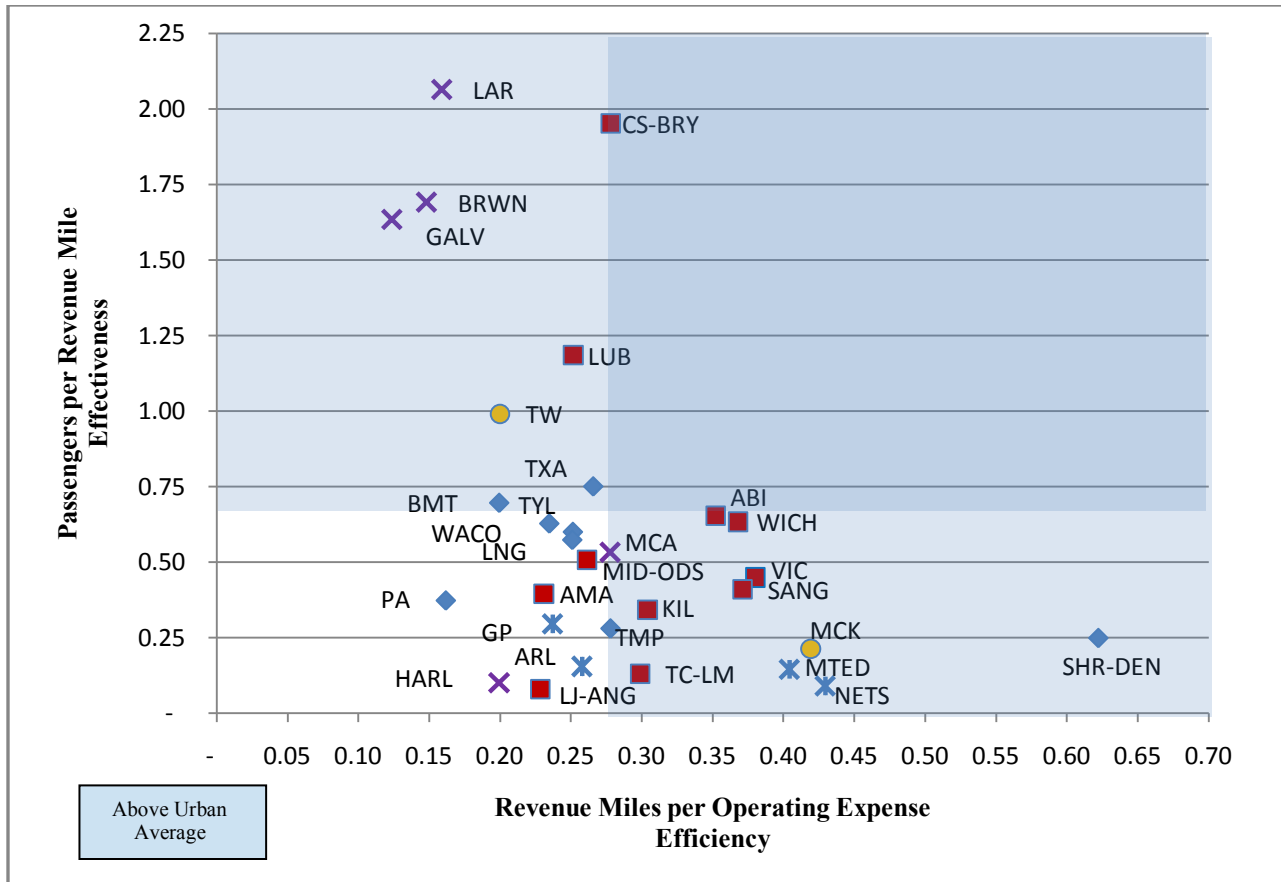


Figure 17. Rural Transit District Operating Effectiveness and Efficiency.



**Figure 18. Urban Transit District Operating Effectiveness and Efficiency.**

These data suggest that the following agencies should be used for rural case studies:

- Rural (efficiency):
  - Ark-Tex Council of Governments.
  - Collin County Area Regional Transportation.
  - Golden Crescent Regional Planning Commission.
  - Heart of Texas Council of Governments.
  - Public Transit Services.
  
- Rural (effectiveness):
  - Ark-Tex Council of Governments.
  - Brazos Transit District.
  - Community Action Council of South Texas.
  - Kleburg County Human Services.
  - Panhandle Community Services.
  - Rural Economic Assistance League.
  - Webb County Community Action Agency.



Two systems were removed from case study consideration due to ongoing efforts to improve data quality—Collin County Area Regional Transportation and the Community Action Council of South Texas. Note that only the Ark-Tex Council of Governments appears in both rural lists of having both efficiency and effectiveness measures over the peer average.

The following agencies should be used for urban case studies:

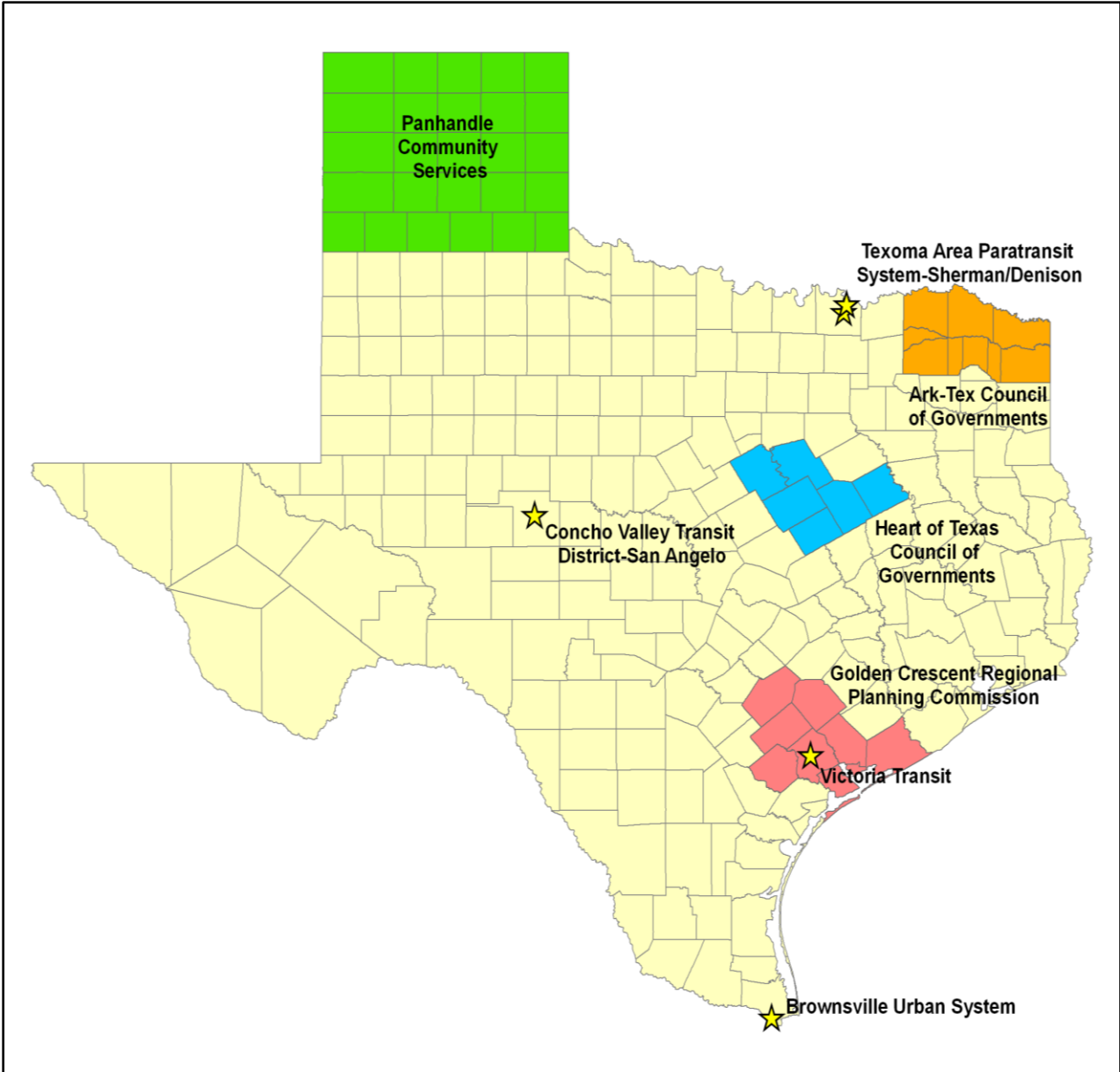
- Urban (efficiency):
  - McKinney.
  - San Angelo.
  - Sherman-Denison.
  - Victoria.
  - Wichita Falls.
  
- Urban (effectiveness):
  - Brownsville.
  - College Station-Bryan.
  - Galveston.
  - Laredo.

McKinney, like Collin County Area Regional Transportation, was removed from consideration.

Researchers selected case studies from the identified high performers with the goal of better understanding why these rural and urban transit districts perform well in efficiency and/or effectiveness. In this way, key elements that drive efficiency and those that drive effectiveness may be better isolated. Researchers chose the following transit districts as case studies:

- Ark-Tex Council of Governments.
- Brownsville.
- Golden Crescent Regional Planning Commission/Victoria Transit.
- Heart of Texas Council of Governments.
- Panhandle Community Services.
- San Angelo.
- Sherman-Denison.

Figure 19 illustrates the selected case study service area and location.



**Figure 19. Case Study Service Area and Location.**

## CHAPTER 5: CASE STUDIES OF EFFICIENT AND EFFECTIVE AGENCIES

The purpose of this chapter is to document case study best practices and specific strategies that are being used by successful urban and rural transit providers to achieve high performance. The goal of this chapter is to provide rural and urban transit districts with information to better understand and set targets for performance, increasing the return on federal and state transit investment.

This chapter is organized into two sections. In the first section, case studies of the identified transit districts from [Chapter 4](#) are described for transferrable elements of high performance that may provide transit districts information applicable to improve their own performance. The second section categorizes performance strategies into four categories that impact operational effectiveness and efficiency.

### DESCRIPTION OF CASE STUDIES

The case studies selected represent a variety of service delivery and environmental influences impacting performance. Researchers contacted case study transit district staff to ask a series of fact-finding questions. Researchers divided fact-finding questions into four subject categories that pertain to factors that may influence operational effectiveness and efficiency. The four categories include:

- Transit environment.
- Service design and delivery.
- Service policy and procedures.
- operating costs.

[Appendix D](#) provides the list of questions. Not all questions were asked of each transit district. For example, if the transit district did not use technology to schedule trips, researchers did not ask questions pertaining to technology.

#### **Panhandle Community Services (High Operational Effectiveness)**

Panhandle Community Services (PCS) is a Section 5311 rural transit grant recipient. PCS is part of a larger community service agency and serves a 26-county service area of over 25,749 square miles and has a population of 223,550 (2000 U.S. Census) and a projected population of 235,386—a 5.3 percent projected growth. PCS provided 300,056 annual passenger boardings in fiscal year 2009, operating 985,861 revenue miles with \$2.62 million in operating expenditures. PCS's operational effectiveness was 0.30 in fiscal year 2009 as compared to the rural average of 0.17 (excluding South Padre Island).

The PCS service area includes a diverse agriculture-based economy including farm- and ranch-related industries that has seen consistent employment. The counties of Castro and Deaf Smith are reported to have the most head of cattle in the United States. The least demand for transit service is in Roberts County where there is a higher income level and low density. The major

generators of service are reported to be meat and bi-product processing plants; major medical facilities in Amarillo, Lubbock, and Wichita Falls; dialysis centers; local colleges; and Workforce Solutions.

PCS operates a demand response service only, with no fixed-route service. Demand response transit service operates using a pre-scheduled reservation system where patrons call in advance and request a pick-up and drop-off at their choice of location within a service area. Approximately 50 percent of the patrons are subscription trips. Subscription service is service for which patron trips that have the same origin and destination (typically work trips) are automatically scheduled; the patron is not required to call in for a reservation. All trips are shared ride trips not dedicated to one trip type.

The PCS Board consists of 15 members from the 26 counties and are all local officials reported to be transit supportive and active in board decisions. PCS works closely with the community and regularly attends community and town hall meetings. Community meetings have recently resulted in coordination with two plants—Cargill Meat Solutions in Parmer County and Tejas Bi-Products in Deaf Smith County. These plants employ 1,600 workers per shift. These plants worked with PCS to align transit with worker shifts to allow PCS to effectively serve both plants through subscription service. PCS reports that worker turnover at these plants was drastically reduced (over 30 percent drop) when reliable public transportation was introduced.

PCS receives funding for service from federal and state Section 5311 funding, Section 5316 Job Access Reverse Commute (JARC) funds, passenger fares, and a variety of contract revenues. Agencies that contract for service with PCS include American Medical Response, the Veterans Administration, Pantex Employee, Tejas Industries, and Cargill Industries.

PCS stations vehicles at 10 locations throughout its 26-county area to reduce mileage to the first patron pick-up and from the last patron drop-off point of the day (referred to as deadhead miles). At least one spare vehicle is stationed at these locations during the day to provide switch-out vehicles in case of a vehicle breakdown or to operate a smaller/larger-size vehicle for different peak times of the day.

PCS uses computer-assisted scheduling/dispatching and routing software, mobile data computers (MDCs), automatic vehicle locator systems, and cell phones to schedule, dispatch, and communicate. Prior to the day of service, patrons throughout the region call a 1-800 telephone number to schedule a trip. When reserving their first trip, PCS creates a client profile in the scheduling system to facilitate the reservation process. When a reservation is requested, the scheduling system provides a list of suggested trips. The suggested trips are a result of the scheduling system's optimizing algorithm based on parameters PCS inputs into the system including cost per labor hour, overtime rates, number of vehicles available, number of drivers available, capacity of vehicle, and wheelchair capacity. Trips are automatically scheduled, and each area dispatcher reviews trips within his or her portion of the region for reasonableness. The dispatchers then provide suggested changes to the central Routemaster, who makes the final change decision and creates the final schedule.

On the day of service, drivers download scheduled trips sorted by estimated time of arrival through the MDC during their pre-trip inspection and then initialize their odometer miles. Paper manifests (driver trip schedules) are printed for Medicaid trips only where the patron is required to provide a signature. Drivers log arrivals, departures, and no-shows through MDCs. These data then update the scheduling system in real time.

Dispatchers use the automatic vehicle locator system for a variety of functions including identifying the closest vehicle to a waiting patron, estimating the vehicle arrival time for patron pick-up, and determining the direction and speed that a vehicle is moving. PCS relies on MDC text messages to communicate with drivers and uses cell phones only when voice communication is needed. The scheduling system provides a visual of the slack in the system—usable time that is not yet scheduled. This provides the dispatcher options when trips are running late and may be moved to another vehicle to maintain on-time performance. PCS allows same-day reservations if the schedule allows.

At the end of the day, drivers input ending mileage into the MDC. A program detects data entry errors in mileage, allowing mileage to be corrected by administrative staff. Drivers turn in fares collected to the finance department. The finance department prints a report of the cash fares and contract fares by driver to reconcile and provides a receipt to the driver with discrepancies reported to the supervisor for review.

The scheduling and dispatching function was centralized, moving 10 regional dispatchers to be housed in one location. PCS reports that productivity has increased because dispatchers are better able to communicate to resolve trip issues, readily transferring trips between vehicles to prevent late trips, and because they can see the big picture. PCS cross-trains staff, partnering a Routemaster with new employees, and provides training for all staff four to five times annually.

Because PCS cross-trains staff to serve in multiple functions, PCS looks for computer-savvy employees. PCS recommends a strong network administrator when operating an automated scheduling/dispatching, automated vehicle location, and mobile data computer system that provides for a paperless operation. Lessons from PCS include:

- Ensure the active support of a transit board made of local officials.
- Attend and participate in community meetings.
- Work closely with employment centers to accommodate worker shifts.
- Decentralize the transit fleet.
- Invest in technology.
- Centralize scheduling/dispatching.
- Cross-train staff.

### **Heart of Texas Council of Governments (High Operational Efficiency)**

The Heart of Texas Council of Governments (HOTCOG) is a Section 5311 rural transit grant recipient. HOTCOG serves a six-county service area over 5,478 square miles and has a population of 168,338 (2000 U.S. Census) with a projected 2010 population of 180,734—a 7.4 percent projected growth. HOTCOG provided 56,251 annual passenger boardings in fiscal

year 2009, operating 619,091 revenue miles with \$1.16 million in operating expenditures. HOTCOG's operational efficiency was 0.53 in fiscal year 2009 as compared to the rural average of 0.38 (excluding South Padre Island).

HOTCOG serves the rural portion of McLennan County, and Waco Transit serves the urban portion (Waco urbanized area) of McLennan County. The Waco urbanized area is a major destination for HOTCOG patrons to access medical facilities, the Texas Workforce Center, Baylor University, McLennan Community College, and Texas State Technical College.

HOTCOG contracts with four service providers to provide service throughout its six-county service area. Falls County is described as the most economically distressed county in HOTCOG's service area. An initiative called *6 to Success* provides a transit service operated in cooperation with HOTCOG and Waco Transit (16). This initiative was planned through the Heart of Texas Workforce Board through the Highway 6 Regional Transportation Project. This route connects rural areas to the urban Waco Transit system where riders can access employment, education, and other destinations. HOTCOG provides service from Falls County into the Waco service area. Waco Transit provides service to the *6 to Success* route from Waco into Falls County. Three major poultry processing plants—Pilgrim's Pride, Sanderson Farms, and Cargill—are included along the *6 to Success* transit route and five small cities.

HOTCOG also provides demand response service throughout the remaining service area. Outside of Waco, major generators of transit service include Hill College in Bosque County and service to primary and intermediate schools throughout the counties. HOTCOG provided 56,251 passenger boardings in fiscal year 2009. The number of trips originating in each county is as follows:

- Bosque: 6,207.
- Hill: 5,095.
- McLennan: 12,676.
- Falls: 10,146.
- Limestone: 18,496.
- Freestone: 3,631.

HOTCOG receives funding for service from federal and state Section 5311 funding, local contributions, Section 5310 elderly and individuals with disabilities funds, and passenger fares.

HOTCOG relies on its subcontractors to effectively schedule and dispatch, and is working to coordinate service among these subcontractors to avoid duplicative service. (HOTCOG plans to have an automated scheduling/dispatching system and mobile data computers operational in FY 2011.) Drivers receive their manifests from the site offices where their vehicles are housed. The vehicles are housed in locations that are closest to the most populated towns in each of the counties. They receive changes/modifications to the schedules throughout the day via cell phone. At the end of the day, drivers return the manifests at the site office. The site manager or transportation director reviews the manifests for correctness and completeness.

HOTCOG allows same-day “will call” reservations mainly on return trips when the patron does not know the exact pick-up time (i.e., from a doctor’s office). Patrons may reserve subscription (standing) reservations for repeat trips on the same days, times, and locations. As noted above, HOTCOG contracts the operation of its service to four subcontractors:

- Central Texas Senior Ministry.
- Bosque County Transit.
- Freestone County Transit.
- Limestone County Transit.

HOTCOG negotiates rates with each of its subcontractors for the operation and maintenance (including fuel) of transit service. HOTCOG’s purchase of service expenditures in fiscal year 2009 were \$902,429, for an average purchase of service expenditure per boarding of \$16.04. [Table 27](#) provides the fiscal year 2009 purchase of service expenditures by contractor.

**Table 27. HOTCOG Fiscal Year 2009 Purchase of Service Expenditures by Subcontractor.**

<b>Subcontractor</b>	<b>Operating Expenditures</b>
Central Texas Senior Ministry	\$424,247
Bosque County Transit	\$96,114
Freestone County Transit	\$67,830
Limestone County Transit	\$314,238
<b>Total Purchase of Service Expenditure</b>	<b>\$902,429</b>
Total Passenger Boardings	56,251
<b>Average Subcontractor Expenditure per Boarding</b>	<b>\$16.04</b>

In fiscal year 2009, HOTCOG maintenance cost was part of the lease agreement with the subcontractors. In fiscal year 2010, HOTCOG received funding through TxDOT to contract with Waco Transit to provide vehicle maintenance. HOTCOG and Waco Transit have a memorandum of understanding to provide centralized maintenance at the Waco Maintenance Facility. The goals of this arrangement are to assess the status of the fleet condition, standardize maintenance costs for the six-county region, standardize maintenance records, decrease vehicle downtime, provide consistent wheelchair-lift diagnostics/repair, track warranty recovery, and maximize the useful fleet life. Lessons from HOTCOG include:

- Sub-contract service to local transit providers.
- Plan and develop service with Workforce Solutions, businesses, schools, cities, community organizations, and adjacent urban transit district.
- Arrange for vehicle maintenance through a memorandum of understanding with the urban transit district.

### **Ark-Tex Council of Governments (High Operational Effectiveness and Efficiency)**

The Ark-Tex Council of Governments (Ark-Tex) is a Section 5311 rural transit grant recipient. Ark-Tex serves a nine-county service area over 5,761 square miles and has a population of 221,701 (2000 U.S. Census) with a projected 2010 population of 230,739—a 4.1 percent growth. Ark-Tex provided 394,657 annual passenger boardings in fiscal year 2009, operating 1,312,82 revenue miles with \$2.37 million in operating expenditures. Ark-Tex's operational effectiveness was 0.30, and operating efficiency was 0.55 in fiscal year 2009, as compared to the rural average of 0.17 and 0.38, respectively (excluding South Padre Island).

Ark-Tex receives funding for service from federal and state Section 5311 funding, local contributions, in-kind contributions, the Department of Aging and Disabilities, the Department of State Health Services, Section 5310 elderly and individuals with disabilities funds, Section 5316 Job Access Reverse Commute (JARC) funds, and passenger fares. Revenues are also generated from a variety of contract revenues including the Veterans Administration, North East Texas Community College, the Texarkana Vocational Technical Institute, and Opportunities Incorporated.

The Ark-Tex service area is an agriculture-based economy including farm- and ranch-related industries. Pilgrim's Pride headquartered in East Texas filed for bankruptcy in December 2008, resulting in nine poultry-plant closings in the area. These poultry processing plant closings significantly impacted employment and transit ridership serving these plants—general public ridership dropped over 20 percent from fiscal year 2008 to 2009. Ark-Tex adjusted its service supply with the drop in demand, maintaining good service productivity. Other major generators of service include orchard farms, Workforce Solutions, the Red River Army Depot, colleges and universities, medical facilities, and a variety of manufacturing plants.

Transit staff at Ark-Tex exerted effort to connect to community transit needs and work with employers. Being a part of a council of governments provides an advantage in staying connected to community needs. [Table 28](#) provides major generators of service and passenger boardings by county in the Ark-Tex transit service area.



**Table 28. Ark-Tex Council of Governments Major Generators of Service by County.**

<b>County</b>	<b>Major Transit Service Generators</b>	<b>Passenger Boardings</b>
Bowie County (22% of ridership)	Red River Army Depot, Christus St. Michael's Hospital, Wadley Hospital, Texas A&M University, Texarkana College, Sterno and Colgate Palmolive manufacturing plants, Workforce Solutions	86,826
Titus County (20% of ridership)	Titus County Memorial Hospital, Pilgrim's Pride Rendering Plant, Northeast Texas Community College, Pittsburgh Hotlink Plant, tortilla factories	78,931
Lamar County (18% of ridership)	Paris Junior College, Paris Regional Medical Center, Campbell Soup, Earth Grain Foods, Sara Lee, MacIntosh Cloth	71,038
Hopkins County (15% of ridership)	Hopkins County Memorial Hospital, Torro Chainsaw plant, Pilgrim's Pride rendering plant, major industrial park	59,199
Cass County (8% of ridership)	Atlanta Memorial Hospital, Evinrude Motors	31,572
Red River County (6% of ridership)	Chainsaw and casket manufacturers	23,679
Franklin County (4% of ridership)	Strip mining—limited generators of service	15,786
Morris County (5% of ridership)	Lone Star Steel, lumber manufacturing	19,733
Delta County (2% of ridership)	Lake area—no major generators of service	7,893
<b>Total</b>		<b>394,657</b>

Ark-Tex directly operates demand response service in four counties and contracts with Northeast Texas Opportunities (NETO) to provide service in the western counties. The NETO service contract is a 10-year request for proposal contract and paid on a cost reimbursement basis. Ark-Tex also has a memorandum of understand with NETO and two taxicab companies—Yellow Cab of Paris and City Cab of Texarkana—to provide Section 5316 JARC and Section 5317 New Freedom service. These services are paid on a trip-by-trip basis set at a negotiated rate of \$6.00 within the city limits of Texarkana and Paris; \$10.00 within the counties of Lamar, Bowie, Red River, Titus, Morris, and Hopkins; and \$12.00 county to county. The taximeter fare is not taken into account.

Ark-Tex houses vehicles throughout its nine-county service area and typically has one spare vehicle in each area to cover vehicle breakdowns or other immediate needs. Ark-Tex has some maintenance conducted at the Regional Maintenance Facility located in Mt. Pleasant and also has agreements with maintenance vendors in all nine counties that provide maintenance and in-kind wrecker services. Ark-Tex procured an automated scheduling/dispatching and mobile data computer system in fiscal year 2010. Ark-Tex relies on cell phones and radios to communicate with drivers. Ark-Tex uses fleet maintenance software to track vehicle maintenance, report on

vehicle reliability, and prompt scheduling for preventive maintenance. With the installment of the mobile data computer system, drivers will receive and complete a Daily Vehicle Inspection Report upon morning log-in. This report will be uploaded to the Regional Maintenance Facility for review. The maintenance facility will have a locator map to track vehicles.

Ark-Tex allows patrons to schedule trips as much as one month to as little as one day in advance. Same-day service is accommodated if the schedule allows. The agency creates a profile for each patron when he or she first uses the service and provides rules and procedures. Reservations are currently taken at offices across nine counties. Schedules are created for the vehicles assigned in each area. When the new automated scheduling/dispatching system is implemented, there will be one 866 phone number for the entire service area. Because the current Texarkana office does not have the ability to house the entire dispatch/scheduling/reservation staff, initially patron calls will be routed to two dispatch/reservation centers—one located in Texarkana and one in Paris. Patron calls from the counties of Bowie, Cass, Morris, Titus, and Franklin will be routed to the Texarkana office, and calls from the counties of Lamar, Delta, Red River, and Hopkins will be routed to the Paris office. At 4:00 p.m., passenger trips from the two offices will be combined with the Texarkana office, creating the final driver manifests (schedules). These schedules will be downloaded to the respective driver's mobile data computer units, with the final schedule sent to the Paris office. A new transportation facility located in Texarkana is planned to accommodate the entire staff in the future with dispatch/scheduling/reservations completely centralized.

Ark-Tex controls fuel costs using a private fuel card company and also purchases fuel through county agreements with Red River, Hopkins, and Titus Counties. Ark-Tex drivers' beginning wage is approximately \$9.00 per hour with no commercial driver license (CDL) and \$10 with a CDL. The highest paid driver at Ark-Tex earns approximately \$11.50 per hour. No overtime is allowed, only compensatory time due to the Ark-Tex Council of Governments' policy. The majority of Ark-Tex drivers are full-time—49 full-time drivers and 5 part-time drivers. Full-time drivers receive 100 percent paid health, dental, and vision benefits and a plan for retirement. Ark-Tex employs nine full-time dispatchers/schedulers, four supervisors, two mechanics, and six administrative staff. Ark-Tex also has some volunteer dispatchers. Lessons from Ark-Tex include:

- Take advantage of council of government community outreach programs.
- Work closely with employment centers to accommodate worker shifts.
- Adjust service supply to match service demand.
- Contract JARC and New Freedom on a trip-by-trip basis to control costs.
- Negotiate long-term contracts for service in western counties to lower rates.
- Arrange agreements with maintenance vendors in all counties served.
- Purchase fuel through fuel cards and interlocal agreements with county governments.
- Establish driver wage rates at a competitive but conservative level.

## **Golden Crescent Regional Planning Commission (High Operational Efficiency)**

The Golden Crescent Regional Planning Commission (GCRPC) is a Section 5311 rural transit grant recipient. GCRPC serves an eight-county service area over 7,088 square miles and has a population of 160,333 (2000 U.S. Census) with a projected 2010 population of 169,456—a 5.6 percent projected growth. GCRPC provided 136,619 annual passenger boardings in fiscal year 2009 over 1,027,494 revenue miles with \$1.94 million in operating expenditures. Operational efficiency was 0.53 in fiscal year 2009 as compared to the rural average of 0.38 (excluding South Padre Island). GCRPC receives funding for service from federal and state Section 5311 funding, local contributions, in-kind contributions, the Medical Transportation Program, the Department of Aging and Disabilities, Section 5310 elderly and individuals with disabilities funds, Section 5316 JARC funds, and passenger fares.

The GCRPC transit service area has seen a steady growth in unemployment, hitting a high of 8.1 percent in the first half of 2010. Loss of jobs in the construction, manufacturing, and natural resources (oil and gas) industries has had negative effects on the economy. The major generators of service in the GCRPC rural transit district area are the attractors of transit trips (employers, medical facilities, retail businesses) within the Victoria urbanized area. The City of Victoria is the designated recipient of the Victoria urbanized area transit funds and has an agreement with GCRPC to provide transit service. Major generators of service include three hospitals and medical specialists located in Victoria. Victoria is also a major destination for shopping/retail, restaurants, and colleges/university.

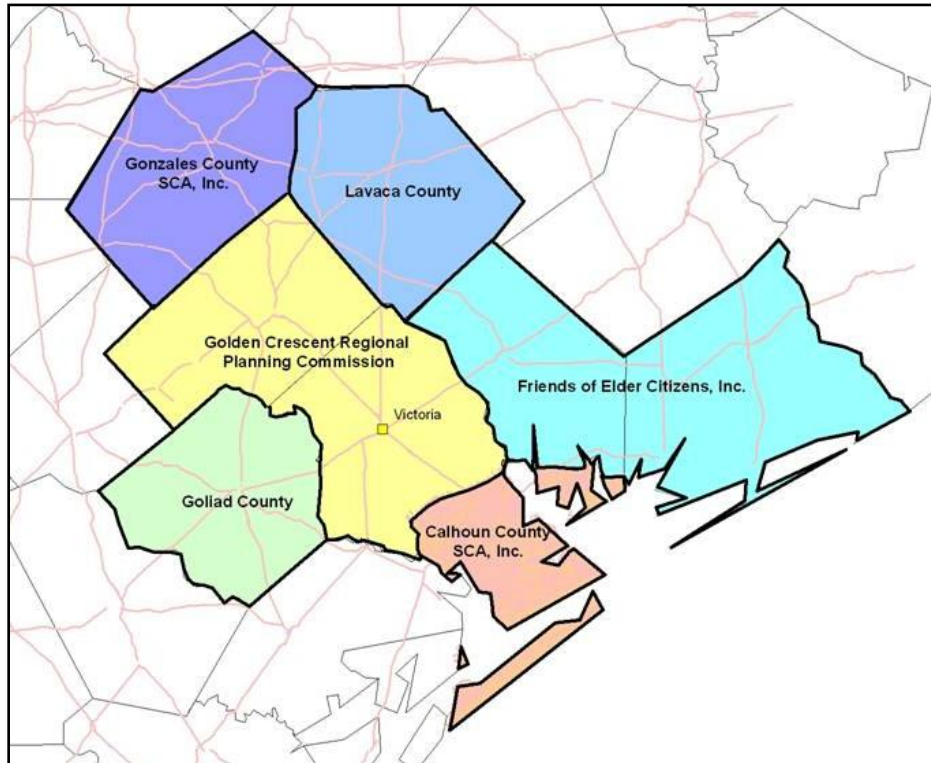
GCRPC rural service is provided in an eight-county area. The rural general public service is called RTRANSIT, is a demand response service, and requires a 24-hour advance reservation. GCRPC also provides demand response medical transportation program (MTP) service for Medicaid recipients under a contract with the Texas Health and Human Services Commission. MTP offers non-emergency medical transportation services under constrained service delivery guidelines. Reimbursement for MTP services is based on a pre-established rate per passenger trip. GCRPC is reimbursed \$23.65 for routine MTP trips and \$79.50 for special MTP trips. Special MTP trips are those that cross county lines. GCRPC also oversees a commuter vanpool program to the Inteplast Plant in Jackson County. The vanpool program offers three routes from Victoria, Port Lavaca, and Bay City. The vanpool program carried 13,051 passengers in fiscal year 2009.

GCRPC directly operates all services within Victoria and Dewitt Counties. This includes Victoria Transit, RTRANSIT, and MTP services in those two counties. In each of the remaining six counties in its region, GCRPC contracts for provision of RTRANSIT and MTP services as follows:

- Calhoun County—Calhoun County Senior Citizens Association (SCA), Inc.
- Goliad County—Goliad County.
- Gonzales County—Gonzales County SCA, Inc.
- Jackson County—Friends of Elder Citizens, Inc.

- Lavaca County—Lavaca County.
- Matagorda County—Friends of Elder Citizens, Inc.

Matagorda County is not part of the designated GCRPC region but is served under contract to the organization that also serves Jackson County. [Figure 20](#) shows the service area by provider.



**Figure 20. Golden Crescent Regional Planning Commission Transit Providers.**

The following lists the number of trips originating in each county that GCRPC serves:

- Victoria: 27,205.
- Lavaca: 26,388.
- Matagorda: 25,374.
- Calhoun: 18,511.
- Gonzales: 17,078.
- Jackson: 10,371.
- Goliad: 6,150.
- Dewitt: 5,542.

GCRPC does provide subscription service and allows same-day reservations where schedules can accommodate. GCRPC directly operated service is scheduled through an automated scheduling/dispatching system. No mobile data computer or automated vehicle location system is used. GCRPC recently installed an automated scheduling/dispatching system at its subcontractors. Not all subcontractors use the automated scheduling/dispatching due to connectivity issues. Vehicles are housed nearest to transit demand to minimize deadhead miles. GCRPC partners with cities, counties, and school districts to use secured parking facilities (in-kind contribution) to park vehicles.

GCRPC directly operated service has a large part-time driver contingent with approximately 50 percent of all drivers being part-time. Driver wages begin at \$9.00 with the maximum driver wage at \$11.71. Overtime is controlled by having a large part-time staff. Full-time drivers are provided 100 percent paid health benefits and life benefits. GCRPC pays its subcontractors on a cost-per-trip basis. GCRPC has 12 full-time and 4 part-time dispatchers/schedulers/reservationist, 10 supervisors, 12 administrative positions, and 2 full-time-equivalent GCRPC overhead staff. Lessons from the Golden Crescent Regional Planning Commission include:

- Set wage rates at a moderate level and establish a cap on wage rate increases.
- Increase the percent of part-time drivers.
- Contract with local transportation providers for service in outlying areas.
- Reduce administrative costs and share overhead through operation of an urban and rural transit district under one agency.
- Decentralize the transit fleet.
- Invest in technology.

### **Brownsville Urban System (High Effectiveness)**

The City of Brownsville's Brownsville Urban System (BUS) is a Section 5307 small urban transit grant recipient. BUS is a mass transit system based in and serving Brownsville, Texas. BUS is currently the largest mass transit system in the Rio Grande Valley. Brownsville's urbanized area (UZA) has a population of 165,776 (2000 U.S. Census) and a projected population of 214,428 in 2010—a 29 percent projected growth. BUS serves the UZA. Brownsville is located at the southernmost tip of Texas and is a gateway for U.S.-Mexico commerce.

BUS provides fixed-route bus service and ADA complementary paratransit service operating between 6:00 a.m. and 8:26 p.m. Monday through Saturday. No service is provided on Sundays and on four major holidays. All fixed-route service begins and ends at the downtown transit terminal ([Figure 21](#)). The terminal is built around the old City Hall that still houses several City of Brownsville departments.



Image Source: [http://www.waymarking.com/waymarks/WM3CWR\\_Brownsville\\_Texas](http://www.waymarking.com/waymarks/WM3CWR_Brownsville_Texas)

**Figure 21. Brownsville Downtown Transit Terminal.**

In fiscal year 2009, BUS transportation provided 1,775,683 passenger trips operating 998,317 revenue miles and expended \$6,537,176 in operating dollars. BUS operating effectiveness is 1.69 as compared to the 0.95 urban transit district average.

The City of Brownsville directly provides bus operations and other administration. BUS subcontracts for fleet maintenance to First Vehicle Services and subcontracts for the director and assistant director positions to First Transit, Inc. BUS receives funding for service from federal and state Section 5307 funding, local contributions, in-kind contributions, passenger fares, auxiliary transit revenues, non-transit-related revenues, Section 5310 elderly and individuals with disabilities funds, Section 5316 Job Access Reverse Commute funds, and Section 5317 New Freedom funds.

The major generator of service in the BUS transit service area includes three international crossings, two major hospitals, other medical facilities, a shopping mall, Workforce Solutions, the Port of Brownsville, educational facilities including the University of Texas at Brownsville, and health and human service agencies. According to a survey conducted by BUS in 2008, only 24 percent of BUS riders are employed, and the trip purpose, by percentage, was found to be as follows:

- School: 15.5 percent.
- Work: 20.0 percent.
- Other: 5.9 percent.
- Visit/recreation: 11 percent.
- Personal: 15.5 percent.
- Shopping: 21.1 percent.
- Medical: 10.9 percent.

The survey reported that 66 percent of respondents use BUS more than three times a week and 61 percent have no other means of transportation. BUS staff reports that international bridge crossings are a major source of ridership, with the high traffic resulting in non-resident transit demand. According to the 2010–2035 Brownsville Metropolitan Transportation Plan, the average monthly traffic based on the first six months of fiscal year 2009 was as follows:

- Veterans International Bridge:
  - Auto: 132,180 monthly.
  - Truck/commercial: 12,859 monthly.
  - Pedestrian: 3,741 monthly.
  - Bus: 697 monthly.
  
- Brownsville and Matamoros Border Crossing:
  - Auto: 139,741 monthly.
  - Truck/commercial: 0.
  - Pedestrian: 50,354 monthly.
  - Bus: 0.
  
- Gateway International Bridge:
  - Auto: 127,070 monthly.
  - Truck/commercial: 0.
  - Pedestrian: 160,339 monthly.
  - Bus: 0.

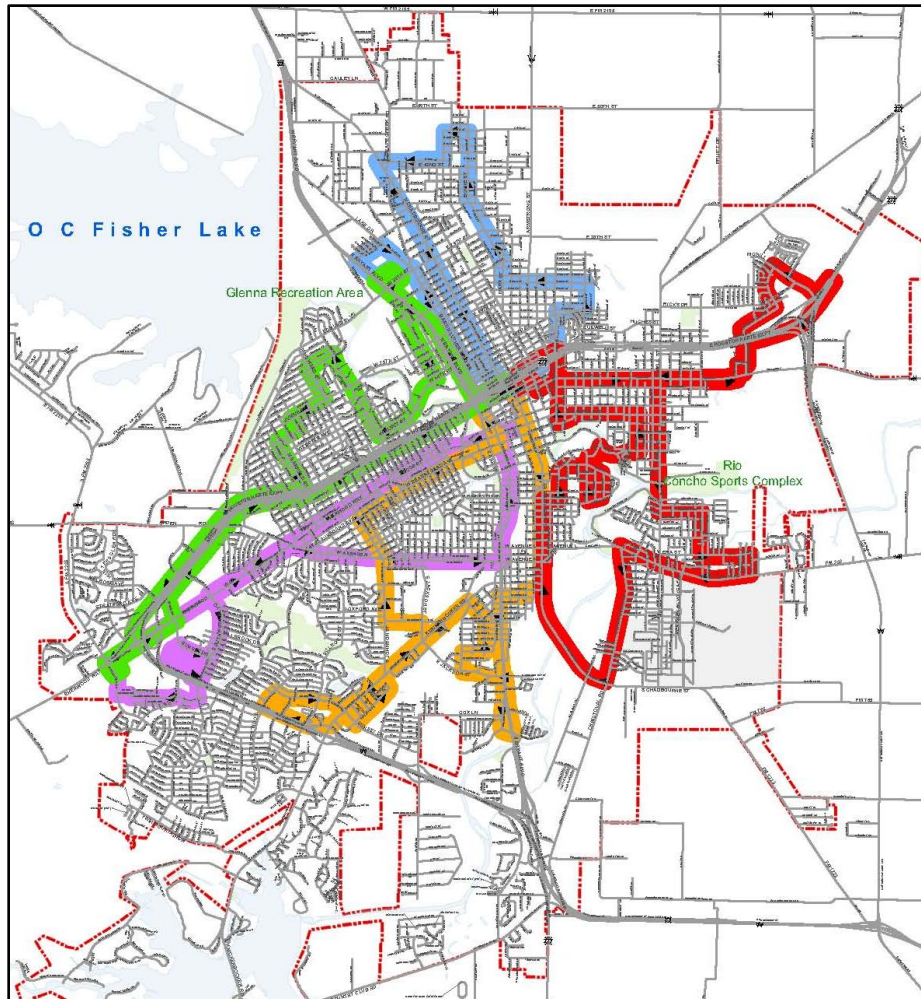
Lessons from BUS include:

- Design transit routes and locate stops to serve the significant number of international travelers near the Texas-Mexico border.
- Ensure transit routes serve all major shopping, medical facilities, education centers, and employment centers.
- Coordinate bus services by connecting routes at a central bus terminal.

### **San Angelo—Concho Valley Transit District (High Efficiency)**

The designated recipient of Section 5307 small urban transit district funds for the San Angelo urbanized area is the City of San Angelo. The City of San Angelo has an agreement with the Concho Valley Transit District (CVTD) to provide transit service in the San Angelo urbanized area. On September 1, 2006, the City of San Angelo and the Concho Valley Council of Governments (the designated Section 5311 rural transit recipient) consolidated the urban and rural public transportation system under the operation of CVTD.

The urban transportation system is known as the TRANSA Public Transportation System. The TRANSA service area boundary is the San Angelo urbanized area, which had a population of 87,969 (2000 U.S. Census). In addition, the area is projected to have virtually no growth, with an estimated 2010 population of 87,710. TRANSA directly operates all service and has five accessible fixed-route vehicles and ADA complementary paratransit services operating Monday through Friday 6:30 a.m.–6:30 p.m. and Saturday 7:30 a.m.–6:30 p.m. (Figure 22). Passengers on the fixed route use a flag-down system and can transfer at the Santa Fe depot. Major generators of transit service include medical facilities, colleges/universities, nutrition centers, shopping centers, and social service agencies.



**Figure 22. San Angelo TRANSA Fixed-Route Map.**

In fiscal year 2009, TRANSA provided 207,090 passenger trips over 466,107 revenue miles with \$1,556,604 in operating expenditures. TRANSA operating efficiency was 0.37 as compared to the urban transit district average of 0.24. TRANSA receives funding for service from federal and state Section 5307 grants, local contributions, passenger fares, auxiliary transit revenues, other transportation revenues, Section 5310 funds for the elderly and people with disabilities, and Area Agency on Aging contracts.



TRANSA has the advantage of sharing costs between the urban and rural transit districts. TRANSA purchases preventive maintenance through a contract that incorporates both the urban and rural transit systems, receiving volume discounts. Administrative costs such as utilities, office space, accounting, and other administrative staff are shared between the urban and rural systems. TRANSA purchases fuel from the City of San Angelo through a local agreement with the city. TRANSA has 21 full-time drivers and 1.5 full-time-equivalent part-time drivers. Driver wages begin at \$8.00. The average full-time driver wage is \$10.00, and the average part-time wage is \$8.76. TRANSA pays for 48 percent of the cost of health benefits for full-time staff. Lessons from San Angelo include:

- Reduce administrative costs through operation of urban and rural transit districts under one agency. Negotiate volume discounts for maintenance through joint urban and rural transit district contracts.
- Offer competitive but moderate driver wage rates and benefits.

### **Sherman-Denison—Texoma Area Paratransit System (High Efficiency)**

The designated recipient of Section 5307 small urban transit district funds for the Sherman-Denison urbanized area is the Texoma Council of Governments (TCOG). TCOG, in turn, contracts with Texoma Area Paratransit System for the delivery of all services within the TCOG service area. TAPS also operates the rural system in the six counties surrounding the Sherman-Denison urbanized area and is the designated recipient of Section 5311 rural transit district funds. Thus, TAPS provides all public transportation services within the region, both rural and urban. TAPS restructured its board and now consists of city and county officials providing support and a voice for transit in the community.

The Sherman-Denison urbanized area has a population of 56,168 (2000 U.S. Census) and a projected population of 62,140 in 2010—an 11 percent projected growth. The TAPS urban system provided 139,095 annual passenger boardings in fiscal year 2009, operating 436,305 revenue miles with \$1.05 million in operating expenditures. TAPS urban system efficiency was 0.62 in fiscal year 2009 as compared to the urban average of 0.24. The TAPS urban system received funding in fiscal year 2009 from federal and state Section 5307 funding, local contributions, other transportation revenues, non-transit-related revenues, the Medical Transportation Program, the Department of Aging and Disabilities, Texoma Tours, and Mental Health Mental Retardation of Texoma.

The TAPS executive director and staff regularly attend community meetings and frequently speak to groups at colleges, employment centers, and community outreach activities. TAPS is regularly in the media (newspapers, television, and magazines) with stories such as celebrating the opening of new routes, celebrating its financial turnaround, and celebrating receipt of its 200<sup>th</sup> bus. The TAPS executive director is a community leader who actively promotes TAPS, serves as mayor pro-tem for the City of Bonham and serves on the Grayson County College Board of Directors.

The TAPS urban system operated demand response transit service only in 2009 and starting in fiscal year 2010 began operating two fixed routes (Roo Route and Viking Route) serving Austin College and Grayson Community College. Other major generators of service within Sherman-Denison are primary/intermediate schools, after-school care programs, medical facilities, shopping, the Dallas Area Rapid Transit (DART) rail station, Peterbilt Motor Company, Trailblazer Blue Cross Blue Shield, Workforce Solutions, and health and human services.

TAPS purchases fuel through a private fuel card contract in cooperation with Tarrant County. The cooperative purchase of fuel with Tarrant County allows TAPS to take advantage of the larger fuel quantity and therefore lower cost. TAPS estimates \$0.10 to \$0.12 per gallon savings in fuel costs. Additionally, the TAPS fuel card vendor provides a mechanism to track fuel and mileage to monitor fuel usage and fuel efficiency. Fuel reports are reviewed weekly.

The beginning driver wage is \$7.95 with an average driver wage of \$8.18. Overtime is closely monitored and limited. TAPS urban and rural operation employs approximately 80 full-time drivers and 50 part-time drivers. Health benefits are provided for full-time drivers at 90 percent, and part-time drivers have the option of receiving a limited plan for \$10 per paycheck. TAPS supervisory staff actively monitors driver/staff productivity and pay hours. Maintenance is provided through a partnership with a local dealership that provides preventive maintenance at a volume discount rate. The dealership provides a vehicle diagnostic with every oil change and reports on the life of parts/need of replacement. Minor repairs are conducted by two in-house mechanics and one technician. The dealership provides free towing and charges a flat mechanic rate for major repairs. Lessons from TAPS include:

- Reduced administrative costs through operation of urban and rural transit districts under one agency and allocation of overhead.
- Actively monitor driver/staff productivity and pay time.
- Partner with local maintenance providers for volume discounts.
- Purchase fuel through fuel cards and county agreements.
- Have an active/supportive transit board made of city/county elected officials.
- Publicize service through a variety of media outlets.
- Plan and develop service with colleges, employment centers, school districts, and community organizations.

## **TEXAS TRANSIT DISTRICT STRATEGIES THAT IMPACT OPERATING EFFECTIVENESS AND EFFICIENCY**

Researchers found through the case study research that although the environment plays some role in performance, there are other factors that management can control or influence to improve operating effectiveness and efficiency. Researchers grouped these factors into four major categories:

- Efforts to grow ridership.
- Efforts to manage costs.
- Efforts to decrease vehicle miles and maximize labor productivity.
- Efforts to improve administration.

The following lists strategy factors by the four major categories.

### **Efforts to Grow Ridership—Improve Effectiveness**

Factors that contribute to growing ridership include the following:

- Engage city and county officials in transit—find champions for transit.
- Actively seek out areas with transit-dependent communities.
- Work with major manufacturers, plants, and industries to serve worker shifts.
- Consistently attend and actively request to speak at community events and meetings.
- Work with colleges, universities, and school districts to provide transit routes and create cooperative agreements.
- Work with health and human services and medical facilities to serve patrons.
- Drive routes and monitor for new service needs.

### **Efforts to Manage Costs—Improve Efficiency**

Factors that contribute to managing cost include:

- Actively seek in-kind contributions to support transit.
- Work with cities and counties in supplying fuel at lower-cost bulk rates.
- Utilize fuel cards (state or private) to monitor fuel usage and cost.
- Use sub-contractors at cost-effective rates where appropriate.
- Utilize sub-contractors to provide service during low-demand times of day on a trip-by-trip cost basis.
- Ensure contract rates are appropriate and cover both operating and capital costs.
- Allocate administrative and overhead costs across programs.

### **Efforts to Decrease Vehicle Miles and Maximize Labor Productivity—Improve Efficiency and Effectiveness**

Factors that contribute to decreasing vehicle miles or maximizing labor productivity include:

- Create satellite parking sites to minimize deadhead, with spares located throughout the service area (seek in-kind contributions for parking).
- Create cooperative agreements with other transit districts to utilize vehicles when in other transit-district service areas to minimize downtime/idle time and maximize productivity.
- Utilize scheduling systems to maximize grouping of trips and minimize slack time.
- Utilize vehicle locator systems to find the closest vehicles, provide quality information to patrons, map scheduled trips to ensure trip reasonableness, and verify no-shows.
- Cross-train staff to provide backup and improve staff productivity (match senior staff with new trainees).
- Monitor/manage driver overtime.
- Monitor vehicles to proactively troubleshoot late trips and take “will-call” or same-day trips to fill the slack.

- Create both full-time and part-time driver schedules to match service demand.
- Group trips without dedicating vehicles to trip types—shared-ride general public service.

### **Efforts to Improve Administration—Improve Effectiveness and Efficiency**

Factors that contribute to improving administration include:

- Run weekly/monthly reports to monitor/manage driver productivity, passenger complaints, passenger no-shows/cancellations, absenteeism, vehicle inspections, vehicle repairs (repeats), client travel times, and client wait times.
- Require vehicle operators to turn in paperwork and fares on a daily basis, with finance staff providing receipt and reconciliation.
- Ensure quality maintenance with priority turnaround through maintenance agreements.
- Monitor preventive maintenance and fleet issues to prevent costly repairs.
- Regularly communicate to passengers rules/regulations. Create a partnership with patrons to meet vehicles on time.
- Follow up with complaints quickly to nurture the patron-transit agency relationship.

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## APPENDICES





**APPENDIX A. ALTERNATIVE RURAL CLUSTER ANALYSIS DATA DETAIL**

**Table A1. Rural C1.**

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
East Texas Council of Governments (Kilgore)	2.654	0.366	0.618	0.843	-0.193	-0.241	0.351	0	0	1	0.000
Central Texas Rural Transit District (Coleman)	0.002	0.365	-0.758	1.240	-0.402	-0.059	0.034	0	0	2	0.586
Heart of Texas Council of Governments (Waco)	0.107	-0.141	-0.281	0.966	-0.263	-0.332	0.134	0	0	2	0.678
Golden Crescent Regional Planning Commission (Victoria)	0.056	0.056	-0.540	0.813	0.364	-0.049	0.034	0	0	2	0.683
South Plains Community Action Association (Levelland)	-0.038	0.369	-0.780	0.263	-0.472	0.042	-0.133	0	0	2	0.837
Hill Country Transit District (San Saba)	0.024	0.207	-0.666	1.362	-0.577	0.305	-0.250	0	0	2	0.866
Rolling Plains Management Corp. (Crowell)	-0.420	-0.009	-0.843	1.362	-0.507	-0.373	-0.016	0	0	2	0.873
Colorado Valley Transit (Columbus)	-0.221	-0.419	-0.100	0.935	0.468	-0.059	-0.350	0	0	2	0.958
Ark-Tex Council of Governments (Texarkana)	0.449	-0.107	-0.033	0.874	0.225	-0.049	0.317	0	0	2	1.033
Bee Community Action Agency (Beeville)	-0.486	-0.317	-0.665	0.599	0.085	0.184	0.401	0	0	2	1.087
Concho Valley Council of Governments (San Angelo)	-0.609	1.065	-1.145	0.935	-0.402	-0.059	-0.383	0	0	2	1.104
Aspermont Small Business Development Center (Aspermont)	-0.716	-0.038	-1.062	1.729	-0.402	-0.100	-0.116	0	0	2	1.113
Caprock Community Action Association (Crosbyton)	-0.613	-0.114	-0.949	0.355	-0.089	0.255	-0.050	0	0	2	1.140
South East Texas Regional Planning Commission (Beaumont)	-0.131	-0.565	0.805	-0.164	-0.124	-0.565	-0.183	0	0	2	1.481
Panhandle Community Services (Amarillo)	0.461	2.346	-0.986	0.263	-0.751	-0.261	-0.483	0	0	2	2.416
<b>Average</b>	-0.152	0.193	-0.572	0.824	-0.203	-0.080	-0.075				
<b>Standard Deviation</b>	0.377	0.738	0.522	0.518	0.370	0.243	0.254				

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Kaufman County Senior Citizens Service (Terrell)	-0.441	-0.704	1.689	-0.744	-0.646	-0.605	-0.166	0	1	3	0.404
Cleburne (Cleburne)	-0.310	-0.726	3.385	-0.805	-0.820	-0.727	-0.083	0	1	3	0.449
Public Transit Services (Mineral Wells)	-0.218	-0.474	0.096	-0.072	-0.751	-0.686	-0.350	0	1	3	0.546
Community Services, Inc. (Corsicana)	-0.104	-0.577	0.986	-0.317	-0.124	-0.393	0.084	0	1	3	0.934
Senior Center Resources and Public Transit (Sherman)	-0.481	-0.710	1.648	-0.072	-0.298	-0.383	0.217	0	1	3	0.982
Collin County Committee on Aging (McKinney)	0.315	-0.126	-0.118	0.477	-0.786	-0.555	-0.316	0	1	3	1.354
Services Program for Aging Needs (SPAN) (Denton)	-0.609	-0.729	1.358	-1.599	-1.203	-1.445	-0.817	0	1	3	1.437
Fort Bend County	-0.571	-0.722	1.406	-1.660	-1.552	-1.030	-1.117	0	1	3	1.646
The Transit System, Inc. (Glen Rose)	-0.729	-0.722	0.358	-1.965	-1.308	-1.405	-0.833	0	1	3	1.823
Gulf Coast Center (Galveston)	-0.453	-0.606	0.263	1.301	-1.552	-0.788	-0.566	0	1	3	2.042
<b>Average</b>	-0.313	-0.621	0.828	-0.317	1.444	-1.293	0.000	0	1	3	2.231
<b>Standard Deviation</b>	-0.356	-0.611	1.082	-0.525	-0.691	-0.846	-0.359				
<b>Standard Deviation</b>	0.286	0.180	0.993	0.973	0.848	0.389	0.427				
Alamo Area Council of Governments (San Antonio)	1.547	0.429	-0.023	0.569	-0.577	-0.352	-0.200	0	1	4	1.128
Capital Area Rural Transportation System (CARTS) (Austin)	1.771	0.069	0.639	-0.225	-0.855	-0.626	-0.867	0	1	4	1.204
Brazos Transit District (Bryan/College Station)	4.144	1.261	0.246	0.111	0.085	-0.170	0.117	0	1	4	1.970
<b>Average</b>	2.488	0.587	0.287	0.152	-0.449	-0.383	-0.316				
<b>Standard Deviation</b>	1.439	0.612	0.333	0.398	0.483	0.229	0.502				

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Rural Economic Assistance League, Inc. (REAL) (Alice)	-0.350	-0.508	-0.019	-0.286	0.921	0.720	0.634	1	0	5	1.250
Lower Rio Grande Valley Development Council (McAllen)	-0.185	-0.490	0.221	-0.317	1.165	1.074	-0.066	1	0	5	1.527
West Texas Opportunities, Inc. (Lamesa)	0.251	4.593	-1.125	-0.011	0.050	0.224	0.217	1	0	5	2.571
<b>Average</b>	-0.095	1.198	-0.308	-0.205	0.712	0.673	0.262				
<b>Standard Deviation</b>	0.311	2.939	0.718	0.168	0.586	0.427	0.352				
Community Act. Council of South Texas (Rio Grande City)	-0.432	-0.182	-0.741	-0.774	2.210	2.703	1.668	1	0	6	1.518
Kleberg County Human Services (Kingsville)	-0.767	-0.528	-0.824	-0.622	1.757	-0.535	-0.383	1	0	6	2.208
Community Council of Southwest Texas (Uvalde)	-0.270	0.553	-0.949	-0.225	1.583	1.539	4.286	1	0	6	2.256
Del Rio (Del Rio)	-0.684	-0.425	-0.811	-0.652	0.364	0.963	-2.834	1	0	6	2.486
Webb County Community Action Agency (Laredo)	-0.859	-0.407	-1.094	-2.240	2.489	2.996	1.034	1	0	6	2.721
<b>Average</b>	-0.602	-0.198	-0.884	-0.903	1.680	1.533	0.754				
<b>Standard Deviation</b>	0.245	0.438	0.140	0.775	0.819	1.424	2.625				
El Paso County	-0.772	-0.714	-0.032	-1.934	1.444	2.136	1.034	1	1	7	0.000

**Table A2. Rural C2 (Five Clusters).**

<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% 65+</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region No.</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
South East Texas Regional Planning Commission (Beaumont)	-0.13	-0.56	0.81	-0.16	-0.12	-0.56	-0.18	0	0	1	1.20
Public Transit Services (Mineral Wells)	-0.22	-0.47	0.10	-0.07	-0.75	-0.69	-0.35	0	1	1	1.29
Heart of Texas Council of Governments (Waco)	0.11	-0.14	-0.28	0.97	-0.26	-0.33	0.13	0	0	1	1.32
Community Services, Inc. (Corsicana)	-0.10	-0.58	0.99	-0.32	-0.12	-0.39	0.08	0	1	1	1.33
Senior Center Resources and Public Transit	-0.48	-0.71	1.65	-0.07	-0.30	-0.38	0.22	0	1	1	1.35
Texoma Area Paratransit System (TAPS) (Sherman)	0.31	-0.13	-0.12	0.48	-0.79	-0.55	-0.32	0	1	1	1.40
South Plains Community Action Association (Levelland)	-0.04	0.37	-0.78	0.26	-0.47	0.04	-0.13	0	0	1	1.40
Colorado Valley Transit (Columbus)	-0.22	-0.42	-0.10	0.94	0.47	-0.06	-0.35	0	0	1	1.53
Rolling Plains Management Corp. (Crowell)	-0.42	-0.01	-0.84	1.36	-0.51	-0.37	-0.02	0	0	1	1.53
Golden Crescent Regional Planning Commission (Victoria)	0.06	0.06	-0.54	0.81	0.36	-0.05	0.03	0	0	1	1.54
Kaufman County Senior Citizens Service (Terrell)	-0.44	-0.70	1.69	-0.74	-0.65	-0.61	-0.17	0	1	1	1.58
Caprock Community Action Association (Crosbyton)	-0.61	-0.11	-0.95	0.36	-0.09	0.25	-0.05	0	0	1	1.58
Central Texas Rural Transit District (Coleman)	0.00	0.37	-0.76	1.24	-0.40	-0.06	0.03	0	0	1	1.59
Bee Community Action Agency (Beeville)	-0.49	-0.32	-0.66	0.60	0.09	0.18	0.40	0	0	1	1.61
Ark-Tex Council of Governments (Texasarkana)	0.45	-0.11	-0.03	0.87	0.22	-0.05	0.32	0	0	1	1.66
Cleburne (Cleburne)	-0.31	-0.73	3.39	-0.80	-0.82	-0.73	-0.08	0	1	1	1.67
Hill Country Transit District (San Saba)	0.02	0.21	-0.67	1.36	-0.58	0.31	-0.25	0	0	1	1.75
Aspermont Small Business Development Center (Aspermont)	-0.72	-0.04	-1.06	1.73	-0.40	-0.10	-0.12	0	0	1	1.86
Concho Valley Council of Governments (San Angelo)	-0.61	1.07	-1.15	0.94	-0.40	-0.06	-0.38	0	0	1	1.91

Rural Agency	Pop.	Land Area	Density	% 65+	% HHS with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
The Transit System, Inc. (Glen Rose)	-0.45	-0.61	0.26	1.30	-1.55	-0.79	-0.57	0	1	1	2.05
Gulf Coast Center (Galveston)	-0.31	-0.62	0.83	-0.32	1.44	-1.29	0.00	0	1	1	2.41
Collin County Committee on Aging (McKinney)	-0.61	-0.73	1.36	-1.60	-1.20	-1.45	-0.82	0	1	1	2.64
Services Program for Aging Needs (SPAN) (Denton)	-0.57	-0.72	1.41	-1.66	-1.55	-1.03	-1.12	0	1	1	2.77
Fort Bend County	-0.73	-0.72	0.36	-1.96	-1.31	-1.40	-0.83	0	1	1	2.95
<b>Average</b>	-0.27	-0.27	0.20	0.23	-0.40	-0.42	-0.19				
<b>Standard Deviation</b>	0.32	0.46	1.12	1.03	0.67	0.51	0.37				
Panhandle Community Services (Amarillo)	0.46	2.35	-0.99	0.26	-0.75	-0.26	-0.48	0	0	2	1.77
West Texas Opportunities, Inc. (Lamesa)	0.25	4.59	-1.12	-0.01	0.05	0.22	0.22	1	0	2	1.77
<b>Average</b>	0.36	3.47	-1.06	0.13	-0.35	-0.02	-0.13				
<b>Standard Deviation</b>	0.15	1.59	0.10	0.19	0.57	0.34	0.50				
Community Act. Council of South Texas (Rio Grande City)	-0.43	-0.18	-0.74	-0.77	2.21	2.70	1.67	1	0	3	0.94
Webb County Community Action Agency (Laredo)	-0.86	-0.41	-1.09	-2.24	2.49	3.00	1.03	1	0	3	1.73
El Paso County	-0.77	-0.71	-0.03	-1.93	1.44	2.14	1.03	1	1	3	2.06
Community Council of Southwest Texas (Uvalde)	-0.27	0.55	-0.95	-0.22	1.58	1.54	4.29	1	0	3	2.85
<b>Average</b>	-0.58	-0.19	-0.70	-1.29	1.93	2.34	2.01				
<b>Standard Deviation</b>	0.28	0.54	0.47	0.95	0.50	0.64	1.55				

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region No.	Cluster No.	Distance to Center of Cluster
Lower Rio Grande Valley Development Council (McAllen)	-0.19	-0.49	0.22	-0.32	1.16	1.07	-0.07	1	0	4	0.91
Rural Economic Assistance League, Inc. (REAL) (Alice)	-0.35	-0.51	-0.02	-0.29	0.92	0.72	0.63	1	0	4	1.35
Kleberg County Human Services (Kingsville)	-0.77	-0.53	-0.82	-0.62	1.76	-0.53	-0.38	1	0	4	1.38
Del Rio (Del Rio)	-0.68	-0.42	-0.81	-0.65	0.36	0.96	-2.83	1	0	4	2.33
<b>Average</b>	-0.50	-0.49	-0.36	-0.47	1.05	0.56	-0.66				
<b>Standard Deviation</b>	0.27	0.04	0.54	0.19	0.58	0.74	1.51				
Alamo Area Council of Governments (San Antonio)	1.55	0.43	-0.02	0.57	-0.58	-0.35	-0.20	0	1	5	1.27
Capital Area Rural Transportation System (CARTS) (Austin)	1.77	0.07	0.64	-0.22	-0.86	-0.63	-0.87	0	1	5	1.48
East Texas Council of Governments (Kilgore)	2.65	0.37	0.62	0.84	-0.19	-0.24	0.35	0	0	5	1.75
Brazos Transit District (Bryan/College Station)	4.14	1.26	0.25	0.11	0.09	-0.17	0.12	0	1	5	1.96
<b>Average</b>	2.53	0.53	0.37	0.32	-0.38	-0.35	-0.15				
<b>Standard Deviation</b>	1.18	0.51	0.32	0.47	0.41	0.20	0.53				

**Distances between Final Cluster Centers**

Cluster	1	2	3	4	5
1		4.139	5.71	3.705	2.973
2	4.139		6.084	4.715	4.186
3	5.71	6.084		3.549	6.562
4	3.705	4.715	3.549		5.016
5	2.973	4.186	6.562	5.016	

**Table A3. Rural C2 (Six Clusters).**

<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% 65+</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
Lower Rio Grande Valley Development Council (McAllen)	-0.185	-0.490	0.221	-0.317	1.165	1.074	-0.066	1	0	1	0.914
Rural Economic Assistance League, Inc. (REAL) (Alice)	-0.350	-0.508	-0.019	-0.286	0.921	0.720	0.634	1	0	1	1.348
Kleberg County Human Services (Kingsville)	-0.767	-0.528	-0.824	-0.622	1.757	-0.535	-0.383	1	0	1	1.382
Del Rio (Del Rio)	-0.684	-0.425	-0.811	-0.652	0.364	0.963	-2.834	1	0	1	2.333
<b>Average</b>	-0.497	-0.488	-0.358	-0.469	1.052	0.556	-0.662				
<b>Standard Deviation</b>	0.275	0.045	0.539	0.195	0.578	0.742	1.509				
West Texas Opportunities, Inc. (Lamesa)	0.251	4.593	-1.125	-0.011	0.050	0.224	0.217	1	0	2	0.000
Central Texas Rural Transit District (Coleman)	0.002	0.365	-0.758	1.240	-0.402	-0.059	0.034	0	0	3	0.586
Heart of Texas Council of Governments (Waco)	0.107	-0.141	-0.281	0.966	-0.263	-0.332	0.134	0	0	3	0.678
Golden Crescent Regional Planning Commission (Victoria)	0.056	0.056	-0.540	0.813	0.364	-0.049	0.034	0	0	3	0.683
South Plains Community Action Association (Levelland)	-0.038	0.369	-0.780	0.263	-0.472	0.042	-0.133	0	0	3	0.837
Hill Country Transit District (San Saba)	0.024	0.207	-0.666	1.362	-0.577	0.305	-0.250	0	0	3	0.866
Rolling Plains Management Corp. (Crowell)	-0.420	-0.009	-0.843	1.362	-0.507	-0.373	-0.016	0	0	3	0.873
Colorado Valley Transit (Columbus)	-0.221	-0.419	-0.100	0.935	0.468	-0.059	-0.350	0	0	3	0.958
Ark-Tex Council of Governments (Texarkana)	0.449	-0.107	-0.033	0.874	0.225	-0.049	0.317	0	0	3	1.033
Bee Community Action Agency (Beeville)	-0.486	-0.317	-0.665	0.599	0.085	0.184	0.401	0	0	3	1.087
Concho Valley Council of Governments (San Angelo)	-0.609	1.065	-1.145	0.935	-0.402	-0.059	-0.383	0	0	3	1.104
Aspermont Small Business Development Center (Aspermont)	-0.716	-0.038	-1.062	1.729	-0.402	-0.100	-0.116	0	0	3	1.113
Caprock Community Action Association (Crosbyton)	-0.613	-0.114	-0.949	0.355	-0.089	0.255	-0.050	0	0	3	1.140

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
South East Texas Regional Planning Commission (Beaumont)	-0.131	-0.565	0.805	-0.164	-0.124	-0.565	-0.183	0	0	3	1.481
Panhandle Community Services (Amarillo)	0.461	2.346	-0.986	0.263	-0.751	-0.261	-0.483	0	0	3	2.416
<b>Average</b>	-0.152	0.193	-0.572	0.824	-0.203	-0.080	-0.075				
<b>Standard Deviation</b>	0.377	0.738	0.522	0.518	0.370	0.243	0.254				
Kaufman County Senior Citizens Service (Terrell)	-0.441	-0.704	1.689	-0.744	-0.646	-0.605	-0.166	0	1	4	0.404
Cleburne (Cleburne)	-0.310	-0.726	3.385	-0.805	-0.820	-0.727	-0.083	0	1	4	0.449
Public Transit Services (Mineral Wells)	-0.218	-0.474	0.096	-0.072	-0.751	-0.686	-0.350	0	1	4	0.546
Community Services, Inc. (Corsicana)	-0.104	-0.577	0.986	-0.317	-0.124	-0.393	0.084	0	1	4	0.934
Senior Center Resources and Public Transit Texoma Area Paratransit System (TAPS) (Sherman)	-0.481	-0.710	1.648	-0.072	-0.298	-0.383	0.217	0	1	4	0.982
Collin County Committee on Aging (McKinney)	0.315	-0.126	-0.118	0.477	-0.786	-0.555	-0.316	0	1	4	1.354
Services Program for Aging Needs (SPAN) (Denton)	-0.609	-0.729	1.358	-1.599	-1.203	-1.445	-0.817	0	1	4	1.437
Fort Bend County	-0.571	-0.722	1.406	-1.660	-1.552	-1.030	-1.117	0	1	4	1.646
The Transit System, Inc. (Glen Rose)	-0.729	-0.722	0.358	-1.965	-1.308	-1.405	-0.833	0	1	4	1.823
Gulf Coast Center (Galveston)	-0.453	-0.606	0.263	1.301	-1.552	-0.788	-0.566	0	1	4	2.042
<b>Average</b>	-0.313	-0.621	0.828	-0.317	1.444	-1.293	0.000	0	1	4	2.231
<b>Standard Deviation</b>	-0.356	-0.611	1.082	-0.525	-0.691	-0.846	-0.359				
<b>Standard Deviation</b>	0.286	0.180	0.993	0.973	0.848	0.389	0.427				



Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Alamo Area Council of Governments (San Antonio)	1.547	0.429	-0.023	0.569	-0.577	-0.352	-0.200	0	1	5	1.271
Capital Area Rural Transportation System (CARTS) (Austin)	1.771	0.069	0.639	-0.225	-0.855	-0.626	-0.867	0	1	5	1.476
East Texas Council of Governments (Kilgore)	2.654	0.366	0.618	0.843	-0.193	-0.241	0.351	0	0	5	1.753
Brazos Transit District (Bryan/College Station)	4.144	1.261	0.246	0.111	0.085	-0.170	0.117	0	1	5	1.959
<b>Average</b>	2.529	0.531	0.370	0.325	-0.385	-0.347	-0.150				
<b>Standard Deviation</b>	1.178	0.511	0.318	0.475	0.415	0.200	0.528				
Community Act. Council of South Texas (Rio Grande City)	-0.432	-0.182	-0.741	-0.774	2.210	2.703	1.668	1	0	6	0.936
Webb County Community Action Agency (Laredo)	-0.859	-0.407	-1.094	-2.240	2.489	2.996	1.034	1	0	6	1.729
El Paso County	-0.772	-0.714	-0.032	-1.934	1.444	2.136	1.034	1	1	6	2.061
Community Council of Southwest Texas (Uvalde)	-0.270	0.553	-0.949	-0.225	1.583	1.539	4.286	1	0	6	2.852
<b>Average</b>	-0.583	-0.187	-0.704	-1.293	1.931	2.344	2.005				
<b>Standard Deviation</b>	0.279	0.540	0.471	0.952	0.499	0.644	1.549				

**Distances between Final Cluster Centers**

Cluster	1	2	3	4	5	6
1		5.407	3.605	4.343	5.016	3.549
2	5.407		5.156	6.372	5.578	6.256
3	3.605	5.156		2.756	3.158	5.579
4	4.343	6.372	2.756		3.321	6.225
5	5.016	5.578	3.158	3.321		6.562
6	3.549	6.256	5.579	6.225	6.562	

**Table A4. Rural C2 (Seven Clusters).**

<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% 65+</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
Community Council of Southwest Texas (Uvalde)	-0.270	0.553	-0.949	-0.225	1.583	1.539	4.286	1	0	1	0.000
Public Transit Services (Mineral Wells)	-0.218	-0.474	0.096	-0.072	-0.751	-0.686	-0.350	0	1	2	0.474
Cleburne (Cleburne)	-0.310	-0.726	3.385	-0.805	-0.820	-0.727	-0.083	0	1	2	0.630
Kaufman County Senior Citizens Service (Terrell)	-0.441	-0.704	1.689	-0.744	-0.646	-0.605	-0.166	0	1	2	0.644
Community Services, Inc. (Corsicana)	-0.104	-0.577	0.986	-0.317	-0.124	-0.393	0.084	0	1	2	0.862
Senior Center Resources and Public Transit	-0.481	-0.710	1.648	-0.072	-0.298	-0.383	0.217	0	1	2	1.059
Texoma Area Paratransit System (TAPS) (Sherman)	0.315	-0.126	-0.118	0.477	-0.786	-0.555	-0.316	0	1	2	1.102
Collin County Committee on Aging (McKinney)	-0.609	-0.729	1.358	-1.599	-1.203	-1.445	-0.817	0	1	2	1.628
Services Program for Aging Needs (SPAN) (Denton)	-0.571	-0.722	1.406	-1.660	-1.552	-1.030	-1.117	0	1	2	1.800
The Transit System, Inc. (Glen Rose)	-0.453	-0.606	0.263	1.301	-1.552	-0.788	-0.566	0	1	2	1.995
Capital Area Rural Transportation System (CARTS) (Austin)	1.771	0.069	0.639	-0.225	-0.855	-0.626	-0.867	0	1	2	1.996
Fort Bend County	-0.729	-0.722	0.358	-1.965	-1.308	-1.405	-0.833	0	1	2	1.998
Alamo Area Council of Governments (San Antonio)	1.547	0.429	-0.023	0.569	-0.577	-0.352	-0.200	0	1	2	2.235
Gulf Coast Center (Galveston)	-0.313	-0.621	0.828	-0.317	1.444	-1.293	0.000	0	1	2	2.257
<b>Average</b>	-0.046	-0.478	0.963	-0.417	-0.694	-0.791	-0.386				
<b>Standard Deviation</b>	0.802	0.370	0.961	0.940	0.776	0.383	0.418				
Central Texas Rural Transit District (Coleman)	0.002	0.365	-0.758	1.240	-0.402	-0.059	0.034	0	0	3	0.586
Heart of Texas Council of Governments (Waco)	0.107	-0.141	-0.281	0.966	-0.263	-0.332	0.134	0	0	3	0.678
Golden Crescent Regional Planning Commission (Victoria)	0.056	0.056	-0.540	0.813	0.364	-0.049	0.034	0	0	3	0.683

<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% 65+</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
South Plains Community Action Association (Levelland)	-0.038	0.369	-0.780	0.263	-0.472	0.042	-0.133	0	0	3	0.837
Hill Country Transit District (San Saba)	0.024	0.207	-0.666	1.362	-0.577	0.305	-0.250	0	0	3	0.866
Rolling Plains Management Corp. (Crowell)	-0.420	-0.009	-0.843	1.362	-0.507	-0.373	-0.016	0	0	3	0.873
Colorado Valley Transit (Columbus)	-0.221	-0.419	-0.100	0.935	0.468	-0.059	-0.350	0	0	3	0.958
Ark-Tex Council of Governments (Texarkana)	0.449	-0.107	-0.033	0.874	0.225	-0.049	0.317	0	0	3	1.033
Bee Community Action Agency (Beeville)	-0.486	-0.317	-0.665	0.599	0.085	0.184	0.401	0	0	3	1.087
Concho Valley Council of Governments (San Angelo)	-0.609	1.065	-1.145	0.935	-0.402	-0.059	-0.383	0	0	3	1.104
Aspermont Small Business Development Center (Aspermont)	-0.716	-0.038	-1.062	1.729	-0.402	-0.100	-0.116	0	0	3	1.113
Caprock Community Action Association (Crosbyton)	-0.613	-0.114	-0.949	0.355	-0.089	0.255	-0.050	0	0	3	1.140
South East Texas Regional Planning Commission (Beaumont)	-0.131	-0.565	0.805	-0.164	-0.124	-0.565	-0.183	0	0	3	1.481
Panhandle Community Services (Amarillo)	0.461	2.346	-0.986	0.263	-0.751	-0.261	-0.483	0	0	3	2.416
<b>Average</b>	-0.152	0.193	-0.572	0.824	-0.203	-0.080	-0.075				
<b>Standard Deviation</b>	0.377	0.738	0.522	0.518	0.370	0.243	0.254				
Lower Rio Grande Valley Development Council (McAllen)	-0.185	-0.490	0.221	-0.317	1.165	1.074	-0.066	1	0	4	0.914
Rural Economic Assistance League, Inc. (REAL) (Alice)	-0.350	-0.508	-0.019	-0.286	0.921	0.720	0.634	1	0	4	1.348
Kleberg County Human Services (Kingsville)	-0.767	-0.528	-0.824	-0.622	1.757	-0.535	-0.383	1	0	4	1.382
Del Rio (Del Rio)	-0.684	-0.425	-0.811	-0.652	0.364	0.963	-2.834	1	0	4	2.333
<b>Average</b>	-0.497	-0.488	-0.358	-0.469	1.052	0.556	-0.662				
<b>Standard Deviation</b>	0.275	0.045	0.539	0.195	0.578	0.742	1.509				

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Brazos Transit District (Bryan/College Station)	4.144	1.261	0.246	0.111	0.085	-0.170	0.117	0	1	5	1.396
East Texas Council of Governments (Kilgore)	2.654	0.366	0.618	0.843	-0.193	-0.241	0.351	0	0	5	1.396
<b>Average</b>	3.399	0.814	0.432	0.477	-0.054	-0.206	0.234				
<b>Standard Deviation</b>	1.054	0.633	0.263	0.518	0.197	0.050	0.165				
Community Act. Council of South Texas (Rio Grande City)	-0.432	-0.182	-0.741	-0.774	2.210	2.703	1.668	1	0	6	1.250
El Paso County	-0.772	-0.714	-0.032	-1.934	1.444	2.136	1.034	1	1	6	1.617
Webb County Community Action Agency (Laredo)	-0.859	-0.407	-1.094	-2.240	2.489	2.996	1.034	1	0	6	1.106
<b>Average</b>	-0.688	-0.434	-0.622	-1.649	2.047	2.612	1.245				
<b>Standard Deviation</b>	0.226	0.267	0.541	0.773	0.541	0.437	0.366				
West Texas Opportunities, Inc. (Lamesa)	0.251	4.593	-1.125	-0.011	0.050	0.224	0.217	1	0	7	0.000

**Distances between Final Cluster Centers**

Cluster	1	2	3	4	5	6	7
1		6.962	5.982	5.200	7.007	3.803	6.225
2	6.962		2.642	4.307	4.068	6.221	6.213
3	5.982	2.642		3.605	3.807	5.761	5.156
4	5.200	4.307	3.605		5.628	3.376	5.407
5	7.007	4.068	3.807	5.628		7.127	5.728
6	3.803	6.221	5.761	3.376	7.127		6.549
7	6.225	6.213	5.156	5.407	5.728	6.549	

**Table A5. Rural C2 (Eight Clusters).**

<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
West Texas Opportunities, Inc. (Lamesa)	0.251	4.593	-1.125	0.050	0.224	0.217	1	0	1	0.000
Cleburne (Cleburne)	-0.310	-0.726	3.385	-0.820	-0.727	-0.083	0	1	2	0.406
Collin County Committee on Aging (McKinney)	-0.609	-0.729	1.358	-1.203	-1.445	-0.817	0	1	2	1.241
Community Services, Inc. (Corsicana)	-0.104	-0.577	0.986	-0.124	-0.393	0.084	0	1	2	1.020
Fort Bend County	-0.729	-0.722	0.358	-1.308	-1.405	-0.833	0	1	2	1.596
Gulf Coast Center (Galveston)	-0.313	-0.621	0.828	1.444	-1.293	0.000	0	1	2	2.171
Senior Center Resources and Public Transit	-0.481	-0.710	1.648	-0.298	-0.383	0.217	0	1	2	1.137
Kaufman County Senior Citizens Service (Terrell)	-0.441	-0.704	1.689	-0.646	-0.605	-0.166	0	1	2	0.363
Public Transit Services (Mineral Wells)	-0.218	-0.474	0.096	-0.751	-0.686	-0.350	0	1	2	0.881
Services Program for Aging Needs (SPAN) (Denton)	-0.571	-0.722	1.406	-1.552	-1.030	-1.117	0	1	2	1.511
<b>Average</b>	-0.420	-0.665	1.306	-0.584	-0.885	-0.340				
<b>Standard Deviation</b>	0.201	0.089	0.955	0.729	0.420	0.471				
Ark-Tex Council of Governments (Texarkana)	0.449	-0.107	-0.033	0.874	-0.049	0.317	0	0	3	1.033
Aspermont Small Business Development Center (Aspermont)	-0.716	-0.038	-1.062	-0.402	-0.100	-0.116	0	0	3	1.113
Bee Community Action Agency (Beeville)	-0.486	-0.317	-0.665	0.085	0.184	0.401	0	0	3	1.087
Caprock Community Action Association (Crosbyton)	-0.613	-0.114	-0.949	-0.089	0.255	-0.050	0	0	3	1.140
Concho Valley Council of Governments (San Angelo)	-0.609	1.065	-1.145	-0.402	-0.059	-0.383	0	0	3	1.104
Central Texas Rural Transit District (Coleman)	0.002	0.365	-0.758	-0.402	-0.059	0.034	0	0	3	0.586
Colorado Valley Transit (Columbus)	-0.221	-0.419	-0.100	0.468	-0.059	-0.350	0	0	3	0.958

<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% 65+</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
Golden Crescent Regional Planning Commission (Victoria)	0.056	0.056	-0.540	0.813	0.364	-0.049	0.034	0	0	3	0.683
Hill Country Transit District (San Saba)	0.024	0.207	-0.666	1.362	-0.577	0.305	-0.250	0	0	3	0.866
Heart of Texas Council of Governments (Waco)	0.107	-0.141	-0.281	0.966	-0.263	-0.332	0.134	0	0	3	0.678
Panhandle Community Services (Amarillo)	0.461	2.346	-0.986	0.263	-0.751	-0.261	-0.483	0	0	3	2.416
Rolling Plains Management Corp. (Crowell)	-0.420	-0.009	-0.843	1.362	-0.507	-0.373	-0.016	0	0	3	0.873
South East Texas Regional Planning Commission (Beaumont)	-0.131	-0.565	0.805	-0.164	-0.124	-0.565	-0.183	0	0	3	1.481
South Plains Community Action Association (Levelland)	-0.038	0.369	-0.780	0.263	-0.472	0.042	-0.133	0	0	3	0.837
<b>Average</b>	-0.152	0.193	-0.572	0.824	-0.203	-0.080	-0.075				
<b>Standard Deviation</b>	0.377	0.738	0.522	0.518	0.370	0.243	0.254				
Community Council of Southwest Texas (Uvalde)	-0.270	0.553	-0.949	-0.225	1.583	1.539	4.286	1	0	4	0.000
Brazos Transit District (Bryan/College Station)	4.144	1.261	0.246	0.111	0.085	-0.170	0.117	0	1	5	1.396
East Texas Council of Governments (Kilgore)	2.654	0.366	0.618	0.843	-0.193	-0.241	0.351	0	0	5	1.396
<b>Average</b>	3.399	0.814	0.432	0.477	-0.054	-0.206	0.234				
<b>Standard Deviation</b>	1.054	0.633	0.263	0.518	0.197	0.050	0.165				
Community Act. Council of South Texas (Rio Grande City)	-0.432	-0.182	-0.741	-0.774	2.210	2.703	1.668	1	0	6	1.250
El Paso County	-0.772	-0.714	-0.032	-1.934	1.444	2.136	1.034	1	1	6	1.617
Webb County Community Action Agency (Laredo)	-0.859	-0.407	-1.094	-2.240	2.489	2.996	1.034	1	0	6	1.106
<b>Average</b>	-0.688	-0.434	-0.622	-1.649	2.047	2.612	1.245				
<b>Standard Deviation</b>	0.226	0.267	0.541	0.773	0.541	0.437	0.366				

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Alamo Area Council of Governments (San Antonio)	1.547	0.429	-0.023	0.569	-0.577	-0.352	-0.200	0	1	7	1.181
Capital Area Rural Transportation System (CARTS) (Austin)	1.771	0.069	0.639	-0.225	-0.855	-0.626	-0.867	0	1	7	1.312
Texoma Area Paratransit System (TAPS) (Sherman)	0.315	-0.126	-0.118	0.477	-0.786	-0.555	-0.316	0	1	7	0.662
The Transit System, Inc. (Glen Rose)	-0.453	-0.606	0.263	1.301	-1.552	-0.788	-0.566	0	1	7	1.732
<b>Average</b>	0.795	-0.058	0.190	0.531	-0.942	-0.580	-0.487				
<b>Standard Deviation</b>	1.050	0.431	0.340	0.624	0.423	0.180	0.296				
Del Rio (Del Rio)	-0.684	-0.425	-0.811	-0.652	0.364	0.963	-2.834	1	0	8	2.333
Kleberg County Human Services (Kingsville)	-0.767	-0.528	-0.824	-0.622	1.757	-0.535	-0.383	1	0	8	1.382
Lower Rio Grande Valley Development Council (McAllen)	-0.185	-0.490	0.221	-0.317	1.165	1.074	-0.066	1	0	8	0.914
Rural Economic Assistance League, Inc. (REAL) (Alice)	-0.350	-0.508	-0.019	-0.286	0.921	0.720	0.634	1	0	8	1.348
<b>Average</b>	-0.497	-0.488	-0.358	-0.469	1.052	0.556	-0.662				
<b>Standard Deviation</b>	0.275	0.045	0.539	0.195	0.578	0.742	1.509				

### Distances between Final Cluster Centers

Cluster	1	2	3	4	5	6	7	8
1		6.441	5.156	6.225	5.728	6.549	5.905	5.407
2	6.441		2.931	6.993	4.542	6.137	1.994	4.310
3	5.156	2.931		5.982	3.807	5.761	2.473	3.605
4	6.225	6.993	5.982		7.007	3.803	7.088	5.200
5	5.728	4.542	3.807	7.007		7.127	3.179	5.628
6	6.549	6.137	5.761	3.803	7.127		6.617	3.376
7	5.905	1.994	2.473	7.088	3.179	6.617		4.609
8	5.407	4.310	3.605	5.200	5.628	3.376	4.609	

**Table A6. Rural C3 (Five Clusters).**

<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% 65+</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
Public Transit Services (Mineral Wells)	-0.22	-0.47	0.10	-0.07	-0.75	-0.69	-0.35	0	1	1	0.69
Texoma Area Paratransit System (TAPS) (Sherman)	0.31	-0.13	-0.12	0.48	-0.79	-0.55	-0.32	0	1	1	0.77
Community Services, Inc. (Corsicana)	-0.10	-0.58	0.99	-0.32	-0.12	-0.39	0.08	0	1	1	0.77
South East Texas Regional Planning Commission (Beaumont)	-0.13	-0.56	0.81	-0.16	-0.12	-0.56	-0.18	0	0	1	0.79
Senior Center Resources and Public Transit Heart of Texas Council of Governments (Waco)	-0.48	-0.71	1.65	-0.07	-0.30	-0.38	0.22	0	1	1	0.90
South Plains Community Action Association (Levelland)	0.11	-0.14	-0.28	0.97	-0.26	-0.33	0.13	0	0	1	0.91
Kaufman County Senior Citizens Service (Terrell)	-0.04	0.37	-0.78	0.26	-0.47	0.04	-0.13	0	0	1	0.99
Golden Crescent Regional Planning Commission (Victoria)	-0.44	-0.70	1.69	-0.74	-0.65	-0.61	-0.17	0	1	1	1.19
Colorado Valley Transit (Columbus)	0.06	0.06	-0.54	0.81	0.36	-0.05	0.03	0	0	1	1.20
Rolling Plains Management Corp. (Crowell)	-0.22	-0.42	-0.10	0.94	0.47	-0.06	-0.35	0	0	1	1.24
Central Texas Rural Transit District (Coleman)	-0.42	-0.01	-0.84	1.36	-0.51	-0.37	-0.02	0	0	1	1.25
Cleburne (Cleburne)	0.00	0.37	-0.76	1.24	-0.40	-0.06	0.03	0	0	1	1.27
Caprock Community Action Association (Crosbyton)	-0.31	-0.73	3.39	-0.80	-0.82	-0.73	-0.08	0	1	1	1.28
Ark-Tex Council of Governments (Texarkana)	-0.61	-0.11	-0.95	0.36	-0.09	0.25	-0.05	0	0	1	1.32
Bee Community Action Agency (Beeville)	0.45	-0.11	-0.03	0.87	0.22	-0.05	0.32	0	0	1	1.33
Hill Country Transit District (San Saba)	-0.49	-0.32	-0.66	0.60	0.09	0.18	0.40	0	0	1	1.36
Aspermont Small Business Development Center (Aspermont)	0.02	0.21	-0.67	1.36	-0.58	0.31	-0.25	0	0	1	1.45
Concho Valley Council of Governments (San Angelo)	-0.72	-0.04	-1.06	1.73	-0.40	-0.10	-0.12	0	0	1	1.66
	-0.61	1.07	-1.15	0.94	-0.40	-0.06	-0.38	0	0	1	1.66



<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% 65+</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
The Transit System, Inc. (Glen Rose)	-0.45	-0.61	0.26	1.30	-1.55	-0.79	-0.57	0	1	1	1.76
Alamo Area Council of Governments (San Antonio)	1.55	0.43	-0.02	0.57	-0.58	-0.35	-0.20	0	1	1	1.91
Capital Area Rural Transportation System (CARTS) (Austin)	1.77	0.07	0.64	-0.22	-0.86	-0.63	-0.87	0	1	1	2.13
Gulf Coast Center (Galveston)	-0.31	-0.62	0.83	-0.32	1.44	-1.29	0.00	0	1	1	2.19
Collin County Committee on Aging (McKinney)	-0.61	-0.73	1.36	-1.60	-1.20	-1.45	-0.82	0	1	1	2.42
Services Program for Aging Needs (SPAN) (Denton)	-0.57	-0.72	1.41	-1.66	-1.55	-1.03	-1.12	0	1	1	2.56
Fort Bend County	-0.73	-0.72	0.36	-1.96	-1.31	-1.40	-0.83	0	1	1	2.75
<b>Average</b>	-0.12	-0.23	0.21	0.22	-0.43	-0.43	-0.21				
<b>Standard Deviation</b>	0.61	0.46	1.08	0.99	0.65	0.49	0.38				
Community Act. Council of South Texas (Rio Grande City)	-0.43	-0.18	-0.74	-0.77	2.21	2.70	1.67	1	0	2	0.79
El Paso County	-0.77	-0.71	-0.03	-1.93	1.44	2.14	1.03	1	1	2	1.40
Webb County Community Action Agency (Laredo)	-0.86	-0.41	-1.09	-2.24	2.49	3.00	1.03	1	0	2	1.65
Community Council of Southwest Texas (Uvalde)	-0.27	0.55	-0.95	-0.22	1.58	1.54	4.29	1	0	2	2.81
<b>Average</b>	-0.58	-0.19	-0.70	-1.29	1.93	2.34	2.01				
<b>Standard Deviation</b>	0.28	0.54	0.47	0.95	0.50	0.64	1.55				
Panhandle Community Services (Amarillo)	0.46	2.35	-0.99	0.26	-0.75	-0.26	-0.48	0	0	3	1.33
West Texas Opportunities, Inc. (Lamesa)	0.25	4.59	-1.12	-0.01	0.05	0.22	0.22	1	0	3	1.33
<b>Average</b>	0.36	3.47	-1.06	0.13	-0.35	-0.02	-0.13				
<b>Standard Deviation</b>	0.15	1.59	0.10	0.19	0.57	0.34	0.50				

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Lower Rio Grande Valley Development Council (McAllen)	-0.19	-0.49	0.22	-0.32	1.16	1.07	-0.07	1	0	4	0.91
Rural Economic Assistance League, Inc. (REAL) (Alice)	-0.35	-0.51	-0.02	-0.29	0.92	0.72	0.63	1	0	4	1.35
Kleberg County Human Services (Kingsville)	-0.77	-0.53	-0.82	-0.62	1.76	-0.53	-0.38	1	0	4	1.38
Del Rio (Del Rio)	-0.68	-0.42	-0.81	-0.65	0.36	0.96	-2.83	1	0	4	2.33
<b>Average</b>	-0.50	-0.49	-0.36	-0.47	1.05	0.56	-0.66				
<b>Standard Deviation</b>	0.27	0.04	0.54	0.19	0.58	0.74	1.51				
Brazos Transit District (Bryan/College Station)	4.14	1.26	0.25	0.11	0.09	-0.17	0.12	0	1	5	0.96
East Texas Council of Governments (Kilgore)	2.65	0.37	0.62	0.84	-0.19	-0.24	0.35	0	0	5	0.96
<b>Average</b>	3.40	0.81	0.43	0.48	-0.05	-0.21	0.23				
<b>Standard Deviation</b>	1.05	0.63	0.26	0.52	0.20	0.05	0.17				

**Distances between Final Cluster Centers**

Cluster	1	2	3	4	5
1				2.745	3.749
2	5.22			3.513	6.482
3	3.801	5.951		4.57	4.197
4	2.745	3.513	4.57		5.027
5	3.749	6.482	4.197	5.027	

**Table A7. Rural C3 (Six Clusters).**

<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% 65+</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
Lower Rio Grande Valley Development Council (McAllen)	-0.185	-0.490	0.221	-0.317	1.165	1.074	-0.066	1	0	1	0.914
Rural Economic Assistance League, Inc. (REAL) (Alice)	-0.350	-0.508	-0.019	-0.286	0.921	0.720	0.634	1	0	1	1.348
Kleberg County Human Services (Kingsville)	-0.767	-0.528	-0.824	-0.622	1.757	-0.535	-0.383	1	0	1	1.382
Del Rio (Del Rio)	-0.684	-0.425	-0.811	-0.652	0.364	0.963	-2.834	1	0	1	2.333
<b>Average</b>	-0.497	-0.488	-0.358	-0.469	1.052	0.556	-0.662				
<b>Standard Deviation</b>	0.275	0.045	0.539	0.195	0.578	0.742	1.509				
Community Council of Southwest Texas (Uvalde)	-0.270	0.553	-0.949	-0.225	1.583	1.539	4.286	1	0	2	0.000
Panhandle Community Services (Amarillo)	0.461	2.346	-0.986	0.263	-0.751	-0.261	-0.483	0	0	3	1.332
West Texas Opportunities, Inc. (Lamesa)	0.251	4.593	-1.125	-0.011	0.050	0.224	0.217	1	0	3	1.332
<b>Average</b>	0.356	3.469	-1.055	0.126	-0.350	-0.019	-0.133				
<b>Standard Deviation</b>	0.149	1.589	0.098	0.194	0.566	0.343	0.495				
Public Transit Services (Mineral Wells)	-0.218	-0.474	0.096	-0.072	-0.751	-0.686	-0.350	0	1	4	0.682
Community Services, Inc. (Corsicana)	-0.104	-0.577	0.986	-0.317	-0.124	-0.393	0.084	0	1	4	0.760
South East Texas Regional Planning Commission (Beaumont)	-0.131	-0.565	0.805	-0.164	-0.124	-0.565	-0.183	0	0	4	0.764
Senior Center Resources and Public Transit (Sherman)	-0.481	-0.710	1.648	-0.072	-0.298	-0.383	0.217	0	1	4	0.798
Texoma Area Paratransit System (TAPS) (Waco)	0.315	-0.126	-0.118	0.477	-0.786	-0.555	-0.316	0	1	4	0.870
Heart of Texas Council of Governments (Levelland)	0.107	-0.141	-0.281	0.966	-0.263	-0.332	0.134	0	0	4	0.942
South Plains Community Action Association (Terrell)	-0.038	0.369	-0.780	0.263	-0.472	0.042	-0.133	0	0	4	1.055
Kaufman County Senior Citizens Service (Terrell)	-0.441	-0.704	1.689	-0.744	-0.646	-0.605	-0.166	0	1	4	1.143
Colorado Valley Transit (Columbus)	-0.221	-0.419	-0.100	0.935	0.468	-0.059	-0.350	0	0	4	1.213
Rolling Plains Management Corp. (Crowell)	-0.420	-0.009	-0.843	1.362	-0.507	-0.373	-0.016	0	0	4	1.219

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Golden Crescent Regional Planning Commission (Victoria)	0.056	0.056	-0.540	0.813	0.364	-0.049	0.034	0	0	4	1.227
Cleburne (Cleburne)	-0.310	-0.726	3.385	-0.805	-0.820	-0.727	-0.083	0	1	4	1.259
Caprock Community Action Association (Crosbyton)	-0.613	-0.114	-0.949	0.355	-0.089	0.255	-0.050	0	0	4	1.286
Central Texas Rural Transit District (Coleman)	0.002	0.365	-0.758	1.240	-0.402	-0.059	0.034	0	0	4	1.299
Bee Community Action Agency (Beeville)	-0.486	-0.317	-0.665	0.599	0.085	0.184	0.401	0	0	4	1.318
Ark-Tex Council of Governments (Texarkana)	0.449	-0.107	-0.033	0.874	0.225	-0.049	0.317	0	0	4	1.374
Hill Country Transit District (San Saba)	0.024	0.207	-0.666	1.362	-0.577	0.305	-0.250	0	0	4	1.480
Aspermont Small Business Development Center (Aspermont)	-0.716	-0.038	-1.062	1.729	-0.402	-0.100	-0.116	0	0	4	1.617
Concho Valley Council of Governments (San Angelo)	-0.609	1.065	-1.145	0.935	-0.402	-0.059	-0.383	0	0	4	1.666
The Transit System, Inc. (Glen Rose)	-0.453	-0.606	0.263	1.301	-1.552	-0.788	-0.566	0	1	4	1.740
Gulf Coast Center (Galveston)	-0.313	-0.621	0.828	-0.317	1.444	-1.293	0.000	0	1	4	2.152
Collin County Committee on Aging (McKinney)	-0.609	-0.729	1.358	-1.599	-1.203	-1.445	-0.817	0	1	4	2.401
Services Program for Aging Needs (SPAN) (Denton)	-0.571	-0.722	1.406	-1.660	-1.552	-1.030	-1.117	0	1	4	2.548
Fort Bend County	-0.729	-0.722	0.358	-1.965	-1.308	-1.405	-0.833	0	1	4	2.737
<b>Average</b>	-0.271	-0.265	0.203	0.229	-0.404	-0.424	-0.188				
<b>Standard Deviation</b>	0.323	0.458	1.121	1.025	0.670	0.505	0.366				
East Texas Council of Governments (Kilgore)	2.654	0.366	0.618	0.843	-0.193	-0.241	0.351	0	0	5	0.884
Alamo Area Council of Governments (San Antonio)	1.547	0.429	-0.023	0.569	-0.577	-0.352	-0.200	0	1	5	1.166
Capital Area Rural Transportation System (CARTS) (Austin)	1.771	0.069	0.639	-0.225	-0.855	-0.626	-0.867	0	1	5	1.387
Brazos Transit District (Bryan/College Station)	4.144	1.261	0.246	0.111	0.085	-0.170	0.117	0	1	5	1.892
<b>Average</b>	2.529	0.531	0.370	0.325	-0.385	-0.347	-0.150				
<b>Standard Deviation</b>	1.178	0.511	0.318	0.475	0.415	0.200	0.528				

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Webb County Community Action Agency (Laredo)	-0.859	-0.407	-1.094	-2.240	2.489	2.996	1.034	1	0	6	0.878
El Paso County	-0.772	-0.714	-0.032	-1.934	1.444	2.136	1.034	1	1	6	0.896
Community Act. Council of South Texas (Rio Grande City)	-0.432	-0.182	-0.741	-0.774	2.210	2.703	1.668	1	0	6	1.053
<b>Average</b>	-0.688	-0.434	-0.622	-1.649	2.047	2.612	1.245				
<b>Standard Deviation</b>	0.226	0.267	0.541	0.773	0.541	0.437	0.366				

**Distances between Final Cluster Centers**

Cluster	1	2	3	4	5	6
1		5.200	4.570	2.735	4.181	3.309
2	5.200		6.103	5.804	6.336	3.743
3	4.570	6.103		3.864	3.727	6.189
4	2.735	5.804	3.864		2.914	5.322
5	4.181	6.336	3.727	2.914		6.245
6	3.309	3.743	6.189	5.322	6.245	

**Table A8. Rural C3 (Seven Clusters).**

<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% 65+</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
Community Council of Southwest Texas (Uvalde)	-0.270	0.553	-0.949	-0.225	1.583	1.539	4.286	1	0	1	0.000
Collin County Committee on Aging (McKinney)	-0.609	-0.729	1.358	-1.599	-1.203	-1.445	-0.817	0	1	2	0.532
Services Program for Aging Needs (SPAN) (Denton)	-0.571	-0.722	1.406	-1.660	-1.552	-1.030	-1.117	0	1	2	0.766
Fort Bend County	-0.729	-0.722	0.358	-1.965	-1.308	-1.405	-0.833	0	1	2	0.874
Cleburne (Cleburne)	-0.310	-0.726	3.385	-0.805	-0.820	-0.727	-0.083	0	1	2	0.898
Kaufman County Senior Citizens Service (Terrell)	-0.441	-0.704	1.689	-0.744	-0.646	-0.605	-0.166	0	1	2	0.993
<b>Average</b>	-0.532	-0.721	1.639	-1.354	-1.106	-1.042	-0.603				
<b>Standard Deviation</b>	0.161	0.010	1.099	0.548	0.368	0.382	0.454				
Panhandle Community Services (Amarillo)	0.461	2.346	-0.986	0.263	-0.751	-0.261	-0.483	0	0	3	1.332
West Texas Opportunities, Inc. (Lamesa)	0.251	4.593	-1.125	-0.011	0.050	0.224	0.217	1	0	3	1.332
<b>Average</b>	0.356	3.469	-1.055	0.126	-0.350	-0.019	-0.133				
<b>Standard Deviation</b>	0.149	1.589	0.098	0.194	0.566	0.343	0.495				
Lower Rio Grande Valley Development Council (McAllen)	-0.185	-0.490	0.221	-0.317	1.165	1.074	-0.066	1	0	4	0.914
Rural Economic Assistance League, Inc. (REAL) (Alice)	-0.350	-0.508	-0.019	-0.286	0.921	0.720	0.634	1	0	4	1.348
Kleberg County Human Services (Kingsville)	-0.767	-0.528	-0.824	-0.622	1.757	-0.535	-0.383	1	0	4	1.382
Del Rio (Del Rio)	-0.684	-0.425	-0.811	-0.652	0.364	0.963	-2.834	1	0	4	2.333
<b>Average</b>	-0.497	-0.488	-0.358	-0.469	1.052	0.556	-0.662				
<b>Standard Deviation</b>	0.275	0.045	0.539	0.195	0.578	0.742	1.509				

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
East Texas Council of Governments (Kilgore)	2.654	0.366	0.618	0.843	-0.193	-0.241	0.351	0	0	5	0.884
Alamo Area Council of Governments (San Antonio)	1.547	0.429	-0.023	0.569	-0.577	-0.352	-0.200	0	1	5	1.166
Capital Area Rural Transportation System (CARTS) (Austin)	1.771	0.069	0.639	-0.225	-0.855	-0.626	-0.867	0	1	5	1.387
Brazos Transit District (Bryan/College Station)	4.144	1.261	0.246	0.111	0.085	-0.170	0.117	0	1	5	1.892
<b>Average</b>	2.529	0.531	0.370	0.325	-0.385	-0.347	-0.150				
<b>Standard Deviation</b>	1.178	0.511	0.318	0.475	0.415	0.200	0.528				
Webb County Community Action Agency (Laredo)	-0.859	-0.407	-1.094	-2.240	2.489	2.996	1.034	1	0	6	0.878
El Paso County	-0.772	-0.714	-0.032	-1.934	1.444	2.136	1.034	1	1	6	0.896
Community Act. Council of South Texas (Rio Grande City)	-0.432	-0.182	-0.741	-0.774	2.210	2.703	1.668	1	0	6	1.053
<b>Average</b>	-0.688	-0.434	-0.622	-1.649	2.047	2.612	1.245				
<b>Standard Deviation</b>	0.226	0.267	0.541	0.773	0.541	0.437	0.366				
Heart of Texas Council of Governments (Waco)	0.107	-0.141	-0.281	0.966	-0.263	-0.332	0.134	0	0	7	0.564
Golden Crescent Regional Planning Commission (Victoria)	0.056	0.056	-0.540	0.813	0.364	-0.049	0.034	0	0	7	0.828
Central Texas Rural Transit District (Coleman)	0.002	0.365	-0.758	1.240	-0.402	-0.059	0.034	0	0	7	0.871
Colorado Valley Transit (Columbus)	-0.221	-0.419	-0.100	0.935	0.468	-0.059	-0.350	0	0	7	0.874
Rolling Plains Management Corp. (Crowell)	-0.420	-0.009	-0.843	1.362	-0.507	-0.373	-0.016	0	0	7	0.875
Texoma Area Paratransit System (TAPS) (Sherman)	0.315	-0.126	-0.118	0.477	-0.786	-0.555	-0.316	0	1	7	0.968
South Plains Community Action Association (Levelland)	-0.038	0.369	-0.780	0.263	-0.472	0.042	-0.133	0	0	7	0.996
Ark-Tex Council of Governments (Texarkana)	0.449	-0.107	-0.033	0.874	0.225	-0.049	0.317	0	0	7	1.018
Senior Center Resources and Public Transit	-0.481	-0.710	1.648	-0.072	-0.298	-0.383	0.217	0	1	7	1.081

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Community Services, Inc. (Corsicana)	-0.104	-0.577	0.986	-0.317	-0.124	-0.393	0.084	0	1	7	1.084
Bee Community Action Agency (Beeville)	-0.486	-0.317	-0.665	0.599	0.085	0.184	0.401	0	0	7	1.089
South East Texas Regional Planning Commission (Beaumont)	-0.131	-0.565	0.805	-0.164	-0.124	-0.565	-0.183	0	0	7	1.094
Hill Country Transit District (San Saba)	0.024	0.207	-0.666	1.362	-0.577	0.305	-0.250	0	0	7	1.099
Public Transit Services (Mineral Wells)	-0.218	-0.474	0.096	-0.072	-0.751	-0.686	-0.350	0	1	7	1.137
Caprock Community Action Association (Crosbyton)	-0.613	-0.114	-0.949	0.355	-0.089	0.255	-0.050	0	0	7	1.185
Aspermont Small Business Development Center (Aspermont)	-0.716	-0.038	-1.062	1.729	-0.402	-0.100	-0.116	0	0	7	1.229
Concho Valley Council of Governments (San Angelo)	-0.609	1.065	-1.145	0.935	-0.402	-0.059	-0.383	0	0	7	1.442
The Transit System, Inc. (Glen Rose)	-0.453	-0.606	0.263	1.301	-1.552	-0.788	-0.566	0	1	7	1.775
Gulf Coast Center (Galveston)	-0.313	-0.621	0.828	-0.317	1.444	-1.293	0.000	0	1	7	2.236
<b>Average</b>	-0.203	-0.145	-0.174	0.646	-0.219	-0.261	-0.079				
<b>Standard Deviation</b>	0.322	0.442	0.783	0.630	0.608	0.399	0.254				

### Distances between Final Cluster Centers

Cluster	1	2	3	4	5	6	7
1		6.800	6.103	5.200	6.336	3.743	5.627
2	6.800		4.789	3.471	3.871	5.899	2.476
3	6.103	4.789		4.570	3.727	6.189	3.756
4	5.200	3.471	4.570		4.181	3.309	2.749
5	6.336	3.871	3.727	4.181		6.245	2.840
6	3.743	5.899	6.189	3.309	6.245		5.281
7	5.627	2.476	3.756	2.749	2.840	5.281	



**Table A9. Rural C3 (Eight Clusters).**

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Panhandle Community Services (Amarillo)	0.461	2.346	-0.986	0.263	-0.751	-0.261	-0.483	0	0	1	1.332
West Texas Opportunities, Inc. (Lamesa)	0.251	4.593	-1.125	-0.011	0.050	0.224	0.217	1	0	1	1.332
<b>Average</b>	0.356	3.469	-1.055	0.126	-0.350	-0.019	-0.133				
<b>Standard Deviation</b>	0.149	1.589	0.098	0.194	0.566	0.343	0.495				
Bee Community Action Agency (Beeville)	-0.486	-0.317	-0.665	0.599	0.085	0.184	0.401	0	0	2	0.883
Community Services, Inc. (Corsicana)	-0.104	-0.577	0.986	-0.317	-0.124	-0.393	0.084	0	1	2	0.902
Golden Crescent Regional Planning Commission (Victoria)	0.056	0.056	-0.540	0.813	0.364	-0.049	0.034	0	0	2	0.975
Caprock Community Action Association (Crosbyton)	-0.613	-0.114	-0.949	0.355	-0.089	0.255	-0.050	0	0	2	0.982
Colorado Valley Transit (Columbus)	-0.221	-0.419	-0.100	0.935	0.468	-0.059	-0.350	0	0	2	1.005
Senior Center Resources and Public Transit	-0.481	-0.710	1.648	-0.072	-0.298	-0.383	0.217	0	1	2	1.207
South East Texas Regional Planning Commission (Beaumont)	-0.131	-0.565	0.805	-0.164	-0.124	-0.565	-0.183	0	0	2	1.245
Gulf Coast Center (Galveston)	-0.313	-0.621	0.828	-0.317	1.444	-1.293	0.000	0	1	2	1.606
Rural Economic Assistance League, Inc. (REAL) (Alice)	-0.350	-0.508	-0.019	-0.286	0.921	0.720	0.634	1	0	2	1.750
Kleberg County Human Services (Kingsville)	-0.767	-0.528	-0.824	-0.622	1.757	-0.535	-0.383	1	0	2	2.028
<b>Average</b>	-0.341	-0.430	0.117	0.093	0.441	-0.212	0.040				
<b>Standard Deviation</b>	0.251	0.240	0.895	0.541	0.712	0.553	0.317				
Del Rio (Del Rio)	-0.684	-0.425	-0.811	-0.652	0.364	0.963	-2.834	1	0	3	1.475
Lower Rio Grande Valley Development Council (McAllen)	-0.185	-0.490	0.221	-0.317	1.165	1.074	-0.066	1	0	3	1.475
<b>Average</b>	-0.435	-0.457	-0.295	-0.484	0.764	1.018	-1.450				
<b>Standard Deviation</b>	0.353	0.046	0.730	0.237	0.566	0.079	1.957				

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Community Council of Southwest Texas (Uvalde)	-0.270	0.553	-0.949	-0.225	1.583	1.539	4.286	1	0	4	0.000
Brazos Transit District (Bryan/College Station)	4.144	1.261	0.246	0.111	0.085	-0.170	0.117	0	1	5	0.964
East Texas Council of Governments (Kilgore)	2.654	0.366	0.618	0.843	-0.193	-0.241	0.351	0	0	5	0.964
<b>Average</b>	3.399	0.814	0.432	0.477	-0.054	-0.206	0.234				
<b>Standard Deviation</b>	1.054	0.633	0.263	0.518	0.197	0.050	0.165				
Webb County Community Action Agency (Laredo)	-0.859	-0.407	-1.094	-2.240	2.489	2.996	1.034	1	0	6	0.878
El Paso County	-0.772	-0.714	-0.032	-1.934	1.444	2.136	1.034	1	1	6	0.896
Community Act. Council of South Texas (Rio Grande City)	-0.432	-0.182	-0.741	-0.774	2.210	2.703	1.668	1	0	6	1.053
<b>Average</b>	-0.688	-0.434	-0.622	-1.649	2.047	2.612	1.245				
<b>Standard Deviation</b>	0.226	0.267	0.541	0.773	0.541	0.437	0.366				
Collin County Committee on Aging (McKinney)	-0.609	-0.729	1.358	-1.599	-1.203	-1.445	-0.817	0	1	7	0.532
Services Program for Aging Needs (SPAN) (Denton)	-0.571	-0.722	1.406	-1.660	-1.552	-1.030	-1.117	0	1	7	0.766
Fort Bend County	-0.729	-0.722	0.358	-1.965	-1.308	-1.405	-0.833	0	1	7	0.874
Cleburne (Cleburne)	-0.310	-0.726	3.385	-0.805	-0.820	-0.727	-0.083	0	1	7	0.898
Kaufman County Senior Citizens Service (Terrell)	-0.441	-0.704	1.689	-0.744	-0.646	-0.605	-0.166	0	1	7	0.993
<b>Average</b>	-0.532	-0.721	1.639	-1.354	-1.106	-1.042	-0.603				
<b>Standard Deviation</b>	0.161	0.010	1.099	0.548	0.368	0.382	0.454				
Heart of Texas Council of Governments (Waco)	0.107	-0.141	-0.281	0.966	-0.263	-0.332	0.134	0	0	8	0.566
Central Texas Rural Transit District (Coleman)	0.002	0.365	-0.758	1.240	-0.402	-0.059	0.034	0	0	8	0.639
Texoma Area Paratransit System (TAPS) (Sherman)	0.315	-0.126	-0.118	0.477	-0.786	-0.555	-0.316	0	1	8	0.685

Rural Agency	Pop.	Land Area	% Density 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Hill Country Transit District (San Saba)	0.024	0.207	-0.666	1.362	-0.577	0.305	-0.250	0	0	0.825
Rolling Plains Management Corp. (Crowell)	-0.420	-0.009	-0.843	1.362	-0.507	-0.373	-0.016	0	0	0.842
South Plains Community Action Association (Levelland)	-0.038	0.369	-0.780	0.263	-0.472	0.042	-0.133	0	0	1.008
Ark-Tex Council of Governments (Texarkana)	0.449	-0.107	-0.033	0.874	0.225	-0.049	0.317	0	0	1.097
Public Transit Services (Mineral Wells)	-0.218	-0.474	0.096	-0.072	-0.751	-0.686	-0.350	0	1	1.249
Aspermont Small Business Development Center (Aspermont)	-0.716	-0.038	-1.062	1.729	-0.402	-0.100	-0.116	0	0	1.274
Concho Valley Council of Governments (San Angelo)	-0.609	1.065	-1.145	0.935	-0.402	-0.059	-0.383	0	0	1.376
The Transit System, Inc. (Glen Rose)	-0.453	-0.606	0.263	1.301	-1.552	-0.788	-0.566	0	1	1.586
Alamo Area Council of Governments (San Antonio)	1.547	0.429	-0.023	0.569	-0.577	-0.352	-0.200	0	1	1.591
Capital Area Rural Transportation System (CARTS) (Austin)	1.771	0.069	0.639	-0.225	-0.855	-0.626	-0.867	0	1	2.112
<b>Average</b>	0.136	0.077	-0.362	0.829	-0.563	-0.279	-0.209			
<b>Standard Deviation</b>	0.759	0.428	0.551	0.594	0.403	0.325	0.307			

### Distances between Final Cluster Centers

Cluster	1	2	3	4	5	6	7	8
1		4.051	4.753	6.103	4.197	6.189	4.789	3.552
2	4.051		2.600	5.148	4.077	4.477	2.464	1.540
3	4.753	2.600		5.914	5.300	3.638	3.763	3.441
4	6.103	5.148	5.914		6.533	3.743	6.800	5.893
5	4.197	4.077	5.300	6.533		6.730	4.870	3.444
6	6.189	4.477	3.638	3.743	6.730		5.899	5.641
7	4.789	2.464	3.763	6.800	4.870	5.899		2.625
8	3.552	1.540	3.441	5.893	3.444	5.641	2.625	

**Table A10. Rural Five Clusters without the Variables of Percent of HHs without Autos and Percent below Poverty Level.**

<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% 65+</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
Community Act. Council of South Texas (Rio Grande City)	-0.432	-0.182	-0.741	-0.774	2.210	2.703	1.668	1	0	1	0.829
Rural Economic Assistance League, Inc. (REAL) (Alice)	-0.350	-0.508	-0.019	-0.286	0.921	0.720	0.634	1	0	1	1.168
Lower Rio Grande Valley Development Council (McAllen)	-0.185	-0.490	0.221	-0.317	1.165	1.074	-0.066	1	0	1	1.533
Webb County Community Action Agency (Laredo)	-0.859	-0.407	-1.094	-2.240	2.489	2.996	1.034	1	0	1	1.637
Kleberg County Human Services (Kingsville)	-0.767	-0.528	-0.824	-0.622	1.757	-0.535	-0.383	1	0	1	1.644
El Paso County	-0.772	-0.714	-0.032	-1.934	1.444	2.136	1.034	1	1	1	2.077
Community Council of Southwest Texas (Uvalde)	-0.270	0.553	-0.949	-0.225	1.583	1.539	4.286	1	0	1	3.330
<b>Average</b>	-0.519	-0.325	-0.491	-0.914	1.653	1.519	1.172				
<b>Standard Deviation</b>	0.274	0.419	0.530	0.830	0.554	1.226	1.539				
Panhandle Community Services (Amarillo)	0.461	2.346	-0.986	0.263	-0.751	-0.261	-0.483	0	0	2	1.709
West Texas Opportunities, Inc. (Lamesa)	0.251	4.593	-1.125	-0.011	0.050	0.224	0.217	1	0	2	1.709
<b>Average</b>	0.356	3.469	-1.055	0.126	-0.350	-0.019	-0.133				
<b>Standard Deviation</b>	0.149	1.589	0.098	0.194	0.566	0.343	0.495				
Public Transit Services (Mineral Wells)	-0.218	-0.474	0.096	-0.072	-0.751	-0.686	-0.350	0	1	3	1.140
South East Texas Regional Planning Commission (Beaumont)	-0.131	-0.565	0.805	-0.164	-0.124	-0.565	-0.183	0	0	3	1.174
South Plains Community Action Association (Levelland)	-0.038	0.369	-0.780	0.263	-0.472	0.042	-0.133	0	0	3	1.179
Texoma Area Paratransit System (TAPS) (Sherman)	0.315	-0.126	-0.118	0.477	-0.786	-0.555	-0.316	0	1	3	1.192
Caprock Community Action Association (Crosbyton)	-0.613	-0.114	-0.949	0.355	-0.089	0.255	-0.050	0	0	3	1.196
Community Services, Inc. (Corsicana)	-0.104	-0.577	0.986	-0.317	-0.124	-0.393	0.084	0	1	3	1.272
Senior Center Resources and Public Transit	-0.481	-0.710	1.648	-0.072	-0.298	-0.383	0.217	0	1	3	1.294

<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% 65+</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
Heart of Texas Council of Governments (Waco)	0.107	-0.141	-0.281	0.966	-0.263	-0.332	0.134	0	0	3	1.333
Bee Community Action Agency (Beeville)	-0.486	-0.317	-0.665	0.599	0.085	0.184	0.401	0	0	3	1.393
Golden Crescent Regional Planning Commission (Victoria)	0.056	0.056	-0.540	0.813	0.364	-0.049	0.034	0	0	3	1.471
Kaufman County Senior Citizens Service (Terrell)	-0.441	-0.704	1.689	-0.744	-0.646	-0.605	-0.166	0	1	3	1.529
Colorado Valley Transit (Columbus)	-0.221	-0.419	-0.100	0.935	0.468	-0.059	-0.350	0	0	3	1.547
Central Texas Rural Transit District (Coleman)	0.002	0.365	-0.758	1.240	-0.402	-0.059	0.034	0	0	3	1.574
Ark-Tex Council of Governments (Texarkana)	0.449	-0.107	-0.033	0.874	0.225	-0.049	0.317	0	0	3	1.578
Rolling Plains Management Corp. (Crowell)	-0.420	-0.009	-0.843	1.362	-0.507	-0.373	-0.016	0	0	3	1.579
Cleburne (Cleburne)	-0.310	-0.726	3.385	-0.805	-0.820	-0.727	-0.083	0	1	3	1.593
Hill Country Transit District (San Saba)	0.024	0.207	-0.666	1.362	-0.577	0.305	-0.250	0	0	3	1.596
Concho Valley Council of Governments (San Angelo)	-0.609	1.065	-1.145	0.935	-0.402	-0.059	-0.383	0	0	3	1.859
Aspermont Small Business Development Center (Aspermont)	-0.716	-0.038	-1.062	1.729	-0.402	-0.100	-0.116	0	0	3	1.918
The Transit System, Inc. (Glen Rose)	-0.453	-0.606	0.263	1.301	-1.552	-0.788	-0.566	0	1	3	1.954
Alamo Area Council of Governments (San Antonio)	1.547	0.429	-0.023	0.569	-0.577	-0.352	-0.200	0	1	3	2.092
Gulf Coast Center (Galveston)	-0.313	-0.621	0.828	-0.317	1.444	-1.293	0.000	0	1	3	2.248
Capital Area Rural Transportation System (CARTS) (Austin)	1.771	0.069	0.639	-0.225	-0.855	-0.626	-0.867	0	1	3	2.346
Collin County Committee on Aging (McKinney)	-0.609	-0.729	1.358	-1.599	-1.203	-1.445	-0.817	0	1	3	2.408

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Services Program for Aging Needs (SPAN) (Denton)	-0.571	-0.722	1.406	-1.660	-1.552	-1.030	-1.117	0	1	3	2.664
Fort Bend County	-0.729	-0.722	0.358	-1.965	-1.308	-1.405	-0.833	0	1	3	2.754
<b>Average</b>	-0.123	-0.226	0.211	0.225	-0.428	-0.429	-0.214				
<b>Standard Deviation</b>	0.610	0.464	1.079	0.990	0.649	0.486	0.375				
Del Rio (Del Rio)	-0.684	-0.425	-0.811	-0.652	0.364	0.963	-2.834	1	0	4	0.000
Brazos Transit District (Bryan/College Station)	4.144	1.261	0.246	0.111	0.085	-0.170	0.117	0	1	5	1.394
East Texas Council of Governments (Kilgore)	2.654	0.366	0.618	0.843	-0.193	-0.241	0.351	0	0	5	1.394
<b>Average</b>	2.038	0.401	0.017	0.101	0.085	0.184	-0.789				
<b>Standard Deviation</b>	2.472	0.844	0.741	0.748	0.279	0.676	1.775				

**Distances between Final Cluster Centers**

Cluster	1	2	3	4	5
1		4.836	3.691	4.231	5.319
2	4.836		4.034	5.099	4.362
3	3.691	4.034		3.875	3.727
4	4.231	5.099	3.875		5.956
5	5.319	4.362	3.727	5.956	

**Table A11. Rural Six Clusters without the Variables of Percent of HHs without Autos and Percent below Poverty Level.**

<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% 65+</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
South East Texas Regional Planning Commission (Beaumont)	-0.131	-0.565	0.805	-0.164	-0.124	-0.565	-0.183	0	0	0	1.158
Colorado Valley Transit (Columbus)	-0.221	-0.419	-0.100	0.935	0.468	-0.059	-0.350	0	0	0	1.197
Public Transit Services (Mineral Wells)	-0.218	-0.474	0.096	-0.072	-0.751	-0.686	-0.350	0	1	1	1.213
Golden Crescent Regional Planning Commission (Victoria)	0.056	0.056	-0.540	0.813	0.364	-0.049	0.034	0	0	0	1.278
Gulf Coast Center (Galveston)	-0.313	-0.621	0.828	-0.317	1.444	-1.293	0.000	0	1	1	1.288
Community Services, Inc. (Corsicana)	-0.104	-0.577	0.986	-0.317	-0.124	-0.393	0.084	0	1	1	1.301
Heart of Texas Council of Governments (Waco)	0.107	-0.141	-0.281	0.966	-0.263	-0.332	0.134	0	0	0	1.310
South Plains Community Action Association (Levelland)	-0.038	0.369	-0.780	0.263	-0.472	0.042	-0.133	0	0	0	1.322
Texoma Area Paratransit System (TAPS) (Sherman)	0.315	-0.126	-0.118	0.477	-0.786	-0.555	-0.316	0	1	1	1.338
Senior Center Resources and Public Transit	-0.481	-0.710	1.648	-0.072	-0.298	-0.383	0.217	0	1	1	1.349
Caprock Community Action Association (Crosbyton)	-0.613	-0.114	-0.949	0.355	-0.089	0.255	-0.050	0	0	0	1.396
Bee Community Action Agency (Beeville)	-0.486	-0.317	-0.665	0.599	0.085	0.184	0.401	0	0	0	1.408
Ark-Tex Council of Governments (Texarkana)	0.449	-0.107	-0.033	0.874	0.225	-0.049	0.317	0	0	0	1.486
Rolling Plains Management Corp. (Crowell)	-0.420	-0.009	-0.843	1.362	-0.507	-0.373	-0.016	0	0	0	1.526
Central Texas Rural Transit District (Coleman)	0.002	0.365	-0.758	1.240	-0.402	-0.059	0.034	0	0	0	1.552
Kaufman County Senior Citizens Service (Terrell)	-0.441	-0.704	1.689	-0.744	-0.646	-0.605	-0.166	0	1	1	1.553
Hill Country Transit District (San Saba)	0.024	0.207	-0.666	1.362	-0.577	0.305	-0.250	0	0	0	1.577
Cleburne (Cleburne)	-0.310	-0.726	3.385	-0.805	-0.820	-0.727	-0.083	0	1	1	1.586
The Transit System, Inc. (Glen Rose)	-0.453	-0.606	0.263	1.301	-1.552	-0.788	-0.566	0	1	1	1.665
Aspermont Small Business Development Center (Aspermont)	-0.716	-0.038	-1.062	1.729	-0.402	-0.100	-0.116	0	0	0	1.834

Rural Agency	Pop.	Land Area	% Density 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Concho Valley Council of Governments (San Angelo)	-0.609	1.065	-1.145	0.935	-0.402	-0.059	-0.383	0	0	1.871
Collin County Committee on Aging (McKinney)	-0.609	-0.729	1.358	-1.599	-1.203	-1.445	-0.817	0	1	2.297
Services Program for Aging Needs (SPAN) (Denton)	-0.571	-0.722	1.406	-1.660	-1.552	-1.030	-1.117	0	1	2.450
Fort Bend County	-0.729	-0.722	0.358	-1.965	-1.308	-1.405	-0.833	0	1	2.628
<b>Average</b>	-0.268	-0.031	-0.152	-0.087	-0.414	-0.306	-0.094			
<b>Standard Deviation</b>	0.392	0.879	0.906	0.914	0.587	0.452	0.273			
Community Council of Southwest Texas (Uvalde)	-0.270	0.553	-0.949	-0.225	1.583	1.539	4.286	1	0	0.000
Panhandle Community Services (Amarillo)	0.461	2.346	-0.986	0.263	-0.751	-0.261	-0.483	0	0	1.703
West Texas Opportunities, Inc. (Lamesa)	0.251	4.593	-1.125	-0.011	0.050	0.224	0.217	1	0	1.703
<b>Average</b>	0.356	3.469	-1.055	0.126	-0.350	-0.019	-0.133			
<b>Standard Deviation</b>	0.149	1.589	0.098	0.194	0.566	0.343	0.495			
Community Act. Council of South Texas (Rio Grande City)	-0.432	-0.182	-0.741	-0.774	2.210	2.703	1.668	1	0	1.012
Webb County Community Action Agency (Laredo)	-0.859	-0.407	-1.094	-2.240	2.489	2.996	1.034	1	0	1.137
Rural Economic Assistance League, Inc. (REAL) (Alice)	-0.350	-0.508	-0.019	-0.286	0.921	0.720	0.634	1	0	1.463
El Paso County	-0.772	-0.714	-0.032	-1.934	1.444	2.136	1.034	1	1	1.682
<b>Average</b>	-0.603	-0.453	-0.472	-1.309	1.766	2.139	1.093			
<b>Standard Deviation</b>	0.250	0.221	0.535	0.929	0.716	1.011	0.427			



Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Alamo Area Council of Governments (San Antonio)	1,547	0.429	-0.023	0.569	-0.577	-0.352	-0.200	0	1	5	1,256
Capital Area Rural Transportation System (CARTS) (Austin)	1,771	0.069	0.639	-0.225	-0.855	-0.626	-0.867	0	1	5	1,371
East Texas Council of Governments (Kilgore)	2,654	0.366	0.618	0.843	-0.193	-0.241	0.351	0	0	5	1,739
Brazos Transit District (Bryan/College Station)	4,144	1.261	0.246	0.111	0.085	-0.170	0.117	0	1	5	1,893
<b>Average</b>	2,529	0.531	0.370	0.325	-0.385	-0.347	-0.150				
<b>Standard Deviation</b>	1,178	0.511	0.318	0.475	0.415	0.200	0.528				
Kleberg County Human Services (Kingsville)	-0.767	-0.528	-0.824	-0.622	1.757	-0.535	-0.383	1	0	6	0.804
Lower Rio Grande Valley Development Council (McAllen)	-0.185	-0.490	0.221	-0.317	1.165	1.074	-0.066	1	0	6	1.131
Del Rio (Del Rio)	-0.684	-0.425	-0.811	-0.652	0.364	0.963	-2.834	1	0	6	1.752
<b>Average</b>	-0.545	-0.481	-0.471	-0.530	1.095	0.501	-1.094				
<b>Standard Deviation</b>	0.315	0.052	0.600	0.186	0.699	0.898	1.515				

### Distances between Final Cluster Centers

Cluster	1	2	3	4	5	6
1		5.668	4.119	3.967	2.972	3.406
2	5.668		5.695	3.577	6.356	5.501
3	4.119	5.695		4.975	4.173	4.566
4	3.967	3.577	4.975		5.227	2.428
5	2.972	6.356	4.173	5.227		4.851
6	3.406	5.501	4.566	2.428	4.851	

**Table A12. Rural Seven Clusters without the Variables of Percent of HHs without Autos and Percent below Poverty Level.**

<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% 65+</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
Community Council of Southwest Texas (Uvalde)	-0.270	0.553	-0.949	-0.225	1.583	1.539	4.286	1	0	1	0.00
Kleberg County Human Services (Kingsville)	-0.767	-0.528	-0.824	-0.622	1.757	-0.535	-0.383	1	0	2	0.80
Lower Rio Grande Valley Development Council (McAllen)	-0.185	-0.490	0.221	-0.317	1.165	1.074	-0.066	1	0	2	1.13
Del Rio (Del Rio)	-0.684	-0.425	-0.811	-0.652	0.364	0.963	-2.834	1	0	2	1.75
<b>Average</b>	-0.545	-0.481	-0.471	-0.530	1.095	0.501	-1.094				
<b>Standard Deviation</b>	0.315	0.052	0.600	0.186	0.699	0.898	1.515				
Golden Crescent Regional Planning Commission (Victoria)	0.056	0.056	-0.540	0.813	0.364	-0.049	0.034	1	0	3	0.38
Central Texas Rural Transit District (Coleman)	0.002	0.365	-0.758	1.240	-0.402	-0.059	0.034	1	0	3	0.55
Heart of Texas Council of Governments (Waco)	0.107	-0.141	-0.281	0.966	-0.263	-0.332	0.134	1	0	3	0.63
Hill Country Transit District (San Saba)	0.024	0.207	-0.666	1.362	-0.577	0.305	-0.250	1	0	3	0.68
Colorado Valley Transit (Columbus)	-0.221	-0.419	-0.100	0.935	0.468	-0.059	-0.350	1	0	3	0.68
Rolling Plains Management Corp. (Crowell)	-0.420	-0.009	-0.843	1.362	-0.507	-0.373	-0.016	1	0	3	0.77
South Plains Community Action Association (Levelland)	-0.038	0.369	-0.780	0.263	-0.472	0.042	-0.133	1	0	3	0.78
Ark-Tex Council of Governments (Texarkana)	0.449	-0.107	-0.033	0.874	0.225	-0.049	0.317	1	0	3	0.94
Bee Community Action Agency (Beeville)	-0.486	-0.317	-0.665	0.599	0.085	0.184	0.401	1	0	3	1.01
Caprock Community Action Association (Crosbyton)	-0.613	-0.114	-0.949	0.355	-0.089	0.255	-0.050	1	0	3	1.08
Concho Valley Council of Governments (San Angelo)	-0.609	1.065	-1.145	0.935	-0.402	-0.059	-0.383	1	0	3	1.09
Aspermont Small Business Development Center (Aspermont)	-0.716	-0.038	-1.062	1.729	-0.402	-0.100	-0.116	1	0	3	1.10

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
South East Texas Regional Planning Commission (Beaumont)	-0.131	-0.565	0.805	-0.164	-0.124	-0.565	-0.183	1	0	3	1.40
Panhandle Community Services (Amarillo)	0.461	2.346	-0.986	0.263	-0.751	-0.261	-0.483	1	0	3	2.35
<b>Average</b>	-0.152	0.193	-0.572	0.824	-0.203	-0.080	-0.075				
<b>Standard Deviation</b>	0.377	0.738	0.522	0.518	0.370	0.243	0.254				
Community Act. Council of South Texas (Rio Grande City)	-0.432	-0.182	-0.741	-0.774	2.210	2.703	1.668	1	0	4	1.01
Webb County Community Action Agency (Laredo)	-0.859	-0.407	-1.094	-2.240	2.489	2.996	1.034	1	0	4	1.14
Rural Economic Assistance League, Inc. (REAL) (Alice)	-0.350	-0.508	-0.019	-0.286	0.921	0.720	0.634	1	0	4	1.46
El Paso County	-0.772	-0.714	-0.032	-1.934	1.444	2.136	1.034	1	1	4	1.68
<b>Average</b>	-0.603	-0.453	-0.472	-1.309	1.766	2.139	1.093				
<b>Standard Deviation</b>	0.250	0.221	0.535	0.929	0.716	1.011	0.427				
Alamo Area Council of Governments (San Antonio)	1.547	0.429	-0.023	0.569	-0.577	-0.352	-0.200	0	1	5	1.26
Capital Area Rural Transportation System (CARTS) (Austin)	1.771	0.069	0.639	-0.225	-0.855	-0.626	-0.867	0	1	5	1.37
East Texas Council of Governments (Kilgore)	2.654	0.366	0.618	0.843	-0.193	-0.241	0.351	0	1	5	1.74
Brazos Transit District Bryan/College Station)	4.144	1.261	0.246	0.111	0.085	-0.170	0.117	0	1	5	1.89
<b>Average</b>	2.529	0.531	0.370	0.325	-0.385	-0.347	-0.150				
<b>Standard Deviation</b>	1.178	0.511	0.318	0.475	0.415	0.200	0.528				
Kaufman County Senior Citizens Service (Terrell)	-0.441	-0.704	1.689	-0.744	-0.646	-0.605	-0.166	0	1	6	0.32
Cleburne (Cleburne)	-0.310	-0.726	3.385	-0.805	-0.820	-0.727	-0.083	0	1	6	0.41
Gulf Coast Center (Galveston)	-0.313	-0.621	0.828	-0.317	1.444	-1.293	0.000	0	1	6	0.47
Public Transit Services (Mineral Wells)	-0.218	-0.474	0.096	-0.072	-0.751	-0.686	-0.350	0	1	6	0.52
Community Services, Inc. (Corsicana)	-0.104	-0.577	0.986	-0.317	-0.124	-0.393	0.084	0	1	6	0.59

Rural Agency	Pop.	Land Area	Density	% 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster
Senior Center Resources and Public Transit	-0.481	-0.710	1.648	-0.072	-0.298	-0.383	0.217	0	1	6	0.77
Collin County Committee on Aging (McKinney)	-0.609	-0.729	1.358	-1.599	-1.203	-1.445	-0.817	0	1	6	1.20
Texoma Area Paratransit System (TAPS) (Sherman)	0.315	-0.126	-0.118	0.477	-0.786	-0.555	-0.316	0	1	6	1.32
Services Program for Aging Needs (SPAN) (Denton)	-0.571	-0.722	1.406	-1.660	-1.552	-1.030	-1.117	0	1	6	1.39
Fort Bend County	-0.729	-0.722	0.358	-1.965	-1.308	-1.405	-0.833	0	1	6	1.62
The Transit System, Inc. (Glen Rose)	-0.453	-0.606	0.263	1.301	-1.552	-0.788	-0.566	0	1	6	1.85
<b>Average</b>	-0.356	-0.611	1.082	-0.525	-0.691	-0.846	-0.359				
<b>Standard Deviation</b>	0.286	0.180	0.993	0.973	0.848	0.389	0.427				
West Texas Opportunities, Inc. (Lamesa)	0.251	4.593	-1.125	-0.011	0.050	0.224	0.217	1	0	7	0.00

### Distances between Final Cluster Centers

Cluster	1	2	3	4	5	6	7
1		5.501	5.475	3.577	6.356	6.187	5.889
2	5.501		3.482	2.428	4.851	3.820	5.408
3	5.475	3.482		4.178	3.142	2.602	5.141
4	3.577	2.428	4.178		5.227	4.169	5.564
5	6.356	4.851	3.142	5.227		3.269	5.532
6	6.187	3.82	2.602	4.169	3.269		6.238
7	5.889	5.408	5.141	5.564	5.532	6.238	

**Table A13. Rural Eight Clusters without the Variables of Percent of HHs without Autos and Percent below Poverty Level.**

<b>Rural Agency</b>	<b>Pop.</b>	<b>Land Area</b>	<b>Density</b>	<b>% 65+</b>	<b>% HHs with Zero Autos</b>	<b>% below Poverty Level</b>	<b>% Ages 21-64 Disabled</b>	<b>Border</b>	<b>Metro Region</b>	<b>Cluster No.</b>	<b>Distance to Center of Cluster</b>
West Texas Opportunities, Inc. (Lamesa)	0.251	4.593	-1.125	-0.011	0.050	0.224	0.217	1	0	1	0.000
Community Act. Council of South Texas (Rio Grande City)	-0.432	-0.182	-0.741	-0.774	2.210	2.703	1.668	1	0	2	1.012
Webb County Community Action Agency (Laredo)	-0.859	-0.407	-1.094	-2.240	2.489	2.996	1.034	1	0	2	1.137
Rural Economic Assistance League, Inc. (REAL) (Alice)	-0.350	-0.508	-0.019	-0.286	0.921	0.720	0.634	1	0	2	1.463
El Paso County	-0.772	-0.714	-0.032	-1.934	1.444	2.136	1.034	1	1	2	1.682
<b>Average</b>	-0.603	-0.453	-0.472	-1.309	1.766	2.139	1.093				
<b>Standard Deviation</b>	0.250	0.221	0.535	0.929	0.716	1.011	0.427				
Golden Crescent Regional Planning Commission (Victoria)	0.056	0.056	-0.540	0.813	0.364	-0.049	0.034	0	0	3	0.387
Colorado Valley Transit (Columbus)	-0.221	-0.419	-0.100	0.935	0.468	-0.059	-0.350	0	0	3	0.546
Heart of Texas Council of Governments (Waco)	0.107	-0.141	-0.281	0.966	-0.263	-0.332	0.134	0	0	3	0.554
Central Texas Rural Transit District (Coleman)	0.002	0.365	-0.758	1.240	-0.402	-0.059	0.034	0	0	3	0.600
Rolling Plains Management Corp. (Crowell)	-0.420	-0.009	-0.843	1.362	-0.507	-0.373	-0.016	0	0	3	0.684
Hill Country Transit District (San Saba)	0.024	0.207	-0.666	1.362	-0.577	0.305	-0.250	0	0	3	0.689
South Plains Community Action Association (Levelland)	-0.038	0.369	-0.780	0.263	-0.472	0.042	-0.133	0	0	3	0.881
Ark-Tex Council of Governments (Texarkana)	0.449	-0.107	-0.033	0.874	0.225	-0.049	0.317	0	0	3	0.914
Bee Community Action Agency (Beeville)	-0.486	-0.317	-0.665	0.599	0.085	0.184	0.401	0	0	3	0.928
Aspermont Small Business Development Center (Aspermont)	-0.716	-0.038	-1.062	1.729	-0.402	-0.100	-0.116	0	0	3	1.012
Caprock Community Action Association (Crosbyton)	-0.613	-0.114	-0.949	0.355	-0.089	0.255	-0.050	0	0	3	1.056

Rural Agency	Pop.	Land Area	Density	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster	
Concho Valley Council of Governments (San Angelo)	-0.609	1.065	-1.145	0.935	-0.402	-0.059	-0.383	0	0	3	1.213
South East Texas Regional Planning Commission (Beaumont)	-0.131	-0.565	0.805	-0.164	-0.124	-0.565	-0.183	0	0	3	1.348
<b>Average</b>	-0.200	0.027	-0.540	0.867	-0.161	-0.066	-0.043				
<b>Standard Deviation</b>	0.346	0.416	0.529	0.513	0.349	0.247	0.234				
Community Council of Southwest Texas (Uvalde)	-0.270	0.553	-0.949	-0.225	1.583	1.539	4.286	1	0	4	0.000
Alamo Area Council of Governments (San Antonio)	1.547	0.429	-0.023	0.569	-0.577	-0.352	-0.200	0	1	5	1.256
Capital Area Rural Transportation System (CARTS) (Austin)	1.771	0.069	0.639	-0.225	-0.855	-0.626	-0.867	0	1	5	1.371
East Texas Council of Governments (Kilgore)	2.654	0.366	0.618	0.843	-0.193	-0.241	0.351	0	0	5	1.739
Brazos Transit District (Bryan/College Station)	4.144	1.261	0.246	0.111	0.085	-0.170	0.117	0	1	5	1.893
<b>Average</b>	2.529	0.531	0.370	0.325	-0.385	-0.347	-0.150				
<b>Standard Deviation</b>	1.615	0.443	0.651	0.479	0.950	0.861	2.036				
Panhandle Community Services (Amarillo)	0.461	2.346	-0.986	0.263	-0.751	-0.261	-0.483	0	0	6	0.000
Kaufman County Senior Citizens Service (Terrell)	-0.441	-0.704	1.689	-0.744	-0.646	-0.605	-0.166	0	1	7	0.321
Cleburne (Cleburne)	-0.310	-0.726	3.385	-0.805	-0.820	-0.727	-0.083	0	1	7	0.413
Gulf Coast Center (Galveston)	-0.313	-0.621	0.828	-0.317	1.444	-1.293	0.000	0	1	7	0.472
Public Transit Services (Mineral Wells)	-0.218	-0.474	0.096	-0.072	-0.751	-0.686	-0.350	0	1	7	0.519
Community Services, Inc. (Corsicana)	-0.104	-0.577	0.986	-0.317	-0.124	-0.393	0.084	0	1	7	0.588
Senior Center Resources and Public Transit	-0.481	-0.710	1.648	-0.072	-0.298	-0.383	0.217	0	1	7	0.772
Collin County Committee on Aging (McKinney)	-0.609	-0.729	1.358	-1.599	-1.203	-1.445	-0.817	0	1	7	1.201
Texoma Area Paratransit System (TAPS) (Sherman)	0.315	-0.126	-0.118	0.477	-0.786	-0.555	-0.316	0	1	7	1.318

Rural Agency	Pop.	Land Area	% Density 65+	% HHs with Zero Autos	% below Poverty Level	% Ages 21-64 Disabled	Border	Metro Region	Cluster No.	Distance to Center of Cluster	
Services Program for Aging Needs (SPAN) (Denton)	-0.571	-0.722	1.406	-1.660	-1.552	-1.030	-1.117	0	1	7	1.390
Fort Bend County	-0.729	-0.722	0.358	-1.965	-1.308	-1.405	-0.833	0	1	7	1.622
The Transit System, Inc. (Glen Rose)	-0.453	-0.606	0.263	1.301	-1.552	-0.788	-0.566	0	1	7	1.851
<b>Average</b>	-0.356	-0.611	1.082	-0.525	-0.691	-0.846	-0.359				
<b>Standard Deviation</b>	0.286	0.180	0.993	0.973	0.848	0.389	0.427				
Kleberg County Human Services (Kingsville)	-0.767	-0.528	-0.824	-0.622	1.757	-0.535	-0.383	1	0	8	0.804
Lower Rio Grande Valley Development Council (McAllen)	-0.185	-0.490	0.221	-0.317	1.165	1.074	-0.066	1	0	8	1.131
Del Rio (Del Rio)	-0.684	-0.425	-0.811	-0.652	0.364	0.963	-2.834	1	0	8	1.752
<b>Average</b>	-0.545	-0.481	-0.471	-0.530	1.095	0.501	-1.094				
<b>Standard Deviation</b>	0.315	0.052	0.600	0.186	0.699	0.898	1.515				

### Distances between Final Cluster Centers

Cluster	1	2	3	4	5	6	7	8
1		5.564	5.294	5.889	5.532	3.406	6.238	5.408
2	5.564		4.17	3.577	5.227	4.934	4.169	2.428
3	5.294	4.17		5.474	3.211	2.527	2.578	3.48
4	5.889	3.577	5.474		6.356	5.999	6.187	5.501
5	5.532	5.227	3.211	6.356		3.168	3.269	4.851
6	3.406	4.934	2.527	5.999	3.168		3.784	4.272
7	6.238	4.169	2.578	6.187	3.269	3.784		3.820
8	5.408	2.428	3.480	5.501	4.851	4.272	3.820	





APPENDIX B. ALTERNATIVE URBAN CLUSTER ANALYSIS DATA DETAIL

Table B1. Four Clusters.

Name	Service Area Definition	Pop.	Land Area	Density	% Ages 21-64 Disabled	% HHs with Zero Autos	% Pop. 65+	% below Poverty Level	% Management, Professional, and Related Occupations	% Service Occupations	% Production, Transportation, and Material Moving Occupations	Border	Metro	Cluster No.	Distance to Center of Each Cluster
City of Abilene, Texas	UZA	-0.136	-0.452	1.107	-0.225	-0.694	0.210	-0.368	-0.058	0.984	-0.774	0	0	1	2.124
City of Brownsville	UZA	0.608	-0.257	2.554	1.355	1.249	-0.759	2.475	-0.743	0.426	1.195	1	0	1	3.830
City of Harlingen	city limits	-0.756	-0.724	-0.125	-0.086	0.672	1.148	0.862	0.205	0.922	-0.685	1	0	1	3.069
City Transit Management Company, Inc.—Lubbock	city limits	1.031	0.903	-0.018	-0.086	-0.542	-0.165	0.002	0.263	-0.101	-0.924	0	0	1	2.492
Gulf Coast Center/Connect Transit—Lake Jackson/Angleton	UZA	-0.554	-0.730	0.960	-0.271	-0.694	-0.759	-0.818	-0.043	-1.093	0.658	0	1	1	3.365
Hill Country Transit District—Killeen Division	city limits of Killeen, Copperas Cove, Harker Heights	0.208	-0.162	0.927	0.193	-0.998	-2.071	-0.871	-0.641	0.984	-0.297	0	0	1	2.696
Laredo Transit Management Incorporated	city limits	0.745	0.171	1.124	0.565	1.006	-1.165	1.483	-0.714	0.085	0.330	1	0	1	2.528
<b>Average</b>		0.164	-0.179	0.933	0.207	0.000	-0.509	0.395	-0.247	0.315	-0.071				
<b>Standard Deviation</b>		0.676	0.574	0.887	0.582	0.938	1.031	1.261	0.440	0.762	0.811				
Hidalgo County combined (McAllen)	urbanized Hidalgo County and McAllen Express	4.091	4.384	-0.460	0.597	0.222	-0.274	1.942	-0.633	0.328	0.078	1	0	2	0.000
Brazos Transit District—Bryan/College Station	city limits	0.206	0.274	-0.319	-2.223	-0.542	-1.603	1.457	1.022	-0.039	-1.162	0	0	3	3.475
Brazos Transit District—The Woodlands	designated place boundary	-0.779	-0.940	1.420	-2.688	-1.574	-1.290	-1.876	3.924	-2.922	-2.655	0	1	3	3.471
Collin County Area Regional Transit	UZA	-0.790	-0.865	0.620	-1.944	-1.423	-1.509	-1.373	1.707	-1.589	-1.282	0	1	3	1.359
Denton County Transportation Authority	city limits of Denton, Highland Village, Lewisville	0.663	0.681	-0.236	-1.247	-1.180	-1.759	-1.082	0.803	-1.155	-1.103	0	1	3	2.101
<b>Average</b>		-0.175	-0.213	0.371	-2.026	-1.180	-1.540	-0.719	1.864	-1.426	-1.550				
<b>Standard Deviation</b>		0.728	0.814	0.818	0.603	0.455	0.196	1.487	1.426	1.192	0.740				

Name	Service Area Definition	Pop.	Land Area	Density	% Ages 21-64 Disabled	% HHs with Zero Autos	% Pop. 65+	% below Poverty Level	% Management, Professional, and Related Occupations	% Service Occupations	% Production, Transportation, and Material Moving Occupations	Border	Metro	Cluster No.	Distance to Center of Each Cluster
Beaumont Municipal Transit	city limits	-0.047	0.302	-0.903	0.844	1.037	0.554	0.161	0.001	0.457	-0.177	0	0	4	1.386
City of Amarillo—Amarillo City Transit	city limits	0.704	0.401	0.409	0.007	-0.694	0.335	-0.514	-0.495	0.147	0.270	0	0	4	1.928
City of Galveston	city limits	-0.761	-0.480	-1.129	0.612	2.676	0.554	0.518	0.409	2.131	-1.550	0	1	4	4.402
City of Port Arthur	city limits	-0.754	0.260	-2.331	1.076	2.069	1.304	0.901	-1.691	1.821	1.673	0	0	4	3.845
Concho Valley Transit District	UZA	-0.372	-0.492	0.412	0.100	-0.421	0.773	-0.368	-0.685	0.705	-0.058	0	0	4	1.535
Golden Crescent Regional Planning Commission—Victoria	city limits	-0.720	-0.746	0.191	0.007	-0.178	0.210	-0.487	-0.320	-0.411	0.360	0	0	4	1.495
Gulf Coast Center/Connect Transit—Texas City/La Marque	UZA	-0.267	-0.230	-0.222	0.565	-0.481	0.241	-0.580	-0.728	-0.318	0.479	0	1	4	2.427
Hill Country Transit District—Temple and Belton	city limits	-0.611	0.157	-1.905	-0.178	0.399	0.929	-0.487	0.161	-0.318	1.016	0	0	4	1.915
Longview Transit	city limits	-0.560	-0.309	-0.908	0.426	-0.360	0.616	-0.302	-0.305	-0.504	1.046	0	0	4	1.306
Midland-Odessa Urban Transit District	city limits	0.863	0.673	0.121	-0.783	-0.512	0.116	-0.355	-0.101	-0.442	-0.386	0	0	4	2.475
city limits of Texarkana, Nash, Wake Village															
Texarkana Urban Transit District	UZA	-0.950	-0.805	-0.764	1.123	1.067	1.179	0.478	-0.145	-0.225	0.718	0	0	4	1.746
Texoma Area Paratransit System, Inc.—Sherman/Denison	UZA	-0.779	-0.769	0.008	0.983	-0.178	1.366	-0.606	-0.466	-0.535	1.494	0	0	4	1.985
Tyler Transit	city limits	-0.425	-0.418	-0.100	0.797	0.126	1.085	-0.209	0.001	-0.256	0.718	0	0	4	1.063
ADA service area plus identifiable features															
Waco Transit System	city limits	0.316	0.163	0.182	0.704	0.369	0.523	0.610	-0.393	0.240	0.628	0	0	4	1.321
Wichita Falls Transit System	city limits	-0.173	0.014	-0.614	-0.225	-0.421	0.210	-0.593	-0.335	0.674	0.390	0	0	4	1.312
Average		-0.302	-0.152	-0.504	0.404	0.300	0.666	-0.122	-0.340	0.211	0.441				
Standard Deviation		0.551	0.468	0.829	0.558	1.005	0.420	0.512	0.484	0.830	0.794				

**Distances between Final Cluster Centers**

Cluster	1	2	3	4
1		6.611	4.730	2.408
2	6.611		8.982	7.302
3	4.730	8.982		5.273
4	2.408	7.302	5.273	

**Table B2. Five Clusters.**

Name	Service Area Definition	Pop.	Land Area	Density	% Ages 21-64 Disabled	% HHs with Zero Autos	% Pop. 65+	% below Poverty Level	% Management, Professional, and Related Occupations	% Service Occupations	% Production, Transportation, and Material Moving Occupations	Border	Metro	Cluster No.	Distance to Center of Each Cluster
Beaumont Municipal Transit	city limits	-0.047	0.302	-0.903	0.844	1.037	0.554	0.161	0.001	0.457	-0.177	0	0	1	1.489
City of Port Arthur	city limits	-0.754	0.260	-2.331	1.076	2.069	1.304	0.901	-1.691	1.821	1.673	0	0	1	3.333
Hill Country Transit District—Temple Division	city limits of Temple and Belton	-0.611	0.157	-1.905	-0.178	0.399	0.929	-0.487	0.161	-0.318	1.016	0	0	1	1.690
Longview Transit	city limits	-0.560	-0.309	-0.908	0.426	-0.360	0.616	-0.302	-0.305	-0.504	1.046	0	0	1	1.262
Texarkana Urban Transit District	city limits of Texarkana, Nash, Wake Village	-0.950	-0.805	-0.764	1.123	1.067	1.179	0.478	-0.145	-0.225	0.718	0	0	1	1.195
Texoma Area Paratransit System, Inc.—Sherman/Denison	UZA	-0.779	-0.769	0.008	0.983	-0.178	1.366	-0.606	-0.466	-0.535	1.494	0	0	1	1.782
Tyler Transit	city limits	-0.425	-0.418	-0.100	0.797	0.126	1.085	-0.209	0.001	-0.256	0.718	0	0	1	1.085
Waco Transit System	ADA service area plus identifiable features	0.316	0.163	0.182	0.704	0.369	0.523	0.610	-0.393	0.240	0.628	0	0	1	1.547
<b>Average</b>		-0.476	-0.177	-0.840	0.722	0.566	0.945	0.068	-0.355	0.085	0.890				
<b>Standard Deviation</b>		0.420	0.458	0.901	0.427	0.793	0.342	0.553	0.581	0.782	0.571				
Brazos Transit District—Bryan/College Station	city limits	0.206	0.274	-0.319	-2.223	-0.542	-1.603	1.457	1.022	-0.039	-1.162	0	0	2	3.372
City of Abilene, Texas	UZA	-0.136	-0.452	1.107	-0.225	-0.694	0.210	-0.368	-0.058	0.984	-0.774	0	0	2	1.748
City of Amarillo—Amarillo City Transit	city limits	0.704	0.401	0.409	0.007	-0.694	0.335	-0.514	-0.495	0.147	0.270	0	0	2	1.385
City Transit Management Company, Inc.—Lubbock	city limits	1.031	0.903	-0.018	-0.086	-0.542	-0.165	0.002	0.263	-0.101	-0.924	0	0	2	1.720
Concho Valley Transit District	UZA	-0.372	-0.492	0.412	0.100	-0.421	0.773	-0.368	-0.685	0.705	-0.058	0	0	2	1.806
Denton County Transportation Authority	city limits of Denton, Highland Village, Lewisville	0.663	0.681	-0.256	-1.247	-1.180	-1.759	-1.082	0.803	-1.155	-1.103	0	1	2	3.278
Golden Crescent Regional Planning Commission—Victoria	city limits	-0.720	-0.746	0.191	0.007	-0.178	0.210	-0.487	-0.320	-0.411	0.360	0	0	2	1.681

Name	Service Area Definition	Pop.	Land Area	Density	% Ages 21-64 Disabled	% HHs with Zero Autos	% Pop. 65+	% below Poverty Level	% Management, Professional, and Related Occupations	% Service Occupations	% Production, Transportation, and Material Moving Occupations	Border	Metro	Cluster No.	Distance to Center of Each Cluster
Gulf Coast Center/Connect Transit—Lake Jackson/Angleton	UZA	-0.554	-0.730	0.960	-0.271	-0.694	-0.759	-0.818	-0.043	-1.093	0.658	0	1	2	2.666
Gulf Coast Center/Connect Transit—Texas City/La Marque	UZA	-0.267	-0.230	-0.222	0.565	-0.481	0.241	-0.580	-0.728	-0.318	0.479	0	1	2	2.423
Hill Country Transit District—Killeen Division	city limits of Killeen, Copperas Cove, Harker Heights	0.208	-0.162	0.927	0.193	-0.998	-2.071	-0.871	-0.641	0.984	-0.297	0	0	2	2.405
Midland-Odessa Urban Transit District	city limits	0.863	0.673	0.121	-0.783	-0.512	0.116	-0.355	-0.101	-0.442	-0.386	0	0	2	1.416
Wichita Falls Transit System	city limits	-0.173	0.014	-0.614	-0.225	-0.421	0.210	-0.593	-0.335	0.674	0.390	0	0	2	1.564
<b>Average</b>		0.121	0.011	0.227	-0.349	-0.613	-0.355	-0.381	-0.110	-0.005	-0.212				
<b>Standard Deviation</b>		0.583	0.571	0.553	0.751	0.268	0.951	0.644	0.564	0.733	0.656				
Brazos Transit District—The Woodlands	designated place boundary	-0.779	-0.940	1.420	-2.688	-1.574	-1.290	-1.876	3.924	-2.922	-2.655	0	1	3	1.589
Collin County Area Regional Transit	UZA	-0.790	-0.865	0.620	-1.944	-1.423	-1.509	-1.373	1.707	-1.589	-1.282	0	1	3	1.589
<b>Average</b>		-0.784	-0.903	1.020	-2.316	-1.498	-1.399	-1.625	2.816	-2.255	-1.968				
<b>Standard Deviation</b>		0.008	0.053	0.566	0.526	0.107	0.155	0.355	1.568	0.942	0.971				
City of Brownsville	UZA	0.608	-0.257	2.554	1.355	1.249	-0.759	2.475	-0.743	0.426	1.195	1	0	4	3.136
City of Galveston	city limits	-0.761	-0.480	-1.129	0.612	2.676	0.554	0.518	0.409	2.131	-1.550	0	1	4	4.212
City of Harlingen	city limits	-0.756	-0.724	-0.125	-0.086	0.672	1.148	0.862	0.205	0.922	-0.685	1	0	4	2.277
Laredo Transit Management Incorporated	city limits	0.745	0.171	1.124	0.565	1.006	-1.165	1.483	-0.714	0.085	0.330	1	0	4	2.135
<b>Average</b>		-0.041	-0.323	0.606	0.612	1.401	-0.056	1.334	-0.211	0.891	-0.177				
<b>Standard Deviation</b>		0.831	0.380	1.593	0.589	0.882	1.087	0.859	0.604	0.895	1.195				
Hidalgo County combined (McAllen)	urbanized Hidalgo County and McAllen Express	4.091	4.384	-0.460	0.597	0.222	-0.274	1.942	-0.633	0.328	0.078	1	0	5	0.000

**Distances between Final Cluster Centers**

Cluster	1	2	3	4	5
1		2.757	7.444	3.499	7.460
2	2.757		5.434	3.683	7.149
3	7.444	5.434		7.653	10.761
4	3.499	3.683	7.653		6.602
5	7.460	7.149	10.761	6.602	

**Table B3. Six Clusters.**

Name	Service Area Definition	Pop.	Land Area	Density	% Ages 21-64 Disabled	% HHs with Zero Autos	% Pop. 65+	% below Poverty Level	% Management, Professional, and Related Occupations	% Service Occupations	% Production, Transportation, and Material Moving Occupations	Border	Metro	Cluster No.	Distance to Center of Each Cluster
Hidalgo County combined (McAllen)	urbanized Hidalgo County and McAllen Express	4.091	4.384	-0.460	0.597	0.222	-0.274	1.942	-0.633	0.328	0.078	1	0	1	0.000
Brazos Transit District—Bryan/College Station	city limits	0.206	0.274	-0.319	-2.223	-0.542	-1.603	1.457	1.022	-0.039	-1.162	0	0	2	3.816
City of Abilene, Texas	UZA	-0.136	-0.452	1.107	-0.225	-0.694	0.210	-0.368	-0.058	0.984	-0.774	0	0	2	1.781
City of Amarillo—Amarillo City Transit	city limits	0.704	0.401	0.409	0.007	-0.694	0.335	-0.514	-0.495	0.147	0.270	0	0	2	1.152
City Transit Management Company, Inc.—Lubbock	city limits	1.031	0.903	-0.018	-0.086	-0.542	-0.165	0.002	0.263	-0.101	-0.924	0	0	2	1.979
Concho Valley Transit District	UZA	-0.372	-0.492	0.412	0.100	-0.421	0.773	-0.368	-0.685	0.705	-0.058	0	0	2	1.299
Golden Crescent Regional Planning Commission—Victoria	city limits	-0.720	-0.746	0.191	0.007	-0.178	0.210	-0.487	-0.320	-0.411	0.360	0	0	2	1.136
Gulf Coast Center/Connect Transit—Lake Jackson/Angleton	UZA	-0.554	-0.730	0.960	-0.271	-0.694	-0.759	-0.818	-0.043	-1.093	0.658	0	1	2	2.874
Gulf Coast Center/Connect Transit—Texas City/La Marque	UZA	-0.267	-0.230	-0.222	0.565	-0.481	0.241	-0.580	-0.728	-0.318	0.479	0	1	2	2.335
Hill Country Transit District—Killeen Division	city limits of Killeen, Copperas Cove, Harker Heights	0.208	-0.162	0.927	0.193	-0.998	-2.071	-0.871	-0.641	0.984	-0.297	0	0	2	2.734
Longview Transit	city limits	-0.560	-0.309	-0.908	0.426	-0.360	0.616	-0.302	-0.305	-0.504	1.046	0	0	2	1.742
Midland-Odessa Urban Transit District	city limits	0.863	0.673	0.121	-0.783	-0.512	0.116	-0.355	-0.101	-0.442	-0.386	0	0	2	1.645
Texoma Area Paratransit System, Inc.—Sherman/Denison	UZA	-0.779	-0.769	0.008	0.983	-0.178	1.366	-0.606	-0.466	-0.535	1.494	0	0	2	2.452
Tyler Transit	city limits	-0.425	-0.418	-0.100	0.797	0.126	1.085	-0.209	0.001	-0.256	0.718	0	0	2	1.666
Waco Transit System	ADA service area plus identifiable features	0.316	0.163	0.182	0.704	0.369	0.523	0.610	-0.393	0.240	0.628	0	0	2	1.645

Name	Service Area Definition	Pop.	Land Area	Density	% Ages 21-64 Disabled	% HHs with Zero Autos	% Pop. 65+	% below Poverty Level	% Management, Professional, and Related Occupations	% Service Occupations	% Production, Transportation, and Material Moving Occupations	Border	Metro	Cluster No.	Distance to Center of Each Cluster
Wichita Falls Transit System	city limits	-0.173	0.014	-0.614	-0.225	-0.421	0.210	-0.593	-0.335	0.674	0.390	0	0	2	1.184
<b>Average</b>		-0.044	-0.126	0.142	-0.002	-0.415	0.073	-0.267	-0.219	0.002	0.163				
<b>Standard Deviation</b>		0.576	0.519	0.566	0.774	0.342	0.926	0.594	0.443	0.612	0.751				
Brazos Transit District—The Woodlands	designated place boundary	-0.779	-0.940	1.420	-2.688	-1.574	-1.290	-1.876	3.924	-2.922	-2.655	0	1	3	2.684
Collin County Area Regional Transit	UZA	-0.790	-0.865	0.620	-1.944	-1.423	-1.509	-1.373	1.707	-1.589	-1.282	0	1	3	0.962
Denton County Transportation Authority	city limits of Denton, Highland Village, Lewisville	0.663	0.681	-0.236	-1.247	-1.180	-1.759	-1.082	0.803	-1.155	-1.103	0	1	3	2.482
<b>Average</b>		-0.302	-0.375	0.602	-1.960	-1.392	-1.519	-1.444	2.145	-1.888	-1.680				
<b>Standard Deviation</b>		0.835	0.915	0.828	0.720	0.199	0.235	0.401	1.606	0.921	0.849				
City of Galveston	city limits	-0.761	-0.480	-1.129	0.612	2.676	0.554	0.518	0.409	2.131	-1.550	0	1	4	2.345
City of Harlingen	city limits	-0.756	-0.724	-0.125	-0.086	0.672	1.148	0.862	0.205	0.922	-0.685	1	0	4	2.345
<b>Average</b>		-0.759	-0.602	-0.627	0.263	1.674	0.851	0.690	0.307	1.526	-1.118				
<b>Standard Deviation</b>		0.004	0.172	0.710	0.493	1.417	0.420	0.243	0.144	0.855	0.612				
Beaumont Municipal Transit	city limits	-0.047	0.302	-0.903	0.844	1.037	0.554	0.161	0.001	0.457	-0.177	0	0	5	1.451
City of Port Arthur	city limits	-0.754	0.260	-2.331	1.076	2.069	1.304	0.901	-1.691	1.821	1.673	0	0	5	2.573
Hill Country Transit District—Temple Division	city limits of Temple and Belton	-0.611	0.157	-1.905	-0.178	0.399	0.929	-0.487	0.161	-0.318	1.016	0	0	5	1.755
Texarkana Urban Transit District	city limits of Texarkana, Nash, Wake Village	-0.950	-0.805	-0.764	1.123	1.067	1.179	0.478	-0.145	-0.225	0.718	0	0	5	1.421
<b>Average</b>		-0.591	-0.022	-1.476	0.716	1.143	0.991	0.263	-0.419	0.434	0.807				
<b>Standard Deviation</b>		0.388	0.526	0.764	0.609	0.690	0.331	0.585	0.858	0.987	0.768				
City of Brownsville Laredo Transit Management Incorporated	UZA	0.608	-0.257	2.554	1.355	1.249	-0.759	2.475	-0.743	0.426	1.195	1	0	6	1.112
City of Brownsville Laredo Transit Management Incorporated	city limits	0.745	0.171	1.124	0.565	1.006	-1.165	1.483	-0.714	0.085	0.330	1	0	6	1.112
<b>Average</b>		0.677	-0.043	1.839	0.960	1.128	-0.962	1.979	-0.728	0.256	0.763				
<b>Standard Deviation</b>		0.097	0.302	1.011	0.559	0.172	0.287	0.701	0.021	0.241	0.612				



**Distances between Final Cluster Centers**

Cluster	1	2	3	4	5	6
1		7.202	9.729	7.787	7.493	6.201
2	7.202		5.094	3.779	2.782	4.641
3	9.729	5.094		6.713	7.160	7.876
4	7.787	3.779	6.713		3.260	4.883
5	7.493	2.782	7.160	3.260		5.241
6	6.201	4.641	7.876	4.883	5.241	

**Table B4. Seven Clusters.**

Name	Service Area Definition	Pop.	Land Area	Density	% Ages 21-64 Disabled	% HHs with Zero Autos	% Pop. 65+	% below Poverty Level	% Management, Professional, and Related Occupations	% Service Occupations	% Production, Transportation, and Material Moving Occupations	Border	Metro	Cluster No.	Distance to Center of Each Cluster
City of Port Arthur	city limits	-0.754	0.260	-2.331	1.076	2.069	1.304	0.901	-1.691	1.821	1.673	0	0	1	2.336
Hill Country Transit District—Temple Division	city limits of Temple and Bellon	-0.611	0.157	-1.905	-0.178	0.399	0.929	-0.487	0.161	-0.318	1.016	0	0	1	1.801
Texarkana Urban Transit District	city limits of Texarkana, Nash, Wake Village	-0.950	-0.805	-0.764	1.123	1.067	1.179	0.478	-0.145	-0.225	0.718	0	0	1	1.523
<b>Average</b>		-0.772	-0.130	-1.667	0.674	1.178	1.137	0.297	-0.558	0.426	1.136				
<b>Standard Deviation</b>		0.170	0.587	0.810	0.738	0.840	0.191	0.712	0.993	1.209	0.489				
Brazos Transit District—Bryan/College Station	city limits	0.206	0.274	-0.319	-2.223	-0.542	-1.603	1.457	1.022	-0.039	-1.162	0	0	2	2.772
City Transit Management Company, Inc.—Lubbock	city limits	1.031	0.903	-0.018	-0.086	-0.542	-0.165	0.002	0.263	-0.101	-0.924	0	0	2	1.733
Denton County Transportation Authority	city limits of Denton, Highland Village, Lewisville	0.663	0.681	-0.236	-1.247	-1.180	-1.759	-1.082	0.803	-1.155	-1.103	0	1	2	2.455
Gulf Coast Center/Lake Jackson/Angleton	UZA	-0.554	-0.730	0.960	-0.271	-0.694	-0.759	-0.818	-0.043	-1.093	0.658	0	1	2	2.777
Hill Country Transit District—Killeen Division	city limits of Killeen, Copperas Cove, Harker Heights	0.208	-0.162	0.927	0.193	-0.998	-2.071	-0.871	-0.641	0.984	-0.297	0	0	2	2.479
Midland-Odessa Urban Transit District	city limits	0.863	0.673	0.121	-0.783	-0.512	0.116	-0.355	-0.101	-0.442	-0.386	0	0	2	1.603
<b>Average</b>		0.403	0.273	0.239	-0.736	-0.745	-1.040	-0.278	0.217	-0.307	-0.536				
<b>Standard Deviation</b>		0.578	0.619	0.567	0.892	0.280	0.903	0.936	0.616	0.792	0.688				
Brazos Transit District—The Woodlands	designated place boundary	-0.779	-0.940	1.420	-2.688	-1.574	-1.290	-1.876	3.924	-2.922	-2.655	0	1	3	1.589
Collin County Area Regional Transit	UZA	-0.790	-0.865	0.620	-1.944	-1.423	-1.509	-1.373	1.707	-1.589	-1.282	0	1	3	1.589
<b>Average</b>		-0.784	-0.903	1.020	-2.316	-1.498	-1.399	-1.625	2.816	-2.255	-1.968				
<b>Standard Deviation</b>		0.008	0.053	0.566	0.526	0.107	0.155	0.355	1.568	0.942	0.971				

Name	Service Area Definition	Pop.	Land Area	Density	% Ages 21-64 Disabled	% HHs with Zero Autos	% Pop. 65+	% below Poverty Level	% Management, Professional, and Related Occupations	% Service Occupations	% Production, Transportation, and Material Moving Occupations	Border	Metro	Cluster No.	Distance to Center of Each Cluster
Beaumont Municipal Transit	city limits	-0.047	0.302	-0.903	0.844	1.037	0.554	0.161	0.001	0.457	-0.177	0	0	4	1.819
City of Abilene, Texas	UZA	-0.136	-0.452	1.107	-0.225	-0.694	0.210	-0.368	-0.058	0.984	-0.774	0	0	4	2.049
City of Amarillo—Amarillo City Transit	city limits	0.704	0.401	0.409	0.007	-0.694	0.335	-0.514	-0.495	0.147	0.270	0	0	4	1.537
City of Harlingen	city limits	-0.756	-0.724	-0.125	-0.086	0.672	1.148	0.862	0.205	0.922	-0.685	1	0	4	3.336
Concho Valley Transit District	UZA	-0.372	-0.492	0.412	0.100	-0.421	0.773	-0.368	-0.685	0.705	-0.058	0	0	4	1.066
Golden Crescent Regional Planning Commission—Victoria	city limits	-0.720	-0.746	0.191	0.007	-0.178	0.210	-0.487	-0.320	-0.411	0.360	0	0	4	1.129
Gulf Coast Center/Connect Transit—Texas City/La Marque	UZA	-0.267	-0.230	-0.222	0.565	-0.481	0.241	-0.580	-0.728	-0.318	0.479	0	1	4	2.426
Longview Transit	city limits	-0.560	-0.309	-0.908	0.426	-0.360	0.616	-0.302	-0.305	-0.504	1.046	0	0	4	1.421
Texoma Area Paratransit System, Inc.—Sherman/Denison	UZA	-0.779	-0.769	0.008	0.983	-0.178	1.366	-0.606	-0.466	-0.535	1.494	0	0	4	1.931
Tyler Transit	city limits	-0.425	-0.418	-0.100	0.797	0.126	1.085	-0.209	0.001	-0.256	0.718	0	0	4	1.045
ADA service area plus identifiable features															
Waco Transit System		0.316	0.163	0.182	0.704	0.369	0.523	0.610	-0.393	0.240	0.628	0	0	4	1.350
Wichita Falls Transit System	city limits	-0.173	0.014	-0.614	-0.225	-0.421	0.210	-0.593	-0.335	0.674	0.390	0	0	4	1.216
<b>Average</b>		-0.268	-0.272	-0.047	0.325	-0.102	0.606	-0.200	-0.298	0.176	0.308				
<b>Standard Deviation</b>		0.446	0.408	0.580	0.443	0.547	0.406	0.489	0.286	0.569	0.660				
Hidalgo County and McAllen (McAllen)	urbanized Hidalgo County and McAllen Express	4.091	4.384	-0.460	0.597	0.222	-0.274	1.942	-0.633	0.328	0.078	1	0	5	0.000
City of Brownsville	UZA	0.608	-0.257	2.554	1.355	1.249	-0.759	2.475	-0.743	0.426	1.195	1	0	6	1.112
Laredo Transit Management Incorporated	city limits	0.745	0.171	1.124	0.565	1.006	-1.165	1.483	-0.714	0.085	0.330	1	0	6	1.112
<b>Average</b>		0.677	-0.043	1.839	0.960	1.128	-0.962	1.979	-0.728	0.256	0.763				
<b>Standard Deviation</b>		0.097	0.302	1.011	0.559	0.172	0.287	0.701	0.021	0.241	0.612				
City of Galveston	city limits	-0.761	-0.480	-1.129	0.612	2.676	0.554	0.518	0.409	2.131	-1.550	0	1	7	0.000

### Distances between Final Cluster Centers

Cluster	1	2	3	4	5	6	7
1		4.528	8.249	2.470	7.755	5.462	4.460
2	4.528		4.856	2.590	7.020	5.068	5.484
3	8.249	4.856		6.518	10.761	8.625	8.025
4	2.470	2.590	6.518		7.299	4.552	4.740
5	7.755	7.020	10.761	7.299		6.201	8.780
6	5.462	5.068	8.625	4.552	6.201		6.473
7	4.460	5.484	8.025	4.740	8.780	6.473	

## APPENDIX C. EFFECTIVENESS AND EFFICIENCY MEASURES BY TRANSIT DISTRICT

**Table C1. Rural Transit District Effectiveness and Efficiency Measures (Fiscal Year 2009).**

Rural Transit Districts	Revenue Miles per Operating Expense	Passenger Trips per Revenue Mile
<b>State Average for Rural Transit Districts</b>	<b>0.39</b>	<b>0.17</b>
Alamo Area Council of Governments (San Antonio)	0.41	0.09
Ark-Tex Council of Governments (Texarkana)	0.55	0.30
Aspermont Small Business Development Center	0.45	0.04
Bee Community Action Agency (Beeville)	0.38	0.12
Brazos Transit—The District (Bryan)	0.26	0.29
Capital Area Rural Transportation System (CARTS) (Austin)	0.43	0.19
Caprock Community Action Association (Crosbyton)	0.43	0.15
Central Texas Rural Transit District (Coleman)	0.42	0.12
Cleburne (Cleburne)	0.29	0.14
Collin County Area Regional Transit (McKinney)	0.60	0.11
Colorado Valley Transit (Columbus)	0.36	0.15
Community Act. Council of South Texas	0.21	0.38
Community Council of Southwest Texas (Uvalde)	0.46	0.13
Community Services, Inc. (Corsicana)	0.41	0.20
Concho Valley Transit District (Rural)	0.20	0.23
Del Rio	0.33	0.25
East Texas Council of Governments (Kilgore)	0.33	0.09
El Paso County	0.38	0.26
Fort Bend County	0.40	0.21
Golden Crescent Regional Planning Commission	0.53	0.13
Gulf Coast Center (Galveston)	0.26	0.10
Heart of Texas Council of Governments (Waco)	0.53	0.09
Hill Country Transit District (San Saba)	0.36	0.20
Kaufman Area Rural Transportation	0.48	0.15
Kleberg County Human Services	0.24	0.26
Lower Rio Grande Valley Development Council	0.41	0.14
Panhandle Community Services (Amarillo)	0.38	0.30
Public Transit Services (Mineral Wells)	0.63	0.10
Rolling Plains Management Corp. (Crowell)	0.43	0.19
Rural Economic Assistance League, Inc.	0.46	0.31
Senior Center Resources and Public Transit Service	0.48	0.13
Services Program for Aging Needs (SPAN)	0.37	0.11
South East Texas Regional Planning Commission	0.23	0.15
South Plains Community Action Association (Levelland)	0.33	0.13
Texoma Area Paratransit System/TAPS (Sherman)	0.44	0.13
The Transit System, Inc. (Glen Rose)	0.28	0.11
Webb County Community Action Agency (Laredo)	0.32	0.38
West Texas Opportunities, Inc. (Lamesa)	0.39	0.08
<b>Not Included in Rural Average</b>		
South Padre Island (South Padre Island)	0.41	1.45

**Table C2. Urban Transit District Effectiveness and Efficiency Measures (Fiscal Year 2009).**

<b>Urban Transit Districts</b>	<b>Revenue Miles per Operating Expense</b>	<b>Passenger Trips per Revenue Mile</b>
<b>State Average for Urban Transit Districts</b>	<b>0.27</b>	<b>0.70</b>
Abilene	0.35	0.65
Amarillo	0.23	0.40
Beaumont	0.20	0.70
Brownsville	0.15	1.69
College Station-Bryan	0.28	1.95
Galveston	0.12	1.63
Harlingen-San Benito	0.20	0.10
Killeen-Copperas Cove-Harker Heights	0.30	0.34
Lake Jackson-Angleton	0.23	0.08
Laredo	0.16	2.06
Longview	0.25	0.57
Lubbock	0.25	1.19
McAllen	0.28	0.53
McKinney	0.42	0.21
Midland-Odessa	0.26	0.51
Port Arthur	0.16	0.37
San Angelo	0.37	0.41
Sherman-Denison	0.62	0.25
Temple	0.28	0.28
Texarkana	0.27	0.75
Texas City-LaMarque	0.30	0.13
The Woodlands	0.20	0.99
Tyler	0.23	0.63
Victoria	0.38	0.45
Waco	0.25	0.60
Wichita Falls	0.37	0.63
<b>Average for Limited Eligibility Urban Transit Districts</b>	<b>0.33</b>	<b>0.17</b>
Grand Prairie	0.24	0.30
Mesquite	0.40	0.15
Arlington	0.26	0.16
NETS	0.43	0.09

## APPENDIX D. CASE STUDY FACT-FINDING QUESTIONS

**Transit Environment:**

1. Organization type
  - a. Council of governments/regional planning commission
  - b. Community service agency
  - c. Transit agency
  - d. City/county
2. Number of counties and/or cities served
3. Square miles/population (PTN-128)
4. How is the economy of the area served (loss of major employers, economic impacts to transit service)?
5. What are the major transit service generators (hospitals, schools, employment centers, etc.)?
6. What other environmental factors or influences (roadway networks, natural barriers—borders, lakes, mountains)?

**Service Design/Delivery:**

1. Number of annual passenger boardings in fiscal year 2009 (PTN-128)
2. Total number of fixed-route passenger boardings in fiscal year 2009:

<b>Fixed Route Type</b>	<b>No. of Passenger Boardings</b>
Local	
Commuter	
Feeder	
Other	
<b>Total</b>	

3. Number of demand response passenger boardings in fiscal year 2009

<b>Demand Response Type</b>	<b>No. of Passenger Boardings</b>
Advanced reservation (non-subscription)	
Same day	
Subscription (please describe)	
Other (please describe)	
<b>Total</b>	

4. Does your transit system group all trip types, or do some trip types have dedicated vehicles (MTP, schools, etc.)?

<b>Passenger Boardings by Directly Operated or Contracted</b>	<b>No. of Passenger Boardings</b>	
	<b>Directly Operated</b>	<b>Contracted</b>
General public		
Clientele-type services		
Total		

5. Approximately how many spare vehicles does your transit agency have on an average day?
6. What fleet issues are you having, if any, that may affect the efficiency and effectiveness of the transit system?
7. Please list the technology products used in the table below:

<b>Technology Type</b>	<b>Please List the Product in Use in Fiscal Year 2009</b>
Computer-assisted scheduling and dispatching/automated scheduling and routing software	
Automated vehicle locators	
Mobile data terminals/computers	
Other communication equipment (cell phones, radios)	
Electronic payment systems	
Interactive voice response	
Other mapping technologies (e.g., online mapping tools)	

8. Does the agency provide ongoing dispatch training in the use of technologies? How often?
9. If it uses computer-assisted scheduling and dispatching (CASD) or automated scheduling, does the agency re-optimize the CASD parameters to test productivity levels periodically?
10. Does the agency use automated vehicle locators to find the closest vehicle to a waiting patron, to provide vehicle updates to waiting patrons, to determine if the driver is in the right place when calling in a no-show, or to track driver whereabouts?
11. Does the agency use mobile data terminals to log arrival and departure times of vehicles, request permission for no-shows, or monitor drivers that may be off route?
12. Does the agency use technology to minimize driver trip times (review trip lengths, speeds, non-productive time)?
13. Is service coordinated with other transit agencies to utilize vehicle resources during times of day or in areas where service demand is low?
14. Where are vehicles located—end of the day or during the day? How is deadhead managed to be minimized?



15. Does the agency educate patrons on the policies and procedures (fares, cancellations, pick-up windows, shared-ride service)?
16. What service reports does the agency generate? How often and how are they used (is a copy available)?

<b>Report Type</b>	<b>Please Indicate Yes If Generated</b>	<b>How Often Generated (Monthly/Annually)?</b>	<b>How Is the Report Used?</b>
Productivity reports			
No-shows/cancellations			
Late/missed trips			
Grouping trips			
Slack (open times in schedules)			
Calls—staffing, service quality			
Fleet reliability/monitoring/servicing			
Complaints			
Driver issues (unreliable drivers, lost drivers, etc.)			

17. Describe the reservation, schedule, and day-of-service delivery (demand response):

<b>Process</b>	<b>Description</b>
Patron calls in... (appointment or pick-up time scheduled?)	
How is the reservation recorded (manual, scheduling system)?	
Is the patron given a pick-up window?	
Scheduler optimizes schedules at the end of the day?	
How are patrons informed of changes to the schedule (within pick-up window)?	
When are driver manifests printed, and how are they distributed?	
What role does the driver have in service delivery (change schedule)?	
How do dispatchers monitor for late pull-outs, missed trips, cancellations, no-shows (trouble dispatcher)?	
How do drivers communicate or record pick-ups and drop-offs to dispatch?	
When do drivers drop off manifests? Are manifests reviewed for completeness?	

**Service Policies/Procedures:**

<b>Policy/Procedure</b>	<b>Description</b>
Door-through-door, door-to-door, or curb-to-curb service?	
Allow will-call trips?	
Average on-hold, telephone queue time for reservations?	
Is there a subscription requirement?	
Is there an eligibility requirement?	
Does the agency have a send-back policy?	
Does the agency have a no-show/cancellation policy?	
Does the agency have an extra-board for drivers?	
Does the agency have a vehicle breakdown/accident procedure?	
Does the agency have dwell time/idle time and pick-up window policies?	

**Cost Factors:**

<b>Cost Factor</b>	<b>Question</b>	<b>Description</b>
Fuel	How does the agency purchase fuel? What is the percent of budget that is fuel?	
Full-Time Drivers	No. of full-time drivers? Beginning wage, average wage of full-time, highest wage? Guarantee 40 hours per week pay? Average overtime per week per driver?	
Part-Time Drivers	No. of part-time drivers? Beginning wage, average wage of full-time, highest wage? Guaranteed pay hours per week? How much?	
Health Benefit	Amount of health benefit paid by agency?	
Life and/or Other Benefits	Amount of life and/or other benefits paid by agency?	
Maintenance Cost	What is the amount of maintenance cost (preventive maintenance, major repair, body work, etc.) in fiscal year 2009?	
Contract Service	If the agency contracts service, what are the contract terms (cost per mile, cost per passenger, etc.)?	
Other Staff	No. of dispatchers/schedulers/reservations (full-time and part-time) No. of supervisors No. of mechanics No. of administrative staff Other overhead staff allocated to transit	