Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FHWA/TX-08/0-5542-1		

4. Title and Subtitle	5. Report Date
REGIONAL PUBLIC TRANSPORTATION COORDINATION IN TEXAS	Published: January 2008
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
John H. Overman, Linda K. Cherrington, and Jeffrey C. Arndt	Report 0-5542-1

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Texas Transportation Institute The Texas A&M University System College Station, Texas 77843-3135	11. Contract or Grant No. Project 0-5542

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
Texas Department of Transportation Research and Technology Implementation Office P.O. Box 5080 Austin, Texas 78763-5080	Technical Report: September 2005 – August 2007
	14. Sponsoring Agency Code

15. Supplementary Notes

Project performed in cooperation with the Texas Department of Transportation and the Federal Highway Administration.
Project Title: Integrating Regional Multimodal and Public Transportation Planning
URL: http://tti.tamu.edu/documents/0-5542-1.pdf

16. Abstract

Chapter 461 of the Texas State Transportation Code focuses on maximizing the benefits of the state's investment in public transportation through the coordination of services. In 2005, the Texas Transportation Commission, under the leadership of Commissioner Hope Andrade, established the Regional Planning and Public Transportation Study Group. The mission of the Study Group was to review current public transportation planning and programming practices within metropolitan, suburban, and rural areas and to enhance service delivery, customer satisfaction, efficiency and effectiveness. TxDOT sponsored project 0-5542 to support the Study Group and twenty four regional efforts to develop regional coordinated human service public transportation plans. This report and compact disc (CD) presents the major elements of the on-going planning and implementation process being conducted by twenty-four planning regions and TxDOT. The three primary project objectives included:

- a website and information clearinghouse for coordinated public transit-human services transportation plans http://www.regionalserviceplanning.org/
- facilitating regional coordination plan development efforts
- providing technical and information resource services to the planning regions.

The accompanying CD contains the project website and all of its contents as of August 2007. The combined report and CD serve to archive this two year effort.

17. Key Words	18. Distribution Statement
public transportation, public transit, regional coordination, coordinated human service public transportation plan	No restrictions. This document is available to the public through NTIS: National Technical Information Service Springfield, Virginia 22161 http://www.ntis.gov

19. Security Classif.(of this report)	20. Security Classif.(of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	68	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

Regional Public Transportation Coordination in Texas

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Report 0-5542-1
Project 0-5542
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Performed in cooperation with the
Texas Department of Transportation
and the
Federal Highway Administration

January 2008

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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 the 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 would like to acknowledge the leadership and contributions of the Project Director, Shawna Russell, Assistant to Texas Transportation Commissioner Hope Andrade. In addition, the authors would like to acknowledge the contributions from the dedicated public transportation professionals that serve in TxDOT's Public Transportation Division (PTN), the Study Group, and the twenty-four planning regions of Texas. Many other stakeholders, citizens, human service organizations, and public transportation advocates have contributed to public transportation coordination in Texas. Their spirit of cooperation and dedication is commendable. Listed below are some of the key participants and contributors to public transportation coordination planning in Texas.

Texas Transportation Commission
Hope Andrade, Texas Transportation Commissioner
Shawna Russell, Assistant to Commissioner Andrade

TxDOT Public Transportation Division (PTN)
Eric Gleason, Director
Kelly Kirkland
Karen Dunlap
Paul Moon
Steve Wright
Ginny Mayle

Study Group Leader
Michael Morris, Director of Transportation North Central Texas Council of Governments

Texas Planning Region Lead Entities

Alamo Area State Planning Region
Ark-Tex State Planning Region
Brazos Valley State Planning Region
Capital Area State Planning Region
Central Texas State Planning Region
Coastal Bend State Planning Region
Concho Valley State Planning Region
Deep East Texas State Planning Region
East Texas State Planning Region
Golden Crescent State Planning Region
Gulf Coast State Planning Region
Heart of Texas State Planning Region
Lower Rio Grande Valley State Planning Region
Middle Rio Grande State Planning Region
Nortex State Planning Region
North Central State Planning Region
Panhandle State Planning Region
Permian Basin State Planning Region
South East Texas State Planning Region
South Plains State Planning Region
South Texas State Planning Region
Texoma State Planning Region
Upper Rio Grande State Planning Region
West Central State Planning Region

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CHAPTER 1:
PROJECT OVERVIEW

INTRODUCTION

This report and accompanying compact disc (CD) document the results of research project 0-5542, "Integrating Regional Multimodal and Public Transportation Planning" conducted for the Texas Department of Transportation (TxDOT). This research report presents the major elements of an on-going-and-continuing planning and implementation process being conducted by 24 planning regions and TxDOT. Specifically, this research report covers regional coordination of public transportation services in Texas. This research project involved three primary objectives:

- Develop a website and information clearinghouse for coordinated public transit-human services transportation plans.
- Facilitate and assist regional coordination plan development efforts, and
- Provide technical and information resource services.

The accompanying CD contains the contents of the project website http://www.regionalserviceplanning.org/ (RSP website) and all of its contents as of August 2007. Many project-related documents, presentations, reports, and other materials were posted to the RSP website during this two-year project and the website should be considered as part of the research results and this report. Materials that are not contained within this written report are contained on CD. The combined report and CD serve to archive this two-year effort. For example, the coordination plans for each of the twenty-four regions are contained only on the CD and the RSP Website. This written research report is intended to provide an overall capstone to the research project that began in September 2005 and concluded in August 2007. However, coordination planning and implementation continues in Texas' twenty-four planning regions.

BACKGROUND

Chapter 461 of the Texas State Transportation Code focuses on maximizing the benefits of the state's investment in public transportation through the coordination of services. In 2005, the Texas Transportation Commission, under the leadership of Commissioner Hope Andrade,

established the Regional Planning and Public Transportation Study Group (Study Group). The mission of the Study Group was to review current public transportation planning and programming practices within metropolitan, suburban, and rural areas and to enhance service delivery, customer satisfaction, efficiency and effectiveness.

TxDOT sponsored project 0-5542 to support the Study Group and regional efforts to develop regional coordinated public transit-human services transportation plans. Specific support activities of the project included:

- developing a website and information clearinghouse,
- facilitating regional public transit coordination and coordination plan development, and
- providing technical and information resources.

The Study Group recommended that each region of the state develop and submit a regional coordinated public transportation service plan to the Commission by December 2006.

The Study Group divided the state into 24 regions and proposed lead agencies for each region. Each of these regions and their lead agencies then formed a local steering committee to help oversee the service regional planning process. The twenty-four regions and the current lead agencies are shown in Figure 1. The regions represent many diverse settings, and include:

- 8 Metropolitan Transit Authorities serving areas with populations over 200,000
- 30 Urban Transit Districts serving urbanized areas with populations between 50,000 to 200,000
- 39 Rural Transit Districts serving areas with a population under 50,000
- 343 Service Provider Companies, with a combined fleet of 7,753 vehicles
- 16,400 private-for-hire vehicles

The Study Group hosted five statewide workshops to guide this initiative and to showcase practices. Through the work of this group, transit delivery in Texas is being coordinated to meet the requirements of Chapter 461.

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was signed into law in August 2005. Provisions in SAFETEA-LU require the establishment of locally developed, coordinated public transit-human services transportation plans. In February 2007, the Federal Highway Administration (FHWA) and the

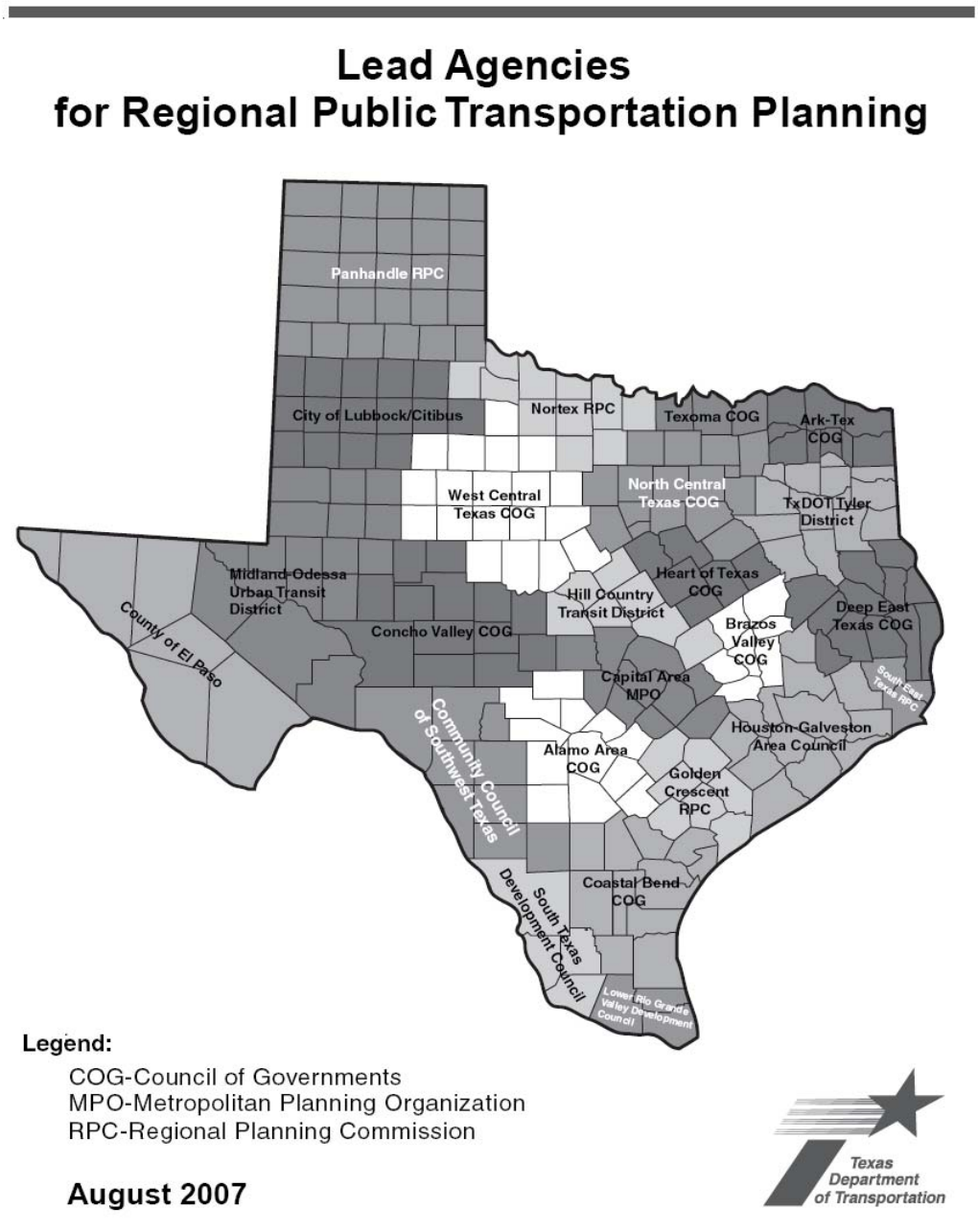

Figure 1. Lead Agencies for Texas Planning Regions .

Federal Transit Administration (FTA) issued rules requiring public transit -human services coordination planning.[1]

Texas was prepared to meet the new state and federal requirements and advance the state of public transportation coordination in Texas because the early initiative of Commissioner Hope Andrade and the Study Group began before SFATEA-LU and the subsequent federal planning rules.

PROJECT OUTCOMES

From September 2005 through August 2007, Texas Transportation Institute (TTI) participated with TxDOT in fifty facilitations and/or presentations in 14 of the 24 regions. The dates and locations of the meetings and facilitation sessions for fiscal years 2006 and 2007 where TTI participated are presented in Tables 1 and 2. In addition to the listed meetings with TTI participation, TxDOT staff conducted many additional meetings with regions throughout Texas. The meetings in bold type depict a meeting of the Study Group where all of the 24 regions convened together to share progress and address common issues during the regional coordination planning process.

Figure 2 shows Commissioner Andrade addressing representatives from the planning regions at the May 2007 meeting. The agendas and presentations from these meetings are posted to the Regional Service Planning website and accompanying reference CD.

The twenty-four 24 state planning regions also held regular meetings with a wide range of stakeholders represented and established a set of common regional goals and objectives that served as the key in developing successful coordination plans. Some of the regional planning meetings had more than 100 stakeholders in attendance. Many of the regions also used the RSP website to announce their meetings and post information from the meetings. During this research project from 2005 through 2007, the planning regions reported their progress on regional coordination planning stages to the Study Group. These activities included:

- identifying stakeholders,
- coordinating work plans,

[1] Department of Transportation, Federal Highway Administration, 23 CFR Parts 450 and 500, Federal Transit Administration 49 CFR Part 613. Statewide Transportation Planning; Metropolitan Transportation Planning; Final Rule National Archives and Records Administration , Federal Register. Vol. 72, Issue 30 February 14, 2007. p. 7224-7286

- developing regional organizational structure,
- preparing regional goals and objectives,
- outreaching to stakeholders,
- identifying needs and strategies,
- identifying barriers, constraints, and best practices in existing coordination efforts,
- preparing the regional coordination plan outline, and
- preparing the regional coordination plan document.

Ultimately, each of the 24 regions prepared and submitted regional public transportation service coordination plans to the Commission in December 2006.

Table 1. FY 2005-06 Project Meetings, Technical Support and Facilitation Activities.

	Location	**Date**	**Type Meeting/Service**
1	Tyler	October 6, 2005	Facilitation
2	College Station	October 12, 2005	Project meeting
3	**Austin**	**October 18-19**	**Study Group meeting**
4	Longview	October 25, 2005	Facilitate coordination meeting
5	Pharr	November 8, 2005	Facilitate coordination meeting
6	Marshall	November, 18, 2005	Facilitate coordination meeting
7	Laredo	January 11, 2006	Facilitate coordination meeting
8	Pharr	January 12, 2006	Facilitate coordination meeting
9	Odessa	January 18, 2006	Facilitate coordination meeting
10	Austin	February 1, 2006	Transit operators meeting
11	Longview	February 28, 2006	Facilitate coordination meeting
12	Marshall	March 22, 2006	Facilitate coordination meeting
13	Marshall	April 5, 2006	Facilitate coordination meeting
14	El Paso	April 6, 2006	Facilitate coordination meeting
15	Pittsburg	April 26, 2006	Facilitate coordination meeting
16	Waco	May 16, 2006	Facilitate coordination meeting
17	Waco	May 23, 2006	Facilitate coordination meeting
18	Waco	May 25, 2006	Facilitate coordination meeting
19	**Austin**	**June 29, 2006**	**Roundtable meeting**
20	**Austin**	**June 30, 2006**	**Roundtable meeting**
21	Wichita Falls	July 6, 2006	Facilitate coordination meeting
22	Waco	July 11, 2006	Facilitate coordination meeting
23	Waco	July 25, 2006	Facilitate coordination meeting
24	Wichita Falls	July 27, 2006	Facilitate coordination meeting
25	Sherman	August 15, 2006	Facilitate coordination meeting

Table 2. FY 2006-07 Project Meetings, Technical Support and Facilitation Activities.

	Location	Date	Type Meeting/Service
1	Sherman	September 7, 2006	Facilitate coordination meeting
2	Waco	September 12, 2006	Facilitate coordination meeting
3	Waco	September 19, 2006	Facilitate coordination meeting
4	Wichita Falls	September 19, 2006	Facilitate coordination meeting
5	Waco	September 26, 2006	Facilitate coordination meeting
6	Sherman	October 3, 2006	Facilitate coordination meeting
7	Sherman	October 31, 2006	Facilitate coordination meeting
8	Alpine	November 1, 2006	Facilitate coordination meeting
9	Austin	November 7, 2006	Project coordination meeting
10	**Austin**	**November 8, 2006**	**Barriers and constraints workshop**
11	Austin	November 15,2006	Project coordination meeting
12	Austin	November 16, 2006	Texas Transportation Commission meeting
13	Temple	December 12, 2006	Alternative fuels meeting
14	Arlington	January 8, 2007	Project coordination meeting
15	Austin	January 24, 2007	Project coordination meeting,
16	Austin	February 6, 2007	Project coordination meeting
17	Ft. Worth	February 9, 2007	Statewide video conference
18	**Austin**	**May 3, 2007**	**Study Group workshop**
19	Victoria	June 6, 2007	Technology case study work session
20	Victoria	June 26, 2007	Technology case study work session
21	Austin	July 9, 2007	Project coordination meeting
22	Houston	July 12, 2007	Regional coordination meeting
23	Austin	July 17, 2007	Transit operators meeting
24	The Woodlands	July 20, 2007	Facilitate transportation task force
25	Austin	July 26, 2007	Facilitate technology application

Figure 2. Texas Transportation Commissioner Hope Andrade Addressing the Regional Planning Representatives at the Study Group's Workshop on May 3, 2007.

REGIONAL SERVICE PLANNING WEBSITE AND CLEARINGHOUSE

In addition to facilitating and documenting meetings, researchers developed a website and information clearinghouse (see Figures 3 and 4). Plans from each of the 24 regions are posted to the website. The regions also reported on work plans, stakeholders, and identified barriers and constraints to coordination, all of which was shared via the regional service planning clearinghouse on the RSP website.

The original RSP website (Figure 3), included:

- a clearinghouse where users can access records of websites, documents, and other material that may be useful in developing regional plans;
- information about the Regional Planning and Public Transportation Study Group and its activities;
- announcements for coordination related news, events, and documents;
- a calendar of events and meetings;
- a map of the Texas transportation regions with contact information for each region; and

- an email group that enables users to participate in or help facilitate efforts to coordinate regional transportation.

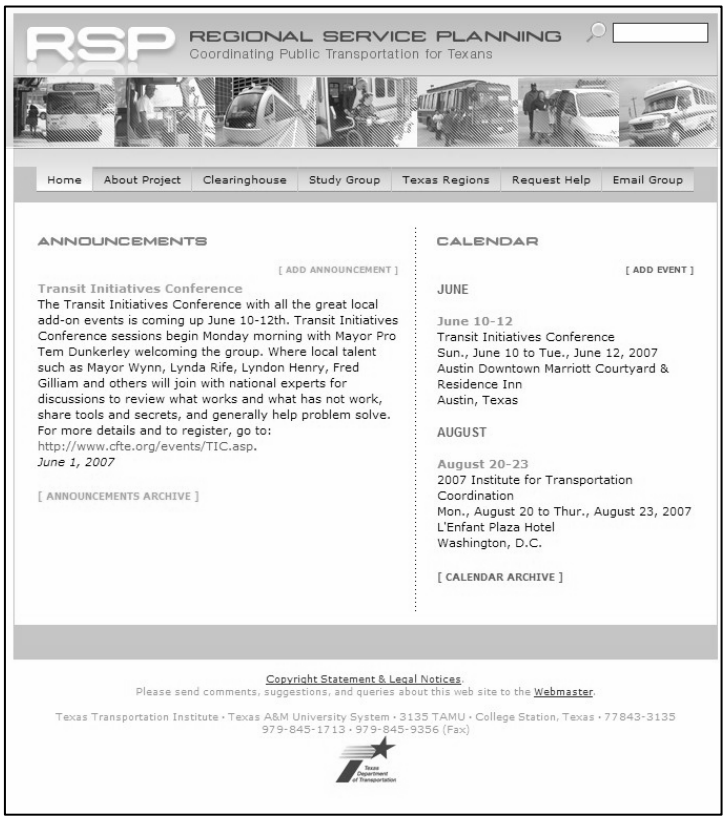

Figure 3. Home Page Screenshot of the Regional Service Planning Website, June 2007.

The regional service planning website http://www.regionalserviceplanning.org was updated in the summer of 2007 and subsequently debuted August of 2007. The website includes additional web pages to support maintenance issues, including the Operator's Technical Assistance Program (OTAP), the Rural Transit Assistance Program (RTAP), and the Regional Maintenance Project that provides an outreach and clearinghouse function.

Many other aspects of the RSP website were updated to aid the 24 regions across Texas coordinate public transportation services and implement on-going coordination efforts. RSP website users can find published planning resources, announce meetings, request assistance, and join an online community. A screen-shot of the new website is provided below (Figure 4). The updated RSP website includes:

- Coordination Clearinghouse – Users may access records of websites, documents, and other materials that may be useful for regional plan implementation and public transithuman service coordination.
- Maintenance Clearinghouse - As part of the Operators Technical Assistance Program (OTAP), this clearinghouse provides access to records of websites, documents, and other materials that may be useful to maintenance coordination and the regional maintenance center project.
- Texas Regions – Users may view a map of the Texas regions and find contact information for each.
- Contact Us – Users may request help from TxDOT or TTI
- Announcements
- Calendar
- Online Communities – Users may join these groups to participate and share experiences in coordinating regional public transportation across Texas. There are two online communities:
    - Coordination community
    - Maintenance community

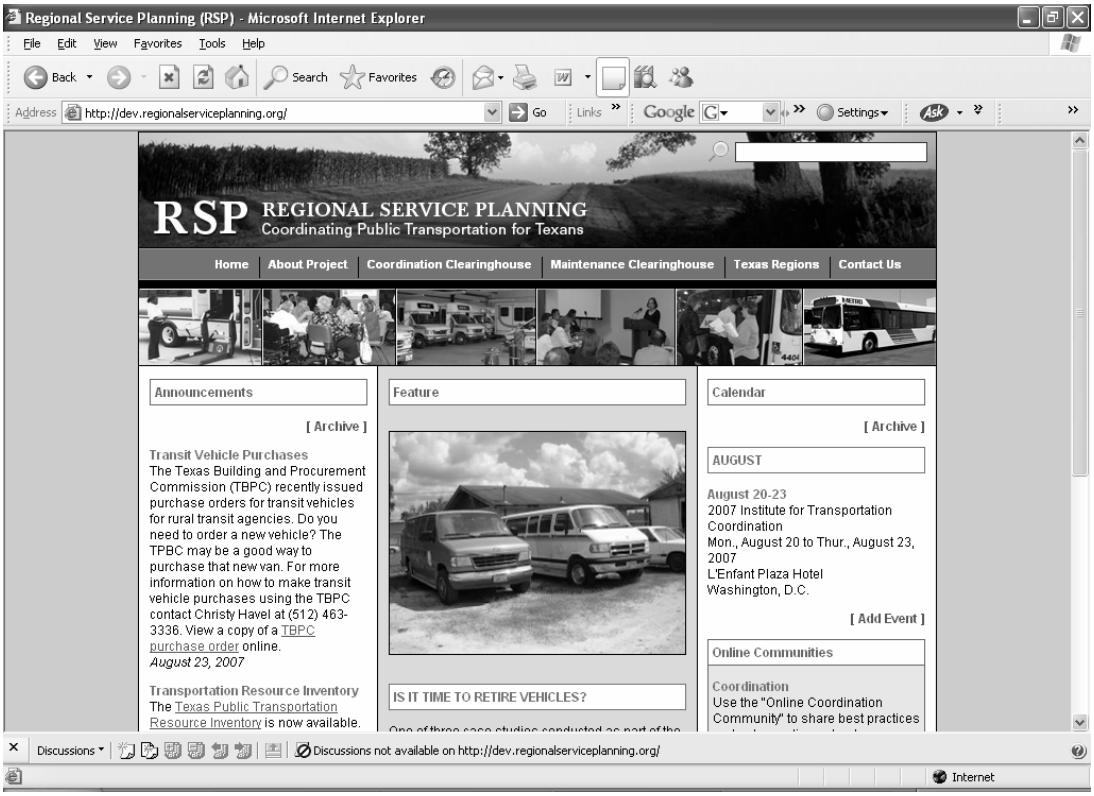

Figure 4. Updated RSP Website Homepage Screen-Shot August 2007.

CHAPTER 2:
REGIONAL COORDINATION PLAN DEVELOPMENT

This chapter provides an overview and highlights from the regional coordination planning process. The chapter presents key elements of the process, barriers/constraints, and best practices from the region's coordination planning efforts.

OVERVIEW OF COORDINATION PLAN DEVELOPMENT PROCESS

The preparation of regional coordination plans in Texas was the result of a planning process that included three general phases of development. A fourth implementation phase of coordination activities is currently underway. It is important to note that these planning phases did not always occur sequentially. Like any planning process, the development of the regional coordination plans is an iterative process. Also, some regions had existing coordination plans and on-going coordination efforts in place. In other regions, coordination efforts were much less developed and the planning process provided an opportunity for regions to coordinate for the first time.

Phase I – Preliminary Planning (plan to plan)

In this initial planning phase general information was collected by the regions and the Study Group. Although each region's approach and process may have varied, the consistent elements in this phase of development included the following planning elements:

- Prepare initial budgets for the planning effort
- Determine lead entities and organization structure
- Identify key stakeholders
- Prepare general work plans, work assignments, and schedules

Phase II – Goals, Objectives/Needs and Strategies

The second phase of the process focused primarily on establishing goals and objectives and assessing the current strengths and weaknesses in existing coordination planning efforts. The following general planning elements were addressed:

- Outreach to stakeholders
- Prepare goals and objectives

- Identify needs and strategies using Framework for Action[2]
- Identify barriers/constraints and best practices
- Prepare plan outline and action plan

One of the key planning elements which factored heavily in the success of the regional efforts consisted of establishing a region's goals and objectives, followed by identifying needs and strategies.

The research team provided guidance for regions by providing:

- Facilitation service to establish goals and objectives
- "A Framework for Action" and other community assessment tools
- Example plans from other regions in the state and from across the country

Phase III – Plan Preparation

During the plan preparation phase, regions had access to guidance documents and samples plans from other regions in the state and from across the country through the RSP website. In addition, regions were provided a sample plan document outline. This sample plan outline (Figure 5) was developed through a collaborative effort among TxDOT, TTI, and regional representatives. In December 2006, all 24 regions submitted coordination plans to the TxDOT Study Group. The following planning elements were accomplished in this phase of development.

- Sample outline for plan preparation
- Plan document preparation
- Action plan preparation
- Barriers and constraints forms and descriptions

[2] "A Framework for Action: Building the Fully Coordinated Human Service Transportation System is a community assessment tool prepared for the Federal Transit Administration. Washington, D.C. 2003. available at http://www.fta.dot.gov/CCAM/ www/index.html or www.ccam.gov.

Coordinated Regional Public Transportation Plan

(Sample Outline)

- **TITLE PAGE**
- **TABLE OF CONTENTS**
- **ACKNOWLEDGMENTS**
- **EXECUTIVE SUMMARY** *(2-5 pages highlighting key goals and action items)*
- **BACKGROUND**
  - Regional Description
    - Geography and Demographics
    - Planning Partners *(who does what)*
    - Current Public Transportation Services/Providers *(who does what)*
  - History of Regional Coordination of Public Transportation
    - Past/continuing planning activities (*share what's been done*)
    - Past and current implemented projects/services
- **REGIONAL SERVICE COORDINATION PLANNING**
  - Planning Process & Work Plan Descriptions *(what are you doing, how, and with whom)*
    - Organization
      - Lead Entity(ies)
      - Other Involved Entities
      - Committee(s) Structure Description
    - Outreach/Public Involvement Description
- **COORDINATED TRANSPORTATION PLAN**
  - Goals and Objectives
  - Regional Needs Assessment
    - Regional Transportation Resources: Overlaps and Gaps (*unmet needs*)
    - Strategies to Address Gaps and Needs
    - Barriers/Constraints
  - Coordination Action Plan
    - Actions Items/Service Descriptions
    - Prioritization/Implementation
    - Schedule
  - Inter-regional coordination
  - Action Plan Evaluation
  - Continuing/Sustaining the Coordination Plan
    - Continuation strategies
    - Plan Update Cycle/Process
- **APPENDICES**
  - Provider Inventory Summary
  - Public Outreach Activities Summary
  - Framework for Action

Figure 5. Sample Coordination Plan Outline.

Phase IV - Plan Implementation

Most regions implemented action plans concurrent with their planning process or expanded on-going coordination efforts. Plan implementation efforts generally began after plans were submitted in December 2006. This research project concluded in August 2007 during the implementation phase of coordination efforts in most regions. TxDOT continues to provide on-going support to the regions using TTI on an as-needed basis.

KEY ELEMENTS AND BENCHMARKS IN COORDINATION PLANNING

There were several key elements involved in coordinating regional public transportation in Texas. These key elements occurred at various stages of coordination plan development but were generally common to all of the regions' planning efforts. The regions reported these key elements to the Study Group and TxDOT. Documents associated with these efforts are included on the CD and RSP Website.

Study Group Workshops

Four of the Study Group workshops generally coincided with the phases of planning process and addressed key planning elements. These workshops included focused efforts on identifying stakeholders, and addressing barriers/constraints and practices. The agendas, presentations and handouts from each the Study Group meetings are available on the RSP website or the CD. These workshops included:

- Regional Planning and Public Transportation Coordination Workshop. May 3, 2007, Austin, Texas.
- Regional Planning and Public Transportation Coordination Workshop. November 8, 2006, Austin, Texas
- Texas Best Practices Roundtable. June 29-30, 2006, Austin, Texas
- Sharing Approaches Workshop. October 19, 2005, Austin, Texas

Stakeholders

One of the very first tasks the regions undertook was to identify stakeholders and to organize stakeholder representatives into a steering committee. Many regions already had

existing committees dedicated to public transportation. To assist newly forming and existing committees, the regions were provided with a suggested representation list, and when requested, example by-laws for organizing steering committees. The suggested representation list for committees is in Table 3.

The regions submitted stakeholder lists to the Study Group early in the plan development process. All of the available stakeholder lists submitted by the regions were posted to the RSP website under the *Regions* tab. (See accompanying CD).

Table 3. Regional Public Transportation Coordination Suggested Representation.

Group	Category	Types of Agencies Represented
General Public Transportation	Public transportation authorities, urban transit systems and rural transit districts	Transit authorities (regional, metropolitan, county, municipal) Urban transit providers (5307) Rural transit providers (5311)
	Intercity transportation providers	National intercity providers Regional intercity providers
	Passenger rail transit (intercity)	Rail transit districts Intercity rail
	Agencies that fund public transportation for the general public	TxDOT District (Planning and Public Transportation) *Federal Transit Administration* *Federal Highway Administration (CMAQ)*
Client Transportation	Client transportation providers	*Examples including but not limited to* TxDOT medical transportation program Meals on Wheels Parks and recreation programs Senior services Community action agencies Mental health services Mental retardation services
	TxDOT elderly and disabled (5310)	Recipients TxDOT 5310 funds to provide client transportation
	Health and human service agencies that fund or purchase transportation for clients	*Regional representation for the following:* Health and Human Services Commission (HHSC) Department of Aging and Disability Services (DADS) Department of Assistive and Rehabilitative Services (DARS) Department of Family and Protective Services (DFPS) Department of State Health Services (DSHS) Texas Council on Developmental Disabilities Commission on Alcohol and Drug Abuse
		Area agency on aging Workforce development boards
Regional Planning	Regional transportation planning organizations	Metropolitan Planning Organization (MPO) Council of Governments (COG) Regional Planning Council (RPC) Regional Mobility Authorities (RMA) if applicable

Table 3. (Continued)
Regional Public Transportation Coordination Suggested Representation.

Group	Category	Types of Agencies Represented
Local Gov't	Elected officials, local governments	Representative from elected officials on behalf of regional counties and cities
	Economic development	City or county or regional economic development programs
	Emergency first response	City or county or regional emergency management programs
	Related programs	Housing authorities
Human Service Providers	Agencies that provide services for clients who need transportation	*Examples including but not limited to* Hospitals Medical clinics Recovery services City health and human services County health and human services Veterans services Disability assistance Economic opportunity programs United Way and partner agencies Easter Seals Domestic violence & sexual assault survival centers Faith-based organizations
Advocates	Advocates for those who use or need public transportation and advocates for transit coordination	*Examples including but not limited to* American Association of Retired Persons (AARP) Center for Independent Living ARC Guide Dog Users of Texas Lighthouse for the Blind Texas Mental Health Consumers Just Transportation Alliance
Public	User of public transportation – urban	
	User of public transportation – rural	
	Interested general public	
Other Transportation	University transportation providers	State universities Private universities Community colleges Vocational institutes
	Armed forces	Transportation programs for military bases
	Private sector providers	Local taxi companies Taxi, Limo & Para-transit Association
	Faith-based transportation providers	Local churches Interfaith Ministries
	Sponsor of volunteer driver programs	Representative from caregivers, organizations
	Student transportation	Representative from local school districts
Business	Business community	*Examples including but not limited to* Representative from regional Chambers of Commerce Representative from economic development initiatives

Source: Initial list provided by Capital Area RTCC, modified by participants in Best Practices Roundtable Junes 2006

Barriers and Constraints

One of the most noteworthy efforts being undertaken by TxDOT, the Study Group, and the planning regions is identifying and addressing barriers and constraints to coordination. Commissioners wanted to identify barriers and constraints to coordination and in early 2006, TxDOT and the Study Group requested each of the regions to submit barriers/constraints and best practices. The Study Group wanted a list of barriers that they could take back to the commissioners and to the legislature, as well as a list of practices to share among the regions. The barriers/constraints and best practices were identified through interviews, meetings, and research.

TxDOT, TTI, and selected members of the Study Group teamed together to review all of the submitted barriers/constraints and best practices. The results of the review were presented at the June and November 2006 Study Group meetings, and posted to the RSP website. Provided below are highlights of these barriers, constraints and best practices that have been reported by the planning regions. Additional information on barriers, constraints and best practices is also available on the RSP Website and accompanying CD. The barriers/constraints and best practices are also contained within most of the regions' plans.

Defining what constitutes a barrier is important to the coordination planning process. For example, an aging fleet might have been cited by a region as a barrier, but this could be resolved with more money and newer vehicles. An aging fleet does not necessarily provide a barrier to coordination since vehicle age does not directly address coordination issues. In contrast, barriers are issues that directly affect coordination and may need a legislative or policy action. The working definition of barriers and constraints are provided below.

Barriers *are defined as something that obstructs. It is a structure blocking access; or structure intended to prevent access or to keep one program separate from another. In the case of coordination, barriers may be written into statute, code, regulation, policy, or contract language that prevents coordination.*

Constraints *are limiting factors. It is something that limits the freedom to act. It can be a practice, restriction or limitation. A constraint requires initiative to resolve, but is not codified into law or rule. Example constraints include historical practices, misinformation, myths, institutional conflicts or agency turf issues.*

In response to the TxDOT Study Group request, the twenty-four regions cited 162 barriers and 215 constraints. On average, each region reported 16 barriers/constraints, with a range of 4 to 35 citations per region. Among the barriers/constraints cited, six common issues emerged. The bulleted list below provides only description of the barrier/constraint topic cited by the regions. The complete list of barriers/constraints cited by the regions is available on the RSP website or the accompanying CD. The six most commonly cited barriers/constraints were:

- Alternative Fuel. Alternative fuel requirements, in particular the use of propane fueled vehicles, resulted in an operational and maintenance burden to operators.
- Drivers. Hiring, training and availability of qualified drivers limiting coordination activities. Additionally, varying hiring and training standards among agencies was perceived to create a constraint.
- Vehicles and Fleets. Aging vehicles cost more to operate. New smaller vehicles are needed. Different types of vehicles are needed (minivans) because larger vehicles are not suited to the types of service being performed.
- Technology. Improving and using new technology applications is needed to improve operational efficiency and coordination, particularly in the areas of communications, dispatching and routing.
- Vehicle Requirements. The requirement that all vehicles be Americans with Disabilities Act (ADA) equipped is a constraint when a small portion of trips require ADA equipment.
- Insurance. The increasing cost of liability insurance and restrictions on vehicle sharing, differing insurance requirements for various programs, and inflexible requirements for van pool drivers.

The most common barrier/constraint cited by the regions related to the requirement to use alternative fuel vehicles and in particular, propane fueled vehicles. Seventeen of the twenty-four regions reported that alternative fuel requirements (and issues related to propane fueled vehicles) as a barrier to improving coordination. The second most commonly cited barrier/constraint was the driver training and hiring topic which was reported by thirteen of the twenty regions. The remaining barriers/constraints topics were cited as follows:

- 11 cited technology applications,
- 9 regions cited vehicles and fleet issues,

- 9 regions cited insurance issues, and
- 5 regions cited ADA equipment requirements.

Figure 6 presents the results of these six most cited barriers/constraints.

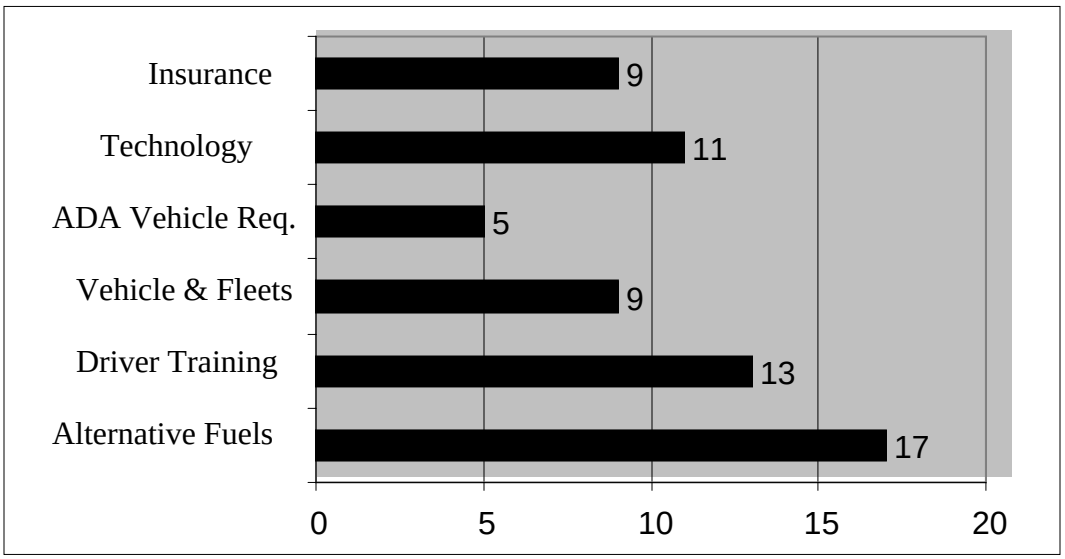

Figure 6. Frequency of Barrier/Constraints Cited by Regions.

WhitePapers

Recognizing that these six barriers/constraints garnered the most mention from the regions, TxDOT, the Study Group, and TTI collaborated to research these issues in greater depth. As part of this research effort, TTI prepared five informational white papers on these issues to dispel common misunderstandings on the topics. The research on barriers/constraints and information also provided TxDOT and the Study Group an opportunity to clarify policies that might affect barriers/constraints. For example, TxDOT clarified its position on the purchase of new transit vehicles to a fuel neutral and emissions-based guidance. The five white papers on the RSP website or the accompanying CD are:

- Alternative Fuel Vehicles at Small Urban and Rural Public Transportation Systems in Texas, 2007
- Insurance for Small Urban and Rural Public Transportation Systems in Texas, 2007
- Transit Vehicles for Small Urban and Rural Public Transportation Systems in Texas, 2007

- Driver Hiring and Training Standards, 2006
- Technology and Public Transportation Operation and Management, 2006

Positive Outcomes

Perceived barriers/constraints were frequently overcome through:

- research,
- education and outreach,
- policy clarifications, and
- new initiatives.

As one constraint was identified, other related perceived barriers/constraints were often addressed. For example, the use of emissions-based criteria for new vehicle purchases to address alternative fuel concerns by the regions led to a broadening of vehicle procurement options for the regions. To ease vehicle procurement constraints, TxDOT facilitated joint purchase agreements among the regions, cooperative purchases, and facilitated the use of the Texas Building Procurement Commission (TBPC) that allows providers to take advantage of the state's buying-power. This situation is just one example of a commonly cited barrier/constraint being addressed to improve coordination. Listed below are selected highlights from barriers/constraints and best practices. The regions reported on their successful practices within their regional coordination plans. Readers interested in the successful outcomes from the twenty-four regions in Texas are encouraged to examine the regional coordination plans on the CD and/or RSP Website.

Inter-agency Coordination

An early constraint identified by the regions was coordinating services with Health and Human Services (HHS) and other organizations to provide coordinated transportation service. The constraints frequently center on:

- differing agency goals and missions,
- turf issues,
- cost allocation, and
- differing clients' needs.

As with many coordination efforts across the country, success in inter-agency coordination began with finding common ground, establishing mutual goals, and building relationships. In Texas, several regions identified themselves as having success in HHS and interagency coordination. This list provides only a sampling of successful interagency coordination.

- **Capital Area** has been coordinating and contracting service with HHS for years. Their inter-agency working relationship is the foundation for coordination.
- **Central Texas** has been providing client-based transportation service based on established relationships with HHS and other organizations. Maintaining those relationships with organizations and clients is a key to their on-going coordination efforts.
- **Coastal Bend** used workforce money to fund a transportation coordinator position to be shared by various agencies.
- **Deep East Texas** recognized that establishing common goals at the local level helped build a foundation for their coordination efforts.
- **Permian Basin Region** has a fuel-sharing and cooperation agreement among providers.
- **Gulf Coast works through**the Harris County RIDES Program, formerly known as the Harris County Coordinated Transportation Program (HCCTP), which coordinates many of Harris County's transportation resources to provide basic mobility for people with disabilities, seniors, and low-income residents. The program involves the City of Houston, Houston Galveston Area Council (H-GAC), the Greater Houston Chapter of the American Red Cross, Houston METRO, Area Agency on Aging, and other stakeholders. When the current transportation system is unavailable, insufficient, or inappropriate, RIDES fills in the gaps to provide non-emergency transportation service.
- **West Central Texas** has four agencies working together and created momentum by breaking down one barrier at a time. As each barrier falls, it provides momentum for more coordination.
- Middle Rio Grande and NORTEX and other regions cited success in coordinating services and funding opportunities with regional workforce development boards.

Information Technology

Information technology in transit applications can benefit transit operations by helping to improve efficiency, flexibility, convenience, safety, and security. These technologies can similarly benefit coordinated efforts. A sample of these on-going efforts is described below:

- **Capital Area Rural Transportation System (CARTS)** provides rural, urban, and medical transportation in a nine-county area. CARTS has become known for its effective use of advanced public transportation systems (APTS) technologies to improve passenger service, including demand-response transit scheduling software, voice and data communications, and automated vehicle locater (AVL). One challenge that CARTS faced was in a partnership with the Lower Colorado River Authority (LCRA). CARTS uses mobile data terminals that operate on LCRA's radio network to communicate with its vehicles across a large, mostly rural area where cell phone service can be unreliable. CARTS credits the success of its technology program to its baby steps approach for adding new systems. The transit system makes sure that each new technological element is working smoothly before adding the next element.
- **El Paso County Rural Transit**, using a grant from the rural transit assistance program, is developing an intelligent transportation system (ITS) application that will be integrated into El Paso County's transit service. Project tasks have included extensive investigation into available transit technologies (hardware and software), evaluation of the compatibility of identified components, and development of recommendations and strategies for integrating technology systems into transit operations. A demonstration project will deploy a smart bus equipped with a system of ITS technologies.
- **Golden Crescent** conducted technology assessment and software training as part of a case study implementation of this research project. The case study is highlighted in the following chapter.

Facilitating Longer Distance Trips

Long distance trips are a challenge in many parts of Texas due to the dispersed population centers, service destinations, and regional characteristics. Larger planning regions in Texas cover hundreds of square miles.

- **Middle Rio Grande --** Region coordinates trips among providers in the region and developed a memorandum of understanding (MOU) with providers and organizations to share client trips that ultimately reduce wait times.
- **Permian Basin –** West Texas Opportunities, the region's provider, assigns work to drivers/vehicles from adjacent regions promoting inter-regional cooperation among providers.
- **Texoma Region – Texoma Area Paratransit Services (**TAPS), the rural provider north of the Dallas-Ft. Worth (DFW) area makes connection to Dallas Area Rapid Transit (DART), the metropolitan transit provider in adjacent county. TAPS also provides rides from the Veterans hospital to neighboring Greyhound, and provides single point service access.

Driver Qualifications and Skill Training

Hiring practices and driver standards from fourteen different transit providers are highlighted in the Driver Hiring and Training Standards White Paper[3]. Common noteworthy practices occurring at Texas planning regions is peer-to-peer and shared training.

- **Upper Rio Grande,** the metropolitan transit authority in El Paso, is inviting drivers from other providers to training classes, cooperating with the community college for mechanic training proposes, and proposing to draw from a pool of school bus drivers on weekends.
- **Heart of Texas requires that** all drivers have commercial driver's license(CDL) and undergo same standards so that all drivers can be shared among providers and services. Many regions include background checks and CDL as minimum standard for all drivers. Heart of Texas region is just one example.

[3] The Driver Hiring and Training Standards white paper is available on the RSP Website via this link

- **Alamo Area** uses drivers from an employment service to meet intermittent increases in demand for drivers and service. This provides a ready pool of qualified drivers.
- **Deep East Texas** uses peer-to-peer training among providers to reduce costs and avoid duplication of training services.
- **Middle Rio Grande** shares its trainer among providers, so that one trainer can assist in meeting training demands for numerous providers across the region.
- **Gulf Coast / Houston-Galveston Region** offers no-cost and low-cost training to providers.

Insurance

Insuring vehicles and drivers was cited as barrier/constraint to coordination among regions. As examined in the white paper and evidenced by many regions, reducing risks and working closely with insurance carriers provides the best opportunity to address insurance barriers/constraints.

- **Texas Municipal League Intergovernmental Risk Pool** (TMLIRP). TMLIRP provides Texas municipalities and other units of local government with risk financing and loss prevention services. The Pool offers workers' compensation, liability, and property protection to Texas political subdivisions, which include transit authorities and councils of government.
- **Shared Vehicle Misconception.** The Federal Interagency Coordinating Council on Access and Mobility (CCAM) adopted a policy statement that eliminates any misconceptions on preventing vehicle resource sharing. The CCAM policy statement: "…clarifies that Federal cost principles do not restrict grantees to serving only their own clients. To the contrary, applicable cost principles enable grantees to share the use of their own vehicles if the cost of providing transportation to the community is also shared."
- **Mixing Client Population Misconception**. It is important to note that public transportation providers have been mixing clients successfully for years. It is possible to manage risk by developing and adopting driver and training standards and limiting mixing with school-aged riders. Many coordination projects address

the issue of client mixing by educating member agencies about not only the differences, but the similarities of their particular client population.

Purchasing and Procurement

The examination of barriers/constraints associated with vehicle and fleets provided an opportunity to improve procurement options for providers. This on-going effort seeks to maximize providers buying power while reducing costs. Aside from individual purchases by agencies, regions have been able to make group purchases and use cooperative purchasing agreements. Group and cooperative purchases may offer the benefit of lower cost procurement through increased buying power and by taking advantage of purchasing experience and expertise. The FTA and TxDOT encourage the use of group and cooperative purchases when appropriate.

- **Group Purchase Agreements** – two or more grantees combine to procure vehicles. This is sometime referred to as piggy-back procurement. Group purchases have been made among Capital Area/Central Texas/Heart of Texas and other agencies.
- **Cooperative Purchases** – grantees purchase through another agency such as the Texas Building Procurement Agency (http://www.tbpc.state.tx.us) or the Houston-Galveston Area Council (HGAC) (https://www.hgacbuy.org/default.html.) Examples of regions participating in these programs include the purchase of ramped mini-vans and professional services through the HGAC

Vehicles

When barriers/constraints associated with vehicles and fleet composition were examined, vehicle and fleet issues became much less problematic. In the case of alternative fuels usage (in particular propane vehicles), policies were clarified. For vehicle fleet selection and configuration, increased flexibility on new vehicle purchases provided regions with new coordination opportunities. For example:

- **New vehicle purchases are emissions-based/fuel neutral standards**. In attainment areas, new vehicles should meet low emission vehicle (LEV) standard. Ultra-low emission vehicles (ULEV) are required for non-attainment areas. Using the current Environmental Protection Agency (EPA) terminology, this is the

equivalent of Tier 2, Bins 1-5. A map of the affected rural districts is shown in Figure 7.

- **Americans with Disabilities Act (ADA) equipment is not required on all new vehicle purchases.** But vehicles should be ADA equipped when it is appropriate for the type service the vehicle will perform, and in consideration of the overall fleet composition.
- **Ramped minivans were recently purchased through the TPBC.** These smaller vehicles, compared to the traditional Type II cutaway bus, are appropriate for certain types of services and allow regions to match the vehicle to service demands more effectively.

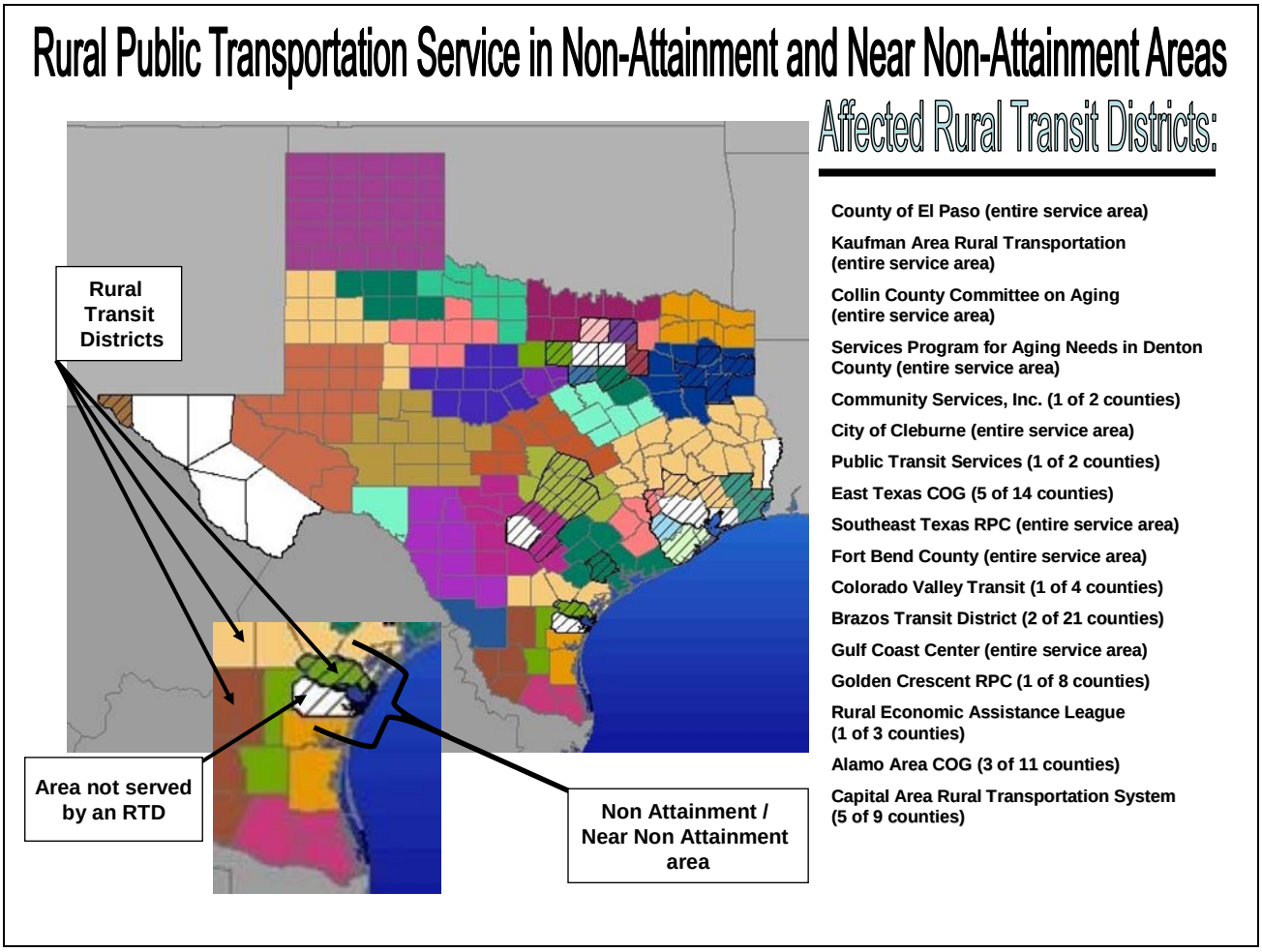

Figure 7. Rural Transit Districts in Non-Attainment Areas.

COORDINATION PLANNING SUMMARY

With many different agencies and stakeholders involved in public transportation, coordination and cooperation were keys to successful regional coordination plans. Regions in Texas have also been able to overcome barriers/constraints faced in coordinating public transportation operations and services. By beginning the coordination planning process early in 2005 and completing regional coordination plans in December 2006, Texas addressed federal requirements quickly. TxDOT, the Study Group, TTI, and the twenty-four planning regions continue to work together to implement public human service coordination.

Although it is difficult to quantify the benefits of this effort, great strides have been made in opening lines of communication and understanding among the coordination stakeholders. Secondly, many barriers and constraints that were previously perceived as insurmountable are now recognized as opportunities to improve coordination. Perhaps the greatest benefits are improved transportation services for the many Texans – young and old, disabled or not, and in both urban and rural settings – that rely on public transportation to travel to their jobs, make it to medical appointments, and live productive lives.

CHAPTER 3:
CASE STUDIES

COORDINATION IMPLEMENTATION PROJECTS

In May 2007, TxDOT requested the TTI team to prepare three case studies. The purpose of the case studies is to assist an individual region and/or provider to improve coordination with a specific implementation project that could be repeated in other regions. The three case study topics included:

- Asset management and vehicle disposition,
- Technology application in human service public transportation coordination, and
- Updating the RSP website to include a transit maintenance clearinghouse.

These three topics were short-listed from a larger list of eighteen potential implementation projects. Case Study 3, "Updating the RSP website", is described in Chapter 1. Overview of the Project, in this report. Case Studies 1 and 2 are presented below. Each case study was also prepared as an individual deliverable for the project.

CASE STUDY 1 - VEHICLE DISPOSITION

Guidelines for the disposition of transit vehicles vary because of differences in state and federal rules. Due to capital funding availability and fleet/operational needs, some transit operators may be able to dispose of vehicles that have useful life remaining if originally purchased with federal funds. Other transit operators may have a need for such vehicles as they could be more suitable for providing transit operations than their current fleet.

This case study assesses current vehicle disposition practices and guidelines. Additionally, coordinating opportunities, tools, and resources that can be used in vehicle disposition are presented. The task was completed with cooperation from the North Central State Planning Region *(4)*, and Services Program for Aging Needs (SPAN), the rural public transportation provider for Denton County.

Transit Vehicle Disposition

Vehicle disposition is regulated by both FTA and TxDOT when either has contributed a portion of the cost of the vehicle. FTA Grant Management Guidelines C5010.1C contain the

federal rules for determining whether a vehicle is eligible for disposition and how disposition should be handled. Texas Administrative Code (TAC) Title 43, Part 1, Chapter 31, Subchapter E, Rule 31.57 prescribes the disposition criteria and processes required by the state. Table 1 compares FTA and TxDOT rules and regulations related to vehicle disposition.

Useful Life -- Eligible for Disposition

FTA sub-divides transit vehicles into five types, ranging from the large, heavy-duty transit bus to light-duty specialty vehicles. For each vehicle type, eligibility is defined based upon a minimum number years or miles of service life. These standards are contained in Table 4.

TxDOT's vehicle disposition eligibility is at the discretion of TxDOT staff. The TAC states that vehicles with a market value less than $5000 may be eligible for disposition. Thus, a vehicle may be eligible for disposition under FTA guidelines but not be approved for disposition by TxDOT.

End of Useful Life Disposition -- Reimbursement

Upon their approval, both FTA and TxDOT require the vehicle owner to dispose of any vehicle in a competitive manner (unless they transfer the vehicle to another entity, as described below). Agencies typically conduct auctions to dispose of surplus and retired equipment. Traditionally, live auctions are the method used for vehicle disposition. Numerous public agencies are now using web-based auction sites like www.publicsurplus.com to dispose of materials and equipment.

Even though FTA has recognized that a vehicle has reached the end of its useful life, FTA may still have a remaining financial interest in the proceeds from the sale of the vehicle. If a vehicle sells for less than $5000, then FTA requires no reimbursement. If the sale price exceeds $5000, then FTA requires reimbursement commensurate with the original federal share. Thus, if a vehicle sold for $4999, the FTA would require no reimbursement; if the vehicle sold for $5001 and if FTA provided 80 percent of the original cost, FTA would receive $4001 and the local transit agency would receive $1000. Note that the value of the vehicle is established by the sales price only.

If TxDOT approves disposition of a vehicle and considers the vehicle at the end of its useful life, then TxDOT requires no reimbursement of the state's percentage contribution of the original purchase price.

Early Transfer of Vehicle Assets

FTA permits the transfer of vehicles with remaining useful life to other public transportation operators that provide service to the public-at-large. FTA must approve the transfer and the FTA interest in the vehicles is retained, but is assigned to the new owner. FTA will also permit the transfer of vehicles to local government agencies for non-transit if:

- there is no identified public transportation use for the vehicles,
- the vehicles will remain in public use after the transfer for at least five years, and
- if the benefit of the transfer is greater than FTA's financial interest in the vehicle at the time of transfer.

Note that any service that is not available to the public-at-large, includes Medicaid transportation, university transportation, and charter services.

TxDOT matches the FTA conditions in cases where the vehicle is transferred to another public transportation provider. However, TxDOT does not permit transfer for non-public transportation purpose, even if FTA approves of such a transfer. TxDOT would require the current owner to sell the vehicle as an early disposition.

Early Disposition

An early disposition is the sale of a vehicle prior to it reaching its useful life. For example, if a provider reduces service, a portion of the service fleet may no longer be required. If there is no need to transfer the excess fleet to another public transportation provider, then TxDOT will require disposition of the vehicle (see above).

With an early disposition, FTA requires reimbursement of their share of the value of the vehicle, even if that value is less than $5000. FTA determines value by the sale price of the vehicle. However, if the remaining unamortized value on the vehicle is greater than the sale price, then the federal reimbursement would be based upon that unamortized value rather than the sale price.

TxDOT also requires reimbursement for the state's share of the value of the vehicle. However, TxDOT does not establish the vehicle's value based upon the sale price. Instead, for

early disposition, TxDOT requires three valuations on the vehicle and bases the level of state reimbursement upon the average of the three.

Proceeds to Other Capital Projects

In place of remitting federal and/or state reimbursement, an agency may hold that money and apply it as part of the federal and/or state share on a future capital project. FTA requires the proceeds be placed in a restricted fund so that those monies can only be used on a future capital project.

TxDOT instead establishes a record of liability indicating that the agency owes TxDOT the state's computed portion share. That record is removed when the funds are applied. Thus, FTA and TxDOT have similar policies implemented in slightly different manners.

Table 4. Federal and Texas Conditions for Disposition of Transit Vehicles with Federal/State Funding Participation.

	FTA	TxDOT
Useful Life/ Eligible for Disposition	• Large size/heavy-duty (35+ ft): 12 yr/500k mi. • Medium/heavy duty (30'): 10yr/350k mi • Medium/medium duty(30'): 7 yr/200k mi • Medium/light duty(25'-35'): 5 yr/150k mi • Other light duty/special vans: 4 yr/100k mi	Requires TxDOT approval: if current per-unit value is less than $5000, under administrative code the vehicle may qualify for disposition
"Early" Transfer of Vehicle Assets	May transfer to local government authority for public use with no obligation to federal if: • Asset will remain in public use for 5 years after transfer • No public transportation use for the asset • Benefit of transfer outweighs financial benefit to Government	• No further financial obligation to state if state approves exception and vehicle to continue to be used in transit (financial obligation assumed by transferee) • TxDOT does *not* permit transfer of vehicles for non-public transportation uses: becomes an early disposition
"Early" Disposition	Only after approval, must remit to FTA the federal share of the sale price or the unamortized value on the remaining service life, whichever is greater, (even if unamortized value is less than $5000)	Only after approval, must remit to TxDOT the state's share of the sales price
Proceeds to Other Capital Projects	Agency must put proceeds into a restricted fund for use in later capital projects and apply the funds to reduce the gross cost of the future project	Agency must establish a record of liability showing the funds as owed and then remove the record when funds are used on subsequent project
End of Useful Life Disposition: Reimbursement	• If unit has value of $5000 or less: no obligation to reimburse FTA • If unit has value above $5000: reimburse based upon federal share in unit (sales price if sold, market value if retained)	If TxDOT approves disposition, state has no further financial interest

Operating Cost Considerations in Vehicle Fleet Replacement: Services Program for Aging Needs (SPAN) Example

SPAN is the designated provider of rural transportation services to the general public in Denton County. They also provide a variety of public services targeted at meeting the needs of seniors. They operate demand response service using 20 lift-equipped vehicles on weekdays between 7 a.m. and 6 p.m.

The fleet operated by SPAN is classified as other light duty/special vans per FTA definitions. FTA defines the useful life of a vehicle as four (4) years or 100,000 miles for this fleet type. As of January 2007, only five (5) vehicles in the SPAN fleet had accumulated less than 100,000 miles, and seven (7) vehicles had over 200,000 miles.

As any fleet ages, the cost per mile of operating that fleet will tend to escalate. To illustrate this point, Figure 8 displays actual data for a school transportation system. Data were accumulated by sub-fleets reflecting each five-year increment of vehicle service age.

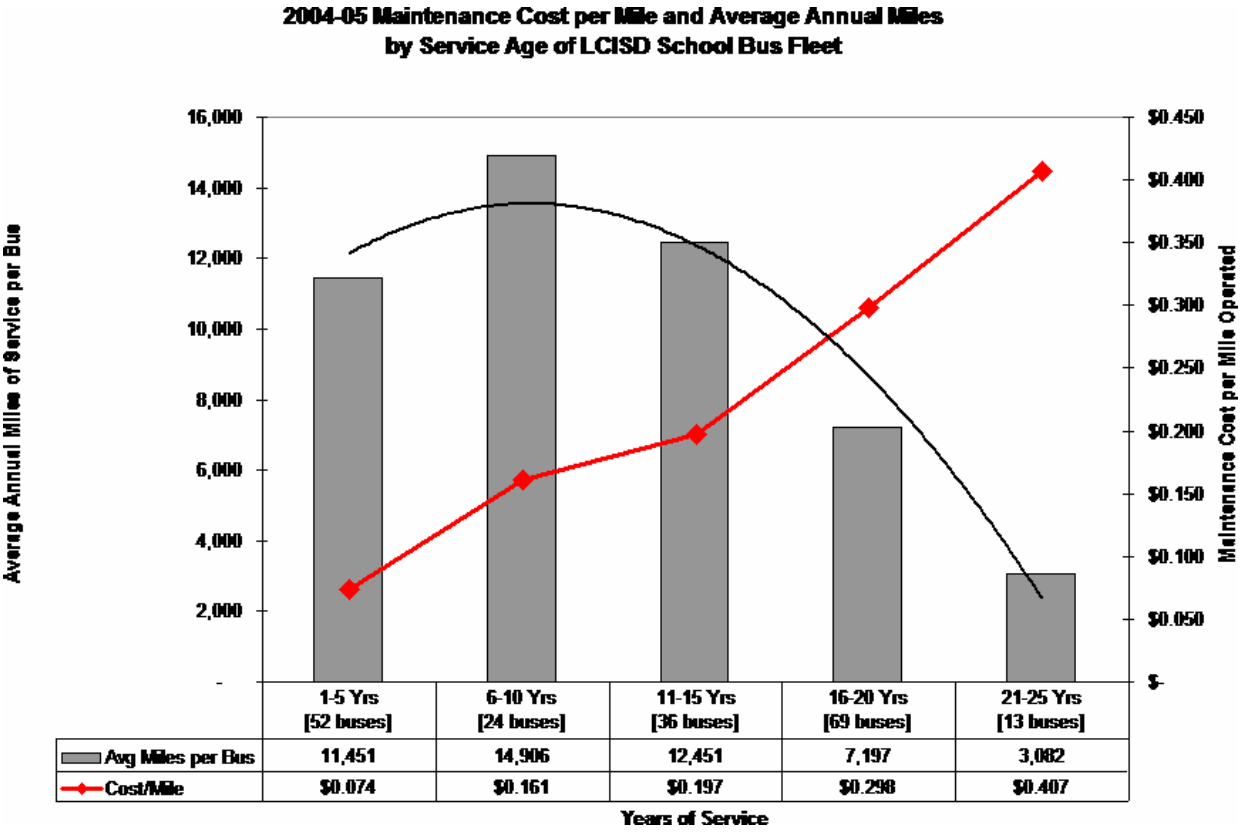

Figure 8. Utilization and Maintenance Cost by Age Groupings of Vehicles.

In Figure 8, the vertical bar illustrates the average annual miles accumulated per bus in each sub-fleet. Vehicles in the 6 to 10 years of service life ran the most average annual miles. Vehicles with a service life of 16 to 20 years are operated about half as many miles annually as the 6 to 10 year fleet; and vehicles older than 20 years are operated less than 25 percent of the miles of the 6 to 10 year fleet.

The line with diamond markers represents the average maintenance cost per mile of each sub-fleet. The slope of this line increases when the sub-fleet exceeds 15 years of service life, and the cost per mile is doubled when the fleet exceeds 20 years. Older vehicles have higher maintenance costs. These maintenance cost rates increase despite the lower mileage being accumulated on the older fleets.

Capital Versus Operating Costs

One key benefit of capital investment is saving on operating costs. For example, automation of manufacturing processes leads to a reduction in the labor costs required to produce an item. In this example, a capital investment is justified if the annual depreciation on the investment plus the associated operating cost required to operate and maintain that investment results in a greater savings compared to the former non-automated process. Or, in the case of a vehicle fleet, capital investment in new vehicles may make economic sense if operating cost for older vehicles exceeds the cost of capital investments.

In the case of vehicle replacement, a second factor influences this economic analysis. Rural transit agencies receive section 5311 federal funding and state rural transportation funding to provide public transit. State funds are typically used to match federal funds. FTA permits the use of 80 percent of federal dollars to be used for capital expenditures and 50 per cent for operating expenditures.

Since vehicle maintenance is considered an operating cost, the disparity in federal reimbursement rates for operating (maintenance) and capital (vehicle replacement) raised concern at the federal level that transit operators may defer care of vehicles and the related on-going expenses in favor of rapid replacement of the fleet. Therefore, maintenance costs are also reimbursed at the 80% rate to avoid deferral of maintenance. Other operating costs (i.e. fuel) may also vary with the age of a vehicle; those costs are reimbursed only at the 50% rate. These different rates of reimbursement may become factors in the economic analysis.

Economic Analysis

A sample analysis was conducted on the SPAN fleet. This analysis is based upon actual data provided by SPAN. However, the same process could be applied to any fleet using data from the fleet's system.

SPAN maintains records on parts and materials cost for each vehicle in its fleet. These vehicle costs for FY07 to-date were adjusted to reflect annualized parts/materials costs. The total maintenance cost was derived assuming that labor represent approximately 40 per cent increase over parts costs.[4] Maintenance costs reflect only typical preventive maintenance and standard repairs; major component rebuild/replacement and body repairs are not included for this comparison.

Based on the review of the SPAN inventory and maintenance records, vehicle 40 appears to be a candidate for replacement. It has operated over 233,000 miles and has a projected annual maintenance cost of $17,530. Conversely, vehicle 27 has among the lowest mileage recorded (30,000) and a similarly low annual maintenance cost of $4630. It is likely that a portion of these costs are recovered through warranty. To be conservative, no warranty recovery is included in these calculations. Table 5 compares these two vehicles.

Table 5. Comparison of Annual Costs.

Annual cost	**Vehicle 40**	**Vehicle 27**
Est. Life Miles (1/1/07)	233,000	30,000
Depreciation	$0	$11,000
Maintenance	$17,530	$4,630
TOTAL	$17,530	$15,630

For the SPAN fleet, a capital cost per vehicle of $60,000 and a residual value of $5000 at the end of its economic life is assumed. Therefore, over a five-year economic life, depreciation is an estimated $11,000 annually. Note that these assumptions are used in developing the depreciation expense. Clearly, vehicles are not routinely retired at five years. Table 5 reflects an example economic analysis targeted at determining when a vehicle *should* be retired.

In Table 5, the total annual cost of operating vehicle 40, despite the lack of depreciation cost, still exceeds the total annual cost of operating vehicle 27. The comparison is conservative

[4] This labor adjustment reflects data obtained by reviewing details parts and labor documentation reviewed in the previous transportation analyses.

since there has been no consideration of possible warranty recovery for vehicle 27, which would lower the annual maintenance cost to SPAN. Additionally, the disposal of vehicle 40 would generate some additional income for the agency. Lastly, vehicle 40 likely also has an incremental difference in operating cost, usually due to lower fuel efficiency in older vehicles. Since operating costs are reimbursed at only a 50 percent federal rate, these differences result in a greater impact to state and local transit dollars than maintenance cost differences.

Cash Flow Considerations

One factor that inhibits fleet replacement is cash flow. Using the example provided in Table 2, SPAN is expected to spend $2000 more this year maintaining vehicle 40 compared to the annualized cost of operating a new vehicle. However, if SPAN buys a new vehicle, they must generate the entire non-federal share at the time of procurement. Thus, SPAN would need to generate $12,000 in state and local money to buy a vehicle compared to the $2000 saved in maintenance costs.

However, with each passing year, SPAN will likely spend increasing amounts of money maintaining the older vehicle and responding to service interruptions. The investment in equipment would support improved service reliability, fuel economy, and typically reduced emissions.

Ideally, a system would establish a vehicle replacement program so that monies can be reserved for regular replacement. In the long term, the total system costs would be expected to decrease and service quality would improve.

Regional Opportunities

Conducting this economic analysis on a single fleet is limited and reflects any specific circumstances related to that agency's fleet mix, service mix, and maintenance plan. An improved approach would be to gather information on a larger set of vehicles on a regional basis. A broader mix of providers and fleets could provide better information upon which to establish a regional vehicle replacement plan. Further, if an agency had vehicles that it no longer needed, sharing that information first with the region would permit other regional providers an early opportunity for transfer of a vehicle to their organization.

One simple mechanism for sharing of fleet information would be through the creation of a fleet management subcommittee as part of each regional service coordination group. This

subcommittee could develop a regional fleet retirement/replacement schedule that would in turn foster the opportunity for joint vehicle procurement.

In order to ensure information flow, TxDOT could modify their fleet disposal process to include notification of all providers of an operator's intent to dispose of a vehicle. All providers wishing to dispose of a vehicle must obtain written concurrence from TxDOT prior doing so. If TxDOT concurs in this request, they could immediately notify all operators of the availability of a vehicle. Thus, TxDOT would still make sure that the intended disposal meets all federal and state requirements while giving Texas providers the first opportunity to obtain the vehicle. Vehicle availability could be made through website announcements.

CASE STUDY 2 - TECHNOLOGY APPLICATIONS IN HUMAN SERVICE PUBLIC TRANSPORTATION

A range of computer hardware and software is available for rural transit and client service providers. The challenge for rural transportation managers is how to take advantage of the tools offered by technology without being overwhelmed by either the complexity or the cost. Many rural transit systems in Texas have explored the use of technology to improve service efficiency and to enhance the ability to coordinate transit services. Other rural providers are just now beginning to consider the application of technology.

This case study documents the experience of one rural provider as an example of best practices for the selection of technology solutions for rural public transportation application. Additionally, coordinating opportunities, tools, and resources are presented. The task was completed with cooperation from the Golden Crescent Regional Planning Commission (GCRPC).

Case Study Background

The Golden Crescent Region consists of seven mostly rural counties along the Texas Gulf Coast. The seven counties include Calhoun, Dewitt, Goliad, Gonzales, Jackson, Lavaca, and Goliad. The region is illustrated in Figure 9. The land area is over 6000 square miles with a population of 187,000 in 2006. The largest city in the region is Victoria, with a population of 69,000 in 2005. All seven counties and 19 incorporated cities and towns in the region are active members of the GCRPC.

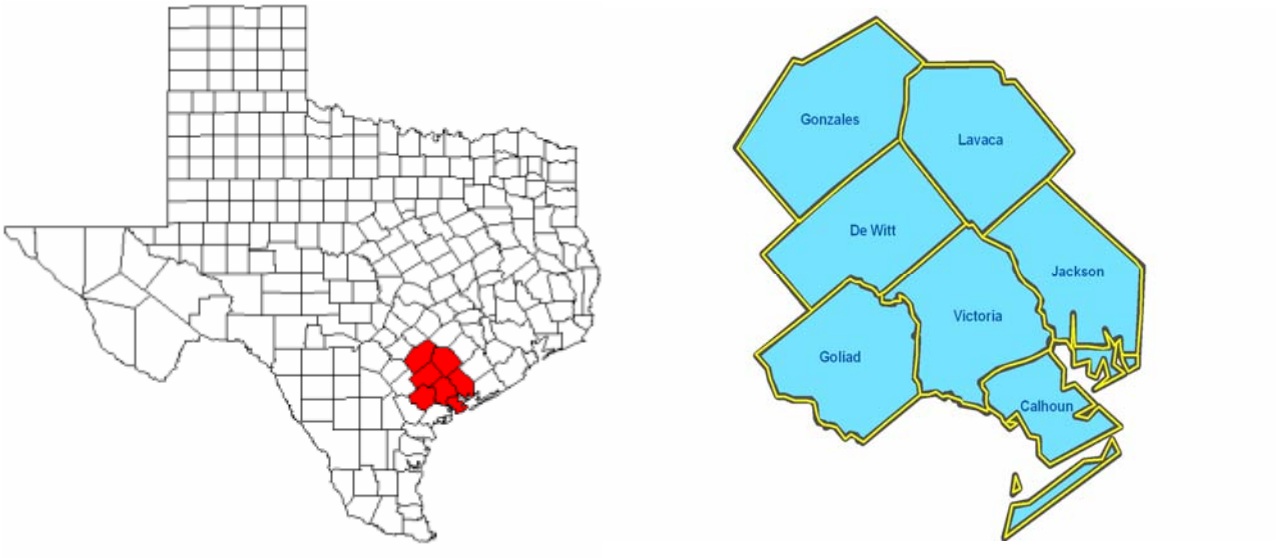

Figure 9. Golden Crescent Region.

GCRPC is a regional voluntary association of local governments and other agencies. The basic responsibility of the GCRPC involves planning for the development of the region and assisting local governments in carrying out regional plans and recommendations. Since its inception in 1968, the GCRPC has grown to include comprehensive planning and service delivery in program areas such as aging, economic development, solid waste management, and public transportation.

GCRPC began providing public transportation services in November 1986. GCRPC currently provides directly or contracts with another agency to provide rural public transportation services called RTransit in the seven counties in the Golden Crescent region plus the adjacent Matagorda County. GCRPC also directly operates a small-urban system called Victoria Transit within the city limits of Victoria.

In 2005 GCRPC was designated as the lead agency for coordination of public transportation and client transportation services in the Golden Crescent region. The regional coordination project is guided by an advisory committee comprised of more than 25 representatives of agencies and organizations that are responsible for providing public transportation services or are interested in the coordination of transportation and client transportation services in the region. The goals of GCRPC and the advisory committee are to:

- improve delivery of transportation services,

- generate efficiencies in operation,
- enhance customer service and satisfaction, and
- encourage cooperation and coordination.

In December 2006, the GCRPC published the *Regional Coordination Study* report for the region. In the report, five pilot projects were identified as the initial steps to achieve better coordination of transportation services in the Golden Crescent region. One of the pilot projects was to enhance rural transit service using technology to facilitate central dispatching.

The purpose of the case study is to document the GCRPC experience as an illustration of how one rural transit system in Texas explored the use of technology to improve service efficiency and to enhance the ability to coordinate transit services.

Technology and Small Urban/Rural Transit

Small urban and rural transit operators are challenged to improve passenger service while maintaining acceptable system productivity and containing costs. To meet this challenge, more and more transit managers are using advanced technology tools. To apply technology, the managers need guidance on the types of technology available, product information, case study experience, and sources for additional information. This technical memorandum provides this information in the context of the experience of one rural transit provider.

This case study is directed to the transit manager of a relatively small operation who faces the need to make technology decisions. The focus is on small urban and rural transit operators that provide traditional fixed route and demand response transit services but are also coordinating public transportation services for human service agencies, job access, and medical transportation.

Identifying Transit System Needs for Technology

A Guidebook for Planning Rural Transit ITS Applications from the Federal Transit Administration (FTA) Office of Research, Innovation, and Demonstration describes three steps to identifying transit system needs for technology. The three steps are to:

- assess the existing system,
- predict future needs, and
- analyze current business processes.

The following discussion is drawn in large part from that report. (*1*)

The first step in identifying transit system needs for technology applications is to assess the existing system to recognize the strengths and weaknesses of the current operation by asking how technology can be used to leverage strengths and address weaknesses and by documenting the goals and objectives for the transit system. Meeting these objectives may require changes in the quantity or quality of transit service. Technology applications may help to accomplish these changes. For example, an objective to improve efficient delivery of service may call for automated scheduling software and an objective to track the cost of vehicle maintenance could be achieved by installing vehicle information management software for the garage superintendent.

The important next step to identify transit system needs is to look to the future.

- Consider how the transit system might change or expand.
- Relate future plans to the goals and objectives for the transit system.
- Keep in mind the transit system is part of a larger community.

Other agencies and organizations could impact the transit system's direction in future years. A few examples of things to consider about future changes in the service area are:

- Will there be a need to expand service to new geographic areas?
- Is the population in the service area increasing or decreasing?
- Is there an increase in the number of a particular group needing transit services (seniors, for example) in the service area?
- Is service now focused on access to specific destinations or trip purposes but there is an expectation that service will expand to serve more transit markets?
- Will there be a need to coordinate with other transportation programs?

Planners should develop a list of future needs and system changes to consider different technology applications that may help to meet these future needs and determine if choices made about technology applications now can help to accomplish plans for the future.

The third step in identifying transit system needs for new technology is to look at business processes. Examples of business processes are:

- taking reservations,
- scheduling and routing trips,
- preparing manifests for drivers,

- billing,
- cash management,
- collecting and reporting data to funding agencies, and
- reporting performance.

These business processes may be inefficient. Technology applications can help improve processes and enhance efficiency – leaving more time to manage and deliver transit services. To identify tasks that appear to take too much staff time and/or cost to accomplish, some questions to consider are:

- Are the tasks involved unnecessarily complex or circuitous?
- Are the tasks redundant or just plain unnecessary?
- What technology applications could help to improve the processes?
- What are the costs and benefits to switch to automated processes?

A good idea is to develop diagrams or process charts to document and illustrate all the actors and the actions required for a particular business process.

GCRPC Approach to Assessing Needs for Technology

The GCRPC case study illustrates one example of how a transit agency assesses needs for technology. GCRPC sponsors RTransit, rural public transportation services in the seven counties in the Golden Crescent region plus adjacent Matagorda County. GCRPC directly operates services in two counties and contracts with five different providers in other counties of the region. GCRPC also directly operates Victoria Transit. Table 6 identifies the RTransit service providers by the county and city served. Figure 9 illustrates the same information

Table 6. RTransit Service Providers.

County or City	Directly Operated	Subcontractor
Victoria County	GCRPC	
Dewitt County		
City of Victoria		
Gonzales County		Gonzales County SCA, Inc.
Lavaca County		Lavaca County
Goliad County		Goliad County
Calhoun County		Calhoun County SCA, Inc.
Jackson County		Friends of Elder Citizens, Inc.
Matagorda County		

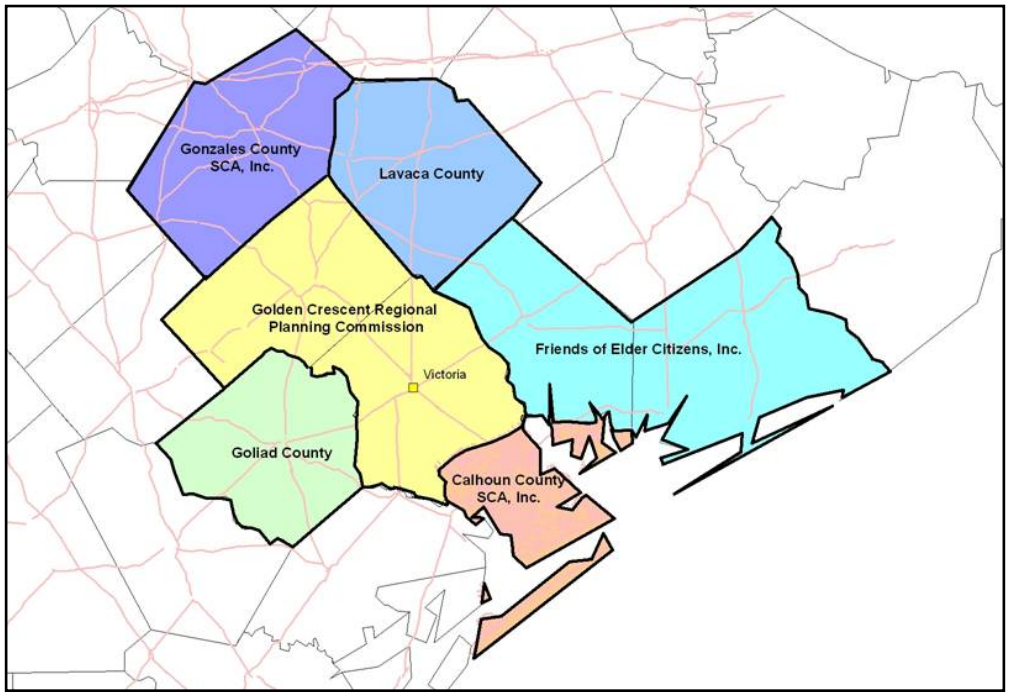

Figure 10. RTransit Service Provider by County

The first step in identifying transit system needs for technology applications is to assess the existing system to recognize the strengths and weaknesses of the current operation. During the regional planning study in 2005-2006, the GCRPC and the advisory committee conducted a comprehensive needs assessment for transit in the Golden Crescent region. The goals adopted by the region were as follows:

- Improve delivery of transportation services,
- Generate efficiencies in operation,
- Enhance customer service satisfaction, and
- Encourage cooperation and coordination.

While assessing the current service levels in the region, GCRPC and the advisory committee did not identify any overlaps in service areas. However, the regional stakeholders did identify inefficiencies in rural vehicles sitting idle waiting for passengers.

Each service provider schedules and dispatches services independently. Many destinations for trips are in Victoria where medical services, essential shopping, and regional social and human services are located. Since each provider routes and schedules trips independently, vehicles often deadhead without revenue passengers to and from each county or vehicles wait for hours at the destination. GCRPC uses an automated routing and scheduling system for Victoria Transit and rural services in Victoria and Dewitt counties. In the past,

GCRPC has attempted to consolidate aspects of operations with the subcontractors. However, each subcontractor continues to do their own call taking, scheduling, and dispatching manually. Figure 11 illustrates the current organization for scheduling, dispatching, and operating transit services.

The GCRPC and the advisory committee identified a pilot project to demonstrate how technology can enhance coordination between GCRPC and the various subcontractors in the region. The purpose of the pilot project for the Golden Crescent region is to provide a central dispatching function to route and schedule services for all subcontractors using the automated scheduling and routing software.

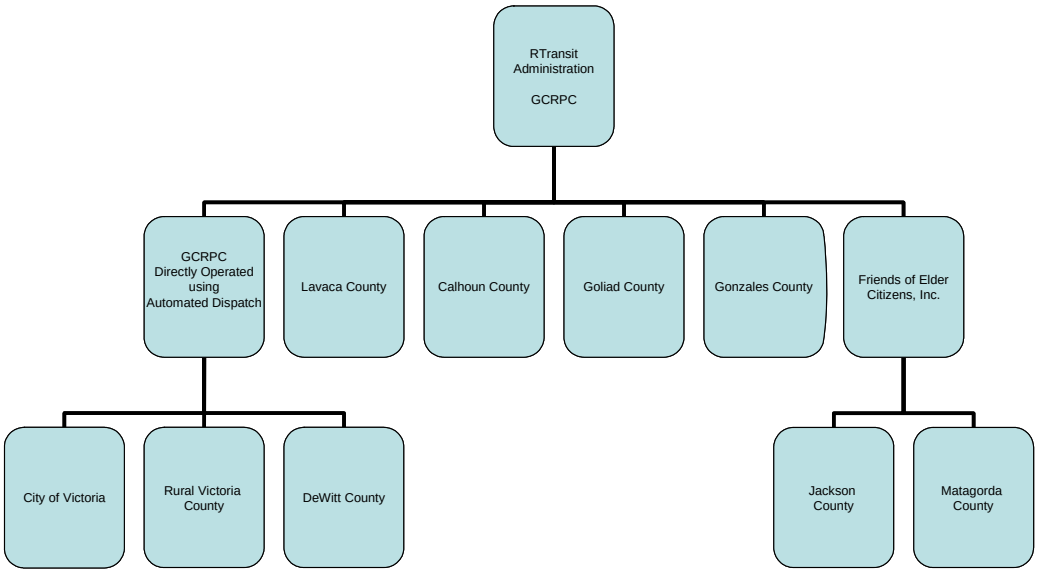

Figure 11. RTransit Current Organization

Using automated scheduling software and a central dispatch center, trips can be coordinated system-wide in a manner than will lead to increased productivity, efficiency, and reduced cost. Among the advantages that could be realized by consolidated dispatch are the following:

- Provide one number to call for mobility services within the region – better customer service.
- Schedule all trips by automated scheduling software to maximize service efficiency and reduce operating costs.

- Increase service productivity to allow more people to be transported with less resources.
- Maximize vehicle and driver productivity, especially when the vehicles are within the city of Victoria.
- Share trips while drivers are idle in the city of Victoria waiting for passengers.
- Maintain local autonomy by making the current service provider the primary provider for service within the county.

GCRPC considered the pilot project in terms of both short-term goals and a long-term strategy. Following best practices, the transit system considered how the transit system might change or expand and how those future plans relate to the goals and objectives for the transit system. GCRPC recognizes the transit system is part of a larger community. Other agencies and organizations could impact the transit system's direction in future years.

With these long-term considerations in mind, the transit program staff at GCRPC proposes to set up the pilot project for a designated period of time. The agreement will be that if the pilot project works to the satisfaction of the county and GCRPC, then the central dispatch function will continue. In addition, Goliad County has volunteered to be the first county to participate in the pilot project. With a willing partner, GCRPC can develop Goliad County as a test site to work out all problems and adjustments before rolling the project out to the remaining counties.

Figure 12 illustrates how the central function would coordinate all rural transit services.

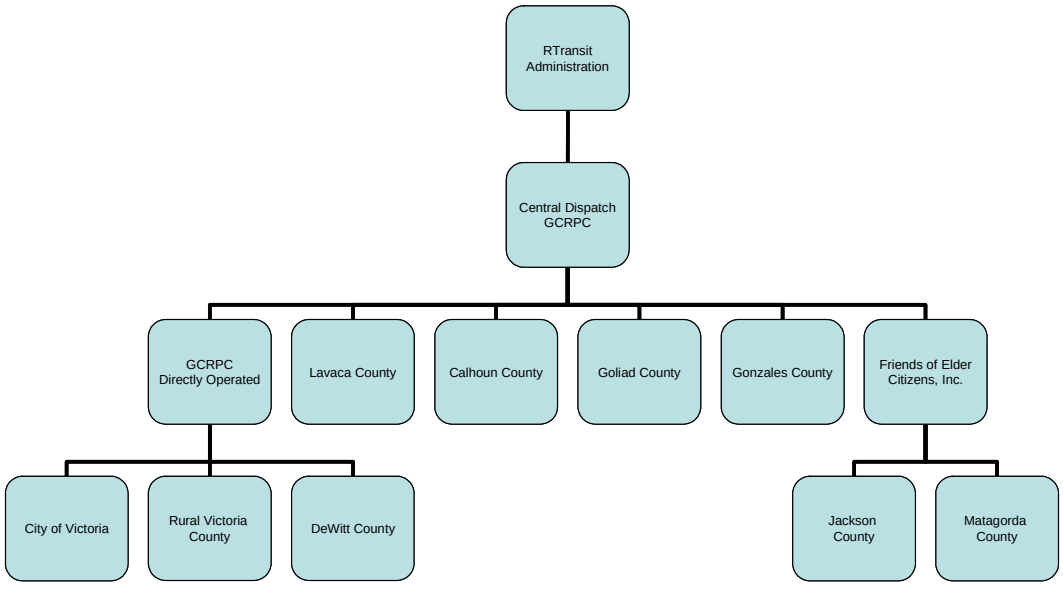

Figure 12. Proposed RTransit Organization with Central Dispatch

The third step in identifying transit system needs for new technology is to look at business processes that may be inefficient. Key staff with the RTransit program at GCRPC met for several hours and diagrammed the steps involved in central dispatch, starting with the customer's phone call to schedule services. The participants in the working session diagrammed the relationship of each step to the next and then discussed the business processes involved. The business processes identified for review were:

- taking reservations by telephone
- scheduling and routing trips
- preparing and distributing manifests for drivers
- communicating with drivers in the field
- collecting and reporting data
- reporting performance
- handling customer requests

The GCRPC staff identified how business would need to change, what technology was already in place and what additional technology would be needed to resolve the inefficiencies.

An automated routing and scheduling system is one current technology used by GCRPC for Victoria County and the rural services in Victoria and Dewitt counties. Prior to the business process review, GCRPC had worked with the software vendor, Route Match ™, to resolve issues about reporting functionality. An additional enhancement that will be required for central dispatch is increased range for the geographic information system maps used by the software. Procurement of the maps was identified as an early action.

GCRPC determined in the business process review that additional data were needed to:

- estimate current and projected customer calls,
- evaluate capacity of the telephone system, and
- determine the number of staff to take calls.

Call takers were asked to keep detailed records of the number of calls and length of time required per call for several days to establish a baseline for evaluating the existing capacity and estimating future requirements. The outcome was a decision to expand the number of telephone lines and to plan acquisition of an automated call management system to queue telephone calls for reservation clerks and monitor performance statistics for customer service.

The communications system was also identified as critical to the ultimate success of central dispatching. The existing providers for each county have a different communications system (radios, cell phones). At one point in the process, the lack of a central radio communications system was identified as a possible fatal flaw. However, GCRPC staff researched options for mobile communications systems and evaluated the technology options. After talking to technology experts and observing other system operations, GCRPC determined that the central dispatch concept could work with a mix of radios and cell phones. A long-term strategy will be to develop a coordinated system perhaps using mobile data computers (discussed further in the next section).

Identifying Technologies to Address Needs

Technology applications are powerful tools for transit. Even a readily available technology application such as email and features of the internet can be used to improve administrative efficiency and customer service. Not all technology applications that are available will be appropriate for a small urban or rural transit system. Many were designed originally for larger transit systems in urban environments but there are more and more applications of technology that have been adapted for implementation in smaller transit systems.

The report *Best Practices in Rural Transit ITS* is a companion document to *A Guidebook for Planning Rural Transit ITS Applications* and a good resource. (*2*) The best practices report identifies the following ways to learn about transit technology.

- Read literature.
- Attend conferences.
- Visit other transit systems.
- Work with other systems.
- Develop a relationship with local educational institutions.
- Educate about technology through training.
- Know stakeholders and look at the possibilities.
- Work with and learn from state and regional governments.
- Apply for grants.

The most important thing to know about a computer-based technology tool is what functions are performed. The answers to the following four questions essentially define the function of each technology:

- What data goes into the tool?
- What does the technology tool do with or to the data?
- What information does the tool provide?
- How will the information provided be useful?

Table 7 is a list of the major transit technology tools grouped by function.

Table 7. Major Transit Technologies Grouped by Function. (*1*)

Technology Tool	Function
Accounting Software	Electronically processes, stores, tracks, and reports accounting data. Produces financial reports. This information can be used to improve financial accountability.
Automatic Passenger Counters (APC)	Collects data on passenger boarding and alighting by time and location. Produces reports on boarding and alighting activity by stop or by time of day. This information can be used to increase operating efficiency through better service planning.
Automated Scheduling and Routing Software	Automatically routes and schedules transit services. For a fixed route system: produces schedules for most efficient assignment of vehicles and operators. For a demand response system: expedites call taking; automatically schedules trips and routes vehicles; collects and maintains client, service, and vehicle data; generates driver manifests; and generates standard and customized reports. This information can be used to improve overall system efficiency and productivity to manage and operate transit services.
Automated Vehicle Location Systems (AVL)	Measures real-time position of transit vehicles using onboard computers and a positioning system such as global positioning system (GPS) or signpost. Relays the information to a central location such as a central dispatch center. This information can be used to know where each vehicle is located at any point in time and can be used to improve scheduling and dispatching to increase productivity.
Communications	Provides voice and/or digital communication among vehicles and between vehicles and the base station or central dispatch center. Communication may be by radio, cell phone, or mobile data terminal.
Computer-Assisted Software for Demand Response Transit	For a demand response system: expedites call taking; collects and maintains client, service, and vehicle data; generates driver manifests; and generates standard and customized reports. Differs from automated routing and scheduling software in that it does not automatically schedule trips and routes vehicles. Requires manual scheduling of trips and assignment of vehicles. This information can be used to improve efficiency and productivity in customer service, scheduling, and administration.
Electronic Payment System	Allows passengers to pay for transportation services with electronic fare media. This system includes automated fare payment systems such as bar codes, magnetic stripe cards, and smart cards. Electronic payment systems may improve customer service and convenience and assists transit managers to report and collect fare revenues more efficiently.
Geographic Information System (GIS)	Computerized data management system in which databases are related to one another using a common set of location coordinates. GIS is used by dispatchers to display fleet and route data on a display map on a computer screen.
Interactive Voice	Automates interaction with telephone callers. Historically, IVR

Technology Tool	Function
Response	solutions have used pre-recorded voice prompts and menus to present information and options to callers and touch-tone telephone keypad entry to gather responses. IVR solutions enable transit users to retrieve information about routes, schedules, and more from any telephone. Additionally, IVR solutions are increasingly used for demand response transit to place outbound calls to deliver messages such as reminders of the time a scheduled transit trip will arrive.
Internet Web Site	Allows personal computer users to easily exchange or display transit service information such as trip requests, route schedules, and maps.
Vehicle Management Information System (VMIS)	Electronically processes, stores, and reports detailed vehicle maintenance and repair data, including parts and supplies inventories, and may also track fuel. Generates standard and customized reports. This information can be used to monitor vehicle preventive maintenance accountability.
Mobile Data Terminal (MDT) or Mobile Data Computer (MDC)	Serves as the information link between the control or dispatch center and driver to relay relevant information such as driver, route, trip and rider information. Electronically stores and updates vehicle schedules (driver manifests). This can be mounted in a vehicle or can be hand-held personal electronic device. The terms for MDT and MDC are often used interchangeably; however, an MDT may be used to refer to a terminal where data can be received and acknowledged only. An MDC typically refers to a device where important information can be sent as well as received.
Personnel Management Software	Processes, stores, tracks and reports detailed payroll benefits, hours worked, and personnel information. Generates standard and customized reports. This information can be used to improve overall personnel management and financial accountability.
Signal Priority	Holds a traffic signal at green so that a particular vehicle may pass through the intersection more quickly.
Traveler Information Systems	When applied to transit, traveler information can take many forms, including pre-trip information, in-vehicle information, and in-terminal/wayside information. Examples are automated trip itineraries, in-vehicle annunciators, variable message signs and monitors, and interactive information kiosks.

Transit system needs for new technology can be compared to the functions of each of the technology tools listed. Additional opportunities may be identified by one of the best-practices ways to learn about transit technology as discussed above.

Each technology can be applied to meet one or more needs of a transit system. There are a number of vendors or suppliers for software and hardware for every tool. Some technology applications can be purchased off the shelf (ready to use) while others require customization to meet the particular needs of the transit agency.

The rough cost of purchasing, installing, activating, maintaining, and upgrading new software or hardware should be known in order to assess whether a particular technology tool is right for the agency. If cost exceeds available resources, the transit agency could:

- evaluate lower cost technology tools to serve the same or similar function,
- look at off-the-shelf products rather than customization,
- phase implementation to spread costs over time, or
- search for additional financial resources to make the acquisition possible.

Before making a choice of software or a decision to acquire hardware, the transit manager must understand the implications that the new technology will have for the transit system. In order for the new technology to operate properly and produce promised benefits, the transit system manager must be aware of the changes required in the entire system. These changes will encompass:

- business processes,
- staff skills and training,
- job requirements,
- computers and related hardware, and
- all of the applicable costs, including maintenance contracts.

The transit manager needs to know all of the costs (operating and capital) and the expected benefits in order to make a confident go/no-go decision about investing in new technology tools.

GCRPC Approach to Identifying Technology Tools

GCPRC used the following best practices to learn about transit technologies.

- Visit other transit systems.
- Attend conferences.
- Develop a relationship with local educational institutions.
- Educate staff about technology through training.
- Know stakeholders and look at the possibilities.

One of the important steps that GCRPC took to learn about the essential functions of each technology was to organize a workshop with technology vendors to provide a chance to talk in depth about the particular objectives and needs of the transit agency. The workshop included

participants from GCPRC, TTI, and vendors for software and hardware. The workshop was hosted by the Capital Area Rural Transportation System (CARTS), a peer rural transit agency with extensive experience with technology applications. GCRPC learned that wireless communications systems will allow the agency to consolidate dispatch into one facility. Centralization will allow GCRPC to use the scheduling software more efficiently and to store all of the customer information in one centralized database.

As an outcome of the workshop, the GCRPC transit manager learned the costs (operating and capital) and the expected benefits in order to make confident decisions about investing in new technology tools. The transit manager also learned which investments could be made in the short term that will leverage longer term enhancements to the system (after the pilot project proves successful and additional funds are identified).

Planning Implementation of Technology

There are a number of factors to consider in making a decision on technology choice and then proceeding with implementation. In the discussion below, two topics are highlighted: availability of financial resources and considerations about project installation and implementation. As in early sections of this case study, much of the material in this section is taken from *A Guidebook for Planning Rural Transit ITS Applications.*

Funding for both the capital and operating expenses of small urban and rural transit systems is available at the federal, state, and local levels. The critical factor with any transit funding factor is whether or not it covers expenditures on computer hardware and software, technology consultants, and training. Any funding source should be researched to confirm eligibility and any limitations on amount, timing, or match requirements.

Investments in technology are generally eligible under all funding sources authorized from the Federal Transit Act. These sources include Section 5307 Urban, Section 5310 Elderly and Handicapped, Section 5311 Rural, and Section 5309 Discretionary Capital. Of course, funds for technology are subject to approval of project grant applications and execution of federal grant funding agreements. In addition, the Rural Transit Assistance Program (RTAP), sponsored by FTA and TxDOT, offers training materials, technical assistance, and other support services. Technology applications are also eligible under Texas state funds for urban and rural transportation.

Additional federal resources include health management and social service agencies that offer various programs requiring transportation. Another opportunity is the possibility of sharing costs with other organizations. The basis for sharing costs is the common use of facilities or services.

In several communities, rural or client transportation services are supported from private contributions. Private sector funding sources may be supportive of investments in technology to enhance operating efficiencies. For rural transit operators that provide subscription services to clients of human or social service organizations, it may be possible to share the costs of installing computer and internet-based systems that lower the cost or improve the efficiency of billing and payment. Agencies can also be creative and innovative in obtaining funding for technology deployment. For example, multiple funding sources may be combined for a project.

Some research and background work may be required to identify what funds are available and when they are distributed to ensure the dollars can be used for the technology application. Once sources of funds are identified, agencies should determine the level and timing of funding available and the requirements for plans and other information in order to qualify for the various sources of funding.

Any implementation of new technology should be carefully considered in light of the goals and objectives for the transit system. Will the investment in the software or hardware result in benefits that improve the transit system in terms of efficiency, capacity, or reliability? Will the benefits exceed costs? The following are things to consider about installation and implementation of technology.

- Make sure all of the stakeholders are involved in the project, especially in the initial planning and design stage.
- Develop memoranda of understanding for projects that involve multiple agencies to help clarify each participant's responsibilities.
- Identify how the project will benefit participants. It may be necessary to demonstrate to participants that the technology application will fit them directly. Although it may be difficult to quantify these benefits, providing at least a description of how participants can use the system to improve operation can greatly increase their willingness to participate in the project.

- Orient the entire staff about the implementation of transit technology and how it will affect their jobs.
- Begin implementation with a pilot phase, in which hardware is installed on only a portion of the fleet and fully tested before full installation is completed or run new software on a parallel system while existing processes continue to function as a backup until the installation is successful.
- Be flexible and patient. Seldom does everything go as smoothly as planned with technology deployments. It may be necessary to stray from the original project implementation plan in order to move ahead more quickly and efficiently.
- Establish a formal process to track problems and resolutions during implementation and operations.
- Conduct outreach to ensure the project accomplishments and successes are well publicized.

GCRPC Approach to Planning Implementation of Technology

The GCRPC currently receives federal and state funds for transit from the Section 5307 Urban, Section 5310 Elderly and Handicapped, and Section 5311 Rural programs to support RTransit operations and capital cost of vehicles. There is a need for basic public transportation in the region and an on-going goal of GCRPC is to successfully capture funds from these programs to sustain on-going services.

GCRPC has identified the need to pursue additional resources to support the expansion of transit services, implementation of technology, capital replacement of equipment, and development of an intermodal transit terminal to accommodate the interface between:

- urban rural,
- intercity bus,
- local taxi services, and
- other modes of transportation.

To accomplish the capital and operating needs of the GCRPC beyond state and federal formula funding, the agency will pursue the following additional resources.

- Intercity bus funds for development of the intermodal transportation terminal,
- Section 5309 Discretionary funds for capital replacement of equipment

- Local financial support via the City of Victoria and the Victoria Economic Development Corporation to support future transit initiatives
- Job Access/Reverse Commute (JARC) and new freedom funds for pilot projects

In the short term, GCRPC has funding from the State of Texas for upgrade of the automated software and new system maps to implement the pilot project for central dispatching. However, the agency will need to identify new sources of funding to implement additional technology such as:

- mobile data computers,
- automated vehicle locating systems, and
- a coordinated communications system.

GCRPC recognizes that the success of a central dispatching system will require that all stakeholders are involved in the project, especially in the initial planning and design stage. For this reason, the transit manager decided to visit each county in the region to talk with elected officials and the transit service managers about what is involved and how the project will benefit each of the participants.

From the beginning, GCRPC has involved the staff in the planning for new technology. The GCRPC plans to expand training opportunities and review business processes in the scheduling and dispatch areas. Staff will be encouraged to more fully utilize the software by providing them with more training or implementing a change of procedures. Drivers will be involved in the installation and implementation of the system.

GCRPC is also thinking ahead about the impact of technology changes on users of the system. Many regular RTransit customers are very comfortable with the current way of doing business and may find change disconcerting. GCRPC has already begun to think about the human factors in making the changes in operations that are planned.

Other lessons learned include the following:

- Technology changes fast, so agencies should make sure that the system can be easily upgraded. It is important to ensure that the technology application can also be easily expanded as technology evolves.
- A comprehensive communications/radio analysis is necessary, so. agencies should perform a comprehensive communications analysis prior to implementing a technology application that will depend heavily on a communications backbone.

- Web-based solutions may be appropriate for rural areas, so agencies that are spread over a larger geographic area should consider allowing support from a remote location.
- The experiences of other systems of similar size and complexity are valuable, so agencies should find out if the selected tools met the system's expectation and learn about the system's experience with the vendor.
- Installation should not be rushed, so agencies should not try to install and implement new technology too quickly. Problems may be created that will be difficult to correct in the future. Additionally, if implementation is too rushed, staff or stakeholders may not fully realize its potential benefits.
- Incremental start-up seems to work well, so agencies should implement components of technology one at a time. Problems can be addressed more easily than trying to integrate multiple components all at once.

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