Laredo Transit Development Plan

Prepared for:

Laredo Urban Transportation Study
Metropolitan Planning Organization

Prepared by:
Parsons Brinckerhoff Americas Inc.

In association with:
NuStats

and:
GeoStats

September 17, 2009

LAREDO TRANSIT DEVELOPMENT PLAN

FINAL REPORT
September 17, 2009

Prepared for:
LAREDO URBAN TRANSPORTATION STUDY
Metropolitan Planning Organization

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LAREDO URBAN TRANSPORTATION STUDY
metropolitan planning organization

Table of Contents

LIST OF TABLES

LIST OF FIGURES

APPENDICES

LAREDO TRANSIT DEVELOPMENT PLAN – EXECUTIVE SUMMARY

The Laredo Transit Development Plan (TDP) sets out a five-year program of improvements to serve the public transportation needs within the Laredo Metropolitan Planning Organization boundary. The TDP included the following elements:

- A passenger intercept survey of El Metro passengers, conducted at the Transit Center in downtown Laredo
- A boarding and alighting survey, conducted on board El Metro buses
- Analysis of recent performance of transit services in the area, especially El Metro, the fixed-route transit system, and El Lift, the primary paratransit service. Data are also provided on El Aguila, the rural fixed-route and paratransit provider
- Recommendation of improvements that can be accomplished within the next five years, and a suggested timetable for their accomplishment.

The two surveys provide data of on-going usefulness to Laredo, especially to El Metro, as well as forming the primary basis for the recommendations included in this TDP. The analysis of recent performance, including comparison of El Metro with a broad selection of Texas and other US fixed-route transit systems, shows that Laredo is fortunate to have a system of its level of overall ridership, productivity, and efficiency. At the same time, the study finds that the area faces significant issues at this time of economic uncertainty. Both El Metro and El Aguila have experienced significant reductions in transit ridership and fare revenues during 2009, compared with levels reached in 2008. Although fare revenues cover less than one-fourth of transit operating costs, which is typical of transit systems in the United States, any decline even in that level of income challenges the opportunity to maintain, let alone augment the quality and quantity of transit service offered to the public.

In that context, the TDP provides a flexible approach, to be pursued according to the opportunities and constraints that may arise during the next several years. The recommendations cover five categories, including (1) fares, (2) fixed-route service refinement and improvement, (3) paratransit strengthening, (4) marketing and passenger information, and (5) capital improvements. These recommendations are summarized briefly below.

1. Fares: El Metro fare increases, together with limited service reductions, are currently under consideration. That is a reasonable immediate response to the drop in fare revenue, with one exception: the proposal to eliminate transfers, requiring full fare payment for a second or third bus some passengers require to reach their destination, is inequitable and should not be adopted.
2. Fixed-route service refinement and improvement: Five recommendations are made:
    a. Refine the current bus schedules to assure that there is minimal unproductive time, and that drivers' adherence to schedules is facilitated, so that buses are not early or late at published time points.

b. Minimize bus congestion in the Transit Center by staggering the arrival times of the routes that have the most frequent service.

c. Investigate, design, and implement selective route re-structuring. A concept is presented to establish a "Linear Hub" complementing the Laredo Urban Transportation Study's San Bernardo Avenue Renovation and Restoration Project. The Linear Hub would consolidate six current bus routes into two – local service on San Bernardo, and express service on I-35, between the downtown Transit Center and Mall del Norte. Other parts of the six routes would be re-organized as pulsed routes to and from a secondary transit center at Mall del Norte. Variants of this structure could range from saving at least one bus, compared with existing service, to requiring several more buses but improving service throughout the corridor. Even the bus-saving version would benefit many riders by offering more frequent service along the Linear Hub.

d. Abandon the current Downtown Trolley route and replace it with a new downtown circulation system. First, provide a short, frequent-service link between the Transit Center and the bridge to Nuevo Laredo, as a convenient alternative to the present five-block walk required of this large group of El Metro riders. Secon, add a low-floor bus loop route, also providing frequent service, connecting a number of major downtown Laredo locations.

e. Initiate a major route re-structuring study to further advance the San Bernardo Linear Hub concept and to introduce other improvements that would enhance main-corridor service levels, reduce route circuity, and seek to improve both level of service and operational efficiency. A study scope for this purpose is provided.

3. Reduce expenditures for paratransit:

   a. Establish more stringent eligibility requirements for paratransit. An interview method to determine eligibility is recommended.

   b. Investigate the feasibility of contracting paratransit operation through a competitive procurement designed for response by taxicab operators.

4. Introduce marketing and passenger information improvements.

   a. Prepare and implement directed transit marketing programs designed to increase ridership, especially where there is unused transit capacity

   b. Provide real-time passenger trip planning service

5. Make selective capital improvements

   a. Design and build new bus stops and shelters

   b. Design and build a new operations facility on the selected site.

   c. Resolve bus delay problems at the KCS Moctezuma Avenue track crossings by scheduling trains outside bus service hours or building bypasses (flyover west of I-35, or bypass lanes within the I-35 right of way).

1.0 INTRODUCTION AND SUMMARY OF RECOMMENDATIONS

The Laredo Transit Development Plan (TDP) sets out a five-year program of improvements to serve the public transportation needs within the Laredo Metropolitan Planning Organization boundary, shown in Figure I-1, within which the responsibilities of the Laredo Urban Transportation Study (LUTS) are exercised. The LUTS is the designated Metropolitan Planning Organization (MPO) for the City of Laredo Metropolitan Area.

Transit services within the metropolitan area are provided mainly by two transit operators. One operator serves the primary urbanized area with fixed route services, known as El Metro, and demand response services for disadvantaged riders. The demand response services are known as El Lift. The current route map and brief description of El Metro's 22 routes are provided as Figures 1-2 and 1-3. The second of these transit operators, El Aguila, serves the more rural parts of the metropolitan area. El Aguila also provides both fixed route and demand response services. There is a third transit provider, La Fleur, which provides paratransit service for Medicaid patients. The service is operated by an agency in the Rio Grande Valley, and was not researched.

An initial action of this study to prepare a TDP for Laredo was to carry out two surveys.

- One survey had the purpose of developing a transit rider profile for the fixed route transit services provided by El Metro.
- The second survey had the purpose of obtaining detailed route-by-route passenger travel data for the El Metro services.

In addition to these two surveys, data was requested and obtained to describe services provided by El Aguila.

The information acquired in the two surveys and other data collection was subjected to preliminary analysis that developed a description of the main existing transit services. This descriptive information was supplemented by a trend analysis, which provided evidence relevant in understanding the future conditions under which the services will operate. Also provided was a peer analysis, which provided a basis for measurement of the overall performance of the transit services by means of comparison with other transit systems within Texas and within the United States. Systems for comparison purposes were selected on the basis of geographic area served, population served, and vehicle fleet size, as measured by the number of vehicles operated during periods of maximum service. The peer analysis was limited to El Metro fixed route services, because of the many difficulties in comparing demand response services among different metropolitan areas including urban and rural service areas.

Figure 1-1: The Laredo Metropolitan Planning Organization Boundary

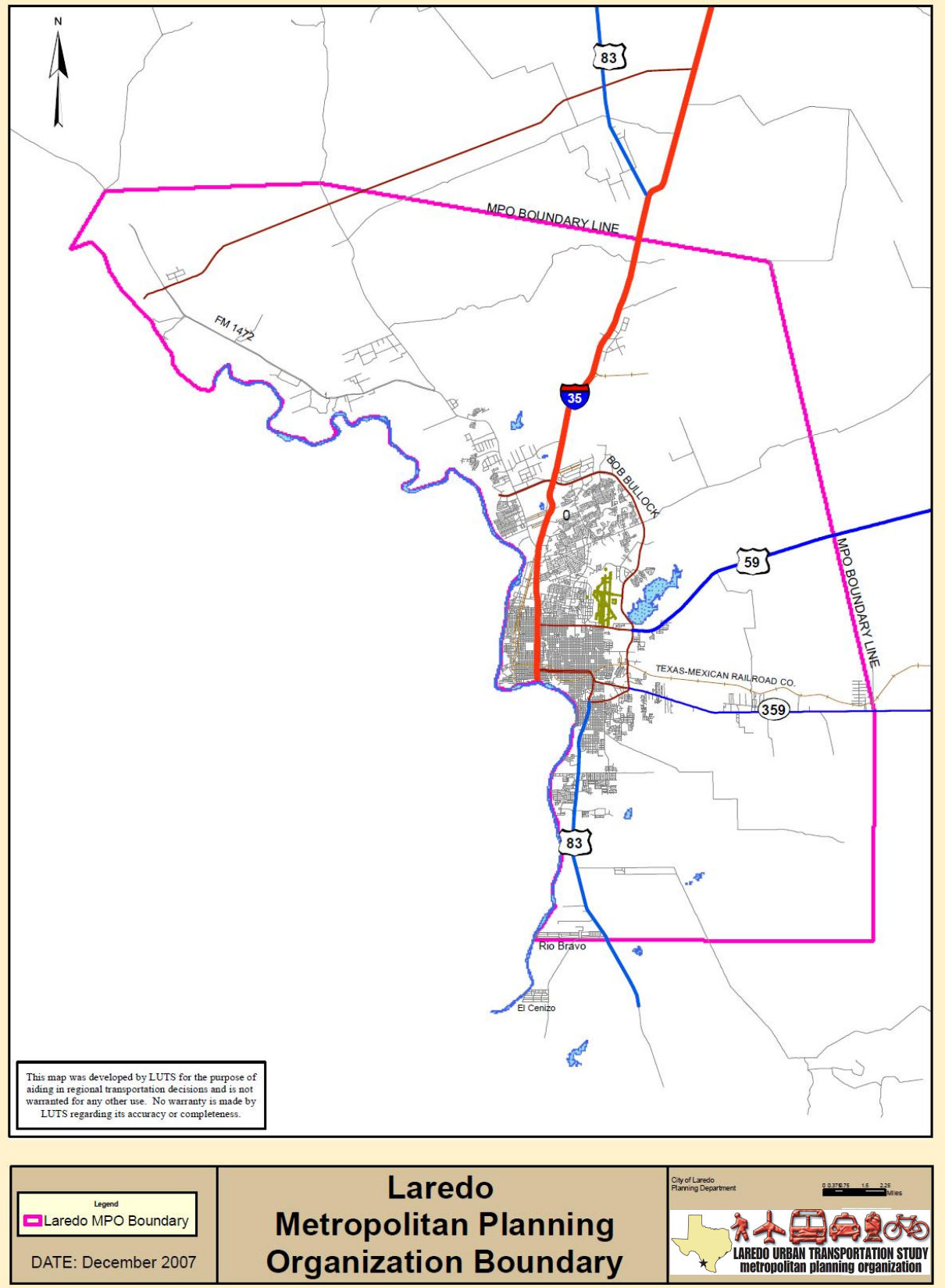


Figure 1-2: El Metro Fixed-Route Bus System

Figure 1-3: El Metro Bus Routes

Guide to Bus Service in Laredo *Guía al servicio del autobús en Laredo*

APPROXIMATE FREQUENCY IN MINUTES *Frecuencia aproximada en minutos*

Ruta Route	Nombre De la Ruta Route Name	Puntos Servidos Serving	WEEKDAY Entre Semana Peaks	WEEKDAY Entre Semana Day	WEEKDAY Entre Semana Eve	SATURDAY Sábado Day	SATURDAY Sábado Eve	SUNDAY Domingo Day	SUNDAY Domingo Eve
1	Santa Maria	Downtown - Santa Maria - Mall del Norte - Target Store #1	20	20	20-55	20	20-55	40-80	40
2A	San Bernardo	Downtown - Mall del Norte - Social Security Office	30	30	30-60	30	30-60	60	60
2B	San Bernardo	Downtown - Park & Ride - Calton	30	30	30-60	30	30-60	60	60
3	Convent	Downtown - Laredo Medical Center - Doctor's Hospital	45	45	45	45	45	60	60
4	Springfield	Downtown - Springfield - Retama - Target Store #1	37-38	37-38	37-38	37-38	37-38	75	75
5	Tilden	Downtown - Tilden - Gateway Community Health Ctr - Public Library	70	70	70	70	70	70	70
6	Cedar	Downtown - Cedar - Casa Blanca Clinic	30	60	60	60	60	60	60
7	LCC	Downtown - LCC - San Francisco Javier	30-60	30-60	30-60	30-60	30-60	30-60	30-60
8A	Guadalupe/Lane	Downtown - Corpus Christi - Texas Workforce	70	70	70	70	70	70	70
8B	Guadalupe/Villa del Sol	Downtown - Tilden - Cheynenne Subdivision	70	70	70	70	70	–	–
9	Market	Downtown - Market - New York/Lomas del Sur	45	45	45-90	45	45	90	90
10	Corpus Christi	Downtown - Meadow - Zacatecas/Bartlett	30	30	30	30	30	60	60
11	Gustavus/LEC	Downtown - Gustavus - Clark - Laredo Entertainment Center	75	75	75	75	75	85	85
12A	Del Mar Express	Downtown - Mall del Norte - International	30	60	60	60	60	60	60
12B	Express/Shiloh	Downtown - Mall del Norte - Shiloh - International	30	60	60	–	–	–	–
13	Heritage Park	Downtown - Gustavus - Clark - Heritage Park	75	75	–	75	–	See Route 11	
14	Santa Rita	Downtown - LCC South Campus - Santa Rita	90	90	90	90	90	90	90
15	Main/Riverside	Downtown - Main - Riverside/Calton	60	60	60	60	60	60	60
16	TAMIU	Downtown - Texas A & M University	30	60	60	60	60	60	–
17	Mines Road	Downtown - Mall del Norte - Rancho Viejo	37	75	75	75	75	75	–
19	Santo Niño	Downtown - Concord Hills - Larga Vista	70	70	70	70	70	70	–
20	Los Angeles	Downtown - Zapata Highway - Los Angeles	85	85	85	85	–	See Route 14	

(from El Metro website)

The preliminary analysis shows that transit in Laredo is above average in ridership per capita and also above average in cost effectiveness and productivity. Per capita, numbers of passengers boarding buses (boardings) are twice the national average and three times the average of the Texas peer systems. Boardings per bus hour are 25 for El Metro, versus 22 in the national group and 20 in the Texas group. The percentage of operating and maintenance cost (O&M cost) recovered from fares is 25 percent in Laredo, compared with national and state averages of 19 percent.

Although the system performs very well, the surveys and other data collection provide the basis for recommendation of potential improvements to the existing transit services. Improvement topics, with summary recommendations, include the following:

- Consideration of overcrowded or under-used services: Although some bus trips were found to be heavily loaded, this was not a prevailing condition and was a minor subject of complaint or suggested improvement in El Metro service.
- Consideration of possibilities for greater service flexibility: Passenger views expressed in the passenger intercept survey included no complaints or improvement suggestions that relate to the flexibility of service. Recognizing the high cost of demand-response service, which is the primary possibility for augmented flexibility of service, no recommendations for increased service flexibility are made.

- Recognition of unmet needs and their significance: In general the transit services have kept pace with known needs, in terms of travel demand. The fixed-route services would benefit from substantial improvement of bus stops, which should be attractive but more prominent, and should provide a more sheltered environment. If customer opinions reflect unmet needs, it is notable that the leading suggestions of those interviewed in the rider profile survey were for more frequent service, improved schedule adherence, and less deviation from prescribed routes. More frequent service will be more costly unless schedules can be more efficient, requiring less time per round trip, or routes can be re-designed to improve frequency on the most heavily-patronized routes, or concentrate service in fewer alignments. This report provides specific recommendations for route changes that could minimize added costs while increasing service frequency on the most-used routes. Schedule adherence requires attention to schedules and more aggressive management of operations; any driver deviation from routes requires stronger management as well.
- Title VI and ADA issues: The study has not discovered instances in violation of Title VI of the Americans with Disabilities Act of 1964 and Americans with Disabilities Act of 1990, including appropriate provisions for those with limited English proficiency. The Laredo area transit systems use accessible vehicles and include extensive paratransit services for those unable to travel via fixed-route buses. At the time of writing this report, the new El Metro website, www.elmetrotransit.com, had no Spanish or other non-English language option, but a Spanish-language version was in preparation.
- Potential for cost-effective application of new technologies: The study finds new-technology potential primarily in web-based marketing and passenger information methods. Automatic Vehicle Location (AVL) – Global Positioning System (GPS) technology is planned for El Lift's paratransit vehicles. El Metro's new website is attractive and much improved, but deserves additional attention. Its Downtown Trolley page is incomplete at present and could promote increased use of the Trolley if it is adequately informative. (Possible improvements in Downtown Trolley service are discussed as a later item – see below). The website would benefit by offering a Spanish-language version as well as English.
- Potential benefit from changes in policies affecting transit: The primary target should be paratransit, which needs two cost-containing strategies. One of these changes would be an improved, more stringent means of establishing eligibility for the service. The other change is to find a way to reduce the cost, either by contracting with a taxi company to provide the service, or by negotiating lower pay rates for paratransit drivers. Contracting with taxicab companies to operate the paratransit buses should be investigated. The City should be mindful of policies that favor or hinder transit and its use. Examples include ways in which traffic and parking are managed, pedestrianways provided and maintained, and transit-supportive land uses encouraged.
- Any need for changes in fares: At the time of completing this report, a fare increase was under consideration. The 2009 El Metro operating budget was planned for a 23 percent farebox recovery ratio, which is well within normal practice. Actual fare revenues, however, have been lower than projected, because of drop in ridership

compared with 2008. A modest fare increase might have little adverse effect on ridership; only one percent of the riders surveyed in 2008 complained about the fare level. Introduction of weekly or monthly passes could be beneficial and should be investigated. One of the fare changes under consideration was to eliminate transfers, which currently cost five cents. Elimination of transfers would result in passengers who transfer having to pay two (sometimes three) fares. This would affect approximately one-fourth of current ridership, and in our view is inequitable. Passengers transfer because the route structure does not provide direct service between their origin and destination. Transferring is inconvenient and time-consuming; it is made even worse if the passenger must also pay an additional fare. Charging for transfers is useful to minimize abuse in the use of transfers, and an increase from five cents to ten cents would be reasonable.

- Service expansion opportunities: El Metro planning should continue to recognize needs for extending service to areas of urban and suburban development, to the extent justifiable. Equally important is to consider a careful re-structuring of the system, as a means to encourage new transit passenger markets, complementing the present dominance of passengers from Mexico, who travel from and to the downtown Transit Center. Detailed planning would be necessary to identify current and potential new markets and design a re-structured system that would maintain the level of service provided to current passengers while attracting new riders. The Santa Barbara – Santa Ursula corridor project being prepared for implementation by City Planning provides an opportunity to modify and strengthen El Metro Routes 2A and 2B, which together are the highest-volume transit service in Laredo. Some of the longer routes are a cost problem not offset by favorable ridership levels. Selective modification of routes is indicated, possibly by conversion of under-used route segments into feeder routes linked to main routes at non-central transit centers. The City's long-range thoroughfare plan and land use plans should be reviewed within the public transportation context to maximize the opportunities to provide direct, efficient transit routes that are convenient to the future population and activity centers serving those populations. Specific recommendations are:
    - Initiate a detailed study of route re-structuring. This would entail limited additional data collection but substantial analysis to develop routes that best meet objectives, including maintaining cost effectiveness, minimizing increase in operating costs, maintaining current service quality to existing riders, and supporting the development of expanded or new ridership.
    - Consider the following immediate action, which will establish a "Linear Hub transit structure complementing the planned San Bernardo Avenue Renovation and Restoration Project of the Laredo Urban Transportation Study. The concept is subject to verification of affordability and improved levels of service to the existing ridership; variants could range from a slight reduction to a moderate increase in hours of bus service:
        - Redesign the common portion of Routes 2A, 2B, 12A, 12B, 16, and 17 as local and express routes between the Transit Center and a new transit center established at Mall del Norte. Convert the present 2A, 2B, 12A, 12B, 16, and 17 outer sections into feeder routes covering the

present service areas of the routes, with timed transfers at Mall del Norte. The six routes between the downtown Transit Center and Mall del Norte would become just two routes, one providing frequent local service along San Bernardo Avenue, and one providing express service on I-35.

- Truncate Route 3 at Calton, Hillside, or Calle del Norte; possibly integrating its schedule with the Route 2 or Route 12 feeder routes.

- The Laredo Transit Center, and downtown circulation needs: The Transit Center is adequate and its lobby restrooms are currently under renovation. Improvements in signing to help passengers find bus routes are needed. If bus frequency at the Transit Center becomes excessive, shift the scheduled times for Routes 1 and 2 by five to ten minutes, leaving other routes as they are. This will reduce the peak numbers of buses at the Transit Center. Downtown circulation is provided by the little-used fare-free Downtown Trolley route, which is under-defined in readily-available information, under-promoted, and insufficiently frequent to serve its intended purpose effectively. Its downtown-to-mall feature could be discontinued (regular fixed routes provide that function effectively), and the resulting unused revenue vehicle hours applied to provide increased frequency of downtown circulation trips. Two new downtown circulation routes are proposed (see Section 4 of this report).
- Transit marketing: Much can be done to build transit use, but market-development must be done with care to avoid developing markets that require added service without commensurate contributions to fare revenues, mobility needs-satisfaction, or attainment of other goals such as those related to energy, air quality, or sustainability.
- Transit vehicles and facilities: El Metro is currently engaged in a joint ARRA-funded procurement, with one or more other transit agencies, to purchase new diesel-fueled buses. This purchase will assure the system of an ample vehicle fleet, and operations and fueling stations, at least through the five future years considered in this Transit Development Plan. El Metro also is planning to build a new maintenance facility and has identified a suitable site. This facility should be funded and built at the earliest opportunity. El Lift has received the first 6 of 18 new diesel-powered paratransit buses, securing its fleet replacement needs for the near future. Other planned paratransit improvements include equipping the vehicles with AVL-GPS technology. The current daily disruptions to bus service caused by trains on the at-grade KCS track along Moctezuma Avenue should be addressed by re-scheduling trains to operate outside of bus service hours. If this is not possible, alternative capital-improvement solutions should be investigated and pursued. Options include construction of a grade separation (flyover) west of I-35, and construction of bus bypass lanes within the I-35 right of way.

2.0 DATA COLLECTION

2.1 2008 El Metro Passenger Interviews (Intercept Survey)

From May 14, 2008 to May 17, 2008, NuStats, acting as sub-consultant to Parsons Brinckerhoff, conducted a public transit intercept survey of El Metro passengers in Laredo, Texas. The survey was conducted at the Laredo Transit Center, and resulted in the collection of 412 completed and usable surveys. The work included developing the sampling plan, designing the survey instrument; collecting, processing, and geo-coding the data, analyzing the data, and reporting results. The report documenting these tasks is provided as Appendix A to this report.

The objectives of the survey analysis were two-fold: (1) examine the socio-demographic characteristics of El Metro riders, and (2) examine the travel behavior characteristics of El Metro riders. Some important findings from the analysis of the El Metro riders are presented below:

1. The socio-demographic characteristics of the riders indicate that 73% of El Metro riders are between the ages of 25-64 and 62% of the riders are women. Eighty-one percent of the riders are "transit captives" (i.e. they are from households that do not own any vehicles). Half of El Metro riders are employed, with 29% employed full-time and 22% employed part-time. Overwhelmingly, Spanish is the dominant primary language (91%).
2. The travel behavior characteristics of the riders indicate that home and personal business (all non-home purposes other than work and school) are the dominant trip origins and destinations of riders. Three-quarters of riders do not make any transfers on their one-way trips. Eighty-four percent of riders use El Metro at least twice a week, with 15% using El Metro daily.

It is also noted that 45 percent of those interviewed were making trips to or from Mexico. Only 3 percent of those interviewed were under age 18. While 51 percent of interviewees were employed full or part time, only 29 percent were traveling to or from work

Note that these results have been drawn entirely from interviews conducted at the Laredo Transit Center, located in downtown five blocks from the cross-border bridge. Based upon the unexpanded sample data from the boarding and alighting survey, approximately 35 percent of riders do not pass through the Transit Center. Those riders may not have the same socio-demographic or travel behavior characteristics. The low percentage of riders who were under age 18, and the small percentage of trips that were made to or from school, for example, may not apply to passenger trips that do not use the Transit Center.

2.2 2008 El Metro Boarding and Alighting Survey

The firm GeoStats, as sub-consultant to Parsons Brinckerhoff, planned and conducted the El Metro Boarding and Alighting Survey. Their report is provided as Appendix B to this report. GeoStats used the system schedule database of El Metro to create a sample plan for collecting ridership information. A total of 164 assignments were created, covering approximately 773 service hours split between Weekday, Saturday and Sunday.

To conduct a system-wide boarding and alighting study for El Metro, GeoStats team used its RideCount™ system, which features software that runs on GPS-enabled handheld devices, and an integrated data collection management and processing website. This application was designed to collect accurate boarding and alighting counts, along with bus stop location and time details (provided by the GPS receiver in the iPAQ device). The surveys were conducted primarily during May 2008, with additional weekend surveys during the month of July.

The expanded sample of boarding and alighting (on-off) counts included 15,497 weekday, 12,658 Saturday, and 5,877 Sunday passenger boardings. These are above-average days; annual ridership in 2008 was .

2.3 El Aguila Rural Transit: Information Supplied

Information was obtained from Mr. Robert Martinez Jr., Director of El Aguila Rural Transit, regarding the facilities and services of this system, which provides demand-response and fixed-route service within rural Webb County including travel to or from urban destinations, especially to their downtown Laredo terminal located at Jarvis Plaza, adjacent to the Laredo Transit Center. The system operates a fleet of 23 wheelchair-accessible vehicles carrying approximately 110,000 passengers annually. Their vehicles operate a total of 342,800 miles and 17,285 hours annually. Some passengers concurrently use El Metro routes, transferring at the Laredo Transit Center. Although the primary purpose of the system is to serve elderly and disabled persons, the system is available also to anyone else, at higher fares.

3.0 CURRENT CONDITIONS AND TRENDS

This section of the report provides a description of current conditions and trends of the public transportation systems and services within the MPO area. This material provides the basic starting point for preparation of the Transit Development Plan, which will address anticipated actions and conditions during the next five years, to continue provision of effective and efficient public transportation for the Laredo area.

The subject of recent trends is presented first, followed by a comparison of the main Laredo public transportation system with selected peer systems in Texas and throughout the United States, and finally by further information on current conditions.

3.1 El Metro and El Lift Trend Analysis

Data during five recent successive years were analyzed to understand trends in El Metro and El Lift services, costs, and use. The data source for this purpose was the National Transit Database (NTD), which provides a standardized reporting system for the transit industry in the United States. Information from this source is well defined and easily interpreted.

The most recent year's published NTD records are for Fiscal Year 2006. For this reason the trend analysis covers the period 2002 through 2006. Within this period, there are some evidences of changes in data reporting requirements or, possibly, changes in accounting practices of El Metro and El Lift.

El Aguila Rural Transit does not report to the NTD and consequently their trend data were not available.

3.1.1. El Metro

This system, which currently operates 22 fixed bus routes, is the main transit carrier in the Laredo area. Key statistics covering transit service and use during the years 2002 through 2007 are provided in Table 3-1, below.

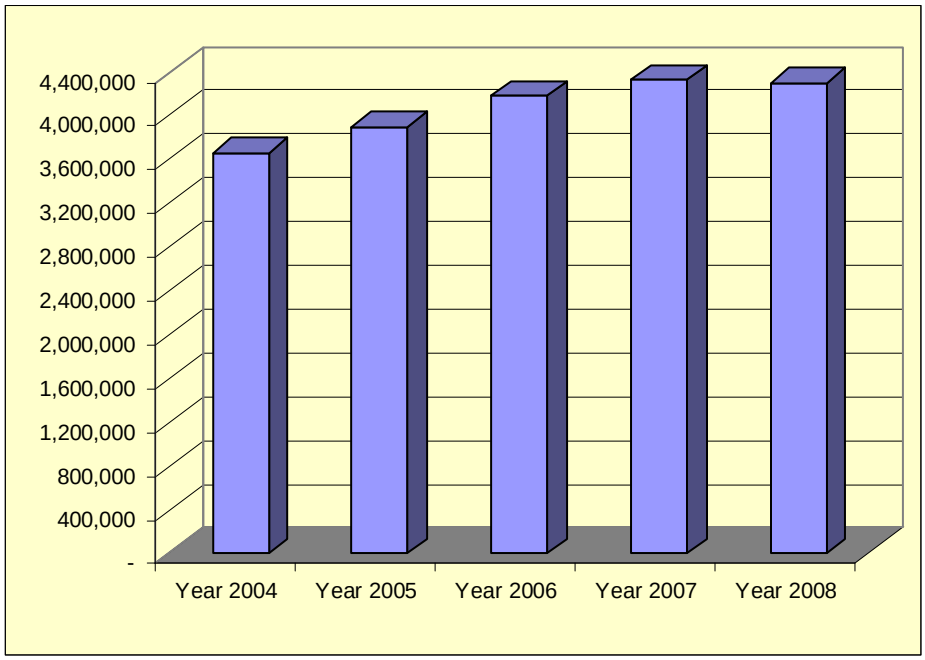
Table 3-1: El Metro Trend in Service and Use

EL METRO -- FIXED ROUTE OPERATIONS SERVICE AND USE	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007
Average Typical Weekday						
Vehicles in operation	34	31	35	34	34	34
Vehicle revenue miles	5,857	5,371	5,365	5,271	5,273	5,326
Vehicle revenue hours	475	473	465	497	499	503
Unlinked passenger trip	15,187	15,187	11,327	12,135	13,005	13,503
Passenger miles	65,657	65,657	48,933	37,497	40,185	41,724
Average Typical Saturday						
Vehicles in operation	33	30	33	33	33	33
Vehicle revenue miles	5,232	4,885	4,997	4,989	4,990	4,985
Vehicle revenue hours	398	421	425	453	456	451
Unlinked passenger trip	13,668	13,668	9,313	9,237	10,314	10,693
Passenger miles	54,992	54,992	37,438	26,602	29,704	30,795
Average Typical Sunday						
Vehicles in operation	19	20	20	20	20	20
Vehicle revenue miles	2,749	2,340	2,364	2,513	2,515	2,499
Vehicle revenue hours	198	214	211	228	229	223
Unlinked passenger trip	5,576	5,576	4,255	4,819	4,720	5,323
Passenger miles	29,598	29,598	22,594	15,951	15,623	17,619
Annual						
Vehicle revenue miles	1,937,832	1,777,531	1,783,037	1,765,835	1,766,513	1,767,946
Vehicle revenue hours	154,492	154,385	154,437	165,129	165,859	165,211
Unlinked passenger trip	4,596,162	4,964,495	3,661,883	3,898,147	4,176,073	4,324,395
Passenger miles	21,524,492	21,535,157	15,893,177	11,999,473	12,845,289	13,311,072

Source: Parsons Brinckerhoff from National Transit Database

The data show a marked drop in reported ridership and passenger miles (the sum of miles traveled by passengers on board buses) between 2003 and 2004. This proved to be the result of installing new Odyssey GSI fareboxes, which provide more accurate passenger data than were available from the previous fareboxes. The positive trend in ridership from 2004 through 2007, which actually continued from earlier years, is shown in Figure 3-1. The figure also shows that ridership growth stopped after reaching 4.32 million in 2007, remaining almost the same in 2008, when the total was 4.30 million. Ridership during the first half of 2009 has been down about ten percent compared to the 2008 results. Revenue vehicle hours show an increase in 2005 and 2006 while revenue vehicle miles are lower in those years than they were previously. This suggests either scheduling changes, or a revision in how revenue vehicle hours were defined.

Figure 3-1: El Metro Fixed-Route Bus Passengers (Annual Totals)



Further interpretation of trends is provided in Table 3-2

Table 3-2: El Metro Service Productivity

	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007
Annual Service Productivity Measures						
Passengers per rev veh hr.	29.75	32.16	23.71	23.61	25.18	26.17
Passenger miles per rev veh mi.	11.11	12.12	8.91	6.80	7.27	7.53
Average passenger trip length	4.68	4.34	4.34	3.08	3.08	3.08
Revenue veh mi per rev veh hr	12.54	11.51	11.55	10.69	10.65	10.70
Rev veh mi per peak veh	56,995	57,340	50,944	51,936	51,956	51,998
Rev veh hr per peak veh	4,544	4,980	4,412	4,857	4,878	4,859

Source: Parsons Brinckerhoff from National Transit Database

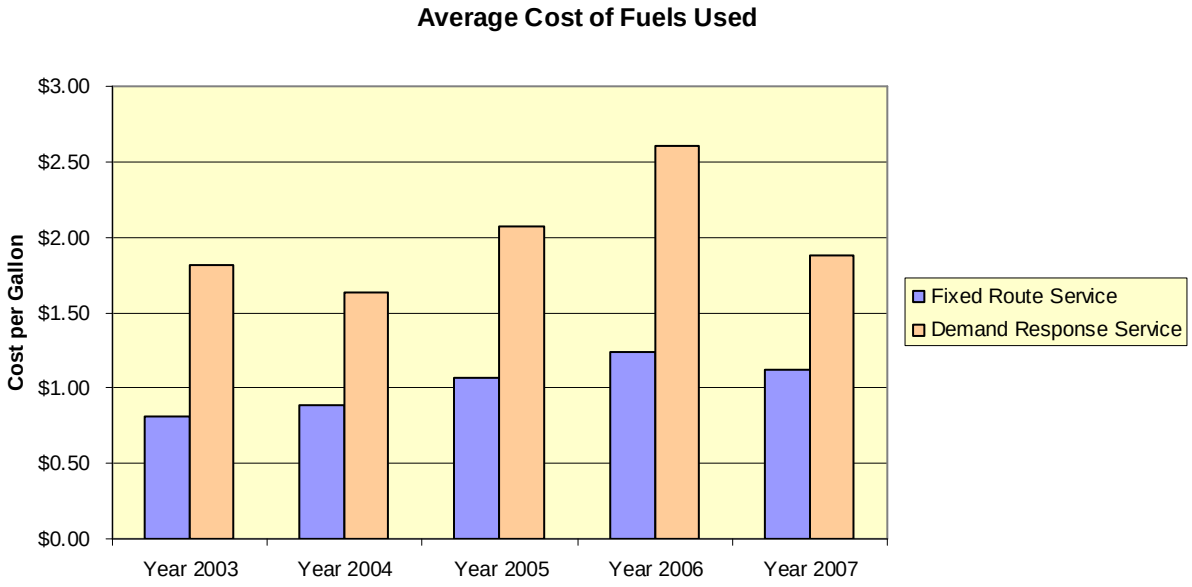
El Metro's bus fleet is now largely powered by compressed natural gas (CNG). This fuel is relatively clean environmentally and also notably less expensive than gasoline or diesel fuel. The record of fuel use during the 2002-2006 period is documented in Table 3-3. Figure 3-2 illustrates the dramatic difference in the average fuel price per gallon experienced by El Metro, powered mainly by CNG, and El Lift, which operates a diesel-powered fleet.

Table 3-3: El Metro Fuel Usage

FIXED ROUTE SERVICE	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007
Gallons of Fuel Used						
Diesel	284,141	263,353	216,831	191,912	174,519	91,487
Gasoline						
Compressed Natural Gas (CNG)	517,267	506,662	623,786	656,979	692,830	749,102
Total	801,408	770,015	840,617	848,891	867,349	840,589
Percent CNG	64.5%	65.8%	74.2%	77.4%	79.9%	89.1%

Source: Parsons Brinckerhoff from National Transit Database

Figure 3-2: Comparative Fuel Costs, El Metro and El Lift



Source: Parsons Brinckerhoff from National Transit Database

El Metro's record in operating and maintenance (O&M) cost during the years 2002-2007 is tabulated below.

Table 3-4: El Metro O&M Costs

EL METRO -- FIXED ROUTE OPERATIONS	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007
All Operating and Maintenance Expenses						
Operators	$ 2,568,203	$ 2,869,203	$ 3,003,976	$ 3,121,059	$ 3,139,495	$ 3,275,798
Other staff	$ 1,892,213	$ 1,772,894	$ 1,837,686	$ 1,875,820	$ 1,922,095	$ 1,982,304
Fringe benefits	$ 1,389,182	$ 1,743,020	$ 1,807,648	$ 1,964,290	$ 2,199,664	$ 2,339,650
Service costs	$ 466,254	$ 546,706	$ 638,516	$ 656,435	$ 678,525	$ 698,617
Fuels & lubricants	$ 428,815	$ 625,132	$ 741,741	$ 903,080	$ 1,072,129	$ 943,594
Tires and tubes	$ 47,928	$ 49,515	$ 39,325	$ 63,202	$ 52,277	$ 69,796
Other materials & supplies	$ 660,936	$ 657,980	$ 750,359	$ 856,295	$ 1,045,188	$ 1,034,977
Utilities	$ 163,792	$ 140,236	$ 149,907	$ 166,872	$ 212,039	$ 274,588
Casualties & liabilities	$ 211,863	$ 293,652	$ 242,749	$ 217,192	$ 208,711	$ 181,741
Taxes	$ 46,827	$ 48,699	$ 52,934	$ 41,498	$ 37,060	$ 21,879
Miscellaneous expense	$ (45,234)	$ (162,926)	$ (38,599)	$ 643	$ 391	$ 4,194
Totals	$ 7,830,779	$ 8,584,111	$ 9,226,242	$ 9,866,386	$ 10,567,574	$ 10,827,138
Percent General Administration	14.0%	13.1%	12.2%	11.4%	13.3%	13.5%

Source: Parsons Brinckerhoff from National Transit Database

The relationship between service and use, on the one hand, and O&M costs is demonstrated in Table 3-5. O&M cost per revenue vehicle hour rose by 29 percent over the tabulated period.

Table 3-5: El Metro Financial Productivity Measures

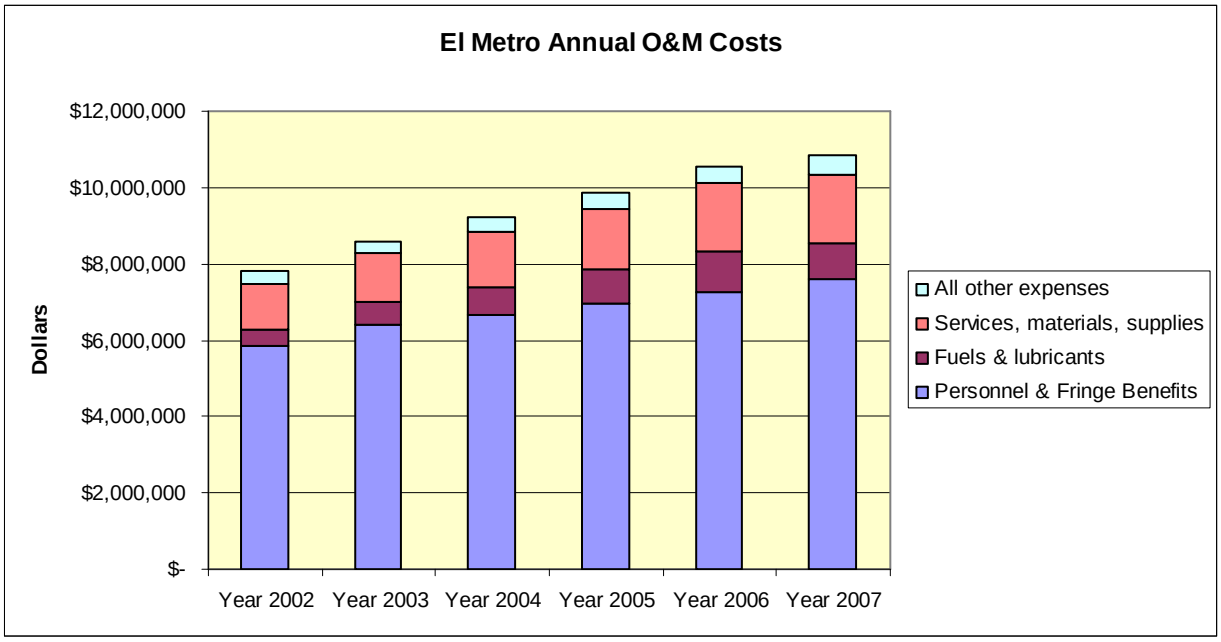
	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007
Annual Financial Productivity Measures						
O&M cost per rev veh mi	$ 4.041	$ 4.829	$ 5.174	$ 5.587	$ 5.982	$ 6.124
O&M cost per rev veh hr	$ 50.69	$ 55.60	$ 59.74	$ 59.75	$ 63.71	$ 65.54
O&M cost per passenger	$ 1.704	$ 1.729	$ 2.520	$ 2.531	$ 2.531	$ 2.504
O&M cost per passenger mile	$ 0.364	$ 0.399	$ 0.581	$ 0.822	$ 0.823	$ 0.813

Note: "passengers" = unlinked passenger trips

Source: Parsons Brinckerhoff from National Transit Database

The trends in O&M costs by major category are illustrated in Figure 3-3. The rapid increases in fuel cost can be seen clearly. Fuel expenditures in 2006 were 2.5 times the reported 2002 value.

Figure 3-3: El Metro O&M Cost Trends



Source: Parsons Brinckerhoff from National Transit Database

The recent fare revenue history of El Metro is shown in Table 3-6. The table documents the notable increase in revenue in years 2004-2007, and the corresponding sharp rise in average fare per passenger boarding. Using transfer incidence data from the 2008 passenger interview survey, the average cost per linked passenger trip is shown for the years 2004-2007, on the assumption that the incidence of transferring has not changed materially during that period.

Table 3-6: El Metro Fare Revenue Trends

FIXED ROUTE SERVICE	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007
Annual Fare Revenue	$ 2,086,386	$ 1,944,893	$ 2,405,879	$ 2,484,051	$ 2,673,937	$2,775,002
Fare revenue per passenger	$ 0.454	$ 0.392	$ 0.657	$ 0.637	$ 0.640	$ 0.642
Fare revenue per psngr mile	$ 0.097	$ 0.090	$ 0.151	$ 0.207	$ 0.208	$ 0.208
Approximate avg. per linked passenger trip			$ 0.82	$ 0.80	$ 0.80	$ 0.80
Fare revenue per rev veh hr	$ 13.505	$ 12.598	$ 15.578	$ 15.043	$ 16.122	$ 16.797

Note: "passengers" = unlinked passenger trips

Source: Parsons Brinckerhoff from National Transit Database

3.1.2. El Lift

El Lift provides demand response service for eligible persons within the Laredo urbanized area, using a fleet of 18 diesel-powered vans equipped with wheelchair lifts. Their operating experience during the years 2002-2007 is as outlined in Table 3-7.

Table 3-7: El Lift Trend in Service and Use

EL LIFT -- DEMAND RESPONSE OPERATIONS SERVICE AND USE	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007
Average Typical Weekday						
Vehicles in operation	15	14	14	14	14	14
Vehicle revenue miles	508	542	545	735	937	964
Vehicle revenue hours	91	83	82	90	101	104
Unlinked passenger trip	180	163	173	175	185	176
Passenger miles	473	487	517	738	1,023	885
Average Typical Saturday						
Vehicles in operation	6	6	6	6	6	6
Vehicle revenue miles	241	185	198	274	369	389
Vehicle revenue hours	31	30	30	33	37	40
Unlinked passenger trip	66	64	73	64	65	59
Passenger miles	182	187	213	240	344	274
Average Typical Sunday						
Vehicles in operation	4	4	4	4	4	4
Vehicle revenue miles	191	155	154	285	207	213
Vehicle revenue hours	19	20	20	29	31	32
Unlinked passenger trip	44	46	58	62	58	58
Passenger miles	165	170	215	222	213	273
Annual						
Vehicle revenue miles	154,544	159,142	160,549	220,903	272,481	279,904
Vehicle revenue hours	26,260	24,263	24,002	26,714	29,693	30,600
Unlinked passenger trip	52,520	48,263	51,965	52,227	54,307	51,548
Passenger miles	141,024	145,671	157,193	216,642	293,668	256,981

Source: Parsons Brinckerhoff from National Transit Database

The data reveal a large increase in revenue vehicle miles in 2005 through 2007, but much lower increases in revenue vehicle hours, suggesting a possible change in service definition or operating practices. Ridership has remained relatively stable over the years with the exception of a dip in 2003.

Further interpretation of trends is provided in Table 3-8

Table 3-8: El Lift Service Productivity

	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007
Annual Service Productivity Measures						
Passengers per rev veh hr.	2.00	1.99	2.17	1.96	1.83	1.68
Passenger miles per rev veh mi.	0.91	0.92	0.98	0.98	1.08	0.92
Average passenger trip length	2.69	3.02	3.02	4.15	5.41	4.99
Revenue veh mi per rev veh hr	5.89	6.56	6.69	8.27	9.18	9.15
Rev veh mi per peak veh	10,303	11,367	11,468	15,779	19,463	19,993
Rev veh hr per peak veh	1,751	1,733	1,714	1,908	2,121	2,186

Source: Parsons Brinckerhoff analysis from National Transit Database

El Lift's record in operating and maintenance (O&M) cost during the period is tabulated below. Costs have trended steadily upward since 2004.

Table 3-9: El Lift O&M Costs

EL LIFT -- DEMAND RESPONSE OPERATIONS	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007
All Operating and Maintenance Expenses						
Operators	$ 680,814	$ 578,809	$ 480,358	$ 487,423	$ 531,456	$ 540,687
Other staff	$ 364,046	$ 397,323	$ 383,546	$ 375,638	$ 361,567	$ 509,201
Fringe benefits	$ 338,545	$ 372,774	$ 337,030	$ 343,061	$ 388,626	$ 480,952
Service costs	$ 121,299	$ 135,627	$ 171,150	$ 177,315	$ 169,117	$ 173,274
Fuels & lubricants	$ 99,262	$ 89,912	$ 59,857	$ 89,004	$ 109,034	$ 75,093
Tires and tubes	$ 16,172	$ 3,927	$ 5,225	$ 16,032	$ 12,099	$ 9,869
Other materials & supplies	$ 124,762	$ 103,349	$ 64,496	$ 68,775	$ 152,071	$ 102,786
Utilities	$ 28,531	$ 26,577	$ 29,295	$ 32,001	$ 39,715	$ 68,647
Casualties & liabilities	$ 52,956	$ 73,630	$ 60,903	$ 54,483	$ 52,349	$ 45,599
Taxes	$ 18,130	$ 16,582	$ 4,243	$ 10,155	$ 11,242	$ 7,362
Miscellaneous expense	$ (763)	$ (1,546)	$ (53)	$ 314	$ 251	$ 1,048
Totals	$ 1,843,754	$ 1,796,964	$ 1,596,050	$ 1,654,201	$ 1,827,527	$ 2,014,518
Percent General Administration	14.9%	15.7%	17.6%	17.0%	18.4%	18.1%

Source: Parsons Brinckerhoff from National Transit Database

The relationship between service and use, on the one hand, and O&M costs is demonstrated in Table 3-10. O&M cost per revenue vehicle hour was lowest in 2006, and the cost per passenger was lowest in 2004. The cost per passenger has been rising quickly through 2007.

Table 3-10: El Lift Financial Productivity Measures

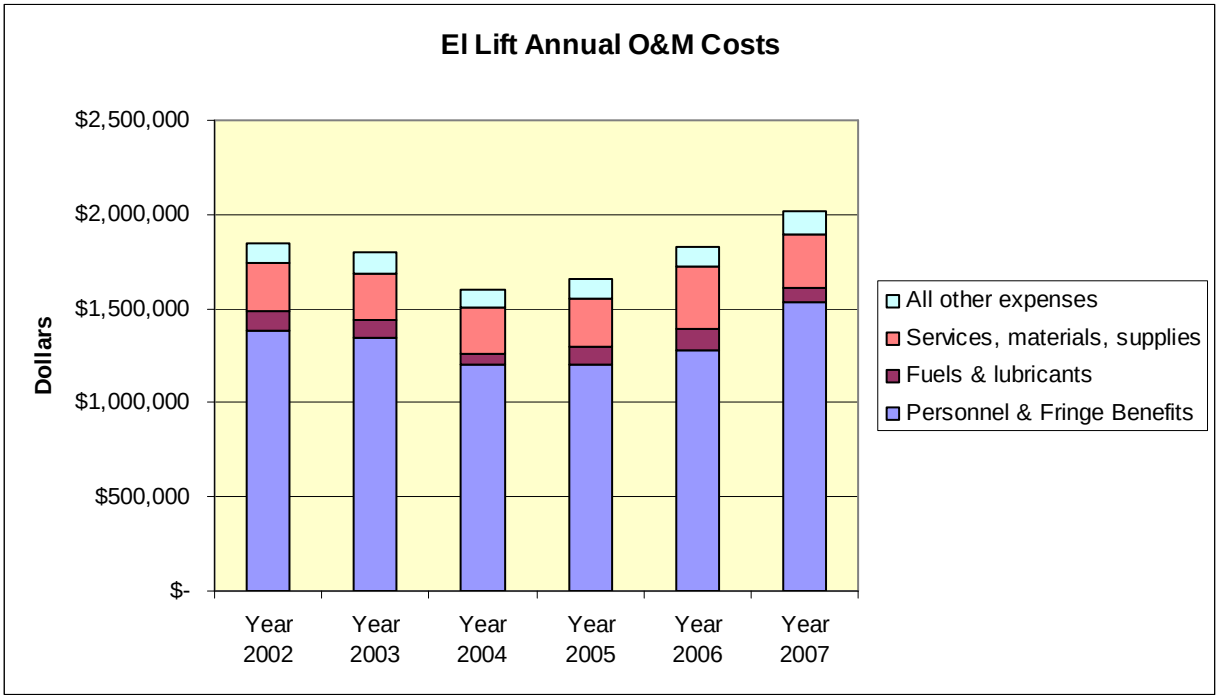
	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007
Annual Financial Productivity Measures						
O&M cost per rev veh mi	$ 11.930	$ 11.292	$ 9.941	$ 7.488	$ 6.707	$ 7.197
O&M cost per rev veh hr	$ 70.21	$ 74.06	$ 66.50	$ 61.92	$ 61.55	$ 65.83
O&M cost per passenger	$ 35.106	$ 37.233	$ 30.714	$ 31.673	$ 33.652	$ 39.080
O&M cost per passenger mile	$ 13.074	$ 12.336	$ 10.153	$ 7.636	$ 6.223	$ 7.839

Note: "passengers" = unlinked passenger trips

Source: Parsons Brinckerhoff analysis from National Transit Database

The trend experience in O&M costs by major category is illustrated in Figure 3-4.

Figure 3-4: El Lift O&M Cost Trends



Source: Parsons Brinckerhoff from National Transit Database

The recent fare revenue history of El Lift is shown in Table 3-11. The table documents an upward trend in revenue throughout the period. There has been a moderate rise in average fare per passenger boarding, but a large decline in average fare per passenger mile, which results from the reported increase in average passenger trip length.

Table 3-11: El Lift Fare Revenue Trends

DEMAND RESPONSE SERVICE

	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007
Annual Fare Revenue	$ 29,593	$ 30,578	$ 30,167	$ 32,242	$ 34,561	$33,109
Fare revenue per passenger	$ 0.563	$ 0.634	$ 0.581	$ 0.617	$ 0.636	$ 0.642
Fare revenue per psngr mile	$ 0.210	$ 0.210	$ 0.192	$ 0.149	$ 0.118	$ 0.129
Fare revenue per rev veh hr	$ 1.127	$ 1.260	$ 1.257	$ 1.207	$ 1.164	$ 1.082

Note: "passengers" = unlinked passenger trips

Source: Parsons Brinckerhoff from National Transit Database

3.1.3. El Metro and El Lift Directly Generated Funds

El Metro and El Lift obtain funds from direct local sources as well as sales tax revenues. Additional income is obtained from state and federal sources. The record of directly-generated funds (mainly fare revenues) and sales tax proceeds is provided in Table 3-12 below.

Table 3-12: Local Funding of El Metro and El Lift

ANNUAL LOCALLY-DERIVED FUNDS - FIXED ROUTE AND DEMAND RESPONSE SERVICES

	Year 2002	Year 2003	Year 2004	Year 2005	Year 2006	Year 2007
Annual fare revenues	$ 2,115,979	$ 1,975,471	$ 2,436,046	$ 2,516,293	$ 2,708,498	$2,808,111
Other transportation revenues	$ 141,080	$ 77,586	$ 80,786	$ 86,067	$ 54,973	$4,110
Auxiliary concessions	$ 15,303	$ 16,725	$ 15,701	$ 11,617	$ 10,309	$8,841
Auxiliary advertising	$ 8,309	$ 10,251	$ 18,765	$ 70,949	$ 109,148	$84,154
Auxiliary other sources	$ 7,840	$ 5,251	$ 7,126	$ 6,355	$ 7,664	$11,174
Non-transportation amount	$ 476,625	$ 515,045	$ 529,517	$ 536,728	$ 579,523	$583,332
Sales tax proceeds	$ 2,584,815	$ 3,544,664	$ 4,439,820	$ 4,118,932	$ 5,245,860	$4,651,568
Total annual funds	$ 5,349,951	$ 6,144,993	$ 7,527,761	$ 7,346,941	$ 8,715,975	$ 8,151,290

Source: Parsons Brinckerhoff from National Transit Database

3.2 Peer Comparisons

For the purpose of peer comparisons, the NTD was again selected as the data source. The peer comparisons were limited to fixed-route urban bus operations, which were judged to have much greater validity than would any attempt to compare demand response and rural services in Laredo to those in other metropolitan areas. Peer systems were selected on the basis of having similarity in geographic area served, population served, and the scale of transit operations as measured by the number of vehicles used during periods of maximum service.

Because of Laredo's unusual situation as a border city deriving substantial ridership from residents of Mexico, attention also was given to the inclusion of other border cities. Due to their widely different scales and circumstances of operation, however, direct comparisons within this unique group were not found viable; they were included within the overall samples selected. This left two peer groups – 13 systems in Texas cities that broadly met the size measures mentioned, and 84 systems, including the Texas cities, throughout the USA. The 13 Texas systems were Abilene, Amarillo, Beaumont, Brownsville, Denton County Transportation Authority (Lewisville), El Paso, Golden Crescent Regional Planning Commission (Victoria), Hill Country Transit District (San Saba), Lower Rio Grande Valley Development Council, Lubbock, Midland-Odessa, San Angelo, and Waco.

Summary data for El Metro and the national and Texas peer groups are provide in Table 3-13.

Table 3-13: El Metro Peer Comparisons

	El Metro, Laredo	Averages, 84 National Peer Selection	Averages, 13 Selected Texas Cities
OPERATIONS DATA			
Service Area (square miles)	79	120	90
Population	176,576	179,151	182,715
Vehicles Operated during Maximum Service	34	30	20
Annual Revenue Miles Operated	1,766,513	1,209,967	950,304
Annual Revenue Hours Operated	165,859	90,825	70,388
Annual Passenger Boardings	4,176,073	2,029,175	1,426,995
Annual Passenger Miles Carried	12,845,289	7,107,290	6,940,238
Annual Operating and Maintenance Cost	10,567,574	6,495,558	4,547,285
Annual Directly Generated Funds	3,470,115	1,765,742	1,116,949
Annual Fare Revenue	2,673,937	1,210,592	875,563
SELECTED OPERATING RATIOS			
Population Density (persons per square mile)	2,235	1,491	2,034
Annual Average Service Speed (miles per hour)	10.65	13.32	13.50
Annual Passenger Boardings per Capita	23.65	11.33	7.81
Annual Passenger Boardings per Revenue Vehicle Hour	25.18	22.34	20.27
Annual Passenger Miles per Revenue Vehicle Mile	7.27	5.87	7.30
Annual Average Passenger Trip Length (miles on board)	3.08	3.50	4.86
Annual O&M Cost per Revenue Vehicle Mile	$ 5.98	$ 5.37	$ 4.79
Annual O&M Cost per Revenue Vehicle Hour	$ 63.71	$ 71.52	$ 64.60
Annual O&M Cost per Passenger Boarding	$ 2.53	$ 3.20	$ 3.19
Annual O&M Cost per Passenger Mile	$ 0.82	$ 0.91	$ 0.66
Average Fare per Passenger Boarding	$ 0.64	$ 0.60	$ 0.61
Annual Farebox Recovery Ratio (fare revenue / O&M cost)	25.30%	18.64%	19.25%

Source: Parsons Brinckerhoff from National Transit Database

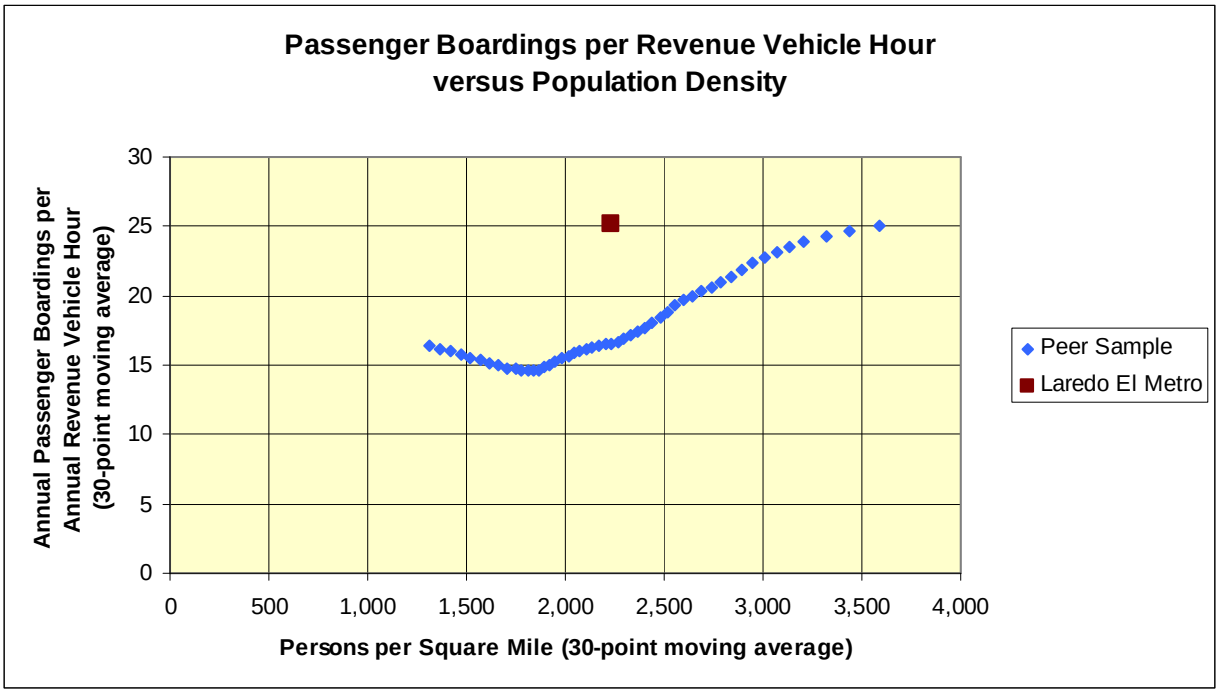
The comparison data show that El Metro, with similar population and a slightly smaller geographic area than the averages for the two peer groups, operates more vehicles, more vehicle miles, and more vehicle hours than either the national or Texas groups. Passenger boardings are twice as high as for the national group, and three times the level of the Texas group. Passenger miles are nearly twice the level carried on average by the national and Texas groups.

In the selected operating ratios section of the table, it will be seen that Laredo has the highest population density – a statistic favorable to transit use, but bear in mind that Laredo also benefits, in ridership, from the substantial proportion of riders who are traveling to or from Mexico, which is outside the measured service area. This fact is underlined by the much higher passenger boardings per capita, compared with the two peer groups. El Metro's operating cost per vehicle hour is very similar to that of the Texas peer group and somewhat lower than this statistic for the national group, which includes numerous cities where wages and the cost of living are likely to be higher. Laredo has the lowest O&M cost per passenger boarding – less than 80 percent of the cost per passenger boarding in the national and Texas groups. The average fare per

passenger boarding is similar to that of the other groups, but Laredo's farebox recovery ratio is 30 to 35 percent better than the national and Texas groups achieve.

Figure 3-5 illustrates one other aspect of the relationship between ridership and population density, and further underscores Laredo's unique situation as a border city. In the graph, the national peer group's data have been plotted as a 30-point moving average, plotting boardings per vehicle hour against population density. The significant correlation between ridership and population density is exhibited. The data point for El Metro is well above the averaged line generated by the peer group.

Figure 3-5: El Metro Peer Comparisons - Ridership



Source: Parsons Brinckerhoff from National Transit Database

While the peer comparisons show that El Metro is a relatively productive and efficient transit service, it is also evident that its ridership success is a challenge to the Laredo government, because of the fact that, like all the US urban transit systems, on-going substantial funding to supplement fare revenues is required. The challenge can only be assumed to grow larger with time, considering factors such as rising energy costs and events such as the country's financial crisis, unfolding at the time of writing this report. As energy prices remain high and the health of the economy is threatened, the demand for public transportation services can be expected to increase, as has already been widely demonstrated. Additional passengers inevitably require increased amounts of service, which in turn require provision of funding beyond what can be earned by the farebox.

3.3 Current Operations of El Metro

As mentioned earlier, El Metro operates 22 bus routes, as shown and described earlier in Figures 1-2 and 1-3.

The service coverage area of El Metro bus routes is governed by the location of the bus stops provided for each route. These stops are shown in Figure 3-6.

The current routes and stops leave a few areas of urbanization un-served, and do not reach outer developing areas.

Another aspect of the existing route structure is how well the route patterns fit travel demands. This can be illustrated by comparing El Metro routes with the transit passenger trip "desire lines" (straight lines between trip origin and destination). These desire lines are illustrated in Figure 3-7. The width of each desire line is proportional to the number of trips made between the indicated trip origin and destination, as developed from the May 2008 passenger interviews conducted at the Laredo Transit Center. In the diagram, trips to and from Mexico are shown as beginning or ending at the Laredo Transit Center. Note that this picture is broadly representative of bus passenger trips, but does not include approximately 35 percent of passengers who do not make use of the Transit Center. Many of the excluded trips will be well-aligned with existing routes, but others may have desire lines that are not directly served by the existing routes. Even those shown are in some cases not well-aligned with the current route structure and obviously pass through the Transit Center only because that is the best available way to use the transit system, in the absence of a more direct bus route.

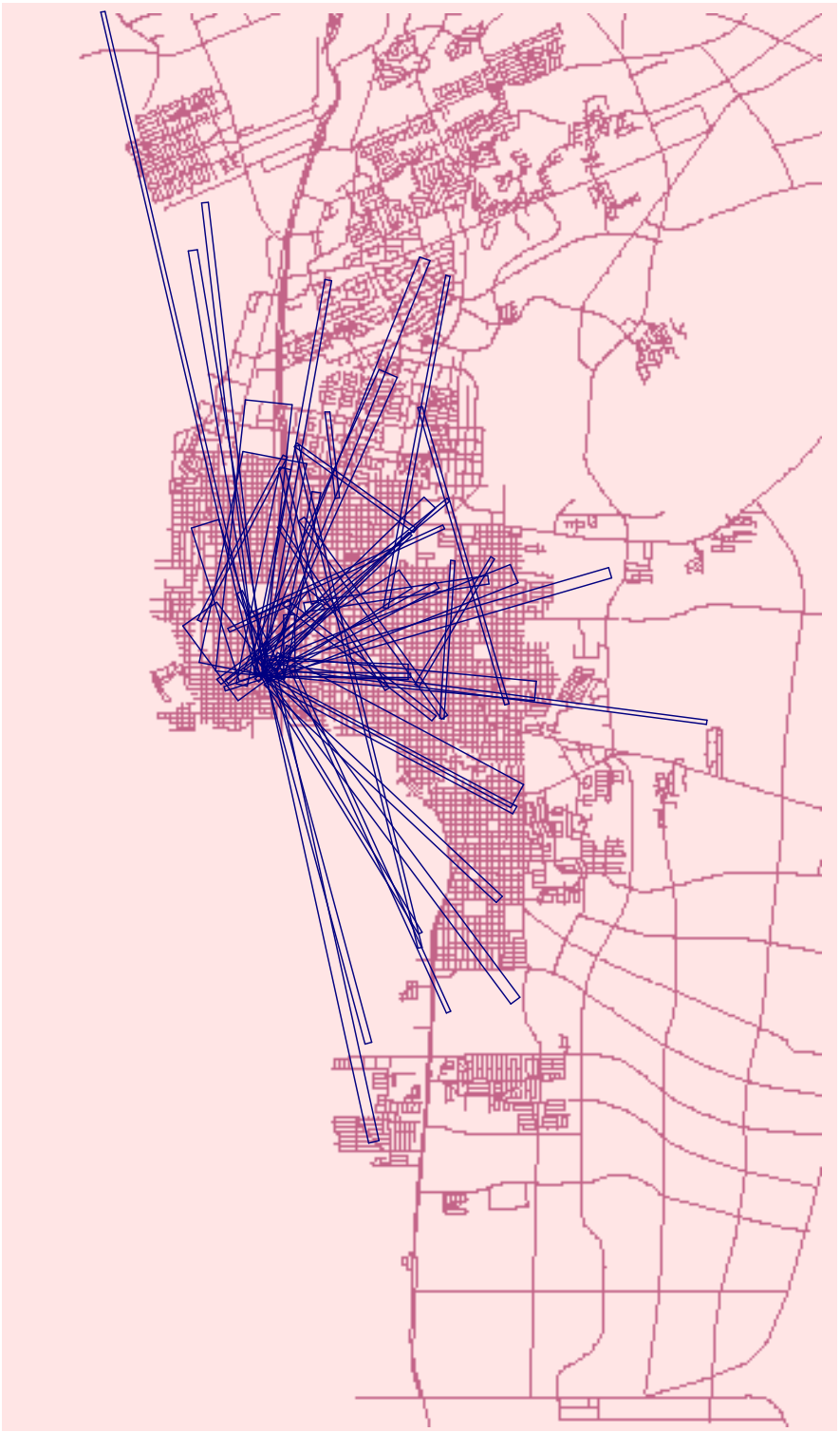
Ideally, every desire line would have a closely-matching transit route. In practice, it is necessary to design and operate a much simpler system, but with bus-to-bus transfer locations that make the indirectly-served trips as convenient as possible. In the next phase of the TDP study, opportunities will be explored to refine the bus route pattern with the objective of improving the directness and convenience of passenger travel without detriment to those who are now conveniently served.

In terms of operating efficiency, objectives include making the best possible use of the hourly bus passenger capacity provided, while avoiding over-crowding in locations where passenger volumes are highest. Table 2-14 documents the vehicle loading as determined from the passenger boarding and alighting counts conducted earlier this year. The table is explained by its footnotes, and gives a general indication of the current situation. Beyond this broad indication, it is necessary to consider, in cases of over-supply, the extent to which bus headways (time between successive bus trips in one direction) might be lengthened without providing an unacceptable service, and whether lengthened headways would result in overcrowding. In the case of under-supply, it is necessary to determine how much headways can be shortened without resulting in cost issues that cannot be resolved within the available operating budget.

Figure 3-6: Bus Stops Served by El Metro Routes

Source: Parsons Brinckerhoff from the GeoStats passenger on-off survey

Figure 3-7: Desire Lines for El Metro Passenger Trips



Source: Parsons Brinckerhoff from the NuStats passenger interviews

Table 3-14: Indications of Over-Supply and Under-Supply of Service Relative to Ridership

Route	Morning Peak				Mid-day				Afternoon Peak				Evening			
	Inbound		Outbound		Inbound		Outbound		Inbound		Outbound		Inbound		Outbound	
	Rank Passengers	Rank Trips	Rank Passengers	Rank Trips	Rank Passengers	Rank Trips	Rank Passengers	Rank Trips	Rank Passengers	Rank Trips	Rank Passengers	Rank Trips	Rank Passengers	Rank Trips	Rank Passengers	Rank Trips
1	7	2	7	2	6	1	3	1	14	1	7	1	7	1	5	1
2A	13	7	1	7	1	7	3	7	1	10	6	10	9	3	9	3
2B	4	7	8	7	5	6	16	6	6	9	8	8	9	3	11	5
3	19	9	18	12	21	12	18	12	21	12	10	10	18	9	11	8
4	7	6	10	2	1	7	6	7	14	2	12	6	15	15	6	11
5	6	15	21	12	16	12	20	9	21	12	22	16	16	9	18	8
6	11	2	10	2	16	3	14	3	14	2	1	1	11	3	2	3
7	3	2	16	2	11	3	19	3	8	2	12	1	18	1	14	2
8A	16	20	14	12	13	18	16	18	11	12	10	19	16	15	14	11
8B	11	15	4	21	11	18	7	18	14	20	16	16	2	20	20	20
9	10	15	19	21	18	22	20	18	14	20	16	19	20	9	8	11
10	19	9	20	12	20	12	14	12	11	12	12	10	11	9	9	11
11	22	9	22	7	21	10	13	12	2	12	21	10	7	7	19	8
12A	17	20	5	12	13	18	2	18	19	12	5	19	21	15	16	11
12B	2	9	2	12	8	12	7	12	11	12	3	10	3	9	3	11
13	1	15	12	12	6	18	5	18	9	20	1	19	4	15	1	11
14	21	1	17	1	3	3	1	3	3	2	3	1	4	7	4	5
15	15	2	3	2	10	2	7	2	9	7	18	6	11	3	16	5
16	14	15	13	12	4	12	10	12	7	12	9	10	4	9	7	11
17	5	20	14	12	18	12	22	12	20	10	19	16	22	22	20	20
19	18	9	9	7	15	10	10	9	5	2	15	8	11	15	11	11
20	7	9	5	7	n8	7	10	9	4	7	20	1	1	20	20	20
		Under-supply														
		Over-supply														

NOTES:
If a route rank number is lower than its passenger rank number, this indicates over-supply of service. If the opposite, then there is an under-supply of service. If the difference between the two rank numbers is two or less, there is considered to be a match between service and supply.

One further indicator of these level-of-service issues is found in the passenger volumes as distributed along the routes, by time of day, location, and direction. The survey data allow examination of route performance for all times of day, and illustrate where maximum passenger loads occur, and over what length of each route those loadings occur. Examination shows that the maximum flows during the morning peak are the reverse of what is usually seen in transit systems. Because of large numbers of passengers from homes in Mexico who board buses at the Laredo Transit Center in downtown Laredo, the largest morning peak-period passenger flow volumes are in the outbound direction.

The surveys also provide the data for Table 3-15, which indicates current ridership by route, as expanded from the boarding and alighting survey. The “B” versions of routes (2B, 8B, 12B) have no Sunday service, and Route 20 Sunday service is combined with Route 14.

Table 3-15: El Metro Ridership by Route, 2008

Route	Route Name	Weekday	Saturday	Sunday
1	Santa Maria	1,492	1,710	1,239
2A	San Bernardo	1,517	1,796	755
2B	San Bernardo	1,099	916	
3	Convent	1,096	811	219
4	Springfield	933	667	325
5	Tilden	323	279	171
6	Cedar	963	475	310
7	LCC	282	175	98
8A	Guadalupe/Lane	547	374	331
8B	Guadalupe/Villa del Sol	283	214	
9	Market	1,053	920	506
10	Corpus Christi	899	640	279
11	Gustavus/LEC	333	304	179
12A	Del Mar Express	767	592	195
12B	Express/Shiloh	791	277	
13	Heritage Park	452	119	275
14	Santa Rita	251	258	460
15	Main/Riverside	326	282	129
16	TAMIU	311	449	71
17	Mines Road	513	430	129
19	Santo Nino	681	439	206
20	Los Angeles	585	531	
Total		15,497	12,658	5,877

Source: Parsons Brinckerhoff from the GeoStats survey report.

4.0 SYSTEM AND ROUTE IMPROVEMENT OPPORTUNITIES

4.1 Service Adjustments Responding to Over-Crowding or Under-Use

Although some bus trips were found to be heavily loaded, this was not a prevailing condition and was a minor subject of complaint or suggested improvement in El Metro service. Considering issues of service frequency, passenger waiting times, and bus schedule adherence, however, service improvement efforts should include more frequent service on the most heavily-used routes, including those that have significant numbers of standees over substantial distances. Scheduling and route refinements might achieve this objective without large increases in bus revenue hours, as discussed later.

4.2 Flexibility of Service

Passenger views expressed in the survey data, considering both complaints and suggestions, do not support service changes to increase flexibility of service. Recognizing the high cost of demand-response service, which is the primary possibility for increased flexibility of service, making this an objective is not recommended.

4.3 Service Infill or Expansion Needs

In general the transit services have kept pace with known needs, in terms of travel demand. Route extensions or new routes have been introduced as development has progressed. The existing route pattern provides adequate coverage within the urbanized area; few people must walk unacceptable distances to reach a bus stop.

The fixed-route services would benefit from substantial improvement of bus stops, which should be attractive but more prominent, and should provide a more sheltered environment. Better bus stops would help to improve the image of the bus services, and make the presence of bus routes more prominent. It is recognized that vandalism and materials theft can be problematic; careful design and selection of materials is required.

If customer opinions reflect unmet needs, it is notable that the leading suggestions of those interviewed in the rider profile survey were for more frequent service, improved schedule adherence, and less deviation from prescribed routes.

Service frequency is the determinant of passenger waiting times. Even if passengers are aware of schedules and plan their arrival at a bus stop to minimize their waiting time, their opportunities to travel are constricted by infrequent service. Effectively, therefore, the average passenger waiting time is half the headway (time interval) between buses. Furthermore, in behavioral terms, time spent walking to or from transit, and time spent waiting, are twice as onerous as in-vehicle time. When headways are an hour, or even 30 minutes, waiting time is more important than time spent walking, and generally exceeds the perceived time spent riding in a bus.

Consequently, improved service frequency is often the most effective improvement that can be made in transit systems.

More frequent service will be more costly, however, unless schedules can be more efficient, requiring less time per round trip, or routes can be re-designed to improve frequency on the most heavily-patronized routes, or concentrate service in fewer alignments. Within a major portion of the city, there is a bus route within one-fourth mile of virtually the entire population, and in many areas, more than one route. Route adjustments to reduce overlap might reduce duplicated coverage of the area and support improved frequency of service in remaining transit corridors.

At present, bus arrivals and departures at the Transit Center are timed to facilitate transfers between routes. This fixed requirement results inevitably in inefficiencies in individual routes, which may have actual round-trip running times not corresponding with the imposed time module. Some routes, therefore, could benefit from modification to achieve better fit with the present hourly module. Scheduling also should consider whether running times are significantly different between peak and off-peak periods. Recognition of such recurring differences would facilitate better schedule adherence. Schedule adherence requires attention not only to scheduling, but also more aggressive management of operations.

Other aspects of service improvement or expansion relate to these issues. In particular, refer to Section 4.9 as it relates to providing more frequent service.

The prevention of driver deviation from routes requires stronger management as well. It is recognized that several of the best-patronized routes must cross the KCS east-west railroad track along Moctezuma and consequently suffer daily disruption of service when trains pass. Efforts by drivers to avoid railroad crossing delays may be one cause of deviating from prescribed routes. Relocation of this KCS track could be an objective of the City and El Metro, but there is legitimate concern that a proposed eastern bypass rail line would introduce a new barrier, seriously affecting future expansion of the Laredo. Another option might be to schedule train operations late at night, during hours when there is no bus service and little other traffic. This should be explored with the KCS. If that approach fails, a satisfactory solution would be to build an underpass or overpass west of I-35 and bus bypass lanes underneath the KCS track within the I-35 right of way. These improvements would allow local-service El Metro routes to avoid delays caused by trains.

4.4 Title VI and ADA Issues and Needs

The study has not discovered instances in violation of Title VI of the Americans with Disabilities Act of 1964 and Americans with Disabilities Act of 1990, including appropriate provisions for those with limited English proficiency. The Laredo area transit systems use accessible vehicles and include extensive paratransit services for those unable to travel via fixed-route buses. A possible exception is that *www.elmetrotransit.com* had no Spanish or other non-English language option at the time of preparing this report. A Spanish-language version was in preparation, however.

4.5 Technology Improvements

The study finds new-technology potential primarily in web-based marketing and passenger information methods. El Metro's new website is attractive and much improved, but deserves additional attention. Its Downtown Trolley page is incomplete at present and could promote increased use of the Trolley if it is adequately informative. The website would benefit by offering a Spanish-language version as well as English. Telephone information as well as the website might benefit from automated real-time trip planning technology, which would allow potential riders to obtain the best routing and specific timing for a specific trip.

4.6 Paratransit and Recommended Policy Changes

The primary policy target should be paratransit, which needs two cost-containing strategies. One of these changes would be an improved, more stringent means of establishing eligibility for the service. The other change is to find a way to reduce the cost of providing this service, either by contracting with a taxi company to provide the service, or by negotiating lower pay rates for paratransit drivers.

The transportation components of the American's with Disabilities Act (ADA) require transit agencies to make their fixed route services accessible while also providing complementary paratransit to individuals who cannot use accessible fixed route services. While the ADA represented service expansion in many respects, the law's narrow eligibility focus intended for paratransit services to be provided to a smaller population than the traditional ridership base. However, the law also recognized that some fixed route systems were not immediately accessible and that alternative means of transportation were needed until full accessibility was achieved.

Under the law, transit agencies are required to develop accurate and cost effective paratransit eligibility certification processes. Eligibility for paratransit service is directly related to the inability of a disabled individual to use the existing fixed route transit system. The inability of an individual may come from two sources: (1) the lack of accessibility of the fixed route system or, (2) the nature of the person's disability. For some individuals, their disability may prohibit them from ever using the fixed route system. For other individuals, use of the fixed route system may be possible under certain circumstances. As a consequence, paratransit eligibility has two components. First, an individual is considered ADA paratransit-eligible if there are circumstances under which the fixed route system cannot be used. Second, the extent of eligibility granted to the individual depends on the conditions and circumstances under which they are not able to travel on the fixed route system. The determination of how these components come together result in either unconditional or conditional eligibility.

A 1998 study of 30 transit agencies conducted by the Transit Cooperative Research Program (TCRP Synthesis 30) indicated a trend towards more in-depth examination of eligibility applications. However, while this trend continues to grow, the majority of transit agencies continue to use the "self certification plus" framework for their eligibility process. The study also suggests that the more in-person contact required by the

eligibility process, the greater the likelihood of eligibility denials and conditional eligibility determinations. While there is no single measure of effectiveness among certification methods, the goal of the process is to identify an individual's ability to use the fixed route system – and to do so as accurately as possible. As such, when taken into account with appeals and reversals, denial and conditional eligibility rates may act collectively to indicate the effectiveness of the eligibility process. Measures of effectiveness must then be weighted against the implementation and operating costs of the certification model. For example, a model in which a professional with specialized expertise evaluates every applicant would likely be the most accurate, but this model might also be prohibitively costly to the agency. On the other hand, a model that allows for complete self certification with no follow-up would likely result in a large volume of paratransit trips booked by passengers who do not need the service.

The requirements for certification tests vary based on different levels of agency interaction with the applicant and can include:

- Self-Certification by the applicant
- Professional verification via written documentation or telephone conversation
- In-person Interview
- In-person physical functional assessment
- In-person cognitive assessment or
- In-person assessment of visual ability

The "Self-Certification Plus Professional Verification" model was tested thru San Mateo County Transit District. This model was found to be the most used throughout the United States due to its ease of implementation and administration. Eligibility is granted based on an application form and verification from a professional as needed. No interview is required in this process. The seven page application form consists of both yes/no questions and open-ended questions. If any of the responses need clarification, the healthcare professional is contacted. Most determinations are made without consultation beyond the application form.

The "Interview" model was tested through Access Services, Inc in Los Angeles. Los Angeles MTA and Access Services provide the highest number of ADA paratransit trips in the country over the largest geographic service area. Eligibility is granted based on an in-person interview. An appeal process is used for tests of physical and cognitive ability. The service is run by a private non profit organization on behalf of Los Angeles County. The process begins with a two-page initial application form for general information about the individual's disability, allowing the analyst to make an eligibility recommendation.

The "Full Functional Assessment" model was tested through the Port Authority of Allegheny County Access Program in Pittsburgh. This model aimed to evaluate functional ability rather than medical factors. The model also wanted to improve upon the cost of assessment and trip-by-trip eligibility. Rather than an interview or an application explaining relevant limitations, this assessment directly tested the abilities

needed for public transit travel. These abilities include ramp, stair, and curb maneuvering and short distance walking. In order to eliminate unnecessary trips, each request is analyzed based on the applicant's abilities and possibilities of fixed route transit as an option. Then that trip is recorded for reference in evaluating future trip requests by the individual.

The "Hybrid Interview and Functional Assessment" model was tested through Citizens Area Transit (CAT) in Las Vegas. The Regional Transportation Commission of Southern Nevada adopted the Pittsburgh model in 1996 with some variations in the screening process. The RTC determined that it was not necessary for all applicants to undergo the functional assessment as in the Pittsburgh model. Instead, a 30 minute interview was conducted first, resulting in a determination that 30 percent of applicants were fully eligible. For the remainder, a functional test was done to determine the applicant's physical ability to use fixed route transit. One of the advantages of this model is that all aspects of the eligibility determination process are conducted at the same location. This saves time and money for both the RTC and applicants, avoiding multiple appointments and trips. The budget is also reduced by eliminating the more expensive cognitive test for some applicants. Table 4-1, below, summarizes the main options for paratransit eligibility certification.

Table 4-1: Paratransit Eligibility Methods

Abridgment	**Formal Designation**	**Location**
Self Certification	Self-Certification Plus Professional Verification Model	San Mateo County, CA
Face-to-Face Interview	Interview Model	Los Angeles, CA
Physical Assessment	Full Functional Assessment Model	Pittsburgh, PA
Interview/Physical	Hybrid Interview and Functional Assessment Model	Las Vegas, NV

Table 4-2 compares the four case studies based on a variety of profile characteristics. Statistics such as service area, budget, trips, eligibility certification, and eligibility outcomes are all given. The Los Angeles model served the largest service population. Las Vegas had the largest ADA Paratransit budget. Pittsburgh had the smallest annual certification costs. San Mateo County had the largest full eligibility certifications.

Table 4-2: Paratransit Eligibility Case Comparisons

Location	Service Area Population	ADA Paratransit Budget	ADA Paratransit Trips	ADA Trips per $1,000 Budget	Budget per Trip
San Mateo County, California	650,000	$4,500,000	195,000	43	$23
Los Angeles County, California	9,800,000	$34,000,000	2,219,000	65	$15
Pittsburgh, Pennsylvania	1,400,000	$6,000,000	604,000	101	$10
Las Vegas, Nevada	1,100,000	$10,500,000	540,000	51	$19
Source: TCRP Synthesis 30					

Table 4-3: Paratransit Eligibility Cost Comparisons

Location	Annual Certification Costs	Cost Per Appicant	% of ADA Paratransit Budget
San Mateo County, California	$84,000	$35.00	1.9%
Los Angeles County, California	$455,000	$26.72	1.3%
Pittsburgh, Pennsylvania	$34,000	$45.00	0.6%
Las Vegas, Nevada	$480,000	$48.00	4.6%
Source: TCRP Synthesis 30			

Table 4-4: Paratransit Eligibility Rate Comparisons

Location	Denied	Full	Conditional	Temporary
San Mateo County, California	4%	94%	1%	5%
Los Angeles County, California	17%	42%	38%	19%
Pittsburgh, Pennsylvania	12%	54%	29%	17%
Las Vegas, Nevada	23%	55%	45%	0%
Source: TCRP Synthesis 30				

Given the high cost of paratransit service, $39 per rider in 2007 and still rising, the expenditure for certification is of less importance than the effectiveness of the certification screening process. It is evident from Table 4-4 that the Los Angeles and

Pittsburgh screening limited eligibility most effectively. Of these two, the interview model, used in Los Angeles, was least costly, and is recommended for trial in Laredo.

4.7 Other Policy Issues

The City should be mindful of policies that favor or hinder transit and its use. Examples include ways in which traffic and parking are managed, pedestrian-ways provided and maintained, and transit-supportive land uses encouraged.

Managing traffic and parking: Attention to traffic signs and signals, lane markings, curb return radii, and bus stop placement can promote or hinder the ease of operating buses. The transit agencies should regularly review conditions along fixed routes and roads most used by paratransit vehicles, and request improvements as needed. The bus stop locations should be systematically reviewed to identify instances of chronic interference between buses and other traffic or parked vehicles, and alternate locations found, or remedial traffic and parking management measures introduced.

Provisions for pedestrians: The transit operators should also review bus stop locations in relation to the main trip origins and destinations served by each stop, and work with the City to assure that adequate sidewalks or other safe pedestrian paths are available for actual and potential bus riders.

Transit-supportive land uses: Development that encourages transit use includes placing development within close proximity to bus stops, along routes that provide convenient connectivity to the most-used trip destinations. In addition, mixed-use development promotes transit use, by making it easier to shop, work, or satisfy other trip needs without the use of any vehicular transportation. These circumstances reduce the need for car ownership and encourage the use of transit for trips to destinations not within easy walking distance.

4.8 Fare Changes

At the time of completing this report, a fare increase was under consideration. The 2009 El Metro operating budget was planned for a 23 percent farebox recovery ratio, which is well within normal practice and consistent with recent El Metro operating results. Actual fare revenues, however, have been lower than projected, because of a drop in ridership compared with 2008. A modest fare increase might have little adverse effect on ridership; only one percent of the riders surveyed in 2008 complained about the fare level. When fares are not extreme, the percentage lost in ridership if fares are increased is typically about one-third the percentage change in fares.

One of the fare changes under consideration is to eliminate transfers, which currently cost five cents. Elimination of transfers would result in passengers who transfer having to pay two (sometimes three) fares. This would affect approximately one-tenth of current ridership, and in our view is inequitable. Passengers transfer because the route structure does not provide direct service between their origin and destination. Transferring is inconvenient and time-consuming; it is made even worse if the

passenger must also pay an additional fare. A small fee for transfers is useful to minimize abuse in the use of transfers, and an increase from five cents to ten cents would be reasonable.

Introduction of daily, weekly or monthly passes could be beneficial and should be investigated. Pass sales improve cash flow by providing revenue in advance of the use of the purchased fares, and encourage riders to rely more on transit. Also, a pass could be a lower-cost option if transfers are eliminated.

In conjunction with proposed fare increases, a reduction in Sunday service is proposed. While such actions may be necessary, there is risk of encouraging a downward spiral in ridership; some riders may need Sunday service in conjunction with trips made on other days of the week.

4.9 Service Expansion

El Metro planning should continue to recognize needs for extending service to areas of urban and suburban development, to the extent justifiable. Equally important is to consider a careful re-structuring of the system, as a means to encourage the emergence of new transit passenger markets, complementing the present dominant market of passengers resident in Mexico, whose travel in Laredo is from and to the downtown Transit Center.

Plan and Implement a Re-Structured Fixed-Route System

Initiate a detailed study of route re-structuring. This would entail limited additional data collection but substantial analysis to develop routes that best meet objectives, including maintaining cost effectiveness, minimizing increase in operating costs, maintaining current service quality to existing riders, and supporting the development of expanded or new ridership. Appendix C outlines the recommended study.

Service planning must account for current ridership while enabling the next generation of passengers to use the system. Because fixed route transit systems are static, they serve existing passenger movements better than new passenger movements. Further, because service planning efforts based on a priori system data (such as on-board surveys and service monitoring) occur within the context of the existing system, these planning efforts focus on improvements for existing passenger movements, not necessarily the facilitation of new passenger movements. To grow transit market share, agencies must break from, but not abandon, existing system enhancements and move toward system designs that allow for new and different passenger movements. In certain cases, fixed route system designs that allow passengers to "reveal" their movement preferences (such as a coverage-based system) can out-perform system designs that attempt to guess, or dictate, passenger movement (such as point-to-point systems) or systems that require extended travel to achieve centralized or timed transfers (such as a pulse or hub-and-spoke system such as now is characteristic of Laredo's fixed routes).

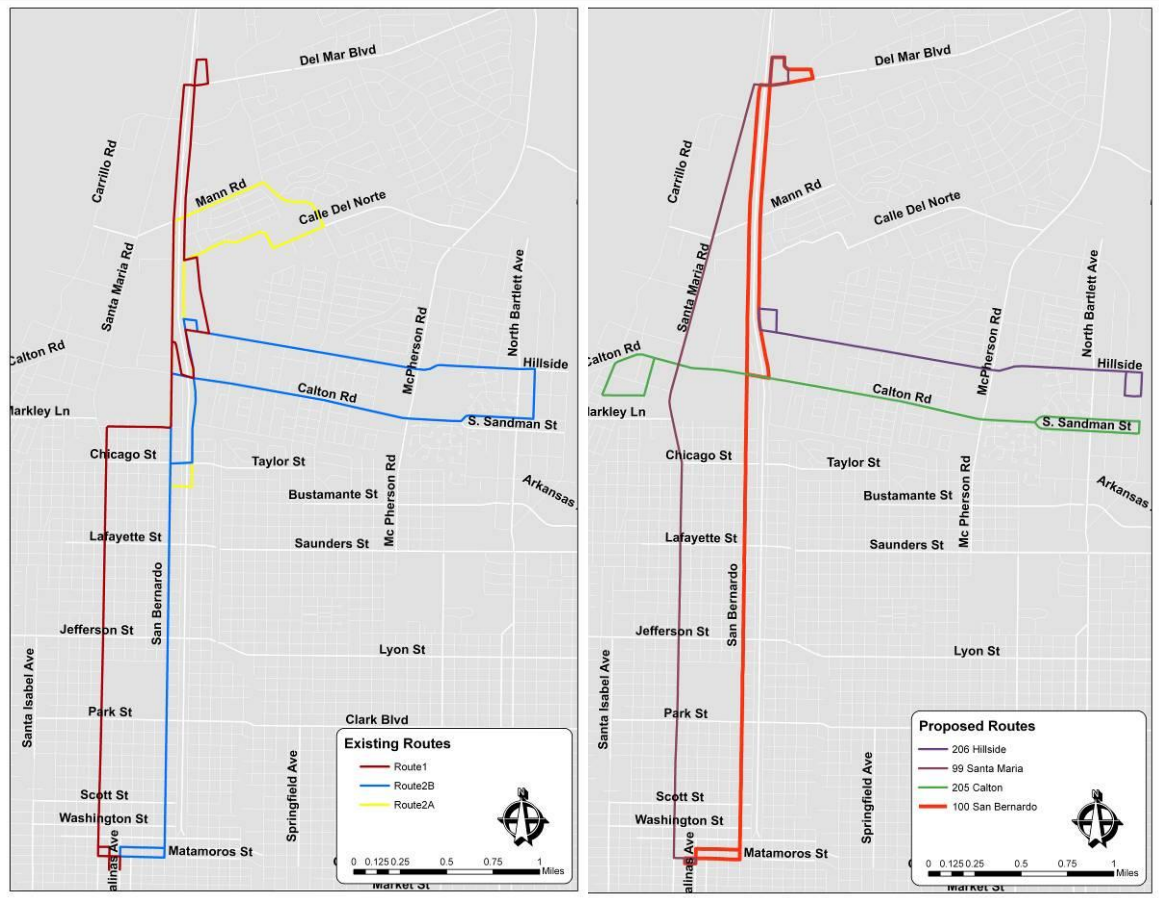
Detailed planning is necessary to identify current and potential new markets and design a re-structured system that would maintain the level of service provided to current passengers while attracting new riders. Also, any major changes would have

to be very well publicized, to assure that existing ridership would not be lost, and would immediately understand how to make best use of new and different routes.

The Santa Barbara – Santa Ursula corridor project being prepared for implementation by City Planning following the Laredo Urban Transportation Study's San Bernardo Avenue Renovation and Restoration Project provides an opportunity to modify and strengthen El Metro Routes 2A and 2B, which together are already the highest-volume transit service in Laredo. They would be key elements in any re-structured route plan.

Figure 4-1 indicates one concept for transforming Routes 1, 2A, and 2B into four new routes – two north-south, and two east-west. One of the benefits of this change in routes would be to provide two-way service on Calton and Hillside, which currently constitute parts of a one-way loop. There are other ways to re-configure the three existing routes – alternatives should be explored and evaluated.

Figure 4-1: A Route Re-Structuring Concept

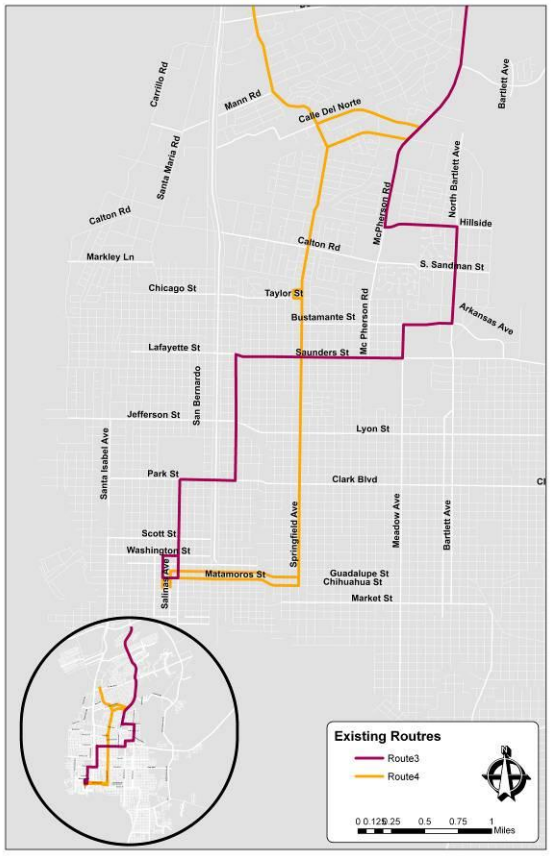


Some of the longer routes are a cost problem not offset by favorable ridership levels. Selective modification of such routes is indicated, possibly by conversion of under-used route segments into separate feeder routes, linked to main routes at non-central transit centers.

Another characteristic of the existing route structure is that some routes are circuitous or have many turns. Circuity adds to the distance passengers must travel to complete

journeys. Turns are time-consuming and often increase accident exposure. An example of a route with many turns and significant circuity is Route 3, illustrated in Figure 4-2.

Figure 4-2: Example of Circuitous Routing



For the longer range, the City's long-range thoroughfare plan and land use plans should be reviewed within the public transportation context to maximize the opportunities for direct, efficient transit routes that are convenient to the future population and activity centers serving those populations. As the city grows, viable transit routes directly serving each new area of development should be pre-planned and accommodated.

Prepare and Implement Immediate-Action Route Refinements

While undertaking an in-depth study of routes, also consider the following immediate actions, subject to verification of affordability and improved levels of service to the existing ridership. It is possible that these changes could be accomplished with a slight reduction or at least no increase in miles and hours of bus service, without detriment to ridership or significant inconvenience to current passengers. Benefits of no-net-cost re-structuring could include a system that is more easily understood by passengers, and improved service frequency on the heavily used corridors. With

some increase in amounts of service, the less-used portions of routes also could have more direct and more frequent service:

- Redesign the common portions of Routes 2A and 2B (San Bernardo) as a single local route between the Transit Center and a new transit center established at Mall del Norte (subject to running times, consider Target as an alternate or additional northern terminus).
- Redesign the common portions of Routes 12A, 12B, 16, and 17 as a single express route via I-35, connecting the Transit Center and Mall del Norte.
- Convert the present 2A, 2B, 12A, 12B, 16, and 17 outer sections into a feeder network covering the various service areas and destinations of the routes, all with timed transfer among feeders and transfer to the frequent San Bernardo and I-35 services at Mall del Norte.
- Truncate Route 3 at Calton, Hillside, or Calle del Norte; possibly integrating its schedule directly with the above feeder routes or terminating Route 3 at Mall del Norte.

A similar concept could be analyzed for possible immediate-action implementation, addressing routes along the US 83 corridor south of central Laredo, as follows:

- Combine the trunk-line portions of Routes 14 and 20 into a single route. Design the collector/distributor portions of routes 14 and 20 as a feeder route.
- Redesign Route 19, eliminating its trunk portion and creating A and B branches connecting to the new Route 14/20 trunk line.

Finally, an immediate-action cost-saving change to consider is:

- Eliminate Route 5; Modify Route 8A to serve the end-of-line loop on Route 5.

4.10 The Laredo Transit Center

The Laredo Transit Center is generally adequate and its lobby restrooms are currently under renovation. A need for better signing directing passengers to route boarding points is needed. If bus frequency at the Transit Center becomes excessive, shift the scheduled times for the routes with highest frequency (because wait times for the most-frequent service are relatively small), avoiding their arrival on the hour or at other times when bus arrivals at the terminal are most frequent. There are some complaints about noise and fumes from buses in the Transit Center. Study of these conditions could determine cost-effective improvements to mitigate these conditions. Increasingly stringent bus specifications and fuels also will help, as new buses replace life-expired vehicles.

4.11 Downtown Circulation and the Downtown Trolley

Downtown circulation is provided by the little-used fare-free Downtown Trolley route, which is under-defined in readily-available information, under-promoted, and insufficiently frequent to serve its intended purpose effectively. Its downtown-to-mall

feature could be discontinued (regular fixed routes provide that function effectively), and the resulting unused revenue vehicle hours applied to provide increased frequency of downtown circulation trips.

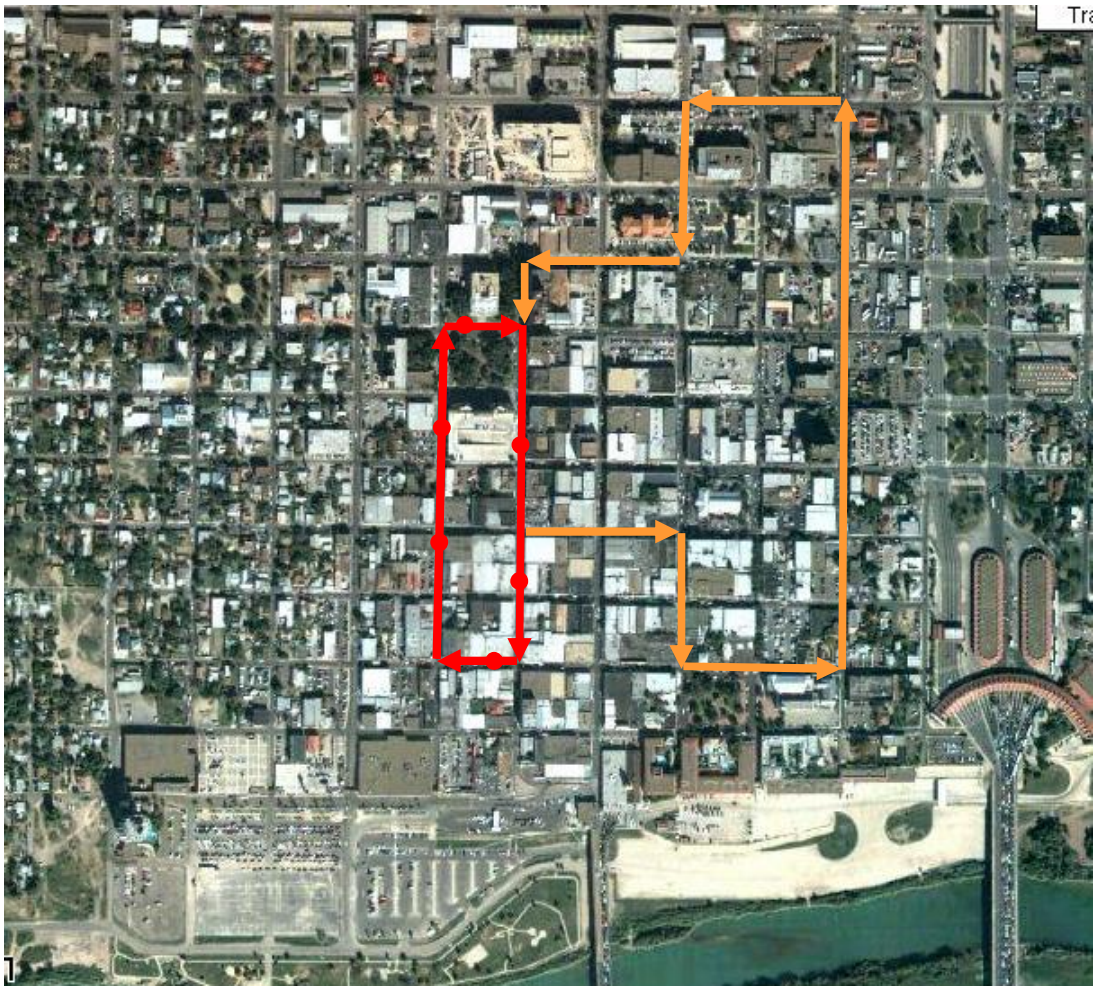
A two-stage implementation of improved downtown circulation is proposed. In stage 1, the Trolley vehicle would be used to provide frequent service linking the Transit Center with the bridge to Mexico. One possibility would be a route using Juarez, Matamoros, Salinas, and Grant streets – a small elongated loop that would allow one bus to provide a frequent service. The route is shown in Figure 4-3. Alternative loop routes of similar length might be more convenient to pedestrians using the bridge; the possibilities should be explored. The purpose of this loop would be to make transit more convenient for this major component of El Metro ridership.

Figure 4-3: Stage 1 New Downtown Trolley

In a second stage, a larger loop is proposed to be added within downtown. This loop would follow the routing illustrated in Figure 4-4, which also shows the proposed new

stage 1 route. The second route should use a conventional low-floor bus, for ease of boarding and alighting. The intent of this loop is to provide broader circulation within downtown for all those making short trips within downtown or who would use the route instead of walking to or from the Transit Center. One or possibly two buses should be deployed on this route, to provide sufficient frequency to make the service attractive.

Figure 4-4: Stage 2 – Added Circulator Route



4.12 Transit Marketing

Much can be done to build transit use, but market-development must be done with care to avoid developing markets that require added service without commensurate contributions to fare revenues, mobility needs-satisfaction, or attainment of other goals such as those related to energy, air quality, or sustainability. Expanding ridership by increasing service may be effective, but unfortunately, easier than expanding the budget to meet the added costs.

Many public transportation agencies either market their services to riders and potential riders or rely on transit dependent population growth to fuel market retention.

However, with a rapid change in market conditions, several transit agencies have begun marketing towards businesses that may have employees or customers that would potentially use their system.

Transit agencies and the business community are inherently linked. Transit operators have the ability to promote and gain ridership by working along side the business community. Likewise, businesses can improve their public image and save money, allowing them to remain competitive within their market. While, businesses do not consume transit directly, their customers, clients and employees do on differing scales. Marketing to employers, universities, shopping malls, and activity centers are all industries that can be used in order to promote transit operations to reach many potential riders through a single targeted approach. This is opposed to the method of focusing on an individual rider which entails extensive advertising and promotional budgets.

Table 4-5: Examples of Major Transit-to Business Marketing Actions

Action	Description
On-Site pass sales	Passes sold at work site
Pass subsidies	Subsidized passes sold at work site
University Pass/ EcoPass Programs	Annual pass for all student/employees sold at major discounts
Vouchers	Scrip sold to employers for employees to use when buying tickets or passes
Credit card/ Third-party billing	Employer is billed for employees' rides
Carpooling	Shared ride for longer distance users; leasing plans
Guaranteed ride home	Provides ride home in emergencies for employees using transit or ridesharing
Employee transpiration coordinators	Staff provided by employer/developer to promote transit, ridesharing, and other transportation demand management strategies
Transportation management associations	Employers/developers who jointly adopt traffic reduction activities
Shuttle services	Local connectors to regional transit or activity centers
Circulator services	Internal circulation at large sites
Subscription services	Develop special bus route for certain destinations
Reverse commute services	Connections for city residents to access suburban employment sites
Modifying existing services	Matching schedules or route to special needs
Transit enhancements/ amenities	Access improvements, including shelters and walk ways
Site design initiatives	Building modification to support transit access
Employer survey assistance	Identifying employee transportation needs
Relocation services	Assisting new employers/ developments
New employee orientation materials	Provide new employees with information about transportation alternatives
Transit information services	Inform employers about transit services and emergency situation
Retail incentives	Partnerships with retailers to promote transit use
Regulatory initiatives	Regulations governing land use, density, parking, transportation, demand management

Voucher Programs: The Milwaukee County Transit System (MCTS) increased transit riding at a specific site by 81% which added over $90,000 a year in revenue by enticing a key downtown employer to subsidize transit fares for its employees to battle high parking prices. Likewise, 150 employers began subsidizing fares in the San Francisco Bay Area, increasing transit use by an average of 31%. Also, in Greater New York over 7,000 employers purchased TransitCheks for annual fare subsidies exceeding $50 million.

Employer Pass Plans: The standard in most cities is to utilize fare subsidies. In Seattle and Des Moines, more than half the passes sold are employer-subsidized. In Boston the MBTA pass program serves over 1,000 employers while Denver's ECOPASS all-

employee subsidy programs provide free transit passes to 50,000 users with fares paid for by their employers.

Promotional Subsidies: The Houston Metro during Try Transit Week in 1997 offered $1.00 per employee transit passes to employers to purchase for their entire staff. The promotional offer resulted in 60,000 more boardings than in the previous year.

Guaranteed Ride Home: This program provides a high level of assurance that in time of emergencies employees will be able to get home with the use of transit or using rideshare. The program is an example of a service that matches a significant business concern, can be simply administered, and has low cost yet perceived benefits. 58% of the program's enrolled employees reported that it was an important factor in their decision to utilize bus, car/vanpool, or bike to work.

4.13 Vehicle Fleet and Transit Facilities Improvements

El Metro is currently engaged in a joint ARRA-funded procurement, with one or more other transit agencies, to purchase 12 new diesel-fueled buses. This purchase will provide needed replacements for the existing vehicle fleet and should sustain requirements through the five future years considered in this Transit Development Plan. Currently, most of El Metro's fixed-route buses are fueled by CNG, which has been significantly cheaper than diesel fuel. Differences in maintenance costs or other factors may offset the penalty of higher fuel costs. If El Metro plans to implement an enhanced service plan, additional buses may be needed.

El Lift recently received 6 of 18 new paratransit buses on order. These vehicles will replace life-expired buses.

El Metro also is planning to build a new maintenance and operations facility for fixed-route and paratransit vehicles. Site selection has been completed, identifying a 23-acre site at Jacaman Road and North Bartlett Avenue. This is ample for a planned capacity of 100 buses and 30 vans. This will accommodate fleet requirements during the five years addressed by the TDP. Funding has not yet been fully committed for design and construction of the new facility.

5.0 COST AND IMPLEMENTATION OF IMPROVEMENTS

5.1 Capital Costs

The capital cost of new El Metro buses is omitted from discussion because of the commitment to use ARRA funds for this purpose. The capital cost of a new El Metro – El Lift operating facility has not been addressed. Capital needs of El Aguila are not known at this time. If route expansion is planned, procurement of additional vehicles may be necessary, and this will require commitment of additional capital funds.

5.2 Operating and Maintenance Costs

Continued growth in the operating and maintenance (O&M) costs of transit services is inevitable, even without the demands population growth place on the transit systems for increases in service. As the data show clearly, fare revenues cannot be expected to cover more than a minority percentage of O&M costs; effective planning and marketing may improve cost recovery but will not allow service expansion to pay for itself.

Consequently budgeting for O&M costs during the next five years should allow for growth, following recent past trends as a guide. In addition, any goals to expand and improve the transit services will require the commitment of O&M funds sufficient to cover increases in bus vehicle hours resulting from those improvements.

5.3 Implementation

The implementation of transit system and facility improvements can be scheduled logically as set out below:

Year 2010: First quarter – fare adjustments

Quarter 1 – cancel current Downtown Trolley and introduce Transit Center – Bridge Trolley Link

Quarter 1 – prepare new paratransit eligibility process

Quarters 1 and 2 – check and refine bus schedules

Quarters 1 and 2 – study and prepare restructuring of the San Bernardo and I-35 routes

Quarters 1 and 2 – prepare, tender, and award paratransit operations

Quarters 1 through 3 – design bus stop/shelter prototype

Quarters 1 through 3 – resolve possibility of scheduling KCS trains during hours of no transit service

Quarter 2 – re-certify paratransit-eligible riders

Quarter 2 and later – adjust bus arrival times at Transit Center if needed

Quarter 3 – implement the San Bernardo/I-35 restructuring; monitor results (include temporary transit center provisions)

Quarter 4 – refine the San Bernardo/I-35 restructuring as needed

Entire year – in-depth study of route restructuring

Entire year – design new transit operations center

Year 2011: Quarter 1 – initiate Downtown Loop Low-Floor Link

Quarters 1 and 2 – complete the in-depth study of route restructuring

Quarters 1 and 2 – select priority sites for bus stop/shelter improvements (include Mall del Norte Transit Center if route restructuring is viable)

Quarters 1 through 3 – develop directed marketing program

Quarters 2 through 4 – develop and implement real-time transit passenger trip planning

Quarter 4, continuing – implement developed marketing program

Quarter 4 – implement and monitor major route restructuring

Entire year – construct new transit operations center

Entire year – if KCS grade separations are needed, prepare preliminary designs (flyover; I-35 bypass lanes)

Year 2012: Entire year – monitor and refine major route restructuring

Entire year – construct bus stop/shelter improvements

Entire year – complete the new transit operations center

Entire year – if KCS grade separations are needed, prepare final designs (flyover; I-35 bypass lanes)

Year 2013, Year 2014: If needed, fund and build KCS grade separations

Continue to monitor and refine restructuring

FUNDING

5.4 CURRENT FUNDING SOURCES AND FORECASTED LEVELS

Urbanized Area Transit Services

The City of Laredo 2009 Annual Budget (for the fiscal year ending September 30, 2009) includes funds for the operating and capital improvement needs for fixed route services (El Metro) and demand response services for disadvantaged riders (El Lift) that are operated in the urbanized area. Each of the funding sources is described below.

Non-Governmental Sources

The use of non-governmental local funds is important because it results in less reliance on politically-sensitive governmental sources. However, non-governmental revenues alone typically do not cover public transit operating expenses.

Passenger Revenue

Passenger revenues represent an important part of the overall transit revenue stream; however, fares for using El Metro and El Lift do not cover the total cost of operating these two transit services. Estimated passenger revenues in the 2009 budget for El Metro service equal $3,207,963, roughly the same amount included in the FY 2008 budget.

El Metro passenger revenue for the current fiscal year is projected to be about the same as the amount received in FY 2008. Passenger revenue increased $430,000 (over 15 percent) between FY 2007 and FY 2008 reflecting implementation of a fare increase from $1.00 to $1.25 for a one-way trip.

El Lift passenger revenue has decreased from FY 2007 and FY 2008 levels of approximately $33,000 to the FY 2009 budget amount of $20,000. This revenue covers less than 1 percent of the cost of providing El Lift service.

Advertising Revenue

El Metro, like many transit systems around the country, has implemented on-board bus advertising and transit shelter programs to provide other sources of “non-government” local funding. Advertising revenues typically cover a small portion of the total transit operating expenses. The FY 2009 City budget includes $70,000, which represents just over 0.5 percent of the City’s transit operating budget for FY 2009.

Advertising revenue in FY 2009 is budgeted to increase by about 8 percent from the FY 2008 figure. Revenues from this source have decreased dramatically from previous years, with $109,148 received during FY 2006 and $84,154 in FY 2007. Advertising revenues are not likely to increase significantly in upcoming years.

Governmental Sources

Small Urban Public Transportation (FTA Sections 5307 and 5309)

The Small Urban Area Public Transportation federal grants program is provided to urbanized areas throughout Texas on a formula basis (population and population

density) and is available for urban transit system operating assistance, planning activities and major capital purchases. The City has budgeted $3,952,135 in federal assistance for current year operations.

Although the FY 2009 budget for this grant category is about 5 percent higher than the FY 2008 figure, it is roughly equal to the operating grant amounts received in FY 2006 ($3,858,953) and FY 2007 ($4,097,680).

The City could potentially lose Section 5307 funds for operating assistance following the 2010 Census, but funds will be available for capital needs and preventive maintenance. Under current Federal law, urban areas with a population over 200,000 persons are ineligible for FTA operating assistance. Laredo is expected to exceed this population at the next Census and become a metropolitan transit authority.

The 100 Bus Coalition has been working for the past four years to amend SAFTEA-LU to allow public transit systems which operate less than 100 buses in peak periods in urbanized areas of more than 200,000 persons the authorization to use FTA Section 5307 formula funds for operating purposes. In 2008, Congress approved technical corrections to SAFTEA-LU to allow systems being phased out of operating assistance by exceeding a population of 200,000 in the 2000 Census to continue to receive 50 percent of their appropriation.

The 100 Bus Coalition is currently seeking Congressional approval of the following language in the authorization of the new six-year federal transportation bill:

> *Public transportation systems in urbanized areas of more than 200,000 population which operate less than 100 buses in peak operation should be authorized to use up to 50 percent of FTA 5307 formula funds for operating purposes.*

Based on analysis of information from the National Transit Database (NTD), the use of Section 5307 funds for preventive maintenance on vehicles, as permitted under current federal law, in conjunction with receipt of 50 percent of the current Section 5307 appropriation should keep most systems virtually whole.

The FY 2009 budget includes $776,000 in federal funds and $194,000 in local matching revenues for capital improvements.

State of Texas Transit Operating Assistance

The City budgeted $667,123 in operating assistance from the State in FY 2009, which is the same amount shown for FY 2008 budget and roughly equal to the State operating revenues received by the City in FY 2006 and FY 2007.

Laredo could lose State operating assistance following the 2010 Census after it becomes a metropolitan transit authority. Areas that exceed a population of 200,000 are ineligible for State operating funds.

Laredo Sales Tax Funding

Chapter 453 of the Texas Transportation Code, *Municipal Transit Departments*, permits cities with municipal transit departments to levy a sales and use tax for public transit of 1) one-quarter of one percent, and 2) one-half of one percent following voter

approval in a referendum. The local share of the State's sales tax for all uses cannot exceed 2 percent. In 1991, the City instituted a ¼-percent sales tax dedicated to public transit services. The City's adopted budget includes projected sales tax proceeds $6,284,977 for FY 2009. This amount, plus a sales tax fund balance from previous years of $1,374,684, is allocated in the FY 2009 budget as follows:

El Metro Operations	$5,387,507
Debt Service	$1,244,536
Capital Grant Match	$ 194,000
Capital Outlay	$ 78,000
Reserve Appropriation	$ 841,218

Transit Center Facility Revenues

The FY 2009 City budget estimates $619,357 in transit center revenues from rent, parking and commissions. Because budgeted facility expenses for the current fiscal year equal $690,875, about $71,518 from a fund balance for transit center operations will be needed, leaving an estimated balance of $81,326 at the end of FY 2009.

Rural Area Transit Services

El Aguila provides demand-response and fixed-route service within rural Webb County including travel to or from urban destinations, especially to their downtown Laredo terminal located at Jarvis Plaza, adjacent to the Laredo Transit Center. The system operates a fleet of 23 wheelchair-accessible vehicles carrying approximately 110,000 passengers annually. El Aguila revenue sources are as follows.

Non-Governmental Revenue Sources

Passenger Revenue

Estimated passenger revenues in the 2009 budget for El Aguila service are $110,000. Year 2009 experience through August is indicating a drop in ridership and fare revenues of about 10 percent, compared with 2008 The one-way fare for fixed-route service is $1.25 while the corresponding fare for demand response service is $0.75. The one-way fare for elderly, disabled, or Medicare passengers is $0.50, or $0.10 with a Metro identification card. There also is a reduced fare for $1.00 for students, and $0.25 for children, per one-way trip.

Governmental Sources

Rural Public Transportation (FTA Section 5311)

The Rural Public Transportation grants program helps people in rural areas to obtain access to health care, shopping, education, employment and recreation. Program funds may be used for capital, planning, operating and maintenance costs, with a maximum federal share of 80 percent and a maximum state/local share of 20 percent for most projects.

The 2009 budget for El Aguila includes $217,700 federal and $292,685 state funding.

Elderly Individuals and Individuals with Disabilities (FTA Section 5310)

This grants program provides funding to improve accessibility and mobility for the elderly and disabled. The funds may be used to defray up to 80 percent of eligible capital expenses, which can include, but are not limited to:

Acquiring transportation service from local transportation providers
Buses, vans or other public transportation vehicles
Radios and communications equipment
Vehicle shelters
Wheelchair lifts and restraints

El Aguila expects to receive $63,152 in Section 5310 funds for preventive maintenance expenses.

Webb County Funding

El Aguila expects to receive $67,700 local funding from Webb County.

Other Federal Funding

The ARRA program is providing funding for four new vehicles, which will replace four of the existing El Aguila fleet.

5.5 RECOMMENDED FUNDING SOURCES

TCRP Report 129: Local and Regional Funding Mechanisms for Public Transportation, which was published in 2009 by the Transportation Research Board, provides an extensive list of funding sources that are in use, or have the prospect of being used, at the local level to support public transportation. The report focused on 1) traditional tax- and fee-based funding sources and 2) common business, activity and related funding sources. The recommended local funding sources reflect guidance which is included in *TCRP Report 129* on advantages and disadvantages of various revenue sources and key criteria that should be considered when proposing new or revised transit funding sources.

Overview of Current Local and Regional Public Transportation Funding

The NTD provides a broad profile of the types of local and regional funding sources being used by transit systems across the country:

Fares and other earned income (concessions, advertising, lease revenues, etc.) accounted for about half of transit revenues, and nearly all of these funds are used for operations.
Local dedicated sources represented about 18 percent of revenue and were generated by:

- sales taxes (58 percent)
- property taxes (6 percent)
- gas taxes (4 percent)
- income taxes (2 percent)
- tolls (2 percent)
- other (29 percent)

Directly generated taxes accounted for approximately 16 percent of revenue and came from:

- sales taxes (46 percent)
- property taxes (7 percent)
- tolls (5 percent)
- gas taxes (1 percent)
- other (41 percent)

Local generated funds represented about 10 percent of revenues.
Other local sources accounted for about 5 percent of revenues.

Traditional Local Tax- and Fee-Based Funding Sources

Financial support for public transportation in the United States comes from various sources, most likely to avoid competing with the use of property taxes for other basic public services such as health, education, police and fire protection. The tax- and fee-based sources used for public transportation most relevant to Laredo are briefly described below.

General Revenues
These revenues are frequently committed on an annual or biennial basis in amounts that vary from budget cycle to budget cycle based on local priorities. The potential uneven flow of general funds contrasts with the more predictable revenue flow from dedicated funding sources.

Sales Taxes
Sales taxes are the most widely used source of dedicated local and regional transit funding because they often provide the greatest yield and stability. This source also is the most broadly accepted funding source for public transportation. At the local level, additional sales taxes enacted for public transit generally range from ¼ to 1 percent, and they often exempt various combinations of food, clothing, and prescription drugs (or apply lower rates to selected good and services).

As previously mentioned, Texas Transportation Code permits metropolitan transit authorities, municipal transit departments, and county transit authorities in the state to impose sales and use taxes between ¼ and 1 percent to finance public transportation.

Property Taxes
Property or ad valorem taxes on land and building value are generally the principal revenue source for local governments with no restrictions on their use. Some transit authorities and local governments use portions of local property taxes to support transit operations.

Vehicle Fees
The authority to collect vehicle fees is often provided by state governments to local jurisdictions in the form of a local option. The fees can be charged for issuance of titles, licenses, registration, and/or inspection. Revenues from these fees can be dedicated directly to public transportation.

Chapter 451 of the Texas Transportation Code, *Metropolitan Rapid Transit Authorities*, permits the levy of a motor vehicle emissions tax as a transit revenue source. The tax varies by the number of cubic inches of cylinder displacement for the vehicle, and the annual tax per vehicle cannot exceed:

51-100 cubic inches	$6.00
101-200 cubic inches	$7.00
201-300 cubic inches	$8.00
310-900 cubic inches	$10.00
901 cubic inches or more	$15.00

The law allows exemptions to the imposition of the vehicle emissions tax for certain vehicle classes.

Common Business, Activity, and Related Funding Sources

A range of additional local and regional revenue sources are being used to support public transportation although their use is not as widespread as the traditional sources discussed above.

Employer/Payroll Taxes
Employer taxes enacted to support transit are typically imposed directly on the company for the amount of gross payroll paid for services performed within the local jurisdiction. Authorizing legislation would define the specific types of wages to be taxed and the organizations which would be exempt from the tax.

Rental Car Fees
Rental car taxes are paid by the consumer on the rental of a vehicle. The revenues can be allocated to local governments or agencies to fund public transit. Rates typically range from 1 to 2 percent.

The State of Texas collects a tax on the short-term rental of passenger cars, vans, sports utility and light trucks for Houston-Harris County, Bexar County, City of Euless and Hill Country Village. The tax supports local sports and community venues. The tax is 5 percent of the rental cost for all jurisdictions except Hill Country Village where the rate is 2 percent.

Realty Transfer Fees/Mortgage Recording Fees
A “real estate transfer tax” is a tax levied on the sale of certain classes of property that increases with the size of the property being sold or transferred. Tax rates and dispositions vary from state to state with some states giving local governments the authority to collect and retain tax revenues for programs such as public transportation.

Room or Occupancy Taxes
Often called a hotel-motel tax, room or occupancy taxes are consumer taxes on the cost of lodging at hotels, motels, rooming houses, private campgrounds, RV parks and similar facilities. Revenues may be collected by a state and, where dedicated for local use, allocated to the levying jurisdiction. Revenues also may be collected by local jurisdictions where state authority is provided. Often these revenues are used for tourism promotion or operation of tourism-related facilities.

Chapter 351 of the Texas Tax Code, *Municipal Hotel Occupancy Taxes*, permits cities to levy a local tax to fund various promotional, tourist, artistic and historical activities. Laredo levies a 7 percent hotel-motel tax which is projected to yield $3,424,128 in FY 2008-2009.

Advantages and Disadvantages of Local Funding Sources

Funding sources used to support public transportation have a wide variety of characteristics. These characteristics – along with local, regional and state taxing, funding and budgetary policies and philosophies – determine the usefulness of a particular source for the Laredo region. Table 6-1, excerpted from *TCRP Report 129*, highlights generally perceived advantages and disadvantages of specific revenue sources regardless of differences in local policies and philosophies.

Table 5-1: Advantages and Disadvantages of Traditional Local PublicTransportation Funding Sources

Traditional Mechanisms	Advantages	Disadvantages
General Revenues	Transit has benefits that are spread broadly across community and across users and non-users.	Subject to annual appropriation/budgeting process.
Sales Taxes	Broad tax base; generally produces high revenue yields for a low marginal tax rate. Keeps pace with inflation. If already in place, very low cost for adjusting rates. Moderately equitable in that individuals of comparable means pay roughly the same amount of tax. All transportation system users pay, including commuters/ visitors. Transit is linked to economic health.	Revenues variable with changes in the economy, negative as well as positive. Considered somewhat regressive; burden is higher on poorer households although benefits of transit may be greater. Possible complications in the geographic limits of taxation and services delivered (users can be from outside the taxing jurisdiction). Must have state legislative authority in place for local enactment. Typically requires voter approval for local enactment.
Motor-vehicle-related sales taxes	Strong historic growth in yield from increases in ownership and use. More progressive than general sales taxes.	Significant potential for decline with economic downturns. Often difficult to divert from general funds. Revenues may decline in future with shift away from vehicles using petroleum.
Property Taxes	All households and businesses must pay. Generally a broad tax base. Revenues are generally not impacted dramatically with changes in the economy. Indexed for inflation (but only in property values). Relevant to and allowed for transit investment as a basic public service. Ease of administration and low evasion. Low compliance cost.	Variable political and public acceptability. Moderately regressive; e.g., some households could be property-rich but income-poor (e.g., retirees). Revenue growth may be limited by tax limitation statutes in some areas. Susceptible to potential yield swings from periodic speculation and housing cycles.
Vehicle fees (Title, registration, tags, and inspection)	Revenues are generally not impacted by changes in the economy. Allow for revenue collection from varied vehicle classes, differential value (i.e., a form of personal property tax) or vehicles using alternative fuels, etc., without establishing new collection mechanisms. Already in place; little added administrative cost for revenue increases.	Flat fees are regressive. Potential for inequities among vehicle classes. Not indexed for inflation. Limited base; Only households that own vehicles pay. Relation to transit is often not acknowledged, e.g., drivers may benefit from transit improvements that reduce congestion. Typically requires legislative action to change or increase rates or structure.

Employer/ Payroll Taxes	Ensures that commuters and businesses contribute to and support transit. Ease of compliance and administration. Responsive to inflation.	Commuters have no say within the local government that imposes the tax. May provide incentive for businesses to locate outside the taxing jurisdiction.
Car Rental Fees	Easy to gain public support; most residents not subject to the tax. Revenues may be impacted by economic changes. Responsive to inflation if fee placed on value.	People paying the tax have no say within the local government imposing the tax. Narrow tax base.
Realty Transfer Taxes/ Mortgage Recording Taxes	New property owners pay a share of transit costs provided in the area. Highly related to economic activity. Responsive to inflation.	Narrow tax base. Considered moderately regressive. Susceptible to potential yield swings from periodic speculation and housing cycles.
Room/ Occupancy Taxes	Politically attractive; mostly visitors pay the tax. Generally based on value; inflation sensitive.	People paying tax have no direct say in the local government that imposes the tax.

Criteria for Evaluating Potential Local Funding Sources

Potential transit funding sources are typically evaluated across several basic dimensions using the criteria briefly described below.

Revenue Yield

Revenue yield is the single most important criterion in evaluating transit revenue sources. Revenue yield measures whether the funding source can provide a significant level of revenue given the expenditures required. Revenue yield should be both "adequate" and "stable". "Adequacy" refers to present and future revenue in comparison with needs for current and projected expenditures. In addition to being adequate, resources under evaluation should be highly predictable in generating revenue. "Stability" refers to whether there are uncertain revenue fluctuations that can impact an agency's ability to manage resources. Enactment of taxes and fees for any public investment is difficult at best. If the effort is to be made, it should be focused directly on achieving adequate, predictable, and reliable revenue yields.

Cost Efficiency

Cost efficiency refers to maximizing benefits in relation to resource use. Related considerations include "administrative cost" issues in tax or fee collection; "compliance costs" passed on to taxpayers; and the potential for, and scale of, tax evasion and enforcement.

Equity
Equity refers to the fairness of the tax burden among various economic groups. A tax burden should be commensurate with the person's ability to pay or with the benefits received.

Economic Efficiency
Economic efficiency in transportation is intended to reflect whether the marginal cost to all travelers and society as a whole of an additional trip taken is captured in the price paid by the trip maker.

Political and Popular Acceptability
A revenue source is typically acceptable when it is politically palatable on the key, or most relevant, criteria. This implies that the revenue source is adequate, fair, simple, effective, efficient and easy to administer.

Technical Feasibility
Technical feasibility reflects how technology advancements, including geographic information systems (GIS), global positioning systems (GPS), and electronic transfer mechanisms, could reduce the administrative and compliance cost of transit-related taxation and revenue handling.

TCRP Report 129 included broad qualitative observations on the degree to which potential local transit revenue sources satisfy the aforementioned criteria. Table 6-2 summarizes these observations in which "H" indicates strong performance, "M" reflects moderate performance, "L" indicates marginal performance, and "V" means variable performance.

Table 5-2: Advantages and Disadvantages of Traditional Local Public Transportation Funding

Source	Revenue Yield	Efficiency	Equity	Economic Efficiency	Political/ Public Acceptance	Technical Feasibility
Traditional Revenue Sources						
General Revenues	H	H	L	M	M	H
Sales Taxes	H	H	L	M	M	H
Property Taxes	H	H	L	M	M	H
Vehicle Fees	H	H	M	M	L	H
Common Business, Activity, and Related Sources						
Employer/Payroll Taxes	H	H	M	H	L	H
Car Rental Fees	M	H	L	M	M	H
Realty Transfer Taxes/Mortgage Recording Fees	M	M	L	L	M	H
Room/Occupancy Taxes	L	M	L	L	H	H

Key:

H = Strong Performance

M = Modest Performance

L = Marginal Performance

V = Variable

Appendix A

Laredo Transit Development Plan 2008 El Metro Passenger Interviews (Transit Intercept Survey)

FINAL SURVEY REPORT

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July 2008

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

1. EXECUTIVE SUMMARY

6.0 BACKGROUND

From May 14, 2008 to May 17, 2008, NuStats conducted a public transit intercept survey of El Metro passengers in Laredo, Texas. The survey was conducted at the Laredo Transit Center and resulted in the collection of 412 completed and usable surveys. The study, part of the Laredo Transit Development Plan project being carried out by Parsons Brinckerhoff, involved developing the sampling plan; designing the survey instrument; collecting, processing, and geocoding the data; analyzing the data; and reporting results. This report documents these tasks.

7.0 KEY FINDINGS

The objectives of the survey analysis were two-fold: (1) examine the socio-demographic characteristics of El Metro riders, and (2) examine the travel behavior characteristics of El Metro riders. Some important findings from the analysis of the El Metro riders are presented below:

1. The socio-demographic characteristics of the riders indicate that 73% of El Metro riders are between the ages of 25-64, while only 11% of the riders are less than 25 years of age, with 3% less than 18 years of age. Nearly 62% of the riders are women, and 81% of the riders are transit-captive riders (i.e. they are from households that do not own any vehicles). Half of El Metro riders are employed, with 29% employed full-time and 22% employed part-time. Overwhelmingly, Spanish is the dominant primary language (91%).
2. The travel behavior characteristics of the riders indicate that home and personal business[1] are the dominant trip origins and destinations of riders. Three-quarters of riders do not make any transfers on their one-way trips. Nearly 84% of riders use El Metro at least twice a week, with 15% using El Metro daily.

[1] "Personal Business" means non-work related purposes other than home and school. This will be used throughout the report.

2. INTRODUCTION

8.0 STUDY PURPOSE

This report documents the methods and results for the transit intercept survey of passengers of Laredo's El Metro fixed-route bus service. This survey was conducted to collect accurate and reliable travel patterns and socio-economic characteristics of weekend and weekday transit passengers. The data collected will be used in preparing a Transit Development Plan for the Laredo metropolitan planning area.

9.0 DATA COLLECTION SCHEDULE

Data collection for the El Metro Passenger Interview study occurred between Wednesday May 14 and Saturday May 17, 2008. Interviewers using a paper survey instrument collected data from transit riders as they waited for their bus. Survey data were scanned and verified, corrected, and geocoded immediately following data collection at the end of May. Data analysis and reporting was conducted in June. This report is based on analysis of the final survey database that contains 412 records.

10.0 REPORT STRUCTURE

This report begins with the survey methods employed followed by the results. Appendix A contains the survey instruments (English and Spanish) and Appendix B contains unweighted data tabulations of key variables.

3. SURVEY METHODS

This section of the report provides details of the survey design including sampling, the survey instrument, data collection (which includes interviewer training, site evaluations, and interviewing protocols), data collection challenges, data processing, and geocoding.

11.0 SAMPLING PLAN

The sample plan for the El Metro survey was established to complete a total of 400 usable surveys from transit riders dispersed over four specific time of day periods: AM, Mid Day, PM and Late Night. Table 1 below identifies the proposed and final survey distributions by time of day.

TABLE 1:
EL METRO SURVEY SAMPLE PLAN

TIME OF DAY	HOURS OF DAY	SURVEY GOAL	SURVEY GOAL DISTRIBUTION	SURVEYS COLLECTED	FINAL SURVEY DISTRIBUTION
AM	0600-1000	104	26%	104	25%
Mid Day	1001-1459	128	32%	130	32%
PM	1500-1900	104	26%	114	28%
Late Night	1901-2130	64	16%	64	15%
Total	N/A	400	100%	412	100%

It should also be noted that 88% of all surveys were completed on weekdays (Wednesday-Friday), while the remaining surveys were completed on a weekend day (Saturday). There were no quotas by day of week.

12.0 SURVEY INSTRUMENT

The survey instrument was designed as an interviewer-guided questionnaire with 17 questions. Questionnaires were attractively designed in a two-sided double letter-size format, and the form was pre-printed with a unique serial number and bar code. The questionnaire was designed to obtain information in three major categories: origin/destination travel patterns, rider demographics, and rider opinions and suggestions about El Metro transit services. The questionnaire was developed to accommodate two languages, English and Spanish.

13.0 INTERVIEWER TRAINING

The survey team for the El Metro Passenger Interview study consisted of four interviewers from DataSource in Edinburg, TX. The interviewers had extensive interview experience and were all bilingual (English and Spanish). Interviewer training occurred on May 14, 2008 from 8 AM to 10 AM at the DataSource facility in Edinburg, TX. The training was conducted by the NuStats project manager and provided details on the following project specific information:

- Project Team Members
- Interview Dates and Shifts
- Interview Goals by Time of Day
- Survey Eligibility
- Interactive Run-Through of Survey Instrument
- Survey Methods
- Post Survey Protocol
- Important Contact Information

The team met with the Metro contact, who guided the team on a tour of the Laredo Transit Center, answered survey-specific questions, provided administrative badges, and identified a break area for the survey team members to rest and store their personal belongings during the survey shift. At the conclusion of the tour, the survey team began surveying for the PM shift.

14.0 INTERVIEWING PROTOCOLS

All interviewing occurred from Wednesday May 14, 2008 to Saturday May 17, 2008 at the Laredo Transit Center, both inside and outside of the enclosed transit ticketing area. Interviewers approached transit riders as they waited for their bus, introduced themselves and asked them if they would like to take a survey about El Metro transit services in return for a chance to win a cash prize. They were also instructed that the survey would take less than five minutes. If they agreed, the survey was administered in the respondent's preferred language. If they refused to participate, they were thanked for their time and a new respondent was sought.

The final response rate was 84% and the final refusal rate was 16%.

15.0 INTERVIEW TEAMS

Surveying for the El Metro Passenger Interview study was conduced by two teams of two surveyors each. Table 2 below summarizes the survey fieldwork by shift and personnel.

TABLE 2:
EL METRO SURVEY FIELDING

SHIFT/PERSON	START TIME	END TIME	START TIME	END TIME	TOTAL HOURS
Shift 1 Surveyor 1	0700	1030	1100	1530	8
Shift 1 Surveyor 2	0700	1100	1130	1530	8
Shift 2 Surveyor 1	1130	1630	1700	2000	8
Shift 2 Surveyor 2	1130	1700	1730	2000	8

Each surveyor was given a half hour for lunch and instructed to take breaks as needed. The shifts were staggered so that there was at least one individual surveying at any given time between 7 AM and 8 PM.

16.0 DATA COLLECTION CHALLENGES

Overall data collection went very well, with response rates that were very much in line with what we had anticipated. During the course of fieldwork, there were two issues that were not anticipated and required some level of client communication to resolve.

1. Capture of non El-Metro Routes. Some respondents provided route names such as “Las Brisas”, “El Express” and “El Aguila”, which did not correspond to any routes identified on the El Metro web site. We later identified “Las Brisas” and “El Express” as other names for route 12B and “El Aguila” as a separate bus system serving outer portions of the Laredo metropolitan area, and as such, of interest to the survey effort. El Aguila picks up riders across the street from the transit center. However, their riders were using the transit center as a staging area until the bus arrived.

2. Lack of Detailed Address Information. In many instances, respondents (particularly those residing in Mexico and working or visiting in the US) were unable to provide detailed address information for their destinations. This led to a reduced ability to geocode to a specific XY coordinate.

17.0 DATA PROCESSING

Data entry was conducted using ScanTron scanning technology in order to minimize human error resulting from traditional data entry methods. The scanning process involved scanning batches of approximately 30 questionnaires to produce an image file of the documents. Data results derived from the image files were individually reviewed and verified by comparing the scanned image to the data contained in the data file. Text data (primarily origin and destination address information) was reviewed for the purpose of correcting misspellings and verifying that the scanner correctly read numeric data. The data file output from scanned documents was maintained unaltered for comparison purposes, if necessary.

Prior to the creation of the final database, a Data Items Matrix and Data Dictionary were created based on the questionnaires and scanning programs.

1. The Data Items Matrix was based on the questionnaires and scanning programs. The Data Items Matrix identified variable names, variable descriptions, data types, field widths, code sets, skips, and exact question wording, as it appeared in the questionnaires.
2. The Data Dictionary was based on the Data Items Matrix. The data dictionary consisted of variable names, data types, field widths, variable labels, and response labels. The labels were abbreviated as necessary to accommodate SPSS field width restrictions.
3. The data dictionary was checked to insure it agreed with the final hard copies of the questionnaires.
4. The data structure was checked to insure consistency for all data files created for the study.

Following duplication of the original database, the data contained in the database copy were checked for integrity. Various edit routines were programmed to check the consistency of data and to identify reporting, scanning or entry errors. Data in the Control File was matched against survey data to ensure that all information was consistent between the two files. Routine edit checks were conducted to examine questionnaire responses for reasonableness and consistency across items. Routine checks included such items as:

Response checks

1. Checking for proper data skips and patterns of answering questions consistent with prior answers
2. Checking for realistic responses
3. Checking for high frequency of item non-response (missing data)

Range checks

4. All categorical values were verified that they were within range
5. Outliers in continuous variables (variables that represent a continuum of values and do not have a code set) were reviewed and flagged

Skip checks

6. Skip patterns were verified to be programmed correctly

Open-ends preparation (non-categorical, text variables)

7. Text variables associated with an "Other" type category were reviewed. Text responses that belong to one of the categories in the response list/code set were recoded.
8. All text responses were corrected for any spelling or typographical errors.

Logic checks

9. The logical consistency of responses was verified. Data cleaning included consistency checks that were not possible to include in the Scanning program.

Other standard checks

10. The total number of records in the data file was checked to determine if the amount was equal to the total number of scanned questionnaires.
11. If duplicate records were identified, all data that was duplicated was checked against the original record. If all data was not identical, data was flagged for review. Otherwise, duplicates were corrected or removed (duplicate unique identifier).
12. Multiple-response variables (if any) were prepared by splitting them into the variables specified by the Matrix.
13. Ten percent of data entry was re-verified.

18.0 GEOCODING[2]

The survey location data consisted of two location types that were explicitly asked on the questionnaire: trip origin and trip destination.

18.1.1 Trip Origin and Trip Destination

Geocoding of respondent-provided trip origin and trip destination addresses consisted of two-stages. An automated batch run was first attempted to successfully geocode origin / destination addresses. The batch run attempted to match exact addresses or cross-streets obtained from respondents to a street coverage file provided by El Metro. Addresses or cross-streets matching the coverage file were assigned an X/Y coordinate and a value of "M" for matched, and placed in the "AV_STATUS" field[3]. Addresses or cross-streets not matched during the batch run were flagged with an "AV_STATUS" value of "U" for unmatched, and passed to the next stage of geocoding.

[2] Geocoding is the process of assigning a code (or formula) to a geographic location.
[3] Indicates the status of an address or intersection, whether it is matched with an actual geographic location or not.

During the next stage, addresses were researched using a series of resources, including Switchboard.com, Google.com (Internet search engines), and DeLorme Street Atlas USA (mapping software). Addresses that were matched to an exact address or cross-streets during this stage were assigned an X/Y coordinate and an "AV_STATUS" of "M". Addresses that fell outside the GIS coverage files have an "AV_STATUS" of "O" for Out of Area. Unmatched addresses were not assigned an X/Y coordinate, and were given the "AV_STATUS" of "U".

It should be noted that, prior to fielding, an agreement was made to geocode all origins and locations in Mexico to out of area. For these locations, city and state were recorded in the survey. See Table 3 for details.

TABLE 3:
GEOCODING MATCH RATES

LOCATION TYPE	MATCHED	UNMATCHED	OUT OF AREA	TOTAL	MATCH RATE (PERCENTAGE OF TOTAL)	MATCH RATE (OF NON-MEXICAN LOCATIONS)
Origin	252	5	155	412	61%	98%
Destination	370	19	23	412	90%	95%

18.2

18.2.1 Geocoding Quality Control

Once geocoded, records were subjected to series of strict quality control checks. The checks included:

- All unmatched locations were run through the geocoding process for a final attempt to be geocoded.
- A random selection of 5% of the geocoded address file was reviewed in detail to ensure proper placement of the overall latitude/longitude points. This entailed using ArcView and displaying the points on the street layer and comparing the points with DeLorme.
- Since a cross-street geocode does not reference a zone (zip code or city) in ArcView, all cross-street points were queried and analyzed to ensure proper placement of the points. (The ArcView default placement of a geocoded cross street places the point in the Southeast quadrant of that intersection).
- Visual quality control check by city. Geocoding was verified by querying of geocoding matches related to each city. Then these points were displayed in the map view in ArcView and visually confirmed. Outlying locations were selected and confirmed to be correct.

Global changes, including correcting misspelled place names, misspelled city names, and correcting any other global address problems, were made prior to each data delivery as well as one final pass on the complete location file.

4. SURVEY RESULTS

This chapter provides detailed information on demographic characteristics (section 1.1) and travel behavior characteristics (section 1.2) of El Metro riders. The survey data used for analysis was neither weighted nor expanded.

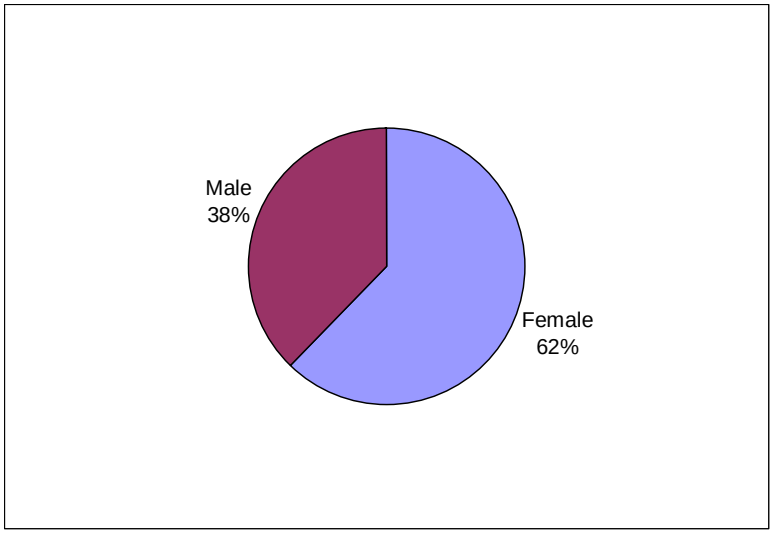
19.0 DEMOGRAPHIC CHARACTERISTICS

This section describes the demographic characteristics of El Metro riders including household size, household income, vehicle ownership, employment status, age, student status, and presence of valid driver's license (see Appendix B for detailed frequencies by time of day).

19.1.1 Gender

Figure 1 shows that nearly two-thirds of riders surveyed were women.

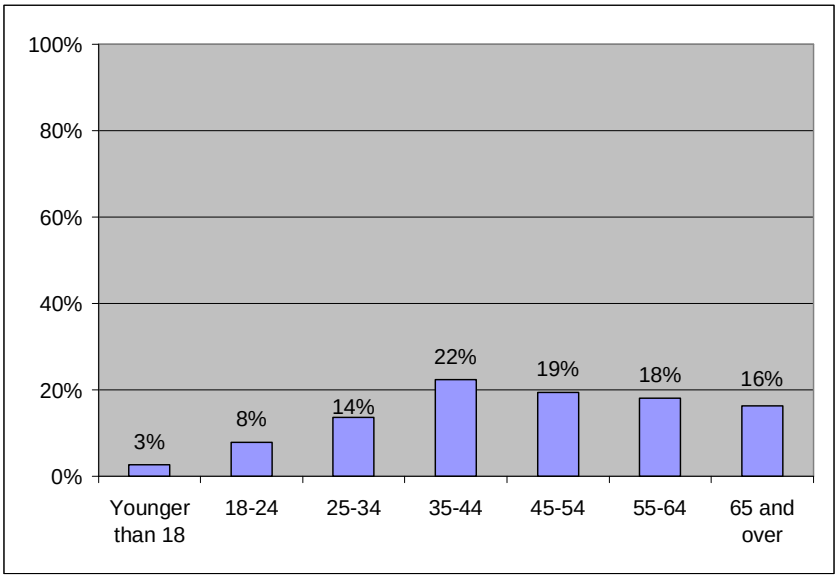
FIGURE 1. GENDER



19.1.2 Age

Figure 2 provides the distribution of riders by age. The figure indicates that only 11% of the riders are less than 25 years of age, with 3% less than 18 years of age. The majority of riders (73%) are between 25 and 64 years of age while 16% of the riders are 65 years or older.

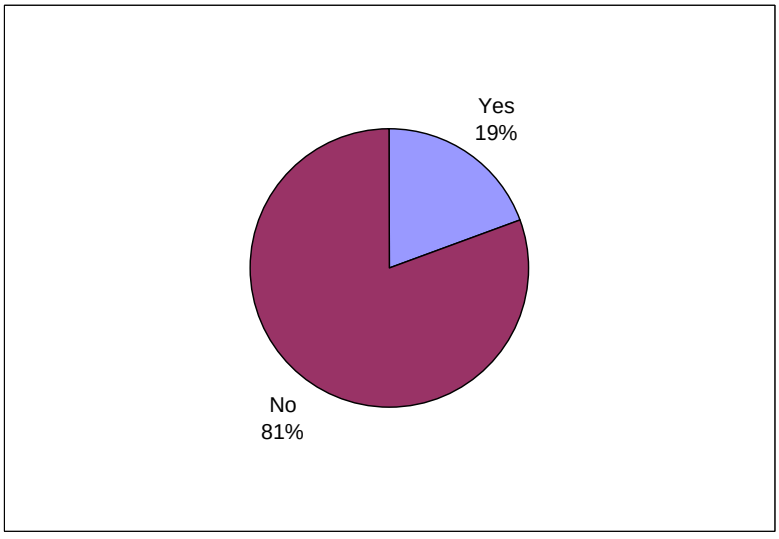
FIGURE 2. AGE



19.1.3 Vehicle Availability

As indicated by Figure 3, 19% of riders have a vehicle available.

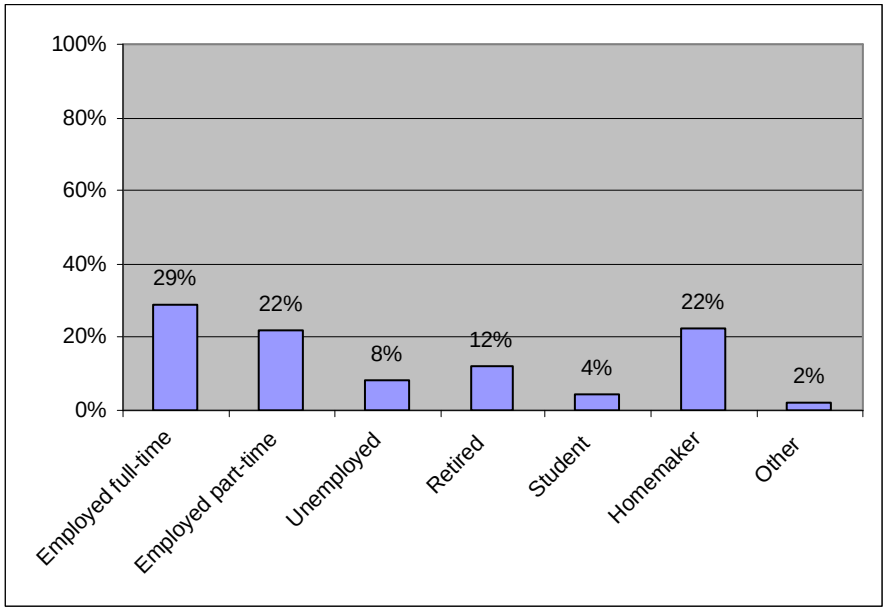
FIGURE 3. VEHICLE AVAILABILITY



19.1.4 Employment Status

The survey data suggests that half of the riders are employed, with 29% working full time and 22% working part time (Figure 4). Nearly a quarter of the riders are homemakers (22%). Further, 8% of the riders are unemployed while an additional 16% are either retired (12%) or students (4%).

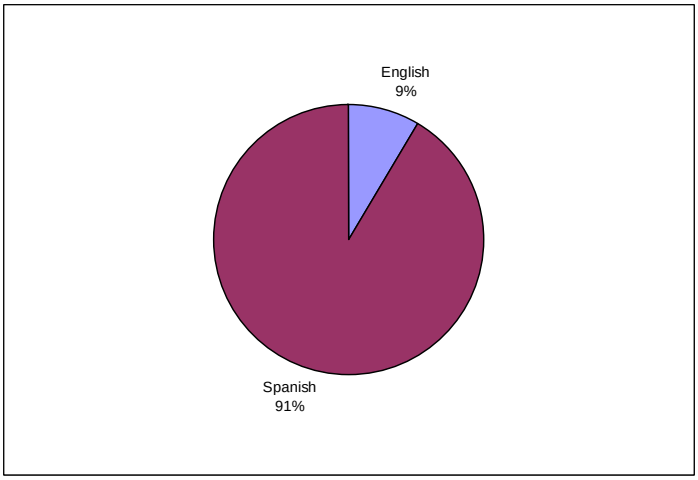
FIGURE 4. EMPLOYMENT STATUS



19.1.5 Primary Language

As suggested by Figure 5, the primary language of riders is Spanish (91%).

FIGURE 5. PRIMARY LANGUAGE



20.0 TRAVEL BEHAVIOR ANALYSIS

This section describes the trip-making characteristics of El Metro riders including trip origin, trip destination, number of transfers, frequency of use, and opinions about El Metro services.

20.1.1 Trip Origin

The distribution of riders by trip origin indicates that the most common trip origins are home and for personal business (Table 4). In particular, half of the riders have trips originating from home while 31% have trips originating from personal business. The other trip origins include work (15%) and school (2%).

TABLE 4. TRIP ORIGIN

TRIP ORIGIN	FREQUENCY	PERCENT
Home	209	50%
Work	61	15%
School	10	2%
Personal Business	126	31%
Other	7	2%
Refused	2	1%
Total	**412**	**100%**

20.1.2 Trip Destination

The distribution of riders by trip destination indicates that the most common trip destinations are personal business or home (Table 5). In particular, about 44% of the riders have trips ending with personal business, while 41% have trips ending at home. The other trip destinations are work (14%), and school (1%).

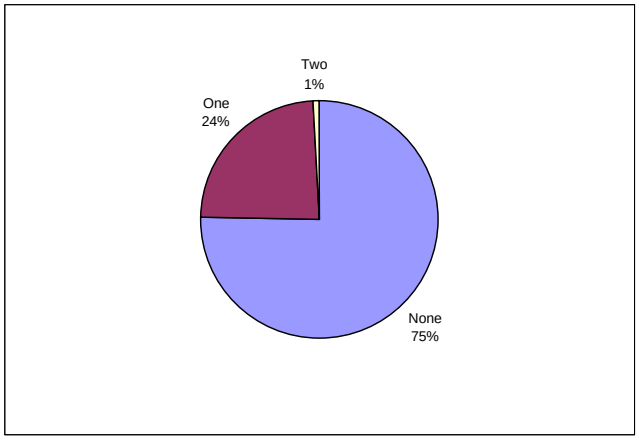
TABLE 5. TRIP DESTINATION

TRIP PURPOSE	FREQUENCY	PERCENT
Home	169	41%
Work	56	14%
School	5	1%
Personal Business	181	44%
Refused	1	0%
Total	**412**	**100%**

20.1.3 Number of Transfers

Figure 6 presents the distribution of riders by the number of transfers made by the riders to complete the one-way trip. The figure indicates that three-quarters of the riders do not make any transfers while 24% make one transfer to complete the one-way trip. The remaining 1% of the riders made two transfers.

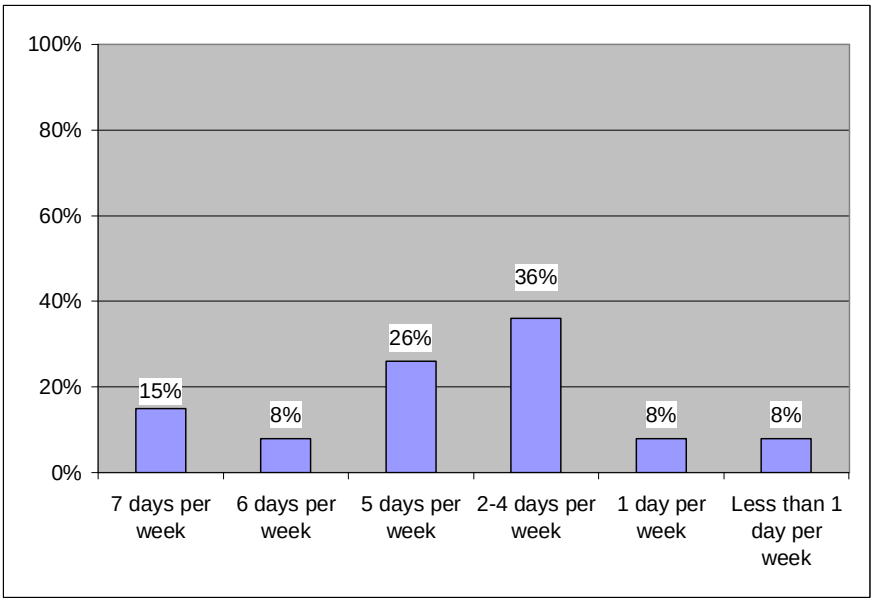
FIGURE 6. DISTRIBUTION OF RIDERS BY NUMBER OF TRANSFERS



20.1.4 Frequency of Use

Figure 7 suggests that a majority of El Metro riders take the bus 2-4 days per week. Just over a quarter of riders take the bus 5 days per week.

FIGURE 7. FREQUENCY OF USE



20.1.5 Characteristics of El Metro that are Liked

When asked what they liked about riding El Metro, over one quarter (27%) of riders were not specific in their response, yet are happy with the existing service. Around 16% of respondents appreciated the comfortable temperature of the buses, 12% had positive comments about the drivers and staff, and 10% felt that the buses are comfortable, clean, and in good condition. About 12% of riders didn't have any positive comments to offer about their experience riding El Metro. See Table 6 for further detail.

TABLE 6. WHAT DO YOU LIKE ABOUT EL METRO?

COMMENT	FREQUENCY	PERCENT
Non specific (everything, good service, fine the way it is)	126	27%
Provides transportation (gets me where I need to go)	21	5%
General positive comment about drivers / staff	55	12%
Drivers are patient	2	<1%
Service is fast	6	1%
Comfortable / Clean / Buses in good condition	47	10%
Temperature of buses (AC/Heater)	73	16%
Safe	3	<1%
Cost / Value	24	5%
Timeliness	16	3%
Reliable / Consistent	3	<1%
Schedule / Routes / Convenient / Efficient / Close to home	16	3%
Positive comment about transit center / Stops	11	2%
Negative comment (nothing, I have no choice, too expensive)	56	12%
Other	10	2%
Total	469	100%

20.1.6 Characteristics of El Metro that are Not Liked

When asked what they disliked about riding El Metro, 16% of riders were concerned with timing issues such as frequency of the buses, length of wait, and slowness of the bus itself. About 15% of riders had complaints about the temperature of the bus and 13% were concerned about the timeliness of the bus (late / early / deviations from the schedule). Overall, 21% of riders did not have anything negative to say about their riding experience. See Table 7 for detail.

TABLE 7. WHAT DO YOU NOT LIKE ABOUT EL METRO?

COMMENT	FREQUENCY	PERCENT
Non-specific (bad service, etc.)	3	<1%
General negative comments about drivers / staff	37	8%
Patience of drivers (pass by stops, don't wait, etc.)	8	2%
Timeliness: late / early / deviation from schedule	63	13%
Schedule / times / stops aren't convenient for them	16	3%
Other time issues: frequency of buses, length of wait, slow	76	16%
Need more buses / new routes	14	3%
Transit Center / stops / change machines	9	2%
Condition of buses (dirty, break down, old, bugs)	45	10%
Bus temperature complaints: A/C, etc.	71	15%
Too expensive	10	2%
Too crowded	6	1%
Seats not available for handicapped / elderly	2	<1%
Negative comment about other passengers	3	<1%
Other	10	2
Positive comment (nothing, everything is fine, etc.)	96	21%
Total	**469**	**100%**

Multiple response table based on total responses

20.1.7 Suggested Improvements to El Metro

Over one quarter (27%) of El Metro riders would like to see improvements to the schedule such as running the bus more frequently and extending service hours and operating more buses per route. About 14% percent of riders would like to see an improvement in the timeliness of the buses and 13% would like to ride in newer, cleaner buses. One quarter (25%) of respondents didn't offer any improvement suggestions. See Table 8 for details.

TABLE 8. SUGGESTED IMPROVEMENTS

COMMENT	FREQUENCY	PERCENT
Non-specific comment (fix all problems)	6	2%
Drivers / staff: be courteous, helpful, patient	27	7%
Timeliness: try not to be late / avoid deviations	52	14%
Improve schedule (times, frequency, buses per route)	102	27%
Lower cost	3	1%
Signage / information distribution	5	1%
Improvements to Transit Center / change machines / ticket booth	11	3%
Fix buses, clean buses, get newer buses	49	13%
Need A/C, need to fix A/C	16	4%
Fix seating, crowding, comfort issues	5	1%
Other	13	3%
Nothing / no suggestions	94	25%
Total	**383**	**100%**

Multiple response table based on total responses

Laredo TDP Survey/ ★ Encuesta de Laredo TDP 2008

Print letters/numbers clearly in upper case. A B C 1 2 3 Fill in bubble. ●
★ Escriba las letras y números claramente en mayúsculas. ★ Rellene la burbuja.

All personal information is confidential and WILL NOT be shared or sold.
★ Toda la información personal es confidencial y no será compartida ni vendida.

Interviewer: ☐☐

1. **DO NOT ASK** - Please specify the **TIME** & **DATE** of when this survey is being administered.
★ NO PREGUNTE - Por favor especifique la **HORA** y **FECHA** en cual se esta llevando acabo la encuesta.

Please specify time: / Por favor especifique la hora: ☐☐:☐☐ ○ a.m. ○ p.m.
Please specify date: / Por favor especifique la fecha: ☐☐/☐☐

2. **DO NOT ASK** - Is the respondent? **★ NO PREGUNTE** - ¿La persona es...?

○ Female / Femenina ○ Male / Masculina

3. Which of the following **AGE GROUPS** do you belong to? **★** ¿A cuál de los siguientes **GRUPOS DE EDAD** pertenece usted?

○ Younger than 18 / Menos de 18 ○ 25 - 34 ○ 45 - 54 ○ 65 & Over / Más de 65
○ 18 - 24 ○ 35 - 44 ○ 55 - 64

4. Do you have a **CAR** available for this trip you are making today? **★** ¿Tiene disponible un **AUTOMÓVIL** para este viaje que esta haciendo hoy?

○ Yes / Sí ○ No

5. Which of the following best describes **YOUR SITUATION**? **MULTIPLE RESPONSE**
★ ¿Cuál de las siguientes opciones describe su situación laboral? **MULTIPLES RESPUESTAS**

○ Employed full time / Empleado/a tiempo completo ○ Unemployed / Desempleado/a ○ Student / Estudiante ○ Homemaker / Ama de casa
○ Employed part time / Empleado/a tiempo medio ○ Retired / Jubilado/a ○ Other (specify) / Otro (especifique):_____

6. What is your **PRIMARY LANGUAGE**? **★** ¿Cuál es su **LENGUAJE PRINCIPAL**?

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
Language / Lenguaje

7. What type of place are you **COMING FROM**? **★** ¿De qué tipo de lugar **VIENE**?

○ Home / Casa ○ School / Escuela ○ Personal business / Negocio personal
○ Work / Trabajo ○ Other (specify) / Otro (especifique):_____

8a. What is the **NAME** of the **PLACE, BUSINESS OR BUILDING** you are **COMING FROM NOW**?
★ ¿Cuál es el **NOMBRE** del **LUGAR**, **NEGOCIO O EDIFICIO** del que **VIENE AHORA**?

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
Place Name / Nombre del Lugar

8b. What is the **ADDRESS**? (Provide the **NEAREST INTERSECTION** if you don't know the **EXACT ADDRESS**.)
★ ¿Cuál es la **DIRECCIÓN**? (Proporcione la **INTERSECCIÓN MÁS CERCANA** si no sabe la **DIRECCIÓN EXACTA**.)

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
Address / Dirección

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ & ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
Cross Street 1 / Primer Cruce de Calles — Cross Street 2 / Segundo Cruce de Calles

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ ☐☐ ☐☐☐☐☐
City / Ciudad — State / Estado — Zip / Código Postal

Continue / Continúe →

9. **DID YOU/WILL YOU TRANSFER** from another bus to get to your last/next bus? If **YES**, what routes are involved in that transfer?
★ ¿**TRASBORDO/VA A TRASBORDAR** de un autobús a otro para llegar a su último/siguiente autobús? Si la respuesta es sí, ¿cuáles rutas se usaran en ese trasbordo?

○ Yes / Sí ○ No → **GO TO Q10 / SIGA A LA PREGUNTA 10**

From Route / De Ruta | To Route / A Ruta

10. What type of place are you **GOING TO**? ★ ¿A qué tipo de lugar **VA AHORA**?

○ Home / Casa ○ School / Escuela ○ Personal business / Negocio personal
○ Work / Trabajo ○ Other (specify) / Otro (especifique): _____

11a. What is the **NAME** of the **PLACE, BUSINESS OR BUILDING** you are **GOING TO NOW**?
★ ¿Cuál es el **NOMBRE** del **LUGAR**, **NEGOCIO O EDIFICIO** al que **VA AHORA**?

Place Name / Nombre del Lugar

11b. What is the **ADDRESS**? (Provide the **NEAREST INTERSECTION** if you don't know the **EXACT ADDRESS**.)
★ ¿Cuál es la **DIRECCIÓN**? (Proporcione la **INTERSECCIÓN MÁS CERCANA** si no sabe la **DIRECCIÓN EXACTA**.)

Address / Dirección

Cross Street 1 / Primer Cruce de Calles & Cross Street 2 / Segundo Cruce de Calles

City / Ciudad | State / Estado | Zip / Código Postal

12. After you get off the bus you are waiting for now, **WILL YOU TRANSFER** to another bus? If yes, from **WHAT ROUTE TO ROUTE**?
★ Después que baje del autobús que espera actualmente, ¿**VA A TRASBORDAR** a otro autobús? Si la respuesta es sí, ¿de cuál ruta a cuál ruta?

○ Yes / Sí ○ No → **GO TO Q13 / SIGA A LA PREGUNTA 13**

From Route / De Ruta | To Route / A Ruta

13. What do you **LIKE** about El Metro? ★ ¿Qué le **GUSTA** de El Metro?

14. What do you **DISLIKE** about El Metro? ★ ¿Qué **NO** le **GUSTA** de El Metro?

15. How often do you **RIDE** El Metro? ★ ¿Qué tan seguido **VIAJA** en El Metro?

○ 7 days per week / 7 días por semana ○ 5 days per week / 5 días por semana ○ 1 day per week / 1 día por semana
○ 6 days per week / 6 días por semana ○ 2 - 4 days per week / 2 - 4 días por semana ○ Less than 1 day per week / Menos de un día por semana

16. What are some **IMPROVEMENTS** or **SUGGESTIONS** you have for El Metro? ★ ¿Cuáles **SUGERENCIAS** o **MEJORAS** tiene para El Metro?

17. In order to be eligible for the $100 cash prize drawing, we'll need your **NAME** and **PHONE NUMBER**. May I please have your name and phone number? ★ Para poder participar en el sorteo en efectivo de $100 necesitamos su **NOMBRE** y **NUMERO DE TELEFONO**. ¿Me da por favor su nombre y numero de telefono?

Name / Nombre | ( ) - Telephone / Teléfono

Thank you! / ¡Muchas gracias!

Table 1. Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Female	252	61.2	62.2	62.2
	2 Male	153	37.1	37.8	100.0
	Total	405	98.3	100.0	
Missing	9 RF	7	1.7		
Total		412	100.0		

1.1.1.1.1.1.1.1.1

1.1.1.1.1.1.1.1.2 Table 2. Age Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Younger than 18	11	2.7	2.7	2.7
	2 18-24	32	7.8	7.8	10.4
	3 25-34	56	13.6	13.6	24.0
	4 35-44	92	22.3	22.3	46.4
	5 45-54	80	19.4	19.4	65.8
	6 55-64	74	18.0	18.0	83.7
	7 65 & over	67	16.3	16.3	100.0
	Total	412	100.0	100.0	

1.1.1.1.1.1.1.1.3 Table 3. Vehicle Available

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Yes	80	19.4	19.4	19.4
	2 No	332	80.6	80.6	100.0
	Total	412	100.0	100.0	

Table 4. Employment Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Employed full time	118	28.6	28.7	28.7
	2 Employed part time	91	22.1	22.1	50.9
	3 Unemployed	33	8.0	8.0	58.9
	4 Retired	50	12.1	12.2	71.0
	5 Student	18	4.4	4.4	75.4
	6 Homemaker	92	22.3	22.4	97.8
	97 other	9	2.2	2.2	100.0
	Total	411	99.8	100.0	
Missing	99 RF	1	.2		
Total		412	100.0		

1.1.1.1.1.1.1.1.4 Table 5. Primary Language

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ENGLISH	36	8.7	8.7	8.7
	SPANISH	376	91.3	91.3	100.0
	Total	412	100.0	100.0	

Table 6. Trip Origin

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Home	206	50.0	50.0	50.0
	2 Work	61	14.8	14.8	64.8
	3 School	10	2.4	2.4	67.2
	4 Personal business	126	30.6	30.6	97.8
	7 Other (specify)	7	1.7	1.7	99.5
	9 RF	2	.5	.5	100.0
	Total	412	100.0	100.0	

TABLE 7. DID YOU TRANSFER?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Yes	98	23.8	23.8	23.8
	2 No	314	76.2	76.2	100.0
	Total	412	100.0	100.0	

Table 8. Trip Destination

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Home	169	41.0	41.0	41.0
	2 Work	56	13.6	13.6	54.6
	3 School	5	1.2	1.2	55.8
	4 Personal business	181	43.9	43.9	99.8
	9 RF	1	.2	.2	100.0
	Total	412	100.0	100.0	

TABLE 9. WILL YOU TRANSFER?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 yes	7	1.7	1.7	1.7
	2 no	405	98.3	98.3	100.0
	Total	412	100.0	100.0	

1.1.1.1.1.1.1.1.5 Table 10. Number of buses taken

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	310	75.2	75.2	75.2
	2	99	24.0	24.0	99.3
	3	3	.7	.7	100.0
	Total	412	100.0	100.0	

TABLE 11. WHAT DO YOU LIKE

	Frequency	Percent
1 Non specific (everything, good service, fine the way it is,	126	30.6
2 Provides transportation (Gets me where I need to go, don't have alternative	21	5.1
3 General positive comment about drivers / staff	55	13.3
4 Drivers are patient	2	.5
5 Service is fast	6	1.5
6 Comfortable / Clean / Buses in good condition	47	11.4
7 Temperature of buses (AC / heater)	73	17.7
8 Safe	3	.7
9 Cost / value	24	5.8
10 Timeliness	16	3.9
11 Reliable / Consistent	3	.7
12 Schedule / Routes / Convenient / Efficient / Close to home,	16	3.9
13 Positive comment about Transit Center / stops	11	2.7
14 Negative comment (nothing, I have no choice, too expensive,	56	13.6
15 Other	10	2.4
Total	412	100.0

TABLE 12. WHAT DO YOU DISLIKE

	Frequency	Percent
1 Non-Specific (bad service, etc.)	3	.7
2 General negative comment about drivers / staff	37	9.0
3 Patience of drivers (pass by stops, don't wait, etc.)	8	1.9
4 Timeliness: late / early / deviation from schedule	63	15.3
5 Schedule / times / stops aren't convenient for them	16	3.9
6 Other Time Issues: Frequency of buses, length of wait, slow	76	18.4
7 Need more buses / new routes	14	3.4
8 Transit Center / stops / change machines	9	2.2
9 Condition of buses (dirty, break down, old, bugs)	45	10.9
10 Bus temperature complaints: A/C, etc.	71	17.2
11 Too expensive	10	2.4
12 Too crowded	6	1.5
13 Seats not available for handicapped / elderly	2	.5
14 Negative comment about other passengers	3	.7
15 Other	10	2.4
16 Positive comment (Nothing, everything is fine, etc.)	96	23.3
Total	412	100.0

TABLE 13. FREQUENCY OF EL METRO USE

	Frequency	Percent	Valid Percent	Cumulative Percent
1 7 days per week	59	14.3	14.3	14.3
2 6 days per week	31	7.5	7.5	21.8
3 5 days per week	105	25.5	25.5	47.3
4 2-4 days per week	146	35.4	35.4	82.8
5 1 day per week	33	8.0	8.0	90.8
6 Less than 1 day per week	31	7.5	7.5	98.3
9 RF	7	1.7	1.7	100.0
Total	412	100.0	100.0	

TABLE 14. IMPROVEMENTS / SUGGESTIONS

	Frequency	Percent
1 Non-Specific comment (fix all problems, etc.)	6	1.5
2 Drivers/staff : be courteous, helpful, patient / need to hire better	27	6.6
3 Timeliness: try not to be late / avoid deviations	52	12.6
4 Improve schedule (times, frequency, buses per route, new routes)	102	24.8
5 Lower cost	3	.7
6 Signage / information distribution	5	1.2
7 Improvements to Transit Center / change machines / ticket booth	11	2.7
8 Fix buses, clean buses, get newer buses	49	11.9
9 Need A/C, need to fix A/C	16	3.9
10 Fix seating, crowding, comfort issues	5	1.2
11 Other	12	2.9
12 Nothing / no suggestions	94	22.8
Total	412	100.0

Appendix B

2008 El Metro
Boarding and Alighting Survey

Prepared For:

The Laredo Metropolitan Planning Organization
1120 San Bernardo
Laredo, Texas 78041
Ph (956) 794-1612

August, 2008

GeoStats

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FIGURES AND TABLES

1. INTRODUCTION

This report describes system-wide boarding and alighting study of the El Metro transit system that GeoStats conducted for Parsons Brinckerhoff (PB) to support their work for the City of Laredo. GeoStats organized teleconference meeting with PB, City of Laredo and El Metro representatives in May 2008 to review the scope of work, the schedule, and the intended methodology for the study.

To conduct a system-wide boarding and alighting study for El Metro, GeoStats team used its RideCount™ system, which features software that runs on GPS-enabled handheld devices and an integrated data collection management and processing website.

Marcelo Oliveira served as the project manager for GeoStats to provide ongoing support, as well as to monitor study progress. Laura Howell served as the GeoStats field supervisor during the field deployment of the study in May and remote support to the field surveyors during the month of July.

2. SURVEY DESIGN AND TRAINING

Using information provided by El Metro, GeoStats developed a database of the scheduled trips and stops of the El Metro system. The stops database obtained with El Metro was processed and geocoded at GeoStats and associated with the developed schedule database. The stop database included 1013 unique stops, of which 937 were successfully geocoded. Figure 1 shows the geocoded stops loaded into the system.

Figure 3: Geocoded El Metro Bus Stops

To collect the boarding and alighting data for El Metro, the GeoStats team used their RideCount™ software application with GPS-enabled PocketPC device. This application was designed to collect accurate boarding and alighting counts, along with bus stop location and time details (provided by the GPS receiver in the iPAQ device). This system was used successfully in Louisville in 2004 (by TARC, the Transit Authority of River City), in Atlanta in 2005 (by GeoStats for the Cobb Community Transit System-wide Boarding and Alighting Study), in Fort Worth, TX in 2005 (by NCTCOG / The T) and (by Broward County Transit) in Ft Lauderdale, FL in 2006. For the El Metro Study, surveyors were provided by a Laredo Texas temporary staffing agency. Using the support databases and sample plan developed in Task 1, GeoStats configured its GeoStats' RideCount TM software for data collection. A total of 25 devices were mobilized for data collection in Laredo.

The surveyors were trained by GeoStats staff on the use of the RideCount™ system, as well as the overall methods for performing assignments. The first wave of training was conducted on May 13th, 2008 with data collection began the following day. A second phase of training was conducted on May 27th with data collection starting that day and continuing until all assignments were completed.

3. INSTRUMENTATION AND METHODOLOGY

RideCount™ supports the collection of time and number of passengers on board at the beginning and end of each trip, as well as the time and number of passengers boarding and/or alighting at each passenger stop. The methodology for this study involved providing iPAQ devices (see Figure 2) with RideCount™, along with an external power pack and an in-home charging station, to each surveyor.

Figure 4: HP IPAQ RX5915 Travel Companion GPS-Enabled Pocket PC Device

All iPAQs were properly initialized and configured before data collection started. Assignments were pre-loaded into the website and contained hyperlinks to generate printable copies of the assignment sheets. Assignment status was kept by the field supervisor through the use of the assignment page. Through this page, assignments can be given the following status: unassigned, assigned, complete, missed and un-surveyed.

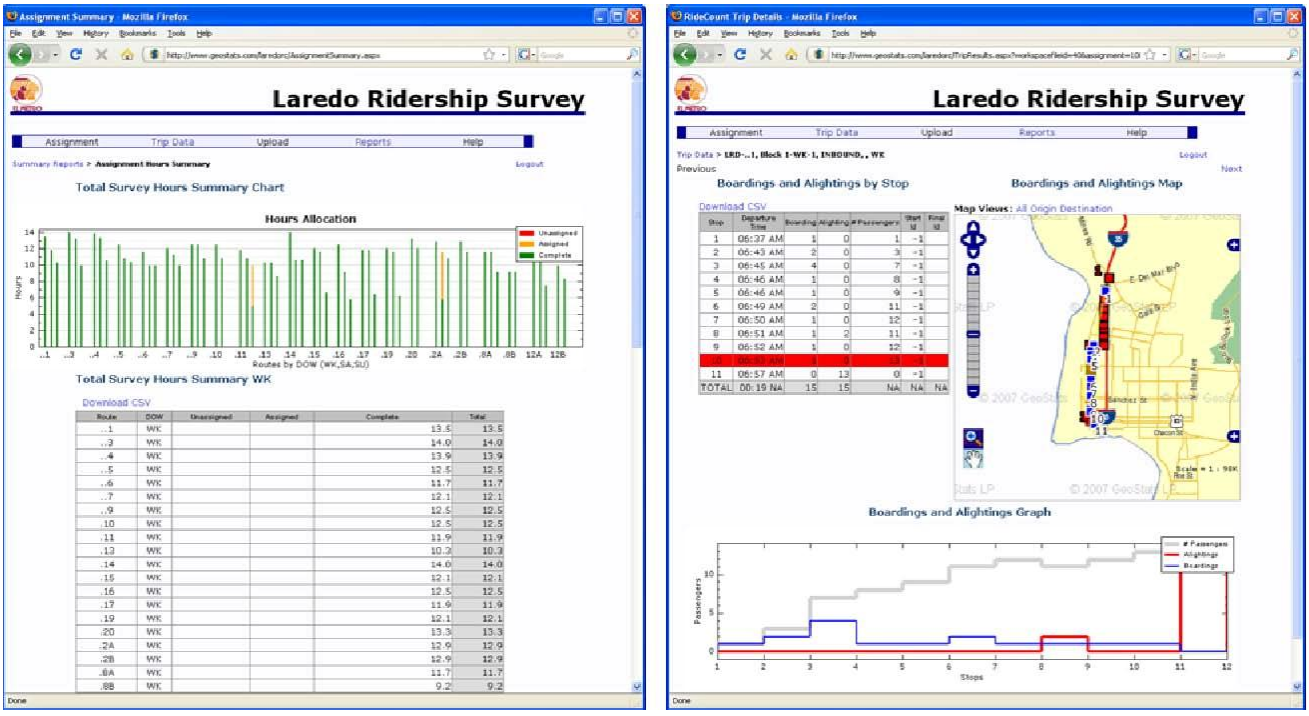
Each surveyor was instructed to charge both the iPAQ device each night, and to bring it to the El Metro survey office for data downloading and assignment check-in, as well as to pick up new assignments and fresh batteries. As the data was collected and delivered to the field supervisor, the data was briefly examined for completeness and accuracy- any problems with the data were addressed with the surveyors and noted in the assignment's comment section.

As data from each iPAQ was downloaded, it was posted to a database driven website accessible to the project team and client for continuous review (explained in more detail in the next section covering the reporting system). Files were immediately uploaded to the website with completion status of the assignments being tracked at the trip level to ensure the incomplete assignments were correctly reported and tracked within the system.

4. THE REPORTING SYSTEM

The project website allowed the team members to track data collection progress and review and summarize ridership data as it was collected, posted to the system, and audited. The RideCount™ Summary report allowed team members to view summarized collected assignments data (Figure 3) by route and day of the week (DOW).

Figure 5: SAMPLE RIDECOUNT™ Summary Reports



The website also provided access to trip and stop level ridership data through the Trip Data web pages, also displayed in Figure 3.

5. DATA COLLECTION

Data collection started in mid May 2008 and ended in mid July 2008. A total of approximately 31 different surveyors were used to collect data, with the average size of the data collection workforce being around 15. The system schedule was broken into 164 work assignments.

The system schedule database was used to create a sample plan for collecting ridership information. A total of 164 assignments were created, covering approximately 773 service hours split between Weekday, Saturday and Sunday according to Table 1.

Table 1: Number of Sample Hours by Day of the Week

Day of the Week	Approx. Sample Hours
Weekday	268
Saturday	246
Sunday	163
Total	**677**

The initial data collection plan developed determined that weekday data was to be collected in 5-10 days, with weekend data to be collected over two weekends.

Using the support databases and sample plan, GeoStats configured its GeoStats' RideCount software for data collection using GPS-equipped HP iPAQ devices. A total of 25 devices were mobilized for data collection in Laredo. GeoStats executed two waves of data collection, during which a full-time field manager was made available in Laredo, TX. Initial training took place in El Metro's offices on May 13th, with data collection starting in the afternoon. A second wave was started following the Memorial Day weekend, with training taking place on May 27th and data collection taking place in the following Saturday and Sunday.

After training a total of 31 different surveyors and collecting data for 15 non-contiguous days GeoStats has completed data collection for weekday service and has obtained Saturday and Sunday data over two weekends. Unfortunately, surveyor attrition, no-shows and other issues resulted in a number of incomplete weekend data collection assignments. In order to cover these service hours GeoStats left iPAQ devices in Laredo with three of the most reliable surveyors. Using these surveyors GeoStats completed weekend data collection over the months of June and July (skipping the July 4th holiday weekend).

Throughout the data collection process, the completion rate was tracked by the field manager through the assignment summary report. The assignment summary report lists hour totals based on the assignment trips set to complete in the assignments page, across the routes scheduled to be surveyed.

Completion percentages were computed by time against the total service hours scheduled to be surveyed by route. The field manager also tracked the assignments that were currently in the field through the outstanding assignments report.

During the initial weeks of data collection the field surveyors experienced problems with locating buses, bus maintenance issues, and bus schedules not matching assignment start times. As a result, some assignment's data was lost or missed and had to be recollected.

Missed assignments were constantly tracked and reasons for lost data noted in the comments section of the assignment page. Strategies to deal with transportation maintenance and operations issues as well as surveyor error were developed so that assignments were rescheduled and data was successfully collected for all of the assignments in the sample plan.

6. Data Coding, Processing and Analysis

Once data was posted by the field manager it was promptly reviewed by GeoStats' data auditors, and feedback information was provided to the field manager on the quality of the assignment. The items in this audit included: balancing passenger counts, zeroing out the passenger counts at the end of trips, and mapping the GPS data on a Geographic Information System (GIS) to ensure the validity of the trips. To balance passenger counts the calculated and observed values of passenger counts were compared against boarding and alighting totals.

In cases where the surveyor failed to terminate a trip at the correct location, more extensive editing of the RideCount™ records had to be performed, including the direction, pattern, start and end times, as well as the stop type field. GIS queries which related the imported RideCount™ data records with the system schedules and infrastructure database were used to facilitate this process. This visual review of the data also allowed GeoStats to catch some untruthful surveyors who did not complete their assignments.

A final automated process was then used to match the GPS-collected ridership back to the geocoded stop locations, computation of passenger miles and expansion of the sampled ridership to the scheduled El Metro service.

7. Data Summary

Approximately 694 hours of operation were surveyed with over 22,366 boarding passengers counted over all days of the week. Table 2 shows the total actual surveyed number of hours by day of the week.

Table 2: Number of Actual Surveyed Hours by Day of the Week

Day of the Week	Approx. Sample Hours
Weekday	276
Saturday	253
Sunday	165
Total	694

Figure 4 displays a map with all the GPS coordinates captured by the IPAQs as part of the ridership survey and Table 3 displays the sampled ridership totals by route and DOW.

Figure 6: Map of El Metro Area with Captured GPS Points Displayed

Table 3: Sampled Ridership by Route and Day of the Week (DOW)

	Day of the Week (DOW)			
Route	**Weekday**	**Saturday**	**Sunday**	**Total**
1	532	502	714	1748
3	517	355	213	1085
4	497	325	325	1147
5	276	239	171	686
6	566	403	310	1279
7	247	161	98	506
9	492	465	506	1463
10	364	280	279	923
11	287	244	179	710
13	452	119	227	798
14	251	201	412	864
15	221	260	129	610
16	316	306	71	693
17	513	430	129	1072
19	550	372	166	1088
20	525	476	0	1001
2A	773	894	643	2310
2B	567	409	0	976
8A	503	374	304	1181
8B	274	214	0	488
12A	494	366	167	1027
12B	474	277	0	751
Grand Total	**9691**	**7672**	**5043**	**22406**

8. DATA EXPANSION

Tabulations of the sample ridership data, such as the one shown in Table 3, provide results that represent the surveyed trips. However, for each route, this group represents a subset of the population of all trips available during a time period. To obtain estimates of the total ridership it is necessary to expand the usable numbers to reflect the actual full schedule of trips. Thus, expansion factors were calculated to adjust ridership figures by time of day (TOD) using the time period definitions in Table 4.

Table 4: TOD Periods Used for Expansion

TOD Definition	
AM	6:00 AM - 9:30 AM
Midday (MD)	9:30 AM - 3:00 PM
PM	3:00 PM - 6:00 PM
Evening (Eve)	6:00 PM - 10:00 PM

The expansion factors were defined as the ratio between the number of scheduled trips and the number of surveyed trips. Table 5 shows the computed expansion factors by

route, day of the week and time of day, blank cells denote combinations where either service is not available or data was not collected.

Table 5: Ridership Expansion Factors by Day of the Week and Time of Day

Route	Weekday				Saturday				Sunday			
	AM	MD	PM	Eve	AM	MD	PM	Eve	AM	MD	PM	Eve
1	2.33	3.25	3.00	2.33	2.80	4.33	3.00	2.33	1.00	1.75	2.00	2.00
3	2.00	2.33	2.00	2.00	2.50	2.00	2.67	2.50	1.00	1.00	1.00	2.00
4	1.67	2.00	2.00	1.80	2.00	2.00	2.50	1.80	1.00	1.00	1.00	1.00
5	1.00	1.67	1.00	1.00	1.17	1.25	1.00	1.20	1.00	1.00	1.00	1.00
6	2.60	1.40	1.86	1.00	1.40	1.11	1.17	1.00	1.00	1.00	1.00	1.00
7	1.00	1.38	1.00	1.00	1.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00
9	2.00	2.00	2.80	1.67	1.71	2.50	2.00	1.33	1.00	1.00	1.00	1.00
10	4.67	2.00	2.00	2.60	2.20	2.22	2.33	3.00	1.00	1.00	1.00	0.00
11	1.67	1.00	1.00	2.00	1.67	1.33	1.00	1.00	1.00	1.00	1.00	1.00
13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.00	1.00
14	1.00	1.00	1.00	1.00	1.25	1.40	1.00	1.67	1.00	1.40	1.00	1.00
15	1.75	1.11	2.33	1.00	1.17	1.11	1.00	1.00		1.00	1.00	1.00
16	3.00	0.92	1.00	1.00	2.25	1.10	1.17			1.00	1.00	1.00
17	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
19	1.75	1.00	1.00	1.67	1.75	1.00	1.00	1.67		1.00	1.40	2.00
20	1.50	1.00	1.00	1.00	1.00	1.33	1.00	1.00				
2A	2.00	2.00	2.00	1.60	2.29	2.50	2.00	1.33	1.00	1.67	1.00	1.00
2B	2.00	2.00	2.00	1.29	2.33	2.44	2.00	1.29				
8A	1.00	1.25	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.00
8B	1.00	1.11	1.00		1.00	1.00	1.00					
12A	1.80	1.20	1.71	2.00	1.80	1.33	2.40	1.00		1.00	1.40	0.00
12B	2.25	1.30	1.86	1.00	1.00	1.00	1.00					

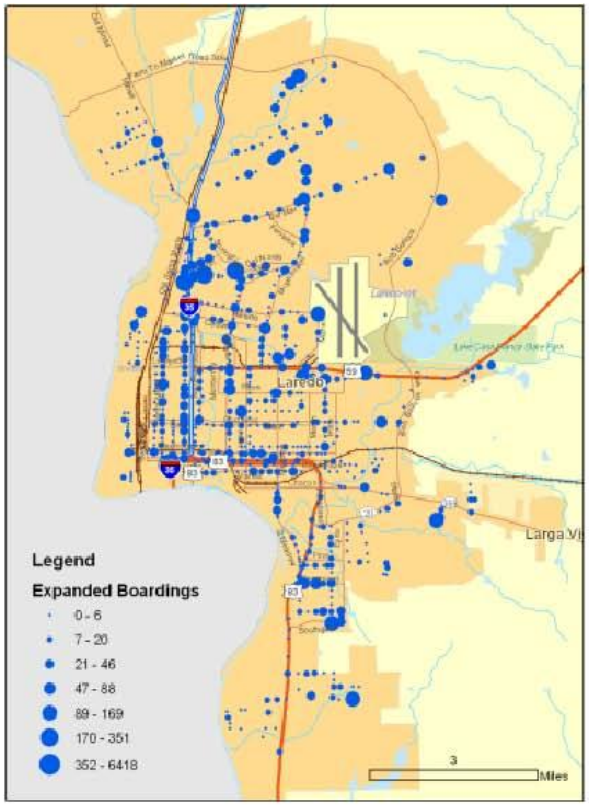
Using the expansion factors in Table 5, total system ridership can be estimated using the sample data. Table 6 shows total boarding totals by route and DOW.

Table 6: Expanded Ridership totals by Route and Day of the Week (DOW)

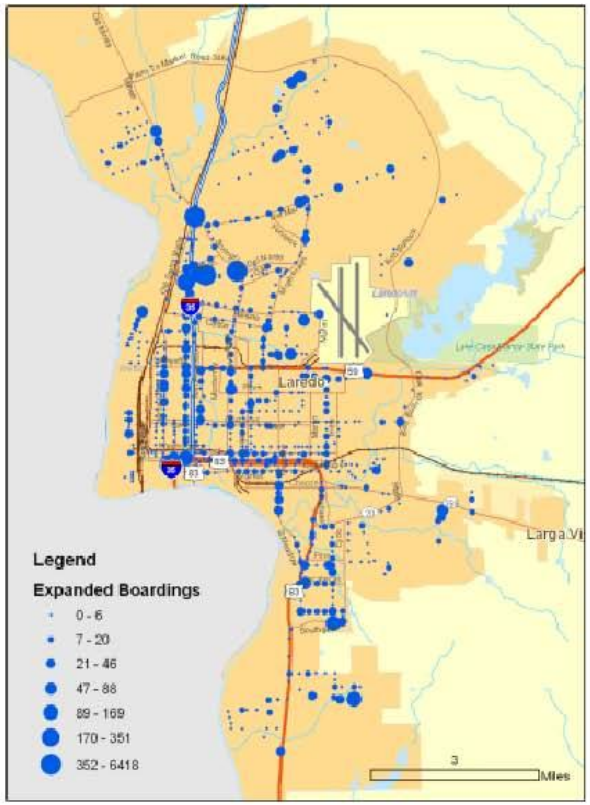
	Day of the Week (DOW)			
Route	**Weekday**	**Saturday**	**Sunday**	**Total**
1	1492	1710	1239	4441
3	1096	811	219	2126
4	933	667	325	1925
5	323	279	171	773
6	963	475	310	1748
7	282	175	98	555
9	1053	920	506	2479
10	899	640	279	1818
11	333	304	179	816
13	452	119	275	846
14	251	258	460	969
15	326	282	129	737
16	311	449	71	831
17	513	430	129	1072
19	681	439	206	1326
20	585	531	0	1116
2A	1517	1796	755	4068
2B	1099	916	0	2015
8A	547	374	331	1252
8B	283	214	0	497
12A	767	592	195	1554
12B	791	277	0	1068
Grand Total	**15497**	**12658**	**5877**	**34032**

An expanded version of Table 6 is included in the electronic data deliverable that accompanies this report. Figure 5 shows total expanded ridership by stop location using the database of geocoded stops where the stop symbols were drawn according to the total expanded boarding counts.

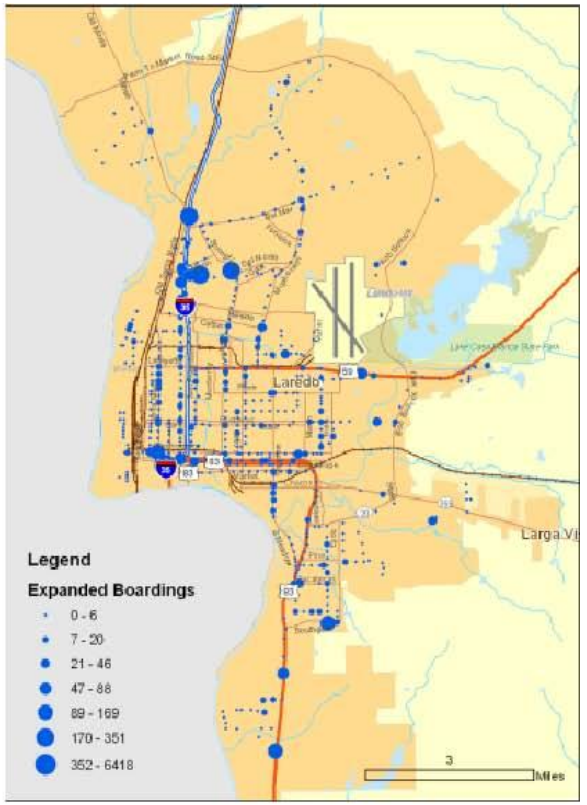
Figure 7: Map of El Metro Area with Captured GPS Points Displayed



Weekday



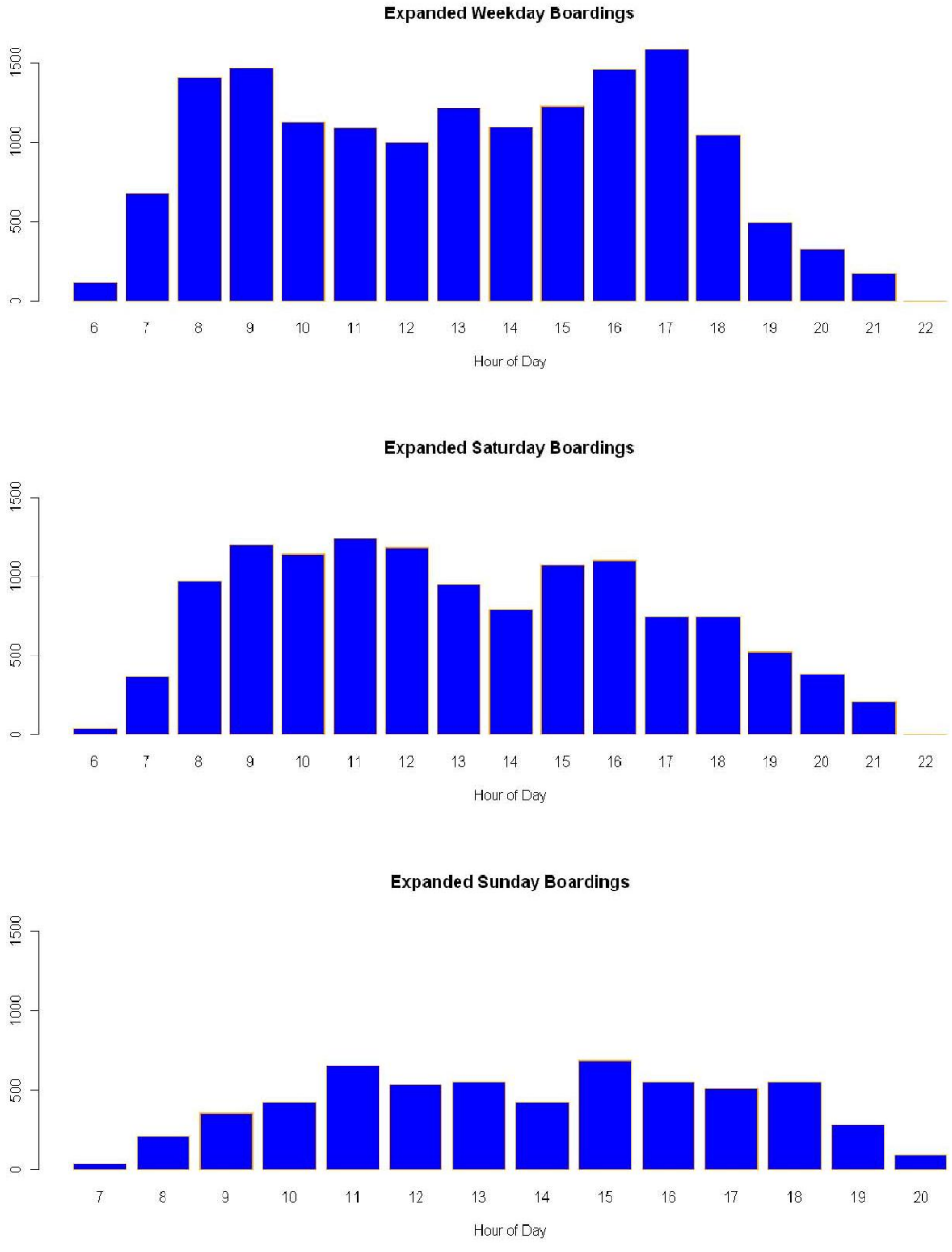
Saturday



Sunday

Figure 6 displays total expanded boarding counts by hour of day (HOD) for Weekday, Saturday and Sunday. It illustrated the presence of pronounced AM and PM peaks during weekdays and the fact that weekend ridership is more evenly distributed throughout the day and peaks later in the morning.

Figure 8: Boarding Totals by Time of Day and Day of the Week



9. RIDERSHIP AND STOP DATA DELIVERABLES

The data deliverables for this study include the complete database records developed from the collected ridership data as well as supporting and summary tables. The deliverable consists of a MS Excel Workbook containing the compiled transit system schedule, the used data collection assignments, the RideCount™ collected ridership data, the developed geocoded bus stops sequences, the factors computed to expand the sampled ridership data and a sample expanded ridership dataset by route, direction, TOD and DOW. A data dictionary of the tables in the delivered Excel Workbook is included in Appendix A.

DATA DICTIONARIES

Table A- 1: Schedule Data Dictionary

Field Name	Description
trip	Schedule trip identifier
route	Route label
direction	Trip direction label
dow	Day of the week label (WK = Weekday, SA = Saturday, SU = Sunday)
tod	Time of day label (see Table 4)
starttime	Trip start local time
endtime	Trip end local time
durationhours	Trip duration in hours
startlocation	Trip starting stop name
endlocation	Trip ending stop name

Table A- 2: Assignments Data Dictionary

Field Name	Description
assignment	Assignment number
triporder	Assignment trip order
trip	Schedule trip identifier
route	Route label
direction	Trip direction label
dow	Day of the week label (WK = Weekday, SA = Saturday, SU = Sunday)
tod	Time of day label (see Table 4)
starttime	Trip start local time
endtime	Trip end local time
durationhours	Trip duration in hours
startlocation	Trip starting stop name
endlocation	Trip ending stop name
countername	Counter name
assignmentdate	Date when data was collected
device	Device (iPAQ) identification number
comments	Comments from the field manager

Table A- 3: RIDECOUNT™ Data Dictionary

Field Name	Description
device	Device (iPAQ) identifier number
surveyorname	Surveyor Name (text entry)
starttime	Device time from assignment info screen
endtime	Device time from end of trip selection (last screen): defaults to <Null> if not laststop on trip
tod	Time of day label (see Table 4)
dow	Day of the week label (WK = Weekday, SA = Saturday, SU = Sunday)
assignment	Assignment data number
route	Route label
direction	Trip direction label
trip	Assignment screen, numeric entry
stop	Trip stop counter, origin starts as 1
boarding	Count of passengers boarding the bus at stop
alighting	Count of passengers leaving the bus at stop
passcount	In-vehicle passenger count
arrtime	Device time at stop arrival (user activated)
arrtimegps	GPS time (UTC) at stop arrival
longitude	GPS longitude at stop arrival (WGS84 decimal degrees)
latitude	GPS latitude at stop arrival (WGS84 decimal degrees)
deptime	Device time at stop departure (user activated)
stoporder	Bus stop sequence according to bus stop route stops database
geoid	Unique bus stop identification number
stoptype	1=Origin, 2=Intermediate, 3=Last Stop

Table A- 4: Route Stops Data Dictionary

Field Name	Description
route	Route label
direction	Trip direction label
stoporder	Position of stop along the sequence
stopname	Stop label displayed in the device
longitude	Longitude of the stop location (decimal degrees in WGS84)
latitude	Latitude of the stop location (decimal degrees in WGS84)
Unnumberedstopname	Stop label without the stop order number
distance	Distance in meters between the current and the previous stop
cumulative Distance	Cumulative distance in meters since the beginning of the route

Table A- 5: Expanded Ridership Data Dictionary

Field Name	Description
route	Route label
dow	Day of the week label (WK = Weekday, SA = Saturday, SU = Sunday)
tod	Time of day label (see Table 4)
nbtrips	Number of scheduled trips for the route for the DOW and TOD combination
nbsurveyed	Number of surveyed trips for the route for the DOW and TOD combination
exp_factor	Expansion factor (nbsurveyed / nbtrips)

ASSIGNMENT SHEET

LAREDO RC ASSIGNMENT

* 1 0 0 1 *

Assignment Number: 1001
Route: LRD-..1
Please Report to: 401 Scott St @ 5:35 AM

Returns to: Transit Center @ 9:25 AM

Counter: _____
Date: _____
Handheld: _____
Bus Number: _____

TRIP #	ROUTE	BLOCK	PATTERN	DIRECTION	START TIME	START LOCATION	END TIME	END LOCATION
1	LRD-..1	1-WK-1	1	INBOUND	6:25 AM	Terminal @Target	6:55 AM	Transit Center
2	LRD-..1	1-WK-1	1	OUTBOUND	7:00 AM	Transit Center	7:35 AM	Terminal @Target
3	LRD-..1	1-WK-1	1	INBOUND	7:40 AM	Terminal @Target	8:10 AM	Transit Center
4	LRD-..1	1-WK-1	1	OUTBOUND	8:15 AM	Transit Center	8:50 AM	Terminal @Target
5	LRD-..1	1-WK-1	1	INBOUND	8:55 AM	Terminal @Target	9:25 AM	Transit Center

Comments

	Yes	No			Yes	No		Yes	No	
A. Was entire assignment completed?	☐	☐	If No...	Vehicle Breakdown?	☐	☐	Surveyor Illness?	☐	☐	Other
B. Standing passengers on all or part of trip?	☐	☐								
C. Other										

Appendix C

Laredo Transit Development Plan

A Study Scope for Development of El Metro Route Restructuring Plans

Prepared For:

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September 2009

A Study Scope for Development of El Metro Route Restructuring Plans

Task 1 Analyze 2008 Boarding and Alighting Data

Using the expanded boarding and alighting survey data, estimate total weekday bus stop to bus stop passenger trip origin-destination matrices for each route. For routes 1, 2A, 14, and 16, estimate matrices for Saturday passenger trips as well. Compare the Saturday O-D patterns to the weekday O-D patterns; subsequently use only the weekday O-D patterns if they are not materially different from the Saturday patterns. Compress the bus stop to bus stop O-D data to the Laredo area Travel Analysis Zone (TAZ) level used by the TxDOT highway travel forecasting model.

Task 2 Analyze Laredo Area Total Person Trip Data

Using the TxDOT highway travel forecasting model data, Identify weekday O-D person trips at the TAZ level for 2008 or the nearest available year. (Estimate person trips from highway vehicle trips if that is the only data available).

Task 3 Assess Unmet Transit Passenger Trip Potential

Working with a current-level trip table representing Laredo area weekday person trips, compare total person trips with the transit person trips prepared in Task 1. Considering available zone-level car ownership or household income level data, identify TAZs and corresponding O-D patterns and volumes that constitute potential markets for increased use of transit.

Task 4 Describe Alternative Routes

Examine the Task 1 O-D and transit passenger flow data to determine where transit service capacities are most used and least used, and where substantial changes in passenger volumes on each route occur. Examine the O-D patterns and volumes developed in Task 3 to identify potential transit user trip patterns and determine how those patterns relate to the existing routes or would benefit more from connectivity not provided by the current El Metro route structure.

Based upon these findings, lay out one or more alternative route structures for testing. In this effort, include the short-term and major restructuring concepts described in the TDP, including the San Bernardo Linear Hub and other trunk-feeder and circuity-reduction concepts. Include the existing routes as one alternative. Describe each route in each alternative in terms of TAZs served, running times for each route link between adjacent TAZs served, and initial assessments of justifiable headways.

Task 5 Assess Performance of Alternative Routes

Separately for the existing ridership and the potential passenger markets, estimate passenger O-D travel times (weighted walk, wait, and ride times) for each alternative. Determine which passenger movements would incur less travel time or more travel time in each alternative. Construct a concept-level (sketch planning) mode choice assessment of the trips in the potential passenger market group, based on general understanding of transit-use propensity in the Laredo area and the known income and car ownership characteristics of the person trips being analyzed.

Also estimate bus fleet requirements and the operating and maintenance (O&M) cost of each alternative.

Compare the alternatives in terms of overall cost effectiveness, overall ridership served, and travel time gains or losses of current riders. Identify strengths and weaknesses of each alternative.

Task 6 Select Preferred Restructured Routes

Based on the results of Task 5, define a preferred route structure that conforms with targeted funding levels, produces beneficial results for current riders, and encourages the development of unserved passenger markets, especially in locations where the routes would have unused passenger capacity. Define the preferred route structure at the same level of detail as done in Task 4, and process the preferred network as in Task 5, to confirm fleet level, O&M cost, and performance estimates with regard to current and potential new riders.

Task 7 Prepare Restructured Route Implementation Plan

Obtain necessary approvals of the route restructuring plan. Drive each route and resolve any physical feasibility issues; select bus stop locations. Make final estimates of bus running times and select schedule time points. Prepare all materials for bus operations; prepare public bus route maps and timetables; prepare overall system route map.

Task 8 Prepare Public Information and Marketing Plan

Develop a detailed plan and materials to inform the public of the new route structure and timetables. Include particular attention to means of informing current riders in detail, to minimize confusion when the new route system is introduced. Prepare a marketing plan to attract potential riders to the new routes, explaining how the system will be of benefit, and how they can best determine how to make specific trips using the routes, schedules, and bus stops that will be available.


LAREDO URBAN TRANSPORTATION STUDY
metropolitan planning organization