

Implementation Plan for El Paso County Rural Transit System (Task Order #5)

Final Report

Prepared for

**El Paso County Planning & Development Department
Transportation, Planning, and Engineering Division**



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CHAPTER 1. INTRODUCTION

As part of the Section 5304 federal planning through the Texas Department of Transportation (TxDOT), El Paso County Transit (EPCT) requested that the Texas A&M Transportation Institute (TTI) provide technical assistance to develop an implementation plan for the entire EPCT bus route system based on the existing and planned service changes and improvements to public transportation services. This report presents an implementation plan for the EPCT system that aims to improve the transit passenger experience and mobility of all people in the region through detailed implementation guidelines and tools that can be directly applied to benefit the planning and operation process and overall transit service. Based on studies conducted prior to this project, EPCT staff adopted the selected service scenario that includes new fixed-route transit services with fixed bus stops, Americans with Disabilities Act (ADA) paratransit service, demand response services, revised configurations and schedules for existing routes, and the implementation of transit technology to improve on- and off-board travelers' experiences while enhancing the transit system operations.

The EPCT implementation plan consists of five tasks that aimed to provide El Paso County (EPC) authorities and staff with transit planning implementation tools to improve transit passenger experiences and the mobility of all people in the rural regions through detailed implementation guidelines that can be directly applied to benefit the overall transit system service in the El Paso area.

This report is organized according to those five tasks, which are presented in the remaining chapters, as follows:

- **Task 1. Scenario Reassessment and Phasing Timeline.** For this task, the TTI team reviewed the latest version of the EPCT system configuration and analyzed whether it is still viable as proposed, given recent and significant changes to EPC transit coverage area land uses, traffic patterns, and operating contexts. The task focused on existing Routes 10, 20, 30, 40, 50, and 84, as well as any service changes to those routes and additions of routes of similar service design and purpose (the most recent being Route 31). The reassessment excluded the Gold Route (an intercity bus route) and the existing vanpool program.
- **Task 2. Service Change Implementation Assessments and Checklist.** For this task, the team developed corridor-specific as well as general strategies to implement recommended fixed-route bus service improvements to the county transit network. These strategies covered concepts of operations, standard operating procedures (SOPs), responsibilities of various partners and stakeholders, an assessment of available resources and needed resources, marketing and education, ADA compliance, Title VI compliance, and a more detailed implementation timeline. During the entire project, the team assessed the implementation changes adopted by the EPCT staff and produced a checklist of the implementation elements at each stage level and route.
- **Task 3. Technology Enhancement Strategies.** For Task 3, researchers focused on technology application enhancements that benefit EPCT and county transit customers' experiences and operations. The benefits of investments in technology include improved operations management, customer information, and customer service. The potential enhancements are

suitable for EPCT Routes 10, 20, 30, 40, 50, and 84, as well as for any service changes to those routes and additions of routes of similar bus service design and purpose. No options were explored for the EPCT Gold Route and the existing Vanpool Program. Additionally, the TTI team included General Transit Feed Specification (GTFS) data sets (the benefits of which include making information about county transit service available through Google Transit and other web-based mapping and trip planning applications). The team also identified specific needs for the EPCT service system and the appropriate technology used to address those needs. Finally, the team evaluated the features and cost-effectiveness of candidate technology tools and developed implementation strategies and timelines.

- **Task 4. ADA Complementary Paratransit Implementation Plan.** This task summarized the TTI team's research and analysis for the completion of the ADA Complementary Paratransit Implementation Plan. The ADA mandates complementary paratransit services alongside fixed-route transit for disabled individuals that meets criteria for service days, area coverage, reservations, fares, trip purpose, and capacity. This chapter provides an overview of key aspects related to ADA paratransit services and some of the potential strategies for its implementation. Additionally, this chapter describes implementation strategies to meet ADA paratransit service planning unique needs for the El Paso County region's demographic characteristics.
- **Task 5. General Public Demand Response (GPDR) Implementation Strategies Research and Analysis.** The purpose of the GPDR implementation strategies task was to develop subarea-specific and general strategies to implement the recommended El Paso Area Transportation Services' (EPATS') GPDR service in the county. The task also involved compiling general strategies for implementation of the recommended GPDR service in the El Paso County and strategies for alternative GPDR service models (including microtransit), GPDR performance considerations, service planning guidelines, steps, standards, management models and scope-of-work (SOW) considerations, technology implementation considerations, marketing and partnerships, an EPATS' GPDR implementation timeline, an EPATS' GPDR service priorities and delivery strategy, and a GPDR implementation plan summary.

CHAPTER 2. SCENARIO REASSESSMENT AND PHASING TIMELINE

This chapter summarizes TTI data analysis and methods to develop Task 1 of the implementation plan: Scenario Reassessment and Phasing Timeline. The analysis described in further sections focuses on Routes 10, 20, 30, 40, 50, and 84 as well as on any service changes to those routes and additions of routes of similar service design and purpose (the most recent being Route 31).

In summary, Chapter 2 is divided into the following sections:

- **Scenario Reassessment.** The TTI team reviewed the latest version of the EPCT system configuration and analyzed whether it is still viable as proposed, given recent and significant changes to EPC transit coverage area land uses, traffic patterns, and operating contexts.
- **EPCT Service Update and Short-Term Improvements (2023–2025).** Based on preliminary results from the EPCT financial plan, the team summarized the current (fiscal year [FY] 2023) EPCT system configuration. All changes to service summarized in this section were assumed to be implemented as traditional, fixed-route county bus service and will not contain any flexible-route service.
- **ADA Complementary Paratransit Demand Estimation for 2022.** This section is key for the overall service plan. TTI reviewed several methods to estimate complementary paratransit ridership and selected the most suitable and low-cost methodology that can be adopted for EPCT staff for future demand projections.
- **Overall Phasing Plan and Timeline.** As a result of a workshop in January 2023, the study team developed an overall phasing plan and timeline for implementation of the preferred selected service based on a discussion with EPCT staff members and representatives from Sun Metro's Planning Department.

SCENARIO REASSESSMENT

Previous studies^{1,2,3} produced a set of selective service scenarios that resulted in recommended transit improvements consisting of new and/or realignment fixed-route bus lines, the introduction of flex-route service in selected corridors, and the introduction of GPDR service in some remote rural areas of the county. To develop the initial Task 1, the study team reassessed the recommended transit improvements in the latest version of the selected service scenario through an implementation plan workshop. This workshop was held at the TTI offices in El Paso with the assistance of the EPCT and Sun Metro planning staff on January 6, 2023. The purpose of the workshop was to ensure that all implementation recommendations were viable as proposed, given five recent and potential significant changes to area land uses, traffic patterns, and operating contexts. These five main changes affecting the selected scenario are as follows:

¹ El Paso County Regional Transit Institutional Options Feasibility Study (2018)

² Developing Guidelines and Best Practices for Bus Shelter Locations Along El Paso County Rural Transit Routes (2020)

³ Best Practices and Guidelines for El Paso County Rural Public Transportation to Identify Potential Stop Locations and Route Configurations (2021)

1. **Construction of an Amazon distribution center and surrounding transportation infrastructure.**

Comprised of a five-story facility of 625,000 square feet, the Amazon distribution center (ADC) is one of the largest facilities in the Paso Del Norte region. This distribution center opened in late 2021 and is located close to Eastlake Boulevard and the Interstate 10 (I-10) interchange. This massive economic driver on the east side of El Paso is part of the EPCT coverage area that was not considered in the first two initial phases of the EPCT study (2018–2021) and requires special attention since the facility will add a considerable number of trips and, consequently, will attract passenger ridership to the area requiring additional shelters/stops.

The team worked with EPCT planning staff to reconsider the extra ridership and transit facilities required for the upcoming demand. As a result, EPCT added a shelter at the entrance to ADC, and the route configuration (Route 31) was adapted to cover the ADC and the rapid development occurring around the area (see Figure 1, Figure 2, and Figure 3).



FIGURE 1. AMAZON DISTRIBUTION CENTER LOCATION 2022



FIGURE 2. AMAZON DISTRIBUTION CENTER AREA 2020



FIGURE 3. EPCT ROUTE 31 AT AMAZON DISTRIBUTION CENTER

2. **Rapid pace of new development activity in some rural parts of the county.** Rapid development in the rural areas of El Paso described below will also influence trip generation in the coming months:

- a. Eastlake, Horizon, and Darrington Corridors. According to 2022 data from the commercial real estate company Berkadia, new and proposed construction of multifamily projects in the rural areas of El Paso is around 1,100 units. This construction will also create a significant induced number of trips and new travel patterns (origin-destination [O-D] pairs). The Vision 2020 Comprehensive and Strategic Plan⁴ from the Town of Horizon City states that Horizon City should continue planning other means of transportation to provide greater localized mobility. Horizon City implemented bike routes along Horizon Boulevard, and the implementation was recently extended to other principal streets, such as Eastlake Boulevard, and, in the near future, will be extended to Darrington Road. Moreover, the access to this rapidly developing town is currently limited to two main corridors—Eastlake and Horizon Boulevards—with a recent delay increase at their main access point (I-10). This development is expected to produce an increase in transit travel time (Route 30, Route 31, and, at a lower rate, Route 84) that was not considered during the early phases of the EPCT route configurations scenarios. In early 2022, a test run was performed by EPCT and TTI staff. The expected delay increased around 35–40 percent of the originally set bus travel time in 2020. All these factors will need to be address during the scenario reassessment process.
- b. Montana Avenue Corridor. TxDOT has started Phase 1 of the US62/180 (Montana Avenue) Corridor improvements from west of Global Reach to east of FM 659 (Zaragoza Road). The proposed improvements include widening US 62/180 to a controlled access facility that consists of frontage roads, sidewalks, a bike lane, three main lanes in each direction between Global Reach and Loop 375, and two or three main lanes in each direction between Loop 375 and Zaragoza Road. The length of the proposed project is approximately 7.6 miles.⁵ Sun Metro recently opened the new Upper East Side Transit Center (UESTC) and Montana Brio on Edgemere Boulevard. The new center connects to the Five Points Transit Center in central El Paso and offers three new park and ride lots. Route 20 and the future Route 21 will be indirectly affected by Sun Metro’s recent opening of transit facilities, its Bus Rapid service and induced infrastructure, and the construction of the corridor improvements along Montana Avenue Corridor.
- c. Doniphan Drive Corridor Plan. According to TxDOT, El Paso District, plans to upgrade this important corridor began in 2016 and will be in the development phase through 2040.⁶ TxDOT’s plans include a 15-mile section of Doniphan Drive (State Highway 20) between the Texas/New Mexico state line and Racetrack Drive in El Paso. This corridor has connectivity with other studies and ongoing or recently completed study areas, such as:
 - i. The New Mexico-Chihuahua Border Master Plan. This plan was developed in 2021 by the New Mexico Department of Transportation in collaboration with the Federal Highway Administration. The plan proposes several improvements

⁴ Vision 2020: Comprehensive and Strategic Plan, 2020

⁵ US 62/180 Project—Phase 1. TxDOT, 2013.

⁶ Doniphan Drive Corridor Plan. TxDOT, 2017–2018

- that affect the connectivity between the Santa Teresa Port of Entry and the El Paso transportation arterials, including Doniphan Drive.
- ii. The Loop 375 Border Highway West Extension. This extension of Loop 375 Border Highway West from US 54 to Racetrack Drive included construction of a new four-lane controlled access toll facility that connects Loop 375 to US 85 (tolls are not being charged at this time).
 - iii. West Mesa Corridor Study. The study corridor spans approximately 9.8 miles, from Doniphan Drive (SH 20) to Texas Avenue (SH 20), and it was extended to include the City of El Paso segment of Mesa St. from Texas Avenue (SH 20) to Cesar Chavez Border Highway (Loop 375). The plan includes mobility aspects such as crash-prone locations and analysis, driver and pedestrian safety, signalization and signage, mass transit and bike route accommodation, forecast traffic and travel demand through 2040, access management, and design alternatives and improvement concepts.⁷
 - iv. Santa Teresa International Rail Study. This study evaluated the potential for a bi-national rail bypass west of the El Paso/Ciudad Juarez urban areas. This project will specifically affect traffic mobility at the Doniphan corridor railroad intersections and conflict areas.
 - v. Doniphan Drive (SH 20) Drainage Study. This study evaluated the right of way and hydrology and hydraulics analysis for several frequencies and developed mitigation measures for drainage and storm water management (currently under construction).

All the above-mentioned studies plus the new development at Enchanted Hills (Transmountain Drive and I-10) will indirectly affect transit mobility (demand/supply) along the Doniphan Drive (SH 20) Corridor and affect the current EPCT Route 10 and future Route 11.

3. **Status of the cities/municipalities within El Paso County that will act as funding partners in the county transit service: Vinton, San Elizario, and Horizon City.** The EPATS' Local Government Corporation (LGC) has been organized to encourage and assist local units of government to join and cooperate with one another to provide and deliver regional multimodal transportation solutions for the residents of the Greater El Paso community.⁸ The LGC is a partnership among the county, Horizon City, the City of San Elizario, and the Village of Vinton. The El Paso County bus service local-share current member allocation as of January 2022 includes El Paso County, Horizon City, San Elizario, and Village of Vinton. There have also been efforts by the EPATS' LGC board to include Anthony, Socorro, and Clint municipalities. According to information from EPCT and LGC members, the City of Socorro will join the LGC in April 2024. Efforts by the LGC board are ongoing to include the Anthony and Clint municipalities.
4. **Transit-oriented development (TOD) activity in Horizon City.** In the comprehensive and strategic plan for Horizon City,⁹ one of the scenarios incorporates TOD into the economic development and future land uses. This TOD scenario projected the highest amount of

⁷ Mesa Street—SH 20 Traffic Engineering and Planning Study. TxDOT, 2018

⁸ <https://www.epcounty.com/EPATS/>

⁹ Shaping Our Horizon 2030: A Comprehensive and Strategic Plan, 2020

residential housing, in various densities, while also providing a Town Center location on the northeast corner of the intersection at Horizon Boulevard and Darrington Road. This center will include a mixed-used development area with a high potential for transit trips (see Figure 4).

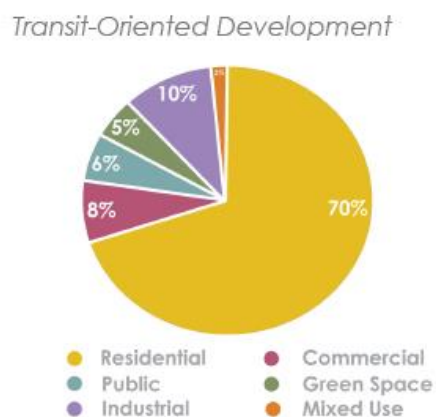


FIGURE 4. TRANSIT-ORIENTED DEVELOPMENT SCENARIO FOR THE CITY OF HORIZON

The TOD scenario will directly affect ridership patterns for Route 30 and Route 31 and will indirectly influence the GPDR services along the Darrington Road, Horizon Blvd., and Eastlake Blvd. corridors.

5. **The impacts of the COVID-19 pandemic on ridership patterns and general traffic (e.g., the effect of increased work-from-home activity on traffic congestion).** According to transit data collected from public transit agencies in April 2020, the ridership levels across all public transit modes have decreased by 73 percent in the United States.¹⁰ Some of the reasons for this drop were as follows:
 - The lockdown and stay-at-home orders abruptly cut bus trips.
 - Many businesses now allow their employees to work remotely, and many schools provide virtual learning options to their students.
 - The risk of COVID-19 transmission may be greater on public transit since it involves collectively moving a group of people in an enclosed space (bus).
 - A large part of the population shifted from public transit to passenger cars and other modes.
 - Nationwide safety protocols to prevent the spread of the coronavirus forced public transit agencies to reduce their service capacity.
 - Many transit agencies reduced their service hours/routes and kept essential functions only.
 - Capacity reduction was also affected by mandatory social distancing. Available seats on transit units were drastically reduced, which also dropped ridership.

The EPCT was no exception, and its ridership has reduced significantly since May 2020. This overall ridership reduction has not recovered to pre-COVID numbers, and it has affected EPCT O-

¹⁰ Transitapp, 2020 and EBP, 2021

D patterns, rendering them different from the travel patterns that were used to modify the route configuration and proposed stop locations. However, recent ridership number trends show a slight recovery (see Figure 5). The EPCT staff can update travel patterns and adjust the stop locations accordingly.

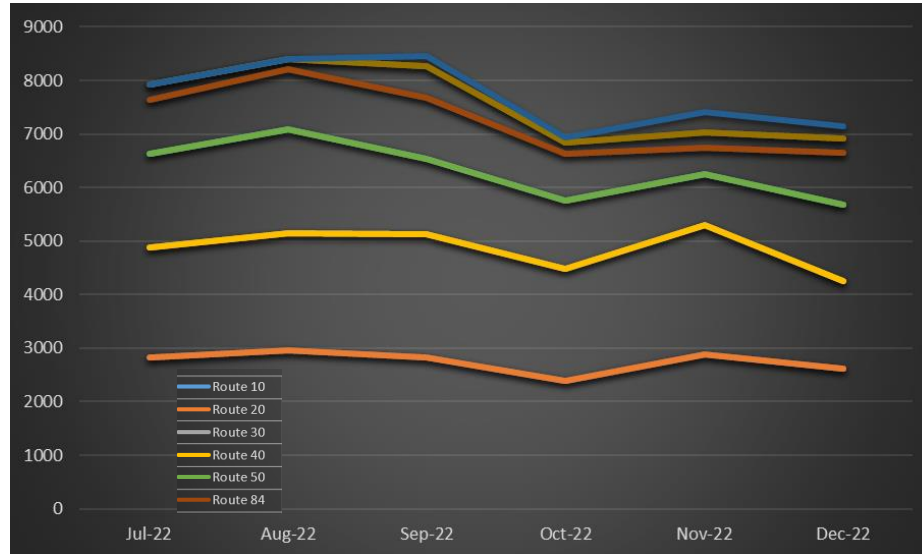


FIGURE 5. SIX-MONTH EPCT RIDERSHIP NUMBERS

**The vertical axis represents number of passengers. The horizontal axis represents time.*

CURRENT EPCT SERVICE AND SHORT-TERM IMPROVEMENTS (FY 2023)

Service changes in FY 2023 were implemented in four phases, as listed below. All services were implemented as traditional, fixed-route county bus service, and did not contain any flexible-route service, GPDR service, or ADA paratransit service.¹¹ Future service changes beyond FY 2023 will likely implement some or all of these additional services.

- Phase 1. Start of FY (October 1, 2022):
 - EPCT implemented Routes 30 and 31 on September 1, 2022, with proposed service levels, including Sunday service, on both routes. In November 2022, EPCT altered the level of service and alignment of Routes 30 and 31 due to concerns raised by the communities served by those routes.
 - Sunday service restarted on Route 50 (using its current alignment).
 - All other routes continued current service.
- Phase 2. January 9, 2023:
 - Route 20 was shortened to terminate at UESTC:
 - Weekday service span and headways remained the same, with two vehicles running.

¹¹ The Phase 1 and Phase 2 plans, created by TTI, all recommend the implementation of flexible-route service and of general-public dial-a-ride service, meeting EPCT's obligations under the ADA. The FY 2023 service changes do not include these service offerings; however, these services should be able to be implemented within the next 2 fiscal years.

- Due to low demand and having a shorter route, Saturday and Sunday service headways were increased from 50 minutes to 90 minutes, reducing the vehicle requirement to one vehicle.
- After receiving LGC approval in April 2023, Route 20 began starting from the Las Casitas stop instead of the UESTC.
- All other routes continued current service.

Based on EPATS' meetings, TTI removed from the FY 2023 service plan the proposal to realign Route 40 and to start the 40X, the implementation of Routes 10 and 11 (including Sunday service on both routes), and the proposed change in configuration for Route 84. Table 1 through Table 3 summarize the FY 2023 service schedules by route.

TABLE 1. FY 2023 WEEKDAY SERVICE SPAN

Route Information				Span			Approx. Headway (min.)		Approx. Cycle Time (min.)		Round Trips	Revenue Service Totals			Peak Vehicles
Route #	Scenario	Start Date	Effective Through	Start	Stop	Hours	Peak	Off-Peak	Peak	Off-Peak		Hours	Miles	Speed	
10	Current	10/1/22	7/30/23	5:42 AM	7:21 PM	13.7	43	91	86	91	13	18.9	422.5	22.4	2
20	Current	10/1/22	1/8/23	5:43 AM	8:06 PM	14.4	55	55	105	105	15	27.5	687.2	25.0	2
20	Truncated	1/9/23	9/30/23	5:45 AM	8:15 PM	14.5	50	50	94	85	17	28.3	540.6	19.1	2
30	Current	10/1/22	9/30/23	5:30 AM	7:00 PM	13.5	60	60	109	116	14	27.0	537.3	19.9	2
31	Current	10/1/22	9/30/23	5:30 AM	8:00 PM	14.5	60	60	113	113	15	29.0	540.9	18.7	2
40	Current	10/1/22	9/30/23	6:43 AM	6:16 PM	11.6	99	99	94	94	7	11.4	333.8	29.3	1
50	Current	10/1/22	9/30/23	8:00 AM	6:00 PM	10.0	60	60	115	115	10	20.0	199.1	10.0	2
84	Current	10/1/22	9/30/23	5:48 AM	7:17 PM	13.5	90	90	90	90	9	13.4	233.8	17.5	1

Note: Values in the table may be rounded. The data in the table contain a mix of finalized and illustrative service schedules. For all proposed services, the final *schedule* may be somewhat different than what is contained in this table. Changes may be necessary due to coordinating routes with other services, operational limitations, or other factors. The current Route 30 is only included for purposes of comparing the service with the new Route 30, which was implemented on October 1, 2022. The proposed Route 40 is included only for purposes of inclusion in future service plans.

TABLE 2. FY 2023 SATURDAY SERVICE PLAN

Route Information				Span			Approx. Headway (min.)		Approx. Cycle Time (min)	Round Trips	Revenue Service Totals			Peak Vehicles
Route #	Scenario	Start Date	Effective Through	Start	Stop	Hours	Peak	Off-Peak	All Day		Hours	Miles	Speed	
10	Current	10/1/22	7/30/23	5:42 AM	7:21 PM	13.7	43	91	91	13	18.9	422.5	22.4	2
20	Current	10/1/22	1/8/23	5:43 AM	8:06 PM	14.4	55	55	105	15	27.5	687.2	25.0	2
20	Truncated	1/9/23	9/30/23	7:45 AM	4:00 PM	8.3		90	82	6	8.3	174.9	21.2	1
30	Current	10/1/22	9/30/23	8:00 AM	5:00 PM	9.0	105	105	104	4	7.0	159.2	22.7	1
31	Current	10/1/22	9/30/23	8:00 AM	5:30 PM	9.5	120	120	116	5	9.0	167.9	18.7	1
40	Current	10/1/22	9/30/203	6:43 AM	6:16 PM	11.6	99	99	94	7	11.4	333.8	29.3	1
50	Current	10/1/22	9/30/23	10:00 AM	6:00 PM	8.0		60	115	8	16.0	159.2	10.0	2
84	Current	10/1/22	9/30/23	7:18 AM	7:17 PM	12.0	90	90	90	8	11.9	207.5	17.5	1

TABLE 3. FY 2023 SUNDAY SERVICE PLAN

Route Information				Span			Approx. Headway (min.)		Approx. Cycle Time	Round Trips	Revenue Service Totals			Peak Vehicles
Route #	Scenario	Start Date	Effective Through	Start	Stop	Hours	Peak	Off-Peak	All Day		Hours	Miles	Speed	
30	Current	10/1/22	9/30/23	8:00 AM	5:00 PM	9.0	105		104	4	7.0	159.2	22.7	1
31	Current	10/1/22	9/30/23	8:00 AM	5:30 PM	9.5	120		109	5	9.0	167.9	18.7	1
40	Current	10/1/22	9/30/23											
50	Current	10/1/22	9/30/23	10:00 AM	6:00 PM	8.0			115	8	16.0	159.2	10.0	2
84	Current	10/1/22	9/30/23											

Note: Values in table may be rounded. The data in the table contain a mix of finalized and illustrative service schedules. For all proposed services, the final schedule may be somewhat different than what is contained in this table. Changes may be necessary due to coordinating routes with other services, operational limitations, or other factors. The current Route 30 is included only for purposes of comparing the service with the new Route 30, which was implemented on October 1, 2022. The proposed Route 40 is included only for purposes of inclusion in future service plans. Empty cells indicate information not available.

ADA COMPLEMENTARY PARATRANSIT DEMAND ESTIMATION FOR 2023

METHODOLOGY

The ADA paratransit calculation method was determined after reading portions of *Improving ADA Complementary Paratransit Demand Estimation* from 2007, which was recommended by another TTI member. The authors of this report also developed a Microsoft Excel calculator/tool that can be used to calculate paratransit ridership given a certain set of inputs. Changing any of these values effects the overall estimation of the tool. The inputs required are as follows:

- Service area population—Population of the area according to the most recent estimates. American Community Survey (ACS) 2021 estimates were used.
- Base fare—The full cash amount for an ADA paratransit trip, which was determined to be \$3.
- Percent of applicants found conditionally eligible—still awaiting data.
- Conditional trip determination—Currently using trip-by-trip determination, or “1” in the calculator. The alternative is “0,” which is anything that is not a trip-by-trip system.
- Percent of individuals below the poverty line—Also comes from the ACS 2021 estimates.
- Effective on-time window—The total variation of pickup time before or after the last time that was given to the customer.

Although part of the data were gathered from ACS estimations, other information had to be collected through communication with Sun Metro (LIFT complementary paratransit services). The most time-consuming part was gathering all the data for this part of the project since using the calculator is quite simple, and several estimations can be generated in a brief period.

Although this tool is more than sufficient for the scope of the project, there are some limitations listed in the text below that are worth noting:

- The accuracy of the model—There is a degree of uncertainty within the tool based on the model itself and the age of the formulas used because it is several years old now. Despite this uncertainty, the tool remains more than sufficient for the scope of the project.
- Population in older age groups—Researchers found that the percentage of the population above age 65 or 75 did not significantly affect paratransit demand within the studied systems.
- Incidence of disability—Research found no statistically significant relationship between paratransit demand and census measures of the population with a disability.
- Availability of human service transportation—The more widely available human service transportation is, the less demand there is on paratransit services. Amistad and Viba are the two most popular providers in the El Paso County area.
- Availability and quality of accessible fixed-route transit—High levels of accessible transit service will reduce the demand for ADA paratransit. However, there was no statistically significant relationship between paratransit demand and availability of accessible transit or transit services overall.

- Ethnicity and language—It is possible that certain groups of individuals may use paratransit less than others.

Despite the drawbacks listed above, the tool is still the best and most accessible method of ascertaining ADA paratransit estimations at this time. Once all the data have been obtained, multiple instances of the calculator can be run to give the most accurate estimates.

RESULTS

Once all the information was collected, the team was able to make estimations based on several assumptions. The results were generated using population figures based on ACS 5-year estimates. The percentage of applicants for ADA eligibility was 94.3 percent because this percentage has been the predominant value in the El Paso region¹² throughout 2023 so far, and it is only 0.3 percent higher than 2022. Population percentage was calculated using the demographic data collected from the ACS estimates. The on-time window of 25 minutes was an estimation (Figure 6).

The impact of using a conditional determination system means that the predicted ridership decreases by approximately half, going from 27,940 to 14,412. Given that this system is new, and a conditional determination system has such a significant impact on ridership, the TTI team believes it is more realistic to use a nonconditional determination system to generate as much ridership as possible, at least during the early stages of the service.

TCRP Project B-28 Estimation Tool for ADA Complementary Paratransit Demand	
	Input Values
ADA service area population (2020 Census)	195,299
Base fare for ADA paratransit (Dollars)	\$3.00
Percent of applicants for ADA paratransit eligibility found conditionally eligible	94.3
Conditional trip determination	0
Percent of the population in the ADA service area in households with 2020 -2021 income below the poverty line	14.0
Effective on-time window for ADA paratransit (minutes)	25
	Results
Predicted Annual Ridership per Capita	0.14
Predicted Annual Ridership	27,940

FIGURE 6. EL PASO COUNTY TRANSIT COVERAGE AREA ADA RIDERSHIP ESTIMATION

Although estimations say the predicted ridership is 27,940, this figure was a peak service estimation because it will ramp up to that point in the future, not start at that point initially. Based on this estimate, the TTI team initially estimated four vehicles to adequately provide ADA service. In Chapter 5 the detailed estimates demonstrate that this number could be reduced to 3 vehicles. These vehicles will be split between the various service areas as well—one in the Westside Area (Routes 10/11), one in the eastern service area (Route 20/Montana Vista), and one more in the southern service area (Routes 30,

¹² Sun Metro LIFT Historical Data from El Paso, Texas, 2022 and 2023.

31, 40, 50, and 84/Mission Valley). Given how all the service areas are distinctly separated by the Sun Metro Coverage area, there are severe limitations on trips between EPCT service areas.

OVERALL PHASING PLAN AND TIMELINE

The study team has developed the overall phasing alternative plans (Plan A and Plan B) and their corresponding timelines for implementation. The timelines for both plans presented in this section allow for reassessments after each phase of implementation. These reassessments should include a check-in with the community to gauge public and stakeholder responses to the enhancements. The list below summarizes the key elements and overall outcomes discussed during the January 6, 2023, workshop:

- EPC's priorities are to implement (a) local fixed-route transit (FRT) service, (b) complementary ADA paratransit, and (c) general public demand responsive transportation (GPDRT) service. It was determined at the workshop that EPC was uninterested in pursuing flex-route transit at this time.
- ADA paratransit service must be provided as soon as possible, given that EPC is already providing FRT.
- While the long-term goal is to provide service countywide, with GPDRT being provided where and/or when FRT is not provided, EPC wishes to implement a first phase of GPDRT in the Montana Vista area at times when FRT is not being provided.
- Area-by-area expansion of GPDRT to countywide service can occur over time.
- At the workshop, the team proposed Plan A and Plan B as temporary solutions toward EPC meeting its ADA obligation as soon as possible (while also implementing off-peak GPDRT service in the Montana Vista area).
- The preferred plan (Plan A) is to provide ADA paratransit service and possibly also advance-reservation off-peak GPDRT in the Montana Vista area by contracting with Transdev via an amendment to the final year of First Transit's contract (covering calendar year [CY] 2024). Plan A assumes a turnkey contract, with First Transit providing all call and control center staff, scheduling software, and vehicles; service will commence in January 2024.
- The backup plan (Plan B) covers the circumstances if First Transit is not amenable to the Plan A contract amendment. In Plan B, EPC will contract with a vendor such as Via Mobility, Spare Labs, or RideCo to provide ADA paratransit and on-demand service.
- EPC is currently starting to develop a Request for Proposal (RFP) for CY 2025+ operations covering FRT, ADA paratransit service, and GPDRT service. TTI can provide a draft of a detailed procurement timeline to assist EPC in developing the RFP. TTI recommends that the RFP allow for flexible proposed solutions. For example, a proposer will be able to propose on (a) FRT only, (b) demand responsive transit only (to include ADA paratransit and GPDRT), or (c) both. During development of the RFP, EPC will determine what supporting assets (facilities, vehicles, and technologies) it will provide the contractor(s) versus what supporting assets will be provided by the contractor(s).

ADA paratransit service needs to be provided as soon as possible.

Coordination with Transdev about Plan A needs to happen as soon as possible.

- In negotiations for CY 2024 and the RFP for CY 2025 and beyond, options for GPDRT can include advance-reservation service (commonly called dial-a-ride service) versus on-demand service (which can include advance-reservation options). The two types of on-demand service for the general public include a shared-ride option (microtransit) and an exclusive ride option; the latter is often related to first-mile/last-mile service.
- On-demand service vendors currently operating in Texas include Via Mobility, Spare Labs, and RideCo; all three companies have experience operating ADA paratransit service. These three companies, as well as several others, also provide on-demand technology for transit agencies that wish to operate microtransit in-house with dedicated vehicles. It is in EPC's best interest to contact these on-demand vendors to set up a meet-and-greet wherein the vendors can provide (a) presentations about their capabilities, and (b) input on EPC's short- and long-term plans. (Contact information for these three vendors was provided to EPC on February 10.)
- Scheduling and dispatching for technology and staff via a call and control center are needed for ADA paratransit and GPDRT options. Call and control center functions include reservations, scheduling, dispatching, handling customers' service-day calls (e.g., expected time of arrival requests and Where's My Ride? calls), and customer service in general. Also, for app-based on-demand services, a call-in option is required for customers without access to smart phones and internet. As mentioned above, how much call and control center space required is to be determined. EPC is planning to build a transit operations facility starting in FY 2025, and this facility can include a call center.
- EPC should rely on a second contractor (e.g., MTM) to conduct eligibility determinations and handle customer complaints. MTM contact information was provided to EPC on February 10. Alternatively, EPC can conduct these activities in-house (with software provided by MTM).
- In the early years of ADA paratransit and GPDRT implementation, the contractor might rely on nondedicated vehicles or a mixture of dedicated and nondedicated vehicles until service demand manifests and it can be determined what approach is most cost-effective.
- With any demand responsive transit (DRT) service, service equivalence is mandated by the ADA. This mandate means that response time (in the case of on-demand trips) and on-time performance (in the case of trips reserved in advance) must be relatively equivalent for trips that require wheelchair-accessible vehicles (WAVs) and trips that do not.
- Sun Metro contracts with MV to operate The LIFT ADA paratransit service. MV operates the service out of Sun Metro facilities (bus yard and call center) using vehicles owned by Sun Metro. Sun Metro uses Via's software for GPDRT and is looking at using it to provide microtransit service. TTI will contact Sun Metro to get the RFP and contract used to procure MV for its ADA paratransit service.
- Sun Metro can provide a Federal Transit Administration (FTA) contact who has been helpful for Sun Metro in the past in the event an emergency procurement under Plan A or B is necessary.

EPC should set up meet-and-greets with on-demand service providers as soon as possible to learn more about their services and get their input on EPC's planned service improvements.

- EPC can choose, at its discretion, to provide ADA paratransit customers with service beyond the minimally required ¾-mile corridors and beyond the prescribed FRT service hours on the same service platform as its ADA paratransit service. A higher fare can be charged for this premium service. The number of such trips can also be limited.
- EPC expects to conduct route analyses and update routes every 3 years or so.
- TTI provided overviews of service models not included in the 2021 study. This information is available in the workshop presentation.
- Regarding technology to support transit service in the county:
 - Automatic vehicle location (AVL) will be more critical when operating DRT. This information is useful for users and operators. Tablets for drivers are recommended. System performance is easier to evaluate with AVL.
 - Security cameras are already installed in county buses, both inside and outside, and are geographic information system (GIS) stamped.
 - EPC is currently working on providing Wi-Fi service on buses.
 - In past surveys, users mentioned that there is no cell service along the Horizon City route.

FULL-SERVICE PLAN

This section discusses the EPCT service plan assumed to be in effect starting in FY 2025. These assumptions might be revised as part of the concurrent FY 2025 financial planning task.

COUNTY BUS

All FRT service recommendations from the 2021 plan are in place, with modifications as follows:

- Route 10 as recommended but no flex-route component; operates all week.
- Route 11 as recommended but no flex-route component; operates all week.
- Route 20 as recommended but terminating at UESTC; fixed route operates only during weekday peaks (GPDRT operates off-peak and on weekends).
- Route 21 as recommended but terminating at Far East Transfer Center; fixed route operates only during weekday peaks (GPDRT operates off-peak and on weekends).
- Route 30 as recommended but no flex-route component and no service east of Darrington Road during off-peak periods (locations east of Darrington Road to be served by GPDRT only during off-peak periods); operates all week.
- Route 31 as recommended but no flex-route component, no service east of Darrington during off-peak periods (locations east of Darrington Road to be served by GPDRT only during off-peak periods), and a permanent stop at EPCT; operates all week.
- Route 40 as recommended but no flex-route component; operates all week.
- Route 40X as recommended; operates during weekday peaks only.
- Route 50 as recommended but no flex-route component; operates all week.
- Route 84 as recommended but no flex-route component; operates all week.

The above service plan is summarized in Table 4 (weekdays) and Table 5 (Saturdays and Sundays).

TABLE 4. FULL-SERVICE PLAN—WEEKDAYS—FIXED ROUTES

Route Information		Span		
Route #	Scenario	Start	Stop	Hours
10	Proposed	5:30 AM	7:30 PM	14.0
11	Proposed	5:30 AM	7:30 PM	14.0
20 AM PK	Proposed Truncated*	5:45 AM	8:15 AM	2.5
20 PM PK	Proposed Truncated*	3:45 PM	6:45 PM	3.0
21 AM PK	Proposed Truncated*	5:30 AM	8:00 AM	2.5
21 PM PK	Proposed Truncated*	3:30 PM	6:30 PM	3.0
30	Proposed**	5:30 AM	7:00 PM	13.5
31	Proposed**	5:30 AM	8:00 PM	14.5
40	Proposed	5:30 AM	7:15 PM	13.8
40X AM	Proposed	5:30 AM	8:00 AM	2.5
40X PM	Proposed	3:30 PM	6:30 PM	3.0
50	Proposed	5:30 AM	7:30 PM	14.0
84	Proposed	5:30 AM	7:30 PM	14.0

Note: All proposed routes are fixed routes. Flex routes are no longer planned.

*Terminating at UESTC.

**Originally proposed alignment during off-peak periods (i.e., not going east of Darrington).

TABLE 5. FULL-SERVICE PLAN—WEEKEND—FIXED ROUTES

Route Information		Span		
Route #	Scenario	Start	Stop	Hours
10	Proposed	7:30 AM	4:30 PM	9.0
11	Proposed	7:30 AM	4:30 PM	9.0
20 AM PK	Proposed Truncated*	—	—	—
20 PM PK	Proposed Truncated*	—	—	—
21 AM PK	Proposed Truncated*	—	—	—
21 PM PK	Proposed Truncated*	—	—	—
30	Proposed**	8:00 AM	5:00 PM	9.0
31	Proposed**	8:00 AM	5:30 PM	9.5
40	Proposed	7:30 AM	4:30 PM	9.0
40X AM	Proposed	—	—	—
40X PM	Proposed	—	—	—
50	Proposed	7:30 AM	4:30 PM	9.0
84	Proposed	7:30 AM	4:30 PM	9.0

Note: All proposed routes are fixed routes. Flex routes are no longer planned. (—) indicates no weekend service.

*Terminating at UESTC.

**Originally proposed alignment (same as weekday off-peak periods).

DEMAND RESPONSE

ADA requirements are met in all FRT corridors using ADA paratransit or GPDRT.

GPDRT is provided countywide or in key areas beyond three-fourths of a mile of FRT service, depending on the capacity of the contractor. GPDRT can take the form of microtransit (same-day on-demand service) but should support advance reservations and provide WAVs when needed.

VANPOOL

Vamonos Vanpool service continues to operate in the region.

GOLD ROUTE

The Gold Route intercity bus service continues to operate in the region.

INTERIM SERVICE PLAN FOR CY2024

This section discusses the EPCT services that can be in operation in CY 2024 and CY 2025. Dates of milestones and processes are specified at a high level. Figure 7 and Figure 8 summarize two paths (Plan A and Plan B) for implementing EPCT services in CY 2024 and CY 2025. Figure 9 and Figure 10 provide an overall timeline for both paths.

The service plans in this section are presented for calendar years rather than fiscal years because operator contract years are calendar years. CY 2024 is First Transit's optional contract year. A contract amendment for CY 2024 is required to continue relying on First Transit to provide FRT service in the county and to add ADA paratransit service and GPDRT to First Transit's responsibilities (if First Transit is amenable to providing these services).

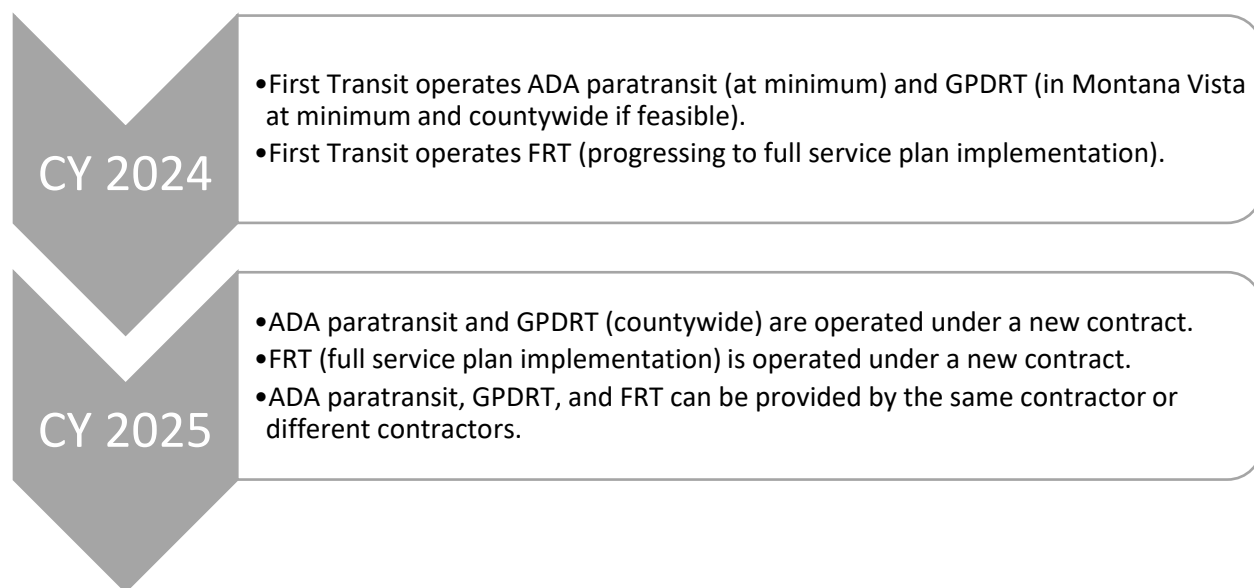


FIGURE 7. CY 2024 PLAN A SUMMARY

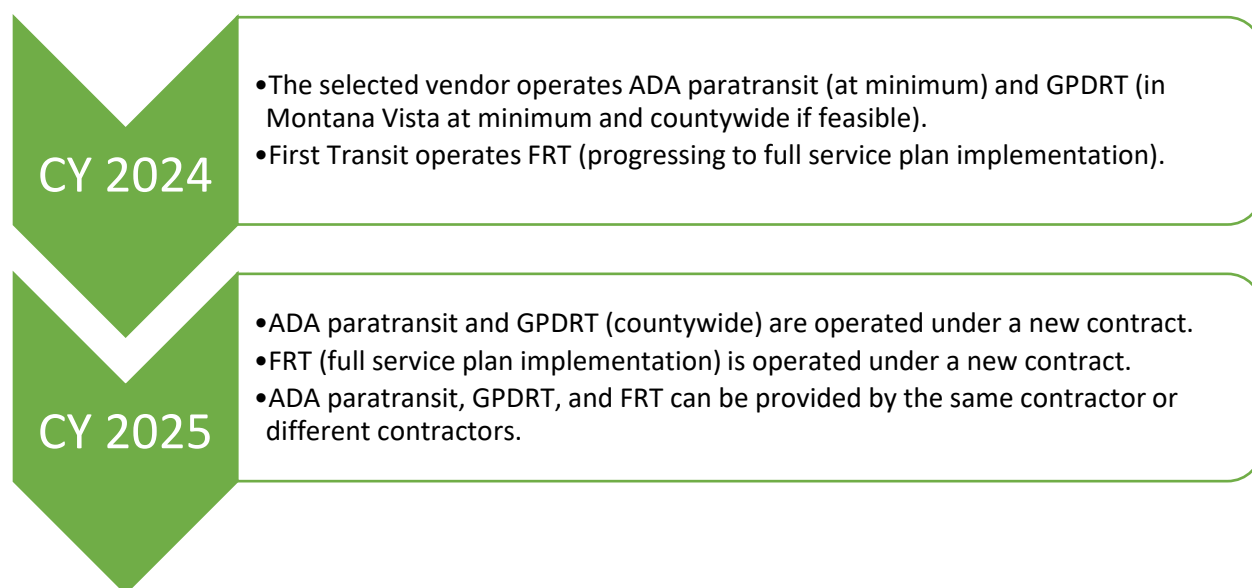


FIGURE 8. CY 2024 PLAN B SUMMARY

CY 2024—PLAN A

Plan A is the preferred option for CY 2024 because it is the simpler option and has fewer unknowns.

- *February 2023.* First Transit confirms interest in providing ADA and GPDRT service in CY 2024 (the contractor amendment year) and describes capabilities (e.g., providing ADA paratransit service only, providing GPDRT in key areas like Montana Vista, or providing countywide GPDRT). At minimum, ADA paratransit service must be provided in CY 2024 where required. The second priority is to provide GPDRT during off-peak periods in Montana Vista. First Transit will continue to provide FRT service in CY 2024, with previously determined service modifications.
- *March 2023.* First Transit provides rates for ADA paratransit service and GPDRT service.
- *March 2023–July 2023.* EPC and First Transit develop and sign a contract amendment for CY 2024 covering ADA paratransit, GPDRT, and FRT services.
- *July 2023–December 2023.* First Transit prepares to provide ADA paratransit and GPDRT service (e.g., hiring drivers, hiring a dispatcher, and adding vehicles if needed). Advance reservations should be allowed for both for ADA and GPDRT services. First Transit implements modified FRT services as previously determined.
- *January 2024–December 2024.* First Transit provides ADA paratransit, GPDRT, and FRT service.

CY 2024—PLAN B

- *February 2023.* First Transit confirms disinterest in providing ADA paratransit service and GPDRT service in CY 2024 (the contractor amendment year).
- *February 2023.* EPC contacts Via, Spare Labs, and RideCo¹³ for the following purposes:
 - To gauge these vendors' interest in providing ADA and GPDRT service in CY 2024 and discuss capabilities (e.g., providing ADA paratransit service only, providing GPDRT in key areas like

¹³ EPC could also contact MV, the operator of Sun Metro's ADA paratransit service. However, MV relies on vehicles and facilities owned by Sun Metro, so opportunities for MV to expand its capacity in the region are limited.

Montana Vista, or providing countywide GPDRT). At minimum, ADA paratransit service must be provided in CY 2024 where required. The second priority is to provide GPDRT during off-peak periods in Montana Vista. (First Transit will continue to provide FRT service in CY 2024, with previously determined service modifications.)

- To seek the vendors' input on EPC's planned service investments and learn about functions they can provide, rates, other costs, etc.
- *March 2023–July 2023.* EPC initiates an emergency procurement process and develops and signs a contract with either Via, Spare Labs, or RideCo. EPC and First Transit develop and sign a contract amendment for CY 2024 covering FRT service.
- *July 2023–December 2023.* The ADA/GPDRT contractor prepares to provide ADA paratransit service and GPDRT service (e.g., hiring drivers, hiring other essential staff, and procuring vehicles). Advance reservations should be allowed for both ADA and GPDRT services. First Transit implements modified FRT services as previously determined.
- *January 2024–December 2024.* The ADA/GPDRT contractor provides ADA paratransit and GPDRT services and First Transit provides FRT service.

CY 2025 AND BEYOND (PLAN A OR PLAN B)

- *July 2023–June 2024.* EPC develops and releases an RFP for operation of ADA paratransit, GPDRT, and FRT services starting January 2025. EPC selects and signs contracts with one or two contractors. If one contractor is selected, the contractor will operate ADA paratransit, GPDRT, and FRT services. If two contractors are selected, one will operate ADA paratransit and GPDRT services and one will operate FRT service. GPDRT should be provided countywide as soon as it is viable. Scaling up from GPDRT in key areas like Montana Vista to countywide GPDRT should be allowed to grow with demand over the contract period.
- *July 2024–December 2024.* The contractor(s) prepare to provide service.
- *January 2025–End of Contract Period.* The ADA/GPDRT contractor provides ADA paratransit service and GPDRT service. The FRT contractor provides FRT service as specified in the Full-Service Plan section above.

FY2023												FY2024												FY2025												FY2026
CY2023												CY2024												CY2025												
1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
Development of CY2024 First Transit contract amendment						First Transit ramp-up						First Transit operates ADA paratransit, GPDRT, and FRT												Contractor(s)operate ADA paratransit, GPDRT, and FRT												
Development of CY2025+ RFP						CY2025 RFP+ and procurement process												Contractor(s) ramp-up																		



First Transit confirms interest in operating ADA paratransit and GPDRT



First Transit provides rates for operating ADA paratransit and GPDRT

FIGURE 9. OVERALL SERVICE IMPLEMENTATION TIMELINE—PLAN A

FY2023												FY2024												FY2025												FY2026
CY2023												CY2024												CY2025												
1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
Development of CY2024 First Transit contract amendment and CY2024 contract with ADA/GPDRT vendor						Contractor ramp-up						Contractor operates ADA paratransit and GPDRT; First Transit operates FRT												Contractor(s)operate ADA paratransit, GPDRT, and FRT												
Development of CY2025+ RFP						CY2025+ RFP and procurement process												Contractor(s) ramp-up																		



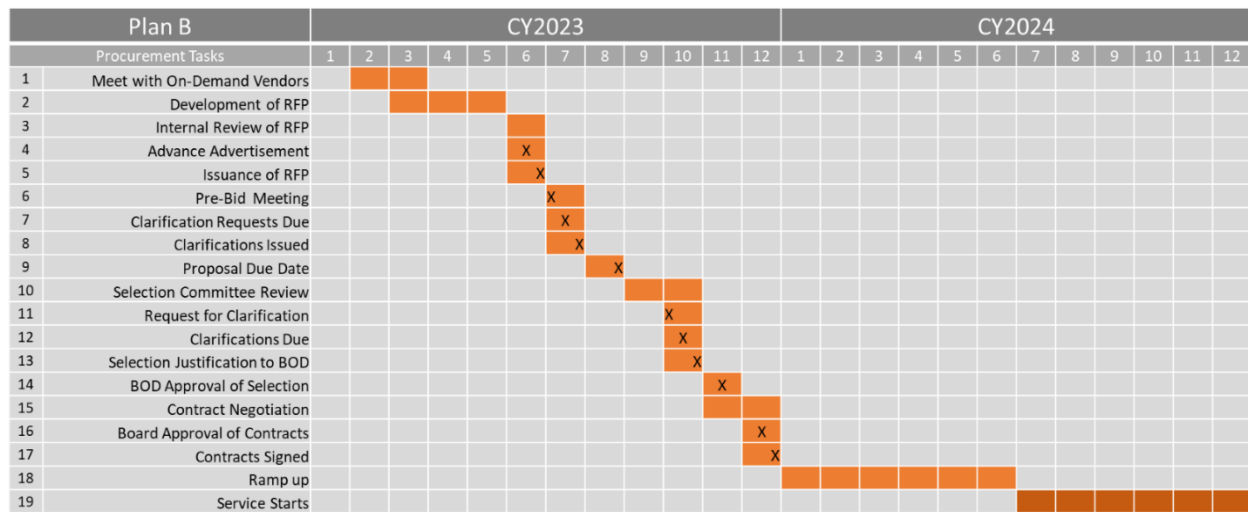
First Transit confirms disinterest in operating ADA paratransit and GPDRT

FIGURE 10. OVERALL SERVICE IMPLEMENTATION TIMELINE—PLAN B

The TTI team also proposed procurement plans for both alternatives. The procurement plans are detailed in Figure 11 and Figure 12.

Plan A		CY2023												CY2024												
Procurement Tasks		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1
1	General Negotiation with First Transit																									
2	Amendment Scope Development																									
3	Amendment Negotiation																									
4	BOD Approval of Amendment					X																				
5	Contract Signed						X																			
6	Ramp Up																									
7	Service Starts																									
8	Development/Refinement of RFP																									
9	Internal Review of RFP																									
10	Advance Advertisement												X													
11	Issuance of RFP												X													
12	Pre-Bid Meeting												X													
13	Clarification Requests Due												X													
14	Clarifications Issued												X													
15	Proposal Due Date													X												
16	Selection Committee Review														X											
17	Request for Clarification															X										
18	Clarifications Due																X									
19	Selection Justification to BOD																	X								
20	BOD Approval of Selection																		X							
21	Contract Negotiation																			X						
22	Board Approval of Contracts																				X					
23	Contracts Signed																					X				
24	Ramp Up																									
25	Service Starts																									

FIGURE 11. MORE DETAILED PROCUREMENT SCHEDULE—PLAN A



Note: Six months could be shaved off this schedule with an emergency (non-competitive) procurement.

FIGURE 12. MORE DETAILED PROCUREMENT SCHEDULE—PLAN B

CHAPTER 3. SERVICE CHANGE IMPLEMENTATION ASSESSMENTS AND CHECKLIST

This chapter focuses on major fixed-route service changes only. GPDR and ADA are not addressed. Minor route changes (e.g., Route 31 realignment at Amazon) are not addressed. Based on the findings from Chapter 2, the TTI team developed corridor-specific as well as general strategies for the implementation of the recommended fixed-route bus service improvements in the county transit network. These strategies covered concepts of operations, SOPs, responsibilities of various partners and stakeholders, an assessment of available resources (e.g., contractor capacity), an assessment of resources needed, marketing and education, ADA and Title VI compliance, and a more detailed implementation checklist. SOPs allowed for revision and improvement as successive corridor enhancements were implemented. Throughout the project, the team assessed the implementation changes adopted by the EPCT and produced a checklist of the implementation elements at each stage level and route. These implementation changes were fully coordinated with EPCT's opening plans for each individual route. Chapter sections describing these changes evaluations are presented as follows:

- The first section evaluates the implementation of changes in Routes 20 and 30 and the introduction of the new Route 31 into the EPCT system. The section also describes the immediate ridership impacts as well as the potential opportunities for improvements based on passengers' and bus operators' feedback.
- The second section describes the relevant best practices in the areas of the public and riders and describes community partners' participation and involvement regarding the potential implementation of changes in the EPCT system.
- The third section emphasizes the EPCT public participation process. The section describes strategies to ensure inclusive public engagement, such as selecting diverse meeting locations and convenient times to cater to minority and limited English-proficient (LEP) communities and collaborating with community organizations, education, and social media in various outreach efforts.
- The four section introduces a customized Excel template for implementing transportation routes, tailored to different stakeholders and markets. The template helps users create a timeline for outreach activities and allows for easy customization of lead times, activity descriptions, and status options.
- The fifth section summarizes the service changes that are currently pending, and summarizes the implementation process applicable to corridor-specific changes.
- The final section proposes an implementation SOP for all remaining new/modified routes. It also explores the corridor-specific implementation plans and the potential stakeholders and markets to be involved during the procedure.

EVALUATION OF ROUTES 20 AND 30, AND IMPLEMENTATION OF ROUTE 31

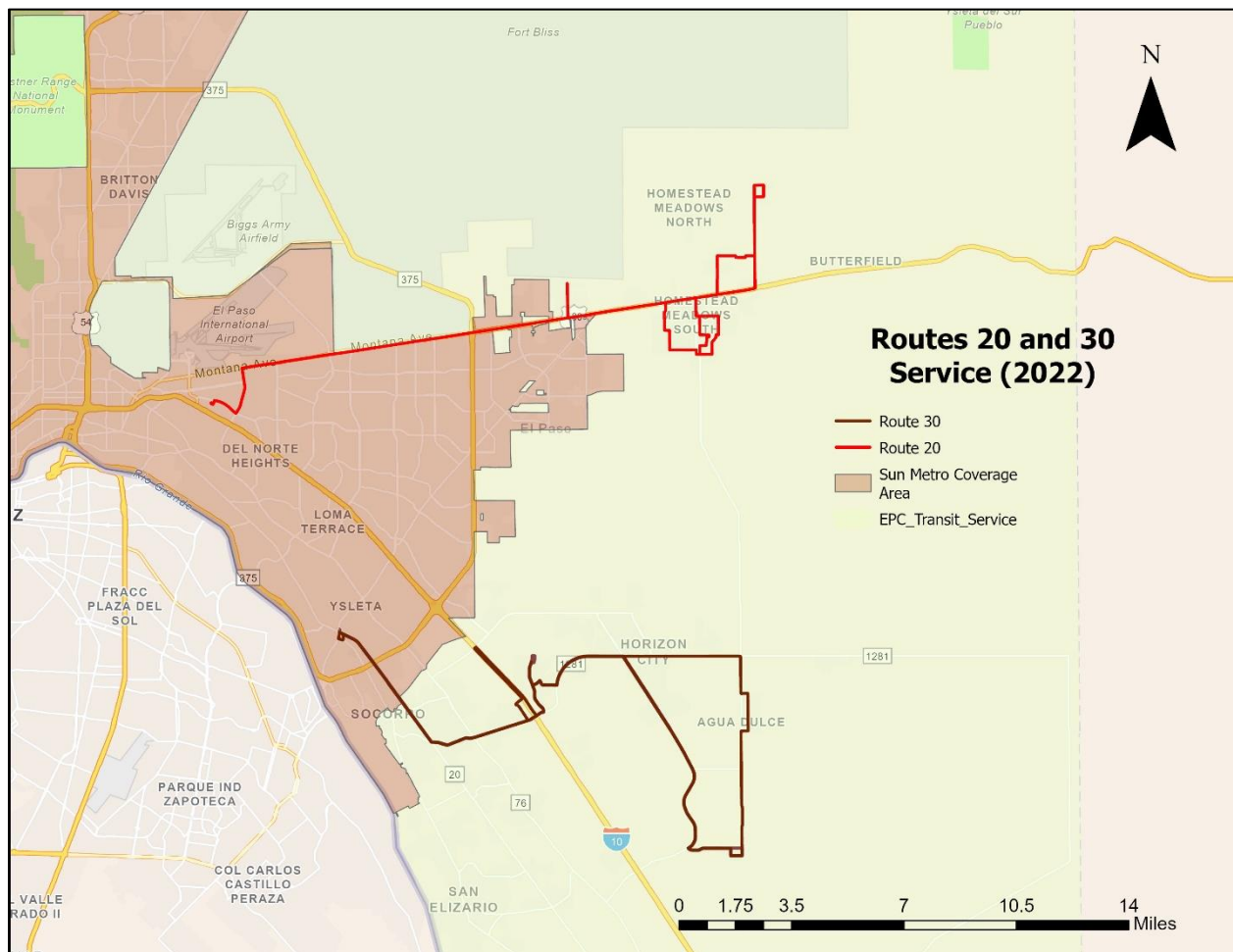
This section describes how changes to Routes 20 and 30 and the introduction of Route 31 were implemented and the impact of the changes. This section also identifies opportunities to improve the implementation process for future service changes.

SUMMARY OF SERVICE CHANGES

Table 6 summarizes the service changes that have been implemented to date. Figure 13 shows the alignments of Routes 20 and 30 before the service changes. Figure 14 shows the alignments of Routes 20, 30, and 31 after the service changes.

TABLE 6. SERVICE CHANGES IMPLEMENTED TO DATE

Service Change	Implementation Date
Route 20 truncation	1/9/23
Route 30 realignment	10/1/22
Route 31 implementation	10/1/22

**FIGURE 13. EPCT TRANSIT SERVICE PRIOR TO OCTOBER 2022**

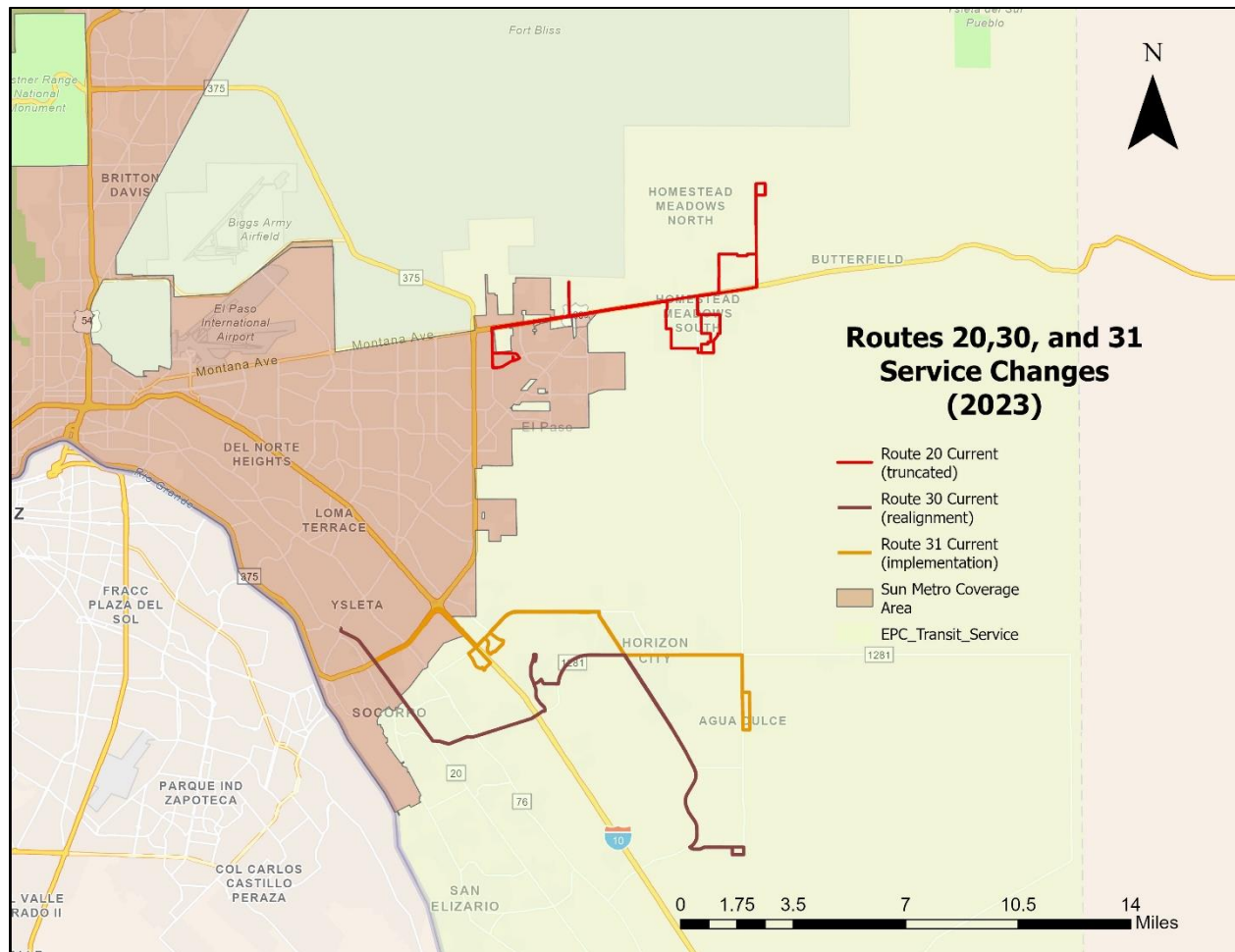


FIGURE 14. EPCT SERVICE AFTER JANUARY 2023

Route 20 was truncated when the Far East Transfer Center opened; the route now terminates at the Upper East Side Transfer Center instead of the Eastside Transfer Center. Route 30 was realigned due to the introduction of Route 31. Routes 30 and 31 currently follow interim alignments. When GPDR service is implemented, Routes 30 and 31 will be modified to follow their ultimate alignments (i.e., the alignments planned in the Phase 2 transit planning study¹⁴).

BEFORE-AND-AFTER ROUTE PERFORMANCE

RIDERSHIP

Ridership data for Routes 20, 30, and 31 are depicted in Figure 15. In this ridership comparison, the team avoided using atypical data from FY 2020, 2021, and 2022 caused by the public health emergency for COVID-19 declared in March 2020 by the U.S. Department of Health and Human Services. Figure 15 shows the comparison of official ridership data between FY 2019 (pre-pandemic conditions) and FY 2023 (post-pandemic conditions), when ridership started to recover to normal ridership conditions. The data were collected using the farebox counters (tickets) recently installed at the EPCT buses. Notice that

¹⁴ “Developing Guidelines and Best Practices for Bus Shelter Locations Along El Paso County Rural Transit Routes” (2020), and “Best Practices and Guidelines for El Paso County Rural Public Transportation to Identify Potential Stop Locations and Route Configurations” (2021).

Route 30 was split starting October 2022 into Routes 30 and 31, so no comparison was available for the new Route 31 from FY 2019. Overall, ridership in the El Paso County area has notably recovered, and data even show an increase for Route 30, going from an average of 1,551 riders in FY 2019 to 1,678 in FY 2023 and reaching a peak of 2,996 passengers during July 2023. If Route 31's ridership is added to Route 30, the average monthly number is 2,236 passengers, surpassing by almost 70 percent the before-implementation conditions. Although EPATS authorized a free-fare policy implementation effective on June 16, 2023, the average comparison before the free-fare implementation (June 2023) is notably higher than the pre-pandemic conditions. In summary, there is positive impact from the implementation of changes (route configurations) that the TTI team recommended in previous planning phases for the EPCT system. On the other hand, changes implemented for the Montana Avenue corridor were initially positive—with ups and downs—followed by a flat behavior (March–June 2023), and a notable decrease starting June 2023. In this specific case, the changes involved a cut of service due to the opening of the Far East Transfer Center, which caused commuting riders to pay an additional trip fee (\$1.50) to reach their preferred final destination (Eastside Transfer Center). The impact of changes in Route 20 can be considered neutral since the overall objective is to split Route 20 into Route 20 and Route 21 and thereby offer an advantage in travel time savings. The TTI team recommends monitoring ridership and comparing Route 20 numbers with those obtained when Route 21 is finally implemented.

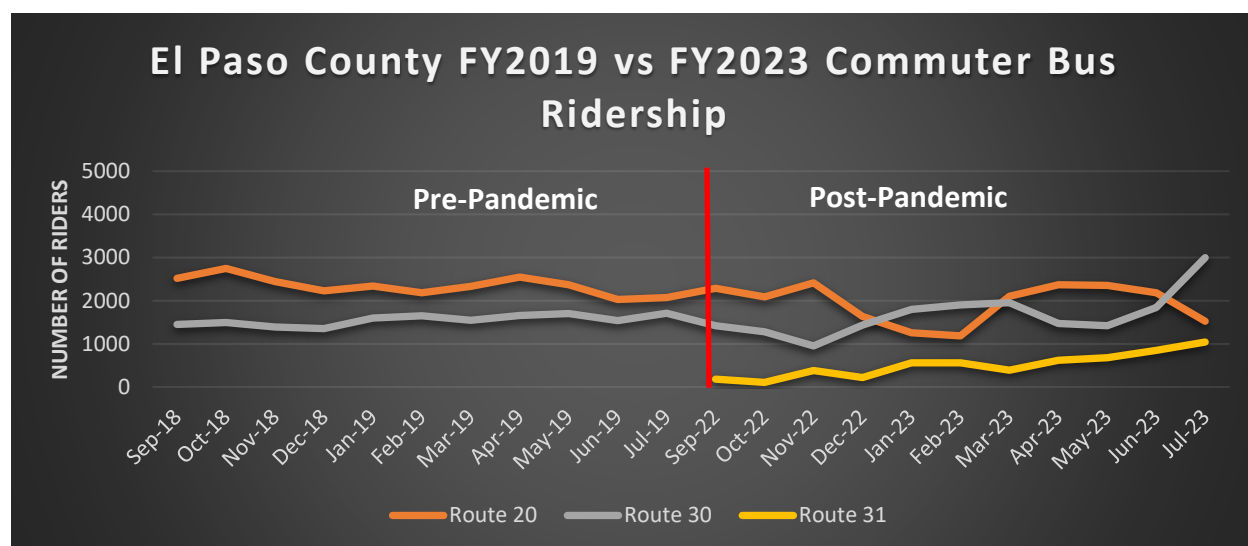


FIGURE 15. RIDERSHIP FOR ROUTES 20, 30, AND 31: FY 2019 VS. FY 2023 COMPARISON.

CUSTOMER SATISFACTION

Recorded feedback from riders, including both complaints and commendations, following the initial service changes introduced in October 2022 is currently unavailable. Nonetheless, EPCT staff have fielded a number of complaints via telephone. In light of this, the research team strongly advises that this valuable feedback be procured, thoroughly evaluated, and responded to or acknowledged as necessary for every route or service that has been altered.

Appendix A contains an alternative method of quantifying customer satisfaction. It is based on the *Transit Capacity & Quality of Service Manual* (TCQSM), 3rd Edition, which provides a transit quality of service

(QoS) framework based on customers' perception of service quality. Note: Since the QoS framework reflects customers' perception, it does not necessarily reflect what is what is efficient, cost-effective, equitable, or sustainable from the agency perspective.

The conclusion of the alternative methodology in Appendix A is that, after implementing Route 31 and the changes to Routes 20 and 30, service characteristics that speak to customers' perception of service quality either stayed the same or improved after the route changes were implemented—excluding passenger loads (though buses are likely not overcrowded) and on-time performance (which could be a significant factor and should be assessed).

RELIABILITY

EPCT's adopted service standards (see Appendix B) establish on-time performance of 95% or better as the reliability standard. No data are available to assess on-time performance before and after the Route 20, 30, and 31 changes implementation. The research team recommends collecting such data moving forward.

OTHER SERVICE STANDARDS

EPCT's other adopted service standards are presented in Appendix B. Appendix B (service standards) and Appendix C (service policies) are presented in their adopted form and with potential revisions for EPCT's consideration. The source of the information in these appendices is the adopted Title VI Plan (Revised October 2020). Data are not currently available for assessing passenger loads; the research team recommends collecting such data moving forward.

IMPLEMENTATION ACTIVITIES

TRANSDEV DISCUSSION

The TTI team set up a discussion with Transdev managers to review their experience with the implementation of the service changes. According to the responses gathered from the EPCT operating agency survey (First Transit/Transdev), it is evident that Transdev employed a proactive approach to communicate recent service changes on the EPCT Routes 30 and 31 to passengers. The primary method utilized for this purpose was the distribution of flyers. Moreover, the agency took the initiative to inform passengers several weeks in advance of the upcoming changes, ensuring that they had sufficient time to prepare for the adjustments.

In terms of the effectiveness of the communication methods employed, Transdev staff expressed confidence that these efforts were sufficient to help passengers understand the impact of the service changes. They reported being extremely confident that passengers were effectively informed before the changes were implemented. Interestingly, the agency noted minimal feedback from passengers, suggesting that the communication methods were perceived positively and resulted in a lack of substantial concerns or confusion among passengers.

Regarding the reasons for passengers' approval of the recent service changes in Route [30/31], the primary factor cited was the improvement in connectivity. Passengers appreciated the enhanced connectivity provided by the service changes, which likely contributed to their overall satisfaction.

However, it is worth noting that some passengers did express dissatisfaction with the service changes, particularly due to inconvenient schedules. This feedback highlights the importance of maintaining convenient and accessible scheduling when implementing service changes to ensure passenger satisfaction.

While the agency reported no formal assessment of the communication methods or implementation process after the changes were enacted, they did identify an area for potential improvement. Specifically, they mentioned a desire to enhance connections with Sun Metro (El Paso's urban transit service), indicating an intention to improve interagency coordination for future service changes. This suggests a proactive approach to addressing any remaining concerns and continuing to improve the transit experience for passengers in the future.

BUS OPERATOR DISCUSSION COVERED DURING ONBOARD SURVEYS AND MEETINGS

A questionnaire gathered insights from EPCT drivers regarding transit riders' concerns. Notable points include the ridership increase after implementing free fares from June 16, 2023, lower ridership on Route 31, and infrequent pickups at the Amazon Warehouse stop. COVID-19 led to reduced ridership on Route 40. More stops on Route 50 are desired for increased ridership. EPCT riders mainly use the service for work, shopping, and medical visits, with many seniors relying solely on this mode of transport.

Some interconnect trips with Sun Metro's routes are not fully synchronized causing excessive waiting times at transfer centers. Limited interconnectivity between EPCT buses forces transfers at Sun Metro centers. The most frequent complaints are about low bus frequency; higher frequency could boost ridership. Elderly passengers dislike walking to stops, a situation that is aggravated by unleashed dogs. A proposed solution is a shuttle to transport passengers to stops.

Debit card payments and daily/weekly passes are requested. Drivers advocate for free fares, acknowledging capacity concerns. Dangerous dog issues at several locations impact passenger safety, suggesting potential County involvement. The issue is recurrent and concerning for riders.

RIDER DISCUSSIONS COVERED DURING ONBOARD SURVEYS

The TTI team suggested conducting onboard discussions with riders to understand their perspective on the service changes. These discussions could be informal one-on-one conversations or completion of a short onboard survey. TTI completed an onboard questionnaire in June–July 2023. The results from these onboard surveys are summarized in the following section. Detailed responses are included in Appendix D of this tech report.

The onboard survey aimed to assess the effectiveness of the communication methods employed, gauge passenger awareness of the changes, and measure passenger opinions about the changes. The findings are derived from the responses of 23 participants who provided valuable insights into their experiences and preferences regarding the service changes. By delving into the survey data, the research team gained a deeper understanding of passengers' experience, highlighting key areas of success and opportunities for improvement. This analysis provided EPCT and other local transportation authorities with ideas for how to enhance communication strategies, optimize service adjustments, and better align service with passenger needs and expectations.

Question 1. How did you find out about [this route change/this new route]? Out of 23 respondents, 30.43 percent mentioned the bus driver as their source of information, while 21.74 percent stated that they found out through flyers. Additionally, 8.70 percent of respondents said they saw the information displayed at the transfer center, and the same percentage learned of the route change through the website. Interestingly, no respondents mentioned receiving information through mailers. Finally, 30.43 percent of respondents indicated “other” as their source of information.

Based on the survey results, it is evident that various channels were used by respondents to learn about the route change or new route. Bus drivers played a significant role in distributing this information, indicating their direct interaction with passengers is an effective communication channel. Flyers also proved to be an important source of information, while the transfer center and the website had moderate impacts. The absence of mailers as a mentioned source suggests that this mode of communication might not be effective for reaching this particular group. The “other” category underlines the diversity of information sources, which include word of mouth, asking other users, and hearing about the changes at a stop/station or when they boarded the route. Surprisingly, a few respondents mentioned discovering the changes by accident. Local organizations looking to inform the public about route changes should consider these findings to optimize their communication strategies for better outreach and effectiveness.

Question 2. How far in advance did you find out about it? Among the 23 respondents, 21.74 percent indicated that they found out weeks in advance, while only 8.70 percent mentioned receiving information days in advance. A significant majority of 69.57 percent of respondents reported that they received no advance notice of the change.

The survey results highlight a concerning trend in which a substantial portion of respondents, nearly 70 percent, stated that they were not provided with any advance notice about the route change or new route. This lack of advanced information could potentially lead to confusion, inconvenience, and dissatisfaction among passengers. The low percentage of respondents informed weeks or days in advance indicates room for improvement in communication strategies. To enhance the passenger experience and ensure a smooth transition to the new route, EPCT or other local agencies/organizations should focus on increasing the proportion of passengers who receive timely and sufficient advance notice. This process should involve utilizing multiple communication channels, such as digital platforms, flyers, announcements on buses, and more, to effectively disseminate information in a timely manner.

Question 3. Did you get enough information about [this route change/the new route] to understand its impact on your travel and help you get ready for the [route change/new route]? When asked whether they received enough information about the route change or new route to understand its impact on their travel and prepare for the change, 56.52 percent of respondents answered “yes,” while 43.48 percent answered “no.”

The survey findings reveal a mixed response regarding the adequacy of information provided to passengers regarding the route change or new route. Although slightly more than half of the respondents felt that they received enough information to comprehend the implications of the change

and adequately prepare for it, a significant minority did not share this feedback. This percentage suggests room for improvement in the communication strategy and content related to such changes. Addressing the needs of the passengers who did not feel adequately informed is crucial to ensure a smooth transition and minimize disruptions. EPCT staff should consider gathering feedback from passengers and identifying areas where more information is needed. By enhancing the clarity, accessibility, and comprehensiveness of information, they can increase the overall satisfaction and preparedness of passengers when faced with route changes or new routes.

Question 4. Do you believe you were effectively informed about the service changes before they were implemented? Among the respondents, 22.73 percent answered “definitely not,” 13.64 percent chose “probably not,” 4.55 percent were uncertain (“might or might not”), 27.27 percent believed they were “probably yes” effectively informed, and 31.82 percent were confident, answering “definitely yes.”

The survey results reflect varying levels of confidence among respondents regarding the effectiveness of the information provided about the service changes prior to their implementation. Although a notable portion expressed uncertainty or doubt, a substantial proportion also believed they were adequately informed. The higher percentages of “probably yes” and “definitely yes” responses indicate a positive perception among a combined 59.09 percent of respondents. However, it is important to address the concerns raised by those who felt inadequately informed. By analyzing feedback and understanding the reasons behind the “definitely not” and “probably not” responses, EPCT, LGC, and EPC municipalities can identify areas for improvement in their communication strategies. This process might involve using clearer language, providing more detailed information, using multiple communication channels, and ensuring that passengers feel confident in their understanding of upcoming service changes.

Question 5. Did you find the communication methods (to be informed about changes) employed by El Paso County Transit to be clear and sufficient? Based on the respondents’ feedback, 26.09 percent answered “definitely not,” 4.35 percent chose “probably not,” 8.70 percent were uncertain (“might or might not”), 17.39 percent believed the methods were “probably yes” clear and sufficient, and 43.48 percent were confident (“definitely yes”).

The survey results provide insight into how respondents perceived the communication methods used by EPCT to inform them about changes. A considerable percentage expressed positive views, with combined “probably yes” and “definitely yes” responses totaling 60.87 percent. However, there were still reservations among certain respondents, with “definitely not” and “probably not” responses making up 30.44 percent of the total. The high percentage of “definitely yes” responses suggests that a considerable portion of respondents found the communication methods employed by the transit service to be effective, clear, and sufficient. Nonetheless, the responses indicating uncertainty or dissatisfaction indicate that further efforts might be needed to ensure that all passengers receive clear and comprehensive information about changes. EPCT should use this feedback to evaluate its communication strategies and consider the needs and preferences of all passengers in order to enhance the overall clarity and effectiveness of its communication methods.

Question 6. Do you like the recent service changes in Route [30/31]? Among respondents, 60.87 percent answered “yes,” indicating that they liked the changes. Only 4.35 percent openly answered “no” and the 34.78 percent preferred not to agree or disagree. However, 34.78 percent provided qualitative responses (“why?”) explaining their opinions.

The majority of respondents expressed positive sentiment toward the recent service changes in Route 30 or 31, with 60.87 percent indicating that they liked the changes. This percentage suggests many passengers were satisfied with the configuration changes on the route. The low percentage of “no” responses may indicate that the changes were well received. The qualitative responses provided by 34.78 percent of respondents who explained their opinions offer valuable insights into the factors influencing passenger preferences. Analyzing these qualitative comments can help EPCT staff to understand the specific aspects of the changes that passengers appreciate and those that might be causing concerns. This feedback is crucial for making informed decisions about future changes and improvements to the route. It demonstrates the importance of not only collecting quantitative data but also qualitative insights to gain a comprehensive understanding of passenger preferences and experiences.

The provided “why?” answers clarified the reasons behind respondents’ opinions regarding the recent service changes in Route 30 or 31. Following is a breakdown of the reasons provided:

- **Faster:** Some respondents liked the changes because they perceived the route to be faster after the modifications. This view suggests that the alterations made to the route may have led to improvements in travel time.
- **Lack of Knowledge:** One respondent indicated not knowing what the changes were, which could suggest a communication gap wherein certain passengers were not adequately informed about the alterations.
- **Evening Service:** Some respondents mentioned the desire for more trips during the evening, suggesting that the availability of transportation during this time period was a key factor for them.
- **Increase in Trips:** Respondents requesting more trips indicated that the frequency of the service was a key consideration for them. This response underscores the importance of meeting the transportation needs of passengers throughout the day.
- **No Impact on Short Trips:** Some passengers noted that the changes did not affect their trips significantly, particularly if they had short journeys. This response indicates that the impact of the changes might be more pronounced for longer routes.
- **Stop Skipping:** One respondent expressed concern about the bus not stopping at designated stops. This response highlights an operational issue that needs to be addressed to ensure a seamless experience for passengers.

Question 7. Is there anything else you would like to share about your experience with El Paso County Transit? Additional comments provided by passengers offered further insights into their experiences and suggestions related to EPCT. Below is a summary of the key points raised:

- **Efficiency and Punctuality:** Some respondents praised the efficiency and punctuality of the service, indicating that the buses are often on time and the transit route is efficient.
- **Service Hour Expansion:** Several respondents suggested expanding service hours, particularly during evenings and during weekends. This suggestion highlights the desire for increased availability of transportation beyond regular hours.
- **Schedule Adherence:** One respondent noted concerns about schedule adherence, mentioning instances where the bus was late by around 15 minutes. This response highlights the importance of maintaining reliable schedules for passengers.
- **Positive Feedback:** A few respondents expressed overall satisfaction with the EPCT service, indicating that the EPCT service has their approval, and they are satisfied with the service provided.
- **Discount Information:** One respondent wanted more information about discounts, suggesting a need for improved communication regarding available fare reductions or promotional offers.
- **Accessibility for Seniors:** A respondent mentioned difficulty in accessing a particular stop, particularly for seniors. This comment highlights the importance of ensuring that stops are in convenient and accessible locations for all passengers.
- **Desire for Longer Trips:** Some respondents indicated a desire for longer trips that potentially connected to other transfer centers or reached different areas of the city.
- **Weekend Trips:** Several respondents expressed the need for more trips on Saturdays and Sundays, indicating a demand for increased weekend service frequency.
- **Favorable Service:** Some respondents provided positive comments about the service, describing it as efficient, particularly good, and satisfactory.
- **Impact of Changes:** One respondent stated that the recent changes did not affect their frequent trips, suggesting that some passengers did not experience significant disruptions due to the alterations.

These comments collectively highlight various aspects of passengers' experiences, including satisfaction with service quality, punctuality, accessibility, quality of service, and desires for service expansion and improvements. EPCT and other local transportation authorities can use this feedback to address specific issues, make informed decisions about service expansion, and enhance communication strategies to better meet the needs of passengers.

SOCIAL MEDIA AND NEWS REVIEW

To gain a comprehensive understanding of the impact of the service changes, an extensive review of social media accounts was conducted. The investigation encompassed EPCT, EPC, and various community partners, each offering unique insights. El Paso County's Facebook page was explored, with a particular focus on the December 2022-January 2023 community meetings, yet transit-related discussions proved ineffective, even after examining as far back as September 1, 2022. EPCT's Facebook account, on the other hand, returned several relevant posts, the details of which are captured in Appendices E and F.

The El Paso Metropolitan Planning Organization (MPO) Facebook page, Homestead Meadows, and Horizon City revealed no substantive mentions of the transit service changes, with the latter solely

featuring notices about Transit-Oriented Development architectural guidelines. EPCC's Facebook account mirrored this trend, showing no discernible references to transit.

This detailed analysis of social media channels unveiled a patchwork of feedback and information, presenting a broader picture of how the service changes were perceived and discussed within the community.

LESSONS LEARNED

Based on all the activities described in the previous sections (Marketing Preparation, Transdev Discussion, Bus Operator Discussions, Rider Discussions, Community Partner Discussions, and Social Media & News Review), a list of recommendations and lessons regarding the recent service changes in Routes 20, 30, and 31 are summarized below.

EPCT STAFF DISCUSSION

- A comprehensive change implementation evaluation involving staff and the fleet operator (Transdev) is crucial.
- Gather key staff at all levels feedback and address their concerns.
- Evaluate operational impacts, customer feedback, service performance metrics, cost analysis, community impact, scheduling, coordination, employee training and support, and communication strategy.
- Consider the impact on the local community.

MARKETING PREPARATION

- Effective marketing can boost ridership and community support, especially for new routes.
- Partnerships with community organizations should be strengthened through marketing efforts.
- Address awareness, misconceptions, target audience, and timing of marketing efforts.
- Evaluate the response to marketing strategies and assess the involvement and effectiveness of community partners.

TRANSDEV FEEDBACK

- According to Transdev, they distributed flyers well in advance. However, passengers' complaints about connectivity issues and cuts in service were received immediately after the changes' implementation.
- Passengers approved of the changes, particularly improvements in connectivity before the changes. However, some passengers expressed concerns about inconvenient schedules after the changes.

SUGGESTIONS FROM BUS OPERATOR DISCUSSION

- Gather feedback from EPCT drivers before implementing any changes. Bus operators seem to understand riders' concerns.
- EPCT staff should consider expanding service hours, addressing schedule adherence, and improving system interconnectivity.

- EPCT should implement solutions to address issues like low bus frequency and passenger safety concerns.

RIDER DISCUSSIONS

- Conduct regular on-board surveys to understand passenger perspectives on service changes.
- Improve advance notice of changes to passengers.
- Ensure clarity and sufficiency of information provided.
- Analyze qualitative feedback from passengers on their preferences and concerns.
- Address efficiency, punctuality, and the availability of service during evenings and on weekends.

COMMUNITY PARTNER DISCUSSIONS

- Engage with community partners to understand the perspectives of both riders and non-riders.
- Consider implementing surveys for rural riders to gather regular feedback (similar feedback from discussions with riders).
- Collaborate with organizations like Sun Metro and the City of El Paso Citizen Committees to gain insights into the transit needs of the region.

SOCIAL MEDIA & NEWS REVIEW

- Review social media channels for insights into public perception of service changes.
- Consider the patchwork of feedback and information gathered from social media platforms.
- Encourage partner involvement on social media and expand outreach to more partners for increased engagement and visibility.
- TTI concluded that the social media presence outside of EPCT is minimal with minimal partner engagement in terms of posts, likes, and shares. EPCT staff and partner agencies should include media presence and strategies weeks before the changes are implemented.

In summary, the above sections aim to provide a comprehensive view of the service changes' impact on EPCT and its ridership. The recommendations emphasize the importance of effective communication, involving staff and operators, addressing passenger concerns, and improving service quality (e.g., expanding service hours to meet the diverse needs of the community). Additionally, the use of surveys, feedback loops, and collaboration with community partners and organizations can help EPCT make informed decisions and improvements in the future.

The following section explores a comprehensive set of best implementation practices. The section covers real-world examples, expert advice, and proven strategies for the successful execution of transit implementation changes focusing on rural transit practices.

RELEVANT BEST PRACTICES

Most free-fare transit agencies primarily serve smaller communities, often where transit agencies have low farebox recovery ratios. These agencies are more likely to implement free-fare transit, often incentivized by funding sources that reward them for operating in this manner. Furthermore, free-fare transit can serve as a valuable competitive asset for resort communities, enhancing the overall user experience. Implementing free-fare transit generally results in a significant increase in ridership, typically

ranging from 20% to 60%, although it can lead to an increased presence of disruptive passengers, as fare disputes with operators are eliminated. While there are evident benefits, there can also be new or increased costs associated with free-fare transit, and approximately 5% to 30% of new free-fare transit trips come from individuals switching from other motorized modes. Nonetheless, free-fare transit often becomes a point of community pride, contributing to more accessible and sustainable transportation options in the communities it serves¹⁵.

EPCT should strongly consider implementing free-fare programs as a strategic initiative. Temporary free-fare periods can be a particularly effective promotional strategy for several compelling reasons. Free-fare periods offer an excellent opportunity to attract new riders by eliminating the initial financial barrier to using public transportation. In EPC communities where the transit system is seeking to increase ridership, this approach can act as a powerful incentive to encourage more residents to experience the benefits of public transit. Furthermore, temporary free-fare periods can create a sense of goodwill and community engagement, fostering a positive perception of EPCT. By providing this promotional offer, EPCT can induce the rural population to explore the convenience and environmental advantages of transit, ultimately leading to increased ridership and a stronger, more sustainable transit system in El Paso County. EPCT has implemented free-fare periods in previous years obtaining a significant increase in ridership. TTI suggests analyzing the increase in ridership by route to avoid bus capacity concerns (crowded buses) by planning the correct adjustments in the vehicle fleet by route in future free-fare implementation programs.

The EPCT agency is currently facing a challenge with its official website, which has not seen recent updates to adequately address the informational needs of its passengers. This situation raises concerns as passengers may not have access to essential information, such as fare-free periods, discounts and fare policy, transfers, the agency's vision and objectives, county maps, service hours, and other vital details such as the mandatory GTFS files now required by the Federal Transit Administration (FTA). The absence of this crucial information can create inconvenience for passengers and may also limit transparency and effective communication between the agency and its ridership. In the interest of ensuring a smooth and well-informed transit experience for passengers, the TTI team suggests that the agency consider a prompt renovation and enhancement of its website. This would facilitate easier access to essential information and help promote a better understanding of the agency's services and objectives among its valued passengers. Since 2011, the National Rural Transit Assistance Program (RTAP) has offered a tool called Website Builder that provides transit agencies with the invaluable opportunity to build and design websites hosted on the National RTAP server completely free of charge. In a recent development, the National RTAP has introduced Website Builder 3.0, drawing from valuable customer feedback, and using the latest technology to simplify the process of creating, editing, and launching websites. This upgraded version boasts an array of impressive product features, including modern transit templates, a user-friendly drag-and-drop editor, the flexibility to edit across various devices, mobile editing capabilities, multilingual support with availability in over 55 languages, and optimization for improved search engine visibility.

¹⁵ National Academies of Sciences, Engineering, and Medicine. 2023. Fare-Free Transit Evaluation Framework. Washington, DC: The National Academies Press. <https://doi.org/10.17226/26732>.

These enhancements could be an excellent option for EPCT staff to effortlessly build and maintain their websites while staying at the forefront of technological advancements in web design and accessibility¹⁶.

ENGAGE THE PUBLIC

Publicize the upcoming service changes. This can occur via EPC and community websites, TV and radio ads, press releases, social media, and distribution of brochures or flyers (on board buses, via mailouts, and via conversations with partners). Appendix G contains guidance for maximizing the impact of social media posts.

Make sure that engagement with seniors and persons with disabilities occurs early and frequently. Identify community events throughout the implementation period at which EPC staff, EPATS member staff, or community representatives (who might be volunteers) could staff a table for the purposes of providing information and answering questions.

Consider launching in advance of each route implementation or change a small ad campaign within EPCT's social media platforms. A small Facebook ad, for example, could include an eye-catching image, a carefully crafted text blurb, and a link to more information, and the ad could be shown to Facebook users who have indicated that they reside in El Paso County. In TTI's experience, an effective ad campaign of this scale could cost \$50-\$100 to run.

Identify a GoLive date for each service change and use it in advance marketing. This can create a sense of urgency to increase community engagement.

Consider handing out free ride tickets in advance of each service change (via drivers or at transfer centers and other key locations).

Be prepared to explain the benefits of the service changes. Some agencies have been able to address individuals' concerns about specific changes by focusing on systemwide benefits. Publicize future Dial-A-Ride (DAR) service to further address individuals' concerns.

On the GoLive date for each service change and for a week afterwards, stage EPC staff, EPATS member staff, or community representatives at transfer centers and other key locations as part of an "on-site team" to assist riders with timing, connections, and service concerns. For at least the first 90 days after GoLive, continue public and stakeholder engagement activities. Get feedback on the service changes via onboard surveys, intercept surveys at bus stops, discussions with bus drivers, phone, social media, and EPC and partner web sites; acknowledge the feedback; and address the concerns with either service modifications or clear explanations.

ENGAGE BUS DRIVERS

Engage bus drivers early so that they are able to provide advance information about service changes to current riders (thus supporting engagement efforts). Coordinate with bus drivers to (a) provide input on new routes, schedules, and stops as they are being developed, (b) coordinate testing of new routes, and

¹⁶ <https://www.nationalrtap.org/Technology-Tools/Website-Builder>

(c) coordinate the provision of information to and review of input from riders during and after implementation of service changes.

ENGAGE COMMUNITY PARTNERS

Engage community partners continuously during the implementation process. Update them at key stages in the implementation process. Consider taking community leaders on a tour of the existing bus service to illustrate where improvements are needed.

COMMUNITY PARTNER DISCUSSIONS

Set up discussions with community partners (particularly those who are EPATS members or could speak on behalf of non-riders) to understand their perspectives and the perspectives of their clients, constituents, customers, etc. on the service changes. Other local organizations such as Sun Metro, El Paso Metropolitan Planning Organization, the City of El Paso Citizen Committees, etc. can provide valuable information in terms of perspectives of transit and non-transit users in the region.

Implementing surveys for rural riders can be a valuable practice for improving transit services. One effective approach is to mail out a monthly survey card with a small set of questions to randomly selected riders. These surveys can provide not only crucial information about ridership but also regular feedback, making it particularly suitable for demand response services. The convenience of pre-paid postage ensures a higher response rate. This method not only keeps you updated on ridership trends but also minimizes the staff workload, making it a practical and efficient way to gather essential data and enhance the quality of rural transit services.

EPCT STAFF DISCUSSION

In the aftermath of the significant service changes introduced in October 2022, a comprehensive evaluation and discussion between the EPCT and the operator (Transdev) staff is strongly suggested. The objective of this discussion is to gain a deeper understanding of the implications of these modifications. The following aspects of the discussion assessment should be taken into consideration:

- Staff Feedback and Concerns
- Operational Impacts Evaluation
- Customer Feedback Collection (Surveys and Complaints)
- Service Performance Metrics (agree on the suitable performance indicators for the entire system changes)
- Cost Analysis (conduct a cost-benefit analysis to determine the financial implications of the service changes)
- Community Impact (explore how the service changes have impacted the local community)
- Scheduling and Coordination (review the scheduling and coordination of services to ensure that the changes are optimized for efficiency)
- Employee Training and Support (evaluate the training and support provided to staff in adapting to the new service model/change)
- Communication Strategy (assess the effectiveness of the communication strategy used to inform both staff and customers about the service changes)

MARKETING PREPARATION

Effective marketing of transportation programs can improve ridership and community support, especially for newer initiatives without an established user network. Partnerships with community organizations are common in such programs and can be strengthened through marketing efforts.

Challenges include addressing awareness and misconceptions about existing services, clarifying the program's target audience, and dispelling any misconceptions. A central component of this evaluation was the examination of marketing efforts executed to inform and engage both riders and the community about the pending service changes. The primary questions guiding this investigation were:

- Target Audience: Who was the intended audience for these marketing endeavors?
- Implementing Parties: Who spearheaded and executed these marketing initiatives?
- Timing and Approach: How and when were these marketing efforts launched?
- Response: What was the overall response to these marketing endeavors?

This segment of the narrative provided important perceptions into the extent to which EPATS and other community partners were involved in these marketing strategies, assessing their contribution and effectiveness.

FEEDBACK LOOP

Equally significant is the feedback received from riders during and after the service changes. Key questions explored in this context included:

- EPCT Staff's Reception: How did EPCT staff receive feedback from the riders?
- Efficacy of Changes: What aspects of the service changes were positively received by riders, and conversely, what areas raised concerns or dissatisfaction?
- Implementation Timeline: What was the duration of the service changes' implementation?

The feedback gathered from riders is vital in comprehending the real-world impact of the modifications. It offered a quick look into which aspects of the implementation succeeded and which fell short, aiding in subsequent decisions and improvements.

In summary, this section serves as a comprehensive examination of the entire process, from marketing and engagement efforts to feedback collection and evaluating the implementation timeline. It offers a complete view of the journey through the service changes and their impact on the EPC community.

A general suggestion is the importance of optimizing changes in route configuration and the need for careful timing and logical alignment of new routes, especially with regard to their expected endpoints. For instance, initial feedback from users emphasizes the significance of designing routes that are not only efficient but also convenient for passengers. By ensuring that inbound and outbound schedules align with the appropriate times of day, EPCT can enhance the overall commuter experience, making public transportation a more viable and attractive option for the residents of El Paso County.

EPCT PUBLIC PARTICIPATION PROCESSES

The adopted EPCT Title VI Plan (Revised October 2020) recognizes the following strategies as part of EPCT's public participation plan:

- Provide for frequent and continuous engagement by the public.
- Select varied meeting locations and times that are convenient and accessible for minority and LEP communities.
- Coordinate with community organizations, educational institutions, and other organizations to implement public engagement strategies that reach out specifically to members of affected minority and/or [Limited-English proficient, or LEP] populations.
- Use media in addition to other resources as a way to gain public involvement, to include publications, notifications, and invitations that serve LEP populations.

As noted in the Title VI Plan, EPCT coordinates stakeholder and public meetings for all transportation studies. At such meetings, service changes (including route changes, major capital improvements, and fare changes) are presented and discussed. Press releases and social media are also used to provide information and seek input.

EPCT may opt to give presentations at events that the public is likely to attend (e.g., community gatherings). EPCT may also proactively schedule presentations before faith-based organizations, community organizations or at community gatherings where members of the public are likely to be in attendance and use County transit services that may be affected by proposed changes.

The following process is used for meetings with the public:

- Outline the project for which public input is being sought.
- Prepare mailing lists (postal mail and e-mail) for key stakeholders and community organizations.
- Prepare and post/publish notices advising the public of the public participation opportunity (which could be a survey as well as a meeting).
- Provide project information (including goals, objectives, and means by which input can be provided) and EPCT standards/policies.
- Keep a record of the public input process, the activities that occurred, and the input that was received.

TEMPLATE FIXED-ROUTE IMPLEMENTATION PLAN

Below is an excerpt of a proposed implementation template (in Excel format) for all remaining new/modified routes. The template has been tailored for specific stakeholders and markets in each corridor. These corridor-specific implementation plans are provided in subsequent sections. The template was informed by the above-described evaluation of Route 20, 30, and 31 implementations as well as relevant best practices.

A		B	C	D
1	Route:		Route XX	
2	Description of Changes:		Realigned, rescheduled route	
3	Go Live Date:		1/1/2024	
4				
5	Status	Deadline	Days Before Go Live	Activity
6	Incomplete	11/2/2023	60	Post flyers on board buses and at stops and transfer centers to provide a heads-up about route change.
7	Incomplete	11/2/2023	60	Post heads-up information about route change on social media.
8	Incomplete	12/2/2023	30	Post updated flyers on board buses and at stops and transfer centers with specific information about route change.
9	Incomplete	12/2/2023	30	Post specific information about route change on social media.
10	Incomplete	12/2/2023	30	Conduct meetings with [city] to provide information and encourage sharing of information with constituents.
11	Incomplete	12/2/2023	30	Conduct meetings with [city] to provide information and encourage sharing of information with constituents.
12	Incomplete	12/2/2023	30	Conduct meetings with [human service agency] to provide information and encourage sharing of information with constituents.
13	Incomplete	12/2/2023	30	Conduct meetings with [human service agency] to provide information and encourage sharing of information with constituents.
14	Incomplete	12/2/2023	30	Conduct meetings with [major employer] to provide information and encourage sharing of information with constituents.
15	Incomplete	12/2/2023	30	Conduct meetings with [major employer] to provide information and encourage sharing of information with constituents.
16	Incomplete	12/2/2023	30	Conduct meetings with [housing community] to provide information and encourage sharing of information with constituents.
17	Incomplete	12/2/2023	30	Conduct meetings with [housing community] to provide information and encourage sharing of information with constituents.
18	Incomplete	12/2/2023	30	Conduct meetings with [neighborhood association] to provide information and encourage sharing of information with constituents.
19	Incomplete	12/2/2023	30	Conduct meetings with [neighborhood association] to provide information and encourage sharing of information with constituents.
20	Incomplete	12/2/2023	30	Brief bus drivers on route change and how they will provide information about route change.
21	Incomplete	12/2/2023	30	Conduct meetings with [major destination] to provide information and encourage sharing of information with constituents.
22	Incomplete	12/2/2023	30	Conduct meetings with [major destination] to provide information and encourage sharing of information with constituents.
23	Incomplete	12/2/2023	30	Release social media ad(s) with notice about route change and link to more-detailed information.
24	Incomplete	12/2/2023	30	Share information with partners and encourage them to share it with constituents.
25	Incomplete	12/25/2023	7	Stage staff at transfer centers and other key locations ([TBD]) to hand out flyers and talk to riders about upcoming route change.
26	Incomplete	12/25/2023	7	Brief bus drivers on how they will provide information about route change and obtain feedback from riders.
27	Incomplete	12/25/2023	7	Post updated flyers on board buses and at stops and transfer centers with specific information about route change.
28	Incomplete	12/25/2023	7	Post specific information about route change on social media.
29	Incomplete	1/1/2024	0	Launch fare-free promotion for [first week/month/TBD] after route change.
30	Incomplete	1/31/2024	-30	Stage staff at transfer centers and other key locations to talk to riders about impacts of route change and success of implementation.
31	Incomplete	1/31/2024	-30	Talk to bus drivers about impacts of route change and success of implementation.

FIGURE 16 EXCERPT OF IMPLEMENTATION TEMPLATE

The implementation plan template generates a timeline for conducting specific outreach activities (e.g., conducting meetings with specific key stakeholders). Users of the template can specify the “Go Live” date for a given service change/implementation (i.e., the date the change/implementation will go into effect). Based on specified lead times, or days in advance of the Go Live date, the agency can see specific deadlines for completing specific activities. Users can modify the lead times if needed (e.g., to provide more specificity for specific activities); the lead times provided in the default template are research team recommendations. Users can also modify the descriptions of each activity to specify participants, the format of the activity, etc.; they can add new activities by inserting new rows; and they can filter and sort by any column. Users can specify custom status options on the StatusOptions tab. The research team will walk EPCT through how to use the template.

KEY STAKEHOLDERS

One of the best practices for implementing a transit service change in the El Paso region is to create a comprehensive list of key stakeholders. Identifying and engaging all relevant parties is critical to ensure the success and efficient implementation of any transit service change. This list should include local government officials, public transportation agencies, community organizations, business associations, commuters, and residents affected by the change. By involving these key stakeholders from the beginning, EPCT and Transdev (operators) staff can gather valuable input, address concerns, and build a consensus around the proposed changes. This collaborative approach not only helps in making informed decisions but also fosters a sense of ownership and support among those impacted by the changes, ultimately

leading to a more successful and sustainable transit service change in the County. The following list (Table 7) shows the key stakeholder organizations to be contacted for any potential transit service change in any of the EPCT routes. This global list includes names of contact person(s) with contact information, and class(es) of constituents represented. Subsequent tables in sections 6 to 11 show additional key stakeholders per transit route, area, and corridor.

TABLE 7 LIST OF POTENTIAL KEY STAKEHOLDERS FOR CHANGES IMPLEMENTATION

Organization	Contact Name	Phone	E-mail
Texas Department of Transportation	Marty Boyd	(915) 790-4221	marty.boyd@txdot.gov
El Paso County	Ricardo Samaniego	(915) 546-2098	rsamaniego@epcounty.com
Far West Texas / El Paso Regional Transportation Coordination Committee (WTCP)	Victor Reta, Jr.	(915) 319-0125	Vreta@costx.us
City of El Paso/Sun Metro	Claudia Garcia	(915) 212-3448	garciack@elpasotexas.gov
Camino Real Regional Mobility Agency	Raymond Telles	(915) 212-1072	tellesrl@crrma.org
Rio Grande Council of Governments	Yvette Lugo	(915) 533-0998	yvettel@riocog.org
El Paso MPO	Eduardo Calvo	(915) 212-0258	ecalvo@elpasompo.org
Project Amistad	Xavier Banales	(915)-532-3790	xbanales@projectamistad.org
El Paso Bike/Pedestrian Coalition	Scott White	(915) 472-0985	info@velopaso.org
South Central Regional Transit District	David Armijo	(575) 323-1620	socenrtd@gmail.com
The University of Texas at El Paso	Victor H. Arreola	915-747-5526	news@utep.edu

Additionally, the list below highlights the critical importance of identifying and incorporating constituent stakeholders wherever their involvement is reasonably relevant and beneficial. In any project or initiative (including service changes), stakeholders play a vital role in shaping outcomes, providing valuable insights, and ensuring that the needs and concerns of all parties are adequately addressed. By adding these constituent stakeholders, EPCT can create a collaborative environment that promotes successful decision-making, fosters inclusivity, and ultimately leads to more effective and sustainable outcomes. TTI strongly recommends that the EPCT/Transdev actively reach out directly to constituent stakeholder organizations since they often serve clients who are low-income or disabled and are in critical need of reliable transportation for accessing essential services such as jobs, healthcare, education, counseling, and more. By establishing partnerships with these stakeholder organizations, EPCT can significantly expand its reach and offer a wider selection of transportation options to those in need. This collaborative approach will not only enhance the accessibility and effectiveness of EPCT's services but also contribute to the overall development of the community by ensuring that vulnerable populations have the means to access vital resources. Therefore, engaging with the list of stakeholder organizations shown below is a vital step in advancing EPCT's mission of providing accessible and inclusive transportation solutions for all County residents.

WORKFORCE SOLUTIONS BORDERPLEX (five offices in the region). Contact info: 915-887-2600; <https://www.borderplexjobs.com/>. This organization is part of the Texas Workforce Commission. It helps

connect people to jobs, providing training and support services (like daycare and transportation). Clients include seasonal workers, veterans, and individuals with disabilities (for vocational rehabilitation).

EL PASO COUNTY HOUSING AUTHORITY. Contact info: <https://epcha.org/>; 915-764-3559. EPCHA manages two public housing communities in Fabens and provides housing vouchers for Section 8 residential rental properties in Fabens, Tornillo, Clint, San Elizario, Socorro, Horizon, Vinton, Canutillo, and other communities in the rural part of the county. EPCHA also partners with the Veterans Administration to provide housing/related support to homeless veterans.

TEXAS HEALTH AND HUMAN SERVICES FACILITIES IN THE COUNTY:

Rio Grande Aging, Disability, and Transportation Resource Center (Rio Grande ADRC). Contact info: 3210 Dyer Street; El Paso, Texas 79930; 877-413-2372; 1-855-937-2372; <https://projectamistad.org/> The Rio Grande ADTRC offers service to Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio Counties and it is administered by Project Amistad. Project Amistad staff can act as the primary contact that needs to notify Rio Grande ADRC of any potential changes in the EPCT transit service. Rio Grande ADRC supports individuals with disabilities and caregivers in various forms.

Rio Grande Area Agency on Aging (RGAAA) Contact info: 8037 Lockheed, Suite 100, El Paso, Texas 79925; 915-533-0998; 800-333-7082, <http://www.riocog.org/aging-services/>. This agency offers service for Brewster, Culberson, El Paso, Hudspeth, Jeff Davis, and Presidio Counties and it is administered by the Rio Grande Council of Governments. RGAAA helps to keep seniors living independently (including transportation and day activities). RGAAA has been identified as a stakeholder that can be contacted before service changes in the entire EPCT system, but especially for the Montana Ave corridor which includes Routes 20 and 21.

Emergence Health Network: Local Mental Health Authority for El Paso County. Contact info: 8730 Boeing; El Paso, Texas 79925; 915-887-3410; 915-599-6645; 877-562-6467; <https://emergencehealthnetwork.org/> Local Intellectual and Developmental Disability Authority and Local Mental Health Authority offering counseling of different kinds and support/programs for individuals with developmental disabilities.

EL PASO COALITION FOR THE HOMELESS (lead agency for El Paso Continuum of Care) Contact Info: Camille Castillo, Director, ccastillo.epch@elp.twcbc.com; (915) 843-2170; epch@elp.twcbc.com; <https://www.epchomeless.org/> The CoC coordinates many different service agencies that provide housing, food, health care, and more to youth, veterans, and the homeless, among others.

INTERFAITH ALLIANCE OF THE SOUTHWEST (optional). Contact info: <https://www.ifaep.org/> This religion-based alliance includes different groups that often have excellent networks and excellent community relationships and is composed of religious organizations that provide social services in some form.

INFORMATIONAL MATERIALS

The TTI team recommends that EPCT take immediate steps to update and enhance its website. Key improvements should include reorganized and improved route maps and schedules, which are essential

for passengers planning their journeys. Additionally, the integration of General Transit Feed Specification (GTFS) data would further allow riders to access real-time transit information, making their experience more convenient and efficient (See Chapter 4). By undertaking these website enhancements, EPCT can bridge the information gap, foster a user-friendly digital platform, and ultimately provide a more seamless and informed public transportation service to its riders.

MARKETING MATERIALS

Tailoring marketing materials to the target audience using channels like websites, social media, publications, signs, and banners is vital. Cultural competence and community-specific approaches are essential. The team suggests EPCT to collaborate with other programs and organizations that can help gain referrals (e.g., TxDOT, El Paso MPO, the City of El Paso, Sun Metro, South Central Regional Transit, El Paso Municipalities, etc.). Transit marketing can be considered as an ongoing process and is similar to the maintenance or operations processes. The team suggests making sure of the following criteria to implement a marketing strategy for potential service changes¹⁷:

- **Awareness:** Initially, marketing aims to create awareness about the transit program's existence. Many potential users may not even be aware that such a service is available.
- **Positive Image:** Building a positive image for the transit system/agency is crucial to inspire confidence and trust among potential riders. A favorable reputation can significantly impact a program's success (customer satisfaction).
- **Knowledge:** Distributing comprehensive information about eligibility, costs, hours, and critical details ensures potential users have the knowledge they need to make informed decisions.
- **Motivation:** Effective marketing should motivate individuals to consider using the transportation service. This motivation can be driven by highlighting the benefits and convenience the program offers.
- **Trial Ridership:** Encouraging people to give the service a try is essential. Trial ridership often acts as a bridge between awareness and becoming a regular rider, allowing users to experience the service firsthand (EPCT could offer free-fare trips encompassed in an effective marketing strategy).
- **Retention:** Maintaining regular riders is a core objective of marketing. EPCT should aim to retain users by consistently delivering a high-quality service experience.
- **Regular Rider:** Ultimately, the goal of marketing is to transition individuals from being occasional or trial riders to becoming regular, loyal users who depend on the service for their transportation needs. This requires continued marketing efforts to sustain interest and satisfaction.

PENDING SERVICE CHANGES

The table below (Table 8) summarizes the service changes that are currently pending. The corridor-specific implementation plans that follow are ordered based on the target implementation date (FY24 and FY25).

¹⁷ National Rural Transit Assistance Program <https://www.nationalrtap.org/Toolkits/Marketing-Toolkit/Welcome>

TABLE 8. PENDING SERVICE CHANGES

Service Change	Target Implementation Date
Route 10 realignment (including Peak Hour)	TBD
Route 11 implementation (including Peak Hour)	TBD
Route 20 realignment (including Peak Hour)	TBD
Route 21 implementation (truncate)	TBD
Route 30 Peak Hour implementation	TBD
Route 31 Peak Hour implementation (truncate)	TBD
Route 40X implementation	TBD
Route 50 realignment	TBD
Route 84 realignment	TBD
ADA Paratransit	TBD
General Public Demand Response	TBD

As stated in all previous sections of this Chapter of the report, the rural transit changes implementation process involves a systematic evaluation and multifaceted approach to ensure the successful execution of service modifications within the EPCT system. The process commonly begins with a staff discussion, focusing on gathering feedback and concerns, assessing operational impacts, collecting customer feedback, evaluating service performance metrics, conducting cost analysis, and exploring the community impact. Scheduling and coordination are reviewed, and employee training and support are also assessed, along with an evaluation of the communication strategy used to inform staff and customers about the changes. Marketing preparations are emphasized to improve ridership and community support, with partnerships with regional community organizations and corridor-specific constituents. Feedback rounds are established to gather information from riders, examining their reception of the changes, the efficacy of the changes, and the implementation timeline. Community partner discussions provide perspectives from both riders and non-riders. Finally, social media and news reviews reveal the broader community opinion. Recommendations emphasize improving communication, collaborating with partners and organizations, and service standards such as expanding service hours, addressing schedule adherence, and enhancing efficiency. These recommendations form a comprehensive guide to navigating the difficulties of an efficient rural transit implementation, with the aim of driving success and better meeting the needs of the community.

ROUTE 10/11 IMPLEMENTATION CHANGES

Current Route 10 would be split into Route 10 serving Anthony and Route 11 serving Westway. Both routes would run on Doniphan Drive between Westside Transfer Center and Canutillo. The intended headway for Route 10 would run every 60-75 minutes, and Route 11 buses would run every 60-75 minutes. Route 11 would also connect the Westside Transfer Center with the El Paso Shoppes (outlet mall). ADA paratransit service will be provided along with the implementation of both routes (10 and 11) covering an area of $\frac{3}{4}$ of a mile from the main routes' configuration. GPDR service will be later introduced. The following table (Table 9) shows the recommended corridor-specific organizations to be contacted for collaboration/feedback before the final changes are implemented.

TABLE 9 LIST OF POTENTIAL KEY STAKEHOLDERS FOR CHANGES IN ROUTES 10 AND 11

Organization	Contact Name	Phone	E-mail	Constituents
Town of Anthony, TX	Anthony David Turner	(915) 886-3944	mayor@townofanthony.org	
Anthony, New Mexico	Diana Murillo-Trujillo	(915) 546-2098	dmurillo@donaanacounty.org	
Village of Vinton	Rachel Quintana	(915) 886-5104	rquintana@vintontx.us.	Westway Neighborhood Association
Canutillo Independent School District	Patsy Mendoza	915.877.7400	pio@canutillo-isd.org	
Anthony Independent School District	Oscar Troncoso	(915) 886-6500	otroncoso@anthonyisd.net	
El Paso Independent School District	Liza Rodriguez	(915) 230-2559	lmrodri2@episd.org	

ROUTE 20/21 IMPLEMENTATION CHANGES

Route 20 would be split into Route 20 serving Homestead Meadows South and Route 21 serving Homestead Meadows North. Both routes are intended to operate every 60-75 minutes and only during peak periods. Route 20 has already been truncated running from the Homestead Meadows communities to the Sun Metro's Upper Eastside Transfer Center (UETC). When implemented, Route 21 will also start and end its trips at the UETC. ADA paratransit service will be provided along with the implementation of both routes (20 and 21) covering an area of $\frac{3}{4}$ of a mile from the main routes' configuration. GPDR service along Routes 20 and 21 will be later introduced.

The following table (Table 10) shows the recommended corridor-specific organizations to be contacted for collaboration/feedback before the final changes are implemented for in Routes 20 and 21.

TABLE 10 LIST OF POTENTIAL KEY STAKEHOLDERS FOR CHANGES IN ROUTES 20 AND 21

Organization	Contact Name	Phone	E-mail	Constituents
Clint Independent School District	Jennifer Parker	915-926-4053 Ext (808)	mary.parker@clint.net	Homestead Meadow HOA. Community of Butterfield
Socorro Independent School District	Daniel Escobar	915-937-0284	descob02@sisd.net	

ROUTE 40 IMPLEMENTATION CHANGES

Configuration of Route 40 will remain the same as the current service (Summer 2023). ADA paratransit service will be provided along with the implementation of Route 40 covering an area of $\frac{3}{4}$ of a mile from the main routes' configuration. GPDR service along the rural areas of Alameda Corridor will be later introduced. The following table (Table 11) shows the recommended corridor-specific organizations to be contacted for collaboration/feedback before the final changes are implemented for Route 40.

TABLE 11 LIST OF POTENTIAL KEY STAKEHOLDERS FOR CHANGES IN ROUTES 40

Organization	Contact Name	Phone	E-mail
Ysleta Independent School District	Xavier De La Torre	915) 434-0505	xdelatorre@yisd.net
Socorro Independent School District	Daniel Escobar	915-937-0284	descob02@sisd.net
Fabens Independent School District	Veronica Vijil	915-765-2600 ext. 210	vvijil@fabensisd.net
San Elizario Independent School District	Jeannie Meza-Chavez	915.872.3900	webmaster@seisd.net
Tornillo Independent School District	Rosy Vega-Barrio	915-765-3000	rvegabarrio@tisd.us
Clint Independent School District	Jennifer Parker,	915-926-4053 Ext (808)	mary.parker@clint.net
El Paso Independent School District	Liza Rodriguez	(915) 230-2559	lmrodri2@episd.org
City of Socorro and San Elizario	Michael Medina	915.974.7037	cityplanner@ci.socorro.tx.us
Town of Clint	Ramon Cano Jr	(915) 851-3146	www.clinttexas.com/government
Clint Senior Adult Center	Yolie Lara	(915) 851-3397	n/a

ROUTE 40X IMPLEMENTATION CHANGES

The above-described Route 40 will be supplemented by Route 40X, which would be a new express route that operates on Interstate 10 during peak periods only. It would connect Mission Valley Transfer Center to the Fabes and Tornillo communities, and buses are intended to run every 75 minutes. The following table (Table 12) shows the recommended corridor-specific organizations to be contacted for collaboration/feedback before the final changes are implemented for Route 40X.

TABLE 12 LIST OF POTENTIAL KEY STAKEHOLDERS FOR CHANGES IN ROUTES 40X

Organization	Contact Name	Phone	E-mail
Ysleta Independent School District	Xavier De La Torre	915) 434-0505	xdelatorre@yisd.net
Socorro Independent School District	Daniel Escobar	915-937-0284	descob02@sisd.net
Fabens Independent School District	Veronica Vijil	915-765-2600 ext. 210	vvijil@fabensisd.net

San Elizario Independent School District	Jeannie Meza-Chavez	915.872.3900	webmaster@seisd.net
Tornillo Independent School District	Rosy Vega-Barrio	915-765-3000	rvegabarro@tisd.us
El Paso Independent School District	Liza Rodriguez	(915) 230-2559	lmrodri2@episd.org
City of Socorro and San Elizario	Michael Medina	915.974.7037	cityplanner@ci.socorro.tx.us
Town of Clint	Ramon Cano Jr	(915) 851-3146	www.clinttexas.com/government
Clint Senior Adult Center	Yolie Lara	(915) 851-3397	n/a

ROUTE 50 IMPLEMENTATION CHANGES

The main change in Route 50 will be the route alignment. Route 50 will not enter the Socorro Entertainment Center or Licon Dairy; however, these locations will be served with GPDR service that will be later introduced. Route 50 buses are intended to run hourly all day. ADA paratransit service will be provided along with the implementation of Route 40 covering an area of $\frac{3}{4}$ of a mile from the main routes' configuration. The following table (Table 13) shows the recommended corridor-specific organizations to be contacted for collaboration/feedback before the final changes are implemented for Route 50.

TABLE 13 LIST OF POTENTIAL KEY STAKEHOLDERS FOR CHANGES IN ROUTES 50

Organization	Contact Name	Phone	E-mail	Constituents
El Paso Independent School District	Liza Rodriguez	(915) 230-2559	lmrodri2@episd.org	
El Paso Community College	Monica Monroy	(915) 831-6726	mmonro21@epcc.edu	
Ysleta Independent School District	Xavier De La Torre	915) 434-0505	xdelatorre@yisd.net	
Socorro Independent School District	Daniel Escobar	915-937-0284	descob02@sisd.net	
San Elizario Independent School District	Jeannie Meza-Chavez	915.872.3900	webmaster@seisd.net	
Clint Independent School District	Jennifer Parker,	915-926-4053 Ext (808)	mary.parker@clint.net	
Ysleta del Sur Pueblo	Tribal Council	915-859-8053	Website: https://mail.ydsp-nsn.gov/owa/	Ysleta del Sur Pueblo Department of Economic Development

City of Socorro and San Elizario	Michael Medina	915.974.7037	cityplanner@ci.socorro.tx.us	
Town of Clint	Ramon Cano Jr	(915) 851-3146	www.clinttexas.com/government	
Clint Senior Adult Center	Yolie Lara	(915) 851-3397	n/a	

ROUTE 84 IMPLEMENTATION CHANGES

Route 84 will be moved to North Loop Road and run hourly all day. Route 50 and Route 84 currently run primarily on the same roads and moving Route 84 may increase transit access to more county residents. After these changes are implemented, an ADA paratransit service will be provided along with the implementation of Route 40 covering an area of $\frac{3}{4}$ of a mile from the main routes' configuration. Finally, GPDR service will be offered for all current stops in this route. Since Route 84 is currently operated by Sun Metro, it is strongly recommended to meet with Sun Metro Planning Department staff and with Sun Metro's LIFT program manager to receive feedback on the intended changes on the route. The following table (Table 14) shows the recommended corridor-specific organizations to be contacted for collaboration/feedback before the final changes are implemented for Route 84.

TABLE 14 LIST OF POTENTIAL KEY STAKEHOLDERS FOR CHANGES IN ROUTES 84

Organization	Contact Name	Phone	E-mail	Constituents
Ysleta Independent School District	Xavier De La Torre	915) 434-0505	xdelatorre@yisd.net	
Socorro Independent School District	Daniel Escobar	915-937-0284	descob02@sisd.net	
Fabens Independent School District	Veronica Vijil	915-765-2600 ext. 210	vvijil@fabensisd.net	
San Elizario Independent School District	Jeannie Meza-Chavez	915.872.3900	webmaster@seisd.net	
Tornillo Independent School District	Rosy Vega-Barrio	915-765-3000	rvegabarrio@tisd.us	
El Paso Independent School District	Liza Rodriguez	(915) 230-2559	lmrodri2@episd.org	
Ysleta del Sur Pueblo	Tribal Council	915-859-8053	Website: https://mail.ydsp-nsn.gov/owa/	Ysleta del Sur Pueblo Department of Economic Development
City of Socorro and San Elizario	Michael Medina	915.974.7037	cityplanner@ci.socorro.tx.us	

Town of Clint	Ramon Cano Jr	(915) 851-3146	www.clinttexas.com/government	
Clint Senior Adult Center	Yolie Lara	(915) 851-3397	n/a	
El Paso Community College	Monica Monroy	(915) 831-6726	mmonro21@epcc.edu	
Sun Metro Planning Department	Claudia Garcia	(915) 212-3448	garciack@elpasotexas.gov	City of El Paso
Sun Metro LIFT	Victor Caraveo	915-212-3333	n/a	Sun Metro Citizens Advisory Committee (SMCAC)

CHAPTER 4. TECHNOLOGY ENHANCEMENT STRATEGIES

EPCT management is planning service changes and improvements to the bus route system. The implementation strategies to consolidate these changes for improvements in transit passenger experience and mobility include the use of innovative technology. During the past 2 decades, advances in communications and information technology have revolutionized transit applications to improve the mobility of passengers and transit operations. The declining costs of communications, data storage, and retrieval, plus the accessibility to innovative technological equipment and intelligent transportation systems (ITS), accelerate the opportunities for the transit industry to offer advancements in customers and operational demands. However, the implementation of technology such as ITS in small rural transit agencies may represent challenges and difficulties. Staffing and funding may impede rural transit agencies from implementing technology, as can the initial cost of determining which solution best solves the agency's problem and the cost associated with that solution.

This chapter summarizes the TTI team's research and analysis for the completion of Task 3 of the EPCT implementation plan—Technology Enhancement Strategies. The analysis described in the following sections focuses on technology application enhancements that benefit EPCT and county transit users. The benefits of investments in technology include improved operations management, customer information, and customer service. The potential enhancements are suitable for EPCT Routes 10, 20, 30, 40, 50, and 84 and for any service changes to those routes and additions of routes of similar bus service design and purpose. No options were explored for the EPCT Gold Route and the existing Vanpool Program. Additionally, the TTI team included GTFS data sets (the benefits of which include making information about county transit service available through Google Transit and other web-based mapping and trip planning applications).

The team also identified specific needs for the EPCT service system and the appropriate technology used to address those needs. Finally, the team evaluated the features and cost-effectiveness of candidate technology tools and developed implementation strategies and timelines.

Chapter 4 is divided into the following sections:

- **EPCT Current Available Technology**—The TTI team performed an assessment of the current technology available on- and off-board the EPCT vehicles and at the operation management center (First Transit Dispatching Center).
- **Intelligent Transportation Systems For Transit**—The second section of this chapter describes the advance transit technologies (e.g., ITS for transit) used to improve the efficiency, safety, and sustainability of transit systems and to contribute to making public transportation more attractive and convenient for passengers.
- **General Transit Feed Specification**—This standardized data format is used to describe public transit schedules, routes, and other information. GTFS files are used by transit agencies and third-party developers to provide transit information to passengers through mobile apps, websites, and other digital platforms. Section 3 of this chapter describes the process the TTI

team used to create a package of GTFS files specifically for the EPCT's existing and upcoming conditions.

- **Technology Implementation Phasing Plan and Timeline**—This section outlines the steps and timeline for implementing new technology solutions for a transit agency in general. A particular EPCT case exemplifies a hypothetical plan that includes the typical phases and set of tasks and timelines to ensure a smooth and efficient transition to new technology.

EPCT CURRENT AVAILABLE TECHNOLOGY

To develop Task 3, the study team started by performing an analysis of the current technology available on board the EPCT vehicles and at the operation management center. A couple members from the TTI team met with First Transit's EPCT General Manager Sylvia Balcazar on March 9, 2023, to document the current technology available on- and off-board. The TTI staff started gathering information regarding the recently installed fareboxes. The team documented the brand, technical specifications, model, functionality, compatibility with Sun Metro's farebox units, maintenance cycle, payment methods accepted, passenger counting through tickets, upgraded units, software updates, and trained personnel required to troubleshoot the farebox units. The team complemented the documentation with an inventory of images.

The following list summarizes the findings in terms of vehicle technology gathered from the visit to First Transit/EPCT maintenance facilities:

- All vehicles are equipped with security cameras inside the vehicle. The vehicles are also equipped with rear cameras that are not currently being used by EPCT. Enabling these cameras can potentially help with bus safety.
- All vehicles are equipped with a lifting mechanism and a wheelchair space.
- Twenty-six vehicles have been equipped with electronic fareboxes since October–November 2022.
- Fareboxes (tech specs and functions):
 - Vendor: Genfare.¹⁸
 - Maintenance: This model needs maintenance for ticket card reloading, checking on internal mechanisms, cashing out to the cash box recipient, and software updates. Genfare fareboxes do not need a printer for tickets; they use heat to print the ticket balance information.
 - Payment methods accepted:
 - Cash (bills and coins; the highest denomination bill accepted is \$20) and EPCT cards (including monthly passes). Change is not given back to customers in cash. Change is given back on the EPCT card.
 - Credit/debit cards, payments through online apps such as a phone reader (although Wi-Fi service is needed for these functions), and even tickets from other local transit agencies. However, to enable these features, a software update is required, along with

¹⁸ <https://genfare.com/products/fast-fare-farebox/>

an agreement among local transit agencies involved. EPCT tickets/cards have no expiration date.

- Compatibility with Sun Metros' fareboxes: Genfare fareboxes are 100 percent compatible with Sun Metro's fareboxes/ticketing.
- Ridership Counts: Passenger counting is performed automatically through passenger tickets/cash payment. Infrared sensor installation is not necessary for counting. In some specific cases (e.g., farebox malfunctions), passengers get counted manually by the bus driver.
- Children under 4 years old ride free. However, they are counted as regular passengers (adults).
- Capability for upgrading: Genfare fareboxes can be upgraded to enable additional features using the firmware software (a laptop/computer with an interface is required). One of the additional features that may be added is a function to identify up to eight different types of users. This information would prove useful to EPC for future transit planning.
- Software/system upgrade requirements: Depends on changes to the fare policy or new discounts authorized by EPCT.
- First Transit staff are trained to operate and troubleshoot Genfare fareboxes, with drivers responsible for troubleshooting during trips. If a severe problem occurs, a technician is needed, and in case of a malfunction, drivers offer a free ride and count passengers manually. A replacement unit may be sent to replace a faulty farebox. Figure 17 through Figure 19 are images of the EPCT vehicles' fare collection technology.



FIGURE 17. GENFARE'S FAST FARE® ONBOARD FARE SYSTEM (OPERATOR'S VIEW)



FIGURE 18. GENFARE'S FAST FARE® ONBOARD FARE SYSTEM (PASSENGER'S VIEW)



FIGURE 19. GENFARE'S FAST FARE® CAPABILITIES (MODEL: AHD130MP-CM1R-28)

- Wi-Fi technology—EPCT is already working with First Transit and a vendor to provide Wi-Fi (internet) to transit users and buses and provide the following components (along with other bus farebox and communication components):
 - Cradlepoint TA1-600C150M-NNN: The Cradlepoint COR IBR600C Series are semi-ruggedized, cloud-managed LTE routers built for the Internet of Things (IoT), machine-to-machine (M2M), and industrial networks. With an embedded modem, the Cradlepoint COR IBR600C Series is ideal for use in high-availability portable or fixed applications such as surveillance cameras, digital signs, oil and gas monitoring, and parallel networking.
 - Cradlepoint COR IBR600/IBR650: This mode may be used in 24/7 business-critical installations such as ATMs, kiosks, surveillance, vehicles, etc. It provides wireless 2x2 MIMO “N” Wi-Fi (802.11 b/g/n). It supports both wireless and wired internet connections, with two ethernet ports for either LAN/LAN or WAN/LAN. Several models are available with 4G and/or 3G support for U.S. and international carriers.
 - INS antenna: The single antenna global positioning system (GPS)-aided internal navigation system (INS) by Inertial Labs features fully integrated, combined GPS, GLONASS, GALILEO, QZSS, and BEIDOU navigation. This high-performance, strap-down system determines position, velocity, heave, and absolute orientation (heading, pitch, and roll) for any device on which it is mounted.
 - Wireless carrier (Verizon) LTE Modem Pro 128L/MDM PROV: This INS network-ready provisioning service includes loading SIM cards into hardware, loading wireless network authentication information (provided by the cellular carrier), documenting network addressing and mobile numbers, and testing network connectivity. There are multiple steps involved with using cellular gateways. The cellular gateway must be activated with an

- appropriate data plan from an approved wireless carrier. After the activation has been completed with the wireless carrier, the cellular gateway must be configured to connect to the cellular network. This configuration process is known as provisioning the modem.
- Communications technology (dispatch)—Currently, EPCT drivers use Citizens Band (CB) radio for communication with dispatch (see Figure 20). CB technology is a type of radio communication that operates on specific channels within the radio frequency spectrum. Although CB radios can be used for communication between drivers, CB radios have limited channels and do not provide the reliability, security, or functionality required for transit operations.



FIGURE 20. CITIZENS BAND RADIO SYSTEM

INTELLIGENT TRANSPORTATION SYSTEMS FOR TRANSIT

ITS offer innovative services for different transportation modes, including transit. ITS integrate advanced information and communications based on technology into transportation infrastructure and vehicles.

ITS refer to a system of technologies and operational advancements.¹⁹ Specifically for transit, FTA has identified and listed these most basic and useful technologies for public transportation agencies to deploy (11 total):²⁰

1. **Automatic Passenger Counter (APC).** A system consisting of electronic machines near the doors of a transit vehicle that count the number of passengers who enter and exit at every transit stop.
2. **Automatic Vehicle Location.** A computer-based vehicle tracking system that uses location technology (usually a GPS) and a wireless data communications system to transmit the real-time location of any bus, van, train, or boat from the vehicle to a transit operations center.
3. **Communication Technologies.** Technologies that pass information from one user to another in a usable form via wire, wireless, radio, internet, or other links. This type of technology facilitates interaction among drivers, dispatchers, and other personnel involved in transit operations.
4. **Computer-Aided Dispatch and Scheduling (CADS).** Software that combines transit routes, schedules, trip orders, and vehicle assignments to allow dispatchers to know where transit vehicles are located.
5. **Electronic Fare Payment or Automatic Fare Collection.** An automated means of collecting and processing fares for public transportation services. EPCT has recently implemented this technology in its entire fleet.
6. **Geographic Information System (GIS).** For managing and creating spatial data such as the location of bus stops, routes, transit facilities, and the regional street network. This technology management, analysis, communication, and display are vital for applications. EPCT has access to some components of GISs. GTFS information systems define a generic format for public transportation schedules and associated geographic information. It is also highly associated with the use of GIS technology.
7. **Maintenance Management Systems.** Used to monitor fluid levels (including fuel), engine temperatures, and other transit vehicle functionalities. Transit operators can build maintenance management systems with the use of AVL or computer-aided dispatch (CAD).
8. **Security Cameras/Systems.** Helps enhance the security of transit customers, personnel, equipment, and facilities. Technologies include radio communications, silent alarms, covert microphones, closed-circuit television (CCTV) cameras (also known as video surveillance), AVL, and other equipment. EPCT vehicles are equipped with front and back cameras to monitor onboard and traffic conditions.
9. **Transit Signal Priority (TSP).** Uses sensors and/or traffic signal timing to detect approaching transit vehicles and grant them priority passage at an intersection. TSP improves reliability, increases ridership, and reduces travel time while reducing transit operating costs.
10. **Traveler Information System (TIS).** Delivers travel information to riders on various transit routes/modes or other types of transportation in the region. A TIS helps reduce the burden on staff who provide customer information.

¹⁹ Intelligent Transportation Systems (ITS) Joint Program Office: Strategic Plan 2020–2025. March 2020

²⁰ <https://www.pcb.its.dot.gov/>

11. **Weather Information System (WIS).** Consists of the hardware, software, and communication interfaces necessary to provide real-time information on weather conditions to transit agencies and their customers.

Besides the staffing, funding, and cost of determining which solution best solves the agency's problem and the cost of that solution, smaller and/or rural transit agencies face the problem of having vendors develop systems for larger, more profitable agencies to maximize profit with larger procurements. It is important to note that the implementation of a technological/ITS application by EPCT staff may be challenging because many vendors may be hesitant to invest their resources in retooling or redesigning a system to meet the specific requirements of a rural agency. This reluctance may stem from the perception that the investment in retooling a system for a smaller/rural agency may not provide an adequate return on investment. Consequently, the EPCT staff may face difficulties finding a vendor that is willing to provide an appropriate solution that meets its unique needs.

AUTOMATIC PASSENGER COUNTER

These systems are electronic devices located near the door(s) of the transit unit that count passengers boarding and alighting. The most common types of technology used in APC systems are horizontal or vertical electronic infrared beams; mechanical treadle mats; passive thermal, digital cameras with three-dimensional vision technology software; thermal imaging; ultrasound; and light beams.

The main benefit of the APC is to obtain better quality ridership data, especially because disaggregated data can be obtained at stop, segment, and trip levels. Most agencies report that they are achieving accuracy levels of 90 percent and above regardless of the APC counting technology employed. The average technology cost is \$10,000 per transit unit.

Several factors need to be considered before implementation. Staffing can present a challenge, especially to small and medium-sized agencies. Successful implementations are characterized by a close review of APC data as part of a quality assurance program. A crucial step in APC implementation is to ensure that the data meet the specified level of accuracy. The threshold accuracy should be 90 to 95 percent for an acceptable APC system.

Other technologies needed to implement APC are the following:

- Wi-Fi access to occasionally upload count data.
- Vehicle Wi-Fi super hotspot to continuously upload data as part of a unit capacity reporting system.

The following are vendor options:

- TRAF-SYS.²¹
- ETA TRANSIT.²²

AUTOMATIC VEHICLE LOCATION

AVL is a computer-based vehicle tracking system that uses location technology, such as a GPS, and a wireless data communications system to transmit the real-time location of any vehicle to the operation center. An AVL system requires a vehicle to be equipped with a computer with a GPS receiver and wireless data communication.

AVL systems provide several benefits, such as data collection, which may be used for daily operations or further analysis; improved on-time bus performance; possible economic savings; and decreased late arrival times for passengers (see Figure 21).

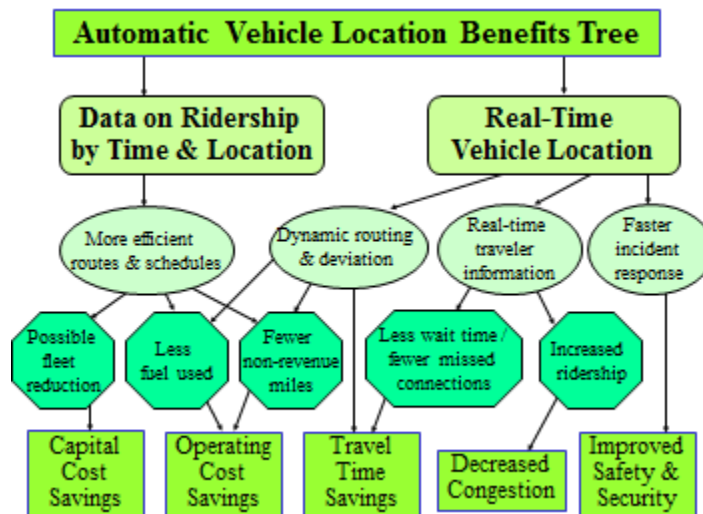


FIGURE 21. VEHICLE LOCATION BENEFITS TREE

A review of various systems implemented across the country suggests that capital costs range between \$10,000 and \$20,000 per transit vehicle.

Other technologies needed to implement AVL:

- No other technologies are needed.
- Addition of Wi-Fi may be a first step to eventually adding a full AVL system.

²¹ TRAF-SYS: https://www.trafsys.com/people-counting/?utm_term=people%20counters&utm_campaign=People+Counters+-+Search+-+%5bKeywords+-+USA/Canada%5d+-+Updated+7.28.20&utm_medium=cpc&gclid=Cj0KCQiA-oqdBhDfARIsAO0TrGFkMY8riDptCXqIM_nzKsTI0t-mGZlvXuNDZHdJm52UHQpPmTv32wAaAqAOEALw_wcB

²² ETA TRANSIT: <https://etatransit.com/passenger-counting/>

The following are vendor options:

- Samsara.²³
- CoPilot.²⁴

SECURITY CAMERAS SYSTEM

Every transit system benefits from the implementation of security cameras. The most basic ITS used for security are CCTV cameras. Such a system can track the operating status and alert officials for a potential delay or closure and a possible or intentional act of crime or violence.

The implementation of a security system may result in a reduction in insurance claims and crime rates. Other benefits include passengers feeling safer and reductions in fare evasion and assaults.

CCTV cameras are usually paired with other technologies—such as radio communications, covert microphones, AVL, and silent alarms—to create an effective security system. See Figure 22 for the CCTV camera's typical setup and hardware requirements.

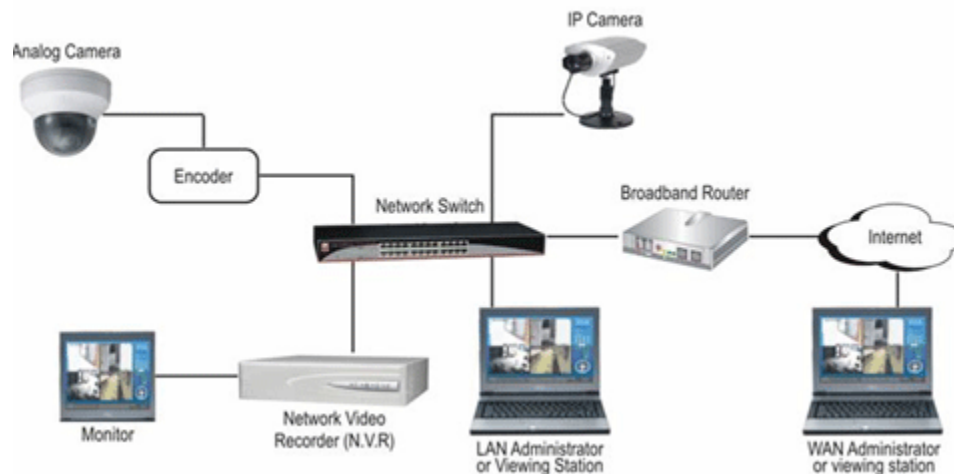


FIGURE 22. TYPICAL SECURITY CAMERA SYSTEM

Onboard security packages that include multiple CCTV cameras, digital video recorders, silent alarms, and covert microphones, range from \$5,000 to \$10,000 per vehicle.

²³ Samsara: https://www.samsara.com/pages/gps-tracking?utm_source=google&utm_campaign=GPS_tracking&utm_medium=search&utm_content=b&utm_term=avl&utm_ext_ad_id=aud-901831099579%3Akwd-15355281&utm_ext_adset_id=140919382534&utm_ext_campaign_id=18523020843&gclid=Cj0KCQiAnsQdBhCGARIsAAvjYjSU_LmH_SwSu6Hng0akAhGZcwYpBXPdezqclLS4m4sNoSSF3gp4YPoaAibdEALw_wcB

²⁴ CoPilot: https://info.maps.trimble.com/copilotmarketplace?utm_term=truck%20fleet%20gps&utm_campaign=NA+-+Appian+-+Brand+-+NEW&utm_source=adwords&utm_medium=ppc&hsrc=adwords&hstgt=kwd-1662420162936&hsrc=ad=565214764752&hsrc=acc=8149172089&hsrc=grp=131204035158&hsrc=mt=b&hsrc=cam=15412935966&hsrc=kw=truck%20fleet%20gps&hsrc=ver=3&hsrc=src=g&gclid=Cj0KCQiAnsQdBhCGARIsAAvjYjSU_LmH_SwSu6Hng0akAhGZcwYpBXPdezqclLS4m4sNoSSF3gp4YPoaAibdEALw_wcB

EPCT's transit provider, First Transit, currently has all vehicles equipped with inside cameras and rear vehicle cameras that are not being used by EPCT. Procuring the funding to enable these cameras will help with bus safety.²⁵

Other technologies needed to implement a camera security system:

- No other technologies are needed.
- Addition of Wi-Fi may be a first step to eventually adding a full security camera system.

The following are vendor options:

- Safe Fleet Transit Surveillance Systems.²⁶
- Safety Vision.²⁷

WI-FI IN TRANSIT UNITS

With the rapid adoption of portable mobile devices (cell phones and tablets), the demand for Wi-Fi has increased dramatically. Consequently, several transit systems around the world started to offer Wi-Fi to their users in their transit units, especially for long commutes. The most basic Wi-Fi technology is offered through the installation of mobile hotspots, which are enterprise-grade, built-in mobile routers that project Wi-Fi signals to the immediate surrounding area.

Super hotspots allow passengers to access the internet while commuting. Hotspots are transportable, meaning they remain functional even in motion from one location to another, which is perfect for public transit. The usage of data can be adjusted based on the demand of the route.

A super hotspot for a transit system is a package that includes a router, an antenna, and a cellular SIM card(s). Passengers will be able to connect to the internet while they are within the system's range even if they are not inside the transit vehicle. The speed of the internet depends on what the selected plan offers.

Since super hotspots are dependent on a cellular signal, some carriers may have better signals and therefore the internet connection will be more reliable than others. The performance may also be affected by the number of people connected to the system. The cost will vary by cellular carrier and the specific demand for each transit route. Cellular carriers charge monthly.

Other technologies needed to implement Wi-Fi:

- No other technologies are needed.
- Addition of Wi-Fi may be a first step to eventually adding other systems that need it for communication.

²⁵ Research Team met with First Transit, Sylvia Balcazar, on March 9, 2023, and this was one of the items discussed.

²⁶ Safe Fleet Transit Surveillance Systems: <https://www.safefleet.net/products/fleet-video-systems/transit-surveillance-systems/>

²⁷ Safety Vision: <https://www.safetyvision.com/about-us>

The following are vendor options:

- Kajeet.²⁸
- Cradlepoint.²⁹

COMMUNICATION TECHNOLOGIES

Improved service may be gained through better communication among drivers, dispatchers, and riders. Greater efficiencies can come from constant communication among drivers and dispatchers to minimize delays and maintain schedules. Current transit drivers use CB radio for this type of communication with dispatch.

As other communication technologies are added to the vehicles, such as cellular (which allows for system internet and Wi-Fi capabilities) and AVL (which provides vehicles' location), communication among drivers and dispatchers will be more automatic. This capacity will also allow for communication with riders via a web mobile/desktop application and take customer service to a higher level. If an on-demand service is added, the option to call for service will still be necessary due to the elderly, who are less likely to use technology, and the language barrier for some riders.

COMPUTER-AIDED DISPATCH AND SCHEDULING

CADS³⁰ is software that combines transit routes, schedules, trip orders, and vehicle assignments to allow dispatchers to know where their agency's transit vehicles are located. This technology is essential to manage DRT services. DRT service provided by transit operators is to dispatch vehicles to pick up passengers and transport them to their destinations on demand. These transit vehicles are not part of the fixed-route fleet and may pick up or drop off several passengers during the same trip.

CADS information enables dispatchers to dispatch trip requests more efficiently; better maintain schedules; and respond to disruptions, emergencies, and other issues, such as a disabled bus. A CADS system is often integrated with AVL systems, GIS, and mobile data terminal technologies to provide advanced real-time system capabilities.

The capability and interoperability of CADS systems will vary by agency based on its specific needs and the accessibility to supporting technologies. Smaller, fixed-route bus agencies may operate basic CADS as a stand-alone technology without additional systems or integration with field equipment. Medium and large transit agencies utilize CADS for real-time operations: dispatching, scheduling, and trip planning optimization. As an example, the cost to replace a computer-aided dispatch and automatic vehicle locator (CAD/AVL) system to support a fleet of 200 vehicles was estimated at \$9.8 million. This was a capital improvement plan for Hillsborough County, Florida, for FY 2020 and 2022.³¹

²⁸ Kajeet: <https://www.kajeet.com/>

²⁹ Cradlepoint: <https://cradlepoint.com/>

³⁰ USDOT Resources for Practitioners: <https://www.its.dot.gov/scrc/index.html#/>

³¹ USDOT ITS Deployment Evaluation: <https://www.itskrs.its.dot.gov/its/benecost.nsf/ID/2e7967c4554a14068525854300630146>

ELECTRONIC FARE PAYMENT OR AUTOMATIC FARE COLLECTION

This technology provides an automated means of collecting and processing fares for public transportation services. EPCT recently implemented this technology to its entire fleet through its fleet provider/manager, First Transit. Thus, the research team visited First Transit facilities in El Paso on March 9, 2023. First Transit provided the following information about this technology.

Twenty-six vehicles were equipped with electronic fareboxes from October–November 2022. Members of First Transit bus maintenance staff were trained in Chicago to operate, maintain, and troubleshoot the vehicles' fareboxes. The manufacturer of the fareboxes is Genfare. The unit needs maintenance for ticket card reloads, checking on internal mechanisms, cashing out to cash box recipients, and software updates. Troubleshooting is done by the bus drivers. If the problem is severe, then a technician at the maintenance facilities is required. If a malfunction occurs during the trip, the driver commonly offers a free ride and counts the passengers manually to avoid travel time delays. A second unit may be sent out to replace the one with the faulty farebox.

Genfare fareboxes do not use ink printers for tickets; instead, they use thermal printers to print the ticket's remaining balance information. Fareboxes accept cash (bills and coins—the highest denomination bill accepted is \$20) and EPCT ticket cards (including monthly passes). Change is not given back to customers in cash. Change is given back in the EPCT ticket card. EPCT tickets/cards have no expiration date.

Passenger counting is performed automatically through passenger tickets/cash payments. Stand-alone APC installation is not necessary for counting. In some specific cases (e.g., farebox malfunctions), passengers get counted manually by the bus driver. Children who are 4 years old and under ride for free. However, they are counted as regular passengers (adults) by the farebox.

In terms of future planning and potential collaboration with Sun Metro, Genfare fareboxes are 100 percent compatible with Sun Metro's fareboxes/ticketing. The fareboxes can be upgraded to enable additional features by requesting Genfare firmware software updates (a laptop/computer with an interface is required). The following are examples of future features that may be enabled via firmware updates:

- Function to identify up to eight different types of users. This upgrade can provide useful information to EPCT for future transit planning.
- Function to accept credit/debit cards, payments through mobile apps (digital wallet—Wi-Fi service is needed for these apps), and even tickets from other local transit agencies. However, an agreement among local agencies will be needed initially.
- Possible changes to the fare policy or new discounts authorized by EPCT.

GEOGRAPHIC INFORMATION SYSTEMS

A GIS is a computer system that creates, manages, analyzes, and maps all types of data. A GIS connects data to a map by integrating location data (where things are) with descriptive information (what things are like there). This connection provides a foundation for mapping and analysis that is used in science and almost every industry. A GIS provides a powerful tool to understand patterns, relationships, and

geographic context. The benefits include improved communication and efficiency by providing the data to make better management and operations decisions. ESRI provides the most common GIS software tools.³²

For transit usage, a GIS may assist in answering critical questions. The mapping of transit lines stops and transit system coverage is the basis for various types of analysis. Demographic analysis answers the question of whom the public transit serves. By mapping the frequency of public transit service into the public transit data model, the ESRI network analyst tool may be used to determine how well people are served by transit. After creating a transit network data set, public transit travel may be modeled to determine if current routes provide access to major destinations.

The use of a GIS is also a step toward developing a GTFS data specification that allows public transit agencies to publish their transit data in a format that can be processed by a wide variety of software applications, including Google Maps. Locally, Google Maps provides the option to use Sun Metro Transit when using the navigation application. GTFS is split into two components. The schedule component contains schedule, fare, and geographic transit information. The real-time component contains arrival predictions, vehicle positions, and service advisories.

Asset management may be improved with GISs since GISs combine geographical data with item description. The description may include condition status or specific maintenance requirements that can be tracked more easily with GIS.

MAINTENANCE MANAGEMENT SYSTEMS

A computerized maintenance management system is software that assists with asset management, in particular maintenance assets. Currently, EPCT provides transit services through First Transit. As EPCT continues to grow its transit program with more assets (i.e., bus stops, shelters, buses, buildings, etc.), a computerized maintenance management system may be something to consider.

There are numerous benefits to such a system.³³ It reduces equipment failure and unplanned downtime. With proactive maintenance management, the equipment will receive proper care and scheduled inspections, which identify issues beforehand. The system extends the equipment's longevity. This element is one of the better-known benefits of maintenance. A machine that receives regular maintenance will perform better and last longer than one that only receives maintenance after malfunctioning. The system helps with workplace safety. Malfunctioning equipment is not only problematic for operations but can also cause workplace safety incidents. The management system improves equipment efficiency. Preventive maintenance provides the equipment with regular maintenance, lubrication, cleaning, and inspections that help it run more efficiently and identify any problems that might not be visible on the surface. The main benefit is that it helps keep costs under control. Emergency repairs are typically more expensive, and if spare parts are required, then they just

³² ESRI: What is GIS? <https://www.esri.com/en-us/what-is-gis/overview>

³³ Top 5 Benefits of Maintenance Management: <https://www.cloudapper.com/computerized-maintenance-management/top-five-maintenance-management-benefits/>

add to the costs and repair schedule. Maintenance management software costs vary between a low of \$3500 and a high of \$47,000, depending on the size of the operation.³⁴

The following are vendor options:

- Samsara.³⁵
- FMX.³⁶

TRANSIT SIGNAL PRIORITY

TSP tools modify traffic signal timing or phasing when transit vehicles are present. This step is done either conditionally for late runs or unconditionally for all arriving transit. TSP can be an effective tool that improves both reliability and travel time, especially on corridor streets with long signal cycles and distances between signals. In urban settings, TSP benefits are significantly amplified when implemented with other strategies like dedicated transit lanes.³⁷

Active signal priority uses a combination of onboard and roadside technology that determines what type of signal priority can be implemented. Conditional priority usually requires onboard AVL, GPS, optical or laser communication, or other link technology between the transit vehicle and the signal system. Implementation costs for TSP range from \$8,000 to \$35,000 per intersection.³⁸

The following are vendor options:

- Emtrac.³⁹
- Global Traffic Technologies.⁴⁰

TRAVELER INFORMATION SYSTEMS

A TIS is critical for both customers and transit agencies. This system enables transit customers to receive travel information regarding various modes of transit or other types of transportation that the traveler may take. They also facilitate lessening the burden on agency staff who provides customer information. A TIS includes a broad range of computer and communications technologies, ranging from a customer service phone line to an automated trip planner, to real-time transit and traffic information provided over a variety of media or mobile applications.⁴¹

³⁴ How Much Does Maintenance Management Software Cost in 2023? <https://priceithere.com/maintenance-management-cost/>

³⁵ Samsara: https://www.samsara.com/pages/fleet-maintenance?utm_source=google&utm_campaign=fleet_maintenance&utm_medium=search&utm_content=b&utm_term=maintenance%20management%20software&utm_ext_ad_id=kwd-15360371&utm_ext_adset_id=92310916074&utm_ext_campaign_id=1592842309&gclid=EAlaIqobChMloPCW7Z2E_gIVdhvUAR0-pwAaEAAYASAAEgJgTvD_BwE

³⁶ FMX: <https://www.gofmx.com/blog/bus-maintenance-software/>

³⁷ Active Transit Signal Priority: <https://nacto.org/publication/transit-street-design-guide/intersections/signals-operations/active-transit-signal-priority/>

³⁸ TSP Implementation Costs: <https://www.itskrs.its.dot.gov/its/benecost.nsf/ID/478b21edd18c9eae85256db100458929#:~:text=Implementation%20costs%20for%20transit%20signal,%248%2C000%20to%20%2435%2C000%20per%20intersection.&text=ITS%20Deployment%20Evaluation>

³⁹ Emtrac: <https://www.emtracsystems.com/transit/transit-signal-priority-tsp/>

⁴⁰ Global Traffic Technologies: <https://www.gtt.com/opticom-transit-signal-priority/>

⁴¹ TIS Technology Overview: <https://www.fhwa.dot.gov/publications/research/operations/its/jpo99038/fotatis.pdf>

A TIS can provide data in various formats as well as a basic transit system map that includes a simple schedule and fare information. It can also provide real-time information—through AVL technology—such as estimated wait or arrival times, route delays, traffic information, weather information, and emergency information. Complementary local information, such as landmark names and locations, street names, alternative names, addresses, transportation options available, road maps, information on paths, and other local information, may also be provided to assist travelers in trip planning.

A TIS includes several types of technologies utilized at various points in a traveler's trip:

- Pre-trip.
- In-terminal/roadside.
- In-vehicle (route).

TIS costs vary depending on the level of information provided, static or real-time, and the availability of complementary technologies.

WEATHER INFORMATION SYSTEMS

A WIS provides weather, hydrologic, and climate information and warnings of hazardous weather, including thunderstorms, flooding, hurricanes, tornadoes, winter weather, tsunamis, and climate events. It provides atmospheric weather observations and forecasts collected and developed by the National Weather Service, private sector providers, and research organizations. A WIS provides an interface of formatted weather data products suitable for online processing and integration with ITS' data products or other functions. These data may also be complemented with Doppler radar images, satellite images, severe storm warnings, and other products.⁴²

OTHER TECHNOLOGY TOOLS

The National Rural Transit Assistant Program (NRTAP) offers free tools to help transit agencies and transit planning staff. Some of these technology tools are web-based and others can be downloaded directly from the NRTAP's website dashboard⁴³ (most of them are designed in Microsoft Excel or Access files).

A different website that offers additional industry technology tools for transit planning staff is the National Center for Applied Transit Technology (N-CATT).⁴⁴ N-CATT is a technical assistance center funded through a cooperative agreement with FTA. The center's mission is "providing small urban, rural, and tribal transit agencies with practical, replicable resources that help them apply technological solutions and innovations." N-CATT provides small urban, tribal, and rural transit agencies with the right-sized and appropriate technology solutions to solve their technological problems (e.g., fare payment technology, AVL systems, scheduling, dispatch software, developed electrification plans, and tech investment road maps).

⁴² Weather Service Functionality: <https://www.elpasompo.org/UTEPWeatherSystems-WeatherServiceSystemFunctionality>

⁴³ <https://www.nationalrtap.org/Technology-Tools/Overview>

⁴⁴ <https://n-catt.org/>

GENERAL TRANSIT FEED SPECIFICATION

As defined by the GTFS central documentation platform,⁴⁵ GTFS is a data specification that allows public transit agencies to publish their transit data in a format that can be utilized by a wide variety of software applications. GTFS can be used in various software applications and web-based navigation and trip planning platforms. In general terms, GTFS information is split into a schedule component that contains transit schedule, fare, and spatial information and a real-time component that contains arrival predictions, vehicle positions, and service advisories.

According to FTA, the GTFS specification significantly increases the utility of transit service data, enabling current and accurate snapshots of transit services that support mobile applications such as mapping and routing services.⁴⁶ FTA estimates that around 35 percent of National Transit Data (NTD) reporters (transit agencies) have adopted the GTFS standard. As of May 2023, FTA required the annual submission of static GTFS data to the NTD and made reporting of GTFS a mandatory requirement for NTD reporters with fixed-route modes. *NTD reporters will be required to create and maintain a public domain GTFS data set that reflects their fixed-route service and to maintain a web link from which the GTFS data set can be collected. This requirement does not apply to capital asset-only reporters.* These new regulations apply to all recipients and beneficiaries of FTA grants under either the Urbanized Area Formula Program (49 U.S.C. 5307) or Rural Area Formula Program (49 U.S.C. 5311), which is the case for EPCT.

There are two types of GTFS data, static and real-time. GTFS Realtime is a feed specification that allows public transportation agencies to provide real-time updates about their fleet to application developers. On the other hand, GTFS static or static transit differs from the GTFS real-time extension by reporting/publishing familiar formats for public transportation schedules and associated geographic information.⁴⁷

As of May 2023, FTA requires annual of static submission of GTFS data to the NTD.

The list below summarizes the steps followed by the TTI team to generate GTFS static data based on the current EPCT system service configuration:

- The team started by identifying the available tools to generate GTFS data. ArcGIS PRO and ArcGIS Desktop offer a GTFS tool to convert existing point and line layers into GTFS (text) format. However, additional data such as transit schedules, fare information policy, number of trips per day, and other GTFS attributes cannot be generated using these ArcGIS tools. Nonetheless, ArcGIS software is an excellent tool to build and visualize route configuration and stop locations, as well as to share mapping information with other contributors to the GTFS processing. The GTFS.org⁴⁸ website is the central documentation platform for the GTFS file-building process. This site and its contents are maintained by MobilityData and the GTFS community.

⁴⁵ <https://gtfs.org>

⁴⁶ <https://www.regulations.gov/document/FTA-2022-0018-0001>

⁴⁷ <https://developers.google.com/transit/gtfs>

⁴⁸ <https://gtfs.org/>

- After reviewing the available tools to create GTFS files, the team decided to work with an online resource provided by the NRTAP. A significant reason for choosing NRTAP resources over ArcGIS products was that ArcGIS tools generate only a few of the basic GTFS data files required, and the EPCT staff has limited access to ArcGIS products' licensing. In contrast, NRTAP resources include no-cost online training, technological tools, webinars, and other resources for rural transit agencies that EPCT staff can access to update/modify GTFS data when needed. Furthermore, one of the NRTAP resources available exclusively for GTFS data is a webinar that focuses on trip planning data and creating GTFS data files.
- TTI gathered all data required for generating GTFS files. This information included the EPCT agency information, current and projected timetables and service hours, route configurations, stops (future stops in the case of EPCT planned fixed routes) and stop times, number of trips per route, feed info (GTFS metadata), fare collection method and policy, and bus transfers.
- The team then input all necessary data using the guidelines provided by NRTAP through the GTFS builder guidebook⁴⁹ and spreadsheet file generators. The team was in constant communication with the NRTAP staff to ensure the quality and accuracy of data used by the tool to generate the GTFS files package.
- The team created EPCT data as per the March 2023 system configuration. Note that Route 84 was excluded from the EPCT system to avoid duplication from the Sun Metro GTFS data. The resulting files are available in a compressed file package attached to this report.
- All EPCT current service GTFS files can be optionally uploaded to the NRTAP GTFS Builder no-cost website. The EPCT GTFS data will be stored on the NRTAP website but will not be published (GTFS data will go live on trip planning platforms). EPCT staff may authorize GTFS publication after the EPC legal department reviews and approves its publication, and all agreements with online trip planning websites may be reached. For more information about the legal agreements, NRTAP also offers a tool at <https://www.nationalrtap.org/Technology-Tools/GTFS-BUILDER/Support> under the Google Transit Sign-Up option.⁵⁰ Google Maps also offers an option to test and validate GTFS data once the agreement has been reached and before the GTFS data are available to the public (i.e., going live online).

EPCT current service GTFS files can be hosted at a NRTAP URL at no cost.

The team generated two sets of GTFS files. The first includes the current system service conditions as of March 2023. This first set contains the stops/time points that officially appear on the EPCT website maps. A second set includes some intermediate stops in between the time points to serve as a reference for users to board the EPCT buses along each line (trip planning platforms such as Google Maps do not allow continuous boarding/alighting transit services to be published). The two alternatives can be published as the EPCT system GTFS files in any trip planner platform accepting GTFS data. In general terms, the generation of GTFS files is summarized in Figure 23.

⁴⁹ GTFS Builder Guidebook, NTAP, April 2021

⁵⁰ https://support.google.com/transitpartners/contact/agency_participate?hl=en&cfsi=supported_languages&cfnti=6154582&cf=3

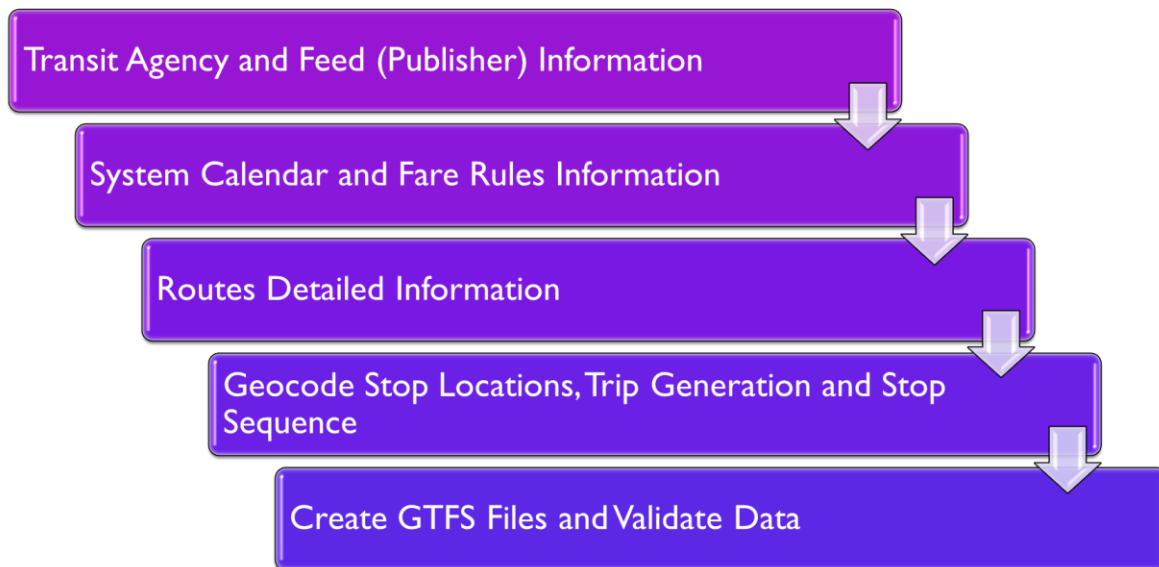


FIGURE 23. SUMMARY OF THE GENERAL TRANSIT FEED SPECIFICATION PROCESS

The individual EPCT GTFS files developed by the TTI team are listed below:

- **agency.txt** (contains agency information such as agency name, identification, contact information, URL, etc.).
- **stops.txt** (includes stop information such as stop name, georeferenced location, locations type, and parent station, among others).
- **routes.txt** (route identification number, short and long names, and route type).
- **trips.txt** (trip directionality, trip identification, service rules, wheelchair, and bicycle accessibility).
- **stop_times.txt** (boarding and alighting information, arrival, and departure).
- **calendar.txt** (identifies different calendar service names).
- **calendar_dates.txt** (identifies different calendar service dates).
- **fare_attributes.txt** (includes the payment methods allowed, trip and transfer cost).
- **fare_rules.txt** (contains information about the EPCT system fare rules).
- **shapes.txt** (route configuration and sequence).
- **feed_info.txt** (GTFS files metadata: publisher, language, service start and end, and contact).
- **transfers** (includes information about recommended transfer points between routes, dwelling time, time intervals between transfers, transfer time, and transfers among regional transit systems).

All the current EPCT service configuration GTFS files were created based on the information available at El Paso County Transportation. Projected service GTFS files were created using the list of stops from the preferred scenario described in Chapter 2. The TTI team will keep working with EPCT for any possible short-term changes that may involve major modifications to the GTFS information occurring during the development of this project. Figure 24 shows the set of EPCT system GTFS files shared with the EPCT staff for publications purposes.

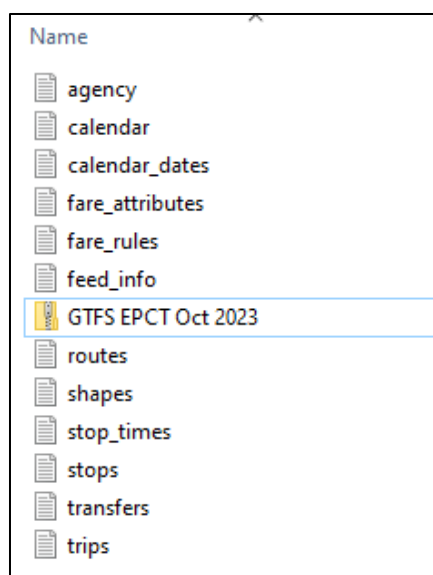


FIGURE 24. TEXT FILES INCLUDED IN THE EPCT GTFS PACKAGE

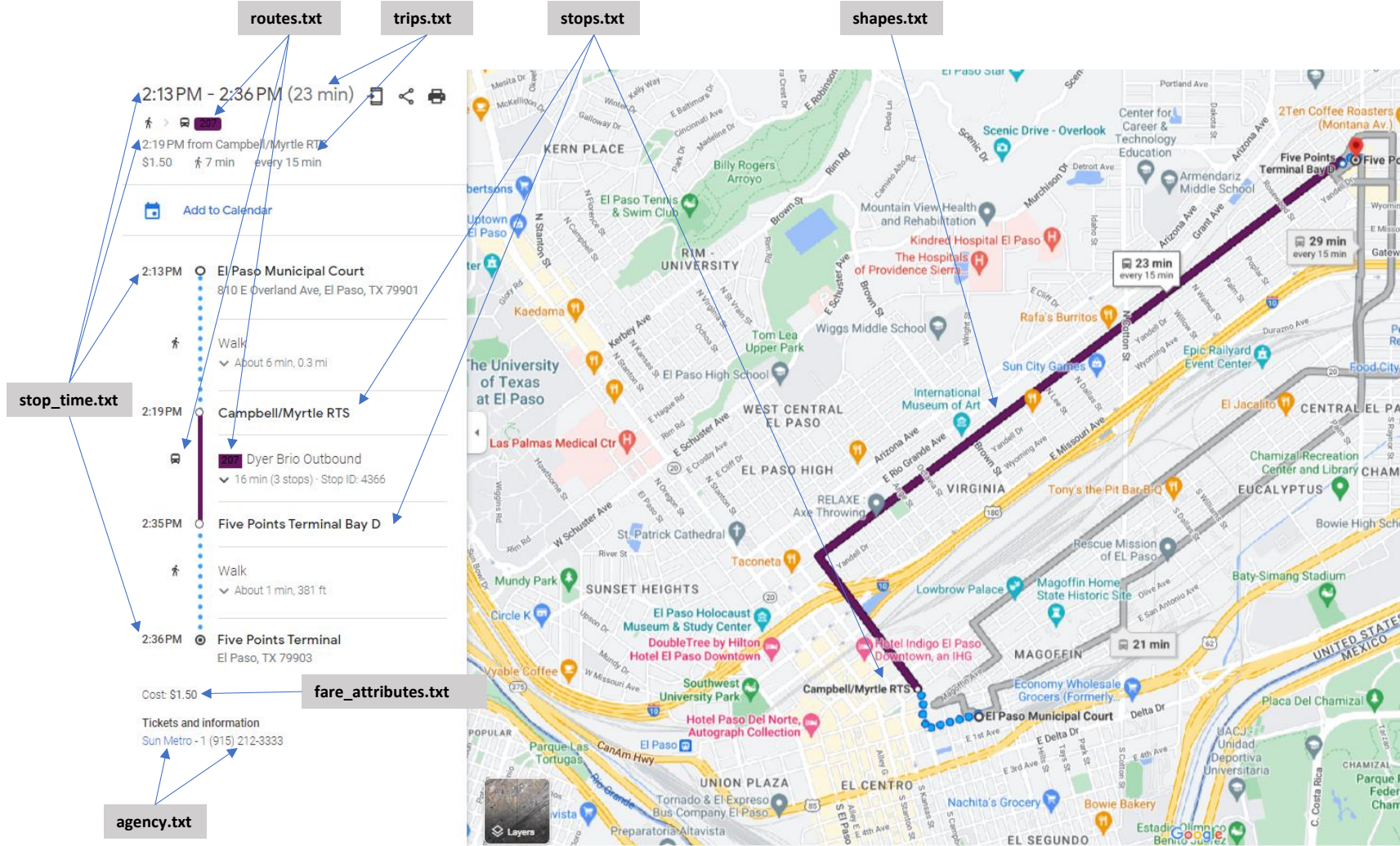
Once the GTFS are published, Google Transit allows users to announce temporary changes by creating and managing online real-time alerts. Managing alerts is an essential aspect of maintaining an efficient transit system, and the Transit Partner Dashboard provides a user-friendly interface to manage alerts. Provisional modifications to the system or an individual route—such as Free Summer Fare or the Texas Commission on Environmental Quality’s Ozone Action Day (when weather conditions are expected to be conducive to producing high levels of ozone pollution)—can easily be created, edited, or duplicated by navigating to the Feeds section and selecting Realtime Feeds. EPCT or First Transit staff members can configure manual alerts and view a list of alerts in chronological order. Each alert includes the start and end date for its validity, informed entities, effect, and cause. By hovering over an alert (Figure 25), EPCT staff can preview its content. Moreover, the list of expired alerts is available at the bottom of the page, which is automatically deleted from the system within 14 days. Overall, the Transit Partner Dashboard offers an intuitive and comprehensive approach to managing alerts.⁵¹

In October 2023, the TTI team updated the GTFS files to the most recent system conditions. These files are also part of the appendixes of this report and are available to be published and submitted to the NTD. Figure 26 shows an example of the Sun Metro GTFS files after being validated and published by Google Maps.

⁵¹ https://support.google.com/transitpartners/answer/6384212?hl=en&ref_topic=6384208&sjid=10032407315162021662-NA

Alert level	Effect	Example
CRITICAL	• NO_SERVICE • SIGNIFICANT DELAYS	 Significant delays
WARNING	• REDUCED_SERVICE • DETOUR • MODIFIED_SERVICE • STOP_MOVED	 Reduced service  Modified service
INFORMATION	• ADDITIONAL_SERVICE • OTHER_EFFECT • UNKNOWN_EFFECT	 Information

FIGURE 25. GOOGLE TRANSIT SERVICE ALERTS EXAMPLE



The resulting EPCT GTFS files are included as part of the deliverable package included in Task 3 of the project. These GTFS files can be published in different trip planning applications available online that support the GTFS format. Each online application/website requires its own instructions, requirements, and agreements before being published. TTI recommends that the fully validated set of GTFS files (zipped package) are published in the EPCT URL. In case EPCT cannot host these data, NRTAP offers this service at no cost. Table 15 shows some of the trip planning platforms that EPCT can consider for agreements to public GTFS data files.

TABLE 15. TRIP PLANNERS AND GTFS FEED

Trip Planning Platform	Contact Information
Apple	transit_contact@group.apple.com
Bing	bingmapstransit@microsoft.com
CityMapper	https://citymapper.com/contact
Google Transit/Google Maps	https://support.google.com/transitpartners/answer/1111481 https://support.google.com/transitpartners/contact/agency_participate
Moovit	https://moovit.com/contact-us/
National Transit Map	https://www.bts.gov/national-transit-map/how-participate
Rome2Rio	https://help.rome2rio.com/en/support/tickets/new
TransitApp	http://transitapp.com
Transit feeds	Open Mobility Data: https://transitfeeds.com
TransitLand feed registry	https://www.transit.land

Source: Adapted from NRTAP GTFS Builder.

For further GTFS information and how to propose or amend published GTFS best practices, the team recommends accessing the resources available at <https://gtfs.org/schedule/best-practices/#all-files>.

TECHNOLOGY IMPLEMENTATION PHASING PLAN AND TIMELINE

The following list summarizes the potential implementation process to develop a comprehensive rural transit technology implementation plan that meets the needs of the EPC community and improves the overall EPCT experience:

1. Identify the current transit challenges faced by the rural transit system. This process includes understanding the current transit infrastructure, ridership demand, current modes of transportation, and any limitations faced by the system.
2. Define goals and objectives for implementing innovative technology. This step may include improving access to transportation, increasing efficiency, reducing costs, or improving the overall rider experience.
3. Determine the potential demand (ridership) that will benefit from such technology.
4. Evaluate available technology options and determine which solutions best meet the goals and objectives of the plan. This step might include mobile ticketing, real-time vehicle tracking, on-demand transit services, or other innovative solutions.
5. Develop a timeline for implementing the chosen technology; consider any necessary hardware or software installations, training requirements, and testing periods.

6. Determine the necessary resources needed to implement the plan, including funding, staff, and community support.
7. Establish partnerships with key stakeholders, including transit agencies, technology providers, local governments, and community organizations. These partnerships can help secure funding, support advocacy efforts, and ensure successful implementation.
8. Regularly monitor and evaluate the implementation plan's progress to ensure that goals are being met and any necessary adjustments are made.

This section discusses the EPCT service plan in effect as of FY 2023. The identification of the need(s) will be crucial to create a path to apply the most suitable technology to address this need. Some of the most common needs that rural transit agencies must address are the following:

- **Reliability:** Transit systems need to be reliable and consistent in terms of scheduling and service frequency. Riders should be able to depend on the transit system to get them to their destination on time and without unexpected delays or cancellations. This subject can be addressed by implementing real-time tracking systems that help riders plan trips efficiently and reduce the amount of time spent waiting at stops. Real-time tracking can also help transit agencies monitor their vehicles and optimize routes for better efficiency (which provides environmental sustainability by reducing greenhouse gas emissions).
- **Accessibility:** Transit systems should be accessible to everyone, including people with disabilities, seniors, and individuals who cannot afford a private vehicle. This element means providing accessible vehicles, stops, stations, and easy-to-understand schedules and routes. Audio and visual announcement technology can improve accessibility for riders with hearing or visual impairments. Additionally, TSP technology can help improve accessibility by reducing wait times at intersections and making it easier for transit vehicles to stay on schedule. Mobile apps (fed with GTFS data) can also help by providing riders with real-time information about transit services, including schedules, arrival times, and service disruptions. Riders can also use mobile apps to plan trips and purchase tickets in advance, which can reduce stress and improve the overall transit experience.
- **Connectivity:** Transit systems should provide connections between different modes of transportation, such as buses, trains, and bikes, as well as connections to key destinations such as employment centers, schools, and healthcare facilities. ITS can help rural transit agencies monitor and manage their operations more efficiently by providing real-time data about traffic and transportation patterns. Additionally, real-time tracking, and integrated fare payment systems can make it easier for riders to pay for and access multiple modes of transportation using a single payment method. For instance, a single smart card or mobile app can serve to ride the bus and rent a bike from a bike-sharing service.
- **Affordability:** Rural transit agencies need to provide affordable transit services, particularly for low-income riders who may not have access to other transportation options. An example of technology to reduce operating costs is the use of automated dispatching. Automated dispatching systems can help rural transit agencies streamline their operations and improve

efficiency by automating the process of assigning vehicles to routes and drivers. This step can help reduce costs and improve service reliability.

- **Coverage:** Rural transit agencies need to provide coverage to a wide geographic area, often with limited resources. It is important to provide service to as many communities as possible, while also optimizing routes and schedules to ensure efficient use of resources. Technology such as microtransit, on-demand transit, or rural ridesharing (in which Uber/Lyft services can be adapted to serve rural areas by using technology to connect riders with nearby drivers, and by providing incentives for drivers to serve low-demand areas) can help improve coverage and access to transportation services in areas where traditional transit options are limited.
- **Safety and Security:** Transit systems should be safe and secure for riders, both in terms of physical safety and security from crime. This includes well-lit stations and stops, secure vehicles, and trained staff who can respond quickly in case of an emergency. Technology frequently used to address this need is CCTV in vehicles and, at stations, APC systems (sensors or cameras to automatically count passengers as they board and exit transit vehicles to make sure vehicles are not overcrowded/overloaded beyond their capacity), emergency communications systems, ITS, and collision avoidance systems.

After the identification of the specific need, the TTI recommends setting a timeline for the implementation of the technology that helps improve that transit need. An overall scheme of a future technology implementation plan is shown in Figure 27. The plan/scheme assumes that the main goal for EPCT is to improve the system's reliability. Bus reliability is achieved when scheduling and service frequency is consistent at any time during the service hours. Utilizing the technological tools shown in Figure 27 is a potential strategy to enhance the reliability of transit systems. Additional technological advancements can also be achieved while improving the system's reliability. Improvements in transit safety, communications, fare collection methods, dispatching, monitoring, control, and connectivity might all be a subsequent outcome of implementing advanced transit technologies. Figure 27 illustrates how these various technologies work together to improve the overall efficiency, effectiveness, and safety of transit operations. Most importantly, by leveraging the latest transit technologies, EPCT can enhance rider experience, reduce costs, and increase ridership while providing a safer and more reliable service to the El Paso County communities. The team developed the technology implementation phasing separated by terms (short, medium, long) to account for the EPCT's own decision and processing times.

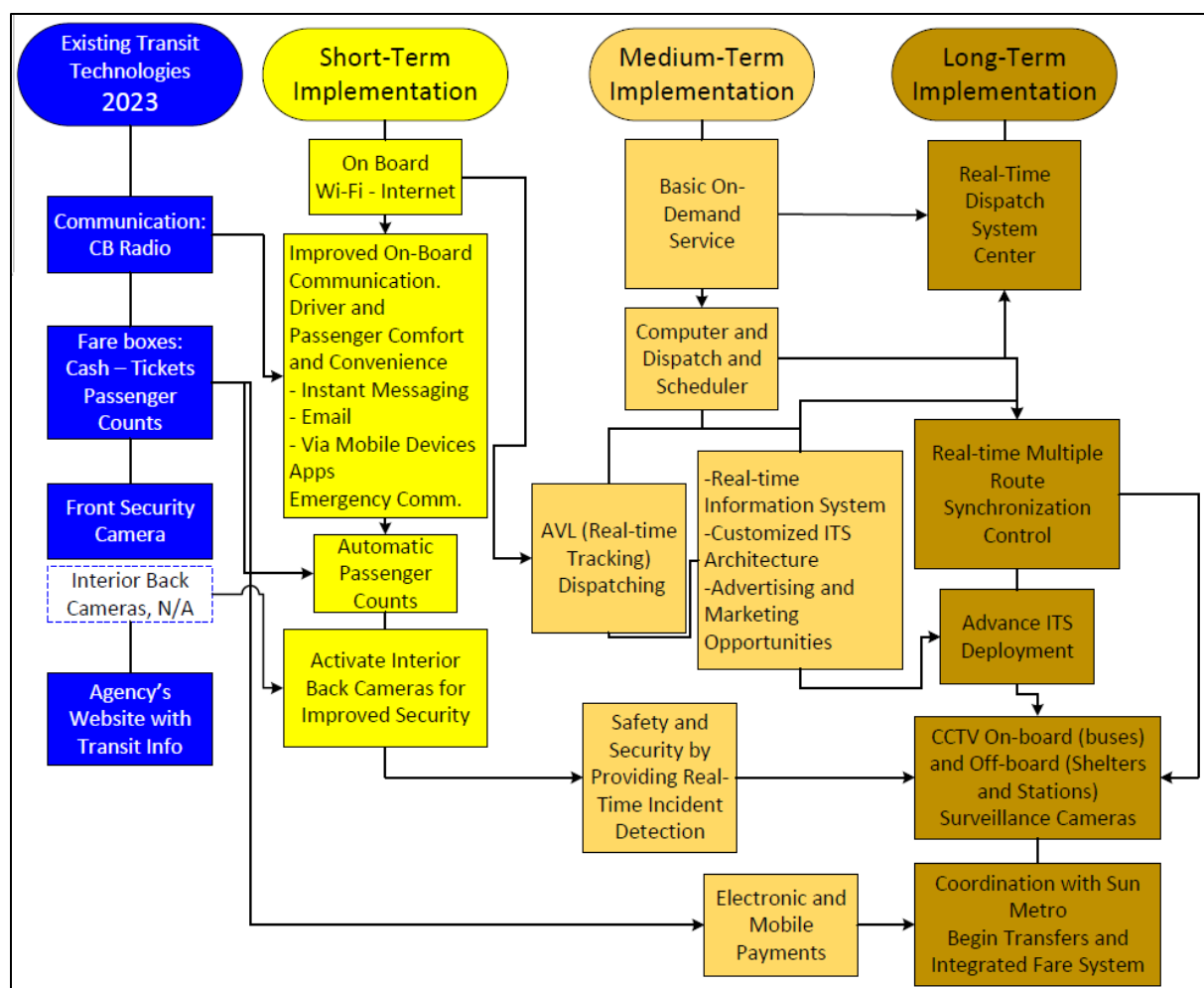


FIGURE 27. EPCT POTENTIAL TECHNOLOGY IMPLEMENTATION PLAN

SUMMARY AND CONCLUSIONS

This chapter examined the current and potential technology solutions available to enhance the EPCT system. The first section evaluated the current technology available on- and off-board the EPCT vehicles and at the operation management center. The second section described advanced transit technologies, such as ITS, that can improve the efficiency, safety, and sustainability of transit systems. The third section explained the use of the GTFS data format to provide transit information to passengers through digital platforms and the process to create the package of GTFS files specifically for the EPCT's existing and upcoming conditions. Finally, the last section outlined a hypothetical plan for implementing new technology solutions in a transit agency, including the typical phases, tasks, and timelines necessary for a smooth and efficient transition. Overall, this chapter provides a comprehensive overview of the technology available to improve the EPCT system and customers' experiences.

As stated in this chapter, the success of implementing technology solutions for any transit system depends on various factors such as user requirements, operational constraints, and technical feasibility. In the case of EPCT, the technology implementation plan priorities will be set based on discussions with EPCT staff members. These discussions will help identify the most pressing technological needs of the

transit system and prioritize them according to their importance. The input from the staff members who have practical experience and knowledge of the system's day-to-day operations will ensure that the implementation plan meets the transit agency's specific needs. Based on these discussions, the implementation plan will be revisited to amend the project timeline, resource allocation, and technical specifications. Overall, by involving the EPCT staff members (including the operating agencies First Transit and Sun Metro) in the decision-making process, the technology implementation plan will be more effective in addressing the transit system's needs and achieving its goals.

The cost of deployment transit technology varies depending on several factors, such as the specific technology solutions chosen, the transit agency's existing infrastructure, and the geographical location. However, a general estimation⁵² of the potential costs of basic ITS' technology implemented at a midsize rural transit agency with a fleet of 26 buses involves the following:

1. **Hardware and Software:** The hardware and software needed for basic ITS' technology such as AVL, CAD, and passenger information systems can range from \$10,000 to \$50,000 per bus, depending on the complexity of the system and the vendor selected. For 26 buses, these modifications can cost anywhere from \$260,000 to \$1.2 million.
2. **Installation and Integration:** Installing the hardware and software for ITS can involve additional costs, such as cabling, mounting equipment, and other materials, which can cost an additional \$2,000 to \$5,000 per bus. Integration costs, including system design, testing, and deployment, can add up to \$10,000 to \$20,000 per bus.
3. **Training and Maintenance:** Once the system is installed and operational, training and maintenance costs will be necessary. Training costs can vary depending on the training program's duration and the number of staff members receiving the training. Maintenance costs can range from \$2,000 to \$5,000 per bus annually.

One successful example of creating an advanced public transit system for a midsize transit system demonstrated costs of approximately \$200,000 in 2023 dollars. The experience of San Luis Obispo (SLO) Transit in implementing AVL, software, dynamic messaging signs, and real-time passenger information systems generated multiple benefits for the agency and the passengers.⁵³ An SLO Transit study was performed to assess the potential expansion of these technologies to other small and middle-sized systems if the SLO Transit system was found to be economically feasible. The total cost of equipment, construction, installation and maintenance for components of the SLO Transit system was \$149,515.13 in 2007 dollars. In order to calculate the inflation-adjusted value, the TTI team used the U.S. Bureau of Labor Statistics' inflation calculator.⁵⁴ According to the calculator, the inflation rate between 2007 and 2023 is 27.8 percent. Therefore, \$149,515.13 in 2007 is equivalent to \$191,153.08 in 2023 dollars.

For all transit systems, providing accurate and up-to-date transit information to passengers is critical in ensuring seamless and efficient transit experiences. Therefore, it is essential to revisit and update the GTFS files regularly. In the case of the EPCT system, all GTFS files will be revisited before the project ends

⁵² Estimates based on 2023 dollars.

⁵³ USDOT. ITS Joint Program Office. <https://www.itskrs.its.dot.gov/its/benecost.nsf/ID/bbad35943dad3f7a852578ae0065e150>

⁵⁴ https://www.bls.gov/data/inflation_calculator.htm

to ensure that the latest changes in the EPCT system are included. The project team will continue monitoring, reviewing and updating the GTFS files to reflect any short-term upcoming changes in the transit system's routes, schedules, stops, or fare policies. Moreover, the project team will also ensure that the GTFS files comply with the latest industry standards and specifications once the EPCT staff complete the agreements with the selected trip planning platform(s).

CHAPTER 5. ADA COMPLEMENTARY PARATRANSIT IMPLEMENTATION PLAN

This chapter summarizes the TTI team’s research and analysis for the completion of Task 4 of the EPCT implementation plan—ADA Complementary Paratransit Implementation Plan. The chapter provides an overview of key aspects related to ADA paratransit services and some of the potential strategies for its implementation. Additionally, this chapter describes implementation strategies to meet ADA paratransit service planning’s unique needs for El Paso County region demographic characteristics. Additionally, the chapter explores the progressing paratransit service models, which encompasses management structures, service delivery frameworks, and the integration of nondedicated service providers to optimize efficiency and expand capacity. Last, Chapter 5 explores two approaches EPATS might follow to implement ADA paratransit. Transfer and service area issues are also discussed in relation to these two approaches. This chapter is divided into the following sections:

- Section 1 defines the six criteria that paratransit service must meet—service hours, coverage area, next-day reservations, fare limits, no trip purpose restrictions, and no capacity constraints.
- Section 2 describes the criteria for premium services that go beyond ADA requirements, such as extending to locations outside the $\frac{3}{4}$ -mile corridors or extending after regular fixed-route service hours.
- Section 3 emphasizes ADA paratransit service models’ three key elements: management structure, service delivery organization, and service mix.
- Section 4 describes how the performance of ADA paratransit services involves balancing service efficiency with quality; metrics include on-time performance (OTP) and productivity. The factors that affect productivity— such as service area size, traffic congestion, demand density, OTP standards, pickup window span, trip characteristics, overflow provider use, and available mobility options—are emphasized.
- Section 5 highlights current transit technology and its impact on ADA paratransit services. This section presents a list of available transit technology, including computerized scheduling systems, continuous dynamic optimization (CDO) automating scheduling, and advanced dispatching processes.
- Section 6 provides an explanation of the two approaches EPATS can explore for implementing ADA paratransit: Approach 1 involves contracting with First Transit (the current FRT contractor), and Approach 2 considers leveraging Sun Metro’s contract with MV Transportation.

ADA PARATRANSIT—WHAT IS IT? WHAT IS REQUIRED?

The ADA requires any public transit agency—urban or rural—that provides FRT service to also provide complementary paratransit to ADA paratransit-eligible individuals, defined as individuals whose disabilities prevent their access to and/or independent use of the fixed-route service. Under the ADA, ADA paratransit must be provided by the transit agency where and when those services are provided. Transit agencies must also establish an eligibility process to determine which individuals qualify for ADA paratransit service.

ADA regulations also stipulate that the following six service criteria must be met, ensuring that paratransit service is comparable to FRT service:⁵⁵

1. Service days/hours.
2. Service area.
3. Next-day reservations.
4. Fares.
5. No restrictions/prioritization based on trip purpose.
6. Absence of capacity constraints.

SERVICE DAYS AND HOURS

Under the first criterion, transit agencies operating fixed-route service are obligated, at a minimum, to provide ADA paratransit service to individuals deemed ADA paratransit eligible ***when FRT service is provided.***

Days and service hours must match—at a minimum—to the service days and hours of the fixed routes in question. Note that ADA paratransit service can have different service days and hours in different areas if the FRT service days and hours similarly differ.

SERVICE AREA

The minimum required service area is described by the $\frac{3}{4}$ -mile corridors about each fixed route plus smaller donut holes. The trips of ADA paratransit customers living outside of this service area must be served, but only if the origin and destination of their trip are within the defined service area. Thus, such riders must get into the service area independently.

If the $\frac{3}{4}$ -mile corridor crosses a jurisdictional boundary, the transit agency must nevertheless provide service. The exception is when a “legal bar” exists to crossing the jurisdictional boundary; however, these restrictions are incredibly rare and unlikely to be applicable.

NEXT-DAY RESERVATIONS, TRIP NEGOTIATIONS AND SUBSCRIPTION SERVICE

A transit agency with an ADA paratransit obligation must provide for *next-day reservations*. What this means is that an ADA paratransit customer must be able to make a reservation on the day before the trip date (up until the reservations line closes on that day.) If ADA paratransit service is provided daily, a customer must be able to make a reservation on Sunday for Monday service. If the agency does not have a reservation agent working on Sunday, it must provide a mechanism for the customer to make the reservation on Sunday. Some public transit agencies allow for after-hour requests via emails and/or phone messages.

Although there is no requirement for advance reservations (beyond next-day reservations), most transit agencies do allow this practice by establishing advance-reservation policies. Common advance-reservation periods include up to 14 days in advance (or more), up to 7 days in advance, or shorter (e.g., up to 5 days or up to 3 days in advance). The primary benefit of an advance-reservation policy is that it

⁵⁵ FTA Circular 4710.1 ADA Guidance, Chapter 8 (Nov. 4, 2015)

allows a customer to lock in a trip to the doctor, for example, in advance. The downside of a long advance-reservation period is that customers may make placeholder trip reservations that result in higher levels of late cancellations and no-shows, which in turn have a negative impact on productivity and OTP. In contrast, a shorter advance-reservation policy counteracts that outcome because customers are more sure of their travel plans the closer it is to the travel date. Some systems have only next-day reservations for this reason.

Transit agencies are obligated to provide confirmations of the pickup window no later than the day before the trip date. This confirmation can be done in real-time, as described above, or at a later time (delayed scheduling).

If a transit agency employs real-time scheduling (reservation agents assigning a trip to a run immediately after a customer's reservation is booked) and there is no apparent solution, the reservation agent may employ *trip negotiation*, which means that the reservation agent can search for and offer an alternative pickup time plus or minus 1 hour from the original requested pickup time. If there are solutions available, and the rider does not accept the offered pickup time, instead choosing not to travel, the trip request is deemed a *refusal*. If there are no solutions within the negotiation period, the request should be deemed a *denial*. If a pickup time beyond the trip negotiation period is offered and accepted, the transit agency is still obligated to record a denial because it is an important data point in establishing whether or not there may be a pattern of denial, thereby suggesting a capacity constraint. There is also a reasonability test to trip negotiation. For example, if a person gets off work at 5:00 p.m., an alternative pickup time prior to 5:00 p.m. cannot be suggested.

Similar to advance reservations beyond the next day, there is no requirement to offer subscription service, but many transit agencies do offer subscription service because it reduces the call volume, and if the trips are scheduled well, they can actually increase both productivity and OTP. Some transit agencies put a limit on subscription trips, and at one point in time, the guidance was to limit subscriptions to no more than 50 percent of the available capacity at any given point, but this guidance is effectively superseded by the sixth criteria—no capacity constraints. Consequently, a transit agency can have subscription trips taking up more than 50 percent of the capacity if there are no capacity constraints. In addition, since there are no obligations, a transit agency can define a subscription trip in different ways—a minimum of three times per week, for example.

FARES

ADA paratransit fares must be no more than twice the fare of the fixed-route service it complements—that is, for a similar trip at a similar time of day. If there are two fixed routes that fit this criteria but have different fares, then the ADA paratransit fare must be no more than twice the lower of the two. If the fixed-route trip requires a transfer and there is a transfer fee (or two fares are charged—one for each leg of the trip), this action must factor into the calculation of the ADA paratransit trips. Transit agencies may charge the same fare to a rider's companion(s); however, personal care attendants (PCAs) and service dogs may ride free. Importantly, companions and PCAs must have the identical origin and destination of the paratransit-eligible rider. Transit agencies may also limit the number of companions.

If the fixed-route system is fare-free, the ADA paratransit fare must be free as well.⁵⁶ Currently, EPCT has a free-fare promotion; if this were to be repeated next summer, the ADA paratransit service would also be free-fare.

Over the years, several transit agencies have offered free fares on transit for ADA paratransit customers while charging fares to other riders. On one hand, this practice may seem like an oxymoron because ADA paratransit customers' disabilities prohibit or limit their use of the fixed-route service. For this reason, some transit agencies only extend this free-fare program to conditionally eligible customers. Nevertheless, a free fare on transit can be attractive, and if the transit agency can entice ADA paratransit customers to use the FRT service instead of making a paratransit trip, the demand for ADA paratransit service can be reduced, leading to reduced costs. Moreover, the rider gains some independence from not having to request a trip in advance and gets to travel at no cost. However, if transit agencies implement such a program, *a very stringent eligibility process* must first be in place because there will be several new applicants for ADA paratransit who have no desire to utilize the ADA paratransit but are interested in getting a free ride on transit.

As mentioned above, a transit agency can negotiate sponsorship rates with sponsoring human service agencies that are higher than its ADA paratransit fares (and indeed whatever the market will bear) for their clients who are dually eligible, or for clients who are not ADA paratransit-eligible, but the transit agency is willing to serve on the service agency's ADA paratransit service platform. Although most of these arrangements involve third-party billing (with the transit agency billing the sponsoring agency at the end of each month, for example), a transit agency can also establish special agency rates for tickets or monthly passes purchased by a sponsoring agency.

NO RESTRICTIONS/PRIORITIZATION BASED ON TRIP PURPOSE

There can be no restrictions or priorities based on trip purpose, and the guidance is that a transit agency reservation agent should not even ask. Note, however, that a transit agency can limit subscription trips and will-call returns by trip purpose because subscription trips and will-call return trips are not required. Thus, for example, a transit agency might only allow a will-call return trip for a medical appointment.

ABSENCE OF CAPACITY CONSTRAINTS

A transit agency may not limit the number of trips a person may make. Second, a transit agency may not place a caller's name on a waiting list (saying they will be called if space opens up or suggesting they call later) because there is no more capacity. By contrast, a transit agency can try trip negotiation (see above) or accept a trip without assigning it to a run as long as the transit agency provides the customer with a confirmed pickup window on the day before the trip date. In general, though, a transit agency must accept or deny the trip.

That said, the sixth service criterion for ADA paratransit is that there cannot be capacity constraints that effectively limit a customer's access to the service.

⁵⁶ Note that during the COVID-19 public health emergency, some agencies went fare-free for public safety reasons.

There are five metrics that transit agencies and FTA reviewers use that can point to a capacity constraint. These metrics are patterns of denials, late trips, missed trips, excessively long trips, and average and maximum telephone hold times. Transit agencies should have practices in place to (a) report on these metrics, and (b) analyze the data to see if patterns that suggest capacity constraints exist. Patterns can exist even if a transit agency is meeting its standards overall.

It is also important to note here that a pattern in any of these areas can exist even if standards are met or exceeded. This pattern might include, for example, frequent late trips or exceedingly long trips as experienced by riders from the same area, or substandard hold times on specific days and at specific times, such as Mondays when the phone lines for reservations first open up. Moreover, even if it is unlikely that a pattern does exist because of exemplary service statistics in these five areas, a transit agency may face a finding of noncompliance if the agency does not have a process in place to detect such patterns. In short, transit agencies must not only track these measures (and establish a standard) but also have a process in place to identify any patterns in each area, regardless of whether or not each standard has been achieved.

Each of these five metrics is discussed below.

DENIALS

A denial is to be recorded when:

- A trip request *cannot* be accommodated at the requested time +/- 60 minutes (within reason) because of capacity constraints.
- A trip request *can* be accommodated but beyond the +/- 60-minute negotiation period, with the rider either choosing to accept or to refuse the offered pickup time.

The phrase “within reason” is included in the first definition because, as discussed above, there are circumstances when a pickup time is available and offered within 60 minutes of the requested pickup time, but that time is incompatible with appointment times, work or class start or end times, building opening and closing times, etc. For example, the pickup time for a return trip might be offered when the rider has not yet concluded their workday.

The second part of the definition needs to be heeded. It is common in the industry for such denials to not be tracked. When systems report zero denials, most FTA reviewers will dig deeper to see how denials are tracked, and if there is not a process in place, the agency will be found to be noncompliant.

Having a denial performance standard of zero is admirable but may be unrealistic if denials are defined and tracked correctly. A more appropriate standard is to have no *pattern* of denials.

ON-TIME PERFORMANCE/LATE TRIPS

FTA policy leaves to the local transit agency the details and span size of the pickup window for ADA paratransit service as well as any other details of what is considered on-time versus late. It is generally a good idea to also involve the disability community when developing standards. Commonly, a trip is considered to be ***on time*** at the pickup location if:

- the vehicle arrives within the confirmed pickup or drop-off window that is confirmed with the customer, and
- the trip is completed (see also definitions of no-shows and missed trips).

In the case of trips requested based on an appointment time or requested drop-off time, a trip can be deemed late if the vehicle does not arrive during the confirmed pickup window or if it arrives late to the destination.

There is really no consensus in the industry about the span of the pickup window. Thirty-minute spans are very common and provide much flexibility on the scheduling side, which translates into greater efficiency. However, from the customer perspective, the larger the span, the more inconvenient it is. The shorter the span, the tougher it is to be on time. Other common 30-minute pickup windows include -10/+20 and 0/+30. Some transit agencies have established 20-minute spans as a compromise between scheduling efficiency and customer convenience. The most common of these are -5/+15 and 0/+20. Less common are transit agencies that have put a premium on customer convenience and offer a 15-minute pickup window, such as -5/+10 and 0/+15. In cases where the window includes a (-) component, it is important for a reservationist to work with the customer in setting the requested pickup time. For example, if a rider gets out of work at 5:00 p.m. and has a pickup window of -/+15 minutes, the customer should not be requesting a 5:00 p.m. pickup because it could result in several no-shows. Under such circumstances, the reservationist should work with the rider at booking to suggest a requested pickup time of 5:15 p.m.

FTA guidance also directs transit agencies to allow for reservations based on appointment times or requested drop-off times. Transit agencies can also establish a drop-off window similar to the pickup window, meaning that a drop-off will be on time if it arrives, for example, up to 20 minutes before—and no later than—the requested drop-off time. Although customers cannot also request a pickup time (it has to be either a pickup time or a drop-off time request), transit agencies must all provide a confirmed pickup window for trips requested based on an appointment or requested drop-off time. Common windows for drop-offs (where a drop-off/appointment time has been requested or indicated) are -15/0 and -20/0. Some agencies have also adopted the policy that a rider cannot be dropped off “x” minutes before a building opens up in the morning if that open time is communicated by the rider.

Industry standards for OTP fluctuate with the span of the pickup window, as shown below. In short, the wider the span, the easier it is to be on time. However, FTA suggests that transit agencies not establish an OTP standard below 90 percent.

MISSED TRIPS

A missed trip is an event where (a) the vehicle never arrives; (b) the vehicle arrives early and departs before the pickup window begins; (c) the vehicle arrives on time or late but departs before the 5-minute wait time is over; (d) a driver fails to carry out specific instructions included with the reservation (e.g., a specific building entrance, door-to-door assistance, honk on arrival, etc.), which results in the rider missing their ride; or (e) the vehicle arrives after the pickup window and the customer does not appear or cancels-at-door.

Such an event is the fault of the service delivery operator and not the rider. Missed trips are not no-shows and need to be tracked separately because they are, again, one of five metrics that point to the possibility of a capacity constraint, which is a compliance issue.

Most transit agencies have not established a standard (a not-to-exceed maximum) for missed trips. Those agencies that do commonly set it as 0.5 percent of the total trips scheduled.

EXCESSIVELY LONG RIDE TIMES

The percentage of excessively long ADA paratransit trips is another service quality metric that can also point to capacity issues. Many ADA paratransit systems have set a maximum ride time standard, such as 90 minutes, and this standard may be used in their scheduling software to identify such instances and to preclude the scheduling of such instances.

However, for ADA paratransit services, the FTA defines an excessively long trip as a travel time that is longer than the travel time for the same trip taken on FRT service but also factors in travel time to/from stops and reasonable wait and transfer times. Since this definition is used in contracts, exceptions may be added, such as in cases when the excessively long ride time is caused by factors that are beyond the control of the contractor.

A common standard in the industry is to have no more than 5 percent of the trips deemed excessively long.

Many transit agencies use a trip planner (their own or Google) to get this information. The analysis should include a statistically relevant sample of trips of all lengths and times and also focus on suspected possible patterns because, in the end, a transit agency wants to know which completed trips are excessively long, not only to make the system better but to ensure compliance.

TELEPHONE ACCESS

Telephone access is another service quality metric that can also point to a capacity constraint if there is an insufficient number of call-takers (or telephone lines) to handle the demand. Most incoming calls from customers can be categorized into four groupings. Note that when considering capacity issues, the first three groups are considered more critical:

- Service requests subdivided further into advance reservations versus same-day requests (if allowed) such as will-calls.
- Cancellations.
- Same-day customer issues (e.g., ETA requests and “where’s my ride?” calls).
- General requests for information.

The daily and hourly figures for call volumes and hold times can often point to certain days and hours of the week when substandard telephone access exists and when there is a capacity constraint. Remember that the FTA’s ADA paratransit policies indicate that a capacity violation may exist where patterns of substandard telephone access occur. The most common examples where such constraints exist is when the supply of call-takers and/or the supply of telephone lines are outstripped by the volume of incoming

calls or when the volume of same-day calls (associated with customer issues) is extremely large because of late service stemming from an undersupply of vehicles or drivers. Requests for same-day service alone (over and above what ADA paratransit minimally requires) can also substantially increase the demand for service and hence the corresponding number of incoming calls.

A common standard is for the average hold time for any hour of any day not to exceed 2 minutes and for the longest hold time in any hour of any day not to exceed 5 minutes.

DETERMINING PATTERNS OF CAPACITY CONSTRAINTS

Even if all standards based on percentage are achieved, a pattern of excessively long ADA paratransit trips may indicate a capacity constraint (e.g., if a limited supply of service forces schedulers and dispatchers to schedule rides to the point where a rider is on board for an excessively long period). For example, while a transit agency may be meeting its 90 percent OTP goal, it still may have a pattern of late trips at a certain time emanating from a certain service area. In this case, a capacity constraint exists. Moreover, if a transit agency has an average hold time for the month that is below its 2-minute threshold but the average on Mondays from 8:00 a.m. to 9:00 a.m. is 5 minutes, a capacity constraint exists.

OTHER MISCELLANEOUS GUIDANCE

PRESUMPTIVE ELIGIBILITY

Transit agencies are given 21 days to rule on a completed application for ADA paratransit. If they have not made a determination and communicated that determination within that time frame, the applicant is to be presumed eligible and shall be registered as a customer and allowed to utilize the ADA paratransit until a determination is made.

ORIGIN TO DESTINATION

ADA guidance has been provided since the regulations were first published to clarify aspects of service provision. This guidance has clarified, for example, the requirement that ADA paratransit must provide *origin-destination* service. According to the guidance, a transit agency may establish the ADA paratransit service policy as either *curb-to-curb* or *door-to-door*, but the agency must ensure that riders can actually get from their origin point to their destination point. This process means the transit provider will need to go beyond the curb to assist some riders to or from their door per the riders' needs if the established policy is curb-to-curb.

NO-SHOWS AND LATE CANCELLATION POLICY

A no-show is an event when either of the following occurs:

- A vehicle arrives at the pickup location within the pickup window and the customer is not present or does not appear within 5 minutes.
- A vehicle arrives before the start of the pickup window, the 5-minute wait time starting at the beginning of the confirmed pickup window elapses, and the customer is not present or does not appear within 5 minutes.
- A vehicle arrives at the pickup location and the customer cancels-at-door.

A common practice in this event is for the driver to notify the dispatcher with a no-show request. The dispatcher then (a) confirms that the driver is in the right location, (b) attempts to contact the customer, and (c) notifies the driver to either wait further (if the dispatcher confirmed with the customer that they still wish to make the trip) or to continue with the run to the next location on the driver manifest to pick up or drop off another rider. However, in no circumstances can the driver depart without first waiting 5 minutes as described in the first two bullets above.

No-shows occur only when a vehicle is present within the confirmed pickup window. As previously mentioned, if a vehicle arrives after the pickup window and the trip is not completed (for whatever reason), it is to be deemed a missed trip.

Transit agencies also may establish a policy for cancellations; for example, all cancellations must be called in at least 2 hours before the start of the pickup window, and cancellations called in later are deemed “late cancellations.”

Typically, the percentage of no-shows plus late cancellations should not exceed 5 percent since both events can have a negative impact on both OTP and productivity.

Consequently, transit agencies to suppress or reduce this percentage have established no-show/late cancellations where a progressive number of such events result in a warning and then a progressively longer suspension from service.

WILL-CALL RETURN POLICY

There are two common approaches to the delays that often happen at medical and other appointments:

- The first is to be very conservative when setting the return trip pickup time. This practice minimizes the disruption with the schedules because it minimizes no-shows. The downside is that riders may have to wait longer for the vehicle to arrive if a medical appointment does not take as long as envisioned.
- The second approach is to allow “will-calls” in cases where the rider is a no-show (or notifies the call center that he/she cannot make the return trip pickup time) because of a delayed appointment.

Most systems use 60 minutes for will-call trip response time and for re-emerging no-shows.

COMPLAINTS

Customers should be provided with an easy and apparent way to register a complaint. Additionally, FTA requires that transit agencies keep a record of complaints specific to the ADA.

It is important that transit agencies establish a standard—in terms of a number of days—for responding to complaints in writing. A common standard for this is 21 days, which gives the transit agency sufficient time to investigate the complaint and provide a resolution to the complainant.

It is also very important that complaints be grouped into categories such as driver-related issues, vehicle-related issues, circuitous routing, (chronically) late pickups or arrivals, etc.

By categorizing complaints as such, it is possible for the transit agency to gauge whether complaints accurately correspond to service shortcomings. For example, if the number of complaints about lateness is minuscule when compared to actual data that point to a poor OTP, one might guess that customers are having trouble registering complaints and/or that not all complaints are being properly registered (if transit agency staff are not intaking complaints). Similarly, if a contractor is reporting excellent OTP while the number of late-trip complaints is huge, it is possible that the OTP data provided by the contractor may be inaccurate. For this reason, it is not a good idea to assign the complaint management process to a turnkey or operations contractor because it poses conflict-of-interest issues.

Many transit agencies also establish a standard complaint frequency ratio as the number of complaints per 1,000 registrant trips or 10,000 registrant trips. The suggested standards in Table 16 show both denominators.

TABLE 16. STANDARD FOR COMPLAINT FREQUENCY RATIO

Rating	Per 1,000 Registrant Trips	Per 10,000 Registrant Trips
Excellent	Under 1	Under 10
Good	Between 1 and 3	Between 10 and 30
Poor	Over 3	Over 30

PREMIUM SERVICE

Some transit agencies, at their discretion, do provide service beyond what is minimally required under the ADA, such as providing service to origins and/or destinations that are beyond the $\frac{3}{4}$ -mile corridors and/or at times when the FRT service has stopped operating.

Even though these trips are served on the same service platform as—and may even be commingled with—ADA paratransit trips, these premium service trips are not ADA paratransit trips. There is no federal obligation for a transit agency to provide them, and transit agencies do so at their own discretion. Technically, this premium service does not have to abide by the other criteria above, but some transit agencies do serve them in the exact same way as their ADA paratransit trips and they do so, again, because they want to and not because they are required to.

An example of premium service is when the FRT service hours differ but the transit agency establishes one end time for the entire region just to make it simple for customers to understand. As another example, some transit agencies have chosen to offer service to a larger area than required, such as to the entire city or county rather than to just the $\frac{3}{4}$ -mile corridors around fixed routes, thereby establishing two tiers, with the first tier being the required service area and the second extending to the jurisdictional limits. Although the fare in the first tier can be no more than twice the fixed-route fare (in keeping with ADA regulations), fares for Tier 2 trips can be higher, i.e., more than twice the fixed-route fare. The transit agency can also adopt differing policies for the premium second tier, such as more limited-service hours and denials of service once capacity is reached.

SERVICE MODELS

ADA paratransit service models can be described based on three primary elements: management structure, service delivery organization, and service mix.

MANAGEMENT STRUCTURE

The management structure of an ADA paratransit service can in large part be distinguished based on the division of responsibilities relative to who operates the service and who performs the four primary call and control center functions of reservations, scheduling, dispatching, and handling trip status (ETA) calls.

As illustrated in Figure 28, there are a variety of possibilities. For example, call and control center functions can be performed by the transit agency itself, a broker or call and control center manager, and/or one or more contractors. Indeed, when a contracted service provider or providers are used, call and control center functions can be consolidated either with the transit agency or with the contractors, or these functions can be split between the transit agency and the contractor(s).

COMMON PARATRANSIT MANAGEMENT STRUCTURES

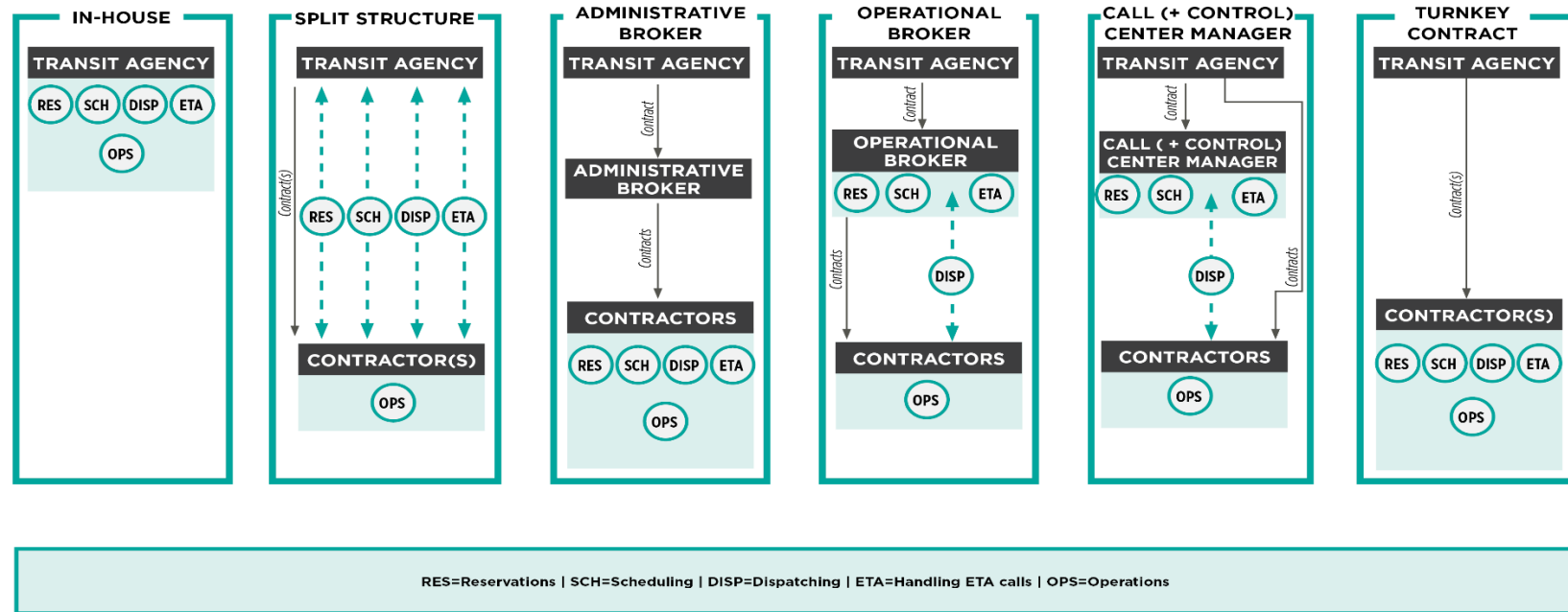


FIGURE 28. ADA PARATRANSIT MANAGEMENT STRUCTURES

Within the management structure, the contracting relationships also become a distinguishing characteristic. For example, with a broker, there is no contractual relationship between the transit agency and the service providers, and with a call (and control) center manager model, there is no contractual relationship between the call (and control) center contractor and the service providers.

The responsibility for providing supporting assets—such as the call center or operations facilities, vehicles, the in-vehicle communication equipment, the paratransit scheduling software, the radio system and the telephone system—can also be included under management structure.

SERVICE DELIVERY ORGANIZATION

The service model is further described by how the service delivery is organized. For example, many ADA paratransit services use multiple dedicated fleets (and multiple contractors) to deliver service. In these cases, this element thus generally focuses on whether or not a service area is organized into zones, with carriers assigned to one or more zones, or whether the service area is unzoned, with carriers assigned “packages” of work.

SERVICE MIX

The third component of service models is whether or not overflow nondedicated service providers (NDSPs)—such as taxis, livery operators, Non-Emergency Medical Transport (NEMT) operators, and now even some transportation network companies (TNCs)—are used as a resource to serve ADA paratransit trips. Many transit agencies utilize such carriers to reduce costs by assigning them trips during the peak periods when demand outstrips supply; will-call trips; re-emerging no-showed trips; trips in low-demand areas or times; and any other trip that might negatively impact the productivity of the dedicated fleet. The split of trips (as a percentage scheduled to the dedicated fleet versus being assigned to NDSPs) is called the *service mix*.

A requirement of overflow providers is that their operators be trained to proficiency and participate in drug and alcohol testing, per the ADA, so that the service quality provided for the system is not two-tiered. A short-hand term for such drivers is they are *ADA paratransit certified*. Thus, taxi companies and other carriers who participate in ADA paratransit services understand and comply with these requirements. Interestingly, TNCs such as Lyft and Uber have stated that they do not intend to meet these requirements (and hence cannot serve ADA paratransit trips), while adaptive TNC companies such as UZURV do meet these requirements.

Another recent development, however, has paved the way for transit agencies to use TNCs like Lyft and Uber as an overflow resource of sorts. Some transit agencies have implemented opt-in programs whereby an ADA paratransit customer voluntarily signs an agreement that says their ADA paratransit trip requests can be assigned to a TNC or taxi company whose drivers are not ADA paratransit certified. In effect, the customer is agreeing to allow the transit agency to convert the customer’s ADA paratransit request to a non-ADA paratransit request. With such a program, transit agencies are able to expand capacity—by supplementing the ADA paratransit service with another kind of service—and reduce the overall costs of transporting ADA paratransit customers. In this era of driver shortages, these opt-in programs have also been shown to significantly improve the OTP of the dedicated fleet.

Note that this use of TNCs is not to be confused with alternative services in which ADA paratransit customers arrange for transit-subsidized on-demand service from TNCs and taxis.

ADA paratransit service models are explored in detail in Transit Cooperative Research Program (TCRP) Synthesis 135 (2017) for larger transit agencies and TCRP Synthesis 161 (2022) for small and midsize transit agencies.

SERVICE PERFORMANCE AND PERFORMANCE METRICS

Generally, and in addition to those performance metrics already discussed, transit agencies need to establish their desired balance between service cost efficiency and service quality. In addition to service quality metrics related to capacity constraint discussed above, the main service quality metric is OTP, expressed as a percentage of trips that are on-time, while the main service efficiency metric is productivity, measured in terms of passenger trips per revenue vehicle hours (RVHs), which can impact cost per trip. With dedicated fleets, OTP typically has an inverse relationship with productivity: as one goes up, the other goes down. For example, the fewer trips served, the easier it is to be on time. If a run schedule is jammed, OTP suffers.

With ADA paratransit, policies and performance related to service quality, such as the span and definition of the on-time window (as discussed in the first section of this chapter) and the specific standards for achievement of on-time performance, such as a 90 percent OTP, are determined locally.

The performance of ADA paratransit services varies in terms of its service efficiency and uses productivity as a metric. Productivity depends on numerous factors, including:

- The size of the service area, which impacts average trip length—the greater the average trip length, the lower the productivity.
- The service area's level of traffic congestion.
- The level of demand and demand density—generally, the more trips, the more ridesharing possibilities there are and the higher the productivity.
- The OTP standard.
- The span of the pickup window.
- The characteristics of the trip demand, especially with respect to the percentage of wheelchair trips.
- Whether the system also serves other trips (e.g., sponsored by human service agencies), with group trips tending to increase productivity.
- The percentage of no-shows/late cancellations.
- The use of overflow providers.
- If other mobility options are available to the ADA paratransit customers.

However, the measurement of productivity varies, which can cause challenges for peer comparisons, for example. In the case of the numerator—passenger trips—some transit agencies count all passenger trips (including companions and PCAs), while other transit agencies report just passenger trips taken by registrants. Counting all passenger trips provides higher productivity.

The denominator—revenue vehicle hours—is calculated differently for dedicated service versus nondedicated service. NTD distinguishes between the two, with dedicated service RVHs measured as first pickup to last drop-off less significant breaks (e.g., for lunch), while nondedicated service is basically live passenger time. Thus, transit agencies with nondedicated overflow providers will tend to have higher productivity for two reasons: their dedicated fleet is being rid of trips that deflate productivity, and the NDSP productivity is higher because it does not reflect the time when the provider is idle or providing non-transit-sponsored trips.

In general, though, ADA paratransit trips are spatially sporadic, many origins to many destinations, which tends to deflate productivity.

With all of those qualifiers as caveats, ADA paratransit productivity levels are generally lower than other types of DRT services, in part because trip patterns of ADA paratransits tend to be many-to-many. Representative data from urban systems show that the largest city transit agencies achieve productivity levels from 1.3 to 2.3 passenger trips per revenue hour, with most below 2. Transit agencies in large cities have productivities ranging from 1.8 to 2.7 and, in small cities, from 1.8 to 3.8 passenger trips per revenue hour. In major metropolitan regions, for example, ADA paratransit productivity may be as low as 1 passenger trip per hour because it is impacted by a large service area, many-to-many travel patterns; and traffic-congested streets with limited curbside parking for passenger boarding and alighting.

Significantly, the focus on meeting requirements and on achieving high service quality standards means that transit agencies have less latitude to make operational changes to their ADA paratransit services that might positively impact service efficiency.

TECHNOLOGY

Many transit agencies have sought the help of computerized scheduling systems for their ADA paratransit services. Automating the schedule optimization can not only result in a more efficient service but also reduce scheduling labor. Such systems have been supporting paratransit services since before the ADA was passed.

As explored in TCRP Synthesis 168, *The Impacts of Continuous Dynamic Optimization on ADA Paratransit*, a few traditional scheduling systems and many of the on-demand technologies that have retrofitted to support ADA paratransit services offer continuous optimization. CDO is an automated process by which the scheduling algorithms continuously or frequently consider additional trips just booked, changes to the booked trips, cancellations, and day-of-service events when solving problems or taking advantage of opportunities. In view of those changes, the CDO process then re-optimizes the assignment of trips to dedicated vehicle runs and available overflow NDSPs to achieve the transit agency's desired balance of service/cost efficiency and service quality. Relative to the service day, CDO automates the proactive dispatching function.

The findings of Synthesis 168 indicate that CDO has had a transformative impact on traditional paratransit dispatching and scheduling functions by continuously scheduling unassigned trips, optimizing

the schedules, and solving upcoming problems ahead of time while continuously looking for new opportunities to improve productivity and/or OTP. The benefits that have accrued to transit agencies include improved productivity and improved OTP. Moreover, because CDO is automated, it is inherently more objective than perceived scheduler/dispatcher favoritism. With dispatchers freed up from proactive dispatching, with fewer real-time problems for dispatchers to solve, and with much of the scheduling of unassigned trips being taken care of, transit agencies have found that they are able to reduce scheduling/dispatching labor costs or re-assign scheduling/dispatching staff to other duties.

Another interesting development has been the on-demand technologies that have been retrofitted to support ADA paratransit issues discussed earlier. With this development, these technologies are now being used by some transit agencies to support ADA paratransit and microtransit services provided separately and also consolidated ADA paratransit/microtransit services.

EPATS' IMPLEMENTATION OF ADA PARATRANSIT

As discussed previously, a variety of service models and designs are possible. Of those possibilities, in-house approaches for most call and control and operational functions can be eliminated due to EPATS' limited staff. That approach does not mean that EPATS cannot eventually bring all or parts of the service in-house, but it will require time. Moreover, EPATS may wish to take responsibility for certain functions, such as complaint management, from the get-go. EPATS does have a history of contracting for its FRT service, though, with the FRT contractor providing its own facility and with EPATS providing vehicles. Thus, it is recommended that contracting be pursued as a short-term solution to implementing ADA paratransit service.

Two alternative approaches to a turnkey solution for 2024 were suggested by TTI and have been pursued:

- Approach 1:** Approach First Transit, EPATS' current FRT contractor, to explore the possibility of a contract amendment to provide ADA paratransit service.
- Approach 2:** Approach Sun Metro to see if EPATS can piggyback onto Sun Metro's contract with MV Transportation, which provides LIFT, Sun Metro's ADA paratransit service. This action would be done via a letter of agreement.

Meanwhile, because the service contemplated would be only for 2024, especially with Approach 1 (since First Transit's contract expires on December 31, 2024), TTI will put together a SOW for a longer-term procurement that will commence on January 1, 2025. One of the challenges that EPATS will face, should additional vehicles be needed, is the current delay being experienced in the industry for acquiring wheelchair vehicles. In recent years, some delays have been as long as 18–24 months, with some large vehicles taking up to 4 years to acquire.

Another challenge has been recruiting and retaining paratransit drivers, which has proven to be a national issue. In Texas:

- A Class B commercial driver's license (CDL) is required to operate a vehicle designed to carry 24 or more passengers, including the driver.
- A Class C CDL is required to operate a vehicle designed to carry 16–23 passengers, including the driver.

Getting a CDL is a time-consuming and expensive process, which in turn limits the driver pool of applicants should a CDL be needed. Moreover, many transit agencies and contractors who cover the cost of CDL training have found that some of their new CDL-licensed drivers have departed for more lucrative jobs (e.g., in the trucking industry) soon after they have acquired a CDL. To address the CDL-related issues, some transit agencies have purposely acquired smaller vehicles that do not require a CDL.

The main shortcoming of Approach 1 is that First Transit would have to create a whole new service, including:

- Setting up a call and control center and acquiring scheduling software.
- Acquiring radios and software to manage dispatching, etc.
- Possibly needing to obtain vehicles for a 1-year guaranteed period.

Another shortcoming to Approach 1 is the possibility of customers having to transfer (onto LIFT) if going into LIFT's service area.

Moreover, although EPATS is best served by hiring a local specialist and or hiring a national firm that specializes in ADA paratransit determination (and EPATS is strongly considering this step for the full procurement starting 2025), EPATS has decided to include the eligibility function with First Transit's responsibilities under Approach 1, thereby allowing First Transit to subcontract this function. Generally, assigning this responsibility to a turnkey contract is not the best idea because it presents a possible conflict of interest: the more individuals deemed eligible, the higher the demand, and the higher the demand, the more service is required, and the more the contractor gets paid. That said, this arrangement would only be in place for a year, and a subsequent, more objective process would catch inaccurate determinations upon recertification (every 3 years).

In Approach 2, MV Transportation would likely have to supply the additional vehicles and drivers, although it was deemed quite possible that in the early infancy of the program, MV might not need additional vehicles (or may only need a few vehicles) because the origins and destinations of the new trips would very close to if not within the LIFT service area. An advantage of Approach 2 is that MV drivers are already ADA paratransit certified (versus First Transit's drivers, who are not), and that EPATS' riders will not have to worry about having to transfer (if MV's contract is amended to serve the broader area). Moreover, MV already is responsible for eligibility for the LIFT program, so adding on new applicants would not be that much of a problem. It was surmised that MV might go for the idea (if it first cleared Sun Metro) because it would put them in a better position for the following EPATS' procurement (for 2025–2029).

In the case of Approach 2, EPATS' staff was also concerned about vehicle branding, especially if a LIFT-branded vehicle were to pick up an EPATS' customer. A reasonable approach to this would be to include a dashboard placard identifying the vehicle as serving EPATS' trips.

If neither First Transit nor Sun Metro expressed interest, other possible approaches to turnkey solutions both involved an emergency contract with either MV Transportation (bypassing Sun Metro) or a technology company such as Via Mobility or Rideco, both of whom serve as turnkey contractors for microtransit services elsewhere in Texas, and both of whom have experience as ADA paratransit turnkey contractors, although Via Mobility has more experience in the ADA paratransit arena. The pursuit of these alternative approaches was put on hold until the outcome of Approach 1 and 2 was determined.

APPROACH 1: FIRST TRANSIT

Regarding Approach 1, First Transit, now part of Transdev, has a wealth of national experience providing ADA paratransit; can operate the service (including the call and control center) out of its current facility; can mobilize relatively quickly; can provide vehicles if the current set of vehicles supplied by EPATS to First Transit is not enough to support both the services under the contract; and can license paratransit scheduling software, with which it was already familiar. The options on the current contract extend to the end of calendar 2024. So, the gist of Approach 1 would be to develop a scope of services and present the scope to First Transit as soon as possible and to request a price proposal for a 1-year amendment to the current contract (for a calendar year) that will cover the ADA paratransit scope.

The scope of services (Appendix H) for the amendment was developed in April/May 2023. The scope called for First Transit to provide turnkey services for the calendar year.

A draft scope was presented to EPATS in May 2023. Based on feedback, a revised document was submitted to EPATS on June 1, and this was forwarded on to Transdev for review prior to an EPATS' and TTI staff meeting with First Transit on June 12 to discuss the possibility.

The outcome of the meeting was that First Transit was indeed interested. Some slight adjustments to the scope were agreed to that were reflected in First Transit's proposal, which was submitted to EPATS on July 18. One of the adjustments stemming from the meeting was that First Transit would be able to use vehicles for the service that EPATS had already provided to First Transit that were not currently being used for FRT service.

APPROACH 2

On a parallel track, the same scope of services that was developed for First Transit was sent to Sun Metro for consideration and review prior to a meeting to discuss. This meeting, which also included TTI and EPATS' staff, was also on June 12.

At this meeting, it was learned that it would be possible to piggyback on Sun Metro's contract with MV Transportation, assuming that MV was in favor of taking on such an amendment, but Sun Metro informed EPATS that the LIFT service was struggling, particularly due to driver shortage (which is plaguing the industry nationally), and as a result, Sun Metro was not in favor of doing anything that

would potentially disrupt LIFT service. This meeting was held a few hours before the First Transit meeting, so any decisions to pursue Approach 2 were tabled.

THE TRANSFER ISSUE—UNRESOLVED

With EPATS thus pursuing Approach 1, one of the major issues is how to serve (a) trips going between EPATS' ADA paratransit service areas, and (b) trips going to/from the LIFT service area.

For the trips going between EPATS' ADA paratransit service areas, it was decided that these trips would require a transfer between First Transit vehicles at existing transit centers.

For the trips going to/from the LIFT service area, there are three options:

- Orchestrate transfers between EPATS' and LIFT vehicles at the transit centers. In this case, one unanswered question is whether the customers will have to make one or two calls. If one call, the customer will call their "home" system, and staff will orchestrate the transfer with the other system. If two calls, the customers will have to call both First Transit and MV Transportation.
- The customer will call his/her home system, and they will complete the trip without a transfer. In case of a round trip, the customer will call their home system for the going-to leg and the other system for their return trip.
- The customer arranges for both or all legs of a trip with their home system, which serves all legs of the trip.

TTI assumes that the percentage of passenger trips going between the EPATS' and LIFT service area may be significant. In general, transfers are meant to improve productivity by minimizing the length of trips and keeping vehicles in the same area. However, if transfers are not well orchestrated, one vehicle can end up waiting for long periods of time at the transfer point (waiting for the second vehicle to arrive), so any productivity gains in implementing transfers might be undone by transfers that are not well orchestrated. This scenario assumes, though, that both EPATS and Sun Metro have a customer hand-off policy. If, however, both EPATS and Sun Metro adopt a drop-and-go policy instead, there will be no driver waiting at the transfer point. Since the transit centers are relatively safe and have customer amenities, a drop-and-go policy and not a customer hand-off would preserve productivity.

Some of the above alternatives are more conducive to customer convenience, and some are more conducive to service productivity (and cost). EPATS and Sun Metro need to further discuss how to handle inter-area trips, using the above discussion as a starting point.

ELIGIBILITY DETERMINATION AND COMPLAINT MANAGEMENT

There are two functions that EPATS ideally may not want its turnkey contractor to perform: (1) ADA paratransit eligibility determination/certification, and (2) complaint management. Both pose conflict-of-interest issues. There are national companies that specialize in both.

ADA paratransit eligibility determination/certification is fairly specialized. EPATS can explore this possibility with an existing experience company or try to find a local organization or individual to be responsible for eligibility determination. If this cannot be done in the short run, the fallback for 2024 is

to add this to First Transit's scope. However, for the full procurement, it is suggested that EPATS contract with a third-party entity to perform eligibility determinations.

It is also suggested for the full procurement that EPATS invest in a process that includes:

- In-person interviews.
- In-person assessments.
- Functional assessment of cognitive transit skills testing (for persons with intellectual/developmental disabilities).

This three-pronged approach (versus just a 100 percent paper review) has been proven to be way more accurate a determination process in screening out persons who really can utilize FRT service for all or part of their trips.⁵⁷ It is also advised that it is not enough to just deem a person conditionally eligible; it has to be operationalized so that reservation agents have the pertinent information available (such pre-rulings on specific trips) when trip requests are booked.

Complaint management is a less specialized function, so it is suggested that EPATS hire someone, possibly as a part-time position, to manage complaints.

⁵⁷ <https://www.nadtc.org/wp-content/uploads/NADTC-Determining-ADA-Paratransit-Eligibility.pdf>

CHAPTER 6. GENERAL PUBLIC DEMAND RESPONSE IMPLEMENTATION PLAN

Chapter 6 summarizes the TTI team's GPDR Implementation Strategies research and analysis. The purpose of the GPDR Implementation Strategies task is to develop subarea-specific and general strategies for implementation of the recommended EPATS' GPDR service in the county.

This chapter is divided into the following sections:

- **General Public Demand Response—What to Know.** This section provides a definition of GPDR as a demand response service and strategies for service delivery and describes the use of GPDR to provide equity.
- **GPDR Performance Considerations.** This section describes influences on GPDR performance, differences in rural versus urban GPDR, GPDR productivity determinants, and how multiload checkpoints can be used to increase productivity.
- **GPDR Service Planning Guidelines, Steps, and Standards.** This section provides EPATS' recommended transit service planning guidelines specific to GPDR and steps to effectively plan and design GPDR services—including service area factors, GPDR categories and typologies, performance measures and standards, and design guidance.
- **GPDR Management Models and SOW Considerations.** This section describes various GPDR management model options—including in-house and contracted services and SOW considerations specific to dial-a-ride and microtransit GPDR services.
- **GPDR Technology Implementation Considerations.** This section describes the technology elements to include in the SOW and provides an example timeline to set up or localize the GPDR software for deployment.
- **GPDR Marketing and Partnerships.** This section provides marketing GPDR-specific considerations and marketing and branding examples for GPDR.
- **EPATS' GPDR Implementation Timeline.** This section describes steps needed to accomplish prior to the development of the RFP—including GPDR Service Standards and Guidelines development, GPDR service design, and financial plan development. This section also provides the timeline for GPDR plan development and procurement from date of issue to service deployment.
- **EPATS' GPDR Service Priorities and Delivery Strategy.** This section outlines EPATS' overall current transit service implementation priorities and strategy and next steps in GPDR transit coverage gap service planning.
- **PDR Implementation Plan Summary.** This section provides a summary of Chapter 6 and outlines the steps needed for EPATS' GPDR service implementation.

GENERAL PUBLIC DEMAND RESPONSE—WHAT TO KNOW

This section defines demand response transit and distinguishes GPDR as a category of DRT service. This section also provides GPDR service delivery strategies, including dial-a-ride, microtransit, fixed-route feeder service, and point/route deviation. Last, this section discusses how GPDR can be used to provide equity in transit.

GPDR DEFINED

The term *demand response transit* is a broad term for public transit service that is not fixed route and operates in response to individual trip requests. DRT operations are characterized by the following:

- The vehicles do not operate over a fixed-route or on a fixed-schedule except, perhaps, on a temporary basis to satisfy a special transport need.
- Typically, the vehicle may be dispatched to pick up several passengers at different pickup points before taking them to their respective destinations and may even be interrupted en route to their destination to pick up other passengers.

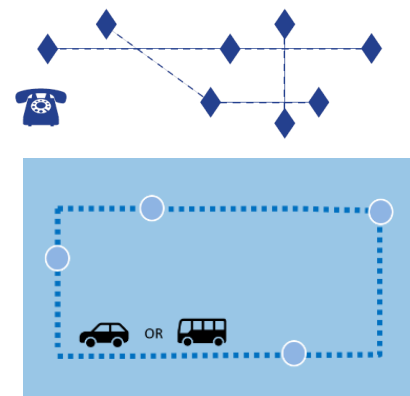
Categories of DRT can be distinguished by the rider group or groups served, such as general public, seniors, and individuals with disabilities:

- **General Public Demand Response**—serves all individuals in the community rather than specific population segments.
- **ADA Paratransit**—required by the ADA of 1990 for FRT systems. ADA Paratransit serves individuals with disabilities who cannot use fixed-route service because of their disability. ADA regulations establish specific ADA paratransit requirements that systems must meet, a number of which set general or specific standards that affect performance.
- **Special Population Demand Response**—serves target populations and typically is a result of transit agency partnerships with community-based or human services agencies to provide DRT. These coordinated services may improve systemwide productivity if the agencies have significant numbers of group trips.

GPDR SERVICE DELIVERY STRATEGIES

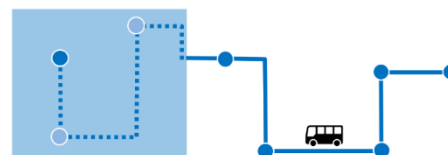
GPDR transit service can take many forms depending on the community needs and environment served. GPDR can be delivered in many ways, such as a dial-a-ride, microtransit, point/route deviation, and feeder service.

- **Dial-a-Ride**—serves dispersed origins and destinations and can be door-to-door, curb-to-curb, or available at strategic stops in the community. Typically dial-a-ride provides more service area coverage.
- **Microtransit**—uses a digital platform to fulfill trip requests wherein customers can reserve service through smartphones or other computing devices with no transit agency personnel needed to take reservations (unless an option to call the transit agency to book for the customer exists). Depending on the technology, reservations can be secured through subscription well in advance or in real-time. Passengers can track the location of their vehicles and receive an alert through text

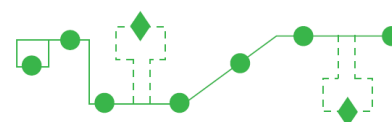


messages or phone calls moments before they are to be picked up⁵⁸. Microtransit can be operated in a variety of ways, including operating within specified zones, as a neighborhood circulator to feed to the fixed-route services, as door-to-door, or at designated stops.

- **Feeder Service to Fixed-Route Transit**—provides an option for people who live outside of walking distance to access FRT service. The service helps address the first-mile/last-mile challenge (when walkability is difficult) that has plagued transit agencies for years by providing an on-call option to serve the general public in small zones around transit centers/stations or fixed-route bus stops. Feeder service can be operated as a dial-a-ride or microtransit type service that feeds to the fixed-route.



- **Point/Route Deviation**—deviation services operate with checkpoints as well. Point deviation services are usually the best choice when there are major generators of trips (e.g., schools, shopping centers, or office parks) within the zone, while the rest of the demand is spread out. Buses can be at those major generators at scheduled times and respond to individual requests for service the remainder of their cycle time before returning to their primary terminal point. Point/route deviation service can be operated as a dial-a-ride or microtransit type service.



GPDR TO IMPROVE EQUITY

Equity in transit is a complex and evolving condition. However, it is vital if a transit system is to achieve its implicit goal of serving the entire community the way it needs to be served. For the purposes of making equity actionable, it is useful to establish a shared understanding of what equity in transit actually means. One example of a definition is as follows:

Equity in transit is the fair and just distribution of the benefits and burdens associated with transit services and infrastructure across communities to address the needs of the people in a manner that acknowledges and accounts for historical and current disparities, considers and supports people's unique circumstances and abilities, and continues to evolve as these factors change. At minimum, transit benefits are presumed to include sufficient access to destinations and opportunities.

This definition makes five key assertions:

1. Benefits (e.g., access to opportunities) and burdens (e.g., fueling or storage depots) of transit service should be shared fairly within a community, regardless of sociodemographic or other spatially linked community factors.
2. Historical and current disparities exist and can influence people's experience with transit, but strategic and equitable service planning can facilitate the process of correcting historically biased decisions and reducing the disparities that persist.

⁵⁸ TCRP Synthesis 141, 2019. <https://nap.nationalacademies.org/catalog/25414/microtransit-or-general-public-demand-response-transit-services-state-of-the-practice>

3. People have a spectrum of needs, life conditions, experience, and abilities; therefore, equity in transit is when service is planned to account for and accommodate these factors.
4. Evolution is an expected and requisite component of equity in transit because the human condition is not constant.
5. As a service intended to get people where they need to be when they need to be there, equity in transit is, *at the least*, transit that provides access to destinations and opportunities when that access is needed.

Traditional transit service planning often emphasizes access to work—often providing the best service in limited corridors and only during traditional commute times (morning and evening peaks). This emphasis on traditional work commuters privileges the people who hold such jobs and who live and work in the locations served by the system, often resulting in service that works best for relatively affluent individuals who are commonly white men. People of color, people with low incomes, women, people with disabilities, and students typically require different types of service at different times of day due to numerous factors, such as residing in affordable but inconvenient locations; caregiving responsibilities; the need to get to multiple jobs or to a job and then school; safety; and accessibility. Furthermore, these individuals typically have less agency in decision-making situations due to barriers stemming from implicit and explicit biases. Further exacerbating the challenges faced by many transit riders is transit funding that emphasizes high ridership and economic development over other factors such as access to opportunities or service to vulnerable populations.

GPDR is a method of more cost-effectively addressing the community equity of transit coverage issue. Although fixed-route service might be too expensive to provide, GPDR might be the most cost-effective way to provide some level of mobility for those who need it in these circumstances. GPDR can be used to replace fixed-route service that is performing well below service standards. GPDR can also be used in areas that have been previously unserved to test the market for transit service. As a transit agency gains experience and knowledge of the patterns of demand through GPDR operation, the agency can adjust the service, potentially resulting in a service progressing from dial-a-ride, to fixed-route deviation, to fixed-route. (TCRP Synthesis 141, 2019)

GPDR PERFORMANCE CONSIDERATIONS

This section describes influences on GPDR performance via productivity and efficiency, the differences and influences in urban and rural performance, and how multiload checkpoints where riders report to designated spots can improve productivity.

INFLUENCES ON GPDR PERFORMANCE

As expected, GPDR does not perform at the same productivity levels as FRT because the demand is not large enough in the areas of lower density typically served by GPDR, even with the greater flexibility offered. Most GPDR services carry between three and four passengers per vehicle service hour, though higher ridership figures are achievable when larger trip generators are present and the service is structured with time points and higher-frequency cycles (TCRP Synthesis 141, 2019). A business case for GPDR can still be made, which is as follows:

- Cost per hour of service provided is usually considerably lower than fixed routes due to the use of smaller vehicles and contractors.
- The price of technology for GPDR is decreasing rapidly.
- Higher productivity and cost efficiency of GPDR can be achieved in comparison to specialized demand response service for a number of reasons, including:
 - The pool of potential rides from the general public is typically larger.
 - Dwell time at pickup locations can be shorter for general public riders.
 - General public riders are less likely to cancel late and no-show because of health issues or inclement weather.

RURAL AND URBAN DIFFERENCES IN GPDR PERFORMANCE

Serving more rural, low-density areas can create downward pressure on productivity of the GPDR and therefore higher costs. Rural GPDR service can operate with limited roadways and challenging terrain and travel long distances to urban centers for medical trips and other appointments. These long-distance, indirect, slower speed trips are more costly to operate.

GPDR rural dial-a-ride operations' differences from more urban GPDR dial-a-rides include the following:

- Advanced scheduled service on specific days to and from distant medical center.
- Outlying community service two or three times per week.
- Regularly scheduled service across multiple counties.

GPDR dial-a-rides in more suburban or urban areas are more common when the number of transit trips and size of the area are likely barriers to justifying FRT. GPDR in suburban or urban areas can be more cost efficient if the agency serves the following:

- An area of low density that is more productive to cover with fewer vehicle resources than fixed route.
- Discontinuous road networks and cul-de-sacs that limit fixed-route buses.
- As a connection to fixed-route services within a zone.

PRODUCTIVITY DETERMINATES OF GPDR

The performance of GPDR services varies in terms of its service efficiency and productivity as a metric. Productivity depends on numerous factors, including:

- The size of the service area, which impacts average trip length; the greater the average trip length, the lower the productivity.
- The service area's level of traffic congestion and roadway structure.
- The level of demand and demand density; generally, the more trips, the more ridesharing possibilities there are, and the higher the productivity.
- The OTP standard.
- The span of the pickup window and response time (microtransit).

- The characteristics of the trip demand, especially with respect to the percentage of wheelchair trips.
- Whether the system also serves other trips (e.g., sponsored by human service agencies), with group trips tending to increase productivity.
- The percentage of no-shows/late cancellations.

MULTILOAD CHECKPOINTS AND DESIGNATED PICKUP LOCATIONS

There are distinct limits to how many pickup and drop-off requests a single vehicle can handle in a specified zone in a given amount of time. For GPDR to be efficient, it must multiload passengers (as opposed to taxis or most TNC services) to the maximum extent possible. Higher numbers of passengers can be carried by GPDR when transit agencies engage in serious planning, by analyzing travel patterns, identifying trip attractors and generators, and understanding the transportation consumer markets in the lower demand areas they serve. GPDR can then be structured with checkpoints (also known as time points) at locations within easy walking distance of a concentration of passengers, where the vehicle will always stop at regular posted times or with enough frequency to not need a schedule. Using such checkpoints minimizes the number of stops a GPDR vehicle needs to make, which allows it to operate with more frequency or serve larger areas. (TCRP Synthesis 141, 2019)

Checkpoints commonly happen when the GPDR serves as a feeder to connect to the fixed-route system and addresses commuters' needs, such as first-mile/last-mile connections to or from employment centers. On the other hand, if GPDR in the area spreads over a wider area, the vehicle can operate as a community circulator and process and serve requests for internal trips within the service zone. In all cases, the drivers of the vehicles only need to follow instructions provided through a tablet or mobile data terminal that enables them to focus on driving rather than on manually managing a hard copy manifest of reservations. (TCRP Synthesis 141, 2019)

GPDR SERVICE PLANNING GUIDELINES, STEPS, AND STANDARDS

There are many different ways to plan and design GPDR services, and it is tightly related to the needs and characteristics of the communities served. This section provides (a) the EPATS' recommended transit service planning guidelines that are the results of the July 2021 Phase 2⁵⁹ research, and (b) the GPDR steps to plan and design services. A table of performance measures, goals, and standards is included for EPATS' consideration.

EPATS' RECOMMENDED TRANSIT SERVICE PLANNING GUIDELINES—GPDR

The following EPATS' transit service planning guidelines are from the July 2021 Phase 2 update entitled *Best Practices and Guidelines for El Paso County Rural Public Transportation to Identify Potential Stop Location and Route Configurations*. The guidelines were developed using the 2018 Phase 1 study findings and recommendations, the review of best practices, input from the public and stakeholders, and peer agency comparison. For GPDR, the EPATS' recommended transit service planning guidelines include the following:

⁵⁹ "Developing Guidelines and Best Practices for Bus Shelter Locations Along El Paso County Rural Transit Routes" (2020), and "Best Practices and Guidelines for El Paso County Rural Public Transportation to Identify Potential Stop Locations and Route Configurations" (2021).

1. County transit service should be **available to all residents of rural El Paso County**.
2. **Transit service can take the form of** flexible bus routes or **dial-a-ride service**.
3. **New or modified county transit services should serve existing riders** to the extent possible.
4. **County transit service should run at least 14 hours per day on weekdays and at least 12 hours per day on weekends**.
5. County transit service **should not compete for riders with Sun Metro bus service**.
6. Buses should run no more than **60 minutes apart during peak times** and no more than 120 minutes apart at other times.
7. DAR service should **connect residents of rural El Paso County to (a) key destinations in the county, and (b) Sun Metro transfer centers**.

The ability to implement these guidelines in full depends on costs, available resources (e.g., funding, staffing, and technology), and operational needs. Planning guidelines for bus stop locations were provided earlier in this report. It should be noted that a service span of 12–14 hours is adequate “to serve work trips based around traditional office hours, with some arrival and departure time flexibility” per the 3rd Edition of the TCQSM (TCRP Report 165). Flex-route bus and DAR might complement each other with respect to service span, as opposed to operating concurrently.

STEPS TO PLAN AND DESIGN GPDR SERVICES

Steps to plan and design GPDR services include:

- A. Evaluation of the service area factors that influence the provision of GPDR service.
- B. Determination of GPDR zone typologies and zone core purpose(s).
- C. Development of performance metric goals and standards.
- D. Service design for highest performance.

STEP A. EVALUATE SERVICE AREA FACTORS

Evaluation of GPDR service areas is influenced by factors such as population and employment density, socioeconomic characteristics and travel behavior of the population, the location of service generators, the service area size, street layout and connectivity, and transit network connections. The terrain and infrastructure within a neighborhood might also affect the type of service selected.

GPDR service planning includes an evaluation of factors that influence what types of GPDR may be most effective and factors that are determinants of GPDR performance. GPDR factors to evaluate include:

- Destinations and activity centers.
- Residential and employment density.
- Land use and roadway framework.
- Demographic and socioeconomic characteristics.
- Service span needs.
- Newly altered services.
- Areas unserved by transit or coverage gaps.
- Transit ridership levels of existing services and new service areas (as applicable).
- Areas that complement the fixed-route system (potential feeder service).

Areas unserved or coverage gaps. GPDR service zones can help provide coverage in gap areas that are not already served by fixed-route bus. EPATS can analyze currently unserved areas for residential densities and trip attractors that would be feasible for a GPDR service zone to provide a transit solution to the area.

Ridership levels of existing services and new service areas. GPDR service zones can replace unproductive fixed routes or segments of fixed routes as ridership levels at bus stops are observed over time and low productivity is determined by fixed-route service standards. GPDR service zones can also help provide capacity for high or excessive ADA paratransit trip demand and provide an on-demand service solution for ADA paratransit customers as appropriate. Determination of ridership in previously unserved areas may be estimated using peer data and experience.

Areas that complement the fixed-route system. All GPDR service zones should complement the fixed-route system and not overlap bus routes or cannibalize existing fixed-route ridership. A GPDR zone with well-designed boundaries will have fixed-route bus stops located at the periphery of the zonal boundary in order to encourage connections to the fixed-route system and increase the number of transfers to and boardings on fixed-route buses. At times, a zonal boundary may overlap a bus stop area slightly in order to include a major destination as a key trip attractor in the zone.

Residential and employment density. Residential and employment density can be primary influences on transit demand. A GPDR service target is to fill in service areas not already identified for fixed-route service. TTI suggests that residential densities in the GPDR zone for microtransit be at minimum 1 to 5 persons per acre in order to have sufficient service. An analysis of population distribution, employment centers, transit demand, and community preferences for small rural communities is also suggested.

Land use. Fixed-route service is generally provided in areas with more mixed-use, commercial, institutional, and higher-density residential land uses. Low-density residential land use types are less likely to generate sufficient fixed-route ridership and are more effective being served as a GPDR zone. Low-density land uses at the periphery of mixed-use and commercial land uses served by fixed route are often effective places for most GPDR microtransit zones.

Destinations and activity centers. GPDR service zones should strive to serve multiple destinations within the zonal boundaries. Activity centers may include destinations and transit attractions such as retail centers and grocery stores (often the highest ridership), parks, employment sites, educational institutions and colleges, healthcare institutions and clinics, social service agencies, libraries, or other community resources. Microtransit software technology has the capability to set up POIs within each GPDR service zone as designated stop points to request trips to and from. These points can be used to track travel to certain destination types as a percentage of the overall completed trips as a performance metric.

Demographic and socioeconomic characteristics. Many transit riders use transit as their access to employment, educational opportunities, medical facilities, shopping, and other activities. GPDR demographic and socioeconomic service area characteristics that often translate to ridership include:

- Households without access to an automobile.
- Older adult population (65 years of age and older).
- Individuals with disabilities.
- Average household income below the poverty threshold.

STEP B. IDENTIFY GPDR SERVICE TYPOLOGIES

Identifying the GPDR zones' typology is an important and helpful step prior to detailed design. The GPDR service types identify the core purpose of the specific zone, how the service will operate, and what metrics will be primarily used to track performance. The zone typologies may fit neatly within only one of these typologies or may have attributes of more than one. The following three GPDR types can be used to guide GPDR service design, and all types can be operated as a dial-a-ride or microtransit service:

- **Transit Coverage Gap Service**—implemented to fill an existing transit coverage gap. A coverage gap is a geographical area that does not have access to transit due to either a lack of transit service or barriers to access.
- **Fixed-Route Replacement Service**—implemented specifically to offset mobility impacts and community concerns caused by fixed-route service reduction or removal.
- **First/Last-Mile Service**—implemented specifically to address first/last-mile transportation needs connecting riders to and from an FRT stop, station, or mobility hubs.

Transit Coverage Gap Service. Transit coverage gap service is designed to increase mobility in a specific geographical area with minimal or nonexistent transit service. These gaps have some transportation demand but cannot support full-scale, fixed-route bus service. A transit coverage gap is frequently due to infrastructure challenges, naturally occurring barriers, or areas that have experienced recent growth. The transit coverage gap service type does not apply to areas where GPDR is used to replace FRT service (see fixed-route replacement service).

Transit coverage gap service should be designed to provide good mobility within the zone and to connect riders to existing transit services if transit is within or reasonably near the zone. Over time, residential and employment densities may change within a transit coverage gap zone to levels that are more akin to fixed-route service standards. Density changes along with trends in ridership and long-term service planning may also signal the transition of a GPDR service zone to a fixed-route service. Standards for GPDR and fixed-route service should be monitored to determine if a GPDR service zone should be graduated and phased out.

Fixed-Route Replacement Service. Fixed-route replacement service is implemented to offset mobility impacts and community concerns caused by FRT service reduction or removal. Fixed-route replacement zones are created to fill in for poor performing fixed-route service. Fixed-route replacement zones should consider the previous fixed route's span of service, ridership trends, origins/destinations, and equity factors. Fixed-route replacement zones may need to be different in size and geography than the area directly impacted by the fixed-route reduction dependent on fixed-route ridership locations.

First/Last-Mile Service. A first/last-mile zone is designed to feed people to and from a community to and from the larger transit system. This type of service is most effective when connecting transit users to higher-frequency service. GPDR operating considerations for first/last-mile zones frequently include:

- A higher volume of passenger trips should end or begin at transit stops/stations.
- Passengers will transfer to/from other transit service, so quick response times and coordinated schedule information are important for service attractiveness.
- First/Last-Mile zones should mirror the span of the connecting transit service(s).
- Peaks in demand may occur in conjunction with infrequent or commuter-based transit services.
- Operating policies that reduce the likelihood of a missed transfer will help improve service attractiveness. For example, EPATS could stage a GPDR vehicle at the stop/station during the PM peak to minimize wait time for passengers connecting to the GPDR service.

GPDR zones are not limited to one operational typology. Service within a given GPDR zone may take on a hybrid form that consists of multiple operational types. The combination of multiple zone types integrated within one GPDR zone increases the complexity for establishing performance measures. For that reason, service standards and guidelines are to be used flexibly, with special attention paid to the needs of the community served.

STEP C. DEVELOP GPDR PERFORMANCE MEASURES, GOALS AND STANDARDS

GPDR performance measures and standards for each zone may vary dependent on (a) the GPDR mode of service (e.g., dial-a-ride and microtransit service), (b) GPDR typology (coverage gap, fixed-route replacement, first mile/last mile), and (c) zone characteristics (e.g., geography, density, demographics). Some measures may be common across all zones. Others, such as the number of connections to a specific fixed-route, is an example of a zone-specific, fixed-route feeder measure.

GPDR Performance Measures, Goal Considerations, and Standards. Table 17 provides for EPATS' consideration, examples of GPDR performance measures, measure description, goal considerations, and suggested standard.

TABLE 17. GPDR PERFORMANCE MEASURES, GOAL CONSIDERATIONS, AND STANDARDS

Performance Measures	Description	Goal Consideration	Suggested Standard
Total passenger trips (service usage metric; equity metric)	Measure of ridership and is the count of each time a passenger boards the bus. Ridership is unique for each zone and is most commonly measured as a daily, weekly or monthly number. Disaggregation of data can show rates of ridership among specific groups/communities, which can help target services to those with highest needs.	Set by zone and goals change as new zones take time to mature, and as new generators of service may be established or disappear.	N/A

Performance Measures	Description	Goal Consideration	Suggested Standard
Passenger trips per revenue hour (productivity metric)	Measure of productivity—how many passengers carried per 1 hour of service.	Each zone will have unique goal based on zone characteristics.	Dial-a-ride: Minimum 2 passengers per revenue hour Microtransit: Minimum 4 passengers per revenue hour
Returning Riders (service usage metric; equity metric)	An indication of good service design can sometimes be seen in the number of repeat or returning customers. Returning riders is calculated through the GPDR scheduling of unique riders. Disaggregation of data can show rates of ridership among specific groups/communities, which can help target services to those with highest needs.	Suggested goal: Number of unique riders that take at least 4 trips per month (two round trips) as returning riders.	N/A
On-time pickup (quality metric; equity metric)	Timeliness of arrival is a critical measure of the quality and reliability of services. For dial-a-ride , a trip is considered to be on time at the pickup location if the vehicle arrives within the confirmed pickup or drop-off window that is confirmed with the customer and the trip is completed. For microtransit , on-time is defined as when an operator arrived to pick up a passenger within the established threshold of the scheduled pickup time per the app. For both services, gauging rate of on-time pickups by demographic or community indicators can help ensure fair distribution of service quality.		Dial-a-ride: At least 90% of customer pickups are within the established pickup threshold Microtransit: At least 92% of the time the vehicle arrives at the requested pickup location within 10 to max 60 minutes, dependent on zone size. Zones that fall below the guideline should be examined for running-time problems, traffic obstacles, construction, oversized zone, vehicle allocation, funding limitations, or zone-design issues.

Performance Measures	Description	Goal Consideration	Suggested Standard
Onboard time (quality metric)	Onboard time is an operational measure that helps evaluate the proper size of the GPDR zone as well as quality of service. The percentage of excessively long trips is another service quality metric that can also point to capacity issues. Dial-a-ride scheduling systems may use trip maximums to preclude the scheduling of such instances. Gauging onboard time by demographic or community indicators can help ensure fair distribution of service quality.		Dial-a-ride: 95% of trips completed, with customer ride times not to exceed 60 minutes. Microtransit: 98% of trips completed, with total customer ride time not to exceed the established threshold per zone square miles.
Missed trips (quality metric; equity metric)	A missed trip is an event where (1) the vehicle never arrives; (2) the vehicle arrives early and departs before the pickup window begins (dial-a-ride); (3) the vehicle arrives on-time or late but departs before the 5-minute wait time is over; (4) a driver fails to carry out specific instructions included with the reservation (e.g., a specific building entrance, door-to-door assistance, etc.), which results in the rider missing their ride; or (5) the vehicle arrives after the pickup window, and the customer does not appear or cancels-at-door (for dial-a-ride). Gauging missed trips by demographic or community indicators can help identify and address specific unique needs.		Dial-a-ride and microtransit: 0.5% of the total trips scheduled.
Fixed-route feeder trips (usage/ purpose metric; equity metric)	GPDR zones designed to provide access to the larger transit network commonly include a measure of how many passenger connections are made with fixed-route bus transit service. There are various ways this can be measured depending on the zone characteristics. A common measure may be a certain percentage of GPDR trips in a zone transferring to the fixed-route system on a regular basis as tracked by drop-off at transit center or bus stop. Microtransit software can track by	Each fixed-route feeder type zone will have unique goal based on zone characteristics.	

Performance Measures	Description	Goal Consideration	Suggested Standard
	creating a point of interest (POI) at a bus stop to count number of drops at the POI. Understanding why people travel, if disaggregated by demographic or community factors, can help inform service decisions that serve unique needs.		
Completed trips (quality metric; equity metric)	Service is negatively impacted when trips are cancelled, no-show, or, in the case of microtransit, the trip is not accepted because seats are unavailable or customers receive an app error. For noncompleted trips, it is important to identify and resolve issues to improve a zone's completed-trip percentage. Disaggregation of data can show rates of noncompleted trips among specific groups/communities, which can help identify unique challenges or unfair distribution of low-quality service.	Microtransit: A general goal for this metric is typically 85% or higher since no-shows and cancellations may be based on riders' trip pickup time estimation given after booked.	Dial-a-ride: Percentage of no-shows plus late cancellations should not exceed 5% (consistent with ADA paratransit)
% of shared rides (efficiency metric)	The ability of GPDR to combine trips to facilitate shared-ride transit allows more people to travel using fewer vehicles. The higher percentage of shared rides allows more service to be utilized with fewer resources. Measured as a percent of all rides that are shared with other customers.	The goal percentage will vary based on zone characteristics such as density, service area size, or other influencing factors.	
Operational cost per passenger trip (cost-effectiveness metric)	Cost-effectiveness can be measured as operational cost per passenger trip. Microtransit and dial-a-ride operational cost will differ based on resources used to deliver service (e.g., number of vehicles in a zone, vehicle type, software costs). Microtransit and dial-a-ride passenger trips will differ based on zone size and zone characteristics.	Dial-a-ride: Each zone will have unique goal based on zone characteristics (especially influenced by average trip distances). Microtransit: Can be measured against the cost of providing equivalent fixed-route service in the zone with similar headways after the zone has matured.	

Performance Measures	Description	Goal Consideration	Suggested Standard
Operational cost per revenue mile (cost efficiency metric)	Cost efficiency can be measured as operational cost per revenue mile—cost of providing one unit (mile) of service. Cost efficiency measures the labor, fuel, and maintenance costs without the consideration of passengers carried. Idle time and trip lengths can influence this measure.	Each zone will have unique goal based on zone characteristics.	
Number of passenger trips by individuals with disabilities (usage/purpose metric; equity metric)	This measure is not an exact measure; however, it is helpful to track and log. This measure is the percent of customers using a mobility device or requesting a higher level of mobility assistance. For dial-a-ride, count is the number of individuals scheduled as door-to-door and/or who use a mobility device. For microtransit, count based on request for a “WAV” trip in the app function, in which the vehicle is requested because it has a wheelchair lift/ramp or driver will pick up at the door. Tracking ridership for people with disabilities helps identify limitations/barriers in the service or in the vehicle design for such riders.	Each zone will have unique goal based on zone characteristics.	

Performance Measures	Description	Goal Consideration	Suggested Standard
Number of passenger trips to essential services (equity metric)	Measured as the number of trips to essential services, including school, medical, grocery, shopping, affordable housing, senior housing, dental, pharmacy, financial institutions, government offices, and social service agencies. Dial-a-ride scheduling system software typically allows for destinations to be defined by type to allow to track and query by location type. For microtransit, these destinations can be flagged by POI in the software to track. While essential services do not represent the universe of destinations that people need for a high quality of life, access to such destinations are critical, and measuring such access ensures vulnerable riders have at least one option to reach them.	Each zone will have unique goal based on number of essential services in the zone. <i>These identified essential services can also be used to determine microtransit boundaries.</i>	
Complaints per 10,000 passenger trips (quality metric; equity metric)	Measure of service quality is measured as the number of complaints per 10,000 passenger trips. Disaggregation of data can show rates of low-quality service among specific groups/communities, which can help target improvements to ensure fairness.		Under 10 complaints per 10,000 passenger trips
Preventable incidents per 100,000 total miles (safety metric; equity metric)	Safety is a key element to the sustainability of all zones. Transit agencies can use the National Safety Council's <i>Guide to Determine Motor Vehicle Collision Preventability</i> to evaluate. Disaggregation of safety data can show whether specific groups/communities are more vulnerable to safety incidents.		No more than 1.20 preventable accidents per 100,000 total miles
Revenue miles between vehicle failures (maintenance/vehicle quality metric)	This maintenance quality metric is defined as total revenue miles between mechanical failures based on agency policy (e.g., wheelchair lift) and major mechanical failure, as defined in the <i>National Transit Database Annual Reporting Manual</i> .		Minimum of 50,000 revenue miles between mechanical failures

STEP D. GPDR DESIGN GUIDANCE

This section provides general guidance when designing and refining GPDR service zone boundaries. These elements are not meant to serve as a comprehensive list of all planning elements used but outline common concepts to consider when developing efficient and effective GPDR zones boundaries. Elements may have a higher or lower importance to a specific zone when applied depending on the zone's service operational type. Situational deviations from these guidelines will likely occur when and where analysis, community feedback, and expert consensus deem it necessary or logical. Design criteria of GPDR service include the outcomes of factors evaluated as previously discussed, including:

- Areas unserved or coverage gaps.
- Ridership levels of existing services and new service areas.
- Areas that complement the fixed-route system.
- Residential and employment density.
- Land use and roadway framework.
- Destinations and activity centers.
- Demographic and socioeconomic characteristics.
- Newly altered services.

In the final design, particular consideration should be given to zone size, fleet resources, service span, and ideal customer wait time.

Zone size. Guidance in designing a GPDR is to design the zone to operate as effectively as possible to minimize travel time while maintaining access to key destinations. Zone boundaries should not overlap with existing fixed-route paths unless key destinations for people in the neighborhood are located on the other side of the route path. For rural dial-a-ride service, TTI suggests establishing boundaries that match residents to activity centers (e.g., jobs) and essential services such as schools, medical, grocery, shopping, affordable housing, senior housing, dental, pharmacy, financial institutions, government offices, and social service agencies.

The size of the zone will depend on the type of GPDR proposed, the level of demand expected from the zone, the known or anticipated markets within the zone, and the desired cycle times. The size of the zone will also depend on the number of vehicles the transit agency is willing to place into service and the capability of the GPDR software platform to accommodate and satisfy multiple real-time trip requests made within a set time. The size of GPDR zones is flexible, with the transit agency reporting zones ranging from about 1 square mile to 30 square miles. (TCRP Synthesis 141, 2019)

For microtransit service, TTI suggests 5 to 10 square miles as the suggested maximum target zone size to meet response time standards. Travel times are very much dependent on roadway structure and barriers. GPDR zones may be larger in order to meet community needs and include key neighborhoods and destinations. Natural and manmade boundaries can affect zone boundaries.

Fleet resources. Zones should have fleets allocated to them based on the availability to serve most customers and to be able to respond within OTP standards. TTI suggests fleets be staged within the

zones to be able to accomplish response time standards. TTI suggests for dial-a-ride at least 90 percent of customer pickups are within the established pickup threshold, and for microtransit at least 92 percent of the time the vehicle arrives at the requested pickup location within the same frequency as fixed-route. TTI suggests that all vehicles should be wheelchair-accessible to ensure equivalent service for wheelchair users.

Service span. Service span refers to the hours that service is available. Service span guidelines can vary by zone typology and level of retail activity in the neighborhood. Zones with higher ridership activity and more retail and grocery destinations may operate over a broader span of service.

According to the TCQSM, service spans of 5 days a week allow demand response trips during every day of the traditional work week, travel for full-time employment and education, and access to medical service on weekdays. Five days a week service spans provide the minimum service for the transit agency to attract choice riders. Providing service 6 days per week increases opportunities for access to employment, education, and medical services and allows other weekend day trips, depending on the goals of the agency and community preferences. (TCRP Report 165, 2013)

The TCQSM also provides guidelines for hours of service each day. Daily hours of service from 12 to 16 hours provides good service for most communities and allows transit service to become integral to travel. Daily hours of service from 5–9 hours provides limited transit service for the community but allows for essential shopping, personal business, and medical appointments to be accessed through transit.

As alluded to in both of the previous paragraphs, the TCQSM guidance represents a minimum level of good service that meets a variety of community needs. However, limitations on span of service and the number of service days per week will limit access to opportunities for some members of the community (e.g., people who are employed in third-shift roles such as the service, care, or warehousing industries or people who want or need to travel for personal purposes outside of available service times). It is important to consider the needs of the community via a thorough and meaningful public engagement process to understand what types of service beyond the basic concepts outlined previously may be useful or necessary to meet their needs.

GPDR MANAGEMENT MODELS AND SOW CONSIDERATIONS

The first through third sections of this chapter provide an understanding of GPDR service, what influences performance, and the steps in service design to help ensure GPDR performance is maximized. Another key element to the performance of GPDR is in its management structure setup and, if contracted, the SOW parameters.

GPDR MANAGEMENT MODELS

Management structures or models can be differentiated by who manages and performs each of the GPDR functional responsibilities (reservations, scheduling, dispatch, operations), and by how (if) a portion or all functions are contracted. The management models for GPDR can be distinguished based on these factors:

1. Division of responsibilities relative to who performs the primary functions of reservations, scheduling, handling trip status (ETA) calls, dispatch, operations.
2. Contractual relationships.
3. Responsibility for providing supporting assets such as the call center and operations facilities, vehicles, the in-vehicle communication equipment, the scheduling software, the radio system and the telephone system.

Figure 29 provides a visual of common demand response management models distinguished by the division of functional responsibilities, and contractual relationships to include the following models:

- **In-house**—where the transit agency performs all primary functions.
- **Split structure**—where the transit agency performs reservations, scheduling, ETA, and dispatch, and the contractor(s) provide the operations.
- **Administrative broker**—where the transit agency contracts with an administrative broker to subcontract all primary functions.
- **Operational broker**—where the transit agency contracts with an operational broker to perform reservations, scheduling, ETA, dispatch, and the operational broker subcontracts for the operations.
- **Call and control center manager**—where the transit agency contracts to a call and control center manager to perform reservations, scheduling, ETA, dispatch, and the transit agency contracts to another contractor for the operations.
- **Turnkey Contract**—where the transit agency contracts for all primary functions, with the transit agency providing administration and oversight of the contractor.

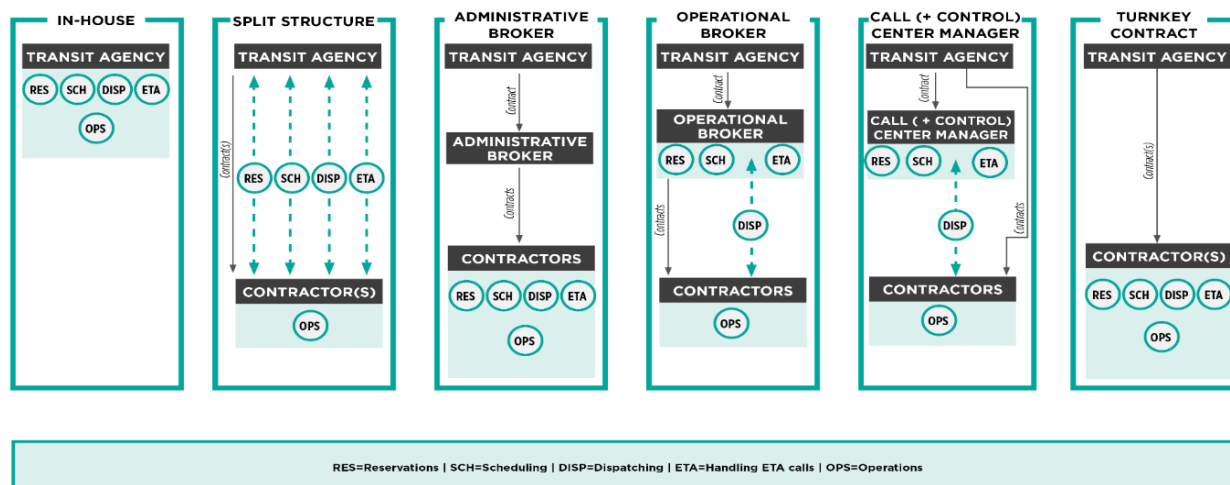


FIGURE 29. COMMON DEMAND RESPONSE OPERATIONS MODELS (TCRP SYNTHESIS 135, 2018)

These management models can work for all demand response type services, and the contracts may be combined with attention to functional and contractual differences in dial-a-ride, microtransit, and ADA paratransit (see Chapter 5).

In particular, for microtransit the functional differences are as follows:

- The need for reservations to schedule customer trips is typically an exception-only basis. Reservations are taken when a customer is unable to use the app or web system to book the trip (e.g., individual with a disability, individuals who do not have access or are uncomfortable with the technology). The transit agency can have an option for customers to call reservations or a dispatch line, and the reservationist can book the trip through the app on the customer's behalf.
- The pre-day scheduling function is eliminated since all trips are booked in real time on the same day of service through the app-based software.
- The dispatch function monitors for issues that may occur (e.g., vehicle breakdowns, driver requests, customer concerns) rather than works to re-schedule trips or move trips from one vehicle to another as the app-based software schedules trips to vehicles in the microtransit zone.

GPDR SCOPE OF WORK CONSIDERATIONS

Many of the Appendix H. Draft Scope of Work for EPATS' Access ADA Paratransit Service provide the scope requirements for dial-a-ride that are not specific to the provision of ADA. There are specific microtransit SOW differences to highlight. The following provides specific microtransit considerations to include in the microtransit SOW, either as a combined or separate GPDR services scope:

- Microtransit policies and procedures in the SOW differ because of operational differences that include microtransit no-shows, zone staging areas (bases or terminals), dispatch check-in zone arrival processes, remote zone operations, customer assistance, and fare handling (as applicable).
- Microtransit performance metric definitions, goals, and standards differ, as discussed in the previous sections (see Table 17).
- Training for microtransit software planning module to set up zone parameters, including zone boundaries and landmarks.
- Training for microtransit dispatch, operator, and supervisors' modules.
- Microtransit specific control center responsibilities, including:
 - Control center is responsible for receiving all microtransit customer trip requests that come over the telephone. Control center also assists passengers who use the microtransit app by monitoring the microtransit dispatch module on the application web site. The microtransit scheduling software system chooses which operator and which vehicle will perform the trip.
 - Control center will monitor the radio and take calls from operators requiring assistance to include time reporting to the zone, requesting breaks, and notification of leaving zones and ending shifts. Control center will make daily adjustments to the number of vehicles needed in a zone predicated by demand. This will include transfer from zone to zone during shifts.
 - Control center daily assignment of operators and vehicles for each zone in the microtransit software. The control center is responsible for ensuring that runs are filled and that operators' tablets are charged and are in good working order before leaving the facility. The

operators must have the microtransit procedure booklet and pre-trip/post trip sheets before leaving the dispatch window.

- Microtransit specific zone coverage requirements, such as:
 - Scheduled vehicles and operators must always be located within the zone boundaries during service hours. If a vehicle goes out of service, a replacement vehicle must be in zone as soon as possible. Missed-service criteria will apply for all minutes that a pickup vehicle is not in revenue service. A 60-minute grace period will apply in cases when an unforeseeable situation causes an out-of-service condition. The clock on the grace period begins as soon as the issue is noticed.
 - An adequate number of vehicle operators must be available to provide service according to the predetermined zones in the scheduled times that were agreed upon. There will be a liquidated damage for each operator who is late or not logged in on time in the zone as scheduled. This penalty also applies to each operator who leaves a zone or logs out before the shift is over for their zone.
 - A microtransit missed trip is defined as a trip that is not completed in its entirety, transporting the wrong customer, or a trip for which the customer is dropped off at an incorrect or unauthorized drop-off location—including outside of the zone without prior permission from the microtransit dispatch. A liquidated damage will be assessed per missed trip and shall be applied to the monthly invoice.

GPDR TECHNOLOGY IMPLEMENTATION CONSIDERATIONS

In recent years, transit agencies are procuring software to support all GPDR services, including dial-a-ride, microtransit, first/last mile, and ADA paratransit. The reduction of these technologies' costs has made the provision of flexible and more customer-centric public transportation more feasible.

According to TCRP Synthesis 141, *Microtransit or General Public Demand Response Transit Services*, these recent technology companies

develop the software to enable dynamic scheduling or reservations and communications necessary for GPDR service and sometimes provide the hardware as well. Because these companies specialize in this type of service, they can help inexperienced local transit agencies understand the issues, problems, and potential associated with GPDR before full deployment. However, they will need the transit agency staff's local knowledge of the area to be served to develop the realistic estimates for demand.... Transit agencies interested in more dynamic scheduling and reservations can now engage in GPDR/microtransit more easily than ever before. A number of technology companies have sprung up in the past few years offering technical assistance to transit agencies interested in pursuing real-time, customer-centric GPDR. Among the newer companies mentioned by survey respondents are DemandTrans Solutions, TransLoc, DoubleMap, VIA, RidePilot, Luum, and Spare Labs. (TCRP Synthesis 141, 2019)

These software companies can also help estimate the demand for service, suggest the size of the area to be served, and run simulations of various scenarios to present alternatives for service delivery. Table 18, which was developed by a GPDR technology company, illustrates a simulation of microtransit

performance. The table provides estimated number of vehicles, hours of service, rides per hour per vehicle, average wait time, average ride time, cost per trip, and ride pooling percent (ride share).

TABLE 18. EXAMPLE MICROTRANSIT ZONE PERFORMANCE PROJECTION (TCRP SYNTHESIS 141, 2019)

Number of Trips	Number of Vehicles	Hours of Service	Rides per hour per Vehicle	Average Wait Time (minutes)	Average Ride Time (minutes)	Cost per Trip (\$)	Ride Pooling %
50	2	11	2.3	2	17	28	25
100	2	11	4.5	10	24	14	41
100	4	11	2.3	2	15	28	20
100	6	11	1.5	0	15	43	15
300	6	11	4.5	8	23	14	40
300	10	11	2.7	2	16	24	25

Note: Ride pooling represents the percent reduction in number of vehicle stops due to pooling of rides. Cost per trip is based on \$65 per vehicle hour.

Source: TransLoc, Inc. (22).

GPDR TECHNOLOGY SCOPE ELEMENTS

Because GPDR transit service is heavily reliant on technology to facilitate the operation of quality transportation, the scope of work elements should include robust technology plans, management, and protocols to ensure consistent and quality functionality throughout the contract life cycle.

Technology topics to include in a SOW include:

- Technology Continuity and Management Plans.
- Technology Change or Upgrade Protocol.
- Technology Integration Plan.
- Internet Technology Procedures.
- Communication and Data Sharing Technology Procedures.
- Telephone and Recording Procedures.
- In-Vehicle Technology Procedures.
- IT Support Service.
- Safety and Security Procedures.

GPDR SOFTWARE LOCALIZATION DEPLOYMENT TIMELINE

During the ramp-up, time is needed to stand up the scheduling/dispatch software for El Paso County specifics. As an idea of the timeline, CapMetro in Austin, Texas, shared the timeline for the localization setup for its microtransit software—Via (see Table 19). The timeline is 5 months from start to full deployment and includes marketing, community involvement, and a communications piece prior to launch.

TABLE 19. EXAMPLE GPDR—MICROTRANSIT SOFTWARE LOCALIZATION DEPLOYMENT TIME

Task	Responsibility	Duration (days)
Total Time to Set Up System for Localization		75
Map and Algorithm	Month 1	
Initial environment and database configuration	Via	14
Mapping and algorithm development	Via	14
Dynamic pickup location configuration	Via	14
Turn restriction data collection	Client	14
Operator environment customization	Via	14
Dynamic pickup business information data entry	Via	7
Messages and Service Parameters	Month 1	
Review and update user-facing messages	Client	14
Review and update driver-facing messages	Client	14
Integration with existing email transaction platforms	Via/Client	10
Analytics dashboard(s) development	Via	10
System Ready for Internal Testing	Month 2	1
(Co)-Branding and Rider App Design	Months 1 to 3	
Co-branding plan for service and rider app	Client/Via	2
Deliver app screenshots and wireframes (as needed)	Via	2
Implement design updates to rider app	Via	21
Define requested changes to rider app	Client	10
Design review and iteration	Client/Via	14
App QA and submission to app store	Via	12
App(s) live	Month 3	0
Testing and Training	Months 2 to 4	59
Internal Product Testing	Months 2 to 3	
End-to-end pickup and drop-off flow (rider and driver)	Via	2
Routing and algorithm performance	Via	2
Scale	Via	2
Account creation	Via	2
Data privacy	Via	4
Pricing and promotional schemes	Via	3
QA and further product fixes	Via	11
Field Testing and Training	Months 3	
Via internal field testing	Via	3
Final tweaks and bug fixes	Via	25
On-site driver and operator training	Via	17
Via/client field testing and demonstration	Via/Client	4
Iteration and optimization	Via	5
Client sign-off	Client	1
App live	Via	1
Soft Launch Follow-Up Tasks	Month 4	11
Marketing	Months 1 to 3	
Vehicle wrap	Client	80
Direct mail 1	Client	16
Direct mail 2	Client	43
Fact sheet for CI outreach	Client	1
Web page	Client	25
Community Involvement	Months 1 to 4	
Identify stakeholder groups	Client	1

Task	Responsibility	Duration (days)
Outreach activities	Client	75
Communications	Client	
In-app messages	Client	1
Web/direct mail copy	Client	1
Content for newsletters	Client	22
Direct mail #2 copy due	Client	1
News release	Client	1
Blog post	Client	1
Media pitching/interview	Client	5
Social media (first posts)	Client	6
Talking points	Client	1
Letter to employees	Client	1
Intranet post	Client	1
System live (soft launch)	Months 4 to 5	11
Service Launch	Month 5	1

GPDR MARKETING AND PARTNERSHIPS

Marketing GPDR service is uniquely different from FRT services. Education is required to learn how to schedule and use the system. According to TCRP Synthesis 165,

People that do not use or have access to smartphones or computers may see the service as intimidating, and understanding the service zones and boundaries may also be an element that requires education. Marketing and education of GPDR requires in-depth community outreach efforts to help people learn the basics of GPDR usage. Education is needed on how to adjust. GPDR technology companies can also be useful in helping to understand the GPDR market and to identify marketing strategies. Via Transportation states that marketing strategies for on-demand transit services should include (1) directing “lifecyle-based marketing” to customers at different stages of use with the service, (2) segmenting customers into use cases and behaviors, (3) developing multiple marketing “touchpoints” to connect to customers, (4) using real-time data for quicker responsive messaging, and (5) developing referral systems for connecting to additional customers. (TCRP Synthesis 165, 2023)

GPDR MARKETING CONSIDERATIONS

Community Partners. Community outreach and education is the key and community partners are often the means to success. TCRP Synthesis 165 states, “Without connections to customers that facilitate communication about on-demand transit services, the success of these services can be limited and may perhaps ultimately not be sustained after initial pilot periods.... Using relationships with community stakeholders and organizations is also important in spreading awareness of the service to populations that may be hard to reach with traditional media channels.” (TCRP Synthesis 165, 2023)

Individuals with Disabilities and Older Adults. Transit agencies aiming to effectively serve persons with disabilities and older adults may need to have specific awareness and education efforts tailored for these customer groups to help familiarize them with the service and overcome perceived barriers in their comfort level with the service technology or with riding in unfamiliar vehicle settings. Accessibility

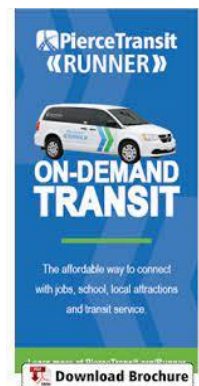
of information is particularly important for these population groups; survey research with older adults about on-demand service options has found a strong relationship between awareness of service availability and respondents' willingness to use the services. (TCRP Synthesis 165, 2023)

Fare Structure. Transit agencies typically report that it is helpful to use the same fare structure and payment methods as they do for fixed-route services to minimize confusion. Utilizing the same fare structure, ensuring the availability of accessible vehicles, and providing service to all areas of a GPDR zone help to address equity and Title VI issues. (TCRP Synthesis 141, 2019)

GPDR MARKETING EXAMPLES

Direct mail marketing can be sent to virtually every residence and business in a DRT zone and is used often because the entire market is in a well-defined and limited geographic area. More targeted follow-up efforts can be made with entities likely to generate or attract the most trips. The following list represents the types of marketing actions survey respondents reported using to promote their GPDR service (TCRP Synthesis 141, 2019):

- Distributing brochures, flyers, seat drops, and car cards.
- Placing ads at rail stations and transit centers that serve as DRT terminals.
- Putting ads on bus exteriors and bus shelters.
- Advertising on digital media.
- Placing information on the transit agency website, including a new carousel image, social media, and eNews.
- Using bilingual brand ambassadors at rail stations and on buses affected by the change to help passengers understand and register for the service.
- Placing at-stop signage, including pole case inserts and flex service signs.
- Distributing copies of *Guides to Proposed Mobility Plan Changes* at outreach sessions and on transit vehicles.
- Placing “take-ones” on all fixed-route buses identifying changes and locations of public open houses where people can provide feedback.
- Conducting employee meetings at the businesses and housing developments within the DRT On-Call Zone.
- Purchasing radio spots and television commercial time on English and Spanish channels.
- Providing information through the transit agency's customer service center.
- Conducting direct outreach to political jurisdictions, planning commissions, government agencies, and human services agencies.
- Holding public meetings, public hearings, and making presentations at community centers and public spaces.
- Advertising and placing a featured story in the local papers.
- Mailing information brochures to large senior living facilities and mobile home parks.



- Holding press conferences, issuing press releases, and arranging television news coverage.
- Mailing introductory notices along with free ride coupons to residents living within 1.5 miles of newly established flex routes.
- Presenting the GPDR vehicles at an organized event with public officials in attendance, thereby drawing media coverage.
- Having ribbon-cutting ceremonies at the start of the new service.

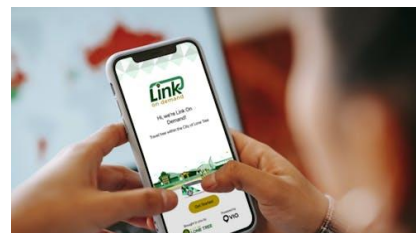


GPDR BRANDING

Transit agencies often create a specific brand name for GPDR services. Branding can also include distinct vehicle wraps and color schemes, and many transit agencies co-brand microtransit services with public transit agency brands and technology company logos. Alternative energy vehicle types used in on-demand services can also serve as a marketing feature to help generate additional attention during the service launch. Hillsborough Area Regional Transit Authority in Tampa, Florida, added electric vehicles to the on-demand fleet as part of its microtransit. (TCRP Synthesis 141, 2019).



Smartphone applications using the digital platform can either be white labeled to incorporate the distinct service brand, or the service may be an option within the existing TNC or microtransit application. As part of this practice, transit agencies can work with their technology partner on improving search results for potential customers of white-label apps within the smartphone digital store. (TCRP Synthesis 165, 2023)



EPATS' GPDR IMPLEMENTATION TIMELINE

This section discusses the two major needs to be accomplished that influence the timeline for GPDR implementation—(a) final GPDR plan and design, and (b) contract procurement. An estimated timeline of tasks needed is also provided for the deployment of GPDR services.

PRIOR TO THE RFP—FINAL GPDR PLAN AND DESIGN

Before an RFP can be developed, key elements are first needed to develop the SOW that include (a) the final GPDR service plan and design for the EPATS' service area, and (b) the GPDR financial plan, which includes cost and funding. The steps needed to complete the service design and financial plan prior to the RFP development are:

1. **Develop and finalize the GPDR service standards and guidelines.** The GPDR service standards and guidelines provide guidance on the design of GPDR service and how EPATS will measure service performance.

2. **Determine potential GPDR service areas and type of GPDR service.** Section 8 of this chapter provides options and priorities for EPATS' GPDR service. Potential GPDR service areas and type is determined by evaluation of service area characteristic factors and the assessment of what GPDR service types (fixed-route replacement, transit gap coverage, fixed-route feeder) will best service the area.
3. **Determine GPDR service delivery strategy** (dial-a-ride, microtransit, or other). Section 7 of this chapter provides options for EPATS' GPDR service delivery strategies. The GPDR strategy is based on standards and guidelines and the strategy that is the best fit to meet community travel needs.
4. **Develop performance measure goals.** Performance measures are identified for each GPDR service, including quality, efficiency, effectiveness, and safety measures. The SOW will include expected performance measures, and the measures will be used to guide EPATS' evaluation of how well GPDR is performing according to established standards.
5. **Create a final draft of the GPDR service plan and design and project service levels.** The final draft plan includes the projected ridership, fleet levels, hours, and miles of service in order to determine the demand and the resources needed to provide service for the contract SOW and determine the estimated cost and funding needed.
6. **Gain community feedback.** Because GPDR is different from fixed route, there is a need to work closely with the community to inform them on the differences and to receive their input prior to finalizing the plan (see Section 4). The final draft should be updated as appropriate with community feedback findings.
7. **Estimate service cost and funding by type of service and service area.** A last step needed is to estimate the cost of service and funding to ensure sustainability. Cost estimates include the cost of community engagement, marketing, training, administrative overhead, and the projected contract independent cost estimate. Funding estimates include both capital and operational expenses for the short- and long-term.
8. **Develop the final GPDR plan and submit for approval.** Once the final draft plan and financial evaluation are complete, a section of this report outlining the entire plan for the provision of GPDR should be developed and submitted for approval.

CONTRACT PROCUREMENT DEVELOPMENT

The desire by EPATS is to contract service to leverage the ability to combine ADA paratransit and GPDR and gain expertise from the contractor regarding the provision of ADA paratransit, dial-a-ride, and/or microtransit services. As discussed in Chapter 5, the in-house approach—wherein EPATS provides all or partial functions in-house—can be eliminated in the short-term due to EPATS' limited staff at this time (FY 2023). The approach is to solicit an RFP for a combined ADA paratransit and GPDR contract, with the contractor providing a scheduling/dispatch software that is capable of operating ADA paratransit, dial-a-ride, and microtransit service.

GPDR FINAL PLAN DEVELOPMENT AND CONTRACT PROCUREMENT TIMELINE

Table 20 provides an estimated timeline to finalize the GPDR service plan and the time for procurement from RFP issuance to full contractor implementation. The estimation is 18 months—a 12-month

procurement process, 3 months for RFP development, and 3 to 6 months after award for the contractor ramp-up. The ramp-up time is dependent on if the contractor has readily available vehicles, equipment, and software, the employment market, and the number of GPDR zones to stand up. The ramp-up time includes the time to accomplish the following:

- Recruit and hire employees.
- Provide start-up training to vehicle operators, dispatch, schedulers, mechanics, and road supervisors.
- Acquire and inspect new assets (as appropriate)—to ensure vehicles and equipment are in place and ready for 1st day of service.
- Stand-up the GPDR zones to ensure design, test, and training are ready to go (see Table 17).

TABLE 20. ESTIMATED GPDR PLANNING AND PROCUREMENT TIMELINE

Months and Tasks	1	2	3	4	5	6	7	8	9	10	11	12	3–6 mos.
GPDR Final Plan Development	S&G*	Plan	Feedback	Approval									
RFP Development													
Internal Review of RFP					X								
Advance Advertisement					X								
Issuance of RFP						X							
Pre-Bid Meeting							X						
Clarification Requests Due							X						
Clarifications Issued							X						
Proposal Due Date								X					
Selection Committee Review													
Request for Clarification										X			
Clarifications Due										X			
Selection Justification to BOD										X			
BOD Approval of Selection											X		
Contract Negotiation													
Board Approval of Contract												X	
Contract Signed												X	
Ramp-Up													

*Standards and Guidelines.

EPATS' SERVICE IMPLEMENTATION PRIORITIES AND DELIVERY STRATEGY

This section describes EPATS' service implementation priorities and service delivery strategy, including the current priority of service implementation and next steps in design of GPDR transit coverage gap areas.

EPATS CURRENT TRANSIT SERVICE IMPLEMENTATION PRIORITY AND STRATEGY

The current EPATS' overall transit service implementation follows a phased approach to allow for contract procurement and deployment. EPATS' current service implementation is a prioritized approach to:

1. **Implement ADA paratransit service** in the ADA required $\frac{3}{4}$ -mile fixed-route buffer to come into compliance with FTA and ADA law. It is a priority for EPATS to meet its ADA obligation as soon as possible. The desire is to obtain an emergency contract as a stop gap in the immediate short-term and then later to solicit a combined ADA paratransit and GPDR service RFP (**estimate emergency contract in the immediate short-term or combined contract in the 15-to-18-month period**).
2. **Implement the set of fixed-route service enhancements** in line with the EPATS' fixed-route service standards. The fixed-route reconfiguration plan optimizes travel time savings as the number one priority from the public outreach process. The fixed-route reconfiguration also aims to ensure air quality benefits (emission reduction because of route and service optimization) that could potentially turn into Congestion Mitigation Air Quality program support. The plan is to implement fixed-route changes in FY 2025 to provide time for a procurement.
3. **Implement GPDR fixed-route replacement service (at the same time as fixed-route reconfiguration)**. The intention is to provide GPDR fixed-route replacement service at the same time as the fixed-route reconfiguration to maintain service to the few riders in areas that no longer receive fixed-route service. EPATS has a few options to provide fixed-route replacement service that may be more readily available for implementation. These options would serve the $\frac{3}{4}$ -mile buffer around the leg of where the fixed route previously was provided with a trip to the nearest bus stop or transfer center. Options for GPDR fixed-route replacement service include:
 - a. Subsidized taxi or TNC-based on-demand service through contract that typically is a quick turnaround procurement timeline (**estimate 6 months**).
 - b. Dial-a-ride service through First Transit—Because of the very low demand, the expectation is that very few vehicle and operator resources are needed; therefore, they can be acquired at an expected low cost and through a contract amendment process (**more immediate**).
 - c. Dial-a-ride service or microtransit service through the expected full solicitation of combined ADA, dial-a-ride, and microtransit services (**estimate 18 months**).
4. **Implement transit coverage gap service and/or fixed-route feeder service in the form of dial-a-ride or microtransit service**. Although the long-term goal is to provide GPDR service to fill service gaps countywide, with GPDR being provided where and/or when FRT is not provided, area-by-area expansion of GPDR to countywide service occurs over time as candidate communities and zones for GPDR are identified and focused planning takes place. A first possible candidate identified is the Montana Vista area as either dial-a-ride or microtransit. Transit coverage gap service, and/or fixed-route feeder service as a dial-a-ride service or microtransit service is expected through the full solicitation of combined ADA, dial-a-ride, and microtransit service (**estimate 18 months**).

To provide context, Figure 30 provides EPATS' existing fixed-route bus routes, ADA paratransit $\frac{3}{4}$ -mile boundary service area, GPDR possible service area coverage, transfer center locations, Sun Metro service area, and Fort Bliss unserved military area.

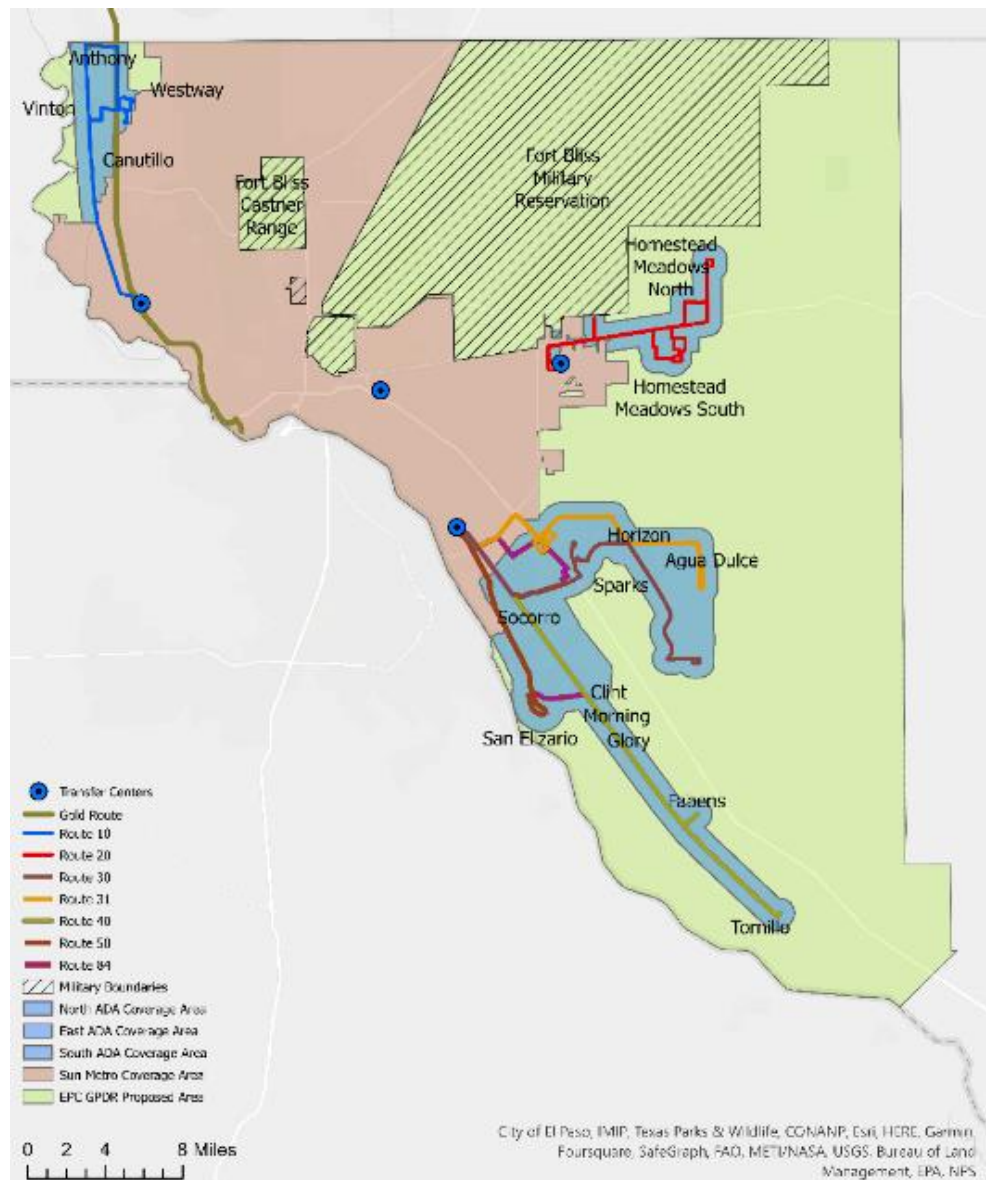


FIGURE 30. EPATS' EXISTING AND PROPOSED TRANSIT SERVICE

NEXT STEPS—GPDR TRANSIT COVERAGE GAP AND FIXED-ROUTE FEEDER SERVICE PLAN

More planning is needed to determine the service area, design, plan for GPDR transit coverage gap service, and fixed-route feeder service potential and options.

A first possible candidate identified is the Montana Vista area as either dial-a-ride or microtransit. This unincorporated community in El Paso County lies northeast of Horizon City. One possibility is to pilot this area as microtransit prior to an RFP issuance.

As a baseline for evaluating service areas for the transit gap service, researchers developed in the July 2021 Phase 2⁶⁰ report a Transit Needs Index (TNI) map that is based on demographic statistics at the census block group level to identify concentrations of transit-dependent residents. TNI comprises four measures to identify transportation-disadvantaged populations or populations more likely to benefit from and use transit. The four variables/measures are:

1. Elderly population (65+).
2. Households with an individual with a disability.
3. People living below the poverty level.
4. Zero-car households.

For the Planning Phase 2 study, the research team updated the TNI for the forecasted year 2024 (see Figure 31). The red represents the highest need and the dark green represents the lowest need. The need for transit service in the county (as represented by the concentration of elderly populations, disabled populations, low-income households, and zero-car households) is greatest in the corridor running from downtown El Paso to Tornillo. The largest gaps in transit service in the county (the difference between transit need and the transit supply) are in the southern and eastern portions of the county. A strategy for deployment of GPDR transit gap service and fixed-route feeder service is to initially provide service in increments to understand demand and trip patterns.

⁶⁰ “Developing Guidelines and Best Practices for Bus Shelter Locations Along El Paso County Rural Transit Routes” (2020), and “Best Practices and Guidelines for El Paso County Rural Public Transportation to Identify Potential Stop Locations and Route Configurations” (2021)

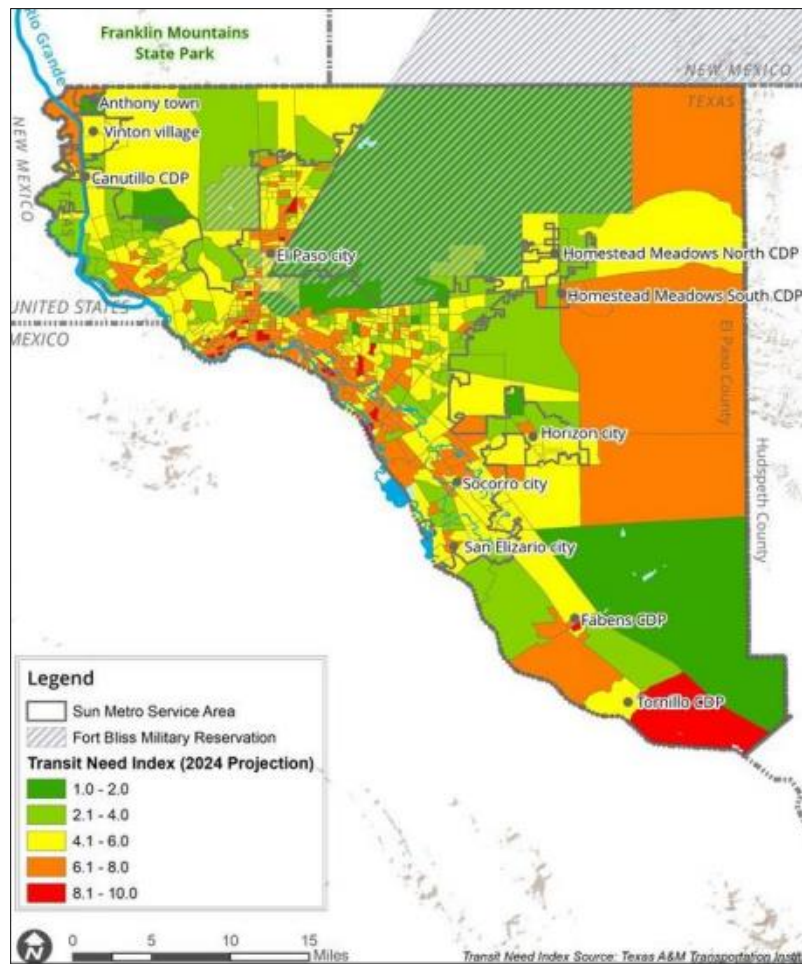


FIGURE 31. EL PASO COUNTY TRANSIT NEED INDEX 2024

EPATS' desire is for transit service to (a) be available to all residents throughout the county, and (b) connect residents to key destinations and transfer centers. The GPDR plan developed should reflect EPATS' guidelines and GPDR service standards.

Chapter 6 provides guidelines and strategies for the provision of GPDR service that include GPDR performance considerations, steps in GPDR service planning and design (evaluation of service area factors, identification of typologies to meet community goals, development of service standards and guidelines, setting performance goals), a description of GPDR management models, and considerations for GPDR technology and marketing. EPATS' GPDR service implementation is dependent on completion of the GPDR service plan and design and the contract procurement. GPDR service plan and design steps needing to be accomplished include:

1. Develop and finalize the GPDR service standards and guidelines.
2. Determine potential GPDR service areas and type of GPDR service.
3. Determine GPDR service delivery strategy (dial-a-ride, microtransit, or other).
4. Develop performance measure goals.
5. Create a final draft of the GPDR service plan and design and project service levels.

6. Gain community feedback.
7. Estimate service cost and funding by type of service and service area.
8. Develop the final GPDR plan and submit for approval.

The contract procurement is expected to be a turnkey approach for a combined ADA paratransit, dial-a-ride, and microtransit service. The expected timeline for final service plan, design, and procurement is approximately an 18-month process. Upon service design, the next step is to develop the draft SOW documents and independent cost estimate for review.