

APPENDIX D

SERVICE AND FUNDING ALTERNATIVES

APPENDIX D

TECHNICAL MEMORANDUM 3

SERVICE AND FUNDING ALTERNATIVES

INTRODUCTION

The purpose of this technical memorandum is to identify potential service concepts for local and regional services in Williamson County and to initiate the selection process with Capital Area Rural Transportation System (CARTS) and the advisory committee regarding the development of the final plan. This technical memorandum introduces a range of public transit service alternatives (options) for the county and cities. Specifically, three levels of service representing alternative investment strategies have been developed to provide the stakeholders and decision-makers a variety of options, as well as, an understanding of the relationship between service and costs.

After a presentation to the committee, public meetings and a second committee meeting regarding the alternatives, the advisory committee will direct the consultants to develop a plan based on the service levels chosen. The consultants will work closely with the staff to provide a mechanism for the decision-making process and will be available to supply additional information as needed.

The transit routes presented in this technical memorandum are more conceptual in nature than a detailed description of actual bus routes and are provided primarily for the purpose of outlining service coverage areas. The estimated costs are used for comparison purposes and are not exact dollar figures, as are the funding resources. The draft and final Transit Service Plan will include more specific street routings and detailed budgets.

This technical memorandum first discusses the background and opportunities, followed by a description of the routes and service alternatives -- describing each of the options, potential ridership, and costs. The second part of this technical memorandum will review institutional issues relating to the planning and operation of

service, followed by a review of potential funding sources that builds on the summary developed in the coordination briefing paper submitted in July, 2002.

Background

Current CARTS service is oriented toward serving the following types of transit demand:

- C **Fixed Schedule/Demand-Response** - urban and rural door-to-door service (primarily medical/dialysis, as well as work, education, and human service agency destinations). Much of this service is in Round Rock or has destinations in Round Rock. This is a very costly service on a per trip basis, due to the demand-response nature of the service.
- C **Intra-County Service** - This service includes medical, work, education, personal and human service needs, including long distance dialysis into Round Rock or Austin. Services start in Florence, Granger, and Liberty Hill.
- C **Inter-County Service** - Medical needs drives this service to Austin, with limited service to Temple.

These are services that CARTS has been operating for many years. In recognizing their importance to CARTS, one objective of these planning efforts is to ensure that any changes do not adversely affect these customers.

Opportunities for Expanding Service

Williamson County is one of the 15 largest counties in the state. Its rapid growth places it among the five fastest growing counties in the country. Projections provided by the Capital Area Metropolitan Planning Organization (CAMPO) indicate continued rapid growth. With this rapid growth comes increased transit needs for residents both internally and into the Austin area. Williamson County's growth has also been in job creation - the county requires two-way service, due to its growth as a major destination for commuters, particularly into Austin.

SERVICE ALTERNATIVES

The service alternatives are discussed in the context of three different levels of potential investment. They are presented in this manner in order to illustrate what the different funding levels will purchase. This does not preclude the advisory committee from "mixing and matching" of routes and ideas as appropriate. Please

note that the routes described on the following pages are conceptual in nature in the alternatives phase of the study. At this stage, we have not made final determinations regarding the exact routing of the vehicles. The routing will be finalized in the Service Plan that is part of the next task.

The three service alternatives are in part driven by the availability of state and federal funding, however, the level of funding that the cities, county and other local sources are willing to commit to, the operation of public transportation services, is the critical ingredient. The three basic service alternatives offered for consideration are as follows:

- **Modified Status Quo** - This scenario assumes approximately the same funding level for transit as exists now, with modest changes to improve performance.
- **Starter System** - This alternative includes additional funding for a modest public transit system - in essence, the minimum system necessary to ensure enough service area coverage to allow the system to develop modest ridership. Commuter and ridesharing service would be expanded.
- **Enhanced Transit** - This includes additional fixed routes and systems that could be employed as a starter system or as a second phase after a smaller initial fixed-route system has generated sufficient ridership.

Prior to the introduction of the service alternatives, it would be helpful to discuss a number of assumptions and issues that determine the type and cost of the system to be put in place.

Service Assumptions

The design of alternative transit services for Williamson County has been based on the following general assumptions:

- Public transit infrastructure has not been able to keep up with the needs in the county.
- Williamson County will experience continued rapid growth over the next ten years.
- Round Rock will be a major destination for many inter- and intra-county needs. Unfortunately, Round Rock has chosen not to coordinate planning

activities with the county study and to date has not shared any information with the study team.

- There are three major commuter transit corridors within the county, including the IH 35 corridor, the US Highway 183 (US 183) corridor, and the State Highway 45/Mopac corridor.
- Our analysis indicates that the travel patterns associated with this area will remain similar in spatial orientation, but will continue to increase in volume over the five-year horizon of the plan.
- There is significant demand for travel between Georgetown, Cedar Park, Pflugerville, and Round Rock. Intra-county service will be an important component of service in the county.
- Future Williamson County transit services will need to be coordinated with those operated by Capital Metro and to a lesser extent, Hill Country Transit. This will help to achieve one of the major objectives of ongoing regional transit planning efforts of ensuring seamless connections between transit services.

Decision Points - Costs

These factors described below will, in large part, determine system costs. They should be carefully considered.

- **Service Hours** - The hours of service directly affect the cost and the ridership. This alternative has included the minimum hours necessary to capture the major ridership groups, most notably commuters. It is proposed that service be initiated at 6:00 a.m. and end at 7:00 p.m. Monday - Friday and be operated between 9:00 a.m. and 7:00 p.m. on Saturdays.
- **Service Days** - These decision points revolve around Saturday and Sunday service. As a general rule, Saturday service provides about half of the ridership seen on weekdays. Sunday service generally sees about one-quarter to one-third of the average daily ridership observed on weekdays. It is recommended that Saturday service be initiated when the system is implemented, with Sunday service implemented in the future only if warranted by demand and funding availability.
- **Headway** - Headway is the time between buses going in the same direction. Typical headways for rural and suburban transit are half hour (often during

peak hours) to one-hour service. It should be pointed out that one half-hour headways cost about twice as much as one-hour headways.

SERVICE DESIGNS/ALTERNATIVES

For each alternative investment scenario, there are five different types of service that will be presented in addition to a discussion on a status quo alternative. It is anticipated that these five types of service will be integrated into one single network, connecting all modes.

Where possible, local and regional services will meet in a timed manner, rural service will feed into the network. By having one interconnected service, each of the individual services will be enhanced and made more attractive for users. The fact that a person can take a bus in Sun City and go (for example) to Georgetown, or transfer and go shopping in Round Rock or even go to Austin, vastly increases the possible destinations. The five types of service include:

- 1. Local City Service** - This includes fixed-route service in Cedar Park, Pflugerville, Georgetown, and Taylor.
- 2. Regional Service** - Connecting the various Williamson County communities with each other and with Austin, with an emphasis on commuter service.
- 3. Rural, Americans with Disabilities Act (ADA), and Human Service Paratransit** - Addressing the service needs in the east, north, and western parts of the county, as well as ADA complementary paratransit. Possible human service customers will use the above network.
- 4. Other Demand Services** - Vanpools, carpools, market development services, and other flexible low cost services should be employed throughout the county.
- 5. Pflugerville and Cedar Park** - These cities currently pay Capital Metro to provide service for persons with disabilities. Most of these trips are to Austin.

First is a discussion of Service Alternative No. 1 the Modified Status Quo Option. This will be followed by Alternatives 2 and 3, reviewing the five service types designed to address the wide variety of needs in the county.

Service Alternative No. 1 - Modified Status Quo

Based on the review of current service, and an analysis of trip origins, trip destinations, and overall travel patterns and volumes in Williamson County, other opportunities emerge for CARTS to improve and enhance the service it provides. Without changing the basic services it already provides, CARTS could focus on:

- C Enhancing cost effectiveness;
- C Offering greater service span and frequency;
- C Identifying cooperative services and connections with regional partners; and
- C Encouraging community initiatives.

Enhancing Cost Effectiveness

This could include identifying the existing routes that cost the most per trip, and finding alternative ways to serve those trips. For example, twice a month Route 907 travels to Temple to serve a handful of trips. The cost of that trip is over \$44. Alternatively, CARTS could contract with a cab company to serve that trip and/or coordinate with Hill Country Transit to deliver the rider to an alternative facility, so that the vehicle can deadhead back to Williamson County and provide productive service.

Another example is further coordinating CARTS services. For example, coordinating/combining services from Round Rock and Pflugerville to Austin (currently they are operated out of separate offices).

Offering Greater Service Span or Frequency

This refers to increasing service by increasing certain trip types by one or a combination of the following as appropriate:

- C Weekly
- C Daily
- C Hourly

Medical trips and other critical errands could be increased from semi-monthly to weekly trips in order to accommodate the needs of more riders. Similarly, if the operating hours of certain routes to areas with higher employment were extended,

more people could choose CARTS as a viable option for their trip to work. Extended operating hours could also benefit those making trips to school, shopping, or other facilities that may be open at hours that do not match the current CARTS service schedule.

Identifying Cooperative Services and Connections with Regional Partners

This refers to the opportunity to coordinate with:

- C Hill Country Transit,
- C Capital Metro,
- C Greyhound, and
- C Commuter Rail.

For example, HCT operates a vehicle from Milam County, through Taylor three days per week for dialysis needs in Round Rock. Currently CARTS has a waiting list for Taylor residents that desire dialysis transportation. HCT management has agreed to pick up Taylor passengers on its way into Round Rock.

There are multiple opportunities to coordinate and feed Capital Metro's Express service, opening up many more options for Williamson County residents.

Encouraging community initiatives acknowledges the potential for organized communities to help themselves by establishing any one or combination of the following:

- C Commuter Vanpool,
- C Subscription bus,
- C Seasonal service, and
- C Events-based service.

Recognizing that CARTS organizes trips in addition to serving them with transit, partnerships could be arranged whereby CARTS acts as the organizing agent and community representatives and/or organizations provide the actual transit service and facilities.

Advantages/Disadvantages

The primary advantage of this approach is that it does not require additional funding to implement. In tight budget times, this can become a viable short-term option. Other advantages include:

- Simple to implement
- Can make incremental improvements to ridership.

The primary disadvantage is that it does not begin to meet the transit needs in Williamson County. Commuter needs outside of the areas surrounding Capital Metro's service will not be met. The county has many locations where fixed-route can operate successfully; this status quo option would not meet the local needs either.

Service Alternative Nos. 2 And 3

The major differences between Alternatives 2 and 3 is the service level/headways. Since it is recommended that the committee select a combination of the service levels/alternatives, they are presented together. Prior to the discussion of specific services, it would first be helpful to review the general concepts associated with fixed-route service, which is the type of service recommended for local service and regional/commuter service.

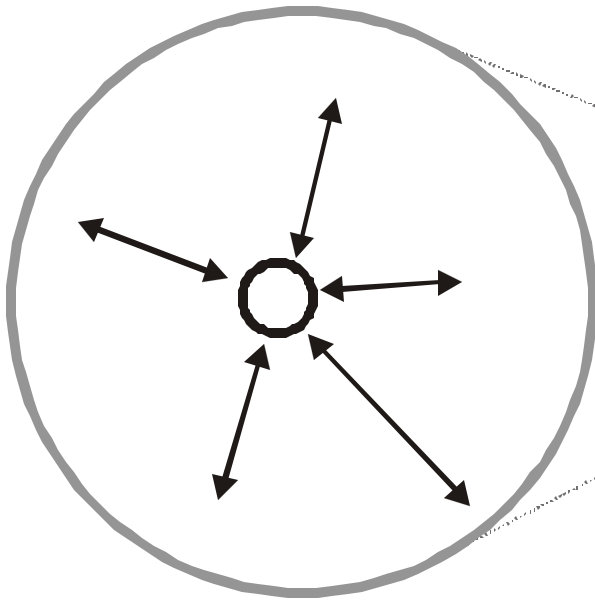
Types of Fixed-Route Services

There are a number of fixed-route approaches that can be used for the local and regional services. Fixed-route is the most familiar type of bus service, and it is the bus service that offers the greatest capacity in most communities. Fixed-route bus systems are typically oriented in one of several different ways. Radial, hub-and-spoke, and grid systems are common route orientations of fixed-route systems.

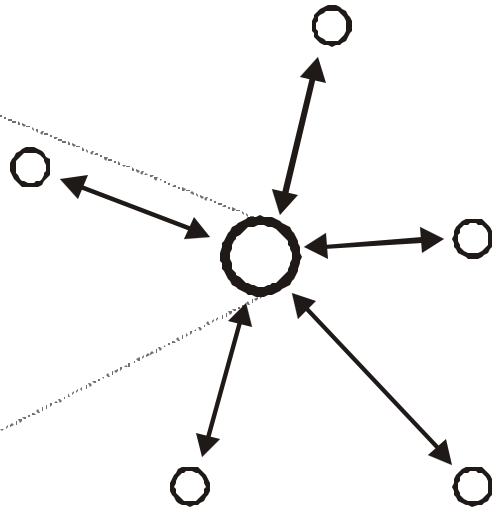
Radially-oriented bus systems are focused around a single transit hub where all bus routes come together, usually downtown or major commercial districts. This is the typical approach found in small cities and towns. Passengers making trips are frequently destined for the commercial center located at the transit hub, or they may transfer to routes serving other areas of the community. In many communities, transit services "pulse" at the transit hub, meaning that all buses arrive and depart the transit hub at the same time to facilitate quick transfers between routes. A radial bus system may operate within a community, or routes from many communities may come together at a transit hub in the principal community in the county or region.

RADIAL

WITHIN A COMMUNITY

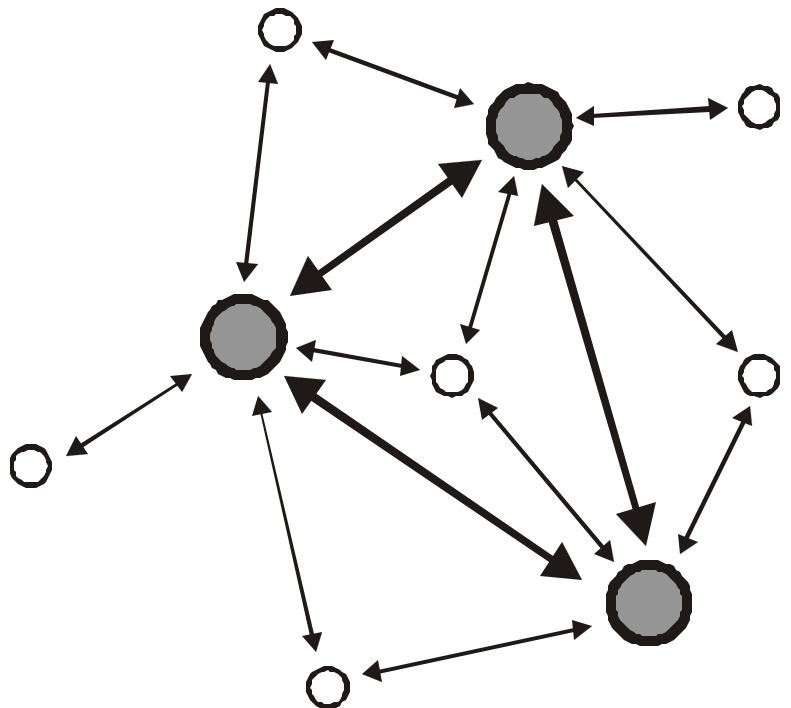


BETWEEN COMMUNITIES



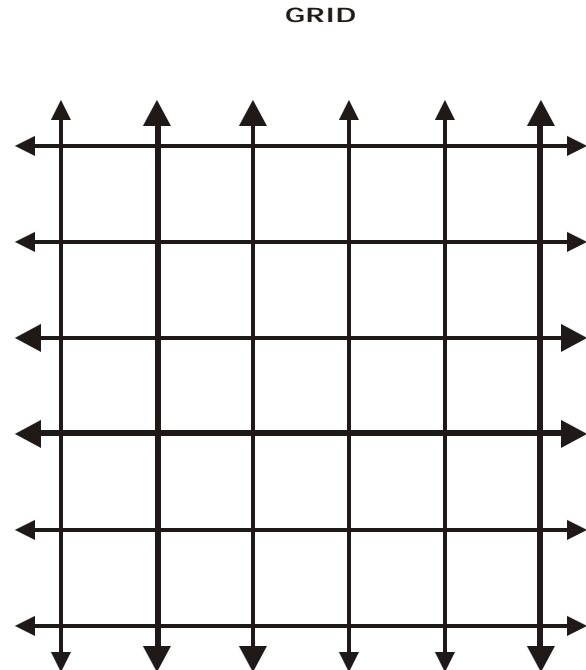
A hub-and-spoke transit system is similar to a radial transit system, except that there are several major transit hubs around which services are focused. This type of system typically operates in larger communities where there may be several commercial districts in addition to downtown. This type of system may also be applicable in a county or region where there are several larger communities, each of which may serve as a focal point for transit services.

HUB-AND-SPOKE



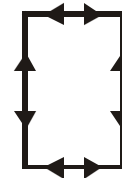
A grid transit system is typically applied in large urban communities or regions where arterial streets are regularly-spaced and trips are dispersed throughout the route. Although a grid transit system is a common concept, the street network and trip patterns in many communities do not support a grid system.

Elements of the grid system are applied in many transit systems. In a radially-oriented transit system, for example, one or more routes may serve commercial corridors without traveling downtown, providing a crosstown direct trip where demand is sufficient to support the service.



Another service concept is based on the need to circulate within a small community or within an activity center of a larger urban community. Although this service concept is seldom applied as a stand-alone transit system, it is frequently used as one element of a larger countywide, urban, or regional transit system. One or several circulator routes may operate within a community to services between many locations within a community. Although this type of service minimizes the need to transfer between routes, service is typically circuitous, and routes must be short to minimize travel times on the indirect service.

CIRCULATOR

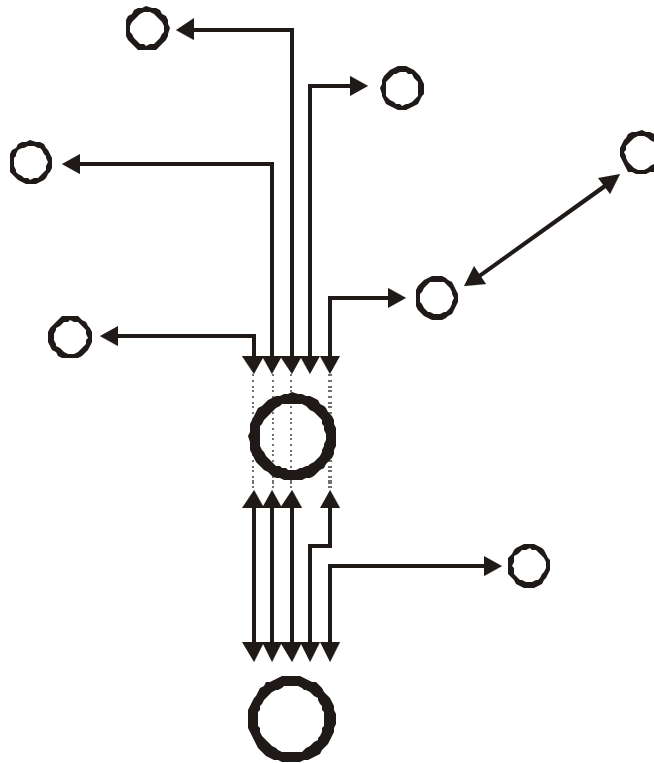


Transit systems generally do not follow one simplified service structure. More often, transit systems may follow a primary service structure but offer services adapted from several service concepts. In Williamson County, it may be possible to operate radial systems within several communities along with a countywide radial system focusing on a larger community like Round Rock or Georgetown. However, a countywide hub-and-spoke system in combination with radial systems and circulator routes within several communities may offer greater mobility, allowing people to travel between several nearby communities using direct transit services (for example, Cedar Park could have direct services to both Round Rock and Georgetown, in addition to a connection to Capital Metro's services).

Another modified service concept is described as a branched radial system. This type of service is common within urban areas as well as regional services where many transit trips are focused around destinations in linear commute corridors.

In this service concept, transit routes from many communities come together along a single corridor and continue service to communities and commercial centers along that corridor. Although there are many overlapping routes, the combined services among all of these routes provide more frequent services to serve the concentrated trip needs along the corridor. This service concept may be appropriate in Williamson County, since smaller communities are dispersed throughout the county, while larger communities and commercial centers are along the county's major transportation corridor, IH 35.

BRANCHED RADIAL



Williamson County, since smaller communities are dispersed throughout the county, while larger communities and commercial centers are along the county's major transportation corridor, IH 35.

Fixed-route bus services may also be operated with more frequent stops to offer greater access or with fewer stops to offer greater speed. Most fixed bus routes are local routes; that is, buses stop every few blocks to serve all passengers who are within walking distance of the routes. Limited stop, express, and commuter routes may serve local stops or a park-and-ride before providing non-stop service along a portion of the route (generally on a highway or freeway). Most urban transit systems offer some form of limited stop services along major transportation corridors, but suburban and rural commuter systems are found in many regions. With the rapid growth of population and employment in Williamson and Travis Counties, there may be sufficient demand to warrant some form of limited stop service to major employment centers.

SERVICE DESIGNS

1. Local City Service

Local fixed-route bus service is proposed for the more densely populated areas of the county, in order to provide connections between major travel destinations such as employment, retail shopping, medical needs, recreation, and education. This service can include internal systems in Cedar Park, Pflugerville, Georgetown, and Taylor.

Fixed-route bus service also includes internal commuter and school service using the fixed-route network, suggesting that the route network may alter slightly during times when commuters need to get to work and when students need to get to and from school. School children will be able to access the service to the maximum extent feasible.

Key Concepts of Fixed-Route City Bus Service

Essential concepts and rules that should be followed in the creation of a fixed-route local bus service plan in Williamson County include:

- **Minimum Density** - Fixed-route service should be available in communities of at least 1,500 persons per square mile, as well as areas with major destinations.
- **Service Days and Hours** - It is recommended that service operate as a minimum, 6:00 a.m. to 7:00 p.m., Monday through Friday and 9:00 a.m. to 7:00 p.m. on Saturday - approximately 3,750 revenue hours annually.
- **Suburban Area Road Network** - The sprawl nature of the southern part of the county limits the effectiveness of public transit service.
- **ADA Complementary Paratransit** - The consultants recommend accessible fixed-route service with complementary paratransit service rather than route deviation service (where the vehicle will deviate off of the route as requested) in most cases. While the fixed-route approach is slightly more expensive, it provides far superior service for both fixed-route riders and persons who cannot ride fixed-route, due to a disability as defined by the ADA. In addition, CARTS will still continue to operate paratransit in much of the county.

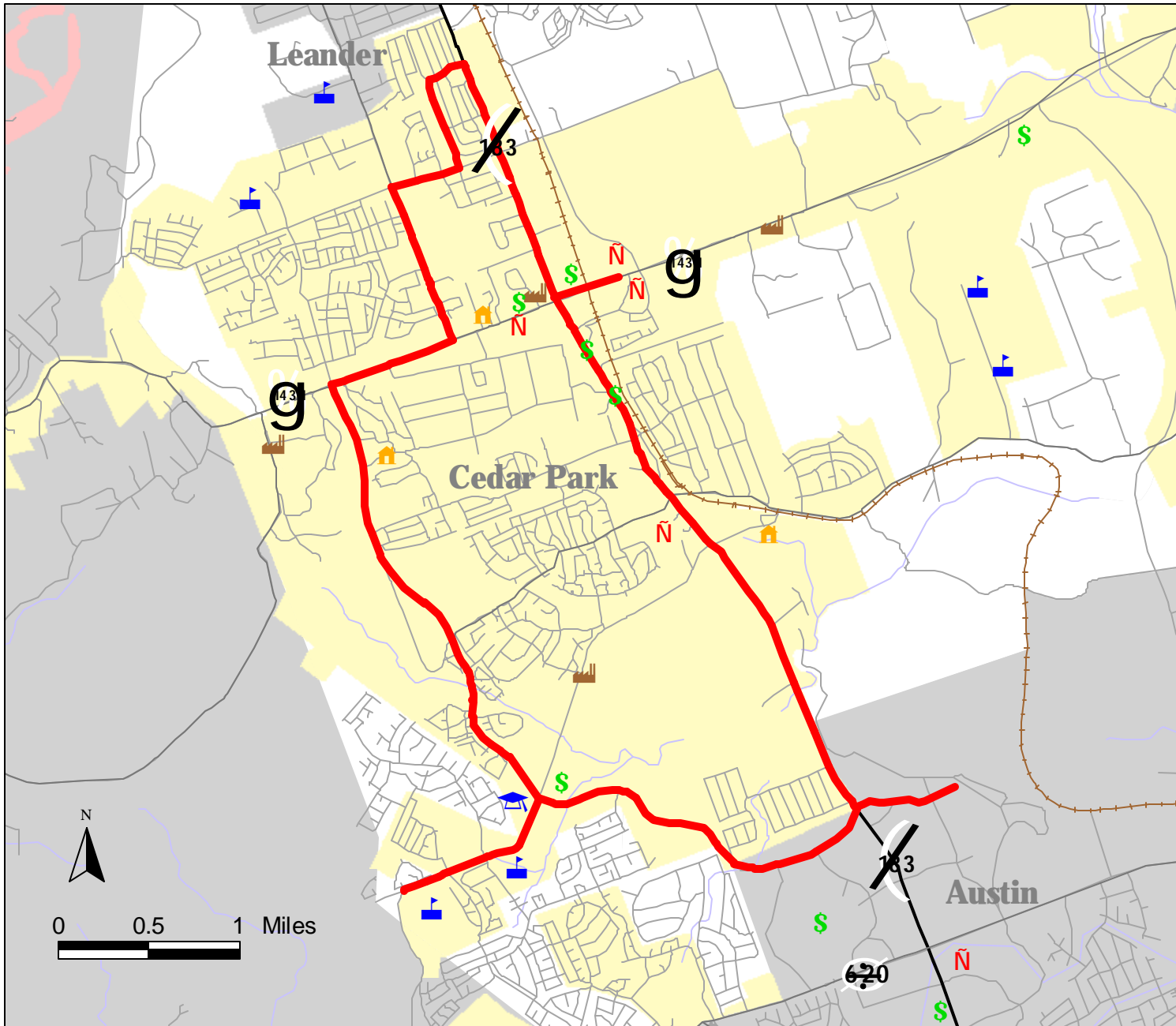
- **Maximize Use of Fixed-Route** - Accessible fixed-route local bus service has proven capable of transporting most persons with disabilities. Indeed, mainstreaming is the intent of the ADA legislation. Incentives and training should be provided for persons with disabilities to ride fixed-route.
- **Serve Public School Students** - Student transportation for children who live less than two miles from a school is an important part of a fixed-route system where this two mile rule applies. Each route will be designed to generate maximum ridership for students. Routes can change during peak school hours to accommodate student needs.
- **Timed Transfer and Interlining** - Fixed routes will meet at designated transfer points and then become a second route (interlining). This reduces the need for transfers. These services will also be timed to meet inter- and intra-county service, where possible.
- **Out and Back** - This is the traditional form of fixed-route transit, where as a general rule, a bus goes in two directions down each street it traverses. Large loop style routes where the vehicle goes one way down each street are generally ineffective due to long travel times, circuitous routings, and difficulties in comprehending schedules.
- **Modest Goals** - Initially modest goals should be set, allowing the service time to build a customer base, like any other business.
- **Marketing Funds** - As with any new start-up business, transit needs to be professionally marketed and promoted, with a reasonable budget.

Service Areas for Local Fixed-Route

Local fixed-route service is feasible in Cedar Park, Georgetown, Pflugerville, and Taylor, based on the criteria set forth above. These cities each indicate significant travel within their community and all are of the size and minimum density that would warrant some level of fixed- route service. Taylor, being on the low end of fixed-route service could also sustain a flexible route.

Cedar Park Fixed-Route

Cedar Park, a suburban community with light density throughout, has the potential to support one - two fixed-route buses that connect at the Lakeline Mall with Capital Metro service. The city is linear in nature with most of the growth occurring alongside the north-south corridor around Bell Boulevard (U.S. 183), and increasingly Lakeline Blvd. to the west. There is no traditional downtown. A starter route and full build routes are presented in Figure 3-1. The major difference



SERVICE STATISTICS

Vehicles:	2
Annual Miles:	105,000
Annual Hours:	7,500
Annual One-Way Trips:	30,000
Productivity (trips/hour):	4
Headway:	1 hour
Annual Operating Cost:	\$300,000
Capital Cost:	\$140,000-\$200,000

Service Hours:	Mon-Fri: 6am-7pm
	Saturday: 9am-7pm

LEGEND

- Local Route
- Local Destinations
 - Major Employer
 - Educational Facility
 - Major Shopping Destination
 - Medical Facility
 - Affordable Housing Complex
- Cedar Park
- Remainder of Study Area



Figure 3-1
LOCAL CEDAR PARK
STARTER ROUTE SERVICE



between the two alternatives is the number of buses and the resulting headways of two hours for the starter system and one hour for the enhanced service.

An approximate route would be as follows: Starting at the north end of Bell Blvd., the route goes south serving the businesses and residences on Bell to Lakeline Mall, where it would connect with Capital Metro service. The route will continue north on Lakeline Blvd. to Cypress Creek Road, where it would serve Austin Community College, Cedar Park Middle School, and Cedar Park High School. The route continues north and then turn east at the vicinity of Whitestone Blvd. to the area surrounding Garner Park. A single bus would reverse course to head back south on Lakeline Blvd. A two bus service would have two loops that go in opposite directions, cutting the two hour headways in half.

Alternative 2 starter service would generate modest ridership at first, with service used by commuters to Austin and for non-work trips for shopping, medical, and school. Table 3-1 reviews ridership, hours, miles, and costs for each of the fixed routes. Based on experience in similar areas, ridership would start at a modest four one-way trips per revenue hour. That is, if one vehicle operates from 6:00 a.m. to 7:00 p.m. - 13 hours per weekday and ten hours on Saturdays - ridership would be approximately 52 one-way trips daily, and 15,000 annual trips. It is expected that ridership would double in 2 - 4 years.

The route mileage is about 15 miles, one-way and 30 miles round trip, allowing for two hour headways (Table 3-1). Total annual mileage would be about 56,500 miles per vehicle. The cost for this service would be approximately \$150,000 for operations with additional cost for vehicles.

For a two bus system that were to start next year, the hours, miles and costs will double, while ridership will be based on three one-way trips per revenue hour at the start (50% ridership increase). Headways will be a more reasonable one hour.

Georgetown Fixed-Route

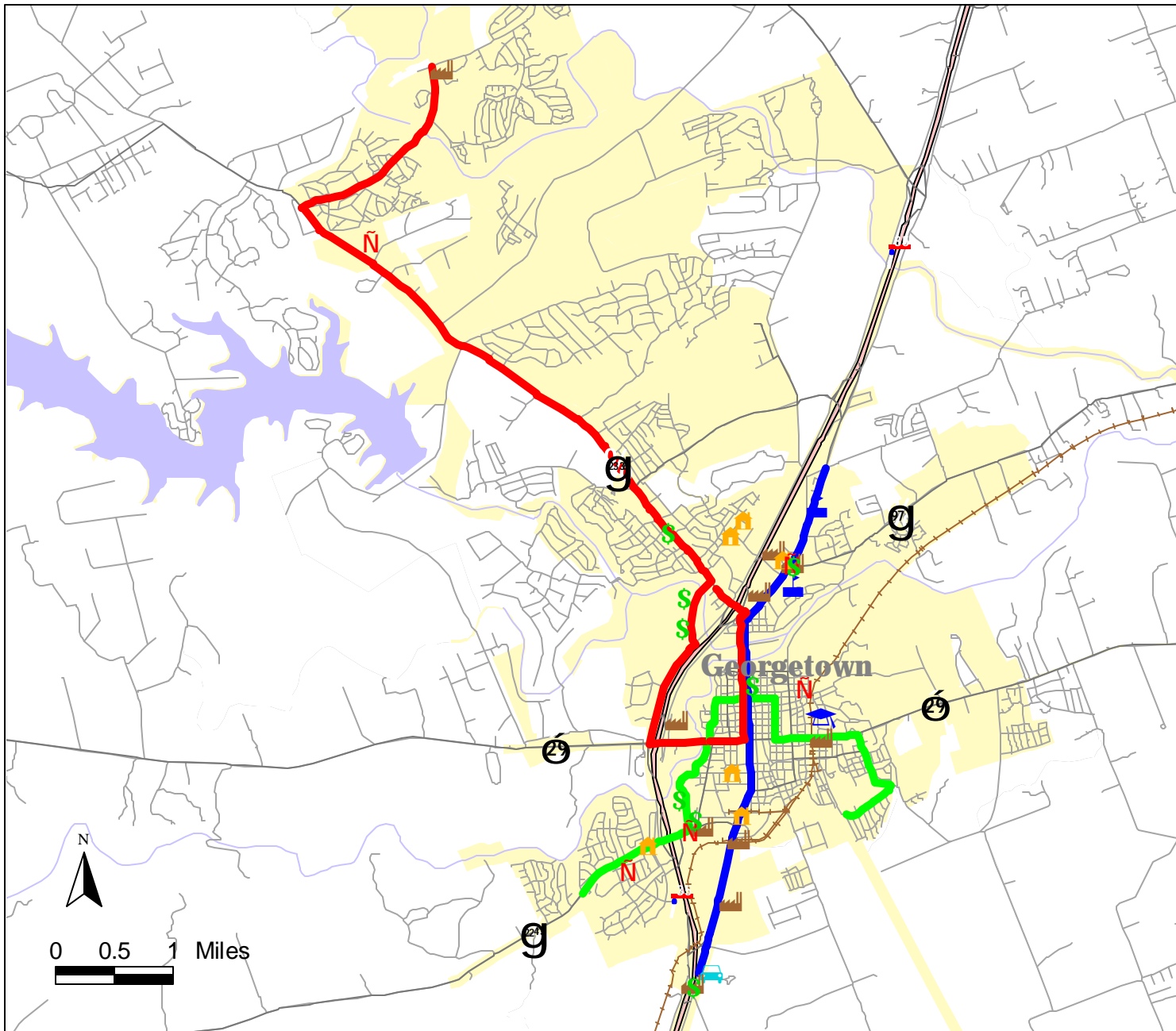
Georgetown is the largest city in the study area, and is a traditional city (for transit purposes) with a significant downtown. Georgetown also has a college and most importantly, much of the city is transit friendly, allowing for the potential of higher ridership. Fixed-route service can also enhance Georgetown's reputation as a walkable city. Walking and transit go hand in hand. The initial plans developed by the KFH Group in 1997 are still viable with some changes in the outlying areas of the city -- including Sun City.

Figure 3-2 depicts the two bus system recommended in 1997. Each bus would meet at a central transfer point downtown. This approach requires one hour

Table 3-1 - LOCAL FIXED-ROUTE SERVICE - POTENTIAL RIDERSHIP AND COSTS

City	Vehicles Required	Headway	Route Length One-Way	Estimated Productivity	Service Hours	Service Miles	Estimated Ridership (Annual - Yr. 1)	Annual Operating Cost*
Cedar Park Starter	1	2 hr.	15.6	4	3,750	58,500	15,000	\$150,000
Cedar Park Enhanced	2	1hr.		3	7,500	117,000	22,500	\$300,000
Georgetown Starter	2	1 hr.	20	5	7,500	225,000	37,500	\$300,000
Georgetown Enhanced	3	1/2 to 1hr.		4	11,250	339,750	45,000	\$450,000
Pflugerville Starter	1	1 hr.	10.4	4	3,750	78,000	15,000	\$150,000
Pflugerville Enhanced	2	1/2 hr.		3	7,500	156,000	22,500	\$300,000
Taylor Starter	1	1 hr.	7.8	4	3,750	58,500	15,000	\$150,000
Taylor Enhanced	2	1/2 hr.		3	7,500	117,000	22,500	\$300,000
Total Starter	5	1-2 hr.			18,750	420,000	82,500	\$750,000
Total Enhanced	8	1/2 to 1 hr.			30,000	651,750	105,000	\$1,200,000

* Assumes \$40 per hour cost.



SERVICE STATISTICS

Vehicles:	3
Annual Miles:	150,000
Annual Hours:	11,250
Annual One-Way Trips:	56,250
Productivity (trips/hour):	5
Headway:	1/2 - 1 hour
Annual Operating Cost:	\$450,000
Capital Cost:	\$210,000-\$300,000

Service	Mon-Fri: 6am-7pm
Hours:	Saturday: 9am-7pm

LEGEND

- Local Route 1
- Local Route 2
- Local Route 3
- Local Destinations
 - Major Employer
 - Educational Facility
 - Major Shopping Destination
 - Medical Facility
 - Affordable Housing Complex
 - Park & Ride Lot
- Georgetown
- Remainder of Study Area



Figure 3-2
LOCAL GEORGETOWN SERVICE
WITH TWO BUSES



headways. The three bus system is the same as the two bus system except that headways on the two in-town route would be 30 minutes.

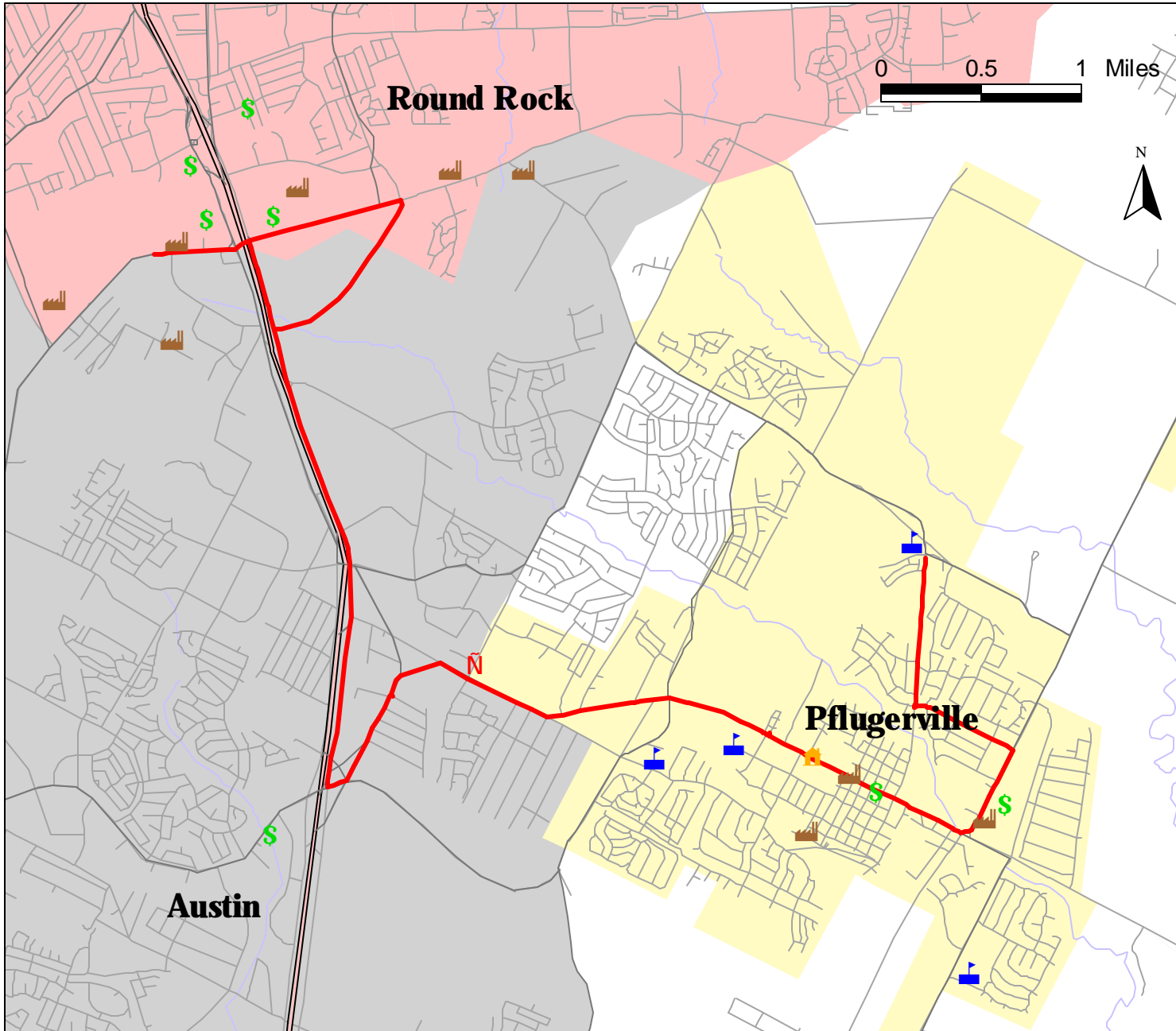
This service would operate three routes. The first route goes to the Sun City area and its neighboring Scott and White Clinic. From downtown, the route travels north on Austin Avenue to Williams Drive, passing McCoy Middle School. The route then goes to Sun City, circulating through the community. The route reverses course and goes back through downtown and then proceeds down through the southeast part of town. It then goes back downtown following the same route. The second route starts at the downtown hub, traveling north on Austin Ave. to the high school. It heads back downtown and then continues south to the park and ride lot at the south side of town. It may be possible to meet the commuter bus at this underused location. The route then goes back to downtown and becomes Route 3. Route 3 goes from downtown, west, and then south to the hospital and retail. The route crosses IH 35 going west on Leander Rd. The route reverses and heads back the same way to downtown, where it goes east on University Avenue, circulating through campus and the Hutto Road area before coming back downtown.

Pflugerville Fixed-Route

Pflugerville is also a small suburban community that is difficult for transit to serve due to its sprawl nature and lack of a downtown core. Through the review of demographics, travel patterns, as well as meetings and discussions with residents, it is evident that many needs will be served by transporting residents to Round Rock where most of the retail shopping and jobs are located. The service will also connect to Capital Metro's all day express service.

Ideally the Pflugerville route would connect with Round Rock's service and act as a feeder route to Capital Metro's express service at FM 1825 and IH 35 (Figure 3-3). This route would provide excellent service for commuters to Austin and Round Rock. In addition, it can provide service throughout the day within Pflugerville and to Round Rock and Austin. The route starts at the Park Crest Middle School, going south on Railroad Avenue to the intersection with Pecan St., where it goes west past the HEB and the high school. The bus then goes to the Capital Metro Park and Ride Lot. The route continues north on IH 35 to Louis Henna Drive, where it will circulate on both sides of the interstate, then reverse direction and return. It is anticipated that this bus will connect to a Round Rock system at Louis Henna Drive.

This service would operate during all service hours and will operate approximately 10.5 miles in each direction (Table 3-1). Headways will be one hour for the starter system. The service would generate 15,000 one-way trips annually and operate 78,000 miles in 3,750 hours.



SERVICE STATISTICS

Vehicles:	2
Annual Miles:	82,500
Annual Hours:	7,500
Annual One-Way Trips:	30,000
Productivity (trips/hour):	4
Headway:	1 hour
Annual Operating Cost:	\$300,000
Capital Cost:	\$140,000-\$200,000

Service Hours:	Mon-Fri: 6am-7pm
	Saturday: 9am-7pm

LEGEND

- Local Route
- Local Destinations
 - Major Employer
 - Educational Facility
 - Major Shopping Destination
 - Medical Facility
 - Affordable Housing Complex
 - Park & Ride Lot
- Pflugerville
- Remainder of Study Area

D-19



Figure 3-3
LOCAL PFLUGERVILLE SERVICE



The full service option would call for half hour headways at least during peak hour. This would require two vehicles at twice the cost of the starter service, if the service was operated all day.

Taylor Fixed-Route

Taylor, like Georgetown is a more traditional city in a geographic/transit sense. Streets are parallel and there is a downtown core area. Taylor can support one full-time fixed-route bus operating on two routes (Figure 3-4). The first route operates north and south on Main Street. At the north are the high school and the HEB. In the center of this route there is the junior high school, city hall, and downtown. At the southern end of this route are residences that can support fixed-route. The East-West Route operates from the new park being planned on the western end of town and serves neighborhoods along West Lake Drive and the south on Jones Street and Burkett to the city hall area. These routes can be adjusted to meet at a new intermodal center when built.

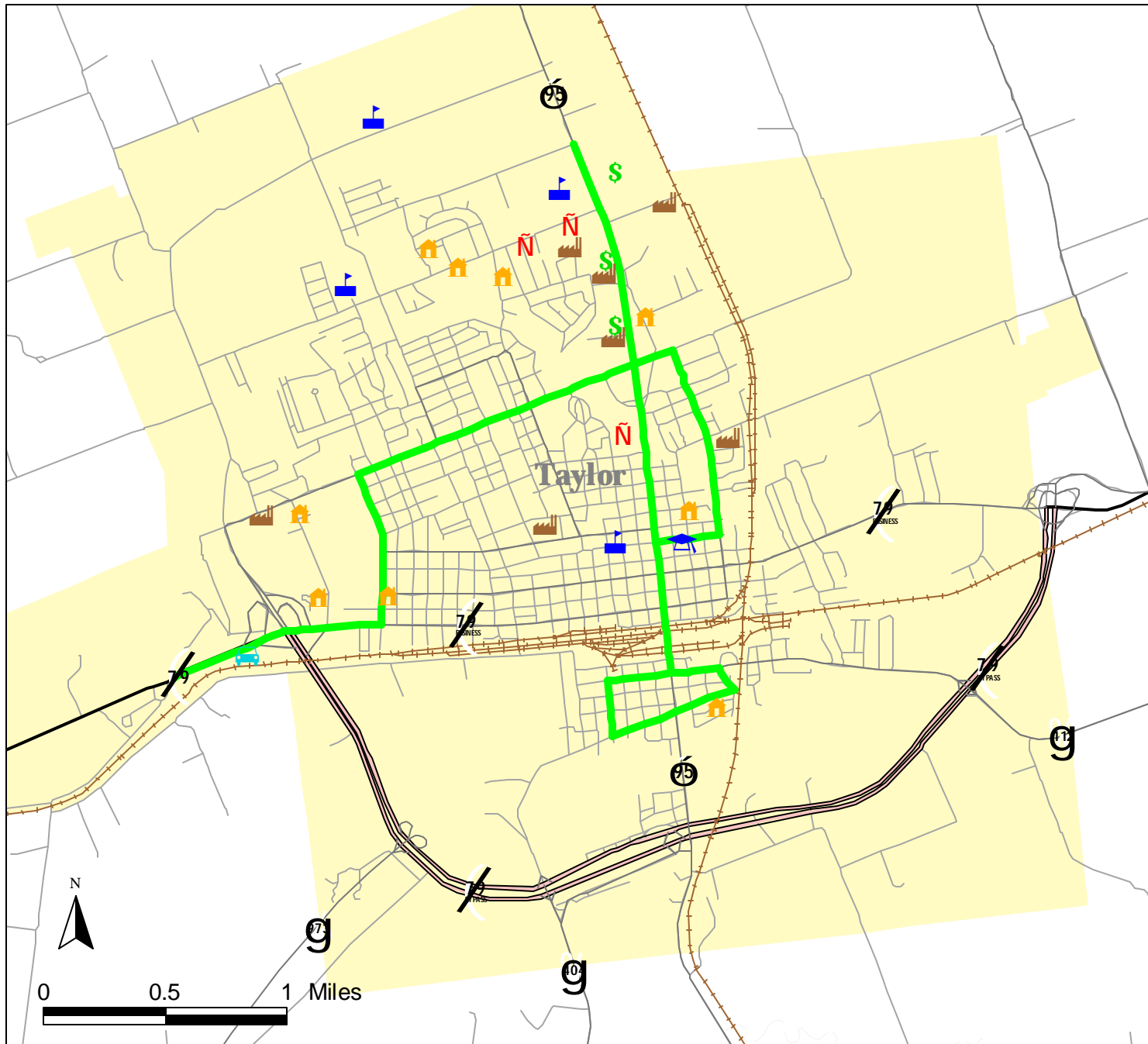
This service would be most beneficial for school age children - going by schools, recreation centers and parks, as well as transit dependent persons for work, school, shopping, and medical needs. This service would also connect with the regional routes.

The service would operate during all regular hours and would operate 58,000 miles and transport approximately four persons per hour during initial start up - 15,000 one-way trips annually, growing to six one-way trips per hour after 2-4 years. This route can also operate as a flex route service, attempting to reduce paratransit needs. The service will cost approximately \$150,000 as well as capital equipment. Table 3-1 describes all of the route information for the starter and enhanced service.

2. Inter-County and Intra-County Regional Service

As detailed in the first technical memorandum, many of the commuter trip needs are regional, with many commuters traveling to Round Rock or Austin. Clearly a fixed-route approach is needed to meet the needs of the county's commuters. Based on the above discussion of fixed-route approaches, there are a number of approaches that can be used. The purpose of the service will be to accommodate persons from most areas of the county to go to all other areas of the county and Austin, by using fixed-route service. Passenger needs include:

- C Commuters to major employment centers in the county and Austin.
- C Persons with medical or human service needs that can use a fixed-route bus.



SERVICE STATISTICS

Vehicles:	1
Annual Miles:	37,750
Annual Hours:	3,750
Annual One-Way Trips:	15,000
Productivity (trips/hour):	4
Headway:	1 hour
Annual Operating Cost:	\$150,000
Total Capital Cost:	\$70,000-\$140,000

Service Hours:	Mon-Fri: 6am-7pm
	Saturday: 9am-7pm

LEGEND

- █ Potential Local Taylor Route
- Local Destinations**
- Major Employer
- Educational Facility
- Major Shopping Destination
- Medical Facility
- Affordable Housing Complex
- Affordable Housing Complex
- Taylor
- Remainder of Study Area

- C Persons with non-recurring, shopping, recreation and other occasional trips.

Regional Service Options

Based on the service concepts presented above, four preliminary service concepts are presented for countywide services in Williamson County:

- A countywide radial transit system focused on a Round Rock transit hub near the intersection of IH 35 and Louis Henna Drive.
- A countywide hub-and spoke transit system focused on hubs in Round Rock, Taylor, and Georgetown with additional connections to Hill Country Transit and Capital Metro.
- A branched radial transit system with increasing service frequency in South Williamson County and connections to Hill Country Transit and Capital Metro.
- A commuter transit system connecting major population centers in Williamson County to major employment centers in Round Rock and Austin and connecting to the Capital.

Transfer Center/Hub

The area along SH 45/Louis Henna Drive and IH 35 is the true intra-county/regional transit hub for the service area. It is the largest set of destinations within the service area. This area includes Dell's main campus, a large shopping area anchored by Wal-Mart (invariably one of the most popular stops in small transit systems), Target, many restaurants, and a large shopping complex at La Frontera. In addition, a business park is developing in La Frontera. By having the area's major trip attractors as a hub/transfer point, reduces the need for transfers and makes the service more convenient. Please note that the hubs for the commuter service should be the two Capital Metro Park and Ride Lots - Lakeline and Pflugerville.

FIXED-ROUTE SERVICE DESIGNS

Following is a description of different types of fixed-route service configurations. The costs and performance estimates are shown in Table 3-2.

Table 3-2 - VEHICLE TYPES

Type of Vehicle	Uses	Advantages	Disadvantages	Cost	Life	Capacity Seats
Paratransit						
1. Body-on-Chassis	Paratransit or Fixed-Route	<ul style="list-style-type: none"> - Smaller - Least expensive - Greater maneuverability for rural areas 	<ul style="list-style-type: none"> - Less comfort - Wear out quickly 	\$50-70K	5 years	15-25
2. Truck Body-on-Chassis	Paratransit or Fixed-Route	<ul style="list-style-type: none"> - Greater capacity - Last longer 	<ul style="list-style-type: none"> - Rough ride - Less comfort - Extra step/less accessible 	\$75-100K	7 years	20-35
Fixed-Route						
3. Medium Duty Transit Coach	Fixed-Route	<ul style="list-style-type: none"> - Good ride qualities - Looks good - Comes in 30, 35, 40 ft. models 	<ul style="list-style-type: none"> - Expensive - Less maneuverable 	\$200K	10 years	20-35
4. Heavy Duty Transit Coach	Fixed-Route	<ul style="list-style-type: none"> - Most comfortable - Low floor models - Comes in 30, 35, 40 ft. models 	<ul style="list-style-type: none"> - Most expensive 	\$300K	12 years	35-45
Commuter						
5. Suburban Transit Coaches	Commuter	<ul style="list-style-type: none"> - Provides necessary comfort for longer distances - High quality coach 	<ul style="list-style-type: none"> - Minimum requirements but high quality 	\$300K	12 years	40-50
6. Over-the-Road Coaches	Commuter	<ul style="list-style-type: none"> - Highest quality for long distance 	<ul style="list-style-type: none"> - With one door alighting takes longer 	\$350K	12 years	45-65

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Countywide Radial Route System

The first service concept provides direct routes from throughout Williamson County to a central transit hub in Round Rock with six regional routes (Figure 3-5).

- Route A provides service from Thrall through Taylor and Hutto to Round Rock via US 79.
- Route B provides service from Bartlett through Granger, Taylor, and Hutto to Round Rock via SH 95 and US 79.
- Route C provides service from Jarrell through Georgetown to Round Rock via IH 35.
- Route D provides service from Florence through Georgetown to Round Rock via SH 195 and IH 35.
- Route E provides service from Liberty Hill through Cedar Park to Round Rock via SH 29, US 183, and RM 1431.

All routes would allow minor deviations from the major highways to provide connections to major destinations and enhance connections to local transit services. These countywide routes may also need to serve a collector and distributor function in smaller communities not served by a local transit system. Each route will connect with the appropriate local bus service - where possible timed meets will be made.

Connections to Hill Country Transit to destinations outside of Williamson County could take place by extending service from Jarrell north to a transfer point near the county line and extending service from Thrall east to a transfer point near the county line. Connections to Capital Metro could take place on the Pflugerville local route and on Cedar Park's local transit system. Connections to Burnet County are already served by CARTS, and regional and statewide connections would take place at a central facility in Round Rock.

A radial system focusing on Round Rock or Pflugerville would be among the most cost-effective systems, but it would require most passengers to travel through Round Rock or Pflugerville to reach Georgetown, possibly transferring between buses at the central transit hub.

An initial level of service generally assumes that routes operate every 60-120 minutes from 7:00 a.m. to 6:00 p.m. Some routes between smaller communities may offer only several trips a day or may include only mid-day services to shopping and medical destinations. All routes would be designed to "pulse" at the Round Rock hub,

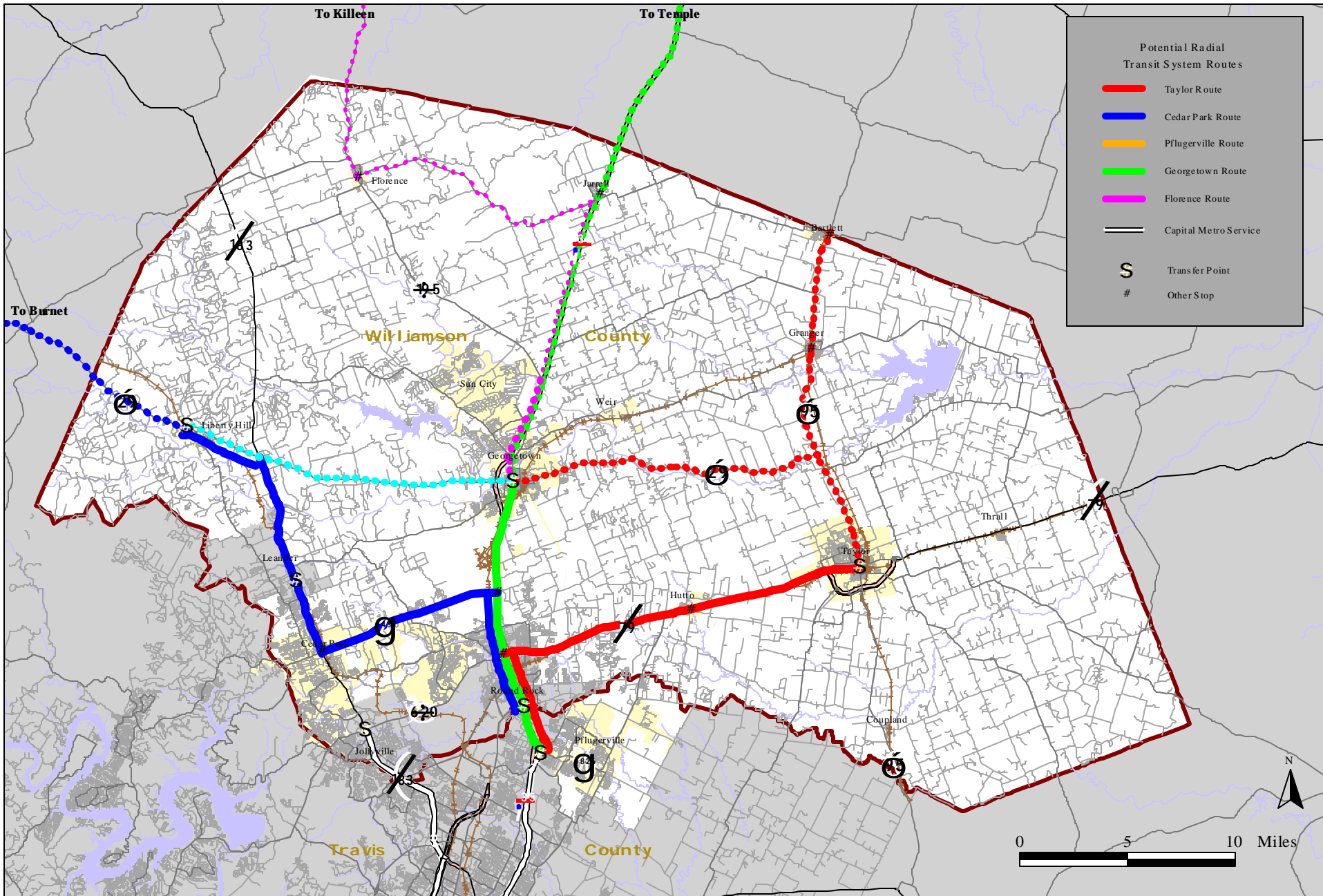


Figure 3-5
 POTENTIAL RADIAL TRANSIT
 SYSTEM MODEL SERVICE



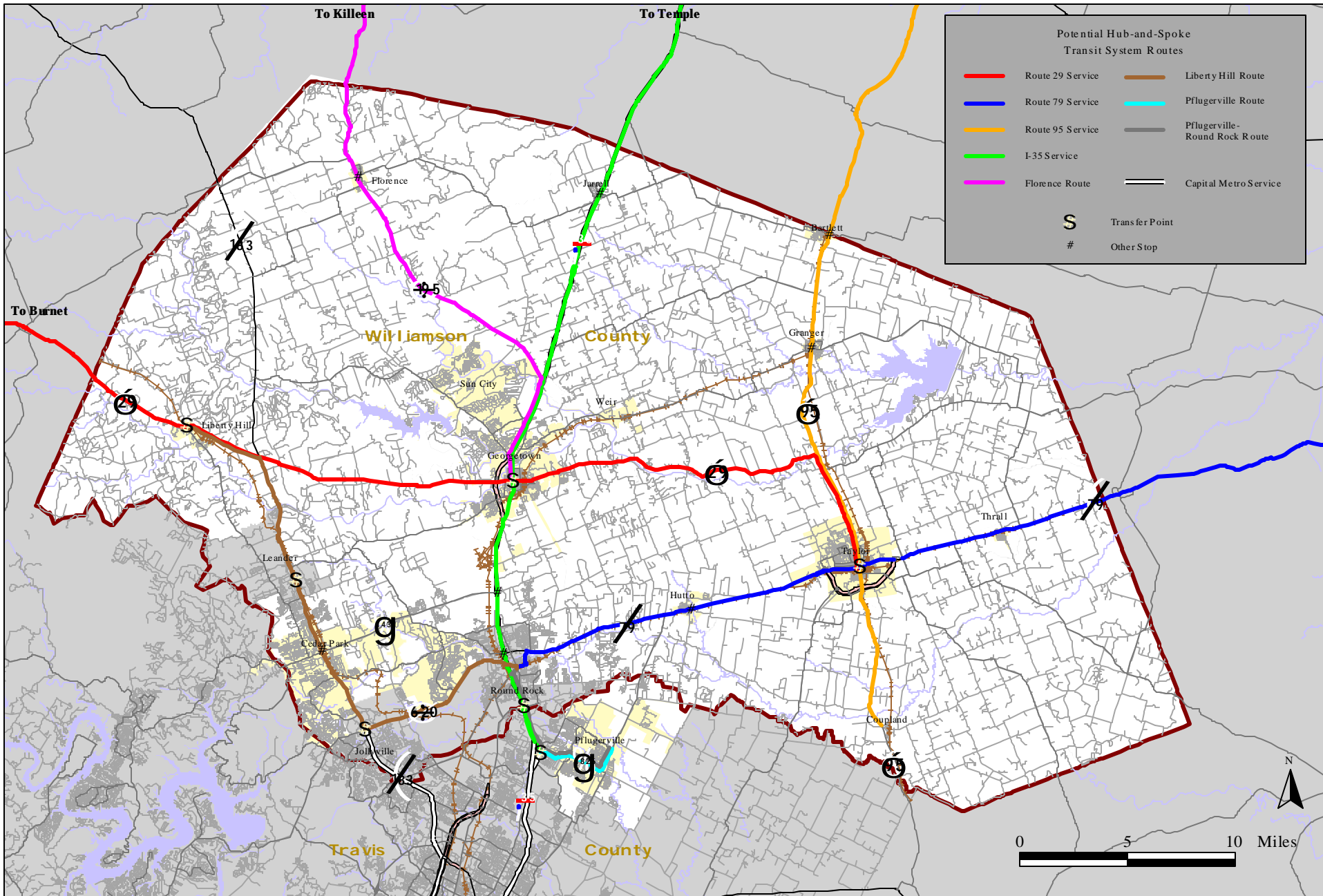
allowing passengers to transfer between routes to make countywide trips and transfer to Greyhound and other regional services with minimal wait times.

Countywide Hub-and-Spoke Route System

A second service concept is designed to provide more direct services between the major communities in Williamson County. A hub-and-spoke system would provide direct services between Georgetown, Round Rock, and Taylor, but still require transfers from smaller communities at one of the major hubs for many trips. This system consists of 13 routes (Figure 3-6).

- Route A provides service between Taylor and Round Rock through Hutto via US 79.
- Route B provides service between Taylor and Georgetown via SH 95 and SH 29.
- Route C provides service between Georgetown and Round Rock via IH 35.
- Route D provides feeder service between Coupland and Taylor via SH 95.
- Route E provides feeder service between Thrall and Taylor via US 79.
- Route F provides feeder service between Bartlett and Taylor through Granger via SH 95.
- Route G provides feeder service between Jarrell and Georgetown via IH 35, with connecting service to Hill Country Transit in Jarrell.
- Route H provides feeder service from Florence to Georgetown via SH 195 and IH 35.
- Route J provides feeder and regional service from Burnet County to Georgetown through Liberty Hill via SH 29.
- Route K provides feeder service from Liberty Hill to the Lakeline Area connection with Capital Metro through Cedar Park via US 183.
- Route L provides feeder service from Cedar Park to Round Rock via RM 1431.

All routes would allow minor deviations from the major highways to provide connections to major destinations and enhance connections to local transit services.



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Figure 3-6
 POTENTIAL HUB-AND-SPOKE
 SYSTEM MODEL SERVICE



These countywide routes may also need to serve a collector and distributor function in smaller communities not served by a local transit system.

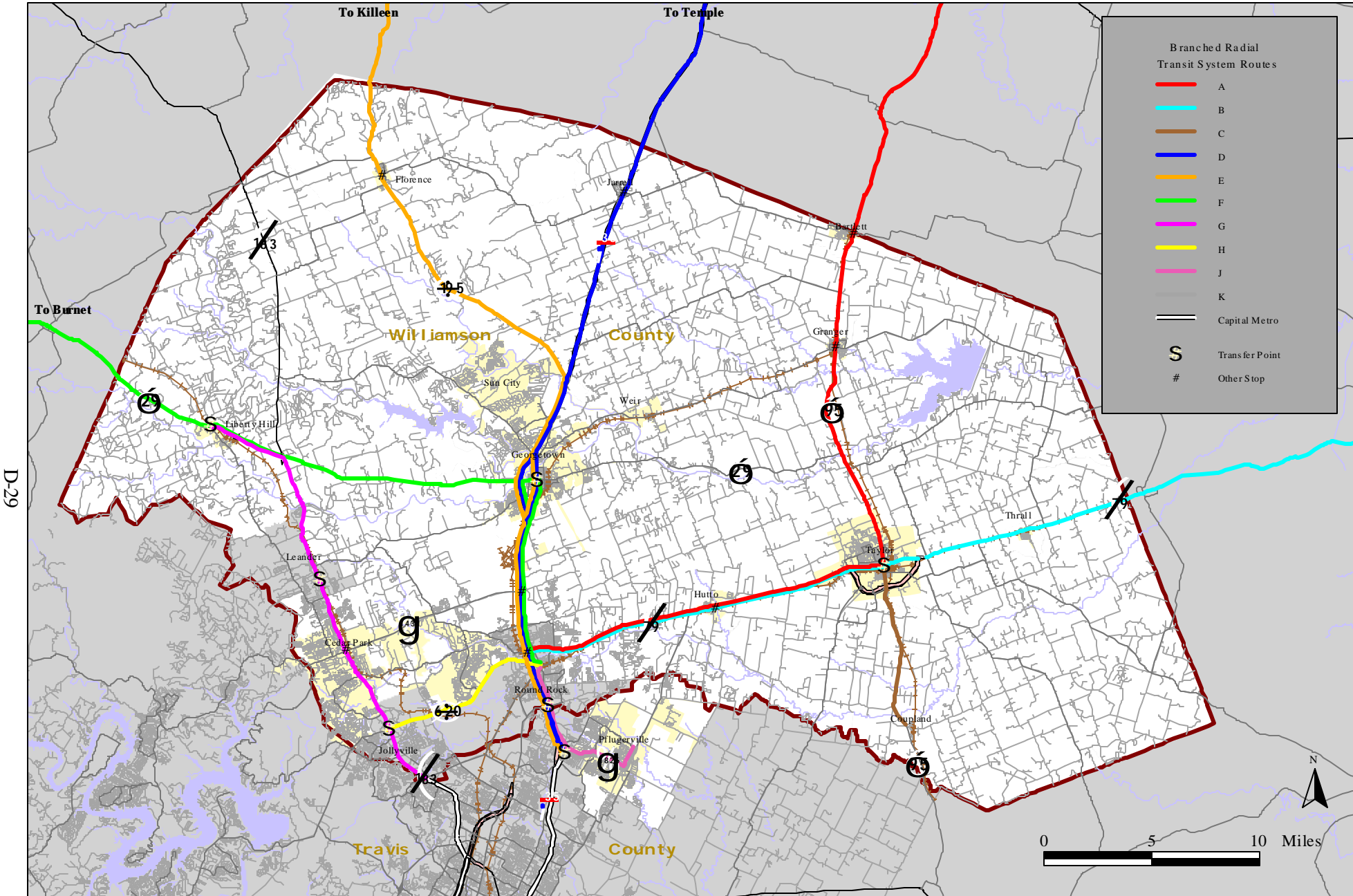
Although a hub-and-spoke transit system would provide more direct services between the major communities in Williamson County, it would also provide more frequent services between the major transit hubs to maintain those connections. The cost to provide services would be substantially greater than a radial system, and the number of vehicles required to operate the system would also be greater. This service concept may be appropriate for a maturing transit system in Williamson County.

An initial level of service generally assumes that routes operate every 60-120 minutes from 7:00 a.m. to 6:00 p.m. Some routes between smaller communities may offer only several trips a day or may include only mid-day services to shopping and medical destinations.

Branched Radial Route System

A third concept for transit services in Williamson County is based on the modified radial service concept. Essentially, services focus on a central hub in Round Rock, but many services continue southward from Round Rock to make a connection with Capital Metro at its park-and-ride lot on IH 35 at FM 1825 (Figure 3-7). Both the route extensions and an assumed enhancement in service frequencies would make this a more costly system to operate than a radial system, but this system would minimize the number of transfers required to make regional trips. This system consists of eight routes.

- Route A provides service between Bartlett and Round Rock through Granger, Taylor, and Hutto via SH 95 and US 79.
- Route B provides service between Thrall and Round Rock through Taylor and Hutto via US 79.
- Route C provides feeder service between Coupland and Taylor via SH 95.
- Route D provides service between Jarrell and Capital Metro's IH 35/FM 1825 facility through Georgetown and Round Rock via IH 35.
- Route E provides service between Florence and Capital Metro's IH 35/FM 1825 facility through Georgetown and Round Rock via IH 35.
- Route F provides service from Burnet County to Round Rock through Liberty Hill and Georgetown via SH 29 and IH 35.



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Figure 3-7
 POTENTIAL BRANCHED RADIAL
 SYSTEM MODEL SERVICE



- Route G provides service from Liberty Hill to Capital Metro's Northwest Park-and-Ride lot through Cedar Park via US 183.
- Route H provides service from Cedar Park to Pflugerville through Round Rock and Capital Metro's IH 35/FM 1825 facility through Round Rock via RM 1431, IH 35, and FM 1825.

All routes would allow minor deviations from the major highways to provide connections to major destinations and enhance connections to local transit services. These countywide routes may also need to serve a collector and distributor function in smaller communities not served by a local transit system.

The branched radial concept is intended to provide better connections between many destinations than the radial transit system concept, but at a lower cost than the hub-and-spoke transit system. This service concept may represent the moderate cost concept or compromise between service concepts in Williamson County. This concept may also be appropriate as a transition from a radial system to meet regional growth and greater demand for transit services.

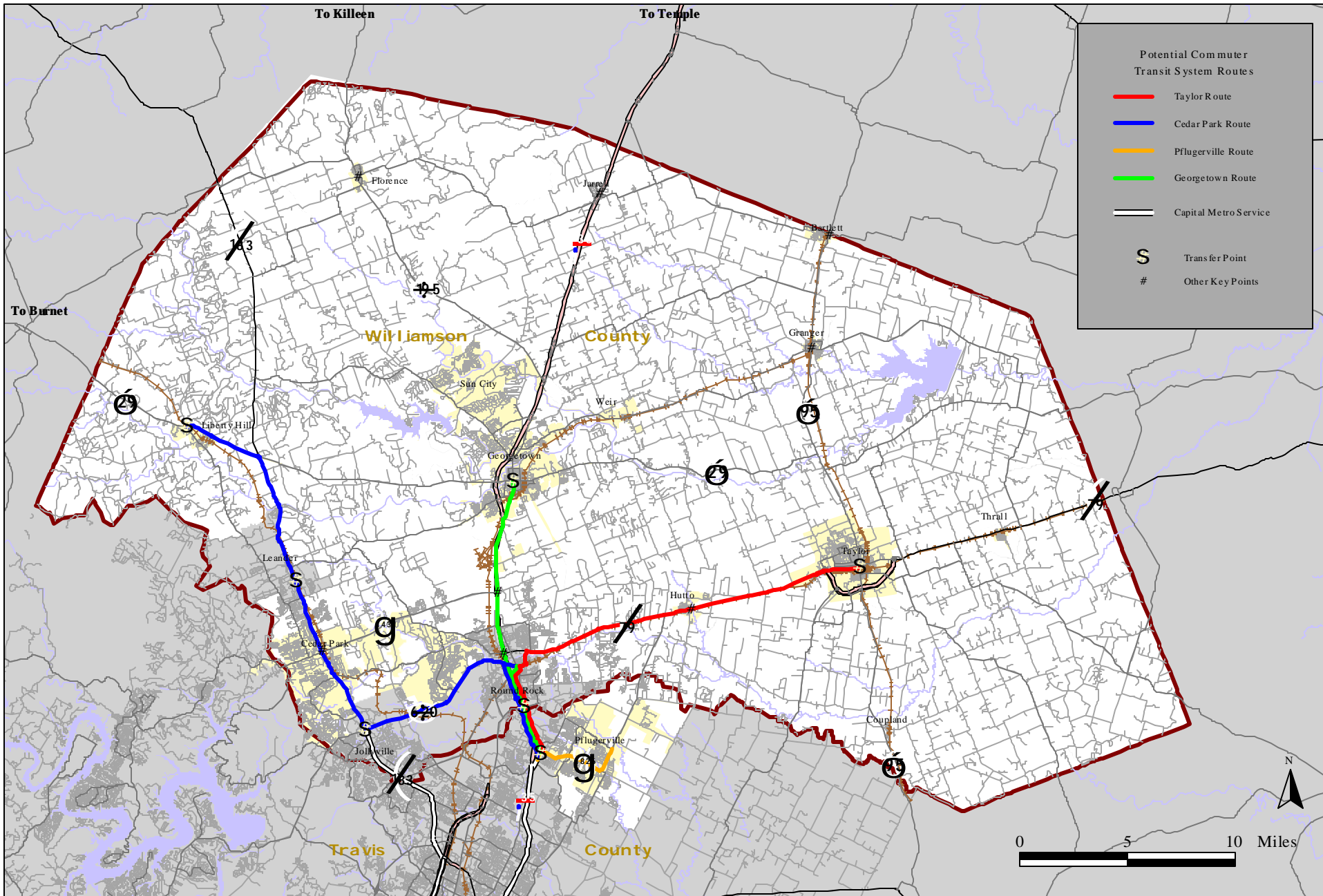
An initial level of service generally assumes that routes operate every 60-120 minutes from 7:00 a.m. to 6:00 p.m. Some routes between smaller communities may offer only several trips a day or may include only mid-day services to shopping and medical destinations. The combined services of routes operating in major corridors, such as IH 35 between Round Rock and Georgetown, would give passengers frequent connections between the major communities in Williamson County.

Commuter Route System

A final service concept was developed not as a stand-alone system; rather, it is intended to supplement another service concept, such as the radial route system. A radial route system would focus service on a Round Rock transit hub. Hours of service may not serve regional commuters to Austin who may leave their communities before local and regional services begin operation or if too many transfers would be required. Unlike the regional system, the commuter route system would not provide local stops in communities; this express service would operate with limited stops, with hubs at the Capital Metro Park and Ride facilities (Figure 3-8).

The commuter route system consists of three routes focused on major employment centers in the IH 35 corridor between Round Rock and Austin. Services would operate only during major peak hours, and services would operate from park-and-ride facilities to major employment centers.

- Route X-1 provides commuter service from Taylor to major employment centers in Round Rock and Capital Metro's IH 35/FM 1825 facility via US 79



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Figure 3-8
 POTENTIAL COMMUTER ROUTE
 SYSTEM MODEL SERVICE



and IH 35 with local connections to the Round Rock transit hub and major employment sites in the Dell and La Frontera employment areas.

- Route X-2 provides commuter service from Georgetown to downtown Austin through Round Rock via IH 35 with local connections to the Round Rock transit hub and major employment sites in the Dell and La Frontera employment areas and circulation between the University of Texas, State Capitol Complex, and downtown Austin.
- Route X-3 provides commuter service from Liberty Hill to major employment centers in Round Rock and Capital Metro's IH 35/FM 1825 facility via US 79 and IH 35 with local connections to the Round Rock transit hub and major employment sites in the Dell and La Frontera employment areas.

Commuter services generally provide between two and four trips in the morning peak to Round Rock and Austin with return trips in the evening peak. Trip times would be designed to serve the most common commute times, arriving Round Rock and Austin between 7:00 a.m. and 8:00 a.m. and departing between 4:30 p.m. and 5:30 p.m. An initial level of service could include two trips each peak period on Routes X-1 and X-3 and three trips each peak period on Route X-2.

3. Rural, ADA, and Human Service Paratransit

Paratransit (door-to-door) service will take two forms. The first is rural fixed schedule service for all areas outside of the designated fixed-route corridors. Those persons residing in the fixed-route corridors should be able to use the regional service. The second component of the demand-response service will be the ADA complementary paratransit for all areas within three-quarters of a mile on either side of a fixed-route, as well as within three-quarters of a mile radius of a commuter bus or rail system. This service will be combined with the existing human service needs (in many cases these will be the same passengers). It is recommended that the service days remain the same, using either the proposed regional network or a fixed schedule bus.

ADA complementary paratransit will be required for those areas within three quarters of a mile of a fixed-route. The service will require vehicles for start-up. This assumes that CARTS takes a proactive approach to placing persons with disabilities onto fixed-route. There are possible cost savings in coordinating this service with the existing or proposed rural and human service transportation programs. The 903 Route - Cedar Park to Round Rock, 904 Route - Georgetown Local, and the 821 Route - Pflugerville, can all be used in combination with human service and ADA paratransit.

It is important to mainstream as many of the current human service passengers onto the local and regional public systems described above. Through training, fare incentives, and a flexible county-wide service, it is possible to transport some human service clients on the regular services illustrated above.

Fixed schedule service should continue to be employed in Williamson County. Fixed schedule service commits a vehicle to be in a particular community or area of the county on a scheduled basis. For example, a vehicle might be assigned to be in Granger for local service during certain days of the week or to provide a connection to Taylor every two hours. Once in Taylor, the customer would have access to the entire CARTS service in Williamson County and Capital Metro's service area. This service would be provided to and from bus stops and to and from the curb of the origin and/or destination for persons with disabilities, or others requesting that service and willing to pay an extra fare. This service has the potential to be far more productive than countywide demand-response service. It simply requires passengers to adhere to a schedule, like that provided by a fixed-route/fixed-schedule bus service.

For example, current service to Austin from Florence to Austin is Monday, Wednesday, and Friday at 7:15 a.m. This service would remain on the same schedule to minimize change.

4. Non-Traditional - Market Development/Ridesharing/Shopper Shuttles

Williamson County's unique geography and development pattern makes traditional transit and commuter service difficult or impossible to operate in many areas of the county. There are a number of non traditional services that are low cost in nature and flexible enough to meet a variety of needs.

The nature of the non-traditional family of services is that service is not implemented (and costs are not incurred) until demand has met minimum thresholds. Market development service requires a minimum number of riders for a group to request service. Ridesharing, vanpooling, and carpooling are other approaches that can help meet the needs of commuters in a very cost-effective manner. While Capital Metro provides some ridesharing services, there are other potential ridesharing opportunities in the county for service to Round Rock, Rockdale (Alcoa), Temple, and Killeen.

It makes sense from a planning, management, and operations standpoint to coordinate all of these non-traditional services together as part of the overall public transit program provided through the county or CARTS.

Each of the alternative investment scenarios will include a non-traditional component that will address these low cost activities. The advantage is that they pay

for a significant portion of the costs of the service out of the user fees. In the case of shopper shuttle services, for example, sponsors will often contribute all or part of the operating expenses of these services.

Shopper Shuttles

With peak hour vehicles available for other services during mid day, it may be possible to offer shopper shuttle services to sponsors willing to support the transit system. The shopper shuttle targets neighborhoods with high numbers of transit dependent populations and frequent destinations (e.g. Wal-Mart, HEB, and medical centers), and can be very effective during off peak hours. Often these arrangements pay for themselves through funding from the retailers, who in return, receive the business, advertising/promotion, and they get involved in a positive way with their communities.

There are numerous examples (in Texas and across the country) of this type of service being successful with supermarkets and discount “big boxes.” Typically shuttles target transit dependent persons (elderly, disabled, and low-income persons) in their neighborhoods. Service is usually for shopping and medical.

Ridesharing/Vanpooling

Ridesharing and vanpooling efforts should be encouraged for work trips both going out of the county as well as those coming into the county from other jurisdictions. CARTS should work with Capital Metro to ensure that there is no duplication of effort with their program. CARTS can bolster its ridesharing efforts and provide more extensive marketing/recruitment of employers and riders. This service should pay for itself operationally through the monthly fares of the riders. Administrative/marketing costs will be borne by the county. Vanpooling may be a good way to serve those persons commuting solely within the county or out of county to Temple, Killeen, and Rockdale.

Market Development

Market development is similar to a vanpool, except that the vehicle is then used for other services, when it is not used for market development - typically for commuters. This service allows CARTS to use bigger vehicles and to keep those assets in service throughout the day.

5. Pflugerville and Cedar Park

Cedar Park and Pflugerville currently pay Capital Metro about \$15 per one-way paratransit trip using the Special Transportation Service (STS). This section reviews options for Cedar Park and Pflugerville to provide this service which currently costs

Cedar Park about \$60,000 and Pflugerville about \$45,000, for 4,000 and 3,000 one-way trips, respectively.

There are three options presented for consideration. If fixed-route, regional, and other services are available as described above, efforts should be made to ensure that as many STS passengers as possible ride fixed-route services. The three options are as follows:

Paratransit Service Alternative No. 1 - Status Quo

Capital Metro charges Cedar Park and Pflugerville one half of their average cost per trip. Capital Metro notes that their average trip systemwide is about one half the trip distances of the trips under review. The costs charged to the cities are reasonable for the level of service that is provided. The service is turnkey, in that Capital Metro manages all aspects of the service and the cities are not involved.

Paratransit Service Alternative No. 2 - Operated by CARTS

Having CARTS operate the service poses different questions. Pflugerville can benefit by the placement of some of the trips onto its existing daily Pflugerville service (Rt. 821), or it can use the three times per week Round Rock bus to Austin as appropriate. Cedar Park can take advantage of the Liberty Hill route. It appears that the origins and destinations are similar. Local service can be met by the existing or planned local fixed-route and ADA paratransit.

The key to this approach is for CARTS to put as many passengers as possible onto its existing service, which is limited in Cedar Park. If passengers cannot be placed on existing or planned runs, each additional vehicle in service will cost \$120,000. This may have the affect of increasing overall costs to Pflugerville and Cedar Park.

Paratransit Service Alternative No. 3 - Combination of Service - Brokering

Cedar Park and Pflugerville should maintain their agreement with Capital Metro and use it in combination with CARTS service. CARTS can act as a broker of service to the least expensive provider. Services can include existing express service, the new local service, regional service, or other CARTS service, as well as STS. For example, CARTS operates service from Pflugerville to Austin every day. Some of the STS riders can probably use that service, rather than STS. Group runs may be more effectively accommodated through CARTS, if a vehicle is available. Some trips may be more appropriate for Capital Metro and CARTS can assign those riders to STS.

This approach will reduce costs from the current \$60,000 by using the least expensive mode for each trip. While CARTS cannot provide one-on-one service less

expensively than STS, there are many trips they can accommodate in group mode, or on existing runs, reducing the per trip and total costs.

POTENTIAL TRANSIT SERVICE VEHICLES

There are a number of different vehicle designs and sizes that Williamson County can use for its fixed-route and paratransit service. Commuter service typically requires full size transit coaches configured for suburban service, or over-the-road coaches. The key decision points revolve around the type and size of the vehicles, passenger comfort, and vehicle cost. These are discussed below.

Type and Size of Vehicles

Different types of transit services require the use of different vehicles. Table 3-3 presents a summary of the capital acquisition costs, average replacement cycle and seated capacity of several different types of transit vehicles suitable for paratransit, local fixed-route, and commuter services.

Paratransit service typically uses light duty body-on-chassis type vehicles. Examples of this are the vehicles currently being used by CARTS in the county. These vehicles can also be used for local fixed-route services, however, they do not hold up as well as regular transit coaches in more heavily patronized service. Another vehicle becoming popular is the truck body-on-chassis type vehicle used by both CARTS in some areas and Capital Metro's STS.

Fixed-route bus service usually requires a heavier duty vehicle due to the larger numbers of passengers and the greater wear and tear associated with that type of service. The vehicles discussed above can also be adapted to fixed-route, especially suburban service, however most systems with significant ridership opt for a traditional medium-duty or heavy-duty transit coach, which last longer and provide greater comfort for passengers. Examples of heavy-duty transit coaches include those operated by Capital Metro. These vehicles come in lengths of 30, 35, and 40 feet and are available with a variety of seating capacities and configurations.

Commuter service, typically include long trip distance, usually call for a heavy duty over-the-road coach similar to what Greyhound and Capital Metro uses on its longer commuter routes. These buses are only cost effective when used to maximum capacity and would probably not be appropriate at this time. However, at such a time when HOV facilities are developed, these vehicles should be considered.

Table 3-3 - COUNTYWIDE TRANSIT OPTIONS

Radial Route System

Route Number	Route Length	Service Hours		Speed (mph)	Headway (minutes)	One-Way Travel Time (minutes)			Total Daily Trips (each way)	Vehicles Required	Weekday Rev. Hours	Annual Cost
		Beginning	Ending			Travel	Layover	Total				
A	24.7	7:00 AM	10:00 AM	25.0	75	59.3	16.0	75.0	6	2	1,530	\$61,200
A	24.7	3:00 PM	6:00 PM	25.0	75	59.3	16.0	75.0	6	2	1,530	\$61,200
B	34.0	7:00 AM	10:00 AM	25.0	90	81.6	8.0	90.0	6	2	1,530	\$61,200
B	34.0	3:00 PM	6:00 PM	25.0	90	81.6	8.0	90.0	6	2	1,530	\$61,200
C	23.4	7:00 AM	10:00 AM	25.0	120	56.2	4.0	60.0	3	1	765	\$30,600
C	23.4	3:00 PM	6:00 PM	25.0	120	56.2	4.0	60.0	3	1	765	\$30,600
D	27.9	10:00 AM	3:00 PM	25.0	150	67.0	8.0	75.0	5	1	1,275	\$51,000
E	25.2	7:00 AM	10:00 AM	22.5	45	67.2	13.0	80.0	11	4	3,060	\$122,400
E	25.2	4:00 PM	7:00 PM	22.5	45	67.2	13.0	80.0	11	4	3,060	\$122,400
Estimated Totals											15,045	\$601,800

Hub-and-Spoke System

Route Number	Route Length	Service Hours		Speed (mph)	Headway (minutes)	One-Way Travel Time (minutes)			Total Daily Trips (each way)	Vehicles Required	Weekday Rev. Hours	Annual Cost
		Beginning	Ending			Travel	Layover	Total				
A	17.6	6:30 AM	7:00 PM	22.5	60	46.9	13.0	60.0	25	2	6,375	\$255,000
B	26.4	6:30 AM	7:00 PM	25.0	120	63.4	12.0	75.0	16	1	3,188	\$127,500
C	10.1	6:30 AM	7:00 PM	22.5	30	26.9	3.0	30.0	25	2	6,375	\$255,000
D	7.0	7:00 AM	6:00 PM	25.0	180	16.8	3.0	20.0	2	0	0	\$0
E	8.4	7:00 AM	6:00 PM	25.0	180	20.2	10.0	30.0	4	0	0	\$0
F	16.4	7:00 AM	6:00 PM	25.0	180	39.4	1.0	40.0	5	0	0	\$0
DEF	31.8	7:00 AM	6:00 PM	25.0	180	180.0	0.0	180.0	22	2	5,610	\$224,400
* Routes D, E, and F provide combined service, alternating trips throughout the day												
G	14.3	7:00 AM	10:00 AM	25.0	80	34.3	6.0	40.0	3	1	765	\$30,600
G	14.3	3:00 PM	6:00 PM	25.0	80	34.3	6.0	40.0	3	1	765	\$30,600
H	18.6	10:00 AM	3:00 PM	25.0	120	44.6	15.0	60.0	5	1	1,275	\$51,000
J	35.4	10:00 AM	3:00 PM	25.0	90	85.0	5.0	90.0	10	2	2,550	\$102,000
K	16.2	6:00 AM	8:00 AM	20.0	30	48.6	11.0	60.0	8	4	2,040	\$81,600
K	16.2	5:00 PM	8:00 PM	20.0	30	48.6	11.0	60.0	12	4	3,060	\$122,400
L	11.2	6:00 AM	7:00 PM	20.0	45	33.6	11.0	45.0	26	2	6,630	\$265,200
Estimated Totals											22,695	\$907,800

Table 3-3 (continued)

Branched Radial System

Route Number	Route Length	Service Hours		Speed (mph)	Headway (minutes)	One-Way Travel Time (minutes)			Total Daily Trips (each way)	Vehicles Required	Weekday Rev. Hours	Annual Cost
		Beginning	Ending			Travel	Layover	Total				
A	34.0	6:00 AM	7:00 PM	25.0	120	81.6	8.0	90.0	20	2	6,630	\$265,200
B	24.7	6:30 AM	7:00 PM	22.5	75	65.9	9.0	75.0	25	2	6,375	\$255,000
C	8.4	10:00 AM	3:00 PM	25.0	60	20.2	10.0	30.0	5	1	1,275	\$51,000
D	53.9	6:30 AM	7:00 PM	25.0	140	129.4	11.0	140.0	25	2	6,375	\$255,000
E	60.8	6:30 AM	7:00 PM	25.0	160	145.9	14.0	160.0	25	2	6,375	\$255,000
F	45.5	6:30 AM	9:00 AM	25.0	120	109.2	11.0	120.0	5	2	1,275	\$51,000
F	45.5	4:30 PM	7:00 PM	25.0	120	109.2	11.0	120.0	5	2	1,275	\$51,000
G	16.2	6:30 AM	9:00 AM	20.0	30	48.6	11.0	60.0	10	4	2,550	\$102,000
G	16.2	4:30 PM	7:00 PM	20.0	30	48.6	11.0	60.0	10	4	2,550	\$102,000
H	18.1	6:30 AM	7:00 PM	20.0	60	54.3	6.0	60.0	25	2	6,375	\$255,000
Estimated Totals											41,055	\$1,642,200

Commuter System

Route Number	Route Length	Service Hours		Speed (mph)	Headway (minutes)	One-Way Travel Time (minutes)			Total Daily Trips (each way)	Vehicles Required	Weekday Rev. Hours	Annual Cost
		Beginning	Ending			Travel	Layover	Total				
X-1	45.0	6:30 AM	7:30 AM	25.0	30	108.0		108.0	3	77	1,377	\$55,080
X-1	45.0	5:00 PM	7:00 PM	25.0	30	108.0		108.0	5	77	2,295	\$91,800
X-2	28.2	6:30 AM	7:30 AM	22.5	30	75.2		75.0	3	77	956	\$38,240
X-2	28.2	5:00 PM	7:00 PM	22.5	30	75.2		75.0	5	77	1,594	\$63,760
X-3	46.9	6:30 AM	7:30 AM	20.0	30	140.7		141.0	3	77	1,798	\$71,920
X-3	46.9	5:00 PM	7:00 PM	20.0	30	140.7		141.0	5	77	2,996	\$119,840
Estimated Totals											58,446	\$2,337,840

* One-Way Peak Direction Service Only.

SUMMARY OF ALTERNATIVES - COSTS

While there are many combinations of alternatives that can be selected, the consultant team has cost out the service based on the alternatives, as an example of the cost of service at various levels. The consultant team is available to develop a variety of alternative cost scenarios.

The consultants have developed operating costs based on a cost of \$40 an hour, this may vary slightly. CAPITAL EXPENDITURES (VEHICLES) ARE IN ADDITION TO THE OPERATING COSTS. At this point, we have not plugged in vehicle costs because the types of vehicles have not been selected yet. Once a decision is made on the type(s) of vehicles, we will include their cost.

Table 3-4 illustrates the costs associated with Alternatives 2 and 3, with the assumption that Alternative No. 1 - Status quo, will cost about the same as present. Alternative No. 2 calls for \$1,640,000 of operating funds -- capital costs will increase the total cost. There will also be implementation costs, especially in the area of preparation and signage for bus stops. This will bring Williamson County closer to the size and scope of transit systems in similar counties.

Alternative No. 2, a much higher level of service, calls for \$2,450,000 in operating expenditures. Again, capital and implementation costs will be in addition to the operating expenses.

FUNDING OPPORTUNITIES

The framework for regional coordination exists for implementation of transit services within the project's study area. Any options must address both funding and operation of a new transit provider. Without at least minor changes to existing state legislation, options for creating a transit authority are limited to:

- Remain organized as a Chapter 458 Rural/Urban Transit District.
- Operate components of the system as one or more Chapter 454 City Transit Departments.

Existing provisions could allow creation of municipal mass transportation systems (Chapter 454). A new Chapter 454 transit system would require annual appropriation of the transit budget by a local municipal government that directly operates or contracts for operation of the system. CARTS is already organized as a

Table 3-4 - SERVICE ALTERNATIVE COSTS

Service Level	Cedar Park	Georgetown	Pflugerville	Taylor	Regional/ Commuter	Paratransit	Demand Services	Total Costs
Alternative 2	\$150,000	\$300,000	150,000	\$150,000	\$601,800	\$240,000	\$50,000	\$1,641,800
Alternative3	\$300,000	\$450,000	\$300,000	\$300,000	\$900,000	\$200,000	\$50,000	\$2,450,000

Chapter 458 district, but its services and finances could be refined to better serve several municipal jurisdictions or all or portions of the study area. Even if CARTS retains its current organization, a joint funding mechanism would have to be created. A joint funding mechanism would typically require that capital and operating costs be allocated according to the benefit that each jurisdiction receives.

There are no provisions to create a transit authority with a dedicated funding source within the study area, but minor modification to existing legislation could allow creation of several types of transit authorities. However, implementation of short-term transit improvements could take place without creating a new transit authority. In the long-term, other options may be viable:

- Creation of a Chapter 457 County Transit Authority.

Or, with minor modifications to state legislation, several additional options may become available:

- Creation of one or more secondary Chapter 451 Transit Authorities.
- Creation of one or more Chapter 453 Municipal Mass Transportation Systems.

Ultimately, the type of system and governance structure for transit will depend on the transit needs identified in the study area. There is likely to be a wide diversity in the need for services in different portions of the study area, and solutions to these diverse needs may result in implementation of different types of services in each portion of the study area.

Opportunities for Implementation

Implementation of short-term transit improvements would likely take place with a mix of funding from various agencies:

- Section 5311 transit funds would remain to serve rural portions of Williamson County. These Federal funds are allocated through the Texas Department of Transportation to CARTS.
- Section 5307 transit funds would be a new source of urban funds for CARTS. These federal funds would be allocated from the Federal Transit Administration (FTA) according to a new agreement with Capital Metro. This requires that CARTS be designated a secondary recipient of the regional funds, a process that is already underway for portions of the study area.

- Section 5309 transit funds would be a new source of urban capital funds that could provide assistance in implementing new transit services through bus and facility purchases. These federal funds are obtained through Congressional earmarks.
- State funding allocations will continue, but the state has been reducing its local match for both rural and small urban transportation systems.
- Local funding, usually general revenue funds, can be pooled from multiple agencies to provide the local match for transit operating and capital funds. This is how CARTS and all other rural transit systems, along with most small urban transit systems, receive their local funds. Local funds will increasingly be important as the state contribution is reduced.

Where transit services are provided to a single jurisdiction, local funding comes solely from that jurisdiction. Small urban systems in Tyler and Beaumont are examples of this type of system. However, transit agencies that cover multiple jurisdictions and receive local general revenue funds must decide on a more complex allocation of funds. This allocation is typically based on some combination of population, transit trips, and amount of services provided in each jurisdiction. As transit options are narrowed and a phasing plan for services is developed, the contribution of local funding for transit will increasingly be the focus.

The Private Sector

A number of transit systems in Texas and around the country have had success in developing sponsors and partners for service. Companies such as HEB, Wal-Mart, and Brookshire's (for example) have been known to sponsor transit service.

Advertising, another form of private sector funding, is very popular in Texas and has been done since the beginning of the 20th Century. An excellent example is Capital Metro's bus wrap program. In Lubbock, the transit system generates over \$200,000 in private funding of various types, including shopper shuttles, partnerships, and advertising.

CARTS should look at these possibilities for funding, especially now, as the system has taken a funding cut. The combination of public and private funding will help CARTS diversify its funding base.