GAINESVILLE REGIONAL TRANSIT SYSTEM
RAPID TRANSIT FEASIBILITY STUDY

DRAFT REPORT

Prepared For:

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Section 1
Introduction

The Gainesville Metropolitan Area 2025 Long Range Transportation Plan (LRTP) and Plan East Gainesville study identified community support for Bus Rapid Transit service and associated bus service enhancements connecting East Gainesville to major employment and shopping areas. A Bus Rapid Transit (BRT) option was determined to be the service type that offered the greatest improvements in mobility and in alleviating traffic congestion. Based on that determination, a set of candidate corridors were selected by MTPO and RTS staff for examination based on key existing transit corridors in the Gainesville area. The purpose of this plan is to conduct a feasibility study of a group of selected corridors. A comparative analysis of these corridors will be performed that will identify the most ideal corridor for BRT service implementation in the near future. The framework for the feasibility study and comparative analysis are described in this section.

PLAN OBJECTIVES

Major objectives of the study are listed below.

- Implement a public involvement plan that incorporates public involvement activities designed to educate residents about BRT and obtain public opinions and feedback.
- Assess the potential application of bus service enhancements, BRT transit technologies, and specific premium transit elements to the study corridors.
- Conduct a corridor assessment and prioritization analysis to determine the best corridors for near term BRT application.
- Ensure consistency with the 2025 LRTP in regard to improving mobility and alleviating traffic congestion in the Gainesville area.
- Provide an environmentally-friendly alternative transportation choice for Gainesville.
- Identify a candidate corridor to be carried forward through the FTA New Starts funding process.

CORRIDOR FEASIBILITY FRAMEWORK

A study evaluation framework was established to guide the selection and assessment of corridors to be considered for near term rapid transit service implementation in the City of Gainesville. That framework combines an objective analysis tool with oversight and policy direction from elected officials and other stakeholder groups to ensure that the most ideal candidate corridor(s) are prioritized for near term FTA funding consideration.

It is important to note, that the prioritization of study corridors resulting from the comparative analysis does not preclude the future consideration of BRT along low-ranking corridors. Although this feasibility study is focused on selecting one corridor that will be carried forward into the FTA New Starts funding process, other corridors may need to be considered as part of a larger conceptual BRT network. These remaining corridors should be targeted for transit supportive development through the local comprehensive planning process and should be added to the MTPO long range transportation plan.

The corridor comparative evaluation process consists of six major tasks and is illustrated in Figure 1-1. Tasks that require a policy and/or data component in order to complete are shown in the figure. Each task is briefly described below.

Task 1: Identification of Analysis Corridors – An initial set of candidate corridors are selected based on oversight committee and/or agency direction. Corridor extents are specified using general policy direction provided by stakeholders, oversight groups, and/or agency staff. A key criterion for selection is typically related to the presence of existing, successful transit service.

Task 2: Corridor Adjustment – Based on the initial set of candidate corridors, an initial field review of the corridors is conducted. Corridors may be extended, truncated, or realigned based on existing and future land use patterns in the study area. New corridors also can be added, if and as necessary.

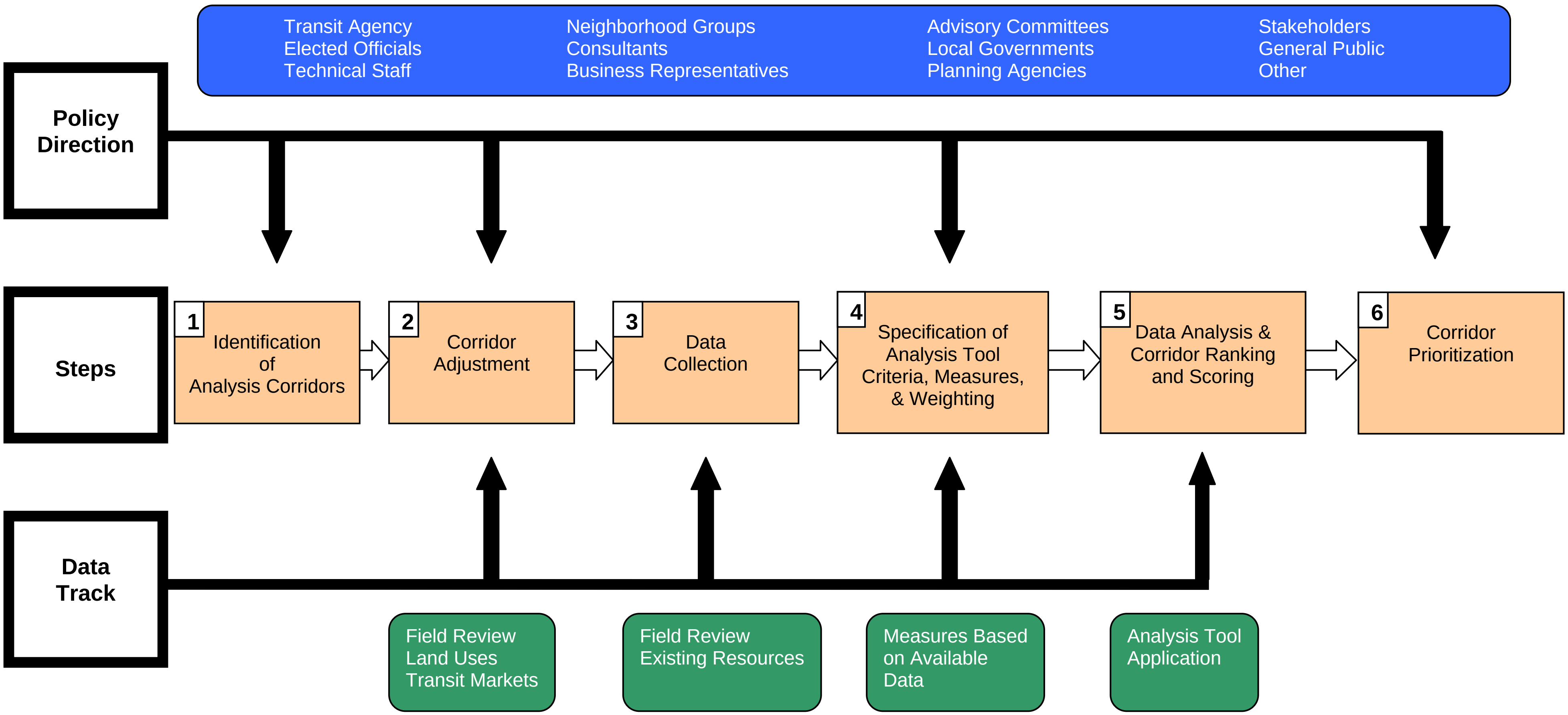
Task 3: Data Collection – With the assistance of local agency staff, relevant data, reports, and information are collected. An assessment of collected data and information is performed to ensure that complete and consistent data are available for each identified corridor. Such an assessment facilitates a fair comparative analysis between corridors. Incomplete, outdated, or irrelevant data are eliminated from the analysis process.

Task 4: Development of Analysis Tool – The analysis tool consists of a set of criteria, a unit of measure for each criterion, and a weighting scheme to be applied to each criterion based on the relative importance to other criteria in the analysis tool. Criteria weights are selected based on oversight committee and/or agency direction. Quantifiable measures for each criterion are determined based on available data.

Task 5: Data Analysis and Corridor Ranking – An objective comparative analysis is performed using the analysis tool. Analysis results indicate the rank order of the study corridors in terms of their ability to meet the given criteria.

Task 6: Corridor Prioritization – Data analysis results are presented to oversight committee and/or agency staff to determine the most appropriate candidate corridor(s) for additional planning and/or implementation. The final corridor ranking and prioritization order is determined using policy direction provided by project stakeholders.

Figure 1-1: RTS Rapid Transit Study Corridor Analysis Framework



REPORT ORGANIZATION

This report documents the activities conducted during the study. Including this introduction, the report is organized into five sections. The remaining sections are summarized below.

Section 2 describes the characteristics of **Bus Rapid Transit** and major BRT components. It provides a general overview of “premium” BRT features that distinguishes it from traditional local bus transit services.

Section 3 provides a brief description of each **Study Corridor**, including the corridor limits, land uses along the length of the corridor, and other characteristics. In addition, this section describes the **Data Collection** effort and data obtained to complete the study. All collected data are presented.

Section 4 describes the **Public Involvement** efforts performed to educate the public and obtain the opinions of transit riders, stakeholders, and the general public on BRT. A public involvement plan is presented that was used to guide the public outreach efforts employed throughout the study.

Section 5 presents the **Corridor Evaluation and Feasibility Analysis** process used to screen the study corridors. The specific criteria, measures, and scoring utilized to conduct the comparative analysis of candidate corridors are presented.

Section 2
Bus Rapid Transit

Bus Rapid Transit is a flexible, rubber-tired rapid-transit mode that includes a host of premium service amenities, infrastructure, and technologies that distinguish it from traditional local bus service. It combines stations, vehicles, services, running ways, and Intelligent Transportation System (ITS) elements into an integrated system with a strong, positive identity. These premium features help ensure that BRT systems can quickly and efficiently transport passengers to their destinations. Premium features also help improved predictability and reliability of services. Passenger can make informed decisions and form real expectations.

BRT has regained attention from transportation and community officials all over the world as an improved public transportation solution to mobility issues. It has been proven to be a cost-effective way of providing high-quality, high-performance transit service while offering considerable travel time savings and ridership increases when compared with traditional local bus service. Other secondary benefits include emission reduction, energy conservation, and opportunities to coordinate land development.

In view of its advantages over traditional local bus service, BRT is being considered as a viable transportation alternative for the Gainesville area. This section documents several elements that support BRT normal operation and distinguish it from traditional local bus service. These elements include:

- running ways,
- station types,
- fare collection systems,
- vehicle design,
- service/operation plans,
- identity/image (“branding”), and
- Intelligent Transportation Systems.

RUNNING WAYS

BRT running ways range from mixed-traffic operation to fully grade-separated busways. They may be classified according to the degree of access control (traffic separation) or by type of facility. In many instances, running ways play a major role in determining the character and scale of the BRT service. Below is a detailed description of various running way types that may be applicable to the Gainesville area.

Mixed-Traffic Lane

This option allows BRT to operate and travel within the regular flow of traffic. Advantages of this running way application include its relatively low cost and ease of implementation. However, such operations can limit bus speeds, service reliability, and service identity. Figure 2-1 illustrates mixed-traffic bus operation.

Figure 2-1
Mixed-Traffic Lane

Designated Bus Lane

Designated bus lanes are a step up from mixed-traffic lanes in that BRT can operate in an exclusive lane of travel, which reduces interruptions with other vehicles traveling in the same direction. The most common application of this running way type is the concurrent flow curb bus lane, which is shown in Figure 2-2. Implementation is relatively low cost except when right-of-way must be acquired and/or additional lanes need to be constructed. Designated lanes can be used during peak hours only or all day. They also or can be used in combination with other HOV (High Occupancy Vehicle) applications. However, they are sometimes difficult to enforce and are not as effective in maintaining service frequencies and travel times as transitways, which are discussed next.

At-Grade Transitway

At-grade transitways provide an opportunity for BRT to perform at relatively high speeds without interference from other traffic operations. A busway is segregated from other vehicular travel through the use of a raised physical barrier. Busways eliminate the passenger loading and curb access issues associated with curb lanes when combined with multi-door configuration bus vehicles and off-board fare collection. They also provide a strong sense of identity for running ways and stations. Figure 2-3 shows a typical median arterial busway in Bogota, Colombia.

Figure 2-2
Designated Bus Lane

Figure 2-3
At-Grade Transitway

STATION TYPES

The BRT station largely represents the physical and symbolic focal point of the BRT system. Stations operate as the nexus where a variety of BRT components, such as fare collection, level boarding, safety, and branding, come together and work to create an expectedly positive experience for the system user. Because of the significance of the BRT station and the relationship stations hold with other BRT elements, existing BRT systems have placed a large emphasis on designing stations that meet BRT operational needs and fit into the character of the surrounding community. Based on the scale of the proposed BRT service in Gainesville area, the following five station types are proposed for potential rapid transit service implementation.

Simple Stop

Typical components for a simple stop include a sign and pole, route designation, sidewalk connectivity, a bench, and schedule information. A shelter is an optional feature at simple stop. Simple stops are generally applicable to a location where only a few passengers board (less than 10 per day). Simple stops can be a good application where BRT mixed-traffic operations share stops with local bus service. Figure 2-4 illustrates a typical simple stop.

Figure 2-4
Simple Stop

Enhanced Stop

Besides the basic components included at a simple stop, an enhanced stop contains a shelter and lighting features to provide an increased sense of comfort and security. Enhanced stops can be installed at locations that experience passenger boardings greater than 35 per day. Real-time passenger information is another feature typically found at an enhanced stop. The enhanced stop generally is particularly well suited for BRT application since the opportunity for branding the service or including more station amenities is greater than for the simple stop. An example of an enhanced stop from Los Vegas, Nevada is shown in Figure 2-5.

Figure 2-5
Enhanced Stop

Designated Station

A designated station is generally equipped with high-quality passenger amenities, off-board fare collection, and level boarding features. Off-board fare collection effectively reduces dwell times and, combined with level boarding, improves the passenger experience by accommodating multi-door boarding and alighting. Designated stations are only suitable at locations with high volumes of BRT passengers, and are ideally applied where there are at-grade transitways. The application of combined designated stations and transitways can optimize BRT operating speeds and passenger comfort and satisfaction. Figure 2-6 shows a typical designated station in Curitiba, Brazil.

Figure 2-6
Designated Station

Fare Collection System

There are generally two major fare collection methods, on-board fare collection and off-board fare collection, of which on-board fare collection is the most commonly used method among North American BRT systems. Off-board fare collection minimizes any delay related to on-board fare payment and allows for the implementation of multi-door boarding strategies. In addition, off-board fare collection systems have been shown to reduce station dwell times and overall bus travel times. On-board fare collection systems are preferred for new BRT systems because they allow transit agencies to continue using existing fare collection hardware, they operate well at low-volume stations and/or during off-peak hours, and they eliminate the need for special fare collection provisions on sidewalks and at stations. Figure 2-7 illustrates an example of an off-board fare collection application that uses barriers.

Figure 2-7
Off-Board Fare Collection

VEHICLE DESIGN

BRT vehicles should be carefully selected for various reasons. Vehicles strongly impact nearly every aspect of transit system performance, from attraction of riders to operating and maintenance costs. For instance, vehicle design has been shown to affect the speed and reliability of BRT service, which indirectly influence ridership and related benefits such as congestion reduction and air quality improvements. A vehicle's mechanical attributes also have an impact on operating and maintenance costs. In addition, proper door and interior design (e.g., a low floor, a wide aisle, and multiple-stream doors) can have an impact on vehicle requirements, which may in turn reduce the number of drivers and maintenance staff needed. In addition, a variety of different propulsion systems are being utilized by various BRT systems, which include a variety of hybrid engines.

Based on the nature and the scale of the potential BRT system in Gainesville, three possible BRT vehicle types are presented below along with an illustration of each.

Conventional Bus Vehicle

The 40-foot conventional bus vehicle currently operated by RTS can be used for BRT application. If this option is adopted, it will significantly reduce the total capital cost of BRT implementation in the future. Figure 2-8 is an example of a new RTS low-floor bus vehicle.

Figure 2-8
Conventional Bus Vehicle

Stylized Bus Vehicle

Stylized bus vehicles primarily distinguish themselves from conventional vehicles in terms of their streamlined exterior look (e.g., panoramic windows, restyled front mask, and rear cap), enhanced interior amenities (e.g., noise reduction, low floor, high-quality interior lighting, and comfortable seats), and environmentally-friendly propulsion engine (e.g., diesel hybrid-electric, gasoline hybrid-electric). They provide both existing users and potential new customers a positive perception of the quality of the entire system. A good example of a stylized bus vehicle is shown in Figure 2-9.

Specialized BRT Bus Vehicle

These types of vehicles include articulated, stylized vehicles that provide higher capacity, a sharp/streamlined exterior look, and high-quality interior amenities. They are also equipped with many ITS features to increase passenger comfort and convenience (e.g. global positioning system, automatic vehicle location, real-time passenger information, video surveillance). These vehicles can also be equipped with environmentally-friendly propulsion systems. Application of this type of vehicle will strongly impact the perceptions of both current bus and potential BRT users, particularly those customers with the choice of using private automobiles. Figure 2-10 illustrates an example of this type of vehicle currently being used in Las Vegas, Nevada.

Figure 2-9
Stylized Bus Vehicle

Figure 2-10
Specialized BRT Bus Vehicle

SERVICE/OPERATION PLAN

BRT service should be easy to use, direct, frequent, and rapid. Consequently, BRT routes, frequencies, and hours of service should complement running way types, locations of major activities, and available resources. Typical BRT service frequency for all-stop service type is about 5 to 8 minutes during the peak hours, but 8 to 15 minutes for rest of the day. Generally, BRT should operate on both weekdays and Saturdays. However, in some rare cases BRT is operated also on Sundays.

IDENTITY/IMAGE ("BRANDING")

Creation of a unified system image and identity is very important in order to emphasize and market the unique features of the BRT service and, thus, attract more ridership. The general image associated with BRT should underline its unique attributes of speed, reliability, and identity. Examples of systems that have developed a distinct BRT identity include Metro Rapid in Los Angeles, California, and the Silver Line in Boston, Massachusetts. Distinctive logos, color combinations, and other graphic standards should be established for use on vehicles, at stations, and on printed materials. Figure 2-11 provides an example of branding for the Los Angeles Metro Rapid service.

Figure 2-11
Los Angeles Metro Rapid Branding

INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

Intelligent transportation system applications are essential components of running ways, stations, vehicles, and overall bus operations. There are two main ITS BRT applications, real-time passenger information and bus preferential treatments.

Passenger Information

ITS can provide dynamic (real-time) information to passengers at stations, stops, and terminals, or on a vehicle. Passenger information systems for BRT should include a variety of methods of informing the public about the service. BRT stops and stations should provide route numbers, static schedule information, and route maps. Generally, dynamic passenger information may come from video monitors or variable message signs, depending on the application. A traditional on-board information system consists of printed timetables and driver announcements. Improvements in technology have allowed stop announcements to be delivered by automated voice recordings or some type of message display. These systems can also announce transfer opportunities and local attractions. Figures 2-12 and 2-13 show passenger information applied to stops and on vehicles, respectively.

Figure 2-12
Passenger Information at Bus Stations

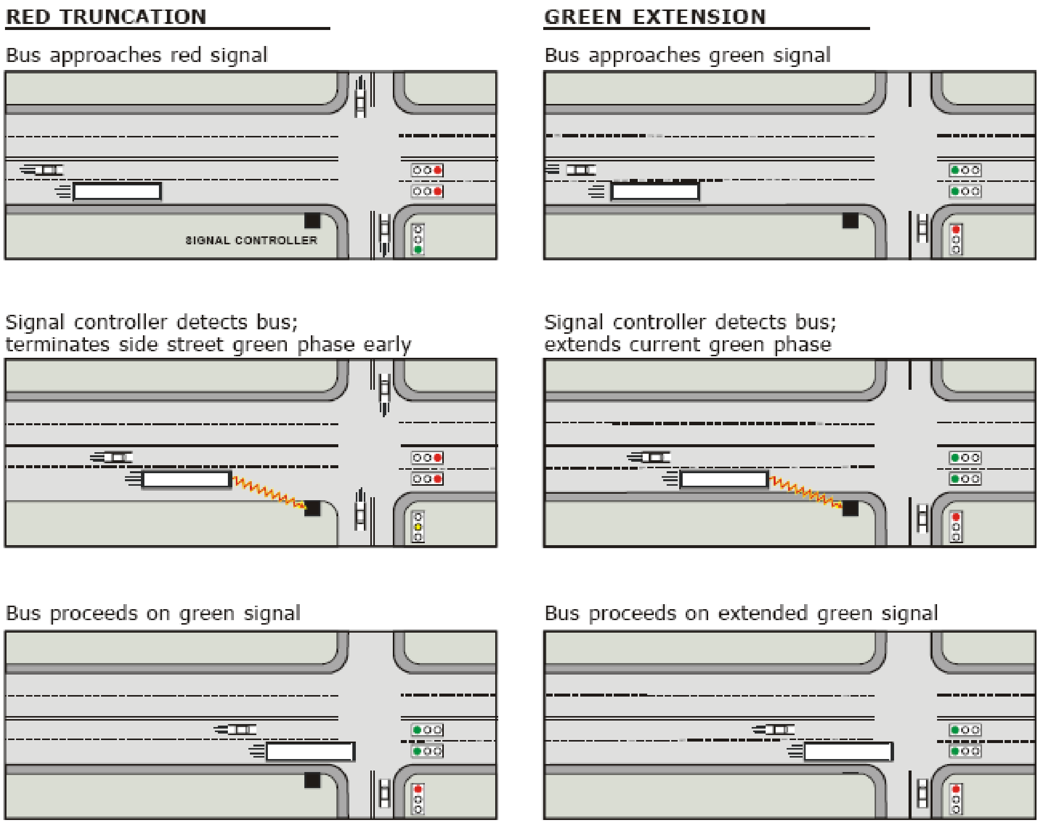
Figure 2-13
Passenger Information on a Vehicle

Bus Preferential Treatments

Bus preferential treatments give buses priority over other vehicles when they arrive at an intersection. Treatments include queue bypass lanes, queue jump operations, and transit signal priority (TSP). The intent of bus preferential treatments at intersections is to reduce bus travel time and improve schedule adherence by reducing bus delay at congested intersections. Generally, bus delays at traffic signals account for 10 to 20 percent of overall bus travel times and 50 percent or more of all delays. Therefore, implementing intersection improvements that expedite BRT service can improve bus speeds and reliability.

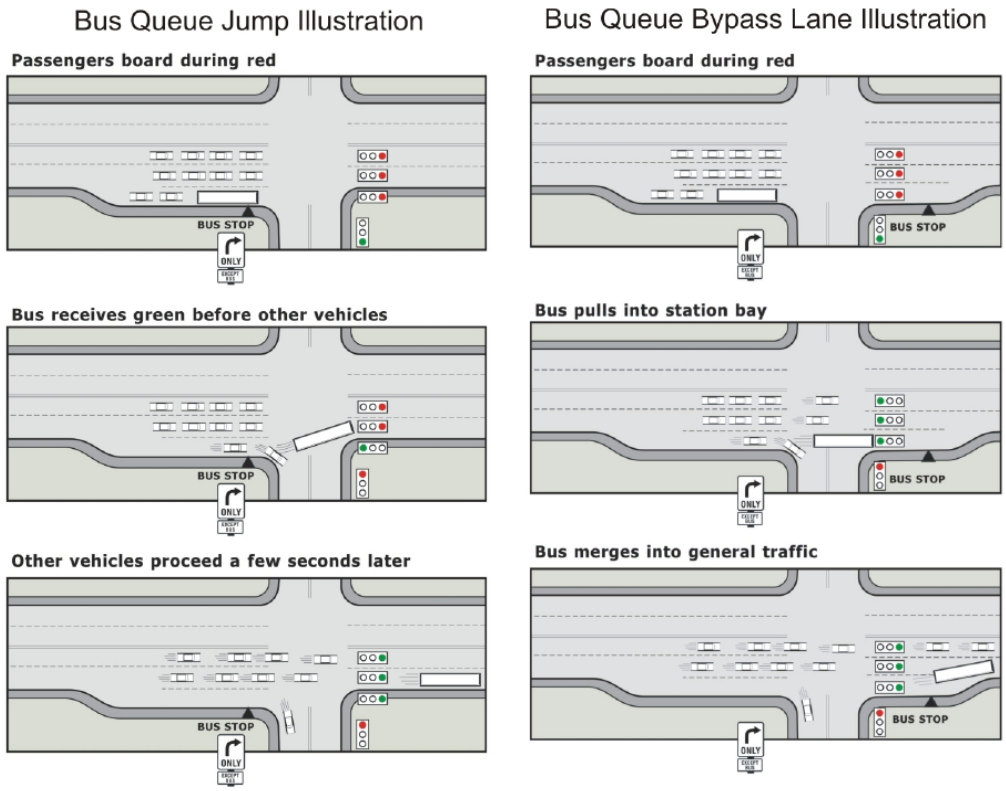
TSP is the process by which the traffic signal operation is altered slightly to provide advantage to the transit operations. TSP involves extending the green or truncating the red signal phase for the general traffic lanes to allow a bus to go through an intersection, with a reduction in overall signal delay. Figure 2-14 illustrates the operating principles of TSP.

Figure 2-14
Transit Signal Priority



A queue jump is where a bus would enter a right turn lane or an exclusive lane at an intersection to bypass the general traffic queue. The bus would then have an advance green signal indication to pull ahead of through-traffic back into the general traffic lanes. A queue bypass lane involves a bus entering a right turn lane or exclusive lane, then going straight through the intersection on the normal through-traffic green phase into a far-side pullout, with no signal priority provided. Illustrations of queue jump and queue bypass lanes are shown in Figure 2-15.

Figure 2-15
Queue Jump and Queue Bypass Lanes



SOURCE: Kittelson & Associates, Inc.

Section 3
Study Corridors & Data Collection

The study corridors were selected by MTPO and RTS staff to collectively provide wide geographic coverage throughout the urban area of Gainesville, and include all of the most heavily-traveled roadways in the city. The following section provides a brief summary of each of the study corridors evaluated as part of the BRT screening process. In addition, data collected for each of the study corridors to support the project feasibility analysis are presented.

STUDY CORRIDORS

Each summary includes a brief description of the corridor, including the corridor limits, land uses along the length of the corridor, and other characteristics. Table 3-1 shows the limits of each study corridor and associated major activity centers. Additionally, Map 3-1 illustrates all the study corridors.

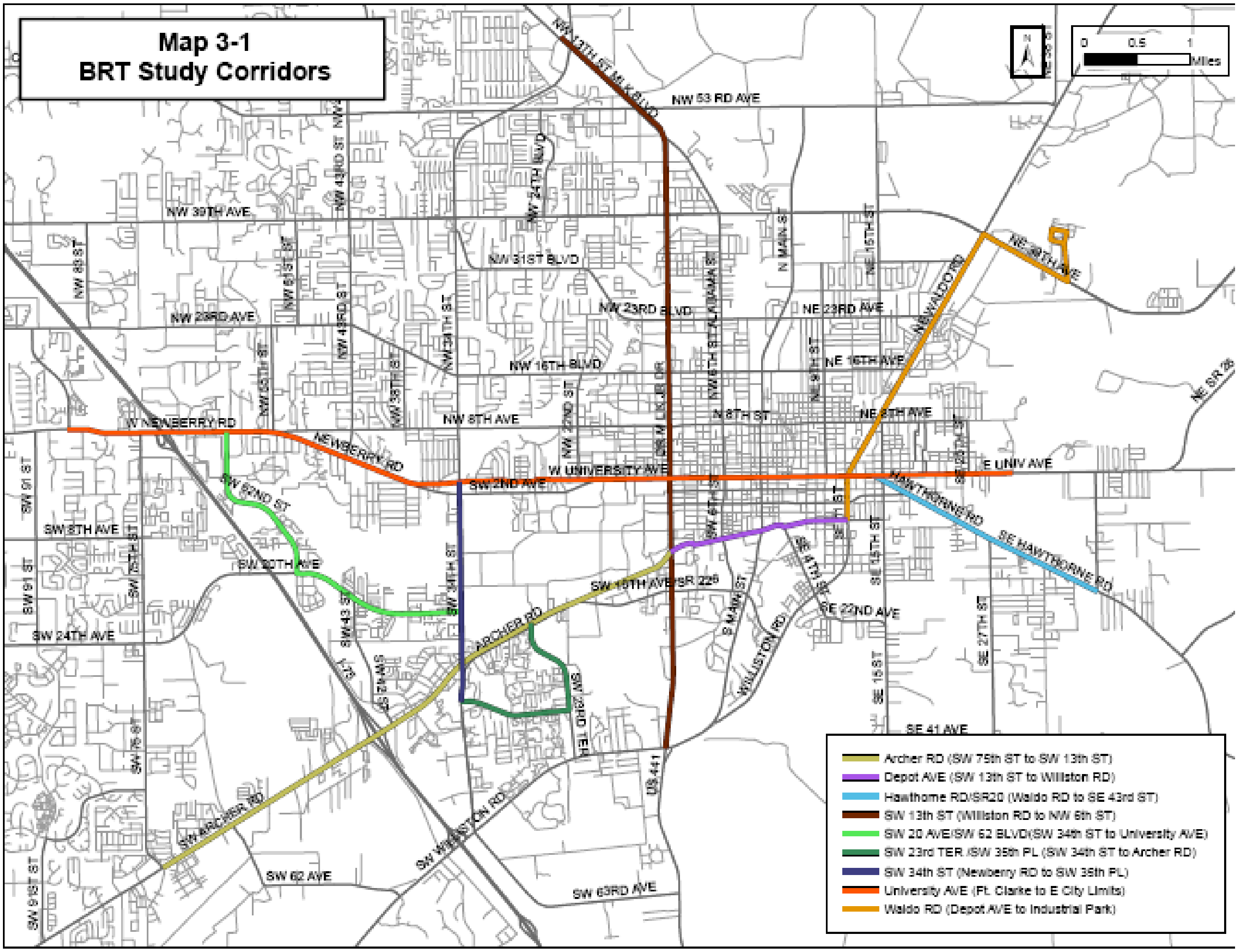
Table 3-1
Corridor Profile

Corridor	From	To	Activity Centers
Archer Road	SW 75th Street	SW 13th Street	Shands Medical Center, University of Florida Main Campus, Butler Plaza-Miracle Mile
Depot Avenue	SW 13th Street	Williston Road	Rosa Parks Transfer Facility
Hawthorne Road/SR 20	Waldo Road	SE 43rd Street	County of Alachua Sheriff's Office
SW 13th Street	Williston Road	Alabama Street	University of Florida Main Campus
SW 20th Avenue/SW 62nd Boulevard	SW 34th Street	University Avenue	Oaks Mall
SW 23rd TER/SW 35th PL	SW 34th Street	Archer Road	NA
SW 34th Street	Newberry Road	SW 35th PL	Butler Plaza-Miracle Mile
University Avenue	Ft. Clarke	East City Limits	Oaks Mall, University of Florida Main Campus, Downtown Gainesville
Waldo Road	Depot Avenue	Industrial Park	Wal-Mart, Gainesville Regional Airport

Archer Road

The Archer Road corridor starts east of SW 75th Street, Tower Road, on SW Archer Road and continues northeast on Archer Road to SW 13th Street, Dr Martin Luther King Jr. Highway. The corridor is approximately 5.7 miles long and the majority of road length consists of a 6-lane divided roadway cross-section.

Map 3-1 Study Corridors



The segment west of the intersection of SW Archer Road and I-75 is bordered by low-density residential and low-intensity commercial developments. However, commercial activities are predominant along the segment between I-75 and SW 34th Street. The rest of the corridor borders the south edge of the University of Florida main campus. Several residential developments are located between SW 34th Street and SW 16th Avenue, and several large-scale medical facilities, including the Shands Medical Center, are located between SW 16th Avenue and SW 13th Street. RTS Routes 12 and 1 operate along a significant portion of this corridor. However, five other routes, including Routes 8, 16, 35, 36, and 43, also operate along this corridor for short (less than half mile) distances.

Depot Avenue

With a total length of 1.7 miles, the Depot Avenue corridor is the shortest corridor among all the study corridors. Going eastbound the corridor begins at Martin Luther King Jr. Highway on Depot Avenue. The corridor travels a short segment of SW 11th Street before it turns back onto SW Depot Avenue and then eastbound to its end at SE 7th Avenue. The entire alignment of the corridor consists of a 2-lane cross-section configuration.

Small scale commercial developments and industrial developments can be found along the segment of the corridor between SW 6th Street and SE 7th Street. The remainder of the corridor is surrounded largely by single-family or multi-family residential developments. RTS's main transfer facility (see Figure 3-1), located in Downtown Gainesville, is sited just off this corridor near SE 3rd Street and generates a significant amount of transit ridership.

Figure 3-1
Rosa Parks Transfer Facility in Downtown Gainesville

Hawthorne Road/SR 20

This corridor runs in a southeast direction along Hawthorne Road, between Waldo Road and SE 43rd Street, and is approximately 2.4 miles long. The roadway cross-section is a four-lane divided segment for the entire length. RTS Routes 2 and 7 operate along this corridor for short distances. Except for the two county facilities located along this corridor, there are very few activity centers. It consists primarily of low-density residential and low-intensity commercial developments.

SW 13th Street

The SW 13th Street corridor is a central north-south route that extends approximately 7.2 miles, only secondary in length to the University Avenue corridor. The corridor starts in the north end at a vacant shopping center near the intersection of SW 13th Street and NW 34th Street, and then follows SW 13th Street south to Williston Road. The entire length of the corridor consists of a four-lane divided cross-section configuration. Routes 6 and 8 are the two major transit lines that serve large portions of the corridor.

North beyond the intersection of University Avenue and SW 13th Street, the corridor is surrounded primarily by relatively low-density residential developments, except for a collection of commercial developments at the intersection of SW 13th Street and NE 23rd Avenue. South of University Avenue, the corridor travels through a busy area bordering the University of Florida main campus. Medium density residential developments border the corridor south of Archer Road.

SW 20th Avenue/SW 62nd Boulevard

From east to west, this corridor begins at the intersection of SW 20th Avenue and SW 34th Street. At SW 62nd Boulevard, the corridor turns northbound onto SW 62nd Boulevard, and ends at University Avenue. The alignment is approximately 3.3 miles long and consists of 2-lane undivided and 2-lane divided roadway cross-sections. RTS Routes 20 and Later Gator C operate along the majority of this corridor. Routes 21, 5, and 75 operate within the corridor for short lengths.

The corridor is mainly bordered by medium-density residential developments that primarily serve the student population. However, the Oaks Mall, located at the north end of the corridor, serves as a major destination for residents and visitors of Alachua County and currently functions as a major transfer hub for RTS. Figure 3-2 shows the sign at the entrance to the Oaks Mall.

Figure 3-2
Roadside Oaks Mall Sign

SW 23rd Terrace/SW 35th Place

This corridor begins along SW 23rd Terrace from Archer Road to SW 35th Place, where it makes a right turn onto SW 35th Place and extends west to SW 34th Street. The corridor is approximately 2.0 miles long with a 2-lane divided cross-section for the SW 23rd Terrace segment and 2-lane undivided cross-section for the SW 35th Place segment. There are currently five RTS routes operating along this corridor, including Routes 9, 34, 35, 36, and Later Gator B.

Surrounding this corridor are medium-density residential subdivisions consisting of student populations. No large scale commercial developments can be found along this corridor.

SW 34th Street

The SW 34th Street corridor is another north-south route that links to University Avenue at the north end and to SW 35th Place at the south end. The corridor runs exclusively on SW 34th Street and is approximately 2.0 miles long. The predominant configuration of the corridor is a six-lane divided roadway. RTS Route 34 serves the corridor between SW 2nd Avenue and SW 35th Place.

High-intensity commercial developments can be found at the intersection of Newberry Road and SW 34th Street. Traveling south from this intersection, the corridor frontage is primarily bordered by residential developments, dotted with medium-scale commercial developments. Another high-intensity commercial development, Butler Plaza-Miracle Mile, is located at the intersection of SW 34th Street and Archer Road.

University Avenue

University Avenue is the major west-east thoroughfare through the City of Gainesville, and it is the longest of all the study corridors with a total length of 9.0 miles. The corridor connects Ft. Clarke Boulevard at the west end and extends to the east limit of the City of Gainesville. The corridor includes Newberry Road and University Avenue. At the west end, the corridor consists of a four-lane divided cross-section and turns into a six-lane divided cross-section at I-75. After passing NW 8th Avenue, the remainder of the corridor has mixed cross-section configurations, varying from 4-lane undivided to 4-lane divided cross-sections with auxiliary and turning lanes at major intersections. RTS Route 5 is the longest bus route operating within the corridor. Several other routes (e.g., Routes 34, 43, 11, and 75) also operate on the corridor for short lengths.

The corridor links several major activity centers, including the Oaks Mall, the University of Florida main campus, and Downtown Gainesville. Another major commercial development can be found at the intersection of Newberry Road and SW 34th Street. The remainder of the corridor is mainly bordered by low-density residential developments.

Waldo Road

The Waldo Road corridor extends northeast from Depot Avenue to the Gainesville Regional Airport. The corridor includes SE 11th Street and NE Waldo Road and is approximately 4.8 miles long. The entire alignment of the corridor consists of a four-lane divided cross-section. Route 24 operates along a significant portion of the corridor, while Route 11 also operates along the corridor for a short length.

Several small scale commercial and low-density residential developments border the corridor. One exception is the Wal-Mart located on 12th Avenue. The northeast terminus of the corridor is located in an industrial park that includes the Gainesville Regional Airport.

DATA COLLECTION

A comprehensive data collection effort was performed to support the feasibility analysis. The data reflect a broad spectrum of roadway, transit, and demographic characteristics. Table 3-2 summarizes the collected data and indicates the data and source of each data set, where appropriate.

Table 3-2
Data Collection Summary

Data Set	Description	Source
Bus ridership data	2008 average daily ridership by route	RTS
BRT study corridor	Study corridor alignments and limits	RTS
Travel flow data	2007 trip distribution model output files	Gainesville MTPO
Travel flow data	2035 trip distribution model output files	Gainesville MTPO
Existing residential and employment density data	2007 SE data by TAZ	Gainesville MTPO
Future residential and employment density data	2035 SE data by TAZ	Gainesville MTPO
Demographic data	2000 demographic data by census tract	U.S. Census
Student population	2000 census tracts with more than 30% student population	UF Campus Master Plan
Faculty and student bus ridership	2008 routes with more than 40% faculty and student ridership	UF Campus Master Plan
Right-of-way data	2009 parcel data	Alachua County Property Appraiser
Intersection cross-section configuration	Availability of right/left turn lanes and far-side receiving bays	Field review & property appraiser aerials
RTS local transit routes	Local transit route alignments	RTS
Transportation improvements	2025 Long Range Transportation Plan	Gainesville MTPO
	2008/09 Transportation Improvement Program	Gainesville MTPO
	Alachua County CIP	Alachua County
	City of Gainesville CIP	City of Gainesville
	Plan East Gainesville	Plan East Gainesville
Minority population	2000 census tracts with high proportion of non-white population	U.S. Census
Local traffic data	2007 roadway level-of-service	Gainesville MTPO
Roadway cross-section	Number of lanes	Gainesville MTPO

Section 4
Public Outreach

At the onset of the project, a public involvement plan was developed to guide all project public outreach efforts and to ensure the active participation of citizens in the community. That public involvement plan can be found in Appendix A. This section highlights the results of the public involvement activities performed. Detailed analyses of the survey responses received at public workshop events are also presented.

BRT SYMPOSIUM

To initiate the project, a BRT symposium was held at the Thomas Center on October 14, 2008. Educational presentations were given during the symposium, where attendees were given the opportunity to ask questions and discuss BRT-related topics. Guest speakers invited to the symposium included:

- Dennis Hinebaugh, Director
  University of South Florida, Tampa
  National Bus Rapid Transit Institute

- Graham Carey, BRT Project Engineer
  Eugene, Oregon
  Lane Transit District

- Dick Jarold, Senior Director
  Kansas City, Missouri
  Kansas City Area Transit Authority

- Marlie Sanderson, Assistant Executive Director
  Gainesville, Florida
  North Central Florida Regional Planning Council

A total of 51 participants attended the symposium. Attendees represented a diversified group of backgrounds that included city officials, university students and faculty, and representatives of community organizations.

PROJECT MANANAGEMENT TEAM

A project management team (PMT) was assembled to provide project oversight and technical feedback throughout the course of the study. To date, four meetings have been held with the PMT.

- May 22, 2008 – Discussion of the scope of work for the project and the preliminary project schedule.
- November 18, 2008 – Discussion of the comparative analysis tool developed to prioritize and rank candidate BRT corridors.
- August 25, 2009
- September 30, 2009 – Discussion of alternative service configurations.

PUBLIC WORKSHOPS

Three series of public workshops have been conducted. A summary of the purpose and results for each series of public workshops is provided below.

Open House Workshops

Two open house workshops were held to provide an opportunity for citizens to participate in the study process. The dates and locations for the two workshops are listed below.

- October 27, 2008 – GRU Multi-purpose Room
  3:00 PM – 6:00 PM

- October 30, 2008 – Terwilliger Elementary School
  3:00 PM – 6:00 PM

The workshops were held in an open house style where participants were allowed to tour a number of workshop stations, which included educational materials (images, illustrations, reading materials, etc.) describing the main components of a BRT system, the differences between BRT and traditional local bus service, and a map illustrating the project study corridors. A combined total of 19 participants attended the two open house workshops.

Attendees to the workshops were asked a complete a short survey form. A copy of that survey is included in Appendix B. The survey gathered information on support for premium transit service or bus rapid transit (BRT). Nineteen surveys were completed by workshop attendees. Their responses are summarized below.

Open House Survey Results

Question 1 asked participants whether they believe "premium" transit service (BRT) is a viable transportation alternative for the City of Gainesville. Of the total respondents, 89.5 percent believe premium transit service is a viable transportation option in the City of Gainesville. Zero percent believe that it was not a viable option, while 10.5 percent indicated that it might be a viable option.

The second question asked in which areas of Alachua County BRT should operate. Respondents were given the option of urban areas, suburban areas, or both. Of the 19 respondents, 31.6 percents indicated that BRT should operate in the urban areas, 15.8 percent indicated the suburban areas, and 52.6 percent said both areas. These results suggest that both areas may need to be considered for service.

Question 3 asked participants which destinations in the City of Gainesville and/or Alachua County should be served by "premium" bus service. Respondents were given five blanks on which to respond. There were a number of responses for this question. Table 4-1 provides data on those responses that appeared at least three times. The University of Florida was the most popular response with 9 respondents listing it as a desirable destination. Downtown Gainesville and Oaks Mall were also popular responses.

Table 4-1
Preferred BRT Location

Location	Number of Survey Responses
University of Florida	9
Downtown	7
Oaks Mall	6
Archer Road	4
Shands	4
Airport	3
Butler Plaza	3
Santa Fe College	3

The fourth question asked whether the proposed analysis corridors (presented at the workshops) were the best corridors for implementing BRT service. Of the 19 participants, 61.1 percent indicated that the proposed corridors were the best corridors. The remainder indicated that these corridors were not the best ones. For those respondents who indicated that the proposed corridors were not the best ones, they were given an opportunity to draw their preferred routes on a map that was provided. Not everyone who answered "no" used the map. Of those who did, two indicated that the University Ave corridor should be extended to Northwest 39th Avenue along Northwest 55th Street, Northwest 23rd Avenue, and Northwest 83rd Street. Two respondents scaled the network back by removing some corridors and truncating others. These same respondents added park-and-ride lots at the ends of the truncated lines. Another respondent wanted to extend the Newberry Road line to the west.

Consensus-Building Workshops

Two consensus-building workshops were conducted in a subsequent phase of the effort to identify a preliminary set of preferred BRT service elements and characteristics. Feedback received will be integrated into the development of preliminary implementation plans as part of Phase II of the Rapid Transit Study. The dates and locations for the two workshops are listed below.

- January 16, 2009 – J. Wayne Reitz Union at University of Florida
  12:00 PM – 1:30 PM

- January 28, 2009 – GRU Multi-Purpose Room
  12:00 PM – 1:30 PM

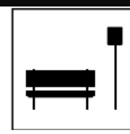
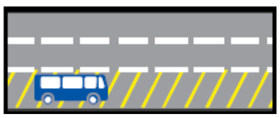
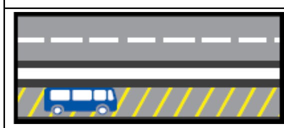
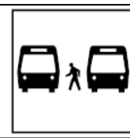
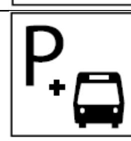
A combined total of 51 participants attended the two consensus-building workshops. A brief presentation was given to workshop participants that described the major components of a BRT system. After the presentation, two interactive activities were conducted with workshop attendees. The first activity involved a visual preference survey where participants were asked to complete a short questionnaire that asked them to choose between various BRT system features displayed on presentation boards. That survey instrument is included in Appendix B.

The second exercise, a mapping exercise, offered participants the opportunity to indicate on a map where they would like to see specific BRT improvements. Participants were first divided into groups. Each group was instructed to indicate their preferred corridor(s) for BRT implementation and then indicate what type of running way and station improvements they would like to see along that preferred corridor. Running way and station improvement options that were given to each group are shown in Table 4-2. The results of the mapping exercises completed at both workshops were incorporated into the corridor analysis process and are included in Section 3 of this report.

Workshop Mapping Exercise

The second consensus-building workshop included the attendance and a presentation by a guest speaker, Jaime Lerner, who is an urban planner by profession and former mayor of the City of Curitiba, Brazil. Curitiba is considered to be the first city in the world to have implemented a BRT system as it is defined today, and Mr. Lerner is widely hailed as the father of BRT.

Table 4-2
Workshop Mapping Exercise Infrastructure Options

Running Way Options		Station Options	
	Mixed-Traffic		Simple Stops
	Designated Arterial Lanes		Enhanced Stops
	Busways		Transfer Station
			Park-and-Ride

Visual Preference Survey Results

A total of 42 visual preference surveys were completed at the consensus-building workshops. Question 1 asked the attendees which type of running way they would prefer for the rapid transit service. Thirty-seven respondents answered this question. Among them, the majority of respondents (72%) indicated they preferred “designated lane.” The remainder of respondents was equally split between “at-grade transitway” and “mixed-flow lane.” Figure 4-1 illustrates the result of this question.

Question 2 asked the participants about their preferred vehicle type for the rapid transit service. Among the thirty-eight responses received for this question, nearly the same number of votes selected “Stylized Bus” and “Specialized BRT Bus.” “Conventional Bus” received the lowest number of responses. Figure 4-2 illustrates the results to this question.

Figure 4-1
Running Way Preference

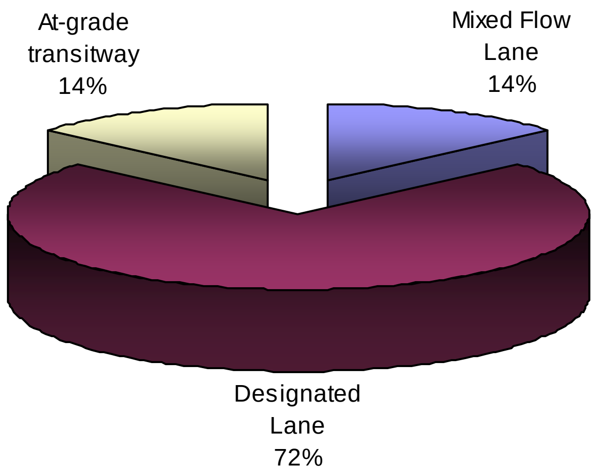
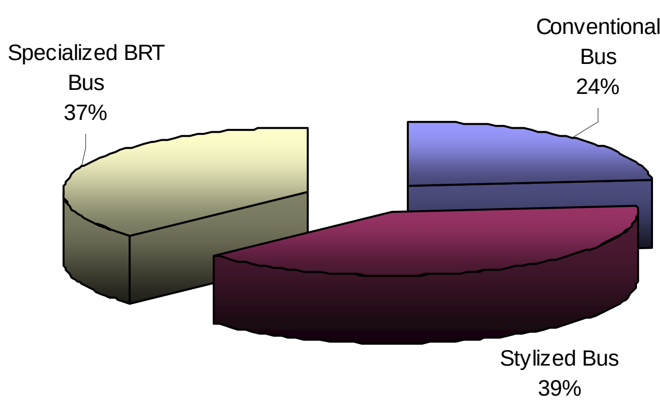
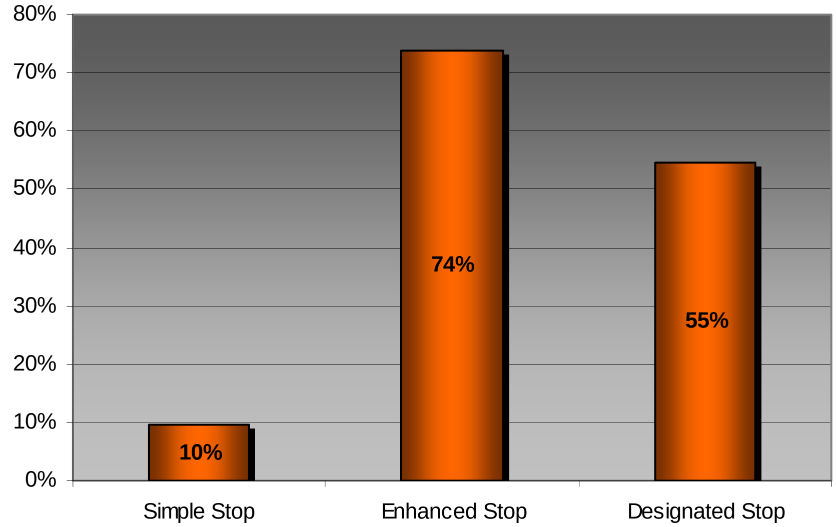


Figure 4-2
Vehicle Type Preference



Question 3 is a multiple answer question that asked the participants which station or stop type they prefer for the rapid transit service. Among all the responses, the "Enhanced Stop" received the highest percent of responses (74%), followed by "Designated Stop" (55%) and "Simple Stop" (10%). Figure 4-3 shows the results for this question.

Figure 4-3
Stop Type Preference



Participants were asked to select their preferred fare collection system for the rapid transit service in Question 4. Figure 4-4 highlights the answers to this question. The majority of respondents (83%) preferred "off-board" fare collection.

Figure 4-4
Fare Collection Preference

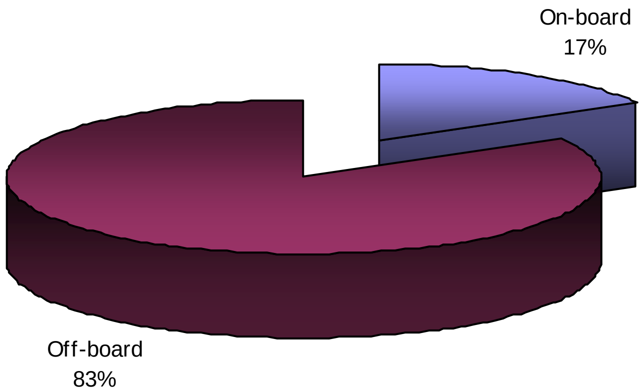
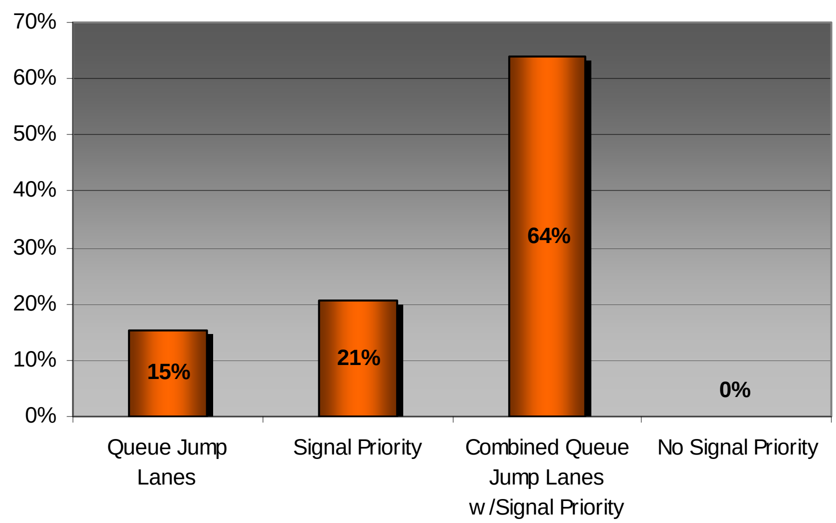


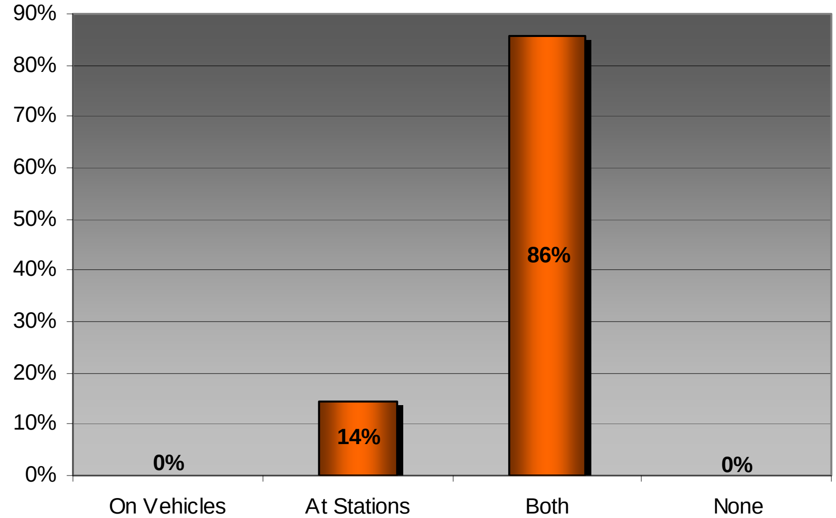
Figure 4-5 includes the result for a question about preferred bus preferential treatments. It is important to note that none of the respondents indicated the "No Signal Priority" option. "Combined queue jump lanes w/signal priority" option was the most popular response, receiving 64 percent of all the responses.

Figure 4-5
Bus Preferential Treatments



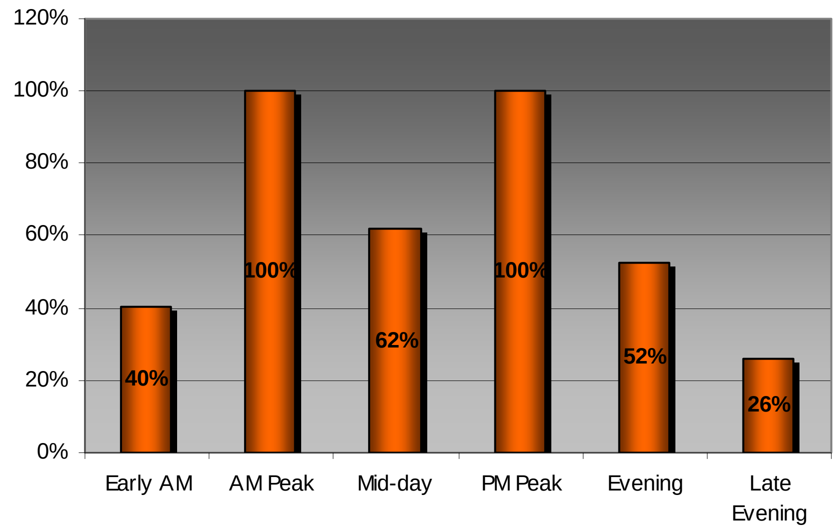
Question 6 asked the participants to indicate where passenger information systems should be installed. The "None" option received zero responses. The predominance of responses was received by the "Both on vehicles and at stations" option. Interestingly, no respondents indicated a preference for installation of passenger information systems exclusively on vehicles. Figure 4-6 illustrates the results of this question.

Figure 4-6
Passenger Information Preference



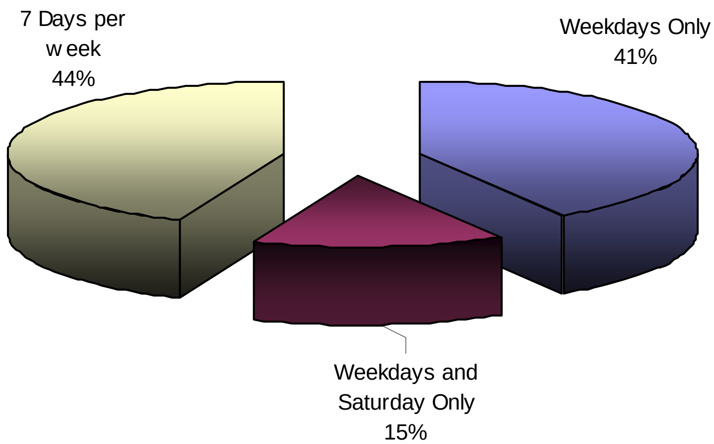
Question 7 asked participants what times of day the rapid transit service should operate. Respondents were given the option to choose more than one response category. Among all the respondents, 100 percent indicated that rapid transit service should operate in both "AM Peak" and "PM Peak" times. Only 26 percent indicated the need for BRT service in the late evening. Figure 4-7 illustrates the results for this question.

Figure 4-7
Service Period Preferences



Participants were asked to indicate the days of the week that they preferred the rapid transit service to operate. Forty-four percent of respondents indicated that rapid transit service should operate 7 days per week, followed by "Weekdays Only" (41%) and "Weekdays and Saturday Only" (15%). Figure 4-8 shows the results for this question.

Figure 4-8
Service Days Preference



Questions 9 through 17 asked participants to indicate their level of agreement with a series of statements related to BRT components, service levels, and features. Respondents were asked to rate their level of agreement with those statements based on the following agreement scale:

- Strongly Agree – 5
- Agree – 4
- Neutral – 3
- Disagree – 2
- Strongly Disagree – 1

Results for the level of agreement questions were summed for all participants by statement and a mean score was calculated to reflect a general collective level of agreement by respondents for each statement. Table 4-3 includes the mean score for each survey question included in this series.

Table 4-3
Participants Level of Agreement

Question Number	Statement	Mean Score
Q9	Rapid transit service vehicles should provide for interior bicycle storage.	3.17
Q10	Rapid transit service vehicles should provide for exterior bicycle storage.	3.54
Q11	Rapid transit service vehicles should operate using environmentally-friendly fuel systems.	4.41
Q12	Rapid transit service will benefit most from off-board fare collection strategies.	4.17
Q13	On-board fare collection strategies for the rapid transit service should minimize the use of cash.	4.12
Q14	Mixed-traffic rapid transit service will be able to operate efficiently in Gainesville.	2.93
Q15	Rapid transit service should have a distinct branding that is different from the local bus service.	4.05
Q16	Rapid transit service stations should provide more amenities than local bus service stops.	3.56
Q17	Rapid transit service buses should be given preferential treatment at busy intersections.	4.28

The top three statements that received the highest mean scores include Q11 – “Rapid transit service vehicles should operate using environmentally-friendly fuel systems”(4.41), Q17 – “Rapid transit service buses should be given preferential treatment at busy intersections” (4.28), and Q12 – “Rapid transit service will benefit most from off-board fare collection strategies” (4.17). The statement receiving the lowest mean score was Q14 – “Mixed-traffic rapid transit service will be able to operate efficiently in Gainesville” (2.93).

Prioritization Workshops

Two prioritization workshops were conducted in the final phase of the effort to identify a preferred BRT service configuration. This series of workshops was conducted in an open-house style and served two major purposes:

- Informed participants on the proposed BRT service alignment and its implementation characteristics, and
- Gathered feedback from participants regarding the proposed BRT service.

The dates and locations for the two workshops are listed below.

- December 8, 2009 – Martin Luther King, Jr. Center
  10:00 AM – 1:00 PM

- December 8, 2009 – GRU Multi-Purpose Room
  3:00 PM – 7:00 PM

A total of 27 participants attended the prioritization workshops. Workshop participants were given the opportunity to tour workshop stations that included materials (images, illustrations, reading materials, staff) illustrating the proposed service alignment and its major characteristics and components. RTS and project team staff were available to answer questions and facilitate the workshop process. Workshop station topics included the following:

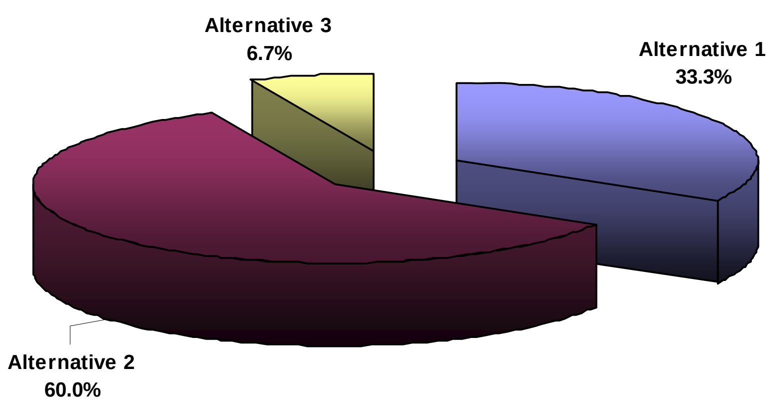
- Proposed BRT corridor and alternatives considered
- Educational materials on BRT service characteristics
- Conceptual exclusive arterial lane running way facilities
- Federal funding process and next steps
- Brief presentation on workshop components and stations

Prioritization Workshops Survey Results

In addition to visiting workshop stations and offering ideas and opinions to staff, participants were given a short survey on which they were asked to provide feedback on their opinion of the preferred service alignment and its service characteristics. Results from the responses received to questions on the survey are provided below. Feedback received was integrated into the selection of the analysis and final service configuration presented in Section 6 of this report.

Question 1 asked the attendees which of the three alternatives they thought would be most effective. Among the 15 respondents who answered this question, the majority (60%) indicated that they preferred "Alternative 2." Only one respondent preferred "Alternative 3." In addition, one respondent indicated the use of the segment of Archer Road east of US 441 in combination with SE 3rd Street. Figure 4-9 illustrates the results of this question.

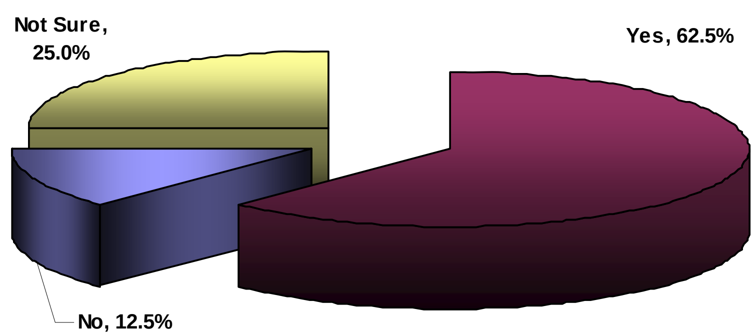
Figure 4-9
In your opinion, which of the three alternatives proposed would be the most effective?



Alternative configurations are shown in Section 6 of this report.

Question 2 asked the participants to indicate whether the proposed BRT service is connecting to the most desirable destinations in the City of Gainesville. Among the 16 responses received for this question, approximately 63 percent said "Yes." A quarter of the respondents were not sure whether the most desirable destinations were connected by the proposed BRT service. Figure 4-10 illustrates the results of this question.

Figure 4-10
Do you think that the proposed BRT service is connecting to the most desirable destinations in the City of Gainsville?



Question 3 consisted of an open-ended question where respondents were allowed to indicate up to five of their preferred areas or destinations that should be served by BRT, but are not along any of the proposed BRT service alternatives. Although the answers to this question varied, there are several common areas or destinations that were indicated by the respondent group. Figure 4-11 shows the most common areas along with the number of times each was indicated by respondents. As shown in Figure 4-11, of all the areas or destinations indicated, Santa Fe College was the most common response.

The last question included a list of BRT features and asked the respondents to select from among these features which ones would help improve the success of the BRT service. Among all the responses to this question, "Park-and-ride facilities" is the only feature that was selected by all the respondents (16), followed by "Enhanced shelters and stations amenities" (14) and "Priority for buses at signalized intersections" (13). Respondents were also allowed to choose an "Other" option and to indicate a feature not included in the feature list. "Bicycle rack at station" was mentioned three times from among the four surveys that included a response in this category. Figure 4-12 illustrates the results of this question.

Figure 4-11
Preferred Areas or Destinations Not Served by Proposed BRT Alternatives

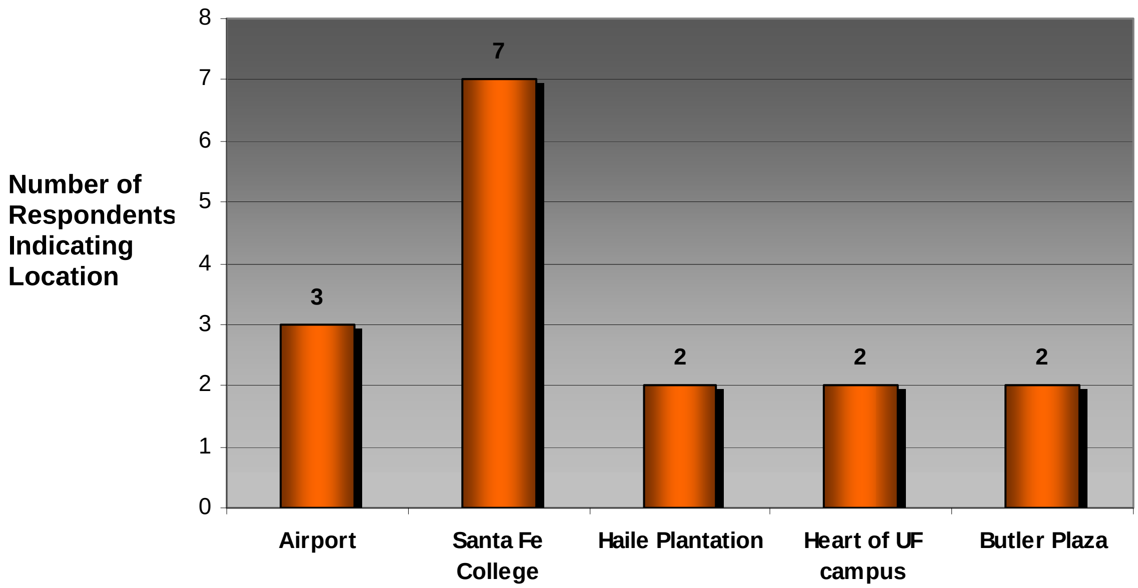
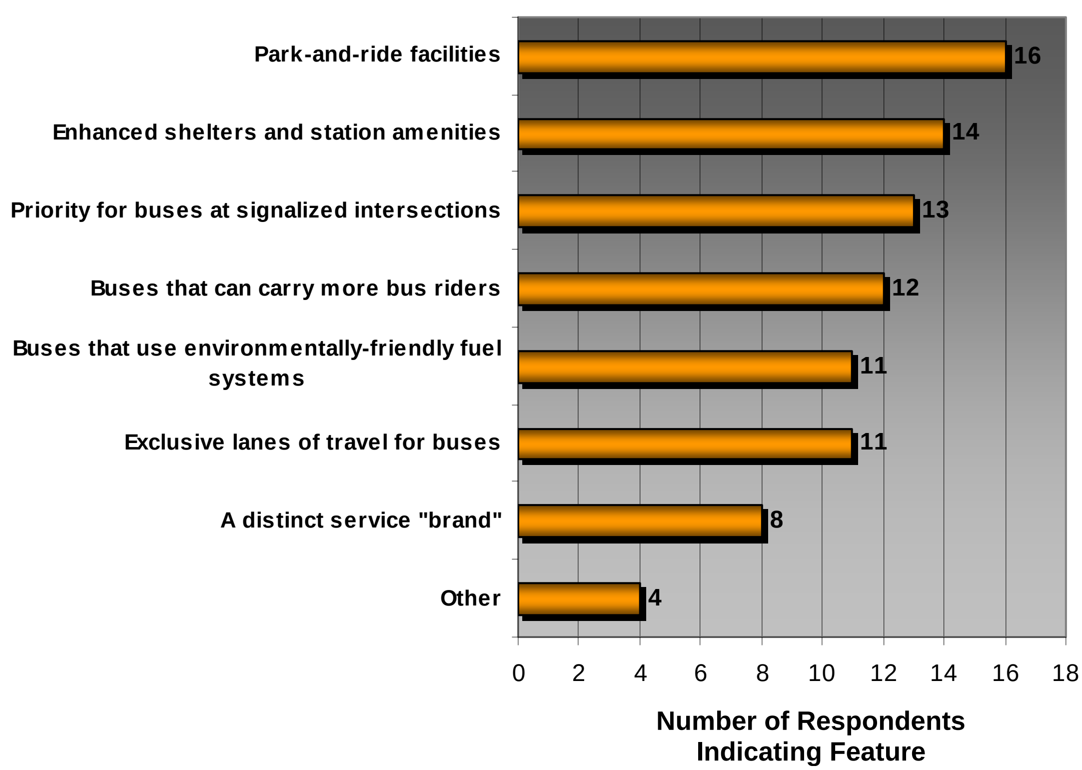


Figure 4-12
Preferred BRT Features



Section 5
Corridor Evaluation and comparative Analysis

The purpose of the corridor evaluation process is to conduct a comparative analysis that will rank the study corridors in terms of their ability to support BRT operations. The analysis identifies the corridors that maximize the potential for net benefits as measured by multiple criteria. Ultimately, based on the evaluation and comparative analysis results, the study will identify two corridors for more detailed BRT planning.

FEASIBILITY ANALYSIS CRITERIA

The chosen methodology for prioritizing the corridors is a multi-criteria analysis. For such an analysis, the criteria should be comprehensive, non-redundant, and mutually-exclusive to the extent possible. The criteria must also be quantifiable or classifiable in order to score individual corridors. Each criterion may also be given a weight to reflect the comparative importance of that criterion related to other criteria.

Table 5-1 is an evaluation matrix developed to guide the prioritization of potential BRT corridors. Included in that table are the criteria and the specific measures that were proposed to be utilized to measure each criterion. The feasibility assessment objectives along with a brief description of each objective's respective criteria are outlined below.

A. Transit Demand/Market Potential – BRT corridors should serve multiple market segments, including discretionary riders and transit-oriented populations. As such, the feasibility assessment includes several criteria that characterize transit market segments found along each corridor. These criteria include **current corridor ridership**, the **projection of future corridor ridership**, **existing** and **future density threshold assessments, transit orientation index score, nearby student populations, faculty & student RTS ridership, and public involvement.**

B. Travel Flows/Patterns – Significant to the success of any BRT operation is the ability to serve predominant travel patterns. **Existing and future model flows** from the regional travel demand model will assist in assessing zone-to-zone travel patterns throughout the study area. In addition, a criterion that credits corridors experiencing longer trips is included in the analysis.

C. Roadway/Intersection Geometries – Running ways play a central role in all BRT systems. Many planning and design issues associated with BRT implementation are determined based on the type of running way to be used for the service and intersection characteristics. Criteria selected to address these issues include the following:

Table 5-1
Criteria and Measures for RTS BRT Feasibility Study

Strategy/Objective	Criteria	Measure	Weight	Thresholds[1] High	Thresholds[1] Med	Thresholds[1] Low	Score
A. Transit Demand/Market Potential	1. Current corridor ridership - 2007	Total existing average weekday ridership per mile	3	5	3	1	
	2. Projected future corridor ridership	Projected future average weekday ridership per mile	3				
	3. Existing conditions Density Threshold Assessment (DTA) - 2007	DTA index scoring based on combined existing residential and employment density within a ½-mile buffer of proposed corridor	2				
	4. Future conditions Density Threshold Assessment (DTA) - 2035	DTA index scoring based on combined future residential and employment density within a ½-mile buffer of proposed corridor	2				
	5. Transit dependency	Index scoring based on Census demographics related to propensity for transit use within ½-mile buffer of proposed corridor	2				
	6. University context area	Percent of proposed corridor adjacent to or within ½-mile of census tracts with residential areas consisting of > 30% student population	2				
	7. University ridership	Percent of proposed corridor that overlaps existing local bus routes experiencing > 40% student and university faculty ridership	2				
	8. Public Involvement	Total votes earned by analysis corridors preferred by public workshop participants	1				
B. Travel Flows/ Traffic Condition	1. Existing travel demand model flows - 2007	Number of person trips per mile occurring between TAZs within a ½-mile buffer of the proposed corridor	1				
	2. Future travel demand model flows - 2035	Number of person trips per mile occurring between TAZs within a ½-mile buffer of the proposed corridor	1				
	3. Existing trip lengths -2007	Proportion of longer person trips occurring between TAZs within a ½-mile buffer of the proposed corridor	1				
	4. Future trip lengths -2035	Proportion of longer person trips occurring between TAZs within a ½-mile buffer of the proposed corridor	1				
C. Roadway/ Intersection Improvements	1. Right-of-way availability	Width of available right-of-way or excess roadway capacity available for exclusive running way facilities from GIS parcel data	3				
	2. Intersection geometries	Number of intersections eligible for bus preferential treatment applications per total signalized intersections	2				
D. Accessibility/ Compatibility	1. Transit connectivity	Number of transfer opportunities with existing non-parallel transit routes per mile	1				
	2. Potential for coordinated improvements	Review of transportation system modifications to include planned and/or programmed roadway, bicycle and pedestrian facilities along the corridor	2				
	3. Environmental justice	Coverage of minority and/or other underrepresented populations within ½-mile buffer of the corridor	2				
					Total Score (Sum)		

- the **availability of right-of-way that may be needed for BRT implementation**; and
- the number of intersections **eligible for Bus Preferential Treatments** per total signalized intersections.

D. Accessibility – The accessibility objective is included to measure three aspects of the BRT service: proximity to existing and traditional transit users, the availability to coordinate the implementation of transit infrastructure, and connection to existing RTS local bus service.

- **Transit connectivity** addresses the potential possibilities of BRT service providing connections to traditional local bus service;
- **Potential for coordinated improvements** refers to future physical elements and infrastructure improvements that may allow for coordinated development with BRT implementation; and
- An **environmental justice** criterion is included to address the Civil Rights Act Title VI requirement to include traditionally underserved and underrepresented segments of the population when implementing public transportation services.

The PMT determined the relevance of each criterion by assigning weights (between 1 and 3) according to their priorities. Those weights are shown in Table 5-1. Each corridor is evaluated according to each criterion using the threshold levels and corresponding scores (1, 3, and 5, which have been chosen to enhance the distinction among the candidate corridors), also shown in Table 5-1. The composite score or sum is used to rank or prioritize the nine corridors.

It is important to note that during the application of the screening and evaluation framework as originally developed, it was necessary to calibrate the threshold levels to more appropriately reflect the conditions in the analysis corridors. As a result, the threshold levels for criteria were indexed to a "high," "medium," or "low" score based on the following scoring scheme:

- Corridors scoring greater than one standard deviation from the average threshold level received a **High** score.
- Corridors better than the average but within one standard deviation received a **Medium** score.
- Corridors scoring below the average threshold level received a **Low** score.

This scoring scheme allowed for a more objective and systematic comparison of the corridors for the following 13 criteria:

- Current Corridor Ridership
- Projected Future Corridor Ridership
- Existing Conditions Density Threshold Assessment
- Future Conditions Density Threshold Assessment
- Transit Dependency
- University Context Area
- University Ridership
- Public Involvement
- Existing Travel Demand Model Flows
- Future Travel Demand Model Flows
- Existing Trip Lengths
- Future Trip Lengths
- Right-of-Way Availability
- Intersection Geometries
- Transit Connectivity
- Potential For Coordinated Improvements
- Environmental Justice

The threshold levels for each criterion (including the average and standard deviation) and scores for each corridor can be found in Appendix A.

EVALUATION

The following section documents the corridor prioritization process conducted using the evaluation matrix shown in Table 5-1. Each criterion is discussed individually in detail and a series of summary tables indicates the scores received by each corridor for each criterion.

Existing Corridor Ridership

In order to determine the number of existing RTS transit trips occurring along each of the analysis corridors, it was first necessary to obtain the ridership data for each local bus stop within each corridor. Total boardings for each corridor by stop were provided by RTS staff.

Existing corridor ridership was calculated by summing total daily boardings occurring at all stops along each corridor. That total was then normalized by dividing by the length of the corresponding analysis corridor. Table 5-2 presents the estimated average daily ridership per mile and the corresponding score for each analysis corridor.

Table 5-2
Ridership Analysis

Corridor	Average Daily Ridership	Corridor Length	Ridership /mile	Score	Category
Archer RD (SW 75th ST to SW 13th ST)	2,948	5.7	517	3	Medium
Depot AVE (SW 13th ST to Williston RD)	511	1.7	295	1	Low
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	27	2.4	11	1	Low
13th ST (Williston RD to NW 6th ST)	1,760	7.2	244	1	Low
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	1,978	3.3	592	3	Medium
SW 23rd TER /SW 35th PL (SW 34th ST to Archer RD)	2,034	2.0	1,002	5	High
SW 34th ST (Newberry RD to SW 35th PL)	944	2.0	451	3	Medium
University AVE (Ft. Clarke to E City Limits)	2,202	9.0	244	1	Low
Waldo RD (Depot AVE to Industrial Park)	79	4.8	16	1	Low

Existing and Future BRT Ridership

The ridership estimation methodology presented is adapted from the methodology given in the *TCRP Report 118 – Bus Rapid Transit Practitioner's Guide (2007)*. The estimations are based on the existing corridor ridership per mile previously developed. That corridor ridership was adjusted to estimate a base year ridership. The base year estimate was then used to project future year 2035 BRT ridership. The adjustment process is described in this section. Figure 5-1 illustrates the ridership projection steps.

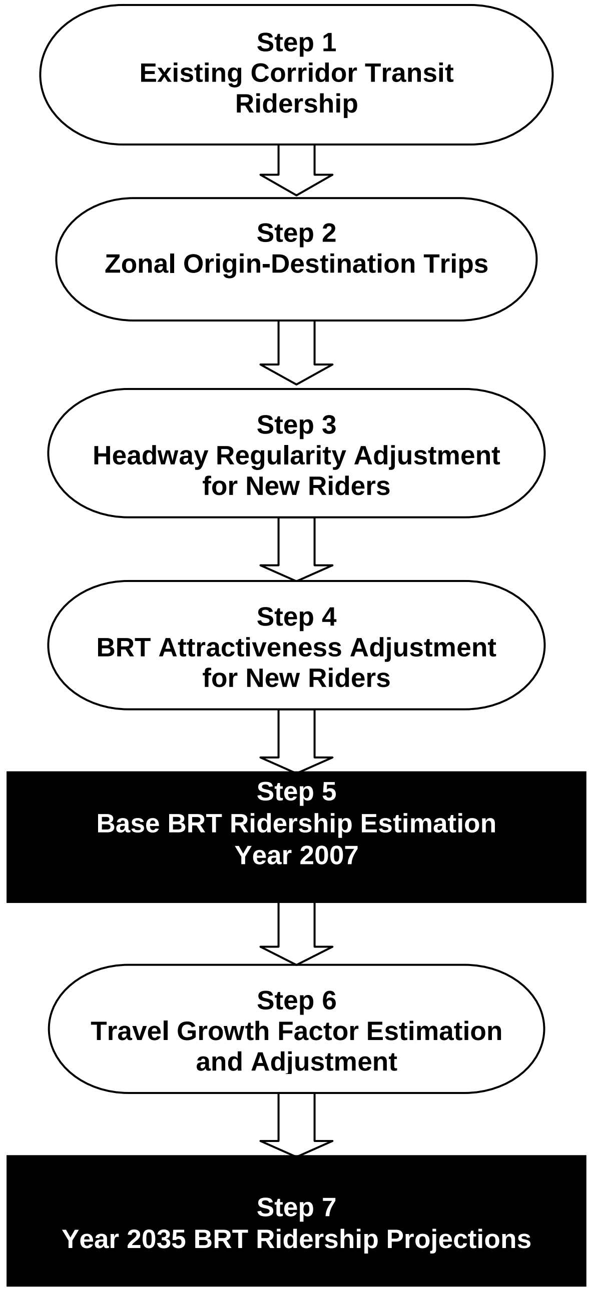
Step 1: Existing Corridor Transit Ridership

The existing corridor transit ridership for each analysis corridor was obtained from the existing ridership estimated in the previous analysis.

Step 2: Zonal Origin-Destination Trips

In order to calculate the distribution of total daily trips along each proposed BRT corridor, origin-destination trip data for traffic analysis zones (TAZs) associated with each BRT corridor were extracted from the travel demand model. A ½-mile (2,640 feet) buffer was used to select TAZs along each BRT corridor. A ½-mile buffer is assumed as an appropriate ridership shed for BRT service in transit research. Using travel demand model data from the Alachua/Gainesville Travel Demand Model, TAZs associated with each BRT corridor were identified and total

Figure 5-1
Ridership Projection Methodology Flow Chart



origin-destination trips for each BRT corridor were summed for the 2007 and 2035 model years, respectively.

Step 3: Headway Regularity Adjustment for New Riders

A headway regularity adjustment factor was utilized to address the benefits of providing consistent headways generally associated with premium BRT service. Providing consistent on-time service tends to attract more passengers than a service with long waits and/or unreliable schedules. Based on the Transit Capacity and Quality of Service Manual (2003), improvements in headway regularity due to the implementation of the new service were assumed to increase the existing ridership by 10 percent, reflecting new riders. This factor was applied to the ridership values obtained in Step 1.

Ex: **Archer Road Corridor**
New riders from headway regularity = Year 2008 base transit ridership × 0.10
adjustment for Archer Road
= 2,948 × 0.10
= 295

Step 4: BRT Attractiveness Adjustment for New Riders

One of the major advantages BRT systems have over traditional bus systems is that BRT provides a host of premium service amenities, infrastructure, and technologies. A modern and sophisticated BRT system draws more riders than traditional bus routes because of the integration of improved service and infrastructure characteristics. In order to adjust ridership forecasts for BRT systems integrating advanced bus system features, an attractiveness factor needs to be calculated for new riders. The relative attractiveness of the proposed BRT service was estimated using a methodology adapted from the *Bus Rapid Transit Practitioner's Guide* (2007). Table 5-3 includes a list of various BRT features and notes an adjustment score for each. An attractiveness factor for the BRT service was calculated using the scores in Table 5-3 consistent with various elements proposed for the service. BRT Elements were selected based on the results of the visual preference survey conducted at the project public consensus building workshops.

Ex: **Archer Road Corridor**
New riders from BRT attractiveness =
Year 2008 base transit ridership × BRT attractiveness factor

Adjustment for Archer Road
= 2,948 × 0.13
= 383

Table 5-3
BRT Attractiveness Factor Estimation

	Component	Percent	RTS BRT
1	Running ways (not additive)*	20	--
	Grade separated busways	(20)	--
	At-grade busways	(15)	--
	Median arterial busways	(10)	✓
	All-day bus lanes	(5)	--
	Rush hour bus lanes	--	--
	Mixed traffic	--	--
2	Stations (additive)	15	--
	Conventional shelter	--	--
	Unique/attractively designed shelter	2	✓
	Illumination	2	✓
	Telephones/security phones	3	✓
	Climate controlled waiting area	3	--
	Passenger amenities	3	✓
	Passenger services	2	--
3	Vehicles (additive)	15	--
	Conventional vehicles	--	--
	Uniquely designed vehicles	5	✓
	Air conditioning	--	✓
	Wide multi-door configuration	5	--
	Level boarding	5	--
4	Service patterns (additive)	15	--
	All day service span	4	✓
	High-frequency service	4	**
	Clear, simple, service span	4	**
	Off-vehicle fare collection	3	✓
5	ITS applications (selective additive)	10	--
	Passenger information at stops	7	✓
	Passenger information on vehicles	3	✓
6	BRT branding (additive)	10	--
	Vehicles & stations	7	✓
	Brochures/schedules	3	✓
	Subtotal (Maximum of 85)	85	52%
7	Synergy (for scores >60 points)	15	--
	Total	100	52%
Bias (10 minutes x Total)			5.2
Elasticity increment (0.25 x Total)			**0.13**

Source: *Bus Rapid Transit Practitioner's Guide, 2007*

* Running way facilities are not additive because only one running way type can be constructed within a given corridor.

**Addressed in headway regularity adjustment.

Step 5: Year 2007 Base BRT Ridership Estimation

Year 2008 base BRT ridership for each proposed BRT corridor was calculated by summing base 2008 local transit ridership with new riders obtained from the headway regularity adjustment and new riders from the attractiveness adjustment.

Ex: **Archer Road Corridor**

Year 2008 BRT ridership for Archer Road = Year 2008 base BRT Ridership + Headway Regularity + Attractiveness Adjustment

= 2,948 + 295 + 383

= 3,626

Step 6: Travel Growth Factor Estimation and Adjustment

The travel growth factor reflects the growth in daily trips between year 2007 and year 2035. Corresponding growth rates by BRT corridor are utilized to project 2035 daily base BRT ridership. The total origin-destination trips for each analysis corridor for 2007 and 2035 were obtained in Step 2. The travel growth factor is defined as the year 2035 O-D trips divided by the Year 2007 O-D trips. A total of nine travel growth factors were calculated, one for each proposed BRT corridor.

Ex: **Archer Road Corridor**

Travel growth factor for Archer Road = Year 2035 O-D trips ÷ Year 2007 O-D trips

= 125,832 ÷ 117,262

= 107%

Step 7: Year 2035 BRT Ridership Projections

The travel growth factor was applied to the total BRT riders reflected in the base BRT ridership obtained in Step 5. Applying the growth factor results in year 2035 BRT ridership estimates for each analysis corridor.

Ex: **Archer Road Corridor**

Year 2035 BRT daily ridership for Archer Road = Year 2007 BRT ridership × Travel growth factor

= 3,626 × 107%

= 3,891

Table 5-4 includes the estimated base 2008 BRT ridership and the forecasted 2035 BRT ridership for each analysis corridor.

Table 5-4
2035 BRT Ridership Analysis

Corridor	Average Daily Ridership	2008 Daily BRT Ridership	Growth Rate	2035 Daily BRT Ridership	Corridor Length	2035 Daily BRT Ridership /mile	Score	Category
Archer RD (SW 75th ST to SW 13th ST)	2,948	3,626	107%	3,891	5.7	682	3	Medium
Depot AVE (SW 13th ST to Williston RD)	511	629	113%	708	1.7	409	1	Low
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	27	33	112%	37	2.4	16	1	Low
13th ST (Williston RD to NW 6th ST)	1,760	2,165	103%	2,219	7.2	308	1	Low
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	1,978	2,433	111%	2,690	3.3	805	3	Medium
SW 23rd TER /SW 35th PL (SW 34th ST to Archer RD)	2,034	2,502	98%	2,463	2.0	1,213	5	High
SW 34th ST (Newberry RD to SW 35th PL)	944	1,161	106%	1,234	2.0	590	3	Medium
University AVE (Ft. Clarke to E City Limits)	2,202	2,708	108%	2,915	9.0	323	1	Low
Waldo RD (Depot AVE to Industrial Park)	79	97	103%	100	4.8	21	1	Low

Density Threshold Assessment

A population and employment Density Threshold Assessment (DTA) was conducted for the analysis area. A DTA illustrates the relationship between the choice market, which includes potential riders living in higher density areas of the county, and the use of transit as a commuting alternative. As density increases, areas generally become more supportive of transit.

The DTA assists in determining the presence of optimal conditions for varying levels of fixed-route transit service. Three levels of density thresholds were developed to indicate whether or not an area contains sufficient densities to sustain efficient fixed-route transit operations. Table 5-5 presents the density thresholds for each of the noted categories. The levels include:

- **Minimum** – Reflects minimum population or employment densities to consider basic fixed-route transit services (e.g., local bus service).
- **High** – Reflects high population or employment densities that may be able to support higher levels of transit service than areas that meet only the minimum density threshold (e.g., increased frequency and service span, express bus, etc.).
- **Very High** – Reflects very high population or employment densities that may be able to

support progressively greater levels of transit investment than areas that meet the minimum or high density thresholds (e.g., progressively greater frequencies, premium transit service, etc.)

Table 5-5
Density Thresholds

Transit Service Threshold Level	Population Density Threshold(1)	Employment Density Threshold(2)
Minimum	3 - 5 dwelling units/acre	4 employees/acre
High	6 - 7 dwelling units/acre	5 - 6 employees/acre
Very High	> or = 8 dwelling units/acre	> or = 7 employees/acre

(1) TRB, National Research Council, TCRP Report 16, Volume 1 (1996), *Transit and Land Use Form;* November 2002, MTC Resolution 3434 TOD Policy for Regional Transit Expansion Projects.

(2) Based on a review of recent research on the relationship between transit technology and employment densities.

Dwelling unit and employment estimates for 2007 and 2035 were developed by traffic analysis zone (TAZ) for all of Alachua County by MTPO staff. TAZs that meet either or both of the “high” thresholds for population density or employment density are considered BRT-supportive. BRT-supportive TAZs intersecting with the analysis corridors or falling within a ½-mile buffer of the analysis corridors were selected to determine the extent to which these analysis corridors meet the density thresholds supportive of BRT service. The area of those TAZs meeting the BRT-supportive thresholds was then summed for each corridor and the summed total was then divided by the total ½-mile buffer area for the corresponding analysis corridor. This resulted in the percent of the total corridor with areas supportive of BRT service in terms of population and/or employment density. Tables 5-6 and 5-7 show the percent of each corridor that is supportive of BRT, the score category, and the score value for each analysis corridor for 2007 and 2035, respectively.

Table 5-6
Existing (2007) Density Threshold Assessment

Corridor	Percent Area BRT Supportive	Score	Category
Archer RD (SW 75th ST to SW 13th ST)	28.3%	1	Low
Depot AVE (SW 13th ST to Williston RD)	42.4%	3	Medium
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	10.4%	1	Low
SW 13th ST (Williston RD to NW 6th ST)	26.7%	1	Low
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	33.7%	3	Medium
SW 23rd TER/SW 35th PL (SW 34th ST to Archer RD)	56.3%	5	High
SW 34th ST (Newberry RD to SW 35th PL)	38.1%	3	Medium
University AVE (Ft. Clarke to E City Limits)	31.1%	1	Low
Waldo RD (Depot AVE to Industrial Park)	16.4%	1	Low

Table 5-7
Future (2035) Density Threshold Assessment

Corridor	Percent Area BRT Supportive	Score	Category
Archer RD (SW 75th ST to SW 13th ST)	39.2%	3	Medium
Depot AVE (SW 13th ST to Williston RD)	44.8%	3	Medium
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	10.5%	1	Low
13th ST (Williston RD to NW 6th ST)	32.5%	1	Low
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	37.1%	3	Medium
SW 23rd TER/SW 35th PL (SW 34th ST to Archer RD)	60.0%	5	High
SW 34th ST (Newberry RD to SW 35th PL)	56.8%	5	High
University AVE (Ft. Clarke to E City Limits)	32.9%	1	Low
Waldo RD (Depot AVE to Industrial Park)	17.2%	1	Low

Transit Dependency

Transit dependency is measured using a Transit Orientation Index (TOI). The TOI addresses the potential for corridors to provide service to traditional transit riders; specifically, the ability of the corridor to provide service to populations with a greater transit orientation. Such populations include the elderly (age 60 or over), youth (age 15 and under), population below poverty, and households with no vehicle ownership. The TOI is used to estimate the extent to which areas with a high transit orientation are being served by a given analysis corridor, i.e., analysis corridor segments passing through Census block groups with a “high” or “very high” transit-oriented population. Similar to the DTA analysis methodology, TAZs intersecting with analysis corridors or falling within the ½-mile buffer of the analysis corridors were selected to determine the extent to which these analysis corridors have a high transit orientation. Those areas of TAZs with a high or very high TOI that are intersected by the analysis corridors were summed for each corridor and the summed total was then divided by the total ½-mile buffer area for the corresponding analysis corridor. This resulted in the percent of the total corridor with areas supportive of BRT service in terms of the TOI. Table 5-8 presents the percent of corridors with high/very high TOI, the score value, and the score category.

Table 5-8
2000 Transit Orientation Index

Corridor	Percent Area BRT Supportive	Score	Category
Archer RD (SW 75th ST to SW 13th ST)	22.5%	1	Low
Depot AVE (SW 13th ST to Williston RD)	67.9%	5	High
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	42.0%	3	Medium
13th ST (Williston RD to NW 6th ST)	15.3%	1	Low
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	7.8%	1	Low
SW 23rd TER/SW 35th PL (SW 34th ST to Archer RD)	47.1%	3	Medium
SW 34th ST (Newberry RD to SW 35th PL)	15.0%	1	Low
University AVE (Ft. Clarke to E City Limits)	27.0%	1	Low
Waldo RD (Depot AVE to Industrial Park)	22.6%	1	Low

University Context Area

The University of Florida (UF) area is one of the major target transit markets for the proposed BRT service. A measure was developed to determine the service potential of each corridor to serve the UF student population.

Census data utilized for the analysis were gathered from the UF Campus Master Plan. The measure used to compare corridors is the percent coverage of residential areas consisting of more than 30 percent student population. Census tracts within ½-mile of the analysis corridors were selected for the comparative analysis. Four steps were taken to measure this criterion for each corridor.

1. Census tracts with student population greater than 30 percent of the total population were identified from the UF Campus Master Plan.
2. A ½-mile buffer around each corridor was used to select Census tracts from among the tracts selected in Step 1 that were adjacent to or near each analysis corridor.
3. The total area of Census tracts identified in Step 1 within each ½-mile buffer was summed.
4. The resulting total area was then divided by the total area of the corridor ½-mile buffer to determine the percent of each analysis corridor that serves areas with student population of more than 30 percent.

Table 5-9 includes the university context area criterion measure and notes the corresponding score for each analysis corridor.

Table 5-9
University Context Area

Corridor	Percent area with more than 30 percent student population	Score	Category
Archer RD (SW 75th ST to SW 13th ST)	57.4%	3	Medium
Depot AVE (SW 13th ST to Williston RD)	63.0%	3	Medium
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	1.4%	1	Low
13th ST (Williston RD to NW 6th ST)	45.1%	1	Low
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	86.6%	3	Medium
SW 23rd TER/SW 35th PL (SW 34th ST to Archer RD)	100.0%	5	High
SW 34th ST (Newberry RD to SW 35th PL)	98.5%	5	High
University AVE (Ft. Clarke to E City Limits)	47.3%	1	Low
Waldo RD (Depot AVE to Industrial Park)	3.6%	1	Low

University Ridership

RTS started its collaboration with the University of Florida to provide students prepaid, unlimited access to transit service in 1998. As such, overall weekday ridership on the RTS system has grown from 2.9 million annual passengers in 1998 to over 9 million annual passengers in 2008. In order to capture the contribution of university students and faculty to RTS transit demand and identify corridors that best meet student and faculty needs, existing local bus routes experiencing more than 40 percent student and university faculty ridership were identified based on information obtained from the UF Campus Master Plan. The length of overlapping segments from these routes with study corridors was summed. That total length was then divided by the total length of the corresponding corridor to produce a point value. Corridors with a higher point value substantiate their priority in terms of servicing university transit demand better. Table 5-10 shows the percent, the score, and the score category for this criterion.

Table 5-10
University Ridership Analysis

Corridor	Routes Meeting Criteria	Point	Score	Category
Archer RD (SW 75th ST to SW 13th ST)	1,8,9,12,16,17,35,36,43	1.33	3	Medium
Depot AVE (SW 13th ST to Williston RD)	43	0.40	1	Low
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	NA	0.00	1	Low
13th ST (Williston RD to NW 6th ST)	8,13,16,43	0.89	1	Low
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	5,20,21	1.50	3	Medium
SW 23rd TER/SW 35th PL (SW 34th ST to Archer RD)	9,34,35,36	2.99	5	High
SW 34th ST (Newberry RD to SW 35th PL)	1,20,21,34,36	1.38	3	Medium
University AVE (Ft. Clarke to E City Limits)	5,34,43	0.97	1	Low
Waldo RD (Depot AVE to Industrial Park)	NA	0.00	1	Low

Public Involvement

The result of the mapping exercise conducted at the consensus building workshops was also considered in order to integrate public outreach efforts into the corridor analysis process. That mapping exercise was used to ask participants to identify their preferred analysis corridor. The following process was used to quantify the results of that process:

- Corridors were assigned a score based on the proportion of the corridor selected by each mapping exercise group. For example, if 50 percent of a certain corridor was identified by a group for BRT implementation, that corridor would receive 0.5 point.

- Scores received by each corridor were then summed, resulting in a final comparative evaluation score.

Table 5-11 shows the comparative evaluation score for each corridor, the overall criteria score, and the score category.

Table 5-11
Public Involvement

Corridor	Comparative Score	Overall Score	Category
Archer RD (SW 75th ST to SW 13th ST)	4.4	5	High
Depot AVE (SW 13th ST to Williston RD)	3.0	3	Medium
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	0.0	1	Low
13th ST (Williston RD to NW 6th ST)	1.0	1	Low
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	2.0	3	Medium
SW 23rd TER/SW 35th PL (SW 34th ST to Archer RD)	0.0	1	Low
SW 34th ST (Newberry RD to SW 35th PL)	0.8	1	Low
University AVE (Ft. Clarke to E City Limits)	3.2	3	Medium
Waldo RD (Depot AVE to Industrial Park)	0.7	1	Low

Existing and Future Model Flows

Existing and future model flows examine 2007 and 2035 total daily person trips occurring within each analysis corridor, respectively. In order to estimate the distribution of total daily trips along each proposed BRT corridor, origin-destination trip data for TAZs associated with each BRT corridor were extracted from the travel demand model. A ½-mile buffer was used to select TAZs along each BRT corridor. Using travel demand model data from the Alachua/Gainesville Travel Demand Model, TAZs associated with each BRT corridor were identified and total daily origin-destination trips for each BRT corridor were summed for the 2007 and 2035 model years, respectively. Total daily person trips were then normalized by dividing by the corridor length to obtain total number of person trips per mile. Tables 5-12 and 5-13 present total daily person trips per mile for each corridor, the overall criteria score, and score category for 2007 and 2035, respectively.

Table 5-12
Existing Model Flows (2007)

Corridor	Total Daily Person Trips	Trips per Mile	Score	Category
Archer RD (SW 75th ST to SW 13th ST)	117,262	20,550	5	High
Depot AVE (SW 13th ST to Williston RD)	7,027	4,059	1	Low
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	4,196	1,761	1	Low
13th ST (Williston RD to NW 6th ST)	55,981	7,773	1	Low
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	50,293	15,044	3	Medium
SW 23rd TER/SW 35th PL (SW 34th ST to Archer RD)	18,267	8,999	1	Low
SW 34th ST (Newberry RD to SW 35th PL)	36,011	17,211	5	High
University AVE (Ft. Clarke to E City Limits)	98,974	10,957	3	Medium
Waldo RD (Depot AVE to Industrial Park)	12,579	2,610	1	Low

Table 5-13
Future Model Flows (2035)

Corridor	Total Daily Person Trips	Trips per Mile	Score	Category
Archer RD (SW 75th ST to SW 13th ST)	125,832	22,052	5	High
Depot AVE (SW 13th ST to Williston RD)	7,920	4,575	1	Low
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	4,690	1,968	1	Low
13th ST (Williston RD to NW 6th ST)	57,388	7,969	1	Low
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	55,615	16,636	3	Medium
SW 23rd TER/SW 35th PL (SW 34th ST to Archer RD)	17,981	8,858	1	Low
SW 34th ST (Newberry RD to SW 35th PL)	38,279	18,295	5	High
University AVE (Ft. Clarke to E City Limits)	106,528	11,794	3	Medium
Waldo RD (Depot AVE to Industrial Park)	12,923	2,681	1	Low

Existing and Future Person Trip Lengths

Passengers making longer trips experience the largest degree of travel time savings provided by BRT (e.g., more travel time savings). In order to capture the trip lengths of potential BRT passengers, existing and future person trip lengths were estimated utilizing the 2007 and 2035 model flow data, respectively. Trip lengths were divided into the following three categories:

- **Short** - Trip length less than or equal to 1.0 mile
- **Medium** - Trip length greater than 1.0 mile and less than 1.5 miles
- **Long** - Trip length equal to or greater than 1.5 miles

In order to reflect the differences among these three trip patterns, weights 1, 3, and 5 were assigned to short, medium, and long trips, respectively. The percent of trips for each of the trip length categories were multiplied with the corresponding weight and then summed to obtain a total weighted point score. Tables 5-14 and 5-15 present the percent of person trips with trip lengths in each of the trip length categories, the weighted score, the overall criteria score, and the score category.

Table 5-14
Existing Trip Length Analysis (2007)

Corridor	Percent trips with trip length <= 1 mile	Weight	Percent trips with trip length 1-1.5 miles	Weight	Percent trips with trip length >=1.5 miles	Weight	Total Weighted Points	Overall Criteria Score	Category
Archer RD (SW 75th ST to SW 13th ST)	34%	1	16%	3	49%	5	3.30	3	Medium
Depot AVE (SW 13th ST to Williston RD)	56%	1	23%	3	21%	5	2.32	1	Low
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	38%	1	12%	3	50%	5	3.23	3	Medium
13th ST (Williston RD to NW 6th ST)	36%	1	17%	3	47%	5	3.23	3	Medium
SW 20 AVE/SW 62 BLVD (SW 34th ST to University AVE)	35%	1	21%	3	44%	5	3.17	3	Medium
SW 23rd TER/SW 35th PL (SW 34th ST to Archer RD)	41%	1	15%	3	44%	5	3.06	1	Low
SW 34th ST (Newberry RD to SW 35th PL)	36%	1	18%	3	46%	5	3.20	3	Medium
University AVE (Ft. Clarke to E City Limits)	32%	1	17%	3	50%	5	3.36	3	Medium
Waldo RD (Depot AVE to Industrial Park)	31%	1	10%	3	59%	5	3.56	5	High

Table 5-15
Future Trip Length Analysis (2035)

Corridor	Percent trips with trip length <= 1 mile	Weight	Percent trips with trip length 1-1.5 miles	Weight	Percent trips with trip length >=1.5 miles	Weight	Total Weighted Points	Score	Category
Archer RD (SW 75th ST to SW 13th ST)	33%	1	16%	3	50%	5	3.34	3	Medium
Depot AVE (SW 13th ST to Williston RD)	56%	1	23%	3	21%	5	2.31	1	Low
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	40%	1	11%	3	49%	5	3.19	3	Medium
13th ST (Williston RD to NW 6th ST)	35%	1	16%	3	49%	5	3.27	3	Medium
SW 20 AVE/SW 62 BLVD (SW 34th ST to University AVE)	34%	1	20%	3	47%	5	3.26	3	Medium
SW 23rd TER/SW 35th PL (SW 34th ST to Archer RD)	41%	1	17%	3	42%	5	3.02	1	Low
SW 34th ST (Newberry RD to SW 35th PL)	36%	1	18%	3	46%	5	3.20	3	Medium
University AVE (Ft. Clarke to E City Limits)	31%	1	17%	3	51%	5	3.40	3	Medium
Waldo RD (Depot AVE to Industrial Park)	32%	1	10%	3	58%	5	3.52	5	High

Right-of-Way Analysis

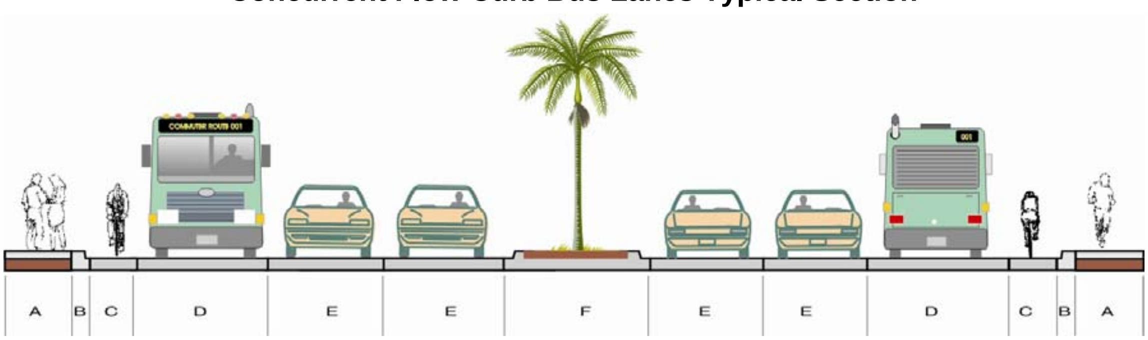
Right-of-way availability was determined using guidelines published in FDOT District 4's *Bus Rapid Transit Functional Classification Study* (2003). That report provides mid-block and intersection design standards for various BRT running way facility types. Table 5-16 includes the profile of a typical mid-block section of a BRT running way facility that includes designated arterial lanes. An illustration of that profile is shown in Figure 5-2.

Table 5-16
Concurrent Flow Curb Bus Lanes ROW Requirement

	Feature	Constrained ROW Requirement (ft)
A	Sidewalk (2)	6
B	Curb and Gutter (2)	2
C	Bike Lane (2)	4*
D	Bus Lane (2)	12
E	Vehicle Lane (4)	11
F	Median	22

*Minimum bike lane width

Figure 5-2
Concurrent Flow Curb Bus Lanes Typical Section



Source: Bus Rapid Transit Functional Classification Study FDOT District 4

The constrained right-of-way requirement for the facility as shown in Figure 5-2 is 114 feet. The preferred width is 140 feet which includes 12 foot and five foot vehicle travel and bicycle lanes, respectively, a 30 foot median, and four foot planting strips buffering the sidewalk from the roadway. This right-of-way analysis is predicated on the assumption that, all else being equal, a wider right-of-way facilitates the inclusion of exclusive lanes, stations, and other supporting infrastructure for BRT.

In order to determine the availability of right-of-way along each analysis corridor, the 2009 parcel data available through the Alachua County Property Appraiser website were obtained and reviewed. A proxy for right-of-way availability was then measured along each segment of road within the corridors as the widths of the right-of-way reflected in the parcel data segments of roadway meeting the right-of-way requirements were organized into two categories:

1. segments of road that met the 114-foot constrained width but did not meet the 140-foot preferred width
2. segments of road that met the 140-foot preferred width

Lengths for all segments were then summed for each category for each corridor and then divided by the total length of the corridor. A weight of 1.0 was multiplied by the percent length of each corridor meeting the constrained right-of-way requirement and a weight of 2.0 was multiplied by the percent of each corridor meeting the preferred right-of-way requirement. Lastly, a composite percentage score was calculated by adding these two weighted percentages.

Table 5-17 presents the composite percent of each corridor with potentially adequate ROW, the score category, and the score value for each analysis corridor.

Table 5-17
Adequate Right-of-Way Analysis

Corridor	Segment length with ROW >114 ft but <140 ft	Segment length with ROW >140 ft	Corridor Length	Percent ROW >114 ft but <140 ft	Weight	Percent ROW >140 ft	Weight	Composite Percent	Score	Category
Archer RD (SW 75th ST to SW 13th ST)	5.46	0.00	5.71	95.64%	1	0.00%	2	95.64%	5	High
Depot AVE (SW 13th ST to Williston RD)	0.19	0.00	1.73	10.93%	1	0.00%	2	10.93%	1	Low
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	0.00	0.00	2.38	0.00%	1	0.00%	2	0.00%	1	Low
13th ST (Williston RD to NW 6th ST)	1.57	1.44	7.20	21.77%	1	20.03%	2	61.83%	3	Medium
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	0.45	0.00	3.34	13.32%	1	0.00%	2	13.32%	1	Low
SW 23rd TER/SW 35th PL (SW 34th ST to Archer RD)	0.00	0.00	2.03	0.00%	1	0.00%	2	0.00%	1	Low
SW 34th ST (Newberry RD to SW 35th PL)	1.94	0.00	2.09	92.63%	1	0.00%	2	92.63%	5	High
University AVE (Ft. Clarke to E City Limits)	0.42	0.07	9.03	4.64%	1	0.74%	2	6.13%	1	Low
Waldo RD (Depot AVE to Industrial Park)	0.16	0.00	4.82	3.29%	1	0.00%	2	3.29%	1	Low

Intersection Geometries

Opportunities for bus preferential treatments were identified by evaluating intersection geometries. Bus queue jump lane applications exist when the approaching lanes to an intersection include independent right-turn lanes. In addition, when the receiving lanes of an intersection possess right-turn auxiliary lanes, bus bypass lane applications exist. Using these assumptions, the number of opportunities for bus queue jump lanes and bus queue bypass lanes were identified for each analysis corridor. Table 5-18 presents the number of signalized intersections, the number of bus queue jump lane opportunities, the number of queue bypass lane opportunities, the combined percent of total signalized intersections, the score value, and the score category for each analysis corridor.

Table 5-18
Intersection Geometries

Corridor	Total Signalized Intersections	Queue Jump Lane	Queue Bypass Lane	Total	Percent	Score	Category
Archer RD (SW 75th ST to SW 13th ST)	12	1	1	2	17%	1	Low
Depot AVE (SW 13th ST to Williston RD)	3	0	1	1	33%	3	Medium
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	5	0	1	1	20%	1	Low
13th ST (Williston RD to NW 53rd Ave)	24	2	0	2	8%	1	Low
SW 20 AVE/SW 62 BLVD (SW 34th ST to University AVE)	4	2	0	2	50%	5	High
SW 23rd TER /SW 35th PL (SW 34th ST to Archer RD)	2	0	0	0	0%	1	Low
SW 34th ST (Newberry RD to SW 35th PL)	6	0	2	2	33%	3	Medium
University AVE (Ft. Clarke to E City Limits)	37	6	1	7	19%	1	Low
Waldo RD (Depot AVE to Industrial Park)	8	2	2	4	50%	5	High

Transit Connectivity

The measure used to gauge transit connectivity is the number of transfer opportunities with existing RTS transit system routes per mile. As such, the number of existing bus routes that intersect (but are not parallel to) each BRT analysis corridor was counted. In the case that part of a RTS route overlapped with a study corridor, the transfer opportunities were determined by dividing the length of the overlapping segment by typical BRT stop spacing of a ½-mile. The result was then rounded to the nearest integer and added to other perpendicular connection counts. This total was then normalized by dividing each total number of transfer opportunities with the corresponding analysis corridor's length. Table 5-19 presents the number of transfer opportunities with the RTS transit system per mile for each corridor.

Table 5-19
Transit Connectivity

Corridor	Transfer Opportunities	Corridor Length	Transfer Opportunities Per Mile	Score	Category
Archer RD (SW 75th ST to SW 13th ST)	37	5.7	6.5	3	Medium
Depot AVE (SW 13th ST to Williston RD)	18	1.7	10.4	5	High
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	4	2.4	1.7	1	Low
13th ST (Williston RD to NW 6th ST)	36	7.2	5.0	1	Low
SW 20 AVE/SW 62 BLVD (SW 34th ST to University AVE)	19	3.3	5.7	1	Low
SW 23rd TER/SW 35th PL (SW 34th ST to Archer RD)	23	2.0	11.3	5	High
SW 34th ST (Newberry RD to SW 35th PL)	20	2.1	9.6	3	Medium
University AVE (Ft. Clarke to E City Limits)	34	9.0	3.8	1	Low
Waldo RD (Depot AVE to Industrial Park)	7	4.8	1.5	1	Low

Potential for Coordinated Improvements

Future roadway improvements provide the opportunity to potentially leverage BRT development in conjunction with planned roadway improvements. Five published documents that include MTPO 2025 Cost Feasible Plan, the MTPO Transportation Improvement Program (TIP) (2008/09-2012/13), the County and City Capital Improvement Programs, and the Plan East Gainesville were reviewed to identify the roadway improvements that may benefit future BRT development. For the analysis, four types of improvements were considered to offer benefits to future BRT service development:

- Roadway resurfacing
- Roadway capacity improvements
- Intersection modifications
- Bicycle/pedestrian facility improvements
- Plan East Gainesville

As the PE (Planning and Engineering) phase of the Gainesville BRT project is expected to occur no earlier than year 2012, the roadway improvement projects that were initiated on and after year 2012 were considered as candidate projects with which to coordinate BRT improvements. Table 5-20 includes the list of eligible projects identified from those documents.

Table 5-20
Roadway Projects Eligible for Coordinated Improvements

Project Name	Type	Source	Horizon Year
SW 20th Avenue/ SW 62 Boulevard Reconstruction	Roadway resurfacing	MTPO 2025 Cost Feasible Plan	2019-2023
Depot Avenue Reconstruction	Roadway resurfacing	MTPO 2025 Cost Feasible Plan	2025
Bicycle/pedestrian Crossings at Hull Road and SW 34th Street	Intersection modifications	MTPO 2025 Cost Feasible Plan	2014-2025
Archer Road Bike Path/Trail	Bicycle/pedestrian facility improvements	MTPO TIP (2008/09 – 2012/13)	2012-2013
SW 20th Avenue/SW 62nd Boulevard Reconstruction	Roadway capacity improvements	MTPO TIP (2008/09 – 2012/13)	2012
Archer Road “High Priority” BRT Alignment	Plan East Gainesville	Plan East Gainesville	2012
Depot Avenue “High Priority” BRT Alignment	Plan East Gainesville	Plan East Gainesville	2012
Waldo Road “Medium Priority” BRT Alignment	Plan East Gainesville	Plan East Gainesville	2012
Hawthorne Road “Medium Priority” BRT Alignment	Plan East Gainesville	Plan East Gainesville	2012

In order to differentiate the levels of benefit offered by each improvement type to BRT developments, weighting was assigned to the four improvement types in the following manner.

- Intersection modifications - 1
- Roadway capacity improvement - 3
- Resurfacing - 3
- Bicycle/pedestrian facility improvement - 3
- Plan East Gainesville - 3

Table 5-21 presents the type of roadway improvements for each corridor, scores, weighted scores, final scores, and category.

Table 5-21
Potential for Coordinate Improvements

Corridor	Number of Intersection Modifications	Score	Weight	Percent of corridor with Roadway Resurfacing, and Bicycle/Pedestrian Facility Improvement	Score	Weight	Percent of Corridor with Roadway Capacity and Plan East Gainesville Improvement	Score	Weight	Composite Score	Final Score	Category
Archer RD (SW 75th ST to SW 13th ST)	0	1	1	41.9%	3	3	16.0%	1	3	13	1	Low
Depot AVE (SW 13th ST to Williston RD)	0	1	1	100.0%	5	3	100.0%	5	3	31	5	High
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	0	1	1	0.0%	1	3	100.0%	5	3	19	3	Medium
13th ST (Williston RD to NW 6th ST)	0	1	1	0.0%	1	3	0.0%	1	3	7	1	Low
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	0	1	1	100%	5	3	0.0%	1	3	19	3	Medium
SW 23rd TER/SW 35th PL (SW 34th ST to Archer RD)	0	1	1	0.0%	1	3	0.0%	1	3	7	1	Low
SW 34th ST (Newberry RD to SW 35th PL)	1	5	1	0.0%	1	3	0.0%	1	3	11	1	Low
University AVE (Ft. Clarke to E City Limits)	0	1	1	0.0%	1	3	0.0%	1	3	7	1	Low
Waldo RD (Depot AVE to Industrial Park)	0	1	1	0.0%	1	3	63.3%	3	3	13	1	Low

Environmental Justice

Under Title VI of the Civil Rights Act of 1964, no person shall be excluded from the benefits of any program or activity receiving financial assistance on the grounds of race, color, or national origin. Consequently, this evaluation of potential BRT corridors in Alachua County includes an environmental justice component. Under this criterion, analysis corridors earn merit based on the extent of the corridor that serves areas of the city with a large proportion of minority populations.

Census data utilized for the analysis were gathered at the Census tract level. The measure used to compare corridors is the percent coverage of non-white populations within a ½-mile of each analysis corridor. The average number of non-white persons within each census tract was calculated as 26 percent using Census 2000 data. Four steps were taken to measure this criterion for each corridor.

1. Census tracts with non-white population equal to or greater than 26 percent of the total population (defined as “minority Census tract”) were identified.
2. A ½-mile buffer around each corridor was used to select Census tracts from among the tracts selected in Step 1 that were adjacent to or near each analysis corridor.
3. The total area of Census tracts identified in Step 1 within each ½-mile buffer was summed.
4. The resulting total area was then divided by the total area of the corridor ½-mile buffer to determine the percent of each analysis corridor that serves areas with a non-white population equal to or greater than 26 percent of the total population.

Table 5-22 includes the environmental justice criterion measure and notes the corresponding score for each analysis corridor.

Table 5-22
Environmental Justice Analysis

Corridor	Percent Area BRT Supportive	Score	Category
Archer RD (SW 75th ST to SW 13th ST)	79.38%	3	Medium
Depot AVE (SW 13th ST to Williston RD)	100.00%	5	High
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	100.00%	5	High
13th ST (Williston RD to NW 6th ST)	52.48%	1	Low
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	21.28%	1	Low
SW 23rd TER/SW 35th PL (SW 34th ST to Archer RD)	52.03%	1	Low
SW 34th ST (Newberry RD to SW 35th PL)	35.18%	1	Low
University AVE (Ft. Clarke to E City Limits)	46.80%	1	Low
Waldo RD (Depot AVE to Industrial Park)	100.00%	5	High

Tables 5-23 and 5-24 note the overall comparative scoring with weighting and without weighting, respectively. As highlighted in both tables, the highest scoring corridors include Archer Road, SW 23rd TER/SW 35th PL, and the 34th Street corridors.

Table 5-23
Overall Corridor Scoring (with weighting)

Corridor	Criteria																
	Weighted Current Corridor Ridership	Weighted Future Corridor Ridership	Weighted Existing DTA (2007)	Weighted Future DTA (2035)	Weighted Transit Dependency	Weighted University Context Area	Weighted University Ridership	Weighted Public Involvement	Weighted Existing Model Flows (2007)	Weighted Future Model Flows (2035)	Weighted Existing Trip Lengths (2007)	Weighted Future Trip Lengths (2035)	Weighted ROW Availability	Weighted Intersection Geometries	Weighted Transit Connectivity	Weighted Potential for Coordinated Improvements	Weighted Environmental Justice	Total Score
Archer RD (SW 75th ST to SW 13th ST)	9	9	2	6	2	6	6	5	5	5	3	3	15	2	3	2	6	89
Depot AVE (SW 13th ST to Williston RD)	3	3	6	6	10	6	2	3	1	1	1	1	3	6	5	10	10	77
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	3	3	2	2	6	2	2	1	1	1	3	3	3	2	1	6	10	51
13th ST (Williston RD to NW 6th ST)	3	3	2	2	2	2	2	1	1	1	3	3	9	2	1	2	2	41
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	9	9	6	6	2	6	6	3	3	3	3	3	3	10	1	6	2	81
SW 23rd TER /SW 35th PL (SW 34th ST to Archer RD)	15	15	10	10	6	10	10	1	1	1	1	1	3	2	5	2	2	95
SW 34th ST (Newberry RD to SW 35th PL)	9	9	6	10	2	10	6	1	5	5	3	3	15	6	3	2	2	97
University AVE (Ft. Clarke to E City Limits)	3	3	2	2	2	2	2	3	3	3	3	3	3	2	1	2	2	41
Waldo RD (Depot AVE to Industrial Park)	3	3	2	2	2	2	2	1	1	1	5	5	3	10	1	2	10	55

Table 5-24
Overall Corridor Scoring (without weighting)

Corridor	Criteria																
	Current Corridor Ridership	Future BRT Ridership	Existing DTA (2007)	Future DTA (2035)	Transit Dependency	University Context Area	University Ridership	Public Involvement	Existing Model Flows (2007)	Future Model Flows (2035)	Existing Trip Lengths (2007)	Future Trip Lengths (2035)	ROW Availability	Intersection Geometries	Transit Connectivity	Potential for Coordinated Improvements	Environmental Justice	Total Score
Archer RD (SW 75th ST to SW 13th ST)	3	3	1	3	1	3	3	5	5	5	3	3	5	1	3	1	3	51
Depot AVE (SW 13th ST to Williston RD)	1	1	3	3	5	3	1	3	1	1	1	1	1	3	5	5	5	43
Hawthorne RD/SR20 (Waldo RD to SE 43rd ST)	1	1	1	1	3	1	1	1	1	1	3	3	1	1	1	3	5	29
13th ST (Williston RD to NW 6th ST)	1	1	1	1	1	1	1	1	1	1	3	3	3	1	1	1	1	23
SW 20 AVE/SW 62 BLVD(SW 34th ST to University AVE)	3	3	3	3	1	3	3	3	3	3	3	3	1	5	1	3	1	45
SW 23rd TER /SW 35th PL (SW 34th ST to Archer RD)	5	5	5	5	3	5	5	1	1	1	1	1	1	1	5	1	1	47
SW 34th ST (Newberry RD to SW 35th PL)	3	3	3	5	1	5	3	1	5	5	3	3	5	3	3	1	1	53
University AVE (Ft. Clarke to E City Limits)	1	1	1	1	1	1	1	3	3	3	3	3	1	1	1	1	1	27
Waldo RD (Depot AVE to Industrial Park)	1	1	1	1	1	1	1	1	1	1	5	5	1	5	1	1	5	33

Section 6
Corridor Selection, Refinement and
Final Priority Alignment and Alternatives

To enhance the selection of a successful initial BRT service, the final selection of a preferred BRT service configuration was subject to an additional analysis and refinement process. Understanding that no one initial study corridor would meet all of the objectives for the service by itself and that no one corridor would be considered BRT-supportive for its entire length, a corridor refinement process was performed to identify the most ideal corridor segments from the nine original study corridors. Those segments were then combined to form a hybrid service configuration that would represent the best service configuration to carry forward into future project implementation phases. This section documents the corridor selection and refinement process and identifies the preferred service configuration for the initial BRT service in the City of Gainesville.

ALTERNATIVE SERVICE CONFIGURATIONS

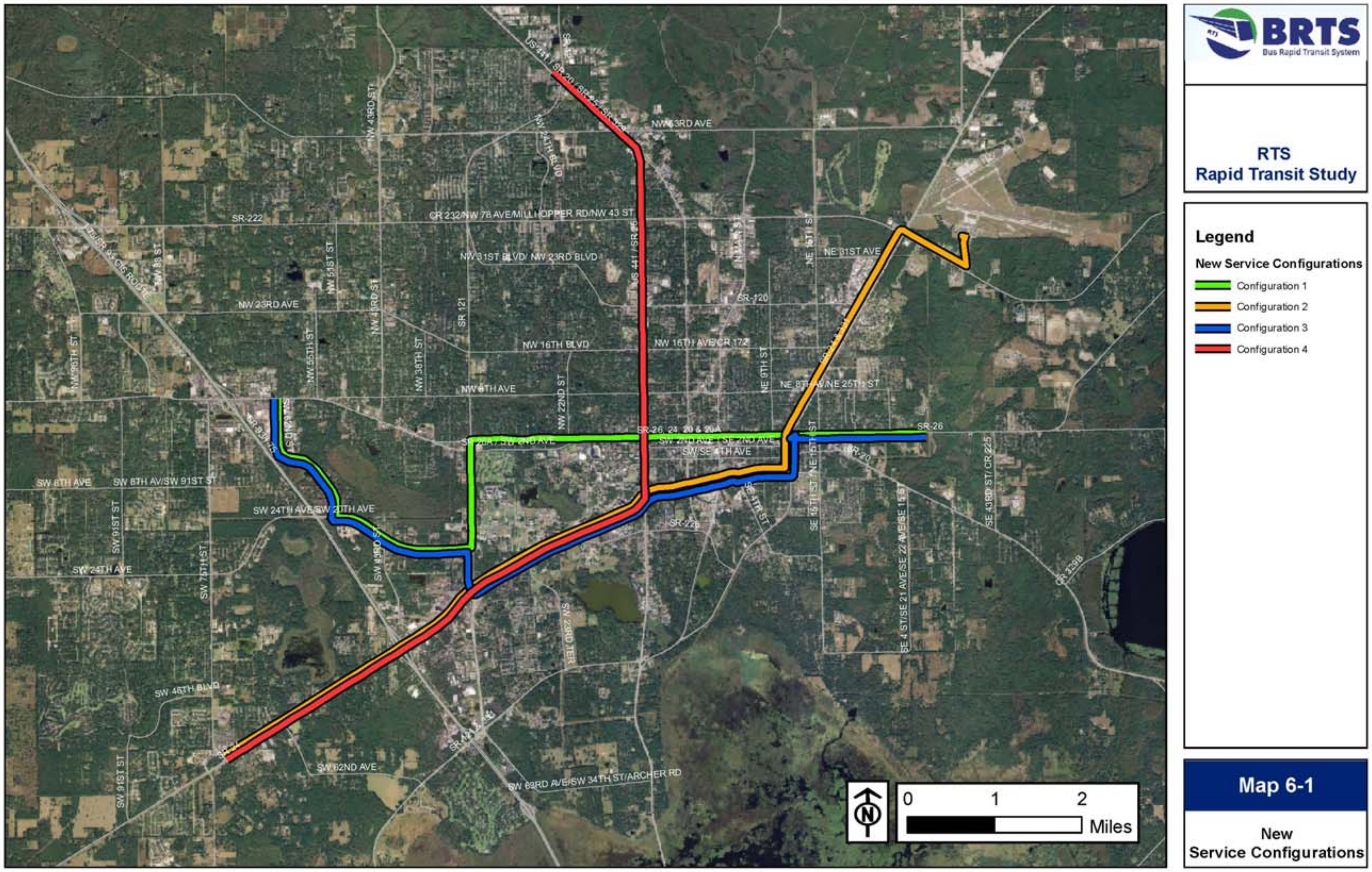
Information from the comparative corridor analysis presented in Section 5 was used to inform the corridor selection and refinement process presented here. Four new service configurations were developed that integrated BRT-supportive data from that data analysis. In addition, a major focus was placed on building connectivity between major activity centers, employment centers, and critical study areas. Locations considered included:

- East Gainesville
- Gainesville Regional Airport
- Downtown Gainesville
- Concentrations of UF student housing
- Archer Road/Butler Plaza
- Shands medical facility
- University of Florida campus
- Rosa Parks Downtown Station

The four new service configurations developed were designed to reflect combined segments of roadway from the original nine analysis corridors that were BRT-supportive and provided connectivity between the noted activity centers. The four service configurations are presented in Map 6-1.

Map 6-1
New Service Configurations

-1



The same methodology used to prioritize the initial nine corridors was applied to the evaluation of the four service configurations. However, only a subset of 6 criteria, from the initial 17 criteria, was used. The majority of the criteria from the comparative analysis process were applicable only to the full extent of the original nine corridors. The six criteria that were selected to measure the four new service configurations were criteria that gauge BRT-supportiveness and that provide enough data at a scale that facilitates a fair comparative analysis among the new service configurations. The criteria used to prioritize the four service configurations include the following.

- Existing Ridership
- Density Threshold Assessment (2007)
- Transit Dependency
- University Context Area
- University Ridership
- Environmental Justice

Measures for each criterion were modeled after the comparative analysis process presented in Section 5. To compare the configurations, each was ranked from one to four, with four being the highest, in terms of its ability to meet the corresponding criteria measure. Table 6-1 presents the results of the prioritization analysis. The table reflects the ranking for each corridor for each criterion. To develop an overall ranking score, criteria rankings were summed for each configuration. The configuration with the highest score was considered to be the top choice for BRT implementation. Among the four new service configurations, configuration 3 ranked the highest, followed by configuration 1.

Table 6-1
Four Alignments Evaluation Results

Description	Existing Ridership	2007 DTA	Transit Dependency	University Context Area	University Ridership	Environmental Justice	Total	Rank
Configuration 1	3	3	3	4	4	2	19	2
Configuration 2	1	1	2	1	1	4	10	3T
Configuration 3	4	4	4	3	3	3	21	1
Configuration 4	2	2	1	2	2	1	10	3T

FINAL CORRIDOR SELECTION AND REFINEMENT

The four service configurations and the corresponding data analysis scores were presented to the Project Management Team (PMT) at a scheduled PMT meeting held on September 30, 2009. At that meeting, a discussion was facilitated regarding a final service configuration. Based on comments and feedback received at that meeting, the PMT was in agreement with the analysis results. The general consensus from the group was that Configuration 3 was the best corridor from among the four configurations presented for initial BRT implementation.

In addition to feedback received from the PMT, selection and refinement of the final service alignment underwent one more layer of analysis. As part of the technology assessment, presented in Section 7 of this report, a windshield survey of the final service alignment was performed. That windshield survey revealed the following issues or observations.

- There are pockets of low-density development and a lack of major activity centers along Depot Avenue, east of the Rosa Parks Downtown Station to SE 11th Street.
- The segment along SE 11th Street, between SE 7th Avenue and University Avenue, also reflects low-density development patterns that are not currently BRT-supportive.
- The low-density segment along Depot Avenue east of the Downtown Station is constrained in terms of available right-of-way.
- There are BRT-supportive corridor segments not on Configuration 3 that are more BRT-supportive than Depot Avenue east of Rosa Parks Downtown Station and SE 11th Street.
- There may be opportunities to enhance service efficiency if the BRT service operates closer to the heart of the UF campus along SW 13th Street and/or through Downtown Gainesville.

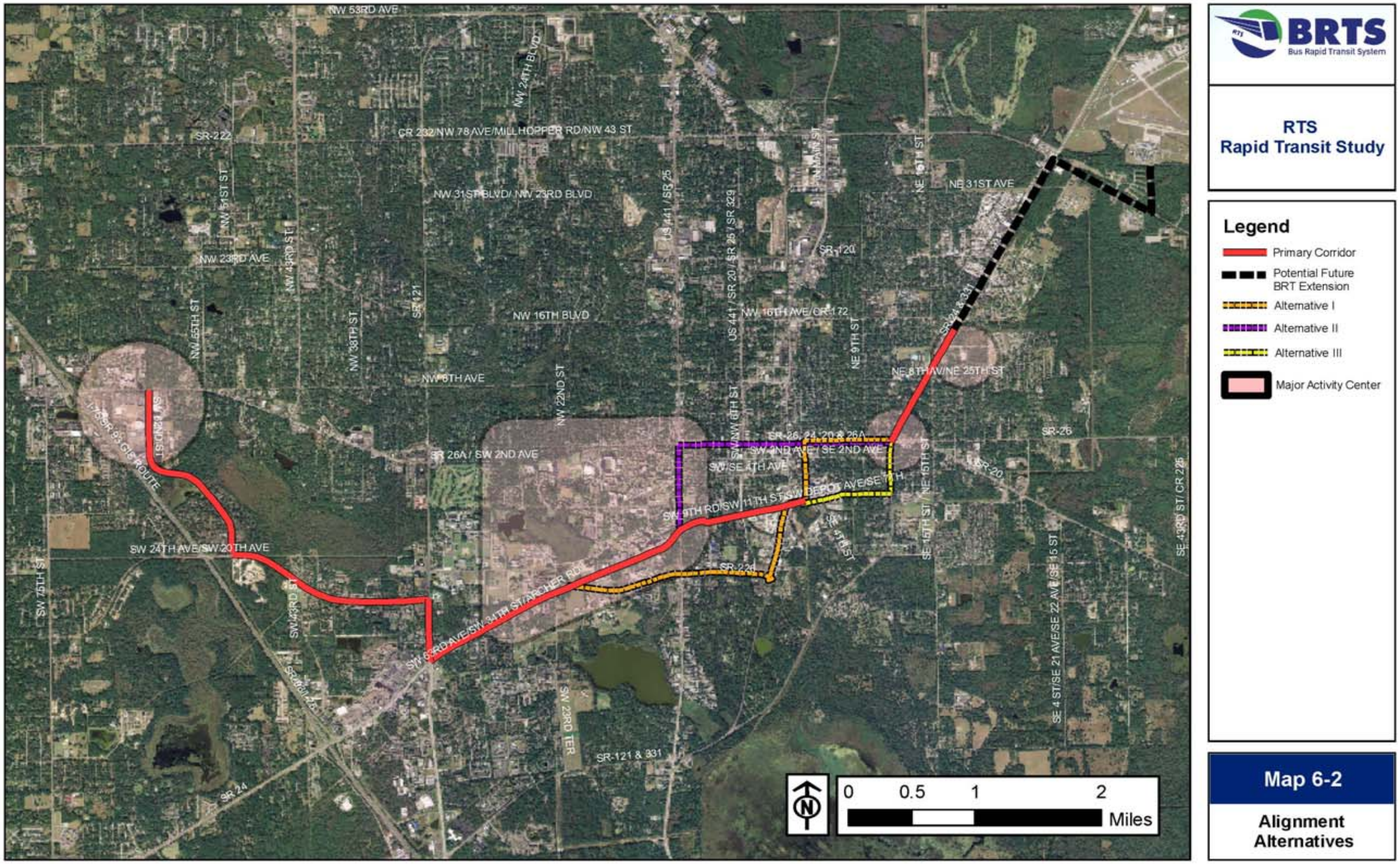
RTS staff also emphasized the need for the BRT service to remain connected to the Rosa Parks Downtown Station if it were to be deviated off of Depot Avenue east of the Downtown Station and off of SE 11th Street. To address these observations, three alternative service alignments, or alternative service branches, were developed. The alternative service alignments are shown in Map 6-2. A final service alignment through Downtown Gainesville was selected based on the alternative alignments shown in the map.

To gather feedback on the three potential Downtown service alignments and to determine a final BRT alignment, two public prioritization workshops were held in December 2009. More information from those workshops is included in Section 4 of this report. Of the three Downtown service alignments, the consensus gathered from workshop participants was that a deviation of the original alignment of Configuration 3 along 3rd Street from Depot Avenue to University Avenue was the best option. The service would then travel east on University Avenue to Waldo Road. In addition, service was extended along Waldo Road to the Gainesville Regional Airport.

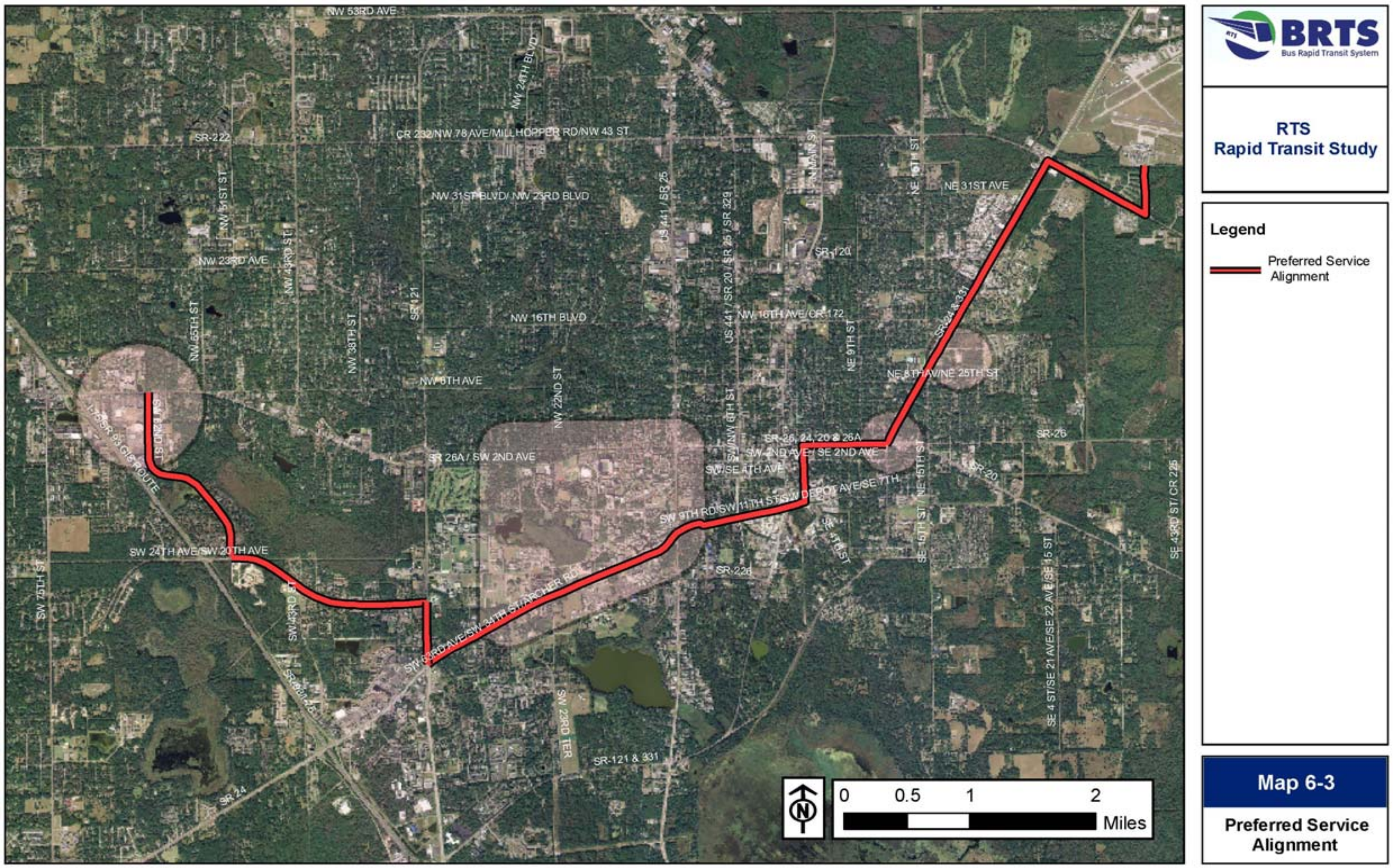
PREFERRED ALIGNMENT

The final BRT service alignment is shown in Map 6-3. As indicated previously, the final alignment includes segments from the original nine study corridors that are considered to be the most

Map 6-2
Alignment Alternatives



Map 6-3
Preferred Service Alignment

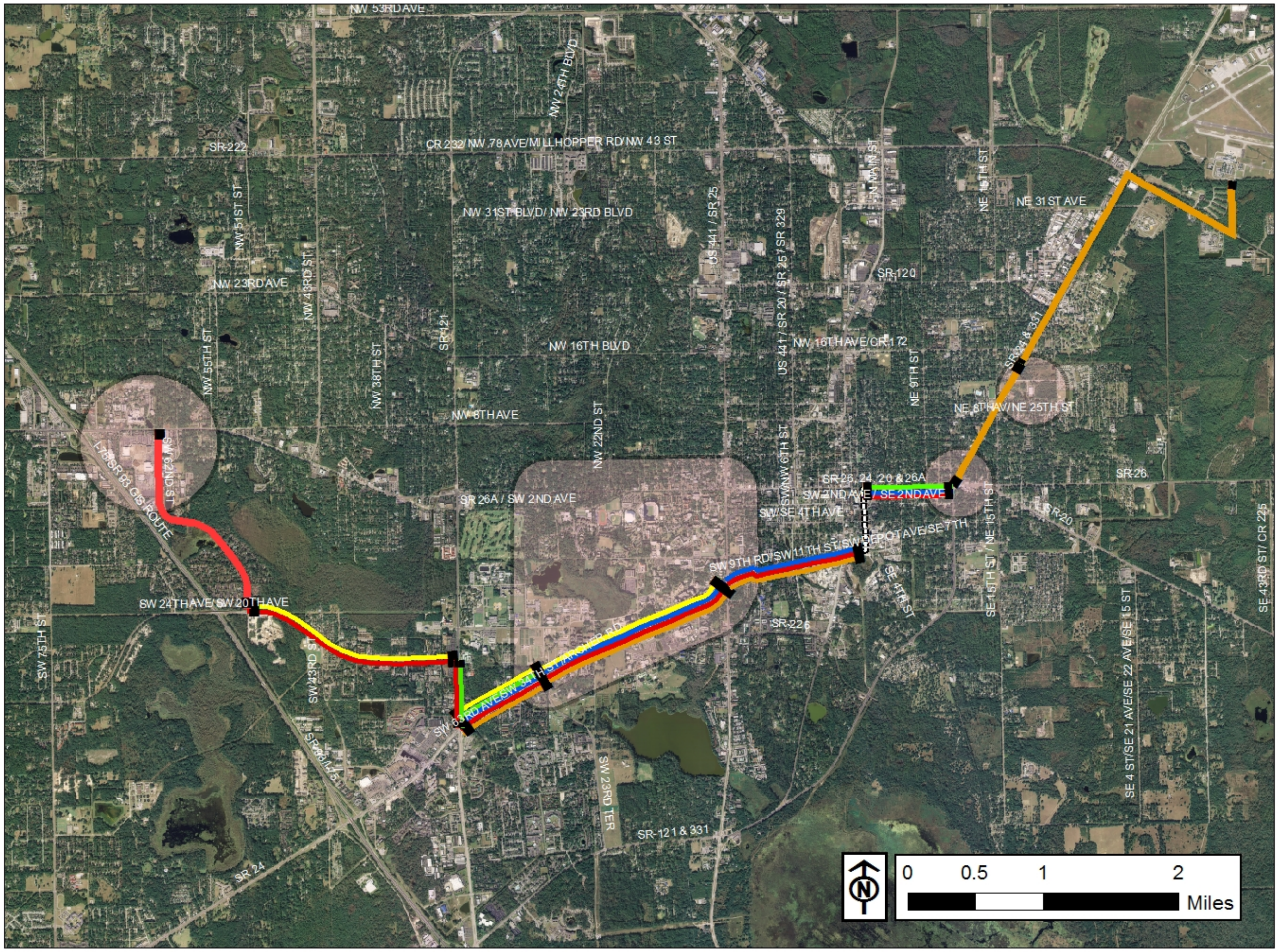


BRT-supportive based on the analysis criteria. Map 6-4 was prepared to illustrate that relationship. The analysis used to support the information in that map is shown in Table 6-2. An analysis of BRT supportiveness by criterion was performed by assigning a “high”, “medium”, or “low” score to each corridor segment for each criterion based on available data from the comparative analysis performed on the original nine corridors. The “high”, “medium”, and “low” designation for each criterion reflects relative scoring between corridor segments. Map 6-4 illustrates “high” scoring criteria by segment using a varied color scheme. It is important to note that the segment along 3rd Street, between Depot Avenue and University Avenue contains no data from the analysis. This segment was added to support connectivity to Downtown Gainesville and to the Rosa Parks Downtown Station.

Table 6-2
Preferred Alignment BRT Supportiveness by Criterion

Description			Existing Ridership	2007 DTA	Transit Dependency	University Context Area	University Ridership	Environmental Justice
On Street	From	To						
SW 20 Ave/SW 62 Blvd	University Ave	SW 34th St	Medium	Medium	Low	High	High	Medium
SW 34th St	SW 20th Ave	Archer Rd	Medium	High	Medium	High	High	Medium
Archer Rd	SW 34th St	SW 23rd Ter	High	High	High	High	High	High
Archer Rd	SW 23rd Ter	SW 13th St	Medium	Medium	High	High	High	High
SW Depot Ave	SW 13th St	SE 3rd St	Low	Medium	High	High	High	High
SE 3rd St	SE Depot Ave	University Ave	N/A	N/A	N/A	N/A	N/A	N/A
University Ave	SE 3rd St	Waldo Rd	Medium	High	High	High	Medium	High
Waldo Rd	University Ave	NE 12th Ave	Low	Low	Medium	Low	Low	High

Map 6-4
BRT Supportive Criteria by Segment



RTS
Rapid Transit Study

BRT Supportive Criteria*

- Transit Ridership
- 2007 DTA
- Transit Dependency
- University Context Area
- Environmental Justice
- No data
- Transit Hubs

*A comparative analysis of proposed corridors/roadway segments was performed using the noted criteria.

This map illustrates segments considered BRT supportive by criterion using a combination of colors.

Map 6-4

BRT Supportive Criteria by Segment

Section 7
BRT Technology Assessment

INTRODUCTION

An integral component of Bus Rapid Transit is the appropriate use of technology. The technologies evaluated for use in Gainesville will facilitate the delivery of faster, more efficient service than existing transit riders may be accustomed to. Chosen technologies should also meet the expectations of new riders drawn to ride a new transit service. The systems identified will create a more predictable traveling experience and support the branded image that will be developed in a later stage of project development.

An evaluation of the technologies to implement at RTS will consider a technology's suitability for intended use as well as the required resources to procure, operate and maintain these systems. Those options which are feasible to implement will be explored for compatibility with existing City of Gainesville technology systems. The items that comprise the technology assessment are components of other successful Bus Rapid Transit projects and have been outlined in Technical Memorandum I. They are:

Vehicle & Station Based Technologies
- Vehicle Selection
- Fare Collection
- Advanced Traveler Information Systems

Roadway Oriented Technologies
- Running Ways
- Transit Preferential Treatments
- Transit Signal Priority

Global Technologies
- Communications
- Information Technology Networks

VEHICLES

One of the most visible technologies of BRT is the vehicle. BRT vehicles may be the greatest defining physical characteristic of the service, as they frequently travel throughout the service area, seen in detail by those who ride them and by others who may see them operate from a distance. The right vehicle for the RTS BRT system will be configured, styled & operated to comfortably serve existing riders & accommodate future riders with distinction from standard local transit services. Selection of vehicles depends on multiple factors however; there are 4 primary characteristics of BRT vehicles: (National Bus Rapid Transit Institute, 'Characteristics of Bus Rapid Transit for Decision Making', 2009):

- Vehicle Configuration – Bus sizing, floor height & body type
- Aesthetic Enhancement – Enhanced styling options, to be better defined in the branding phase
- Passenger Circulation Improvements – Ease of rider movement through bus access way design
- Alternative Propulsion & Fuel Systems – Influence vehicle speed, fuel consumption & emissions

Vehicle Configuration

Bus sizes in BRT systems have ranged from a 'small bus' of under 30 feet, to a conventional 40' to 42' coach and up to 60' articulated 90 passenger buses. Orlando's Lymmo BRT service is an example of a service that runs small to mid-sized buses. Figure 7-1 shows an example of a BRT bus which operates 35' buses with 20 person seated capacity on dedicated running ways.

Figure 7-1
Example of a BRT Bus

Source: (LYNX Lymmo / Courtesy: seefloridago.com)

Identification of the appropriate size for BRTS will consider multiple factors including ridership projections, width of running ways and transit facility accommodations. A CUTR developed decision making application, 'Bus Size Evaluation Tool (BSeT)', looks at current fleet composition and aids in determining if an agency's needs can be best met by a small or large bus. Variables input into the tool include the RTS fleet characteristics, operating environment and perceptions on ridership related to bus sizing that were from conditions consistent with BRT systems. The results indicate considering ridership & operating constraints from a cost perspective. Larger buses are well suited to accommodate the needs of RTS needs. It is therefore recommended that RTS pursue a BRT vehicle to be at a minimum of 40' in length. Table 7-1 below shows the Bus Sizing Comparison.

Table 7- 1
Bus Sizing Comparison

Agency Name:	Gainesville RTS			
Analysis Title:	BRTS			
Analyst Name:	CUTR			
Analysis Year:	2009			
	BASE CASE		ANALYSIS RESULTS	
	Bus Type		Bus Type	
	Small	Large	Small	Large
FLEET COMPOSITION				
Total Bus Fleet	10	75	-	98
TOTAL COSTS				
Vehicle Replacement	2,972,040	23,818,950	-	
Fuel	396,590	3,513,757	-	4,605,067
Maintenance	622,818	4,837,781	-	6,340,309
Operating	0	0	-	0
ANNUALIZED COSTS				
Vehicle Replacement	335,322	2,687,383	-	3,522,036
Fuel	396,590	3,513,757	-	4,605,067
Maintenance	622,818	4,837,781	-	6,340,309
Operating	-	-	-	-
ANNUALIZED COSTS				
Total Annualized Cost	1,354,729	11,038,921	-	
Total Annualized Cost per Mile	2.74	2.85	-	2.85
ANNUALIZED COSTS--LOCAL SHARE				
Total Annualized Cost	1,086,472.00	8,889,015.00	-	
Total Annualized Cost per Mile	2.20	2.30	-	2.30

	Small	Large	Average
Average per Mile Annualized Cost			
Base Case	0.26	2.03	2.29
Analysis Situation	10	2.30	2.30

	Small	Large	Total
Total Vehicle Replacement Costs			
Base Case	335,322	2,687,383	3,022,704
Analysis Simulation	-	3,522,036	3,522,036

Print Results

Back to Introduction

Save Results

View Inputs Used

Model Reset

Note the increase of additional large buses does not increase the ‘Average per Mile Annualized Cost’ as opposed to a small bus/large bus mix. Bus sizing will again be addressed in the Running Ways section of the assessment.

Circulation

BRT buses are generally constructed as low floor, with extended openings and passageways to allow improved flow of riders. One important consideration, given the high amount of bicycle use and current no bikes policy, would be to consider a bus with an increased storage area at the front. Conventional bicycles are not sized to be boarded on vehicles but fold up bikes, intended for commuters may be able to be accommodated.

Propulsion & Fuel Systems

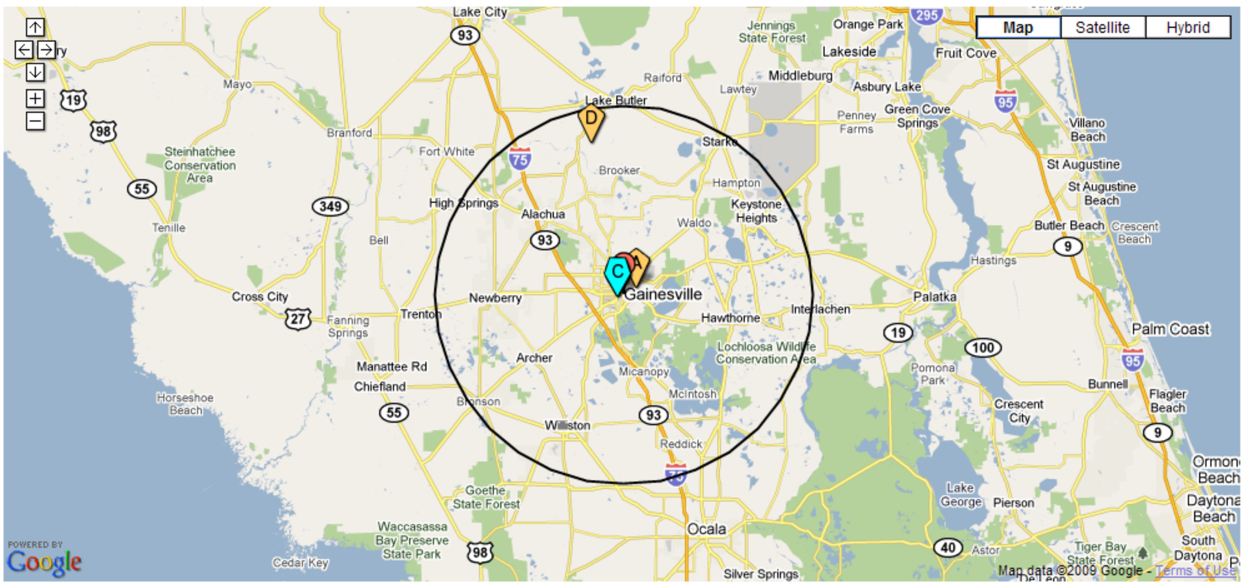
RTS does have hybrid buses, although they are not in operation. The 22’ hybrid buses RTS owns contain legacy technology and have generally not performed up to expectations. This does provide a limited amount of experience with alternative propulsion vehicles with consideration that newer hybrid technology has improved considerably. This option may provide the best opportunity to ‘green’ the service and costs will be described below.

RTS runs their current bus fleet on a biodiesel mix of B20. The 20% biodiesel to 80% diesel mix is a common first entry into the alternative fuel market, as standard diesel engines require no modifications in order to run on this mix. For consideration of BRT, it may be impractical to fuel the fleet on any higher mix of biodiesel, such as B100 with any onsite facilities. Additionally, there are limited options for alternative fueling stations present in the area as seen in Map 7-1.

Map 7-1
Alternative Fueling Stations with 25 Miles of Gainesville, Fl

Alternative fueling stations within 25 miles of gainesville, fl
Station Access: all
Payment Methods: All

- Biodiesel (B20 and above)
- Compressed Natural Gas
- Ethanol (E85)
- Electric
- Hydrogen
- Liquefied Natural Gas (LNG)
- Liquefied Petroleum Gas (Propane)



U-Haul Liquefied Petroleum Gas (Propane) 802 N Main St Gainesville, FL 32601 **Phone:** 352-373-8533 **Distance:** 0.5 Miles **Intersection Directions:** At 8th **Access:** Public - see hours	**University of Florida** Biodiesel (B20 and above) Radio Rd Gainesville, FL 32611 **Distance:** 2.6 Miles **Intersection Directions:** Building 706 **Access:** Private - government only	**University of Florida** Ethanol (E85) Radio Rd Gainesville, FL 32611 **Distance:** 2.6 Miles **Intersection Directions:** Building 706 **Access:** Private - government only

Another CUTR created tool, “Bus Fuels Fleet Evaluation Tool (BuFFeT)” can provide a basis to compare conventional and alternative buses with respect to operating & maintenance costs, capital acquisition & emissions. Although in draft form, the tool can be run to discern the differences in the emerging alternative vehicle fleets available to BRT systems.

In considering alternatively powered & fueled vehicles, the BuFFeT tool provides a comparative analysis of costs compared to Ultra Low Sulfur Diesel (ULSD). Default values were used for inputs on life cycle parameters, capital costs, maintenance & operating costs and fuel prices. Tables 7-2 and 7-3 describe costs and emissions for a variety of alternative fuels with the last two columns describing hybrid-electrics.

Table 7- 2
Fuel and Propulsion Cost Comparison

Agency Name:	**Gainesville RTS**						
Analysis Title:	**BRTS**						
Analyst Name:	**CUTR**						
Analysis Year:	**11/7/2009**						
FLEET COMPOSITION	**UL SD**	**CNG**	**LNG**	**BIODIESEL**	**User Defined**	***ULSD***	***GASOLINE***
Total Bus Fleet	1	1	1	1		1	1
CAPITAL COSTS							
Vehicle Replacement ($/Bus)	317,452	367,409	387,450	317,452		524,498	499,844
Fuel Facility ($)	-	2,875,000	2,800,000	-		-	-
Total Capital Costs ($)	317,452	3,242,409	3,187,450	317,452		524,498	499,844
OPERATING COSTS							
Fuel Efficiency (Miles/Gallon)	3.96	2.89	1.57	4.11		4.05	3.47
Fuel Cost ($/Gallon)	3.65	2.01	3.38	3.37		3.65	3.04
Fuel Cost ($/Mile)	0.92	0.69	2.15	0.82		0.90	0.88
Total Fuel Costs ($)	47,810	36,056	111,527	42,588		46,779	45,470
Maintenance Costs ($)	0.18	0.11	0.18	0.26		0.16	0.11
Parts ($/Mile)	0.11	0.14	0.29	0.12		0.34	0.07
Total Maintenance Costs ($)	15,179	12,824	24,440	19,648		25,921	9,212
Total Maintenance Costs -- Per Mile	0.29	0.25	0.47	0.38		0.50	0.18
Fueling Facility Maintenance Costs	-	43,436	-	-		-	-
Total Annual Operating Costs	15,179	56,260	24,440	19,648		25,921	9,212
Total Operating Costs -- Per Mile	0.29	1.08	0.47	0.38		0.50	0.18
ANNUALIZED COSTS $							
Vehicle Replacement	35,817	41,453	43,714	35,817		59,177	56,395
Facility Modification	0	203,988	198,667	0		0	0
Battery Replacement	0	0	0	0		5,911	5,911
Fuel	47,810	36,056	111,527	42,588		46,779	45,470
Operating	15,179	56,260	24,440	19,648		25,921	9,212
Total Annualized Cost	98,806	337,757	378,348	98,053		137,788	116,988

Table 7- 3
Emissions Comparison

Agency Name:	**Gainesville RTS**						
Analysis Title:	**BRTS**						
Analyst Name:	**CUTR**						
Analysis Year:	**11/7/2009**						
EMISSION CALCULATIONS							
FLEET COMPOSITION	**UL SD**	**CNG**	**LNG**	**BIODIESEL**	**User Defined**	***ULSD***	***GASOLINE***
Total Bus Fleet	1	1	1	1		1	1
CARBON MONOXIDE (CO)							
Emissions (Gram/Mile)	3.96	13.31	0.23	2.69		1.55	0.00
Total Annual Emissions (Tons/Year)	0.16	0.69	0.01	0.14		0.08	0.00
Emission Cost ($/Ton)	15.33	15.33	15.33	15.33		15.33	15.33
Total CO Annual Emissions Costs	2.47	10.59	0.18	2.14		1.23	0.00
CARBON DIOXIDE (CO_2)							
Emissions (Gram/Mile)	3,448.83	2,618.00	2,236.10	2,746.00		2,674.57	-
Total Annual Emissions (Tons/Year)	178.95	135.84	116.02	142.48		138.78	-
Emission Cost ($/Ton)	25	25	25	25		25	25
Total CO_2 Annual Emission Costs ($)	4,474	3,396	2,901	3,562		3,469	-
HYDROCARBONS (HC)							
Emissions (Gram/Mile)	0.55	1.73	0.05	0.51		0.05	0.00
Total Annual Emissions (Tons/Year)	0.90	0.77	1.10	0.84		0.54	-
Emission Cost ($/Ton)	4,475	4,475	4,475	4,475		4,475	4,475
Total HC Annual Emission Costs ($)	4,043	-	-	-		-	-
NITROGEN OXIDES (NO_x)							
Emissions (Gram/Mile)	17.41	14.81	21.25	16.28		10.32	-
Total Annual Emissions (Tons/Year)	0.90	0.77	1.10	0.84		0.54	-
Emission Cost ($/Ton)	1,793	1,793	1,793	1,793		1,793	1,793
Total NO_x Annual Emission Costs ($)	1,620	1,378	1,977	1,515		960	-
PARTICULATE MATTER (PM_x)							
Emissions (Gram/Mile)	0.21	0.04	0.01	0.19		0.04	-
Total Annual Emissions (Tons/Year)	0.01	0.00	0.00	0.01		0.00	-
Emission Cost ($/Ton)	14,943	14,943	14,943	14,943		14,943	14,943
Total PM_x Annual Emission Costs	159	33	8	143		28	-

STATIONS

BRT stations are a substantial component of the overall system that projects the image of a premium service, while serving an essential functional purpose. When designed effectively, they can approximate a rail like experience, providing amenities not found on standard transit. They comprise a majority of the project budget and typically require acquisition of right of way and the cost to construct substantial built environments to accommodate travelers. Stations also offer opportunities to incorporate sustainable environmental practices and ease transitions between modes.

What makes a BRT Station Unique?

- Larger in size than regular bus stop
- Displays the branded image of the BRT service
- Enhanced amenities to increase convenience and comfort, security
- Curb & platform modification to allow ease of boardings

The NBRTI's 'Characteristics of Bus Rapid Transit for Decision Making' describes a number of configurations for sizing and building out BRT stations as follows:

Simple Shelter

A simple shelter is the simplest form of the five BRT station types. It consists of a "basic" transit stop with a simple shelter (often purchased "off the shelf") to protect waiting passengers from the weather. In general, this type of station has the lowest capital cost and provides the lowest level of passenger amenities.

Cost: $15,000 - $20,000 per shelter (includes cost of shelter only; does not include cost of platform or soft costs).

Enhanced Shelter

Enhanced BRT stations include enhanced shelters, which are often specially-designed for BRT to differentiate it from other transit stations and to provide additional features such as more weather protection and lighting. This BRT station type often incorporates additional design treatments such as walls made of glass or other transparent material, high-quality material finishes, and passenger amenities such as benches, trash cans, or pay phones. Enhanced shelters are often installed for on-street BRT applications to integrate with the sidewalk infrastructure.

Cost: $25,000 - $35,000 per shelter (includes cost of the shelter only; does not include cost of platform or soft costs).

Station Enclosure

Often based on a custom design, station enclosures are designed specifically for a BRT system and are fabricated off site, allowing for identical and modular designs for multiple locations. The station enclosure may include level passenger boarding and alighting, a full range of passenger amenities including retail service, and a complete array of passenger information.

Cost: $150,000 - $300,000 per station (lower-cost stations include cost of canopy, platform, station enclosure, and pedestrian access).

Station Building

The designated BRT building represents a large enclosure for passengers. Designs for station buildings are specific to each station location and often include enclosures for passengers waiting for both directions of travel, pedestrian passageways, accessibility features such as ramps and elevators, and grade-separated connections from one platform to another, as well as a full range of passenger amenities including retail service and a complete array of passenger information.

Cost: $500,000 - $2.5 million per station (lower-cost stations include cost of canopy, platform, station enclosure, and pedestrian access; higher-cost stations are designed for higher ridership and include longer platforms and canopies, larger station structure, passenger amenities and roadway access; parking facility and soft costs are not included.

Intermodal Terminal or Transit Center

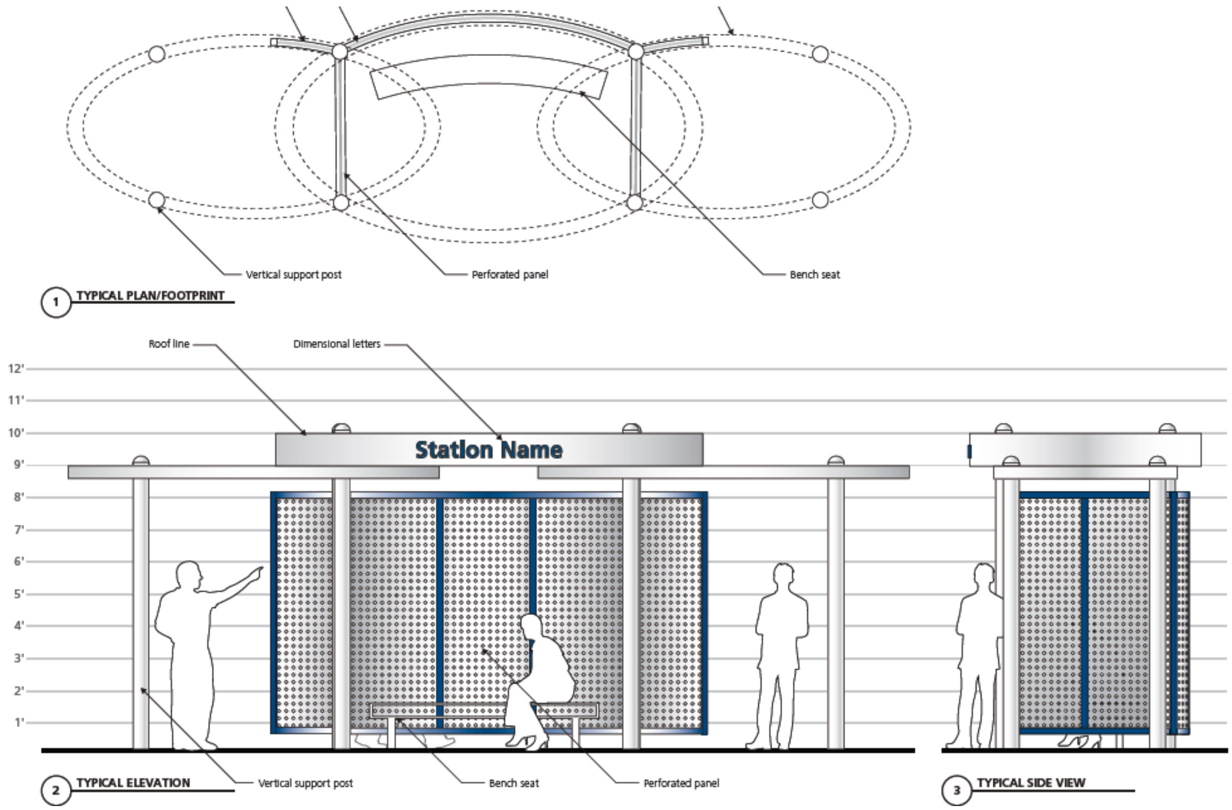
The intermodal terminal or transit center is the most complex and costly of the BRT stations listed in this section. This type of BRT facility often will have level boarding and a host of amenities and will accommodate the transfers from BRT service to local bus and other public transit modes such as local rail transit, intercity bus, and intercity rail.

Cost: $5 million - $20 million per facility or higher (includes the cost of platforms, canopies, large station structure, passenger amenities, pedestrian access, auto access, and transit mode for all transit modes served; does not include soft costs).

In Gainesville, determining the level of investment per station could primarily consist of evaluating ridership projections and available right of way. Stations which may warrant the least amount of investment would be those with limited right of way availability and low projected ridership. The highest amount of investment at stations would take place where sufficient right of way existed or could be acquired and strategically located to host connecting services. The stations would have high projected ridership.

The strategy to identify any number of these configurations and employ them at potential site locations based on ridership and right of way could be complemented by modular station design. This would allow for several different station types from the list above that would all share defining attributes that tie them into the system. The example in Figure 7-2 below, is a 'link' design, allowing for additional links to be added or removed fitting the station footprint allowance.

Figure 7- 2
Example of a Modular Station, designed for HART in Tampa



Minimum elements for BRT in Gainesville will likely include weather protection shelters, seating, a concrete platform, real time traveler information, bike racks and fare vending machines in high volume locations. Level platform boarding is a used on BRT to get passengers on and off. However, if the BRT stations will be shared with local service, level platform boarding may not be possible if RTS operates high floor buses.

FARE COLLECTION

Fare collection systems suitable for use in a BRT system should facilitate an ease of bus boarding through a number of employable strategies that are reliant on technology. Evaluation of these strategies must be done in light of the unique circumstance of the RTS rider population, that is, a majority of riders are students whom ride local services by simply flashing a student ID to board the bus. Individual rides are free, paid for by fees collected by the University and given to RTS to fund service. There are multiple other City, University & Private employee populations riding under unlimited access programs as well. Assuming this same payment arrangement for the approximately 78% of the riders who do not pay at point of use of a BRT system, the level of investment in any fare payment and collection system for BRT should be commensurate with the number of riders expected to use it.

Fare Policy

RTS currently accepts cash payment on local services at the farebox for one way trips for $1.50 or purchase of an unlimited all day ride fare card for $3.00. Fare card purchases by mail and ticket outlets are also available to the riding public. Monthly passes can be purchased for the regular rider and all fares have a discount compliment for special populations.

For BRT, RTS may want to consider a specialty fare card, intended for use primarily on the BRT for one day unlimited rides with free transfers to local service. This will allow for another system branding opportunity on the specialty fare media, reduce the number of times payment must be collected on or off board and facilitate mobility across all RTS services by continuation of the no transfer fare policy with use of unlimited ride tickets already in place. The Kansas City Main Street MAX system practices this and it has been reported to be well received. The Las Vegas MAX BRT system offers an all access pass that gives unlimited daily & monthly rides to all bus services.

Another consideration could be to develop a BRT only fare medium and restrict its use to rapid transit services. If a rider wanted to make a transfer to local service they would be required to purchase a separate fare or be in possession of an approved flash pass. This strategy has the potential to increase revenue at the cost of seamless travel among services. In Tampa, HART's 'MetroRapid' BRT system in development has this policy chosen for the launch of the system.

RTS may want to eliminate collecting fares at the vehicles or stations. Eugene's EMAX and Orlando's Lymmo BRT have had years of successful operation under this scenario. Given Gainesville's potential for collecting fares at point of use from only between 20%-25% of its riders should existing policies be continued, a trade off is considered in the cost of capital investment and maintenance of a fare collection system and the potential of lost operating revenue. This strategy encourages system ridership and simplifies the ride for users.

Existing Fare Collection Equipment

RTS uses a GFI Genfare 'CENTSaBill' electronic registering farebox onboard its buses. This farebox technology is in excess of 25 years old, yet is still widely used in the transit industry for its durability and ability to consistently perform the basic functions of fare vending and collection for a modest cost relative to other fareboxes. This box accepts cash but does not provide change for those who don't pay with the exact fare. They have the ability to be refurbished over time to extend beyond what is typically the 'useful life'. Fare cards sold are pre-encoded and contain value as a period pass, good for unlimited rides within a pre-defined number of days.

RTS is transitioning to the newer generation GFI Odyssey validating farebox (see Figure 7-3). The Odyssey validates the bill inserted instead of simply registering its use. The Odyssey has several built in components that exist with the box that are modular add ons to the CENTSaBill. One prominent feature is the ability to include a smart card reader. If RTS should include Odyssey fareboxes in their BRT system, they will have to address a compatibility issue with the wall vaults that are not interoperable with both farebox types. Additionally, RTS operates a GFI data system and all vendor provided components of fixed end cash handling.

Figure 7- 3
Odyssey - GFI Genfare's Validating Farebox

Fare Collection Strategy

According to the TCRP report the “Bus Rapid Transit Practitioner’s Guide”, the fare collection strategy associated with the fastest boarding times is that of pre-payment. In the case of RTS, the majority of the riders are expected to fall into this category if current policy of flash pass boarding is maintained on the BRT. For collecting fares from the remaining riders, several options exist with varying levels of investment and potential for dwell time reduction.

Off Board Fare Collection

An option requiring a high level of investment would be to move all fare collection off board the vehicle with barrier restricted entry. A barrier to the boarding area, such as a fare gate, could be employed at stations and would require payment to pass through and board the bus. Fare checkers would also be needed to monitor for fare evasion. Boarding times be would minimal as drivers would not need to verify or collect payment as riders got on the vehicle. Although used in some international BRT systems, this method is not typically found in the US on BRT and is largely impractical due to cost to construct and employ additional staff.

A moderate level of investment in an off board payment strategy would require the installation of fare vending machines (FVM) at all BRT stations. FVM’s can accept credit & debit cards, as well as provide change to users with cash payment. FVM’s also allow the ability to sell multiple ticket types and riders have greater time to choose among them for a fare that best suits their needs. GFI Genfare’s FVM, Vendstar 2, as seen in Figure 7-4, is compatible with both the CENTSaBill and GFI Odyssey fareboxes. The Las Vegas MAX BRT system uses these FVMs at stations to vend fare media and accepts no cash on board the vehicles.

Figure 7- 4
Vendstar 2 FVM in use on Las Vegas MAX BRT system

Other vendors such as Scheidt & Bachmann and Xerox (formerly ACS) provide a wide range of ticket vending machines which could be selected for use with existing fare collections, mainly as dispensing units. The GFI FVM would have the ability to encode blank fare media at the point of purchase for use on GFI fareboxes, whereas machines from other vendors would not have the ability to encode proprietary data onto the ticket.

On Board Fare Collection

In an exclusive On-Board Fare Collection strategy, operation would be similar to that of current RTS service in that a majority of riders would flash a pass to enter and the remainder would use cash or magnetic stripe in an electronic farebox. This process should be familiar to existing RTS riders but offers no enhancement or speed of boarding that other BRT systems feature.

A hybrid alternative would provide for off board fare purchase at stations through FVM's issuing a magnetic stripe pass, while still accepting cash on board the buses. In general, boarding times would be decreased as individuals make use of idle time at stations by purchasing passes, yet RTS could still allow cash payment in the event a FVM is out of service or a rider simply wants a one way fare.

Smart Card

Smart Cards are stored value, contactless radio frequency chip embedded cards a transit rider would carry as payment to board a vehicle. Smart card systems include stations to load value onto a card, readers at BRT stations and on vehicles to deduct value when a rider boards and a clearinghouse based back end system to process all the exchange of funds. Smart cards can be a component of BRT systems, but are typically found in large, multimodal transit networks where the value of their use can be maximized.

Credit Card

Credit Card payments on transit vehicles have been demonstrated through pilot programs in several US transit systems including Nashville, TN, where GFI Genfare equipment was used. Although the technology to capture payment at passenger boarding has existed many years, only recently have solutions been developed to address persistent policy and security issues. Major card issuers have entered the market recently and pushed for more universal credit card use. The results of a project in the Los Angeles metro area should demonstrate a comprehensive 'credit card as fare payment' strategy. Various fare collection strategies are compared in Table 7-4.

Table 7- 4
Fare Collection Strategies Compared

Collection Method	Level of Investment	Dwell Time for boarding in Seconds*	Estimated Component Costs^	Operating Dollar Return at Point of Use
Off board, Barrier Restricted	Highest	2.25 to 2.75	Varies	Yes
POP, FVM, No Barriers	Medium	2.25 to 2.75	$60,000 per full functioned FVM/$25,000 per limited function FVM	Yes
On & Off Board at Farebox	Medium-High	3.4 to 4.3	$12,000 per farebox, $60,000 per FVM	Yes
On Board Collection Only	Medium-Low	3.6 to 4.3	$12,000 per farebox	Yes
Fare Free	None	2.25 to 2.75	No Capital Costs	No
Contactless Smart Card	Medium-High	3.0 to 3.7	$7,000 per Smart Card unit/ $60,000 per FVM/Up to $100,000 Smart Card Programming	Yes
		*Source - TQOS Manual (9)	^Source = TCRP 118	

ADVANCED TRAVELER INFORMATION SYSTEMS (ATIS)

ATIS are an important component of a BRT system that provides riders assurance of adherence to expected service operation. The ability of a quality customer information system to meet needs of riders from the point of origin to final destination and at all points in-between, makes the BRT system an attractive experience to draw in new riders. TCRP 95 summarized studies that found shorter wait times were reported by well over half of individuals surveyed at stops with real time bus information, where frequencies had not actually changed.

Given the widespread availability of mobile technology, never before have transit users had the capabilities to plan and manage travel on public transportation in such a dynamic way. RTS will have the opportunity to fully develop an end-to-end ATIS solution that will bring knowledge of BRT line operation into a users control to guide decision making. Riders have a need for unique types of information at separate times during the three stages of transit travel; Trip Planning, Trip Commencement & while En-Route. This information is summarized in Table 7-5 on page 7-21. (Source: National Transit Institute Module, 'Multimodal Traveler Information').

Trip Planning

In a BRT system, features to meet rider needs for trip planning are consistent with that of local services. Timetables, maps, station locations, transfers on route and fare information all are typically considered in planning a transit trip. Automated trip planners combine all of these elements into an optimization engine that allows a user to input an origin and destination into a computer interface. The resulting output is a variety of itineraries allowing an individual to choose a trip in the quickest time, making the fewest transfers or paying lowest fare for example. Scheduling software vendors offer products that incorporate existing timetable building applications, such as Trapeze or Giro. In 2005, the internet search engine Google launched Google Transit, a free service to provide automated transit trip planning to the public users of those transit agencies that chose to furnish a specially formatted version of their bus schedules. RTS Gainesville uses this service and BRT would be incorporated once the service launches. Automated trip planners are in development that will incorporate additional modes such as bicycling to the car, transit and pedestrian options that exist currently within Google.

Trip Commencement

For system users, BRT trips will originate at one of the stations along the route. Within these stations, it is typical to have some type of dynamic display of traveler information, preferably with an accompanying audio component to serve visually impaired populations. Displays can take the form of LED single or multiline signs, LCD or TFT ruggedized television type passive displays or kiosks (see Figure 7-5) which allow user interaction to find specific bus or routing options. These

ATIS outlets can provide service and weather information, amber alerts, detours, real time bus locations and arrival predictions. Opportunities for revenue generation are realized through the sale of advertising space on these media.

Each station will require a data connection and power source to operate the electronic signs. Where power may be costly or difficult to bring into a station, solar cells are commonly used to electrify low power applications. Wireless data connections can be established through custom built ‘mesh’ type networks or cellular modems which require a monthly fee.

Vehicles will need to be equipped with a GPS or other type of positioning reference system. Current RTS buses have multiple on board GPS serving different purposes. On bus vehicle location systems report their locations back to a central server over a communications network. Those locations are then fed into maps in display applications and algorithms which attempt to predict when a vehicle will arrive at a certain location. Basic algorithms compare the present location timepoint against scheduled location timepoint and simply add or subtract the difference to the station’s scheduled arrival time. More sophisticated predictive algorithms consider historical segment travel times to account for recurring field conditions that consistently influence on time performance, such as rail crossings and congested intersections. This information is then sent to the display at the station.

A creative approach can be found on the Kansas City MAX BRT line, where next bus arrival information is delivered via a ‘totem’ landmark type sign located at the station. As an arriving bus approaches, the totem lights up in red indicating to the passengers to gather in the boarding area.

Figure 7- 5
Images of a Map-Based ATIS running on an LCD Information Display at a Transit Center

With the more widespread adoption of mobile technologies in recent years, information that could previously only be retrieved on a personal computer with a fixed data line, can now be had with any number of mobile devices. System maps with real-time bus locations and estimated times to arrival on mobile devices are now standard features in many vendors ATIS products. To access at stations, these systems require either a laptop with a wireless connection, connected PDA or smartphone with a data plan to access. Other options to access this information without needing a data plan include the ability to text message a stations ID number to a service and have an estimated arrival time returned, such as in Tri-Met in Portland, OR.

En-Route

To a passenger en-route, a different set of information is needed to make decisions about travel. The concerns of a rider during a trip are primarily about where the bus they are traveling on is located on its route relative to its schedule, and whether any connecting routes needed to make transfers are operating on or behind schedule.

The first piece of information can be addressed through the use of an on-board next bus announcement system. In a limited stop BRT, each station, any landmarks and connecting routes can be announced over the vehicle PA system to alert passengers their drop off point is approaching. This allows passengers to ride a bus and not have to focus their attention on their location while in motion. RTS currently operates such a system on their local service, using the 'Talking Bus' product from Digital Recorders Inc. (DRI). This system utilizes a GPS receiver so the bus always knows its location, then triggers an automated announcement when the bus as it pulls up to a station. RTS uses a mix of the DR 500 and DR 600 DRI logic units to host the announcements and trigger zone information. Figure 7-6 below shows an example of the DRI DR600 logic unit.

Figure 7- 6
DRI's DR600 Logic Unit

As a number of BRT generated or completed trips may require at least one transfer to local service, the ability to know the location of buses on connecting routes is valuable. BRT stations will display real time information, but while on a vehicle, real time traveler information about connecting service has been difficult to obtain. If local service is equipped with a traveler information system, that can be made available to connected mobile devices, as shown in Figure 7-7. RTS has the Trans-Loc vehicle locator installed on its campus serving routes, several of which will make connections to the proposed BRT service.

Figure 7- 7
Image of an IPhone running Trans-Loc Vehicle Locator Service

Table 7- 5
Traveler Information Delivery

BRT Trip Travel Stage	Information Needs	Technologies for Delivery	Existing System Vendors	Potential Future Product Types
Trip Planning	Static – Timetables, routing alternatives, fares, stations	Printed Materials, automated trip planners	Google Transit	Multimodal Trip Planner
Trip Commencement	Dynamic – Next bus arrivals	LED & LCD Station Signs, Kiosks, Mobile Devices, Internet	Trans-Loc	Station based displays, Predictive Information
En-Route	Static & Dynamic – Location of boarded vehicle, on-time performance of transfers	Vehicle Locator, On-Board Next Stop Annuciation, Station Signage, Mobile Devices	Trans-Loc, DRI Talking Bus	Station based displays, Predictive Information

Current ATIS

Trans-Loc is a real time bus locator system that is used at several Universities in the US. Trans-Loc collects and distributes real-time bus locations for vehicles equipped with its proprietary hardware which consists of a GPS receiver and on board cellular modem. Bus positions updating every second or less, are sent to Trans-Loc hosted servers and published to a public website that allows users to highlight routes of interest and watch buses travel in real time. Trans-Loc manages the arrangement entirely turn-key for RTS, including establishing the data accounts required for each vehicle served by the system.

An initial distinction that must be made about this system compared to other ATIS typically used on BRT is that there is no vehicle arrival or departure prediction component. This design lends itself well to serve smaller, College type transit systems which may not have automated software to generate the electronic schedules that are required for predictive algorithms. Specifically, BRT may also be well suited for this design in that it is a premium service, running either on a low fixed headway or frequent time based schedule. For instance, if the bus is scheduled to stop at a station every 10 minutes during operation, a visual representation of the bus location relative to the station of interest provides an orientation to the expected time of arrival. There is a diminishing return for predictive arrival and departure times as headways are shortened and frequencies increase. However, an electronic map of the route with buses in motion provided via displays at stations, smartphones or a workstation may still provide the customer understanding about whether an expected bus has passed them or is yet to arrive.

An arrangement to expand Trans-Loc onto the BRT could serve as an incremental establishment of traveler information, with a good deal of value for nominal cost. A version of the product has been created for fixed passive displays, such as those being considered for BRT. RTS could independently choose a vendor to provide the station displays which the Trans-Loc vehicle locator could run upon. Vendors leading in furnish transit traveler information monitors include Daktronics, Data Display and Sunrise Systems.

OTHER ITS SYSTEMS

Communications

RTS currently operates with 2 way voice radio communications on a trunked, 800 MHz system shared with other municipal services. MCS2000 Motorola radios that are installed within vehicles and can communicate with central dispatch. This system was built by a local communications services provider, GRU, and accesses 5 radio towers throughout the municipal area.

Given the high number of potential send/receive sites in the City, discussion has been underway in moving out of analog radio and onto a new digital system. The benefits of a digital radio network are realized in improved voice quality, the ability to intersperse data communications with voice and increased interoperability of systems. One drawback with digital is losing all communications once the edge of the coverage area is reached, whereas analog systems will degrade quality without completely dropping coverage in the same situation. As the proposed BRT alignment falls within an area of the City with quality radio communications, a radio system upgrade may not be of high priority to operate service.

Computer Aided Dispatch (CAD)

CAD provides bus dispatchers' tools that are used to actively manage fleet operations. CAD systems improve dispatch and vehicle communication efficiencies by setting up voice calls to vehicles individually or in groups, exchanging text messages and integrating features such as covert emergency alarms and display of on time performance. CAD systems are typically found in complement to Vehicle Location and are common in many fixed route operations. Mobile Data Terminals (MDT) work in concert with CAD to provide an interactive interface for the bus operator.

In BRT, CAD systems working with Vehicle Locators are essential for headway based operations. Bus bunching is avoided by using AVL to locate each vehicle and CAD to calculate headway separation to maintain a regular service interval. In a schedule based BRT system, CAD can be used to monitor vehicle on time performance at stations and when integrated with Automated Passenger Counters (APC), to determine if passenger loads are resulting in passing up of waiting riders due to full buses.

Automatic Passenger Counters (APC)

APCs are used to capture information about how many riders board and alight at each bus stop. They typically consist of overhead or side door mounted sensors that measure a change in light and/or heat to count the number of people getting on or off the bus. Although this information is generally used in planning and the decision making to place amenities at stops, in a BRT, APCs can serve an operational purpose in fleet management and transit preferential traffic treatments, such as conditional Transit Signal Priority (TSP).

RTS is currently conducting a pilot program using APCs provided by Urban Transportation Associates and the evaluation of the technology is ongoing.

Deployment Strategy

All of the aforementioned technologies can be individually applied as part of a phased implementation or installed as a bundle at once by a systems integrator. At RTS; fare collection, ATIS and other ITS systems are in place and reported to be working effectively. Scaling these existing systems up to include the BRT with modifications to support the service is a relatively low cost, effective manner to introduce efficiency to the system while future stages of BRT network implementation may allow for expansion into some more sophisticated products.

TRANSIT SIGNAL PRIORITY

A component of BRT that has the opportunity to provide one of the greatest savings in travel time is Transit Signal Priority (TSP). TSP on BRT corridors would extend green and provide a shortened red light time for buses at intersections, giving preference to high capacity, premium transit service mixed in traffic or on dedicated roadways.

TSP is in operation on several BRT systems nationwide and in development on many planned networks. Travel time savings realized from TSP can depend on many factors, but have been reported across a number of systems to range from 4% up to as much as 15%. In order to not disrupt the traffic network, impacts to the cross streets on BRT corridors are typically minimal.

Components of a TSP System

In order to run a transit signal preferential system several components are required. A bus would typically operate some kind of vehicle location system. In most new TSP projects, GPS receivers are used to determine bus position. Other methods have included signpost based AVL systems, where a bus passes fixed position wayside receivers that relay the vehicle information to a priority generating engine. Roadway embedded loop detectors can be used to sense passing buses and initiate the priority sequence, such as on the West Busway BRT in Pittsburgh.

There must also be a communications link from the vehicle or wayside equipment to the traffic system. Depending on how the configuration of the priority system is structured, options include:

- Wireless transmissions from the vehicle to a transit or traffic management center or directly to intersections
- Fiber optic cable and copper lines from wayside detectors and traffic intersection equipment to traffic management centers, where in use

A phase selector within the traffic cabinet at the intersection is required to activate a priority sequence. As TSP capability may not be standard within traffic controllers, particularly in older models, the controller hardware may need to be upgraded or replaced in order to operate. Software that contains the logic for signal priority may need to be developed or be purchased off the shelf if available.

Transit Signal Priority Functional Requirements

In order for a transit vehicle to receive an early green or shortened red time at traffic signals, certain key processes must be completed.

- A bus needs to have its location known or emit an identifying signal
- A bus must use that location or signal to:
  - a) generate a request for priority onboard and/or
  - b) transmit its location or signal to equipment at the approaching intersection; or
  - c) send its location directly to a centralized traffic management system
- A request for priority is made within the traffic signal controller
- Regular traffic signal timing is altered to move the bus through the intersection
- The intersection is returned to standard signal operation

Conceptual Operational Scenario in Gainesville

Traffic system control along the BRT corridor is managed by the City of Gainesville Public Works Department. The Department in the process of a major upgrade of their traffic operations into an Advanced Traffic Management System (ATMS) which will give them the ability to better monitor, control and manage traffic from a centralized location. The use of a variety of technologies such as video cameras and new traffic equipment hardware and software will provide the ability to be more adaptive to changes in the traffic due to weather, incidents and congestion.

The City has selected Naztec to provide their ATMS system. As of November 2009, approximately half of all of the City's existing traffic controllers have been replaced with Naztec NEMA 980 TS2, Type I controllers running ATMS.NOW software. This configuration is ready to operate TSP with the addition of the Naztec priority now module that provides firmware to controllers which will first be introduced in Gainesville for Fire & Rescue vehicle priority. There is fiber optic connectivity to the intersections on the main corridors in the City. This will allow for a centrally managed priority scenario to be layered atop of local intersection operation. If communications to an intersection should be disrupted, the ability to operate priority there will be discontinued and signal will operate independent of the central system.

Gainesville currently operates a GTT Infrared 'Opticom' preemption system for Fire/Rescue vehicles. While effective for getting these vehicles through intersections, preemption leaves the traffic network out of coordination. This can take a considerable amount of time to recover, while priority preserves coordination and the ability for traffic to keep flowing. Priority within the ATMS system would be provided to transit similar to how it will be for Fire/Rescue with some minor differences.

Fire/Rescue vehicles use a CAD system provided by the vendor TriTech. When an emergency call is taken requiring Fire/Rescue's response, a path of travel is generated on a map from a fire station to the location identified in the call in the CAD. The CAD passes this information to the traffic management software which enables signal priority at the intersections along the travel path. As the fire/rescue vehicle approaches an intersection, the lights are changed to green in a more controlled manner than if the vehicles had received a locally provided preempt of the signal phase.

BRT vehicles using GPS receivers would transmit their position in real time to the central TMC to be spatially represented on a GIS map. As the bus entered a predefined zone around the intersection, a request to operate a priority sequence would be sent from the center to the intersection. Conditions of the bus and at the intersection could be considered in determining whether or not to grant priority. Vehicle speed and the amount of congestion and would be evaluated in determining if the maximum amount of extra time allowed for a priority sequence would be sufficient to move the bus through the intersection. A vehicle may then receive priority and clear the intersection.

RTS already has a GPS system that sends a vehicle location every second or less, the Trans-Loc position feed makes a good source of the high quality information needed from the bus to effectively operate TSP in this way. There is also interest from traffic management to consider a conditional priority at some point in the future. This will require real time calculation of On Time Performance and passenger loading, capabilities neither RTS currently possesses nor Naztec provides.

RUNNING WAYS

The speed and reliability of BRT service are largely dependent on the type of running way facility on which the BRT service operates. Bus-only running ways allow buses to flow freely without interruption by other vehicular traffic. Conversely, mixed-traffic operations limit the speed of the service to the speed of the flow of traffic.

To assess the opportunity for implementing exclusive running way facilities for the proposed BRT service, an assessment of existing available right-of-way was performed. Parcel data from the Alachua County Property Appraiser was obtained and an average right-of-way width was determined for segments of roadway along the proposed corridor. Based on the estimated available right-of-way width, a determination was made as to what type of facility would be most appropriate for each corridor segment.

It is important to note that running way facility design can vary depending on various physical and policy related factors, such as the willingness to impact the existing roadway level of service, size and design of facility features such as medians, bike lanes, and sidewalks, and the impact on existing infrastructure. As such, the recommendations developed here do not preclude the implementation of more sophisticated running way and roadway cross-section designs which may be determined in future planning, design, and engineering phases.

For the purpose of developing an initial set of running way facility recommendations, three major considerations were applied. Those considerations include:

- Facility design and construction costs
- Estimated available right-of-way for facility implementation
- Impact of facility design on the existing roadway level of service

Because initial service design will consist of low-cost infrastructure improvements, two running way designs were considered for implementation by RTS, arterial bus lanes and mixed-traffic operations. At-grade median separated busway facilities were not included in this assessment because such facilities generally cost more to design, engineer, and construct.

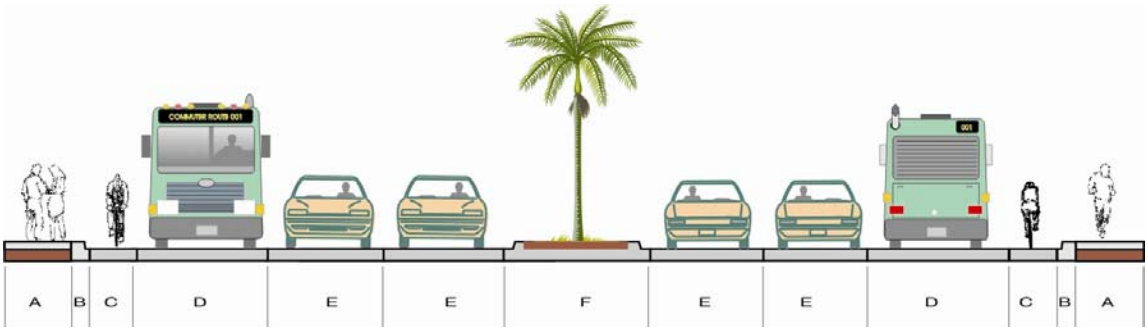
The cross-section width assumptions used to determine facility recommendations were obtained from the FDOT District IV report, Functional Classification of Transit (2003), and reflect the right-of-way needed to implement concurrent flow bus lanes using a constrained right-of-way width requirement of 114 feet for existing four-lane roadways and 136 feet for existing six-lane roadways. Roadway features included within the 114 feet are noted in Table 7-6 and illustrated in Figure 7-8. Two additional 11-foot vehicle lanes of travel are added to the six-lane configuration.

Table 7- 6
Concurrent Flow Bus Lanes ROW Requirement

	Feature	**ROW Requirement (ft)**
A	Sidewalk (2)	6
B	Curb and Gutter (2)	2
C	Bike Lane (2)	4*
D	Bus Lane (2)	12
E	Vehicle Lane (4)	11
F	Median	22

* Minimum bike lane width

Figure 7- 8
Concurrent Flow Curb Bus Lanes Typical Section

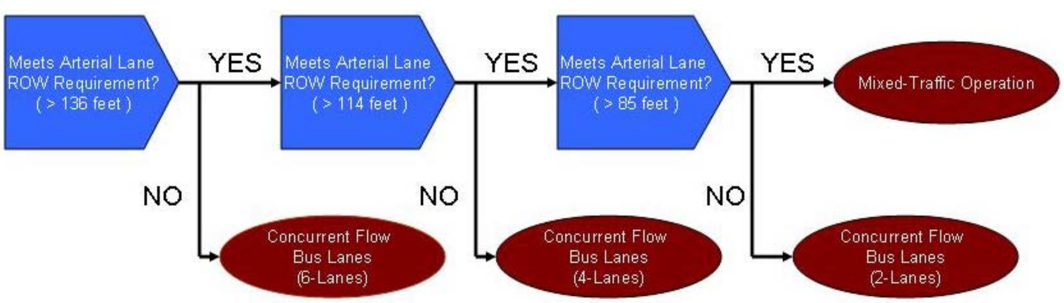


Source: Functional Classification of Transit, FDOT District 4

Much of the corridor does not meet the right-of-way requirement for arterial bus lanes with six-lanes or four-lanes of travel without reductions in the number of existing vehicle travel lanes or investment in right-of-way acquisition. The assessment of available right-of-way revealed that about 50 percent of the corridor contains approximately 100 feet of right-of-way or less. To accommodate more options into the running way facility recommendations, an additional running way option was included that required a narrower cross-section design. A narrower design was accomplished by reducing vehicle travel lanes to two, one in each direction, and reducing the width of the median to 15 feet. The end right-of-way requirement for a facility with concurrent flow bus lanes plus two vehicle lanes of travel was estimated to be 85 feet. Such a facility would have the greatest impact on roadway level service as several segments of the corridor would require the elimination of existing vehicle travel lanes in order to implement.

A set of proposed running way facility recommendations was developed based on the six-lane, four-lane, and two-lane concurrent flow bus lane designs presented. The process for developing those recommendations involved the decision tree shown in Figure 7- 9.

Figure 7- 9
Running Way Decision Tree



A summary of running way facility recommendations by segment is shown in Table 7-7. That table indicates with a check mark which segment of road meets the right-of-way requirement for each facility type.

Table 7-7
Rapid Transit Running Way Facility by Segment

On Road	Segment			Roadway Type	ROW Width (ft)	Segment Length (ft)	Concurrent Flow Bus Lanes			Running Way Recommendations
							4-Lane	6-Lane	2-Lane	
							114	136	85	
NW 62nd St	W Newberry Rd	to	NW 4 Pl	4-Lane Un-divided	85	1,056			✓	Concurrent Flow Bus Lanes (2-Lanes)
NW 62nd St	NW 4Pl	to	NW 1st Pl	4-Lane Un-divided	80	1,056				Mixed Traffic
NW 62nd St	NW 1st Pl	to	SW 4th Pl	2-Lane Un-divided	105	3,168			✓	Concurrent Flow Bus Lanes (2-Lanes)
NW 62nd St	SW 4th Pl	to	SW 20th Ave	2-Lane Un-divided	100	3,168			✓	Concurrent Flow Bus Lanes (2-Lanes)
SW 20th Ave	SW 62nd St	to	SW 38th Terrace	2-Lane Un-divided	100	6,336			✓	Concurrent Flow Bus Lanes (2-Lanes)
SW 20th Ave	SW 38 Terrace	to	SW 34th St	2-Lane Un-divided	80	2,640				Mixed Traffic
SW 34th St	SW 20th Ave	to	Archer Rd	6-Lane Divided	115	2,640	✓		✓	Concurrent Flow Bus Lanes (4-Lanes)
Archer Rd	SW 34th St	to	SW 23rd St	6-Lane Divided	220	6,336	✓	✓	✓	Concurrent Flow Bus Lanes (6-Lanes)
Archer Rd	SW 23rd St	to	SW 16th Ave	6-Lane Divided	180	528	✓	✓	✓	Concurrent Flow Bus Lanes (6-Lanes)
Archer Rd	SW 16th Ave	to	Shealy Dr	4-Lane Divided	180	1,056	✓	✓	✓	Concurrent Flow Bus Lanes (6-Lanes)
Archer Rd	Shealy Dr	to	SW 16th St	4-Lane Divided	150	2,640	✓	✓	✓	Concurrent Flow Bus Lanes (6-Lanes)
Archer Rd	SW 16th St	to	SW 13th St	4-Lane Divided	100	1,584			✓	Concurrent Flow Bus Lanes (2-Lanes)
SW 9th Rd	SW 13th St	to	SW 11th ST	2-Lane Un-divided	50	1,056				Mixed Traffic
SW Depot Ave	SW 11th St	to	SW 6th St	2-Lane Un-divided	90	1,584			✓	Concurrent Flow Bus Lanes (2-Lanes)
SW Depot Ave	SW 6th St	to	S Main St	2-Lane Un-divided	90	2,112			✓	Concurrent Flow Bus Lanes (2-Lanes)
SE Detroit Ave	S Main St	to	SE 7th Ave	2-Lane Un-divided	35	1,056				Mixed Traffic
SE 7th Ave	SE 4th St	to	SE 7th St	2-Lane Un-divided	85	1,056			✓	Concurrent Flow Bus Lanes (2-Lanes)
SE 7th Ave	SE 7th St	to	SE 11th St	2-Lane Un-divided	40	2,112				Mixed Traffic
SE 11th St	SE 7th Ave	to	E University Ave	4-Lane Divided	115	2,112	✓		✓	Concurrent Flow Bus Lanes (4-Lanes)
NE Waldo Rd	E University Ave	to	NE 8th Ave	4-Lane Un-divided	100	3,168			✓	Concurrent Flow Bus Lanes (2-Lanes)
NE Waldo Rd	NE 8th Ave	to	NE 12th Ave	4-Lane Un-divided	100	1,584			✓	Concurrent Flow Bus Lanes (2-Lanes)

FINAL TECHNOLOGY DEPLOYMENT RECOMMENDATIONS

A modest investment BRT system would include those elements which are both essential to a rapid transit service and those items which could be employed that provide a great deal of value relative to cost. The following recommendations, shown in Table 7-8, include the basic elements of BRT. Additionally, bus lanes on Archer Road, extensive TSP treatments, hybrid-electric buses and off-board fare payment at select locations should be primary considerations to enhance those basic elements in an initial phase if funding allows. Future phases would include median BRT lanes, moving the entire fare payment system off board and Real Time Information at every stop.

Table 7-8
Technology Deployment Recommendations

Corridor Segment	Simple Stops	Super Stops	Stations	Running Ways	Intersections for TSP Consideration	Off-Board Fare Payment	Vehicles	Real Time Information
							Stylized, with 40' hybrid electric approximate cost increase of $175k	At all super stops & stations
SW 62nd Boulevard	**X**	**X**	**X**	Mixed traffic	All (2)	Yes - End of Line/Start of Line		
SW 20th Avenue	**X**	**X**	**X**	Mixed traffic	All (1)	Yes		
SW34th Street	**X**	**X**	**X**	Mixed traffic	All (1)	No		
Archer Rd (SR 24)	**X**	**X**	**X**	Bus lane potential on Archer from SW34th St. to SW 16th St.	All, except Archer/34th (8)	Yes		
SW 9th Road	**X**	**X**		Mixed traffic	All (2)	No		
Depot Avenue	**X**	**X**		Mixed traffic	All (2)	No		
SE 7th Avenue	**X**	**X**		Mixed traffic	All (1)	No		
Waldo Road	**X**	**X**		Mixed traffic	All (4)	Yes - End of Line/Start of Line		
Costs				Approx 4 million per route mile - busway	$30,000 for TSP traffic controller firmware license	$60,000 per FVM	Standard 40' Coach $317,000; Gasoline Hybrid $500,000	$5,000 per location
Future Phases				Consider median bus lanes		Fare Vending machines at all stops		Real-time information at all stops

Section 8
Potential Funding Sources for BRT

INTRODUCTION

The City of Gainesville Regional Transit System (RTS) is a designated recipient of federal formula funds (Section 5307) and State Block Grant funds. As such, the City, as the transit agency, is eligible for most federal and state grant programs for public transportation. New programs continue to emerge at the federal level for public transportation, most recently the Job Access/Reverse Commute (JARC, Section 5316) and New Freedom (Section 5317). In addition, the FTA put out a solicitation via Federal Register in December 2009 for Exempt Discretionary Program Grants (Section 5309) for Urban Circulator Systems to support the USDOT's Livability Initiative with projects under $25 million. RTS has applied for a $25 million grant to fund BRT fixed-guideway improvements.

In addition, there are other funding programs not specifically for transit or fixed-guideway improvements (including Bus Rapid Transit), but can support the overall development of a BRT system. Below is a complete inventory of federal, state and local funding sources available to the City of Gainesville for the development of BRT.

FEDERAL FUNDING SOURCES

Flexible Funds

Flexible funds are certain legislatively specified funds that may be used either for transit or highway purposes. This provision was first included in the Intermodal Surface Transportation Efficiency Act of 1999 (ISTEA) and was continued with the Transportation Equity Act for the 21st Century (TEA-21). The idea of flexible funds is that a local area can choose to use certain Federal surface transportation funds based on local planning priorities, not on a restrictive definition of program eligibility. Flexible funds include Federal Highway Administration (FHWA) Surface Transportation Program (STP) funds and Congestion Mitigation and Air Quality Improvement Program (CMAQ) and Federal Transit Administration (FTA) Urban Formula Funds.

Since the enactment of ISTEA, FHWA funds transferred to the FTA have provided a substantial new source of funds for transit projects. When FHWA funds are transferred to FTA, they can be used for a variety of transit improvements such as new fixed guideway projects, bus purchases, construction and rehabilitation of rail stations, maintenance facility construction and renovations, alternatively-fueled bus purchases, bus transfer facilities, multimodal transportation centers, and advanced technology fare collection systems

When FHWA funds are transferred to FTA they are transferred to one of the following three programs:

- Urbanized Area Formula Program (5307),
- Nonurbanized Area Formula Program (Section 5311 program);
- Elderly and Persons with Disabilities Program (Section 5310 program).

Once they are transferred to FTA for a transit project, the funds are administered as FTA funds and take on all the requirements of the FTA program. Transferred funds may use the same non-Federal matching share that the funds would have if they were used for highway purposes and administered by FHWA.

In urbanized areas over 200,000 population, the decision on the transfer of flexible funds is made by the Metropolitan Planning Organization (MPO). In areas under 200,000 population the decision is made by the MPO in cooperation with the State DOT. In rural areas, the transfer decision is made by the State DOT. The decision to transfer funds should flow from the transportation planning process and the priorities established for an area as part of the planning process.

Surface Transportation Program

The Surface Transportation Program (STP) (23 U.S.C. 133) provides the greatest flexibility in the use of funds. These funds may be used (as capital funding) for public transportation capital improvements, car and vanpool projects, fringe and corridor parking facilities, bicycle and pedestrian facilities, and intercity or intracity bus terminals and bus facilities. As funding for planning, these funds can be used for surface transportation planning activities, wetland mitigation, transit research and development, and environmental analysis. Other eligible projects under STP include transit safety improvements and most transportation control measures.

STP funds are distributed among various population and programmatic categories within a State. Some program funds are made available to metropolitan planning areas containing urbanized areas over 200,000 population; STP funds are also set aside to areas under 200,000 and 50,000 population. The largest portion of STP funds may be used anywhere within the State to which they are apportioned.

Congestion Mitigation and Air Quality Improvement Program

The Congestion Mitigation and Air Quality Improvement Program (CMAQ) (23 U.S.C. 149) has the objective of improving the Nation's air quality and managing traffic congestion. CMAQ projects and programs are often innovative solutions to common mobility problems and are driven by Clean Air Act mandates to attain national ambient air quality standards. Eligible activities under CMAQ include transit system capital expansion and improvements that are projected to realize an increase in ridership; travel demand management strategies and shared ride services; pedestrian and bicycle facilities and promotional activities that encourage bicycle commuting. Programs and projects are funded in air quality nonattainment and maintenance areas for ozone, carbon monoxide (CO), and small particulate matter (PM-10) that reduce transportation-related emissions.

RTS has been the recipient of flex funds in the past for purchase of buses and currently has $250,000 in flex funds to purchase paratransit vehicles and associated equipment. The Gainesville LRTP includes $36.1 million over a 22 year period for flex funds for enhancements, highway or transit.

The Transportation Infrastructure Finance and Innovation Act (TIFIA)

This program provides Federal credit assistance in the form of direct loans, loan guarantees, and standby lines of credit to finance surface transportation projects of national and regional significance. TIFIA credit assistance provides improved access to capital markets, flexible repayment terms, and potentially more favorable interest rates than can be found in private capital markets for similar instruments. TIFIA can help advance qualified, large-scale projects that otherwise might be delayed or deferred because of size, complexity, or uncertainty over the timing of revenues. Many surface transportation projects - highway, transit, railroad, intermodal freight, and port access - are eligible for assistance. Each dollar of Federal funds can provide up to $10 in TIFIA credit assistance - and leverage $30 in transportation infrastructure investment.

The Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides credit assistance for qualified projects of regional and national significance. Many large-scale, surface transportation projects—highway, transit, railroad, intermodal freight, and port access—are eligible for assistance. Eligible applicants include state and local governments, transit agencies, railroad companies, special authorities, special districts, and private entities. The TIFIA credit program is designed to fill market gaps and leverage substantial private co-investment by providing supplemental and subordinate capital. Each dollar of Federal funds can provide up to $10 in TIFIA credit assistance and support up to $30 in transportation infrastructure investment.

Program Goal

The program's fundamental goal is to leverage Federal funds by attracting substantial private and other non-Federal co-investment in critical improvements to the nation's surface transportation system. TIFIA was created because state and local governments that sought to finance large-scale transportation projects with tolls and other forms of user-backed revenue often had difficulty obtaining financing at reasonable rates due to the uncertainties associated with these revenue streams. Tolls and other project-based revenues are difficult to predict, particularly for new facilities. Although tolls can become a predictable revenue source over the long term, it is difficult to estimate how many road users will pay tolls, particularly during the initial "ramp-up" years after construction of a new facility. Similarly, innovative revenue sources, such as proceeds from tax increment financing, are difficult to predict. TIFIA credit assistance is often available on more advantageous terms than in the financial market making it possible to obtain financing for needed projects when it might not otherwise be possible.

Credit Assistance & Benefits

The TIFIA credit program offers three distinct types of financial assistance designed to address the varying requirements of projects throughout their life cycles:

- Secured (direct) loan — Offers flexible repayment terms and provides combined construction and permanent financing of capital costs. Maximum term of 35 years from substantial completion. Repayments can start up to five years after substantial completion to allow time for facility construction and ramp-up.
- Loan guarantee — Provides full-faith-and-credit guarantees by the Federal Government and guarantees a borrower's repayments to non-Federal lender. Loan repayments to lender must commence no later than five years after substantial completion of project.
- Standby line of credit — Represents a secondary source of funding in the form of a contingent Federal loan to supplement project revenues, if needed, during the first 10 years of project operations, available up to 10 years after substantial completion of project.

The amount of Federal credit assistance may not exceed 33 percent of total reasonably anticipated eligible project costs. The exact terms for each loan are negotiated between the USDOT and the borrower, based on the project economics, the cost and revenue profile of the project, and any other relevant factors. For example, USDOT policy does not generally permit equity investors to receive project returns unless the borrower is current on TIFIA interest payments. TIFIA interest rates are equivalent to Treasury rates. Depending on market conditions, these rates are often lower than what most borrowers can obtain in the private markets. Unlike private commercial loans with variable rate debt, TIFIA interest rates are fixed. Overall, borrowers benefit from improved access to capital markets and potentially achieve earlier completion of large-scale, capital intensive projects that otherwise might be delayed or not built at all because of their size and complexity and the market's uncertainty over the timing of revenues.

Clean Fuels Formula Grant Program

Section 3008 of the recently enacted Transportation Equity Act for the 21st Century (TEA-21) establishes a new FTA categorical funding program known as the Clean Fuels Formula Grant program. The new program is intended to assist transit operators finance the purchase or lease of low-emissions buses and related equipment, construct alternative fueling facilities and make required modifications to existing facilities to accommodate clean fuel buses. The new program is also designed to assist transit operators reduce emission pollutants from transit buses, enhance attainment of air quality standards in urban areas and accelerate the introduction of advanced clean fuel transit buses.

The act authorizes guaranteed funding of $100 million annually for the program (beginning in FFY 1999) with the potential for additional authorizations of up to $100 million annually. ***FTA will allocate available funding only to grantees that apply using a formula based on population, fleet size, bus passenger miles and the severity of air quality non-attainment.*** Gainesville is not designated as an area of air quality non-attainment. To be eligible for funding under this program, designated recipients must submit an application directly to FTA no later than each January 1 of each fiscal year (beginning in 1999), with apportionment of program funds expected by February of each fiscal year. Funds apportioned under this program remain available to a project for one year after the fiscal year for which the amount is made available or appropriated. Maximum grant awards and limitations on the use of funds and eligible projects are detailed below:

Maximum eligible grant:

- $25,000,000 annually, for urban areas with population of at least 1 million in population
- $15,000,000 annually, for urban areas with population of less than 1 million in population
- 80% of the total project cost

Formula limitations:

- No less than 5% of annual apportionments shall be made available for purchase or construction of hybrid electric or battery-powered bus or facility projects
- No more than 35% of annual apportionments shall be made available to fund clean diesel

- No more than 5% of annual apportionments may be made available to fund retrofitting or replacement bus engines that do not meet EPA clean air standards.

Eligible projects include:

- Purchase or lease and operation of clean fuel buses, including clean diesel
- Improving existing facilities to accommodate clean fuel buses, including the construction of alternative fueling facilities
- Re-powering or retrofitting existing vehicles engines (pre-1993) with clean fuel technology to meet current emissions standards

Exempt Discretionary Program Grants (Section 5309) for Urban Circulator Systems

The program is authorized under 49 U.S.C. 5309(a) as amended by section 3011 of SAFETEA-LU. The Secretary may make grants under this section to assist State and local governmental authorities in financing new fixed guideway capital projects, including the acquisition of real property, the initial acquisition of rolling stock for the systems, the acquisition of rights-of-way, and relocation. Consistent with Section 5309(e)(1)(B), projects receiving less than $25,000,000 in Federal assistance with respect to a new fixed guideway capital project are considered exempt from certain requirements of the program until a final regulation issued takes effect.

B. Background

FTA has long fostered livable communities and sustainable transit development through its various programs and activities. Public transportation supports the development of communities, providing effective and reliable transportation alternatives that increase access to jobs, health and social services, entertainment, educational opportunities, and other activities of daily life, while also improving mobility within and among these communities. Through various initiatives and legislative changes over the last fifteen years, FTA has allowed and encouraged projects that help integrate transit into a community through neighborhood improvements and enhancements to transit facilities or services, or make improvements to areas adjacent to public transit facilities that may ease the transportation needs of transit users or support other infrastructure investments that enhance the use of transit for the community.

On June 16, 2009, U.S. Department of Transportation (DOT) Secretary Ray LaHood, U.S. Department of Housing and Urban Development (HUD) Secretary Shaun Donovan, and U.S.

Environmental Protection Agency (EPA) Administrator Lisa Jackson announced a new partnership to help American families in all communities--rural, suburban and urban--gain better access to affordable housing, more transportation options, and lower transportation costs.

DOT, HUD and EPA created a high-level interagency partnership to better coordinate Federal transportation, environmental protection, and housing investments. The Urban Circulator Program funding will be awarded to eligible projects that best demonstrate these livability principles (see C. below).

Approximately $130 million in unallocated Section 5309 New Starts/Small Starts funds are available under this notice. By using these available funds, FTA and DOT can support tangible livability improvements within existing programs while demonstrating the feasibility and value of such improvements. These demonstrations can provide a sound basis for advancing greater investments in the future. In addition, the program builds on the momentum generated by the American Recovery and Reinvestment Act 2009 and can help inform Administration and Congressional decisions makers on guidance needs for reauthorization.

The City of Gainesville Regional Transit System has applied for $25 million in funding for BRT from the solicitation.

Community Development Block Grant Program - CDBG

The Community Development Block Grant (CDBG) program is a flexible program that provides communities with resources to address a wide range of unique community development needs. Beginning in 1974, the CDBG program is one of the longest continuously run programs at HUD. The CDBG program provides annual grants on a formula basis to 1209 general units of local government and States.

Renewal Communities/ Empowerment Zones/ Enterprise Communities (RC/EZ/EC)

This is a program that uses an innovative approach to revitalization, bringing communities together through public and private partnerships to attract the investment necessary for sustainable economic and community development. This program would be most appropriate in fostering the goals and objectives of Plan East Gainesville.

Urbanized Area Formula Program - (49 U.S.C. §5307)

Section 5307 funding is a formula grant program for urbanized areas providing capital, operating, and planning assistance for mass transportation. This program was initiated by the Surface Transportation Act of 1982 and became FTA's major transit assistance program in FY 1984.

Funding is apportioned on the basis of legislative formulas. For areas of 50,000 to 199,999 in population, the formula is based on population and population density. For areas with populations of 200,000 and more, the formula is based on a combination of bus revenue vehicle miles, bus passenger miles, fixed guideway revenue vehicle miles, and fixed guideway route miles as well as population and population density. For urbanized areas over 200,000 in population, funds flow directly to the designated recipient. The Governor or Governor's designee is the designated recipient for urbanized areas with a population between 50,000 and 200,000.

Capital assistance is provided to urbanized areas at an 80 percent federal share. In areas with populations over 200,000, Section 5307 funds cannot be used for operating expenses, with the exception of certain eligible maintenance expenses as defined in the National Transit Database. Additional exceptions in FY 2005 – FY 2007 are described below.

In areas with populations under 200,000, funds can be used for operating at an 80/20 federal/local match. However, the federal share may be 90 percent for the cost of vehicle-related equipment attributable to compliance with ADA and the Clean Air Act. The federal share may also be 90% for projects or portions of projects related to bicycles. The federal share may not exceed 50% of the net project cost of operating assistance.

As a result of the 2000 census, a number of urbanized areas can no longer receive operating assistance because their population now exceeds 200,000. SAFETEA: LU contained exceptions and provides transitional assistance as follows.

In urbanized areas with a population of at least 200,000 but not more than 225,000, operating costs of equipment and facilities are eligible expenses if:

- the urbanized area includes parts of more than one state;
- the portion of the urbanized area includes only one state;
- the population of the portion of the urbanized area is less than 30,000; or
- the grant will not be used to provide public transportation outside of the portion of the urbanized area.

In FY 2005-2007, the operating costs of equipment and facilities in an urbanized area with a population of at least 200,000 are eligible expenses if:

- the urbanized area had a population of less than 200,000 as determined by the 1990 Census;
- a portion of the urbanized area was a separate urbanized area with a population of less than 200,000 as determined by the 1990 Census;
- the area was not designated as an urbanized area as determined by the 1990 Census; or
- a portion of the area was not designated as an urbanized area as determined by the 1990 Census, and received assistance under Section 5311 in FY 2002.

The maximum amount available to urbanized areas for the operating costs of equipment and facilities in FY 2005 shall:

- not be more than the amount apportioned in FY 2002 to an urbanized area with a population of less than 200,000 as determined by the 1990 Census;
- not be more than the amount apportioned to the urbanized area in FY 2003 if the area was not a designated urbanized area as determined by the 1990 Census; or
- not be less than the amount the portion of the area received under Section 5311 in FY 02 for areas not designated as urbanized as determined by the 1990 Census.

The maximum amount available to urbanized areas for the operating costs of equipment and facilities in FY 2006 shall:

- not be more than 50 percent of the amount apportioned to the urbanized area in 2002 if the urbanized area had a population of less than 200,000 or a portion of the urbanized area was separate and had a population of less than 200,000 according to the 1990 Census;
- not be more than 50 percent of the amount apportioned under this section for FY 2003 if the area was not designated as an urbanized area as determined by the 1990 Census; or
- not be less than 50 percent of the amount received under section 5311 in FY 2002 if a portion of the area was not designated as an urbanized area as determined by the 1990 Census and received assistance under section 5311 in FY 2002.

The maximum amount available to urbanized areas for the operating costs of equipment and facilities in FY 2007 shall:

- not be more than 25 percent of the amount apportioned to the urbanized area in 2002 if the urbanized area had a population of less than 200,000 or a portion of the urbanized area was separate and had a population of less than 200,000 according to the 1990 Census;
- not be more than 25 percent of the amount apportioned under this section for FY 2003 if the area was not designated as an urbanized area as determined by the 1990 Census; or
- not be less than 25 percent of the amount received under section 5311 in FY 2002 if a portion of the area was not designated as an urbanized area as determined by the 1990 Census and received assistance under section 5311 in FY 2002.

Small Transit Intensive Cities - 49 U.S.C Section 5336(j)

Within the Urbanized Area Formula, this program establishes a new tier for transit intensive urbanized areas with less than 200,000 in population funded through a 1 percent set-aside from the Elderly Individuals and Individuals with Disabilities Program and the Urbanized Area Formula Program. Funds are available for capital and operating expenses at an 80/20 percent match for capital projects and a 50/50 match for eligible operating expenses.

The smaller cities eligible for this program must exceed the industry average for cities with a population of at least 200,000 and not more than 999,999 for one or more of six performance categories, including: passenger miles per vehicle revenue mile, passenger miles per vehicle revenue hour, vehicle revenue miles per capita, vehicle revenue hours per capita, passenger miles per capita, and passengers per capita. Funds are apportioned based on the number of performance categories for which eligible areas meet or exceed the industry average and the aggregate number of performance categories for which all eligible areas meet or exceed the industry average.

Growing States and High Density States Program - (49 U.S.C. §5340)

In an effort to better support states that have made significant investments in transit, this new formula program provides additional support to recipients of urbanized (Section 5307) and non-urbanized areas (Section 5311) formula programs with high rates of population growth and those that are most densely populated.

Approximately 4 percent of the overall formula program to states (based on population trends comparing the most recent census population estimates for 15 years beyond the most recent census) is allocated to the Growing States and High Density States Program. The amount of Section 5340 funds apportioned to each state are then distributed between urbanized areas and rural areas based on the ratio of urban/rural population within each state. The High Density States factor distributes the other half of the funds to urbanized areas within each state with population densities in excess of 370 persons per square mile.

Transit Capital Investment Program - (49 U.S.C. §5309)

The Transit Capital Investment Program provides capital assistance for three primary activities: bus and bus related projects, fixed guideway modernization, and new fixed guideway systems "New Starts" (projects requiring more than $75 million in federal assistance). Santa Rosa County is currently or has been a grant recipient under this program.

Eligible recipients for capital investment funds are public bodies and agencies (transit authorities and other state and local public bodies and agencies) including states, municipalities, other political subdivisions of states; public agencies and instrumentalities of one or more states; and certain public corporations, boards, and commissions established under state law. Funds are allocated on a discretionary basis. Beginning in FY 2006, bus and bus related projects receive 22.2 percent of the allocation, fixed guideway modernization 37.4 percent and New Starts 40.4 percent. By FY 2009, 23.5 percent will be allocated to bus and bus facilities, 36 percent to fixed guideway modernization and 40.5 percent to New Starts and Small Starts (a new tier for projects seeking less than $75 million from section 5309 and a total estimated net capital cost of less than $250 million).

Bus and Bus-Related Projects

These funds require a 20 percent local match and are available for acquisition of buses for fleet and service expansion, bus maintenance and administrative facilities, transfer facilities, bus malls, transportation centers, intermodal terminals, park-and-ride stations, acquisition of replacement vehicles, bus rebuilds, bus preventive maintenance, passenger amenities such as passenger shelters and bus stop signs, accessory and miscellaneous equipment such as mobile radio units, supervisory vehicles, fareboxes, computers, shop and garage equipment, and costs incurred in arranging innovative financing for eligible projects.

Job Access/Reverse Commute - (23 U.S.C. §5316)

The purpose of this grant program is to develop transportation services designed to transport welfare recipients and low income individuals to and from jobs, training and child care, and to develop reverse commute transportation services for residents of urban centers and rural and suburban areas to suburban employment opportunities. Emphasis is placed on projects that use mass transportation services.

SAFETEA-LU requires that by FY 2007, projects selected under Job Access/Reverse Commute (JARC – Section 5316) must be derived from a locally developed coordinated public transit/human service transportation plan.

Eligible activities for Job Access grants include the capital and operating costs of equipment, facilities, and associated capital maintenance items related to providing access to jobs. Also included are the costs of promoting the use of transit by workers with nontraditional work schedules, promoting the use of transit vouchers, and promoting the use of employer-provided transportation including transit benefits. For Reverse Commute grants, operating costs, capital costs and other costs associated with reverse commute by bus, train, carpool, vans or other transit service are eligible.

Funding is available to local governmental authorities and agencies and non-profit entities for up to three years. Funds are allocated on a formula basis with 60 percent to areas over 200,000 in population and 20 percent allocated by a competitive grant solicitation process to eligible recipients in urbanized areas between 50,000 – 200,000 in population and 20 percent to rural areas. Not more than $10 million per year may be made available for Reverse Commute projects. The federal contribution to eligible projects is 50 percent. The remaining 50 percent may be derived from other federal programs where eligible, state and/or local sources, but excluding revenue derived from providing mass transportation services unless the funds are received through a service agreement.

New Freedom Program - (49 U.S.C. §5317)

This new program provides formula funding for transportation services beyond those required by the Americans with Disabilities Act (ADA) to assist persons with disabilities to get to and from jobs and employment support services. Sixty percent of the funds are apportioned directly to large urbanized areas (over 200,000 population), based on a ratio of the number of individuals with disabilities in the urbanized area to the number of individuals with disabilities in all urbanized areas. Twenty percent are apportioned to states based on a ratio of the number of individuals with disabilities in urbanized areas under 200,000 in population and to the number of individuals with disabilities in all states. The remaining 20 percent are allocated to each state based on the number of individuals with disabilities in the non-urbanized areas and the number of individuals in the non-urbanized areas of all states.

SAFETEA-LU requires that by FY 2007, projects selected under New Freedom (Section 5317) must be derived from a locally developed coordinated public transit/human service transportation plan.

Working in coordination with its MPO, the recipient offers an area-wide solicitation for applications for grants to the recipient and subrecipients. Selected projects must be derived from a coordinated human services transportation plan developed through a process that includes representatives of public, private, and nonprofit transportation and human service providers as well as the general public.

Capital funding is provided on an 80/20 federal/local match basis. Operating assistance may not exceed 50 percent of the net operating cost of the project.

STATE OF FLORIDA FUNDING SOURCES

Public Transit Block Grant Program - (Section 341.052, Florida Statutes, FDOT Procedure Topic Number 725-030-030)

The Public Transit Block Grant Program was enacted by the Florida Legislature to provide a stable source of funding for public transit. Funds are awarded by FDOT to those public transit providers eligible to receive funding from the FTA's Sections 5307 and 5311 programs and to CTCs. FDOT distributes 85 percent of the funds to FTA Section 5307 providers and to FTA Section 5311 providers who are not CTCs. The Florida Commission for the Transportation Disadvantaged distributes 15 percent of the funds to CTCs according to their own funding formula.

Public Transit Block Grant funds may be used for eligible capital and operating costs of providing public transit service. Program funds may also be used for transit service development and transit corridor projects. Public Transit Block Grant projects must be consistent with applicable approved local government comprehensive plans. State participation is limited to 50% of the non-federal share of capital projects. Program funds may be used to pay up to 50 percent of eligible operating costs, or an amount equal to the total revenue, excluding farebox, charter, and advertising revenue, and federal funds received by the provider for operating costs, whichever amount is less.

FDOT Administration Guidelines for Block Grant Eligibility

Transit Development Plan - (Section 341.052 Florida Statutes, Chapter 14-73.001)

To receive State Public Block Grant funding, applicants are required to develop and adopt a Transit Development Plan (TDP). Plans are to be submitted or be on file at the appropriate District Office by July 1 of each year. The TDP is the applicant's five year planning, development and operational guidance document. Annual updates and revisions to the five year plan are required, with major updates completed every third year.

At a minimum, the TDP shall:

- identify and list community goals and objectives with respect to transportation and land use in general and specifically to transit;
- identify and quantify the community's need for transit service using demographic, socio-economic, land use, transportation, transit data and input received from the general public through committees and workshops;
- include an analysis of the services currently provided within the community by public and private transit providers and identification of alternative methods for addressing deficiencies (and the costs and benefits of each);
- present a five year program for implementing service alternatives including maps indicating areas served and service provided, a monitoring program to track performance measures, a five year financial plan and a list of projects or services for which funding has not been identified; and
- maintain consistency with approved local government comprehensive plans and long range transportation plans.

Transit Performance Reporting - (Section 341.041(3) Florida Statutes, Section 341.071 Florida Statutes)

Another requirement for receipt of State Block Grant funds is the establishment of annual productivity and performance measures approved by FDOT. In approving these measures, FDOT shall give consideration to the goals and objectives of each system and the needs and role for public transit in the local area.

Each public transit provider must publish the productivity and performance measures established for the year in a report format providing quantitative data relative to the attainment of established productivity and performance measures. The information must be published in a newspaper of general circulation within the local area.

Public Transit Service Development Program - (Chapter 341, Florida Statutes, FDOT Procedure Topic Number 725-030-005)

The Public Transit Service Development Program was enacted by the Florida Legislature to provide initial funding for special projects. The program is selectively applied to determine whether a new or innovative technique or measure can be used to improve or expand public transit services. Service Development Projects specifically include projects involving the use of new technologies, services, routes, or vehicle frequencies; the purchase of special transportation services, and other such techniques for increasing service to the riding public. Projects involving the application of new technologies or methods for improving operations, maintenance, and marketing in public transit systems are also eligible for Service Development Program funding. Service Development Projects are subject to specified times of duration, but no more than three years. If determined to be successful, Service Development Projects must be continued by the public transit provider without additional Public Transit Service Development Program funds.

Each FDOT district office must develop a program of eligible Service Development projects and submit that program of projects to the FDOT Central Office by the first working day of July each year. Implementation of those projects can begin on or after July 1 of the following fiscal year. Projects submitted for funding must be justified in the recipient's TDP (or transportation disadvantaged plan, if applicable).

Transit Corridor Program - (Chapter 341, Florida Statutes, FDOT Procedure Topic Number 725-030-003)

The Transit Corridor Program provides funding to CTCs or transit agencies to support new services within specific corridors when the services are designed and expected to help reduce or alleviate congestion or other mobility issues within the corridor. Transit Corridor funds are discretionary and are distributed based on documented need. Transit Corridor Program funds may be used for capital or operating expenses. Eligible projects must be identified in a Transit Development Plan, Congestion Management System Plan, or other formal study undertaken by a public agency.

The FDOT Central Office annually reviews all existing (i.e., currently approved and operating as of the annual review) Transit Corridor projects, and allocates, to the respective FDOT district office, sufficient funds to cover these ongoing projects. First priority for funding under this program is for existing projects to meet their adopted goals and objectives. Any remaining funds are allocated to each of the districts by formula, based on each district’s percentage of the total state urbanized population. Projects are funded at one-half the non-federal share. Projects that have regional or statewide significance may receive funding at up to 100 percent. The classification of a project as either of regional or statewide significance is made by the FDOT Central Office.

Park and Ride Lot Program - (FDOT Procedure Topic Number 725-030-002)

The statewide Park and Ride Program was initiated in 1982 to provide organized, safe parking for personal vehicles of persons using transit, carpools, vanpools and other high occupancy modes. The program provides for the purchase and/or leasing of private land for the construction of park and ride lots, the promotion of these lots, and the monitoring of their usage. This program is an integral part of the commuter assistance program efforts to encourage the use of transit, carpools, vanpools and other high occupancy modes.

FDOT has established criteria for park and ride planning to assist in siting, sizing, and disposal of park and ride facilities. These criteria are contained in the “State Park and Ride Lot Planning Handbook”. Proposed plans and designs for park and ride lots should be reviewed and approved by the FDOT district office to ensure that FDOT park and ride lot guidelines have been met. Park and Ride facilities constructed by the FDOT, or funded in whole, or in part by FDOT, must be sited, sized, and promoted in such a way that there is a reasonable expectation of at least an average 60 percent occupancy.

Local agencies may request the use of Park and Ride Lot Program funds by filing a project proposal with the FDOT district office. The FDOT district office sends a project priority list to the FDOT Central Office. The FDOT Central Office determines which projects will be funded.

FDOT will fund up to one-half the non-federal share of Park and Ride Lot capital projects. If a local project is in the best interest of FDOT, then the local share may be provided in cash, donated land value, or in-kind services. If federal funds are involved, federal match guidelines shall be used.

***Transportation Regional Incentive Program* (www.dot.state.fl.us/planning/TRIP)**

The Transportation Regional Incentive Program (TRIP) was created by the 2005 Legislature to improve regionally significant transportation facilities in "regional transportation areas." State funds are available throughout Florida to provide incentives for local governments and the private sector to help pay for critically needed projects that benefit regional travel and commerce. FDOT will pay for 50 percent of project costs, or up to 50 percent of the nonfederal share of project costs for public transportation facility projects. This program can be used to leverage investments in regionally significant transportation facilities, and must be linked to growth management objectives.

The TRIP Program is designed to provide an opportunity for regional partners to designate facilities that they deem to be regionally-significant and to set priorities for them that will be used by the Department in the programming process. Eligible TRIP projects must be identified in appropriate local government capital improvements program(s) or long-term concurrency management system(s) that are in compliance with state comprehensive plan requirements. In addition, projects must be consistent with the Strategic Intermodal System and support facilities that serve national, statewide, or regional functions and function as an integrated transportation system.

The FDOT district offices will provide district priorities for TRIP funds to the FDOT Central Office. Based on the guidance developed by FDOT Central Office, the District will program the projects within the development of the work program cycle time frame (September/October). TRIP program projects are also eligible for revolving loans and/or credit enhancements from the State Infrastructure Bank (SIB) program. The state funded SIB is capitalized by state money and bond proceeds only. If project funding is awarded through the SIB, the funding must be matched by a minimum of 25 percent from funds other than the SIB. SIB loans can be made to a FDOT district office or the Turnpike Enterprise, or they can be between the Department and an entity external to the Department (e.g., County, City, or Expressway Authority).

County Incentive Grant Program (CIGP)* - (*Chapter 339.2817 Florida Statutes)

The purpose of the program is to provide grants to counties to improve a transportation facility (including transit) which is located on the State Highway System or which relieves traffic congestion on the State Highway System (SHS). Municipalities are eligible to apply also and can do so by submitting their application through the county. CIGP funds are distributed to each FDOT district office by statutory formula. FDOT will cover 50 percent of eligible project costs.

Eligible projects include those that improve the mobility on the SHS; encourage, enhance, or create economic benefits; foster innovative public-private partnerships; maintain or protect the environment; enhance intermodalism and safety; and those that advance other projects. New technologies, including intelligent transportation systems, which enhance the efficiency of a project, are also eligible.

CIGP is managed within the FDOT district. Each year, each district notifies the counties within its boundaries of the availability of CIGP funds and asks that applications be submitted by a certain deadline. The District ranks the projects according to the selection criteria and selects projects as funds are made available. Selected projects are added to the Department's Adopted Work

Program. Subsequent to selection of a project, a Joint Participation Agreement is signed between the Department and the county and/or municipality.

LOCAL FUNDING SOURCES

Data represented in this section was extracted from the *September 2006 Local Government Financial Information Handbook* developed by the Florida Legislative Committee on Intergovernmental Relations.

Local Option Fuel Taxes

Local governments are authorized to levy up to 12 cents of local option fuel taxes in the form of three separate levies, as described below.

1 to 6 Cents Local Option Fuel Tax

Local governments are authorized to levy a tax of 1 to 6 cents on every net gallon of motor and diesel fuel sold in a county. This tax may be authorized by an ordinance adopted by a majority vote of the governing body or voter approval in a county-wide referendum. Tax proceeds may only be used for transportation expenditures, including public transportation operations and maintenance. Alachua County currently levies all 6 cents, the maximum allowable. As of September 30, 2010, this tax is estimated to generate $3,590,639 county-wide.

1 to 5 Cents Local Option Fuel Tax

County governments are authorized to levy a tax of 1 to 5 cents on every net gallon of motor fuel sold within a county. This tax is levied by an ordinance adopted by a majority plus one vote of the membership of the governing body or voter approval in a county-wide referendum. The tax proceeds may be used for transportation expenditures needed to meet the requirements of the capital improvements element of an adopted local government comprehensive plan, including those improvements for the public transportation system. Currently, Alachua County levies all 5 cents, the maximum allowable. As of September 30, 2010, this tax is estimated to generate $2,640,075.

Ninth-Cent Fuel Tax

The Ninth-Cent Fuel Tax is a tax of 1 cent on every net gallon of motor fuel and diesel fuel sold within a county. The tax may be authorized by an ordinance adopted by an extraordinary vote of the governing board or voter referendum. County and municipal governments may use the tax proceeds for transportation expenditures, including, but not limited to public transportation operations and maintenance. Alachua County levies the 9th cent fuel tax.

Charter County Transportation System Surtax

Alachua County is a Charter County and is eligible to levy a 1 percent surtax subject to a charter amendment approved by a majority of the county's electorate. Proceeds are used for the development construction, operation and maintenance of fixed guideway rapid transit systems, bus systems, and roads and bridges.

Local Discretionary Sales Surtaxes

The governing authority in each county may levy a discretionary sales surtax of 0.5 to 1.0 percent. The levy of the surtax shall be pursuant to ordinance enacted by a majority of the members of the county governing authority and approved by a majority of the electors of the county voting in a referendum on the surtax. The proceeds of the surtax may be expended by a county and municipalities within the county. The surtax, which is limited for use on capital projects, may be used to finance, plan or construct. As of September 30, 2010 the estimated revenue from this tax if fully enacted is estimated to be $15,752,851 county-wide, with the City's share being $12,292,452. The proceeds from this tax can be used for infrastructure, which would include major transit capital investments such as operations and maintenance facilities or administrative centers.

Dedicated Millage Rates

Currently, three counties in Florida dedicate millage to their transit systems. The systems receiving revenue from dedicated millage rates are HARTline in Hillsborough County, PSTA in Pinellas County, and Lakeland Area Mass Transit District in Polk County. These ad valorem taxes have been a major source of revenue for the systems.

Municipal Service Taxing Unit

The Board of County Commissioners may establish a Municipal Service Taxing Unit (MSTU) to fund the capital and operating expenses associated with public transit services. The boundary of the MSTU may include unincorporated areas of the county as well as municipalities, subject to the consent by the governing bodies of the affected municipalities. The funding source is a mechanism for using ad valorem taxes without impacting the general millage cap for the county.

Municipalities

Individual municipalities receive transportation funding primarily from the state-initiated municipal gas tax and the local option gas tax, which was previously discussed. These and other local municipal funding sources could be provided to support public transportation.

Section 9
Implementation Plan

A series of action steps is identified in this section that serve as guidelines for the City of Gainesville to follow in developing the initial BRT service route that is proposed in this Feasibility Study. As the implementation of BRT in Gainesville moves forward and plans to expand the service are developed, other candidate corridors and more sophisticated BRT elements and technologies should be considered and adapted to meet the desired character and scale of BRT service envisioned for the area.

FTA SECTION 5309 SMALL STARTS AND VERY SMALL STARTS

To prepare the outline of steps, a review of the Federal Transit Administration's (FTA) Section 5309 Capital Investment Grant Program Small Starts and Very Small Starts requirements was performed. The Section 5309 Small Starts and Very Small Starts programs provide capital funds on a competitive basis for new fixed guideway transit facilities, such as light rail transit lines, bus rapid transit, commuter rail, or heavy rail transit. To receive funding under either of the two programs, applicants must conduct a series of planning and analysis steps. Both programs follow a similar process, as shown in Figure 9-1, but differ in terms of the project rating process and evaluation criteria. That figure also indicates FTA's primary role in each phase of the Small Starts and Very Small Starts funding process. Detailed information on the project rating process and evaluation criteria can be obtained from FTA at the following website address: www.fta.dot.gov/planning/newstarts/planning_environment_222.html.

Figure 9-1
FTA Section 5309 Small Starts and Very Small Starts Development Process

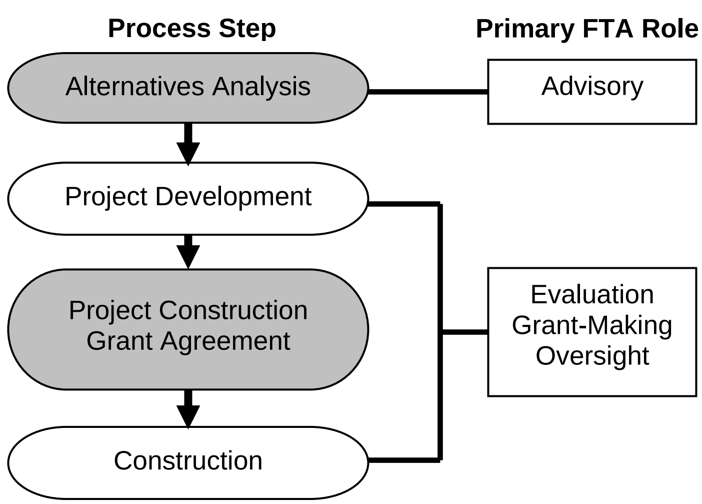


Table 9-1 indicates the requirements for Small Starts and Very Small Starts projects. The Very Small Starts program distinguishes itself from the Small Starts program in that the total cost of the project must not exceed $50 million and must be less than $3 million per mile (excluding vehicles). The Small Starts program caps the total cost of eligible projects at $250 million. The second major distinction between the two programs is the requirement under Very Small Starts that existing corridor ridership that would benefit from the more premium transit service must exceed 3,000 per day.

Table 9-1
Very Small Starts and Small Starts Requirements

Very Small Starts	Small Starts
Differences	
Less than $50 Million Total Cost	Less than $250 Million Total Cost
Less than $3 Million per Mile (excluding vehicles)	Less than $75 Million Section 5309 Funding Request
Existing Corridor Ridership Exceeds 3,000/Day	Fixed Guideway at Least 50% of the Project Length During Peak Period
Transit Stations	Substantial Transit Stations
Similarities	
Signal Priority	Signal Priority
Low Floor/Level Boarding Vehicles	Low Floor/Level Boarding Vehicles
10-Minute Peak/15-Minute Off-Peak	10-Minute Peak/15-Minute Off-Peak
Special Branding of Service	Special Branding of Service
14-Hour Service Span Minimum	14-Hour Service Span Minimum

Based on the type and scale of the BRT corridor determined from the feasibility analysis presented in this report, the City of Gainesville should pursue capital funding under the Section 5309 Very Small Starts program. The following action steps provide guidance to the City in pursuing Section 5309 Very Small Starts funding.

Step 1: Select preferred BRT alternative for initial implementation and Very Small Starts projects consideration

Based on the results of this Feasibility Study, the City should move forward with the preferred BRT alignment and its recommended service elements. Recommendations provided in this study can facilitate development of the Alternatives Analysis described in Step 2.

Step 2: Prepare and submit alternatives analysis report to FTA

The Alternatives Analysis is one of the major steps in pursuing FTA approval for advancing in the Section 5309 funding process. One of the major components of an Alternatives Analysis for Small

Starts funding is assessing the cost-effectiveness of the project. By their very nature, Very Small Starts projects are considered cost-effective and require a very simple “project-definition”-based alternatives analysis process. More information on that process and its requirements are available in FTA’s *Interim Guidance and Instructions for Small Starts* under the Section 5309 Capital Investment Grants Program available on the FTA website.

Step 3: Receive approval from FTA to enter into project development

For Very Small Starts, preliminary engineering and final design phases are combined into one phase, the Project Development phase. An applicant cannot initiate the Project Development phase without FTA approval. Prior to approval, the applicant will need to have met several criteria. They include:

- Completion of an Alternative Analysis – Step 2 in this set of actions
- Adoption of a Locally Preferred Alternative – Formulated from Step 2 in this set of actions, the LPA will need to be adopted by the City and the MTPO.
- Inclusion of the LPA into the local area MPO’s Long Range Plan – The MTPOs endorsement of the Alternative Analysis is generally sufficient to meet this criterion and can be expressed in a letter of approval from the MTPO.
- Meet any NEPA requirements – Very Small Starts projects are generally eligible for a Categorical Exclusion. This will need to be determined by the applicant.
- Project must receive a medium rating from FTA – Very Small Starts projects receive a medium rating automatically for two of FTA’s three project justification criteria, cost effectiveness and land use and economic development. For the third criterion, local financial commitment, the applicant will need to demonstrate that funds are available for the local share and that the annual operating costs for the project are less than five percent of the agency’s total annual operating budget.

Step 4: Receive approval from FTA and enter into FTA Project Construction Grant Agreement

Once final engineering and design work for the project is complete, the agency is ready to receive financial assistance from FTA for construction of the project. FTA provides that financial assistance through a Project Construction Grant Agreement. Specific terms for the agreement are developed during the project development phase of the process.

Step 5: Construct project

The Very Small Starts proposal for BRT service in Gainesville will not require large scale construction of new facilities. Very Small Starts projects must be ready to be implemented before FTA considers them for funding. It is envisioned that construction elements for the project will be minimal and that a schedule for initiation of the service can be tied directly to the schedule for procurement, testing, and branding of vehicles.

The typical project development process under the FTA New Starts program is 6 to 12 years. Considering that the Gainesville BRT project would fall under the Very Small Starts program, that timeframe could be considerably shorter depending on the identification of local funding and the approval of a grant agreement through the FTA Section 5309 program.

INCREMENTAL PROJECT DEVELOPMENT

One of the major advantages of BRT service is the opportunity to incrementally build up the service. Incremental service development, or phasing, allows for flexibility with regard to adjustments in the BRT service plan. Decision-makers, public transportation users, and others can gauge the effectiveness of routes or service technologies before committing to a large capital investment. Consequently, the Very Small Starts process will allow Gainesville to fund the initial BRT service design and service elements outlined in this feasibility study and test whether or not the service is effective prior to committing more resources.

A recommendation for future phased development can include intermediate and long-term phases. Examples of service elements that the City may want to consider for implementation in each of those phases include the following:

Intermediate Service Concept

- Implementation of a north-south BRT service route
- Enhanced BRT stations with passenger information technology
- Designated bus lanes for peak-period BRT use
- Off-board fare collection system that is barrier-free
- Signal priority at key intersections

Long-Term Service Concept

- BRT service network consisting of multiple routes
- Enhanced or designated station facilities at all BRT stops
- Exclusive busways
- Off-board fare collection system that is barrier enforced
- Fully integrated signal priority system

As the service matures, each service element should be reassessed to determine the most cost-effective technology for implementation.

INSTITUTIONAL ARRANGEMENTS

Institutional arrangements refer to agreements and organizational structures within and between public agencies. Arrangements can include committees that facilitate involvement in planning and management of activities, or they can include agreements between organizations to share in the responsibility of administering and delivering services. A discussion on committees that will inform the decision-making process and agreements between agencies that will plan or fund the transit operation is provided here.

Committee Structures

For BRT services in the City of Gainesville, it is important to consider all of the stakeholder groups that will benefit from the service and how participation will be encouraged and feedback generated in order to expand and enhance the service once it is in operation. Existing forums created specifically to generate feedback on transportation plans in the area, such as the MTPO advisory committees, serve as a good starting point. Committee structures such as the MTPO advisory committees are encouraged and do provide a good source of public and stakeholder feedback, but focusing strategically on specific stakeholder groups may provide better input for informing decisions on future transit service. Examples of specific stakeholder groups may include:

- Shands Hospital employees
- East Gainesville business owners
- Downtown business owners
- UF student and faculty organizations

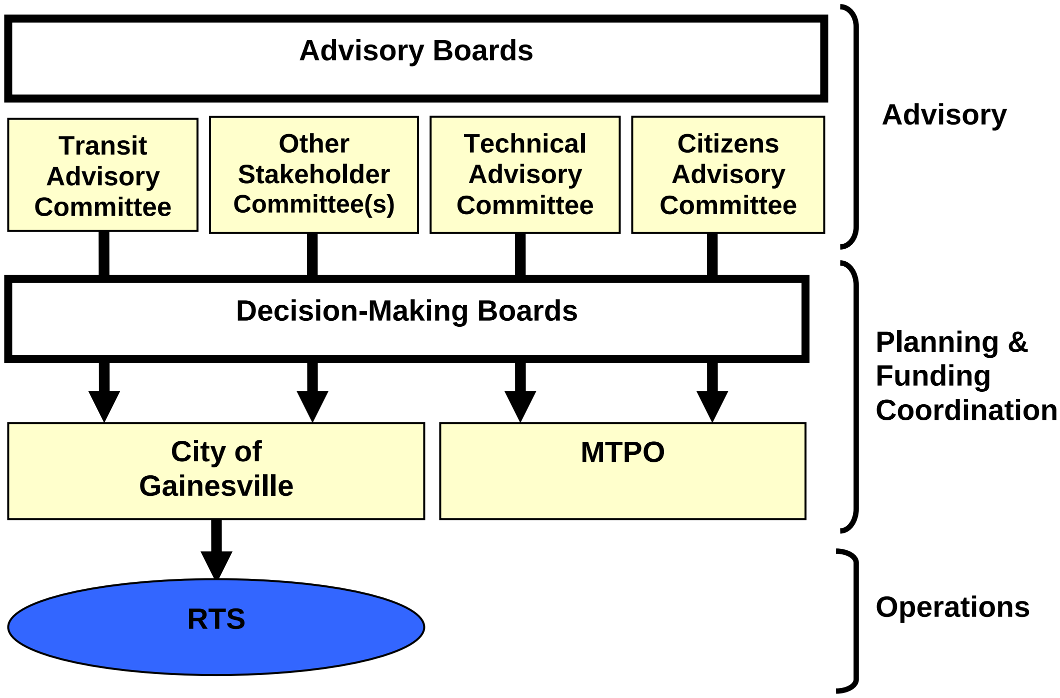
One effort that can facilitate a constructive forum for discussion on public transportation issues is the development of a Transit Advisory Committee (TAC). Such a committee has been successfully employed by other transit agencies and can serve in an advisory role to the City Commission on transit-related issues. The TAC can consist of transit users only or it can consist of a mix of stakeholders and transit users.

Integrating specific feedback from such stakeholders groups will provide better direction to RTS and other agencies that are assisting in the planning of services and the programming of funds. Institutional arrangements for those organizations are described below.

Agency Planning and Funding Agreements

For the initial implementation of BRT services, it is proposed that existing institutional arrangements and agreements be continued. The City, as the recipient of federal funding, will continue to administer and operate RTS transit services, including the BRT service. Transit planning functions performed by the City, such as the Transit Development Plan, will be used to inform the development of the MTPO Long Range Transportation Plan, and both agencies will ensure consistency between the plans. That arrangement and the formal committee structures that will provide support, information, and make recommendations to the two boards, the City Commission and the MTPO Board, are illustrated in Figure 9-2. As the service continues to expand and RTS continues to grow, it may be necessary to pursue a more sophisticated transit governance structure, such as a transit authority.

Figure 9-2
BRT Planning and Operations Arrangements



BRT SUPPORTIVE POLICIES

To ensure the long-term success of the service, it is important to establish plans and policies that complement and support the BRT service. Although, land development will largely be a function of the market, the City and the County can encourage the creation of transit-friendly and transit-supportive development through the adoption of growth management policies and specific land development codes. Based on FTA guidance, transit supportive policies can be organized into four major categories. Those four categories and examples of policies, tools, and/or programs for each category that the City should consider to support the BRT service are shown in Table 9-2.

Table 9-2
Transit Supportive Policies

Transit-Supportive Policy Category	Example Policy/Program
Growth Management	• Plans or policies that promote infill development and redevelopment in established urban activity centers. • Plans or policies that concentrate development around major transit facilities. • Plans or policies that allow transfer of development rights to urban areas
Transit-Supportive Corridor Policies	• Subarea and station area plans and policies that include initiatives to develop or redevelop in the transit corridor • Policies that promote mixed-use development • Requirements and/or capital improvement plans that outline sidewalk improvements, connected streets and walkways, and other pedestrian infrastructure around stations • Policies to reduce parking requirements or cap parking in station areas
Supportive Zoning Regulations Near Transit Stations	• Transit overlay zoning • Zoning incentives for increased development in station areas, such as density bonuses
Tools that Implement Land Use Policies	• Inter-local agreements, resolutions, or letters of endorsement in support of coordinating land use and transit investment • Public outreach materials • Zoning requirements for traffic mitigation • Programs that provide incentives for transit-oriented development (tax-increment financing, tax abatement, etc.)

Alachua County and the City of Gainesville should work cooperatively to establish similar policies. Transit supportive policies and programs will not only ensure the long-term success and growth of the BRT service, but they will also position the area for future funding opportunities available through FTA and FDOT.

Appendix A
Public Involvement Plan

Appendix B
Public Workshop Survey Instruments

Appendix C
Public Outreach Advertisements