Lee County MPO Rail Feasibility Study
Contract 2012-001

Technical Report

Assessment of Potential Options for Passenger Service

July 23, 2013

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1. Report Summary

This report evaluates the feasibility of a passenger service option along the Seminole Gulf Railway (SGLR) corridor. It discusses different modal options that could be implemented along this rail corridor: Bus Rapid Transit (BRT) in shared or exclusive right of way, Light Rail Transit (LRT) and Commuter Rail Transit (CRT). The report also discusses the feasibility of a Multi-Use Pathway along the corridor.

This report is based on the assumption that a recommended passenger service option will need to be based not just on a particular mode of travel but also on the system's ability to attract riders, be cost effective and serve as a tool for economic development. Overall, each mode of travel has its benefits and challenges regardless of where the system is operated and this report presents that information. Although no recommendation is made with regards to the appropriate technology for providing passenger service along the SGLR corridor, the feasibility of each mode specific to the corridor is also presented.

The report proposes that a 31.8-mile passenger service should be operated between Prospect Avenue to the north and Immokalee Road to the south. This service would run along approximately 27.7 miles of the corridor from Prospect Avenue to just south of Bonita Beach Road, then extend along 4.1 miles on surface streets to reach the intersection of Immokalee Road and Goodlette-Frank Road (just east of Naples Park). The report proposes eighteen (18) conceptual stations located between Prospect Avenue (proposed northern terminus) and Immokalee Road (proposed southern terminus).

These termini were proposed for the following reasons (further details in Section 9.2 of the report):

- Although the SGLR corridor does not extend to Immokalee Road on the southern edge (in Collier County), this report evaluates the feasibility of running a future passenger service from Immokalee Road in Collier County because it serves as a logical terminus for an efficient high capacity transit service. Lee Tran's LinC route connects south Lee County to this location which also serves as a northern terminus for Collier's transit service. There are other trip generators located at this point that could provide ridership for a transit service: Naples Park (an affordable community of 6,000 resident), North Naples Hospital (northern campus of Naples Community Hospital) and Creekside Commerce Center, a growing industrial and commercial park.

An obvious terminus would be downtown Fort Myers to the north. However, there is a strong case for extending the line beyond downtown into East Fort Myers, where the rail corridor runs parallel to and very close to Palm Beach Boulevard (SR 80). The transit line could be extended as far east as Prospect Avenue (the city limits of Fort Myers), without extraordinary additional cost. The extension could be part of the initial transit corridor or it could be added as part of a later phase.

Further, the planning, implementation and operation of any major capital investment in transit project requires a sound estimation of capital and operating and maintenance (O&M) costs. This helps to fully grasp the feasibility of the project and the funding needs of the project. The report provides capital cost estimates of each passenger service option as well as the operations and maintenance cost estimates of the options (see Section 9). Implementation of a high capacity transit service along this corridor will depend on a combination of various funding sources with the likelihood that the project proponent will seek substantial federal funding participation. Therefore the report presents an overview of the federal funding situation within the context of the recently enacted Moving Ahead for Progress in the 21st Century (MAP-21) legislation.

Although this report does not make any recommendation for a particular passenger service modal option along the SGLR corridor, the report recognizes that all the transit modes considered could be implemented along the corridor. However, the implementation of a particular mode along the SGLR will depend on different factors such as costs, ridership levels, impacts on land surrounding land uses, among others. These factors need further refinement beyond the level of a feasibility study to be able to help make the determination for a specific transit service along the corridor.

The most logical next step in the process will be a full analysis of the corridor and determination of a specific passenger service option for operations along the corridor. Such analysis will define the following elements:

- The extent of double tracking for rail operations over the corridor;
- The size of the maintenance facility including vehicle parking;
- Location of park and ride lots;
- Specific locations of transit stations and analysis of parking demands at those stations;
- Potential need for grade separations of major roadways during peak hour rail operations;
- Potential requirement for grade separated access to center stations in a rail corridor; and
- Operational elements such as service frequency, number of vehicles in fleet, actual distance to be traveled, among others.

2. <u>Overview</u>

The Rail Feasibility Study is intended to evaluate the feasibility of a passenger service system through Lee County and into northern Collier County, FL. The evaluation includes north-south options for providing premium transit service along Seminole Gulf Railway corridor (SGLR) as well as along Interstate 75 (I-75) multi-modal envelope (*Multi-Use Assessment: I-75 Multi-Modal Envelope vs. Rail Corridor* Technical Report, November 2012). The *Multi-Use Assessment Report* concludes that "the Seminole Gulf (SGLR) corridor is clearly superior to the I-75 multi-modal envelope for intra urban commuter rail, light rail, Bus Rapid Transit (BRT) and/or multi-use pathways serving Lee and Collier Counties." Based on that conclusion, this report focuses on the feasibility of service along that corridor. This technical report identifies and compares the appropriate transit modal options that could be provided along the SGLR corridor. These options include commuter rail transit (CRT), light rail transit (LRT), and bus rapid transit (BRT) and the consideration of a Multi-use Corridor.

The Lee County Comprehensive Plan (The Lee Plan) has identified a policy (Policy*44.1.3*) to "Develop transit system alternatives to fixed route bus service, such as High Occupancy Vehicle Lanes, Bus Rapid Transit and Light Rail" (see *Seminole Gulf/CSX Rail Corridor in Southwest Florida Land Use Plans* Technical Report, December 2012). This report has been developed consistent with this policy. It also takes into consideration existing operations and long term plans for transit service in Lee County by LeeTran.

LeeTran is a Department of Lee County government, responsible for operating the public transit system that serves the county. It currently operates 18 bus routes; a paratransit service for the disabled called *Passport*; and an employer vanpool program. Its fleet consists of 50 full size buses, 11 trolley buses and 47 paratransit vans. LeeTran serves an area with a population of approximately 450,000 people (2009). One of LeeTran's long-term goals is the implementation of an 11.4-mile BRT service along US 41 (north-south) and along US 80 (east-west). LeeTran's most productive route, Route 140, currently operates along US 41 every 20 minutes and has the highest ridership in the system at 975,485 riders annually (FY 2009 data). Implementation of any high capacity transit service along the SGLR corridor should be complimentary to the LeeTran service plan while providing the significant improvements needed to the overall transit operations in the region.

3. Assumptions

This technical report assumes the following:

- That the information provided is conceptual in nature and will form the basis of further service planning and advanced conceptual engineering work to refine and advance the appropriate modal options for the SGLR corridor.
- That a future passenger service along the SGLR corridor will be fully integrated with LeeTran's transit service and will help shape future service plans. Any high capacity transit service along this corridor will transform the current transit system offered in Lee County. Thus it is important to assume that LeeTran's service will be revised, redefined and most likely expanded to maximize the implementation of this type of service along the corridor.
- That LeeTran's Transit Development Plan (FY2012-2021) and Lee County MPO's 2035 LRTP goals and vision have been carefully reviewed and considered as policy and technical input to the development and evaluation of modal options.
- In identifying potential station locations, careful consideration has been given to population density, employment density, transit-oriented development (TOD) potential, transfer possibilities, and opportunities for connections with LeeTran's transit centers.
- Passenger service options need to consider not just a choice of travel mode (LRT, BRT, Commuter Rail) but also the complete transit system's ability to attract riders, be cost effective and serve as a tool for economic development.
- The report assumes a northern terminus at Prospect Avenue and a southern terminus at Immokalee Road.

4. Seminole Gulf Railway (SGLR) Corridor

The Seminole Gulf Railway corridor is approximately 37.5 miles long (from the end of the line in northern Collier County to the Lee/Charlotte County line). The *Inventory of Existing Seminole Gulf Railway Corridor Report (April 2013),* based on information obtained from the Lee County Property Appraisers GIS and the SGLR Valuation (Val maps), the railroad right of way (ROW) varies in width throughout the corridor from 40 feet to approximately 200 feet.

- South Lee County and Northern Collier County: Averages 130 feet
- Middle portion of Lee County: Varies between 97 feet to 159 feet
- Northern Portion of Lee County: Varies between 80 feet and 120 feet

While this is generally sufficient to accommodate a passenger transit service operating within the right of way, acquisition of some right-of-way may be required for park-and-ride lots and station areas at a minimum.

SGLR currently operates a freight rail service along the corridor through a long-term lease agreement with CSX Transportation, which owns the land within the right-of-way.

Starting at Prospect Avenue, the rail line runs parallel to SR 80 (Palm Beach Boulevard) and Seaboard Street until it reaches the eastern edge of Downtown Fort Myers. It then runs parallel to and approximately one mile east of US 41. US 41 is the primary commercial/business corridor in Lee County. The rail line continues to run parallel to US 41 as it passes through San Carlos Park, Estero and Bonita Springs into northern Collier County.

The SGLR rail line is multi-jurisdictional, crosses multiple uses and connects with various trip generators and activity centers along the corridor providing opportunity for a feasible and successful transit service.

5. Potential Passenger Service Options

A typical comparison of modal options examines a number of evaluation criteria, including the availability of existing right of way (ROW), capital and operating costs, and service characteristics. The descriptions of the modes in this report supplement the general descriptions presented in an accompanying technical report on *Preservation of Rail Corridors: Experience in Other Communities*, January 2013.

The SGLR corridor generally has sufficient ROW to accommodate an exclusive guideway. *Table 1* is a comparison of the different transit options that could be implemented along the SGLR corridor. A discussion of the modes and respective service characteristics is provided hereafter.

5.1 Bus Rapid Transit (BRT)

BRT is defined by the Federal Transit Administration (FTA) as “a rapid mode of transportation that can provide the quality of rail transit and the flexibility of buses”. BRT is an integrated system of physical and operating components which exhibits distinct identity and high quality image. The National Bus Rapid Transit Institute (NBRTI) estimates that about 30 U.S. cities have adopted some form of BRT (www.nbrti.org). The system is advantageous in that it combines the travel time savings associated with Light Rail Transit (LRT) with the flexibility of buses. BRT can operate in bus-only lanes and offer high-frequency bus operation with reliable headways.

BRT relies on a combination of limited-stop service and advanced technology to help speed up travel times and improve service reliability. BRT service can be designed to operate in exclusive transitways/busways such as the SGLR corridor, as well as in mixed-traffic on expressways or arterial streets. Technological enhancements commonly incorporated into new BRT projects include transit signal priority, off-board fare collection, enhanced passenger amenities and real-time passenger information. BRT service is typically viewed as a premium service; however, many service providers charge a standard bus fare.

BRT is a very feasible option along the SGLR corridor. From an operating standpoint, it can run in an exclusive guideway, have minimal disruptions to vehicular and pedestrian traffic and can fairly easily connect commuters to key job centers, downtown employments and other major trip generators along the corridor. A previous study (LeeTran's *BRT Feasibility Study*, April 2008) identified the SGLR corridor as a candidate for implementing a BRT service. Although the corridor was eventually excluded from the study because of its proximity to US 41 corridor (which was identified as the most feasible corridor for operating a BRT service in Lee County), the study states that this exclusion does not preclude it from future BRT consideration. The study further states that, "as corridors continue to develop and transit demand rises, assessment of other BRT corridors should be performed." Further assessment of the SGLR should be performed to determine if a BRT service can be implemented along the corridor successfully.

Table 1: Comparison of Transit Modes

Attributes	Transit Modes				
	Bus Rapid Transit (Exclusive ROW*)	**Bus Rapid Transit (Shared ROW**)**	**Light Rail Transit (Exclusive ROW)**	**Light Rail Transit (Shared ROW)**	**Commuter Rail Transit**
Capital Cost per mile	$20-40 million	$5-15 million	$80-120 million	$40-80+ million	$10-20 million***
Capacity (seats/vehicle)	40-60	40-60	225	225	Over 250
Service Range	Up to 20 miles	Up to 15 miles	Up to 20 miles	Up to 15 miles	Up to 50 miles
Impact on Land Use	Moderate	Limited	Strong	Strong	Strong
Station Spacing	1/4 to 2 miles	1/4 to 1 mile	1/2 to 2 mile	1/2 to 1 mile	1-4 miles
Maximum Speed	35-55 mph	35-55 mph	45-65 mph	45-55 mph	Up to 60 mph
Average Speed	25-30 mph	15-25 mph	30-35 mph	15-25 mph	40 mph
Frequency of Service	5-15 minutes	5-15 minutes	5-15 minutes	5-15 minutes	30 minutes
Operating cost	$80-120/bus-hour	$80-120/bus-hour	$200-400/train-hour	$200-400/train-hour	$1,500-2,500/train-hour
Cost of vehicles	Low	Low	Medium	Medium	High
Life of Vehicle (years)	12	12	25	25	25
Residents + Jobs per acre	10 to 25	10 to 25	More than 40	More than 40	More than 40
Examples of Applications	Eugene, Orlando, Boston, Cleveland, Pittsburgh, Salt Lake City, Los Angeles	Albuquerque, Ottawa, Los Angeles, Kansas City, Miami, Minneapolis, Pittsburgh Busways	Baltimore, San Diego, San Jose, Portland, Dallas, Phoenix, Charlotte, Sacramento, St Louis.		Nashville, Dallas, Salt Lake City, Washington DC, Miami, Orlando (under construction)

Source: HDR Engineering Inc.

*BRT/LRT (Exclusive ROW) refers to BRT/LRT operating in dedicated lanes (such as within the SGLR corridor).
**BRT/LRT (Shared ROW) refers to BRT/LRT operating in mixed-traffic as opposed to an exclusive right of way (within the SGLR corridor).
***This is a range of capital cost for Commuter Rail along a shared corridor.

Based on information in the *FDOT Transit Facility Handbook*[1], *Table 2* explains the primary advantages of BRT while *Table 3* presents the challenges of BRT projects.

Table 2: Benefits of BRT

Benefits of BRT	Description
Reduced Travel Time	• Faster boarding than conventional buses • Smarter roadway configurations • Technology • Fare prepayment
More Reliability	• Reduction or elimination of: ○ Traffic delays at congested intersections ○ Traffic signal stops • Responsive transit management
Greater System Capacity	• Larger vehicles than conventional buses • Shorter headways
Lower Risk	• Cost is lower than rail due to: ○ Less investment in ROW, vehicles and construction ○ Shorter implementation time ○ Greater vehicle flexibility
Increased Comfort	• Added amenities compared to conventional buses • Attractive facilities • Vehicles (inside and out) • Passenger information systems
Improved Safety	• Added lighting • Security systems • Removing dangers • Additional ridership

Table 3: Challenges of BRT

Challenges of BRT	Description
Capacity	• Does not carry as many people as LRT or CRT
Service Range	• In most cases, BRT services, especially in shared right of way, do not travel as far as LRT and certainly not as far out as CRT
Speed	• Because most BRT services operate in mixed traffic, speed is not as high as what can be obtained for LRT services
Economic Development	• Compared to LRT and CRT, there are very few demonstrated examples of BRT projects in the United States with impact on economic development along its corridor.
Identity	• Depending on unique branding scheme, a new BRT service may confuse transit riders since it still appears like a conventional bus.

[1] *Florida Department of Transportation Districts One and Seven Transit Facility Handbook; Gannett Fleming, Inc.; October 11, 2007*

According to the 2009 *Characteristics of Bus Rapid Transit for Decision-Making*[2] report there are seven major elements of BRT: running ways, stations, vehicles, fare collection, ITS, service and operations plans and branding elements. These elements are each related to attributes of system performance such as travel time savings, reliability, identity and image, safety and security, capacity and accessibility. When developing a BRT system the integration of elements improves system performance and the experience for passengers. Improvements to system performance, in turn, provide benefits to transit agencies and local communities.

An exclusive BRT guideway usually consists of two 11-ft lanes. However, BRT systems that operate at 30 mph or less can be reduced to 10-ft lanes. Curbs are sometimes used in BRT systems to provide a greater degree of separation between the BRT guideway and adjacent general purpose travel lanes. Curbs determine the maximum safe speed of the facility.

Height and Width

The width and height of BRT systems, as shown below, are based on BRT guideway designs. If possible, additional width is ideal as it allows for maintenance access, emergency access and, when necessary, side slope grading.

Transit Vehicle Dimensions

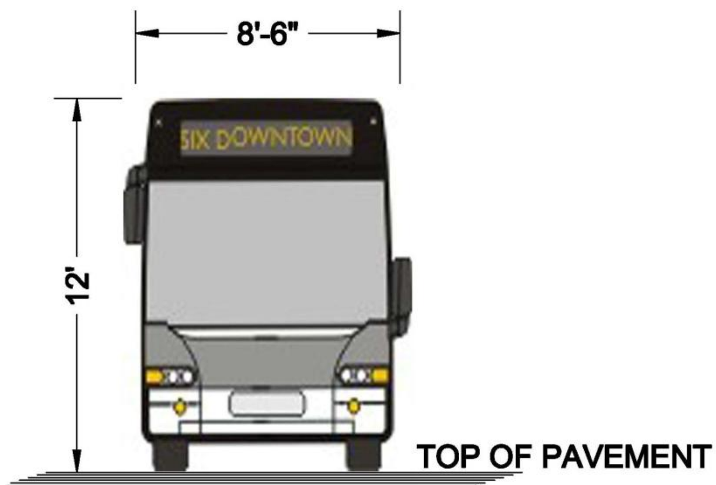


Figure 1: Typical BRT Dimensions

Stations

The recommended BRT design guidelines are as follows:

- Side (curb) platform width – 8-10-ft
- Median platform width – 12-ft

[2] *Characteristics of Bus Rapid Transit for Decision-Making; United States Department of Transportation and Federal Transit Administration; Project No. FTA-FL-26-7109.2009.1; February 2009*

- Platform Length – 40-130-ft (Note: 130-ft will accommodate two articulated buses stalled)
- Platform Height – 10-14-in (Note: 14-in will provide level boarding for low-floor buses)

Operating Speeds

In exclusive lanes, BRT operating speeds are typically between 35 and 55 miles per hour (mph). In general, proposed design speeds less than 40 mph should be avoided except when operating in mixed traffic. The distance between stations will impact the operating speed. Typically, in operations, BRT systems with frequent stops will average between 15 and 25 mph.

5.2 <u>Light Rail Transit (LRT)</u>

LRT operates singly or in short, usually 2-4 car trains, on fixed rails. LRT operates in exclusive lanes or in its own dedicated ROW, and can operate in mixed traffic if needed to pass through downtowns. LRT vehicles are typically driven electrically with power being drawn from an overhead electric line, but new systems are in development that will allow the LRT vehicle to draw its power wirelessly from the guideway.

LRT is often used to serve regional transit needs in cities that cannot support or afford heavy rail transit, where all grade crossings are eliminated. LRT is also less invasive than heavy rail because its power supply is overhead, thus allowing the vehicles to interface with vehicle and/or pedestrian traffic when necessary.

LRT is also a feasible option along the SGLR corridor as it can share the existing right of way with minimal impacts to vehicular and pedestrian traffic and can serve downtown areas along the route effectively. LRT along the SGLR corridor can either run on its own tracks or share existing SGLR track where possible such as the case with San Diego Trolley (see Section 5.5.3).

Tables 4 and *5* present the benefits and challenges of an LRT system.

Table 4: Benefits of LRT

Benefits of LRT	Description
Passenger Capacity	• Serves moderate to high passenger volume
Vehicle Speed	• Operates at low to medium speed (depending on exclusivity of ROW and distance between stops)
Distance Served	• Serves short to long distance trips
Stations	• Has station spacing from 0.5 to 1 mile in shared ROW and 0.5 to 2 miles in exclusive ROW • May use low platforms, high platforms or both • May have elaborate or simple stations
Vehicles	• Uses overhead power collection • Operate as a single vehicle or in trains of up for four vehicles
Running Ways	• May operate in mixed traffic, with cross-traffic, or on exclusive ROW • Can negotiate steep grades (generally up to 5 percent) and small radius curves
Costs	• Has moderate operating and maintenance costs compared to commuter or heavy rail

Source: HDR Engineering Inc. (2013)

Table 5: Challenges of LRT

Limitations of LRT	Description
Station Spacing	• Outside the CBD, stations are spaced farther apart than a BRT system and as such may impact potential riders
Costs	• Capital and operating costs of a new LRT system is higher than a BRT system
Impact on Real Estate	• May involve substantial property acquisition along its right of way for tracks, maintenance facilities, etc.
Utilities/Infrastructure	• Impact on utilities cost is higher than BRT system

Source: HDR Engineering Inc. (2013)

Height and Width

In general, LRT vehicle heights fall between the range of 11-ft and 12-ft-5-in. The maximum height is controlled by the height of the overhead centenary wire which is usually between 14-ft and 22-ft above the top of the rail. It is important to consider an additional 2-ft above the contact wire in order to account for the supporting arms that cantilever from the centenary poles over the trackway. Taking all of this into consideration the total LRT height is in the range of 16-ft to 24-ft. Most LRT vehicles in the United States are between 8-ft-7-in and 8-ft-10-in in width.

Transit Vehicle Dimensions

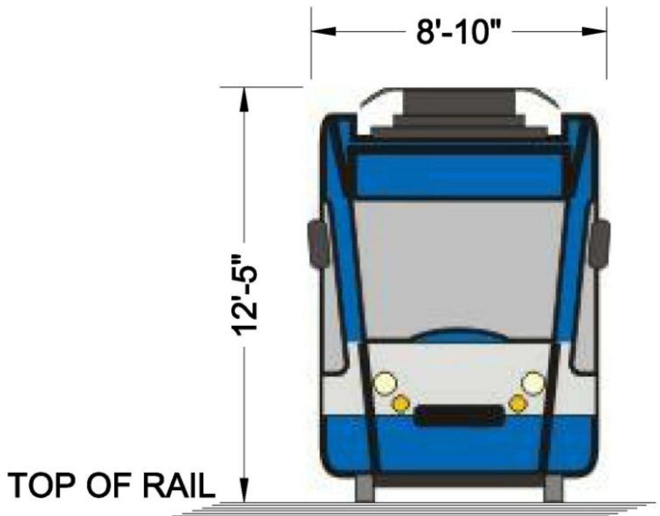


Figure 2: Typical LRT Dimensions (overhead catenary wires not shown or included in the dimensions)

Stations

The recommended LRT design guidelines are as follows:

- Center platform width – 15-ft
- Platform Length – 300-ft
- Platform Height – 14-in

Operating Speeds

LRT operating speeds are typically between 45 and 65 mph in an exclusive guideway or between 45 and 55 mph in mixed traffic. The distance between stations will impact the operating speed.

5.3 <u>Commuter Rail</u>

A typical commuter rail uses a fixed rail corridor to provide commuter service between the suburbs and the central business district. This is often the most practical and efficient method to get commuters traveling long distances to and from an urban core. They are usually home-based trips and therefore dependent on jobs in the urban core.

There are, however, a few exceptions to this typical standard of commuter rail operations (for example, RailRunner Express, Tri-Rail and Sunrail – see *Preservation of Rail Corridor Technical Report*). These exceptions are especially relevant in areas where there are more than a single location for concentration of employment, thereby necessitating more than point-to-point stops between central city and suburbs. Commuter trains can be configured traditionally using locomotives and coach cars, or passenger cars equipped with their own individual motors (Diesel Multiple Unit/Electric Multiple Unit). Most of the commuter rail systems in the US use diesel locomotives; however, some legacy electric systems are still in service. Most systems operate in freight railroad corridors and share track with freight trains; however, some systems with high frequency service have track dedicated solely to commuter rail.

Similar to a typical passenger rail system, commuter rail service must be operated on a regular basis by or under contract with a transit operator for the purpose of transporting passengers within urbanized areas, or between urbanized areas and outlying areas. Predominantly commuter service means that for any given trip segment (i.e. distance between any two stations), over 50 percent of the average daily ridership travels on the train at least three times a week.

Table 6 and *Table 7* present the benefits and challenges of a Commuter Rail Transit system.

Table 6: Benefits of CRT

Benefits of CRT	Description
Passenger Capacity	• Serves high passenger volumes during commuting periods
Vehicle Speed	• Operates medium to high speed (depending on number of stops and distance between stops)
Distance Served	• Serves long distance trips connecting people who live in the suburbs with job opportunities in the urban core
Stations	• Has station spacing from 1 to 4 miles • May use low platforms, high platforms or both • Improved station appearance
Vehicles	• Uses diesel multiple units, third rails or overhead lines (electric multiple units) • Typically operates as multiple units in single or double level, with cab controls at both ends for short turn around time.
Running Ways	• Operates on exclusive ROW but could share tracks with freight service
Economic Benefits	• Increased economic activities around commuter rail stations

Source: HDR Engineering, Inc. (2013)

Table 7: Challenges of CRT

Limitations of CRT	Description
Frequency	• CRT services are less frequent than LRT and BRT and sometimes has no weekend off-peak trips
Utilities/Infrastructure	• Impact on utilities/infrastructure is higher
Corridor	• Sharing a rail corridor with a freight operator can impose operating limitations on schedule making and schedule adherence by both freight and passenger operators. If the commuter rail operator is not the rail property owner, the freight operator traditionally provides dispatching and determines train movement priorities. • The use of an existing railroad may impose labor costs and work rules that limit the ability to control costs and management options to achieve a cost-effective operation. Thus what is saved in initial capital cost may be eroded by the costs of traditional railroad operating practices.
Railroad Regulations	• Railroad regulation in the United States does not permit the simultaneous operation of light rail derivative diesel multiple unit (DMU) equipment and conventional railroad equipment on shared track. Unless time separation can be arranged, rail new starts using active railroad infrastructure as a foundation must use vehicles that comply with Federal Railroad Administration (FRA) rules and thus that are larger and more costly than lightweight types. This also limits the ability to integrate CRT and LRT services.

Source: HDR Engineering Inc. (2013)

Height and Width

Most CRT vehicles have heights and widths that are standard for passenger coaches in service on Federal Railroad Administration (FRA) regulated railroad. They are typically 85 feet long, 10’6” wide and between 14’6’ and 16’ high.

Transit Vehicle Dimensions

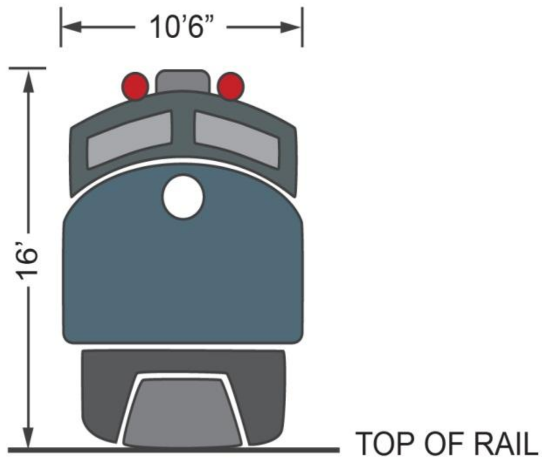


Figure 3: Typical CRT Dimensions

Stations

Stations are typically placed 1 to 4 miles apart with platform stretching the entire length of the vehicle. Commuter rail stations can have uni-directional or bi-directional stations, depending on the demand and service frequency. On lower frequency lines, unidirectional stations are employed to lower capital costs.

Operating Speeds

CRT operating speeds are typically up to 60 mph (average speed is 40 mph). Similar to transit operations, the distance between stations will impact the operating speed.

As indicated for the other modal options evaluated in this report, CRT service is also very feasible along the SGLR corridor. It can provide convenient travels for suburban residents who work downtown using the existing freight rail tracks, where possible. The nearest example of commuter rail service is Tri-Rail, which connects Miami, Fort Lauderdale, and West Palm Beach. Another example is SunRail which is currently under construction in Central Florida.

5.4 **Multi-Use Pathway**

Lee County's Multi-Purpose Recreational Trails Master Plan (*Figure 4*) includes a north-south trail connecting Lee County to Charlotte and Collier Counties. A portion of this trail route would follow the rail corridor, generally from Martin Luther King Jr. Boulevard in Fort Myers south to Briarcliff Road. Segments that have been completed to date run from Crystal Drive south to Six Mile Cypress Parkway, parallel to and adjoining the SGLR corridor. These segments have been built in the right-of-way of the Ten Mile Canal.

The Lee County MPO *Bicycle Pedestrian Master Plan* (*2011)* shows a 14-foot paved bicycle path within the rail corridor through the City of Fort Myers. The plan states that the "SGLR right-of-way presents an opportunity to develop a cross-county, off-road trail that could provide significant recreation, tourism and economic benefits." As part of its multi-modal approach to transportation planning, to integrate biking, walking and transit, the plan understands the relevance of the SGLR as the most direct and long reaching opportunity for these activities along a rail corridor (see *Seminole Gulf/CSX Rail Corridor in Southwest Florida Land Use Plans* Technical Report, November 2012).

In addition, the Conceptual Bicycle System Master Plan in the City of Fort Myers Bicycle and Pedestrian Plan shows the Seminole Rail Corridor as a "Proposed Bike Greenway". The Conceptual Parks System Master Plan and the Parks System Conceptual Park Designs and Waterfront Area Connections in the City's Parks & Open Space System Master Plan show the Seminole Rail Corridor as a "Proposed Greenway" and "Potential Rail Trail", respectively. There are segments which have been completed to date along the corridor: the segment which runs from Colonial Boulevard south to north of Alico Road and the segment south of Six Mile Cypress Parkway which was built in conjunction with the Metro Parkway Extension. The existing trail from Colonial Boulevard to Six Mile Cypress Parkway is known officially as John Yarborough Linear Park. A Project Development and Environmental (PD&E) study to extend the trail to the North Colonial Waterway is currently programmed in FY2016/17.

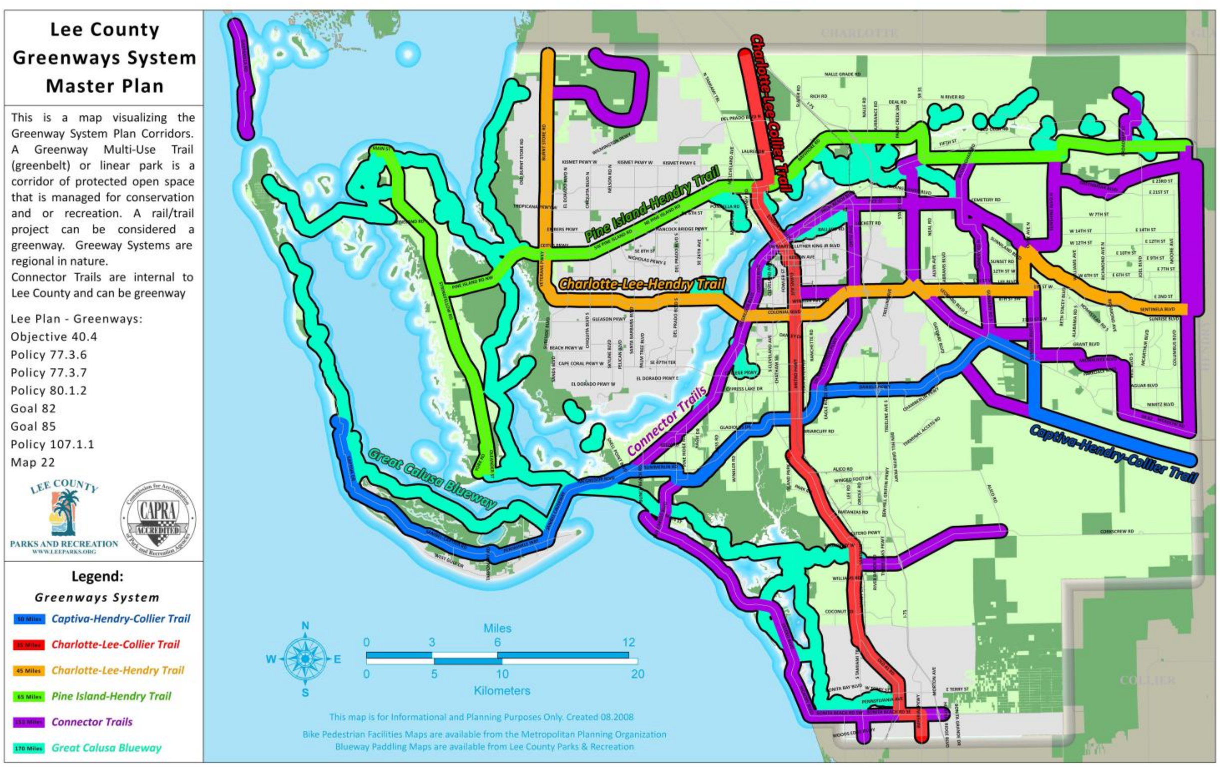
The implementation of a multi-use path along the corridor, as envisioned by these Plans, needs further evaluation to determine the constraints along the corridor. Considering that the corridor is currently utilized for a freight service, offers a potential for a passenger rail service and there are right of way width constraints, it is highly likely that there would be sections along the corridor not suitable for bike/pedestrian pathways. The Federal Highway Administration (FHWA) in its *Best Practices Design Guide* (May 2012) identifies Rail Trails as examples of shared-use paths created from right of way of abandoned railroad lines. However, the SGLR is

an active railroad corridor and in order to integrate a bike/pedestrian trail with freight and passenger rail service along the corridor, safety and liability are often the greatest concern.

Further studies will identify sections along the corridor where right of way constraints exist, where grades could be an issue, specific crossings where conflicts may exist between pedestrian, bicyclists, motorists and rail road operators and how to design the trails for access, safety and ease of use. The minimum width required along the corridor to be able to add a pathway in conjunction with a transit mode will depend on a number of factors such as the type of transit mode and right of way constraints along the corridor, among others.

Generally, experience shows that the success of transit projects increases with the integration of a multi-use system of transit, trails and parks/open space. Although the corridor is envisioned for a high capacity passenger transit system running on an exclusive corridor, because it connects different land uses and neighborhoods, it provides a rare opportunity for a multi-use system of transit, trails and parks. By utilizing the corridor for transit, trails and parks/open spaces, the value of the corridor increases, ridership potential increases, and the ability of the project to attract funding for implementation is enhanced.

Figure 4: Lee County Multi Purpose Recreational Trails Master Plan



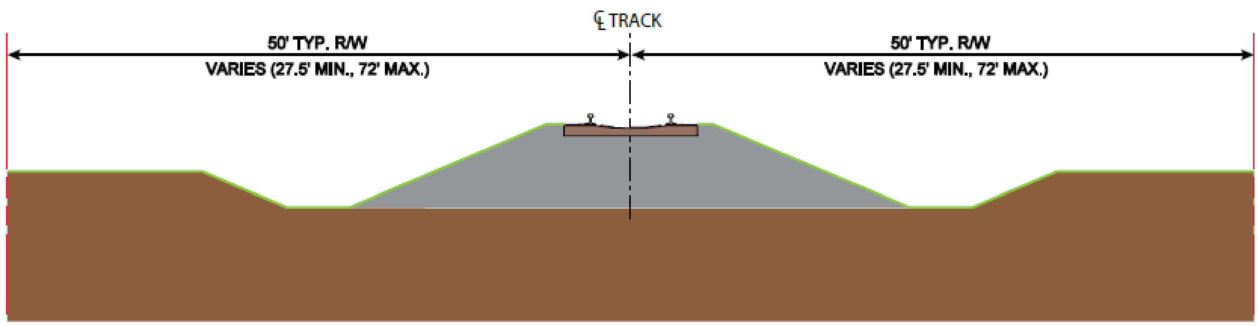
5.5 SGLR Right of Way and Modal Cross Sections

The following typical cross-sections indicate that the SGLR corridor could accommodate all transit modes described above (including bike and pedestrian trails which will need right of ways in certain locations).

5.5.1 Cross Section of Existing ROW

The existing SGLR right of way consists of a single track, shown on Figure 5. The existing ROW width varies from 40 feet to 200 feet, with the majority of the ROW width being more than 95 feet. There are no other features within the ROW except open drainage swales. While this is generally sufficient to accommodate a passenger transit service operating within the right of way, acquisition of some right-of-way may be required for park-and-ride lots and station areas at a minimum.

Figure 5: Existing ROW



EXISTING RAILROAD TYPICAL SECTION

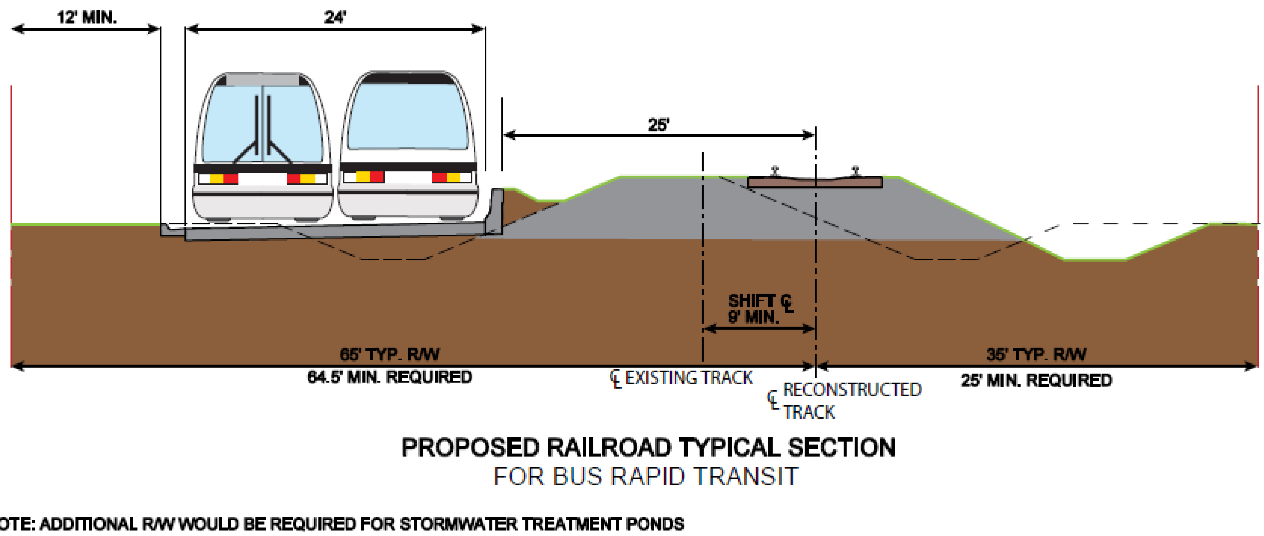
Note:
SGLR ROW varies between 40 and 200 feet. An average 100-foot cross-section is shown.

5.5.2 BRT Cross Section

Figure 6 shows how a BRT system could operate in the right of way sharing the travel corridor with the existing rail service. A two-way divided guideway is proposed for the operations of the BRT system, requiring 24 feet of pavement separated from the centerline of the existing rail track by a minimum of 25 feet on one side, which could require relocating the existing rail line as much as nine feet. The BRT guideway would require barrier wall and an urban drainage system to reduce ROW impacts, but would still require a minimum of 90 feet of ROW for the entire length of the corridor. To allow for required stormwater treatment ponds, additional ROW would need to be acquired outside of the SGLR corridor. The determination of the adequacy of ROW to accommodate pond sites will depend on Water Management District and County permitting requirements.

Consideration was also given to directional single-lane BRT roadways that would be located on each side of the SGLR track. This configuration is not desired since the track would be isolated between the BRT roadways, hence greatly impeding access to the track for maintenance purposes.

Figure 6: BRT Cross Section

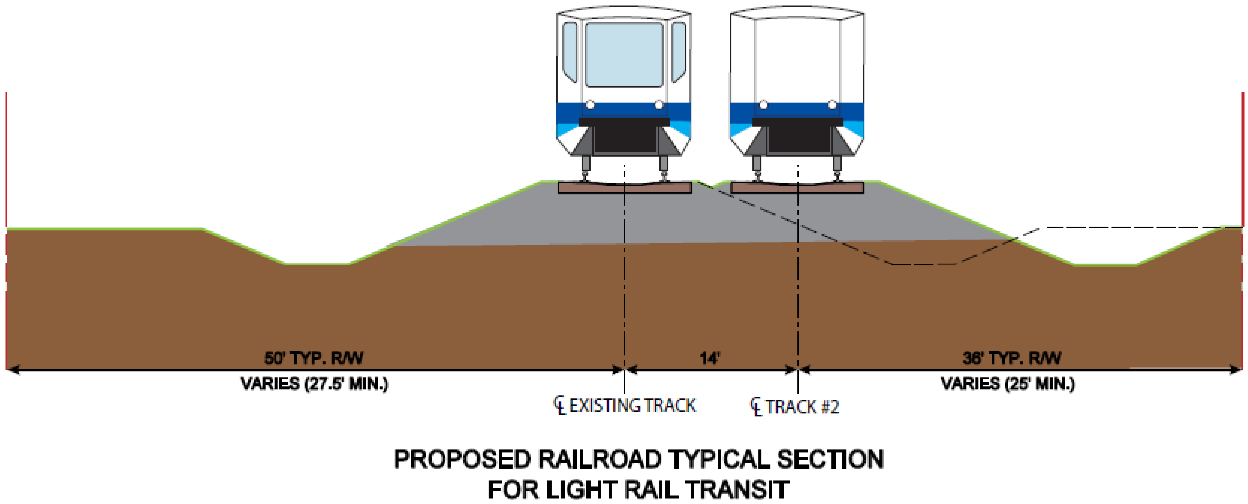


5.5.3 LRT Cross Section

Figure 7 depicts how the corridor could be utilized for LRT operations. It is likely that LRT would be a double-track operation with the tracks spaced 14 feet apart on-centers. Sharing the tracks with the existing rail service as shown would require temporal separation, i.e., restrictions as to when freight operations can use the tracks. If temporal separation cannot be achieved, the construction of a third track for freight operations offset 25 feet from the LRT tracks would be required.

If LRT operations share track usage with freight, it would require that freight operations occur when LRT is not operating because LRT service preferably should not comingle with freight trains on the same tracks. It is not known if SGLR would consider running their freight trains in the evening to allow unimpeded LRT operations during the day (such as the case with the San Diego Trolley). Overhead catenary would need to be of sufficient height to provide vertical clearance for freight cars. The existing track would need to be upgraded to accommodate frequent use by an LRT service at a higher speed than freight trains. An operational analysis would need to be performed to determine the need for passing sidings and/or double track for LRT. Since the use of LRT within the corridor would likely recommend double-track for the length of the corridor, this would require ROW outside of the existing SGLR ROW in areas where the existing ROW is less than 65 feet in width.

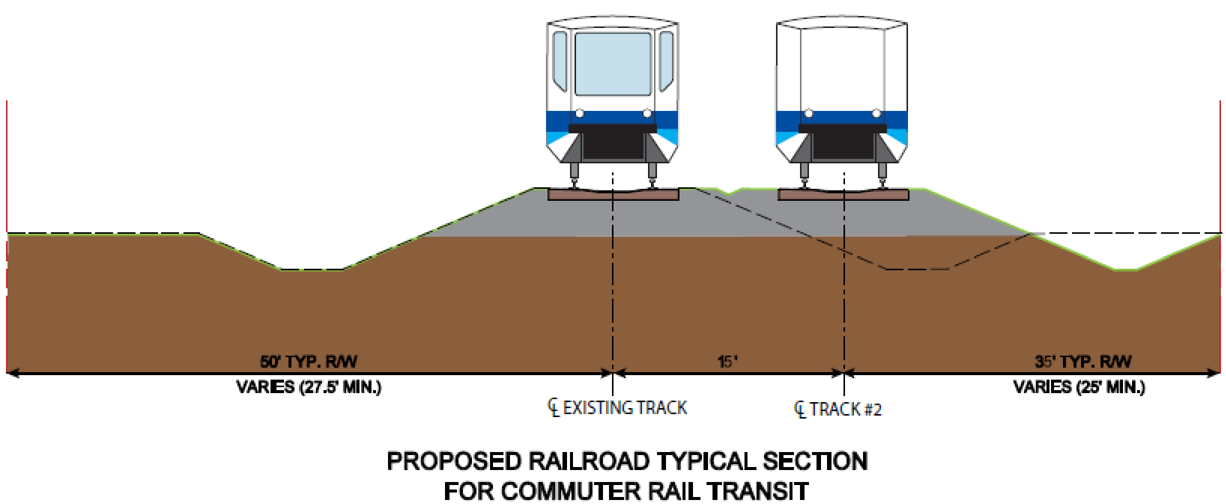
Figure 7: LRT Cross Section



5.5.4 CRT Cross Section

Figure 8 shows the operations of a commuter rail service along the SGLR as a double-track system, sharing the track with the existing service. Unlike LRT, commuter rail and freight rail could be scheduled to comingle on the same tracks. The existing track would need to be upgraded to accommodate frequent use of a CRT train service at a higher speed than freight trains. Passing sidings, or double track, would be constructed using minimum 15’ track centers. The addition of a second track in the corridor would likely require additional ROW in the areas where the existing ROW is less than 67.5 feet in width.

Figure 8: CRT Cross Section



5.6 Evaluation Criteria

Evaluation measures are usually defined to compare how well each alternative meets the goals and objectives defined for a transportation improvement in a corridor. Developing a preliminary set of evaluation criteria during the planning phase ensures that the study generates the data and information used to support decision-making for local policymakers to pursue the ultimately selected transit alternative.

For comparison purposes within this feasibility analysis, the following evaluation measures were established to address the common categories of goals, objectives and evaluation measures identified by the Federal Transit Administration (FTA). Other evaluation measures such as population density, employment density, consistency with regional/local plans, major activity centers, land use consistency and right-of-way constraints were not included since these items are consistent along the corridor and across all mode options.

- Travel Demand – Measured by ability to attract new ridership.
- Development / Land Use Impact – Measured by ability to influence and attract new development, and/or support high-density, sustainable development in accordance with County's Comprehensive Plan
- Roadway Congestion – Measured by potential to reduce congestion through auto trip reduction and/or infrastructure improvements
- Capital Costs – Measured by total capital costs associated with implementing scenario
- Operating Costs – Measured by total operating and maintenance costs associated with implementing scenario

Table 8 presents the results of the screening of alternatives based on meeting the evaluation criteria.

Table 8: Summary of Evaluation Measures

Alternative	BRT (Exclusive ROW)	*BRT (Shared ROW)	Light Rail Transit	Commuter Rail Transit
Travel Demand	●	○	●	◐
Development/Land Use Impact	◐	○	●	●
Roadway Congestion Impact	◐	○	●	◐
Capital Costs	●	●	○	○
Operating Costs	●	●	◐	○

● = Ranks highest (best) in comparison to other alternatives.
◐ = Ranks well in comparison to other alternatives.
○ = Ranks lowest in comparison to other alternatives.

*Please note: BRT (Shared ROW) refers to BRT operating in mixed-traffic as opposed to an exclusive right of way (within the SGLR corridor).

From this feasibility-level comparison, it is obvious that each of the different transit modes can be operated successfully along the SGLR for several reasons:

- They all have the capacity to attract significantly higher ridership than a regular bus system will do.

- They all have the ability to generate fairly positive impacts on land use along the corridor. Studies have shown that LRT and CRT can result in better land use impacts than BRT systems, however, it depends on how the rail service is operated (single or double tracking as well as headways).
- LRT and CRT can move faster and ultimately become the north-south "spine" that would connect the existing and future systems at specific locations to the rest of the region.
- LRTs (unlike BRTs) have several demonstrated examples of serving as a tool for economic development through transit-oriented developments within a half-mile radius of its stations.
- CRTs can utilize the existing freight rail tracks, have a moderate economic development potential but a broader catchment area than LRTs and BRTs because it can travel further out, linking the urban core with the suburbs.
- BRTs can offer the same service as LRTs, in terms of frequencies and distance traveled, at lower costs. However, in efforts to reduce costs, most BRT systems in the United States do not offer the same service as LRTs. The capital costs of implementing a BRT system and the operating costs of running it could be less than LRT or CRT along this corridor.
- Although experiences with transit-oriented development (TOD) associated with BRT systems in the United States is fairly new and examples are limited, the successful Euclid Corridor project (in Cleveland, OH) has demonstrated that substantial investment in BRTs can also result in the mode serving as economic engines of growth. Since the initial phase of building the HealthLine, the public and private sectors are reported to have built or planned $4.7 billion in real estate developments within walking distance of Euclid Avenue.[3] A BRT system along SGLR can serve as a catalyst for development along the corridor in a way that conventional bus service cannot match.
- An LRT or BRT service along this corridor could provide faster access to suburban employers and schools and Downtown Fort Myers similar to the 12.3-mile Minneapolis' Hiawatha Line (or Blue Line) LRT which runs in an exclusive guideway, linking Downtown Minneapolis with the Mall of America and connecting commuters to jobs along the route. In addition to providing connectivity to jobs, the line has also proven to be a powerful catalyst for development in a corridor that once had large tracts of vacant and underutilized land. According to Minneapolis Metro Council (August 2011 Newsletter), since 2000, nearly 7,700 new housing units have been built along the line, with another 6,750 units planned.
- Depending on how it is designed and how a transit system is operated along the SGLR, it appears that pedestrian and bicycle trails could possibly be integrated along the corridor regardless of the transit mode implemented.

6. <u>Characteristics of A Transit Service Along SGLR</u>

The following describes the characteristics of a high capacity transit service along the SGLR. Depending on the modal choice selected for implementation along this corridor, these characteristics are subject to further refinement and will be tailored to the specific type of modal option to be implemented:

[3] *Developing the Next Frontier: Capitalizing on Bus Rapid Transit to Build Community. Urban Land Institute, 2011.*

6.1 Elements and Operating Characteristics

A report recently released by the Government Accountability Office on "Bus Rapid Transit Projects Improve Transit Service and Can Contribute to Economic Development" reviewed 20 BRT projects performance in terms of ridership and service (July 2012).[4] The report indicates that many U.S BRT projects incorporate at least some station amenities and most other BRT features that distinguish them from standard bus service, and improve riders' transit experience.

One of those distinguishing features is the running way element. BRT research indicates that projects that have used dedicated running ways, such as that proposed for here, achieve significant travel time savings because of the congestion levels on city streets. This same distinctive feature applies to an LRT or CRT system operating along the SGLR corridor.

Utilizing the SGLR corridor as the preferred route will enable a high capacity transit service to avoid conflicts with city traffic while traveling exclusively within a railroad right of way and privately held property. However, in order for the system to operate optimally, it is important to carefully integrate other critical transit elements such as:

- *Integration with other routes*: this high-capacity transit service should be fully integrated with the remainder of Lee and Collier County's transit service to provide convenient connections to Cape Coral, North Fort Myers, Lehigh Acres, and Fort Myers Beach. These connections should be carefully timed to allow quick transfers for transit patrons.

- *Stations*: comfortable, suitably located stations with amenities such as adequate seating, weather protection, level boarding, posted route maps and schedules.

- *Fare Collections*: use of off-board fare collection methods to allow savings in boarding and travel time. This can be achieved on all transit modes being considered here.

- *Vehicles*: use of low-floor vehicles with expedited wheelchair-boarding capabilities to reduce passenger-loading times and ease of entrance.

- *Branding and Marketing:* use of branding and marketing to promote a unique service identity and distinguish the service from the current regular transit service. This is particularly needed for BRT projects rather than LRTs or CRTs.

- *Intelligent Transportation Systems* (ITS): installation of ITS features such as transit signal priority (TSP), vehicle tracking systems, next bus information and wireless local area network (Wi-Fi), and technology installation to overcome at-grade railroad crossing issues.

6.1.1 Operations and Maintenance Facility

An operations and maintenance facility to store and maintain transit vehicles within proximity of the corridor is an important component of transit operations, and the location and design of

[4] *GAO Report to the Committee on Banking, Housing, and Urban Affairs, U.S. Senate: BRT Projects Improve Transit Service and Can Contribute to Economic Development (July 2012)*

such a facility must enable optimal system efficiency. The facility will be required to support planned operations to be used for overnight storage and vehicle maintenance that would include preventive (scheduled) maintenance, corrective (unscheduled) maintenance, routine cleaning and servicing, and major campaigns to correct component failures.

The existing SGLR maintenance facility is located west of Metro Parkway between Colonial Boulevard and Landing View Road. This facility is bounded on the west side by the John Yarbrough Linear Trail Park and on the east side by commercial and vacant property. It is not likely that SGLR would be able to accommodate a transit maintenance facility on their ROW in this area.

Currently, LeeTran is constructing a new maintenance facility on a 23-acre site very close to the SGLR corridor. This site is located on the east side of Evans Avenue between Moreno Avenue and Welch Street and will be adjacent to the proposed Metro-Fowler Crossover. The new facility will house administration, operations and maintenance buildings and allow LeeTran to house all of its employees in one location with enough parking to accommodate moderate growth to the system as projected in its long-range transportation plan.

This facility could possibly be used for the storage and maintenance of the transit vehicles used for the high capacity transit system. The suitability of this facility and how transit vehicles would access the facility is recommended to be addressed in detail in a separate maintenance facility analysis.

6.2 Recommended Operating & Maintenance Plan

General operating assumptions and plans for a service along this corridor assume service levels for a future opening year. Determining the opening year of the service could depend on a number of factors. One primary factor is the coordination with the current owners of the SGLR. The use of the rail corridor will require coordination with SGLR and/or CSX Transportation. However, for the purpose of this feasibility analysis, an approximate opening year could be 2018 given the understanding that detailed analysis to determine the appropriate mode of service still needs to be done, transit funding issues addressed and environmental analysis will need to be conducted. For this level of analysis, operating assumptions include span of service, service frequency, vehicle capacity/loading standards, vehicle performance, and station dwell times.

6.3 Vehicle Capacity and Passenger Load Standards

Vehicle capacity and passenger loading standards will have to be established in order to determine the service frequency and fleet requirements for the preferred transit system. The passenger capacity will vary depending on the transit mode of choice and also if custom seating configurations are utilized. For future analysis, load standards should be developed to determine the peak hour throughput required, appropriate vehicle size and level of service.

During off-peak hours, the load standard for all modes should be a maximum of 100 percent (i.e. no standees).

6.4 Vehicle Performance

Vehicle performance varies by transit mode. According to *Table 1*, BRT vehicles can travel at a speed as high as 55 mph while LRT and CRT vehicles can travel at a speed of 55 to 65 mph or higher. However, sections of the alignments will have speed restrictions due to speed limits, operating environments, station spacing and/or cross streets. Station-to-station run time estimates will be developed based on these criteria.

6.5 Average Intersection Delay

The average intersection delay will assume a significant level of transit signal priority (TSP) for transit operations with the majority of the alignment at-grade. Average intersection delay for existing signalized intersections is assumed to be 10-15 seconds, assuming time savings with TSP at all signalized intersections along the corridor with grade crossings.

6.6 Run Time Estimates

The run time estimates are not provided at this level of study, but it is expected that a detailed station-to-station run time estimate for the transit service will be based on operating assumptions approved by the project implementer. Station-to-station train running times will be calculated and calibrated using the vehicle performance characteristics, speed restrictions for operations (mixed traffic vs. exclusive alignments), distances between stations and dwell times.

6.7 End-of-Line Layovers

Transit operations plans will include time for end-of-line layovers to provide sufficient time for drivers to take breaks as well as provide for schedule recovery (i.e., a late bus can “catch up” to its schedule). Operations plans will include layovers of at least 15% of the one-way run time at each end-of-line station.

6.8 Cycle Times

Cycle times are an important component used to determine operating requirements for the service. The cycle time consists of running time, station dwells, intersection delays, and layover time. Cycle times should be divisible by the proposed headway and used to determine peak vehicle requirements for each mode option along the corridor.

6.9 Maintenance Spare Ratio

The maintenance spare ratio (MSR) is the percentage of extra vehicles in a fleet, over and above the number actually required to provide scheduled peak period service. A 20% spare ratio is typically recommended (a commonly accepted standard in the transit industry as a goal for most new premium transit systems).

6.10 Peak and Fleet Vehicle Requirements

The transit operating plan's vehicle requirements will depend on the preferred transit mode, cycle time, and anticipated ridership. The number of vehicles will need to accommodate peak period operations.

6.11 Operating Concerns

While the passenger service is not proposed to cross the Caloosahatchee River at this time due to constraints such as costs, environmental issues and operation concerns, among others, it is proposed to run parallel to SR 80 (Palm Beach Boulevard) terminating at Prospect Avenue (west of I-75). However, improving the other existing minor crossings along the corridor is very critical to the efficiency of transit operations. Additionally, grade crossings along the corridor are a major concern for operating any type of transit system. Grade crossings can result in delays to transit operations, affect travel times and create conflicts between transit operations and auto travels. These concerns will have to be factored into the transit service operating plans.

7. Transit Stations and Locations

This report also examines potential locations of stations along the corridor. Station locations are critical elements of passenger services because they impact travel time and provide opportunities for maximizing existing and potential land use development.

The station locations defined in the report are conceptual and are subject to refinement (*Figure 9*). These station locations along the SGLR corridor have been identified with the following assumptions:

- To integrate with existing transit routes (thereby sustaining existing transit ridership), including the Downtown Fort Myers Trolley bus service,
- To maximize potential ridership within a half-mile radius of the corridor,
- To minimize frequent stops,
- To ensure savings in travel time,
- To maximize existing land uses within a ¼ to ½ mile radius of the stations (the SGLR corridor operates primarily through residential areas and areas of high employment density),
- To ensure regional connectivity by locating some stations in conjunction with existing transit transfer centers,
- To create "places" which will provide access points to current or planned transit services, as well as the network of major roadways,

Station locations may require land acquisition adjacent to the rail line to ensure that stations are convenient for passengers and provide parking for transit users.

7.1 Station Spacing

Station spacing is critical because the number and location of stations influence travel time. No technical analysis was done as part of this feasibility to determine the spacing of transit stations along the SGLR corridor. However, Florida Planning & Development Lab (Florida State University) in its *Accessing Transit: Design Handbook for Florida Bus Passenger Facilities* (Volume II, 2008) recommends BRT station locations to be spaced 0.25 to 0.50 miles apart if they are located within the Central Business District (CBD) and one to two miles apart if they are located outside the CBD. This is consistent with the typical characteristics of BRT systems. The Handbook does not have specifications for other types of modal stations. However, distances between transit stations vary from mode to mode, as shown in Table 1, depending on other factors such as balancing the need between accessibility by users and interconnectivity with existing or planned transit systems.

Eighteen (18) conceptual stations have been identified for the 31.8-mile proposed service corridor between Immokalee Road to the south and Prospect Avenue to the north, spaced an average of less than two miles apart. In addition to these conceptual station locations, the opportunity exists to have more stations, especially in the Downtown Fort Myers area and in Bonita Springs. With the number of grade crossings and more stations, the potential for delays to travel time exists. A balance therefore has to be achieved between the number of stations and the number of possible delays at grade crossings. These conceptual station locations are identified in *Table 9 and Figure 9.*

These station locations are proposed so as to maximize the existing opportunities provided by major trip generators within a ½ to a mile radius of the SGLR corridor (*Figure 10*).

Stations located at Immokalee Road, Bonita Beach Road (Downtown Bonita Springs) and Coconut Road are spaced about 5 miles apart. At these stations, LeeTran currently provides a commuter bus service called the "LinC" which provides service from Coconut Point Mall (at Coconut Road) along US-41 through Downtown Bonita Springs to the northernmost part of Collier at Immokalee Road. Of the 18 conceptual stations, seven stations could be designated as major transfer points: Immokalee Road, Downtown Bonita Springs, Corkscrew Road, Gladiolus/Six Mile Cypress Parkway, Daniels Parkway, Colonial Boulevard, and Rosa Parks Transportation Center in Downtown Fort Myers.

The stations at Immokalee Road (to the south) and Prospect Avenue (to the north) will serve as origin stations as well as end of the line stations, depending on the direction of service.

7.2 Rationale for North and South Termini

Transit lines function most efficiently when they are anchored at both ends with strong generators or attractors of transit trips. Without anchors, trips beginning at each end will be empty or sparsely populated, then fill in gradually with passengers, then drop off again toward the other end. A great deal of capacity can be wasted in this manner. A transit line with strong anchors at each end will have a higher and more uniform ridership over its entire length and would make better use of its overall capacity.

At the south end of the rail corridor, an obvious terminus would be the historic depot in downtown Bonita Springs, the center of redevelopment activities in the City of Bonita Springs where there is already considerable activity and existing public parking. However, a stronger anchor for the southern terminus would be about five miles further south at Immokalee Road in North Naples, a location with numerous transit attributes such as:

- The north edge of Naples Park, an affordable community of 6,000 residents.
- The Creekside Commerce Center, an industrial and commercial park that contains the headquarters for the Naples Daily News and for Arthrex, a medical device manufacturer
- The North Naples Hospital, which is the northern campus of Naples Community Hospital and the largest employer in the area
- The northern terminus of two bus routes provided by Collier Area Transit (routes 1B and 1C)

If the transit line were extended to Immokalee Road instead of ending in downtown Bonita Springs, a station could also be provided midway to serve the industrial parks along US 41 just south of the county line. A station could also be provided further south at the intersection of a potential future east-west road known as Veterans Memorial Boulevard.

There are different options for operating a service which extends into Collier County at Immokalee Road:

– If the preferred transit service is BRT, the BRT vehicles could leave the rail corridor at Old US 41 and travel to the Immokalee Road station either in mixed traffic lanes or in a dedicated lane in the US 41 and Immokalee Road ROWs.

– If the preferred service is LRT, the LRT vehicles would travel in a dedicated lane in the US 41 and Immokalee Road ROWs, either making stops like a streetcar or moving directly to the Immokalee Road terminal.

– If the preferred service is CRT, passengers would transfer to a LINC-like local bus service whose schedule would be timed to match the train's arrival and departures (LINC-like service could also be used with BRT or LRT, either permanently or in the early operating phase of the service.)

At the north end, an obvious terminus would be downtown Fort Myers, which is the county seat, a major employment center and the primary redevelopment district for the City of Fort Myers. However, there is a strong case for extending the line beyond downtown into East Fort Myers, where the rail corridor runs parallel to and very close to Palm Beach Boulevard (SR 80). The transit line could be extended as far east as Prospect Avenue (the city limits of Fort Myers), without extraordinary additional cost. The extension could be part of the initial transit corridor or it could be added as part of a later phase.

An extension to Marsh Avenue or Prospect Avenue would serve the residential communities of Dunbar and East Fort Myers, where transit patronage (of existing Lee Tran buses) demonstrates a strong demand for transit and where walking and bicycling are significant means of transportation. It would also serve proposed medium and high density redevelopment along Palm Beach Boulevard, as set forth in the 2010 East Fort Myers Revitalization & Redevelopment Plan and subsequent amendments to the Fort Myers Comprehensive Plan.

Extending the line beyond Prospect Avenue is challenging for a number of reasons. Most commercial land uses end at Marsh Avenue, four blocks before Prospect Avenue, and the rail corridor begins its turn north to cross the Caloosahatchee River only about eight blocks beyond Prospect. The four Caloosahatchee River railroad bridges (three fixed and one movable) are problematic because they are wide enough to support only a single track. Construction of an additional track or a busway would require major capital investment and would have significant environmental hurdles. The existing bridges have been identified as needing rehabilitation work which is described in the *Assessment of Existing and Future Freight Issues Technical Report.* While a future extension beyond Prospect Avenue would require significant costs for addressing these bridges, this would allow service to be extended to Bayshore Road in North Fort Myers which could be a valuable park-and-ride location serving residents of North Fort Myers, Bayshore and Alva. It could also be a connection point for future transit service to the proposed Babcock Ranch community in southern Charlotte County. Further analysis should be done to determine the cost effectiveness of this extension from a transit perspective.

Table 9: Conceptual Station Locations

Distance in miles	Station location	Areas & trip generators served (*also see Figure 9*)	Transit connections	Municipal jurisdiction
0.0	**Immokalee Road** (in Collier County)	Naples Park; North Naples Hospital; Creekside Commerce Center (Naples Daily News, Arthrex); Granada Shoppes	LinC 600 from Coconut Point; northern terminus of Collier Transit's 1B & 1C routes	Unincorporated Collier County
5.7	**Downtown Bonita Springs**	Riverside Park; Pennsylvania Avenue; Old US 41 Community Redevelopment Area; significant TOD opportunities	LinC 600; Lee Tran 150 to Lovers Key and Bonita Grande Drive	City of Bonita Springs
9.0	**Strike Lane**	Intersection of US 41 and Old 41; The Plaza, Crossroad Center & Bernwood Shoppes (shopping); Bernwood Center (business park)	LinC 600 along US 41	City of Bonita Springs
10.6	**Coconut Road**	Coconut Point (outdoor mall & mixed-use community with regional shopping, movie theaters, condos & offices); Bonita Community Health Center; significant TOD opportunities	northern terminus of LinC 600 to Immokalee Road in Collier County; southern terminus of Lee Tran 140	Unincorporated Lee County
12.6	**Corkscrew Road**	Koreshan State Park; Estero Community Park; Corkscrew Village (shopping); Estero community; significant TOD opportunities	Lee Tran 140 along US 41	Unincorporated Lee County
15.4	**Sanibel Boulevard**	San Carlos Park community	Lee Tran 60 to Three Oaks Parkway, Miromar Outlets, Germain Arena & FGCU	Unincorporated Lee County
17.6	**Alico Road / Metro Parkway**	Industrial parks along both sides of Alico Road	Lee Tran 140 along US 41	Unincorporated Lee County
20.1	**Gladiolus / Six Mile Cypress Parkway**	Hammond Stadium; Arthrex distribution center; Sheriff's headquarters; Jamaica Bay community; School district bus depot	Lee Tran 80 along Metro Parkway to Edison Mall	Unincorporated Lee County
21.4	**Daniels Parkway**	Gulf Coast Hospital, South Fort Myers High School; jobs along Metro Parkway	Lee Tran 50 from airport to Summerlin Square; Lee Tran 80; potential E-W BRT-lite connecting Cape Coral & Lehigh Acres	Unincorporated Lee County
22.7	**Crystal Drive**	Villas community; Crystal Drive industrial parks; jobs along Metro Parkway	Lee Tran 80 along Metro Parkway to Edison Mall	Unincorporated Lee County
23.7	**Danley Drive**	Page Field; Munters Corp; Chico's national headquarters & distribution center; Page Park community; jobs along Metro Parkway	Lee Tran 80 along Metro Parkway to Edison Mall	Unincorporated Lee County
24.9	**Colonial Boulevard**	Lee County Public Education Center (school district headquarters); Metro Park commerce center; Pall Corp; significant TOD opportunities	Lee Tran 110 from Edison Mall to Lehigh Acres; potential E-W BRT-lite route connecting Cape Coral & Lehigh Acres	City of Fort Myers
26.7	**Hanson Street**	Industrial parks along both sides of Hanson Street	Lee Tran 10 along Fowler Street; Hanson Street to be extended to Ortiz	City of Fort Myers
28.2	**Downtown Fort Myers**	County and federal courthouses; Fort Myers City Hall; Lee County Justice Center; Florida regional service center; News-Press; Constitutional Complex; Downtown library; Harborside Event Center; City of Palms Park	Rosa Parks Transportation Center (terminus of multiple Lee Tran routes, plus Greyhound station & taxi stand)	City of Fort Myers
29.3	**Michigan Avenue**	Dunbar community; Dean Park community; riverfront high-rises; significant TOD opportunities	Lee Tran 15 to Rosa Parks & Ortiz; Lee Tran 100 to Rosa Parks & Buckingham	City of Fort Myers
30.3	**Tarpon Street**	Terry Park; East Fort Myers communities; significant TOD opportunities	Lee Tran 100 to Rosa Parks & Buckingham	City of Fort Myers
31.1	**Van Buren Street**	U-Save transit terminal; East Fort Myers communities; significant TOD opportunities	Lee Tran 100; terminus of Lee Tran 20 to Edison / Ford Estates	City of Fort Myers
31.8	**Prospect Avenue**	Fort Myers city limits (near Tice Street); East Fort Myers communities	Lee Tran 100 to Rosa Parks & Buckingham	City of Fort Myers (at city limits)

Figure 9: Conceptual Station Locations

7.3 Span of Service

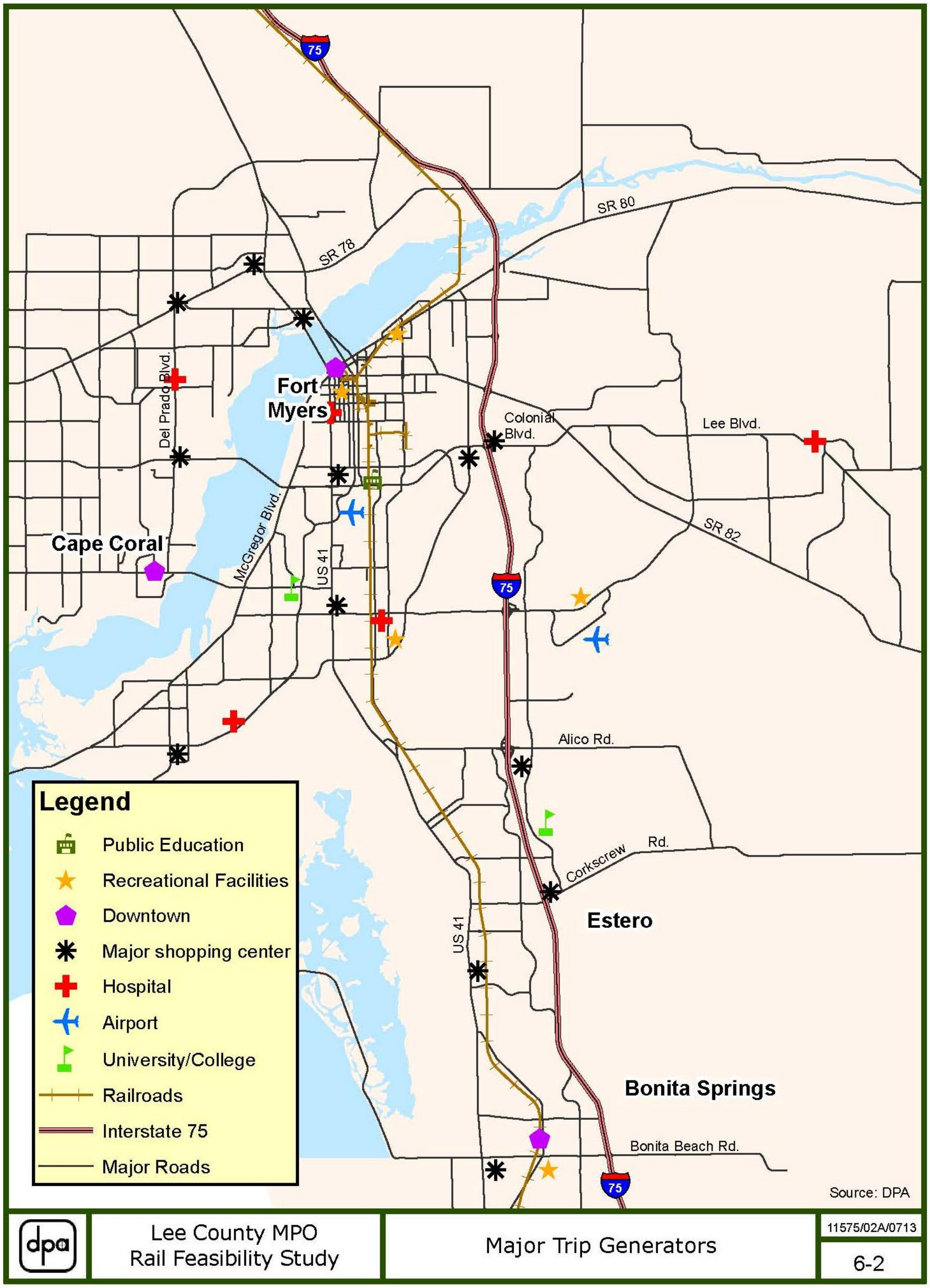
Currently, LeeTran buses operate between 5:00am and 9:45pm between Monday and Saturday. On Sundays, LeeTran operates selected bus routes between 6:00am and 9:20pm. The downtown Fort Myers trolleys operate between 11:00am and 8:00pm from Monday to Thursday and between 11:00am and 10:30pm on Friday and Saturday. It should be noted that the trolley service is a peak-season service and does not run all year round.

This report proposes that span of service for a premium transit system be developed to operate on weekdays and Saturday only, initially. As the system evolves and demand for service increases in the future, expanded hours, Sunday and holiday service could be introduced. Even though other funding sources may be used, the operating plans will be developed to meet FTA Small Starts operating requirements of offering service at least 14 hours per day and service frequency of 10 minutes during the peak period and 15 minutes during the off peak (during weekdays).

7.4 Station Dwell Times

The average station dwell times, which factor in the time to allow passengers to board and alight the transit vehicle, are assumed to be 10-20 seconds at all of the proposed stations. This average is assumed, understanding that dwell time can vary by station and time of day.

Figure 10: Major Trip Generators



8. Compatibility With Land Uses And Neighborhoods

Figure 11 (Lee County's 2010 Transit Orientation Index) categorizes land uses along the corridor as "Very High," "High," "Medium'" or "Low" transit orientation along the SGLR corridor. As expected, the primary land uses immediately along the corridor are industrial and commercial. These are uses consistent with the current use of the rail corridor.

Where the railroad line passes major trip generators such as recreational facilities, shopping malls, transit centers, medical facilities and Downtown areas, the TOIs indicate a range between Medium and Very High. Otherwise the TOI along the corridor is mostly low. This provides opportunity for station areas to serve as economic tools to spur development that can be located within close proximity of the corridor. Typically, a high capacity transit service along the corridor should result in mixed-use development which is supported by an effective transit service.

An accompanying report "*Compatibility of Public Transit And Freight Rail Expansion*" (May 21, 2013) examined the impact of different factors such as noise, vibration, pollution, physical and aesthetics effects on land uses along the corridor. The effect of these factors on surrounding land uses and neighborhoods will largely depend on the type of passenger transit mode operated along the corridor. For example the level of noise generated by a BRT or LRT service along this corridor will be less than the level of noise generated by a CRT service along the corridor. Similarly, the level of vibration generated by freight trains is considerably higher than that generated by a passenger transit service depending on the type of vehicles in operations.

Effects of a high capacity transit service along this corridor on adjoining land uses are subject to further refinement through a formal environmental review process.

Population density is fairly distributed in a balanced manner along the corridor, while employment density is concentrated mostly at the northern and southern ends of the corridor, with low employment density between north of Bonita Springs and Alico Road. A future high capacity transit service would serve residents traveling to and from employment and shopping centers. *Figure 12* shows that the majority of the stations have been located close to existing employment centers to best serve their employees and customers.

Figure 11: Transit-Orientation Index Map

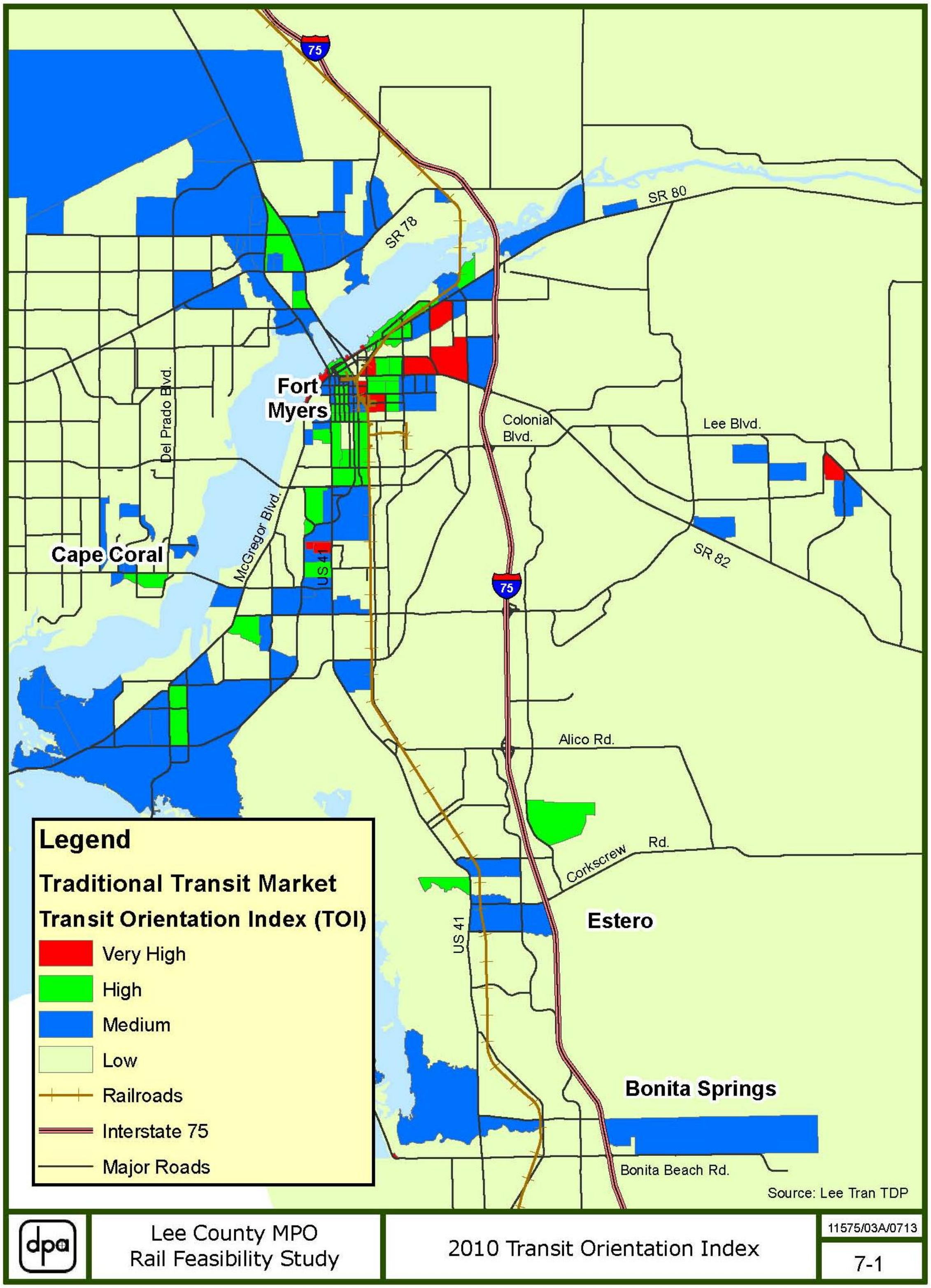


Figure 12: Rail Corridor with Conceptual Stations and Employment Centers

9. Cost Estimates

The planning, implementation and operation of any major capital investment transit project requires a sound estimation of capital and operating and maintenance (O&M) costs to fully understand feasibility and funding needs. The estimation process and methodology for cost estimation varies, depending upon the phase of project development. For initial feasibility studies, project cost estimates are usually based on general unit costs, derived primarily from recent projects similar in scope and transit mode. As projects advance into more detailed planning and engineering, cost estimate structure and approaches will need to be developed.

Using a range of cost per mile estimate is the most reasonable means to provide cost information for the various modes at this time (*Table 1*). To develop detailed level of costs for the project, a number of specifics will need to be defined. Elements that are not adequately defined at this time are:

- The extent of double tracking for rail operations over the corridor;
- The number of type of rail vehicles given potential for Federal Railroad Administration (FRA) crash-worthiness of vehicles;
- The size of the maintenance facility including vehicle parking;
- The parking demands at each station;
- Potential need for grade separations of major roadways during peak hour rail operations;
- Potential requirement for grade separated access to center stations in a rail corridor; and
- Size and location of an operations control center.

9.1 Capital Cost Estimates

Because these elements, stated above, are yet undefined, a set of assumptions were made in order to be able to develop some planning level capital costs for the transit modes. These assumptions are:

- The guideway and track elements will be calculated for the entire length of the corridor (33 miles).
- The number of stations for BRT and LRT is 18 stations and 9 stations for CRT.
- The sitework consisting of track rehabilitation, utilities relocation, bridge crossings rehabilitation will be performed for the 33-mile corridor where necessary.
- A total of 50 traffic signals priorities are assumed due to the existing 50 at-grade crossings along the SGLR.
- Park-and-ride lots are assumed at the two end-of-the-line stations and areas with employment and major TOD opportunities for a total of 9 lots.
- Number of vehicles (16) assumes 1-car sets at 10 minutes headways at 35 mph with a total fleet including peak vehicle requirement and 20% spare ratio.
- These include costs for additional ROW.
- The modal costs for CRT and LRT were based on a review of projects in engineering or construction, or recently constructed in the United States. These are:
    - LRT: Minneapolis Central Corridor, Portland Milwaukie Extension.

- Commuter rail: UTA Frontrunner, Denver Eagle P3, Minnesota Northstar.

Based on a review of projects in engineering or construction, or recently constructed in the country, the ranges of costs for each mode will be as shown in *Table 1* and below. :

- Commuter rail: $10M to $20M per mile
- Light rail: $80M to $120M per mile
- BRT Exclusive ROW: $20M to $40M per mile
- BRT Shared: $5M to $15M per mile

Thus, the capital costs (including vehicles, ROW requirements, vehicle maintenance and storage facility, professional fees for design work, escalation costs, et cetera) for each mode, using the average of the range above is proposed as follows:

- Commuter rail: $500M based on $15M per mile for 33 miles
- Light rail: $3.3B based on $100M per mile for 33 miles
- BRT Exclusive ROW: $990M based on $30M per mile for 33 miles (since it is not shared ROW for most of the corridor)

These are planning level order of magnitude capital cost estimates. As the project is developed and the scope becomes better refined and more defined, the cost estimates would be developed to reflect current information. These costs should be based on a scope that includes facilities, structures (bridges), property acquisition, park and ride lots, environmental mitigation, and vehicles. As more detailed engineering is done and information emerges with regards to utilities, drainage, etc. costs can be better defined in subsequent studies for the corridor.

The above figures indicate that the cost of implementing a CRT along the SGLR corridor is less than the cost of implementing a BRT service along the same corridor. The reasons for these are because:

- A CRT system could utilize the existing tracks along the corridor.
- The cost of upgrading/rehabilitation of the existing tracks is not expected to be as high as the cost of building a separate alignment for a BRT system within the corridor's right of way.
- Fewer number of stations for a CRT system as opposed to a BRT system.
- The cost of relocating tracks to accommodate BRT alignment.

These costs need to be refined further. The next step in developing more detailed capital costs would be to develop the Federal Transit Administration's (FTA) Standard Cost Categories (SCC) worksheets assuming that the project will pursue federal funding through the FTA. Any project pursuing (or potentially pursuing) federal funding through FTA must organize project costs according to the SCC structure, which contains the following categories:

SCC Category 10 - Guideway and Track Elements – includes all improvements associated with track (e.g. rails, ties, and ballast) and the guideway supporting the track (e.g. in-street slab, aerial structure, and underground tunnels). This category includes costs associated with excavation, fill, retaining walls, and other elements necessary for track and guideway construction.

SCC Category 20 - Stations, Stops, Terminals, Intermodal – includes all costs associated with at-grade, underground, and aerial stations, such as grading, parking, structures, finishes, equipment, mechanical and electrical components, and safety systems.

SCC Category 30 - Support Facilities: Yards, Shops, Administration Buildings – includes construction costs associated with all support facilities, such as train storage yards, maintenance facilities, and administration buildings. Cost elements include grading, structures, finishes, equipment, mechanical and electrical components, safety systems, and guideway and track associated specifically with a storage yard.

SCC Category 40 – Sitework and Special Conditions – includes site civil elements associated with the project, including clearing and demolition, utilities relocation, environmental mitigation, sidewalks, landscaping, fencing, public art, paving, and temporary construction facilities.

SCC Category 50 - Systems – includes all systems-related elements, such as train control and signaling, traffic signals, traction power supply and distribution, and communications systems.

SCC Category 60 – Right of Way, Land, Existing Improvements – includes the purchase or lease of real estate, relocation of existing households and businesses, and professional services associated with the real estate component of the project.

SCC Category 70 – Vehicles – includes the costs for the vehicles.

SCC Category 80 – Professional Services – includes all professional, technical and management services related to the design and construction of fixed infrastructure during the preliminary engineering, final design, and construction phases of the project.

SCC Category 90 – Unallocated Contingency – includes a standard unallocated contingency to account for undefined project items in early stages of project planning and design. This contingency is in addition to specific allocated contingencies for individual line items.

SCC Category 100 – Finance Charges – Includes finance charges expected to be paid by the project sponsor/grantee prior to either the completion of the project or the fulfillment of the New Starts funding commitment, whichever occurs later in time.

9.2 O&M Cost Estimates

O&M cost estimates will also be developed for the project based on average unit cost per hour in current year dollars. For the same reasons that specific capital costs could not be developed for the project currently, O&M cost estimates cannot accurately be developed until information such as mode of service, service frequency, number of vehicles in fleet, actual distance to be traveled, etc. are known and analyzed.

The FTA publishes the National Transit Database (NTD) as the primary source for information and statistics on the transit systems in the United States. Over 660 transit providers in urbanized areas currently report data to the NTD. Information such as fare revenue, capital expense, passenger mile traveled and operating expenses among others are reported annually. In order to determine planning-level order of magnitude operating and maintenance (O&M)

costs for modal options, a review of operating costs per unlinked passenger trip was used. The following assumptions were made:

- Costs based on assumed average daily ridership along the corridor of 5,000, 10,000, 15,000 and 20,000 riders respectively
- Operating costs (per unlinked passenger trip): Bus (BRT) = $3.60; LRT = $10.00 and CRT = $3.30

Based on these assumptions, the following O&M costs were developed for the SGLR corridor:

Mode	Operating Costs Per Unlinked Passenger Trip	Assumed Average Daily Ridership			
		5,000 riders	10,000 riders	15,000 riders	20,000 riders
Bus (BRT)*	$3.60	$4,680,000	$9,360,000	$14,040,000	$18,720,000
LRT	$10.00	$13,000,000	$26,000,000	$39,000,000	$52,000,000
CRT	$3.30	$4,290,000	$8,580,000	$12,870,000	$17,160,000

Source: 2010 National Transit Database Profile for all transit agencies.
**NTD does not show separate cost for BRT.*

It is recommended that a more detailed O&M cost model be developed in future planning efforts for the preferred mode of passenger service. This would include developing operating plans and requirements for phased implementation of the system, which can further identify and breakout ongoing cost to operate and maintain the service on an annual basis by operating function (vehicle operation, vehicle maintenance, maintenance of way, and general administration). The O&M model and cost estimation methodology, structure and inputs should be consistent with the Federal Transit Administration (FTA) guidelines.

9.3 Overview of Federal Funding: MAP-21 Legislation

Implementation of a high capacity transit service along this corridor will depend on a combination of various funding sources, federal, state, regional and local, both public and private. It is most likely that project proponent will seek substantial federal funding participation to implement this service. Because federal funding is highly competitive and typically constitutes a larger share of the funding combination and requires considerable commitment from the project sponsor, this section provides a brief overview of federal funding opportunities.

The recently enacted Moving Ahead for Progress in the 21st Century (MAP-21) legislation has altered the funding landscape for transit projects requiring federal funding contribution. MAP-21 was signed into law in July 2012 and went into effect in October 2012. It has a 2-year authorization through September 30, 2014 and maintains comparable program funding levels for the New Starts and Small Starts programs.

MAP-21 defines the federal transportation programs and funding levels for federal fiscal year (FFY) 2013 and FFY 2014. As the project moves through the local planning process, and the required project development and implementation process, it will be necessary to track and evaluate future surface transportation legislation for any changes to the federal funding programs as well as to evaluate potential opportunities for any new programs.

Additionally, over the last several years the US Department of Transportation (USDOT) has issued notices of availability for competitive grants applications including four rounds of Transportation Investment Generating Economic Recovery (TIGER) grants, Urban Circulator grants, Bus and Bus Livability Grants, and State of Good Repair Grants. While MAP-21 only includes one competitive grant program (Projects of National and Regional Significance) for FY 2013 and FY 2014, there are indications that additional rounds of competitive grants may be considered in the future. This assumption is based in large part on the number of applications received for these grant programs compared with the funding that was available. For example, for the last round of TIGER grants (2012), USDOT received approximately 700 applications totaling over $10 billion in requests for $500 million in available funding.

10. Service Implementation

The project is scheduled for an unspecified future revenue start date. While this is a possibility within a decade, the implementation will depend on a number of factors. These factors include coordination with the owners and operators of the SGLR corridor, local and regional planning processes, funding opportunities, funding process and fulfillment of the various requirements for project implementation.

As mentioned earlier, the operation (as well as timing) of passenger service along the SGLR corridor will require coordination with the Seminole Gulf Railway and/or CSX Transportation. It is assumed that this can be accomplished so that the project can take advantage of future federal funding opportunities to implement the project.

10.1 Impact on Surrounding Roadway Network

Operating a high capacity transit service along the SGLR corridor has the potential to impact the roadway crossings and traffic movement especially along roadways adjacent to the corridor. Utilizing the SGLR corridor as the preferred route will allow a high capacity transit service to avoid conflicts with city traffic (except at crossings) while traveling exclusively within a railroad right of way.

Public transit plays a critical role in the transportation system of an urban area and its performance is often affected by general traffic conditions and signal timing at intersections especially along congested corridors. When transit services can operate in exclusive right of way, away from city streets, it can operate with premium efficiency. The SGLR corridor provides such an opportunity. Utilizing the corridor for public transit has the potential to divert traffic away from US 41, reducing congestion and improving traffic conditions along the roadway and key intersections.

However, there are potential issues to be aware of along SGLR primarily because of several at-grade crossings, where existing streets cross the tracks. There are more than 50 at-grade crossings along the corridor which means that there will be transit vehicles crossing the intersecting roadways at these locations which will affect highway traffic on these roadways.

In order to minimize impacts on vehicular movements and transit travel time, different options have to be considered including: improvements of specific crossings, and the installation of technology that would facilitate movement of transit vehicles in the most effective way without major disruption to vehicular movements. Additionally, implementation of a transit service on the SGLR will have a positive benefit of diverting some traffic off of adjacent roadways as transit ridership increases.

Further, as the alignment goes through downtown Fort Myers, traffic could be impacted. A separate traffic analysis would be done as part of the environmental review process to determine the extent of these impacts on vehicular operations and impacts on the transit service operations and cost. It is possible that if a mode such as LRT is implemented along the corridor, it could transition into a form of urban circulator (such as streetcar) as it travels through downtown areas (downtown Denver, San Diego and Minneapolis are examples).

10.2 Area of Service

This report assumes the service coverage area to be similar to LeeTran service area but with an opportunity to attract ridership over an expanded area because of the high capacity nature of the proposed transit system. Lee Tran currently provides service to a 121 square mile area with a service area population of 443,696 (2011 National Transit Database). A north-south service along the SGLR corridor will act as a starter-line and a catalyst/transit spine for future connectivity east and west of the corridor.

10.3 Impact on Transit Service

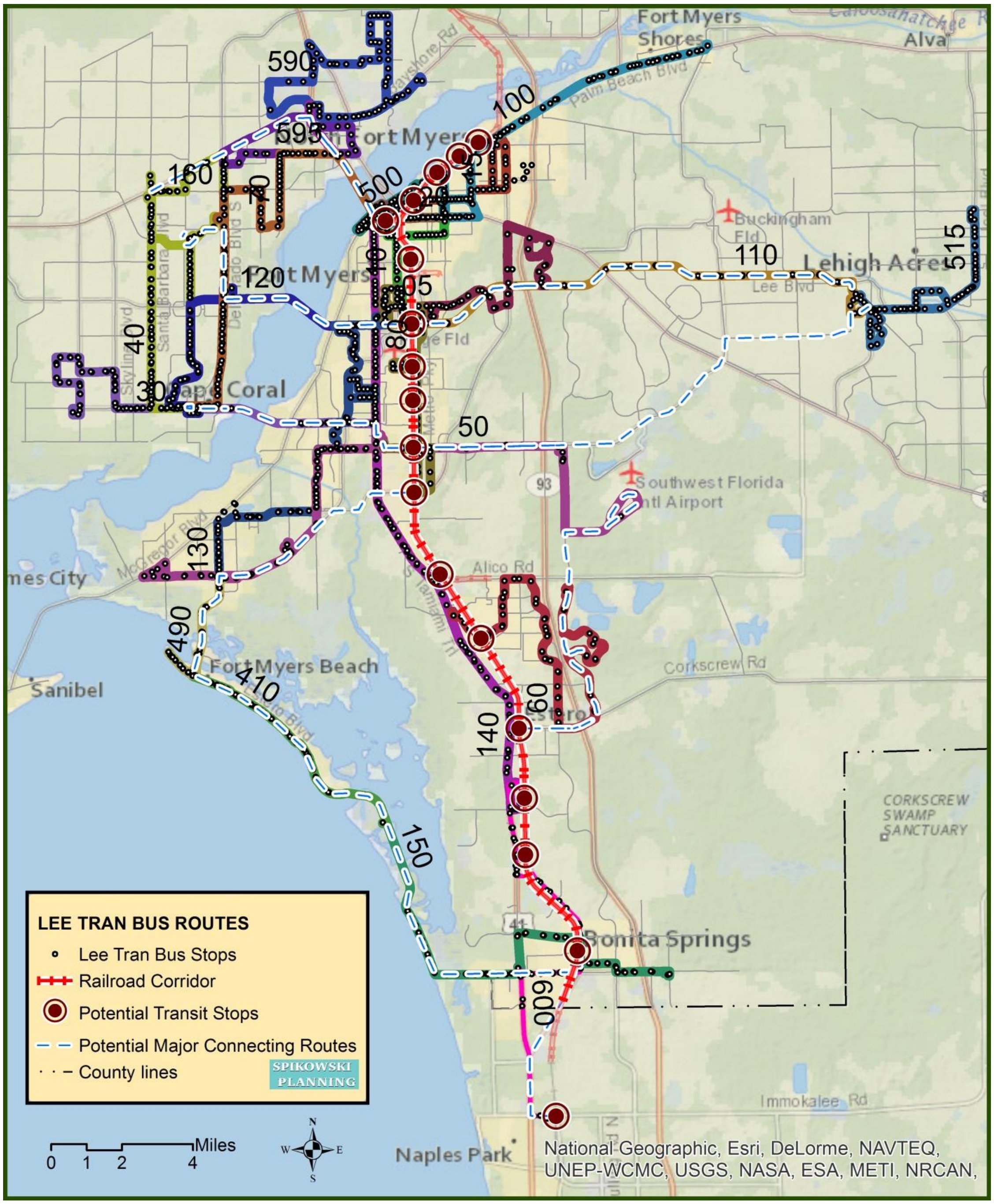
Currently, LeeTran routes 5, 15, 20, 50, 60, 100 and 110 are crosstown services connecting the east and west sides of the SGLR corridor (see *Figure 13*). Routes 140, 80 and LinC 600 (commuter service) provide parallel services to the corridor. With the integration of these current and planned routes, the potential exists to improve service frequencies of specific routes and create more opportunities for regional connections, thus increasing ridership on a high capacity transit service along the SGLR corridor as well as on individual bus routes.

As *Figure 11* shows, the rail line runs very close and parallel to SR 80 (Palm Beach Blvd.) and US 41 where LeeTran envisions future implementation of BRT services. Palm Beach Blvd is an opportunity for an east-west connection, while US 41 offers an opportunity for a north-south BRT service. LeeTran has identified both as candidate corridors for this premium service. Along US 41, LeeTran envisions the implementation of an 11.4-mile north-south BRT service along US 41 and an east-west high capacity transit service along SR 80. Although it is likely that a service along the SGLR corridor will result in duplication or elimination of transit services along US 41, such determination cannot be made in the absence of such service. It is also not the focus of this feasibility report.

Currently, in the LeeTran transit system, service along the US 41 corridor (route 140) has the highest ridership in the LeeTran fixed route system (operates every 20 minutes with 1,209,936 riders annually, FY 2012, LeeTran). It makes connections to several major transfer hubs throughout the county and much of the corridor is developed with medium- to low-density urban commercial development with increasing intensities found near Downtown Fort Myers. The Palm Beach Boulevard Corridor (SR 80) exhibits above average transit performance, runs through urban, medium-density commercial development in the Fort Myers area and provides direct access into Downtown Fort Myers and into the Rosa Parks Transportation Center.

LeeTran's *BRT Feasibility Study* (April 2008) also identified the SGLR corridor as a candidate for implementation of a BRT service. However, the study did not select the corridor for further evaluation because: "one of the major objectives of this study is to determine the most appropriate north-south and east-west BRT corridors that will represent the initial BRT network in Lee County. At this time, the US 41 corridor is the most productive north/south corridor in the County. The SGLR corridor will be excluded from the initial BRT network in Lee County because of its proximity to the US 41 corridor and because of the minimum amount of commercial and residential development immediately adjacent to the corridor at this time. However, exclusion of any candidate BRT corridors from this feasibility study does not preclude any corridor from future BRT consideration. As corridors continue to develop and transit demand rises, assessment of other BRT corridors should be performed."

Figure 13: Lee Tran Service Routes



Thus, it is important to further evaluate the SGLR corridor because any proposed high capacity transit service along the corridor will have significant implications on LeeTran transit service plan, both in the near and long terms. Some longer north-south trips would shift from conventional buses to the new service, but many new passengers would be transferred by the new service to other bus routes. Coordination between the MPO, LeeTran and respective jurisdictions will have to be effective in order to ensure that transit needs are analyzed before a transit integration plan is developed to address those needs. Routes that parallel the SGLR would need to be evaluated to minimize duplication of services and to maximize complimentary transit services. There will also be need to evaluate opportunities for park and ride lots at transit stations where surplus land is available. Overall, the introduction of high capacity transit services typically results in operational improvements to existing transit routes.

11. <u>Conclusions</u>

Lee County Comprehensive Plan (Lee Plan) Policy 44.1.3 states the intent of the County to: "*Develop transit system alternatives to fixed route bus service, such as High Occupancy Vehicle Lanes, Bus Rapid Transit and Light Rail."*

The SGLR corridor provides such an opportunity to introduce high capacity transit system into the transit options available to residents of Lee County in the foreseeable future.

The corridor provides a central location within the urban area and passes through major cities and hubs of activities: East Fort Myers, Downtown Fort Myers, Central Fort Myers, South Fort Myers, San Carlos Park, Estero and Downtown Bonita Springs. Furthermore, the corridor is closer to several major trip generators, including industrial parks, office centers, hospitals and clinics, major shopping centers and recreational facilities. There are redevelopment opportunities which exist along the corridor creating potentials for transit supportive developments which maximize capacity for future transit ridership. Although the corridor is within proximity of SR 80 and US 41 where LeeTran envisions future BRT routes, there exists opportunity to introduce another transit option for commuters in the County by utilizing the corridor for a high capacity transit service.

This report has evaluated different high capacity transit service options from Bus Rapid Transit (BRT) in shared and exclusive lanes to Light Rail Transit (LRT) and Commuter Rail Transit (CRT) along the corridor, providing 18 or more transit stations and connectivity between the suburbs and areas of employments. The report also considered the integration of a multi-use pathway along the corridor.

The report concludes that a passenger rail service is very feasible along the SGLR corridor. Previous studies have recommended the implementation of a BRT along the SGLR corridor without any analysis conducted regarding ridership or suitability of such a service. While it is possible that a BRT service could be operated along this corridor, the relatively lower cost of operating a CRT along the corridor makes that mode equally attractive. Further, the potentials presented by both CRT and LRT to attract transit-oriented development along the corridor in contrast to a BRT system also makes a rail option feasible along this corridor.

The concept of bus service utilizing freight rail tracks is unprecedented in the United States, although it could be considered along this corridor subject to a future Alternatives Analysis and environmental study that could determine its feasibility and applicability. However, there are few examples of BRT sharing Light Rail tracks and corridors in the United States: South Pittsburg Busway and Seattle Downtown Tunnel are two examples while CTRAN in Vancouver, WA, is undergoing an Alternatives Analysis that evaluates the possibility of operating a BRT service on a short segment of LRT tracks in Downtown Vancouver. For the SGLR corridor, it is not viable to have a BRT service that could also operate on paved LRT trackage since only one mode is being considered for implementation.

It is important that a further evaluation of these passenger service modal options is conducted to determine the most feasible option. This analysis would evaluate for instance, ridership forecasting, intent of the service, the market being served, the specific costs of the mode, and the level of operations among others.