CITY OF GAINESVILLE
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City of Gainesville Streetcar Conceptual Study

FINAL REPORT

RTS

Tindale-Oliver & Associates, Inc.
Planning and Engineering

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City of Gainesville Streetcar
Feasibility Study

Chapter 1:

Project Background and Conceptualization

FINAL REPORT

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1.1 Introduction

The Gainesville Regional Transit System (RTS) contracted with Tindale-Oliver & Associates, Inc., to complete a Streetcar Feasibility Study to assess the potential viability of implementing a streetcar system to connect three major activity centers within the urban core of the City of Gainesville. These centers include the University of Florida (UF), Innovation Square(, and Downtown Gainesville (including the Rosa Parks Transfer Center). As described in Section 1.4 later in this Chapter, development of a streetcar has been considered by as one potential premium transit solutions as Gainesville continues to grow and develop.

1.2 Study Format

The purpose of the Streetcar Feasibility Study is to provide technical data and information, along with a sketch-level operating concept, that can be used by the City's elected officials to make an informed decision about the viability of a future streetcar implementation in Gainesville. Thus, the results of this effort will provide an advanced starting point for the development of more detailed recommendations concerning system alignment, operational characteristics, vehicle acquisition, and implementation should a decision be made to move forward with such a modal implementation.

Despite the conceptual nature of this feasibility examination, it includes an overall assessment of what the potential costs/benefits of a future streetcar system could be, and allows for officials to gain a more objective understanding of all aspects of such an implementation.

The study is broken down into nine chapters covering many different facets of streetcar development and operation. The chapter names and short descriptions are listed below:

- *1.0 Project Background and Conceptualization* - This chapter includes a brief description of the project background, planning context, and system case studies from around the United States.
- *2.0 Preliminary Screening of Conceptual Alignments* - This chapter includes a description of the preliminary screening process, and the introduction of the preferred conceptual alignment.
- *3.0 Economic Development Assessment* - This chapter includes a detailed economic analysis that examines the potential benefits of implementing a streetcar system.
- *4.0 Ridership Estimate* - This chapter includes a ridership range estimate for the streetcar system.
- *5.0 Vehicle Technology Assessment* - This chapter includes background on the different types of streetcar vehicle technology currently available.
- *6.0 Proposed Operating Plan* - This Chapter contains an assumed cursory operating plan including hours of operation, headway, and an estimate of vehicles needed, to be used subsequently in the estimation of potential costs.
- *7.0 Cost Estimates* - This chapter includes an estimate of capital and ongoing operating costs for the system based on the proposed operating plan.
- *8.0 Funding and Financing* - This chapter includes a listing of current potential funding sources for both capital and operating expenses that could be used to support the implementation of a streetcar system.
- *9.0 Conclusions and Recommendations* - This chapter includes a brief conclusion along with some potential next steps for consideration moving forward.

In addition to the chapters listed above, there are three appendices that include additional background information related to the study. These include the following:

Appendix A - Preliminary Screening Analysis

Appendix B - Summary of Existing Utilities

Appendix C– Economic Development Model Assumptions Table

Appendix D - Capital Cost Summary Tables

1.3 Development Context

As discussed in more detail in Chapter 3 the University of Florida, (UF) City of Gainesville, Alachua County, and other agencies and organizations have been working to transform the urban core of Gainesville into one that supports diverse public/private sector employment and a significant residential population. There have been a number of initiatives focused on encouraging this type of growth and, in recent years, focused infrastructure investments have served as the impetus for significant infill and redevelopment between UF and Downtown Gainesville. These public/private sector investments are setting the stage for an urban transformation unlike anything that has been experienced in Gainesville, and the impacts to existing transportation and transit infrastructure could be significant.

It is within this future development context, not within the existing development context, that a streetcar is being considered in Gainesville. The development of a streetcar system from feasibility study to operation can, under a best case scenario, take 8-10 years to implement. Wherever possible, efforts were made in this study to reflect this time lag, in order to accommodate the expected growth and change in the various analyses. More background on the projected development expected within the urban core can be found in Chapter 3.

of this report, the final recommendation had not been adopted yet by the City .

1.4 Case Study Summaries

An important step in developing any transit system is understanding the experiences of similar systems. This is particularly important in the case of streetcar systems, as they have only recently begun to be implemented in cities across the United States.

Interest in urban streetcar systems, whether using authentic, reconditioned vintage streetcars, new vehicles that are replicas of original streetcars, or modern trams, is growing and continuing to receive financial support from federal, state, and local funding sources.

Increasingly, many of these same communities are engaged in the pursuit of regional solutions to mobility, including express bus, bus rapid transit (BRT), light rail, and commuter rail. The City of Gainesville falls in that category, with its current study of a new BRT/Premium Bus system.

The development of new streetcar systems within the U.S. has been a fairly recent phenomenon, as communities have begun to recognize the transportation and economic development advantages of these systems. The new systems have continued to evolve, and where many of the early adopters (Memphis, Tampa, Little Rock) chose to use vintage or vintage-replica rolling stock, with the exception of St. Louis, Missouri, all of the systems currently under construction are using modern tram cars.

The list in Table 1-1 provides a status for streetcar systems in North America From this list, a total of five streetcar systems were selected as case studies in order to provide background information relevant to the proposed system in Gainesville. These five systems include Little Rock, Arkansas; Tampa and Ft. Lauderdale, Florida; Portland, Oregon; and Tucson, Arizona. These case studies were chosen for their unique characteristics that are relevant to the study of a potential streetcar system in Gainesville. For each of these systems, information was gathered through the review of planning documents and interviews with local staff/officials where possible.

Table 1-1: Streetcar Systems in North America

Operating	
Seattle, WA	New Orleans, LA
Portland, OR	Kenosha, WI
Tacoma, WA	Tampa, FL
San Francisco, CA	Philadelphia, PA
Dallas, TX	Lowell, MA
Memphis, TN	Boston, MA
Little Rock, AR	Toronto, Canada
Under Construction	
Tucson, AZ	Cincinnati, OH
Salt Lake City, UT	St. Louis, MO
Atlanta, GA	Washington, DC
Charlotte, NC	Ft. Lauderdale, FL
Planned / Committed	
Sacramento, CA	Detroit, MI
Milwaukee, WI	

(Source: Infrastructurist)

Potential case studies were also identified in cities and/or metropolitan areas more comparable in size to Gainesville, and cursory information was gathered about the following systems:

- Kenosha, Wisconsin
- Lake Oswego, Oregon
- Galveston, Texas

Of these three systems, only Kenosha, Wisconsin is currently in operation. The Galveston system has been closed since being damaged by a hurricane in 2008, and the Lake Oswego system was closed due to funding /maintenance issues. Ultimately, the project team determined that there were more relevant commonalities between the chosen case studies and Gainesville, and that these other examples were not sufficient for further examination given the purpose of these systems, their operational characteristics, and current status.

However, it is important to note that there are a number of smaller cities and metropolitan areas more similar in scale to Gainesville that have been examining the possibility of implementing a streetcar system; though, at this point, they are all new efforts in the early stages of planning. Some of these examples are listed below. Major universities are noted where applicable.

- Lancaster, Pennsylvania
- Madison, Wisconsin - University of Wisconsin
- Salem, Oregon
- Sarasota, Florida
- New Haven, Connecticut—Yale University
- Ann Arbor, Michigan—University of Michigan
- Fayetteville, Arkansas—University of Arkansas
- Missoula, Montana—University of Montana
- Boise Idaho—Boise State University

Although these cities have not yet committed to the implementation of a streetcar system, the examination of such systems is evidence of the interest in developing effective urban circulator services.

1.4.1 Little Rock, Arkansas

Figure 1-1: River Rail Streetcar System (Image Source: www.greentravelarkansas.com)

Table 1-2: River Rail Fare Schedule

Persons age 4 & under	Free
Persons age 5-11	$0.50 per boarding
Persons age 12-64	$1.00 per boarding
Persons age 65 & above	$0.50 per boarding
Persons with disabilities	$0.50 per boarding
Day Pass	$2.00 (1 day unlimited travel)
3 Day Pass	$5.00 (3 days unlimited travel)
20 Ride Card	$15.00

(Source: www.cat.org/river-rail)

System History

The first phase of the River Rail Streetcar System was a single 2.5-mile long line operated by the Central Arkansas Transit Authority (CATA) in Little Rock. It began operation on November 1, 2004, and in the first year served 200,000 passengers. An expansion opened in 2007, which extended the line to allow access to the Clinton Presidential Library and the Heifer International Headquarters. This 0.9-mile expansion increased the length of the line by 33 percent. The system serves the cities of Little Rock (Census 2010 population of 193,524) and North Little Rock (Census 2010 population of 62,304), which are located in Pulaski County (2010 Census population of 382,748) in Central Arkansas. The River Rail connects the communities of Little Rock and North Little Rock via the Main Street Bridge, where a track has been constructed outside of automobile travel lanes. There are a total of 15 stops for the 3.4-mile route and there are two lines that operate, the Blue Line and the Green Line. The Blue Line crosses the Arkansas River and completes the loop in both Little Rock and North Little Rock. The Green Line is the Little Rock Loop and operates only on the Little Rock side of the river. The system connects with the regional CATA Bus System.

Future expansions are being considered, including a 2.5-mile line to the Clinton National Airport that would operate as a Rail Rapid Transit Line.

Operational Characteristics

The system runs on 25-minute headways from 8:30 AM to 10:00 PM on Monday, Tuesday, and Wednesday; 8:30 AM to 12:00 AM on Thursday, Friday, and Saturday; and 11:00 AM to 5:00 PM on Sunday.

The fare structure can be seen in Table 1-2 to the left, which defines costs per trip.

Organizational Structure

The River Rail Streetcar System is operated by CATA, which provides transit throughout the Central Arkansas Region. As noted previously, most of the operating funding comes from the municipalities of Little Rock and North Little Rock. There is no special board of directors or advisory board serving the streetcar system, but it does function as a special component of CATA.

Design

The River Rail Streetcar System primarily uses a single-track design, with two loops, one in Downtown Little Rock and the other in Downtown North Little Rock. The system also includes an extension, as previously mentioned, that became operational in 2007, and connects the Downtown Little Rock loop with the Clinton Presidential Library and the Heifer International Headquarters. The system operates using an overhead electric power supply. The specific design challenge for this project was the technical solution for the streetcar crossing the bridge to connect the cities. A special control system was used to accomplish the appropriate technical solution.

Rolling Stock

The system operates with five Birney-style streetcars that were built by the Gomaco Trolley Company in Iowa. The carbodies are replicas, while the trucks and motors are recycled from old streetcars. The streetcars are numbered #408, #409, #410, #411, and #412, which continues the numbering scheme of the previous streetcar system of many years ago that ended in #407. The streetcars can carry a maximum of 88 people (44 seated).

Ridership

The ridership for the system started strongly, with nearly 200,000 riders in its opening year. However, since 2008, the numbers have been slowly declining, and the overall reduction from 2007–2011 is 11.8 percent. The cause of the ridership drop is uncertain, but it seems to follow the economic downturn that has affected the country since 2008. Like most medium-size cities with regional and/or national attractions, ridership is a combination of visitors and local residents and workers.

Figure 1-2: River Rail System Map (Image Source: www.cat.org)

Table 1-3: Ridership

2011	136,380
2010	107,088
2009	119,758
2008	134,204
2007	154,644

(Source: National Transit Database)

Ridership for each year from 2007 to 2011 is shown in Table 1-3 below:

Surrounding Land Use Context

The streetcar connects a number of the region's most significant points of interest, all located on or within a short distance of the streetcar line, including:

- Statehouse Convention Center
- River Market
- Verizon Arena
- Historic Argenta Neighborhood
- Dickey Stevens Ballpark
- Historic Arkansas Museum
- Museum of Discovery
- Main Branch of the Central Arkansas Library
- Robinson Auditorium Concert Hall
- State and Local Government Buildings
- Numerous hotels including the Little Rock Peabody Hotel

In 2011–2012, CATA compiled data on economic growth and development that has occurred within four blocks (¼–½mile) of the River Rail Streetcar Line. This analysis looked generally at the changes that have occurred within the area immediately surrounding the system for the years from 2000 to 2010. It concluded that there had been substantial investment and development within the area including the following:

- 1,084 new residential units
- $883 million in new capital investment (new construction & rehabilitations)
- 56% increase in residential property value
- 44% increase in retail property value
- 21% population growth

Figure 1-3 - New development along River Rail. (Image Source: www.apta.org)

The degree to which the streetcar system influenced that growth in Little Rock is debatable; however, it was disproportionately significant compared to proximate development outside that area during the same period.

Costs

The initial capital cost to construct Phase I of the system was $20.5 million ($8.2 million per mile). With the Phase II extension to the Clinton Presidential Library and Heifer International costing approximately $8 million, the total capital cost for the system is $28 million. The capital funding for the system was raised from a number of sources including federal grants and earmarks, the FTA New Starts Program, State Transportation funds, and the cities of Little Rock and North Little Rock.

Operating costs for the system have averaged between $850,000–$1,000,000 per year. The operating costs for 2009, 2010, and 2011 were provided by CATA are listed in Table 1-4 below:

Table 1-4 - River Rail System Operating Costs 2009-2011

2009	$898, 104
2010	$1,007,510
2011	$928,882
2012	$1,007,601

(Source: CATA & NTD)

For 2012, the National Transit Database (NTD) lists the cost per revenue hour as $81.02.

A portion of the operating costs are covered by revenues raised through merchandise sales, farebox revenue, car rental, and advertising income, which covers about 10 percent of total operating costs. The remaining costs are covered by the cities of Little Rock and North Little Rock from general funds. The system does have programs for naming rights of streetcars and stops, and a streetcar sponsorship program.

1.4.2 Tampa, Florida

Figure 1-4 - USF CAMLS Center on the TECOLine Streetcar System

Table 1-5: Fare Schedule

One-Way Fare	$2.50
Youths and Seniors	$1.25
1-Day Unlimited	$5.00
Family All-Day	$12.50
3-Day Unlimited	$11.00
20 Ride (for residents/businesses)	$25.00
Annual Streetcar Pass	$200

(Source: www.tecostreetcarline.org)

System History

Tampa was once the location of a substantial streetcar system that contained more than 50 miles of track serving the entire City of Tampa. The original system ceased operation in 1946, but for many, the streetcar represented an important part of the city's history. Starting in the 1980s, a group of local enthusiasts created the Tampa and Ybor City Street Railway Society and began advocating for the reintroduction of the streetcar system. This organization educated the public about the benefits of streetcars and eventually was able to raise enough money to restore one of system's original Birney streetcars.

Starting in the 1990s, the City of Tampa, the Tampa/Hillsborough County Metropolitan Planning Organization (MPO), and the Hillsborough Area Regional Transit Authority (HART) began working on developing the system and were eventually able to identify a route, funding, and ownership structure to build and operate the initial system. The system began operation of its first route in 2002 on a 2.4-mile alignment that connected the Channel District to Ybor City, in the urban core of the city. The streetcar line was named the TECOLine Streetcar System after one of its largest sponsors and owner of the original Tampa streetcar system, Tampa Electric, which endowed the system with $1 million for the system naming rights.

The system serves the urban core of the City of Tampa (Census 2010 population of 335,709). An extension in 2010 took the line 3/8-mile north into the southern core of Downtown Tampa, allowing access to the nearly 8 million square feet of office space located there and many more of downtown's 40,000+ employees.

The system connects with the regional HART bus system at multiple locations and a rubber tire trolley system connects with it at the Southern Transportation Plaza in the Channel District.

Operational Characteristics

The system currently has 11 stops on the 3.0-mile route with headways of 20 minutes (See Figure 1-5 for a system map). Hours of operation are Monday through Thursday, 12:00 PM to 10:00 PM; Friday and Saturday, 11:00 AM to 2:00 AM; and Sunday, 12:00 PM to 8:00 PM.

The fare structure can be seen in Table 1-5 on the previous page, which reflects costs per trip. The streetcar route connects with a rubber-tire “In Town” trolley, which has one-way cash fares of $0.25. The fares for the streetcar are higher than those typically charged for HART bus service.

Organizational Structure

The TECOLine Streetcar is administered by Tampa Historic Streetcar, Inc. (THS), a non-profit organization that includes board members from the City, HART, and other public and private entities. THS contracts with HART to operate and maintain the system as part of its overall operations. The arrangement is similar to other cities such as Portland, Oregon, which uses an Advisory Board comprised mainly of business owners in the area. In Tampa’s case, the real purpose of the Board is to provide a citizen-based marketing perspective, manage the endowment fund, and raise additional private-sector funding for the system.

Design

The TECOLine Streetcar System primarily uses a single-track design, with passing tracks to allow for bi-directional operation. The system’s primary station is located at the Southern Transportation Plaza in the Channel District and operates in a dedicated lane separated from traffic.

While the system encountered no specific design problems, by today’s standards, the track is considered to have been somewhat over-designed because the concrete base depth is more than required of the streetcars. This influenced the cost of the track bed and the need for more utility relocation than anticipated.

Rolling Stock

The TECOLine has nine 400-series replica street cars from the Gomaco Trolley Company based on the original streetcars used in Tampa between the 1920s and

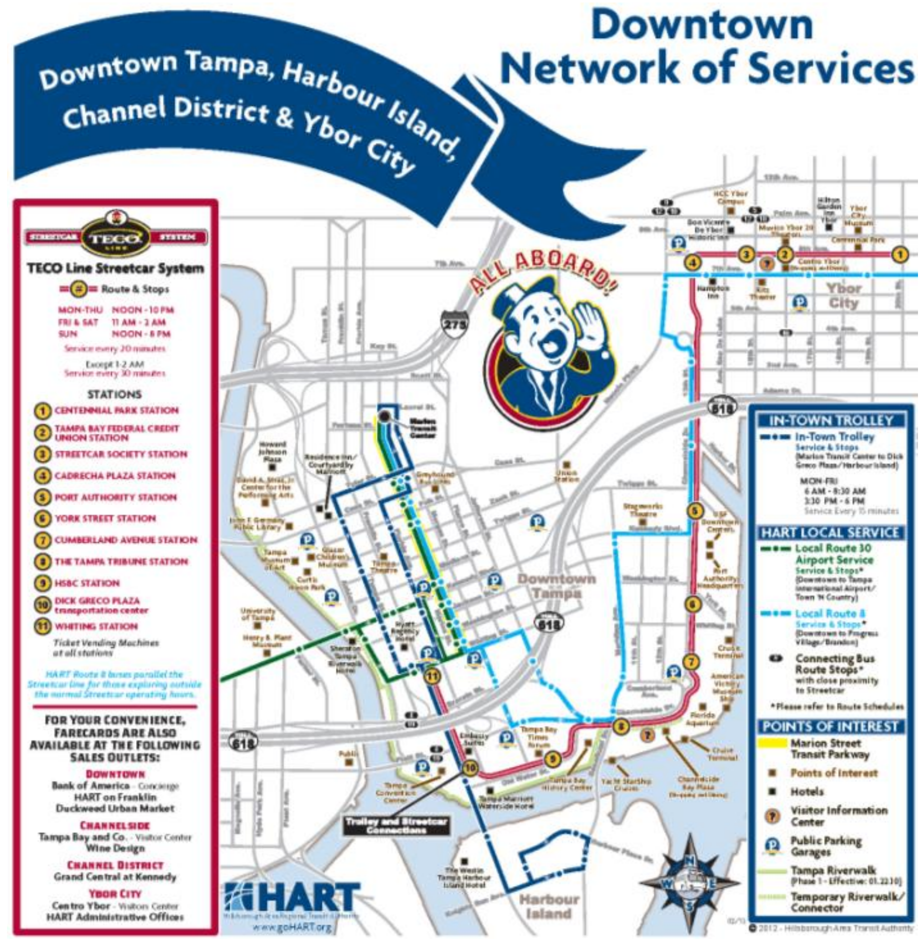

Figure 1-5: TECOLine Streetcar System Map. (Image Source: www.tecolinestreetcar.org)

1946. The carbodies are replicas, while the trucks and motors are recycled from old streetcars. The numbers of the streetcars (#428-436) picked up where the original Tampa streetcar system numbers left off. The cars are 46-feet long, 48,000 pounds, and carry 74 passengers (sitting and standing).

Ridership

The annual ridership for the TECOLine System has been strong, though in recent years there have been some declines, possibly due to reductions in service due to budget cuts and the general decline in the local economy. These cuts have kept the system from operating during peak morning commute hours, which has greatly limited its use by local commuters within the urban core. Ridership for the last several fiscal years is summarized in Table 1-6 below:

Table 1-6: TECOLine Streetcar Ridership

2011	431,425
2010	501,959
2009	505,703
2008	484,711
2007	562,320

(Source: National Transit Database)

Surrounding Land Use Context

As it currently operates, the system links a series of important attractions in the urban core of Tampa:

- Florida Aquarium
- Multiple hotels, including Headquarters Marriott Waterside, Downtown Hyatt, and Embassy Suites
- Three cruise ship terminals operated by the Tampa Port Authority
- Two major urban retail centers, Centro Ybor and Channelside
- Tampa Convention Center
- Tampa Bay History Center
- USF Center for Advanced Medical Simulation (CAMLS)
- Tampa Bay Times Forum Arena
- Historic 7th Avenue in Ybor City

Figure 1-6: Redevelopment along TECOLine Streetcar route
(Image Source: www.apta.org)

The intent of the TECOLine Streetcar System was two-fold. First, it was designed to connect existing/future attractions and parking garages in the City's urban center where visitor attraction and redevelopment was a priority. However, it was equally important to use the system to help spur economic development in areas of the core that had long needed a boost (see redevelopment along the line in Figure 1-6). While the initial alignment was selected to capitalize on urban visitors and local attendance at special events, the system was also intended to eventually serve a significant influx of new residents in the urban core over time. It is also important to note that Tampa, much like other cities in the U.S. that either have operating systems or are contemplating them, has made broad, concerted commitments to many public investments in its urban center to stimulate urban revitalization in which an urban circulator is a key component.

More than $1 billion in private development investment has occurred within the streetcar's Special Assessment District since it opened in 2002, and, while not all of this development can be directly attributed to the presence of the streetcar, the system has contributed to the creation of an urban environment unparalleled in the city, which has been attractive for developers and new urban residents. While the recession essentially stopped new development for several years, additional residential and commercial development has recently re-emerged in the area.

Together with the significant public investment commitment by the City, the Tampa Port Authority, Hillsborough County, the University of South Florida, and other public institutions, private-sector investment has significantly transformed the urban core of Tampa. The system’s potential to continue to spur economic growth is significant as it is expanded farther north into the urban core of the city, and eventually, into other urban neighborhoods.

Costs

The capital cost for the initial system was approximately $53 million ($17.6 million per mile), which was raised from a number of sources including HART, FDOT, the City of Tampa, FTA, and other sources. The .2 mile extension into Downtown Tampa cost an additional $3.5 million. The operating cost for the system in 2010 was $1,993,427, which is covered through a number of sources, including farebox revenues, special event and charter revenues, a special assessment (district), an endowment fund, local contributions from the City of Tampa’s three Community Redevelopment Area (CRA) districts located within the streetcar’s alignment, and state and federal grants.

1.4.3 Portland, Oregon

Figure 1-7: Portland Streetcar (Image Source: Hawkins)

Table 1-7: Portland Streetcar Fare Schedule

Streetcar Only Fare - 2 hour.	$1.00
TriMet - All Day Fare	$5.00
TriMet - Flat Fare	$2.50
TriMet - Honored Citizen/Senior Citizen	$1.00
Tri Met - Youth Fare	$1.65
Streetcar Only Annual Pass	$200

(Source: Portland Streetcar, Inc.)

System History

A streetcar in Portland was called for in the Center City Plan of 1988. The system originally considered using replica cars with the name, Center City Trolley. By the time of first construction, the name was changed to the Central City Streetcar and modern cars were chosen as the vehicles in fear that vintage trolleys would encourage local residents to consider the system a tourist attraction.

The Portland Streetcar system was planned with five planning goals in mind:

- link neighborhoods with a convenient and attractive transportation alternative
- fit the scale and traffic patterns of existing neighborhoods
- provide quality service to attract new transit ridership
- reduce short inner-city auto trips, parking demand, traffic congestion, and air pollution
- encourage development of more housing and businesses in the Central City.

The original route was a 4.8 mile (2.4 miles each direction) continuous loop route that ran from Portland State University to NW 23rd Street. The total cost was $57 million and it opened on July 20, 2001. Since then, three extensions have been built to the North/South (NS) Line (see Figure 1-8 for a system map).

The first phase of the NS Line to extend to the South Waterfront redevelopment area opened on March 11, 2005. The 0.6-mile track began at the existing system's southern end. This section uses a one-way track, except for 100 yards along Montgomery Street and 4th Avenue, which is a two-way single track operated by streetcar signals. The extension cost $18.1 million ($30.2 million per mile), including the purchase of two additional streetcars. The southern end of the NS Line was extended again by 0.42 miles to the Portland Aerial Tram at SW Gibbs Street. Opening on October 20, 2006, this extension also was a two-way single track. This temporary system was changed to a double track in 2011 to accommodate redevelopment along its route. This also included a pedestrian bridge that links the Gibbs Street stop to the Lair Hill neighborhood, which opened in 2012. The third extension to the NS Line was built to serve more of the South Waterfront district in 2007. The 0.46-mile extension from Gibbs Street operates on a 10-block loop.

The Central Loop (CL) Line was an extension to the industrial districts on the east side of the river as called for in the Eastside Streetcar Alignment Study. It was adopted in 2003. Opening on September 22, 2012, it is a 3.3-mile loop. At its terminus at Oregon Rail Heritage Center, it will connect to the future MAX line that will connect to Milwaukie, Oregon. Part of this project includes a new bridge across the Willamette River to the west of the existing Hawthorne Street bridge. When the Portland Streetcar uses the new light rail bridge across the Willamette River, it will need to be outfitted with Automatic Train Stop equipment, which will stop the vehicles in potentially hazardous circumstances (unresponsive driver, etc). This technology is required on all LRT vehicles in Portland, so since the streetcar would be sharing tracks with LRT it will be required too.

Two more extensions are currently being planned to Burnside and Johns Landing. Additionally, Tri-County Metropolitan Transportation District of Oregon (TriMet) is building an extension to Lake Oswego that has currently been put on hold due to conflicts with the City's existing streetcar system.

Operational Characteristics

Streetcars run on two lines, the NS Line and the CL Line. The NS Line is a 8 mile (4.0 mile each direction) continuous loop route from Legacy Good Samaritan Hospital at NW 23rd Avenue, to SW Lowell Street and Bond Avenue at the South Waterfront District. The CL Line, is a 9.3-mile (4.65 miles each direction), continuous loop route from SW Market Street along 10th and 11th to the Pearl District, across the Broadway Bridge, and the Central Eastside. The stops along the line are located every 2-6 blocks.

At its peak, between 10:15 AM to 7:30 PM, the NS Line runs on 12-14-minute headways on the weekdays and 18-minute headways on the weekends. The CL Line runs on 18-20-minute headways. Hours of operation are 7 days a week,

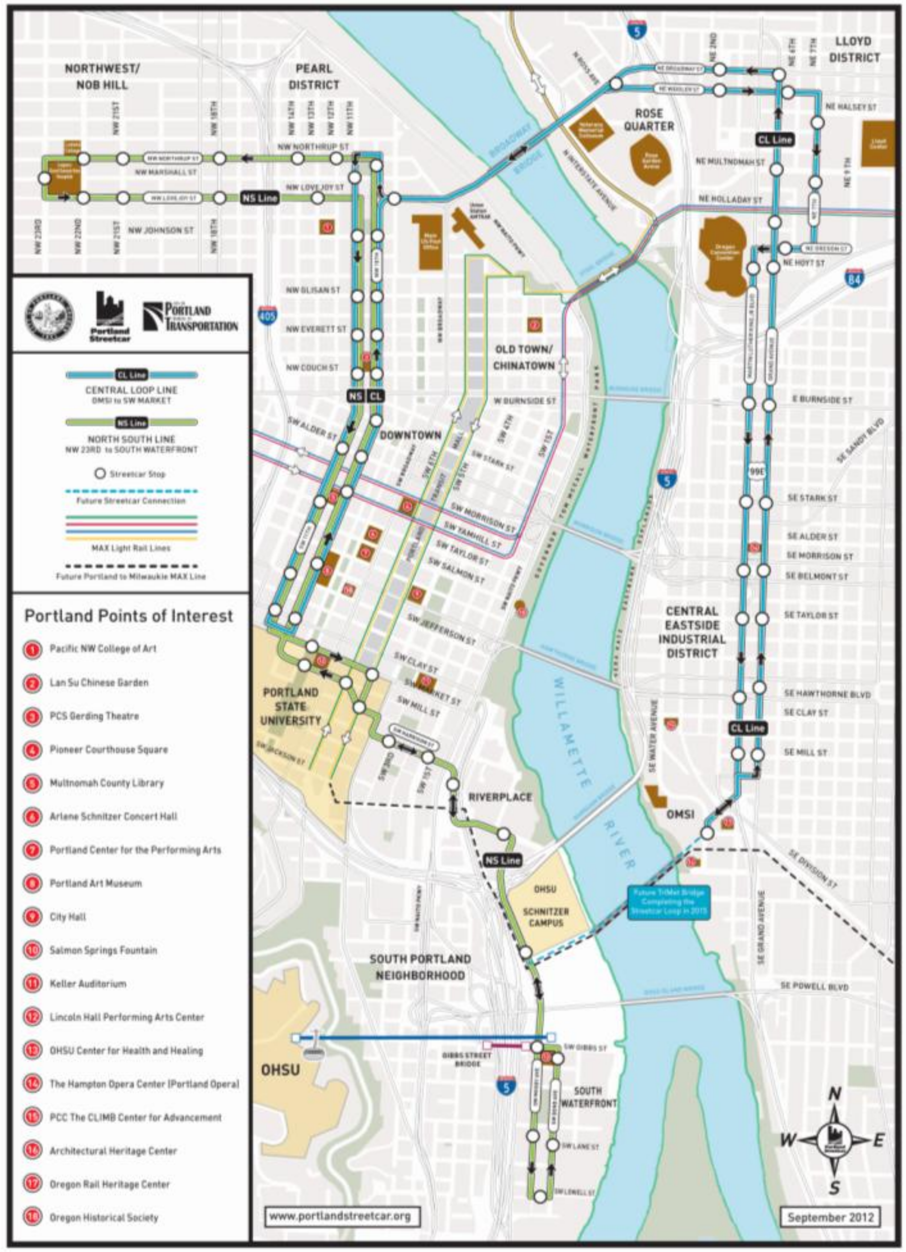

Figure 1-8: Portland Streetcar System Map. (Image Source: www.portlandstreetcar.org)

5:30 AM to 12:00 AM (midnight).

The fare structure can be seen in Table 1-7, which reflects costs per trip.

Organizational Structure

The Portland Streetcar System is owned and operated by the City of Portland. The City contracts with Portland Streetcar, Inc. (PSI) is a private, non-profit corporation that constructed and operates the system. PSI is run by a 17-member Board of Directors. TriMet and the City of Portland run an integrated fare system between the streetcar, light rail, and bus service.

Additionally, a Citizen Advisory Committee was created by the Transportation Commissioner to advise the board in the planning, design, and operation of the streetcar system.

Design

Because of it is one of the oldest modern day streetcar systems, designed around the same time as Tampa's, Portland developed its own track technology: a shallow, but heavily reinforced bed composed of a 7-foot spanable slab, which allows construction of the streetcar track without disturbing existing utilities when they could not be moved. This design has allowed for construction times to be greatly reduced. While the City had agreements with utility companies that made them responsible for moving their own utilities if required, which was the main reason costs could be reduced, the slab technology contributed the reduction of cost as well.

Rolling Stock

The first 10 streetcar vehicles were manufactured by Skoda-Inekon in Pilzen of the Czech Republic. They are 8-feet wide and 66-feet long, which is a third of the length of a light rail double-car train. Seven vehicles from United Streetcar of Clackamas, Oregon, have been added to the fleet, which are the same size as the original vehicles. The United Streetcar vehicles can hold 30 seated passengers, and 127 standing for a total of 157.

Ridership

The annual ridership for the Portland Streetcar has been consistently strong. Ridership rose from its introduction in 2002 to 2009, when the economic recession was in full effect. During the recession, the system has maintained a healthy ridership though there were decreases. (Table 1-8)

Table 1-8: Portland Streetcar Ridership 2007-2012

2012	3,712,762
2011	3,963,368
2010	3,914,722
2009	4,038,920
2008	3,550,316
2007	2,964,576

(Source: Portland Streetcar, Inc.)

Surrounding Land Use Context

The Portland Streetcar is used not only as a transportation tool for the City of Portland, but an economic development one. A main objective of the system was to connect two redevelopment areas: 70 acres of abandoned rail yards and a contaminated brownfield site just north of Downtown (the River District) and 128 acres of vacant industrial land at the opposite end of Downtown (the South Waterfront).

The Streetcar has also had a large effect on the urban form along the alignment. As cited in the *Portland Streetcar Development Oriented Transit* report by the Office of Transportation and Portland Streetcar, Inc., prior to 1997, new projects were built to less than half of the allowable density allowed on a site in the central business district (CBD). Since the streetcar alignment was chosen in 1997, new development achieved an average of 90 percent of the floor-to-area ratio (FAR) potential within one block of the streetcar line. This percentage steadily drops to 43 percent at three or more blocks from the alignment.

Development impacts are most apparent in the transformation of four neighborhoods: Pearl District, South Waterfront, the Brewery Blocks, and more housing in the downtown core.

Figure 1-9 - Redevelopment along Portland Streetcar Route
(Image Source: www.2stcenturyurbansolutions.com)

Since 1997 when the original streetcar alignment was identified, the following transformations have occurred along its route.

- $3.5 billion has been invested within two blocks of the streetcar alignment.
- 10,212 new housing units and 5.4 million square feet of office, institutional, retail, and hotel construction have occurred within two blocks of the alignment.
- 55% of all CBD development since 1997 has occurred within 1-block of the streetcar and properties located closest to the streetcar line more closely approach the zoned density potential than properties situated farther away.
- Developers are building new residential buildings with significantly lower parking ratios than anywhere else in the region.

Costs

The capital costs of the Portland Streetcar System are detailed on the following pages by project segment (Tables 1-9 to 1-14):

Legacy Good Samaritan Hospital to Portland State University (2.4 miles of double track) - Service Began on July 20, 2001

Capital Budget - $56.9 Million

Table 1-9: Capital Funding Sources for Legacy Good Samaritan Hospital to Portland State

City Parking Bonds	$28.6 million
Local Improvement District	$9.6 million
Tax Increment (South Park Blocks	$7.5 million
Federal Transportation Funds	$5 million
City Parking Funds	$2 million
City General Fund	$1.8 million
City Transportation Fund	$1.7 million
U.S. HUD Grant	$0.5 million
Miscellaneous	$2 million

(Source: Portland Streetcar, Inc.)

SW Moody & Gibbs to SW Lowell (0.4 miles of double track) - Service Began on August 17, 2007

Capital Budget - $14.45 million

Table 1-10 - Capital Funding Sources—SW Moody & Gibbs to SW Lowell Extension

Local Improvement District	$4.8 million
Transportation Systems Development	$2.5 million
Connect Oregon	$2.1 million
Tax Increment Funds	$1.8 million
U.S. Dept. of Housing and Urban	$0.65 million
Gibbs Extension Savings	$0.66 million
Tram Transfer	$0.15 million
Miscellaneous	$2 million

(Source: Portland Streetcar, Inc.)

RiverPlace to SW Gibbs Street (0.6 miles of single track) - Service Began on October 20, 2006

Capital Budget - $15.8 million

Table 1-11 - Capital Funding Sources—RiverPlace to SW Gibbs

Regional Transportation Funds	$10 million
Tax Increment (North Macadam URA)	$3.8 million
Local Improvement District	$2.0 million

(Source: Portland Streetcar, Inc.)

Portland State University to RiverPlace (0.6 miles of double track) - Service Began on March 11, 2005

Capital Budget - $16.0 Million

Table 1-12 - Capital Funding Sources—Portland State University to RiverPlace Extension

Tax Increment (North Macadam URA)	$8.4 million
Transportation Land Sale	$3.1 million
Local Improvement District	$3 million
U.S. HUD Grant	$0.8 million
Transportation Fund	$0.6 million
Miscellaneous	$0.1 million

(Source: Portland Streetcar, Inc.)

Loop Extension (Pearl District to OMSI) (3.35 miles of double track)- Service Began on September 22, 2012

Capital Budget - $148.27 million

Table 1-13 - Capital Funding Sources—Loop Extension

Federal Transit Administration	$75 million
State Funds for Vehicles	$20 million
Local Improvement District	$15.5 million
Portland Development Commission	$27.68 million
Regional Funds	$3.62 million
SDC/Other City Funds	$6.11 million
Stimulus Funds	$0.36 million

(Source: Portland Streetcar, Inc.)

Operations Budget

Fiscal Year 2014 - $8.2 million

Table 1-14 - Portland Streetcar System Operating Budget

TriMet	$4.1 million
City of Portland, Office of Transportation	$4.4 million
Portland Streetcar, Inc.	$1.2 million

1.4.4 Ft. Lauderdale, Florida

Figure 1-10 - Conceptual Image of the Completed Wave Streetcar (Image Source: www.sun-sentinel.com)

System History

The Wave Streetcar began when the Ft. Lauderdale Downtown Transit and Pedestrian Mobility Study in 2004 called for an investment in transit and pedestrian improvements in the center city. An Alternatives Analysis (AA) and Environmental Assessment (EA) was completed in 2005 to determine a potential route for the streetcar and which technology would be appropriate to minimize environmental impacts. In 2008, Broward County and the City of Ft. Lauderdale endorsed the locally preferred alternative (LPA). Figure 1-10 is a conceptual image of the finished system. The approved route can be seen on the following page on Figure 1-11.

Also, in 2008, it was established that Broward County Transit would be the owner and operator of the Wave Streetcar system with financial contribution of $10.5 million to the capital costs from the City of Fort Lauderdale. Additionally, the City agreed to lead the process in gaining the additional funds needed.

In the years of 2010 and 2011, the South Florida Regional Transportation Authority (SFRTA) was identified as the FTA project sponsor and the leader of design, construction, and the FTA process.

In the years of 2012 and 2013, the following tasks were completed to prepare for the arrival of the streetcar system:

- environmental clearance (AA/EA) process
- development, approval
- execution of a partnership agreement
- the procurement of a project management consultant team (PMC)
- final local assessment process, which was approved by the City Commission

At the time this document was prepared, the consultant team has begun developing system design, which is expected to be at 30 percent completion by early 2014. The next step in planning will be to hold meetings with the community on final station locations and their design. The construction phase is planned to go from mid-2014 with the streetcar opening in December 2016.

Operational Characteristics

The system, as currently planned, has 10 stops on the 2.7-mile route. The route segment currently in design is 1.42 miles and connects some of the city's most popular attractions:

- Parks (Riverwalk, Huizenga Plaza, Stranahan, Flagler, Esplanade, Hardy Park)
- Himmarshee Entertainment District
- Riverfront
- Flagler Village/Sistrunk
- Broward County Transit Terminal (regional hub)
- Historic District
- Arts & Entertainment District
- FAU/BCC/Nova Campuses
- Main Library
- Financial District/Las Olas
- Government Complex
- Judicial Complex
- School Board Administration
- South Andrews Business District
- North Broward Hospital District

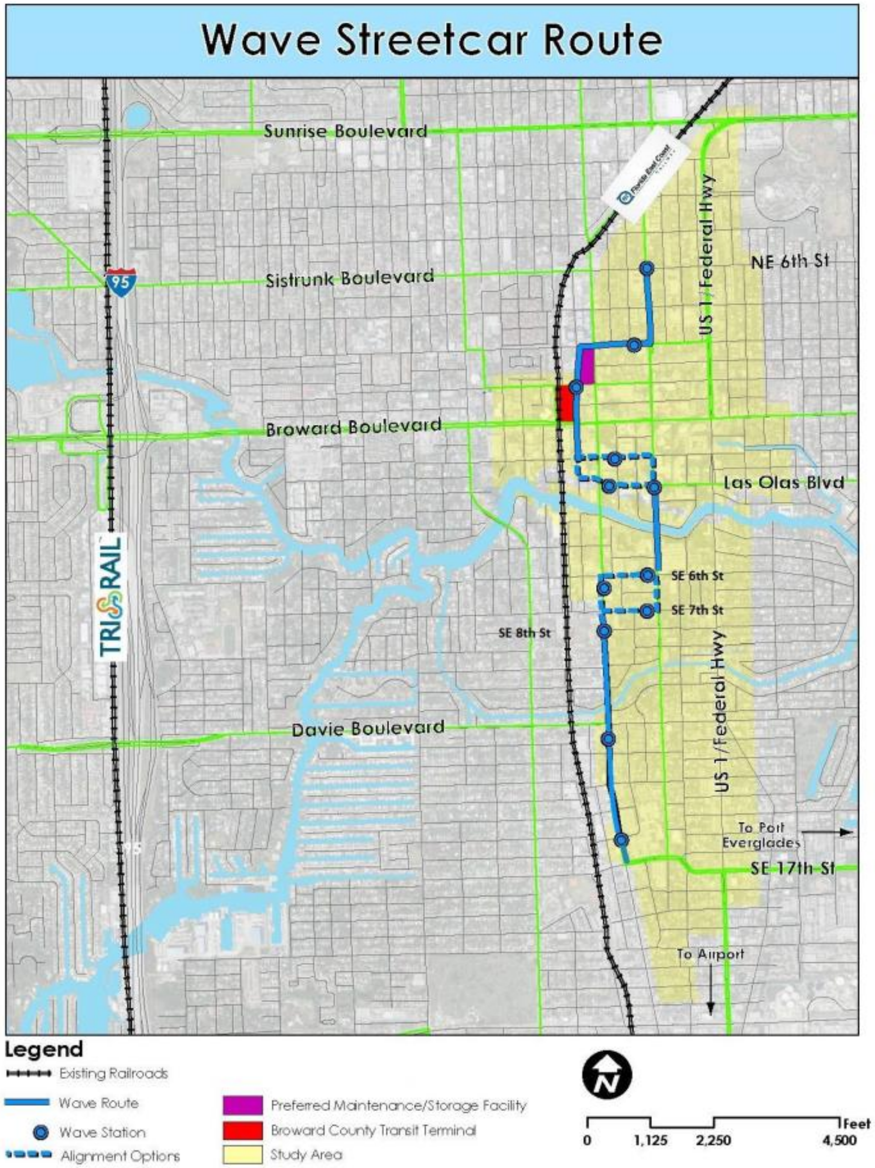

Figure 1-11 - Wave Streetcar System Map. (Image Source: www.wavestreetcar.com)

- Publix @ SE 6th St
- South Side School/Community Center

While a specific schedule has not been determined yet, there has been a commitment that a person will not wait longer than 7.5 minutes at any given stop during peak times, and 10 minutes at off-peak times. It is planned to run in the morning, afternoon, and evening.

Fares have also not been determined, but they are expected to be comparable with Broward County Transit (BCT) bus fare. Daily, monthly, and annual passes will be available, as well as integration with the universal pass system for Broward County. This information will be finalized during the project development phase.

Organizational Structure

As stated before, the Wave Streetcar will be owned and operated by Broward County Transit. SFRTA has been identified as the Sponsor and a partnership between the two organizations is responsible for implementation.

Design

The Wave will run in mixed-traffic, and will be double-tracked for most of its length. There will be some small areas using a single track loop, where the system is located on one-way roadways.

Rolling Stock

SFRTA is currently studying specific modern tram rolling stock options and will likely have a recommendation in early 2014. The chosen vehicle will need to have “off line” capabilities (the ability to switch track systems) to allow for it to cross the New River.

Ridership

The ridership estimations provided in the Tiger IV Grant application completed on March 19, 2012, project an average ridership of 2,407 passengers daily. These numbers were based on three trip types: Regional Trips, Intra-Central Business District Trips, and Additional Event Trips (see Table 1-15 below).

Surrounding Land Use Context

Table 1-15—Wave Streetcar Projected Ridership (Ft. Lauderdale Wave Streetcar Project Tiger IV Application)

Component Streetcar Market	Streetcar Ridership (Daily)		
	Low	**Medium**	**High**
Market 1: Trips to/from outside CBD	967	1,064	1,258
Market 2: Intra-CBD Trips	1,029	1,103	1,179
Market 3: Special Venues Events (daily equiv.)	203	240	330
TOTAL (equivalent daily riders)	**2,199**	**2,407**	**2,766**

Figure 1-12 - Future alignment and redevelopment along the Wave Streetcar Route (Source: www.wavestreetcar.com

Economic development is cited as a driving force for the Wave Streetcar System (along with transportation and mobility). Ft. Lauderdale has made transforming the downtown core into a high-density, transit-supportive, mixed-use urban center a priority. Properties along the planned route include over 15,000 residential units (with densities up to 150 dwelling units per acre) and 5 million square feet of commercial development. The City is currently working on land use, parking, and urban design standards, and is updating its Downtown Design Guidelines to discourage certain types of land uses unsupportive of transit. Land use and zoning requirements are being regulated around a multi-modal center, but eventually will be implemented along the whole streetcar system. Some examples of these regulations include no new surface parking lots within 200-300 feet of a multi-modal station, parking reductions (up to 50%), and density minimums.

A real estate consultant firm conducted an economic impact analysis in 2012 and determined that the Wave Streetcar will enhance and support future development, including:

- Average sale price of new development north of Broward Boulevard and south of the river after completion of the Wave project will be $150 per square foot,
- Average development of 475 units annually during the 15-year cycle after development of the Wave,
- Average unit size would be 1,500 square feet and an average unit sale price would be at $235 per square foot of building area, and
- Cumulative new tax revenue over the next 15 years of between $498,401,944 and $535,053,826, which are reflective of similar returns in the Cities of Portland, Tampa, and Seattle after the implementation of their respective Streetcar projects.

Additionally, land that can be developed within the project area can accommodate 18,000 residential units and 10 million square feet of non-residential. The benefits of this development can be seen in Table 1-16 below, which identifies life cycle benefits for the residential/commercial properties within close proximity to the system.

Table 1-16 - Wave Streetcar Projected Economic Development Benefits (Source: Ft. Lauderdale Wave Streetcar Project Tiger IV Application)

Property Type	Avg. Property Value (2016)	No. of Properties Affected (2016)	20-Year Life Cycle Benefits	20-Year Life Cycle Benefits (Savings in Transportation Costs)
Residential	$368,411	15,936	$104 million	$51.98 million
Commercial	$1,816,489	1,811	$142.8 million	$71.38 million
TOTAL:	**$2,184,900**	**17,747**	**$246.7 million**	**$123.35 million**

Costs

The following capital funding sources have been developed for both Phase I (Starter Line) and Phase II (N/S Line) as seen in Table 1-17 below. The annual forecast year operating costs for the initial starter line is estimated at $2.1 million (Source Wave Streetcar Tiger IV Application).

Table 1-17 - Wave Streetcar Capital Costs Funding Sources (Ft. Lauderdale Wave Streetcar Project Tiger IV Application)

SOURCES	CAPITAL COSTS	STATUS
Phase I (Starter Line)		
Tiger Funds IV	$18 million	Committed
Florida Department of Transportation (New Starts Transportation Program)	$32.6 million	Committed
City of Ft. Lauderdale	$10.5 million	Committed
Special Assessment District	$13.96 million	Committed
Broward MPO	$8.14 million	Committed
SUB - TOTAL	**$83.2 million**	
Phase II (N/S Line)		
Small Starts Fund	$29.7 million	Future Application
Florida Department of Transportation	$3 million	Committed
Additional State and Local	$26.7 million	Pending
SUB - TOTAL	**$59.4 million**	
TOTAL PROJECT FUNDS	**$142.6 million**	
TOTAL PROJECT COST	**$142.6 million**	

1.4.5 Tucson, Arizona

Figure 1-13 - Tucson Streetcar Conceptual Rendering of Completed System (Image Source: www.tusconstreetcar.com)

System History

The City of Tucson is working with community partners to build a 3.9-mile long streetcar route that connects activity centers throughout the city including: the University of Arizona, the Arizona Health Sciences Center, Main Gate district, 4th Avenue district, Downtown Tucson, El Rio Health Center, and the West end planned development area. The streetcar system will serve 85,000 citizens living and working within walking distance of the alignment and 38,000 students at the University of Arizona, as well as visitors and transit-dependent populations. As stated in the Tiger IV Application, the project will specifically focus on the following challenges and opportunities:

- Create direct connectivity between major employment centers and regional attractions
- Serve low income and transit dependent populations
- Support responsible growth in the region
- Provide simple, high frequency service that serves a range of markets and populations

Construction began in 2011, and has been completed as of 2014. Vehicle testing has begun for the system which has 17 stops and 8 vehicles (see Figure 1-14 for system map).

Community partners include the City of Tucson, the Regional Transportation Authority (RTA), the University of Arizona, Sun Tran, and the Arizona Department of Transportation (ADOT).

Operational Characteristics

Headways are scheduled to be every 10 minutes between 6:00 AM and 6:00 PM on weekdays, every 15 minutes for the remaining operating hours on weekdays, and every 20 minutes in the evenings and on the weekend. Late night operation will occur on weekends only. The streetcar will run 20 hours a day (from 6:00 AM to 2:00 AM).

The fare schedule will be the same as local Sun Tran buses to create a regional integrated fare policy. The City is working with the University of Arizona on a universal pass program, where students, faculty, and staff can ride the modern streetcar with their CAT card. The City will also be working with special events to have their admission tickets include streetcar rides for a minor surcharge.

Organizational Structure

The Sun Link Streetcar System will be operated by the City of Tucson through a management contract that has been granted to a private sector operator, RATP Dev McDonald Transit (RDMT). This company will be responsible for operations, maintenance, and the hiring and training of operational staff.

Design

Tucson's streetcar system will use a modified track slab design. The system is designed with a relatively shallow reinforced slab because of the vehicle's lighter design. This minimizes costs substantially as well as the construction activity that is usually required to move utilities in the way of the alignment. However, there have been several instances where utilities were discovered or where their specific locations were unknown. Because this is a City project (the City owns the transit agency and the right of way), the franchise agreements with local utilities are in effect, which require the relocating of utilities at no expense to the City.

The majority of the alignment is double track in the same right-of-way and in the street with shared traffic.

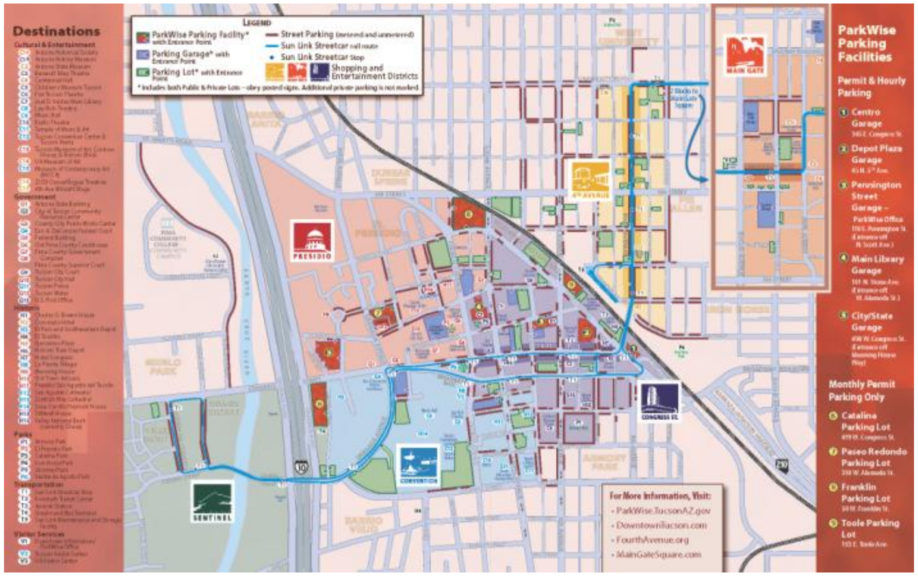

Figure 1-14 - Tucson Streetcar System Map. (Image Source: www.tucsonstreetcar.com)

Rolling Stock

The system will include eight electric powered modern streetcars manufactured by Oregon Iron Works/United Streetcar. Each car will hold approximately 148 passengers (sitting and standing) and be constructed in the U.S. Additionally, they will feature a customized cooling system for the hot climate, and low-floor doors to accommodate ADA accessibility and bicycles.

Ridership

The current ridership estimate is 3,600 boardings per weekday. (Source: Tucson Streetcar)

Surrounding Land Use Context

The streetcar system will connect very important activity centers in Tucson. New transit-oriented development is already being constructed along the alignment, including new retail, office, and residential uses. This includes more than $800 million invested by the private sector. The following are specific economic development benefits that have been constructed since the commitment of the streetcar project in the last two years:

- 50 new restaurants, bars, and cafes
- 1,500 new student housing apartments
- 58 retail businesses
- New headquarters for Unisource Energy (400+ employees)
- Providence Service Corporation

The City of Tucson created the *Transit-Oriented Development Handbook* to ensure transit-supportive development patterns along the streetcar corridor. Elements that are regulated include land use, pedestrian amenities, parking, stop circulation, and access and how they relate to development.

These guidelines were built upon a 2007 market study that examined the City's transit-oriented development potential and an extensive public involvement process. This study found that Tucson would continue to be one of the fastest growing metropolitan areas in the country and will demand a variety of housing types, including high density types. Additionally, it noted the expanding economy, tourist destination identity, and existing transit-oriented-development types as reasons why the market could benefit from the streetcar. The study also predicted an increase in property value near the transit line from 2 to 30 percent. Specifically, for each of the 3,800 properties within 1,500 feet of the alignment, an average property will increase by $9,200 in value by 2015.

Costs

The following capital funding sources have been identified as seen in Table 1-18 below. Operating costs are expected to be $5.2 million annually (Source: Tucson Modern Streetcar Project Tiger IV Application).

Table 1-18 –Tucson Streetcar Capital Costs Funding in Millions (Source: Tucson Modern Streetcar Project Tiger IV Application)

Year	Funding Sources Year of Expenditure		Total
	Local/State	Federal Funds	
2010	$32.20		$32.30
2011	$7.23	$11.18	$18.41
2012	$24.91	$71.46	$96.37
2013	$40.08	9.49	$49.57
Total	**$104.52**	**$92.13**	**$196.65***

*$50.4 million per mile

1.4.6 Relevance to Gainesville

Each of these case studies contains relevant lessons for the City of Gainesville as it considers the feasibility of a streetcar system. These include the following:

Operating Funding Challenges—For each of the operating case studies (Portland, Tampa, and Little Rock), operating funding challenges were identified. These have been particularly acute for Tampa and Little Rock. However, there were also issues identified in Tucson of particular importance to Gainesville. Some key issues are identified below:

- In Tampa, the Special Services District (SSD) developed for the funding of ongoing operations only included commercial, non-homesteaded properties. Although significant redevelopment has occurred along the line, much of it has been in the form homesteaded condominiums, which are not eligible for this assessment. This trend has changed more recently with the introduction of apartment developments. If an SSD or other similar funding mechanism is proposed in Gainesville, it will be important to apply it to all uses within the impact area.
- Tampa currently receives financial support from three Community Redevelopment Areas (CRAs) along the streetcar line, which has helped the system greatly, though it was not envisioned in the initial operating plan. If similar arrangements are proposed in Gainesville, it will be important to get long-term commitments from agencies to ensure ongoing funding availability.
- Little Rock currently funds its streetcar system primarily through contributions from the cities of Little Rock and North Little Rock. While this arrangement has provided consistency in funding, its dependence on these limited sources make it potentially more vulnerable to fluctuations in local government budgets.
- In Tucson, a major focus of the streetcar has been connecting Downtown and the University of Arizona (UA). However, at the time of this writing, UA has not committed to any ongoing funding of the system's capital or operating costs. This commitment may occur in the future, but the project has moved forward with an operating plan that does not include UA participation. The University of Florida has already shown a significant commitment to local transit and, if a streetcar is to succeed in Gainesville, it will be important that the City and the University of Florida commit early on to the long-term success of this project.

Balancing Ridership and Economic Development—Each case study city was focused on economic development as a primary reason for developing a streetcar system. However, of the operating systems, only Portland has also managed to serve as a major transit system that serves local residents and visitors alike. For Gainesville, it will be important to ensure that the system serves both economic development and transit ridership goals. Otherwise in the long term, the ongoing operating costs may not be as palatable once redevelopment has occurred around the streetcar route. The system must remain viable as a transit mode and be an integral part of the overall RTS system.

Choosing the Right Vehicles—Choosing the right streetcar vehicles can make a significant difference in how the streetcar system is perceived within the local community, the construction and operating cost of the system, and may, in fact, contribute to its success, particularly as a transit mode. As Gainesville considers its vehicle options, it will be important to consider the following:

- Tampa and Little Rock both chose to use Gomaco replica-style streetcars for their systems. Although these cars are less expensive to purchase, they do typically require more ongoing maintenance than modern trams. In addition, the systems had to design stations specifically to accommodate ADA requirements. Also, the limited passenger capacity and lack of bike accommodation makes the vehicles less useful for daily transit riders.
- The latest cars that Portland has purchased have been designed and built by United Streetcar, which is based out of Oregon and is building cars similar in design to the original cars. Tucson has also ordered its cars from United

Streetcar, though only one has been delivered for service. Although ultimately, these cars may prove to be reliable and cost effective in the long term, there have been a number of delays and other manufacturing issues that have needed to be addressed. It will be important for Gainesville to learn from these systems to ensure that it chooses the best, most reliable technology that can be delivered on time and within the allotted budget.

- The cars selected for the Wave system in Ft. Lauderdale may ultimately prove to be the best example for potential use in Gainesville. Although the car models have not yet been selected, they will have "off wire" capabilities to travel across the New River without the use of catenary lines. Similar technology could be used to minimize visual impacts for short distances, particularly in the historic part of the UF campus.
- Consideration should be given to the creation of an advisory board to help create community interest and increase buy-in. Portland and Tampa are two examples of systems that have created such Boards, which give them an opportunity to include local landowners, business owners, and institutional partners in on the decision making process.

The case studies included in this section provide significant quantitative and qualitative information that should be considered as the planning for a potential system goes forward. By learning from the experiences of these systems, Gainesville can greatly increase the likelihood of success if the decision is made to eventually implement such a system.

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City of Gainesville Streetcar
Feasibility Study

Chapter 2:

Preliminary Screening of Conceptual Alignments

CITY OF GAINESVILLE every path starts with passion FLORIDA

FINAL REPORT

This chapter summarizes the process undertaken to identify a preferred conceptual alignment for a potential streetcar system to be used in the more detailed analyses described in subsequent chapters. The first step in the Streetcar Feasibility Study was to identify potential candidate corridors for connecting the University of Florida, Innovation Square, and Downtown Gainesville. Once identified, these corridors were assessed using a variety of land use, demographic, and transportation criteria to determine which ones demonstrated the characteristics most supportive of a successful streetcar system. The remainder of this chapter describes this assessment process.

2.1 Identification of Initial Streetcar Corridors

The conceptual alignments considered during the development of the RTS Rapid Transit System Plan were used as an initial starting point. In addition, the Project Team identified some additional alternative segments for consideration during the preliminary screening. Figure 2-1 illustrates all of the initial alignment segments considered.

The segments were presented at the first meeting of the Project Technical Advisory Committee (PTAC) on August 5, 2013. The purpose of this meeting was to discuss the possible alignment segments and to remove those that were not seen as feasible or appropriate. As a result of discussions held during this meeting, several segments were removed from contention. The removed segments included the following:

- Segments of SE 4th Street and SE 10th Avenue surrounding Depot Park – While the PTAC agreed that connecting to the existing RTS facility made sense, it did not think that encircling Depot Park was necessary.
- Archer Road, University Avenue, 13th Street – These segments were removed at the request of FDOT to minimize impacts to vehicle traffic on these major corridors.
- SW 5th Avenue/Inner Road – This segment was removed due to concerns from UF and due to its low-density, residential character.
- Other minor connections to removed sections (i.e., connections to University Drive)

In addition, since the purpose of the Feasibility Study is to identify and analyze a potential starter streetcar line, extended segments that were seen as potential future phases were removed. These were primarily located on the UF campus, and included the following segments:

- Gale Lemerand Drive
- Stadium Road west of Newell Drive
- Center Drive
- Mowry Road

All of the removed segments are shown in red on Figure 2-2.

Following PTAC Meeting #1, and based on the segments identified as "still under consideration" in Figure 2-2, the Project Team identified a total of sixteen (16) potential alignment segments to include in the Preliminary Screening exercise. The purpose of this exercise was to score and rank each of the alignment segments based on a number of criteria to determine which would be most effective as part of an initial alignment for a streetcar system. Following the scoring of each segment, the Project Team worked closely with RTS staff to develop a Preferred Conceptual Alignment. These alignment segments analyzed as part of the Preliminary Screening are illustrated in Figure 2-3.

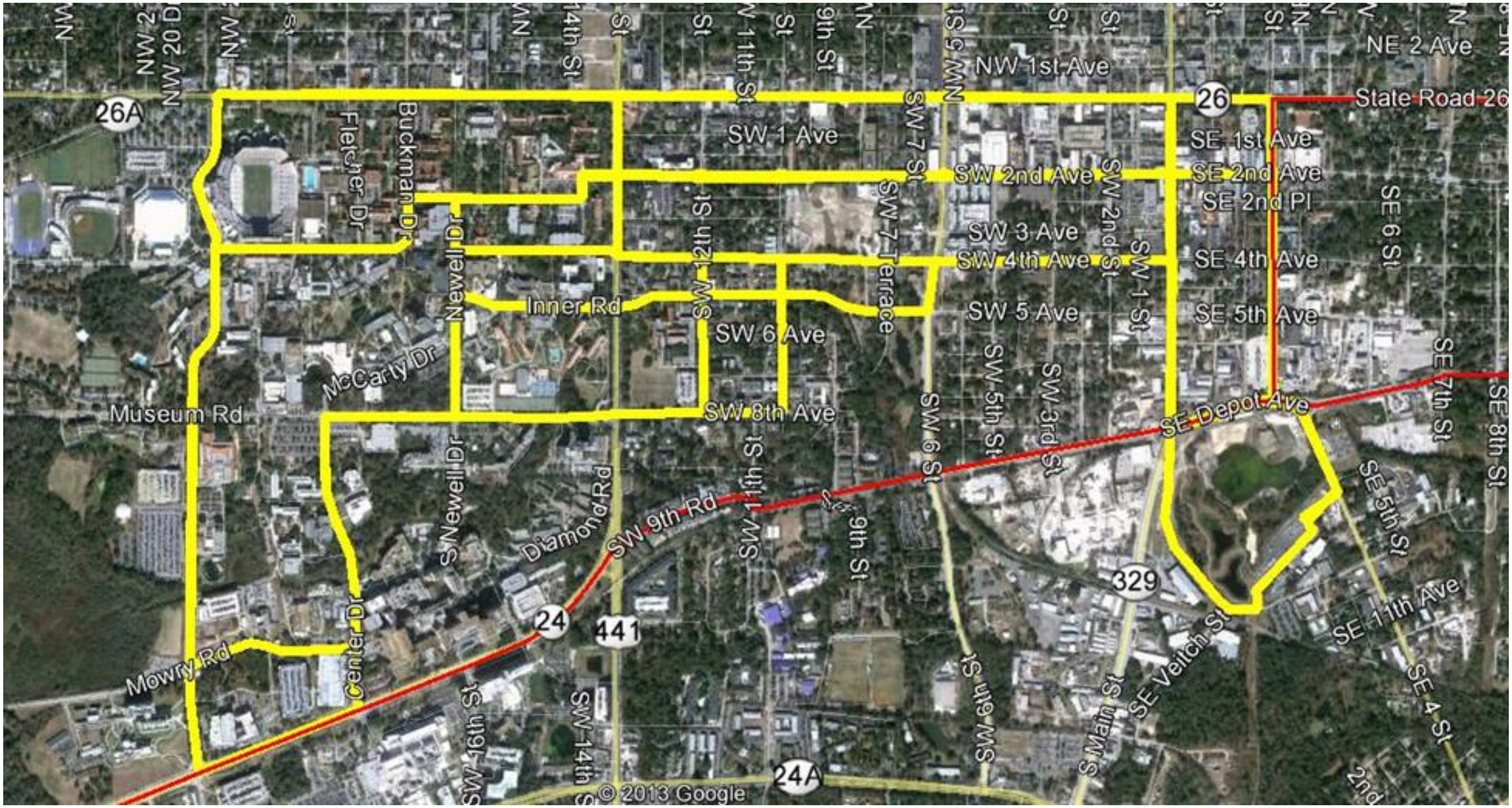

Figure 2-1: Initial Streetcar Alignment Segments

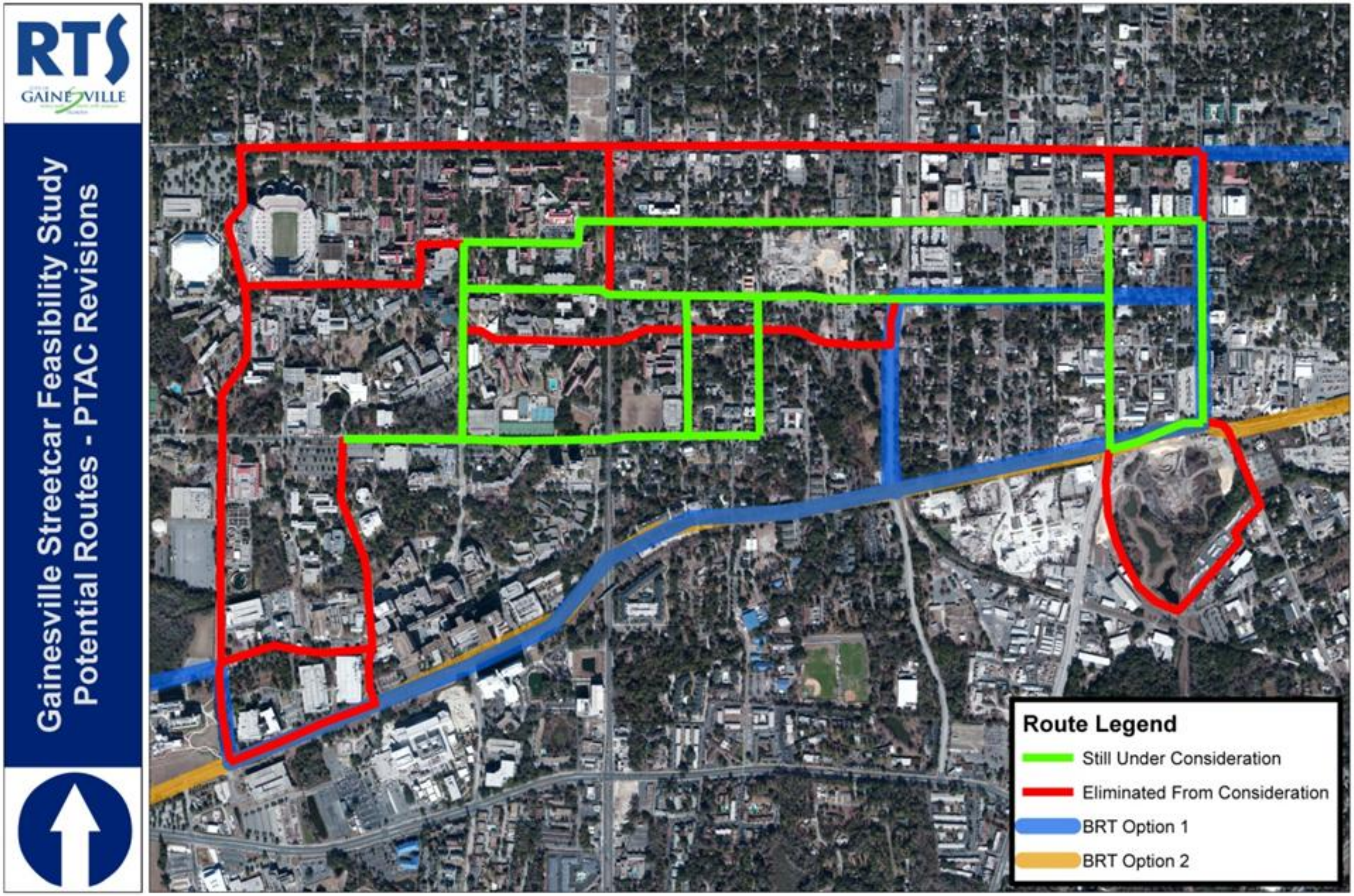

Figure 2-2: Alignment Segments Removed Following PTAC Meeting #1

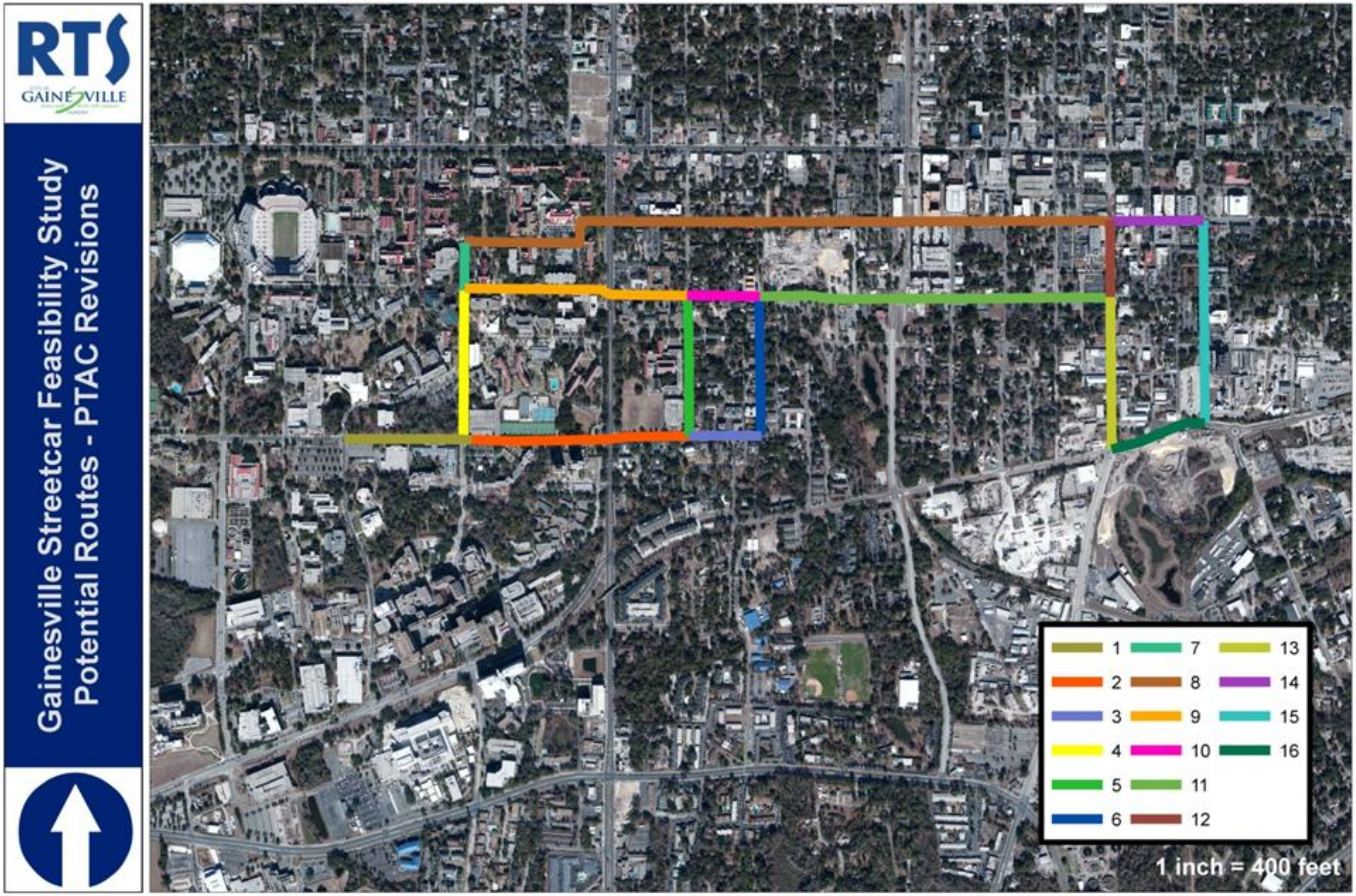

Figure 2-3: Alignment Segments Included in Preliminary Screening

2.2 Assessment Criteria and Analysis

The assessment criteria chosen for the Preliminary Screening exercise were designed to assess economic, land use, demographic, and transportation characteristics that could affect the performance of a future streetcar system. These criteria were developed using existing datasets, and much of the analysis was completed in GIS. Each of the criteria used and the methodology of the analysis are described in this section. A detailed summary of the analysis is contained in Appendix A.

2.2.1 Land Development Potential

Any future system in Gainesville should be designed to encourage redevelopment. The analysis identified areas along each of the segments that, due to the condition/age of existing improvements and the local market dynamics, may be attractive for redevelopment investment. The specific criterion used for this analysis was the Building/Land Value Ratio (BLVR), which is the existing building value (value of built improvements) divided by the value of the underlying land (land value).

Where the value of the built improvements is less than that of the underlying land, the BLVR is under 1.0, which means that, due to depreciated building values and/or increased market interest in the land, conditions may be likely to attract redevelopment in comparison to properties with built improvements that are worth significantly more than the underlying land. Segments with lower BLVR ratios received higher scores.

2.2.2 Traffic Operations

Existing/projected traffic volumes on each segment to identify areas where the operation of a streetcar system would be more likely to encounter significant traffic congestion. The criterion chosen to identify congestion was the volume/capacity ratio (v/c ratio), which was calculated using traffic data gathered from the 2035 Long Range Transportation Plan (LRTP) for each of the segments. This ratio was calculated by dividing the existing/projected traffic volume by the roadway capacity. The higher the v/c ratio (a ratio over 1.00 denotes a roadway that is operating above designed capacity), the more congestion can be expected. The smaller the v/c ratio, the more capacity a roadway segment has to accommodate future traffic or, for the purposes of this study, a streetcar system. Segments with lower v/c ratios received higher scores.

2.2.3 Population and Employment Data

Projected to experience the most significant growth in population and employment (which would likely translate to ridership), population and employment densities from the 2035 LRTP. Both population and employment were analyzed separately, though the same methodology was used for both. The LRTP data reports both population and employment by Traffic Analysis Zone (TAZ), which allowed for easier aggregation and comparison. Segments with higher projected population/employment density received higher scores.

2.2.4 Physical Roadway Constraints

There were three specific criteria assessed to demonstrate physical constraints that may affect streetcar design/operation.

Existing/Planned Roundabouts

Roundabouts can pose a design challenge for streetcars that would have to be addressed before system construction. For the analysis, both existing roundabouts were considered. Segments that had fewer roundabouts received higher scores.

Existing On-Street Parking

The presence of on-street parking along a streetcar alignment can increase the likelihood of conflicts, particularly when the streetcar is operating in mixed-traffic. This criterion identifies segments where on-street parking currently exists and where some additional design or operational characteristics might need be considered in order to minimize conflicts. Segments with lower numbers of on-street parking spaces were given higher scores.

Existing Right of Way Width[1]

The acquisition of right of way can be a significant cost burden for streetcar systems. The purpose of this analysis was to examine the existing right of way widths along each of the segments to determine whether the available right of way is sufficient to accommodate a streetcar.

An assessment was completed examining the existing right of way widths. Compared to a hypothetical roadway cross section that would accommodate the following elements:

- 2 Travel Lanes (11' per lane) - 22' total
- 2 Bike Lanes (5' per lane) - 10' total
- 2 Sidewalks (6' per sidewalk) - 12' total
- Streetcar Envelope (dedicated lane) (16') - 16' total
- Buffering (5' per side) - 10' total

These elements combined create a hypothetical roadway cross section of 70' needed for streetcar operation. This analysis used the existing right of way widths (taken from the Alachua County Property Appraiser Parcel Database) and included an analysis of each segment to determine what percent of its centerline length was at least 70' wide. Segments with high percentages at or above 70' width were given higher scores.

2.2.5 Utility Constraints[2]

Another item that can greatly affect the cost of implementing a streetcar system is utility relocation. Although a detailed assessment of utility locations is beyond the scope of this Feasibility Study, this analysis identified those segments where known existing utilities might cause potential conflicts with streetcar design, implementation, and/or operation. This was a cursory analysis and consisted largely of examining GIS data provided by Gainesville Regional Utilities (GRU), as well as field observations. The specific utility infrastructure assessed included the following:

- Power lines
- Water/wastewater lines
- Stormwater facilities
- Traffic signals - poles and mast arms
- Natural gas lines
- Telephone/communications lines

For each segment, a summary of known utilities was listed, along with immediate areas of concern and any "fatal flaws" that would likely require significant costs to address. Segments that had more potential utility conflicts were scored lower than those with fewer potential conflicts.

2.3 Preliminary Screening - Summary Results and Preferred Conceptual Alignment

Following the completion of the analysis, the total scores for each of the segments was summed. The summary results are presented in Table 2-1 below.

[1] For the right-of-way assessment described here, it was assumed that the streetcar would run within a dedicated lane. However as the study progressed, the decision was made to include the streetcar within the existing traffic lanes. Capital cost estimates in Chapter 7 are based on a mixed-traffic streetcar system.

[2] The utility assessment completed as part of the Preliminary Screening was included a review of all 16 potential segments using GIS data. This assessment identified areas of concern or "fatal flaws" based on a cursory review of potential utility conflicts, and were scored accordingly. Those segments where potential "fatal flaws" were identified were not removed from the Preliminary Screening, but were scored accordingly. "Fatal flaws" in the context of this analysis were identified as potential significant challenges that would have to be designed around.

Table 2-1: Preliminary Screening - Overall Summary Scoring Table

Segment #	Total Scores by Segment
Segment 1	26
Segment 2	28
Segment 3	22
Segment 4	28
Segment 5	22
Segment 6	22
Segment 7	30
Segment 8	20
Segment 9	26
Segment 10	30
Segment 11	20
Segment 12	26
Segment 13	22
Segment 14	20
Segment 15	24
Segment 16	24

The next step in the preliminary screening was to identify a preferred conceptual alignment. The recommended preferred conceptual alignment is shown in Figure 2-3. This alignment was created using segments 7, 8, 14, and 15. As can be seen in Table 2-1, the alignment includes some lower scoring segments (primarily the east/west segments 8 and 14), a mid scoring segment (segment 15), and one of the highest scoring segments (segment 7). Ultimately, this mix of segments, including the following:

- Connect to Rosa Parks Transfer Station.
- Minimize footprint on UF campus. The intent was to make a convenient connection to the heart of campus (proximate to Reitz Union and the athletic stadiums) without going too deep into the campus to minimize costs.
- Connect to Innovation Square. The alignment must provide an east/west connection through Innovation Square.
- Minimize overall length of the alignment. This preferred alignment is intended to represent a starter system.

The preferred conceptual alignment shown in Figure 2-4 accomplishes each of these objectives.

2.3.1 Connection to University of Florida

As shown in Figure 2-4, the preferred conceptual alignment does have a potential connection to the University of Florida campus. It is not yet known where this connection could be made, or how changes in the University's campus plan in the coming years might affect egress/ingress to the campus. For the purposes of the detailed analysis performed in the subsequent chapters, a connection to the UF Campus and an overall length of two miles was assumed.

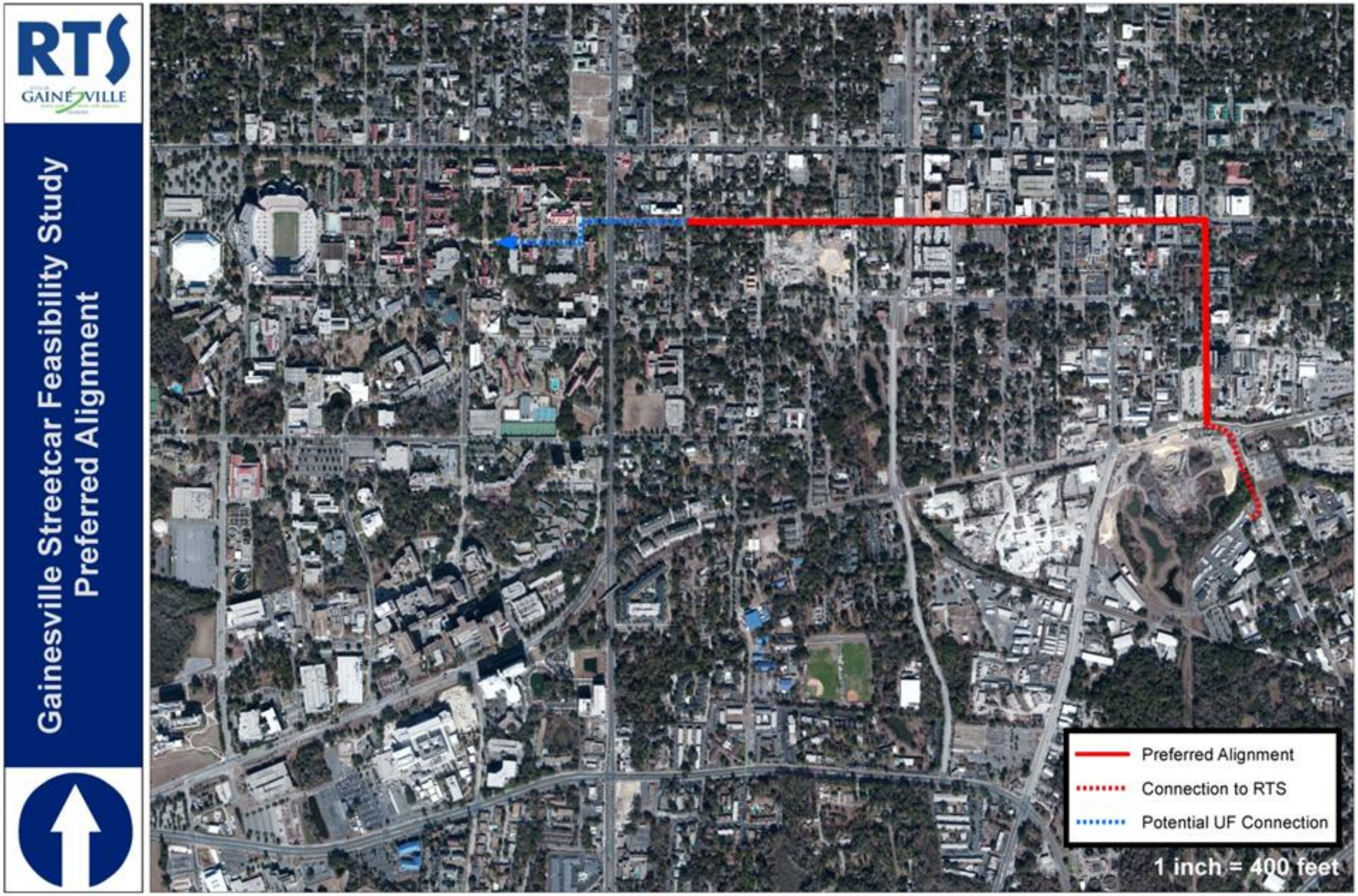

Figure 2-4: Preferred Conceptual Alignment

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City of Gainesville Streetcar
Feasibility Study

Chapter 3:

ECONOMIC DEVELOPMENT ASSESSMENT

FINAL REPORT

CITY OF GAINESVILLE every path starts with passion FLORIDA

3.1 City of Gainesville: Overview

Understanding the nature, assets, and role of Gainesville in the region is the foundation of understanding its market potential. Gainesville is the County seat and largest city in Alachua County and the North Central Florida region. Gainesville encompasses an area of 62.4 sq. mi. According to estimates[1] for 2013, the median age of residents is estimated to be 26.4 years, and the median household income is estimated to be $31,283. The population of Gainesville in 2010 was 124,354[2] and is projected to continue growing. It should be noted that most of the 50,000+ UF students are not reflected in the population figures. The historic trend of the city's population is reflected in Figure 3-1.

Gainesville is a mix of new development/redevelopment on the outer edges of the urbanized area, interspersed with older neighborhoods of restored Victorian and Queen Anne style residences and other more conventional neighborhoods. There are several historic areas and a number of noteworthy structures in the community. The areas immediately northeast of UF are seeing active redevelopment. Revitalization of the city's downtown core is actively underway, and many parking lots and/or underutilized buildings are being redeveloped, with infill development and near-campus housing designed to blend in with existing historic structures. The UF Campus Historic District has numerous contributing properties, most of which reflect variations of Collegiate Gothic architecture prominent in the late 19th and early 20th centuries.

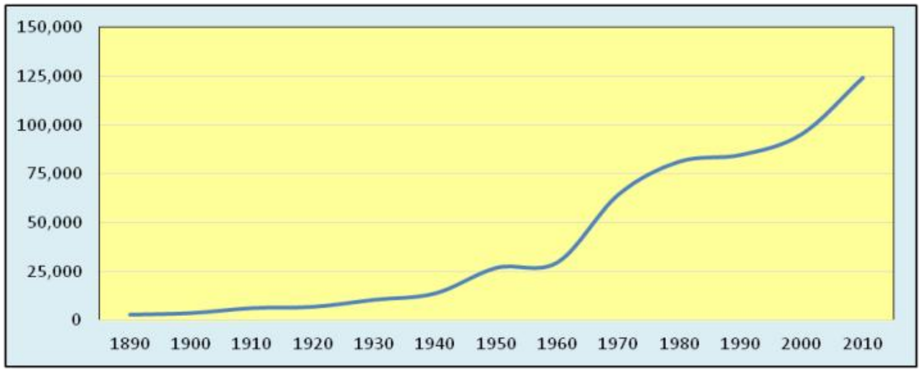

Figure 3-1: Gainesville population trend

In April 2003, Gainesville became known as the "Healthiest Community in America" when it achieved the only "Gold Well City" award given by the Wellness Councils of America. Headed up by Gainesville Health & Fitness Centers, and with the support of Shands HealthCare and the Gainesville Area Chamber of Commerce, 21 businesses (employing 60% of the city's workforce) became involved in the "Gold Well City" effort. The Gainesville Metropolitan Statistical Area (MSA—Alachua and Gilchrist counties) was ranked as the #1 place to live in North America in the 2007 edition of *Cities Ranked and Rated*. Also in 2007, Gainesville was ranked as one of the "Best Places to Live and Play" in the United States by *National Geographic Adventure*.

Several significant recognitions/rankings received by Gainesville in recent years are shown in the Table 3-1.[3]

3.1.1 University and College

The area is dominated by the UF, with approximately 50,000 students, the seventh largest campus by enrollment in the U.S. as of Fall 2011. In addition to holding a number of NCAA Division I titles for football, basketball, and other men's and women's sports, UF frequently receives recognition for its academics, including Top Public University (14th) and top graduate school program (the Hough Graduate School of Business, ranked 15th) by *US News & World Report*. The Sid Martin Biotechnology Incubator also was ranked as the World's Best University Incubator by the National Business Incubation Association in the past year.

[1] The Nielsen Company, 2013.
[2] U.S. Census.

[3] Gainesville Area Chamber of Commerce, Council for Economic Outreach.

Table 3-1: Significant Gainesville Recognitions and Rankings

2013		2011	
#3	Best Hospitals in Florida, *US News & World Report*	#7	America's 25 Greenest Cities, *The Daily Beast*
#3	Top College Towns, *Livability.com*	#8	Top 10 in Number of Start-ups Created, *UFL.edu*
Top 25	Best Places to Retire, *Forbes*	#2	Best City Producing Computer Graduates (Per Capita) , *Expansion Solutions Magazine*
#4	Best Small College City, *American Institute for Economic Research*	#8	Happiest Cities in U.S., *Gallup*
2012		Top 5	Top Hot Spots for Research in Florida, *Florida Trend*
#1	Best Place for Business and Careers in Florida, *Forbes*	**2010**	
#6	Best Places for New College Grads, *The Atlantic Cities*	#1	Highest Projected Growth of Creative Class Jobs in the Nation, *Richard Florida*
#14	America's Brainiest Cities, *The Atlantic Cities*	#1	Top College Towns; *Livability.com*
#10	America's Leading College Towns, *The Atlantic Cities*	#5	Top 10 Small Cities, *USA Today*
#8	Most Well Read' Cities, *The Atlantic Cities*	**2009**	
#6	Hardest Working Cities in US, *Parade Magazine*	#1	Hotspots for Young Professionals to Live and Work, *Next Generation Consulting*

Gainesville is also home to Santa Fe College, with approximately 24,000 students and one of only two teaching zoos in the nation. The influence of these institutions is reflected in the educational attainment of the city's residents—44.5 percent hold a bachelor's degree or higher (vs. 25.7% for Florida).

3.1.2 Cultural Environment

The presence of a major university and a large college allows the city to support numerous and diverse cultural and arts venues. Each year, two large art festivals attract artists and visitors from the southeastern United States. Cultural facilities include the Florida Museum of Natural History, the Harn Museum of Art, the Hippodrome State Theatre, and the Curtis M. Phillips Center for the Performing Arts. Smaller theaters include the Acrosstown Repertory Theatre and the Gainesville Community Playhouse, the oldest community theater group in Florida.

Gainesville also has a vibrant local music scene, which can be traced back to 1984 when a local music video station, TV-69, owned by Cozzin Communications and comedian Bill Cosby, was brought on the air. Gainesville continues to be known for its music scene and has spawned a number of bands and musicians. Gainesville was ranked as the #1 best place to start a band by *Blender* magazine in 2008.

3.1.3 Shands at the University of Florida[4]

Shands Healthcare, affiliated with the UF Health Science Center, is one of the premier health systems in the Southeast. It operates two academic medical centers (UF and Jacksonville), four community hospitals, a network of outpatient rehabilitation centers, and two home-health agencies, with more than 1,500 UF-affiliated and community physicians and 8,000 skilled nursing and support staff. Shands at UF opened in 1958 to serve as the primary teaching hospital for the UF College of Medicine (est. 1956). UF physicians at Shands are also the official medical providers for NASA, serving as the medical support team for every launch and landing at the Kennedy Space Center. Seven medical specialty programs at UF Health Shands Hospital are recognized among the nation's best in the 2011–2012 *US News & World Report* "Best Hospitals" rankings, including urology, pulmonology, and gastroenterology.

[4] From UF Health and Innovation Square Development Framework.

3.1.4 Gainesville Regional Utilities (GRU)[5]

GRU is a multi-service utility owned by the City of Gainesville and is the 5th largest municipal electric utility in Florida, providing electric, water, wastewater, telecommunications and natural gas service to more than 93,000 business and residential customers. In 2007, GRU built the South Energy Center for the new Shands Cancer Hospital, converting natural gas into electricity, chilled water, and steam at double the efficiency of a centralized power plant.

3.1.5 Gainesville Regional Transit Services (RTS)[6]

The City of Gainesville operates RTS, which services most areas of Gainesville and smaller portions of the county. RTS was ranked the No. 1 Florida transit agency in 2008 by the Florida Public Transportation Association (FPTA). Based on fiscal year 2012 ridership, RTS had the 8th highest number of passenger trips in Florida, and the highest overall productivity (36.97 passengers per revenue hour). Moreover, according to demographic data,[7] 6.4 percent of Gainesville's population use public transportation to commute to work, versus 2.0% statewide.

3.1.6 Innovation Square (IS)[8]

Innovation Square is a research-oriented, mixed-use development, envisioned as the leader of a series of interrelated downtown area redevelopment districts within the larger urban community—districts that are anticipated to create symbiotic relationships, providing reciprocal economic benefits for all. The IS District, an intense zone for research and related activities, will develop and deliver resources and opportunities beyond its boundaries. Conversely, the larger community will contribute resources that benefit the core district. These mutually-beneficial relationships are a critical element of a successful community and the cornerstone of the IS project's conceptualization.

A summary of the anticipated IS development types and amounts, according to the Development Framework report, is reflected in Table 3-2. The Development Framework specifically states that no timeframe is associated with the phases. It should be noted that the planning document encompasses land under a variety of ownership/control. Therefore, the planned development, type, and amount within each phase may vary, which could result in more or less development of any type and the resulting totals. This analysis has made several alternative assumptions regarding the pace of IS project absorption and build-out for the purposes of identifying potential economic impacts of developing a streetcar system. These assumptions are described in more detail later in this report.

3.1.7 Gainesville Economy

The overall economy of Gainesville and the surrounding area is closely linked to the universities/education, medical care/services, and government, as reflected by the city's largest employers listed in the Table 3-3.[9]

Property tax revenue is generated on the taxable value of real and personal property. Total property tax revenue for Gainesville in FY2012/13 was $23,219,460 (21.6% of City's total revenue[10]), generated on $5.17 billion of taxable value in 2012, of which 9.3 percent was levied on personal property. Approximately $21,013,611 of property tax revenue was generated on real property, reflecting $4.67 billion of taxable value on real property. A categorized breakdown of the city's real property tax base[11] is in Table 3-4.

Gainesville's gross taxable value increased steadily from FY03 through FY10, began to decline in FY11, and continues to decline through FY12/13 as reflected in Figure 3-2.[12]

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[4] From UF Health and Innovation Square Development Framework.

[5] Paraphrased from @2013, Gainesville Regional Utilities.

[6] Gainesville Area Chamber of Commerce.

[7] The Nielsen Company, 2013; 2012 U.S. Census.

[8] Innovation Square Development Framework.

[9] City of Gainesville, Comprehensive Annual Financial Report, Fiscal Year Ended Sept. 30, 2011.

[10] City of Gainesville, FY12 Financial Budget in Brief.

[11] Florida Department of Revenue, City of Gainesville 2012 Certified Tax Roll.

[12] City of Gainesville, FY2013 Financial Budget in Brief.

Table 3-2: Innovation Square - Development Pro Forma Summary

Development By Phase	Ph 1	Ph 2	Ph 3	Ph 4	Ph 5	Ph 6	Ph 7	Ph 8	Ph 9	Ph 10	TBD	Total
Research Labs	46,000	110,000	285,000	269,000	256,000	156,000	245,000	158,000	199,000	157,000	252,000	2,133,000
Commercial - Office Space	0	0	140,000	212,000	0	80,000	116,000	148,000	0	0	0	696,000
Residential / Hospitality	0	260,000	0	0	48,500	182,000	0	153,000	37,500	200,000	0	881,000
Commercial - Retail	0	35,000	25,700	38,500	41,400	33,300	38,700	0	0	10,000	26,000	248,600
Institutional	0	0	0	0	0	0	0	0	45,000	0	295,000	340,000
Total Development	46,000	405,000	450,700	519,500	345,900	451,300	399,700	459,000	281,500	367,000	573,000	4,298,600

Table 3-3: Largest Gainesville Employers

Rank	Employer	Employees
1	University of Florida	14,723
2	Shands HealthCare	12,588
3	Veterans Health Administration	4,317
4	School Board of Alachua County	4,299
5	City of Gainesville	2,200
6	Publix	2,056
7	North Florida Regional Medical Center	1,700
8	Nationwide Insurance	1,300
9	Alachua County	1,120
10	Santa Fe College	796

Based on analysis of the "preliminary" FY13 Certified Tax Roll (certified, but subject to adjustment), taxable value on real property will increase in 2013, largely due to a net increase of new construction value in the tax base of approximately $397 million. Even without the net increase of new construction value, total taxable value reflects an increase of 0.31 percent. On a square foot basis, single-family residential continued to decline by 2.2 percent, but all other property categories increased, with the most material increase occurring in multi-family residential at 4.8 percent.

In 2007, legislation was enacted that set maximum city/county millage rates for non-voted levies. The legislation created a "rolled-back rate," a rate that, when levied on the current year's tax roll, will provide the same revenue as was raised the previous year (whether taxable value goes up or down), adjusted for growth and other factors. The rolled-back rate allows a "cost of living increase" equal to the increase of per capita income statewide (historically, 4.0–4.5%). The value of new construction and capital improvements does not affect the calculation of the rolled-back rate. Therefore, *new development and improvements on existing properties are critical* to accelerating the growth of city/county ad valorem revenues. Figure 3-3[13] reflects the number and value of building permits issued from FY07 to FY11. The values of projects resulting from the building permits

[13] City of Gainesville, FY2013 Final Budget in Brief.

Table 3-4: Gainesville Real Property Tax Base by Property Categories

Property Category	Parcel Count	Dwelling Unit Count	Land Area (acres)	Taxable Value		Building Area (sf)		Avg Tax Val / Parcel	Avg Parcel Area (ac)	Homestead Parcels	
				Total	Percent	Total	Percent			Count	%
Single Family	23,429	23,768	7,817	$1,692,309,085	36.3%	41,977,715	34.9%	$72,231	0.33	15,890	66.9%
Multi-Family (incl CAM)	7,389	35,253	32,620	$1,251,998,076	26.8%	33,102,579	27.5%	$169,441	4.41	1,536	4.4%
Mobile Home	146	151	75	$2,556,330	0.1%	201,946	0.2%	$17,509	0.51	89	58.9%
Residential - Vacant	2,218	0	3,703	$37,435,880	0.8%	0	0.0%	$16,878	1.67		
Commercial	2,080	491	4,077	$1,255,012,062	26.9%	19,796,377	16.5%	$603,371	1.96	11	2.2%
Commercial - Vacant	477	0	562	$54,931,760	1.2%	0	0.0%	$115,161	1.18		
Institutional / Govt	424	819	3,821	$167,689,340	3.6%	18,126,134	15.1%	$395,494	9.01	2	0.2%
Institutional / Govt - Vacant	122	0	3,778	$424,500	0.0%	0	0.0%	$3,480	30.97		
Industrial	477	4	974	$181,629,530	3.9%	6,695,829	5.6%	$380,775	2.04	0	0.0%
Industrial - Vacant	222	0	456	$14,575,090	0.3%	0	0.0%	$65,654	2.05		
Other	17	6	249	$2,843,880	0.1%	435,141	0.4%	$167,287	14.68		
Other - Vacant	184	0	6,948	$4,612,840	0.1%	0	0.0%	$25,070	37.76		
Total	37,185	60,492	65,080	$4,666,018,373	100.0%	120,335,721	100.0%	$125,481	4,427.40	17,528	

take 1-4 years to appear on the tax roll, depending on construction time and completion date (value is assessed as of January 1). Tax revenues are not generated until the following year.

Gainesville is a regional shopping destination, with slightly more than $1.0 billion[14] of local sales attributed to non-local consumers in 2013. In September 2009, the Gainesville CRA engaged Buxton Community*ID* to conduct a Retail Site Assessment. The Buxton analysis covered areas within two-and five-minute drive times from the intersection of University Avenue and SW 13th Street. Buxton used the Nielsen Company as its data source. As part of its market research, Urban Development & Mobility Solutions engaged a citywide Retail Gap Analysis from the Nielsen Company. Nielsen data are derived from two major sources—demand data are from the Consumer Expenditure Survey by the U.S. Bureau of Labor Statistics, and supply data are from the Census of Retail Trade by the U.S. Census. Additional data sources are incorporated to create both supply and demand estimates. The difference between demand and supply represents the opportunity gap or surplus available for each retail category. When the demand is greater than the supply, there is an opportunity gap for that retail category. A retail surplus means that the community's trade area is capturing the local market and non-local shoppers.

Since both analyses used Nielsen data, it is not surprising that several categories of retail opportunities are common to both analyses: Motor Vehicles and Parts; Electronics and Appliances; Sporting Goods, Hobby, Books, Music; Lawn, Garden Equipment, Nursery; Specialty Food; and Miscellaneous Retail. The 2009 Buxton analysis identified opportunities for Clothing and Accessories and Furniture Stores not identified in the 2013 Nielsen analysis, which may be

[14] The Nielsen Company, 2012.

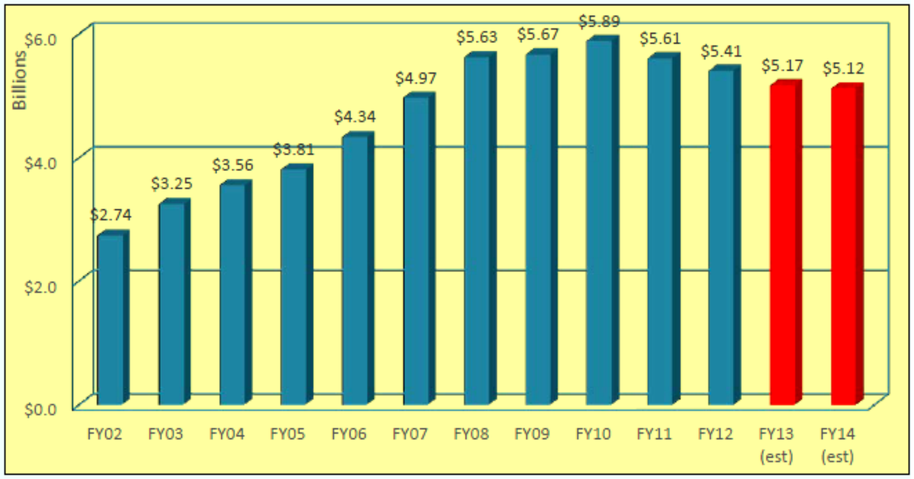


Figure 3-2: Gainesville trend in gross taxable value

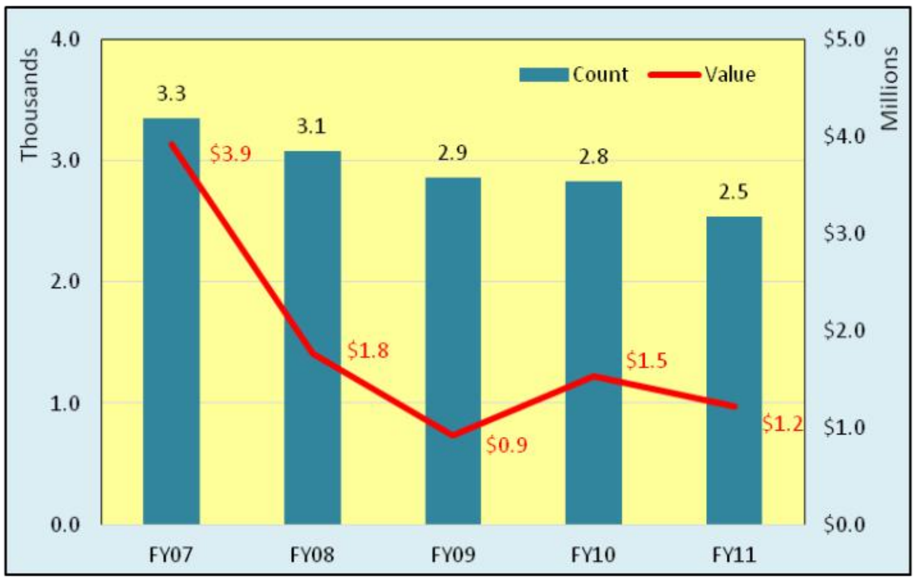


Figure 3-3: Building permits issued – count/value

attributed to the growth of retail outlets over the four-year gap and/or the broader market area of the citywide analysis. Generally, the findings of both studies suggest that retail outlets for certain goods and services are deficient in Gainesville, and the Focus Area may be a viable location for some of those deficient outlets.

3.2 Route Alternatives / Preferred Conceptual Alignment

As discussed in Chapter 2, initially several alignments were under consideration to connect UF, Innovation Square, downtown Gainesville, and adjacent areas. Preliminary evaluations of the options were conducted, including but not limited to, input from the PTAC, known utility and right-of-way issues, community plans and objectives, and demographic and market characteristics of the Focus Area. The preferred conceptual alignment can be seen in Figure 2-4.

A streetcar investment will generate an economic impact "ripple effect" citywide and countywide. Tindale-Oliver GIS technicians placed a ¼-mile overlay along the alignment, adjusting the borders to capture or eliminate whole properties to create a boundary for the Focus Area. All growth/revenue models are based on this Focus Area, as depicted in Figure 3-4. Note, the substantial extension of the overlay at the southwest corner is due to large land parcels on the UF campus.

Table 3-5 provides the current profile of the land parcels and tax base of the Focus Area by use category.

While Institutional/Government buildings dominate the Focus Area (59.6%), the most prominent development contributing to taxable value in the Focus Area is multi-family residential properties (42.7%), closely followed by commercial properties (40.9%).

The Focus Area encompasses an area of approximately 1,033 acres, of which 82 acres are vacant land. Vacant land is not the only opportunity for market growth. As in most redeveloping urban areas, significant growth is achieved through the renovation/revitalization of existing properties and redevelopment of underutilized and/or functionally obsolete properties. The major segment of the alignment running along the SW 2nd Avenue corridor is only two blocks from University Avenue and SW 4th Avenue, which are within the ¼-mile radius and represent significant opportunities for revitalization along both corridors. While there are many stable single-family homes in the Focus Area, the most likely residential development will be multi-family properties as infill development on underperforming commercial property. Given the proximity to UF, student residential housing is already in place. As the development of Innovation Square's 4.3 million sq. ft. of research labs, commercial, and institutional space evolves, non-student multi-family residential will become viable in the Focus Area.

3.3 Expert / Institutional Studies Influencing the Streetcar Models

3.3.1 Key Streetcar Models Assumption

The purpose of the quotes and references in this section is to provide summary information to assist in understanding relevant factors associated with a critical assumption in the Streetcar Models—a streetcar system will accelerate the development of Innovation Square, energize revitalization within the Focus Area (e.g., University Avenue, SW 2nd Avenue, SW 4th Avenue, downtown, and Depot Park), and stimulate more new development faster in the Focus Area than would otherwise occur. This section contains summary information to assist in associating relevant factors with the market potential conclusions of this section.

3.3.2 Findings of Transit/Streetcar Experts

- "There is considerable debate over the relative merits of bus and rail transit (Hass-Klau, et al. 2003; Pascall 2001; GAO 2001; Thompson and Matoff 2003; Balaker 2004; Litman 2004a; Henry and Litman 2006; Hidalgo and Carrigan 2010)..."Rail transit is considered a prestige service that gains more public support, and provides a catalyst for urban redevelopment and more compact, multi-modal development patterns. Transit-oriented land use patterns can increase property values and economic productivity by improving accessibility, reducing costs, improving livability, and providing economies of agglomeration. In some cases, increased property values offset most or all transit subsidy costs. This does not generally occur with bus service."[15]
- "Real estate developers and lending institutions are not willing to base investments on the location of easily changed bus routes. However, the availability of local bus service does increase the value of at least some urban real estate."[16]
- Regardless of their differences, there are some points transit experts[17] agree upon:
  - ◊ Bus and rail transit are complementary – bus is best at serving areas with more dispersed destinations and lower demand; rail is best at serving corridors where destinations are concentrated, such as commercial centers and mixed-use urban villages.
  - ◊ Bus and rail transit become more efficient and effective at achieving planning objectives if implemented with supportive policies that improve service quality, create supportive land use patterns, and encourage ridership.
  - ◊ Funding is critical to success, especially operating funding.
  - ◊ Partnerships are vital in providing political support and are a means to change the perception of transit in the business community.

3.3.3 Streetcars and Economic Development: Summary of Case Study Findings[18]

Operating streetcar systems across the United States are proven to stimulate abnormally high economic development activity and increased values of existing real estate proximate to the alignment. The actual impacts realized reflect the size, characteristics, and opportunities available along the selected alignments of each city. Some examples of these streetcar impacts are:

- Tucson, Arizona, complete during 2013, 3.9-mile route: More than $800 million of private-sector investment in new transit-oriented development is already being constructed along the alignment (constructed since the commitment of the streetcar project), including:

- ◊ 50 new restaurants, bars, and cafes
- ◊ 1,500 new student housing apartments
- ◊ 58 retail businesses
- ◊ New headquarter for Unisource Energy (400+ employees)

- Portland, Oregon, 4.8-mile route (2001), 0.6-mile route (2005), 0.42-mile route (2006), 0.46-mile route (2007), 3.3-mile route (2012): Since 1997 when the original streetcar alignment was identified, the following transformations have occurred along its route:
  - ◊ $3.5 billion has been invested within two blocks of the streetcar alignment.
  - ◊ 10,212 new housing units and 5.4 million square feet of office, institutional, retail, and hotel construction have occurred within two blocks of the alignment.
  - ◊ 55% of all CBD development since 1997 has occurred within one block of the streetcar, and properties located closest to the streetcar line more

[15] Victoria Transport Policy Institute, 2012, "Rail Transit In America: Comprehensive Evaluation of Benefits."

Figure 3-4: Focus area

Table 3-5: Focus Area Land Parcels by Use Category

Property Category	Parcel Count	Dwelling Unit Count	Land Area (acres)	Taxable Value		Building Area (sf)		Avg Tax Value / Parcel	Avg Parcel Area (ac)	Homestead Parcels	
				Total	Percent	Total	Percent			Count	%
Single Family	188	209	33.38	$17,103,820	5.8%	309,298	2.2%	$90,978	0.18	39	18.7%
Multi-Family (incl CAM)	376	3,026	144.14	$126,918,760	42.7%	2,475,803	17.8%	$337,550	0.38	60	2.0%
Mobile Home											
Residential - Vacant	24	0	5.89	$1,709,600	0.6%	0	0.0%	$71,233	0.25		
Commercial	276	25	179.54	$121,560,165	40.9%	2,305,084	16.6%	$440,435	0.65	0	0.0%
Commercial - Vacant	70	0	30.79	$16,000,000	5.4%	0	0.0%	$228,571	0.44		
Institutional / Govt	67	144	537.58	$5,480,080	1.8%	8,297,630	59.6%	$81,792	8.02	0	0.0%
Institutional / Govt - Vacant	47	0	30.91	$2,293,300	0.8%	0	0.0%	$48,794	0.66		
Industrial	33	4	34.05	$4,864,900	1.6%	205,328	1.5%	$147,421	1.03	0	0.0%
Industrial - Vacant	25	0	6.83	$221,600	0.1%	0	0.0%	$8,864	0.27		
Other	4	0	23.35	$992,800	0.3%	332,724	2.4%	$248,200	5.84		
Other - Vacant	3	0	7.34	$0	0.0%	0	0.0%	$0	2.45		
Total	1,113	3,408	1,033.80	$297,145,025		13,925,867				99	

closely approach the zoned density potential than properties situated farther away.

◊ Developers are building new residential buildings with significantly lower parking ratios than anywhere else in the region.

◊ Since the streetcar alignment was chosen in 1997, new development achieved an average of 90 percent of the allowed floor area ratio (FAR) within one block of the alignment, compared to 43 percent at three or more blocks from the alignment.

- Tampa, Florida, opened in 2001, 2.4-mile route: New development investment started within the streetcar's Special Assessment District before the system opened and has continued to grow:

◊ Attracted more than $600 million prior to construction.

◊ Attracted more than $1.3 billion by the end of 2006.

◊ Vacant and multifamily properties along the alignment saw value increases of 166 percent and 117 percent, respectively, from 2001 to 2008.

- Little Rock, Arkansas, 2.5-mile route (2004), 0.9-mile route (2007): In 2011 –2012, CATA compiled data on economic growth and development that has occurred within four blocks (¼–½mile) of the River Rail Streetcar Line. This analysis looked generally at the changes that have occurred within the area immediately surrounding the system for the years from 2000–2010. It concluded that there had been substantial investment and development within the area, including:

◊ 1,084 new residential units

[16] William G. Barker, 1998, "Bus Service and Real Estate Values," 68th Annual Meeting of the Institute of Transportation Engineers.

[17] Federal Transit Administration, Development and Deployment of Downtown Circulators.

[18] For an in-depth review of each location, see the Case Study Section.

- ◊ $883 million in new capital investment (new construction and rehabilitations)
- ◊ 56% increase in residential property value
- ◊ 44% increase in retail property value
- ◊ 21% population growth

"An overview of studies indicates, as with the development of Portland, Tampa, and Seattle streetcars, it is not uncommon to find a 400 percent increase in the value of property along adjacent areas of these three cities' streetcars. In all case studies, underutilized property became attractive to developers."[19]

3.4 Calculation Methodologies

This market analysis is based on a balanced perspective of the historic growth rates experienced by other communities implementing streetcar systems, local Gainesville area market trends derived from market data and planning documents, and input collected during interviews with key stakeholders having specialized local knowledge of Gainesville, UF, and the local real estate market/trends. When taken together, the data enable the estimation of development potential and property value premiums along the alignment. It is an analytical approach that seeks to identify "revealed preference" as a method of estimating demand and value. This approach is heavily influenced by the unique characteristics and environment of Gainesville. The analysis identifies three types of taxable value growth: general changes in community conditions and the economic environment; capital improvements to existing properties; and new residential and commercial development. The growth of two primary categories of properties was explored—Residential and Commercial. The primary categories were split into sub-categories to improve forecasting the timing and value of each development type, resulting in more precise and appropriate growth.

Analysis of the 2013 certified tax roll for the City of Gainesville (latest certified tax roll) was the starting point. Tax roll parcels within the Focus Area were extracted from the citywide tax roll and were the basis of all growth/revenue models. The data were sorted into major use categories, e.g., single-family residential, multi-family residential, commercial, etc. Some of the data extracted included, but were not limited to, land (acreage), improvements (building square footage), market values, exemptions (numbers/amounts), and taxable values. Findings from this analysis were coupled with the evaluation of Gainesville demographics, long-range planning studies of Gainesville, and the impacts of a streetcar investment on other cities derived from case study research to develop assumptions used in the models. Special characteristics of properties proximate to the Alignment were identified.

A single growth/revenue model for the Focus Area was developed based on existing conditions (Base Model), including Innovation Square, and reasonable absorption assumptions. This model served as the benchmark comparison for the models based on the development of a streetcar system (Streetcar Models). Three growth/revenue Streetcar Models for the Focus Area were developed. These models were differentiated by low, moderate (not necessarily median), and high assumptions. All models spanned a 35-year growth/revenue period.

Net Present Value (NPV) analyses were performed on Total Taxable Value, Incremental Taxable Value, Incremental Ad Valorem Tax Revenue, and Special Service District (SSD) Revenue for all models. The NPV analyses followed the standards of the Office of Management and Budget (OMB), Circular A-94, "Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs."

The Streetcar Models were subjected to a probability distribution analysis to identify the range of revenues likely to result from a streetcar investment and particularly to identify the range of values having an 80 percent probability of achievement. The NPV of the 35-year cumulative incremental taxable values of the three Streetcar Models were the basis of the distribution analysis. The median value of the Streetcar Models was calculated and the values of the distribution spread were calculated from the median value.

[19] The Brookings Institution, May 2009, "Value Capture and Tax-Increment Financing Options for Streetcar Construction," HDR, Reconnecting America, and RCLCO.

The average taxable values of each property category were escalated annually, as appropriate for each model, and served as the basis for the values of forecasted property improvements and new development over the 35-year analysis period—rolled in at their escalated values as they occur. This approach provides a more accurate reflection of the growth of the tax base than estimated construction costs, as tax roll values are based on market values (owner-occupied residential properties) and rent rolls (income producing properties) rather than construction costs.

The revenue generated by a potential transit SSD was calculated for each model. If an SSD is established as a streetcar funding source, a ¼-mile radius from the alignment (the Focus Area) is logical and defensible. The SSD millage would be applied to the entire tax base, not just the incremental increase and the resulting revenue would accrue to the SSD. These revenues could be used to make debt service payments for construction/capital costs and/or operating/maintenance costs, which will be discussed in another section of this study.

Most of the Focus Area overlaps the College Park/University Heights (anticipated ending 2034) and Downtown (anticipated ending 2027) CRAs. However, some of the investments activities in the Focus Area will occur in non-CRA areas. Taxable values and ad valorem revenues based only on city millage were calculated for the non-CRA areas.

The boundaries of the affected CRAs/non-CRA areas and the Focus Area overly are reflected in Figure 3-5. Innovation Square is within the College Park/University Heights CRA and the value of its growth will accrue to the College Park/University Heights TIF. The location of other new development and property improvements will be influenced by the property ownership and/or control of land; forecasted revenue from development activity was allocated on a pro rata calculation based on the percent of track segment within each CRA. Incremental CRA/TIF revenues in the Models reflect revenues generated by Gainesville and Alachua County (General Fund) millage captured by the TIFs until they expire. After their expiration, only revenues generated by Gainesville millage were calculated. How, or if TIF funds are used to support the capital costs and/or operating costs, is at the discretion of the City/CRA and must consider any current and/or future planned commitments on the use of those funds. The current CRA budget reflects annual loan repayments of $91,566 for the College Park/University Heights CRA and $185,584 for the Downtown CRA.

Direct jobs created by the Base Model and Streetcar Model. Moderate were forecasted using the employment standards prescribed in the Fiscal Impact Analysis Model[20] (FIAM) created for the former Florida Department of Community Affairs (DCA). The FIAM estimates the number of jobs created by the development of new space by major use categories. These employment standards were applied to the square footage of vertical development as it is forecasted to occur. Indirect jobs are calculated using he Regional Input-Output Modeling System[21] (RIMS II) multipliers obtained specifically for the Gainesville MSA. Multipliers for major categories of new growth were applied to the vertical development as it occurs. New UF development will be tax exempt, but will generate job growth as forecasted in the 2035 LRTP Update.

1. General/Common Conditions of the Models:

- The base values and assumptions of all models are provided in Appendix .
- All models consider factors relevant to the three types of assessed value growth: economic climate/local market conditions (escalation of assessed value), capital improvements on existing properties, and new development. The Streetcar Models reflect the data and findings of references and case studies of U.S. cities with streetcar systems herein. The models were refined to account for the specific conditions of the Focus Area.
- Innovation Square is an emerging economic engine in the Focus Area for all Models. Therefore, it is assumed the Focus Area will capture more than its historical share of the citywide population growth through the analysis time horizon, which is reflected by the forecasted development of non-student, multi-family residential projects. The introduction of a streetcar system will

accelerate the development of Innovation Square and stimulate revitalization within the Focus Area. It is assumed all research lab space and only non-student residential will be developed within Innovation Square.

- The timing and pace of development is a variable assumption among the models, with more aggressive (faster timing) assumptions for the Streetcar Models. The timing of new development and capital improvements reflects anticipation of market demand/absorption of developed projects, which is critical to underwriting the investment of the next project.
- The starting point of all models was the 2013 certified tax roll for the City of Gainesville (FY2013/14 budget year). Tax roll parcels within the Focus Area were extracted from the citywide tax roll. The Focus Area tax roll parcels are the basis of all models. Analysis of these data was coupled with evaluation of the market potential of Gainesville to develop assumptions used in all models.
- The property tax levy is calculated by applying the millage rates of the applicable taxing districts to the previous year's incremental taxable value. All incremental taxable values in the models are generated in the CRAs; therefore, the City of Gainesville (4.4946) and Alachua County (8.5956) millage rates[22] were applied during the lifespan of each CRA, and only the city millage rate thereafter. The current city/county millage rates were held constant when applied through the 35-year analysis period. In reality, these rates may change over time, potentially due to the 2007 "Rolled-Back Rate" legislation. The Florida Department of Revenue calculation of the rolled-back rate is based on citywide/countywide assessed values, and any resulting changes are applied citywide/countywide. The taxable value of all improvements/development may take 1-3 years from the construction start to appear on the tax roll, depending on the construction period and the date of its "certificate of occupancy." Ad valorem revenues are calculated as 95% of the tax levy.
- The values reflected in new development and capital improvements tables are based on the first year's taxable value as projects/improvements are completed and the City of Gainesville millage rate only. These values are different than values in the revenue tables, which reflect the capture of Alachua County revenues during the existence of the College Park/University Heights and Downtown CRAs/TIFs.
- A forecast of revenue generated by a potential transit SSD was calculated for illustrative purposes. The base for the SSD is the entire taxable value within the Focus Area.

3.4.1 The 18-Year Real Estate Cycle

According to Steve H. Hanke,[23] "Data demonstrates that every 18 years we can expect the culmination of a credit-fueled real estate and ensuing business cycle. Generally, the steps of the cycle are: available, low interest bank credit raises property prices; buyers take on more credit to purchase property; the appreciated property value serves as collateral for more bank loans; property prices eventually peak; construction activity and the general economy peak; property value declines; declining property value reduces owner equity and lender collateral; loans become bad debts; banks adjust lending criteria making it more difficult to qualify for loans to buy property." A graph depicting the phases in a real estate cycle[24] is reflected in Figure 3-6.

The graph in Figure 3-7 reflects Alachua County real property taxable value[25] from 1996 to 2013. The graph bears a strong resemblance to the hypothetical curve in Figure 3-6. The similarity of the two graphs supports the presence of the real estate cycle within Alachua County and the validity of including it within the analysis.

[20] Fiscal Impact Analysis Model created for the Florida Department of Community Affairs.

[21] U.S. Department of Commerce, Bureau of Economic Analysis.

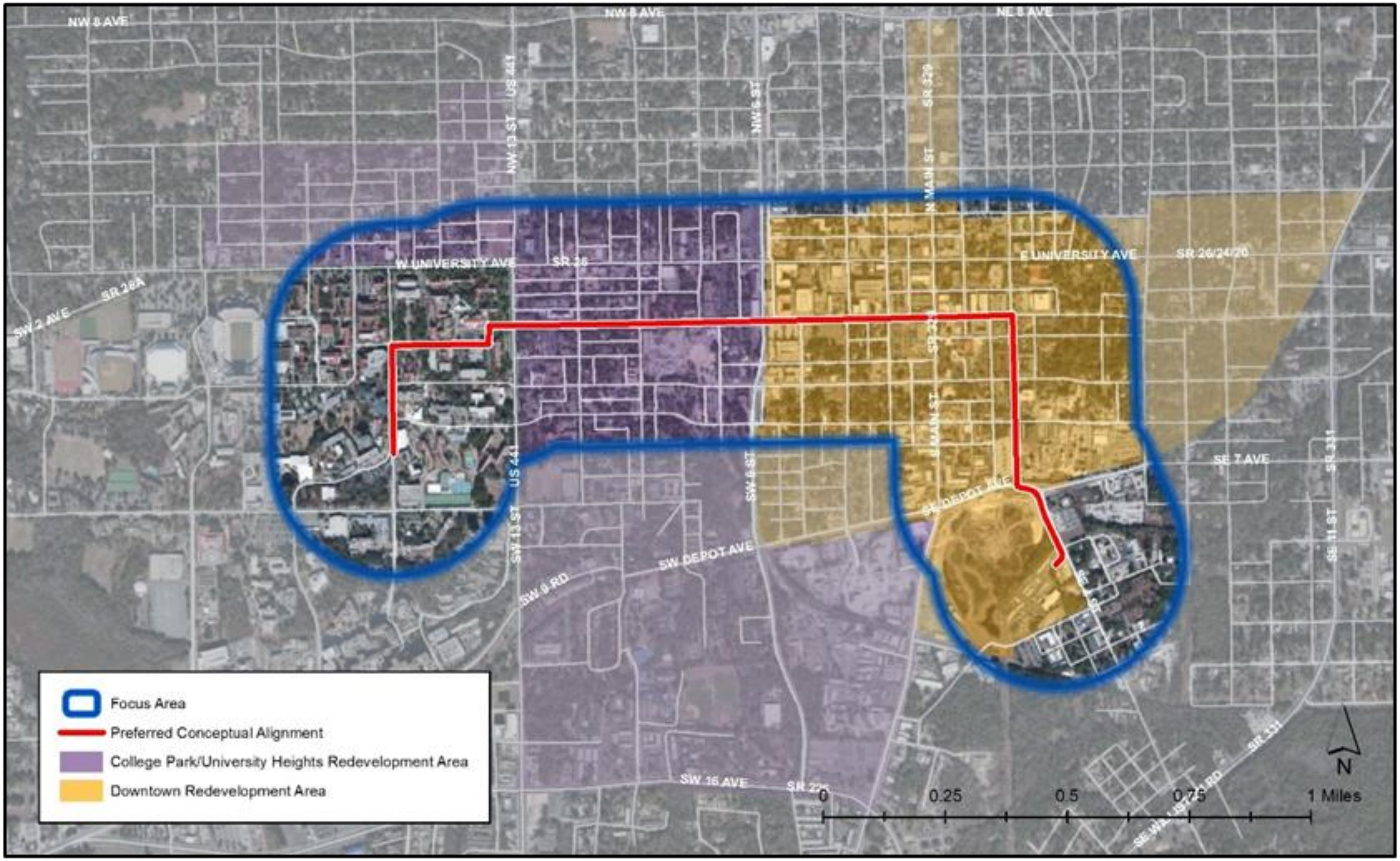


Figure 3-5: College Park and University Heights CRAs with Focus Area overlay

The 18-year real estate cycle affects all U.S. communities/cities; the timing/ duration is the same in all models. The rate of increase in the growth periods and depth of decline in the recession periods are specific to each community/city. All models anticipate the 18-year real estate cycle, starting in 2013 (FY2013/14 budget year). The rates of growth/decline vary in each model. Growth/decline periods affect the timing of construction starts for renovations/development projects—new construction and capital improvement projects do not start during the decline but new projects are added to the tax role during the decline that were started prior to the decline period

2. Unique Assumptions between the Base Model and the Streetcar Models

a. Increases associated with general community conditions and/or economic environment:

- Annual escalation rates to reflect the economic environment were selected for properties by two primary categories: for-sale residential and commercial, including for-rent residential. The escalation rates were applied to the existing taxable values for various categories of use: Non-Student Multi-Family Residential, Student Residential, Lab Space, Office Space, Retail Space, Hotel–General, Hotel–Conference, and Institutional.

- The Streetcar Models project a more robust, but still conservative, economic escalation for both existing properties and new developments as they enter the market. This increase reflects the rising value of existing properties proximate to transit experienced in many cities across the U.S.

b. Increases associated with capital improvements to existing properties:

- All models include the expectation of annual capital improvement on existing residential properties (e.g., bath/kitchen updates, or home additions) and commercial properties (e.g., facade improvements, new awnings, renewed storefronts, or building systems). Gainesville's overall market factors and factors specific to each model influenced the assumptions on the number of properties improved annually and the value of the improvements in each model. The number of properties improved annually is based on a percentage of properties existing in 2013. The value of the improvements is based on the value of properties as escalated over time.

- Assumptions in the Streetcar Models are more robust than the Base Model. The larger improvement value in the transit case analyses reflect the expectation of more extensive improvements.

c. Increases associated with new residential development:

- The calculation of new residential development and commercial space is driven by the estimate of Focus Area's share of forecasted citywide population growth, from the Gainesville Urbanized Area Year 2035 Long Range Transportation Plan Update, the Innovation Square Development Framework plan, and other reference sources.

- Population growth and Focus Area capture rate assumptions in the Streetcar Models are more aggressive than the Base Model. The more aggressive assumptions in the Streetcar Models reflect the expectation of the more/faster growth of UF students and Gainesville overall due to a streetcar system. The additional population growth comes from the growth already anticipated in Gainesville and/or the Focus Area, but may also come from outside the Focus Area, the City, or the County.

- Growing population represents a demand for housing. The 2013 estimated household size[26] for Gainesville is 2.18. New housing demand was calculated using estimated population growth and adjusted (smaller) household size estimates for urban residential properties in the Focus

[22] Alachua County Property Appraiser, Final 2012 Millages.

[23] Steve H. Hanke, professor of applied economics at the John Hopkins University and a senior fellow at the Cato Institute, "The Great 18-Year Real Estate Cycle."
[24] Glenn R. Mueller, 2001, "Predicting Long-Term Trends & Market Cycles in Commercial Real Estate."
[25] Tax Roll Summary 2012, Alachua County Property Appraiser.

Area. The Focus Area is ideal for the development of multi-family residential properties and creating areas of higher density (transit-oriented development), which is among the objectives of a transit system. All Models assume new housing development will be multi-family units, built as unmet demand accrues.

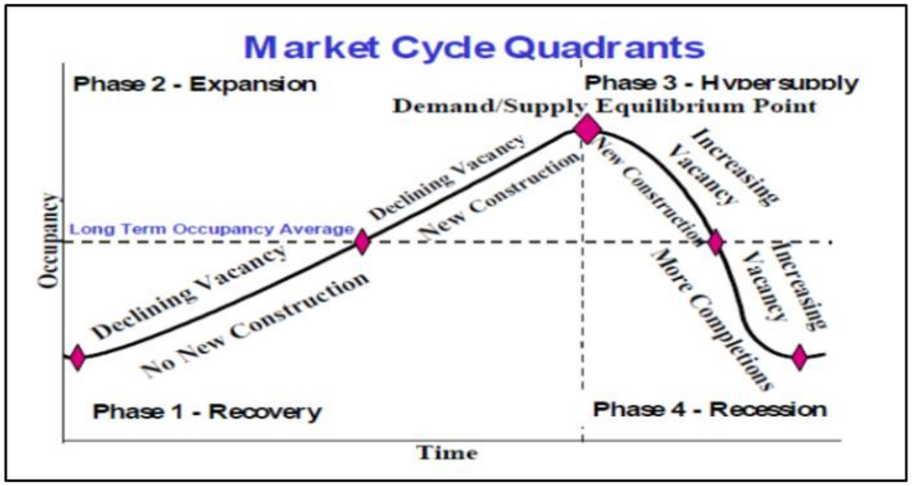


Figure 3-6: Phases in the real estate cycle

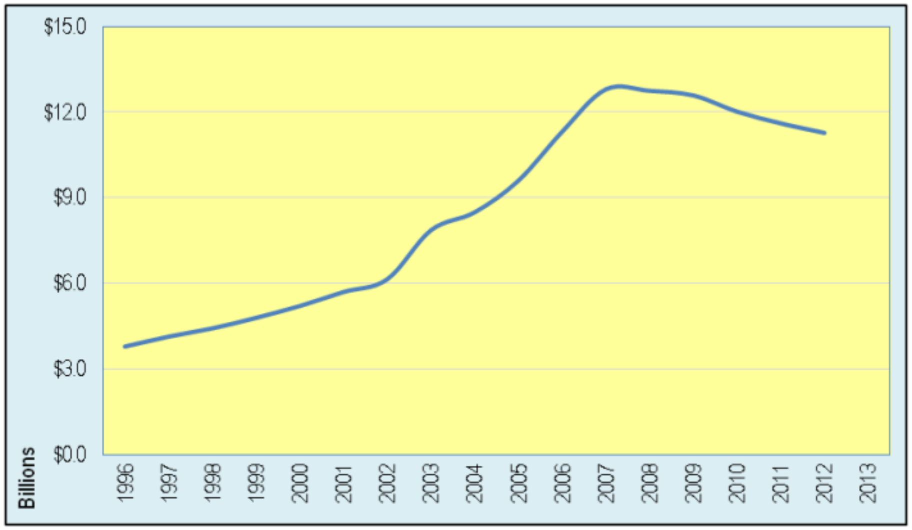


Figure 3-7: Alachua County historic trend of real property taxable value

- The value of new residential development is calculated on the taxable value specific to the Focus Area and applicable residential type, student and non-student residential, as escalated to the year of its development.

d. Increases associated with new commercial development:

- The population growth of Gainesville, student growth of UF, and the emerging economic engine of Innovation Square will drive the demand for new commercial space
- The development assumptions for commercial development are more aggressive in the Streetcar Models than the Base Model. The more aggressive assumptions in the Streetcar Models reflect the expectation of 1) the greater/faster growth of Gainesville population due to a streetcar system, 2) a higher capture rate of the Gainesville/UF student population growth, and 3) the numbers/types of businesses that will benefit from the demands of transit ridership.
- The value of each category of new commercial space is calculated on the taxable value specific to the Focus Area, as escalated to the year of its development.

3.5 Summary of Findings

3.5.1 Base Model Findings

The Base Model reflects significant growth, both in terms of new development in the Focus Area and in the tax base. It should be noted that Innovation Square is not fully developed during the 35-year analysis period; therefore, its full potential value is not realized in the Base Model. Table 3-6 is a summary of the new development by category in five year increments resulting from the assumptions of the Base Model.

Table 3-7 is a summary of the taxable value of new development, in five-year increments, resulting from the assumptions of the Base Model.

The model also includes the anticipation of capital improvements on existing (as of 2013) residential and commercial properties. Table 3-8 is a summary of the capital improvements (sf) and their taxable value, in five-year increments, resulting from the assumptions of the Base Model.

Considering the total 2013 taxable value of $297,145,025 in the Focus Area, the total development values in the Base Model represent a 113.2 percent increase in the Focus Area, and a 7.2 percent increase citywide.

3.5.2 Streetcar Models Findings

The Streetcar Models reflect more robust growth and value than the Base Model. Table 3-9 is a summary of the new development (sf) by category in five-year increments resulting from the assumptions of the three Streetcar Models.

Table 3-10 is a summary of the taxable value of new development, in five-year increments, resulting from the assumptions of the Streetcar Models.

The Streetcar Models include the anticipation of capital improvements on existing (as of 2013) residential and commercial properties. Table 3-11 is a summary of the capital improvements and values in five year increments resulting from the assumptions of the Streetcar Models.

3.5.3 Probability Distribution

The Streetcar Models were subjected to a probability distribution analysis (Figure 3-8) to identify the range of revenues likely to result from a streetcar investment, particularly the range of values having an eighty (80%) percent probability of achievement. The NPV of the 35-year cumulative incremental taxable values of the three Streetcar Models was the basis of the distribution analysis. The median value was calculated from the resulting values of the Streetcar Models, and the values of the distribution spread were calculated from the median value. The NPV analyses followed the standards of the OMB Circular A-94, “Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs.” The median taxable value of the Streetcar Models is $400.7 million, which falls at approximately the 50 percent probability distribution.

3.6 Summary of Comparison of the Base Model and Streetcar Models Results

A clear picture of the differences between the Base Model and each of the Streetcar Models is illustrated in Figure 3-9. The incremental taxable values depicted in the graph are cumulative year-to-year (data points in each model reflects the cumulative value of all prior-year data points) based on the current taxable value of new projects/improvements in their first year of assessment. All models start at $0, and a material gap of taxable value develops among the models over the analysis period; this gap continues to increase beyond the 35th year.

Table 3-12 illustrates the impact of a streetcar system on the tax base by comparing the discounted (NPV) incremental taxable values in the 35-year analyses. The Base Model value is included to highlight the incremental values attributed specifically to a streetcar investment.

3.7 Incremental Property Tax Revenue/Tax Increment Financing

No attempt was made to project future development on the UF campus, which would be tax-exempt. The models assume all development occurs only along the passenger segments of the alignments. Most of the Focus Area is within the CRAs, with a few parcels outside of the CRAs, and the incremental property tax revenue is distributed among the two CRAs and the City general fund. Innovation Square is within the Downtown CRA, and the value of its development will accrue to the Downtown TIF. The location of non-Innovation Square development/ improvements will be influenced by the property ownership and/or control of

[26] ©The Nielsen Company.

Table 3-6: Base Model Completed Development

Base Model: Development Completed (sf)										
Innovation Square	**Yrs 1 - 5**	**Yrs 6 - 10**	**Yrs 11 - 15**	**Yrs 16 - 20**	**Yrs 21 - 25**	**Yrs 26 - 30**	**Yrs 31 - 35**	**Cum Total**	**Pro Forma**	**Pro Forma %**
Lab Space	135,365	374,667	350,000	137,333	185,667	268,667	251,667	1,703,365	2,133,000	79.9%
Commercial - Office	1,338	210,667	141,333	26,667	92,000	176,000	49,333	697,338	696,000	100.2%
Commercial - Retail/ Other	38,801	38,533	53,267	24,900	35,100	25,800	0	216,401	248,600	87.0%
Institutional	0	0	0	0	0	0	45,000	45,000	340,000	13.2%
Hotel - Conference Center	260,000	0	0	0	0	0	0	260,000	260,000	100.0%
Residential - Non-Student	0	0	32,333	76,833	121,333	102,000	88,500	421,000	621,000	67.8%
Tot Innovation Square	435,504	623,867	576,933	265,733	434,100	572,467	434,500	3,343,104	4,298,600	77.8%
Non-Innovation Square	**Yrs 1 - 5**	**Yrs 6 - 10**	**Yrs 11 - 15**	**Yrs 16 - 20**	**Yrs 21 - 25**	**Yrs 26 - 30**	**Yrs 31 - 35**	**Cum Total**		
Commercial - Office	4,851	6,064	6,064	3,639	4,851	6,064	6,064	37,598		
Commercial - Office	3,139	3,923	3,923	2,354	3,139	3,923	3,923	24,324		
Hotel - General	0	0	72,618	0	0	72,618	0	145,236		
Residential - Non-Student	60,816	44,058	52,962	33,600	41,328	80,388	24,150	337,302		
Residential - Student	9,200	11,500	11,500	6,900	9,200	11,500	11,500	71,300		
Tot Non-Innovation Square	78,006	65,545	147,067	46,492	58,518	174,493	45,637	615,760		
Total Development	513,510	689,412	724,001	312,226	492,618	746,960	480,137	3,958,864		

land. Revenue from non-Innovation Square development/improvements was allocated based on the percent of track segment within each CRA. Table 3-13 reflects the calculation of the pro rata impact on the CRAs.

The non-Innovation Square incremental tax revenue in each model was split as described above, and the incremental property tax revenue impact on the two affected CRAs is reflected in Table 3-14. Again, current dollar and NPV values are included. If any of the incremental property tax revenue is used to support capital and/or operating costs, it will have to be done through a CRA initiative; this has been done in other cities. How, or if, TIF funds are used to support the capital costs and/or operating costs is at the discretion of the City/CRA and must consider any current and/or future planned commitments on the use of those funds.

Table 3-7: Base Model - Value of Development at Time of Completion

Innovation Square	Yrs 1 - 5	Yrs 6 - 10	Yrs 11 - 15	Yrs 16 - 20	Yrs 21 - 25	Yrs 26 - 30	Yrs 31 - 35	Cum Total
Lab Space	$0	$39,737,014	$41,051,408	$16,713,864	$19,917,120	$30,989,363	$32,485,547	$180,894,316
Business Space	$0	$11,703,692	$8,380,107	$1,618,088	$5,137,851	$10,677,529	$3,157,342	$40,674,608
Commercial - Retail/Other	$1,829,143	$2,196,317	$3,346,382	$1,612,594	$2,006,839	$1,555,928	$0	$12,547,203
Institutional	$0	$0	$0	$0	$0	$0	$41,051	$41,051
Hotel - Conference Center	$36,787,818	$0	$0	$0	$0	$0	$0	$36,787,818
Residential - Non-Student	$0	$0	$2,133,466	$4,828,480	$6,549,832	$6,028,066	$5,438,629	$24,978,472
(1st year assessment)	$38,616,961	$53,637,023	$54,911,363	$24,773,025	$33,611,641	$49,250,885	$41,122,569	$295,923,467
Non-Innovation Square	**Yrs 1 - 5**	**Yrs 6 - 10**	**Yrs 11 - 15**	**Yrs 16 - 20**	**Yrs 21 - 25**	**Yrs 26 - 30**	**Yrs 31 - 35**	**Cum Total**
Business Space	$249,172	$336,804	$370,788	$233,213	$270,660	$366,589	$404,669	$2,231,895
Commercial - Retail/Other	$165,410	$223,583	$246,143	$154,816	$179,675	$243,356	$268,635	$1,481,617
Hotel - General	$0	$0	$5,715,710	$0	$0	$5,631,816	$0	$11,347,526
Residential - Non-Student (DU)	$3,487,334	$2,658,193	$3,372,612	$2,266,202	$2,217,264	$4,657,029	$1,520,761	$20,179,396
Residential - Student	$491,195	$663,944	$730,938	$459,736	$533,555	$722,660	$797,729	$4,399,757
Tot Non-Innovation Square	$4,393,111	$3,882,524	$10,436,191	$3,113,967	$3,201,154	$11,621,450	$2,991,794	$39,640,192
Total Development	$43,010,072	$57,519,547	$65,347,554	$27,886,992	$36,812,795	$60,872,335	$44,114,363	$335,563,659

Table 3-8: Base Model - Capital Improvements Completed and their Value (1st Year Assessment)

Improvements (sf)	Yrs 1 - 5	Yrs 6 - 10	Yrs 11 - 15	Yrs 16 - 20	Yrs 21 - 25	Yrs 26 - 30	Yrs 31 - 35	Cum Total
Residential	14,855	18,569	18,569	11,141	14,855	18,569	18,569	115,125
Commercial	13,831	17,288	17,288	10,373	13,831	17,288	17,288	107,186
Tot Capital Improvements	28,685	35,857	35,857	21,514	28,685	35,857	35,857	222,311
Value	**Yrs 1 - 5**	**Yrs 6 - 10**	**Yrs 11 - 15**	**Yrs 16 - 20**	**Yrs 21 - 25**	**Yrs 26 - 30**	**Yrs 31 - 35**	**Cum Total**
Residential	$39,656	$53,602	$59,011	$37,116	$43,075	$58,342	$64,403	$355,204
Commercial	$37,981	$51,339	$56,519	$35,549	$41,257	$55,879	$61,684	$340,207
Tot Capital Improvements	$77,637	$104,941	$115,530	$72,664	$84,332	$114,221	$126,087	$695,412

Table 3-9: Streetcar Models - Completed Development (sf)

Streetcar Model - Low: Development Completed (sf)										
Innovation Square	**Yrs 1 - 5**	**Yrs 6 - 10**	**Yrs 11 - 15**	**Yrs 16 - 20**	**Yrs 21 - 25**	**Yrs 26 - 30**	**Yrs 31 - 35**	**Cum Total**	**Pro Forma**	**Pro Forma %**
Lab Space	230,365	459,000	360,000	215,333	239,667	303,667	304,333	2,112,365	2,133,000	99.0%
Commercial - Office	48,005	305,333	53,333	104,000	186,667	0	0	697,338	696,000	100.2%
Commercial - Retail/ Other	47,368	55,633	63,600	36,900	12,900	6,667	29,333	252,401	248,600	101.5%
Institutional	0	0	0	0	0	45,000	295,000	340,000	340,000	100.0%
Hotel - Conference Center	260,000	0	0	0	0	0	0	260,000	260,000	100.0%
Residential - Non-Student	0	0	169,833	60,667	153,000	170,833	66,667	621,000	621,000	100.0%
Tot Innovation Square	585,737	819,967	646,767	416,900	592,233	526,167	695,333	4,283,104	4,298,600	99.6%
Non-Innovation Square	**Yrs 1 - 5**	**Yrs 6 - 10**	**Yrs 11 - 15**	**Yrs 16 - 20**	**Yrs 21 - 25**	**Yrs 26 - 30**	**Yrs 31 - 35**	**Cum Total**		
Commercial - Office	9,703	12,128	12,128	7,277	9,703	12,128	12,128	75,196		
Commercial - Retail/ Other	9,416	11,770	11,770	7,062	9,416	11,770	11,770	72,972		
Hotel - General	0	72,618	0	72,618	0	72,618	0	217,854		
Residential - Non-Student	191,437	284,296	148,396	134,397	233,377	128,146	262,426	1,382,474		
Residential - Student	15,456	19,320	19,320	11,592	15,456	19,320	19,320	119,784		
Tot Non-Innovation Square	226,011	400,132	191,614	232,946	267,951	243,982	305,644	1,868,280		
Total Development	811,748	1,220,099	838,381	649,846	860,184	770,149	1,000,977	6,151,384		

Table 3-9 Cont'd: Streetcar Models - Completed Development (sf)

Streetcar Model - Moderate: Development Completed (sf)										
Innovation Square	Yrs 1 - 5	Yrs 6 - 10	Yrs 11 - 15	Yrs 16 - 20	Yrs 21 - 25	Yrs 26 - 30	Yrs 31 - 35	Cum Total	Pro Forma	Pro Forma %
Lab Space	277,865	411,500	412,000	245,000	257,500	256,500	252,000	2,112,365	2,133,000	99.0%
Commercial - Office	71,338	282,000	80,000	116,000	148,000	0	0	697,338	696,000	100.2%
Commercial - Retail/ Other	51,651	51,350	74,700	38,700	0	10,000	26,000	252,401	248,600	101.5%
Institutional	0	0	0	0	22,500	22,500	295,000	340,000	340,000	100.0%
Hotel - Conference Center	260,000	0	0	0	0	0	0	260,000	260,000	100.0%
Residential - Non-Student	0	0	230,500	0	171,750	218,750	0	621,000	621,000	100.0%
Tot Innovation Square	660,854	744,850	797,200	399,700	599,750	507,750	573,000	4,283,104	4,298,600	99.6%
Non-Innovation Square	Yrs 1 - 5	Yrs 6 - 10	Yrs 11 - 15	Yrs 16 - 20	Yrs 21 - 25	Yrs 26 - 30	Yrs 31 - 35	Cum Total		
Commercial - Office	18,193	22,741	22,741	13,644	18,193	22,741	22,741	140,992		
Commercial - Retail/ Other	18,832	23,539	23,539	14,124	18,832	23,539	23,539	145,945		
Hotel - General	0	72,618	0	72,618	72,618	0	72,618	290,472		
Residential - Non-Student	317,739	472,173	393,273	221,354	241,689	316,323	331,323	2,293,874		
Residential - Student	19,780	24,725	24,725	14,835	19,780	24,725	24,725	153,295		
Tot Non-Innovation Square	374,543	615,796	464,278	336,575	371,111	387,328	474,946	3,024,577		
Total Development	1,035,397	1,360,646	1,261,478	736,275	970,861	895,078	1,047,946	7,307,681		

Table 3-9 Cont'd: Streetcar Models - Completed Development (sf)

Streetcar Model - High: Development Completed (sf)										
Innovation Square	Yrs 1 - 5	Yrs 6 - 10	Yrs 11 - 15	Yrs 16 - 20	Yrs 21 - 25	Yrs 26 - 30	Yrs 31 - 35	Cum Total	Pro Forma	Pro Forma %
Lab Space	420,365	603,000	481,000	277,500	330,500	0	0	2,112,365	2,133,000	99.0%
Commercial - Office	141,338	252,000	304,000	0	0	0	0	697,338	696,000	100.2%
Commercial - Retail/ Other	64,501	96,550	55,350	5,000	31,000	0	0	252,401	248,600	101.5%
Institutional	0	0	0	45,000	295,000	0	0	340,000	340,000	100.0%
Hotel - Conference Center	260,000	0	0	0	0	0	0	260,000	260,000	100.0%
Residential - Non-Student	0	139,500	244,000	137,500	100,000	0	0	621,000	621,000	100.0%
Tot Innovation Square	886,204	1,091,050	1,084,350	465,000	756,500	0	0	4,283,104	4,298,600	99.6%
Non-Innovation Square	Yrs 1 - 5	Yrs 6 - 10	Yrs 11 - 15	Yrs 16 - 20	Yrs 21 - 25	Yrs 26 - 30	Yrs 31 - 35	Cum Total		
Commercial - Office	36,385	45,481	45,481	27,289	36,385	45,481	45,481	281,984		
Commercial - Retail/ Other	37,663	47,079	47,079	28,247	37,663	47,079	47,079	291,889		
Hotel - General	0	72,618	72,618	0	72,618	72,618	0	290,472		
Residential - Non-Student	655,832	616,221	776,925	242,706	176,408	220,509	220,509	2,909,111		
Residential - Student	34,408	43,010	43,010	25,806	34,408	43,010	43,010	266,662		
Tot Non-Innovation Square	764,288	824,410	985,114	324,048	357,482	428,698	356,080	4,040,119		
Total Development	1,650,492	1,915,460	2,069,464	789,048	1,113,982	428,698	356,080	8,323,223		

Table 3-10: Streetcar Models - Value of Development at Time of Completion (1st Year Assessment)

Streetcar Model - Low								
Innovation Square	Yrs 1 - 5	Yrs 6 - 10	Yrs 11 - 15	Yrs 16 - 20	Yrs 21 - 25	Yrs 26 - 30	Yrs 31 - 35	Cum Total
Lab Space	$10,251,817	$53,031,528	$46,927,163	$30,663,599	$31,350,326	$44,089,801	$50,091,077	$266,405,311
Commercial - Office	$2,623,897	$18,497,028	$3,802,485	$7,716,942	$12,794,617	$0	$0	$45,434,969
Commercial - Retail/Other	$2,430,608	$3,457,752	$4,450,972	$2,810,204	$876,825	$538,490	$2,589,485	$17,154,335
Institutional	$0	$0	$0	$0	$0	$44,617	$342,004	$386,621
Hotel - Conference Center	$38,944,254	$0	$0	$0	$0	$0	$0	$38,944,254
Residential - Non-Student	$0	$0	$12,022,714	$4,464,760	$9,833,584	$11,857,118	$4,784,533	$42,962,709
Tot Innovation Square	$54,250,576	$74,986,308	$67,203,334	$45,655,505	$54,855,352	$56,530,025	$57,807,099	$411,288,199
Non-Innovation Square	Yrs 1 - 5	Yrs 6 - 10	Yrs 11 - 15	Yrs 16 - 20	Yrs 21 - 25	Yrs 26 - 30	Yrs 31 - 35	Cum Total
Commercial - Office	$528,746	$730,703	$830,136	$540,203	$663,841	$920,643	$1,051,174	$5,265,446
Commercial - Retail/Other	$526,502	$727,603	$826,614	$537,911	$661,024	$916,737	$1,046,715	$5,243,107
Hotel - General	$0	$5,531,200	$0	$6,401,330	$0	$6,641,708	$0	$18,574,238
Residential - Non-Student	$11,571,603	$18,434,207	$10,361,596	$9,841,060	$14,889,950	$8,758,956	$19,502,351	$93,359,722
Residential - Student	$875,550	$1,209,971	$1,374,623	$894,522	$1,099,254	$1,524,493	$1,740,640	$8,719,053
Tot Non-Innovation Square	$13,502,400	$26,633,682	$13,392,969	$18,215,026	$17,314,070	$18,762,537	$23,340,880	$131,161,565
Total Development	$67,752,977	$101,619,990	$80,596,304	$63,870,531	$72,169,422	$75,292,562	$81,147,979	$542,449,764

Table 3-10 Cont'd: Streetcar Models - Value of Development at Time of Completion (1st Year Assessment)

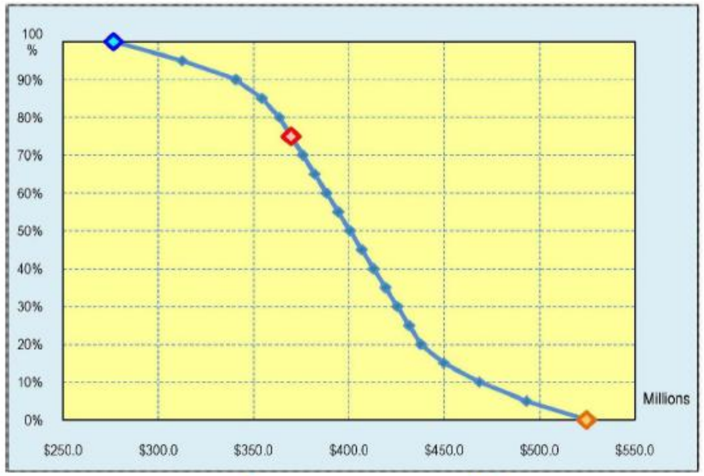
Streetcar Model - Moderate								
Innovation Square	**Yrs 1 - 5**	**Yrs 6 - 10**	**Yrs 11 - 15**	**Yrs 16 - 20**	**Yrs 21 - 25**	**Yrs 26 - 30**	**Yrs 31 - 35**	**Cum Total**
Lab Space	$16,159,617	$50,456,509	$59,894,142	$41,196,610	$41,830,908	$47,001,155	$52,869,230	$309,408,171
Commercial - Office	$4,135,967	$18,147,651	$6,492,889	$10,162,867	$12,189,788	$0	$0	$51,129,162
Commercial - Retail/Other	$2,764,959	$3,390,283	$5,850,631	$3,479,030	$0	$1,009,398	$2,916,269	$19,410,570
Institutional	$0	$0	$0	$0	$26,595	$27,390	$431,857	$485,842
Hotel - Conference Center	$39,940,497	$0	$0	$0	$0	$0	$0	$39,940,497
Residential - Non-Student	$0	$0	$17,400,084	$0	$12,283,770	$17,256,770	$0	$46,940,624
Tot Innovation Square	$63,001,041	$71,994,443	$89,637,745	$54,838,507	$66,331,061	$65,294,713	$56,217,356	$467,314,866
Non-Innovation Square	**Yrs 1 - 5**	**Yrs 6 - 10**	**Yrs 11 - 15**	**Yrs 16 - 20**	**Yrs 21 - 25**	**Yrs 26 - 30**	**Yrs 31 - 35**	**Cum Total**
Commercial - Office	$1,033,226	$1,469,965	$1,745,187	$1,189,835	$1,540,764	$2,205,217	$2,642,272	$11,826,466
Commercial - Retail/Other	$1,097,432	$1,561,310	$1,853,635	$1,263,773	$1,636,509	$2,342,251	$2,806,466	$12,561,377
Hotel - General	$0	$5,789,109	$0	$7,753,160	$7,698,874	$0	$9,993,897	$31,235,039
Residential - Non-Student	$19,648,464	$31,619,766	$29,433,238	$16,951,244	$17,411,323	$24,734,121	$28,358,858	$168,157,013
Residential - Student	$1,167,770	$1,661,380	$1,972,441	$1,344,773	$1,741,399	$2,492,375	$2,986,343	$13,366,481
Tot Non-Innovation Square	$22,946,893	$42,101,530	$35,004,500	$28,502,785	$30,028,870	$31,773,963	$46,787,836	$237,146,377
Total Development	$85,947,934	$114,095,973	$124,642,245	$83,341,292	$96,359,930	$97,068,677	$103,005,192	$704,461,243

Table 3-10 Cont'd: Streetcar Models - Value of Development at Time of Completion (1st Year Assessment)

Streetcar Model - High								
Innovation Square	**Yrs 1 - 5**	**Yrs 6 - 10**	**Yrs 11 - 15**	**Yrs 16 - 20**	**Yrs 21 - 25**	**Yrs 26 - 30**	**Yrs 31 - 35**	**Cum Total**
Lab Space	$33,091,130	$79,005,167	$78,961,452	$55,146,979	$66,383,128	$0	$0	$312,587,856
Commercial - Office	$8,469,497	$16,725,590	$26,493,814	$0	$0	$0	$0	$51,688,901
Commercial - Retail/Other	$3,633,268	$6,806,002	$4,642,778	$524,211	$3,341,234	$0	$0	$18,947,494
Institutional	$0	$0	$0	$62,725	$418,227	$0	$0	$480,952
Hotel - Conference Center	$40,987,036	$0	$0	$0	$0	$0	$0	$40,987,036
Residential - Non-Student	$0	$10,021,407	$19,120,172	$11,364,992	$7,815,392	$0	$0	$48,321,964
Tot Innovation Square	$86,180,932	$112,558,166	$129,218,216	$67,098,908	$77,957,981	$0	$0	$473,014,203
Non-Innovation Square	**Yrs 1 - 5**	**Yrs 6 - 10**	**Yrs 11 - 15**	**Yrs 16 - 20**	**Yrs 21 - 25**	**Yrs 26 - 30**	**Yrs 31 - 35**	**Cum Total**
Commercial - Office	$2,132,932	$3,129,792	$3,909,949	$2,822,945	$3,856,685	$5,712,170	$7,248,038	$28,812,511
Commercial - Retail/Other	$2,265,475	$3,324,281	$4,152,918	$2,998,367	$4,096,344	$6,067,131	$7,698,440	$30,602,957
Hotel - General	$0	$5,926,191	$8,080,965	$0	$9,044,075	$11,714,787	$0	$34,766,017
Residential - Non-Student	$41,959,855	$42,778,100	$60,544,016	$20,629,355	$14,191,712	$19,458,221	$21,863,189	$221,424,448
Residential - Student	$2,096,729	$3,076,669	$3,843,584	$2,775,030	$3,791,224	$5,615,215	$7,125,013	$28,323,464
Tot Non-Innovation Square	$48,454,991	$58,235,033	$80,531,433	$29,225,697	$34,980,039	$48,567,525	$43,934,679	$343,929,397
Total Development	$134,635,924	$170,793,198	$209,749,649	$96,324,605	$112,938,020	$48,567,525	$43,934,679	$816,943,600

Table 3-11: Streetcar Models - Capital Improvements Completed (sf) and their Value (1st Year Assessment)

Streetcar Model - Low								
Improvements (sf)	Yrs 1 - 5	Yrs 6 - 10	Yrs 11 - 15	Yrs 16 - 20	Yrs 21 - 25	Yrs 26 - 30	Yrs 31 - 35	Cum Total
Residential	24,758	30,948	30,948	18,569	24,758	30,948	30,948	191,875
Commercial	23,051	28,814	28,814	17,288	23,051	28,814	28,814	178,644
Tot Capital Improvements	47,809	59,761	59,761	35,857	47,809	59,761	59,761	370,519
Value	Yrs 1 - 5	Yrs 6 - 10	Yrs 11 - 15	Yrs 16 - 20	Yrs 21 - 25	Yrs 26 - 30	Yrs 31 - 35	Cum Total
Residential	$175,311	$242,272	$275,241	$179,110	$220,104	$305,249	$348,528	$1,745,815
Commercial	$167,910	$232,043	$263,620	$171,548	$210,811	$292,361	$333,813	$1,672,106
Tot Capital Improvements	$343,221	$474,316	$538,860	$350,658	$430,914	$597,610	$682,341	$3,417,921
Streetcar Model - Mod								
Improvements (sf)	Yrs 1 - 5	Yrs 6 - 10	Yrs 11 - 15	Yrs 16 - 20	Yrs 21 - 25	Yrs 26 - 30	Yrs 31 - 35	Cum Total
Residential	29,710	37,137	37,137	22,282	29,710	37,137	37,137	230,250
Commercial	27,661	34,576	34,576	20,746	27,661	34,576	34,576	214,373
Tot Capital Improvements	57,371	71,713	71,713	43,028	57,371	71,713	71,713	444,622
Value	Yrs 1 - 5	Yrs 6 - 10	Yrs 11 - 15	Yrs 16 - 20	Yrs 21 - 25	Yrs 26 - 30	Yrs 31 - 35	Cum Total
Residential	$219,249	$311,925	$370,327	$252,482	$326,949	$467,945	$560,687	$2,509,563
Commercial	$235,192	$334,606	$397,254	$270,840	$350,722	$501,970	$601,456	$2,692,041
Tot Capital Improvements	$454,441	$646,531	$767,581	$523,322	$677,670	$969,915	$1,162,144	$5,201,604
Streetcar Model - High								
Improvements (sf)	Yrs 1 - 5	Yrs 6 - 10	Yrs 11 - 15	Yrs 16 - 20	Yrs 21 - 25	Yrs 26 - 30	Yrs 31 - 35	Cum Total
Residential	34,661	43,327	43,327	25,996	34,661	43,327	43,327	268,625
Commercial	35,037	43,797	43,797	26,278	35,037	43,797	43,797	271,539
Tot Capital Improvements	69,699	87,123	87,123	52,274	69,699	87,123	87,123	540,164
Value	Yrs 1 - 5	Yrs 6 - 10	Yrs 11 - 15	Yrs 16 - 20	Yrs 21 - 25	Yrs 26 - 30	Yrs 31 - 35	Cum Total
Residential	$316,824	$464,897	$580,781	$419,318	$572,869	$848,481	$1,076,618	$4,279,789
Commercial	$362,403	$531,778	$664,333	$479,642	$655,283	$970,546	$1,231,503	$4,895,488
Tot Capital Improvements	$679,227	$996,675	$1,245,114	$898,960	$1,228,152	$1,819,027	$2,308,121	$9,175,277



(= Streetcar Model – Low, = Streetcar Model – Mod, = Streetcar Model – High)

Figure 3-8: NPV incremental taxable value probability distribution

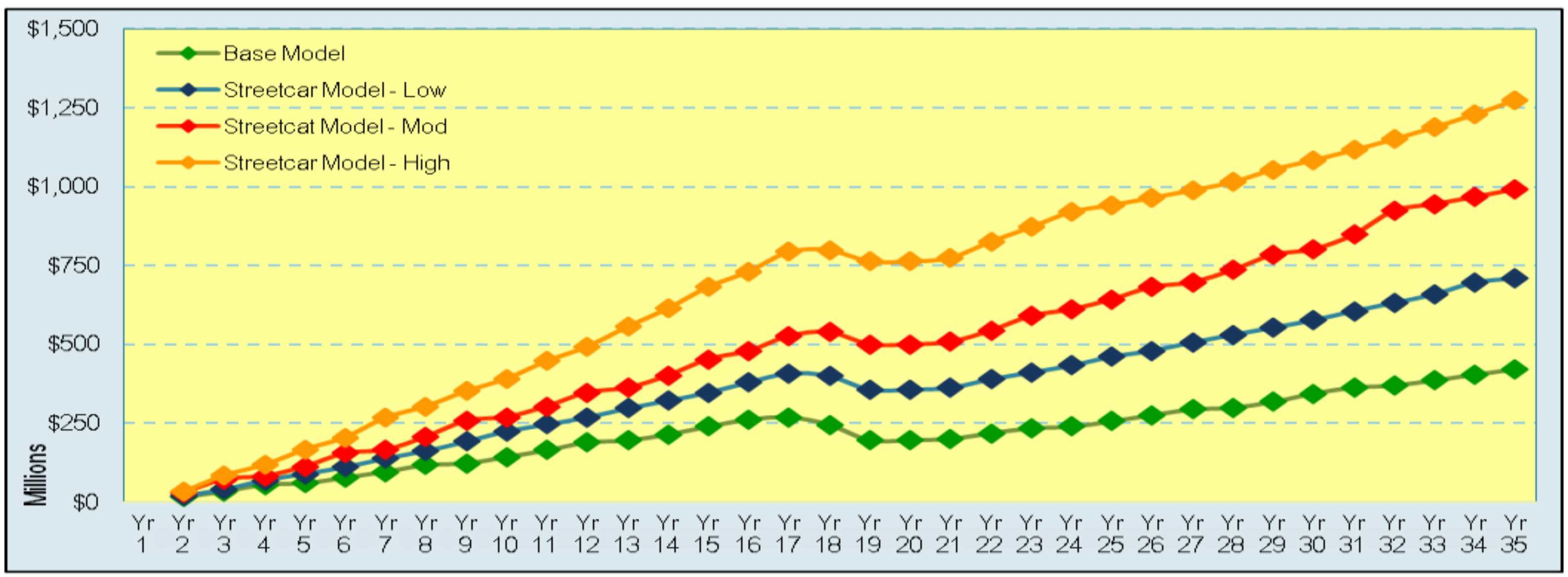


Figure 3-9: NPV incremental taxable value probability distribution

Table 3-12: Streetcar System Impacts on the Tax Base (2014 - 2048)

($millions)	Net Present Value (Discounted)		
	Mean Expected	90% Probability of Exceeding	10% Probability of Exceeding
Incremental Taxable Value			
Base Model	$172.1		
Streetcar Models	$400.7	$340.7	$468.5

Table 3-13: Alignment Segments – CRA Pro Rata Distribution of Incremental Property Tax Revenue

Alignment Segment	Alignment Length (lf)	% of Total
Service Spur	1,056	9.1%
UF Campus	3,387	29.2%
College Park / University Heights CRA	2,650	22.8%
Downtown CRA	4,519	38.9%
Total Track Length	11,616	
College Park / University Heights CRA	2,650	37.0%
Downtown CRA	4,519	63.0%
Total Track Length In CRAs	7,169	

Table 3-14: Incremental Property Tax Revenue Impact (2014–2048)

($ millions)	Current Dollars				Net Present Value (Discounted)			
	Total	Non-CRA	College Park / Univ Hgts CRA	Downtown CRA	Total	Non-CRA	College Park / Univ Hgts CRA	Downtown CRA
Base Model	$53.9	$0.4	$46.2	$7.2	$18.9	$0.1	$16.0	$2.8
Average / Yr	$1.54	$0.01	$1.32	$0.21	$0.54	$0.00	$0.46	$0.08
Streetcar Model - Low	$89.3	$1.0	$71.9	$16.3	$29.7	$0.3	$23.9	$5.5
Average / Yr	$2.55	$0.03	$2.06	$0.47	$0.85	$0.01	$0.68	$0.16
Streetcar Model - Mod	$126.1	$1.9	$96.0	$28.3	$40.4	$0.5	$30.9	$9.1
Average / Yr	$3.60	$0.05	$2.74	$0.81	$1.16	$0.01	$0.88	$0.26
Streetcar Model - High	$198.5	$3.2	$148.4	$47.0	$62.7	$0.8	$47.4	$14.5
Average / Yr	$5.67	$0.09	$4.24	$1.34	$1.79	$0.02	$1.36	$0.41

3.8 Transit Special Service District Revenue

The market analysis included an evaluation of potential revenue generated in a prospective transit SSD, which is different from TIF revenue in five major ways:

1. SSDs are established by the local jurisdiction (City Council), for a specific purpose, are short term, and must be periodically renewed.
2. Unlike a TIF, SSDs impose an additional millage rate within their borders.
3. SSD revenue is calculated on all properties in the Focus Area and, therefore the word "incremental" is not applicable.
4. SSD revenue is not captured by TIFs.
5. Revenue generated by county millage is not captured by SSDs.

Establishing an SSD in the Focus Area must be for a special purpose and makes sense only in the case of a "premium" transit service, e.g., a streetcar system. It would be difficult to justify the creation of an SSD simply for a dedicated bus route. Nonetheless, the revenue for a prospective SSD was calculated for the Base Model. A summary of the resulting SSD revenues, both current dollars and NPV, is shown in Table 3-15.

An SSD is an additional tax burden to the property owners. The millage applied to an SSD should be kept low to avoid an excessive burden, which would be undesirable for existing property owners and discourage new capital improvement/development investment. Therefore, transit SSD revenues in smaller cities tend to be highly dependent on significant new capital improvement/ development investment. The SSD revenues generated in the Streetcar Models represent approximately 25–50 percent of the total estimated annual operating cost of a streetcar system and provide a material reduction of the contributions needed from the "streetcar partners" providing operational funding support.

Table 3-15: SSD Revenue (2014–2048)

($ thousands)	$ Current		$ NPV
Base Model (total)	$11,067.2		$3,757.4
Average / Yr	$316.21		$107.35
Streetcar Model – Low (total)	$14,697.4		$4,633.3
Average / Yr	$419.92		$132.38
Streetcar Model – Mod (total)	$18,714.4		$5,565.8
Average / Yr	$534.70		$159.02
Streetcar Model – High (total)	$25,980.9		$7,362.1
Average / Yr	$742.31		$210.35

3.9 Job Creation

The market analysis included an evaluation of direct and indirect jobs created by a streetcar investment. This analysis was conducted on the Streetcar Model–Moderate. (The NPV of incremental taxable value generated by the Streetcar Model–Moderate falls within the 70–80% range of the probability distribution.) To facilitate comparison and improve the understanding of the economic benefits derived from a streetcar investment, a job evaluation was also conducted on the Base Model. Only full-time, long-term jobs were calculated in this analysis. All models will generate direct and indirect construction jobs, which are short-term jobs in the context of a single project.

Direct jobs are specifically associated with new development and renovated existing commercial space. The forecasted new development was broken into major categories and the employment appropriate to each category was calculated. It was assumed that new direct jobs would be created by the renovation of existing commercial space due to a higher demand for goods and services and better business performance. The numbers of jobs created by renovated space was discounted from the numbers of jobs created by new development, as these existing businesses are simply adding employees to existing staff. Capital improvements on residential properties generally do not create new jobs.

Indirect jobs are the ripple effect of new direct jobs. This reflects the chain reaction of demand/spending generated by each direct job across all types of jobs in the area, e.g., each research/tech job generates demand/spending for research/tech supplies, personal dining, personal shopping, etc. This ripple effect is already occurring with the existing jobs in Gainesville. Different types of jobs generate different numbers of indirect jobs. Indirect job multipliers specific to the Gainesville MSA were used for these calculations. Direct and indirect jobs created by new development and capital improvements on existing commercial space are reflected in Table 3-16. The numbers of jobs specified in each time period are as of the end of that period and are an accumulation of all previous time periods.

It is important to note that not only are more jobs created in the Streetcar Models, but they are created earlier as well. This is consistent with the accelerated overall growth in the Focus Area with the development of a streetcar system as documented throughout this report.

Table 3-16: Job Creation (2014 - 2048)

Base Model	Yr 5	Yr 10	Yr 15	Yr 20	Yr 25	Yr 30	Yr 35
Total Direct New Jobs	540	3,104	5,060	5,725	6,762	8,437	9,687
Total Indirect New Jobs	296	1,961	3,203	3,596	4,275	5,418	6,229
Total New Jobs	837	5,064	8,263	9,321	11,037	13,855	15,916
Streetcar Model - Mod	**Yr 5**	**Yr 10**	**Yr 15**	**Yr 20**	**Yr 25**	**Yr 30**	**Yr 35**
Total Direct New Jobs	1,846	4,466	6,522	8,019	9,656	10,856	12,840
Total Indirect New Jobs	1,103	2,906	4,126	5,095	6,228	6,927	8,407
Total New Jobs	2,948	7,372	10,648	13,114	15,885	17,783	21,247

3.10 Conclusions of the Economic Development Impact Assessment

As summarized in the Executive Summary of this report, the economic development potential of Gainesville is significant with or without the development of a fixed-guideway streetcar. Key findings from this report include the following:

- The University of Florida, Shands Healthcare, Innovation Square, and other community assets; the astute governance of the city and community services provided; and the natural charm of the area make Gainesville a highly-desirable and economically-stable community. This will continue to be the case with or without a fixed-guideway streetcar system.
- The growth of new development, the increasing tax base, and the creation of jobs will continue beyond the 35-year analysis period. The gap between the incremental taxable values of the Base Model and the Streetcar Models will continue to increase through the future. With a streetcar system, declines during downturns in the 18-year real estate cycle will be less severe in the Focus Area, generally, than other parts of the city.
- Innovation Square has no direct competition for tenants and/or attracting high -tech corporate start-ups/relocations in Gainesville. However, Gainesville and Innovation Square are competing with other "brain hub" cities and research parks across the U.S. and internationally. A streetcar system in Gainesville will not be a primary decision factor for potential tenants/businesses choosing Gainesville and Innovation Square. However, a streetcar system (fixed-guideway transit) could be an important amenity, and potentially a deciding factor, in close competitions. The development of Innovation Square will:
  - ◊ Create a major economic engine, with or without a streetcar system. A streetcar system will accelerate the IS development time frame ,and the acceleration will be greater than any non-rail transit system can provide. The acceleration will begin upon the City's commitment to construct a streetcar system.
  - ◊ Require improved transit support (streetcar or bus) as it evolves, to avoid significant traffic congestion in and around the area.
  - ◊ Require the development of significant parking support (garages) as it evolves. These garages will occupy land that could be used for tax-producing development (lost opportunity cost). With a streetcar system, fewer parking spaces will be required for tenants/residents (the reduction will be greater than a non-rail system can provide), and required garages could potentially be built on less valuable outlying land elsewhere on the streetcar line.
  - ◊ Eventually stimulate the demand/development of non-student, multi-family residential in the Focus Area—attractive to high-wage adult professionals and educators. A streetcar system will accelerate the viability of this type of product - the acceleration will be greater than any non-rail transit system can provide. The wider range of housing opportunities has the potential of attracting a workforce with a wider range of skills, ages and income levels, a greater number of companies/ tenants for Innovation Square and other projects, and improving the retention of graduates from UF and Santa Fe College.
  - ◊ Create a critical mass of new office, retail/restaurant, and residential uses. This will create a new, major activity center between downtown and UF. Absent a permanent streetcar transit connection, over time, it may be increasingly difficult to maintain the vitality and viability of downtown's redevelopment efforts. Conversely, a streetcar system linking the two areas will minimize the perceptual differences between the areas, and make them feel as one.
- As shown in the Base Model, economic growth and development is expected to occur throughout the 2014–2048 (35-year) study timeframe in Gainesville. However, it is expected that the implementation of a streetcar

system will increase/expedite these positive economic impacts significantly through the study timeframe. Some key differences between the Base Model and Streetcar Model–Moderate for the study timeframe include the following:

- ◊ Expected total new development (residential and non-residential) of 3,958,864 sq. ft. in the Base Model, vs. 7,307,681 sq. ft. in the Streetcar Model–Moderate (an increase of 84.6%).
- ◊ Expected capital improvements (residential and non-residential) to 222,311 sq. ft. of existing development in the Base Model vs. 444,622 in the Streetcar Model–Moderate (an increase of 100.0%).
- ◊ A cumulative increase in direct/indirect jobs of 15,916 for the Base Model vs. 21,247 in the Streetcar Model–Moderate (an increase of 33.5%).
- ◊ An increase in cumulative incremental taxable value (discounted) of $172.1 million for the Base Model vs. $400.7 million for the median value of the Streetcar Models (an increase of 132.8%).

- As discussed above, it is expected that the development of a streetcar system within the Focus Area could have significant long-term positive economic impacts. However, these impacts, ultimately, must be weighed against the long-term operating costs of such a system and other local budget priorities before determining whether it is a good investment. This comparison of costs and benefits will be done at a cursory level in the final Feasibility Study, but more detailed analysis is recommended in future studies.

Ultimately, the decision as to whether to move forward with the development of a streetcar system will need to weigh the transit and economic benefits against the short-term capital and long-term operating costs of the system. Investment in a capital-intensive technology such as streetcar will require significantly more money to maintain and operate. While a major contributor to its economic development benefit, a streetcar system requires a significant long-term financial investment from the community. It will be important for the City to understand the full range of costs and benefits to ensure that investment in a streetcar system will not greatly affect the City's abilities to meet other long-term liabilities.

City of Gainesville Streetcar Feasibility Study

Chapter 4:

Ridership Estimation

FINAL REPORT

City of Gainesville
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Florida

4.1 Background

This technical memo addresses the estimated ridership projections associated with the conceptual preferred alignment for a new streetcar line connecting downtown Gainesville with the University of Florida. The alignment is shown in Figure 2-4 and would connect the existing RTS #46 Circulator stop at Rawlings Hall (McCarty Drive) on the UF campus with the Rosa Parks Transfer Station south of downtown. The route would use Newell Drive and Union Road on campus, 2nd Avenue east of campus to SE 3rd Street, then south to Rosa Parks.

The ridership projections were estimated for an average weekday for the year 2022, an estimated year of opening for a new streetcar line; opening year considers project implementation timelines for streetcar efforts and surrounding major development activities but does not consider the possible implementation schedule of other premium transit services.

4.2 Methodology

A four-tier evaluation methodology was employed in the development of the ridership projections:

1. Identify existing stop ridership for applicable existing RTS bus routes that could be diverted to a new two-directional circulator route along 2nd Avenue. This would represent a refined base bus circulator ridership if the service were in operation today.
2. Distribute base bus ridership from existing bus stops to assumed streetcar station locations.
3. Identify base population and employment growth in the area to be served by the streetcar routes to an assumed 2022 year of opening for the streetcar line and translated into added circulator ridership if just projected growth were accommodated.
4. Identify added ridership associated with the attractiveness of streetcar, as opposed to local bus, over the base 2022 circulator ridership

Each step in the methodology is further reviewed below.

4.2.1 Existing RTS Ridership

Based on a review of RTS routes serving downtown Gainesville and UF, it was decided that streetcar ridership, if operating today, would replace portions of ridership on the existing RTS #46 circulator connecting UF with downtown, as well as a portion of the #1 route ridership—in particular, the ridership on that route oriented between the UF and Rosa Parks Transfer Station.[1] Recent (2013) on and off passenger counts from Automatic Passenger Counters (APCs) on-board the RTS buses were used to identify existing ridership. Figures 4-1 and 4 -2 identify the existing stop locations and ridership for the #1 and #46 routes in the study area. Other routes that use only a small portion of 2nd Avenue, or that include extended routing outside of the study area—in particular, routes #121, #127, #27, #25, and #126—were assumed not to divert any ridership to a new streetcar line.

Figure 4-3 identifies the diverted ridership to a two-directional circulator service along 2nd Avenue based on existing conditions if most of the #46 ridership and a portion of the #1 ridership were diverted to a 2nd Avenue service. The following diversion assumptions were made:

1. 100% of the ridership along the 2nd Avenue leg of the #46 circulator was diverted to a 2nd Avenue circulator route, as well as those portions of the #46 on Union Road and Newell Drive.
2. 80% of the ridership along the 4th Avenue leg of the #46 circulator east of SW 10th Street was diverted to a 2nd Avenue circulator route, given the proximity to 2nd Avenue (the remainder of ridership would use the #10 route along 4th Avenue).

[1] In late Fall 2013, the pattern of the #46 route was adjusted to serve Rosa Parks Transfer Station. Due to when this modification occurred, it is not reflected in the analysis.

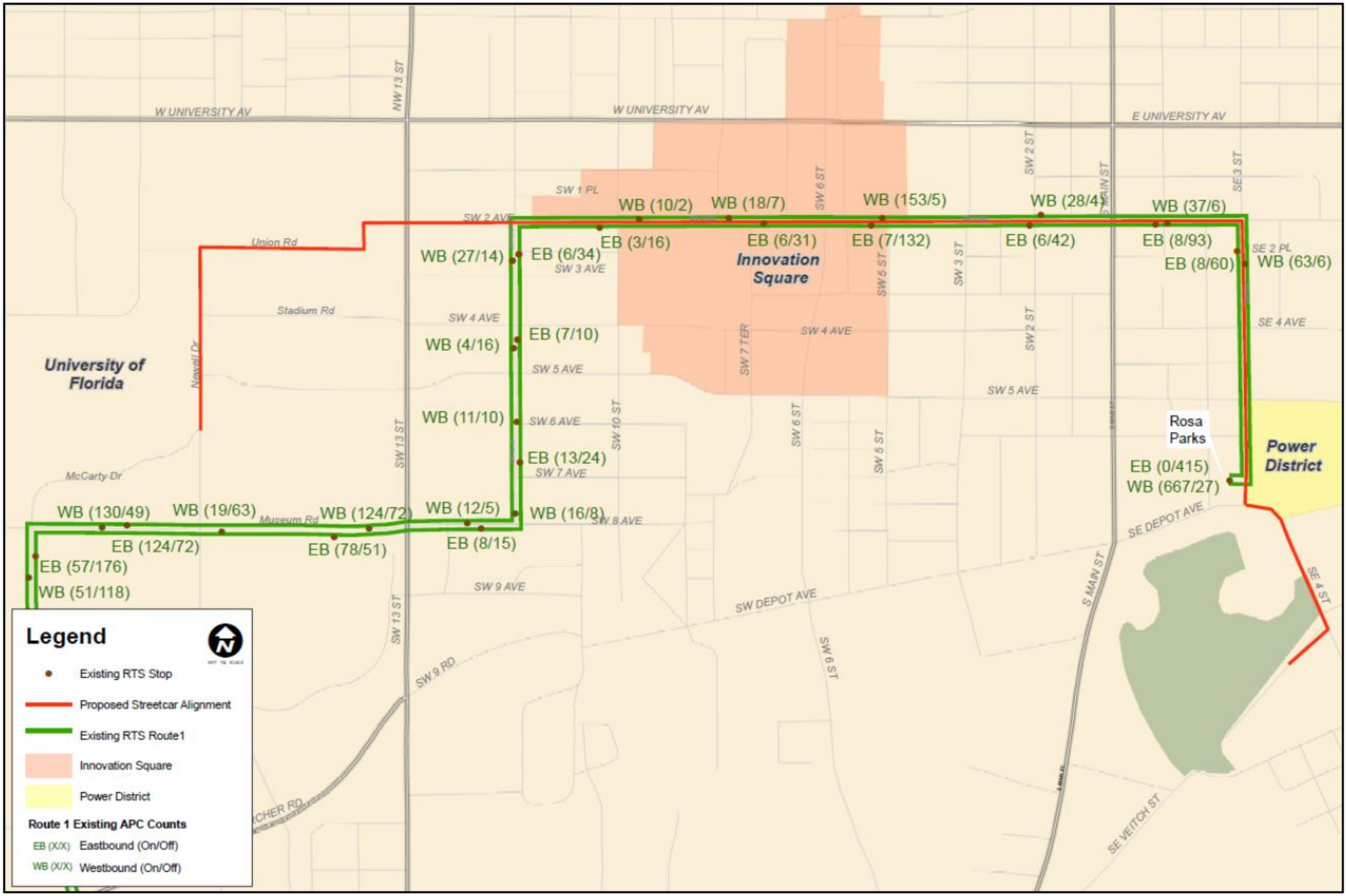

Figure 4-1: Existing weekday ridership, Route 1

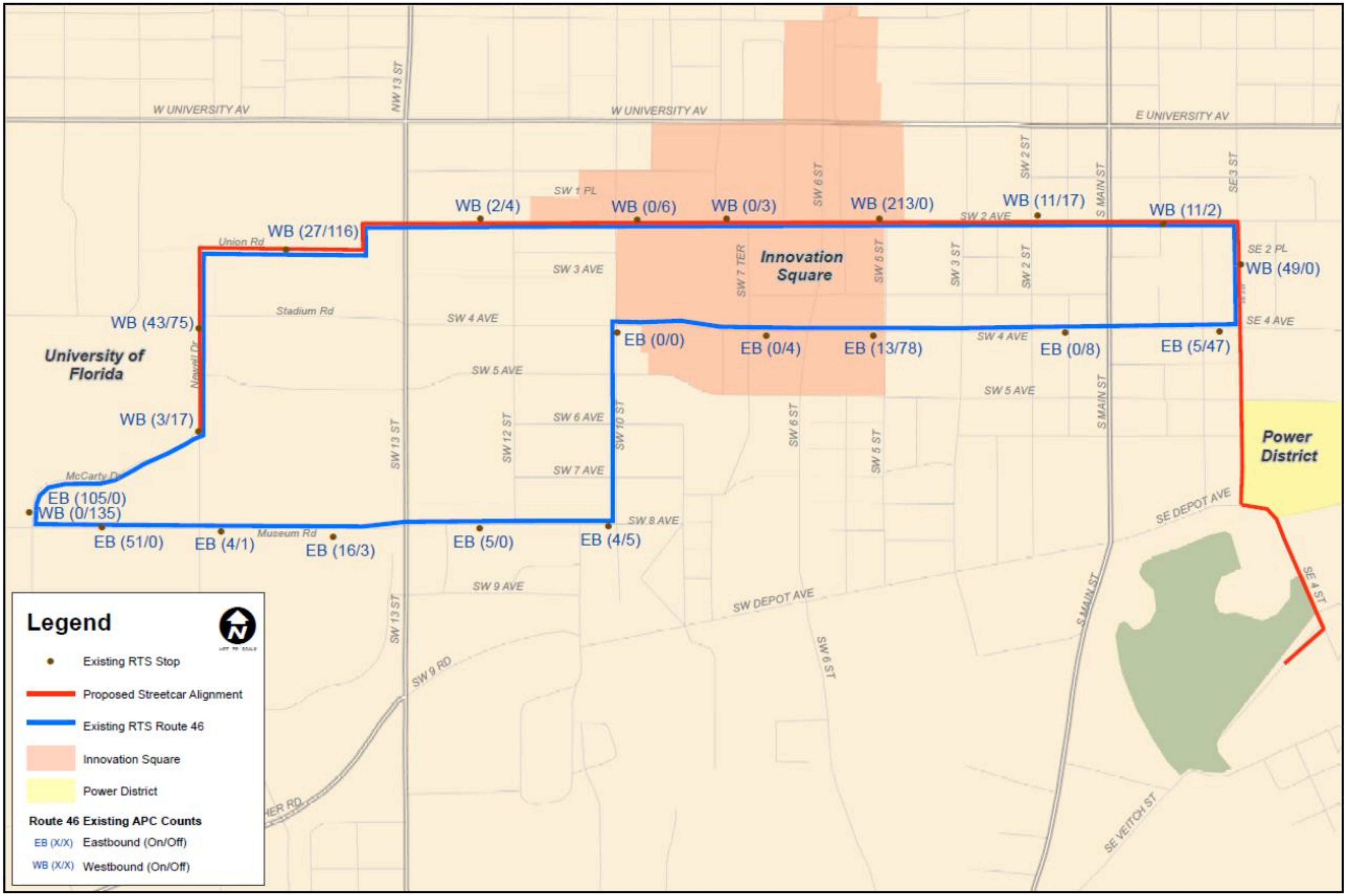

Figure 4-2: Existing weekday ridership, Route 46

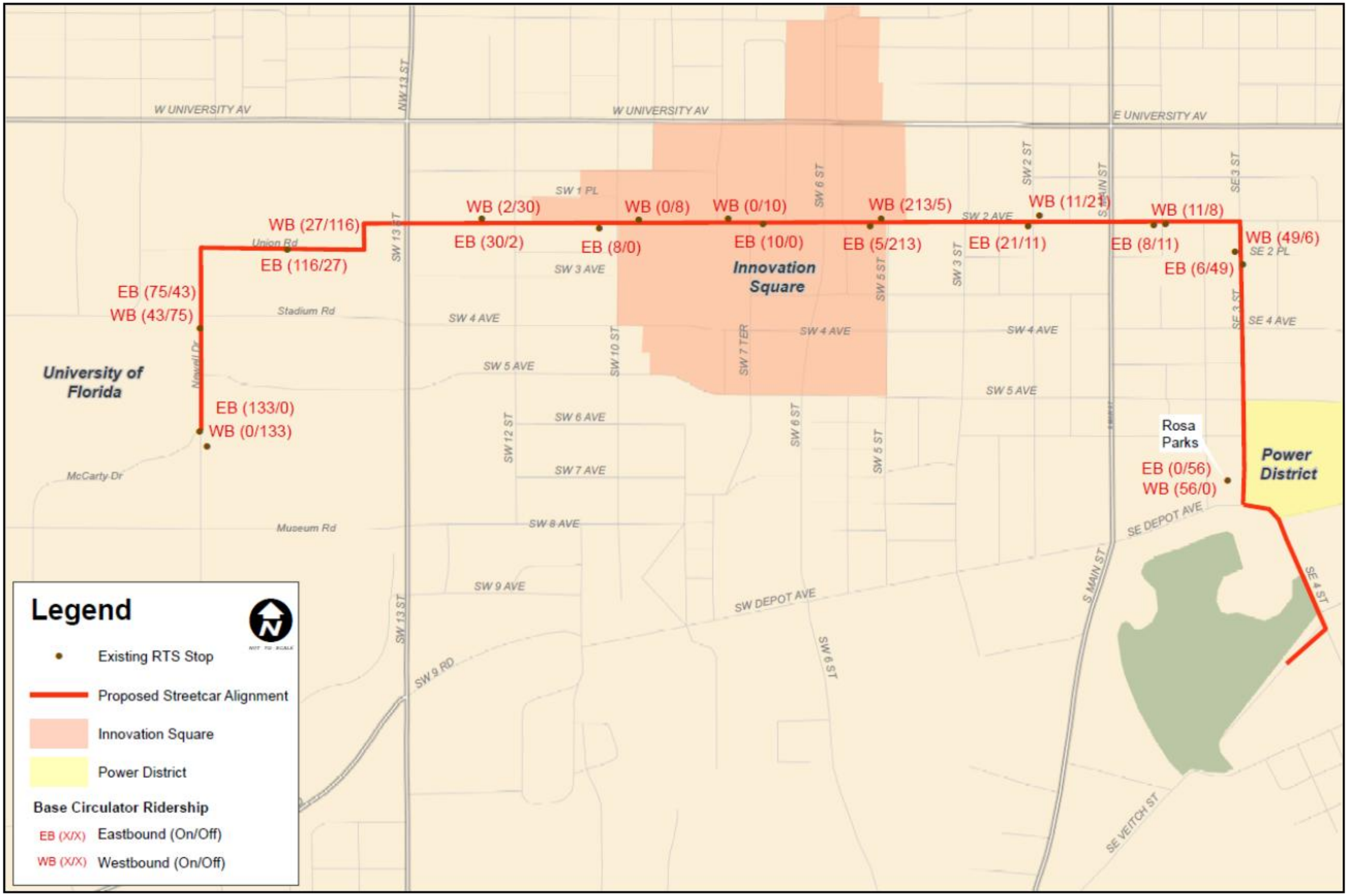

Figure 4-3: Diverted ridership to a two-directional bus circulator route on 2nd Avenue under existing conditions

3. 50% of the #46 circulator ridership at the UF Reitz Union stop and at the stops along SW 8th Avenue west of SW 13th Street were diverted to a 2nd Avenue circulator route.
4. None of the #46 circulator ridership along SW 8th Avenue between SW 13th Street and SW 10th Street was diverted to a 2nd Avenue circulator route because the stops would be greater than ¼-mile from the nearest 2nd Avenue circulator stop.
5. 22% of the #1 route ridership along 2nd Avenue and the northerly section of SW 12th Street was diverted to a 2nd Avenue circulator route. This percentage was derived from the MTPO regional model person trips that show 22% of trips in the downtown area oriented within downtown and to the UF campus.

Ridership was then adjusted for a 2nd Avenue circulator route to reflect the same total number of ons and offs in each direction, and a similar number of offs vs. ons at particular stops, assuming riders would board and alight at the same stop. This balancing was done to assure that subsequent application of growth factors reflecting added development in the area would continue to result in total stop ons and offs along the new circulator route equaling one another.

4.2.2 Distribute Base Bus Ridership to Streetcar Station Locations

It was assumed that a streetcar line along 2nd Avenue would have 7 stations, as compared to the 10 existing bus stops in each direction along 2nd Avenue for the existing #46 and #1 services. As such, the base ridership for 10 stops was reallocated to the following 7 stations[2] (eliminating every other stop of the existing stops along 2nd Avenue and SE 3rd Street):

- McCarty Drive
- Newell Drive/Stadium Road (UF)
- East of SW 13th Street
- SW 7th Terrace (Innovation Square)
- SW 2nd Street (Downtown)
- SE 2nd Place (Downtown)
- Rosa Parks Transfer Station

4.2.3 Impact of Development Growth

Two development scenarios were used to present a range of ridership projections for year 2022. This included 1) use of MTPO regional model development projections and 2) development projections for Innovation Square developed by UDMS for the economic development analysis conducted for the Streetcar Feasibility Study.

Use of Regional Model Data

A baseline development growth for the year 2022 was then identified for a radius of ¼ mile around each of the streetcar station locations by using the population and employment projections within each area as identified using the MTPO regional model data.[3] Year 2022 growth was calculated by interpolation of year 2007 (regional model calibration year) and 2035 (travel projection year) data, with population and employment projections added together. The base ridership for the 7 stations was then incremented to reflect the base 2022 growth conditions. Figure 4-4 shows the ¼-mile station service areas. The growth identified thru 2022 (from 2007 conditions) by station area is as follows:

- McCarty Drive (UF) – 2%
- Stadium Road (UF) – 2%
- East of SW 13th Street – 2%
- SW 7th Terrace (Innovation Square) – 18%
- SW 2nd Street (Downtown) – 18%
- SE 2nd Place (Downtown) – 4%
- Rosa Parks Transfer Station – 4%

[2] These are to be viewed as approximate locations.

[3] General transit ridership growth from the model is believed to be too gross an assumption for the localized area.

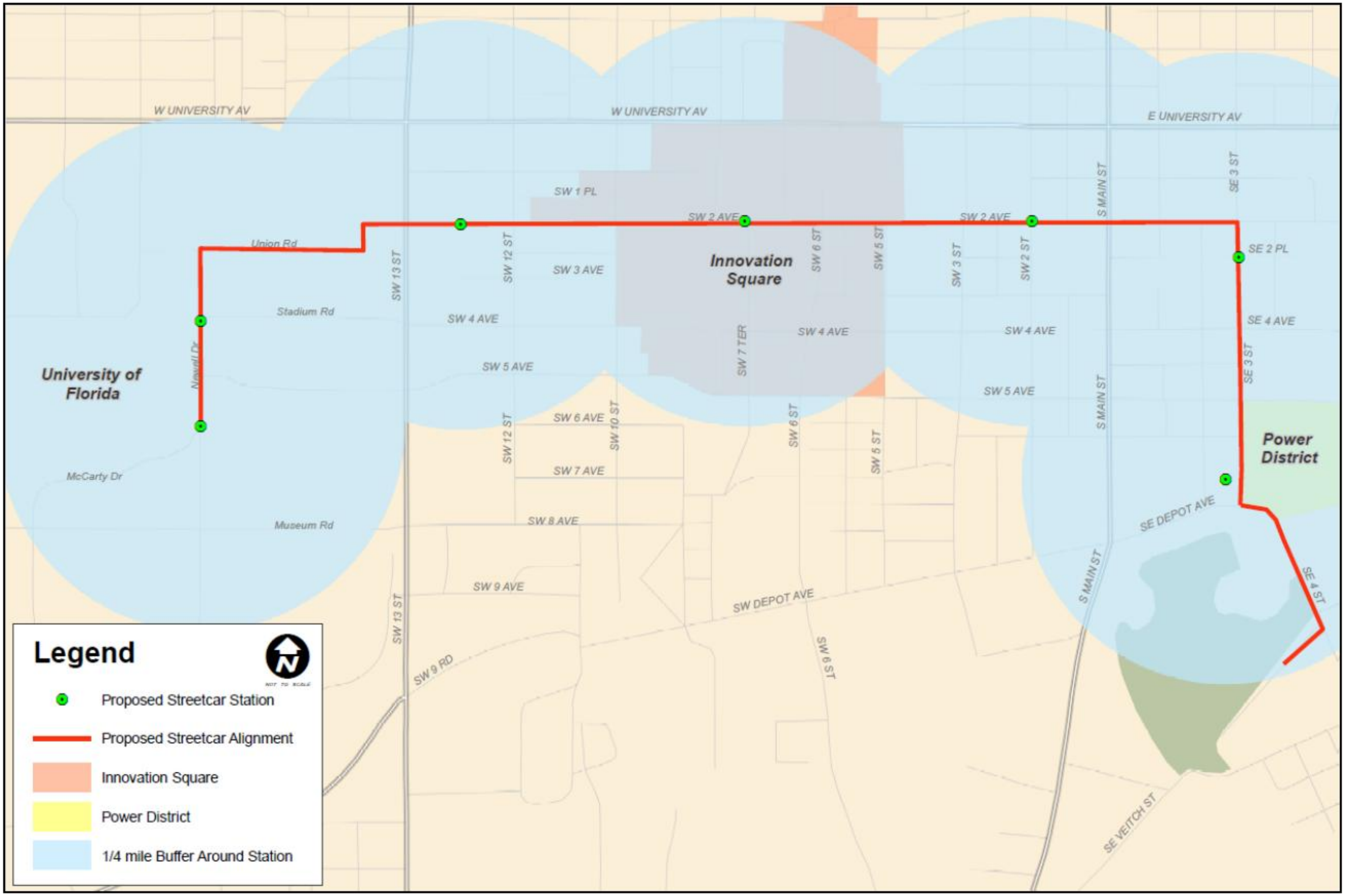

Figure 4-4: Proposed Streetcar Stations and Service Areas

Use of Higher Innovation Square Development Projections

To identify a potential upper bound for the 2022 streetcar ridership and to account for higher growth at Innovation Square than estimated from the regional model, the growth in employment from 2013 to 2022 from the "Base Model" scenario in the Economic Development Analysis conducted by UDMS was applied to the station area located near the development. This growth was distributed to the ¼-mile buffer around the SW 2nd Street SW 7th Terrace and east of SW 13th Street streetcar stops based on the percentage of the designated Innovation Square area within each buffer. For the remainder of the station areas, the population and employment projections within each area, as identified using the regional model data, were used. Year 2022 growth for the areas outside of Innovation Square was calculated by interpolation of year 2007 (regional model calibration year) and 2035 (travel projection year) data.

4.2.4 Impact of Streetcar Attributes

Once the base 2022 circulator ridership along the 2nd Avenue corridor was identified, the added ridership associated with the provision of streetcar as opposed to local bus was identified. Streetcar was assumed to be more attractive than local bus as a mode, given that it exhibits more premium features and a sense of permanence as opposed to local bus. This includes enhanced vehicles and stations with level boarding (assuming modern streetcars would be used) and off-board fare collection.

To identify the added attributes of streetcar, the methodology identified in Transit Cooperative Research Program (TCRP) Report 118 to identify the translation of premium transit features to added ridership was applied. Although the procedure in the report was developed to identify the incremental impact of bus rapid transit (BRT) on ridership, it was assumed to be appropriate for streetcar, as well. It has been shown that premium full-featured BRT service could attract an added 25 percent in ridership based on its attributes over local bus alone. This is beyond the impact associated with travel time and service frequency improvements. Thus, the ridership adjustment associated with streetcar was based on the presence of other "qualitative" attributes.[4]

Table 4-1 identifies the maximum percentage of "qualitative" attributes for BRT and the percentage assumed applicable to streetcar. As rail could be considered a more premium mode than BRT, working off of the BRT maximums is considered a conservative approach to identifying applicable streetcar percentages. Only a minor running-way component was assumed for streetcar because most of the streetcar circulator route would operate in mixed traffic on-street; only a portion of the route within the UF campus would operate in a non-auto-oriented corridor. Also, less than the maximum was assumed for service patterns, as the envisioned peak period service frequency (15 minutes) would be greater than 10 minutes.

Combined, only 65 percent of the maximum ridership would be associated with all identified attributes. As 60 percent would meet the threshold for applying the added 15 percent synergy effect (combined impact of packaging multiple attributes), 80 percent of a 25 percent increase in ridership would be achieved, or 20 percent. Thus, 20 percent additional ridership was added to the base 2022 transit circulator ridership for the two development scenarios evaluated to arrive at an estimated range in streetcar ridership for 2022.

4.3 Regional Mode Analysis Results

Applying the regional model growth scenario and 20 percent streetcar attribute adjustment, a calculation of 1,065 total boardings per day was identified for 2022. This translates to a ridership of 266 on a per-track-mile basis (for a two-directional corridor two miles in length, or four track miles). This compares favorably with the Portland Eastside streetcar extension that was recently implemented, which experienced 299 riders per track mile in its opening year.

While there are many differences between Gainesville and Portland, the ridership estimates for the Portland Eastside extension are instructive for this feasibility

[4] Case studies identifying ridership levels before and after the implementation of streetcar systems could not be identified.

Table 4-1: Estimated Additional Ridership Impacts of Selected Streetcar Components

Component	Maximum % (BRT)	Applicable % to Streetcar
Running ways	20%	5%
Stations	15%	15%
Vehicles	15%	15%
Service Patterns	15%	10%
ITS Applications	10%	10%
Branding	10%	10%
Subtotal	85%	65%
Component synergy (when subtotal is 60% or more)	15%	15%
Total	100%	80%

SOURCE: EXHIBIT 3-21, TCRP REPORT 118, *BRT PRACTITIONERS GUIDE*, 2007.

study and serve as a guide as to what modern streetcar systems have experienced in terms of ridership trends. As described above, Gainesville's streetcar ridership at its opening is expected to be somewhat less than that for Portland's Eastside extension, given the lower development level along the 2nd Avenue corridor, at least through the 2022 time horizon.

4.4 Impact of Added Innovation Square Development

The UDMS Base Model scenario for the Innovation Square area indicates that by 2022, employment will increase to slightly over 2,550, compared to an estimated 540 in 2013. This is the major growth area in the corridor and would have the greatest impact on ridership at the SW 7th Terrace streetcar station, and to a lesser extent at the SW 2nd Street and East of SW 13th Street stations. In the other station areas, employment (and population growth) to 2022 was identified as minimal, assuming the Power District development by Rosa Parks station would not occur until after 2022.

Applying the Innovation Square Base Model projection for year 2022 and 20 percent streetcar attribute adjustment, a calculation of 2,187 total boardings per day was identified for 2022. This translates to a ridership of 547 per day per track mile.

4.5 Summary Insights on Ridership

Given the approximate nature of the ridership estimation process, it is believed that a range in potential ridership is the most appropriate way to represent the data. Applying the two development growth methodologies (with the same percentage for the added impact of streetcar attributes) results in 1,065–2,187 riders per day. To translate the weekday streetcar ridership into an annual streetcar ridership estimate, it was assumed that typical weekend day and holiday ridership would be 20 percent of weekday ridership. Applying this adjustment results in an annual ridership range of 300,000–620,000 in the first year of streetcar operation. The lower end of this range could actually be lower if there was less diversion than assumed from existing RTS routes, and the upper end of the range could actually be higher if more transfers to streetcar occurred at Rosa Parks, pending what level of regional transit service improvements to that transfer station occur in the future and/or potential redevelopment on the Power District occurring sooner rather than later.

4.6 Potential Local Bus Service Modification

If a streetcar line on 2nd Avenue were to be developed and replace the existing #46 circulator, portions of other bus routes using 2nd Avenue, such as routes #25, #27, and #126, also could be diverted to 4th Avenue.[5]

[5] It should be recognized that the current RTS Comprehensive Operations Analysis could result in modifications to one or more of the local bus routes independent of streetcar operation.

City of Gainesville Streetcar
Feasibility Study

Chapter 5:

Vehicle Technology Assessment

FINAL REPORT

CITY OF GAINESVILLE
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Choosing the appropriate vehicle technology is critical when developing a streetcar system. The type of vehicle chosen can affect a variety of factors, including system capital cost, ridership capacity, speed, track design, maintenance costs, accessibility, and safety, to name a few. In fact, the rolling stock, in many ways, defines the character of the system.

This chapter summarizes the variety of potential vehicle options that currently exist for use on a streetcar system. Streetcar technology is evolving quickly, and with the increased interest in developing streetcar systems around the country, there are a number of new varieties of vehicles available or in development. Ultimately, the appropriate vehicle choice today for Gainesville might be completely different in the future, given the pace of innovation.

5.1 Introduction to Streetcar Vehicles

Streetcars are an urban transit technology featuring electrically-propelled, articulated, full or partial low-floor vehicles that ride on steel wheels and run on steel rails. They typically use power drawn from an overhead wire (catenary), with or without off-wire capabilities.

Streetcars typically are used as urban circulators with a focus on serving individual neighborhoods or groups of adjacent neighborhoods, particularly in and around a downtown. Given this operating environment, streetcar vehicles usually are smaller and more maneuverable than other rail technologies, such as light rail vehicles.

While streetcars could benefit from many of the same treatments that improve speed on other transit modes, such as signal priority, queue jumps, longer stop spacing, and exclusive rights-of-way, streetcar systems usually have minimal priorities over other vehicles and are often designed to operate in mixed traffic.

5.2 Current Trends in Streetcar Vehicles

Over the last two decades, there have been a number of changes in system design and vehicle type. The oldest of the new generation systems, which include Memphis (1993), Portland (Oregon) (2001), Tampa (2002), and Little Rock (2004), primarily use either restored historic or replica cars. Memphis uses a mix of restored cars and replica reproductions in its fleet, whereas Tampa and Little Rock use the same replica Birney cars, built by Gomaco (see Figure 5.22 on page 5-14). Of the early adopters of new-generation streetcar systems, only Portland chose modern streetcar vehicles, which were built by Skoda in the Czech Republic (see Figure 5.16 on page 5-11).

Newer systems (either in development or operating), such as Fort Lauderdale, Atlanta, Seattle, Cincinnati, Tucson, Dallas, and Washington DC, however, are choosing to go with modern tram-style cars. The only example of a new system in development that will be using replica streetcar technology is the Delmar Loop in St. Louis, Missouri. Some of the reasons for the shift are that modern vehicles carry more passengers than the older-style cars, offer easier passenger access, and, increasingly, offer more variety in style.

Because of the renewed interest in streetcar systems and the trend for communities to select modern streetcar vehicles, there has been an effort to begin manufacturing these cars in the United States; currently, there is only one domestic company, United Streetcar, LLC, that has streetcars in revenue operation. Some foreign companies, such as Siemens and CAF, have built new production facilities in the United States, and new America-based manufacturers also have begun producing streetcar vehicles for the domestic market.

The latest development in the streetcar circulator industry has been the introduction of limited overhead wire-free operation. Streetcars that no longer require the installation of overhead conductor wire or catenary have been operating in Europe for several years. Seattle, Washington DC, Dallas, and Fort Lauderdale intend to operate without overhead wires in portions of their systems. Although the cars for these and similar systems are under continued development, it can be expected that these vehicles will become more common as cities continue to seek to minimize visual clutter in their urban core areas.

5.3 Streetcar Vehicles – Features and Technology

The final decision on vehicle type will be guided by a number of design and technological features. The American Public Transportation Association (APTA) recently released guidance for local governments and transit agencies in its "Modern Streetcar Vehicle Guideline," which documents in detail the various technological configurations and standards that must be assessed when designing a system and choosing a vehicle. Table 5-1 identifies these APTA guidelines and summarizes some of the design options and considerations that Gainesville will need to account for when selecting a vehicle.

Figure 5-1: Replica streetcars (Image Source: www.apta.org)

Figure 5-2: Modern streetcar (Image Source: www.modernstreetcar.com)

Table 5-1: Elements and Characteristics of Streetcar Vehicles

Element	Options	Design Considerations	Application
Vehicle Configuration			
Vehicle Length	66'–107'		66' length typical for first generation U.S. streetcar systems; longer vehicles applied in Europe and Australia; also depends on alignment challenges
Vehicle Width	7' 6.5", 7' 10.5", 8' 8", 10'*	Cost differential for added vehicle width not significant	
Capacity	115–231 passengers		Added capacity through use of longer vehicles
Seating Configuration (Figure 5.3)	2+2 for wider vehicles, 2+1 for narrow vehicles; optional longitudinal seating on one side		Decision based on ridership projections; less seating, more (standing) riders
Floor Height (Figure 5.4)	Partial (50–70%) vs. 100% low–floor	Partial requires inside steps, 100% low-floor restricts aisle width; 14" common low-floor height	100% low-floor vehicles new to North America; more common in Europe; often reduces cost of station stops
End Treatment (Figure 5.5)	Single- vs. double-ended	Double-ended vehicles also double-sided (passenger entry on both sides); single-sided vehicles require turning loops to reverse direction	Double-ended vehicles universal for modern streetcar systems; single-ended vehicles still applied to legacy systems
Driver Cabs	Partial vs. full-width	Full-width cabs not well-suited to operator-collected fares	Full-width cabs prevalent for modern streetcars
Towing	Tow-bar or coupler for multi-unit vehicles	Equipment should be capable of pushing or pulling vehicle	Tow-bars typically applied
Passenger Information	Next stop annunciators typically applied; video plus potential audio	Messages to be defined	Accepted practice to include in new systems

*The 10' width car is not a standard for modern streetcar vehicles, but is used on replica vehicles.

Table 5-1 (Cont'd): Elements and Characteristics of Streetcar Vehicles

Element	Options	Design Considerations	Application
Vehicle / Platform Interface			
Platform Length (Figure 5.6)	Partial vs. full-length	Partial sometimes accommodates only doors within streetcar low-floor area; full-length can accommodate multiple vehicles	
Platform Height and Accessibility (Figure 5.7)	Fully-level (vehicle floor and platform at same height—13-14") vs. near-level boarding	Fully-level requires no bridgeplates, but automatic load leveling system required; near-level has lower platforms (8–10") with bridgeplates	New systems prefer fully-level if possible; difficult with vintage cars
Doors (Figure 5.8)	Variable—greater number for low-floor and longer vehicles	Doors limited to low-floor section of partial low-floor vehicle	Double doors typical, and with passenger actuation
Bridgeplates (Figure 5.9)	Typical only with near-level boarding—32" min. width	Side barriers required unless variance	
Bus and Streetcar Sharing Platform (Figure 5.10)		Sharing of stops more compatible with lower heights with near-level platform; vehicle lowest step level cannot be lower than platform	
Vehicle/Track Interface			
Turning Radius (Figure 5.11)	66' minimum for modern streetcar, 82' min. for LRT; legacy systems 40–50'	Need to accommodate vehicle "swept path"	Choice depends on alignment challenges, cost, ridership expectations
Maximum Grade (Figure 5.12)	4% maximum for sustained grade; 7% maximum short sustained grade; 9% absolute maximum		
Vertical Curve (Figure 5.13)	1,148' guideline for new streetcar systems		

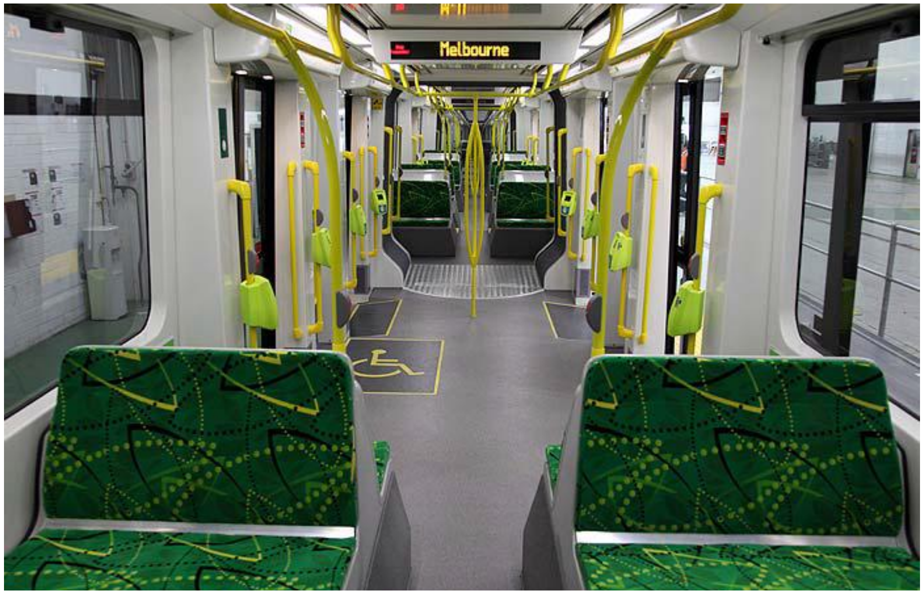

Figure 5-3: Seat configuration showing areas for flexibility
(Image Source: Modern Streetcar Vehicle Guidelines)

Figure 5-4: Example of a partial low-floor vehicle
(Image Source: Modern Streetcar Vehicles Guidelines)

Figure 5-5: Single-ended streetcar Line (Image Source: www.gohart.blogspot.com)

Figure 5-6: Partial-length platform (Image Source: Modern Streetcar Vehicle Guidelines)

Figure 5-7: Platform height vs. floor height
(Image Source: Modern Streetcar Vehicle Guidelines)

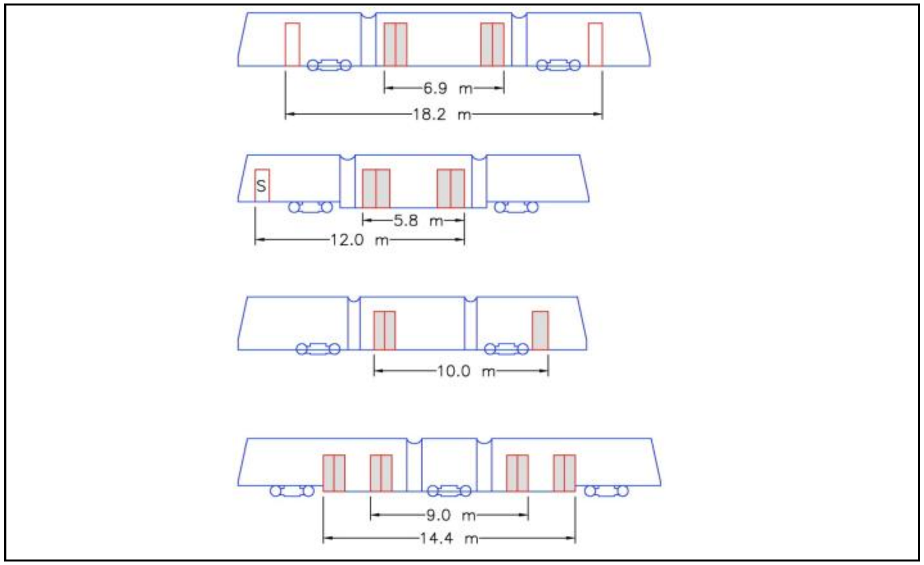

Figure 5-8: Options in door configuration
(Image Source: Modern Streetcar Vehicle Guidelines)

Figure 5-9: Bridgeplate
(Image Source: Modern Streetcar Vehicle Guidelines)

Figure 5-10: Streetcar and bus sharing platform
(Image Source: Modern Streetcar Vehicle Guidelines)


Figure 5-11: Vehicle turning radius (Image Source: Modern Streetcar Vehicle Guidelines)


Figure 5-12: Steep gradients (Image Source: Modern Streetcar Vehicle Guidelines)


Figure 5-13: Vertical curve (Image Source: Modern Streetcar Vehicle Guidelines)

Table 5-1 (Cont'd): Elements and Characteristics of Streetcar Vehicles

Element	Options	Design Considerations	Application
Power Supply			
Conventional Electric	600 and 750 volt DC versions	Pantograph on vehicles and obstructions in urban environment; minimum heights with operational pantograph can be between 11' 10" and 13' 4" height range, but, in general, 18' recommended clearance for electric wires above streets, and 19' is standard height for streetcar wires to allow for some sag between poles	Still most common system applied
Off-Wire	Battery, fly-wheel, super capacitor, and hybrid systems	Off-wire range dependent on technology applied, but also route characteristics; still requires power distribution system at certain locations for charging; more technologically complex and heavier vehicle	Applied where aesthetics are critical factor and where overhead power could be disruptive (e.g., drawbridges); primary application to date in Europe; technology evolving
Ground-level Power	"Contact" or "contactless" system; contact system uses pickup shoe on surface of power rail, contactless system uses electrical connection between vehicle and guideway	Power switched on only when vehicle is present over one or more short segments; requires traction power substations	Limited examples in Europe; technology and use evolving in U.S.

5.4 Sample of Streetcar Vehicles

This section contains summary information about a variety of streetcar vehicles that are either currently in use or under development in the United States. These examples include vintage refurbished cars, replica cars, and modern cars (trams).

5.4.1 Bombardier Flexity Outlook

Bombardier streetcars are some of the most widely-used in the world today. The Toronto Transit Commission (TTC) confirmed the selection of Bombardier's Flexity Outlook 100% low-floor design as the base model for its next generation fleet and is planning to purchase 204 articulated trams to replace its current aging fleet of streetcars.

With a width of 8 ft. 8 in. and length of 98.4 ft., the Flexity Outlook cars can accommodate 251 passengers (70 seated and up to 181 standing). Once completed, the TTC system will contain the largest fleet of streetcars in North America.

Figure 5-14: Bombardier Flexity Outlook: Exterior view

Figure 5-15: Bombardier Flexity Outlook: Interior view

5.4.2 United Streetcar USC 100

United Streetcar, LLC, is based in Portland, Oregon.

With the USC 100, United Streetcar has produced the first new streetcar in the U.S. in more than 50 years and currently has cars in revenue service on the Portland Streetcar system. In addition, United Streetcar has delivered vehicles to Tucson for the SunLink Streetcar system. These cars are expected to be in revenue operation in late 2014. Washington DC also has ordered vehicles from United Streetcar.

United Streetcar has replicated the Skoda and Inekon design of streetcars used on the Portland and Seattle streetcar systems. The United Streetcar USC 100 streetcar is 50% low-floor, 8 ft. wide and 66 ft. long, and has a total passenger capacity of 157 passengers (30 seated, 127 standing).

Figure 5-16: United Streetcar USC 100: Exterior view

Figure 5-17: United Streetcar USC 100: Interior view

5.4.3 Brookville Equipment Corporation Liberty Streetcar

Brookville Equipment Corporation in Brookville, Pennsylvania, has been in the mining and railroad vehicle manufacturing business for more than 100 years. With a history of manufacturing electric mining locomotives with hybrid and off-wire capabilities, combined with the remanufacture of more than 50 streetcars, Brookville entered the new streetcar market in 2011 with the design of the Liberty.

The Liberty Car is 60% low-floor to increase accessibility and decrease dwell time for loading and unloading of passengers. It is 66 ft. 4 in. long, available in two body widths of 8 ft. and 8 ft. 8 in., and can have various door and seating configurations, body trim, and paint schemes as a regular package. Advanced features also being incorporated into this design include off-wire operation for various periods of time.

Brookville is also currently testing a completely wireless streetcar that is operated by batteries and charged through non-contact charging. The batteries are periodically charged through induction coils located in critical areas along the route. This technology is likely to become more commonplace as more cities bring streetcar service into their urban core areas.

Although there are not yet any examples of the Liberty Streetcar in revenue service, Dallas Area Rapid Transit (DART) has purchased two off-line-capable cars for its new streetcar system, which will be operational in 2015.

Figure 5-18: Brookville Equipment Corporation Liberty Streetcar: Exterior view

Figure 5-19: Brookville Equipment Corporation Liberty Streetcar: Interior view

5.4.4 CAF USA Streetcar

CAF USA is a subsidiary of Construcciones y Auxiliar de Ferrocarriles, S.A., an international market leader in the design, manufacture, maintenance, and supply of equipment and components for railway systems. CAF has experience producing vehicles for high speed rail, commuter rail, light rail, and streetcar applications worldwide.

Cincinnati has selected CAF USA as the preferred vendor to provide up to five modern streetcar vehicles (with options for up to 25 more) for the first phase of the Cincinnati Streetcar. The vehicles produced by CAF USA for the Cincinnati Streetcar will comply with the Federal Transit Administration's Buy America program, which requires that vehicles have at least 60 percent domestic content and final assembly in the U.S.

The vehicle offered by CAF USA is a conventionally-powered vehicle with a 100% low-floor design with a capacity of up to 274 passengers (24 seated, 250 standing). Once operational, this streetcar vehicle will be the first 100% low-floor vehicle in use in the United States.

Figure 5-20: CAF USA Streetcar Exterior view

Figure 5-21: CAF USA Streetcar Interior view

5.4.5 Gomaco Trolley Company Double Truck Replica Birney Car

The Gomaco Trolley Company manufactures authentic vintage trolley cars and refurbishes used cars from around the world.

An aspect of many American streetcar systems is the interest in new replica streetcars being constructed using vintage designs used in those cities in the past. Building on the traditions of America's historical streetcar past, these new vehicles incorporate the classic looks of vintage streetcar designs, but with the reliability and durability of a new vehicle.

Memphis, Little Rock, and Tampa use either refurbished or replica cars manufactured by Gomaco. The refurbished cars vary greatly in specifications, but the most common replica car, the Birney Car, is 49.75 ft. long and 10 ft. wide. The cars are fit to allow for ADA accessibility and have a maximum passenger load (sitting and standing) of 101.

Gomaco also has begun testing a battery-operated wireless streetcar, although none of these cars has yet been put in revenue service.

Figure 5-22: Gomaco Trolley Company Birney Replica Streetcar: Exterior view

Figure 5-23: Gomaco Trolley Company Birney Replica Streetcar: Interior view

5.4.6 PCC Streetcar – Various Suppliers

The most common heritage streetcar in operation and providing transit service in North America is the PCC (Presidents' Conference Committee) car, with 55 still in active service, and the number is increasing.

The PCC streetcar design was first built in the U.S. in the 1930s. The design proved successful and, after World War II, was licensed for use elsewhere in the world.

The standard car under the original 1935 specifications was 46 ft. long and 12.5' wide, with later models at 46.5 ft. long and 13.5 ft. wide.

The Brookville Equipment Corporation in Brookville, Pennsylvania, has rebuilt more than 40 PCC cars for transit agencies, including perhaps the most well-known, San Francisco.

Figure 5-24: PPC Streetcar: Exterior view

Figure 5-25: PPC Streetcar: Interior view

5.5 Vehicle Considerations for Gainesville

The final selection of a streetcar vehicle often comes at the end of the planning process, before final design begins. For a potential streetcar system in Gainesville, this could be **at a minimum 8–10 years** from now, by which time the variety of available streetcar vehicles might have changed significantly.

However, while identifying a specific model may not be possible at this time, there are characteristics that should be considered if discussions within the community continue.

5.5.1 Modern Cars vs. Replica Cars

As stated previously, most communities that have either recently opened new systems or are in the process of design/construction have chosen modern streetcars for the vehicles. Although this reflects a recent trend, the Gainesville community will need to decide whether the additional capital investment in modern cars best serves the community vision for a streetcar system.

5.5.2 Off-Wire Capabilities

Throughout the planning process, there have been discussions about the need for off-wire capabilities for any streetcar vehicle chosen for Gainesville. These discussions have been focused on the need to minimize visual impact in historic areas along the preferred conceptual route, particularly in and around the University of Florida campus. This is a quickly-evolving area in streetcar vehicle design, and it will be important for Gainesville to closely monitor the implementation of these technologies in other cities to identify any potential issues that may affect eventual operation in Gainesville.

5.5.3 Reliability

With the variety of car types and manufacturers that are entering the market, it will be important for Gainesville to research long-term reliability of the various vehicle types. The City will want to make sure that the chosen vehicles will minimize ongoing operating costs to the system. Gainesville is in an advantageous position in this respect. With several systems coming on line in the coming years, there should be excellent data available about any performance/maintenance issues.

5.5.4 Capital Cost

This characteristic relates to the type of vehicle (modern vs. replica) and the brand of the vehicle. The City will need to balance the desired car type and amenities with a budget that is feasible and defensible. Capital costs for streetcars vary significantly, as do maintenance costs. Average capital and operating costs are addressed in the next section, and much more detailed analysis and cost refinement will occur when the City chooses to pursue the concept further.

City of Gainesville Streetcar Feasibility Study

Chapter 6:

Operating Plan

FINAL REPORT

CITY OF GAINESVILLE
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6.1 Introduction

The proposed streetcar service, located in Gainesville's urban core, is envisioned to serve as an urban circulator that connects Rosa Parks Transfer Station, Downtown Gainesville, and the University of Florida. Consequently, the streetcar needs to provide transportation for multiple trip purposes: home-to-work, home-to-school, entertainment trips, and others throughout the course of the day. As a result, the streetcar should be convenient and easy to use.

The operating plan was developed based on the operating environment along the streetcar line, logical connections with other RTS bus routes and services, and operating characteristics of other similar streetcar systems that have been presented in the case study report. The operating plan presented below includes proposed days and hours of service, service frequencies, a preliminary fare structure, and an estimate of the number of vehicles that will be required.

6.2 Service Span and Days of Service

The streetcar would operate 7 days per week and 10–15 hours per day. Since the existing Later Gator A service provides late night service until 2:45 AM from Wednesday through Saturday, the streetcar service may end its service at 10:00 PM on weekdays and Saturday. Sunday service would end at 8:00 PM.

6.3 Service Frequencies and Travel Times

According to the ridership projections developed by Parsons Brinckerhoff, the streetcar service, if implemented today, would capture ridership from existing bus Routes 1 and 46. Route 46 currently operates every 15 minutes from 7:10 AM to 5:52 PM on weekdays. Consequently, streetcar service will need to operate at least every 15 minutes. On weekdays, this operating plan assumes that the streetcar will operate every 10 minutes during the peak period and every 15 minutes during the off-peak period. Weekend service frequencies would be reduced to 20 minutes on Saturday and 30 minutes on Sundays. Table 6-1 presents the proposed operating characteristics for streetcar service, which includes hours of service and service frequencies for each of the days of operation.

The streetcar is expected to operate in mixed-traffic conditions with a minimal degree of signal priority.

To develop a cycle time, results from the streetcar case studies were reviewed. Those results indicate that streetcar services generally operate at an average speed of 10 miles per hour (inclusive of dwell time at stops, traffic signal delays, etc.). To compare the case study analysis results with operating conditions along the proposed Gainesville streetcar alignment, the average operating speed for

Table 6-1: Streetcar Service Operating Characteristics

Service Frequency*				Hours of Service			
Weekday, Saturday		Saturday	Sunday	Monday–Thursday	Friday	Saturday	Sunday
Peak	Off-Peak						
10 min	15 min	20 min	30 min	7:00 AM–10:00 PM	7:00 AM–10:00 PM	10:00 AM–10:00 PM	10:00 AM–8:00 PM

*Peak-hour period is defined between 7:00 AM and 9:00 AM and between 3:00 PM and 6:00 PM

Route 46 was calculated and is approximately 7.2 miles per hour. Given that the Gainesville streetcar will have fewer stops than Route 46, an average operating speed of 10 miles per hour was assumed to be plausible and used to estimate cycle time and, in turn, fleet requirements.

Based on the proposed operating speed and proposed streetcar route length (2.0 miles), a streetcar running time for one round trip, or cycle, is estimated at approximately 30 minutes. This estimate includes dwell time at stops and an estimated layover period of 6 minutes per cycle.

6.4 Fleet Size

Based on the estimated cycle time of 30 minutes and the proposed frequency levels, three streetcar vehicles will be required to operate during peak service, and two vehicles could accommodate off-peak service. One additional streetcar vehicle is suggested to serve as a spare to permit repairs and maintenance without affecting service. That additional streetcar vehicle also could be used to accommodate additional service needs during special events and higher-than-anticipated peak travel demand periods. In total, four streetcar vehicles are recommended for the proposed streetcar service.

6.5 Vehicle Type

The ridership report indicates that the estimated average daily ridership of the proposed streetcar service would range from 1,065 to 2,187. Based on the streetcar operating plan, this translates into an average riders per revenue hour of 30–60 or average riders per trip of 7.5–15. Consequently, the streetcar vehicle maximum capacity needs to be somewhat consistent with the maximum average riders per trip so it can be efficiently used. Accurate fleet size and capacity needs are identified in the Capital section of the study.

6.6 Passenger Fare Assumptions

The full adult fare for streetcar systems included in the case studies varies from $1.00 to $2.50. In addition, regular multi-day passes (e.g., one-day, seven-day, monthly, etc.) for system-wide fixed-route bus service are normally accepted by the streetcar systems. The final decision on streetcar system fare policy will need to be made once the service is implemented. The full cash fare for streetcar service may be different than that of the fixed-route service. For example, some systems charge a premium for streetcar service (e.g., Tampa streetcar full fare is $2.50 and fixed-route service full fare is $2.00), and some systems give discounts to streetcar service (e.g., Portland streetcar-only full fare is $1.00 and fixed-route service full fare is 2.50).

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City of Gainesville Streetcar Feasibility Study

Chapter 7:

Cost Estimates

FINAL REPORT

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7.1 Capital Cost Estimates

7.1.1 Background

This section addresses the estimated capital costs associated with the conceptual alignment for a new streetcar line connecting downtown Gainesville with the University of Florida via the 2nd Avenue corridor. The preferred conceptual alignment is shown in Figure 7-1, and for the purposes of estimating a potential capital cost, it was assumed to connect the existing stop at Rawlings Hall (McCarty Drive) on the UF campus with the Rosa Parks Transfer Station south of downtown. The route would use Newell Drive and Union Road on campus, 2nd Avenue east of campus to SE 3rd Street, then south to Rosa Parks. For purposes of this feasibility assessment, the Operations & Maintenance Facility for the new streetcar line is assumed to be on the existing RTS bus operations site south of Depot Avenue and west of SE 4th Street[1].

7.1.2 Design Assumptions

The capital cost estimate was based on basic typical quantities and unit costs developed by Parsons Brinckerhoff for the Crystal City streetcar project in northern Virginia. The Crystal City project costs reflect the latest in technology application and were based on actual costs from other recent systems, in particular Seattle and Portland. Cost estimates were derived for two scenarios: 1) provision for a dual mode modern streetcar (with off-wire capability) that would preclude the need for overhead catenary on the University of Florida campus, and 2) provision of a traditional modern streetcar with full overhead catenary system throughout the corridor. Other key assumptions in the design of the corridor that impacted cost include:

- Double track operation in mixed traffic next to or in the median along 3rd Street, 2nd Avenue, Union Road and Newell Drive (including roundabout modifications at SW 6th Street, SW 10th Street and SW 12th Street on 2nd Avenue). Parking and bike lanes on outside of street would not be impacted.
- Center platforms in the median at five locations:
  - ◊ SE 3rd Street at SE 2nd Place
  - ◊ SW 2nd Avenue at SW 2nd Street
  - ◊ SW 2nd Avenue at SW 7th Terrace
  - ◊ SW 2nd Avenue east of SW 13th Street
  - ◊ Newell Drive at Union Road
- All station platforms were assumed to be 100 feet in length and 12 feet in width, with one dual-face, real-time digital passenger information message board plus two small fare collection machines assumed for each platform[2]. Narrower platforms are possible, but likely require staggering the eastbound and westbound working edges of the platform so that there is enough room for platform "furniture" such as ticket vending machines. With platforms 100 feet long and streetcars only 70 feet long, that would be possible.
- Single side platforms at the two terminus stations (Figures 7-2 and 7-3)
  - ◊ Rosa Parks Transfer Station
  - ◊ Newell Drive at McCarty Drive
- Single tail track south of Rosa Parks on the west side of SE 4th Street to serve the proposed streetcar operations & maintenance facility (at the existing RTS bus facility); environmental mitigation costs were included given the proximity of the track to the new Depot Park area. The proposed SE 4th

[1] Based on funding obligations to FTA the existing RTS facility needs to maintain some connection to transportation (i.e. City cannot or least probably will not turn and flip it for commercial real estate for example, so the assumption that a streetcar facility on the site could be developed is reasonable.

[2] Unlike the majority of buses employed in fixed route service, with low-floor streetcars there is no driver intervention in the fare collection process. A proof of payment system is utilized with fare enforcement through on-board validation via random, circulating staff inspections or ticketing scanning upon entry.

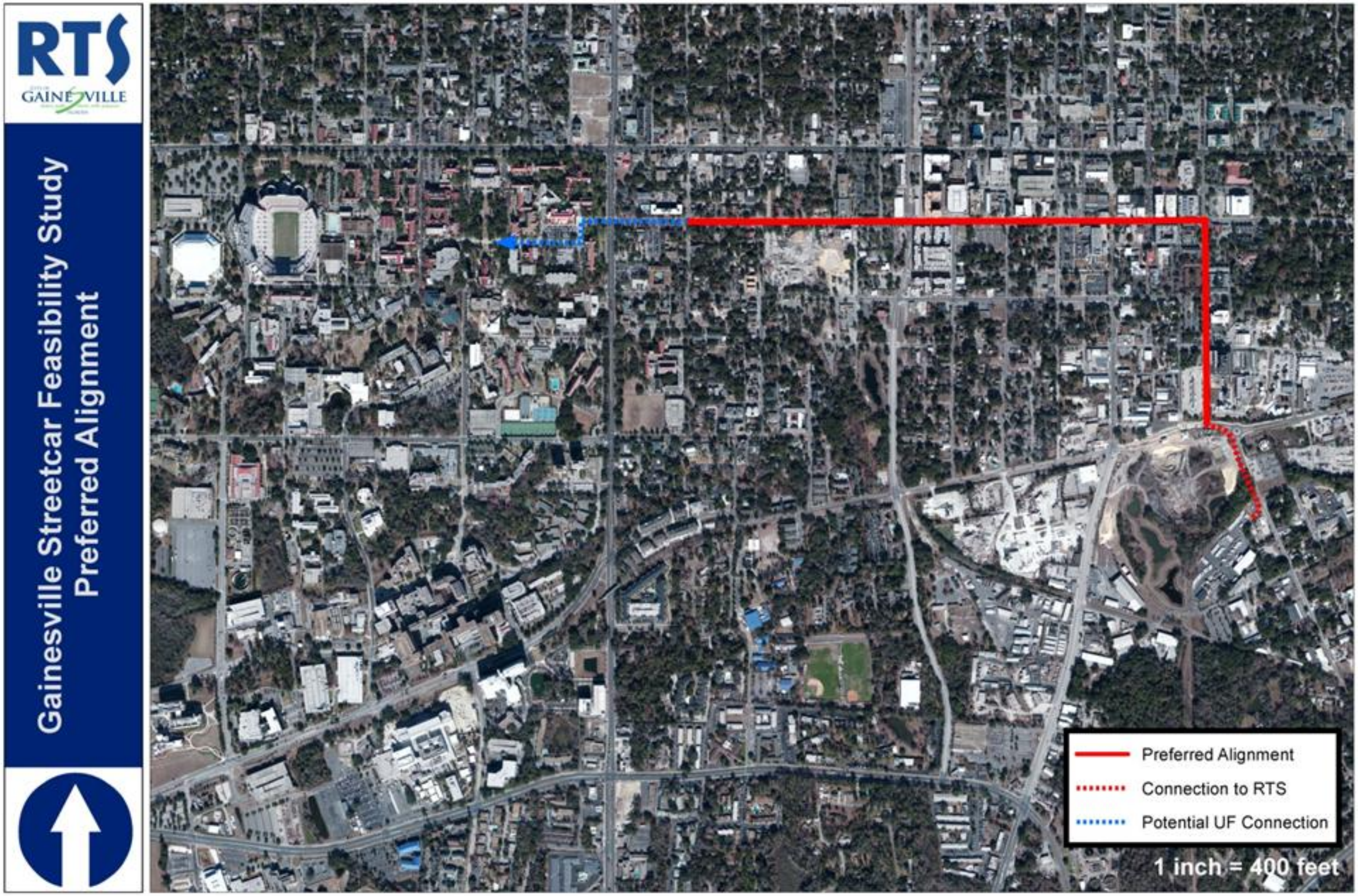

Figure 7-1: Preferred Conceptual Alignment

Street widening plans south of Depot Avenue would have to be modified to remove the new sidewalk on the west side of the street, and some added grading just outside the proposed right-of-way (on City property) would be required. The proposed bike lanes on the new roadway might also have to be eliminated if there is limited opportunity for added grading west of the roadway.

- Use of embedded track both in-street and off-street throughout the streetcar corridor.
- An overall "moderate" level of utility relocations was assumed. Extent of relocations will vary on block-by-block basis. Further surveys and engineering evaluation would be needed to identify specific impacts, and whether a portion of utility relocation cost could be borne by utility companies under existing franchise agreements. Utility maps generated by the consultant were sufficiently detailed to determine both that there was no way to reasonably avoid utility lines and that there does not appear to be any utility lines that absolutely must be avoided.
- Three substations along the corridor (sites to be determined based on parcel availability and ability to provide power feeds). Each substation will be relatively small – probably on the order of 400 square feet. It is not essential that they be located directly alongside of the tracks and they could be a block or more away – wherever there is an available parcel. Typically the location of substations is driven by where the electric utility company can provide suitable power feeds. Ideally, each substation has two independent power feeds so that even if one feeder is down, the substation doesn't drop off line. Catenary poles would be provided in landscaped medians, and/or could be shared with street light and traffic signal poles.
- One battery charging station for an off-wire scenario (no overhead catenary on the UF campus with this option).
- New streetcar operations center and storage/maintenance facility south of high voltage line to be developed at the existing RTS bus facility, including yard track and turnouts; included hazardous material mitigation on RTS site.
- Several roadway geometric modifications would be required:
  - ◊ Curb return modifications to southwest corner of SE 2nd Avenue/SE 3rd Street intersection and southeast corner of Newell Drive/Union Road intersection
  - ◊ Cut back north and south faces of roundabouts on SW 2nd Avenue at SW 6th Street, SW 10th Street, and SW 12th Street (Figure 7-4);
  - ◊ Reconfiguration of west leg of SW 2nd Avenue/SW 13th Street intersection and transition roadway to connect with Union Road
- No right-of-way acquisition (land for off-street termini at UF and Rosa Parks, tail track assumed to be donated by UF and City of Gainesville, and curb return improvements could be developed with existing public right-of-way).

7.1.3 Cost Summary

Cost summary spreadsheets for both the off-wire and traditional streetcar scenarios are presented at the end of this memo. Costs are shown in 2013 dollars. The off-wire vehicle scenario would cost an estimated $93 million, or $46.5 million per revenue mile (excluding deadhead mileage to the new O&M facility south of Rosa Parks), while the traditional streetcar scenario would cost $87.2 million, or $43.6 million per revenue mile. Each off-wire vehicle was estimated to have a base cost of $4.5 million, while the more traditional modern streetcar with overhead catenary was estimated at $3.2 million each. The major cost differential between the two alternatives is the vehicle itself. The added infrastructure cost for the two alternatives was assumed to be similar, with the cost of added catenary to operate on the UF campus with a standard on-wire vehicle assumed to be equivalent to the cost of a battery station with an off-wire vehicle. An extended off-wire operation throughout the entire route would require a more expensive vehicle due to greater battery capability being required, as well as a second battery charging station at Rosa Parks.

The per mile capital costs for Gainesville are very similar to the new systems in Portland and Tucson. The Central Eastside streetcar line in Portland cost $44.3 million per mile, while the planned Tucson line (which connects the University of Arizona with downtown) is estimated at $48 million per mile.

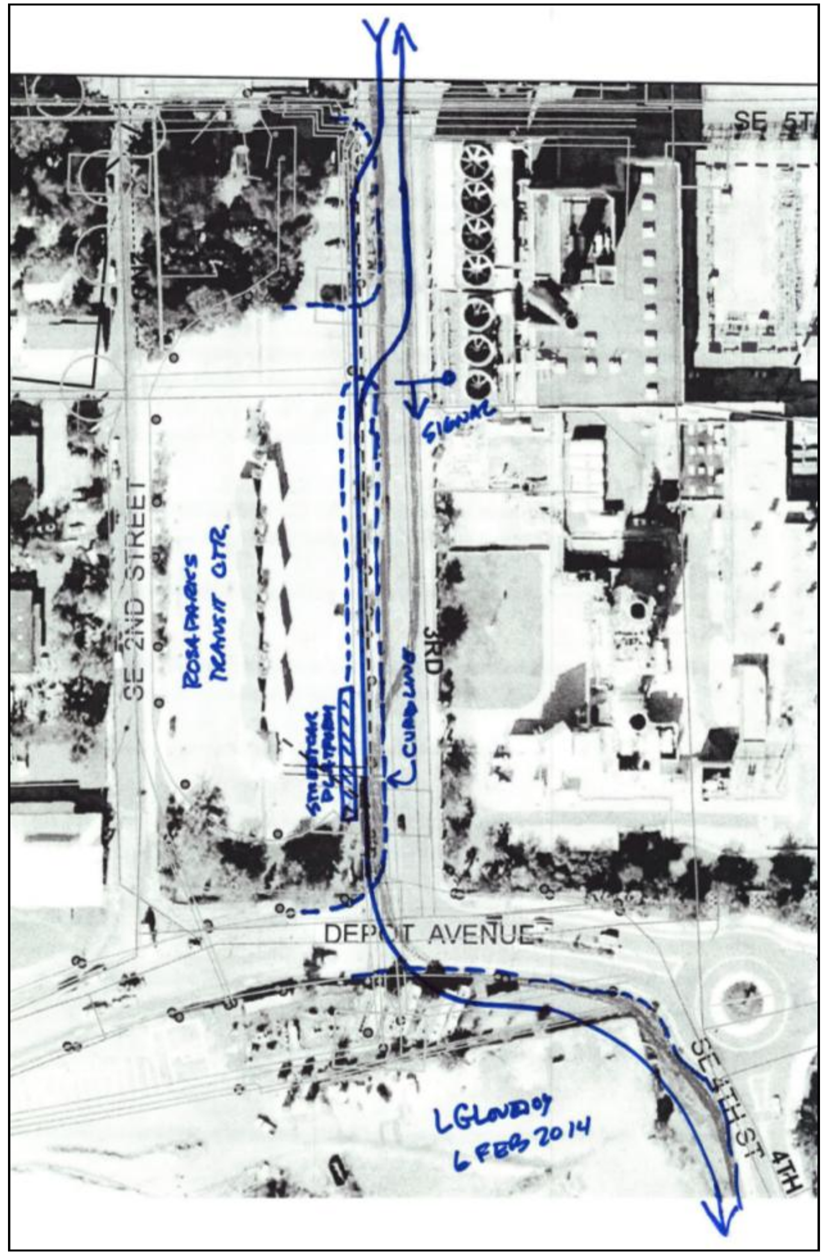

Figure 7-2: Rosa Parks Terminus Concept Sketch

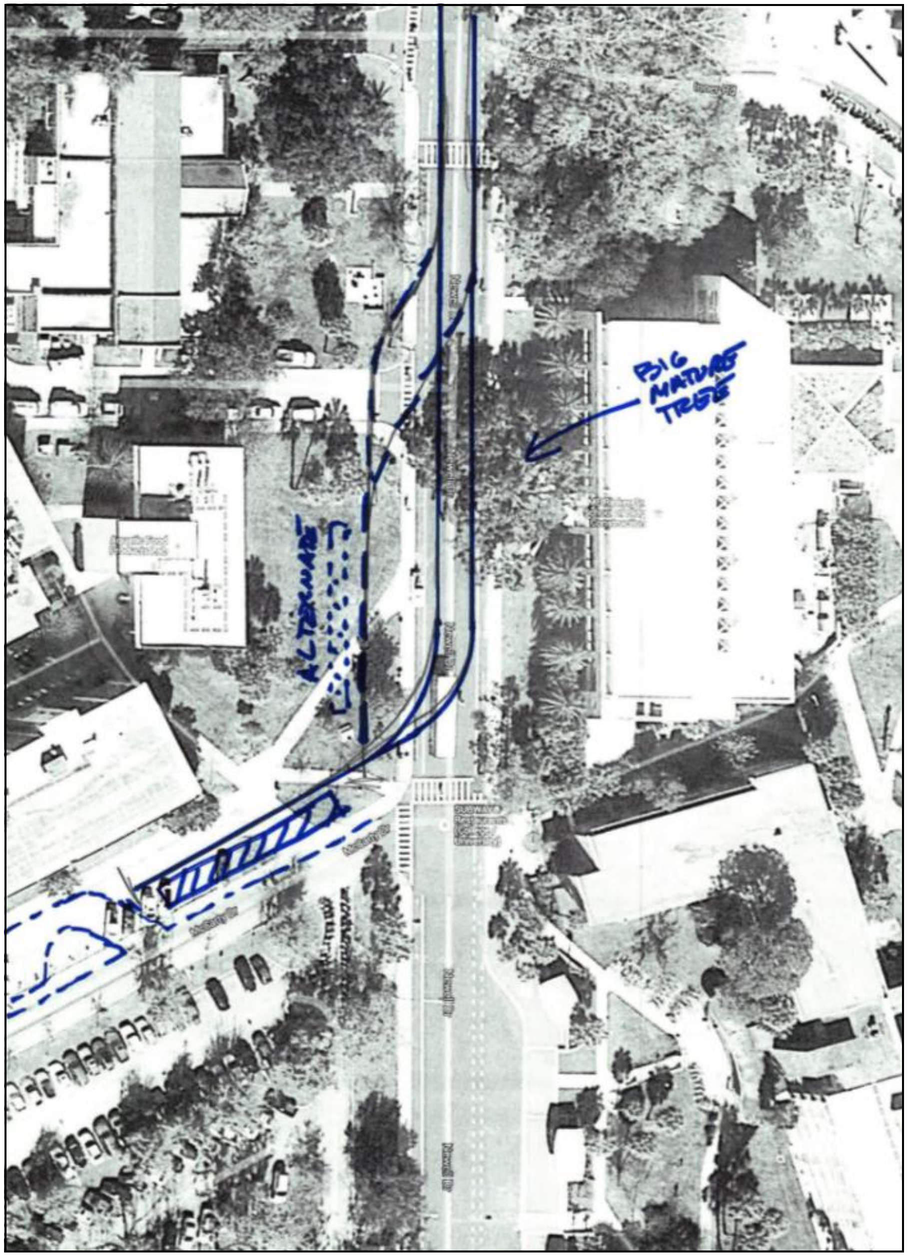

Figure 7-3: Newell Drive at McCarthy Drive (UF) Terminus Concept Sketch

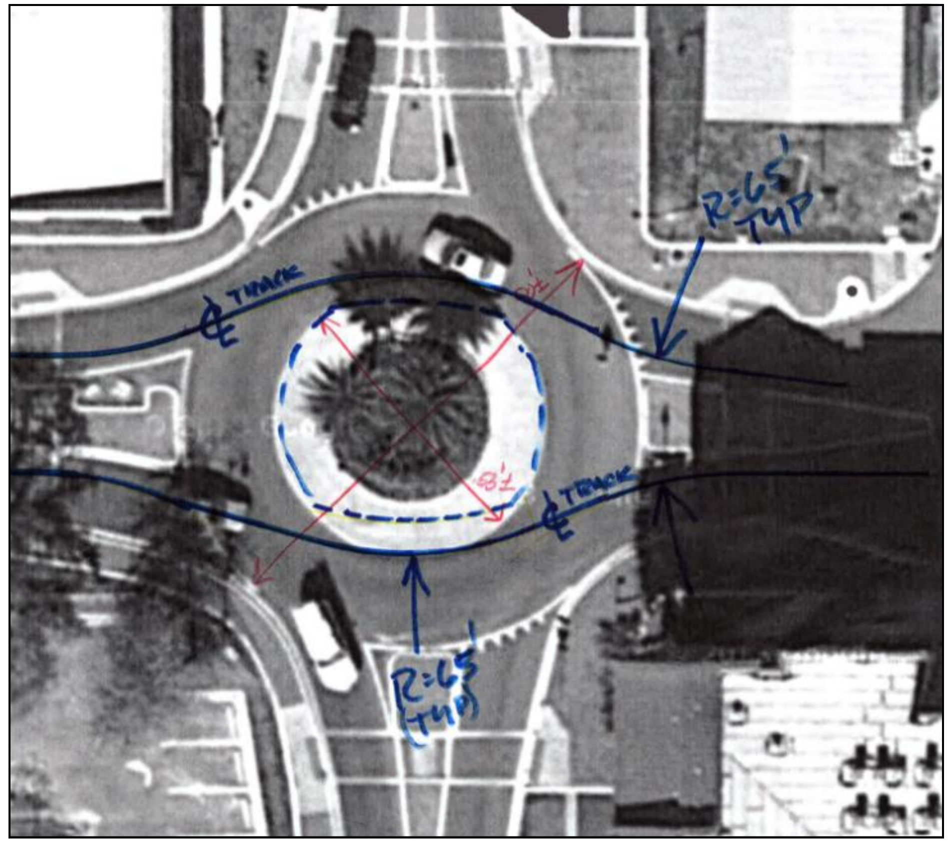

Figure 7-4: Sketch of Typical Roundabout Modification for Streetcar Operations

7.2 Operating Cost Estimates

7.2.1 Introduction

This memorandum summarizes potential annual operating costs for the Gainesville Streetcar system. The costs presented are conceptual and represent a logical range that could be expected based on a review of peer systems throughout the United Sates. The estimates presented are based on 2012 National Transit Database information which is the most current available at the time of publication.

7.2.2 Operating Costs from Peer Systems

The operating costs for streetcar systems vary greatly depending on the type of equipment used and service characteristics, including for example staff salaries and benefits, maintenance costs, and parts replacement.

To estimate an annual operating cost, actual operating costs (annual and per revenue hour) were utilized from the three active systems (Little Rock, Portland, and Tampa) that were included in Chapter 1 of this report and two other (Seattle and Memphis) systems that are also currently active. These systems represent a mix of rolling stock technology (modern, replica, and vintage) and diverse geographic locations. The number of active streetcar systems in the U.S. is increasing, particularly in the southeast, and in the coming years, Dallas, Atlanta, and Ft. Lauderdale will provide good examples to further refine potential operating costs.

In an attempt to isolate the premium service increment and control for factors like salary differences between RTS and these other systems the operating cost per revenue hour for the bus component of these systems was identified and then compared against the cost to operate streetcar. This was then used to identify a base hourly rate for RTS to provide premium transit service. Table 7-1 lists the peer systems identified above, and the associated operating costs and revenue hours for both bus and streetcar from the 2012 National Transit Database (NTD). This information was used to calculate a cost per revenue hour for both of the transit modes and the percentage cost premium between streetcar and bus observed.

Table 7-1: Case Study Operating Cost Comparison

City	Streetcar Operating Cost (2012)	Streetcar Total Revenue Hours (2012)	Bus Operating Cost (2012)	Bus Total Revenue Hours (2012)
Little Rock, AR	$1,007,601	12,436	$12,564,460	162,174
Seattle, WA	$2,794,211	11,736	$430,144,035	2,768,315
Tampa, FL	$1,775,507	12,561	$54,927,727	586,224
Portland, OR	$11,868,085	36,739	$230,726,059	1,625,650
Memphis, TN	$3,887,983	43,211	$43,975,537	360,070
Total	**$21,333,387**	**116,683**	**$772,337,818**	**5,502,433**
Cost Per Revenue Hour	**$182.83**		**$140.36**	
Percentage Cost Premium for Streetcar Operations	**26.28%**			

As shown in the peer systems summarized in Table 7-1, there is a 26.28% premium cost per revenue hour for operating a streetcar in comparison to a bus across the peer systems. In order to estimate the potential cost per revenue hour for a streetcar in Gainesville, the percentage cost premium was applied to the current RTS bus cost per revenue hour of $71.79. This calculation yielded $90.66 per revenue hour for operating a streetcar.

7.2.3 Annual Operating Cost Estimate

In an attempt to account for potential variation in operating costs for a streetcar system, a cost range was calculated. This range was based on a low and high cost per revenue hour for operating a streetcar system.

- Upper Cost per Revenue Hour (Table 7-1 Cost Per Revenue Hour from peer systems) - $182.83
- Lower Cost per Revenue Hour (RTS Cost Per Revenue Hour with streetcar premium) - $90.66

These costs per revenue hour were then applied to the total revenue hours assumed for the initial Gainesville Streetcar system in Chapter 6. The results of this calculation of annual operating cost can be found in Table 7-2 and Table 7-3 below; note that revenue hours differs from service span as it accounts for the number of vehicles needed to achieve desired frequencies.

7.2.4 Conclusion

The operating cost range identified in Table 7-2 and Table 7-3 represents a realistic range of potential costs based on the peer systems identified in Table 7-1. Even at the low end, the operating cost for a streetcar would be a significant increase (approximately $201,777) over what it would cost to operate a fixed-route bus using these same operating characteristics. However, as documented in Chapter 3 (Economic Development Assessment), and Chapter 4 (Ridership Estimation) there are potential benefits to streetcar systems that are not typical with fixed-route bus systems that must also be taken into consideration when determining whether this increased cost is acceptable.

If the City decides to move forward with a streetcar system, it will be important to ensure that the operating costs are planned for well into the future.

Table 7-2: Annual Operating Cost Estimate - Low

Time of Day	Operating Cost Per Revenue Hour	Service Span (hours)	Revenue Hours	Daily Operating Cost	Service Days	Annual Operating Cost
Weekday Peak	$90.66	5.00	15.00	$1,360	255	$346,775
Weekday Off-peak	$90.66	10.00	20.00	$1,813	255	$462,366
Saturday	$90.66	12.00	24.00	$2,176	52	$113,144
Sunday	$90.66	10.00	10.00	$907	52	$47,143
					Total Annual Operating Cost	**$969,427**

Table 7-1: Annual Operating Cost Estimate - High

Time of Day	Operating Cost Per Revenue Hour	Service Span (hours)	Revenue Hours	Daily Operating Cost	Service Days	Annual Operating Cost
Weekday Peak	$182.83	5.00	15.00	$2,742	255	$699,325
Weekday Off-peak	$182.83	10.00	20.00	$3,657	255	$932,433
Saturday	$182.83	12.00	24.00	$4,388	52	$228,172
Sunday	$182.83	10.00	10.00	$1,828	52	$95,072
					Total Annual Operating Cost	**$1,955,001**

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City of Gainesville Streetcar Feasibility Study

Chapter 8:

Funding Assessment

FINAL REPORT

CITY OF GAINESVILLE
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8.1 Introduction

In recent years, Florida's transportation landscape has been changing rapidly as local governments and metropolitan planning organizations (MPOs) are paying more attention to the planning and implementation of alternative modes of transportation. As documented elsewhere in this report, the support for rail, including streetcar, is gaining momentum and is more frequently a topic of discussion at all levels of government. This is important as a favorable political environment will be needed to facilitate funding for both capital and operating expenses for the system.

Most streetcar systems built in the last fifteen years have been funded by a wide variety of local, state, and federal government sources. Typically, the most significant portion of the capital funding mix is from federal grants, which typically does not exceed 50 percent of the initial capital costs for constructing streetcar systems. Securing at least a portion of the capital expenditures through federal sources is likely required to getting any system implemented.

In addition to the initial capital costs to construct the physical infrastructure, identifying long-term income streams to ensure that the long term operation of the system can be maintained is also critical. As discussed in Chapter 7, ensuring that the benefits of a streetcar system are realized requires maintaining high service levels (system hours, frequency, etc.)

8.2 Capital Operating Cost Estimates

As summarized in Chapter 7, the capital and operating costs for a potential streetcar system in Gainesville are fairly significant. Estimated capital costs are between $87.2 million and $93 million and operating costs are estimated between $970 thousand and- $1.9 million annually.

8.3 Review of Potential Funding Sources for a Streetcar System

This section summarizes federal, state, and local funding sources available for new transit systems. It is important to note that, while these sources are currently available, there are no guarantees as to their viability or use in the future. Since a streetcar system is not likely to be implemented in Gainesville before 2022, the funding sources for project financing could change significantly by the time of system opening.

The section starts out with a brief review of the operating and capital sources currently being used by the selected case study systems.

8.3.1 Case Study Systems - Funding Sources

The case study systems identified in Chapter 1 have used unique funding strategies in order to build and operate their systems. Table 1, below, summarizes the initial capital funding sources and ongoing revenue streams being used (or planning to be used for systems not yet in operation) to fund operations for each of the case study systems.

8.3.2 Federal Funding Sources

The landscape of federal funding for transit changed significantly with the passage of the Moving Ahead for Progress in the 21st Century (MAPap-21) funding package in 2012. MAPap-21 approved federal funding for transportation through Fiscal Year 2014 (September 30, 2014), including fixed-guideway transit. Although not yet approved, a proposed reauthorization package was included in President Obama's proposed FY 2015 budget.

MAP-21 contains many of the programs that existed under the previous transportation funding bill, Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), but restructures them significantly. The primary programs included under MAPap-21 that could potentially be used for capital cost expenditures are as follows:

Table 8-1: Streetcar Case Study Systems -Capital and Operating Cost Summary

City	Initial Capital Cost (By Phase)	Approximate Capital Funding Share (Phase I Only)	Capital Funding Sources (By Phase)	Streetcar Operating (2012)	Streetcar Operating Funding Sources
Little Rock, AR	Phase I - $20.5 Million Phase II - $8 Million	Federal -80% State/Local - 20%	Federal Transit Administration (FTA) Small Starts Arkansas Department of Transportation City of Little Rock City of North Little Rock	$1.1 Million	Fare Revenue Car Rental (Special Events) Advertising Car & Station Sponsorships Merchandise Local Government Contributions (Little Rock & North Little Rock)
Tucson, AZ	Phase I - $196.55 Million	Federal -47% State/Local - 53%	US Department of Transportation (USDOT) TIGER Grant Regional Transit Authority (Regional Transit Tax - a portion was allocated for streetcar)	$5.2 Million (estimated)	Fare Revenue Regional Transit Authority City of Tucson General Fund
Tampa, FL	Phase I - $57 Million Phase II - $3.5 Million	Federal - 51% State/Local- 49%	City of Tampa Florida Department of Transportation (FDOT) Funding Including: • Dedicated District Revenue (DDR) • Intermodal Funds • Transit Block Grants Hillsborough Area Regional Transit (HART) USDOT TIGER Grant Federal Highway Administration (FHWA) Congestion Mitigation and Air Quality Improvement Grant (CMAQ)	$1.8 Million	Fare Revenue Car Rental (Special Events) Advertising Car & Station Sponsorships Merchandise Special Services District (SSD) City of Tampa Contributions (CRA Contributions)
Portland, OR	Phase I - $28.6 Million Phase II - $16.0 Million Phase III - $14.45 Million Phase IV - $15.8 Million Phase V - $148.27 Million	Federal -10% State/Local - 90%	FTA New Starts Local Improvement District Portland Development Commission (PDC) Various State of Oregon Sources City Parking Funds	$11.9 Million	Fare Revenue Car & Station Sponsorships TriMet General Fund Local Improvement District (LID) Parking Revenue
Ft. Lauderdale, FL	Phase I - $83.2 Million Phase II (projected) - $59.4 Million	Federal - 22% State/Local - 78%	USDOT TIGER Grant FDOT Special Assessment District Broward MPO	$2.1 Million (estimated)	Fare Revenue Special Assessment District Broward MPO

- New Starts/Small Starts/Core Capacity (Fixed-Guideway Capital Investment Grants - Section 5309)
- Urbanized Area Formula Grants (Section 5307)
- Transportation Investment Generating Economic Recovery (TIGER) Grants
- Transportation Infrastructure Finance and Innovation Act (TIFIA)[1]

New Starts/Small Starts/Core Capacity (Fixed-Guideway Capital Investment Grants - Section 5309)

In MAPap-21, the New Starts/Small Starts program was funded at a level of $1.9 billion for both FY 2013 and FY 2014. This program can be used for capital funding of major investments in new and expanded rail, bus rapid transit (BRT), and ferry systems. There are three distinct categories under Section 5309, which include New Starts, Small Starts, and Core Capacity. In MAPap-21, there were no specific funding limits set for each of these categories out of the total $3.8 billion available.

Core Capacity Grants

Core Capacity project grants are focused on those fixed-guideway transit corridors that are at or above capacity, or are expected to be at capacity within five years. Based on the projected ridership and area levels of service, it does not appear that the Gainesville streetcar would meet this criterion.

New Starts/Small Starts

The New Starts and Small Starts grant programs are very similar in design and purpose, but they differ in project size and required criteria. Based on the capital cost estimate for the streetcar system, it likely would only be eligible for a Small Starts Grant, which is typically less than $75 million on a project that has a total capital cost of under $250 million. This program would likely fund no more than 50 percent of the capital costs of a proposed project.

The Small Starts process under MAPap-21 has two major steps, Project Development and Expedited Grant Agreement. The Project Development Phase includes:

- Completing the environmental review process culminating in the identification and adoption into the MPO's Long Range Transportation Plan (LRTP) of a locally preferred alternative (LPA)[2] .
- Securing commitments of non-federal capital share
- Engineering and design

Small Start grant applications are ranked for funding based on the criteria listed below:

- Project Justification Rating (50% of Overall Rating)
    - ◊ Mobility Improvements
    - ◊ Environmental Benefits
    - ◊ Congestion Relief
    - ◊ Cost-Effectiveness
    - ◊ Economic Development
    - ◊ Land Use
- Local Financial Commitment (50% of Overall Rating)
    - ◊ Current Condition
    - ◊ Commitment of Funds
    - ◊ Reliability/Capacity

[1] Financing mechanism. Other sources are grants

[2] This process is likely to cost in excess of $1 million dollars, which is not likely to be covered by any grant funding.

Currently, the number of project applications outstrips available funding, so, competitive projects are generally receiving a an overall medium-high rating or better.

Urbanized Area Formula Grants (Section 5307)

The Urbanized Area Formula Grants under MAPap-21 can be used for capital expenses for new projects. The grants were funded at $4.3 billion in FY 2013 and $4.4 billion in FY 2014. Funding for this program is distributed by formula based on the level of transit service provision, population, and other factors. For FY 2013, Gainesville was apportioned up to $3.7 million under this program. These grants have traditionally been used to help fund bus replacement, security upgrades, etc., and would not likely contribute to covering the cost of a streetcar system in a meaningful way.

Transportation Investment Generating Economic Recovery (TIGER) Grants

The TIGER Grant program is administered through the US Department of Transportation (US DOT) and was originally created in the American Recovery and Reinvestment Act (ARRA) of 2009. This discretionary grant program continues to be funded after the expiration of ARRA and has been funded at a level of $600 million during FY 2014. These grants can be used for capital expenditures based on the following primary selection criteria:

- State of Good Repair
- Economic Competitiveness
- Quality of Life
- Environmental Sustainability
- Safety

TIGER funds are designed to be used for "shovel ready" projects and they must be obligated within a short timeframe (typically within the next fiscal year). These grants have been used for construction on some streetcar systems, including both Ft. Lauderdale and Tampa. Since TIGER is a discretionary fund, it is unknown what the status of this program will be in the long term.

Transportation Infrastructure Finance and Innovation Act (TIFIA)

The TIFIA program provides credit assistance in the form of direct loans, loan guarantees, and lines of credit to help fund transit and transportation infrastructure programs. Under MAPap-21, this program has been funded at $750 million in FY 2013 and $1.0 billion in FY 2014. TIFIA loans can be used for funding capital projects, including streetcars. The cost of a proposed project must total at least $50 million dollars or make up 33 percent or more of the state's federal-aid highway apportionments for the most recent fiscal year, whichever is less. TIFIA loans must have a dedicated revenue source identified (tolls, taxes, user fees, etc.) to ensure timely repayment.

8.3.3 State Funding Sources

The State of Florida has a number of funding programs available to help with capital and operating expenses. Some of the current programs are described below. Unlike the federal funding sources identified previously, some state programs can be used to fund both capital and operating expenses for new/ expanded transit systems.

FDOT Transit Service Development Grant

Service Development Grant funding is available for no more than three years and is typically used for expanding public transit services. If awarded for a streetcar system, successful operations must continue for the duration of the grant and beyond without receiving additional Public Transit Service Development Program funds. In addition, projects submitted for funding must be justified in the recipient's Transit Development Plan (TDP). Historically, RTS has received annually less than $300,000 from this funding source. Through some preliminary discussions held with FDOT regarding the use of this funding for streetcar planning and operations, the agency has expressed its opposition to using this funding for streetcar -related functions at this time. However, RTS should continue to monitor the use of this funding in coming years in case policy changes.

Public Transit Block Grant Program

The State Block Grant Program was established by the Florida Legislature to provide a stable source of funding for public transit. Public Transit Block Grant funds may be used for eligible capital and operating costs of providing public transit service. Program funds also may be used for transit service development and transit corridor projects. Public Transit Block Grant projects must be consistent with applicable approved local government comprehensive plans. State participation is limited to 50 percent of the non-federal share of capital projects. At this time, this funding is used by RTS to fund a portion of its ongoing operations, and no plans have been made to change the current allocations. However, this funding program does represent an important funding source for transit in Florida, and is an eligible source for potentially funding for a streetcar system.

New Starts Transit Program (NSTP)

The NSTP was started in 2005 by the Florida Legislature to assist local governments with new fixed-guideway and BRT projects. This program was designed to help leverage state funds in order to capture FTA money under the New Starts/Small Starts program. NSTP projects are reviewed using the FTA guidelines from Section 5309. The total amount of the State's participation may not exceed 50 percent of the non-federal share of a project. For those projects that are not approved for federal funding, the maximum project share is 12.5 percent of total costs of design, property acquisition, and construction.

8.3.4 Local and Regional Funding Sources

The local and regional funding categories summarized below are based on information from the 2009 Transit Cooperative Research Program (TCRP) Report 129: Local and Regional Funding Mechanisms for Public Transportation. This report categorizes local and regional sources into a number of categories as follows:

Traditional Tax - and Fee - based Sources

These sources include traditional forms of tax- and fee-based revenue-raising mechanisms typically used to support transit operating costs, such as:

- County/City General Revenue
- Special Assessments
- Fare Revenue
- Advertising
- Concessions

County/City General Revenue

The City's general fund consists of a number of different revenue sources including ad valorem taxes. Ad valorem revenue can fund public transportation, through the general fund, a dedicated millage from the general fund, or some type of dedicated revenue source established through a transit or transportation authority. The use of general revenue funds can be problematic, however, particularly for ongoing operational costs, due to the many competing interests that the City must balance.

Community Redevelopment Areas

The proposed streetcar system in Gainesville is located almost entirely within two Community Redevelopment Areas (CRAs). As demonstrated in Chapter 6, much of the expected increase in property values will be captured as tax increment revenue by the Community Redevelopment Agency until each of the CRAs expires. The Community Redevelopment Agency should be considered an important partner in any decision to develop a streetcar and, given its resources and focus on the Downtown area, this agency has the potential to be a strong partner in the project.

Special Assessments

Special assessments are charges assessed against the property of some particular locality because that property derives special benefits from the expenditure of the money. There are generally two types of special assessments: Municipal Service Taxing Units (MSTUs) and Municipal Service Benefit Units (MSBUs). MSTU assessments are levied on an ad valorem basis, while MSBU assessments are levied on a per-unit basis. Since MSTUs and MSBUs are not taxes, a benefit to the property bearing the assessment must be proven.

Special assessments are often imposed as an ad valorem tax and are currently being used by some counties in Florida to fund transit services. The TECOLine Streetcar in Tampa currently uses a Special Services District (SSD) assessment to fund ongoing operating costs. This is charged as a millage on all non-homesteaded properties within the designated service district for the streetcar (generally Downtown and Ybor City).

Fare Revenue

Fare revenue generated on the streetcar would help cover the ongoing operating costs of the system. While farebox recovery rarely covers more than 10-15 percent of overall operating costs, this is still significant.

Advertising

Although it is not historically a large revenue generator, selling of advertising on vehicles and at stations is a revenue source employed by nearly every streetcar system currently operating in the U.S. Stations are a particularly attractive component of a streetcar system for attracting local advertising revenue, as they provide numerous opportunities for static and/or active media placement as well as opportunities for naming rights.

Concessions

Concession sales can be generated from vending services as well as restaurants/ vendors that rent space from transit agencies. This is likely not a viable funding source for a streetcar system in Gainesville due to the small size and limited number of stations along the routes.

Common Business, Activity, and Related Sources

This potential source includes a less frequently used revenue-raising mechanism to support transit:

- Parking Fees
- Transit-Oriented Development (TOD)/Joint Development

Parking fees/revenues are a potential viable source for funding in the Gainesville context. The development of Innovation Square, Power District, and other similar downtown projects will significantly increase the need for parking unless other options are provided. Agreements could be sought where funding for parking is substituted for a cheaper alternative – funding for transit. Moreover, as discussed in Chapter 6, there is the possibility that, through the implementation of a streetcar system, somewhat more remote locations could be used for the provision of parking, which could create a potential revenue source for streetcar operations.

The City of Gainesville Comprehensive Plan also already allows for the capture of developer contributions towards the improvement of transit around the University of Florida campus. Likely not a major income source, such contributions can continue to be supported and emphasized for those businesses that benefit from their proximity to transit facilities.

8.4 Conclusion

As described in throughout this chapter, there are a number of potential funding sources available for use in the development and operations of a streetcar. However, most of these funding sources are only available following significant planning and design exercises that require a significant upfront financial commitment on the part of RTS. The availability of capital funding from the federal government through various MAP-21the Small Starts programs such as Small Starts can be an attractive source for potential system development. However, competition from other local communities is significant, so preparation is key to a successful application.

Funding of a streetcar system requires careful and deliberate planning, and will require significant local funding, particularly related to ongoing operational costs. As is further discussed in Chapter 9, if the Gainesville community is committed to continuing the conversation about streetcar, there must be an ongoing dialogue among potential funding partners to ensure the success of the system.

City of Gainesville Streetcar Feasibility Study

Chapter 9:

Conclusions and Next Steps

FINAL REPORT

CITY OF GAINESVILLE every path starts with passion FLORIDA

9.1 Background and Study Elements

This Streetcar Feasibility Study, the potential of a (fixed guideway) streetcar system within the urban core of Gainesville. The study components included the following:

- Project Conceptualization
- Preliminary Screening
- Economic Development Assessment
- Ridership Estimation
- Vehicle Technology Assessment
- Proposed Operating Plan
- Cost Estimates
- Funding and Financing

The study does not make a specific recommendation as to whether a streetcar system should be pursued. Instead, potential next steps that should consider if a community decision is made to move the implementation of streetcar These potential next steps are described in more detail below.

9.2 Streetcar Next Steps

1. A public involvement process should be designed and implemented. This public involvement process should include stakeholder interviews, speakers' bureau presentations, large-scale workshops and open house events, and student outreach at UF. In addition, this process should include all key stakeholders, such as the Alachua County Commission, RTS, the Gainesville MTPO, FDOT, state and federal elected officials, the Federal Transit Administration (FTA), the Gainesville City Commission, the Gainesville CRA, affected property owners, downtown area developers, and residents.
2. A detailed land use analysis to gain a more complete understanding of the economic potential at specific development sites. This study should evaluate specific redevelopment and development opportunities, and the potential for providing greater density and intensity potential for the development of transit oriented projects.
3. Additional economic analysis potential revenues compared against not only the long-term operating costs, but also against other long-term liabilities that are the responsibility of the City. This analysis will result in a clearer understanding of possible economic benefits to the community by placing the potential financial benefits in the context of long-term liabilities that could affect the system's financial viability.
4. A more detailed ridership analysis should be generated using population and employment projections. This estimate should also take into account how reconfiguration of fixed-route bus service could affect/maximize streetcar system performance.
5. A more in-depth engineering analysis of underground utilities should be conducted to determine with more specificity the potential need for utility relocations and the associated effects on construction costs. This analysis will be important to establish a capital budget to carry forward with any discussions with potential funding partners.
6. In conjunction with the engineering analysis, a more detailed technology assessment will be needed, including track and track bed requirements, specific rolling stock choices and costs, and more refined costs for the maintenance facility, etc. .
7. Coordination of parking needs with the long-term development/expansion plans of the UF campus, the Power District, Innovation Square, and Downtown Gainesville will create significant demand for the provision of parking options for residents and commuters alike. Close coordination of parking facilities development with the streetcar system (and the larger transit system as a whole) could create real efficiencies that could potentially

reduce the need for some potential parking facilities, and increase transit system ridership.

8. The conversation regarding both capital and operating funding sources should be continued with key funding partners. These conversations should be held with FDOT, the Gainesville MTPO, the City of Gainesville, and UF Administration, at a minimum. Efforts should also be made to coordinate and conduct fact finding trips with some of the newest systems currently being designed and constructed including Ft. Lauderdale, Atlanta, Cincinnati, and Tucson; all of whom have assembled unique funding solutions. A revenue and operations analysis should be conducted along with development of a more detailed operating plan. Based on a reasonable estimate of the operating protocol (hours of operation, headways, maintenance requirements, staffing costs), potential funding sources should be specifically identified, analyzed, and discussed with community funding partners.

9. A governance plan and system partners should, along with the potential for an oversight Board of Directors, if deemed appropriate for the Gainesville context.

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Appendix A - Preliminary Screening Analysis

I. Introduction

Using input from the Project Technical Advisory Committee's (PTAC) August 5, 2013 meeting, stakeholder interviews, and fieldwork observations, Tindale-Oliver & Associates (TOA) staff refined the list of potential streetcar segments from those originally included in the analysis (Figure A-1) to a shortlist of 16 segments recommended for further study. These segments were included on a refined map (Figure A-2) and were subsequently reviewed by both RTS staff and the PTAC prior to beginning the Preliminary Screening Analysis.

The purpose of this memorandum is to describe the criteria used for the Preliminary Screening Analysis and the methodology for analyzing/scoring each of the remaining segments. It concludes with the results of the analysis, which have been used to help identify the recommended preferred alignment. This preferred alternative can be found on Figure A-3

II. Screening Criteria - Methodology and Assessment

This section of the memorandum includes a description of each of the criteria that were analyzed, the methodology for analysis, and the scoring results for each segment.

a. Land Development Potential

Any future system in Gainesville should be designed to encourage redevelopment. The analysis identified areas along each of the segments that, due to the condition/age of existing improvements and the local market dynamics, may be attractive for redevelopment investment. The specific criterion used for this analysis was the Building/Land Value Ratio (BLVR), which is the existing building value (value of built improvements) divided by the value of the underlying land (land value).

Where the value of the built improvements is less than that of the underlying land, the BLVR is under 1.0, which means that, due to depreciated building values and/or increased market interest in the land, conditions may be likely to attract redevelopment in comparison to properties with built improvements that are worth significantly more than the underlying land. Segments with lower BLVR ratios received higher scores.

Methodology

The specific methodology used for calculating the BLVR for each segment is as follows:

i. Using GIS, parcels were identified within a 300' buffer of each of the segments.
ii. Using GIS, a 300' buffer was drawn around each of the segments. The 300' buffer was used for the following reasons:

1. The intent was to focus data capture as close to each individual segment as possible. Given the proximity of the segments to each other, a tighter buffer was used.
2. The blocks in Downtown Gainesville, though irregular, are between 690'-700' east/west and 290'-330' north/south. By employing a 300' buffer properties abutting and adjacent to the segments were captured.

iii. The BLVR was then calculated for each of the parcels that fell completely within or were intersected by the buffer.
iv. The overall BLVR was then calculated for each segment
v. Segments were then scored based on the overall BLVR

Scoring Results

In order to score each of the segments based on the BLVR and later create a cumulative score across all variables (given that they have different units of measurement), the following steps were taken.

i. The average for the BLVR was calculated for all of the segments (excluding those highlighted).
   a. Average BLVR - 2.20
ii. The standard deviation was calculated for the BLVR. This was used to define the ranges for applying scores.
   a. Standard Deviation - 1.36
iii. Points were assigned to each of the segments, based on the ranges determined using the standard deviation. For results greater than the mean, one point was awarded. For results within one standard deviation lower than the mean, three points were awarded. For all results lower than one standard deviation from the mean, five points were awarded. See below for scoring ranges and Table A-1 identifying scoring by segment.
   a. 1 Point - > 2.20
   b. 3 Points - .84-2.20
   c. 5 Points - < .84

Table A-1 Building to Land Value Ratio (BLVR) - Scoring by Segment				
Segment Number	Total Building Value of all Parcels Within Buffer	Total Land Value of all Parcels Within Buffer	BLVR	Scoring
1	$0	$13,469,600	0.00	N/A
2	$13,924,800	$17,967,100	0.78	5
3	$20,552,500	$7,208,000	2.85	1
4	$0	$15,869,600	0.00	N/A
5	$20,864,200	$11,333,300	1.84	3
6	$26,420,100	$16,189,900	1.63	3
7	$0	$4,603,200	0.00	N/A
8	$96,544,700	$36,698,000	2.63	1
9	$9,477,700	$8,980,700	1.06	3
10	$9,249,000	$13,061,900	0.71	5
11	$42,606,800	$20,617,100	2.07	3
12	$24,912,100	$7,971,900	3.12	1
13	$19,247,600	$7,527,200	2.56	1
14	$56,026,200	$9,949,400	5.63	1
15	$45,923,100	$15,639,600	2.94	1
16	$5,633,300	$7,639,100	0.74	5

* For these segments, the buffer only captured properties within the University of Florida, which does not report building value.

b. Traffic Operations

Existing/projected traffic volumes on each segment to identify areas where the operation of a streetcar system would be more likely to encounter significant traffic congestion. The criterion chosen to identify congestion was the volume/capacity ratio (v/c ratio), which was calculated using traffic data gathered from the 2035 Long Range Transportation Plan (LRTP) for each of the segments. This ratio was calculated by dividing the existing/projected traffic volume by the roadway capacity. The higher the v/c ratio (a ratio over 1.00 denotes a roadway that is operating above designed capacity), the more congestion can be expected. The smaller the v/c ratio, the more capacity a roadway segment has to accommodate future traffic or, for the purposes of this study, a streetcar system. Segments with lower v/c ratios received higher scores.

Methodology

The specific methodology for calculating the v/c ratio for each of the shortlisted segments is as follows:

i. Using GIS data retrieved from the Metropolitan Transportation Planning Organization (MTPO), the traffic volumes were identified for every segment for both the base year (2007) and the horizon year (2035)

ii. The traffic volumes were then divided by the traffic capacity for each segment and a v/c ratio was calculated for each segment

iii. Where there were multiple v/c ratios along a segment (e.g., where multiple roadway segments make up a streetcar segment), the maximum v/c ratio was used to ensure that the greatest congestion along each segment was identified

iv. In order to estimate the v/c ratio for a potential system opening date, a potential start year of 2022 was established. Although the specific timeline can vary greatly, a community fully committed to constructing a streetcar system could potentially do so within 8-10 years, assuming no major delays in funding or design. For the purposes of establishing a potential system start date, a 9-year time horizon was used. In order to calculate a v/c ratio for 2022, the data were interpolated between the 2007 and 2035 data years assuming a straight line, and the number was calculated.

v. Segments were then ranked/scored based on the v/c ratio projected in 2022 as described in the Scoring Results section below

Scoring Summary

In order to score each of the segments based on v/c ratio, the following steps were taken.

i. The mean for the 2022 v/c ratio was calculated for all of the segments
   a. Mean v/c ratio - 1.02

ii. The standard deviation was calculated for v/c ratio. This was used to define the ranges for applying scores.
   a. Standard Deviation - 0.23

iii. Points were assigned to each of the segments, based on the ranges determined using the standard deviation. For those results above the mean, one point was awarded. For those results that fell within on standard deviation lower than the mean, three points were awarded. For those results that were greater than one standard deviation lower than the mean, five points were awarded. The specific scoring ranges are below, and the scoring by segment is located in Table A-2 below:
   a. 1 Point - > 1.02
   b. 3 Points - .80-1.02
   c. 5 Points - <.79

Table A-2 Max Volume/Capacity Ratio By Segment				
Segment Number	Max V/C Ratio - 2007	Max V/C Ratio - 2035	Max V/C Ratio - 2022	Points
1	1.20	1.39	1.30	1
2	1.22	1.36	1.30	1
3	0.61	0.89	0.76	5
4	1.01	1.38	1.21	1
5	0.90	1.31	1.12	1
6	0.67	0.91	0.80	3
7	0.88	1.14	1.02	3
8	1.28	1.53	1.42	1
9	0.74	1.05	0.91	3
10	0.78	1.00	0.90	3
11	0.86	1.05	0.96	3
12	1.35	1.03	1.18	1
13	1.09	1.02	1.05	1
14	0.83	0.94	0.89	3
15	0.32	0.76	0.56	5
16	0.95	1.04	1.00	3

c. Population and Employment Data

Projected to experience the most significant growth in population and employment (which would likely translate to ridership), population and employment densities from the 2035 LRTP. Both population and employment were analyzed separately, though the same methodology was used for both. The LRTP data reports both population and employment by Traffic Analysis Zone (TAZ), which allowed for easier aggregation and comparison. Segments with higher projected population/employment density received higher scores.

Methodology

The specific methodology for calculating the population/employment density for each of the shortlisted segments is as follows:

i. Using GIS, a 300' buffer was drawn around each of the segments (see explanation of buffer under BLVR methodology).
ii. Using data from the MTPO LRTP, the TAZs located within or intersected by the buffer were then identified and the total population and employment was summarized for each TAZ
iii. For those TAZs not completely included within the buffer, a proportionate share of the population and employment was calculated by multiplying the total percentage of the TAZ within the buffer by the population and employment totals. This calculation assumed a uniform distribution within each TAZ.
iv. Densities of population/employment were then calculated for each of the segments.
v. In order to calculate the population and employment density for the year 2022, the data were interpolated between the 2007 and 2035 data years assuming a straight line, and the number was calculated.
vi. Segments were then ranked/scored based on the population/employment projected in 2022 as described in the scoring summary section below

Scoring Summary

In order to score each of the segments based on population/employment density, the following steps were taken.

i. The mean for the 2022 population/employment density was calculated for all of the segments
    a. Mean population density - 14.94
    b. Mean employment density - 27.31
ii. The standard deviation was calculated for the population and employment density. This was used to define the ranges for applying scores.
    a. Population density standard deviation - 9.54
    b. Employment density standard deviation - 19.77
iii. Points were assigned to each of the segments, based on the ranges determined using the standard deviation. For those results less than the mean, one point was awarded. For those results within one standard deviation greater than the mean, three points were awarded. For those results greater than one standard deviation from the mean, five points were awarded. The specific scoring ranges are listed below and the scoring results are shown in Table A-3 and A-4 below:
    a. Population Density
        i. 1 Point - ≤ 14.94
        ii. 3 Points - 14.95-24.48
        iii. 5 Points - > 24.48

b. Employment Density
   i. 1 Point - ≤ 27.31
   ii. 3 Points - 27.32-47.08
   iii. 5 Points - >47.08

Table A-3 Population Density - Scoring by Segment				
Segment	Population Density 2007 (acre)	Population Density 2035 (acre)	Population Density 2022 (acre)	Points
1	15.33	15.33	15.33	3
2	26.80	26.80	26.80	5
3	25.01	25.40	25.22	5
4	16.65	16.65	16.65	3
5	24.55	24.55	24.55	5
6	25.29	25.65	25.48	5
7	13.56	13.56	13.56	1
8	13.06	18.46	15.95	3
9	17.08	17.08	17.08	3
10	28.78	29.16	28.98	5
11	12.30	14.99	13.74	1
12	3.67	3.69	3.68	1
13	1.72	1.72	1.72	1
14	5.61	5.65	5.63	1
15	2.97	3.02	3.00	1
16	1.66	1.71	1.69	1

Table A-4 Employment Density - Scoring by Segment				
Segment	Employment Density 2007 (acre)	Employment Density 2035 (acre)	Employment Density 2022 (acre)	Points
1	39.80	41.71	40.83	3
2	19.97	21.93	21.02	1
3	9.92	11.21	10.61	1
4	54.47	56.66	55.64	5
5	12.91	15.21	14.14	1
6	15.84	16.75	16.33	1
7	64.37	66.24	65.37	5
8	48.77	53.09	51.08	5
9	52.92	54.79	53.92	5
10	16.12	17.81	17.02	1
11	11.95	13.20	12.62	1
12	28.01	29.81	28.98	3
13	8.17	8.85	8.54	1
14	26.49	28.89	27.77	3
15	7.73	8.72	8.26	1
16	4.51	5.11	4.83	1

d. Physical Roadway Constraints

There were three specific criteria assessed to demonstrate physical constraints that may affect streetcar design/operation.

Existing/Planned Roundabouts

Roundabouts can pose a design challenge for streetcars that would have to be addressed before system construction. For the analysis, both existing roundabouts were considered. Segments that had fewer roundabouts received higher scores.

Existing On-Street Parking

The presence of on-street parking along a streetcar alignment can increase the likelihood of conflicts, particularly when the streetcar is operating in mixed-traffic. This criterion identifies segments where on-street parking currently exists and where some additional design or operational characteristics might need be considered in order to minimize conflicts. Segments with lower numbers of on-street parking spaces were given higher scores.

Existing Right of Way Width

The acquisition of right of way can be a significant cost burden for streetcar systems. The purpose of this analysis was to examine the existing right of way widths along each of the segments to determine whether the available right of way is sufficient to accommodate a streetcar in a dedicated lane.

This section describes the analysis and results performed to assess each of the above criteria.

i. **Existing/Planned Roundabouts**

Roundabouts can pose a design challenge for streetcars, that would have to be addressed before system construction. Because of this fact, this criteria is designed to score segments that do not have existing/planned roundabouts higher than those that do.

Methodology

- The number of existing/planned roundabouts was calculated by segment through fieldwork and coordination with the City of Gainesville Public Works Department

Scoring Summary

The locations of existing roundabouts within the study area are as follows:

- SW 2nd Avenue and SW 12th Street
- SW 2nd Avenue and SW 10th Street
- SW 2nd Avenue and SW 6th Street
- SE 4th Street and SE Depot Avenue

The locations of proposed roundabouts within the study area are as follows:

- SW 6th Street and SW 4th Avenue

- SE 7th Street and SE Depot Avenue
- SW Main Street and SW Depot Avenue
- SW 11th Street and SW Depot Avenue
- SW 6th Street and SW Depot Avenue

The scoring range for existing/future roundabouts is as follows.

- > 1 roundabout = 1 points
- 1 roundabout = 3 points
- 0 roundabouts = 5 points

Table A-5 below summarizes the scoring of each segment.

Table A-5 Roundabouts - Scoring by Segment		
Segment	**Number of Roundabouts**	**Scoring**
1	0	5
2	0	5
3	0	5
4	0	5
5	0	5
6	0	5
7	0	5
8	3	1
9	0	5
10	0	5
11	1	3
12	0	5
13	1	3
14	0	5
15	0	5
16	1	5

ii. **Existing On-Street Parking**

On-street parking along a streetcar alignment increases the likelihood of conflicts, particularly when the streetcar is operating in mixed-traffic. This criteria addresses this issue, by identifying segments where on-street parking currently exists, and scoring those segments lower than the ones that do not currently have any on-street parking.

Methodology

- Through fieldwork and aerial interpretation, each segment was reviewed to determine if/where on-street parking was available
- The total length of on-street parking areas were calculated per segment using a street dataset provided by Gainesville Public Works Department and through aerial interpretation. If on street parking was located along any portion of a block, the number of spaces was counted, and the total length of those spaces was estimated. For this, the standard length of 22' per space was used (from Gainesville Engineering Standards)
- The percentage of total segment length covered by on-street parking was calculated. For this analysis, the total segment length was doubled to account for the fact that parking may be located on one or both sides of the street.
- Scoring was completed by segment as described in the scoring summary below

Scoring Summary

- The mean percentage of segments with on-street parking was calculated
  - Mean percentage - 6.67%
  - Standard Deviation - 13.37%

  Because of the significant variation in data, the standard deviation is greater than the mean. For those segments with results greater than one standard deviation higher than the mean one point was given. For segments with results within one standard deviation greater than the mean, three points were given. For those segments with results less than the mean, five points were given.

- The scoring for each of the segments was completed based on the ranges listed below and a summary of the results can be found in Table A-6:
  - 1Point - > 20.04

- 3 Points - 6.67-20.04
- 5 Points - = <6.67

Table A-6 On Street Parking - Scoring by Segment

Segment	Total Segment Length (feet)	Total Length (2 sides)	Parking Length	% of Segment with Parking	Scoring
1	1161.60	2323.20	0	0.00%	5
2	2059.20	4118.40	0	0.00%	5
3	633.60	1267.20	264	20.83%	1
4	1320.00	2640.00	0	0.00%	5
5	1267.20	2534.40	0	0.00%	5
6	1267.20	2534.40	1188	46.88%	1
7	422.40	844.80	0	0.00%	5
8	6072.00	12144.00	2200	18.12%	3
9	2006.40	4012.80	0	0.00%	5
10	686.40	1372.80	0	0.00%	5
11	3168.00	6336.00	0	0.00%	5
12	686.40	1372.80	0	0.00%	5
13	1372.80	2745.60	0	0.00%	5
14	844.80	1689.60	352	20.83%	1
15	1848.00	3696.00	0	0.00%	5
16	897.60	1795.20	0	0.00%	5

iii. Existing Right of Way Width[1]

The purpose of this analysis was to examine the existing right of way widths along each of the segments to determine if the available right of way is sufficient to accommodate a streetcar.

Specific design and operating characteristics have not been identified in the study. However, in order to determine those segments where there is currently maximum flexibility for constructing a streetcar, an assessment was completed examining the existing right of way widths. These widths were compared to a hypothetical roadway cross section that would accommodate the following elements:

- 2 Travel Lanes (11' per lane) - 22' total
- 2 Bike Lanes (5' per lane) - 10' total
- 2 Sidewalks (6' per sidewalk) - 12' total
- Streetcar Envelope (dedicated lane) (16') - 16'total
- Buffering (5' per side) - 10' total

These elements combined create a hypothetical roadway cross section of 70'. This cross section was then compared to the existing right-of-way width along each of the segments to determine where, depending on the final configuration and operating characteristics of a system, there may be a need to acquire additional right of way.

Methodology

The specific methodology for determining the availability of adequate right of way for each segment is as follows:

- Using GIS roadway data provided by the City of Gainesville Public Works Department, existing right-of-way widths were identified for each segment.
- The hypothetical cross section was then compared to the available right of way to determine if a dedicated streetcar lane could be constructed without requiring the acquisition of additional right of way.
- For segments in the University of Florida Campus, there is no official right of way, since all property is owned by the university. For these segments, measurements were taken off an aerial to ensure that there was the physical width available without impacting buildings.

[1] For the right-of-way assessment described here, it was assumed that the streetcar would run within a dedicated lane. However as the study progressed, the decision was made to include the streetcar within the existing traffic lanes. Capital cost estimates in Chapter 7 are based on a mixed-traffic streetcar system.

- For Depot Avenue, no right-of way width data was estimated using design drawings for programmed improvements.

Scoring Summary

- The mean and the standard deviation were calculated for the % of each segment that was greater than 70' in width.
  - Mean - 49.49%
  - Standard Deviation - 47.87%

  Due to the amount of variation in the data, the standard deviation is very high. The scoring ranges listed below reflect this fact and give maximum points to those segments that are greater than 70' for their entire length. For those segments with results less than the mean, one point was awarded. For those segments with results between the mean and one standard deviation above the mean, three points were awarded. For those segments higher than one standard deviation from the mean, five points were awarded.
- The scoring for each of the segments was completed based on the ranges listed below and a summary of scoring can be found in Table A-7:
  - 1Point - < 49.49
  - 3 Points - .49.49-97.31
  - 5 Points - = > 97.31

Table A-7 Right-Of-Way Assessment and Scoring by Segment						
Segment #	Total Segment Length (feet)	ROW	Streetcar Cross-Section	Total Length with ROW > 70'	% of Segment with ROW > 70	Scoring
1	1161.60	N/A	70	1161.60	100.00%	5
2	2059.20	N/A	70	1453.58	70.59%	3
3	633.60	50	70	0.00	0.00%	1
4	1320.00	N/A	70	1320.00	100.00%	5
5	1267.20	60	70	0.00	0.00%	1
6	1267.20	60	70	0.00	0.00%	1
7	422.40	N/A	70	422.40	100.00%	5
8	6072.00	N/A	70	3916.07	64.49%	3
9	2006.40	N/A	70	0.00	0.00%	1
10	686.40	60	70	0.00	0.00%	1
11	3168.00	80	70	168.08	5.31%	1
12	686.40	90	70	686.40	100.00%	5
13	1372.80	90	70	1372.80	100.00%	5
14	844.80	67	70	0.00	0.00%	1
15	1848.00	75	70	1848.00	100.00%	5
16	897.60	N/A	70	897.60	100.00%	5

e. Utility Constraints[2]

Another item that can greatly affect the cost of implementing a streetcar system is utility relocation. Although a detailed assessment of utility locations is beyond the scope of this Feasibility Study, this analysis identified those segments where known existing utilities might cause potential conflicts with streetcar design, implementation, and/or operation. This was a cursory analysis and consisted largely of examining GIS data provided by Gainesville Regional Utilities (GRU), as well as field observations.

[2] The utility assessment completed as part of the Preliminary Screening was included a review of all 16 potential segments using GIS data. This assessment identified areas of concern or "fatal flaws" based on a cursory review of potential utility conflicts, and were scored accordingly. Those segments where potential "fatal flaws" were identified were not removed from the Preliminary Screening, but were scored accordingly. "Fatal flaws" in the context of this analysis were identified as potential significant challenges that would have to be designed around.

Methodology

The specific methodology for reviewing utilities and identifying potential conflicts is described as follows:

i. Review GIS data provided by GRU documenting utilities located along each segment
ii. Identify any potential "fatal flaws" or "areas of concern" along each segment. It is recommended that these areas are avoided due to the potential expense of mitigation.

The specific utilities assessed in this analysis are as follows:

- Power lines
- Water/wastewater
- Stormwater facilities
- Traffic signals - poles and mast arms
- Gas lines

For each of the segments the types of utilities, areas of concerns, and fatal flaws are identified. These are reported by segment below.

Segment 1 – Museum Road from Center Drive to Newell Drive

- Utilities present: potable water, gravity sewer, stormwater, gas (fuel), gas (helium), underground electric, underground fiber optic, chilled water, steam, reclaimed water (irrigation). These utilities are owned by UF. There is also City of Gainesville (COG) traffic signal communications cable present.
- Immediate Areas of Concern:
    - There is a span wire traffic signal at Center Drive and Museum Road.
- Fatal Flaws: None

Segment 2 – Museum Road / SW 8th Avenue from Newell Drive to SW 12th Street

- Utilities present: potable water (UF & GRU), gravity sewer (UF & GRU), stormwater (UF & COG), gas (UF), COG traffic signal communications cable.
- Immediate Areas of Concern: There is a convergence of the stormwater system on Museum Road at Jennings Creek, including a concrete culvert and several storm pipes and manholes. There is a span wire traffic signal at Museum Road and Newell Drive. There are mast arm signals at Museum Road and SW 13th Street.

- Fatal Flaws: None

Segment 3 – SW 8th Avenue from SW 12th Street to SW 10th Street

- Utilities present: potable water (GRU & UF), gravity sewer (GRU), stormwater (UF & COG), underground electric (GRU), underground CATV (Cox), underground telephone (AT&T).
- Immediate Areas of Concern:
  - SW 8th Avenue's stormwater system includes areas of pervious pavement and buried infiltration chambers just east of SW 10th Street.
- Fatal Flaws: None

Segment 4 – Newell Drive from Museum Road to Stadium Road

- Utilities Present: potable water, gravity sewer, stormwater, underground electric, gas (fuel), gas (helium), underground fiber optic, steam, reclaimed water (irrigation). All utilities owned by UF.
- Immediate Areas of Concern:
  - There is a span wire signal at Newell Drive and Museum Road (as noted in Segment 2 above).
  - Given existing buildings, the geometry at the intersection of Newell Drive and Stadium Road may be too restricted to allow adequate turning space.
- Fatal Flaws: None

Segment 5 – SW 12th Street from SW 8th Avenue to SW 4th Avenue

- Utilities Present: potable water (GRU), gravity sewer (GRU & UF), underground electric (GRU), gas (UF & GRU), stormwater (UF & COG), underground CATV (Cox), and underground telephone (AT&T).
- Immediate Areas of Concern:
  - SW 12th Street right-of-way is approximately 60 feet and contains a large amount of underground utilities (12" water on the right side, 6" water near the centerline, buried electric, gas, telecom).
  - Utility relocations will be costly and complex. SW 12th Street is designated as a bicycle boulevard by the City of Gainesville.
- Fatal Flaw: Yes – Constricted right-of-way with complex underground utilities and bicycle boulevard designation.

Segment 6 – SW 10th Street from SW 8th Avenue to SW 4th Avenue

- Utilities Present: potable water (GRU), gravity sewer (GRU), stormwater (COG), underground electric (GRU), gas (GRU), underground CATV (Cox), underground telephone (AT&T).
- Immediate Areas of Concern:
  - Like SW 12th Street, the right-of-way on SW 10th street is approximately 60 feet and contains a large number of underground utilities. Unlike SW 12th Street, the utilities appear to be (based on available data) concentrated to the east side of the right of way. The underground utility situation is slightly more complex north of SW 5th Avenue. Constricted right-of-way at SW 8th Avenue may interfere with adequate turning radius.
- Fatal Flaws: None

Segment 7 – Newell Drive from Stadium Road to Union Road

- Utilities Present: stormwater (UF), underground electric (UF), gas (UF), steam (UF).
- Immediate Areas of Concern: None (for utilities). This is close to the center of the historic campus and has very high pedestrian traffic.
- Fatal Flaws: None

Segment 8 – Union Road / SW 2nd Avenue from Newell Drive to Main Street

- Utilities Present: potable water (UF & GRU), stormwater (UF & COG), gravity sewer (UF & GRU), chilled water (UF & GRU), steam (UF), underground electric (UF & GRU), fiber optic (GRUcom), gas (UF & GRU), steam (UF), and reclaimed water (irrigation)(UF).
- Immediate Areas of Concern:
  - The right-of-way for SW 2nd Avenue from SW 13th Street to Main Street is approximately 100 feet wide.
  - There are a large number of underground utilities, particularly at the intersection of SW 12th Street and from SW 10th Street to SW 2nd Street. According to the data provided, the utilities appear to be concentrated in the southern half of the right-of-way, with the exception of the gravity sewer.
  - There are mast arm signals at Union Road / SW 2nd Avenue at SW 13th Street and at SW 2nd Avenue and Main Street.
- Fatal Flaw: None

Segment 9 – Stadium Road / SW 4th Avenue from Newell Drive to SW 12th Street

- Utilities Present: potable water (UF & GRU), gravity sewer (UF & GRU), stormwater (UF & COG), chilled water (UF & GRU), underground electric (UF), overhead electric (GRU), gas (UF & GRU), fiber optic (UF), reclaimed water (irrigation)(UF), overhead CATV (Cox), overhead telephone (AT&T).
- Immediate Areas of Concern:
  - The Stadium Road portion of this proposed segment (Newell Drive to SW 13th Street) is narrow (30 feet +/-) and has two underground 14" chilled water lines down the center, with other underground utilities including electric, sewer, and stormwater.
  - The intersection of Newell Drive and Stadium Road may not be large enough to accommodate sufficient turning radius.
  - This is a heavily traveled pedestrian corridor.
- Fatal Flaws: Yes. SW 4th Avenue from SW 13th Street to SW 12th Street appears to be acceptable; however, Stadium Road from Newell Drive to SW 13th Street is not likely to be feasible due to the large diameter chilled water lines and constricted right-of-way.

Segment 10 – SW 4th Avenue from SW 12th Street to SW 10th Street

- Utilities Present: potable water (GRU), gravity sewer (GRU), gas (GRU), stormwater (COG), overhead electric (GRU), overhead telephone (AT&T), overhead CATV (Cox), and overhead fiber optic (GRU).
- Immediate Areas of Concern: None
- Fatal Flaw: None

Segment 11 – SW 4th Avenue from SW 12th Street to Main Street

- Utilities Present: potable water (GRU), gravity sewer (GRU), gas (GRU), stormwater (COG), overhead electric (GRU), overhead telephone (AT&T), overhead CATV (Cox), overhead and underground fiber optic (GRU), and chilled water (GRU).
- Immediate Areas of Concern:
  - There are mast arm signals at SW 4th Avenue and SW 6th Street and at SW 4th Avenue and Main Street.
  - The City of Gainesville is currently installing a 72" stormwater gravity main across SW 4th Avenue as part of the SW 9th Street / Innovation Square project. Cover depth of the pipe could be an area of concern.
- Fatal Flaws: None

Segment 12 – Main Street from SW 4th Avenue to SW 2nd Avenue

- Utilities Present: potable water (GRU), gravity sewer (GRU), gas (GRU), stormwater (COG), underground electric (GRU), underground telephone (AT&T), underground CATV (Cox), and underground fiber optic (GRU).
- Immediate Areas of Concern: None. Main Street was recently reconstructed including improvements to all underground utilities; therefore, utility locations are relatively well known.
- Fatal Flaw: None

Segment 13 – Main Street from Depot Avenue to SW 4th Avenue

- Utilities Present: potable water (GRU), gravity sewer (GRU), gas (GRU), stormwater (COG), underground electric (GRU distribution), overhead electric (GRU transmission), COG traffic communications cable, underground telephone (AT&T), underground CATV (Cox), and underground fiber optic (GRU).
- Immediate Areas of Concern: None. Main Street was recently reconstructed including improvements to all underground utilities; therefore, utility locations are relatively well known.
- Fatal Flaw: None

Segment 14 – SE 2nd Avenue from Main Street to SE 3rd Street

- Utilities Present: potable water (GRU), gravity sewer (GRU), gas (GRU), stormwater (COG), underground electric (GRU), COG traffic communications cable, underground telephone (AT&T), underground CATV (Cox), and underground fiber optic (GRU).
- Immediate Areas of Concern:
    - There is a pedestrian bridge over SE 2nd Avenue from Union Street Station on the south side of SE 2nd Avenue to the Southeast Parking Garage on the north side. Clearance below the pedestrian bridge appears to be over 14 feet, but could be an issue for catenary cables.
- Fatal Flaw: None

Segment 15 – SE 3rd Street from SE Depot Avenue to SE 2nd Avenue

- Utilities Present: potable water (GRU), gravity sewer (GRU), gas (GRU & Florida Gas Transmission), stormwater (COG), underground electric (GRU), COG traffic communications cable, underground telephone (AT&T), underground CATV (Cox), and underground fiber optic (GRU).

- Immediate Areas of Concern:
    - Underground electrical utilities are heavily concentrated in the area south of SE 5th Avenue near the Kelly Generating Station. According to the information provided by GRU, the electrical utilities are concentrated on the right (west) side of the right-of-way (near the Rosa Parks bus terminal).
    - There is a large diameter gas transmission line in the vicinity of the Kelly Generating Station owned by Florida Gas Transmission (FGT).
- Fatal Flaw: SE 3rd Street from SE 5th Avenue to Depot Avenue may prove infeasible due to the high concentration of underground utilities, depending on actual physical location. The actual location of the FGT gas transmission pipeline could also pose a fatal flaw.

Segment 16 – SE Depot Avenue from Main Street to SE 3rd Street

- Utilities Present: potable water (GRU), gravity sewer (GRU), gas (GRU & Florida Gas Transmission), stormwater (COG), underground electric (GRU), COG traffic communications cable, underground telephone (AT&T), underground CATV (Cox), and underground fiber optic (GRU).
- Immediate Areas of Concern:
    - Underground electrical utilities are heavily concentrated on the south side of Depot Avenue near the Kelly Generating Station and toward Main Street. According to the information provided by GRU, the electrical utilities are concentrated on the right (south) side of the right-of-way (near Depot Park and the Depot building).
    - There is a large-diameter gas transmission line in the vicinity of the Kelly Generating Station owned by FGT.
- Fatal Flaw: Depot Avenue may prove infeasible due to the high concentration of underground utilities, depending on actual physical location. The actual location of the FGT gas transmission pipeline could also pose a fatal flaw.

Scoring Summary

The scoring for utility constraints was largely based on the presence of a potential "fatal flaw" or "immediate area of concern" along a given segment. For those segments that had a fatal flaw identified, a score of one was awarded. For those segments that had an immediate area of concern identified, a score of three was awarded. For those segments that had neither identified a score of five was given. Summary table A-8 below summarizes the scoring for each of the segments.

Table A-8 Utility Impacts Scoring by Segment			
Segment	Fatal Flaw Identified?	Areas of Immediate Concern	Scoring
1	No	Yes	3
2	No	Yes	3
3	No	Yes	3
4	No	Yes	3
5	Yes	Yes	1
6	No	Yes	3
7	No	No	5
8	No	Yes	3
9	Yes	Yes	1
10	No	No	5
11	No	Yes	3
12	No	No	5
13	No	No	5
14	No	No	5
15	Yes	Yes	1
16	Yes	Yes	1

f. Scoring Summary Table

Table A-9 on the following page summarizes the scoring for each of the 16 segments from the Preliminary Screening Analysis. Scores were totaled for each of the segments for all of the criteria documented in this memorandum. The totals were then used to assist in identifying the most appropriate segments to include in the preferred alternative. The summary scoring table is below. The highlighted segments are those used in the preferred alignment described in the next section.

Table A-9 Overall Summary Scoring Table									
Segment	**Criteria 1 BLVR**	**Criteria 2 v/c ratio**	**Criteria 3 Population Density**	**Criteria 4 Employment Density**	**Criteria 5 Roundabouts**	**Criteria 6 On-Street Parking**	**Criteria 7 ROW Width**	**Criteria 8 Utility Constraints**	**Total Scores by Segment**
1	1	1	3	3	5	5	5	3	26
2	5	1	5	1	5	5	3	3	28
3	1	5	5	1	5	1	1	3	22
4	1	1	3	5	5	5	5	3	28
5	3	1	5	1	5	5	1	1	22
6	3	3	5	1	5	1	1	3	22
7	1	3	1	5	5	5	5	5	30
8	1	1	3	5	1	3	3	3	20
9	3	3	3	5	5	5	1	1	26
10	5	3	5	1	5	5	1	5	30
11	3	3	1	1	3	5	1	3	20
12	1	1	1	3	5	5	5	5	26
13	1	1	1	1	3	5	5	5	22
14	1	3	1	3	5	1	1	5	20
15	1	5	1	1	5	5	5	1	24
16	5	3	1	1	3	5	5	1	24

g. Recommended Conceptual Preferred Alignment

The recommended preferred alignment is shown in Figure A-3. The segment lengths are listed below:

- Segment 1(Main Alignment) - Rosa Parks to UF Campus - 1.73 miles
- Segment 2 (Potential Link to RTS) - Rosa Parks to RTS Facility - .21 miles
- Total Alignment Length - 1.94 miles

Figure A-1 Initial Alignment Map

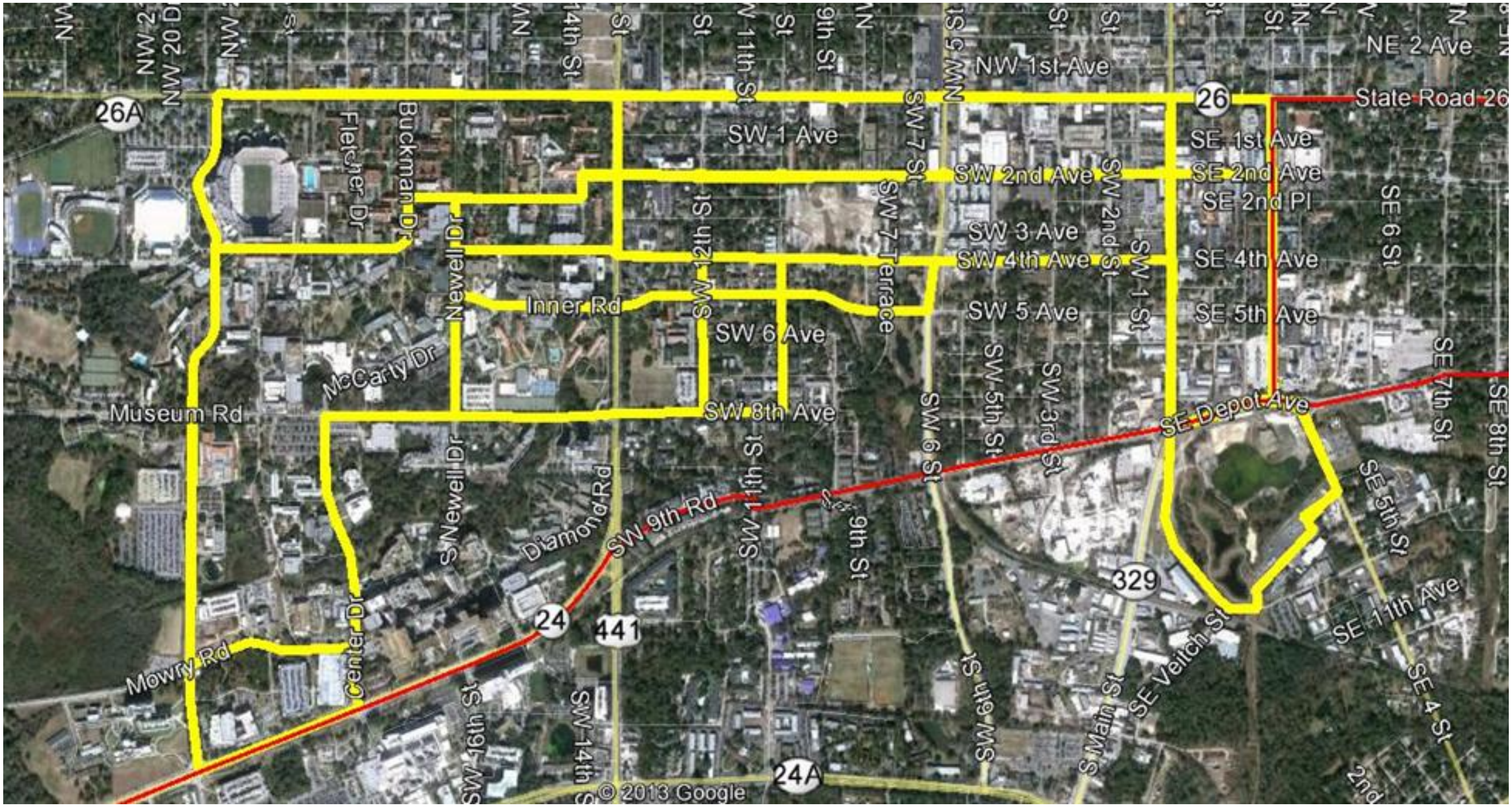


Figure A-2 Refined Segments for Screening Analysis

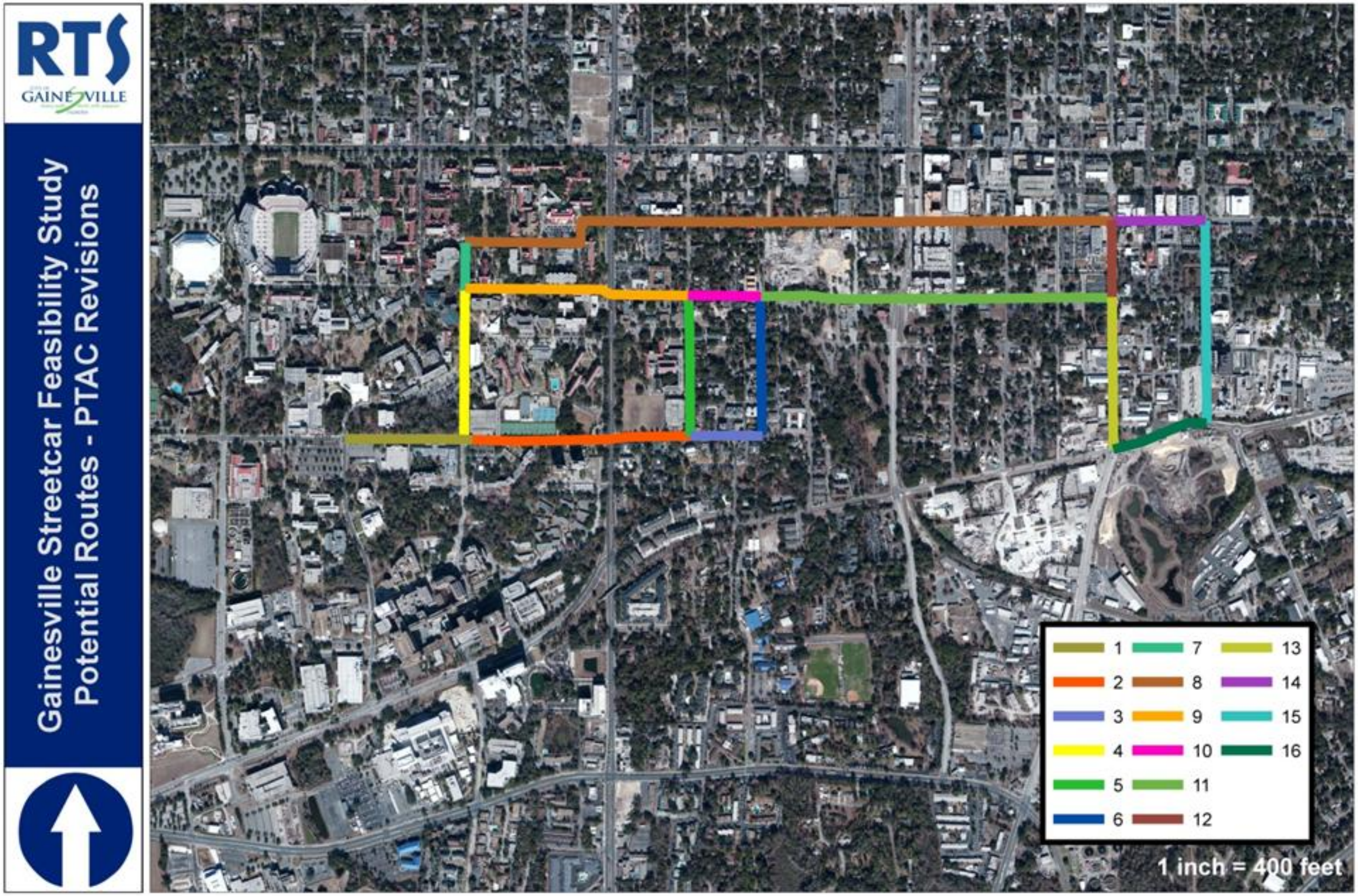
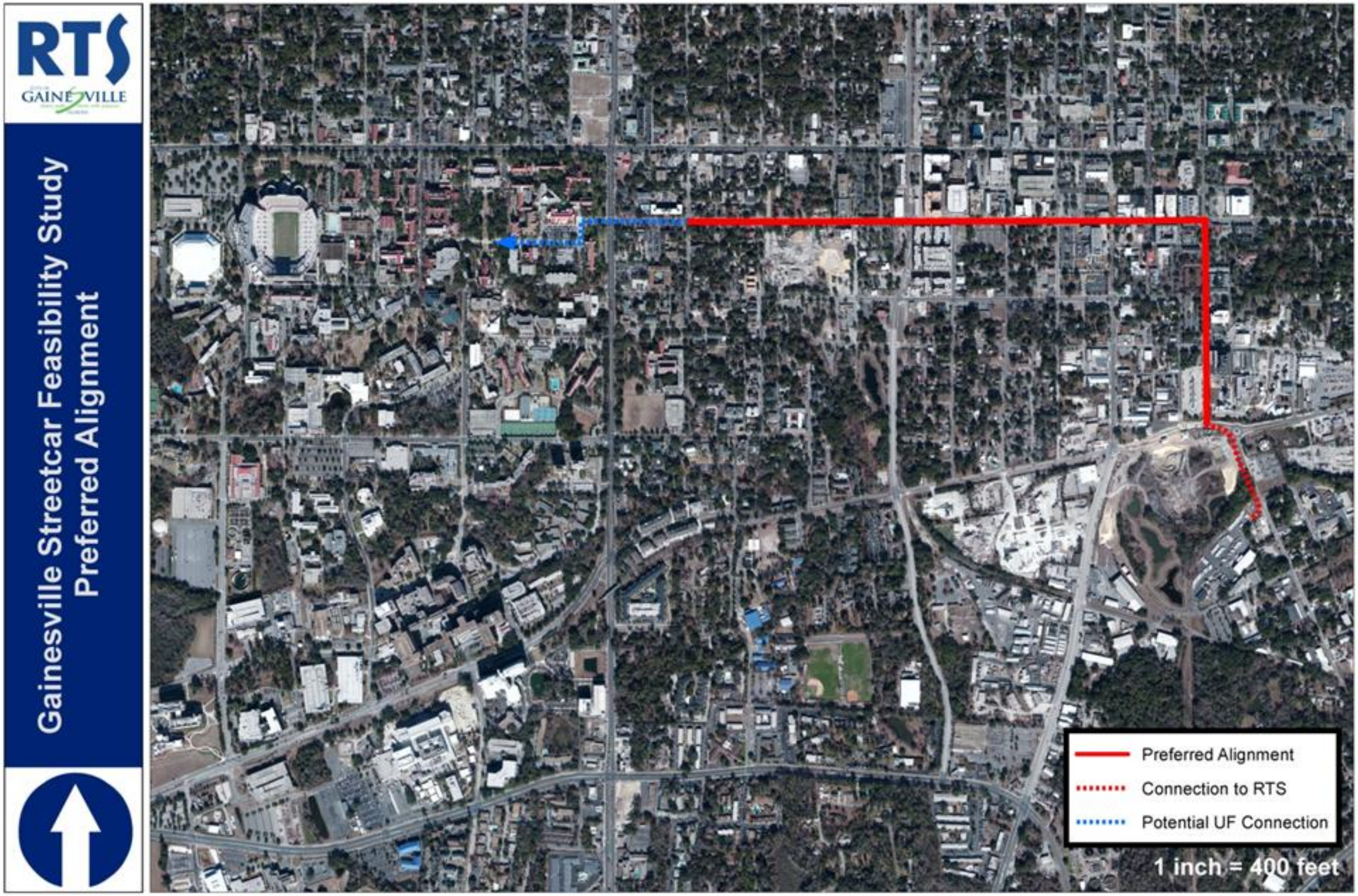


Figure A-3 Conceptual Preferred Alignment



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Appendix B - Summary of Existing Utilities

1. Introduction

Chen Moore and Associates (CMA) conducted an analysis of utility impacts by gathering available data from local utilities and other sources, including Gainesville Regional Utilities (GRU) for water, wastewater, gas, electric, and fiber-optic (GRUcom); Gainesville Public Works Department and Florida Department of Transportation (FDOT) for stormwater and traffic control communications; AT&T and Cox Communications; University of Florida; and Florida Gas Transmission. Locations of underground and overhead utilities were first identified by using the Sunshine One-Call system as a preliminary step, and through Geographic Information Systems (GIS) data provided by GRU. CMA also conducted limited fieldwork to verify some of the issues identified in the data provided and met with utility staff.

2. Utilities Analysis

University of Florida Campus

Potable water – There is an existing 8-inch water main on west side of Newell drive and a 6-inch water main on east side. Both mains appear to be out of the roadway. There are three lateral crossings in this section of the corridor. Construction of the Streetcar would require relocation of a fire hydrant and 6-inch valves at the proposed station near McCarty Hall, relocation of an 8-inch valve at the intersection of Inner Drive, and require a reconfiguration and/or relocation of the 8-inch and 3-inch valves and fittings in the intersection of Newell Drive and Stadium Road. Depending on the actual geometry of the track, the fire hydrant at the intersection of Newell Drive and Union Road may also need to be relocated. There are three lateral crossings along this corridor that were not considered to be impacted by the streetcar, but the actual elevation should be verified during the design phase to confirm. There is a capped 6-inch water main that appears to extend into Union Road near Peabody Hall that should be relocated or abandoned.

Sanitary Sewer – There are existing 8-inch and 10-inch gravity sewer mains along the west side of Newell Drive. Construction of the streetcar along the conceptual route would require relocation of two sanitary manholes, approximately 300 feet of 8-inch gravity main and approximately 50 feet of 10-inch gravity main between Stadium Road and the conceptually proposed station at McCarty Drive. There are two lateral crossings (6-inch and 8-inch) near Peabody Hall on Union Road. These crossings do not appear to be impacted by the streetcar alignment; however the elevation of the lines should be verified during the design phase to confirm. The conceptual alignment of the streetcar does not require realignment of any transmission force mains, and impacts to the sanitary sewer system appear to affect only three buildings.

Stormwater Collection – There are existing stormwater collection structures (both ditch-bottom type and curb type) and manholes along Newell Drive. Construction of the streetcar could require relocation of up to five stormwater structures and associated piping.

Depending on the final geometry, relocation may be required for the two curb inlets near McCarty Hall (one on the east side, one on the west), and the associated 18-inch and 24-inch piping. Construction may also require relocation of the manhole and DBI inlet at the intersection of Newell Drive and Stadium Road with approximately 30 feet of piping, and the relocation of the two DBI inlets at the intersection of Newell Drive and Union Road. One existing manhole and associated 18" pipe on Union Road at Peabody Hall will require relocation. Two stormwater inlets in the parking lot of Criser Hall may also require relocation or reconfiguration of their piping, depending on the final geometry of the streetcar system. The conceptual alignment of the streetcar does not require realignment of any trunk lines or stormwater force mains.

Traffic Control Signals - Along the conceptual preferred alignment there is only one location on UF campus that is close to affecting the streetcar due to a traffic control signal. Immediately south of McCarty Drive there is a span wire traffic signal at Newell Drive and Museum Drive. While this does not directly impact the preferred conceptual alignment it would potentially affect any expansion to the south along Newell Drive. All other traffic signals (mast arms, wire spans, etc.) are outside of the UF campus and are maintained by the City of Gainesville.

Electric – There is existing buried electrical conduit along the west side of Newell Drive. The conceptual alignment of the streetcar would impact only the portion south of Inner Drive, and would require relocation of two manholes and approximately 400 feet of double 3-inch conduit and conductors (3-#6, 3-4/0). There are two electrical manholes and approximately 600 feet of electrical conduit (four, 6-inch diameter) along Union Road from Peabody Hall to the 90° turn at Tigert Hall.

Irrigation / Reclaimed Water – There are no irrigation or reclaimed water facilities within the roadway sections analyzed.

Chilled Water – There is one lateral crossing of twin (one supply, one return) 14-inch chilled water lines at the intersection of Newell Drive and Stadium Road. The depth of the cover over these lines should be verified during the design phase, but they do not appear to be impacted by the streetcar alignment. Approximately 300 feet of existing 6-inch chilled water line will require relocation from Walker Hall to Tigert Hall on the south side of Union Road.

Steam – There is an existing 3-inch steam line on the east side of Newell drive. The section of this line near the Music Building (approximately Inner Drive to Stadium Road) appears to be directly under the curb for approximately 300 feet. This line may need to be relocated depending on the final geometry of the alignment and the verified location of the line. There is also an existing manhole and 10-inch steam line (with 4-inch condensate return) west of Newell drive in the area near the Food Science Building which may require relocation to accommodate the conceptual proposed station at McCarty Drive. There are two lateral crossings along the conceptual alignment on Union Road that do not appear to be impacted by the streetcar alignment, but should be verified during the design phase to confirm.

Data – There is an existing 12-strand fiber optic cable along the east side of Newell Drive that appears to be directly under the curb. This line may require relocation for approximately 800 feet, depending on the verified location and the location of the 4-inch steam line and 2-inch gas line mentioned elsewhere in this section. There were no impacts to the fiber optic system along Union Road.

Telephone – There is approximately 200 feet of 300-pair telephone line in the grassed area near the Food Science Building that may need to accommodate the conceptual proposed station at McCarty Drive. There is a concentrated convergence of telephone conduit at the intersection of Newell Drive and Union Road. CMA considered this to be a lateral crossing that is not impacted by the conceptual streetcar alignment; however the horizontal and vertical location of the conduit should be verified during the design phase.

Gas – There is an existing 2-inch gas line along the east side of Newell Drive from Museum Road to Union Road. Approximately 800 feet of this line would be impacted by the conceptual streetcar alignment and should be relocated. There is approximately 300 feet of existing 3-inch gas line, from west of Peabody Hall to east of Criser hall that appears to be directly under the curb on the north side of Union Road. This line may need to be relocated depending on the final geometry of the alignment and the verified location of the line.

City of Gainesville

Stormwater – The City of Gainesville Public Works Department maintains an extensive stormwater collection system throughout the study corridor. The system consists of concrete and brick stormwater structures that include curb-type and ditch-bottom type inlets, and the associated piping constructed of corrugated metal (CMP), reinforced concrete (RCP), or polyethylene ranging in size from 12 inches to 72 inches in diameter. Construction of the streetcar along the conceptual alignment would impact the stormwater collection system. The extent of the impact will depend on the final geometry of the system and is difficult to quantify within the scope of this study. The impacts will depend upon the construction of the stormwater structures (older brick structures close to the track bed will require replacement, reinforced concrete structures that are not required to be relocated will most likely stay in place); the material used for piping (CMP will likely be replaced while RCP may be able to stay in place, depending on condition); and the depth of cover over the pipe (shallow crossings will most likely require replacement or relocation while pipes deeper than 36 inches below the track bed will probably be left in place).

Generally, the stormwater system along SW 2nd Avenue from SW 13th Street to South Main Street is of newer construction and will be less impacted by the conceptual streetcar alignment. The portion of the alignment on SE 2nd Avenue from South Main Street to SE 3rd

Street, and on SE 3rd Street from SE 2nd Avenue to SE Depot Avenue is older and will be impacted to a larger extent by the conceptual streetcar alignment.

Traffic Control – The existing traffic signals on S 2nd Avenue at SW 13th Street, S. Main Street, and SE 3rd Street, as well as the traffic signal at SE 3rd Street and SE 4th Avenue are connected to the City of Gainesville traffic management system. Those intersections controlled by pavement-embedded inductive loops would be impacted; however the signal control cabinets are not likely to be affected.

SW 2nd Avenue from SW 13th Street to SE 3rd Street

Potable Water – The existing potable water system in this corridor includes an 8-inch cast iron water main on the south side of SW 2nd Avenue from SW 13th Street to SW 6th Street, and transitions to a 12-inch cast iron water main from SW 6th Street to SE 3rd Street. The available data shows the water main along the south side of the right of way, near the curb, which was confirmed by limited field investigation. The conceptual streetcar alignment may require relocation of this water main.

Sanitary Sewer – The existing wastewater collection system in this corridor includes 6-inch and 8-inch vitreous clay pipe (VCP) gravity main and 34 manholes. The system is generally located along the centerline of the corridor. The conceptual streetcar alignment does not appear to require the wholesale relocation of the gravity sewer, but may require relocation or adjustment of manholes and gravity main in some locations, including from SW 13th Street to SW 11th Street, and from SW 10th Street to SW 7th Terrace. The conceptual streetcar alignment does not impact any sanitary sewer force mains.

Reclaimed Water – Existing reclaimed water service is limited to the portion of SW 2nd Avenue between SW 8th Street and SW 7th Terrace. CMA does not anticipate any impact to the reclaimed water system.

Telephone – There is an existing AT&T duct bank located along the north side of SW 2nd Avenue for the length of the corridor. CMA conducted a site visit during the construction of SW 9th Street at SW 2nd Avenue. Utility staff was not available to conduct a site visit. At that location, it was determined that the duct bank consisted of three terracotta ducts located under the sidewalk on the north side of 2nd Avenue, and an asbestos-cement (Transite) duct located in the roadway, approximately 3 feet from the curb on the north side. The portion of the duct bank located under the sidewalk would not be impacted by the conceptual streetcar alignment; however the Transite portion would require relocation. CMA was not able to determine the type of conductor in the duct banks from the information provided by the utility.

Electrical – There is an existing underground electric duct bank located along the south side of the right of way for the length of the corridor. These facilities appear to be limited to under the sidewalk or at the back of sidewalk and do not appear to be impacted by the conceptual streetcar alignment. Lateral transmission and service crossings should be confirmed during the design phase.

Gas[1] – There is an existing 2-inch gas line on SW 2nd Avenue from SW 8th Street to South Main Street constructed of polyethylene and coated steel along the south side of the roadway. At South Main Street the 2-inch line crosses to the north side of the roadway and continues to SE 1st Street, where it transitions to 3-inch and continues east past SE 3rd Street. The conceptual streetcar alignment would require relocation of this line.

Data – The existing GRUcom fiber optic lines are located along SW 2nd Avenue from SW 13th Street to SE 3rd Street along the south side of the right of way. The line appears to be under the sidewalk and is not impacted by the conceptual streetcar alignment.

SE 3rd Street from SE 2nd Avenue to Depot Avenue

Potable Water – There is an existing 16-inch ductile iron pipe water located generally along the centerline of the roadway. This water main does not appear to be impacted by the conceptual streetcar alignment.

Sanitary Sewer – The existing wastewater collection system consists of 6-inch and 8-inch VCP gravity main and seven manholes along the east side of SE 3rd Street. The conceptual streetcar alignment would require relocation of this system, including all of the manholes and approximately 2,000 feet of gravity main piping.

Reclaimed Water – There are no existing reclaimed water facilities in the SE 3rd Street corridor.

Gas – There is a 6-inch coated steel gas main that crosses SE 3rd Street at SE 4th Avenue. CMA considered this to be a lateral crossing that is not impacted by the conceptual streetcar alignment; however the horizontal and vertical location of the conduit should be verified during the design phase.

Telephone – The existing AT&T duct bank is located under the east sidewalk along SE 3rd Street. It does not appear to be impacted by the conceptual streetcar alignment.

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[1] This line was identified in Chapter 2 as a "fatal flaw" for purposes of the Preliminary Screen. However, with the more detailed assessment completed for the preferred conceptual alignment, it was determined that it would not likely be a major impediment to the streetcar. However, final confirmation of the specific pipe location will need to be made before making any design decisions.

Electrical – There is an existing electrical manhole at the intersection of SE 2nd Avenue and SE 3rd Street that may be impacted by the conceptual streetcar alignment. Lateral crossings at SE 2nd Place and SE 4th Avenue do not appear to be impacted, but elevations should be confirmed during the design phase. There is an existing manhole at the intersection of SE 5th Avenue and SE 3rd Street connecting a large duct bank from the generating station which continues south on the west side of SE 3rd Street, past the Rosa Parks Bus Terminal to Depot Avenue. The conceptual streetcar alignment represents as significant impact to the underground electrical system in this area. While relocation of the underground electric in this area is likely to be cost prohibitive, its proximity to the bus terminal will likely allow those impacts to be substantially mitigated during the design phase.

Data – There are three lateral crossings of GRUcom fiber optic cable along the corridor. These lateral crossings are not impacted by the conceptual streetcar alignment; however the horizontal and vertical location of the conduit should be verified during the design phase. There is also existing GRUcom fiber optic cable along the west side of SE 3rd Street from SE 5th Avenue to SE Depot Avenue at the back of sidewalk. This could be impacted by the conceptual station located at the Rosa Parks Bus Terminal and may require relocation.

3. Innovation District Infrastructure Improvement Area

As noted elsewhere in this study, the feasibility of the streetcar system will be impacted greatly by the development of the Innovation District. The development of this area will require substantial improvements to the water and wastewater utility infrastructure. In recognition of this fact, the City of Gainesville is considering an ordinance to create Infrastructure Improvement Areas (IIAs). The proposed ordinance would create three distinct service areas - one for water improvements, one for wastewater improvements, and one for reclaimed water improvements. (See Figures B-1 - B-4)

Through the creation of these IIAs, the City would make the necessary infrastructure improvements ahead of any development and recoup their cost from developers through an infrastructure improvement connection charge as the development occurs. This approach is intended to give developers the confidence to invest in the area knowing the necessary utility infrastructure will be in place, and it allows the City to move forward with a master-planned approach, rather than considering each development on its own. It also presents the City with a unique opportunity with respect to the possibility of a streetcar system in the future.

As noted above, construction of the streetcar along the conceptual alignment could have significant impacts on the City's utilities. Through the planning and implementation of the proposed IIAs, the City should consider the reservation of certain portions of the right of way in these areas for a future streetcar. This consideration now could prove to minimize the impacts to utilities during their design life - which could be up to 50 years or more - with little additional investment now, resulting in a significant cost savings in the future.

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Appendix C - Economic Development Model Assumptions Table

APPENDIX 4-A: VALUES/ASSUMPTIONS FOR BASE AND STREETCAR MODELS

Common Assumptions / Base Data For All Models

(FDOR 2013 Certified Tax Roll)

Focus Area Base Data

Property Category	Parcel Count	DU Count	Land Area (acres)	Taxable Val	Building Area (sf)	Avg Tax Value / Unit	Avg Tax Value / SF	Avg DU (sf)	Homestead Parcels Count	Homestead Parcels Hx Val	Homestead Parcels Avg Hx Val
Single Family	188	209	33.38	$17,103,820	309,298	$81,836	$55.30	1,480	39	1,106,120	28,362
Multi-Family (incl CAM)	376	3,026	144.14	$126,918,760	2,475,803	$41,943	$51.26	818	60	5,848,970	97,483
Mobile Home											
Residential - Vacant	24	0	5.89	$1,709,600	0						
Commercial	276	25	179.54	$121,560,165	2,305,084		$52.74				
Innovation Sq Prof				$12,244,600	129,368		$94.65				
Commercial - Office				$29,905,610	606,418		$49.32				
Commercial - Retail/Other				$79,409,955	1,569,298		$50.60				
Hotel - General (Hampton Inn)				$4,425,960	72,618	$38,500	$60.95				
Hotel - Conference Center*						$100,578	$137.00				
Commercial - Vacant	70	0	30.79	$16,000,000	0						
Institutional / Govt	67	144	537.58	$5,480,080	8,297,630		$0.66				
Institutional / Govt - Vacant	47	0	30.91	$2,293,300	0						
Industrial	33	4	34.05	$4,864,900	205,328		$23.69				
Industrial - Vacant	25	0	6.83	$221,600	0						
Other	4	0	23.35	$992,800	332,724		$2.98				
Other - Vacant	3	0	7.34	$0	0						
Total	1,113	3,408	1,034	297,145,025	13,925,867			2,298	99		

* Currently no hotel properties in Gainesville exist for comparison - the taxable value of the Hilton Hotel in downtown Tampa (520 rooms +30,00sf meeting space) was used to establish value.

Net Present Value (NPV) discount rate per Office of Management and Budget (OMB), Circular A-94: 7.0%

2035 LRTP Update - population growth estimate per year, by category: Non-UF Pop 300.00 Non-UF Emp 741.00 UF Students 161.00 UF Emp 357.00

Residential - Avg Area (sf): Student 1,000 Non-Student 1,200 Avg Household City: 2.18 Student: 1.75 Non-Student: 1.90

Millage Rates
County (Gen Fund): 8.5956 Capture: 100%
City: 4.4946 Capture: 100%
SSD: 15.0% of city = 0.6742

Real Estate Growth / Decline Cycle: 17 years of growth, 2 years of decline starting in the 18th year, 1 year of re-stabilizing value (market bottomed out and stagnant before new growth cycle).

Revenue Distribution:All Innovation Square taxable value accrues to CP / UH CRA. All other taxable value is distributed to Non-CRA / CRA:
Non-CRA: 5.0%
CRA: 95.0%
Non-Innovation Square CRA taxable value is allocated based on the length of track in each CRA:
College Park / University Heights CRA: 37.0%
Downtown CRA: 63.0%

Innovation Square - Development Pro Forma By Phase (no timeframe specified)

By Phase	Ph 1	Ph 2	Ph 3	Ph 4	Ph 5	Ph 6	Ph 7	Ph 8	Ph 9	Ph 10	TBD	Total
Research Labs	46,000	110,000	285,000	269,000	256,000	156,000	245,000	158,000	199,000	157,000	252,000	2,133,000
Commercial - Office Spac	0	0	140,000	212,000	0	80,000	116,000	148,000	0	0	0	696,000
Hospitality - Conf Ctr (rms	0	260,000	0	0	0	0	0	0	0	0	0	260,000
Comm'l / Retail	0	35,000	25,700	38,500	41,400	33,300	38,700	0	0	10,000	26,000	248,600
Institutional	0	0	0	0	0	0	0	0	45,000	0	295,000	340,000
Residential - Student												0
Residential - Non-Student	0	0	0	0	48,500	182,000	0	153,000	37,500	200,000	0	621,000
Tot Development	46,000	405,000	450,700	519,500	345,900	451,300	399,700	459,000	281,500	367,000	573,000	4,298,600
Population Growth	92	1,356	1,049	1,261	800	984	973	941	575	696	1,371	10,098

Innovation Square Development: Phase 1 and Phase 1 Prof/Lab space complete - in 2013 base. Remaining phases developed in sequence, components in each phase averaged over the phase development time.

APPENDIX 4-A: VALUES/ASSUMPTIONS FOR BASE AND STREETCAR MODELS

Base Model

Value Escalation (appreciation from 2013)	
Non-Student Residential Res	
Starting Escalation	1.2%
Escalation Growth	0.2%
Tot Declined Val	-25.0%
Yr 1 % of Decline	40.0%
Yr 2 % of Decline	60.0%
Commercial	
Starting Escalation	1.6%
Escalation Growth	0.4%
Tot Declined Val	-22.0%
Yr 1 % of Decline	40.0%
Yr 2 % of Decline	60.0%

Innovation Square Development			
Development time / Ph (yrs):		3.0	
Lapse between phases (yrs):		1.0	
Property Improvement Values (existing 2013)			
M-F Res	Imp / yr:	0.15%	in growth years
	Imp Val:	5.00%	
Commercial	Imp / yr:	0.15%	in growth years
	Imp Val:	5.00%	
Value Premium From 2013			
Residential	0.0%		
Comm'l/Other	0.0%		

New Non-Innovation Square Development			
Dev Type		% Exist 2013	Amount / Yr
Commercial - Office		0.20%	1,213
Commercial - Retail/Other		0.05%	785
Hotel - General			(1 hotel every 15 yrs)
Residential	Pop Capture	New Pop	DU/Yr
IS Pop	3.50%	(see IS pro forma)	
Non-UF Pop*	0.0%	300	0
Non-UF Emp*	0.0%	741	0
UF Emp*	0.0%	357	0
UF Students*	2.5%	161	2
* 2035 LRTP Population Growth Est			
Additional LRTP growth due to streetcar:		0.0%	

Transit Model - Low

Value Escalation (appreciation from 2013)	
Non-Student Residential Res	
Starting Escalation	1.4%
Escalation Growth	0.3%
Tot Declined Val	-20.0%
Yr 1 % of Decline	40.0%
Yr 2 % of Decline	60.0%
Commercial	
Starting Escalation	2.0%
Escalation Growth	0.6%
Tot Declined Val	-18.0%
Yr 1 % of Decline	40.0%
Yr 2 % of Decline	60.0%

Innovation Square Development			
Development time / Ph (yrs):		3.0	
Lapse between phases (yrs):		0.0	
Property Improvement Values (existing 2013)			
M-F Res	Imp / yr:	0.25%	in growth years
	Imp Val:	12.50%	
Commercial	Imp / yr:	0.25%	in growth years
	Imp Val:	12.50%	
Value Premium From 2013			
Residential	5.0%		
Comm'l/Other	5.0%		

New Non-Innovation Square Development			
Dev Type		% Exist 2013	Amount / Yr
Commercial - Office		0.40%	2,426
Commercial - Retail/Other		0.15%	2,354
Hotel - General			(1 hotel every 9 yrs)
Residential	Pop Capture	New Pop	DU/Yr
IS Pop	7.50%	(see IS pro forma)	
Non-UF Pop*	1.0%	315	2
Non-UF Emp*	1.5%	778	6
UF Emp*	2.5%	375	5
UF Students*	4.0%	169	4
* 2035 LRTP Population Growth Est			
Additional LRTP growth due to streetcar:		5.0%	

Transit Model - Moderate

Value Escalation (appreciation from 2013)	
Non-Student Residential Res	
Starting Escalation	1.6%
Escalation Growth	0.5%
Tot Declined Val	-16.0%
Yr 1 % of Decline	40.0%
Yr 2 % of Decline	60.0%
Commercial	
Starting Escalation	2.5%
Escalation Growth	0.8%
Tot Declined Val	-15.0%
Yr 1 % of Decline	40.0%
Yr 2 % of Decline	60.0%

Innovation Square Development			
Development time / Ph (yrs):		2.0	
Lapse between phases (yrs):		1.0	
Property Improvement Values (existing 2013)			
M-F Res	Imp / yr:	0.30%	in growth years
	Imp Val:	12.50%	
Commercial	Imp / yr:	0.30%	in growth years
	Imp Val:	14.00%	
Value Premium From 2013			
Residential	8.0%		
Comm'l/Other	8.0%		

New Non-Innovation Square Development			
Dev Type		% Exist 2013	Amount / Yr
Commercial - Office		0.75%	4,548
Commercial - Retail/Other		0.30%	4,708
Hotel - General			(1 hotel every 8 yrs)
Residential	Pop Capture	New Pop	DU/Yr
IS Pop	12.50%	(see IS pro forma)	
Non-UF Pop*	2.0%	323	3
Non-UF Emp*	2.5%	797	10
UF Emp*	3.5%	384	7
UF Students*	5.0%	173	5
* 2035 LRTP Population Growth Est			
Additional LRTP growth due to streetcar:		7.5%	

Transit Model - High

Value Escalation (appreciation from 2013)	
Non-Student Residential Res	
Starting Escalation	1.8%
Escalation Growth	0.6%
Tot Declined Val	-13.0%
Yr 1 % of Decline	40.0%
Yr 2 % of Decline	60.0%
Commercial	
Starting Escalation	3.0%
Escalation Growth	1.0%
Tot Declined Val	-12.0%
Yr 1 % of Decline	40.0%
Yr 2 % of Decline	60.0%

Innovation Square Development			
Development time / Ph (yrs):		2.0	
Lapse between phases (yrs):		0.0	
Property Improvement Values (existing 2013)			
M-F Res	Imp / yr:	0.35%	in growth years
	Imp Val:	15.00%	
Commercial	Imp / yr:	0.38%	in growth years
	Imp Val:	16.50%	
Value Premium From 2013			
Residential	10.0%		
Comm'l/Other	10.0%		

New Non-Innovation Square Development			
Dev Type		% Exist 2013	Amount / Yr
Commercial - Office		1.50%	9,096
Commercial - Retail/Other		0.60%	9,416
Hotel - General			(1 hotel every 7 yrs)
Residential	Pop Capture	New Pop	DU/Yr
IS Pop	16.00%	(see IS pro forma)	
Non-UF Pop*	3.5%	330	6
Non-UF Emp*	4.5%	815	19
UF Emp*	5.5%	393	11
UF Students*	8.5%	177	9
* 2035 LRTP Population Growth Est			
Additional LRTP growth due to streetcar:		10.0%	

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Appendix D - Capital Cost Summary Tables

Gainesville Streetcar Feasibility Study

Full Catenary Modern Streetcar Vehicle

Capital Cost Estimate

(2013 Dollars in Millions)

FTA SCC	Description	Base Alternative
	Length (Mile):	2.00
	Number of Stations:	7
	Number of Revenue Vehicles:	4
10	**GUIDEWAY & TRACK ELEMENTS**	$19.81
20	**STATIONS, STOPS, TERMINALS, INTERMODAL**	$2.40
30	**SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS**	$6.27
40	**SITEWORK & SPECIAL CONDITIONS**	$10.19
50	**SYSTEMS**	$10.75
	Construction Subtotal (Sum Categories 10 - 50)	**$49.42**
60	**ROW, LAND, EXISTING IMPROVEMENTS**	$0.00
70	**VEHICLES**	$14.08
80	**PROFESSIONAL SERVICES**	$15.81
90	**UNALLOCATED CONTINGENCY**	$7.93
	Total Project Cost	**$87.24**
	Unit Cost (million per mile)	$43.62

Length (Mile):	2.00
Number of Stations:	7
Number of Revenue Vehicles:	4

10 GUIDEWAY & TRACK ELEMENTS

10.01	Guideway: At-grade exclusive right-of-way	$0.00
10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)	$0.00
10.03	Guideway: At-grade in mixed traffic	$4.86
10.04	Guideway: Aerial structure	$0.00
10.05	Guideway: Built-up fill	$0.00
10.06	Guideway: Underground cut & cover	$0.00
10.07	Guideway: Underground tunnel	$0.00
10.08	Guideway: Retained cut or fill	$0.00
10.09	Track: Direct fixation	$0.00
10.10	Track: Embedded	$14.07
10.11	Track: Ballasted	$0.00
10.12	Track: Special (switches, turnouts)	$0.88
10.13	Track: Vibration and noise dampening[1]	$0.00
	Subtotal Category 10	**$19.81**

20 STATIONS, STOPS, TERMINALS, INTERMODAL

20.01	At-grade station, stop, shelter, mall, terminal, platform	$2.40
20.02	Aerial station, stop, shelter, mall, terminal, platform	$0.00
20.03	Underground station, stop, shelter, mall, terminal, platform	$0.00
20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.	$0.00
20.05	Joint development	$0.00
20.06	Automobile parking multi-story structure	$0.00

[1] Consultant experience on other projects on university campuses, such as the Maryland Purple Line, has shown that specific acoustic mitigation is not required. The rubber "rail boot" that is commonly used for embedded track typically provides all of the acoustic mitigation required. If anything extra is required, its costs are likely within the contingencies.

	20.07	Elevators, escalators	$0.00
		Subtotal Category 20	**$2.40**
30	**SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS**		
	30.01	Administration Building: Office, sales, storage, revenue counting	$0.00
	30.02	Light Maintenance Facility	$3.13
	30.03	Heavy Maintenance Facility	$0.00
	30.04	Storage or Maintenance of Way Building	$0.00
	30.05	Yard and Yard Track[2]	$3.14
		Subtotal Category 30	**$6.27**
40	**SITEWORK & SPECIAL CONDITIONS**		
	40.01	Demolition, Clearing, Earthwork	$0.54
	40.02	Site Utilities, Utility Relocation	$7.18
	40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	$0.69
	40.04	Environmental mitigation, e.g. wetlands, historic/archeological, parks	$0.64
	40.05	Site structures including retaining walls, sound walls	$0.00
	40.06	Pedestrian / bike access and accommodation, landscaping	$0.00
	40.07	Automobile, bus, van access ways including roads, parking lots	$0.65
	40.08	Temporary Facilities and other indirect costs during construction	$0.49
		Subtotal Category 40[3]	**$10.19**
50	**SYSTEMS**		
	50.01	Train control and signals	$0.00
	50.02	Traffic signals and crossing protection[4]	$1.33
	50.03	Traction power supply: substations	$3.74
	50.04	Traction power distribution: catenary and third rail	$3.75
	50.05	Communications	$0.68

2 Cost includes track and turnouts south of Rosa Parks Transfer Station to and within RTS facility to access new streetcar maintenance facility.

3 Assumed a mid-level environmental mitigation with respect to single yard track interface with Depot Park. No specific design features identified. Also assumed some haz mat cost at existing RTS bus facility with clean up to develop new streetcar maintenance facility.

4 Cost for transit signal priority will be added to all signals interfaced (based on cost provided by City of Gainesville Traffic Operations for the GO Enhance RTS Study,

	50.06	Fare collection system and equipment		$0.55
	50.07	Central Control[5]		$0.71
		Subtotal Category 50		**$10.75**
		Subtotal Construction Costs		**$49.42**
60	**ROW, LAND, EXISTING IMPROVEMENTS**			
	60.01	Purchase or lease of real estate		$0.00
		Subtotal Right-of-Way		**$0.00**
70	**VEHICLES**			
	70.01	Light Rail		$14.08
		Subtotal Vehicles		**$14.08**
80	**PROFESSIONAL SERVICES (Categories 10 - 50)**			
	80.01	Preliminary Engineering[6]	4.0%	$1.98
	80.02	Final Design	6.0%	$2.96
	80.03	Project Management for Design and Construction	5.0%	$2.47
	80.04	Construction Administration & Management	8.0%	$3.95
	80.05	Insurance	2.0%	$0.99
	80.06	Legal; Permits; Review Fees by other agencies, cities, etc.	3.0%	$1.48
	80.07	Surveys, Testing, Investigation, Inspection	3.0%	$1.48
	80.08	Start up	1.0%	$0.49
		Subtotal Professional Services	**LS**	**$15.81**

5 Central control relates to the operations center, which at this time is assumed to be integrated into the existing RTS bus facility site or be located in the new RTS facility bus operations. Dollars shown reflect new control/monitoring equipment – one workstation, with no separate building for the operations center.
6 Design costs for rail projects are a much higher percentage of construction costs due to both the complexity of the systems involved and the relative scarcity of designers who do such work.

90	**UNALLOCATED CONTINGENCY**			
	90.01	Categories 10 - 80	10.0%	$7.93
		Subtotal Unallocated Contingency		**$7.93**
		Project Total		**$87.24**

Gainesville Streetcar Feasibility Study

Limited Off-Wire Modern Streetcar Alternative

Capital Cost Estimate

(2013 Dollars in Millions)

FTA SCC	Description	Base Alternative
	Length (Mile):	2.00
	Number of Stations:	7
	Number of Revenue Vehicles:	4
10	**GUIDEWAY & TRACK ELEMENTS**	$19.81
20	**STATIONS, STOPS, TERMINALS, INTERMODAL**	$2.40
30	**SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS**	$6.27
40	**SITEWORK & SPECIAL CONDITIONS**	$10.19
50	**SYSTEMS**	$10.35
	Construction Subtotal (Sum Categories 10 - 50)	**$49.01**
60	**ROW, LAND, EXISTING IMPROVEMENTS**	$0.00
70	**VEHICLES**	$19.80
80	**PROFESSIONAL SERVICES**	$15.68
90	**UNALLOCATED CONTINGENCY**	$8.45
	Total Project Cost	**$92.94**
	Unit Cost (million per revenue mile)	$46.47

10	**GUIDEWAY & TRACK ELEMENTS**		
	10.01	Guideway: At-grade exclusive right-of-way	$0.00
	10.02	Guideway: At-grade semi-exclusive (allows cross-traffic)	$0.00
	10.03	Guideway: At-grade in mixed traffic	$4.86
	10.04	Guideway: Aerial structure	$0.00
	10.05	Guideway: Built-up fill	$0.00
	10.06	Guideway: Underground cut & cover	$0.00
	10.07	Guideway: Underground tunnel	$0.00
	10.08	Guideway: Retained cut or fill	$0.00
	10.09	Track: Direct fixation	$0.00
	10.10	Track: Embedded	$14.07
	10.11	Track: Ballasted	$0.00
	10.12	Track: Special (switches, turnouts)	$0.88
	10.13	Track: Vibration and noise dampening[1]	$0.00
		Subtotal Category 10	**$19.81**

20	**STATIONS, STOPS, TERMINALS, INTERMODAL**		
	20.01	At-grade station, stop, shelter, mall, terminal, platform	$2.40
	20.02	Aerial station, stop, shelter, mall, terminal, platform	$0.00
	20.03	Underground station, stop, shelter, mall, terminal, platform	$0.00
	20.04	Other stations, landings, terminals: Intermodal, ferry, trolley, etc.	$0.00
	20.05	Joint development	$0.00
	20.06	Automobile parking multi-story structure	$0.00
	20.07	Elevators, escalators	$0.00
		Subtotal Category 20	**$2.40**

[1] Consultant experience on other projects on university campuses, such as the Maryland Purple Line, has shown that specific acoustic mitigation is not required. The rubber "rail boot" that is commonly used for embedded track typically provides all of the acoustic mitigation required. If anything extra is required, its costs are likely within the contingencies.

30	**SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS**		
	30.01	Administration Building: Office, sales, storage, revenue counting	$0.00
	30.02	Light Maintenance Facility	$3.13
	30.03	Heavy Maintenance Facility	$0.00
	30.04	Storage or Maintenance of Way Building	$0.00
	30.05	Yard and Yard Track[2]	$3.14
		Subtotal Category 30	**$6.27**
40	**SITEWORK & SPECIAL CONDITIONS**		
	40.01	Demolition, Clearing, Earthwork	$0.54
	40.02	Site Utilities, Utility Relocation	$7.18
	40.03	Haz. mat'l, contam'd soil removal/mitigation, ground water treatments	$0.69
	40.04	Environmental mitigation, e.g. wetlands, historic/archeological, parks	$0.64
	40.05	Site structures including retaining walls, sound walls	$0.00
	40.06	Pedestrian / bike access and accommodation, landscaping	$0.00
	40.07	Automobile, bus, van access ways including roads, parking lots	$0.65
	40.08	Temporary Facilities and other indirect costs during construction	$0.49
		Subtotal Category 40[3]	**$10.19**
50	**SYSTEMS**		
	50.01	Train control and signals	$0.00
	50.02	Traffic signals and crossing protection[4]	$1.33
	50.03	Traction power supply: substations	$3.74
	50.04	Traction power distribution: catenary and third rail	$3.34
	50.05	Communications	$0.68
	50.06	Fare collection system and equipment	$0.55
	50.07	Central Control[5]	$0.71
		Subtotal Category 50	**$10.35**

2 Cost includes track and turnouts south of Rosa Parks Transfer Station to and within RTS facility to access new streetcar maintenance facility.

3 Assumed a mid-level environmental mitigation with respect to single yard track interface with Depot Park. No specific design features identified. Also assumed some haz mat cost at existing RTS bus facility with clean up to develop new streetcar maintenance facility.

4 Cost for transit signal priority will be added to all signals interfaced (based on cost provided by City of Gainesville Traffic Operations for the GO Enhance RTS Study,

5 Central control relates to the operations center, which at this time is assumed to be integrated into the existing RTS bus facility site or be located in the new RTS facility bus operations. Dollars shown reflect new control/monitoring equipment – one workstation, with no separate building for the operations center.

		Subtotal Construction Costs		**$49.01**
60	**ROW, LAND, EXISTING IMPROVEMENTS**			
	60.01	Purchase or lease of real estate		$0.00
		Subtotal Right-of-Way		**$0.00**
70	**VEHICLES**			
	70.01	Light Rail		$19.80
		Subtotal Vehicles		**$19.80**
80	**PROFESSIONAL SERVICES (Categories 10 - 50)**			
	80.01	Preliminary Engineering[6]	4.0%	$1.96
	80.02	Final Design	6.0%	$2.94
	80.03	Project Management for Design and Construction	5.0%	$2.45
	80.04	Construction Administration & Management	8.0%	$3.92
	80.05	Insurance	2.0%	$0.98
	80.06	Legal; Permits; Review Fees by other agencies, cities, etc.	3.0%	$1.47
	80.07	Surveys, Testing, Investigation, Inspection	3.0%	$1.47
	80.08	Start up	1.0%	$0.49
		Subtotal Professional Services	**LS**	**$15.68**
90	**UNALLOCATED CONTINGENCY**			
	90.01	Categories 10 - 80	10.0%	$8.45
		Subtotal Unallocated Contingency		**$8.45**
		Project Total		**$92.94**

6 Design costs for rail projects are a much higher percentage of construction costs due to both the complexity of the systems involved and the relative scarcity of designers who do such work.

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Tindale-Oliver & Associates, Inc.

Planning and Engineering