First Coast Commuter Rail Feasibility Study

Prepared for

JACKSONVILLE TRANSPORTATION AUTHORITY

Regional Transportation Solutions

FINAL REPORT

July 2009

Prepared by: Gannett Fleming

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Northeast Florida Region has an extensive network of rail lines and associated rights-of-way centered on the City of Jacksonville and integrated into the fabric of surrounding communities. The Jacksonville Transportation Authority's (JTA) multimodal approach to providing regional transportation solutions through a diversity of services and facilities has led the Authority to consider whether commuter rail may be another cost-effective and efficient addition to its integrated network of bus, Skyway, Trolley and paratransit services.

The seven-county Northeast Florida region, and adjacent portions of Flagler County, have experienced extraordinary growth in recent decades. That growth is forecasted to continue in the decades to come. Continued growth will bring increasing levels of traffic congestion beyond the capabilities of even an expanded roadway network and may—if left unchecked—threaten the quality of life and economic vitality of Northeast Florida. Development of commuter rail in Northeast Florida will focus an increased portion of future growth in communities that have already experienced some development in the past, leveraging existing infrastructure, reinvigorating existing tax base, limiting the growth in automobile dependency, and improving mobility throughout the region. The project would also leverage the existing JTA network of services, particularly the Skyway, bus and Trolley services in downtown.

This study was conducted in two basic steps. First, a broad examination of all existing rail corridors in the Northeast Florida Region was completed. Then, a more detailed examination was performed on those corridors determined to have the most advantageous combination of potential ridership, and operational, institutional and cost considerations. The broad examination of all existing rail corridors in the region was facilitated by the definition of seven "service corridors" made up of one or more existing rail line segments:

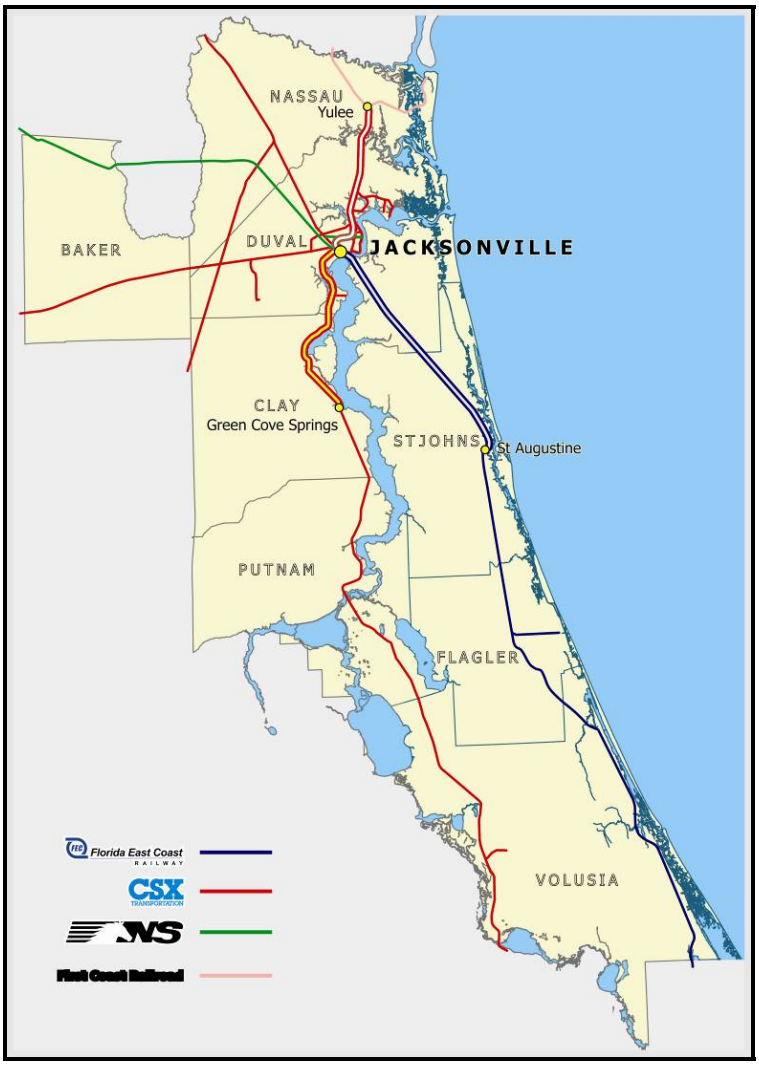
- North: Yulee to Convention Center via Airport Center Drive and Shands Hospital
- Northeast: Fernandina to Yulee via O'Neil as extension of North service corridor
- Northwest-(Norfolk Southern): Crawford to Convention Center
- Northwest-(CSX): Callahan to Convention Center via Ratliff and Dinsmore
- West: Baldwin to Convention Center generally following US 90 (Beaver Street)
- Southwest: Green Cove Springs to Convention Center via Orange Park
- Southeast: St. Augustine to Convention Center generally following US 1 via Durbin and Palencia

These service corridors were evaluated using four sets of factors:

- Urban Travel Factors;
- Railroad Factors;
- Natural and Physical Factors; and,
- Community and Environmental Justice Factors.

As a result of the screening of the service corridors, three preferred service corridors were identified for more detailed examination – North Corridor to Yulee, Southeast Corridor to St. Augustine, and Southwest Corridor to Green Cove Springs – as shown on Figure ES-1.

FIGURE ES-1



Based on performance and cost considerations, Self Propelled Rail Car (SPRC) or Diesel Multiple Unit (DMU) technology was recommended, and assumed as a basis for operational analysis, as well as estimating ridership and capital and operating costs. The commuter rail service is proposed to be operated over three different private sector railroads on an integrated, shared-track basis, therefore requiring the rolling stock and all other aspects of the service to be compliant with the Federal Railroad Administration requirements that govern the national network of conventional railroad lines.

Potential ridership was estimated using a planning model sponsored by the Federal Transit Administration.

TABLE ES-1: 2015 RIDERSHIP BY CORRIDOR

Corridor	Daily Ridership 2015
North Base	770 – 1,540
North Enhanced	1,020 – 2,040
Southwest	1,490 – 2,970
Southeast	2,410 – 4,810

Based on the potential ridership forecasts, two-car trains would be required on the Southeast and Southwest Corridors, while single car trains would be sufficient on the North Corridor. A fleet of 27 vehicles is estimated to be necessary to support the service on all three corridors for the forecasted 2015 ridership.

The capital cost of the overall network is estimated to be $622 million in Year 2008 Dollars. Individual corridor capital costs are estimated to be $239 million for the North Corridor, $195 million for the Southwest Corridor, and $172 million for the Southeast Corridor. Annual operating and maintenance costs are estimated to be $40.6 million annually for the entire system, and $13.7 million, $12.5 million, and $14.4 million annually for the North, Southwest, and Southeast Corridors, respectively. Between 10.2% and 34.1% of the proposed commuter rail system operating and maintenance costs are estimated to be recovered from passenger fares, depending on fare policy assumptions. This compares to ranges of farebox recovery ratios of between 6% and 85% for all North American commuter rail systems and between 6% and 74% for small systems. (Small systems are defined as having less than 4 million trips annually; see Appendix C.) The average commuter rail farebox recovery ratios are 43% for all North American commuter rail systems and 33% for small systems.

The study concluded that commuter rail service in the Northeast Florida region is feasible. Stated another way, the study determined that there are no fatal flaws that would make it impossible or prohibitively expensive to develop commuter rail service on rail lines in the region. Overall feasibility was evaluated by considering operational feasibility, institutional feasibility, and economic feasibility.

1.0 INTRODUCTION

1.1 Purpose and Need

The present-day legacy of 100-plus years of railroad service in the Northeast Florida Region is an extensive system of rail lines and associated rights-of-way centered on the City of Jacksonville and integrated into the fabric of surrounding communities. Most of the original railroad names are gone – names such as Seaboard Air Line Railroad and Atlantic Coast Line – but three major railroad carriers have survived and thrived. CSX Transportation, Inc. (CSXT), the Florida East Coast Railway (FEC), and Norfolk Southern Railway (NS), have, in recent years, transported their largest annual volumes of freight traffic on record. One passenger carrier remains—the National Railroad Passenger Corporation (Amtrak)—and Jacksonville continues to be the nexus of its present and planned strategies for Florida service. The magnificent 1919 Jacksonville Union Station, which fell into disrepair following the withdrawal of Amtrak service in 1974, was reborn in 1986 as the Prime F. Osborn III Convention Center; it was once a major hub of rail passenger travel in the southeast United States and is now the cornerstone of a Northeast Florida regional transportation management center initiative.

The Jacksonville Transportation Authority's (JTA) multimodal approach to providing regional transportation solutions through a diversity of services and facilities has led the Authority to consider whether commuter rail may be another cost-effective and efficient addition to its integrated network of bus, Skyway, Trolley and paratransit services. The seven-county Northeast Florida region, and adjacent portions of Flagler County, have experienced extraordinary growth in recent decades. That growth is forecasted to continue in the decades to come. Continued growth will bring increasing levels of traffic congestion beyond the capabilities of even an expanded roadway network and may—if left unchecked—threaten the quality of life and economic vitality of Northeast Florida. Development of commuter rail in Northeast Florida will focus an increased portion of future growth in communities that have already experienced some development in the past, leveraging existing infrastructure, reinvigorating the existing tax base, limiting the growth in automobile dependency, and improving mobility throughout the region.

JTA has chosen to undertake a feasibility study to determine if one or more existing railroad corridors may be a viable part of a multimodal approach to taming regional traffic congestion. The purpose of the Commuter Rail Feasibility Study is to provide information about whether commuter rail service can be a meaningful component of Northeast Florida's future transportation system. The study area includes the Counties of Baker, Clay, Duval, Nassau, Putnam, Volusia, and St. Johns, as well as portions of Flagler County. At a minimum, the key stakeholder group for this project would be comprised of representatives from these counties, regional and state transportation agencies such as the North Florida

Transportation Planning Organization (NFTPO), the Northeast Florida Regional Council (NEFRC), and the Florida Department of Transportation (FDOT).

1.2 Study Objectives

The Northeast Florida Commuter Rail Study has three fundamental objectives:

- Identify, document and preliminarily evaluate all existing rail corridors in the Northeast Florida region for their viability as commuter rail corridors;
- Perform additional analyses on those corridors identified as having the apparent greatest potential for development; and,
- Determine whether the implementation of commuter rail service in the Northeast Florida Region is feasible, in the contexts of the future transportation needs of the region, and of comparable services operated in other parts of North America.

This report documents that the study effort has met all three of these objectives.

1.3 Study Methodology

Recognizing that a feasibility study is the first step in the Federal Transit Administration (FTA) project development process—it is important to be cognizant of the process as a whole from the outset. A feasibility study is afforded a greater degree of latitude than subsequent steps in the analytic process, as its general goal is to identify whether there is a feasible transit alternative that is potentially applicable to the study area, not whether that alternative is objectively the best or most cost-effective solution available. In anticipation of subsequent study and planning, the work products produced in this phase of work were accomplished, wherever possible, in a manner that meets FTA New Starts criteria and other applicable federal and state requirements.

This study was conducted in two basic steps – a broad examination of all existing rail corridors in the Northeast Florida Region, and a more detailed examination of the corridors determined to have the most advantageous combination of potential ridership, and operational, institutional and cost considerations. These two steps comprise the scope of the Feasibility Study. A map illustrating the corridors examined and the overall study area is provided as Figure 1-1.

The broad examination of all existing rail corridors in the region took into consideration their proximity to existing population and employment centers, physical condition, current and anticipated freight traffic volumes, and environmental factors. Based on these considerations, the corridors that appeared most feasible for commuter rail development were examined further. This examination included preliminary ridership forecasting, and estimates of capital and operating costs.

An important aspect of the study methodology was its inclusive approach to public involvement. Two groups were organized to facilitate local participation – the Project Task Force (PTF) consisting primarily of institutional stakeholders and the Citizens' Advisory Group (CAG) made up of numerous interested citizens from throughout the region. These groups received a series of briefings from the project team throughout the term of the study. The earliest of these briefings were largely educational, consisting of presentations on the range of characteristics and technologies exhibited by commuter rail systems throughout North America. Later briefings included descriptions of tasks performed and study findings, and provided a forum for discussion with, and provision of local feedback to, the study team. Input obtained from these groups was considered and incorporated as appropriate in the study effort.

FIGURE 1-1: MAP OF THE STUDY AREA

To advance the development of commuter rail service in the Northeast Florida Region, additional work beyond the scope of this study is necessary to evaluate the higher-potential corridors in more detail. Once more detailed examinations, primarily relating to matter of potential ridership and costs, confirm the feasibility of the project, design and engineering can begin followed by construction and commissioning.

2.0 BACKGROUND

2.1 Regional Context – Current Regional Conditions and Demographics

The viability of commuter rail service depends on several factors related to population, employment, geography and infrastructure. These include:

- population;
- population density;
- employment;
- employment density;
- coincidence of population and employment with railroad corridors;
- extent and condition of highway network; and,
- geographic barriers or impediments (i.e., mountains, rivers, etc.)

The study considered factors such as these in various contexts, perhaps most importantly in modeling potential ridership. The analyses of potential ridership for the initial candidate corridors and for the identified feasible initial corridors are described in Sections 5.2 and 9.0, respectively, of this report. A compilation of regional demographic data is provided in Appendix A. Selected highlights of that demographic data include:

- The population of the eight-county study area, according to the 2000 Census, was 1.7 million, of which approximately 46% is concentrated in Duval County, and approximately 26% is concentrated in Volusia County.

- 86 percent of the total study area population lives within urbanized areas. This percentage varies significantly by county. Duval and Volusia Counties are the most urbanized with 96 and 91 percent of their respective populations living in urbanized areas; in contrast, the majority of residents in Baker, Nassau and Putnam Counties live in rural areas – 64, 51 and 54 percent of those populations, respectively.

- Workers in less urbanized counties are more likely to work outside their county of residence. Over 50 percent of workers in Baker and Clay Counties worked outside their county of residence. Between 33 and 46 percent of workers in Nassau, St. Johns, Flagler and Putnam Counties work outside their county of residence. Only 7 and 9 percent respectively of workers in Duval and Volusia Counties leave their county of residence to work.

- The number of vehicles per occupied housing unit also varies among the 8 counties. Overall, approximately 7.4 percent of housing units within the study area have no automobiles**.** Over 54% of households within the study area have 2 or more

automobiles available for use. Duval and Putnam Counties have the greatest concentration of zero auto households at 9%.

- 80 percent of workers throughout the study area drove alone to work. Carpooling varied throughout the counties with over 16 percent of workers carpooling in Baker and Putnam Counties; 11 to 13 percent of workers in the remaining six counties carpooled. Less than 1 percent of workers in Baker, Clay, Flagler, Nassau, Putnam, and St. Johns Counties used public transportation as a means to get to work; 2 percent and 1 percent of workers in Duval and Volusia Counties respectively used public transportation.

- Over 10 percent non-home-based workers in Baker, Clay and Putnam Counties travel more than 60 minutes to work. The majority of workers throughout the study area travel between 15 and 59 minutes to get to their place of employment.

These demographics suggest, among other things, a relatively high concentration of regional employment that may be conducive to commuter rail.

2.2 Previous Studies

Several previous studies, not directly addressing commuter rail but still relevant to its development in the Northeast Florida Region, were reviewed in the course of the Feasibility Study. Among these, the following fourteen are the most significant. For each, the report name and its sponsoring agency are listed here; a complete summary of each report, and a review of its relevant aspects, is provided in Appendix B.

- *First Coast MPO 2030 Long Range Transportation Plan* (June 2005)
  First Coast Metropolitan Planning Organization
- *Horizons 2030 Recommendations for Growth Management* (April 2008)
  Mayor's Office, City of Jacksonville
- *Florida Intercity Passenger Rail "Vision Plan" (Draft Executive Report)* (August 2006)
  Florida Department of Transportation
- *Jacksonville 2010 Comprehensive Plan* (May 2007)
  City of Jacksonville
- *Jacksonville Transportation Center* (September 2007)
  Federal Highway Administration, Federal Transit Administration, Florida Department of Transportation and Jacksonville Transportation Authority
- *I-95 Parallel Corridor Study Final Report* (January 2008)
  Florida Department of Transportation; First Coast Metropolitan Planning Organization; Nassau County, Florida
- *Better Jacksonville Plan* (November 2000)
  City of Jacksonville
- *St. Johns County, FL - 2015 EAR Based Comprehensive Plan Amendment* (May 2000)
  St. Johns County

- *St. Johns County Transit Development Plan* (November 2006)
  St. Johns County
- *Waterborne Transportation Feasibility Study* (March 2008)
  Jacksonville Transportation Authority, North Florida Transportation Planning Organization
- *First Coast Regional Intelligent Transportation System (ITS) Master Plan* (2007)
  North Florida Transportation Planning Organization, Jacksonville Transportation Authority, Florida Department of Transportation, City of Jacksonville, and First Coast ITS Coalition
- *Jacksonville Bus Rapid Transit Tier 1 Programmatic Final Environmental Impact Statement* (January 2008)
  Jacksonville Transportation Authority
- *Downtown Master Plan* (September 1999)
  Downtown Development Authority
- *North Jacksonville Marine Terminals Multimodal Impact Study* (December 2007)
  First Coast Metropolitan Planning Organization; Jacksonville Port Authority

The summaries provided in Appendix B address the following characteristics and elements of the reports:

- Report Name
- Agency Sponsor
- Consultant/Preparer
- Date of Report
- Study Area
- Purpose of Study
- Summary of Conclusions
  - Case Study Findings
  - Ridership Demand Findings
  - Infrastructure Findings
  - Community Support Findings
  - Financial Findings
- Relevance to Commuter Rail Development
- Any Follow-up Identified

Most of these reports do not specifically mention commuter rail, but several provide relevant information, ranging from the need for future transportation alternatives, to the importance of coordinating land use and transportation policies. Most notably:

- The First Coast MPO Long Range Transportation Plan, Jacksonville BRT Tier 1 FEIS, and Downtown Master Plan all support the development of commuter rail;
- The Horizons 2030 Growth Management Plan recommends implementation of a rapid transit system to help solve transportation issues in Jacksonville and the region;

- The Florida Intercity Passenger Rail "Vision Plan" (Draft Executive Report) describes a conceptual plan for commuter rail development in the Northeast Florida Region, including proposed station areas and alignments;
- Development and implementation of commuter rail in the region is consistent with all of the policies listed in the Jacksonville 2010 Comprehensive Plan;
- The Jacksonville Transportation Center Report anticipates commuter rail as a possible mode of transportation serving the Center;
- The I-95 Parallel Corridor Study Final Report indicates that commuter rail development in northern Duval County and in Nassau County can affect the increasing traffic volumes along I-95, and may reduce or even eliminate the need for roadway improvements along the corridor;
- The Better Jacksonville Plan has committed $100 million for the acquisition of right-of-way for rapid transit;
- The St. Johns County 2015 Comprehensive Plan includes broad policies that support implementation of commuter rail in Northeast Florida. As a result of the rapid growth and development occurring in St. Johns County, its transportation and land use policies may need to be updated during the next plan update, potentially making them more supportive of commuter rail; and
- The St. Johns County Transit Development Plan (TDP) does not specifically address commuter rail, however, several of the TDP objectives would support the implementation of a commuter rail project in St. Johns County.

3.0 COMMUTER RAIL MODAL CONTEXT

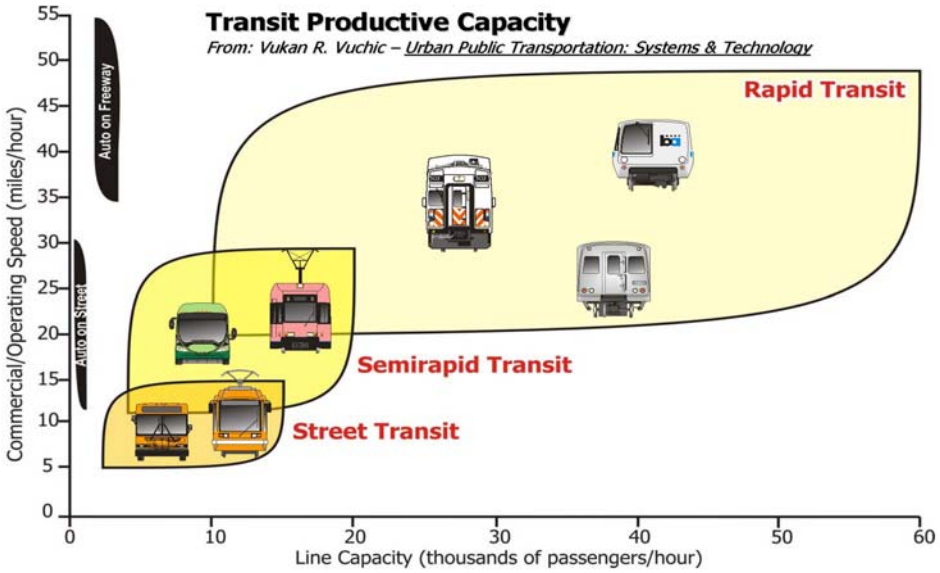
Commuter Rail is a form of rapid transit, most notably characterized by shared use of existing railroad infrastructure. It typically uses rolling stock that complies with crashworthiness and other design requirements of the Federal Railroad Administration, which make commuter rail rolling stock generally larger and heavier than other rail transit vehicles.

TABLE 3-1

Characteristics of the Average US Commuter Rail Trip (2005)[1]	
Average Speed	32 mph
Average Length	22 miles
Average Travel Time	41 minutes

Although few parameters are inviolable, commuter rail corridors are typically between 20 and 50 miles in length, with most stations spaced about one to four miles apart, and a heavy reliance on park-and-ride access. Average operating speeds inclusive of stops are typically between 25mph and 40mph, consistent with Table 3-1 above. Commuter rail systems are a higher-speed and moderate-capacity mode, as illustrated in Figure 3-1.

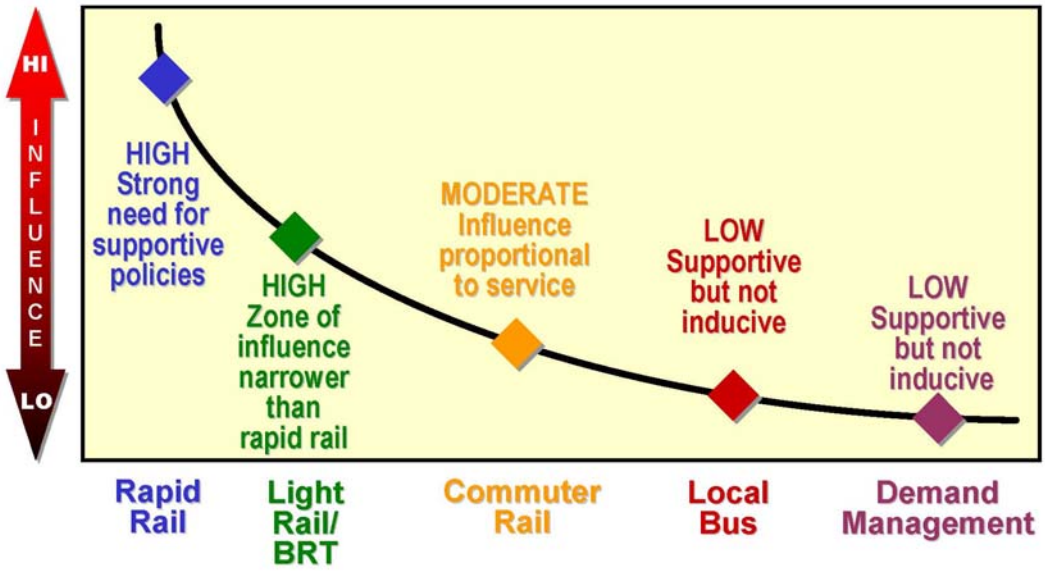
FIGURE 3-1



[1] USDOT, Bureau of Transportation Statistics, *National Transportation Statistics 2007*

Commuter rail systems typically link lower density suburban markets with urban downtowns where employment is concentrated. Commuter rail typically has less direct influence on proximate land use than higher-capacity, fixed-guideway transit modes, such as rapid rail and light rail. Conversely, commuter rail tends to have greater influence than non-fixed-guideway transit modes, such as local bus and demand management strategies. Figure 3-2 illustrates the influence on land use for various transit modes.

FIGURE 3-2



The characteristic of sharing infrastructure with freight railroads generates both advantages and disadvantages. Shared infrastructure can reduce both start-up and ongoing costs, relative to rail rapid transit and light rail transit. However, it may also limit service frequencies and opportunities for growth without significant additional capital expenditure, while forcing a service pattern based on fewer, longer trains.

3.1 Statistical Comparisons

Various operating, service and financial characteristics of the North American commuter rail transit mode are tabulated in Appendix C. Statistics relating to individual properties and to the overall industry are provided. These statistics were assembled to document the framework within which commuter rail operations proposed for the Jacksonville region may be considered.

3.1.1 Definitions and Trends

The Transportation Research Board's Glossary of Public Transport defines commuter rail as "a passenger railroad service that operates within a metropolitan area on trackage that is usually part of the general railroad system [i.e. also used by freight trains]. The operations,

primarily for commuters, are generally run as part of a regional system that is publicly owned, or by a railroad company as part of its overall service." As illustrated by the data in Table 3-1, the US commuter rail transit industry is relatively small, but is one of the fastest growing segments of the US urban transportation market.

TABLE 3-2: PASSENGER MILES TRAVELED IN URBAN PUBLIC TRANSPORTATION[2] (in millions)

Year	Commuter Rail	Other Urban Transport	All Urban Public Transit
1980	6.516	33,338	39,854
1985	6.534	33,047	39,581
1990	7.082	34,061	41,143
1995	8.244	31,564	39,808
2000	9.402	38,264	47,666
2005	9.473	40,205	49,678
Percent Growth:	45%	21%	25%

3.1.2 US Market Characteristics

Customer surveys from three commuter rail operations – SFRTA Tri-Rail (Southeast Florida), Metra (Chicago), and MBTA (Boston) – indicate that commuter rail in the US serves a largely middle class, suburb-to-central-city market. Commuter rail is most successful where the service is faster than traveling by private automobile in the peak period, and where the daily fare is less than the cost of daily parking in the urban center. US commuter rail passengers, like most Americans, usually have ready access to a car for travel.

U.S. commuter rail passengers typically drive themselves to a suburban station and park their automobile for the day. Other types of rail transit passengers travel to stations with friends or walk from nearby homes. Bus access to a suburban station is relatively rare.

Commuter rail passengers are typically lower and middle income suburban office workers. Manual workers and tradesmen tend not to travel to principal commuter rail destinations and schedules of service are not generally designed for their use. Senior office workers tend to travel to work in their personal automobile and use parking provided by their employer during the day.

[2] Data from 1980 to 1990 from USDOT National Transportation Statistics 1995 p 64. Data from 1995 to 2005 from USDOT, Bureau of Transportation Statistics, National Transportation Statistics 2007.

3.2 Case Studies

Case studies were assembled for 13 selected "new start" commuter rail properties – both existing and planned – that would all have some relevance to the proposed Northeast Florida rail service. These case studies are presented in Appendix D. These case studies address the following characteristics of each service. In addition, a route map and photographs are included for each:

- System Description
- Service Planning History
- Revenue Service
- Rolling Stock
- Governance
- Involvement with Freight Railroads
- Service Delivery Strategy
- System Goals
- Performance vs. Goals
- Key Implementation Challenges
- Current Status/Performance
- Future Plans
- Contact Persons

The 13 systems documented in the case studies are:

- Westside Express Service – Washington County, OR
- Champlain Flyer – Burlington, VT
- Central Florida Commuter Rail – Orlando, FL
- Virginia Railway Express – Washington, DC
- Shore Line East – New Haven, CT
- Trinity Railway Express – Dallas / Fort Worth, TX
- Altamont Commuter Express – San Jose, CA
- Tri-County Commuter Rail – Miami / Fort Lauderdale / West Palm Beach, FL
- Music City Star – Nashville, TN
- Capital Metrorail – Austin, TX
- New Mexico Rail Runner Express – Albuquerque, NM
- Sounder – Seattle, WA
- Coaster – San Diego, CA

These commuter rail systems range from some still in planning and design, such as the Central Florida line, to others that have been in operation for about 20 years, such as Tri-Rail in southeast Florida. Although they share the same basic technology as legacy systems serving cities such as Boston, New York, Philadelphia and San Francisco, their genesis is very different. The legacy systems were first built by private-sector railroad companies in the late nineteenth century, either as part of trunk routes between large cities or as branch

routes intended to access developing areas. The construction of such legacy systems stimulated the development and growth of communities along their length, and for the most part, some level of commuter rail service has continued on such lines until the present day. The new start lines followed the legacy systems a century later, starting in the 1980s. Most new start lines never had commuter rail service in the past. In contrast with the legacy systems, the new start lines were developed by government agencies that sought to initiate commuter rail service on existing rail lines to address automobile traffic congestion issues in well established communities, and also to influence land use patterns and stimulate more concentrated development in areas that had experienced limited growth to-date.

These case studies were utilized as references for several purposes during the study, notably in the definition of the candidate corridors and in the development of screening criteria. Criteria developed based in part on the case studies consisted of:

- Urban Travel Factors;
- Railroad Factors;
- Natural and Physical Factors; and,
- Community and Environmental Justice Factors.

4.0 CANDIDATE CORRIDOR IDENTIFICATION

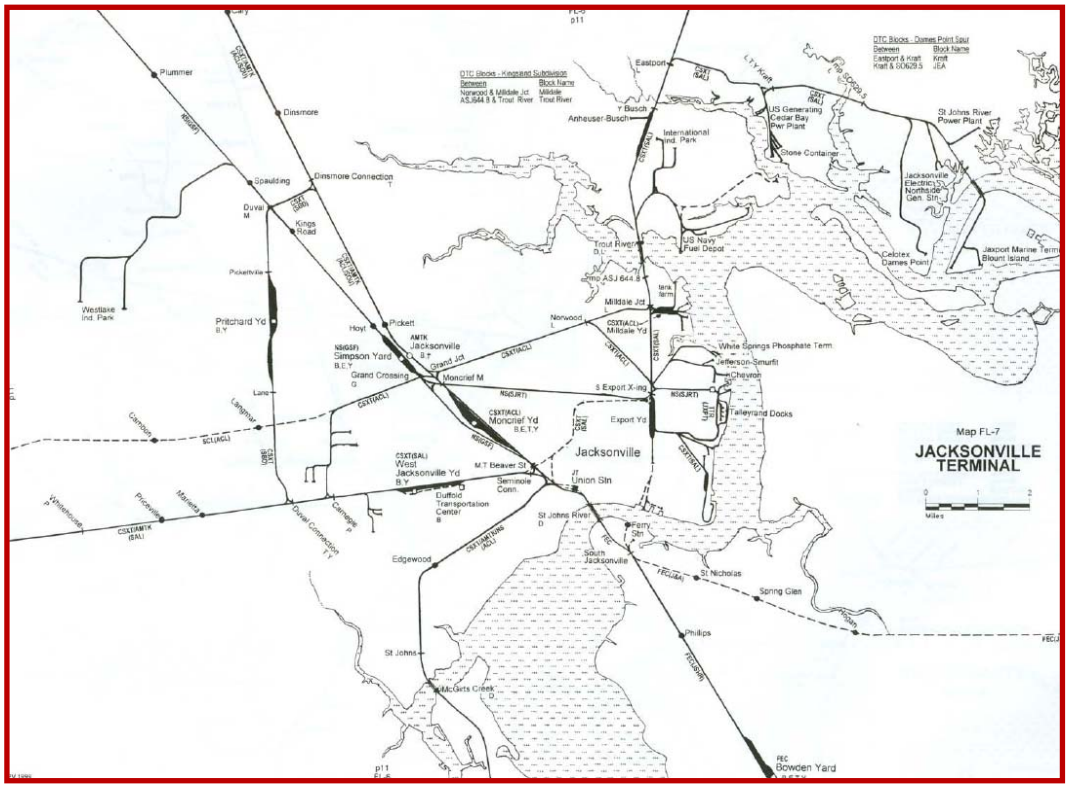
4.1 Candidate Rail Corridors

Working in concert with JTA staff, the study team identified nine candidate rail corridors – most consisting of active rail lines, but including some abandoned mileage as well – with potential for development of an urban passenger railway service. Portions of these rail lines are depicted in Figure 4-1.

1. CSXT Sanford Subdivision (Jacksonville-Orange Park-Green Cove Springs-Palatka)
2. CSXT Tallahassee Subdivision (Jacksonville-Baldwin-Macclenny)
3. CSXT Nahunta Subdivision (Jacksonville-Callahan-Folkston)
4. CSXT Kingsland Subdivision (Jacksonville-Yulee-Kingsland)
5. CSXT/FCRD Fernandina Subdivision (Yulee-Fernandina Beach)
6. NS Valdosta District (Jacksonville-Crawford[3])
7. NS Springfield Lead (North Old Kings Road {Grand Junction}–Walnut Street)
8. FEC Main (Jacksonville-Greenland-St. Augustine)
9. Abandoned S-Line (North Pearl Street, Jacksonville-West Church Street, Jacksonville)

FIGURE 4-1: JACKSONVILLE AREA RAILROADS

Source: Comprehensive Railway Atlas of North America



[3] Crawford is along US 301, approximately 5 miles south of Callahan.

Note that these nine rail lines were recast as seven "service corridors" for evaluation as described in Section 5.

Northeast Florida rail lines are illustrated in Figure 4-2, color-coded to identify ownership. Note that the nine original candidate rail lines were recast as seven candidate "service corridors" for evaluation as described in Section 5.

- **CSX Transportation, Inc. (CSXT)** operates the largest railroad in the eastern United States with a 21,000-mile rail network linking commercial markets in 23 states, the District of Columbia, and two Canadian provinces. CSXT headquarters are in Jacksonville, Florida. The majority of rail infrastructure in the Northeast Florida Region is owned by CSXT. Its local assets were originally assembled and constructed by the Seaboard Air Line (S-Line) and Atlantic Coast Line (A-Line) railroads, and their predecessors.

  Local commuter rail services are operated on CSXT rail lines in Massachusetts, Maryland, Virginia, West Virginia and Illinois. Amtrak operates extensive services on CSXT trackage including all Amtrak services in Florida – the Silver Meteor, the Silver Star and the Auto Train. South Florida Regional Transportation Authority's Tri-Rail service operates on track purchased by FDOT from CSXT; that track is still maintained by CSXT for its freight operations as well as for the passenger services.

- **Florida East Coast Railway (FEC)** operates a Class II freight railroad along a 351-mile corridor between Jacksonville and Miami. Headquartered in Jacksonville, the railway serves the densely populated east coast of Florida and is the only rail-service provider to the Port of Palm Beach, Port Everglades (Ft. Lauderdale) and the Port of Miami. The railway carries the lion's share of intermodal traffic to and from South Florida in addition to having significant minerals, automotive and merchandise traffic.

  Although the FEC has a history of noteworthy intercity passenger operations, no passenger services have been operated on the FEC since 1968.

- **Norfolk Southern Railway (NS)** operates approximately 21,000 route miles in 22 states and the District of Columbia. The railway boasts that it operates the most extensive intermodal network in the East and is North America's largest rail carrier of metals and automotive products. NS operations in Florida are limited to two lines originating in Valdosta, Georgia. The main line linking Valdosta with Jacksonville is busy with traffic to and from the Port of Jacksonville, goods for regional consumption and interchange traffic for the FEC.

  Local commuter rail services are operated on NS rail lines in Virginia, New York and Illinois. NS hosts several Amtrak trains including New Orleans' Crescent and North Carolina's Piedmont and Carolinian services.

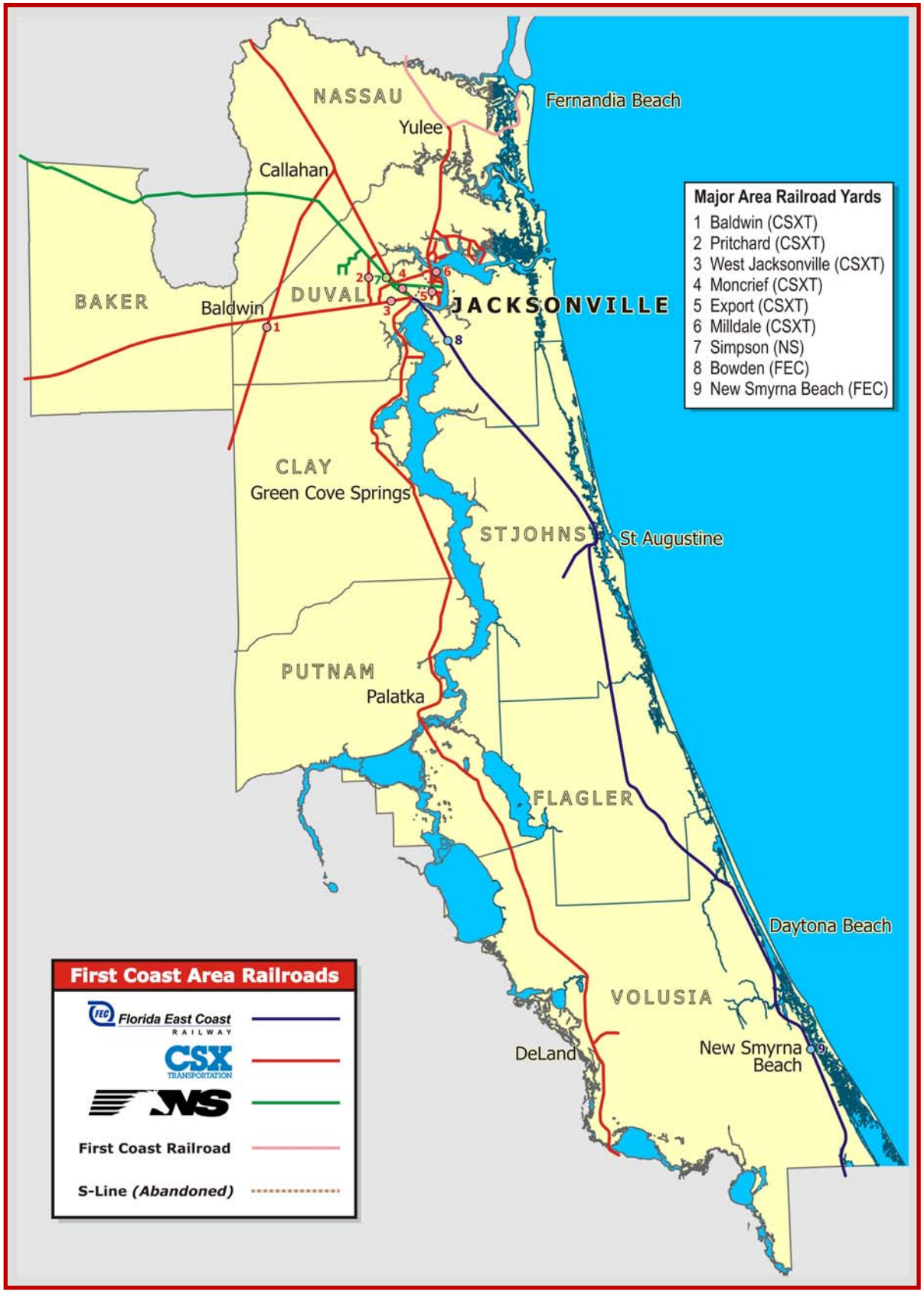
- **First Coast Railroad (FCRD)** operates freight service on CSXT's Kingsland and Fernandina Subdivisions through a lease of these lines from CSXT. This short line operator, owned by Rail Link of Jacksonville, provides rail freight service from Yulee to Fernandina Beach and from Yulee to Seals, Georgia. No passenger service is operated on the FCRD.

Information concerning each candidate rail line was assembled with cooperation from the railroads, and from a variety of public and private sources. Complete information regarding the candidate corridors is provided in Appendix E and summarized in the following section. The information presented includes:

- Ownership
- Traffic Density
- Number of Tracks
- Track condition and construction
- Maximum allowable speeds
- Signaling
- Grade Crossings
- Major Freight Customers
- Moveable bridges and other major structures
- Surrounding land uses and population densities

Data on CSX, NS and FEC infrastructure and operations are based on information submitted by the railroads for this study. Some additional information was developed from public sources.

FIGURE 4-2


NASSAU
Fernandia Beach
Yulee
Callahan
BAKER
Baldwin
DUVAL
JACKSONVILLE
CLAY
Green Cove Springs
STJOHNS
St Augustine
PUTNAM
Palatka
FLAGLER
Daytona Beach
VOLUSIA
DeLand
New Smyrna Beach
Major Area Railroad Yards
1 Baldwin (CSXT)
2 Pritchard (CSXT)
3 West Jacksonville (CSXT)
4 Moncrief (CSXT)
5 Export (CSXT)
6 Milldale (CSXT)
7 Simpson (NS)
8 Bowden (FEC)
9 New Smyrna Beach (FEC)
First Coast Area Railroads
Florida East Coast Railway
CSX Transportation
NS
First Coast Railroad
S-Line (Abandoned)

Candidate Corridor 1: CSXT Sanford Subdivision - Starting in Jacksonville, the line runs from Beaver Street (MP 642.5) immediately west of FEC's downtown yard, southwesterly paralleling Roosevelt Boulevard by the Avondale and Murray Hill neighborhoods, crossing the Ortega River on a lift bridge to Orange Park in Clay County. From Orange Park, the railway parallels Doctor's Lake Drive eventually crossing Doctor's Inlet Road (Route 220) then running to Green Cove Springs. The line continues southward to Palatka (MP 698.0) then Sanford and Orlando. Immediately south of Beaver Street the line crosses the FEC Main Line leading to Jacksonville's historic Union Station (now the Convention Center).

Historically the line was a portion of the Atlantic Coast Line Railroad's mainline from Richmond, Virginia to Tampa, Florida. As a result, all portions of this former route now owned by CSXT are collectively called the "A-Line".

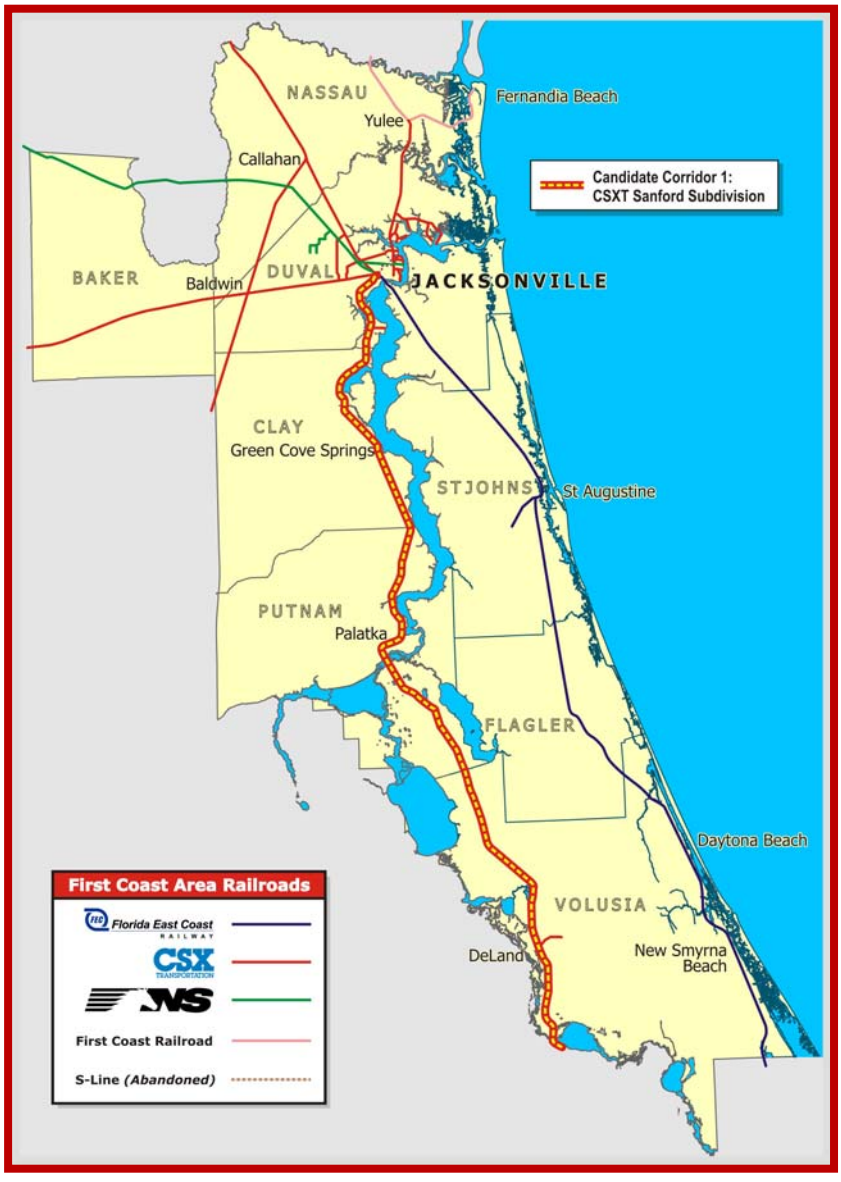
CSXT Sanford Subdivision	
Ownership	CSXT, Jacksonville, FL
Traffic density	20-30 million gross-ton miles annually
Number of tracks	Single track with passing sidings
Predominant FRA Track Class	4
Maximum allowable passenger speeds (mph)	79
General tie and rail conditions	Predominately CWR, wooden ties
Signals and line capacity	Wayside CTC
Grade crossings within 30 miles of JAX	52 (41 in closest 40 miles)
Major customers within 30 miles of JAX	Teasdale Power Plant
Moveable bridges and other major structures	Ortega River

Infrastructure: The railroad is presently maintained as a largely single track railway with a CTC wayside signal system. The track is predominately continuous welded rail maintained to FRA Class 4 standards. Close to Downtown, the line is constructed with jointed rail and maintained at a lower track standard. The maximum allowable passenger train speed along the line is 79 mph. However, the line has 19 permanent speed restrictions as low as 25 mph between Jacksonville and Palatka. Capacity of the line is limited by the density and length of passing sidings. There are five segments of double track/passing sidings between Jacksonville and Palatka. Each double track section is approximately two miles in length allowing full length freight trains to meet and pass along the line. Informal inspection of the line indicates that it does not appear that the line was ever fully double-tracked although the right-of-way is clearly sufficient along its entire length to accommodate a second track.

Freight and Passenger Rail Traffic: The Sanford Subdivision hosts six Amtrak trains each day. The line is also a critical portion of the regional freight network. It is reported to carry

as much as 30 million gross tons of freight each year along the segment between Jacksonville and Palatka.[4] South of Palatka the density of freight traffic drops considerably. CSXT serves a major coal-fired power plant located in Teasdale, north of Palatka.

Surrounding Land Uses and Population Densities: The line passes through areas of dense residential development from Beaver Street to Orange Park. South of Orange Park the line parallels dense residential development off Doctor's Lake Drive enroute to Flemming Island (CR 220).



[4] U.S. Railway Traffic Atlas, Ladd Publications, Orange California (Ladd), Page 21

Candidate Corridor 2: CSXT Tallahassee Subdivision - Like the Sanford Subdivision this line also runs from Beaver (MP 635.1) near the FEC Yard, but runs westward paralleling Beaver Street (Routes 10 and 90) to approximately 20 miles to Baldwin (MP 655.8). West of Baldwin, the Tallahassee Subdivision continues westward into Nassau County to Macclenny and points west. At Baldwin, the Tallahassee Subdivision connects with the Wildwood Subdivision which turns southward toward Wildwood.

The line has an active connection to the FEC Main Line leading to Jacksonville's historic Union Station.

CSXT Tallahassee Subdivision	
Ownership	CSXT, Jacksonville, FL
Traffic density	20-30 million gross-ton miles annually
Number of tracks	Single track with passing sidings
Predominant FRA Track Class	4
Maximum allowable passenger speeds (mph)	79
General tie and rail conditions	Predominately CWR, wooden ties
Signals and line capacity	Wayside CTC
Grade crossings within 30 miles of JAX	41
Major customers within 30 miles of JAX	West Jacksonville Yard complex
Moveable bridges and other major structures	None

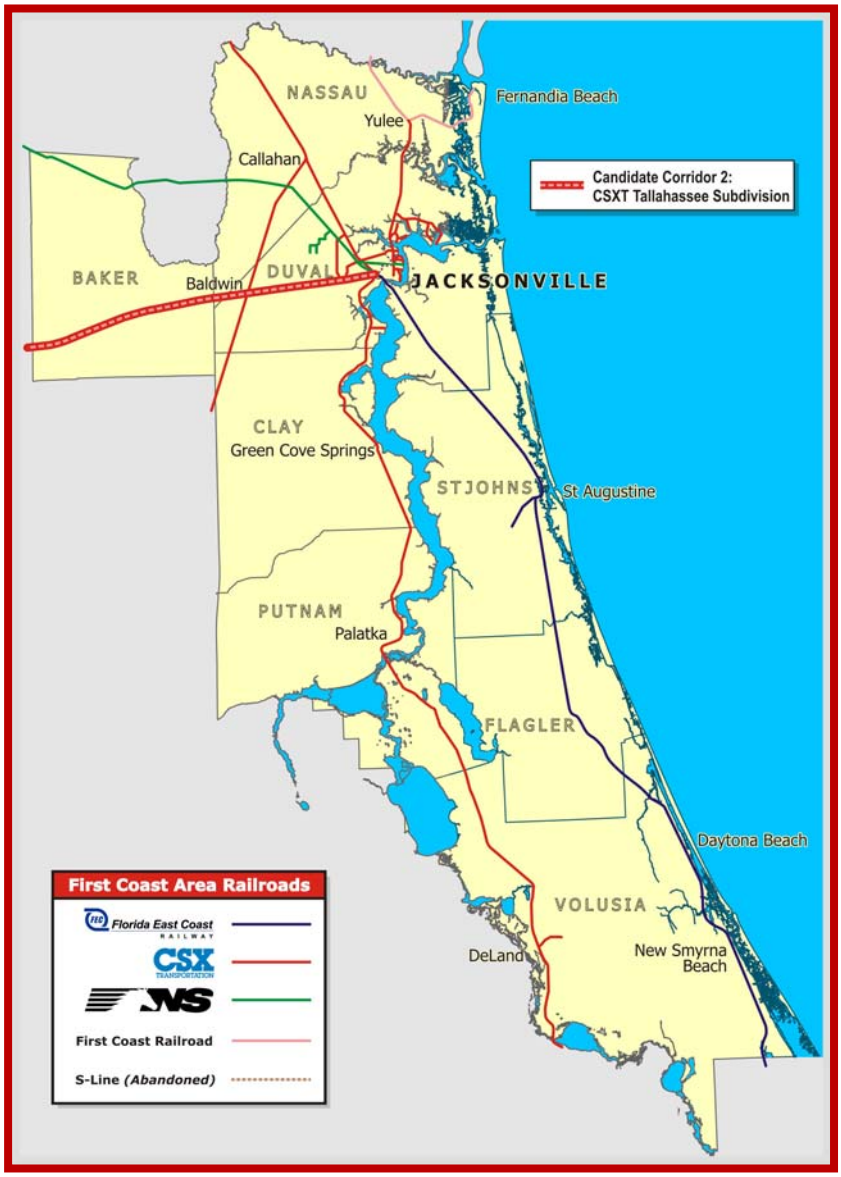
Infrastructure: The railroad is presently maintained as a largely single track railway with a CTC wayside signal system. The track is predominately continuous welded rail maintained to FRA Class 4 standards. West of the yard, the maximum allowable passenger train speed along the line is typically 60 to 79 mph. Capacity of the line is limited by the density and length of passing sidings. There are three passing sidings between Jacksonville and Baldwin. The passing sidings range from 4,000 to 7,300 feet in length. Although the line is presently single tracked, it appears that the right-of-way has sufficient width along it entire length to construct a second track.

Freight and Passenger Rail Traffic: There are no regularly scheduled passenger trains on the Tallahassee Subdivision. The line is reported to carry as much as 30 million gross tons of freight each year along the segment between Jacksonville and Baldwin.[5] There are 23 freight customer sidings on the line between the Jacksonville terminal and 12 miles to the west. Two sidings, one on either side of the tracks near West Jacksonville Yard, serve

[5] Ladd, page 21

clusters of warehouses. Other customers on the line include other warehouses, steel and lumber yards, and feed mills.

Surrounding Land Uses and Population Densities: There is a high density of local freight customers on the line east of I-295, as the land use along the line is predominately industrial and warehousing. CSX's West Jacksonville Yard is immediately south of this busy segment. West of I-295, the line passes through an area of modest residential development before passing into areas of agricultural and modern low-density warehousing activities enroute to the community of Baldwin.



Candidate Corridor 3: CSXT Nahunta Subdivision - Starting in Jacksonville the line runs from Beaver Street-MP 642.5, through Moncrief Yard, northwesterly paralleling Kings Road enroute to Dinsmore, Callahan (MP 624.3), Hilliard and Folkston, Georgia (MP 602.5). Jacksonville's Amtrak Station is located along this segment at MP 639.4 approximately three miles outside downtown Jacksonville. Immediately south of Beaver Street, the line has an active connection to the FEC Main Line leading to Jacksonville's historic Union Station. The Nahunta Subdivision was historically a portion of the Atlantic Coast Line Railroad's mainline to Jacksonville, Orlando and Tampa. ("A-Line")

CSXT Nahunta Subdivision	
Ownership	CSXT, Jacksonville, FL
Traffic density	40+ million gross-ton miles annually
Number of tracks	Double Track
Predominant FRA Track Class	4
Maximum allowable passenger speeds (mph)	79
General tie and rail conditions	CWR, mix of concrete and wooden ties
Signals and line capacity	Wayside CTC
Grade crossings within 30 miles of JAX	21
Major customers within 30 miles of JAX	Jacksonville Intermodal Facility
Moveable bridges and other major structures	None

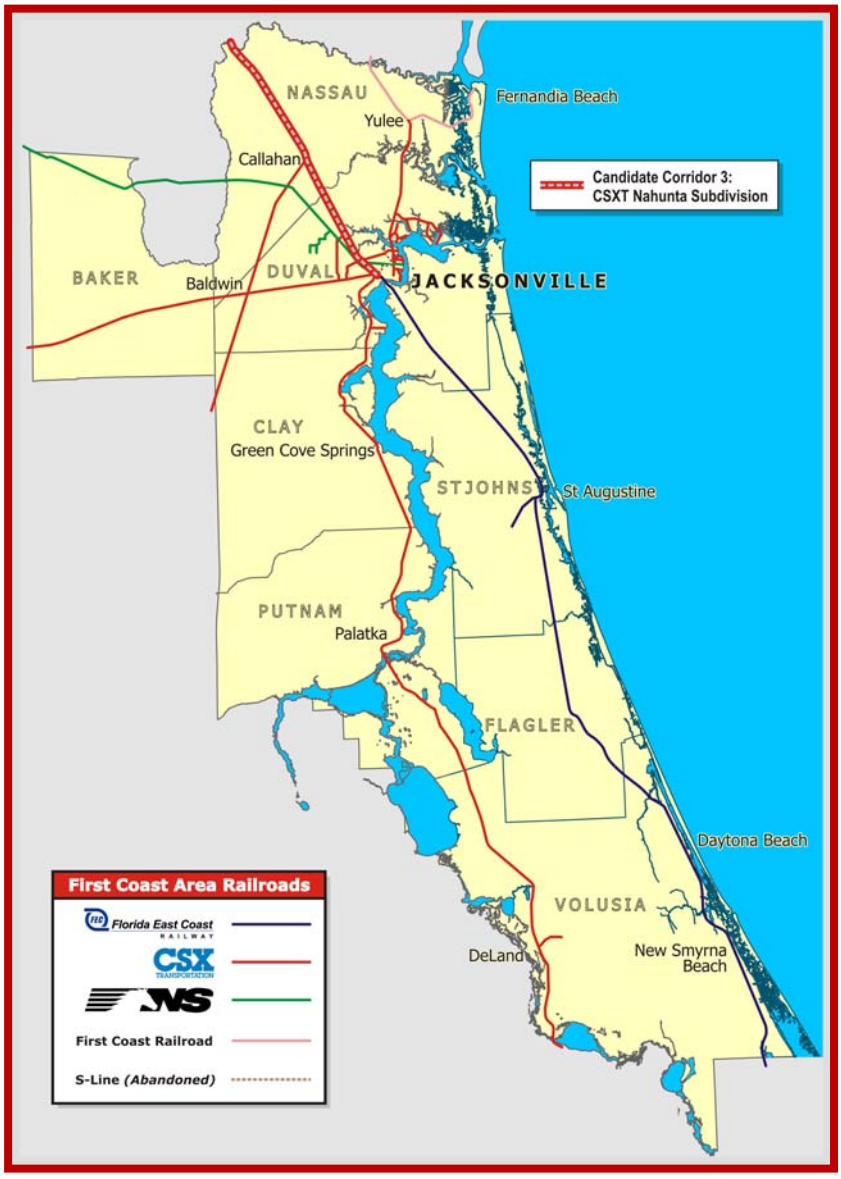
Infrastructure: The railroad is presently maintained as a double track railway with a CTC wayside signal system. The track is continuous welded rail maintained to FRA Class 4 standards. Ties are a mix of wood and concrete. North of the Amtrak Station, the maximum allowable passenger train speed is 79 mph. Informal inspection of the line indicates that the right-of-way has sufficient width along its entire length to construct a third main track.

Freight and Passenger Rail Traffic: The Nahunta Subdivision hosts six Amtrak trains each day. Four run between Savannah and Jacksonville enroute between New York and Miami. The line is the busiest segment of freight trackage in the State of Florida. It is reported to carry more than 40 million gross tons of freight each year along the segment between Folkston and Jacksonville.[6] South of Callahan the density of freight traffic drops as many trains divert from the Nahunta Subdivision to the Callahan Subdivision southward to Baldwin

[6] Ladd, Page 21

for transport to Wildwood, Tampa and Miami. No local customers were identified along the line north of Edgewood Avenue in Jacksonville.

Surrounding Land Uses and Population Densities: The land use along line from Moncrief Yard westward to Dinsmore is generally industrial in character, or undeveloped. The residential communities of Dinsmore and Callahan are the only population concentrations along the line west of downtown Jacksonville.



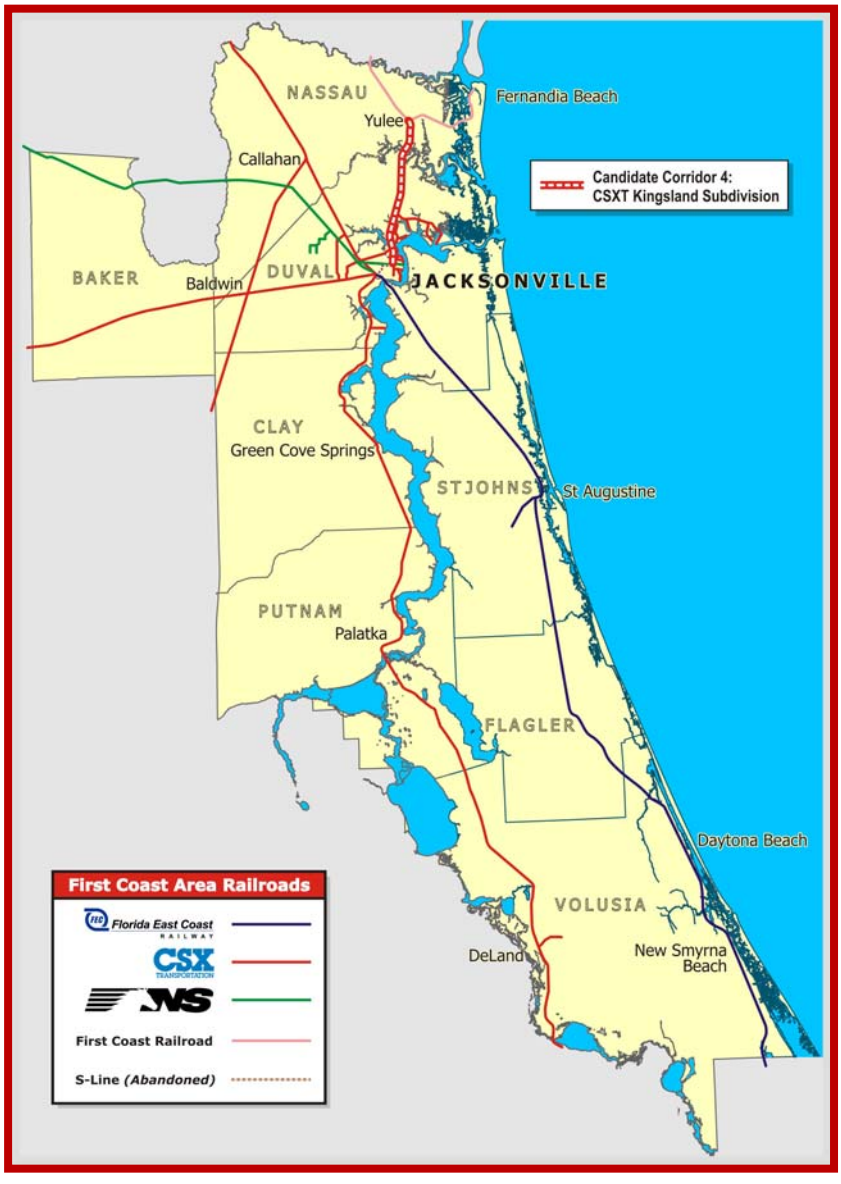
Candidate Corridor 4: CSXT Kingsland Subdivision – The Kingsland Division is a remnant of the Seaboard Coast Line's mainline, which has been severed north of Kingsland, Georgia. Now operated as a branch line by CSXT and the short line First Coast Railroad, it connects to the regional rail network at the Grand Junction, 2.2 miles north of Beaver Street interlocking at the south of end of Moncrief Yard. The single track line crosses over New Kings Road and proceeds easterly to a point east of North Main Street. At North Main Street the line turns northward toward Yulee and the Fernandina Beach Subdivision. The line lies immediately west of North Main Street for most of it route to Yulee. Yulee is 21.6 miles from the Grand Junction. CSXT operation of the line terminates at Yulee. The 18.6 remaining miles of the Kingsland Subdivision to Seals, Georgia and the 12.1-mile Fernandina Subdivision, are operated by the First Coast Railroad.

CSXT Kingsland Subdivision	
Ownership	CSXT, Jacksonville, FL
Traffic density	5-10 million gross-ton miles annually
Number of tracks	Single Track with passing sidings
Predominant FRA Track Class	3 and 2
Maximum allowable passenger speeds (mph)	25
General tie and rail conditions	Predominantly CWR with wooden ties
Signals and line capacity	Unsignalled
Grade crossings within 30 miles of JAX	30
Major customers within 30 miles of JAX	Anheuser Busch and other large industrial customers at Evergreen Avenue, Heckscher Drive, and Eastport Road
Moveable bridges and other major structures	Crosses Trout River on long bridge with a swing span. Crosses Timucuan Ecological Preserve on Embankment

Infrastructure: The railroad is presently maintained as an unsignalled, single-track branch line under OCS operating rules. Despite its branch line status, much of the line is constructed with continuous welded rail. There are at least four passing sidings between the Grand Junction and Yulee. Informal inspection of the line indicates that the right-of-way has sufficient width along its entire length to construct a second main track.

Freight and Passenger Rail Traffic: The branch line has a lower density of traffic than other CSXT lines in Jacksonville, but has the highest density of local freight customers and industrial plants of all lines in the region. Development of passenger service on this line would require careful planning to avoid interference between local carload freight traffic and passenger operations.

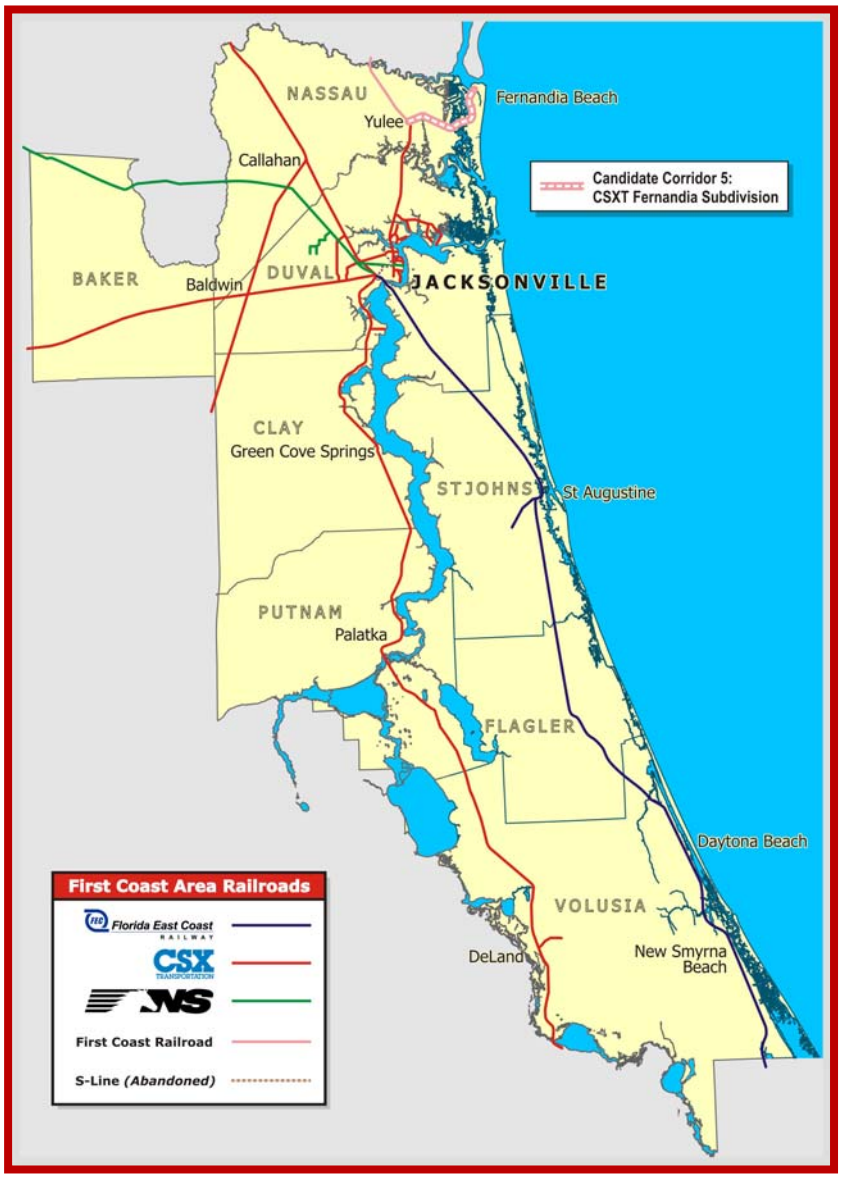
Surrounding Land Uses and Population Densities: The line passes approximately two miles to the east of the main terminal of the Jacksonville International Airport. It is conceivable that a spur to the airport terminal could be constructed north of Owen Road, and Airport planning apparently anticipates future access by passenger rail. Between Grand Junction and North Main Street, the land along the line is urbanized with a mix of industrial, commercial and residential uses. Once the line starts heading north, the land uses in the vicinity of the line are generally industrial, commercial or undeveloped.



Candidate Corridor 5: CSXT Fernandina Subdivision – The Fernandina Subdivision operated by the First Coast Railroad runs 12-miles east from Yulee to the seaside community of Fernandina Beach. The single track line parallels State Route 300, the Buccaneer Trail. The principal customer on the line is a paper processing plant in Fernandina Beach.

CSXT Fernandina Subdivision	
Ownership	CSXT, Jacksonville, FL Operated by First Coast Railroad
Traffic density	1-5 million gross-tons annually
Number of tracks	Single Track
Predominant FRA Track Class	2 and 1
Maximum allowable passenger speeds (mph)	35 and 15
General tie and rail conditions	Unknown
Signals and line capacity	Unsignalled
Grade crossings	18
Major customers	Container Corporation of America
Moveable bridges and other major structures	Crosses Amelia River on a swing bridge.

Surrounding Land Uses and Population Densities: The land along the branch is generally undeveloped except at Yulee and Fernandina Beach.

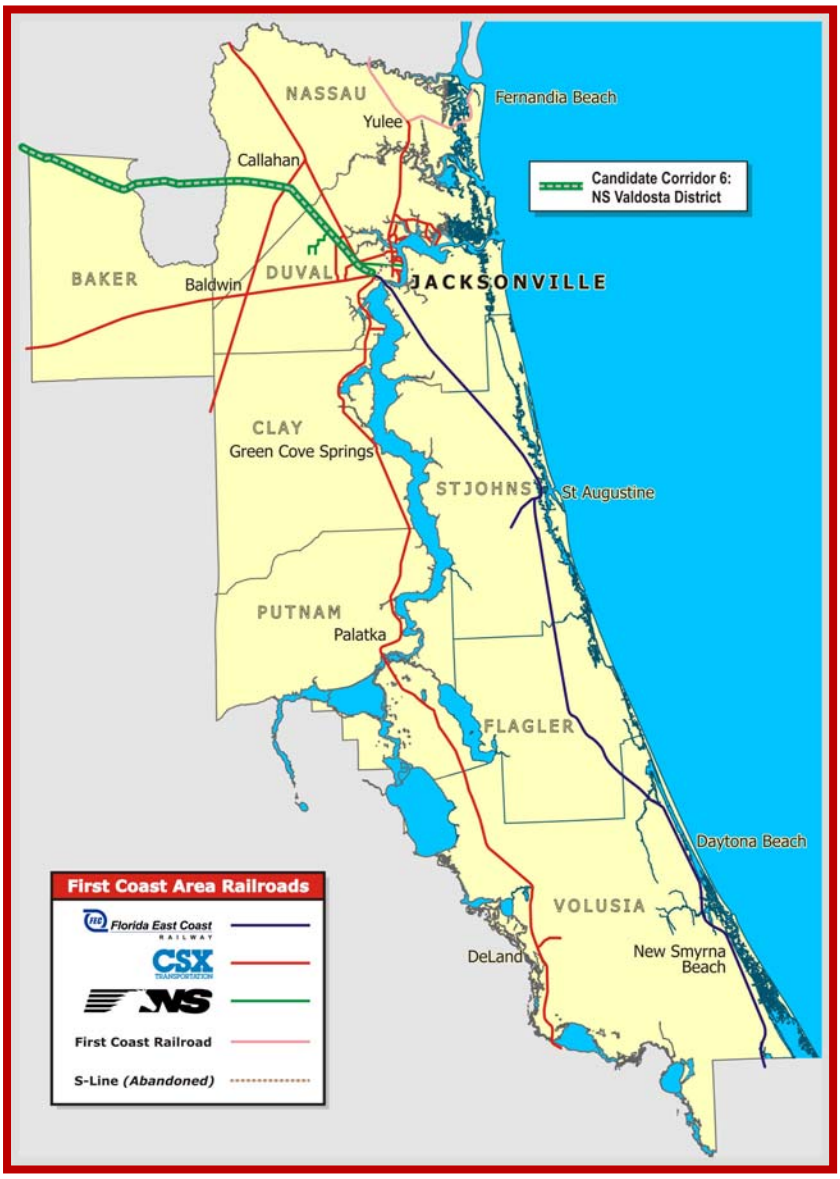

NASSAU
Yulee
Fernandia Beach
Callahan
Candidate Corridor 5:
CSXT Fernandia Subdivision
BAKER
Baldwin
DUVAL
JACKSONVILLE
CLAY
Green Cove Springs
STJOHNS
St Augustine
PUTNAM
Palatka
FLAGLER
Daytona Beach
VOLUSIA
DeLand
New Smyrna
Beach
First Coast Area Railroads
Florida East Coast
CSX
NS
First Coast Railroad
S-Line (Abandoned)

Candidate Corridor 6: NS Valdosta District – The Norfolk Southern Valdosta - Jacksonville Line into Jacksonville from the northwest runs more than 100 miles from Valdosta, Georgia via Crawford, Florida in Nassau County. The NS Valdosta line runs roughly parallel to the CSXT Nahunta Line through the study area. Simpson Yard, a NS main terminal in the study area is immediately northwest of Moncrief Yard and the Grand Junction. The line continues to the south of Moncrief Yard on a separate alignment to reach Beaver Street interlocking and the connection to the FEC leading to historic Union Station.

NS Valdosta-Jacksonville Main Line	
Ownership	Norfolk Southern Corporation
Traffic density	20-30 million gross-ton miles annually
Number of tracks	Single Track
Predominant FRA Track Class	3
Maximum allowable passenger speeds (mph)	60
General tie and rail conditions	1977 CWR last surfaced in 2006
Signals and line capacity	ABS (None within Simpson Yard limits)
Grade crossings within 30 miles of JAX	24
Major customers within 30 miles of JAX	None noted in track charts
Moveable bridges and other major structures	None

Infrastructure: For the most part, the railroad is presently maintained as an ABS single track main with passing sidings. All train movements on the line between Beaver Street (one mile north of the southern terminus) and eight miles north are controlled by Simpson Yard, which is located approximately 5 miles northwest of Union Station and immediately northwest of Grand Crossing. The line is double-tracked from Beaver Street to 3.5 miles north. Informal inspection of the line indicates that the right-of-way has sufficient width along its entire length to construct a second main track.

Surrounding Land Uses and Population Densities: The land use along the eastern end of the line is generally industrial and warehousing. Outside the urbanized area, it passes through largely undeveloped land on its way west to Crawford.

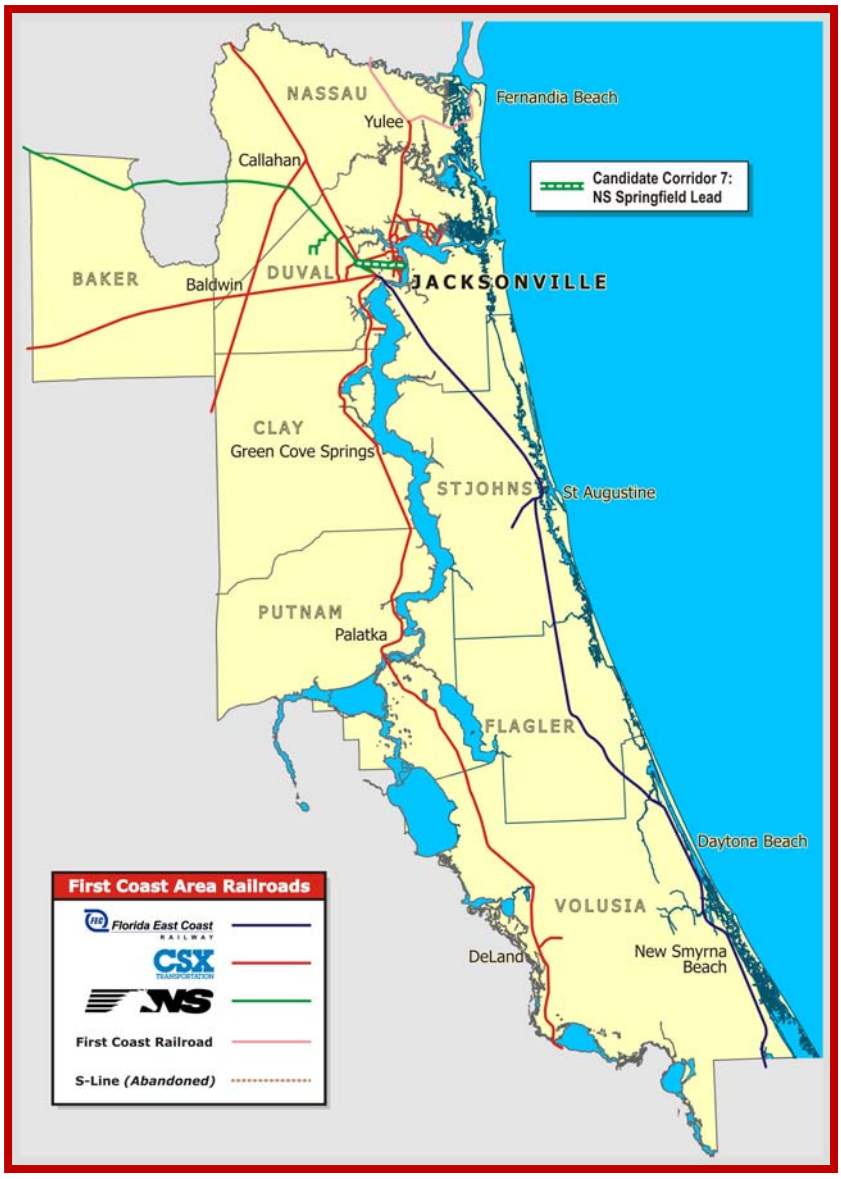

NASSAU
Yulee
Fernandia Beach
Callahan
Candidate Corridor 6:
NS Valdosta District
BAKER
Baldwin
DUVAL
JACKSONVILLE
CLAY
Green Cove Springs
STJOHNS
St Augustine
PUTNAM
Palatka
FLAGLER
Daytona Beach
VOLUSIA
DeLand
New Smyrna
Beach
First Coast Area Railroads
Florida East Coast
CSX
NS
First Coast Railroad
S-Line (Abandoned)

Candidate Corridor 7: NS Springfield Lead – The Springfield Lead runs east from Grand Crossing to Jacksonville industries including Springfield Yard and plants on the St. Johns River. No point on the line is further than five miles from the center of Jacksonville's CBD.

NS Springfield Lead	
Ownership	Norfolk Southern
Traffic density	Unspecified
Number of tracks	1
Predominant FRA Track Class	Class 3+
Maximum allowable passenger speeds (mph)	20
General tie and rail conditions	1988 CWR last surfaced in 1990
Signals	Unsignalled
Grade crossings within 30 miles of JAX	16
Major customers within 30 miles of JAX	TBD
Moveable bridges and other major structures	None

Infrastructure: The six mile portion of the single-track Springfield Lead currently maintained by Norfolk Southern runs east from Simpson Yard. Approximately four miles east of Simpson Yard, near Springfield Yard, the Springfield Lead turns northeast, terminating at a plant on the water.

Surrounding Land Uses and Population Densities: The Springfield Lead runs within close proximity to Downtown Jacksonville, and through Jacksonville neighborhoods. Land use along the western end of the line is mainly residential and light industrial. The number of residential developments abutting the line is less along the central portions. There are a variety of land uses, including schools and warehouses, located along the central portions of the Springfield Lead between the railroad and residential developments to the north and south. After the line turns north, at the eastern end, land-uses abutting the railroad are mainly industrial.


NASSAU
Yulee
Fernandia Beach
Callahan
Candidate Corridor 7:
NS Springfield Lead
BAKER
Baldwin
DUVAL
JACKSONVILLE
CLAY
Green Cove Springs
STJOHNS
St Augustine
PUTNAM
Palatka
FLAGLER
Daytona Beach
VOLUSIA
DeLand
New Smyrna
Beach
First Coast Area Railroads
Florida East Coast
CSX
NS
First Coast Railroad
S-Line (Abandoned)

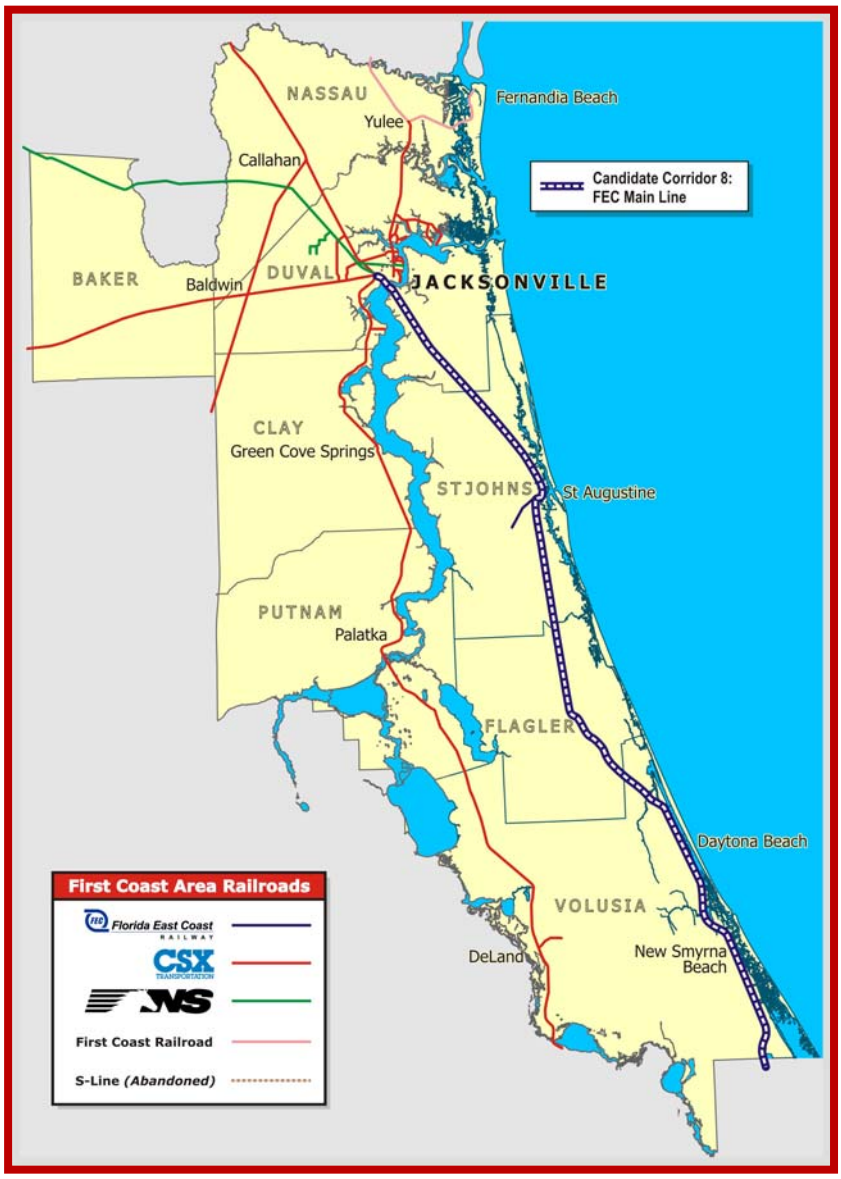
Candidate Corridor 8: FEC Main Line – The Florida East Coast rail corridor is the northern-most 36 route miles of a 368 mile freight rail corridor extending from Jacksonville to Miami. The corridor is owned and operated by the Florida East Coast Railway (FEC) based in Jacksonville. The FEC operates a freight only rail operation focusing on intermodal, aggregates, automobiles, and limited carload freight traffic.

Florida East Coast Main Line	
Ownership	Florida East Coast Railway
Traffic density	20-30 million gross tons
Number of tracks	Single track with passing sidings
Predominant FRA Track Class	4
Maximum allowable passenger speeds (mph)	79
General tie and rail conditions	CWR with concrete ties
Signals and line capacity	ATC with cab signalling
Grade crossings within 30 miles of JAX	24 (20 in closest 20 miles)
Major customers within 30 miles of JAX	Tarmac Concrete, Rinker
Moveable bridges and other major structures	Lift bridge crossing St. Johns River

Infrastructure: It is understood that the corridor right-of-way is generally 100 feet wide. The vertical profile of the line is very gentle, with mainline grades seldom exceeding 0.3%. The FEC was built as a double-track line, but it is now primarily a single track railway. The northern most six miles of the railway between the interchange yard in Downtown Jacksonville and FEC's Bowden Yard is double tracked. Between Bowden and St. Augustine there are two three-mile passing sidings – at Bayard and Magnolia Grove - and a short team track at Sampson.

Much of the railway is equipped with a sophisticated cab signal technology – Automatic Train Control (ATC). FEC's installation of ATC includes cab signaling with automatic enforcement of speed limits and signal aspects. Under ATC rules, all tracks are bidirectional allowing trains to operate at maximum allowable speeds in both directions on the line. A cab signal system, such as ATC, is federally required for operations where passenger train speeds exceed 79 mph. In contrast, the approximately 11 miles of double track between Beaver Street and Sunbeam the railway is controlled with ABS rules and wayside signals. Tracks controlled with ABS are uni-directional. Trains cannot operate on the "wrong track" without explicit formal authority from the train dispatcher, and such operations are limited to a maximum speed of 20 mph.

Freight and Passenger Rail Traffic: All of the 17 regularly scheduled interregional freight trains operating on the FEC within the corridor travel between Bowden Yard, approximately eight miles south of Beaver Street in Jacksonville, and South Florida. The segment of track between Downtown Jacksonville and Bowden Yard is a critical link for commuter rail, and requires additional detailed study in a subsequent phase of analysis.



Candidate Corridor 9: Jacksonville S-Line – An abandoned portion of the historic S-Line winds its way through Jacksonville from West Church Street near the JTA Bus Garage and Moncrief Yard to North Pearl Street, North of West 12th Street. East of North Pearl, the right-of-way has been severed by the construction of a school in the former right-of-way. The right-of-way is owned by the City of Jacksonville which has developed portions of the line as a bicycle and pedestrian trail. Expansion of the bicycle/pedestrian use of the rail right-of-way is ongoing.

Abandoned Jacksonville S-Line	
Ownership	City of Jacksonville
Traffic density	*NA*
Number of tracks	None
Predominant FRA Track Class	*NA*
Maximum allowable passenger speeds (mph)	*NA*
General tie and rail conditions	*NA*
Signals and line capacity	*NA*
Grade crossings within 30 miles of JAX	12
Major customers within 30 miles of JAX	NA
Moveable bridges and other major structures	None

Surrounding Land Uses and Population Densities: The line runs through a mix of residential, warehousing, and light industrial land uses. Much of it has been developed as a "rail trail" for use by pedestrians and bicyclists. It has been suggested that the line could be restored for urban passenger rail applications. However any such application would require circumnavigation of the Andrew Robinson Elementary School, which now occupies a portion of the right-of-way; this could be accomplished through use of s short segment of a nearby NS right-of-way.

West of Boulevard the line runs one block south of the parallel NS Springfield Lead. It appears that it could be possible to connect the abandoned right-of-way with the active track via a new one block connecting track. Should this connection be created, the line offers an alternative route to connect the Kingsland Subdivision (also former S-Line) to Downtown Jacksonville at the Convention Center.

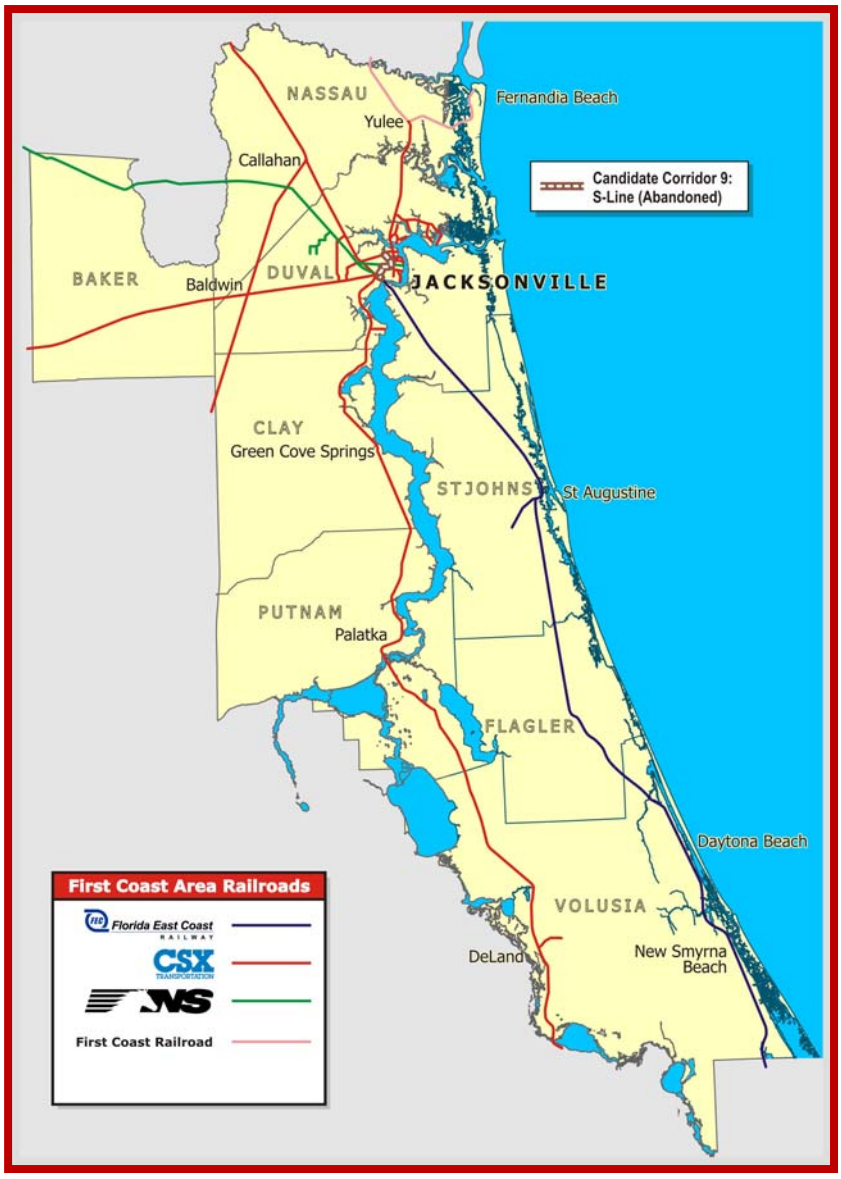
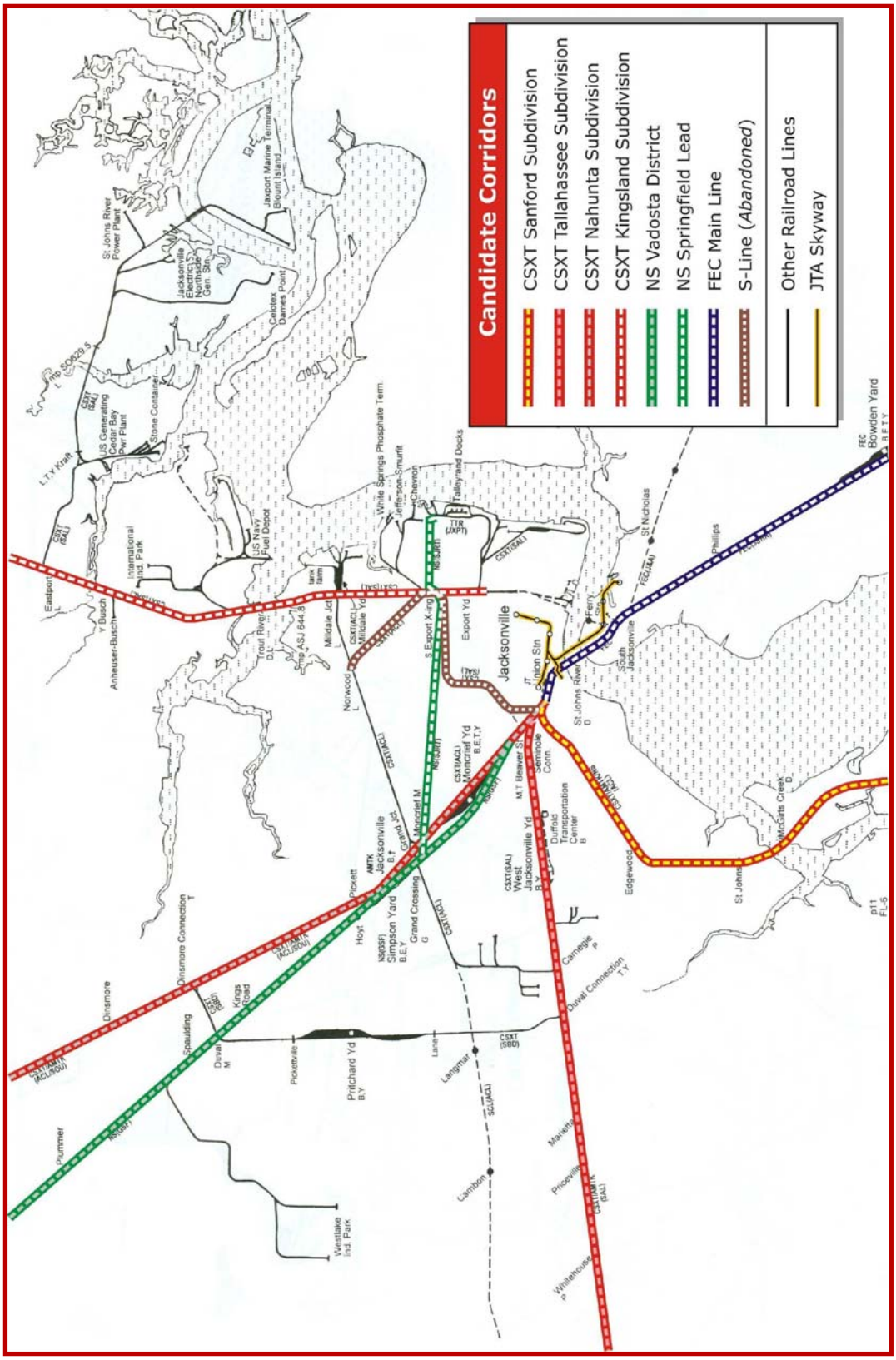

NASSAU
Yulee
Fernandia Beach
Callahan
Candidate Corridor 9:
S-Line (Abandoned)
BAKER
Baldwin
DUVAL
JACKSONVILLE
CLAY
Green Cove Springs
STJOHNS
St Augustine
PUTNAM
Palatka
FLAGLER
Daytona Beach
VOLUSIA
DeLand
New Smyrna
Beach
First Coast Area Railroads
Florida East Coast
CSX
NS
First Coast Railroad

FIGURE 4-3: CANDIDATE CORRIDORS



5.0 CANDIDATE CORRIDOR EVALUATION

Using the information on candidate rail corridors reviewed in Section 4, the study team developed seven ***service corridors*** that would link various areas of the region to downtown Jacksonville using existing or abandoned rail lines. The following descriptions indicate what lines are included in each service corridor, with individual rail lines numbered to correspond with the numbers used in Section 4 to identify the candidate rail corridors.

1. **North**: Yulee to Convention Center via CSXT Kingsland Branch (4), NS Springfield Lead (4), S-Line (9) and CSXT Tallahassee Subdivision (2).
2. **Northeast**: Fernandina Branch from Fernandina to Yulee as possible extension of North service corridor (5).
3. **Northwest (NS)**: Crawford to Convention Center via NS Valdosta-Jacksonville Line (6) and CSXT Tallahassee Subdivision (2).
4. **Northwest (CSX):** Callahan to Convention Center via CSXT Nahunta Subdivision (3).
5. **West**: Baldwin to Convention Center via CSXT Tallahassee Subdivision (2).
6. **Southwest**: Green Cove Springs to Convention Center via CSXT Sanford Subdivision (1).
7. **Southeast**: St. Augustine to Convention Center via FEC Main Line (8).

5.1 Corridor Development Evaluation Criteria

The following evaluation criteria were developed by the study team in concert with JTA staff for the initial screening of railroad corridors as to their potential for commuter rail service.

- Urban Travel Factors
- Community and Environmental Justice Factors
- Railroad Factors
- Natural and Physical Factors

These factors are consistent with the FTA requirements for, and anticipate the subsequent preparation of, an Alternatives Analysis. Specific factors within these broad criteria were selected to address the particular circumstances of the proposed northeast Florida commuter rail service. These factors included:

Urban Travel Demand Factors

- Number of persons residing within one mile of the candidate rail corridor and within 30 miles of Downtown Jacksonville
- Number of jobs within one mile of the candidate rail corridor and within 10 miles of Downtown Jacksonville

Community and Environmental Justice Factors

- Number of minority and/or low-income residents within one mile of railway and within 20 miles of downtown
- Number of zero auto households within one mile of railway and within 20 miles of downtown

Railroad Factors

- Existing freight traffic levels, expressed in annual gross ton miles per track mile
- Track and right-of-way conditions, including Number of active freight tracks (1 or 2), FRA Track Class (2, 3 or 4), Width of Right of way (in feet), Train control system (OCS, ABS, CTC), and Number of Grade crossings within 20 miles of Downtown Jacksonville
- Intermodal connectivity including the Skyway, determined in terms of feet from existing railway to intersection with nearest Skyway Line
- Potential for cooperation from owning railway, either high, medium or low

Natural and Physical Factors

- Natural resource considerations and constraints, such as significant river crossings and other wetlands, sensitive receptors adjacent to railway (e.g., Hospitals, Schools), and other environmental constraints.

The candidate corridors were evaluated using a comparative analysis since the application of evaluation factors are more qualitative that quantitative. Though some of the forth coming tables include quantitative data, the data was simplified to be expressed relative to the average.

5.2 Urban Travel Demand and Community/Environmental Justice Factors

The initial screening of candidate rail corridors did not employ demand modeling. Because of the preliminary level of study, population and employment in proximity to the planned rail line was used as a proxy for ridership potential. The following Tables 5-1 and 5-2 present the raw data, and the associated scoring and ranking of the corridors, based on potential travel demand and potential environmental justice impacts.

The combined scores for the potential travel demand and potential environmental justice impacts result in the North, Southwest and Southeast corridors being meaningfully more feasible than the other candidate corridors.

TABLE 5-1

		NORTH	NORTH EAST	NORTHWEST		WEST	SOUTH WEST	SOUTH EAST
				via NS	via CSXT			
URBAN TRAVEL FACTORS								
Population	TAZ Population within 1 mile	61,400	13,200	37,200	42,500	47,100	103,300	74,500
Households	TAZ Households within 3 miles	95,400	16,000	78,000	81,800	87,300	130,600	139,400
Employment	TAZ Employees within ½ mile	28,900	4,100	22,600	21,900	31,500	23,300	72,600
ENVIRONMENTAL JUSTICE/COMMUNITY FACTORS								
Minority Population	Census Minority Pop w/in 1 mile	43,200	2,800	28,000	32,600	23,800	31,600	23,700
Economically Disadvantaged	TAZ No-Car Hshlds w/in 1 mile	5,600	300	3,300	4,000	3,600	3,600	3,100

TABLE 5-2

	NORTH	NORTH EAST	NORTHWEST		WEST	SOUTH WEST	SOUTH EAST
			via NS	via CSXT			
URBAN TRAVEL FACTORS							
Population	⭘	○	◉	◉	◉	●	⭘
Households	⭘	○	◉	◉	◉	●	●
Employment	◉	○	◉	◉	⭘	◉	●
ENVIRONMENTAL JUSTICE/COMMUNITY FACTORS							
Minority Population	●	○	⭘	⭘	◉	⭘	◉
Economically Disadvantaged	●	○	◉	⭘	⭘	⭘	◉
Total Score	●	○	◉	◉	◉	●	●
Rank	**1**	**7**	**6**	**4**	**4**	**1**	**3**

●	Well Above Average
⭘	Above Average
◉	Below Average
○	Well Below Average

5.3 Railroad Factors

All seven service corridors were examined to assess condition and to establish the level of capital investment required to attain adequate condition and capacity to accommodate the proposed commuter rail service, as shown in Table 5-3.

TABLE 5-3

	NORTH	NORTH EAST	NORTHWEST		WEST	SOUTH WEST	SOUTH EAST
			via NS	via CSXT			
RAILROAD FACTORS							
Freight Conflicts	●	●	◉	○	◉	◉	◉
Number of Existing Tracks	◉	◉	◉	O	◉	◉	◉
Existing FRA Track Class	◉	○	O	●	●	●	●
Right of Way Width	O	O	O	O	O	O	O
Existing Train Control	◉	◉	O	●	●	●	●
Number of Crossings	◉	O	O	●	◉	○	O
Total Score	◉	◉	◉	O	◉	◉	O
Rank	5	5	4	1	3	4	2

●	Well Above Average
O	Above Average
◉	Below Average
○	Well Below Average

Lightly used rail lines are typically in a condition requiring improvement before passenger trains can be operated. Lines that support substantial freight traffic are typically in good condition, suitable for passenger operations, but also typically lack sufficient capacity to accommodate commuter rail service except at very limited levels of service. In either circumstance, capital investment is required – the difference being rehabilitation of existing track infrastructure in one instance and adding new track infrastructure in the other. These concepts are borne out by the high ranking of the Northwest (via CSX) and Southeast Corridors, which are in excellent condition, but which are also very busy freight railroads.

5.4 Natural and Physical Factors

All seven service corridors were examined in terms of four natural and physical factors. Scores did not vary as much with regard to these criteria as with others, as illustrated in Table 5-4.

TABLE 5-4

	NORTH	NORTH EAST	NORTHWEST via NS	NORTHWEST via CSXT	WEST	SOUTH WEST	SOUTH EAST
NATURAL & PHYSICAL							
New Crossings	O	O	O	O	O	O	O
Wetlands	◉	◉	◉	◉	◉	◉	◉
Sensitive Receptors	◉	O	◉	◉	O	◉	O
Distance to Skyway	◉	○	◉	◉	◉	◉	O
Total Score	◉	◉	◉	◉	O	◉	O
Rank	**3**	**3**	**3**	**3**	**2**	**3**	**1**

●	Well Above Average
O	Above Average
◉	Below Average
○	Well Below Average

New Grade Crossings – Implementing new rail passenger creates new risk of grade crossing collisions at existing crossings as a result of increased exposure (more trains) and generally higher speeds. However, the increased risk at existing crossings is small and incremental in nature, especially where passenger service is being added to a relatively busy freight line. Further, such risk can be mitigated by improved crossing protection systems. Conversely, a new grade crossing creates a risk of grade crossing collisions where there previously was no risk. Accordingly, plans to create new grade crossings are usually strongly discouraged.

The initial candidate corridors do not vary meaningfully in this regard, and this criterion was not a differentiator among the corridors.

Wetlands – As a result of Florida's geography, this type of environmental factor is particularly important. However, since all of the candidate corridors consist of existing or previous rail lines, they are all anticipated to have little or no wetlands impacts, and consequently this criterion is not a differentiator among them.

Sensitive Receptors – This term refers to facilities whose occupants could be particularly adversely affected by the noise, vibration, exhaust emissions, and other impacts of a new passenger rail line. Such facilities include hospitals, schools, eldercare homes, and

residential neighborhoods. This criterion was only a slight differentiator among the candidate corridors.

Distance to Skyway – Because most of downtown Jacksonville employment is located more than a typical walking distance from the Jacksonville Convention Center, formerly Union Terminal, proximity to a Skyway Station is considered an essential characteristic. The scores applied vary based on whether feasible alignments for a given corridor could reach the north or south side of the Convention Center site. In the case of the Southeast Corridor, interface with the Skyway at the San Marco Station enables passengers on that Corridor to transfer to the Skyway earlier than would otherwise be the case, therefore earning a higher score. This arrangement would also mitigate potential delays that Southeast Corridor trains would encounter at times when the moveable bridge over the St. Johns River is open to river traffic, further supporting the higher score.

5.5 Evaluation Results

Table 5-5 presents the overall scores for the candidate corridors, combining scores for all criteria. The study scope required selection of between one and three of the candidate corridors for further, more detailed examination.

TABLE 5-5

	NORTH	NORTH EAST	NORTHWEST		WEST	SOUTH WEST	SOUTH EAST
			via NS	via CSXT			
Urban Travel & Community	16	5	11	12	12	16	15
Railroad	15	15	16	19	17	16	18
Natural & Physical	9	9	9	9	10	9	11
Total Score	**40**	**29**	**36**	**40**	**39**	**41**	**44**
Average	**38.4**						
Rank	**3**	**3**	**3**	**3**	**2**	**3**	**1**

●	Well Above Average
◉	Above Average
◉	Below Average
○	Well Below Average

The two highest scores were earned by the Southeast Corridor at 44, and the Southwest Corridor with 41. The North and Northwest (via CSX) Corridors were tied with a score of 40. In response, the greater population measure on the North Corridor was used as a tie-breaker, on the premise that population is arguably the most important factor being considered.

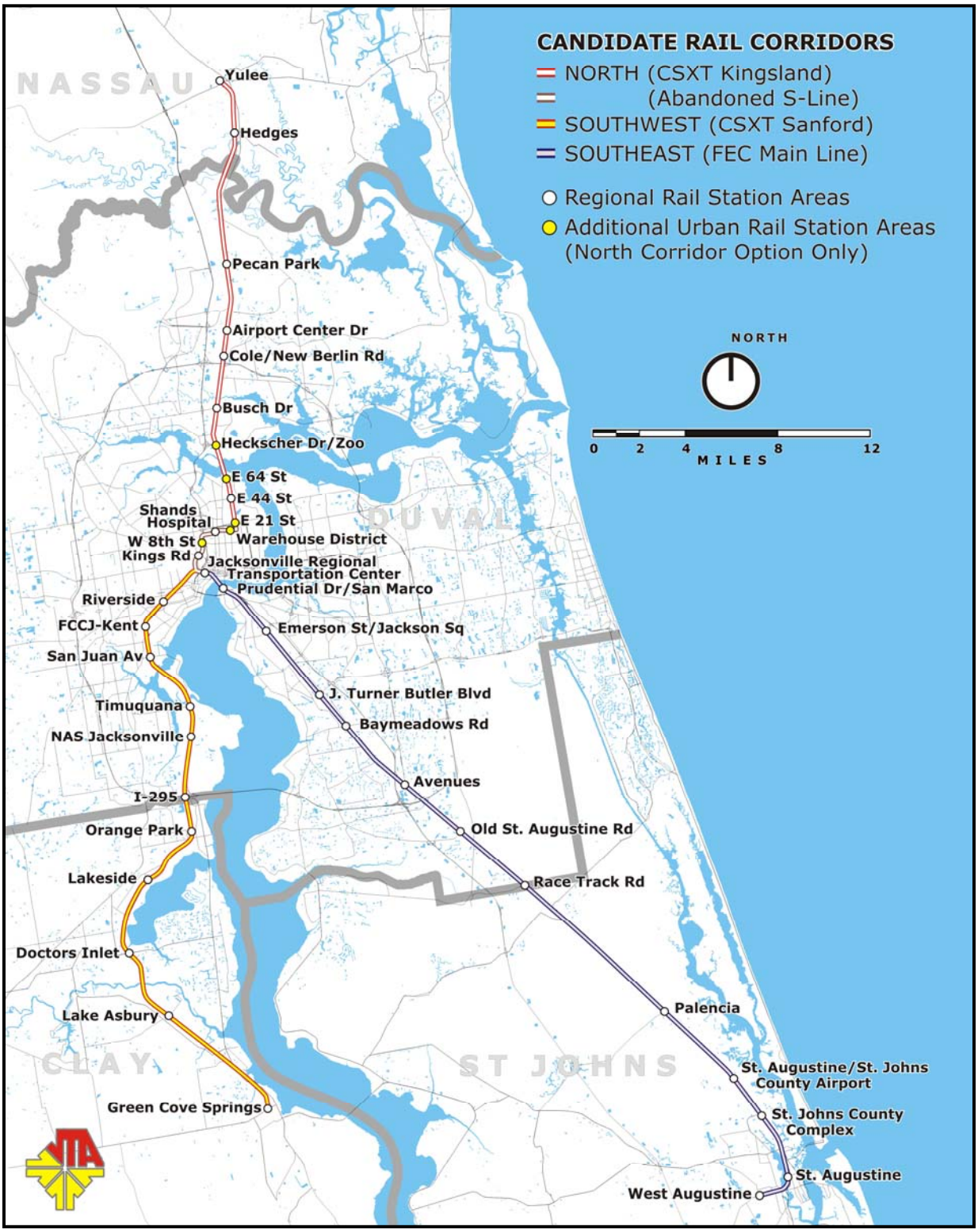
6.0 PREFERRED CORRIDORS

As a result of the screening of the candidate corridors as described in Section 5, three preferred service corridors were identified for more detailed examination. The three highest ranked corridors and their scores were:

- Southeast (44)
- Southwest (41)
- North (40)

Specific station locations were identified, as were other corridor characteristics, pursuant to this evaluation and as described in the following section. The Preferred Corridors – North to Yulee, Southeast to St. Augustine, and Southwest to Green Cove Springs – are shown on Figure 6-1 on the next page.

FIGURE 6-1: CANDIDATE RAIL CORRIDORS AND POTENTIAL STATION LOCATIONS



6.1 Potential Station Locations

Potential station locations were a fundamental characteristic to be defined for each of the preferred corridors. Analyses performed in this study were limited to rail corridors as defined generally, with no specific station locations considered, other than the corridor endpoints. The locations were used to facilitate calculation of train travel times; they were not used in estimating potential ridership.

The locations listed in Tables 6-1 through 6-3, and depicted in Figure 6-1, represent the centroids of proposed station areas for modeling purposes, not the precise location of a proposed station platform and ancillary facilities. Should any of the candidate commuter rail corridors advance beyond the feasibility study stage of project development, a more detailed analysis of station locations would be conducted in collaboration with subject communities and other stakeholders.

Definition of potential station areas was performed consistent with a set of guiding principles. Primary among these were proximity to population and employment centers, and proximity to major road crossings to provide automobile access.

Station areas were assumed to be the same for each station in each of the corridors. All stations were assumed to have 200 to 500 parking spaces which would require a site of approximately 2 to 5 acres. The facilities would be designed to accommodate drop off and pick up by automobile. Two to three bus bays would allow for the transit pick up and drop off. The platforms would be approximately 500 feet in length, and low level – approximately eight inches above the top of rail – and would provide for level boarding to an appropriately designed railcar. The assumption was made that the zoning and land use regulations (within ½ mile radius of the station) would be revised to reflect accessibility to major transit service with increased densities, mixed use, and design standards for sidewalks and other transit-oriented characteristics.

A representative modern commuter rail station is illustrated by the photograph of the Pennsauken, New Jersey station, provided as Figure 6-2.

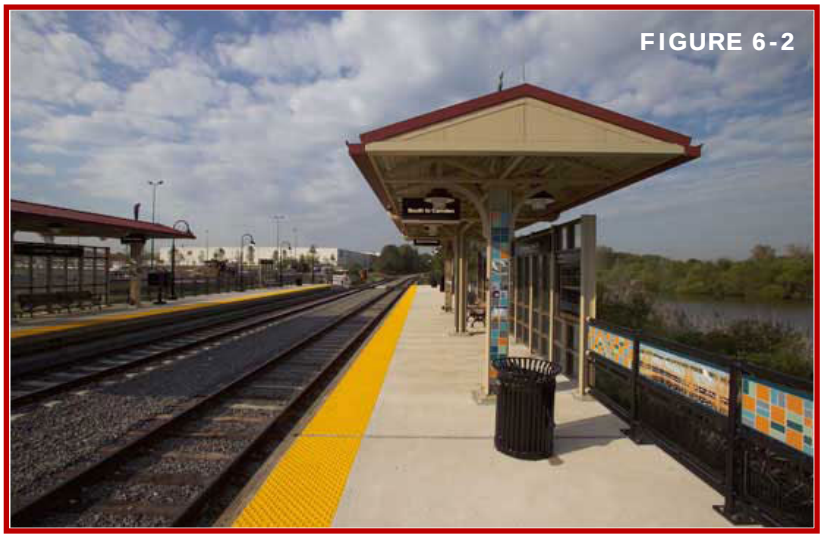


FIGURE 6-2

Two levels of rail service were considered for the North Corridor: one a traditional commuter rail level of service and a second providing an enhanced, urban rail level of service. The shaded rows with station names italicized in Table 6-1 would only be included in the second urban rail service option, referred to as North Enhanced Corridor. Figure 6-1 depicts the potential station locations for the three preferred corridors.

TABLE 6-1: NORTH AND NORTH ENHANCED CORRIDOR STATION AREAS

Name	Mile Post	Station Area Centroid Cross Street / Reference Point
Transportation Center	0.0	Jacksonville Regional Transportation Center
Kings Road	1.3	Kings Road
West 8th Street	*1.9*	*West 8th Street*
Shands Hospital	2.6	Boulevard Road
Warehouse District	*3.4*	*North Market Street*
East 21st Street	*4.1*	*East 21st Street*
East 44th Street	5.1	East 44th Street
East 65th Street	*6.3*	*East 65th Street*
Heckscher Drive/Zoo	*7.7*	*Jericho Road*
Busch Drive	9.3	Busch Drive
Cole/New Berlin Roads	11.6	Cole Road West
Airport Center Drive	12.6	Airport Center Drive
Pecan Park	15.5	Pecan Park Road North
Hedges	21.7	East Harts Road
Yulee	22.8	East State Road 200

* Highlighted italic stations are additional stations included in the North Enhanced Corridor.

TABLE 6-2: SOUTHWEST CORRIDOR STATION AREAS

Name	Mile Post	Station Area Centroid Cross Street / Reference Point
Transportation Center	0.0	Jacksonville Regional Transportation Center
Riverside	2.0	King Street
FCCJ-Kent	3.9	Across from FCCJ Kent Campus
San Juan Avenue	5.1	San Juan Avenue
Timuquana	8.0	Timuquana Road
NAS Jacksonville	9.5	Yorktown Avenue
I-295	11.9	Under Interstate 295
Orange Park	13.6	Allen Lane
Lakeside	16.5	Greenridge Road
Doctors Inlet	19.9	Doctors Inlet Road
Lake Asbury	23.3	State Highway 209B
Green Cove Springs	29.3	State Road 16W (Idlewild Av/Farris St)

TABLE 6-3: SOUTHEAST CORRIDOR STATION AREAS

Name	Mile Post	Station Area Centroid Cross Street / Reference Point
Transportation Center	0.0	Jacksonville Regional Transportation Center
Prudential Drive/San Marco	1.1	Prudential Drive
Emerson Street/Jackson Square	3.6	Emerson Street
J. Turner Butler Boulevard	7.2	J. Turner Butler Boulevard
Baymeadows Road	9.0	Baymeadows Road
Avenues	13.3	Sunshine Boulevard
Old St. Augustine Road	15.8	Old St. Augustine Road
Race Track Road	19.3	Race Track Road
Palencia	27.5	International Golf Parkway
St. Augustine/ St. Johns County Airport	31.8	Big Oak Road
St. Johns County Complex	33.6	Lewis Speedway
St. Augustine	35.7	Orange Street
West Augustine	38.4	Between West King & McLaughlin Streets

6.2 Shared Facilities – Downtown Terminal and Maintenance Shop

Two substantial elements of the infrastructure of the proposed commuter rail network are common to all of the candidate corridors, and would need to be developed regardless of which corridor(s) are initially implemented, or the sequence in which they are developed: the terminal facilities in downtown Jacksonville, and the equipment maintenance shop and yard.

The study efforts to-date have identified the former Jacksonville Union Terminal, now the Jacksonville Convention Center, as the most viable downtown Jacksonville terminal location for the proposed commuter rail network. This facility would primarily occupy the former Seaboard Coast Line Station along West Bay Street, directly opposite from the existing Skyway Station and the site of the proposed Jacksonville Regional Transportation Center (JRTC), depicted in Figure 6-1. The JRTC is a planned multimodal facility, intended to become the focal point of regional and local bus service and an interchange point with the Skyway, proposed commuter rail, and existing Amtrak intercity rail services.

FIGURE 6-3: JACKSONVILLE REGIONAL TRANSPORTATION CENTER

A maintenance shop will be needed to support maintenance and repair of rail rolling stock, and to accommodate storage of much of the equipment fleet during periods of non-peak service, such as overnight and on weekends. Sizing of such facilities will be driven by how many and which lines are implemented, the extent to which some rolling stock is stored overnight at end-of-line stations, and the extent to which specific maintenance functions – ranging from rolling stock component or subcomponent overhaul, to non-rolling stock functions such as track or stations maintenance – are to be sited there. Such facilities can be designed to suit initial fleet requirements, while providing for expansion to accommodate greater needs at such time in the future that the Northeast Florida network is expanded.

A preferred site for maintenance facility has not yet been identified, however, a key consideration, beyond adequate parcel size and suitable parcel shape, is proximity to the downtown terminal. This is important to make access to the maintenance shop from all of the corridors as convenient as possible, and to minimize non-revenue miles and operating costs.

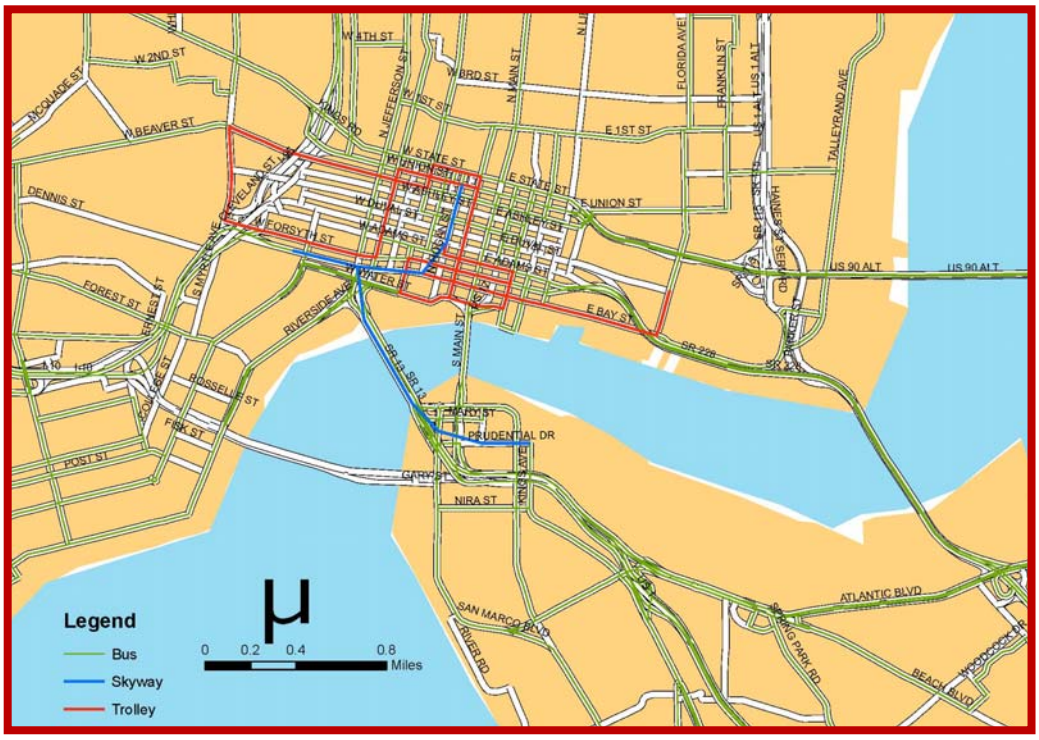
There are enough available and suitable sites in industrial areas that a feasible location was assumed for this phase of the study. An optimum location may be a site in immediate proximity to the existing JTA Headquarters and Bus Maintenance facilities.

6.3 Interface with Other Transit Modes

Commuter rail services generally require interfaces with other transit modes for circulation beyond the pedestrian range of downtown terminals. This is especially important for Jacksonville, since the concentration of downtown employment is beyond a typical walking distance from the Jacksonville Convention Center, formerly Union Terminal. Consequently, convenient interface with the Skyway will be essential for the planned service to attract passengers. Because of the configuration of the existing rail lines in the vicinity of Union Station, the proposed terminal arrangement would utilize both the north and south sides of Union Station. The former Seaboard Coast Line Railroad Station immediately adjacent to and north of Union Terminal is located directly across West Bay Street from the Convention Center Skyway Station and would serve trains from the North and Southwest Lines. The Southeast Corridor would access the Convention Center building on its south side, providing pedestrian access to the Skyway via a level concourse over a distance of approximately 600 feet. This slight inconvenience associated with the Southeast Corridor terminal arrangement is largely mitigated, however, by the planned location of a station south of the St. Johns River in immediate proximity to the San Marco Skyway Station, to facilitate interface with the Skyway at that location.

Circulation in Downtown Jacksonville for commuter rail passengers, although intended to be primarily accomplished via transfer to the Skyway, will also rely on transfers to JTA bus and Trolley routes. The map provided as Figure 6-4 illustrates the proximity of existing JTA bus and trolley routes to the downtown core and proposed commuter rail terminal.

FIGURE 6-4: DOWNTOWN JACKSONVILLE EXISTING TRANSIT ROUTES



These routes would be evaluated for modification to improve the intermodal interfaces. In addition, existing JTA bus and future JTA Bus Rapid Transit (BRT) services would be integrated with commuter rail by implementation of convenient transfer stations. The evaluation and recommendation of viable locations for such transfer stations would be undertaken in a subsequent phase of the study.

7.0 EQUIPMENT TECHNOLOGY ALTERNATIVES

This section evaluates commuter rail rolling stock technology alternatives for the proposed commuter rail service. The evaluation takes into account the service designs, forecast passenger capacity requirements, station spacing, rail infrastructure requirements, and the institutional/ regulatory environment. The following were specifically addressed:

- electrification versus on-board propulsion power;
- push-pull coaches versus self-powered rail cars (DMUs);
- Federal Railroad Administration (FRA) compliant versus non-compliant rolling stock; and
- high versus low platforms to achieve ADA Accessibility.

Selection of a recommended and assumed rolling stock technology is required for operational analysis, as well as estimating capital and operating costs. Descriptions of alternative commuter rail rolling stock technologies are included in Appendix F.

7.1 Electrification versus on-board propulsion power

Owing to the long route lengths of the proposed commuter rail lines, the modest forecast ridership levels and the need for cost-effectiveness, an on-board propulsion system employing internal combustion engines is recommended.

The use of electric traction with overhead catenary would add substantially to the cost of constructing and operating the proposed services. Due to cost considerations, no new electrified commuter rail lines have been constructed in recent years, outside of service improvement-driven extensions of electrification on Amtrak's Northeast Corridor between New Haven and Boston, and of NJ Transit's North Jersey Coast Line between Red Bank and Long Branch NJ. In fact, when services on electrified lines in New York have been extended beyond the limits of the overhead wires (catenary), diesel shuttles or dual mode (dc electric/diesel) locomotives have been employed.

7.2 Push-Pull Versus Self-Powered Rolling Stock

Two general equipment options for the proposed Northeast Florida commuter rail service were identified and evaluated:

- Locomotive-hauled Push-Pull Coach Train; and,
- Self-Powered Rail Car (SPRC) or Diesel Multiple Unit (DMU) technology.

Neither of these equipment alternatives is completely homogeneous, but some general characterizations are valid. Details on two possible equipment configurations are listed in Table 7-1. Either configuration would be generally sufficient to carry the peak ridership on

the forecast peak train on the Southeast and Southwest lines. However, there are forecasted to be some standees during peak periods on the Southeast line with the push-pull train, based on its slightly smaller capacity. In contrast, peak ridership on the North Line could be accommodated with a single car train, because of the greater frequency of proposed service.

TABLE 7-1:
COMPARISON OF TWO UNIT BI-LEVEL PUSH-PULL VS. SELF PROPELLED RAIL CAR (SPRC) TRAIN

	Typical New Two-Car Push-Pull Trainset (Bi-level)	Two Car Bi-level DMU Train Set
Minimum Configuration	One Locomotive and Two Bi-level Coaches	One DMU and One Trailer
Seating Capacity	324	406
Standees Possible	552	154
Total Passenger Capacity	876	560
Capital Cost (Millions)	$5.90	$6.90
Horsepower	3000	1200
Weight (Tons)	235	180
Length (Feet)	235	170
Tons/Seat	0.7	0.4
Miles per Gallon	0.5	1.3
Capital Cost/Seat	$18,210	$16,995
HP/Ton	13	7
Noise and Vibration	High	Medium/Low

As shown in Table 7-1, the push-pull option would have a lower overall capital cost than the bi-level DMU option, but the higher seating capacity DMU vehicles exhibit a lower average cost per seat. Fuel consumption for the DMU would be much lower as would maintenance expenses. The noise and vibration impacts of the somewhat lighter DMU train would also be less than for the push-pull train. Consequently, it is recommended that pending any further evaluation and study that the JTA plan to employ bi-level DMUs similar in design to the units in operation in Miami and planned for Orlando.

In general terms, because most commuter rail properties operate push-pull trains of as many as seven and eight cars, the push-pull configuration usually offers the most capacity for the lowest overall cost per seat. (See Figure 7-1.) However, for operations with shorter train lengths such as the one and two-car trains of the proposed northeast Florida service, the SPRC technology offers superior acceleration and braking performance, with lower

operating and maintenance costs. The push-pull equipment also has the higher potential environmental impact in terms of noise, vibration and air quality.

FIGURE 7-1: MBTA AND TRI-RAIL PUSH-PULL EQUIPMENT

The relative advantages of push-pull and DMU equipment are summarized in Table 7-2. Plus signs in Table 7-2 are indicative of which of the identified technologies has a relative advantage. Characteristics for which neither technology has a clear advantage are labeled "even".

TABLE 7-2:
SUMMARY COMPARISON OF PUSH-PULL AND SPRC TECHNOLOGIES FOR PROPOSED COMMUTER RAIL SERVICE

CHARACTERISTIC	MORE ADVANTAGEOUS TECHNOLOGY
Operating Cost	SPRC
Capital Cost	Push-Pull
Minimum Fleet Size	SPRC
Comfort	Even
Availability	Push-Pull
Reliability	Even
Noise and Vibration	SPRC
Air Quality Impacts	SPRC
Fuel Consumption	SPRC
Maintenance Costs	SPRC
Image	SPRC
Flexibility	SPRC
Potential for One-Person-Train-Operation	SPRC

Worldwide, SPRCs are designed for use in a wide variety of operating environments ranging from main line intercity railways to street running trolley car type service. Different vehicle designs are employed depending upon service requirements. It can be useful to think of SPRCs as falling into three main classes for North American application. For the proposed Jacksonville service, only the Category 1 units can be readily operated in mixed traffic sharing track with Amtrak and freight operations. Categories of SPRC vehicles are described and illustrated in Figure 7-2.

FIGURE 7-2

Typology of North American SPRC Vehicles and Applications		
Category	**Description**	**North American Examples**
Category 1: FRA Compliant Car	Relatively heavy cars primarily designed for safe and unrestricted use on the nation's conventional railroad network sharing track with other trains including freight, commuter rail and Amtrak operations. Complies with all regulations stipulated by Federal Railroad Administration (FRA) for operation on the US conventional railroad network. *A Category 1 Car would be required for the proposed commuter rail service.*	 *SFRTA Low Floor Trailer Cab Car*
Category 2: Non-FRA Compliant Railway Car	Similar to Category 1 units but generally too lightly built to meet FRA standards relating to crashworthiness. Generally used to provide service in the 15 to 30 minute headway regime on a railway shared with conventional railroad operations. In North America, the conventional railway operations are almost always limited to the overnight period to minimize risk of catastrophic collision between the light passenger car and heavier conventional rail equipment.	 *Ottawa's O-Train*
Category 3: Diesel Light Rail Vehicle	Diesel Light Rail Vehicles (DLRVs) are shorter, lighter, articulated cars designed to negotiate tight turns required for street running trolley operations. Both domestically and overseas, the Category 3 car is used in similar settings to the Category 2 car except that the passenger service generally extends onto a street running segment where track geometry requires a DLRV to negotiate tight curves	 *New Jersey's RiverLINE - GTW 2/6*

7.3 Institutional and Regulatory Environment

Nearly the entire proposed commuter rail system uses right-of-way owned by private sector transportation companies and maintained as part of the national network of conventional railroad lines.

In considering possible local passenger services on their lines, private railway companies tend to focus on two principal concerns:

- preserving capacity and flexibility for freight operations; and,
- limiting liability from allowing passengers to use corporate assets.

As part of the national network of conventional railways, the commuter rail lines would be subject to the safety oversight and regulation of the Federal Railroad Administration (FRA). The FRA is primarily a safety agency with strict standards concerning the design of rail cars and train control systems. In the absence of such regulatory compliance, physical or temporal separation would be required between freight trains and JTA passenger trains.

In light of these institutional and regulatory considerations, it is strongly recommended that JTA employ rolling stock that meets all FRA safety criteria. The use of cars that conform with FRA safety regulations will help relieve liability concerns of the private railway owners and satisfy the safety concerns of both the FRA and the private railway owners.

7.4 Balancing ADA Accessibility with Freight Clearance Needs

Under regulations related to the Americans with Disabilities Act, all rail transit cars must provide level boarding for persons with disabilities wherever structurally and operationally practicable[7]. This provision is typically met in one of two ways. First, by building 48+" high station platforms adjacent to the track allowing passengers to wait for the train at the same level as the passenger floor of a conventionally designed rail car. Or second, by coordinating rail car floor height and station platform height to permit level boarding, typically at a height of between 18" and 24" above the top of rail (TOR), and also typically by using a small elevated block with a ramp and a bridge plate.

For a myriad of reasons relating to horizontal clearance, freight operators are typically loath to operate freight cars on tracks equipped with traditional high-level passenger platforms. They are concerned about losing the flexibility to carry wide loads, potential problems with shifted loads, damage resulting if doors on moving freight cars are inadvertently left open, and the serious hazard created by the platform for train crews that may be riding on the

[7] §1192.91 (c)(1) Commuter rail cars shall (provide) for level boarding wherever structurally and operationally practicable.

side of a car during local switching operations. These concerns all favor a low platform solution to meeting ADA goals, since at between 18" and 24" above TOR the low platform creates only limited interference with the freight clearance envelope, and at 8" above TOR there is no interference.

Low floor bi-level coaches for push-pull service are commonly used in Toronto, Miami, Dallas, Los Angeles, Seattle, San Diego, Albuquerque, and Salt Lake City. In contrast, no manufacturer presently offers a low floor SPRC that meets FRA regulations for unrestricted operation in mixed traffic with freight trains. However, the Central Florida's Commuter Rail system is planning to employ a fleet of as yet un-designed low-floor SPRCs. That project's outreach with equipment vendors indicates that such a vehicle could be constructed.

It is understood that CSXT has agreed to allow the development of low platforms along their line in Orlando, but has refused to allow high platforms to be built. The Northeast Florida project should anticipate that CSX, FEC and NS will have similar concerns and requirements for Jacksonville. Miami's Tri-Rail system uses low floor coaches that are accessed by handicapped passengers via 24" high pedestals on the 8.5" high platform that is typical on that line.

8.0 OPERATIONS ANALYSIS

Table 8-1 summarizes the key characteristics of the preferred corridors. These characteristics were utilized to develop rolling stock assumptions and estimate travel times, which in-turn were used to help estimate ridership and costs.

TABLE 8-1: NORTH FLORIDA COMMUTER RAIL SERVICE FORECAST SERVICE STATISTICS

Line	Southeast	Southwest	North *(Enhanced)*
Suburban Terminal	West Augustine	Green Cove Springs	Yulee
Downtown Terminal	Convention Center	Transportation Center	Transportation Center
Length (miles)	38.4	29.3	23.7
Stations	13	12	15
Average Station Spacing (miles)	3.2	2.7	1.7
One way trip time (min)	52	41	40
Comparable automobile trip time (min)	61	60	41
End-to-end service velocity (mph)	44	43	36
Peak Headway (min)	30	30	15
Off Peak Headway (min)	60	60	30
Weekday One way Trains	36	36	70
Peak Train Sets Required	4	4	7
Off Peak Train Sets Required	2	2	4

Consistent with typical commuter rail operations, the Southwest, Southeast and North (Base) services were all designed with 30 minutes peak service headways and 60 minutes off-peak service headways. Rolling stock technology was assumed to be self-powered diesel multiple unit (DMU) vehicles, to provide the best acceleration and braking capabilities without electrification, and to provide the best economy of operation given the anticipated relatively limited train lengths. To provide a frame of reference, comparable current automobile uncongested trip times were estimated using the Northeast Florida Regional Planning Model (NERPM) 2000 base year assuming paths close to the preferred corridors. The automobile trip times are anticipated to increase in the future while the rail trip times would not change.

8.1 Southeast Corridor

The Southeast service would have 13 stations (see Table 8-2) along its 38 mile route operating at an end-to-end service speed of 44 mph. The one way travel time would be 51 minutes. The service would operate 36 one way trips each day with a fleet of four trains operating in peak periods and two trains operating during the off-peak.

TABLE 8-2: SOUTHEAST CORRIDOR
STATION AREAS AND TRAVEL TIMES

Name	Mile Post	Approx mm:ss[8]	Station Area / Cross Street
Transportation Center	0.0		Jacksonville Regional Transportation Center
Prudential Drive/San Marco	1.1	03:31	Prudential Drive
Emerson Street Jackson Sq	3.6	03:36	Emerson Street
J.T. Butler Boulevard	7.2	04:42	J.T. Butler Boulevard
Baymeadows Road	9.0	02:54	Baymeadows Road
Avenues	13.3	04:51	Sunshine Boulevard
Old St. Augustine Road	15.8	03:21	Old St. Augustine Road
Race Track Road	19.3	04:06	Race Track Road
Palencia	27.5	07:40	International Golf Parkway
St. Augustine/ St. Johns County Airport	31.8	04:43	Big Oak Road
St. Johns County Complex	33.6	02:46	Lewis Speedway
St. Augustine	35.7	03:04	Orange Steet
West Augustine	38.4	03:34	BTW West King & McLaughlin St.

Total Travel Time: 51 minutes
Stations: 13 stations

Each preferred corridor and the potential station location are depicted in Figure 6-1.

The average distance between stations on the Southeast Corridor is 3.1 miles. The stations located the closest together are the Transportation Center and the Prudential Drive/San Marco Stations with a distance of 1.1 miles. The furthest distance between stations is 8.2 miles, between the Race Track Road and Palencia Stations.

[8] Not including 7% scheduling pad allowance

8.2 Southwest Corridor

The Southwest service would have 12 stations (see Table 8-3) along it route. The route would be 29.3 miles in length with an end-to-end service velocity of 43 mph. The one way travel time would be approximately 42 minutes. The service would operate 36 one way trips each day with a fleet of four trains operating in the peak period and two trains operating during the off-peak.

TABLE 8-3: SOUTHWEST CORRIDOR STATION AREAS AND TRAVEL TIMES

Name	Mile Post	Approx mm:ss[9]	Station Area / Cross Street
Transportation Center	0.0		Jacksonville Regional Transportation Center
Riverside	2.0	03:11	King Street
FCCJ Kent	3.9	02:53	Across from FCCJ Kent Campus
San Juan Avenue	5.1	02:15	San Juan Avenue
Timuquana	8.0	03:42	Timuquana Road
NAS Jacksonville	9.5	02:31	Yorktown Avenue
I-295	11.9	03:16	Under Interstate 295
Orange Park	13.6	02:42	Allen Lane
Lakeside	16.5	03:45	Greenridge Road
Doctors Inlet	19.9	04:06	Doctors Inlet Road
Lake Asbury	23.3	04:07	State Highway 209B
Green Cove Springs	29.3	06:03	State Road 16W (Idlewild Avenue/ Farris Street)

Total Travel Time: 42 minutes
Stations: 12 stations

The average distance between stations on the Southwest Corridor is 2.5 miles. The stations located the closest together are the FCCJ Kent and San Juan Avenue Stations with 1.2 miles. The furthest distance between stations is 6.0 miles, between the Lake Asbury and Green Cove Springs Stations.

[9] Not including 7% scheduling pad allowance

8.3 North Corridor – Base and Enhanced

Based on several factors – most notably population density, potential environmental justice considerations, and speed limitations, an Enhanced North Corridor variation was designed that would increase frequency and add stations, making the character of the North Corridor more transit-like than the other two commuter rail corridors. Stations and run times are presented in Table 8-4.

Both the Base and Enhanced services would operate over the same 22.7 mile route. The Base service would serve 10 stations with 36 one way trips each weekday; offering 30 minute peak headways and 60 minute off peak headways with an end-to-end service velocity of 37 mph making the trip in 37 minutes. (Stations highlighted in Table 8-4 are not included in the Base configuration – only in the Enhanced.) The end-to-end service velocity would be 38 mph. The base service would require a fleet of four train sets in the peak and two train sets in the off peak.

The Enhanced service would serve 15 stations with 70 one way trips each weekday. The Enhanced variation's travel time would be 40 minutes with an end-to-end service velocity of 36 mph. Operation of the enhanced service would require a fleet of 7 train sets in the peak and four train sets in the off peak.

TABLE 8-4: NORTH AND NORTH ENHANCED CORRIDORS STATION AREAS AND TRAVEL TIMES

Name	Mile Post	Approx mm:ss[10]	Station Area / Cross Street
Transportation Center	0.0		Jacksonville Regional Transportation Center
Kings Road	1.3	03:27	Kings Street
West 8th Street	*1.9*	*01:47*	*West 8th Street*
Shands Hospital	2.6	01:59	Boulevard Road
Warehouse District	*3.4*	*02:26*	*North Market Street*
East 21st Street	*4.1*	*01:40*	*East 21st Street*
East 44th Street	5.1	01:56	East 44th Street
East 65th Street	*6.3*	*02:10*	*East 65th Street*
Heckscher Drive/Zoo	*7.7*	*02:20*	*Jericho Road*
Bush Drive	9.3	02:28	Bush Drive
Cole/New Berlin Road	11.6	03:01	Cole Road West
Airport Center Drive	12.6	01:54	Airport Center Drive
Pecan Park	15.5	03:30	Pecan Park North
Hedges	21.7	06:05	East Harts Road
Yulee	22.8	02:53	State Road 200

* Highlighted italic stations are additional stations that were included in the North Enhanced Corridor, but not in the Base version of the North Corridor.

Travel Times: Base Service Option – 37 minutes
Enhanced Service Option – 41 minutes

Stations: Base Service Option – 10 stations
Enhanced Service Option – 15 stations

The average distance between stations on the North Corridor is 2.9 miles. The stations located the closest together are the Cole/New Berlin and the Airport Center Drive Stations, with a spacing of 1.0 mile. The North Enhanced Corridor has an average station spacing of 1.6 miles. The stations located the closest together are the Kings Road and West 8th Street Stations with a spacing of 0.6 miles. The furthest distance between stations is 6.2 miles, between the Pecan Park and Hedges Stations.

[10] Not including 7% scheduling pad allowance

9.0 POTENTIAL RIDERSHIP

Three different options were considered for the travel demand forecast modeling:

- Expanding the Northeast Regional Planning Model (NERPM) to include several new Counties.
- Combining the NERPM with the Central Florida Regional Planning Model (CFRPM).
- Use of an off model sketch planning technique developed for FTA.

The NERPM includes: St. Johns, Duval, Clay and Nassau Counties and has a year 2000 base network with 2030 as the forecast year. In order to use the NERPM it would need to be expanded to include Putnam, Volusia, Flagler and Baker Counties. The CFRPM includes Volusia, Flagler, Sumter, Lake, Marion, Osceola, Orange, Seminole, Brevard Counties as well as part of Polk County. It has a year 2000 base network with 2025 as the forecast year. If the NERPM and the CFRPM were to be combined, the result would cover an area much larger than the study area, and Putnam and Baker Counties would still need to be added. Due to the differences in forecast years of these two models, and complexity of expanding the model with the funds available, it was decided not to use the first two methods.

Consequently, it was decided to use the Aggregate Rail Ridership Forecasting (ARRF) Model, an FTA sponsored "order of magnitude" off-model technique that is based on recently built projects. This technique is a spreadsheet analysis that provides a range of potential ridership. The Census Transportation Planning Package (CTPP) and existing forecasted data for Baker, Putnam, Volusia, and Flagler Counties, along with the CTPP data of the Counties in the NERPM, were used to supplement the NERPM data.

Four preferred corridors, namely North Corridor Base, North Enhanced Corridor, Southwest Corridor, and Southeast Corridor were analyzed. The CTPP-Based Aggregate Rail Ridership Forecasting (ARRF) Model was used to forecast ridership for the commuter rail corridors. Growth rates estimated from the Northeast Regional Planning Model (NERPM) future year socioeconomic datasets, used by the North Florida TPO and approved by all the counties, were applied to the ARRF estimations to obtain future year forecasts. The results indicate that the Southeast Corridor yields the highest ridership, while North Corridor Base results in the lowest ridership, of the four alternatives. The ARRF Model estimates rail ridership by applying rail market share to the 2000 CTPP, Journey-to-Work (JTW) data. Therefore, ridership estimates for the base year 2000 were developed, and growth rates estimated from socioeconomic data were applied to the 2000 ridership to estimate the future year ridership.

A description of the ARRF Model is included in Appendix G.

9.1 Corridor Operating Characteristics

Each alternative corridor is defined by a set of operating assumptions, including average system speed, the number of trains per weekday (headway) and peak/off-peak service periods. The North Base, Southwest and Southeast corridors were assumed to have the same service frequencies, defined by 30 minute peak service headways and 60 minute off-peak service headways. Other service characteristics are discussed in Section 9.8.

9.2 Corridor Socioeconomic Characteristics

Growth rates obtained from NERPM future year socioeconomic datasets were applied to the estimates produced by ARRF to obtain future year ridership forecasts. Six-mile and two-mile population and 1 mile employment buffers were calculated around stations. Growth rates of the population and employment data within the respective buffers were averaged for each station. Those station-specific average growth rates were applied to the station boardings estimated for 2000 by ARRF to escalate them to the future year forecast. Table 9-1 shows the total population within 6 mile (Medium / High Income) and 2 mile (Low Income) buffers, and employment within 1 mile buffers around train stations for all four corridors. Table 9-2 includes the aggregate corridor growth rates in population and employment by buffer and corridor.

TABLE 9-1: POPULATION AND EMPLOYMENT BY BUFFER AND CORRIDOR (IN THOUSANDS)

Corridor	2000			2015		
	Employment Buffer (1 mile)	Population Buffer		Employment Buffer (1 mile)	Population Buffer	
		2 mile	6 mile		2 mile	6 mile
North Base	54.9	99.8	344.9	57.8	116.6	408.2
North Enhanced	58.5	105.7	351.5	62.5	123.2	415.3
Southwest	75.4	167.8	518.8	76.9	190.3	639.7
Southeast	101.7	148.0	484.3	112.2	196.9	608.2

TABLE 9-2: POPULATION AND EMPLOYMENT GROWTH RATES BY BUFFER AND CORRIDOR

Corridor	2000 – 2015		
	Employment (1 mile)	Population (2 mile)	Population (6 mile)
North Base	5%	17%	18%
North Enhanced	7%	17%	18%
Southwest	2%	13%	23%
Southeast	10%	33%	26%

The maps shown in Figures 9-1 and 9-2 show the 2015 population and employment buffers around the North Corridor Base alternative stations. The figures show that the stations on the south end of the line, namely Convention Center South, Kings Road, Shands Hospital and West 44th Street, serve high population and employment density areas. The stations north of West 44th Street Station, namely Busch Drive, Cole Road, Airport Center Drive, Pecan Park, Hodges, and Yulee, serve low population and employment density areas. Figures 9-3 and 9-4 show the 2015 population and employment buffers around the North Enhanced Corridor alternative stations. The North Enhanced Corridor alignment is similar to North Corridor Base, with the exception of 5 additional stations. Three of the 5 additional stations, namely West 8th Street, Warehouse District, and East 21st Street serve high density population and employment areas, while East 65th Street and Heckscher Drive/Zoo serve low density areas.

Figures 9-5 and 9-6 show the 2015 population and employment buffers around Southwest Corridor train stations. It can be observed from the figures that the stations on the north end of the line, namely Convention Center North, Riverside, FCCJ-Kent, San Juan Ave, Timiuquana, NASJAX, I-295, and Orange Park serve medium to high population and employment density areas. Stations south of Orange Park, namely Lake Side, Doctors Inlet, Lake Asbury and Green Cove Springs, are stations that serve regions of low population and employment density.

Figures 9-7 and 9-8 show the 2015 population and employment buffers around Southeast Corridor train stations. It can be observed from the figures that with the exception of Palencia and St. Augustine Airport, all other stations serve areas of medium to high population density. Palencia and St. Augustine Airport serve low population density areas. The figures also show that with the exception of Palencia, St. Augustine Airport, and West Augustine, all other stations serve areas of medium to high employment density. Overall, the population and employment density are higher on the north part of the corridor, with gradually less density to the south end of the corridor, with the exception of the southern terminus in St. Augustine.

FIGURE 9-1: 2015 NORTH CORRIDOR BASE POPULATION BUFFER

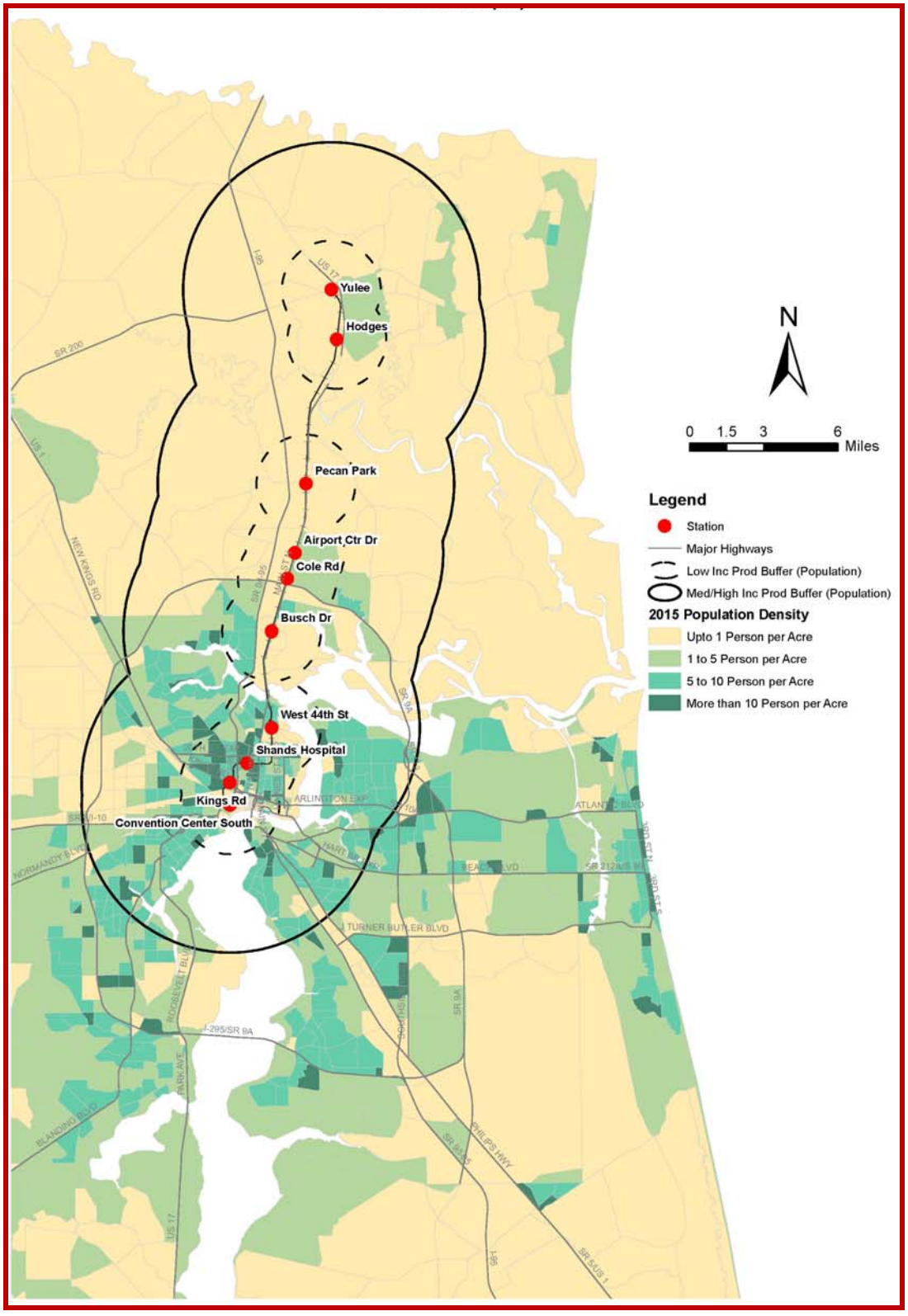


FIGURE 9-2: 2015 NORTH CORRIDOR BASE EMPLOYMENT BUFFER

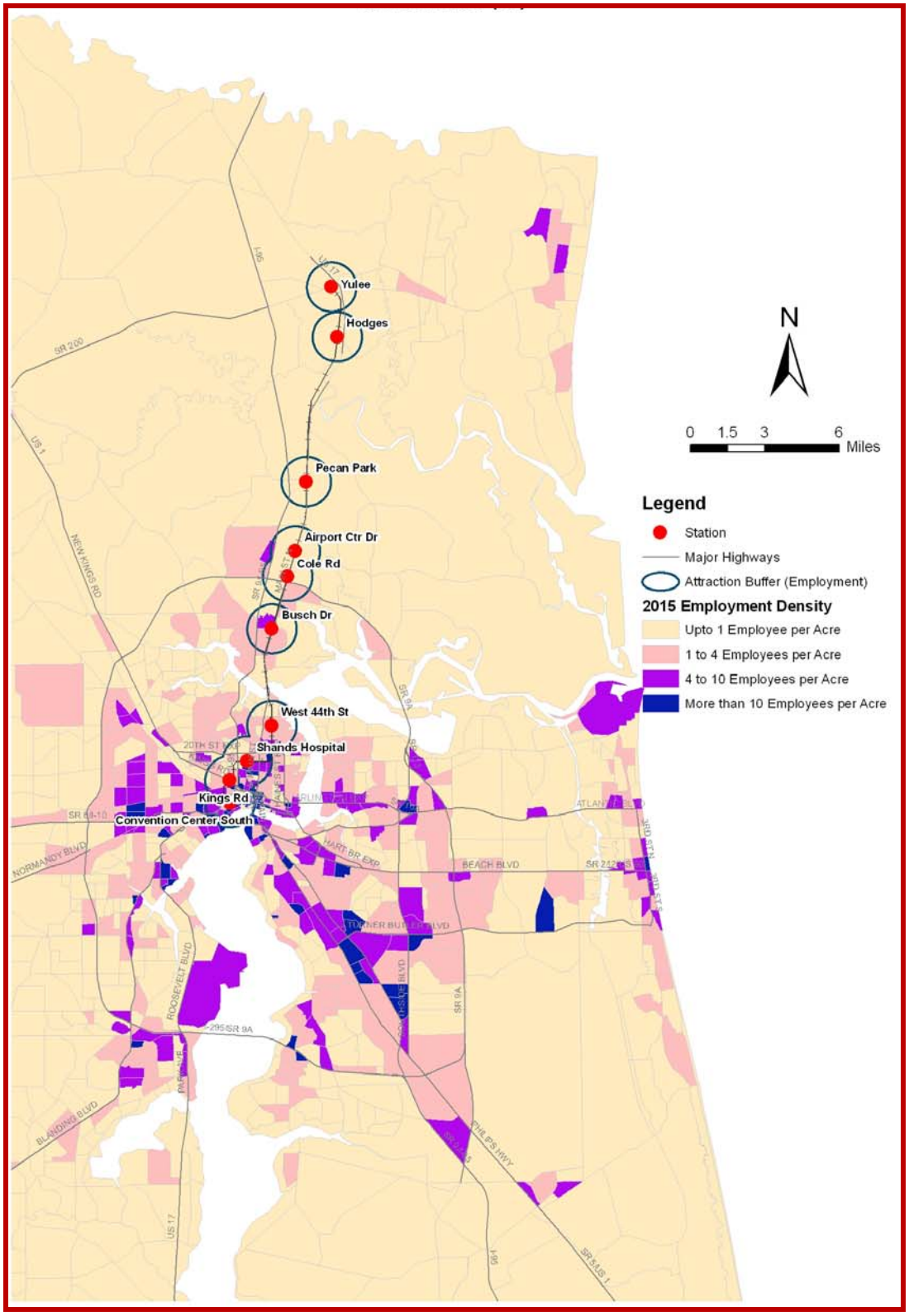


FIGURE 9-3: 2015 NORTH ENHANCED CORRIDOR POPULATION BUFFER

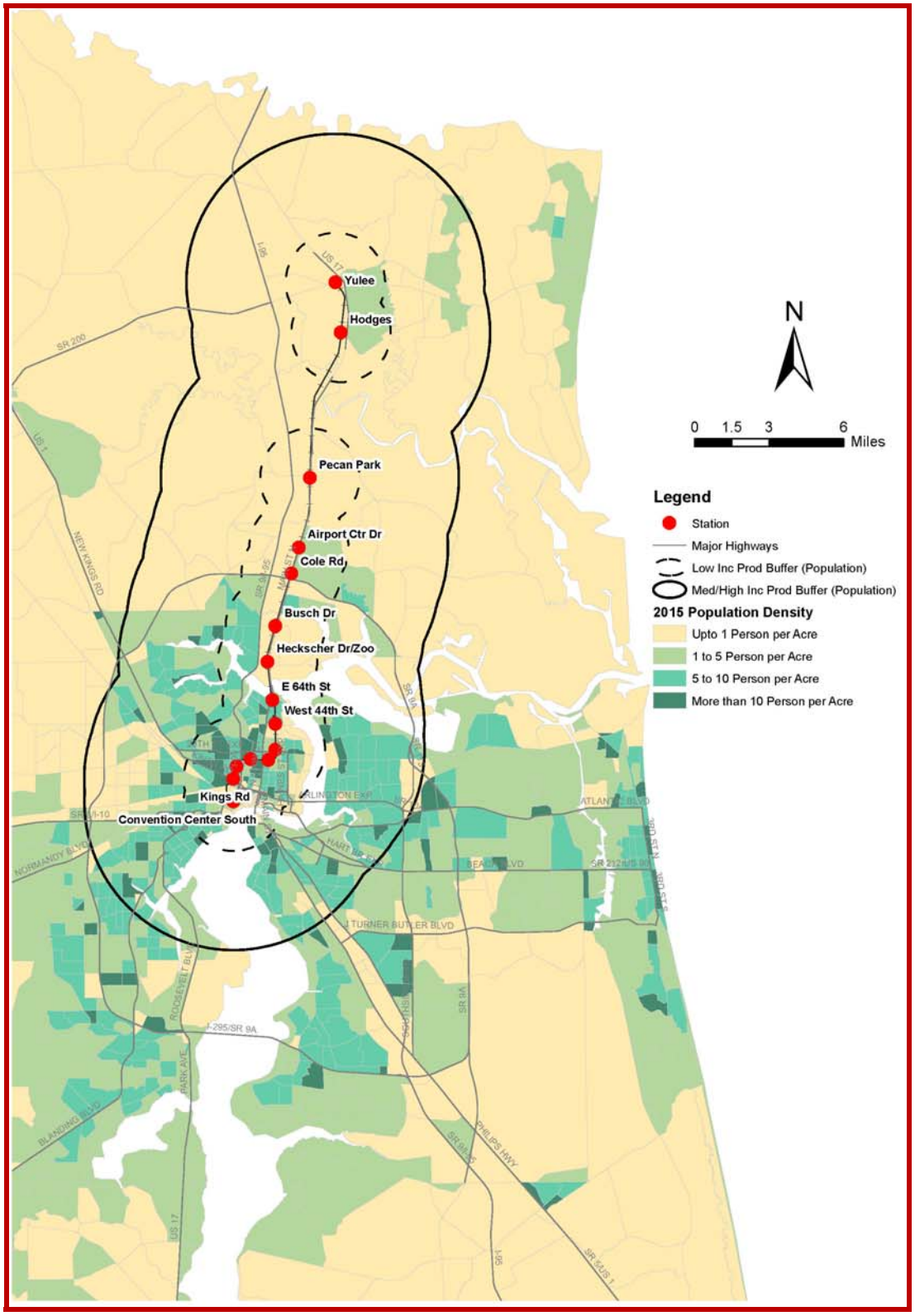


FIGURE 9-4: 2015 NORTH ENHANCED CORRIDOR EMPLOYMENT BUFFER

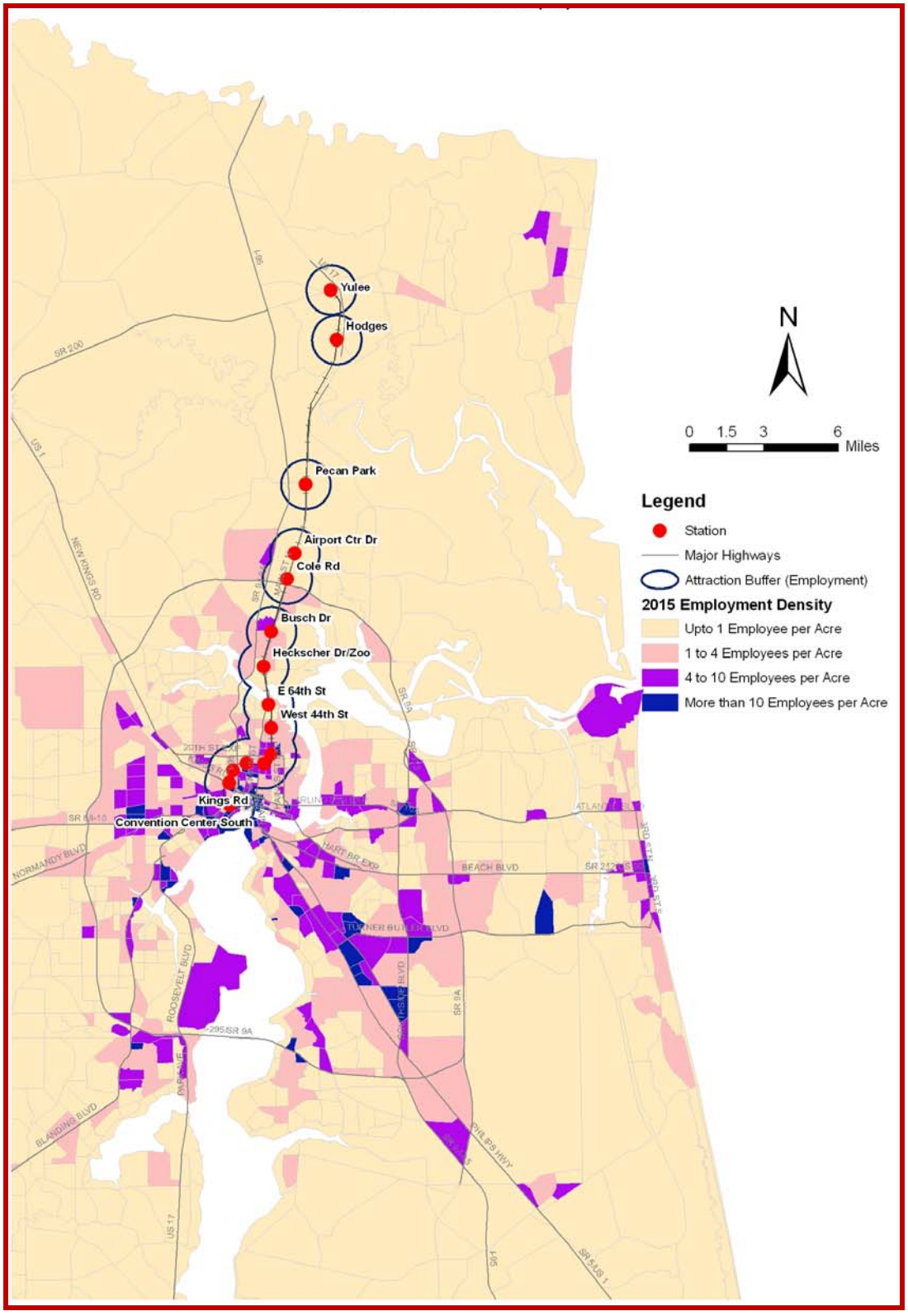


FIGURE 9-5: 2015 SOUTHWEST CORRIDOR POPULATION BUFFER

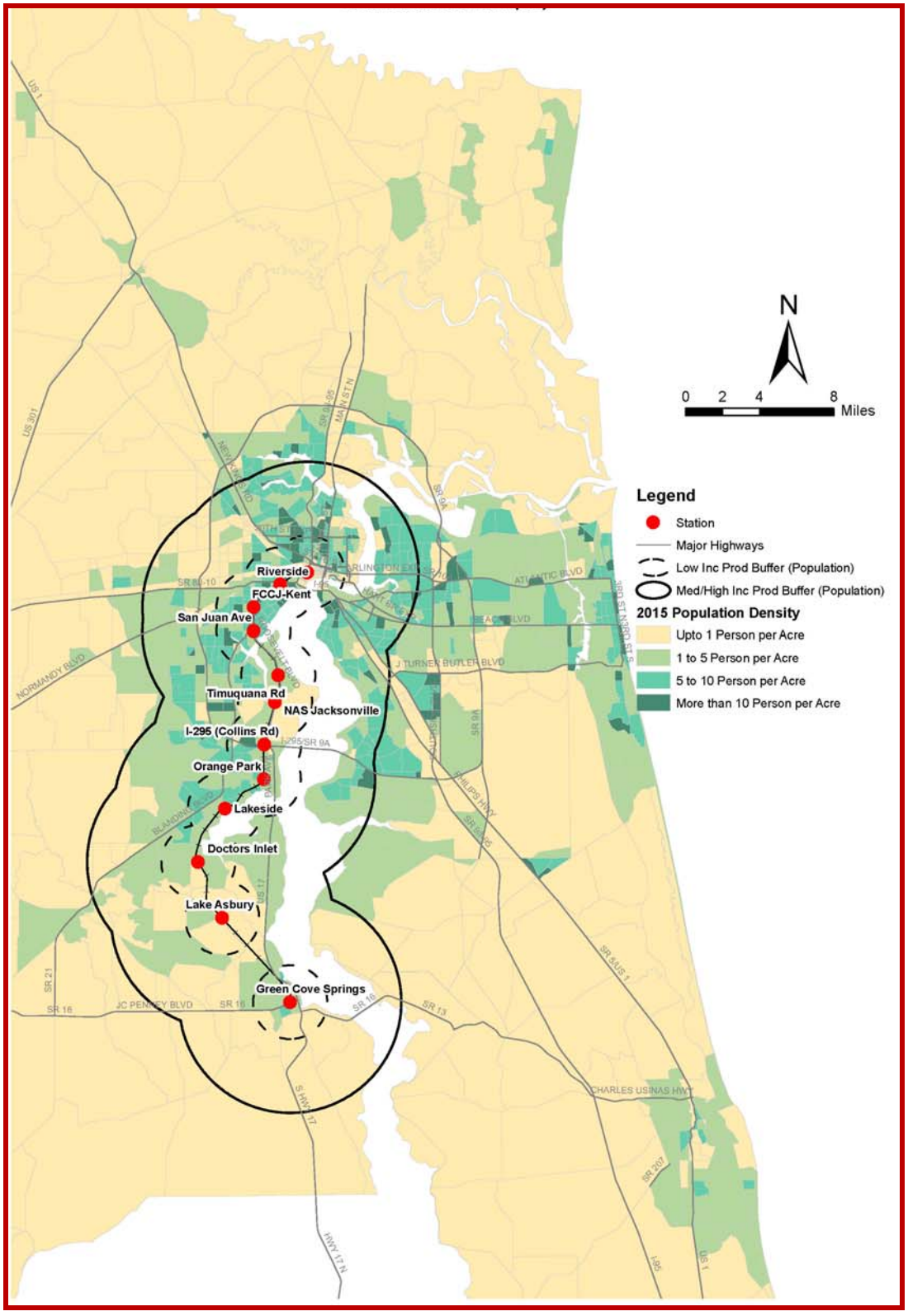


FIGURE 9-6: 2015 SOUTHWEST CORRIDOR EMPLOYMENT BUFFER

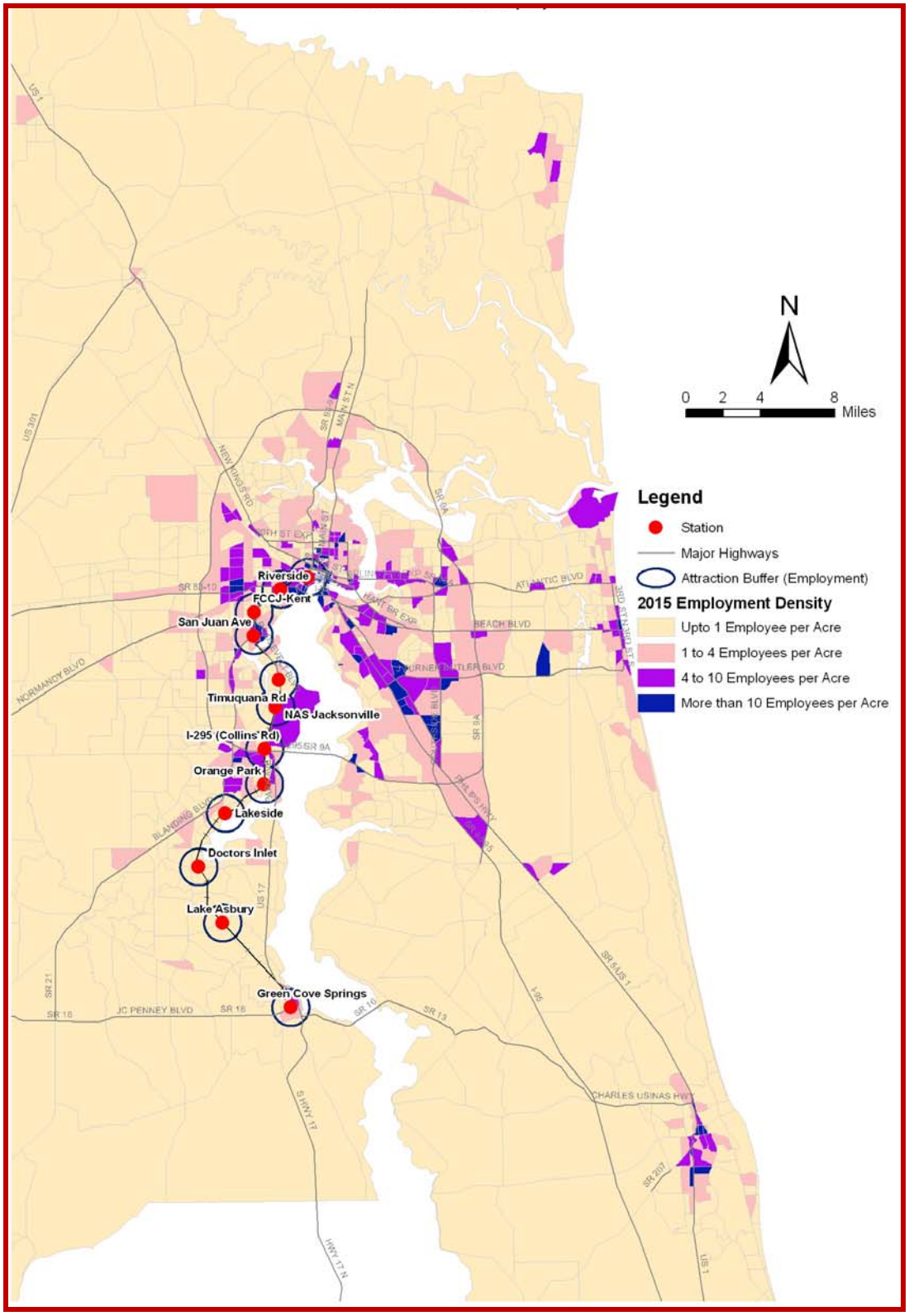


FIGURE 9-7: 2015 SOUTHEAST CORRIDOR POPULATION BUFFER

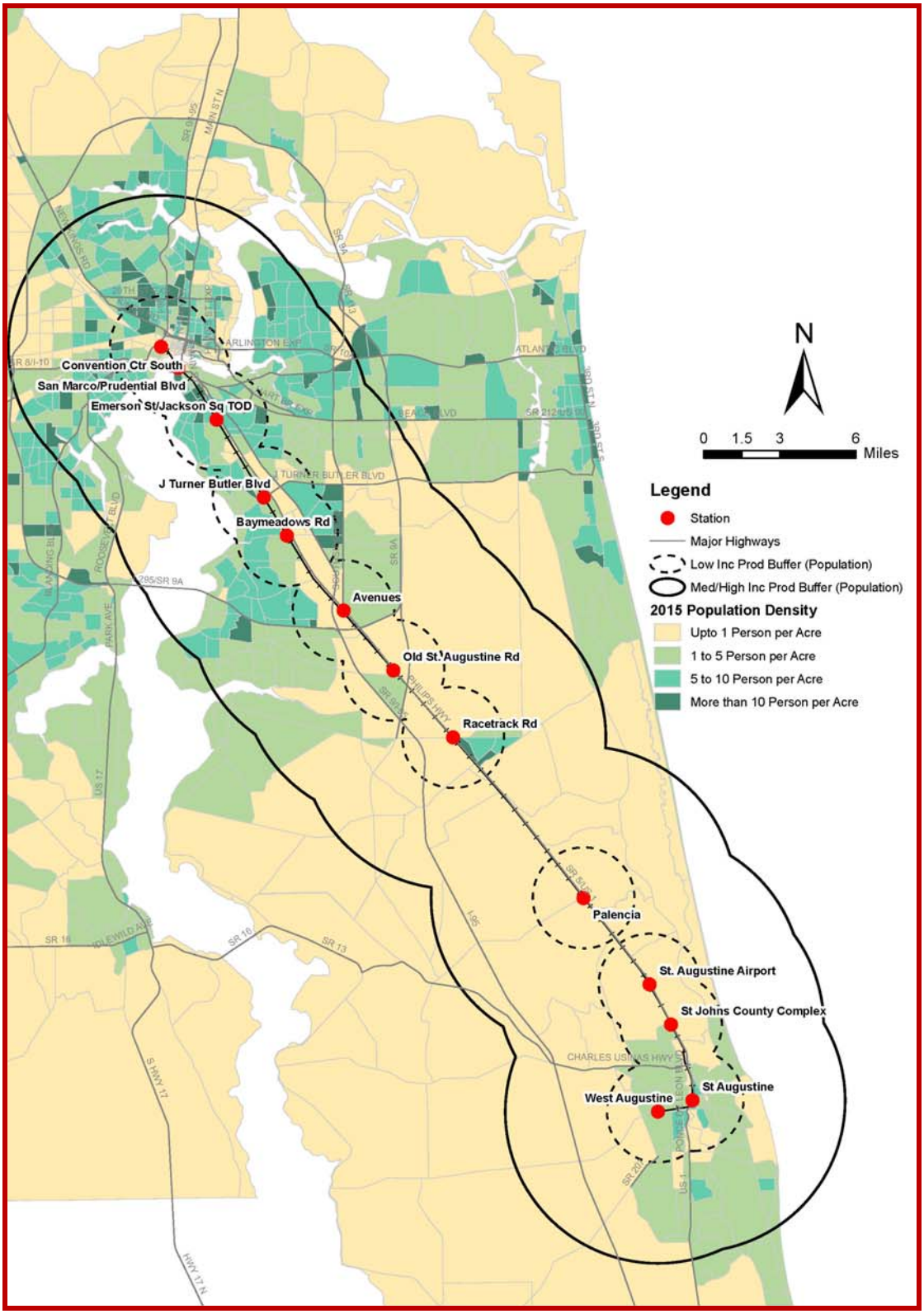
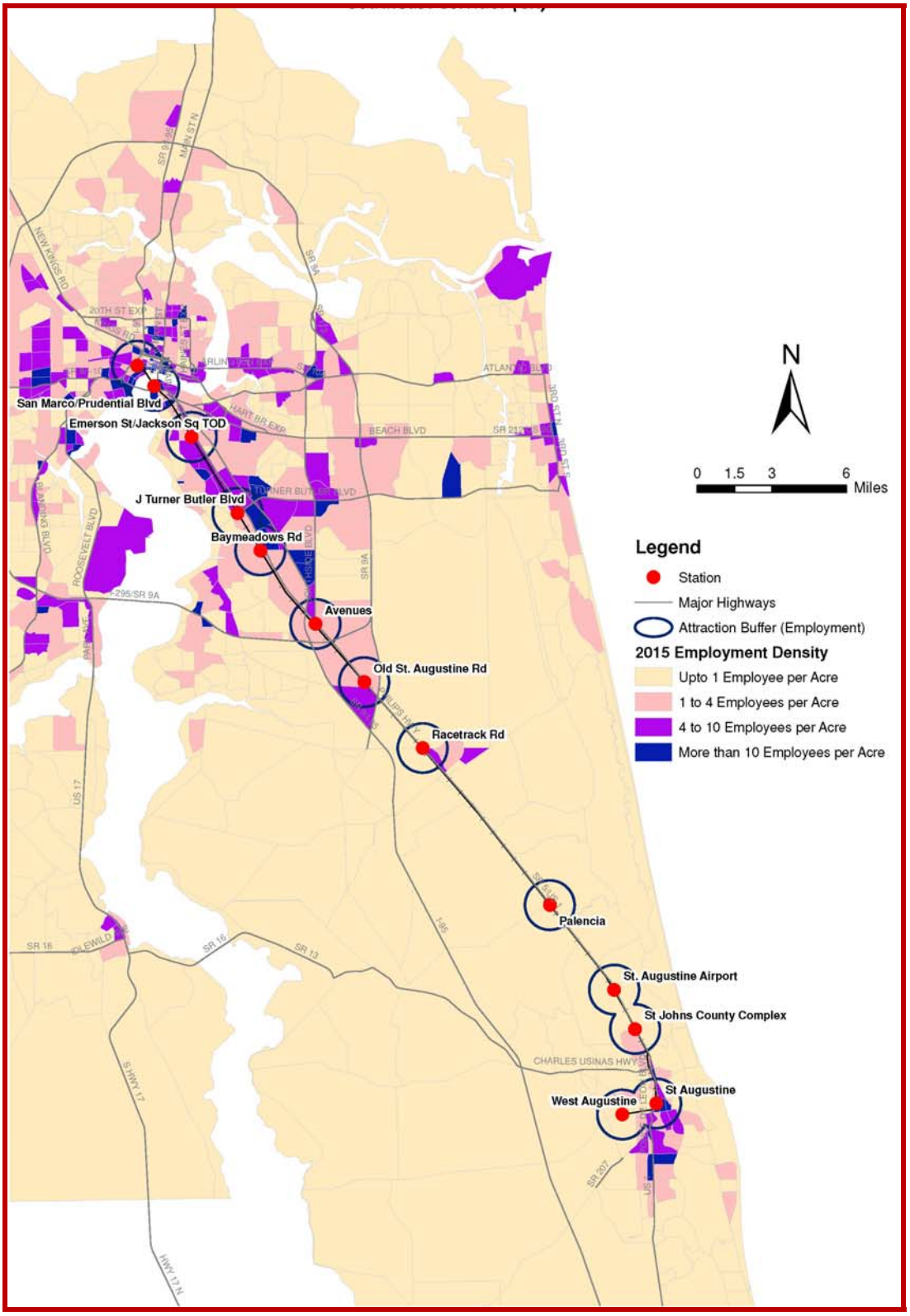


FIGURE 9-8: 2015 SOUTHEAST CORRIDOR EMPLOYMENT BUFFER



9.3 Ridership Forecast

The ARRF model, which estimates rail ridership by applying rail market share to the 2000 CTPP JTW data, was used to estimate the ridership for the different corridors for the base year 2000. The model also provides the option of modeling two different commuter rail scenarios; one that connects to an urban rail line; the other that provides no such connection. The two options are modeled by setting up the parameter "Rail Connection Index" equal to 1.0 for the scenario that has connection with urban rail line, and setting the parameter "Rail Connection Index" equal to 0.5 for the scenario without connection to urban rail line. Therefore two sets of estimates were developed (Rail Connection Index=1.0 and Rail Connection Index=0.5). Population and employment growth rates were applied to the 2000 ridership estimates to obtain 2015 ridership forecasts.

Table 9-3 shows the ridership estimates for the year 2000 and 2015 forecasts. The table shows that the Southeast Corridor has maximum daily ridership for 2000 and 2015, while North Base has the least. The Southwest Corridor yields the second highest ridership among the four corridors. The North Enhanced Corridor has higher ridership than North Base Corridor due to higher station density and frequency of service.

TABLE 9-3: 2000 AND 2015 RIDERSHIP BY CORRIDOR

Corridor	Rail Connection Index	Daily Ridership	
		2000	2015
North Base	0.5	690	770
	1.0	1,370	1,540
North Enhanced	0.5	900	1,020
	1.0	1,800	2,040
Southwest	0.5	1,280	1,490
	1.0	2,560	2,970
Southeast	0.5	1,860	2,410
	1.0	3,720	4,810

9.4 Demand Modeling Issues

The analytical capability of the ARRF model is limited in two ways. It is unable to evaluate ridership at the station level, and it is unable to account for off-line ridership sources.

Station Level Ridership – The ARRF model is capable of generating relatively reliable corridor level ridership estimates, but cannot provide ridership estimates at the station level. More detailed demand modeling will be necessary in a subsequent phase to determine station level forecasts which are necessary for both operations and infrastructure planning and design.

Off-Line Ridership Sources – The ARRF model does not account for off-line ridership sources. For some rail corridors, this can be very significant. In the context of this study, it is very significant for the North Corridor. Specifically, the North Corridor will likely capture a meaningful portion of its ridership from commuters whose homes are north of the corridor endpoint at Yulee and whose work destination is downtown Jacksonville. Because these potential riders are located beyond the limits of the corridor, potentially across the state line in Georgia, the ARRF model cannot recognize them. The result is that the corridor endpoint at Yulee, which is located in an undeveloped area with no significant population or employment density, would be incorrectly characterized as having little ridership potential. Similarly, Jacksonville International Airport is a significant employment destination and trip generator, but its location off-corridor prevents the ARRF model from recognizing any ridership associated with it. The next phase of demand modeling should be designed to capture and evaluate the ridership potential associated with the airport.

10.0 ESTIMATED COSTS

10.1 Assumed Network Definition and Quantities

In developing the Corridor Service plans the team prepared sketch schedules for service with time distances diagrams showing where trains would meet and pass. A key consideration for each service was allowing passenger trains to operate without interfering with present and likely freight operations of each lines' owner. With that objective in mind, the team identified each freight yard and freight customer along each route and designed the service and infrastructure such that each yard and freight customer could be served during off peak periods with no interference from passenger operations. The net impact of this approach was to require double track in most locations with crossover plant that would allow passenger trains to run around local freight operation serving local customers along the line. Signal upgrades would be necessary on all lines to provide for controlled, bidirectional running.

10.1.1 North Corridor Plan

The proposed service would require a substantial improvement to the current track configuration. Figure 10-1 shows the track configuration, road crossing and bridges from the Transportation Center through Yulee. The current track configuration is shown in black. Required new infrastructure to support the enhanced service is shown in red. An at-grade or water crossing is indicated with a dotted horizontal line or a solid blue line respectively. There are 45 at-grade crossings and four water crossings on this corridor. The Trout River crossing is the most substantial water crossing and includes a swing bridge.

There are several active freight customer sidings along this route. To avoid conflicts with freight traffic, a second track is designated over the entire route. Two passenger train meets are scheduled in the vicinity of Cole / New Berlin Road Station and between Hedges and Yulee Station. Both of these meets are near the entrance to a freight customer siding so a third track is necessary to allow the local freight train to park near the customer while passenger trains meet and pass at the same location. The line presently has one passing siding on the NS Springfield Lead track between milepost SL004.5 and SL004.7 and three passing sidings on the CSXT Kingsland Subdivision between mileposts 626.35 and 626.05, 625.50 and 624.50, and 619.90 and 618.80.

The downtown Transportation Center terminal would require all new construction. A triple platform station with four tracks is specified to also accommodate Southwest corridor service trains at this station. The terminal configuration would provide necessary capacity to recover from delays and allow for other deviations from scheduled service. New track would be necessary to traverse the existing JTA bus garage area and follow the abandoned S Line corridor. A single track is specified along the segment between Grothe Street and

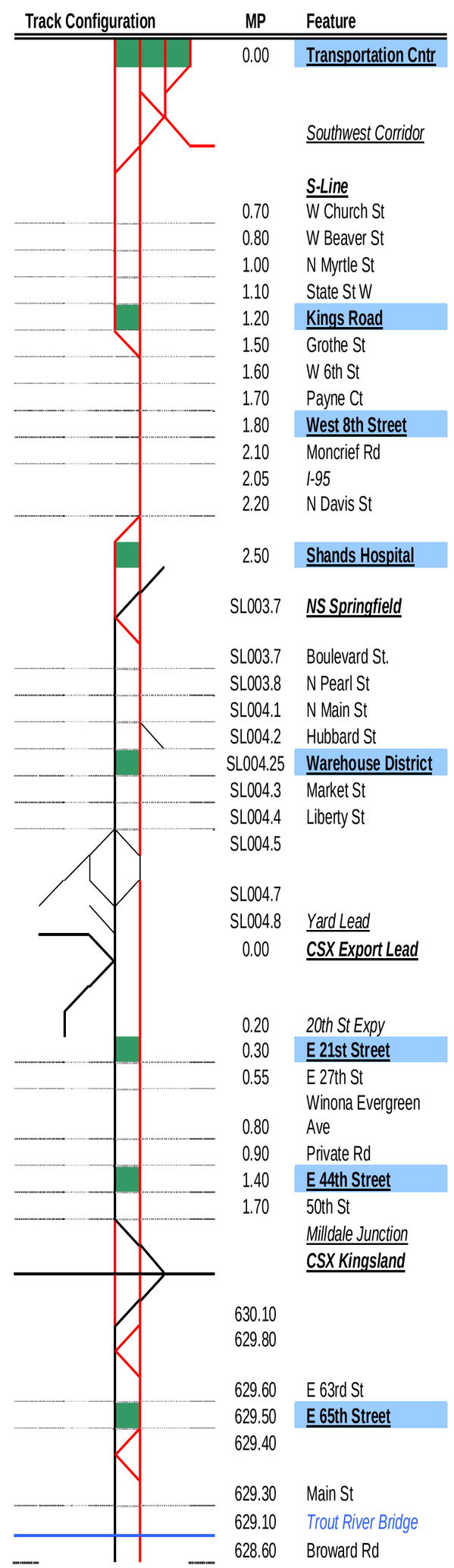
North Davis Street, because of the narrow right-of-way and dense surrounding neighborhood. A two track segment is proposed at the Shands Hospital Station to accommodate trains passing in opposite directions.

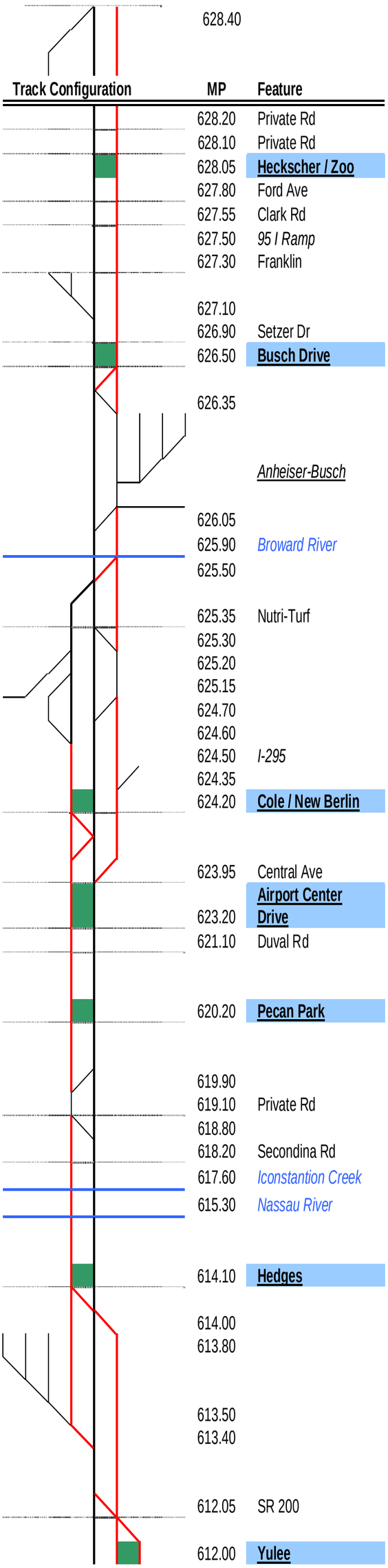
To accommodate trains passing in opposite directions near East 65th Street Station, a crossover north and south of the station would be required. An additional crossover would be required near the Busch Drive Station to maneuver around freight traffic at the siding near Franklin Avenue on the east track and freight traffic at the Anheuser-Busch brewery siding on the west track.

The existing passing sidings south of Cole / New Berlin Road Station would be extended to provide three tracks near the customer siding entrance, and a universal crossover would be constructed North of Cole / New Berlin Road Station to accommodate passing trains. Between Hedges and Yulee Stations, two new tracks would be constructed to allow for the scheduled meet as well as service to the customer siding.

The northern terminus at Yulee would be constructed north of State Road 200 on the west side of the track. The terminus would consist of one platform, as well as four tracks to store up to seven trains and allow for a rotation of consists among different schedule cycles over the course of the day.

FIGURE 10-1: RECOMMENDED NORTH CORRIDOR TRACK CONFIGURATION





10.1.2 Southeast Corridor Plan

The proposed service and its associated train require a substantial improvement to the current track configuration. Figure 10-2 shows the track configuration and road/water crossings from Convention Center through West Augustine. There are 30 at-grade crossings and 8 water crossings on this corridor. The St. Johns River crossing is the most substantial and includes a draw bridge.

Approximately eight daily freight trains in each direction are currently scheduled to run between Bowden Yard and South Florida. Northbound freight traffic is scheduled to arrive at Bowden through the morning peak and again in the evening peak with no trains arriving throughout the midday. The first southbound freight train is scheduled to depart Bowden at 10:00 A.M. and successive trains depart every one to four hours until late at night. It is expected that customers along the mainline would be serviced throughout the midday.

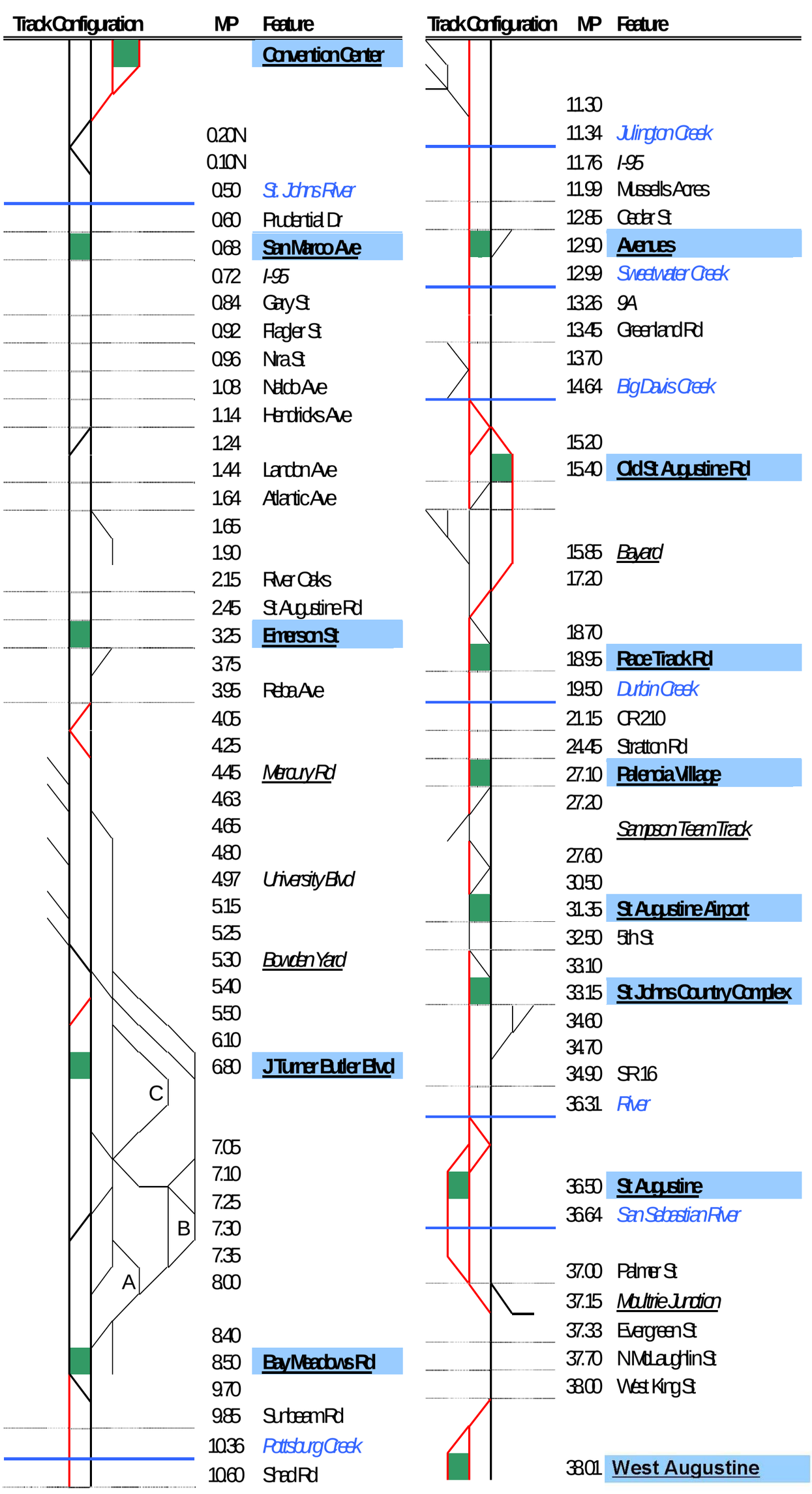
The proposed passenger service would need to avoid the freight traffic so a second track is designated over the entire route. The corridor is currently double-tracked between FEC milepost 0.2-North and 9.70 but this section is controlled with Automatic Block Signal (ABS) rules and wayside signals. An upgrade of the signal control in this section to Automatic Train Control (ATC) to allow bi-directional travel on either track would be required. The remaining track is ATC controlled single-track except for passing sidings from milepost 15.40 to 18.70, milepost 27.20 to 27.60, and milepost 30.50 to 33.10.

To provide capacity for through freight movement during the morning and evening peaks, a third track is indicated where passenger trains are expected to pass each other in opposite directions. To enable maneuvering to an unoccupied track, new crossovers are specified between Emerson Street Station and J. Turner Butler Boulevard Station, between Old St. Augustine Road Station and Racetrack Road Station, and at St. Augustine Airport Station. A third track is also between Old St. Augustine Road Station and Racetrack Road Station and at St. Augustine Airport Station. Further study is necessary to determine the detailed configuration of the third track through Bowden Yard between Emerson Street Station and J. Turner Butler Boulevard Station. Consequently, that track is NOT shown in Figure 10-2.

The downtown Convention Center terminal would require all new construction. A single platform with two tracks would be required to facilitate the exchange of trains in and out of service. New track would be necessary to connect the station to the FEC track.

The West Augustine southern terminus would be constructed immediately beyond West King Street on the west side of the track. A single platform with two tracks would be sufficient to serve passengers and provide an overnight storage area.

FIGURE 10-2: RECOMMENDED SOUTHEAST CORRIDOR TRACK CONFIGURATION



10.1.3 Southwest Corridor Plan

The proposed service would require a substantial improvement to the current track configuration. Figure 10-3 shows the track configuration and road/water crossings from Transportation Center through Green Cove Springs. The Ortega River crossing is the most substantial and includes a draw bridge.

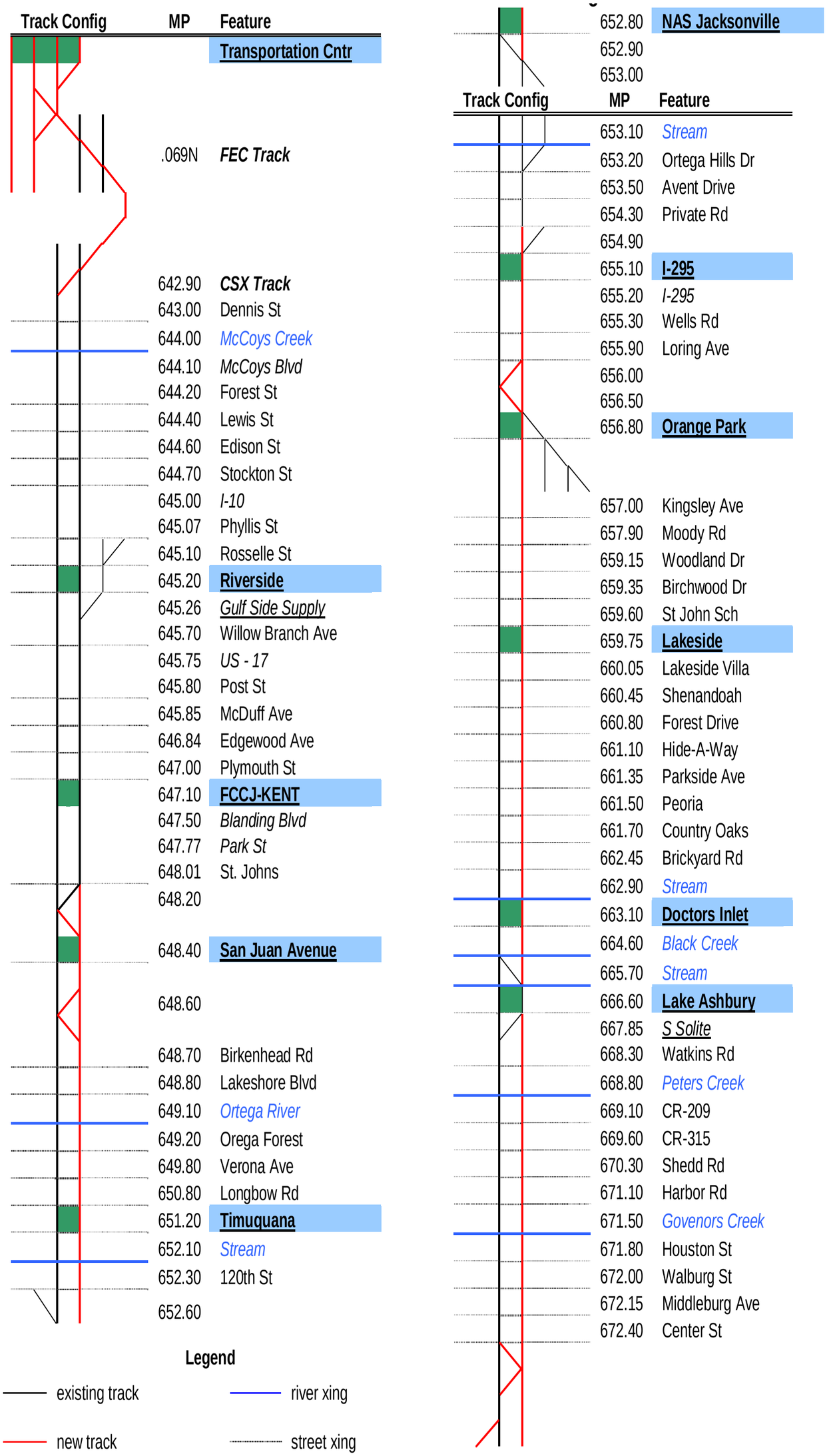
A second track is designated over the entire route to allow passenger trains to pass each other and to avoid freight traffic. The corridor is currently double-tracked between CSXT milepost 642.90 and 648.01 and has passing sidings between mileposts 653.00 and 653.3 and between mileposts 665.70 and 667.85.

The downtown Transportation Center terminal would require all new construction. A triple platform with four tracks would be required because the facility would be shared with trains from the North Corridor service. New track would be necessary to cross the FEC track and connect to the CSXT Sanford Branch.

To handle the passenger trains scheduled to pass each other at San Juan Station, crossovers north and south of the station would be required. An additional crossover would be required near the Orange Park Station to allow freight traffic to access the nearby customer siding from either track.

The Green Cove Springs southern terminus would be constructed between Center Street and Idlewild Avenue on the west side of the track. A new crossover would be constructed immediately north of the terminus to allow continuing traffic to maneuver onto the through track. The existing track would stub end at the station and an additional track would be built for storage adjacent to the existing track. The new second track would rejoin the existing track south of Idlewild Avenue.

FIGURE 10-3: RECOMMENDED SOUTHWEST CORRIDOR TRACK CONFIGURATION



10.1.4 Rollingstock Requirements

Capacity requirements were determined using estimates of the 2015 peak passenger demand. The morning (inbound) peak hour typically has the highest concentration of trips. Passenger forecasts, however, were calculated as total boardings across the entire line for an entire day. It was assumed that travel patterns would be symmetrical (i.e. inbound trips equal outbound trips). Therefore, to calculate inbound boardings, total boardings are divided by two. To determine the peak load, assumptions about the trip origins, destinations and timing are also necessary. On a typical commuter rail, practically all inbound passengers alight at the downtown terminal and one third of trips are made in the peak hour. To calculate the peak train loading, the inbound boardings are divided by 3 and divided by the peak frequency. These forecasts assume interface with the Skyway in downtown Jacksonville.

Table 10-1 shows the peak load passenger forecast and capacity calculation for each corridor assuming a double-decker DMU car with approximately 200 seats.

TABLE 10-1: 2015 ROLLING STOCK REQUIREMENTS

Corridor	Typical Daily Ridership	Total Weekday Inbound Boardings	Peak Hour Boardings	Peak Load on Peak Train	Required Cars Per Train (200 seats/car)
North Enhanced	2,045	1,022	341	85	1
Southwest	2,974	1,487	496	248	2
Southeast	4,814	2,407	802	401	2

Table 10-2 derives total fleet requirements assuming a 15% operating and maintenance spare reserve for the entire fleet.

TABLE 10-2: 2015 FLEET REQUIREMENTS

Corridor	Cars per Peak Train	Peak Trains Required	Peak Vehicle Requirement
North Enhanced	1	7	7
Southwest	2	4	8
Southeast	2	4	8
Total Required for Revenue Service		15	23
Operating and Maintenance Spares (15%)			4
Total Fleet Required			27

10.2 Capital Costs

Estimated capital costs are summarized in Table 10-3. These costs were developed using a "bottom-up" approach, combining quantities specific to the proposed project with construction unit costs from recent, relevant rail transit projects in various locations throughout the United States. Although data from projects in the south and southeast US were used where available, regional variations in construction costs have not been specifically reflected in the estimated capital costs. The individual cost categories listed in Table 10-3 are numbered in accordance with the Federal Transit Administration (FTA) reporting protocol.

TABLE 10-3: ESTIMATED CAPITAL COSTS
(2008 $ in millions)

	North Enhanced	Southwest	Southeast	Totals
10 Guideway, Track, Structures	$60.8	$50.0	$30.7	$141.5
20 Stations, Stops, Terminals	$5.3	$5.2	$6.6	$17.1
30 Support Facilities*	$-	$-	$-	$11.0
40 Sitework / Special Conditions	$28.3	$26.9	$29.7	$84.9
50 Systems	$28.0	$14.2	$14.2	$56.4
60 ROW, Land, Improvements	Not Estimated			
70 Vehicles	$37.8	$34.5	$34.5	$106.8
SUBTOTALS**	$160.2	$130.8	$115.7	$417.7
80 Professional Services	$38.7	$31.2	$27.1	$99.9
90 Unallocated Contingency	$40.1	$32.7	$28.9	$104.4
100 Finance Charges	Not Estimated			
TOTALS	$239.0	$194.7	$171.7	$622.0

* Support Facilites (Line 30) costs will be part of the initial corridor investment.

** Does not include right-of-way (Line 60) or "soft costs" (Lines 80, 90, 100).

10.3 Operating and Maintenance Costs

Estimated Operating and Maintenance Costs are summarized in Table 10-4. Operating and maintenance costs were developed on a "bottom up" basis, combining operating statistics developed specifically for the proposed service, such as crew hours and car miles, with unit costs from relevant commuter rail operations in the United States. Although data from projects in the south and southeast US were used where available, regional variations in operating and maintenance costs have not been specifically reflected in the estimated costs.

TABLE 10-4: ESTIMATED ANNUAL OPERATING AND MAINTENANCE COSTS (2008 $ in thousands)

	Southwest	Southeast	North Enhanced
Rail Transportation			
Train Crews	$1,464	$1,464	$2,743
Supervision	$851	$851	$851
Fuel	$1,172	$1,536	$1,141
Mechanical			
Labor	$1,045	$1,045	$1,263
Materials	$302	$302	$425
Maintenance of Way			
Labor	$1,670	$2,077	$1,348
Materials	$2,321	$3,010	$1,877
Trackage Fees			
Fees	$289	$379	$221
Administration			
Operating Agency	$1,579	$1,811	$1,461
Contractor	$1,777	$1,907	$2,389
TOTALS	**$12,471**	**$14,383**	**$13,717**
	$40,572		

10.4 Fare Box Recovery Ratio

The Alternatives Analysis phase of study is expected to include fare policy analysis and recommendations. In the absence of such an analysis, and to determine a preliminary value for the potential fare box ratio, the current JTA suburban commuter bus and special event shuttle bus fares were applied to the estimated ridership and combined with the estimated operating and maintenance costs. The resultant fare box recovery ratio for the proposed commuter rail service would be 34.1%.

11.0 FUNDING SOURCES

Construction of public transit projects are typically funded with a combination of federal, state and local funds. In addition, private funds can sometimes be used, typically through joint development of stations or other public private partnership opportunities. It is anticipated that the commuter rail network proposed for the Northeast Florida region would be built using the typical combination of funds from multiple sources.

This section identifies the types of funds available from various federal, state and local resources, the requirements to gain access to these resources, and other considerations relevant to the use of these funds. Additional, more detailed documentation of federal and state programs is provided in Appendix H.

11.1 Federal Funding Sources

The primary source of federal funds for rail transit projects is the Federal Transit Administration (FTA) through grants for planning, vehicle purchases, facility construction, operations, and other public transportation purposes. FTA administers this financial assistance according to the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), an authorization bill that was signed into law in August 2005.

SAFETEA-LU authorizes specific dollar amounts for each program. Each year Congress provides an annual appropriation which funds the programs specified in SAFETEA-LU. Upon receiving this appropriation, FTA apportions and allocates these funds according to formulas and earmarks. The federal financial assistance programs which provide the majority of the federal transit investment in Florida include:

- Urbanized Area Formula Program. This program is governed by 49 USC 5307 and provides funding for transit capital and operating assistance and for transportation related planning in urbanized areas. (Operating assistance is limited to urbanized areas between 50,000 and 200,000 in population.)

- Formula Grants for Other than Urbanized Areas. This program is governed by 49 USC 5311 and provides funding to states for the purpose of supporting public transportation in areas of less than 50,000 in population. This program is administered by FDOT.

11.1.1 Transit Finance

Financing the construction, operation and maintenance of public transportation systems involves many different types of funding sources, including Federal and non-federal grants,

loans, and revenue sources. Special types of financing arrangements such as leases and public private partnerships have been used to fund transit projects.

The FTA participates in USDOT sponsored credit assistance programs, including the Transportation Infrastructure Finance and Innovation Act (TIFIA) program and the State Infrastructure Bank program. These programs offer additional non-grant funding flexibility for transportation projects including direct loans, loan guarantees, lines of credit, and credit enhancement support such as bond insurance.

11.1.2 Flexible Funds: FHWA and FTA Programs

Flexible funds are certain legislatively specified funds that may be used either for transit or highway purposes. The decision to transfer funds between these federal programs, or to utilize the broad eligibility allowed in some federal funding programs, is made by state and local decision makers, in consultation with federal officials, and in the context of the metropolitan planning process.

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

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

1. Urbanized Area Formula Program (5307)
2. Non-urbanized Area Formula Program (Section 5311 program)
3. Elderly and Persons with Disabilities Program (Section 5310 program).

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

In urbanized areas over 200,000 in population, such as the Jacksonville Metropolitan Station Area, the decision on the transfer of flexible funds is made by the Metropolitan Planning Organization (MPO). The MPO for the Jacksonville region is the North Florida Transportation Planning Organization (TPO). In areas under 200,000 in population the decision is made by the MPO in cooperation with the State DOT. In rural areas, the transfer decision is made by

the State DOT. The decision to transfer funds is designed to be established for an area and flow from the transportation planning process.

11.1.3 Surface Transportation Program

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

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

11.1.4 Congestion Mitigation and Air Quality Improvement Program

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

Funds are apportioned to states based on a formula that considers the severity of air quality problems; based on the USEPA eight-hour measurement standard, Jacksonville will receive CMAQ funds for the next five years, as follows:

Table 11-1
Jacksonville CMAQ Funds

YEAR	AMOUNT
2010	$1,522,833
2011	$1,544,566
2012	$1,575,240
2013	$1,606,528
2014	$1,638,441

If CMAQ funding will be limited to five years, it will not be considered in the Long Range Transportation Plan (LRTP). This will be evaluated when the North Florida TPO prepares the LRTP financial resources element.

11.1.5 New Starts

The FTA's discretionary New Starts program is the federal government's primary financial resource for supporting locally-planned, implemented, and operated transit "guideway" capital investments. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) has authorized $6.6 billion in New Starts funding through fiscal year 2009. $600 million of the New Starts funding is set-aside for a sub-category of "Small Starts" projects. These include transit capital projects costing less than $250 million overall, and requiring less than $75 million in Small Starts resources. SAFETEA-LU directs the FTA to evaluate and rate candidate projects as an input to federal funding decisions and at specific milestones throughout each project's planning and development. New Starts funding is discretionary, and SAFETEA-LU continues previous federal law intended to facilitate effective FTA management of the program and ensure that scarce New Starts resources are made available to the most meritorious of transit investments. Subsequently, FTA approval is required for a New Starts project entry into preliminary engineering and final design. This approval is based upon the readiness of a project (and its sponsor) to carry out the activities of each phase of development and its rating against defined New Starts criteria.

11.1.6 Earmarks

Earmarks are funds provided by the Congress for projects or programs where the Congressional direction (in bill or report language) circumvents the merit-based or competitive allocation process, or specifies the location or recipient of federal financial assistance for a project. Congress includes earmarks in appropriation bills - the annual spending bills that Congress enacts to allocate discretionary spending - and also in authorization bills.

11.2 Innovative Financing

Many innovative financing techniques do not always generate new revenue, but generate benefits by providing more effective management of a transaction's cash flow. By filling gaps between revenues and expenses which in turn allow for projects to be undertaken sooner, related financing decisions can then influence project costs and the timing of benefit streams from capital investments.

11.2.1 COPs and Lease-backed Bonds

Certificates of Participation (COPs) are one mechanism for improving the flow of revenues and outlays, enabling larger acquisitions to be funded sooner. For example, an agency needing 50 replacement buses for its fleet may only have adequate revenue streams to purchase 10 in one year. Issuing COPs backed by future flows of Federal and local revenues could permit the full replacement acquisition to be undertaken at one time.

The benefits of accelerating the purchase would be realized in the form of potentially lower unit costs from a larger order size; reduced risk of future price increase due to inflation or changes in environmental or other laws; lower operating costs from the retirement of older vehicles and maintaining a more standardized fleet; higher quality of service to the public and potentially increased patronage; better conformance with mandates for air quality, or service to persons with disabilities; and a net cost savings from interest earned on cash balances.

11.2.2 Joint Development

The FTA is encouraging transit systems to undertake transit-oriented joint development projects either under new grants or with property acquired under previous grants. The purpose of this joint development should be both to secure a revenue stream for the transit system and to help shape the community that is being served by the transit system. Where the grantee retains effective continuing control over the joint development for mass transportation purposes, all proceeds of sale, lease or other encumbrance of the property will be treated as program income for use by the transit system to meet capital and operating needs, for as long as the joint development lasts.

This method is a departure from previous policy in two areas. First, FTA will now define all revenue derived from such joint development to be program income. Second, grantees may now use the new concept of "highest and best transit use," as an alternate to "highest and best use," in valuing real property for transit-oriented joint development. In accordance with this new policy, transit agencies have three options:

1. Sell property as excess for non-transit use;
2. Lease the property for incidental, non-interfering use by others while the property is held for a future identified transit use; and,
3. Undertake a transit-oriented joint development on the property.

11.2.3 Transportation Infrastructure Finance and Innovation Act

The Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA) established a federal credit program for eligible transportation projects of national or regional significance. The program's fundamental goal is to leverage federal funds by attracting substantial

private and other non-federal co-investment in critical improvements to the nation's surface transportation system.

The program enables the U.S. DOT to provide three forms of credit assistance: secured (direct) loans, loan guarantees, and standby lines of credit.

Congress authorized $122 million in SAFETEA-LU for TIFIA in each federal fiscal year from 2005 through 2009. These funds pay the subsidy cost to the Federal Government of providing credit assistance, and are available until expended by the DOT or reprogrammed by Congress.

11.3 State Transit Funding Sources

FDOT is responsible for identifying, supporting, advancing, and managing cost effective, efficient and safe transportation systems and alternatives to maximize the passenger carrying capacity of surface transportation facilities.

11.3.1 Florida Transit Office

Florida's Transit Office is part of FDOT and consists of three sections (Transit Planning, Grants Administration, and Transit Operations) each of which has specific areas of responsibility:

Transit Planning Section: The Transit Planning Section is responsible for developing the state's transit plan. The Transit 2020 Plan identifies three key issues in Florida:

- Transit Service;
- Transit Funding; and,
- Transit Planning/Policy.

Grants Administration Section: The Grants Administration Section is responsible for administering some federal and all state transit grants, ensuring the grant funds are spent in accordance with federal and state laws. Section 206.46(3) of the Florida Statutes requires, in each fiscal year, a minimum of 15 percent of all state revenues deposited into the State Transportation Trust Fund (STTF) (primarily derived from gas taxes, motor vehicle/rental car sales taxes/surcharges, and motor vehicle title and registration fees) shall be committed annually by FDOT for public transportation projects (aviation, transit, rail, intermodal and seaports).

Transit Operations Section: Florida's transit funding programs administered by the Transit Office include:

Fixed-Guideway Transportation Funding
Public Transit Block Grant Program
Transit Corridor Program
Public Transit Service Development Program
Commuter Assistance Program
New Starts Transit Program
Intermodal Development Program
Transportation Regional Incentive Program
County Incentive Grant Program

11.3.2 State Infrastructure Banks

The State Infrastructure Bank (SIB) is a revolving loan and credit enhancement program consisting of two separate accounts. The federally-funded SIB account is capitalized by federal money matched with state funds as required by law, and the state-funded SIB account is capitalized by bond proceeds and state funds only.

Section 350 of the National Highway System Designation Act of 1995 established a pilot program to create up to ten State Infrastructure Banks (SIB), providing $150 million in general funds to help capitalize the original pilot SIBs and any new SIBs approved by the Department. Using federal dollars, pilot states were permitted to establish a leveraging program or create a simple revolving loan fund, to be administered at the state level. Florida was selected as one of the original ten states to establish such a SIB.

Under the Transportation Equity Act for the 21st Century (TEA-21), another SIB pilot program was implemented with Florida as one of four participating states. Under the previous "NHS Act", SIB was rolled into the new pilot program under TEA-21 to form the SIB program. The SIB Program currently operates under SAFETEA-LU.

Florida Governor Crist signed HB 985 on June 19, 2007, allowing for the state-funded SIB to lend capital costs or provide credit enhancements for emergency loans for damages incurred to public-use commercial deepwater seaports, public-use airports, and other public-use transit and intermodal facilities that are within an area that is part of an official state declaration of emergency pursuant to Chapter 252 and all other applicable laws.

SIB participation from the state-funded SIB account is limited to a transportation facility project that is on the State Highway System or that provides for increased mobility on the state's transportation system in accordance with Section 339.55, Florida Statutes, or provides for intermodal connectivity with airports, seaports, rail facilities, transportation terminals, and other intermodal options for increased accessibility and movement of people, cargo, and freight. Projects under the Transportation Regional Incentive Program (TRIP)

are eligible for the state-funded SIB, provided the project is matched by a minimum of 25% from funds other than the SIB.

11.4 Revenue Sources for O&M

JTA relies on eight major potential revenue sources for system-wide O&M:

1. Bus, Skyway, and CTC Fares
2. Other Operating Revenues (including Parking Fees)
3. FTA Section 5307 UZA Formula Funds (Preventive Maintenance)
4. Other Federal (Job Access Reverse Commute, Other)
5. State Block Grants and Service Development Grants
6. State Transportation Disadvantaged and Medicaid (for CTC)
7. Gas Tax, Sales Tax, Mass Transit Discretionary Account, and Other Local; and,
8. Supplementary Revenue Sources.

11.5 Local Funding

Funding for the implementation of new transportation projects, such as the Northeast Florida Commuter Rail system, will be highly competitive at all levels of government. The availability of local funds will be an important element in financing and delivering of any major transportation project within the northeast Florida region, due to the match requirements associated with federal and state funding. This section presents information regarding local funding resources and priorities.

11.5.1 North Florida TPO

The North Florida Transportation Planning Organization (TPO) is responsible for development of the Transportation Improvement Program (TIP), which begins with a “List of Priority Projects” to be used in developing the Florida Department of Transportation’s (FDOT) Tentative Five Year Work Program. The “List of Priority Projects” identifies potential projects to be funded in the new fifth year of the FDOT Work Program.

The Florida Department of Transportation (FDOT) creation of the Strategic Intermodal System (SIS) and the Transportation Regional Incentive Program (TRIP), now requires the inclusion of the “List of Priority Projects” for potential funding in other years of the FDOT Work Program under the SIS and TRIP programs. The “List of Priority Projects” includes a prioritized listing of state highway, mass transit, aviation, intermodal and enhancement projects. JTA projects contained in the North Florida TPO List of Priority Projects for 2013/2014 (Adopted 8/14/08) are shown in Tables H-4 through H-7, in Appendix H.

11.5.2 TRIP Program

TRIP was created to improve regionally significant transportation facilities in "regional transportation areas". State funds are available throughout Florida to provide incentives for local governments and the private sector to help pay for critically needed projects that benefit regional travel and commerce. FDOT will match up to 50 percent of the non-federal share of project costs for public transportation facility projects.

The TRIP program is funded through General Revenue Funds made available through the Florida's 2005 growth management legislation. TRIP funds are distributed to the FDOT Districts based on a statutory formula of equal parts population and fuel tax collections. The minimum eligibility requirements for TRIP projects are:

- Support facilities that serve national, statewide or regional functions and function as an integrated transportation system;
- Be identified in appropriate local government capital improvements program(s) or long term concurrency management system(s) that are in compliance with state comprehensive plan requirements;
- Be included in the MPO LRTP, the STIP, TIP and consistent with the local government comprehensive plan;
- Be consistent with the Strategic Intermodal System (SIS);
- Be in compliance with local corridor management policies; and,
- Have commitment of local, regional or private matching funds.

11.5.3 JTA Mass Transit Capital Projects

A prioritized list of mass transit capital projects as submitted by the JTA for funding in FY 2013/2014 is provided in Appendix H.

11.5.4 JTA Mass Transit Operational Related Projects

A prioritized list of mass transit operational related projects as submitted by the JTA for funding in FY 2013/2014 is provided in Appendix H.

11.5.5 Strategic Intermodal System (SIS) Projects

North Florida TPO Staff request input from member counties, cities and authorities for proposed SIS projects in the North Florida TPO area. A table is provided in Appendix H, which identifies potential projects to be funded under SIS in the FDOT Work Program.

11.6 Local Funding Sources

Numerous local revenue sources were identified for consideration to fund public transportation services in Jacksonville and the surrounding counties. These potential sources

could include new taxes and increments to existing taxes. These potential funding sources are listed below, and described in greater detail in Appendix H.

- Ad Valorem (property taxes)
- Municipal Service Taxing Unit (MSTU)
- Local Option Gas Tax
- Local Option Sales Tax
- Regional Transportation Authority (RTA)
- Transit Impact Fees
- Joint Transfer Stations

11.6.1 Ad Valorem

Property (Ad valorem) taxes are the largest source of local revenue in the City of Jacksonville (Duval County) budget. These taxes account for 46.7 percent of the General Fund, including the General Services District (GSD) and 35.6 percent of the overall city revenues. In Florida, four counties currently dedicate ad valorem taxes to public transportation as part of transit authority revenue (Hillsborough, Pinellas, Polk, and Volusia). Other counties fund public transportation through a County general fund that is composed largely of revenues from ad valorem.

11.6.2 Municipal Service Taxing Unit (MSTU)

The City of Jacksonville or JTA may choose to establish a Municipal Service Taxing Unit (MSTU) to fund public transportation. The boundary of the MSTU may include unincorporated areas of the county, as well as municipalities, subject to the consent by ordinance of the governing bodies of the affected municipalities.

11.6.3 Local Option Gas Tax

Counties in Florida have the ability to levy local option gas taxes and use the revenue for transportation purposes. All 67 counties have imposed varying amounts between three and 12 cents of local option gas tax. All local option gas taxes are collected for counties by the Department of Revenue and then distributed monthly according to a formula calculated annually. The City of Jacksonville levies a local option gas tax of six cents per gallon, which accounts for 2.3 percent of the annual budget. In accordance with the Better Jacksonville Plan (BJP) and the Interlocal Agreement between the city and the JTA, the revenue in this fund is transferred to the JTA as a mass transit subsidy and for debt service. Increasing the local option gas tax and amending the Interlocal Agreement could result in additional funding.

11.6.4 Local Option Sales Taxes

A Local Option Sales Tax offers a stable funding source. On August 11, 1989, the citizens of Jacksonville voted for the removal of all toll facilities from city bridges and certain roads and replaced the toll revenues with a local option half-cent sales tax. This tax provides a permanent source of funds for the construction and maintenance of city roads and bridges as well as the operation and maintenance of the JTA transit system and other public transportation efforts. The state collects the sales taxes and remits to the city the actual collections, which are then forwarded to the JTA. This method ends up reducing total proceeds due to the administrative fees charge by each handler. Increasing the local option sales tax for the JTA could result in additional revenues.

11.6.5 Transit Impact Fees

Transit impact fees place a portion of the cost of transit service directly on those who benefit. Increased development and growth within a community typically requires expanded transportation infrastructure. Impact fees are implemented to allow development to "pay for itself" by assessing the costs of transit expansion on the development that the transit system is serving.

11.6.6 Joint Transfer Stations

Development of joint transfer stations for commuter rail and BRT service would minimize costs associated with station design and construction, and the acquisition of right-of-way.

11.7 Public Private Partnerships

According to the National Council for Public-Private Partnerships, a Public-Private Partnership (PPP) is a contractual agreement between a public agency (federal, state or local) and a private sector entity[11]. Through this agreement, the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the general public. In addition to the sharing of resources, each party shares in the risks and rewards potential in the delivery of the service and/or facility.

[11] Information provided in this portion of the report, relies in part on data and information provided by the:
International Monetary Fund (http://blog-pfm.imf.org/pfmblog/2008/02/a-primer-on-pub.html),
National Council for Public Private Partnerships (http://www.ncppp.org/howpart/index.shtml),
American Public Transportation Association (http://www.apta.com/about/committees/public_private/index.cfm) and
Federal Highway Administration (http://www.fhwa.dot.gov/PPP/defined_default.htm)

11.7.1 Background of Public Private Partnerships

In the mid to late 20th century United States, private sector participation in public transportation services has been generally limited to separate planning, design, construction or operations contracts on a fee for service basis – based on the public agencies specifications. Elsewhere in the world and to a growing extent in the United States, the opportunities for private participation in the provision of transportation infrastructure and services have been increasing. Several factors have contributed to this trend.

- Public interest in accelerating high priority projects by packaging and procuring services in new ways.
- Using private sector expertise to manage large and complex projects
- Access to new financial resources
- Encouraging entrepreneurial development, ownership and operation of transportation facilities and services
- Substitute temporary private sector staff for permanent cost public employees.

There are wide variety of possible relationships between private entities and the Jacksonville Transportation Authority that could be pursued to design, build, finance, operate and maintain the proposed Northeast Florida commuter rail system. However, not all possible PPP arrangements would be applicable to this service. Specifically, partnerships where the full cost of building and operating the commuter rail service would be retired via user fees (transit fare revenue) are unrealistic. Consequently the structure of PPP commonly used to finance toll road facilities is not applicable to this commuter rail operation. Nonetheless, there are a number of PPP arrangements that could be applicable in developing the network of commuter rail services. Those arrangements with the greatest applicability to the development the Northeast Florida network are listed below[12].

11.7.2 PPP Arrangements with High Potential

Contract Services: Operations and Maintenance - A public partner (federal, state, or local government agency or authority) contracts with a private partner to operate and/or maintain a specific service. Under the private operation and maintenance option, the public partner retains ownership and overall management of the public facility or system. Nearly all new US commuter rail operations implemented in the last 20 years use contract operators.

[12] These basic definitions were extracted by the National Council for Public-Private Partnerships from "Public-Private Partnerships: Terms Related to Building and Facility Partnerships", Government Accounting Office, April 1999. (The National Council for Public-Private Partnerships was a resource used in developing the GAO report.)

Design/Build – Project elements where specification of design details is not important, and the character of the finished product can be driven primarily by functional performance requirements, may be candidates for design/build delivery. This approach combines development of performance-based specifications and limited design drawings by the owner and their engineers and architects, with contractor preparation of final design concurrent with construction.

Design/Build/Maintain – Rolling stock may be advantageously procured under this approach, by which the contractor maintains the rolling stock for the owner or their contract operator. If structured properly, this approach can have the effect of creating an improved and extended warranty on the delivered products. This approach has been used successfully by Amtrak in the Northeast Corridor and by SEPTA in Philadelphia. It has also been used with success in highway construction.

Design-Build-Operate-Maintain (DBOM) **-** A single contract is awarded for the design, construction, operation and maintenance of a capital improvement. Title to the facility remains with the public sector unless the project is a design/build/operate/transfer or design/build/own/operate project. The DBOM method of contracting is contrary to the separated and sequential approach ordinarily used in the United States by both the public and private sectors, typically referred to as design/bid/build. The traditional design/bid/build approach involves one contract for design with an architect and/or engineer, followed by a different contract with a builder for project construction, followed by the owner's taking over the project and operating it.

New Jersey Transit's RiverLINE was built and operated as DBOM concession. Denver's FasTracks commuter rail system is also being procured as a DBOM. It is notable in both of these cases that the railway passed into public ownership before the DBOM started work. It is conceivable that the Northeast Florida network could be developed as DBOM with JTA taking the responsibility for securing access to railway assets necessary for service.

Sale/Leaseback - This is a financial arrangement in which the owner of a facility sells it to another entity, and subsequently leases it back from the new owner. Both public and private entities may enter into sale/leaseback arrangements for a variety of reasons. An innovative application of the sale/leaseback technique is the sale of a public facility to a public or private holding company for the purposes of limiting governmental liability under certain statues. Under this arrangement, the government that sold the facility leases it back and continues to operate it.

In the Northeast Florida circumstance, it is conceivable that the relationship between JTA and the host railway(s) could entail a transfer of sale of railway assets to the JTA with a lease back to the previous owner. This arrangement would facilitate public investment in the railway and help limit railway liability for the new service.

Developer Finance **-** The private party finances the construction or expansion of a public facility in exchange for the right to build residential housing, commercial stores, and/or industrial facilities at the site. The private developer contributes capital and may operate the facility under the oversight of the government. The developer gains the right to use the facility and may receive future income from user fees. Developer finance may possible to develop transit-oriented facilities at Northeast Florida Stations including downtown terminals at San Marcos and the Convention Center.

11.7.3 Other Potential PPP Arrangements

Build/Operate/Transfer (BOT) or Build/Transfer/Operate (BTO) - The private partner builds a facility to the specifications agreed to by the public agency, operates the facility for a specified time period under a contract or franchise agreement with the agency, and then transfers the facility to the agency at the end of the specified period of time. In many cases, the private partner will also provide some financing for the facility, so the length of the contract or franchise must be sufficient to enable the private partner to realize a reasonable return on its investment through user charges. In US public transport applications, the private debt is generally retired by dedicating some or all of a non-transit related revenue stream to debt retirement. Such revenue streams are often sales taxes or property tax revenues. For instance, Denver's FasTracks commuter railroad private debt will be retired with a dedicated stream of sales tax revenues.

At the end of the franchise period, the public partner can assume operating responsibility for the facility, contract the operations to the original franchise holder, or award a new contract or franchise to a new private partner. The BTO model is similar to the BOT model except that the transfer to the public owner takes place at the time that construction is completed, rather than at the end of the franchise period.

Build-Own-Operate (BOO) **-** The contractor constructs and operates a facility without transferring ownership to the public sector. Legal title to the facility remains in the private sector, and there is no obligation for the public sector to purchase the facility or take title. A BOO transaction may qualify for tax-exempt status as a service contract if all Internal Revenue Code requirements are satisfied. Although viable overseas, and it is conceivable that such a partnership could be agreed between the JTA and the railroad owners of the commuter rail routes, it is highly unlikely.

Contract Services: Operations, Maintenance, & Management **-** Many local governments use this contractual partnership to provide wastewater treatment services. It is not commonly used for commuter rail services. In this scheme, a public partner contracts with a private partner to operate, maintain, and manage a facility or system proving a service. Under this contract option, the public partner retains ownership of the public facility or system, but the private party may invest its own capital in the facility or system. Any private investment is carefully calculated in relation to its contributions to operational efficiencies and savings over the term of the contract. Generally, the longer the contract term, the greater the

opportunity for increased private investment because there is more time available in which to recoup any investment and earn a reasonable return.

Lease/Develop/Operate (LDO) or Build/Develop/Operate (BDO) **-** Under these partnership arrangements, the private party leases or buys an existing facility from a public agency; invests its own capital to renovate, modernize, and/or expand the facility; and then operates it under a contract with the public agency. It is understood that a number of different types of municipal transit facilities have been leased and developed under LDO and BDO arrangements. It is not evident how this type of PPP could be readily used to develop or operate the Northeast Florida service.

Lease/Purchase - A lease/purchase is an installment-purchase contract. Under this model, the private sector finances and builds a new facility, which it then leases to a public agency. The public agency makes scheduled lease payments to the private party. The public agency accrues equity in the facility with each payment. At the end of the lease term, the public agency owns the facility or purchases it at the cost of any remaining unpaid balance in the lease.

Under this arrangement, the facility may be operated by either the public agency or the private developer during the term of the lease. It is understood that lease/purchase arrangements have been used by a number of states to build prisons and other correctional facilities. It is not evident how this type of PPP might be used to develop or operate the proposed commuter rail service.

Tax-Exempt Lease **-** A public partner finances capital assets or facilities by borrowing funds from a private investor or financial institution. The private partner generally acquires title to the asset, but then transfers it to the public partner either at the beginning or end of the lease term. The portion of the lease payment used to pay interest on the capital investment is tax exempt under state and federal laws. Tax-exempt leases have been used to finance a wide variety of capital assets, ranging from computers to telecommunication systems and municipal vehicle fleets. It is possible that such an arrangement could be employed for Northeast Florida commuter rail rolling stock but, it is understood that the Internal Revenue Service has been recently disallowing such leases of specialized transit equipment as assets that can be treated in tax-favorable manner.

Turnkey **-** A public agency contracts with a private investor/vendor to design and build a complete facility in accordance with specified performance standards and criteria agreed to between the agency and the vendor. The private developer commits to build the facility for a fixed price and absorbs the construction risk of meeting that price commitment. Generally, in a turnkey transaction, the private partners use fast-track construction techniques (such as design-build) and are not bound by traditional public sector procurement regulations. This combination often enables the private partner to complete the facility in significantly less time and for less cost than could be accomplished under traditional construction techniques.

In a turnkey transaction, financing and ownership of the facility can rest with either the public or private partner. For example, the public agency might provide the financing, with the attendant costs and risks. Alternatively, the private party might provide the financing capital, generally in exchange for a long-term contract to operate the facility.

Public private partnerships (P3) and turnkey delivery techniques would be applicable to the proposed commuter rail network, although their application would be constrained by the relationship between JTA and the private-sector host railroads over which the proposed commuter rail service would operate. One or more turnkey contracts could be employed to implement the system, and station facilities are typically good candidates for a P3 strategy. Specific opportunities should be identified in the next phase of study, as more details are defined, such as specific station locations. Additionally, potential port expansion and related projects being considered by CSXT should be reviewed to identify possible synergies with the proposed commuter rail system.

11.7.4 Contract Service Delivery

One of the most important questions that the developers of the Northeast Florida commuter rail service will have to deal with and resolve is the methodology that will be employed in the actual provision of commuter rail service. Since the very first of the "New Start" services, South Florida's Tri-Rail service, commenced operations on January 9, 1989, an additional 11 new systems have begun commuter rail service in the U. S. and, until 2007, all of them had outsourced vital operations and maintenance (O & M) services to a variety of contract service providers. This string was broken in 2007 when Salt Lake City's "Front Runner" service began with both operating and maintenance personnel who are employees of the Utah Transit Authority.

Contracting out for O & M services has been widely regarded as both an ideal way to get a new commuter rail service up and running without fundamentally altering and/or expanding the scope and structure of the overseeing government agency responsible for the service, as well as a way to get the private sector not only involved in, but to some extent to share risk for, the performance, safety and success of the new service.

Defining the Role of the Host Freight Railroad – Gaining access to the existing railroad lines over which the proposed commuter rail service will operate may be accomplished in two basic ways – acquire the rail lines from the freight railroads or pay to gain access to the lines, which then remain owned by the railroads.

Acquisition of some or all of the relevant rail lines may prove both feasible and advantageous. It is noteworthy that ownership of rail lines to support public purposes has successful precedent in Florida, including the purchase of the former CSXT lines over which SFRTA's Tri-Rail service operates, and the planned acquisition of additional CSXT lines in central Florida to support the new SunRail commuter rail system. The SunRail acquisition is particularly relevant because it may abut at Deland with a future expansion of the proposed

Northeast Florida service, suggesting that state acquisition of the CSXT Sanford Corridor north of Deland should be raised as a possibility as early as possible.

Regardless of whether access to the rail lines is accomplished by purchase or through some form of access agreement, the ongoing relationship among the JTA, the freight railroads, and other public and private parties, will essentially constitute a Public-Private Partnership. The terms and conditions of such agreements will define the relationships among the parties for many years to come, and will include:

- Purchase price and/or costs for access by trains operated by the parties;
- Ownership of the underlying property and improvements related to freight, passenger, or both services;
- Rules regarding the numbers of trains, priorities of trains, and the effects of time of day on operations, as well as other operating rules;
- Dispatching authority;
- Maintenance standards to be applied, and by who and for which assets; and,
- Financial responsibility for maintenance and for additional improvements, if and when they become necessary.

A good example of an access agreement is the 1998 Trackage Rights Agreement (TRA) between the San Joaquin Regional Rail Commission (SJRRC) and the Union Pacific Railroad (UPRR) for the operation of the Altamont Commuter Express (ACE) service over a UPRR line between Stockton and San Jose, CA. All of the above bulleted points are covered in the TRA, including a very specific performance standard that allows the ACE trains to be dispatched with priority over all UPRR freight trains, including intermodal, if the ACE trains do not achieve a very high level of on-time performance (in this case 95%). In this instance the SJRRC and the UPRR have created a PPP to help assure the reliable and successful operation of a new commuter rail service.

Also, importantly, the TRA addresses the manner in which the new service can be increased should it prove successful – which ACE has over a 10-year period. Provisions are included for subsequent capital investment by the SJRRC in the UPRR rail line, which then creates the ability for SJRRC to add additional daily trains as those investments are made.

The significance of the ability to expand service after initial start-up should not be overlooked and, of course, this growth principle will apply to the expected growth in the freight service, as well as the new commuter rail service. The original agreement for the establishment of the Tri-Rail service in South Florida did not contain such a provision and the new service was limited to peak hours only. The desire for midday service began to be expressed by Tri-Rail users almost immediately after service commencement and led to another negotiation very soon after the completion of the original agreement.

One of the most successful approaches to ongoing capital and investment needs on shared-use rail lines has been that of the Burlington Northern Santa Fe (BNSF) Railway. In both

Chicago, where BNSF operates a segment of the METRA system and in Seattle, where BNSF operates the Sounder commuter rail trains, BNSF partners continuously and effectively to plan, implement and fund an ongoing program of capital investments and improvements to benefit and allow growth for both freight and commuter services.

It is circumstances such as these that point to the need for and the importance of the relationship and the PPP between the agency and the host freight railroad. This will not be a static relationship and will require the parties to work closely together to understand the different needs of the two services (freight and commuter) in a shared operating environment in order for both to be safe and successful.

In addition to granting access to its rail line(s) and working closely with the agency on service establishment and potential service increase issues, the majority of the 12 "New Start" commuter rail services referenced above have train dispatching and infrastructure maintenance services provided by the host freight railroad. This creates yet another dynamic element to the PPP, as the manner in which these services are delivered, on not just an everyday but on an every-train basis, will play a large role in the safety, reliability and, ultimately, the success of the new service. Again, unless the JTA acquires the rail line(s) over which its trains will operate, it should be expected that the host freight railroad will want to retain the train dispatching and infrastructure maintenance functions for itself.

Finally, there have been a few cases where the host freight railroad has wanted to actually operate the new commuter train service with its own operating crews. This has been the case in Seattle, where the "Sounder" service is operated by train crews from the BNSF Railway, and in Nashville, TN, where the "Music City Star" service is operated by a joint venture entity that includes the freight railroad owning the rail line, the Nashville and Eastern. There are also two new services slated to commence operation within the next several months, that will have the operation of the trains handled by operating crews from the freight railroad over whose lines the trains will be operated, e.g., the "Northstar" service in Minneapolis-St. Paul (BNSF crews) and the Washington County service in Portland, OR (Portland and Western Railroad crews).

Having the host freight railroad provide train crews adds another dimension to the PPP between the agency and the railroad, one in which the freight railroad's employees become front-line representatives of the agency and the service in dealing everyday with the customers on the trains, and, one which can provide additional opportunities for sharing of the risks associated with the service through the PPP.

Acquiring Additional O&M Services – In the majority of the commuter rail "New Starts", the host freight railroad has not wanted to provide O&M services. If this proves to be the case in Jacksonville, the JTA will then have a fundamental decision to make as to how it wishes to acquire those services. The alternatives are to "bundle" (i.e., have all of the O&M services furnished by a single provider under one contract) or "unbundle" (i.e., have one entity provide the train crews, another provide the maintenance of the equipment, etc.), the

contracts for these services. Put another way, do you want to have a single PPP or multiple PPPs, in addition to the agency-host freight railway relationship, as part of your service delivery strategy.

The commuter rail industry in the Unites States today presents a complete range of options in this regard, from the completely "bundled" agreements in San Francisco and Boston, where one contract provider (Amtrak in San Francisco for the Caltrain service and the Massachusetts Bay Commuter Railroad Company (MBCR) in Boston) is responsible for train operation, equipment maintenance, infrastructure maintenance, train dispatching, etc. to completely "unbundled", with the Metrolink service in Los Angeles being the best example of this approach. The Metrolink service, managed by the Southern California Regional Rail Authority (SCRRA), has separate service providers, working under separate contracts with SCRRA, for train operations, equipment maintenance and infrastructure maintenance; SCRRA handles train dispatching with its own agency employees.

Outside of the U.S., the GO Transit commuter rail system in Toronto employs the "unbundled" approach to train operations and equipment maintenance, in that each function has its own separate service contract. However in this instance, after a lengthy competitive bid process, both contracts were awarded to the same provider, Bombardier.

It is important to recognize that the "unbundling" approach does carry an additional level of responsibility for the agency, in terms of being closely involved in all aspects of service delivery on a daily basis, to assure that the various providers are working together smoothly and in harmony. Without question, when the different aspects of service delivery are "unbundled", the opportunities for finger-pointing and blame shifting amongst the different providers do arise, particularly when the contracts governing service provision contain penalty clauses for cases of non-performance or below-standard performance by the contractor(s).

Whether "bundled" or "unbundled", in each case where an agency has acquired O&M services for its commuter rail system, this has been done by means of a competitive bid leading to the award of an operating and/or a maintenance contract for the types of services being discussed herein. It is in the contract that the essential elements of the PPP, including both operational and financial performance, as well as risk sharing, need to be fully and completely established.

Risk Sharing in a Commuter Rail PPP – Up until the early 1980's, if and when a government agency became involved in the operation of a commuter rail service, it was generally to preserve a service that a freight railroad was trying to abandon and the manner in which the agency became involved was generally referred to as a "Purchase of Service" agreement, which typically said little more than the railroad will run the trains and the agency will reimburse them for doing so. With the advent of government ownership of rail lines, agency-railroad access agreements for the purpose of establishing new services, such

as the SJRRC-UPRR TRA discussed above, and non-railroads providing O&M services (such as Bombardier and MBCR), the arrangements have changed dramatically.

An agency today can expect—and require—that its service providers:

- Operate trains and maintain equipment in a manner that will produce safe, reliable service that is no less than 95% on time (usually measured in terms of arrival at the final station no more than five (5) minutes after scheduled arrival time).
- Adhere to a system of penalties, frequently running into thousands of dollars per train delayed or unavailable for service, for cases of non-compliance with the established performance, reliability and availability standards.
- Reimburse the agency for any damage to agency equipment and/or property caused by the contractor or its employees.
- Provide some of the insurance necessary to protect the agency against losses arising from the commuter rail service.
- Assume some of the responsibility for accidents, injuries, fatalities, etc. related to the service.

This approach to risk-sharing has been incorporated into many of the commuter rail O&M contracts in effect today. However, it is not just risk that is often shared in these contractual relationships. There are also provisions in a number of contracts for rewards to the service providers, such as:

- In cases where superior performance leads to increased ridership and increased revenues for the agency, the increased revenue may be shared with the contractor.
- If the contractor can make fundamental changes in the way in which they provide services and/or procure materials that lead to savings for the agency, these savings may be shared with the contractor.

This is another example of how the principles of a PPP can be incorporated into service delivery for a commuter rail service.

Whether the relationship is with the host freight railroad or one or more O&M service providers, or both, it is important to embrace and to incorporate into the agreements and contracts governing all aspects of service delivery, these critical elements of a Public-Private Partnership:

- common interest and commitment;
- constant, everyday management involvement;
- shared risk; and,
- shared reward.

12.0 ASSESSMENT OF FEASIBILITY

12.1 Feasibility

Generally speaking, the study concluded that commuter rail service in the Northeast Florida region is feasible. Stated another way, the study determined that there are no fatal flaws that would make it impossible or prohibitively expensive to develop commuter rail service on rail lines in the region.

Overall feasibility is a function of operational feasibility, institutional feasibility, and economic feasibility. Each of these is essential to a finding of overall feasibility.

Operational Feasibility – Can the existing infrastructure, with reasonable improvements, accommodate the proposed service?

The rail corridors vary significantly in character and condition, ranging from an abandoned line segment that has been converted to a bicycle path, to well maintained operating rail lines, already suitable for 79 mph passenger train operation. The study identified what track improvements, signal system improvements, and dedicated passenger facilities – such as stations and an equipment maintenance shop – would be required for the proposed service, and confirmed that adequate right-of-way is in place to accommodate the required facilities.

Institutional Feasibility – Are the parties involved able and willing to take the actions necessary to implement the proposed service?

Consistent with the recommendation to operate rolling stock that is compliant with FRA regulations, the major institutional issues will be related to meeting the requirements of the host freight railroads to preserve adequate capacity for freight operations and to provide the freight carriers with adequate indemnification from passenger-related liability. Both Norfolk Southern (NS) and CSX Transportation, Inc. (CSXT) have been able to satisfactorily resolve issues of this type for commuter rail operations on other parts of their systems. FEC has not hosted passenger trains for decades, but in meetings held early in the study, expressed willingness to negotiate in good faith to accommodate commuter rail service. Accordingly, and based on similar discussions held with NS and CSXT during the study, there do not appear to be any insurmountable institutional obstacles that would prevent successful implementation of the proposed service.

In addition to issues related to the freight railroads, there are institutional feasibility issues related to government. These issues are present primarily at the local municipal level, and relate to zoning and land use. These issues will be manifest in such forms as the need for zoning changes at proposed station locations, and long term policy changes that will support

the development of the rail service, such as potential limitations and/or taxes on automobile parking in downtown Jacksonville.

Economic Feasibility – Can the proposed service attract enough passengers, willing to pay an appropriate fare, so that the resultant farebox recovery ratio is in the acceptable range for public transit services of this type? Prospective passengers will decide whether or not to use the proposed service based on numerous considerations. Primary among these are competitiveness of travel time, convenience of station locations at their trip origin and destination, frequency and hours of service, and fare structure.

To put this into a relative context, farebox recovery ratios for small commuter rail systems range between 6% for Trinity Railway Express in the Dallas Ft.Worth area in Texas, and 74% for West Coast Express in Vancouver, British Columbia. Both of these services are single-line systems, and these data illustrate how different the economics can be among similarly sized systems. Looking beyond these extremes, three small single-line systems, Coaster (Oceanside-San Diego), Altamont Corridor Express (Stockton-San Jose), and Tri-Rail (Mangonia Park-Miami), recover 38%, 28% and 18% of their costs through farebox revenues, respectively. Two systems that consist of two lines each, Virginia Railway Express (Washington DC) and Sounder (Seattle), recover 47% and 23% respectively. JTA's preliminary estimate of farebox recovery ranges between 10.2% and 34.1%. These figures are within the range for comparable small systems, and – at its best – slightly better than the average recovery for all small systems of 33%.

To put this into a bottom-line context, the proposed JTA commuter rail system would cost a minimum of approximately $26.8 million annually to operate and maintain. This compares to annual operating subsidies of between $4 and $28 million required by other small commuter rail systems in the US.

12.2 Capital Cost Per Rider

The capital cost per rider has been calculated based on the ridership estimate presented in Table 9-3 and the capital cost estimate presented in Table 10-3.

CORRIDOR	CAPITAL COST (Millions)	TYPICAL DAILY RIDERSHIP	CAPITAL COST PER RIDER
North	$239.0	2,045	$116,870
Southwest	$194.7	2,974	$65,467
Southeast	$171.7	4,814	$45,637
Total	$622.0	9,833	$63,256

These capital costs per rider are comparable to those for other recent commuter rail projects, such as Sounder – at an estimated $40,000 per rider – and New Mexico Rail Runner – at an estimated $150,000 per rider.

13.0 RECOMMENDATIONS

13.1 Preferred Corridors

The three preferred corridors identified in this study – Southeast, Southwest, and North (Enhanced) – are recommended to be carried forward into the next phase of study and development. Other service corridors not recommended at this time may be reconsidered if potential demand increases and funding is available.

13.2 Implementation Steps

Based on the required planning process, there will be literally hundreds of individual tasks necessary for the implementation of commuter rail service on the preferred corridors. At the simplest level, these tasks include the steps in the formal FTA New Starts process for funding approval. Additionally, steps related to land use and zoning and other local policy considerations will be essential to the successful implementation of service. The following list identifies the primary steps necessary for implementation; the need for an implementation strategy is discussed in Section 14.1.

- Secure funding for Alternatives Analysis (AA) phase of study.
- Solicit proposals and engage consultant to perform Alternatives Analysis.
- Execute Alternatives Analysis. This will include mode neutral analysis, including a baseline alternative (essentially TSM) and a no-build alternative. An AA must include proper identification of benefits and costs, including a financial plan, and should conclude with definition of mode and alignment that address purpose and need. The FTA will be involved throughout the AA process and will perform several reviews.
- At the conclusion of the AA, materials should be available for establishment of an FTA rating, which determines eligibility for federal funding. A summary score is defined by combining the project justification score and the financial score. The project justification score is based on cost effectiveness, land use, and other factors. The financial score is based on the Non-Section 5309 share, capital finances, and operating finances. Minimum considerations include fulfillment of MPO programming requirements, project management technical capability of sponsoring agency, and NEPA approvals.
- Define contract delivery strategy as this drives the character of the design package to be prepared for bid.
- Request and obtain FTA approval to enter design phase.
- Begin preliminary engineering and design. This step establishes the final scope and estimate of cost, completion of any remaining NEPA requirements, and securing commitments to the financial plan.
- Begin final design. This step produces the contract documents.
- Conduct procurement process to select contractors.

- Construction phase.
- Pre-Revenue testing.
- Revenue service.

14.0 ACTION PLAN FOR IMPLEMENTATION

14.1 Comprehensive Implementation Strategy

A comprehensive implementation strategy is needed to define many of the individual tasks necessary to advance the proposed commuter rail system to revenue service. Such a strategy would include scope (what we will build), budget (how much will it cost), schedule (how quickly will we build it), delivery (what contracting approaches will be used), and funding (who will pay and how much will each of them pay). The comprehensive implementation strategy will be developed during the early portion of the design process, after the conclusion of the Alternatives Analysis.

14.2 Demonstration Projects

The opportunity for a demonstration project to be employed as part of the implementation strategy for commuter rail in the Northeast Florida region is limited. FDOT has already jointly sponsored an SPRC/DMU demonstration on Tri-Rail in Southeast Florida, and the manufacturer of the vehicles used in that demonstration – Colorado Railcar – has since gone out of business. Other types of SPRC/DMU technology are either not applicable to the Northeast Florida region project, or have already been deployed successfully elsewhere – for example, diesel light rail vehicles as operated on NJ Transit's RiverLINE.

An area that has not yet been explored in a demonstration project is the application of alternate fuels and/or emissions reduction appliances to SPRC/DMU vehicles. There have been successful applications of these strategies to commuter rail locomotives; Tri-Rail in Southeast Florida utilizes 99% biodiesel fuel (palm oil), and particulate traps and exhaust catalysts have been applied to locomotives recently purchased by multiple agencies, including Metrolink in California and MBTA in Massachusetts. In light of increasing interest in "green" technologies, there may be interest on the part of the FTA in a demonstration of these strategies on SPRC/DMU vehicles.

In anticipation of seeking FTA support for such a demonstration project, the next phase of study should include the following exercises:

- Identification of which alternate fuels offer the greatest potential for emissions reduction or other operational advantage;
- Identification of diesel engines that would be suitable for application in an SPRC/DMU and that could accommodate the preferred alternate fuels; and,
- Identification of a feasible combination of emissions reducing appliances, including devices to treat intake air, exhaust catalysts, and exhaust particulate traps.

APPENDICES

A – Northeast Florida Regional Demographic Data
B – Prior Reports
C – Commuter Rail Characteristics
D – Commuter Rail “New Starts” Case Studies
E – Candidate Rail Corridors
F – Rolling Stock Technologies
G – ARRF Model Description
H – Funding Programs

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