

Transit Assets and Opportunities Study

Final Study Report



September 2014

Prepared For:
The Hillsborough County Metropolitan
Planning Organization (MPO)
in conjunction with
The Tampa Downtown Partnership
(TDP)



TAMPA
DOWNTOWN PARTNERSHIP

TRANSIT ASSETS AND OPPORTUNITIES STUDY (TAOS)

FINAL STUDY REPORT

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in conjunction with
The Tampa Downtown Partnership (TDP)**

Prepared By:

URS



SEPTEMBER 2014

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EXECUTIVE SUMMARY: Downtown Transit Assets and Opportunities

Downtown Tampa and its surrounding neighborhoods form the core of a dynamic and growing metropolitan region. The urban core has attracted more and more people as a place where they can live, work and play. Institutions and developers have increasingly responded by investing in residential complexes and entertainment venues that capitalize on Downtown’s recreational, sports, arts and cultural attractions. With its *InVision Tampa* plan, the City of Tampa has laid the groundwork for a walkable, vibrant, and 24-hour downtown.

Yet multimodal connections between downtown Tampa and the region remain a challenge. Dominated by an auto-centric transportation system, the City needs a more balanced, less disruptive way to move people to and through downtown Tampa. Despite significant investments to expand the Interstate system, Tampa still suffers from chronic peak period congestion. Travel times from Downtown to Westshore and to the USF area are unreliable and frequently delayed. The unfortunate reality is that even after the Interstate is expanded, population and job growth are projected to generate even more traffic, which will eat up available highway capacity and cause congestion to persist into the foreseeable future.

Recognizing that highway expansion has limits, City and County leaders seek more effective forms of mobility. Downtown Tampa is crisscrossed by bus lines, yet most do not run frequently enough or late enough to attract choice riders. Tampa is served by a network of rail lines, but they stand vacant for much of the day, with only infrequent freight trains. Major transit expansion plans have been proposed over the decades, but have not come to fruition. In 2010, voters rejected a ballot proposal which would have funded a greatly expanded bus system and a 56-mile regional rail system.

Following the 2010 referendum, the MPO analyzed the reasons why people voted as they did. The results were eye-opening: voters want a balanced system, focused on cost-effective improvements to traffic flow coupled with lower-cost, incremental transit expansion.

This study responds to those preferences. It builds on existing assets to stimulate redevelopment. It evaluates the feasibility of lower cost approaches, proposing new forms of



fixed-guideway transit. It looks at the potential use of existing freight rail lines, as well as Interstate right-of-way specifically reserved for transit. It recommends re-purposing the streetcar line to make it faster and more effective for day-to-day travel. It highlights the need to integrate current rubber-

wheeled trolley and bus lines with the streetcar system. Taken all together, these assets are the start of regional system that would grow outward from Downtown Tampa. The resulting system would link the three largest job centers in Hillsborough County together and ultimately connect Tampa’s urban core with the rest of the Tampa Bay region.

How are this study’s recommendations different from previous systems proposed?

- This system is a more modest system that leverages the use of existing transit assets and in order to reduce costs. Assets include:
 - TECO Line Streetcar system
 - CSX Clearwater Subdivision
 - I-275 Multi-modal transit envelope
 - FDOT owned site for the Downtown Intermodal Center
 - Marion Street Transitway
- This system can be developed in several incremental segments based on funding and demand.
- It recommends Modern Tram and Diesel Multiple Unit (DMU) rail technologies that are typically less costly than Light Rail Transit (LRT). Preliminary, planning-level capital cost estimates per mile, in present day dollars, for the technology recommended for the corridors discussed in this study, are shown here for comparison with previous LRT estimates.



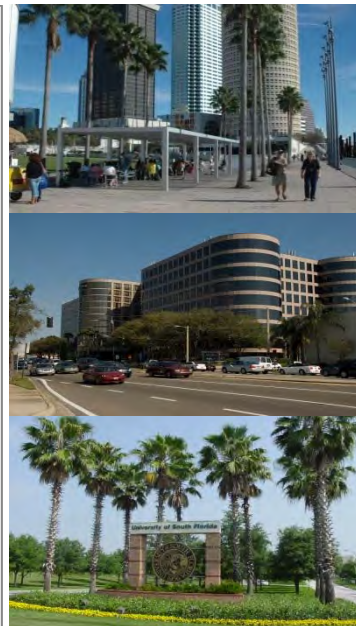
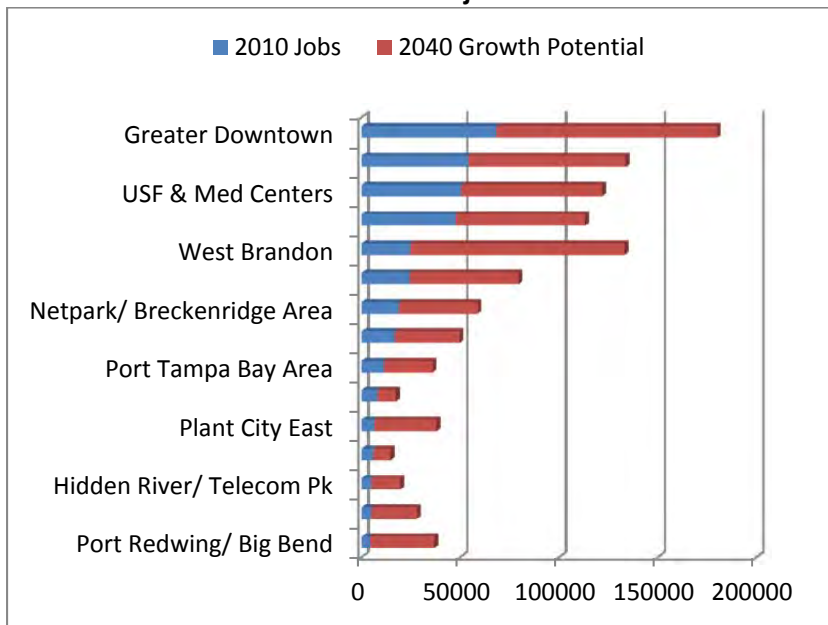
Technology Options	Capital Cost/Mile (\$million)	
	Low	High
Capital Cost Comparison - West Corridor		
Modern Tram	\$ 42.0	\$ 54.7
Light Rail	\$ 53.1	\$ 69.0
Light Rail (2009 estimate)	\$ 58.2	\$ 94.7
North Corridor		
DMU (on existing freight rail*)	\$ 16.5	\$ 21.4
Modern Tram (on street)	\$ 42.5	\$ 55.3
Light Rail (2009 estimate)	\$ 34.6	\$ 90.3

(*) Not including cost of right-of-way shared use agreement with CSX Corporation, which cost \$2.44 million/mile in the case of Orlando’s SunRail project.

Why is rail still being studied?

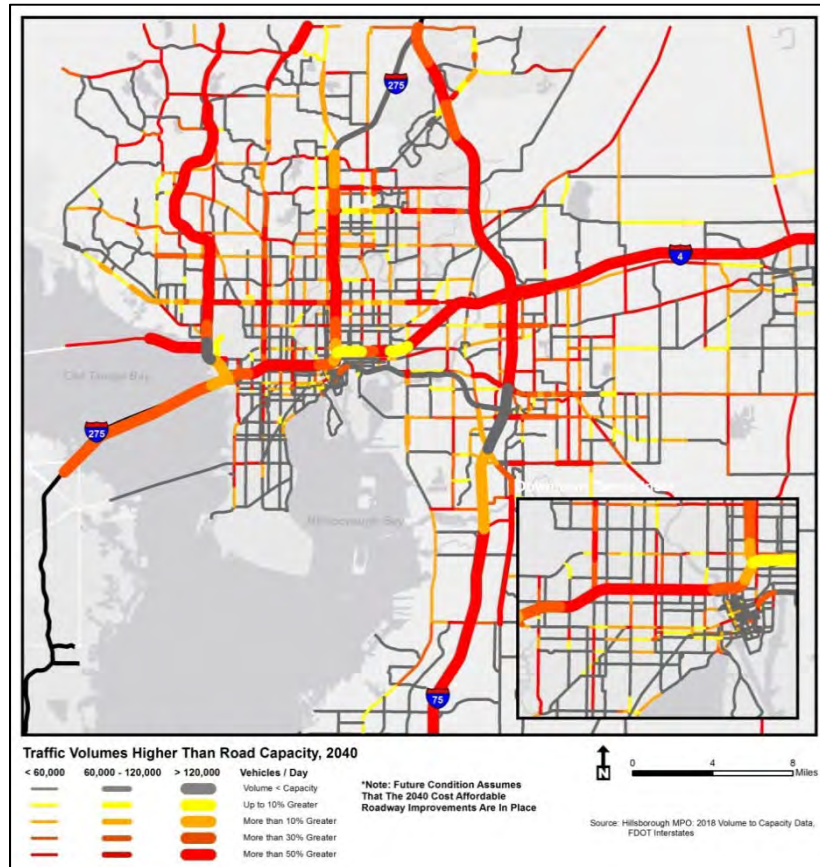
- Capacity improvements to the region’s most congested corridors are constrained by existing land uses and lack of available right-of-way.
- Buses operating in the same congested lanes as other vehicles, while more efficient than single-occupant vehicles, add little new capacity to the system.
- Opportunities for new rights-of-way in the core area are limited and expensive.
- Growth of the region, and especially within job growth centers, over the next 25 years will worsen congestion – even after major road widening projects such as those currently under construction on I-275 are completed.

Projected Job Growth 2010 – 2040

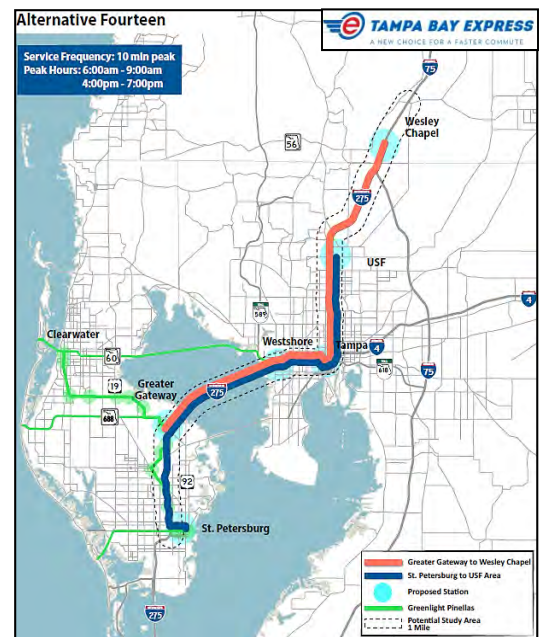


Source: 2040 Long Range Transportation Plan Socioeconomic Data Forecasting Scenarios

Congested Corridors, 2040



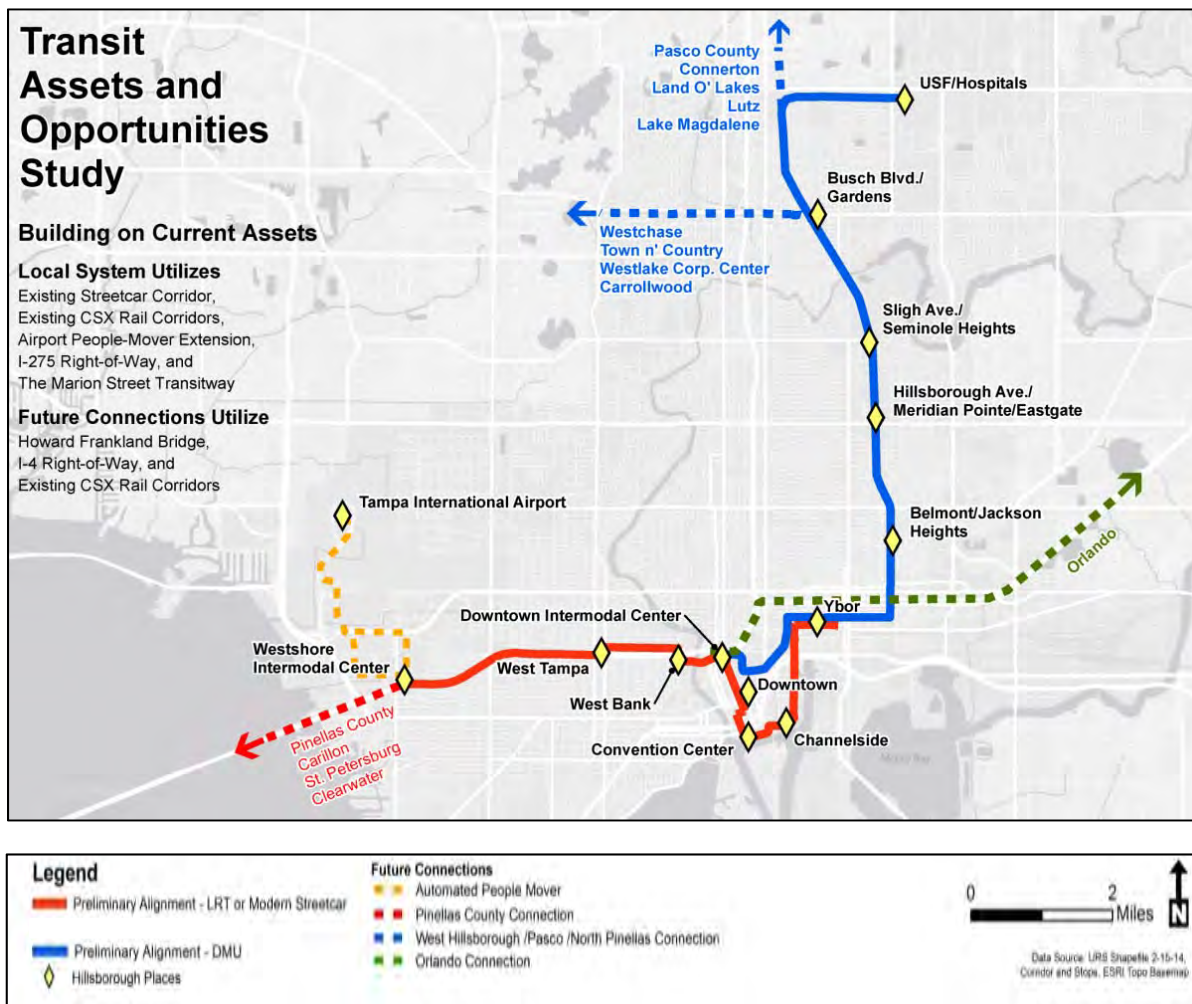
- While other modes of transit are being considered (by others), many are subject to the same levels of congestion as single occupant vehicles
- One of the very few opportunities is FDOT's Tampa Bay Express initiative to add express toll lanes in the medians of I-275 and I-4. Express bus service could operate rapidly in these lanes, and is being evaluated by the MPO and FDOT as part of a separate study of regional mobility. Because the new express toll lanes will have limited access points, bus service will focus on long-distance non-stop trips between Downtown Tampa and Downtown St Petersburg or Wesley Chapel.
- One other opportunity is a rail corridor north of Ybor City owned by CSX Corporation. The Clearwater Subdivision carries only 3-6 trains per day – much less than the 30 trains per day that ran on CSX's "A" line in



Orlando before it became the SunRail corridor. The Clearwater Subdivision dead-ends in Pinellas County, and a secondary line north of it, the Brooksville Subdivision, dead-ends in Brooksville. **Figure ES-1** shows opportunities for potential regional connections.

- Transit operating in its own right-of-way allows for reliable and timely connections between the region’s three largest employment and population centers (USF, Downtown and Westshore/Airport)
- In contrast, driving time from Downtown to USF is forecast to increase to 31 minutes by 2035, and one trip in five could take as long as an hour, as congestion takes its toll on drive time reliability. (Source: 2040 Long Range Transportation Plan Congestion Management Technical Memorandum)

Figure ES-1
Regional Connections



Can the current Streetcar system be more than it is today?

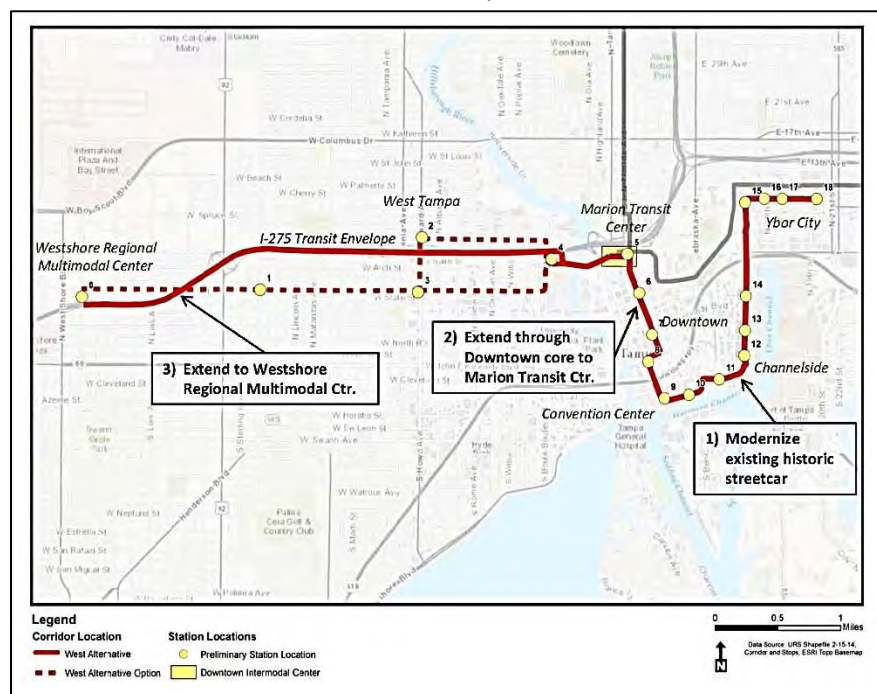
- Yes. The track gauge is the same as that used for light rail and more contemporary types of transit vehicles. The system currently ends south of the Downtown core, and does not operate during morning commute hours. A commuter market could be served with a modest expansion of the service area and hours of operation. Minor repairs of the existing system, at a cost of about \$2.5 million, are needed with the next five years.



(Source: City of Tampa TECO Streetcar Infrastructure Assessment, April 2014.)

- Updating the vehicle fleet to Modern Trams would allow the system to operate faster and carry more riders. Lower floors would allow for easier and quicker boarding's with less delay at stops. The historic-look vehicles could still be used for special events. Modernizing the stations and power system could cost \$10-\$13 million as an add-on to extending the line through Downtown.
- Modern Trams would be an excellent technology to connect Downtown and Westshore. With a 50 to 60-ft minimum turning radius and lighter weight, the vehicle can navigate sharp turns and relatively steep slopes (up to 9%) into and out of the I-275 transit envelope – while still achieving a top speed of up to 45 mph. The cost to extend the streetcar lines through Downtown to Westshore, as shown in the **Figure ES-2**, is \$304-\$445 million, including a new rail bridge over the Hillsborough River.

FIGURE ES-2
West Corridor Options



What about using the CSX corridor(s) for passenger rail?

- This has the potential to dramatically reduce construction costs, as shown above. The cost to implement passenger rail using Diesel Multiple Unit technology in the CSX corridor is \$175-\$228 million (excluding right-of-way).
- Use of the CSX corridor(s) requires agreements with CSX and potential purchase of use rights. Two relevant examples include:
 - Tri-Rail: South Florida Operating and Management Agreement, executed December 6, 2007, which includes:
 - State of Florida purchase of track from CSX
 - CSX payment to the State of Florida for lease and use of track
 - Establish of operational priority timing of passenger and freight use of track
 - Establishment of liability/risk responsibilities of both parties
 - SunRail: Central Florida Operating and Management Agreement, executed November 30, 2007, which includes:
 - State of Florida purchase of track from CSX
 - CSX payment to the State of Florida for lease and use of track
 - Establish of operational priority timing of passenger and freight use of track
 - Establishment of liability/risk responsibilities of both parties
- If an agreement with CSX cannot be reached, an alternative strategy would be to build new track on an existing street, such as Florida Ave, between Downtown and USF. Modern tram would be an appropriate technology to navigate the sharp turns of these urban roads and to provide the opportunity for a one-seat ride from USF to Westshore through Downtown.
- Use of CSX corridor(s), shown in **Figure ES-3**, requires specific technologies (Federal Railroad Administration (FRA) compliant DMUs) if the system is to operate on the existing freight tracks and operate along the same tracks as freight trains.
 - FRA-compliant DMUs have been used in metro areas such as Austin, Texas and San Diego, California to create a rapid commuter transit system at relatively modest cost.
 - Light rail is not recommended in the CSX corridor because a separate, parallel track system would need to be developed including a minimum of 25-ft separation from the freight track, and a 12-ft crash barrier built between the passenger and freight tracks, for the entire length of the corridor. The crash barrier itself could be a significant expenditure, and the track separation could require purchasing new right-of-way along the entire corridor.

FIGURE ES-3
North Corridor Options



What about the accident liability issues between the TECO Streetcar and CSX Corporation?

- The current crossing of the CSX “A” line by the Streetcar requires the Streetcar to hold a liability insurance policy with a large annual premium.
- Additional crossings, such as at Polk Street and Marion Street, would need to be negotiated with CSX, or alternatives such as grade separation would need to be considered. A separated-grade crossing of the CSX Port Tampa Spur on Polk Street would require a modern tram to stay elevated for several blocks, at a typical cost of \$50-\$75 million per mile for a double-tracked structure.

Who benefits from a system like this and why?

- The system would serve:
 - People who live and work in downtown Tampa, its surrounding neighborhoods, Westshore and USF;
 - People who commute to downtown Tampa and would like to leave their car at home or in a garage during the day;
 - Visitors and tourists accessing the airport, convention center, cruise terminal, Busch Gardens or USF.
- The proposed system can be extended in the future as part of a larger, holistic regional plan designed to provide travelers in the greater Tampa area with options for making the daily trips that are made on a daily basis. These include, work, business/shopping, entertainment, recreation, and school trips
- This system supports the *InVision Tampa* plan, which focuses on more options for mobility and re-invigorating downtown and its surrounding neighborhoods.
 - ✓ The *InVision* plan strives to create livable, vibrant space through mixed-use land use development.
 - ✓ This pattern of land use development allows for the use of multimodal transportation options and minimizes overall dependency on single-occupancy vehicles.
- Focusing redevelopment around transit stations creates a more walkable and vibrant community.

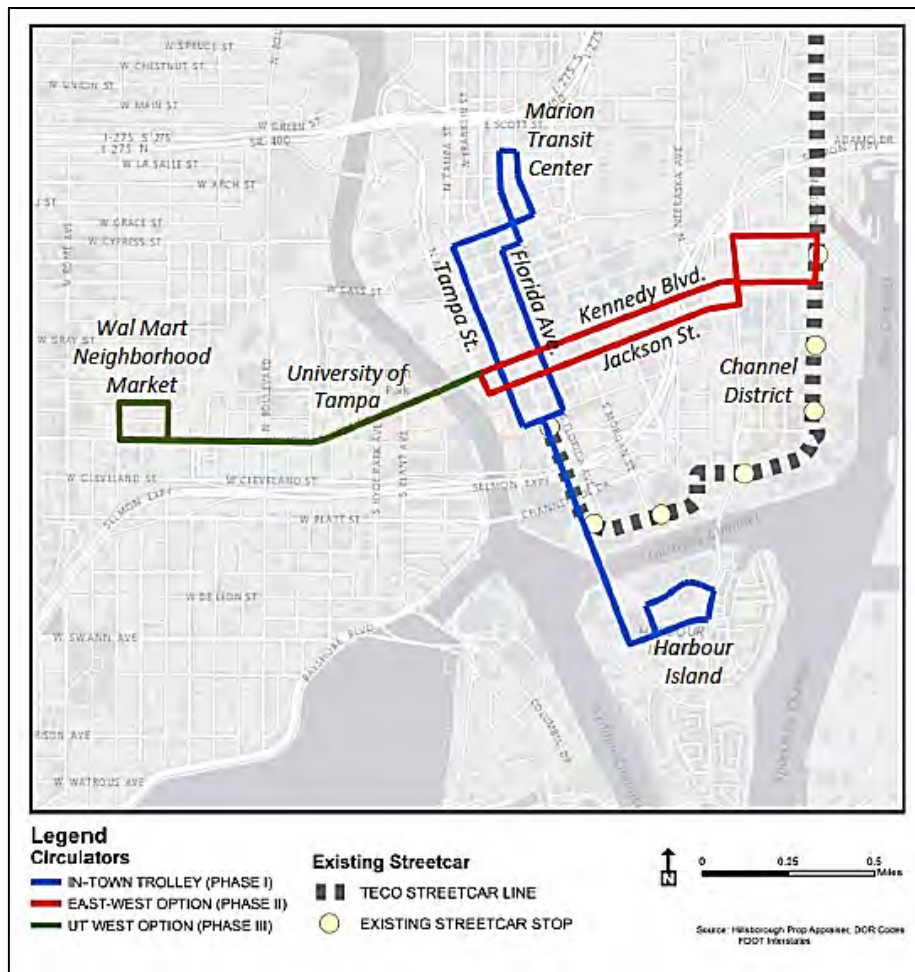


What are the next steps?

- Focus on an incremental expansion, and establish eligibility for a first segment under the FTA Small Starts program. A logical first segment would be the modern tram conversion and extension of the Streetcar line through Downtown to Marion Transit Center.
- Continue to lay the groundwork for future regional connections to systems like:
 - ✓ GreenLight Pinellas
 - ✓ All Aboard Florida
 - ✓ SunRail
 - ✓ Tampa Bay Express (TBX) – Interstate express lanes
 - ✓ Express Bus Toll Lanes
- Expand familiarity with and use of downtown transit by improving In-Town Trolley service.
- Expand and enhance the In-Town Trolley north-south route service hours and frequency

- Develop an East-West rubber-wheeled transit circulator (see **Figure ES-4**). The cost of additional trolley vehicles is \$4 million and the annual cost to operate them is \$2.85 million.
- Improve integration between the In-Town Trolley, East-West Circulator, and TECO Line Streetcar
- Improved integration of the HART and TECO Line Streetcar systems by co-locating stops to provide most effective transfers
- Improve pedestrian/bicycle amenities connecting HART and TECO Line Streetcar
- Develop small scale intermodal hubs at concentrated locations of HART, TECO Line Streetcar, and In-Town Trolley stops allow riders to effectively transfer between systems.

Figure ES-4
Rubber-Wheeled Circulator Options



1.0 INTRODUCTION AND PROJECT DESCRIPTION

The MPO and the TDP contracted with URS in September of 2013 to conduct a review and analysis of the existing transit assets in Downtown Tampa. The purpose of this study was to identify opportunities and develop a strategy for integrating the separate systems into one regional system that connects from Downtown Tampa to the west (Tampa International Airport/Westshore) and to the north (University of South Florida area). This project was conducted in support of developing a regional transit strategy that could be included in the 2040 Long Range Transportation Plan, which is scheduled for adoption in November 2014. Shorter-range recommendations are intended for inclusion in HART’s 10-year Transit Development Plan.

As the TECO Line Streetcar system operates on an existing rail line through Downtown, the MPO requested that the TECO Line Streetcar infrastructure and current alignment be included as the core system to be analyzed for potential integration with CSX and/or other possible light or commuter rail systems. This study considered what upgrades, either through track upgrades or a change in vehicle technology, could be considered to connect the existing TECO Line Streetcar to other systems and develop a regional system.

This project was also conducted to support the Tampa Downtown Partnership’s goal to review HART’s In-Town Trolley system and link this downtown circulator with the regional system, as well as define new routes that would better serve the current and planned development for Downtown Tampa as detailed by the City of Tampa’s InVision Master Plan, 2011.

1.1 PROJECT SPONSORS



Hillsborough Metropolitan Planning Organization (MPO), 601 East Kennedy Boulevard, Tampa, FL 33602



The Tampa Downtown Partnership, 400 North Ashley Drive, Suite 2125, Tampa, FL 33602

1.2 PROJECT MANAGEMENT TEAM

- Hillsborough Metropolitan Planning Organization (MPO)
- Tampa Downtown Partnership
- City of Tampa
- Tampa Historic Streetcar, Inc. (Not-for-Profit Agency)

- Hillsborough Area Regional Transit Authority (HART)
- Florida Department of Transportation, District Seven
- URS (Consultant Staff for Project)

1.3 STUDY PURPOSE

Background

The MPO is developing projects and priorities for the 2040 LRTP adoption in November 2014. This project is one aspect of this LRTP development which focuses on maximizing existing assets by connecting the various systems, either through upgrades to infrastructure or changes in technology, while working within limited revenue projections. The MPO recognizes that several major transit/transportation studies have been conducted in Hillsborough County over the last 15 years. Significant data and recommended alignments, as well as actions have been identified through this previous work. This study was commissioned to review the previous work and use the previous data to support how best to connect the existing systems to develop a general recommendation for the LRTP. Data used from previous studies included: travel patterns, origin/destination analysis, desire lines, ridership projections, and alternatives considered. The 2040 LRTP process includes developing new ridership forecasts. This new data will be utilized for a detailed analysis of alignments and operations once the LRTP is adopted.

The MPO has developed a set of core performance measures by which multimodal transportation projects and investment levels for the various components of the LRTP Needs Plan are being measured. This TAOS project is being conducted in coordination with the development of these performance measures and is considered integral to the measure: *Support Economic Activity Centers*. The TAOS project considers opportunities for linking Westshore/Downtown Tampa/USF, and would spur economic development, job growth, and transit oriented development (TOD) in these corridors and at station areas.

Stakeholders Group

In addition to creating a Project Management Team, the MPO and TDP were pro-active in developing a Stakeholders Group at the beginning of this study (a list of stakeholders invited to meetings, attendance at the meetings, and the presentations presented at the meetings are provided in **Appendix A**). The Stakeholders meetings have been open to all interested parties and agencies. The study purpose and goals and objectives were discussed and revised to reflect input from the Stakeholders in early December 2013.

Purpose

As presented to the Project Team and Stakeholder Groups at each meeting, the study purpose is as follows:

Identification of potential opportunities for expansion and/or extension of the existing transit assets as identified in Downtown Tampa, including but not limited to expansion and/or extension of current rail and rubber-wheeled systems. Use of existing freight rail

corridors, integration with existing rubber-wheeled systems, and other technologies using the existing TECO Line Streetcar system as its core.

The existing transit assets identified in Downtown Tampa include: HART's local and express transit service, HART's MetroRapid premium bus service, HART's In-Town Trolley (rubber-wheeled circulator), and the TECO Line Streetcar System (operated by HART and managed by Tampa Historic Streetcar, Inc.), as shown in **Figure 1-1**.

1.4 GOALS AND OBJECTIVES

A set of goals and objectives were developed during the kick-off for this project and presented to the Project Team and Stakeholders Group. The goals and objectives are presented below.

- *GOAL* – Create a regional transit network maximizing the TECO Line Streetcar System.
 - *OBJECTIVE* – Identify projects for the 2040 LRTP.
 - *OBJECTIVE* – Identify projects for the 2014 HART TDP.

- *GOAL* – Maximize utilization of existing transit assets and expand service markets.
 - *OBJECTIVE* – Identify opportunities along existing freight rail corridors.
 - *OBJECTIVE* – Identify opportunities for effective integration of technologies (rail and bus).
 - *OBJECTIVE* – Identify rail technologies that maximize flexibility of existing rail lines.

- *GOAL* – Create revenue opportunities for the TECO Line Streetcar System.
 - *OBJECTIVE* – Identify opportunities for TOD, redevelopment, public-private partnerships, and/or joint development.
 - *OBJECTIVE* – Identify opportunities for reducing liability for the TECO Line Streetcar.

1.5 POPULATION AND EMPLOYMENT

Hillsborough County dwells within the Tampa-St. Petersburg-Clearwater Metropolitan Statistical Area (MSA). This MSA has been identified as one of the US's fastest growing regions and includes Pinellas, Pasco and Hernando Counties. The population of this MSA has grown from 1,613,000 in 1980 to 2,871,000 in 2013, representing an annual growth rate of 2.36% over the last 33 years. This trend is anticipated to continue with the projected population of the MSA in 2040 to be 3,739,000, growing by 1.12% annually over the next 27 years, (see Section 2.1 for further detail).

The population in Hillsborough County alone has grown from 647,000 in 1980 to 1,292,000 in 2013 (3.02% annually over the last 33 years); and is anticipated to grow to 1,823,000 in 2040 (1.52% annually over the next 27 years). This trend indicates that Hillsborough County's population growth will outpace the other counties in the Tampa-St. Petersburg-Clearwater MSA, see **Figure 1-2**.

FIGURE 1-1
HART DOWNTOWN NETWORK OF SERVICES AS OF JUNE 2014

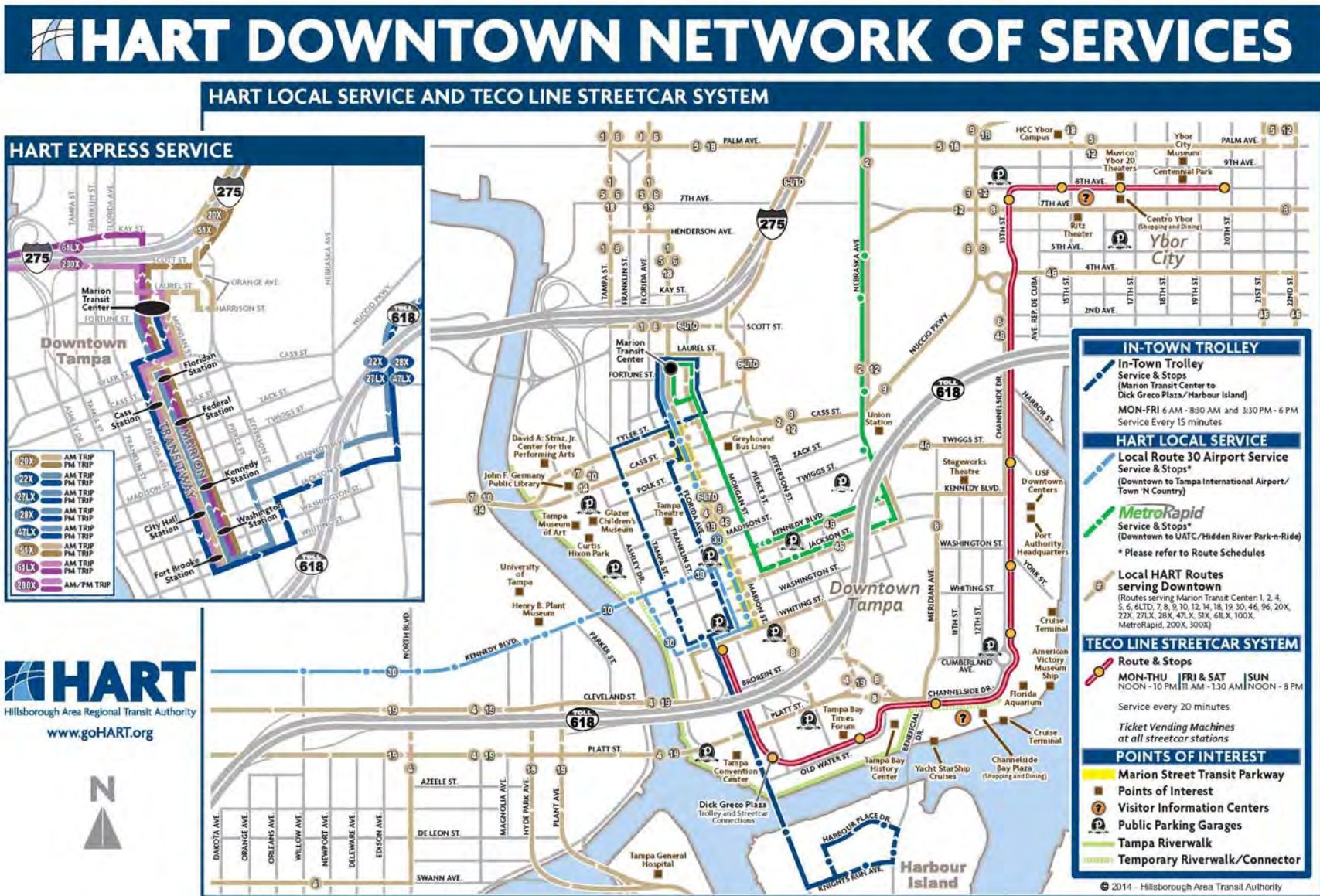
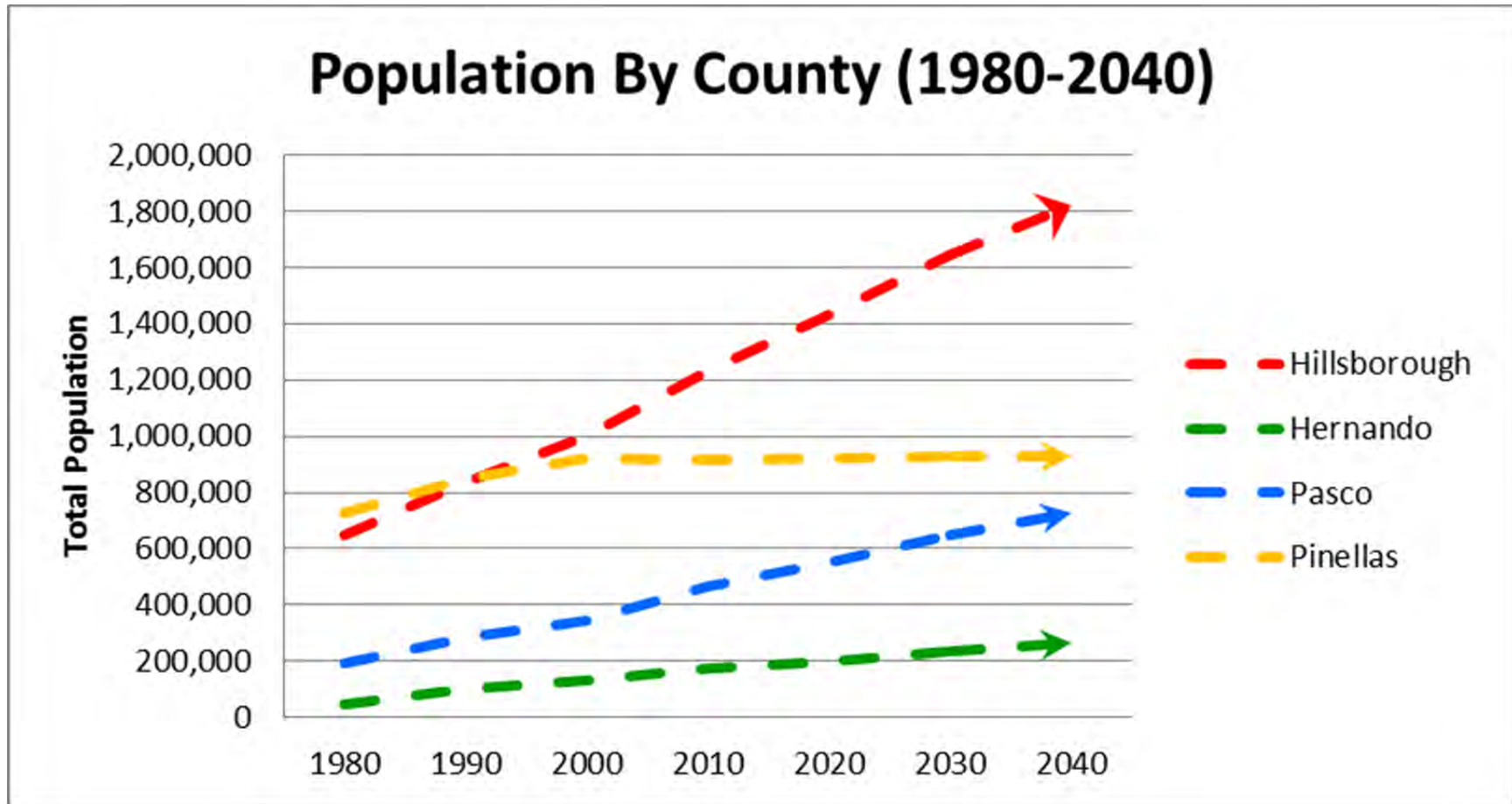


FIGURE 1-2
HISTORIC AND PROJECT POPULATION TRENDS BY COUNTY
TAMPA-ST. PETERSBURG-CLEARWATER MSA (1980 – 2040)



Source: U.S. Census 1990-2010.

Employment patterns and trends closely follow those of populations within the MSA and Hillsborough County. Data from 2012 US Bureau of Economic Analysis shows that approximately 783,000 of the 1,515,000 jobs located within the MSA are found in Hillsborough County. Further, within Hillsborough County, those 783,000 jobs are mostly concentrated in three (3) specific locations - Downtown Tampa, Westshore, and University of South Florida (USF), which represent 168,700 jobs or approximately one out of every four jobs in Hillsborough County and one out of every 10 jobs in the MSA (see Section 2.2 for further detail).

1.6 PREVIOUS EFFORTS

For nearly 15 years Hillsborough County has conducted numerous studies investigating, evaluating, analyzing and recommending various solutions to the ever-growing issue of mobility (see Section 3.0 for further detail). Each successive study has laid the groundwork for the next, and has consistently points to the same three (3) focal points, or nodes, of population and employment densities for connections that include Downtown Tampa; Westshore/Airport Area; and USF. **Figures 1-3, 1-4, and 1-5** depict recommendations from the Tampa Rail Study (2002), HART Alternatives Analysis (AA) (2010) and TBARTA Master Plan (2013), respectfully.

1.7 EXISTING AND FUTURE ROADWAY CONDITIONS

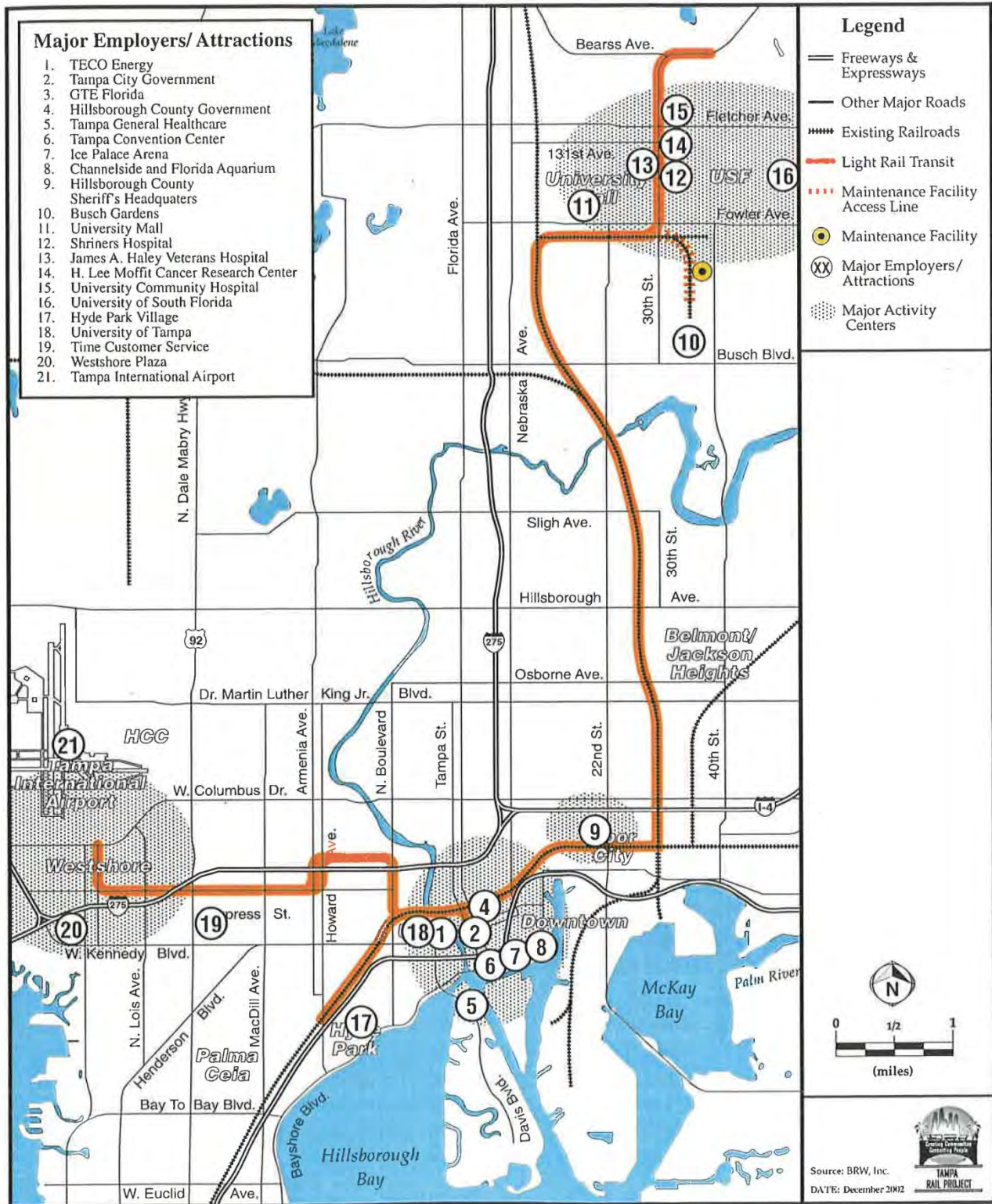
The existing roadway network connecting these nodes operates with daily volumes well in excess of their designed capacities, see **Figure 1-6**. While many of these connections are in the process of being expanded to meet projected future needs, in particular I-275, they represent the ultimate build-out of these roads. Others connections are constrained and are unable to be expanded to meet the projected future needs, see **Figure 1-7**. Additionally, Hillsborough Area Regional Transit (HART) operates a robust system of local, express, flex zones, and Bus Rapid Transit (BRT) bus routes; but each of the routes operate within the congested corridors, discussed above, directly and adversely impacting the on-time performance of routes, see **Figure 1-8**.

A primary connection that has been identified as critically needed is between Tampa International Airport and Downtown. HART Route 30 operates between the airport and Downtown along Kennedy Boulevard (9 miles), but the average travel time is 42 minutes. This is directly related to the congestion in the corridor that the bus must operate within. Representatives of the airport, numerous local and regional business organizations and chambers, as well as local governments have expressed the need for a more “time certain” option between these two critical nodes.

1.8 OPPORTUNITIES

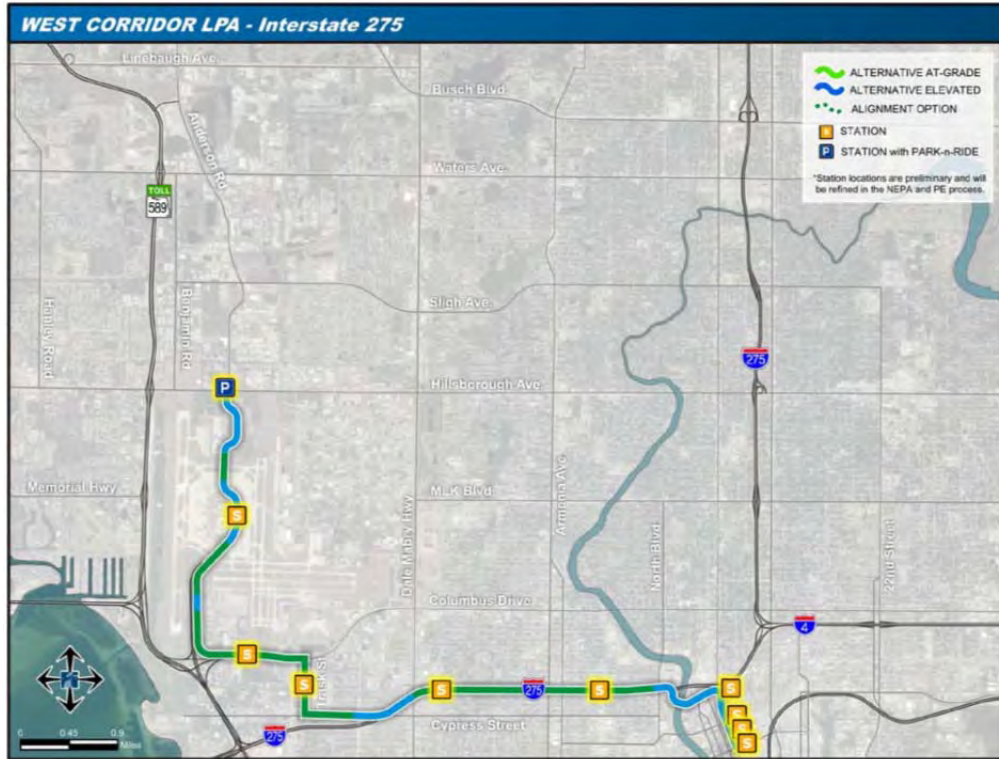
An opportunity for this connection can be found in the I-275 median transit envelope, established as part of the Tampa Interstate Study (TIS) Final Environmental Impact Statement (FEIS)/Record of Decision (ROD) in the late 1990s. This preserves a 48-foot envelope that allows for exclusive dual-track operation of a fixed-guideway system. Additionally, the Florida Department of Transportation (FDOT) District Seven, in coordination with CSX, is evaluating opportunities for alternative usage of under-utilized freight corridors as part of a separate effort.

**FIGURE 1-3
TAMPA RAIL STUDY LOCALLY PREFERRED ALTERNATIVE (2002)**

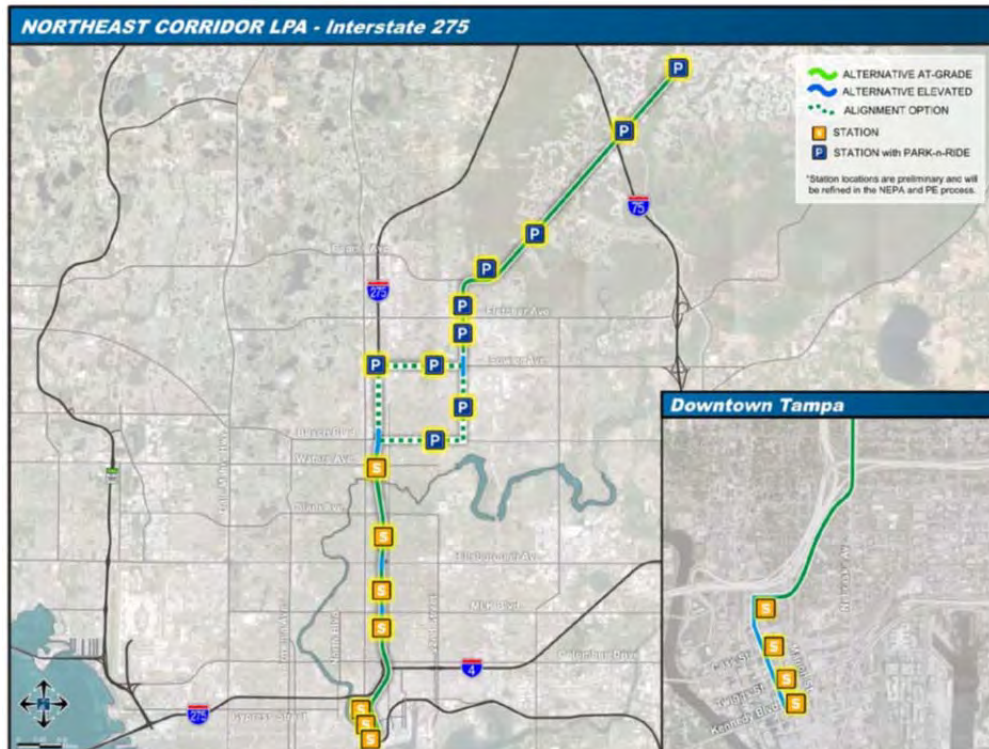


Source: Tampa Rail Project, 2002

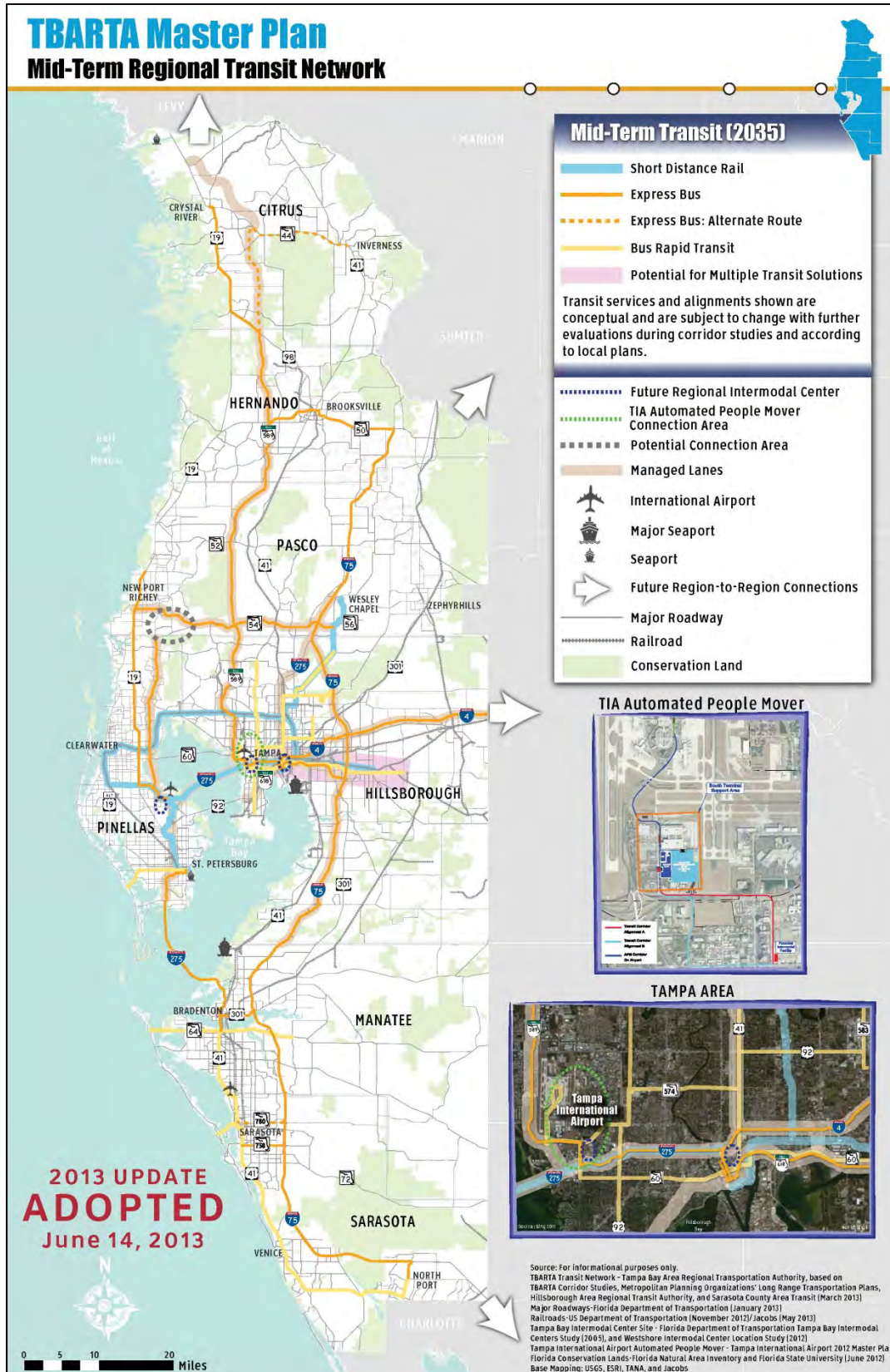
**FIGURE 1-4
DRAFT HART AA LOCALLY PREFERRED WEST ALTERNATIVE (2010)**



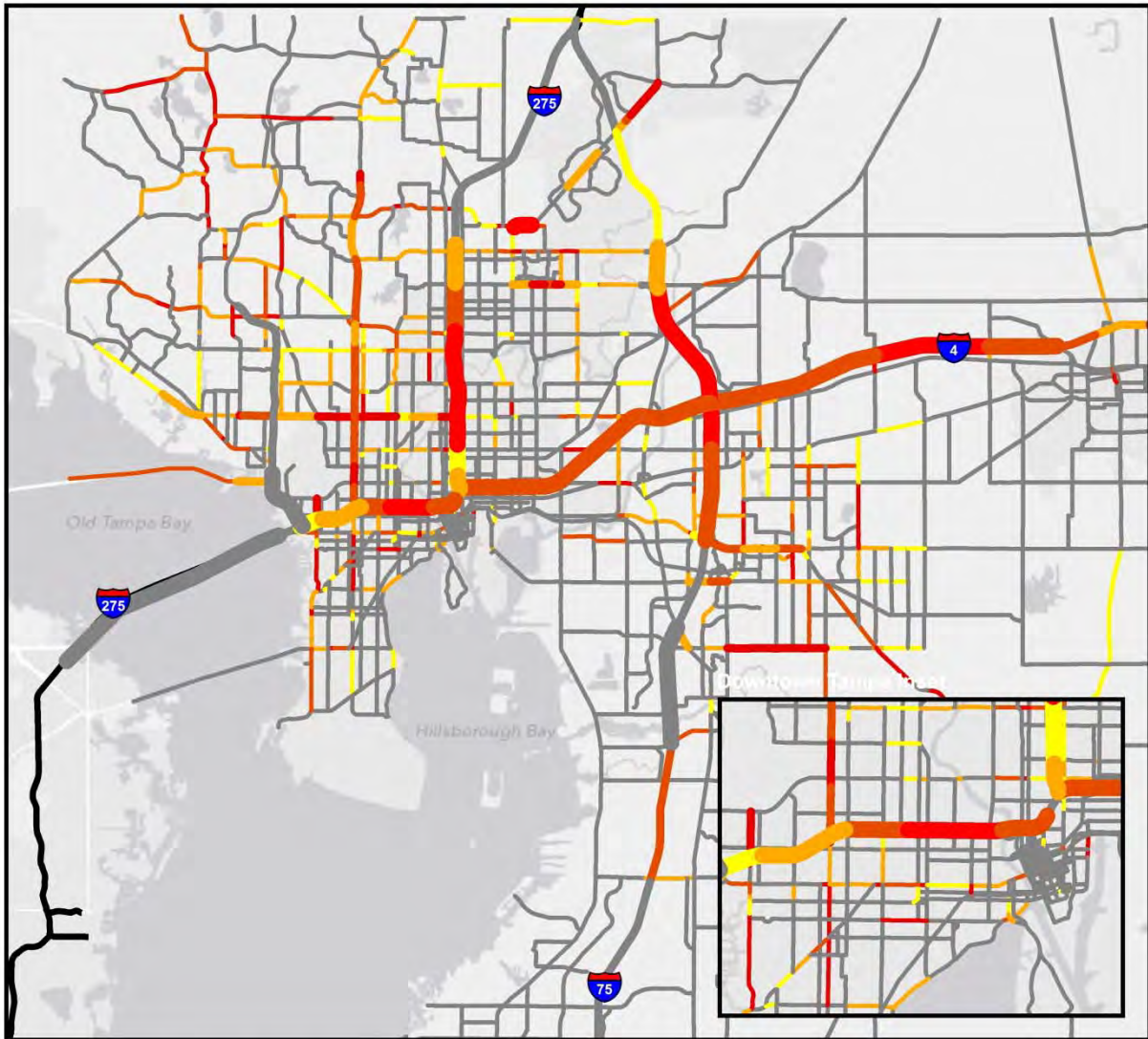
DRAFT HART AA LOCALLY PREFERRED NORTH ALTERNATIVE (2010)



**FIGURE 1-5
TBARTA MASTER PLAN MID-TERM REGIONAL TRANSIT NETWORK (2013)**



**FIGURE 1-6
HILLSBOROUGH COUNTY ROADWAYS WITH V/C RATIO (2018)**



Traffic Volumes Higher Than Road Capacity, 2018

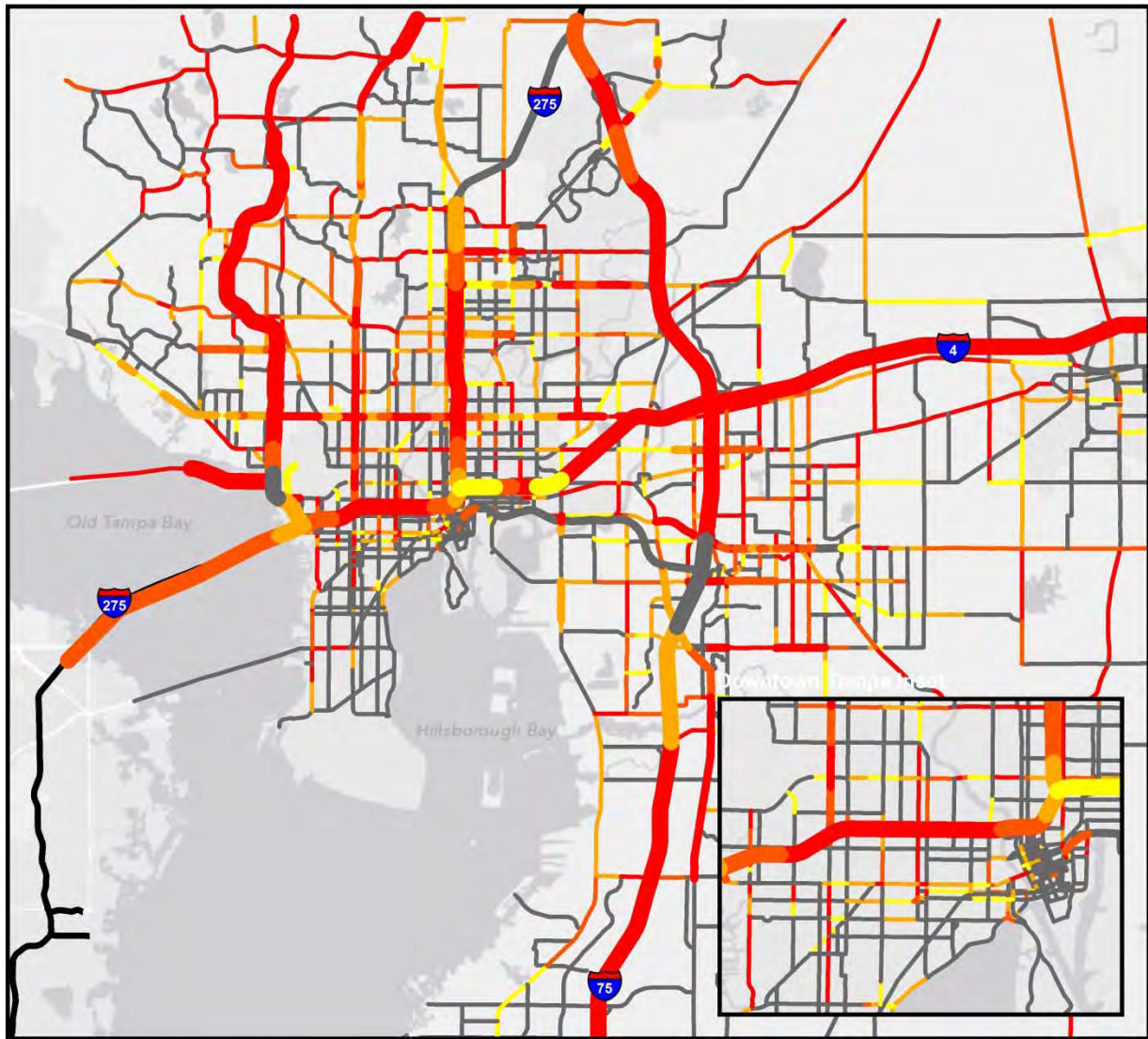
< 60,000	60,000 - 120,000	> 120,000	Vehicles / Day
			Volume < Capacity
			Up to 10% Greater
			More than 10% Greater
			More than 30% Greater
			More than 50% Greater

***Note: Future Condition Assumes That The Projects Listed in the 5 year Work Program Are In Place**



Source: Hillsborough MPO: 2018 Volume to Capacity Data, FDOT Interstates

**FIGURE 1-7
HILLSBOROUGH COUNTY ROADWAYS WITH V/C RATIO (2040)**



Traffic Volumes Higher Than Road Capacity, 2040

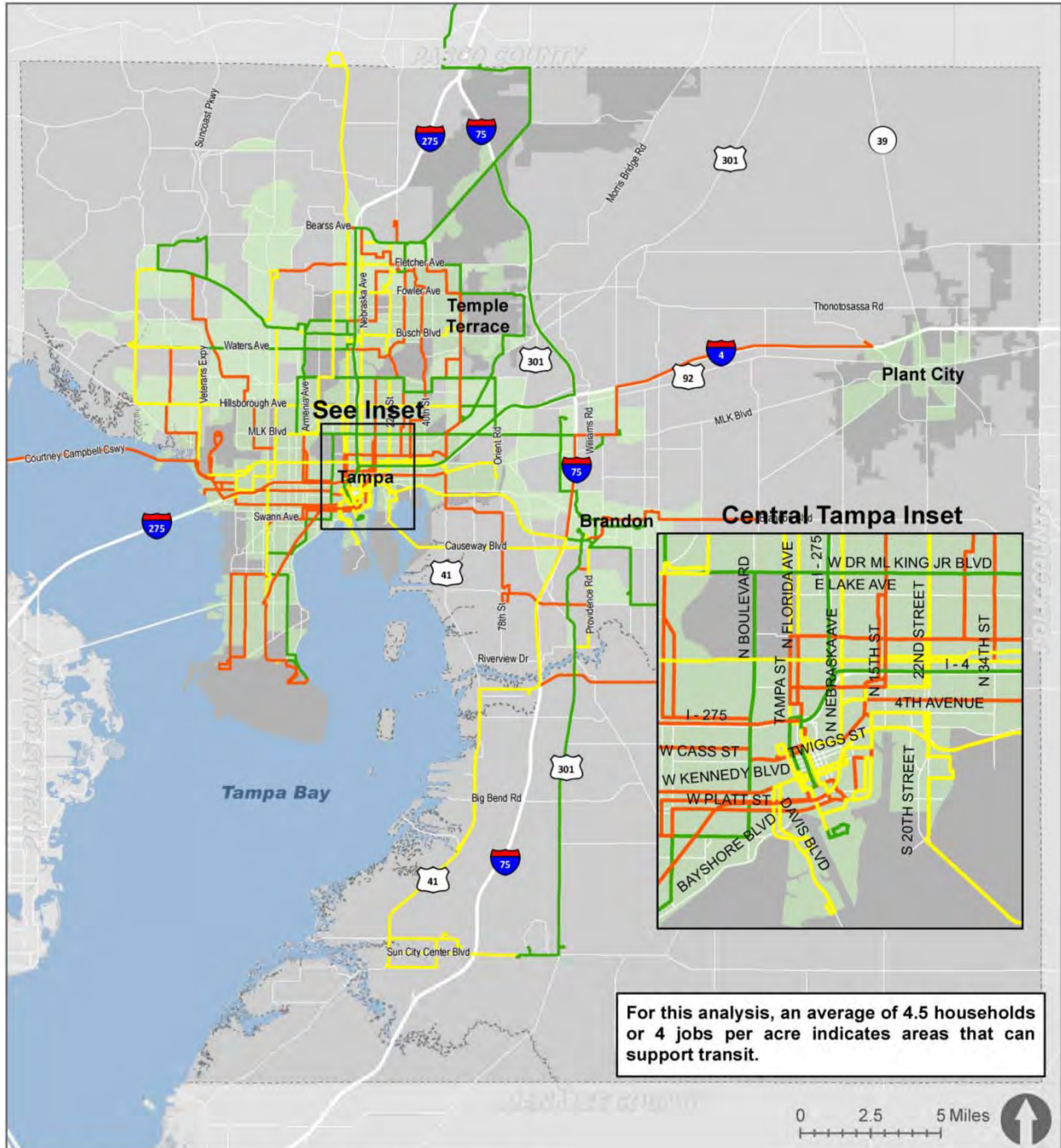
< 60,000	60,000 - 120,000	> 120,000	Vehicles / Day
			Volume < Capacity
			Up to 10% Greater
			More than 10% Greater
			More than 30% Greater
			More than 50% Greater

***Note: Future Condition Assumes
That The 2040 Cost Affordable
Roadway Improvements Are In Place**



Source: Hillsborough MPO: 2018 Volume to Capacity Data, FDOT Interstates

**FIGURE 1-8
HART BUS ROUTES WITH ON-TIME PERFORMANCE RATE**



**Are fewer buses delayed by congestion?
Delayed Transit Runs**

- | | |
|-----------------------------------|---------------------|
| Percentage of Runs Delayed | Major Roads |
| — Less than 1% | Municipalities |
| — 1 - 25% | Hillsborough County |
| — 26 - 50% | Water |
| — Transit Supportive Area | |

Source: Hillsborough County MPO, 2010; HART, 2012
Data Years: 2009 (Transit Supportive Area); July 2011 (Routes Delayed)

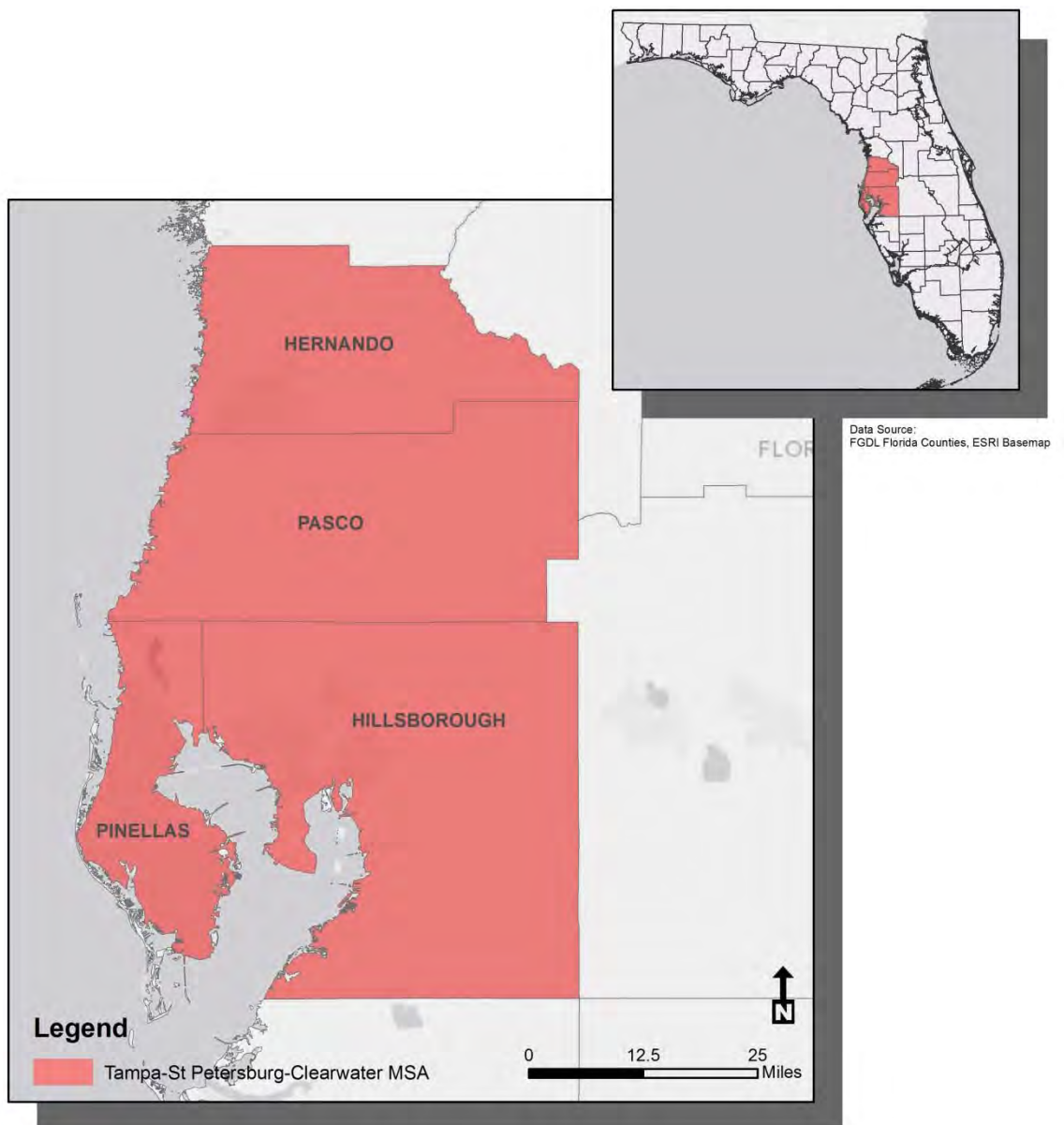


2.0 EXISTING AND FUTURE CONDITIONS

2.1 LOCAL AND REGIONAL GROWTH

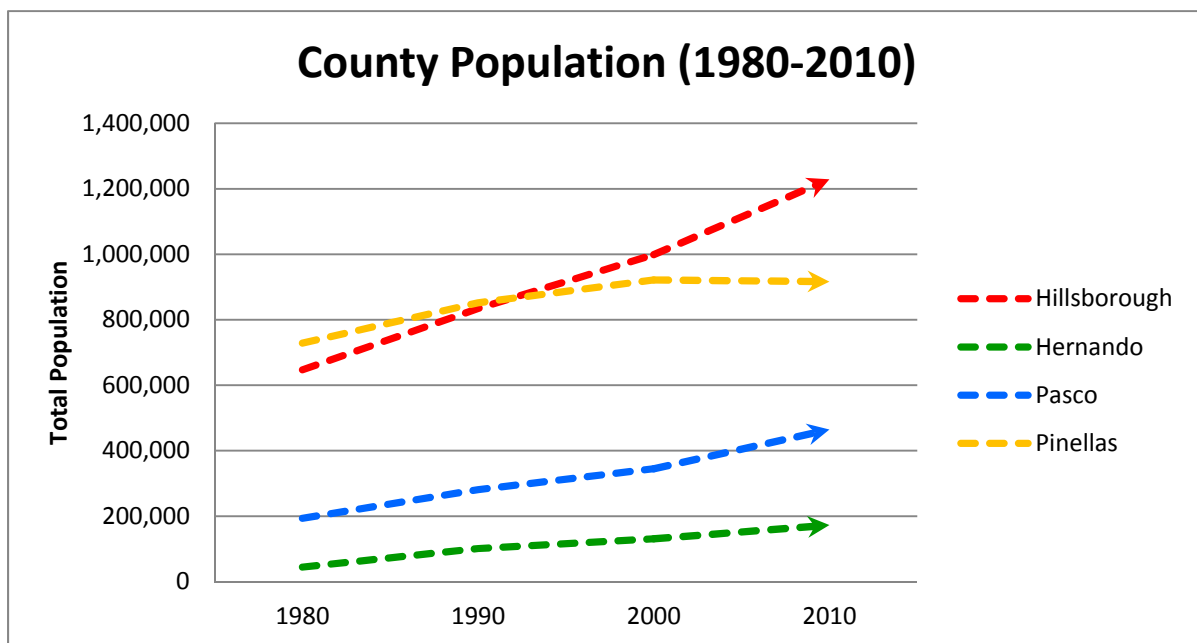
Recent reports detailing national trends in population and employment identify the Tampa Bay Region as one of the fastest growing urban areas in the United States. As shown below, and though the overall growth rate in the region has slowed from past decades, the Tampa – St Petersburg – Clearwater Metropolitan Statistical Area (MSA) continues to grow at a rate well above the national average. **Figure 2-1** depicts the location, composition, and extent of the Tampa-St Petersburg-Clearwater MSA.

FIGURE 2-1
TAMPA-ST PETERSBURG-CLEARWATER MSA



According to the US Census Bureau (USCB), the population of the Tampa-St Petersburg-Clearwater Metropolitan Area grew by approximately 430,000 residents or 18% between 2000 and 2012 to 2,820,000. The rate of growth in population in the MSA from 2000 to 2012 exceeded the national average of 10.6% and made the Tampa-St Petersburg-Clearwater MSA one of the twenty largest and fastest growing metropolitan areas in the nation. By 2040, the population of the Tampa-St Petersburg-Clearwater metropolitan area is projected to grow by an additional 920,000 residents (32%) to 3,739,000. **Figure 2-2** illustrates the trend in recent population growth and shows the relative population size of the four counties that make up the MSA.

**FIGURE 2-2
TAMPA-ST PETERSBURG-CLEARWATER MSA POPULATION TREND**



*Data Source: US Census 1980-2010

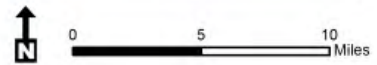
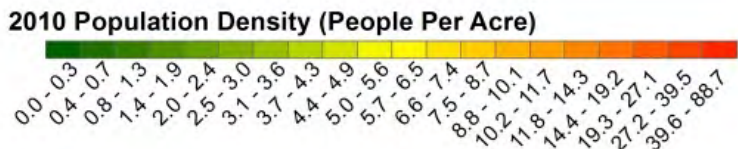
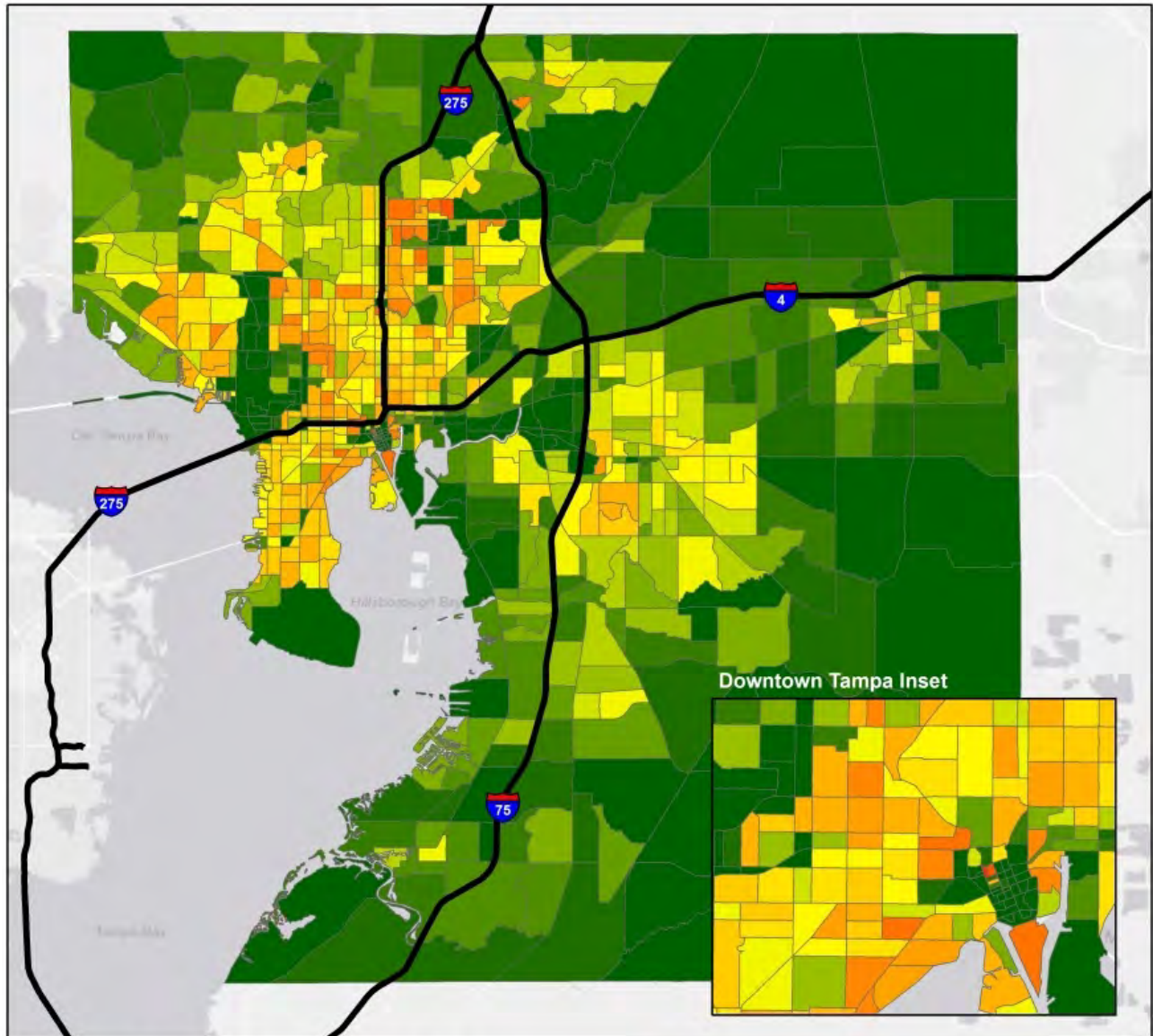
2.2 LOCATION OF POPULATION AND EMPLOYMENT

Within the MSA and as the primary area of focus of this study, Hillsborough County accounts for 44% of the MSA's population or 1,229,000 residents (in year 2012). **Figure 2-3** shows the distribution of the current population in Hillsborough County based on Traffic Analysis Zone (TAZ) geography. Note the focus of many of the most densely populated areas is in central Hillsborough County along the major transportation corridors of I-75, I-275, and I-4.

Figure 2-4 shows the projected population density for Hillsborough County in 2040. The estimates depicted in this figure are based on the most recent projections contained in the Tampa Bay Regional Planning Model (TBRPM). The 2040 map shows a general intensification of residential use across the county with the majority of growth focused in the existing centers. However, the figure highlights major growth in residential use in the urban core and along I-275 between the Downtown Tampa and

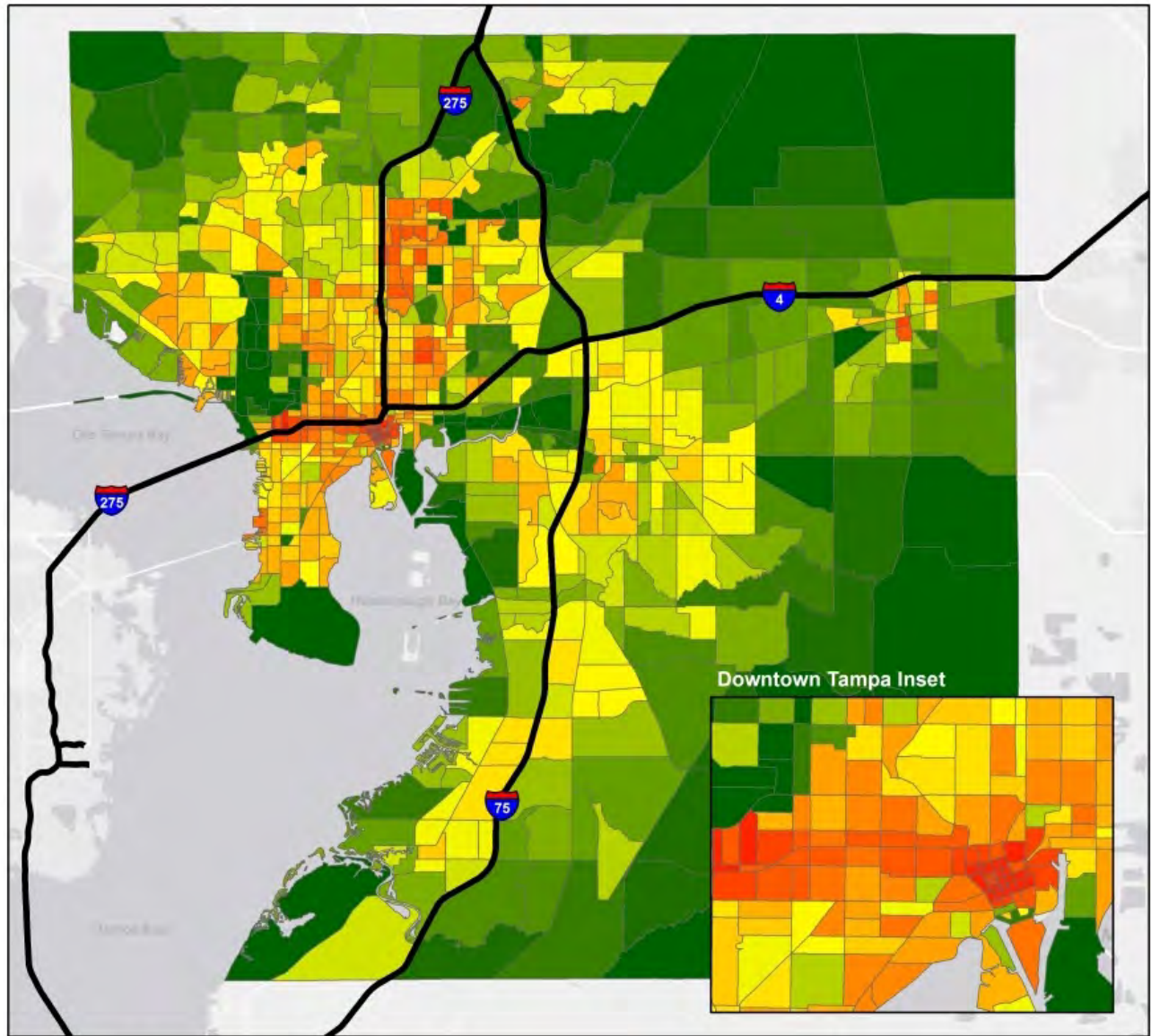
Westshore. The 2040 map shows areas in this part of the county previously void of residential use are expected to transition to areas with some of the highest residential densities.

FIGURE 2-3
2010 POPULATION DENSITY

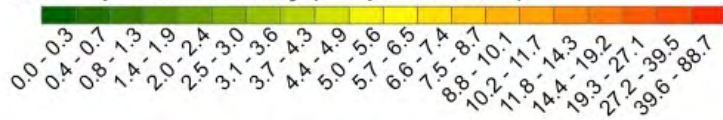


Source: Hillsborough MPO: 2010 Population Estimate, FDOT Interstates

**FIGURE 2-4
2040 POPULATION DENSITY**



2040 Population Density (People Per Acre)



Source: Hillsborough MPO: 2010 Population Estimate, FDOT Interstates

In addition to serving as the major population center in the region, Hillsborough County and the City of Tampa serve as a major focus of the region's economy. Current US Bureau of Economic Analysis estimates show that approximately 783,028 of the 1,515,113 jobs located within the MSA are found in Hillsborough County¹.

Employment is distributed across Hillsborough County though is most intensely focused within the City of Tampa. **Figure 2-5** shows 2010 employment density within the County. Note that the three major employment clusters occur in the area of Downtown Tampa, Westshore, and USF. The use found within these three employment centers (1-mile buffer from center of each district) occupies less than 2% of the total land area within the county, but accounts for approximately 24% (168,700 jobs) of the County's total employment.

Year 2040 projections, **Figure 2-6**, show employment growth will remain focused on the Downtown, Westshore, and USF districts with some notable growth in the south county area. By 2040, the three primary employment centers are projected to add approximately 100,000 new jobs and maintain the 24% share of the total employment in the county.

2.3 STATE OF THE TRANSPORTATION SYSTEM

To support the travel demand generated by expanding populations and economic activity, Hillsborough County has invested heavily in a transportation system that includes approximately 4,100 lane miles of roadway, 245 miles of rail, 45 bus routes, four public airports, five major sea port facilities, as well as an extensive bicycle and pedestrian network. Combined, these systems support an estimated 4.8 million trips per day².

2.3.1 Roadways

In Hillsborough County, the existing roadway system consists of 620 lane-miles of limited access highways, 184 lane-miles of toll roads, and 3,236 lane-miles of arterial/collector roads. This element of the transportation system supports the vast majority of trips made within the County. Based on US Census Commuter statistics taken from the 2012 American Community Survey (ACS), 89.5% of work trips in Hillsborough County were made using private automobiles, 1.6% by transit, 1.6% by walking, and 1.9% by other means.

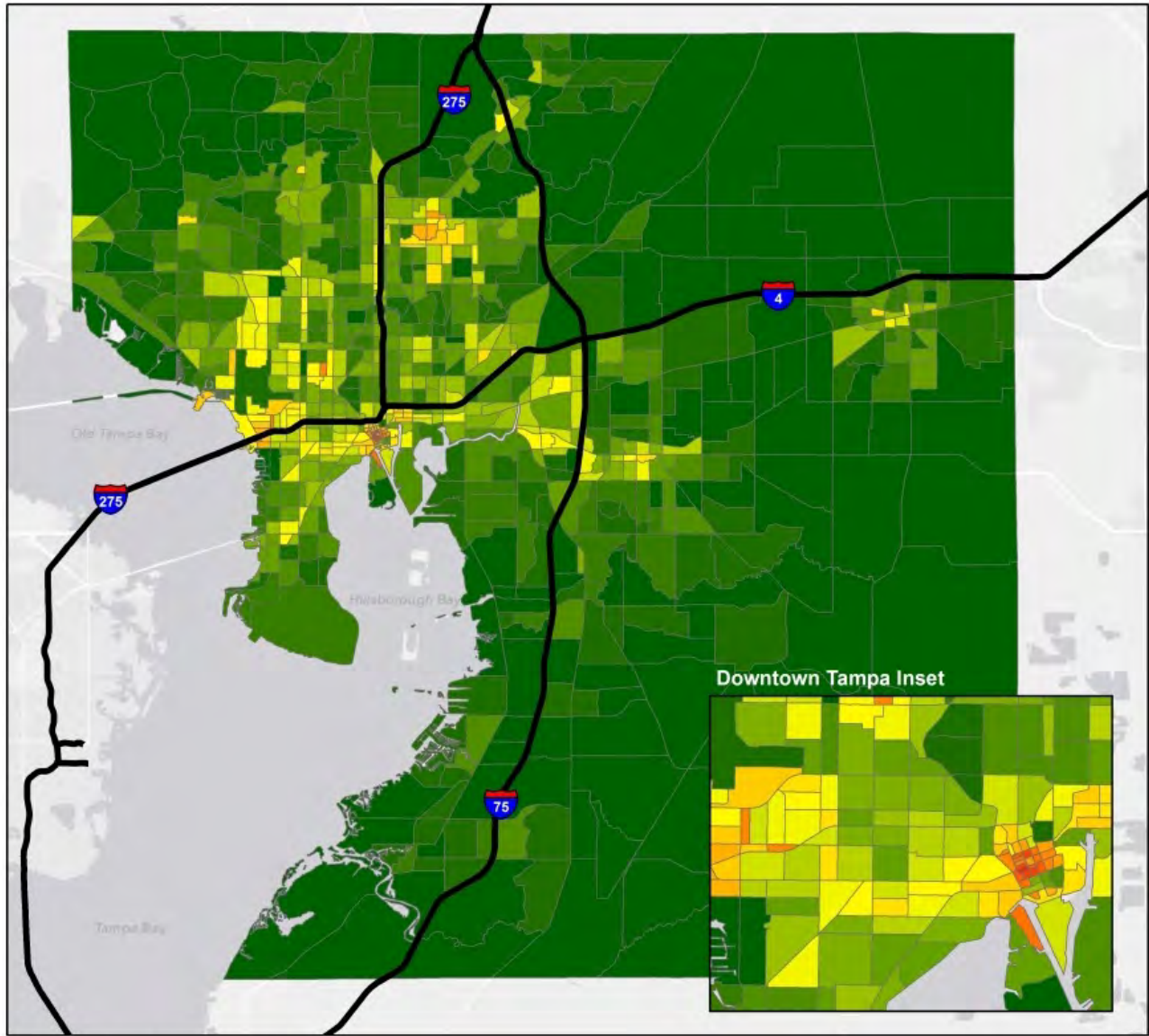
2.3.2 Capacity

As the primary element supporting mobility in the County, the ability of the roadway network to support demand is important. **Figures 2-7** and **2-8** provide a depiction of the condition of the roadway network in 2018 and 2040. The figures show area roadways Average Daily Traffic (ADT) and volume to capacity (V/C) ratio. These statistics serve to highlight those roadways within the system that are functioning at or above intended capacity. V/C Ratio is an important indicator of roadway operations because when the number of vehicles traveling on a roadway exceeds capacity; vehicle movement is restricted resulting in slower traffic speeds and delay.

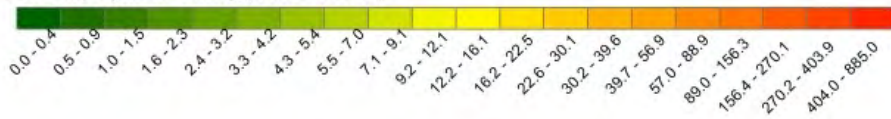
¹ <http://www.bea.gov/itable/> 2012 Local Area Personal Income and Employment. Website Accessed: June 2014

² CUTR, 2009 National Household Travel Survey Florida Data Analysis, March 2013. URS Calculation: Tampa-St. Petersburg-Clearwater MSA Person Trip Rate (3.93)*Current Population

**FIGURE 2-5
2010 EMPLOYMENT DENSITY**

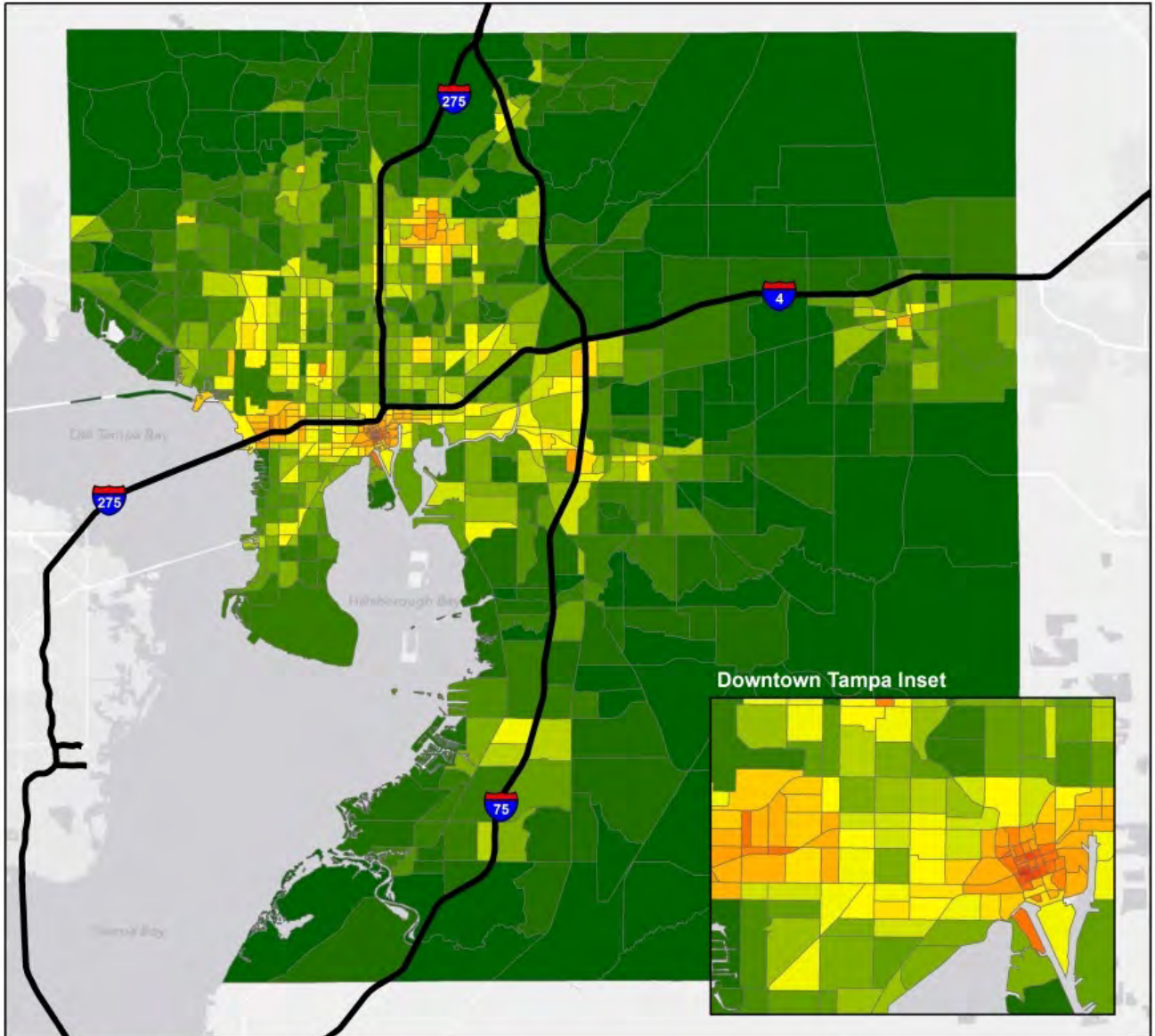


2010 Employment Density (Jobs Per Acre)

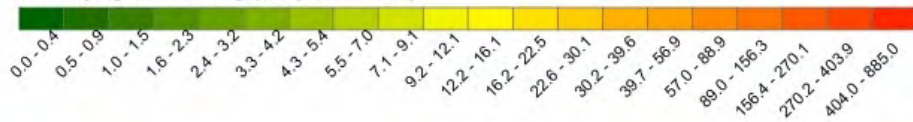


Source: Hillsborough MPO: 2010 Population Estimate, FDOT Interstates

**FIGURE 2-6
2040 EMPLOYMENT DENSITY**

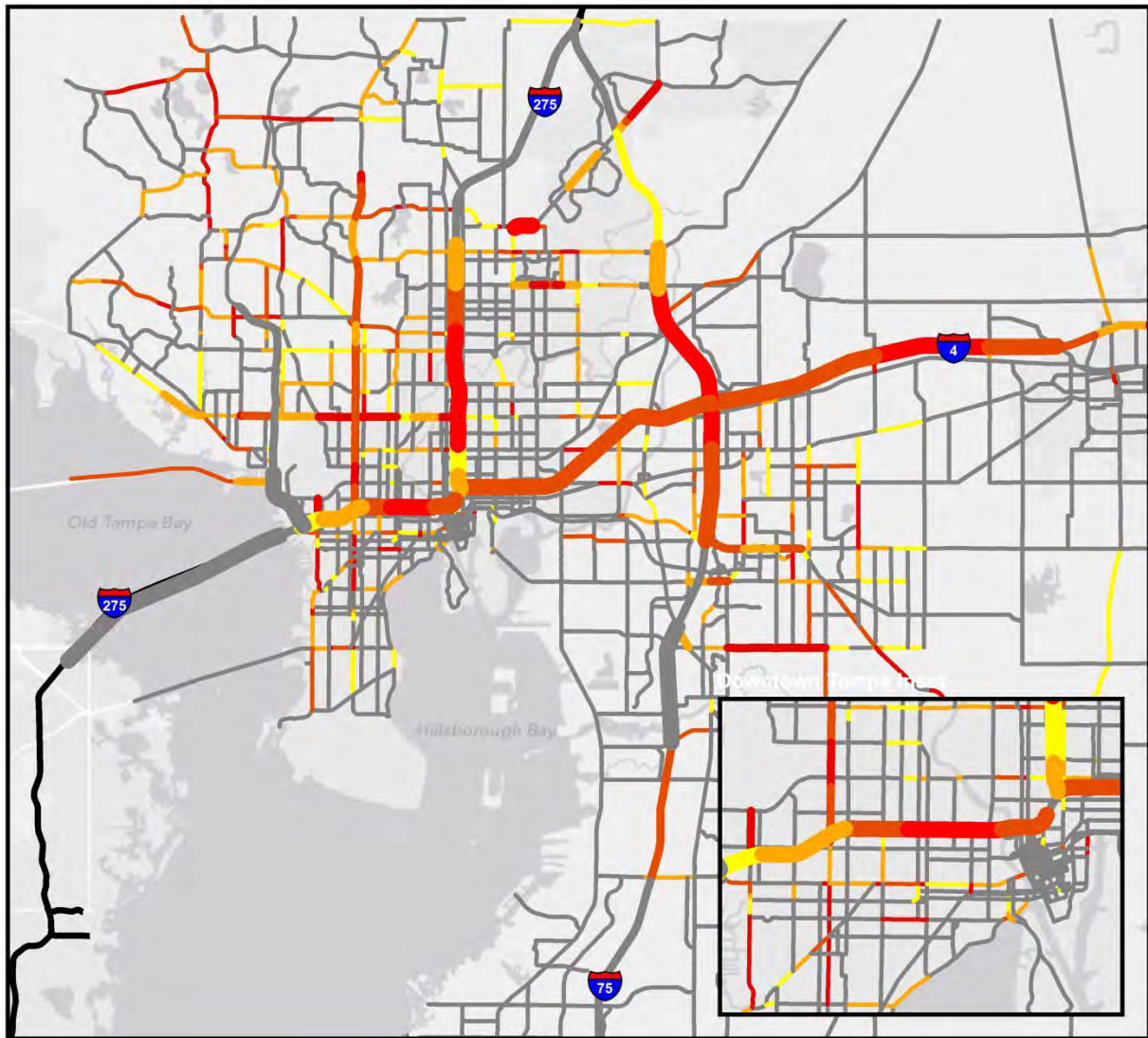


2040 Employment Density (People Per Acre)



Source: Hillsborough MPO: 2010 Population Estimate, FDOT Interstates

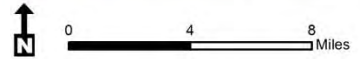
**FIGURE 2-7
HILLSBOROUGH COUNTY ROADWAYS WITH V/C RATIO (2018)**



Traffic Volumes Higher Than Road Capacity, 2018

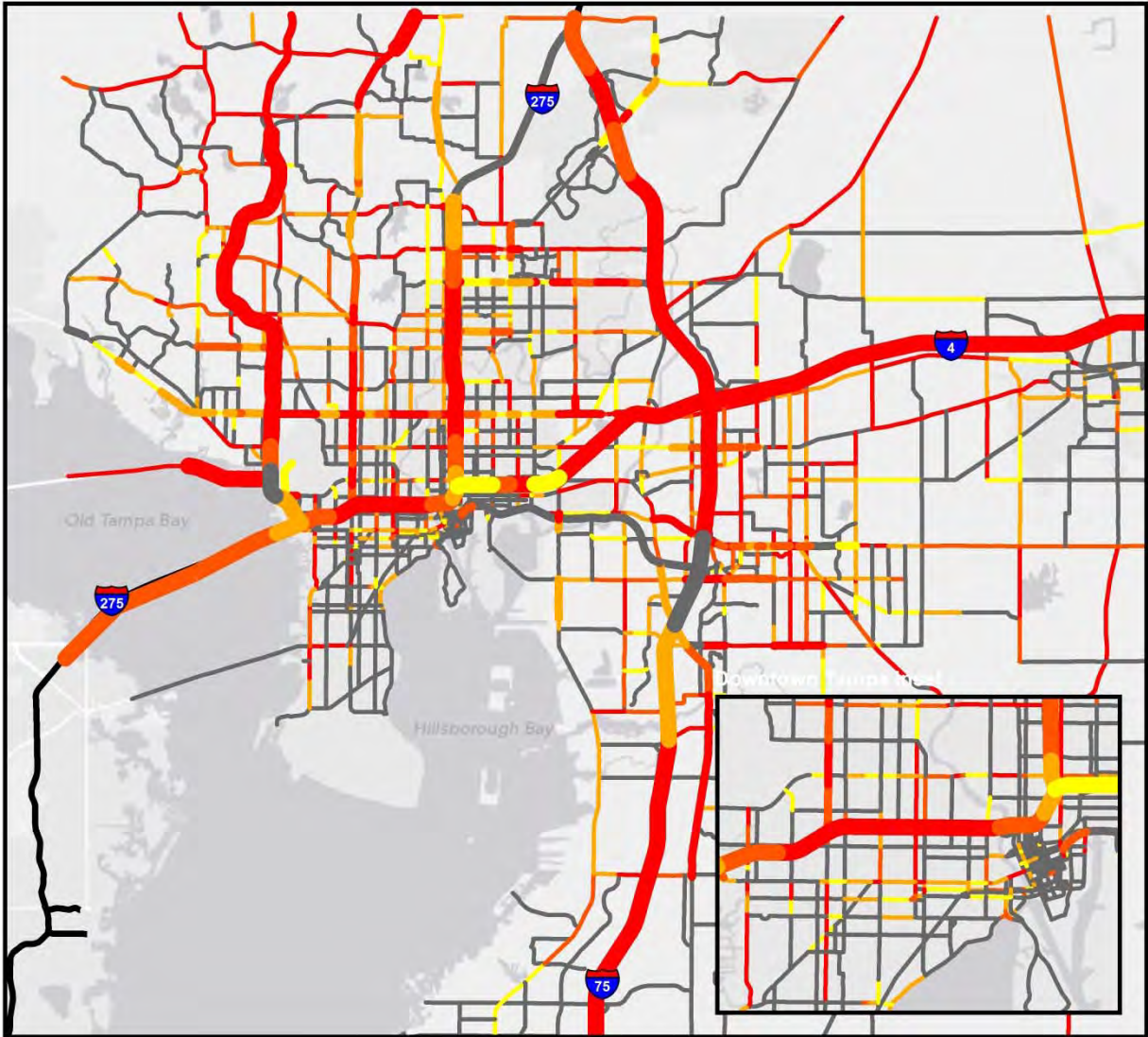
< 60,000	60,000 - 120,000	> 120,000	Vehicles / Day
			Volume < Capacity
			Up to 10% Greater
			More than 10% Greater
			More than 30% Greater
			More than 50% Greater

***Note: Future Condition Assumes That The Projects Listed in the 5 year Work Program Are In Place**



Source: Hillsborough MPO: 2018 Volume to Capacity Data, FDOT Interstates

**FIGURE 2-8
HILLSBOROUGH COUNTY ROADWAYS WITH V/C RATIO (2040)**



Traffic Volumes Higher Than Road Capacity, 2040

< 60,000	60,000 - 120,000	> 120,000	Vehicles / Day
			Volume < Capacity
			Up to 10% Greater
			More than 10% Greater
			More than 30% Greater
			More than 50% Greater

***Note: Future Condition Assumes
That The 2040 Cost Affordable
Roadway Improvements Are In Place**



Source: Hillsborough MPO: 2018 Volume to Capacity Data, FDOT Interstates

The trend highlighted in the figures shows that many of the major roadways in Hillsborough County (those that connect major employment centers) currently operate well above capacity; in addition, the number of congested roadways is projected to increase by 2040.

2.3.3 Reliability

In addition to the assessment of roadway capacity, metrics directed at identifying system reliability are often used to rate roadway performance. The FDOT and the Texas Transportation Institute publish performance reports annually that detail a Travel Time Index (TTI) and a Buffer or Planning Time Index (BI or PTI) for roadways across the State of Florida. Both indices assess travel time and system reliability from the perspective of the motorist.

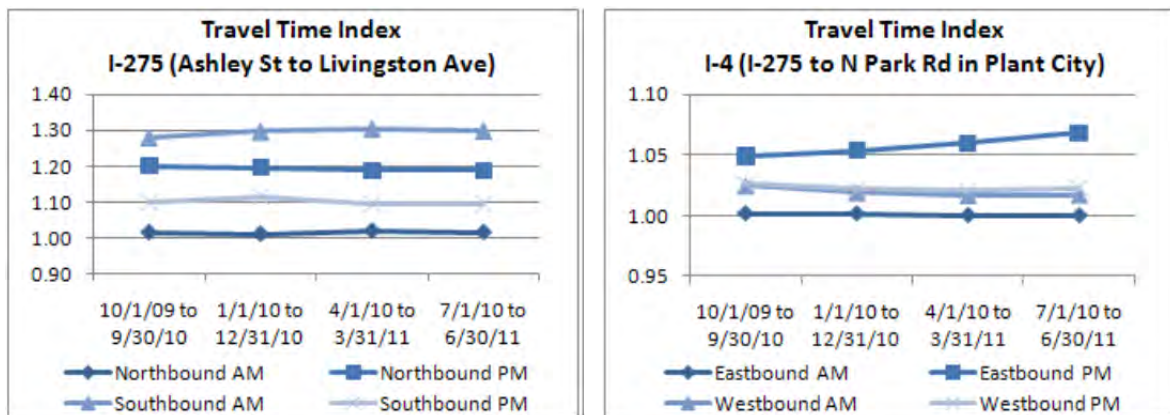
TTI is an assessment of travel times during peak roadway congestion. TTI is the ratio of travel time during the peak period to the time required to make the same trip at free-flow speeds. For example, a TTI value of 1.5 indicates a 20-minute free-flow trip requires 30 minutes during the peak period³.

PTI is a factor that represents the reliability of travel on a roadway. Computed with the 95th percentile travel time, it represents the amount of time that should be planned for a trip to be late no more than 1 day a month. For example, a PTI of 3.00 means that for a 20-minute free-flow trip, 60 minutes must be allotted to ensure an on time arrival⁴.

In their annual mobility report, the Texas Transportation Institute identified average scores based on metropolitan area. The TTI score identified for Tampa freeways was 1.15 and PTI score was 2.9. A TTI of 1.2 was identified for Tampa when the arterial roadway network was factored in to the score.

FDOT reports more detailed information listing TTI scores for specific roadway segments by District. Additionally, the FDOT assessments provide the context of time of year, time of day, and travel direction. **Figure 2-9** presents the TTI for sections of I-275 and I-4 produced by FDOT.

**FIGURE 2-9
I-275 AND I-4 TRAVEL TIME INDEX**



Source: FDOT, 2011-12 Intelligent Transportation Systems Performance Measures Annual Report

³ Texas Transportation Institute, 2012 Urban Mobility Report. <http://mobility.tamu.edu/ums/>

⁴ Texas Transportation Institute, 2012 Urban Mobility Report. <http://mobility.tamu.edu/ums/>

The TTI scores reported by the Texas Transportation Institute and FDOT show that travel speeds on area roadways are reduced on average by as much as 30% during peak periods. Additionally, a relatively high Planning Time Index of 2.9 shows that congestion on Hillsborough County's freeways fluctuates greatly requiring motorists to allocate nearly three times the average trip time to reasonably ensure an on time arrival.

2.3.4 Bus System

HART currently operates 29 local bus routes, eleven commuter express routes, five flex zones, a 2.7-mile street car system, and paratransit service within Hillsborough County. In 2013, HART supported approximately 14.6 million passenger trips⁵.

Currently, the vast majority of transit trips are carried by busses that operate in mixed traffic on existing roadways. This makes the transit trips susceptible to many of the same types of traffic delay that impact automobile traffic. In 2011, 9.8 percent of HART's daily transit runs were delayed by congestion. **Figure 2-10** depicts the percentage of transit runs delayed by congestion.

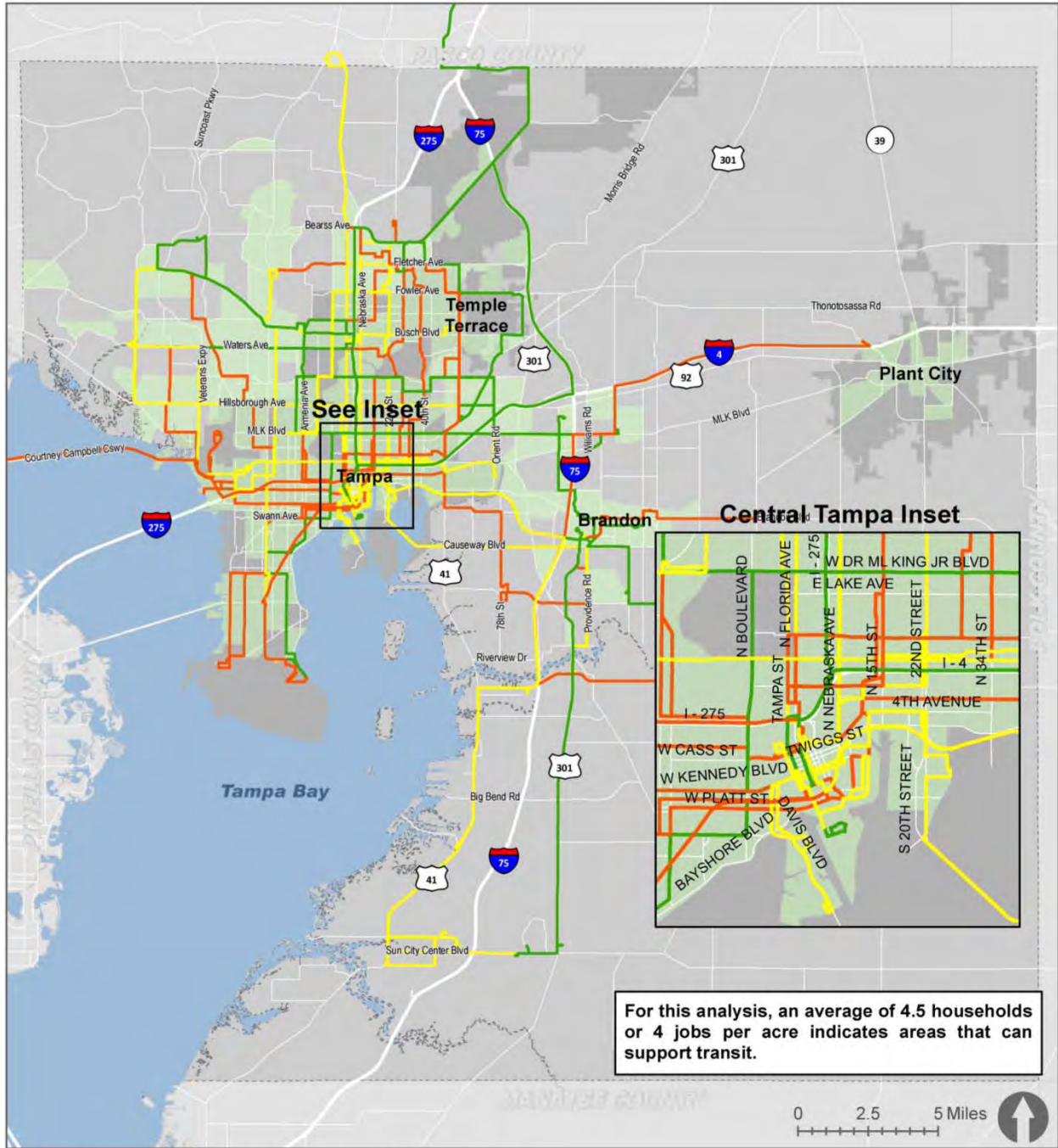
In addition to the analysis of on-time performance for specific routes, an analysis of accessibility was conducted as part of the TAOS study. The accessibility analysis modeled the existing transit system to identify the distance a traveler could cover using transit and walking in a given period of time. **Figure 2-11** shows the area accessible to a transit user who leaves the Marion Transit Center (MTC) during the morning weekday peak travel period (7:30 a.m.). As shown by the colored area in the figure, at the 30-minute (similar to the 26 minute average commute time in the County) mark the transit rider would be able to access most of Downtown, but not be able to travel between Downtown Tampa and Tampa International Airport, nor would the rider be able to reach the USF employment center. Additionally, the model used to generate this data is based on Google Transit Feed Service (GTFS data) and reflects scheduled service. Based on the on-time performance outlined previously, it is likely that a transit rider would often be unable to reach the full extent shown in Figure 2-11 in the allotted trip time.

2.3.5 Rail

One mode not subject to the limitations of roadway congestion is rail. Approximately 245 miles of rail exist within Hillsborough County. This component of the system is focused on goods movement; inter-city passenger rail does operate in Hillsborough County.

⁵ HART Media Alert, *HART Ridership Soars in FY2013*, October 2013

**FIGURE 2-10
HART BUS ROUTES WITH ON-TIME PERFORMANCE RATE**



Are fewer buses delayed by congestion?

Delayed Transit Runs

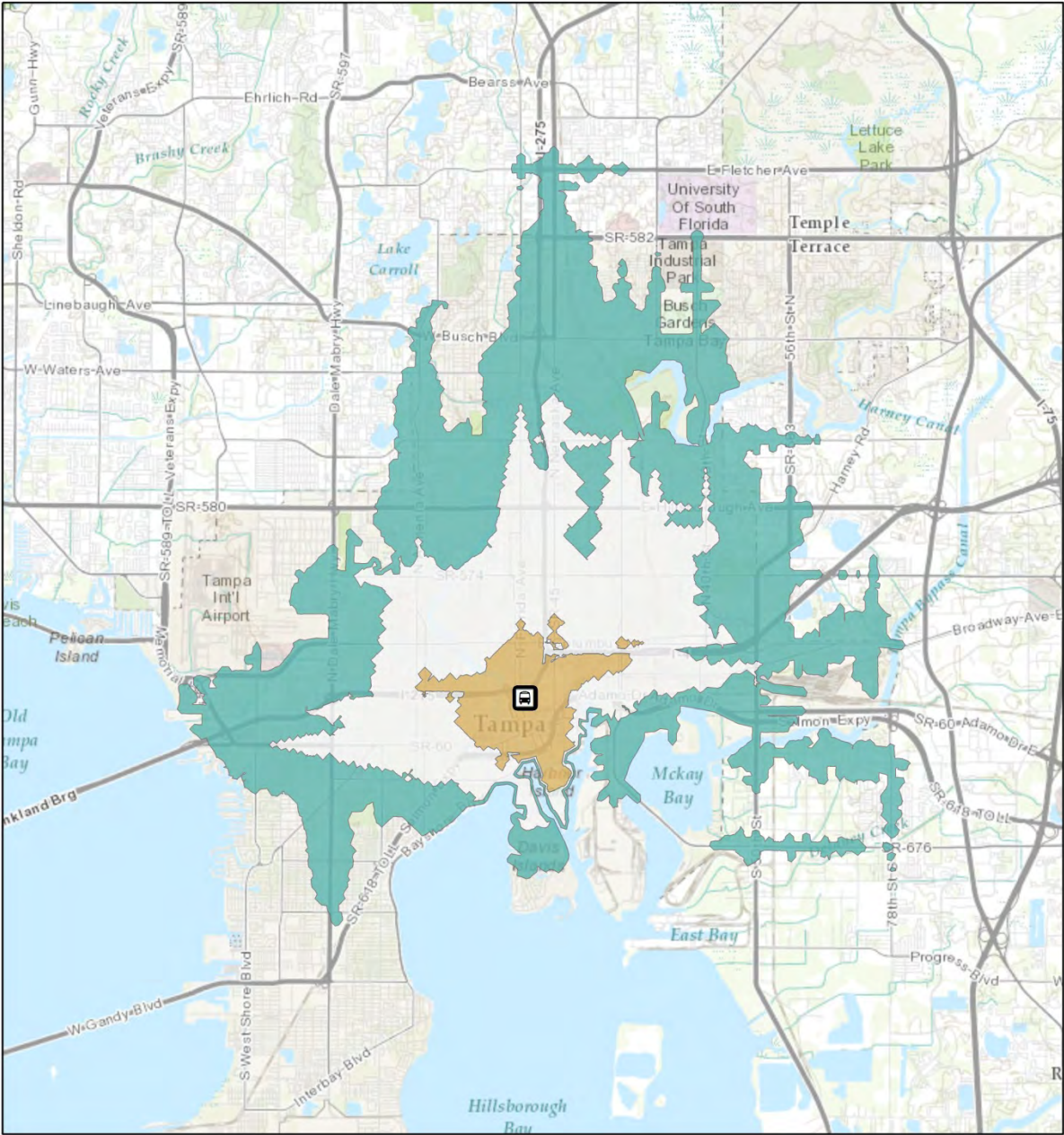
- | | |
|-----------------------------------|---------------------|
| Percentage of Runs Delayed | Major Roads |
| Less than 1% | Municipalities |
| 1 - 25% | Hillsborough County |
| 26 - 50% | Water |
| Transit Supportive Area | |

Source: Hillsborough County MPO, 2010; HART, 2012
Data Years: 2009 (Transit Supportive Area); July 2011 (Routes Delayed)







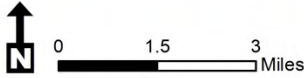
Source: Hillsborough County MPO, State of the System Report, June 2012

**FIGURE 2-11
TRANSIT TRAVEL DISTANCE FROM MTC AT AM PEAK**



Legend

-  Marion Transit Center
- 5:00 PM MTC Outbound**
-  Distance in 15 Minutes
-  Distance in 30 Minutes
-  Distance in 45 Minutes



Data Source:
URS Model Based on GTFS Data, ESRI Basemap

2.3.6 Inter-City Rail (Amtrak)

Amtrak operates the intercity passenger rail service that stops at Union Station in Downtown Tampa; the Silver Service/Palmetto Route operates on the CSX “A” Line. The route connects the cities of Miami, Tampa, Orlando, and Jacksonville as well as several smaller communities across the state. Intersecting service in Kissimmee provides a connection north along the Eastern Seaboard. Three outbound connections to Amtrak service are provided from Union Station in Tampa. The first two are rail connections which depart Union Station daily in the early and late afternoon. The second is a bus service that departs Union Station mid-morning, providing a connection to rail service in Kissimmee. In addition to the outbound service, three inbound connections mirror the previously described service.

2.3.7 Other Rail

The vast majority of the rail infrastructure present in Hillsborough County is owned and maintained by the CSX Corporation. **Figure 2-12** provides a depiction of the existing rail system, and identifies the segmentation of the system (subdivision and spur). Reflective of the ownership of the network, freight movement is the predominant activity supported by the existing rail system. **Table 2-1** identifies the frequency and type of cargo generally carried on each subdivision. Note that relatively little traffic operates on the system north and west of Ybor City. The most intense use is focused on the Tampa Terminal, Palmetto, and Lakeland Subdivisions to the east. With the exception of Amtrak service discussed previously no passenger rail service operates on the CSX lines present in Hillsborough County.

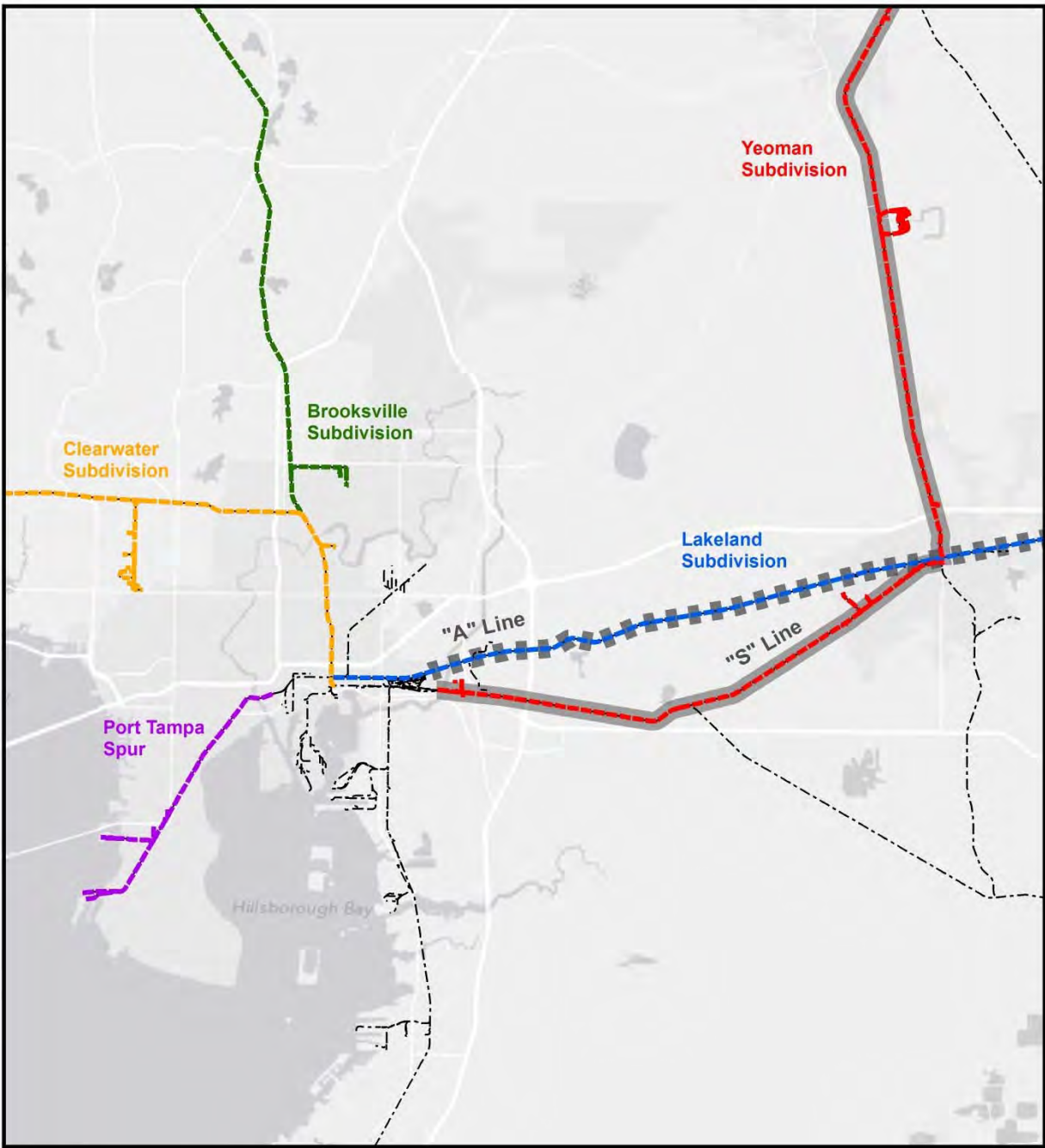
**TABLE 2-1
HILLSBOROUGH COUNTY FREQUENCY AND TYPE OF RAIL CARGO**

Rail Subdivision/Segment	Avg. No. Trains/Day	Description of Primary Use
Brooksville Subdivision	2	Freight – Aggregate and Cement
Clearwater Subdivision	3-6	Freight – Autos and Durable Goods
Lakeland Subdivision	18	Freight and Amtrak (2 trains/day)
Palmetto Spur	27	Freight – Phosphate Related
Port Tampa Spur	1	Freight – Petroleum and Chemicals
Tampa Terminal	20-30	Freight – Port Related

Source: 2009 Regional Freight Rail Study, Hillsborough MPO

Several plans have been put forward to expand passenger rail service in Hillsborough County. One of the most notable is the development of a High Speed Rail between Orlando and Tampa. The plan for the High Speed Rail System evolved over decades with a final plan approved by the Federal Rail Administration in 2005. The alignment proposed in the final environmental document passes along dedicated right-of-way (ROW) in the center of the I-4 corridor. However, in 2010 federal dollars to construct the project were rejected by the state. Though the project was canceled, the site for the intermodal center in Downtown Tampa and transit envelope in the I-4 corridor remain intact.

**FIGURE 2-12
EXISTING RAIL LINES IN HILLSBOROUGH COUNTY**



Legend

Existing Rail System Subdivisions (2014)

- CLEARWATER
- PORT TAMPA SPUR
- YEOMAN
- BROOKSVILLE
- LAKELAND/CARTERS/SANFORD
- - - - Other Rail

- CSX Line**
- CSX "S" Line
 - CSX "A" Line



Data Source:
FDOT, RAILS_TRANSTAT_2014
ESRI Basemap

Subsequent to the planning of the high-speed rail system, a regional system was proposed in central Florida. The enabling legislation for the SunRail system (Florida Statute 341.302), with the first segment now operating in Orlando, includes discussion of a connection to Hillsborough County. Early evaluation of the Orlando to Tampa corridor discussed use of the existing CSX “A” Line. However, CSX has indicated additional passenger service on the segment of the “A” Line between Tampa and Auburndale was not a viable option. Based on this, a SunRail connection to Tampa would likely need to utilize other ROW west of central Polk County. Any development of a SunRail Connection to Union Station would likely be dependent upon further negotiations with CSX.

Currently, a third possibility for an inter-city rail connection is being discussed. A privately owned and operated rail carrier, Florida East Coast Industries (FEC), the operator of All Aboard Florida (AAF), is developing inter-city rail service between Miami and Orlando. Plans for the completed AAF system show connections to Tampa and Jacksonville.

2.3.8 Local Connections

Circulator Service

HART operates a local circulator service in Downtown Tampa that serves many of the major employers. Route 96, branded as the “In-Town Trolley”, utilizes uniquely branded buses to connect the Marion Transit Center to Harbor Island. Additionally, the service connects the Marion Transit Center (the primary transit hub in Hillsborough County) with the TECO Line Streetcar. The In-Town Trolley operates at 15-minute headways, five hours, five days per week. The service is focused during weekday AM and PM peak periods operating from 6:00-8:30 a.m. and 3:30-6:00 p.m. Though the service operates on a shortened schedule, the route carries approximately 210 passengers per day or more than 40 passengers per hour. **Figure 2-13** depicts the In-Town Trolley Route.

2.3.9 TECO Line Streetcar

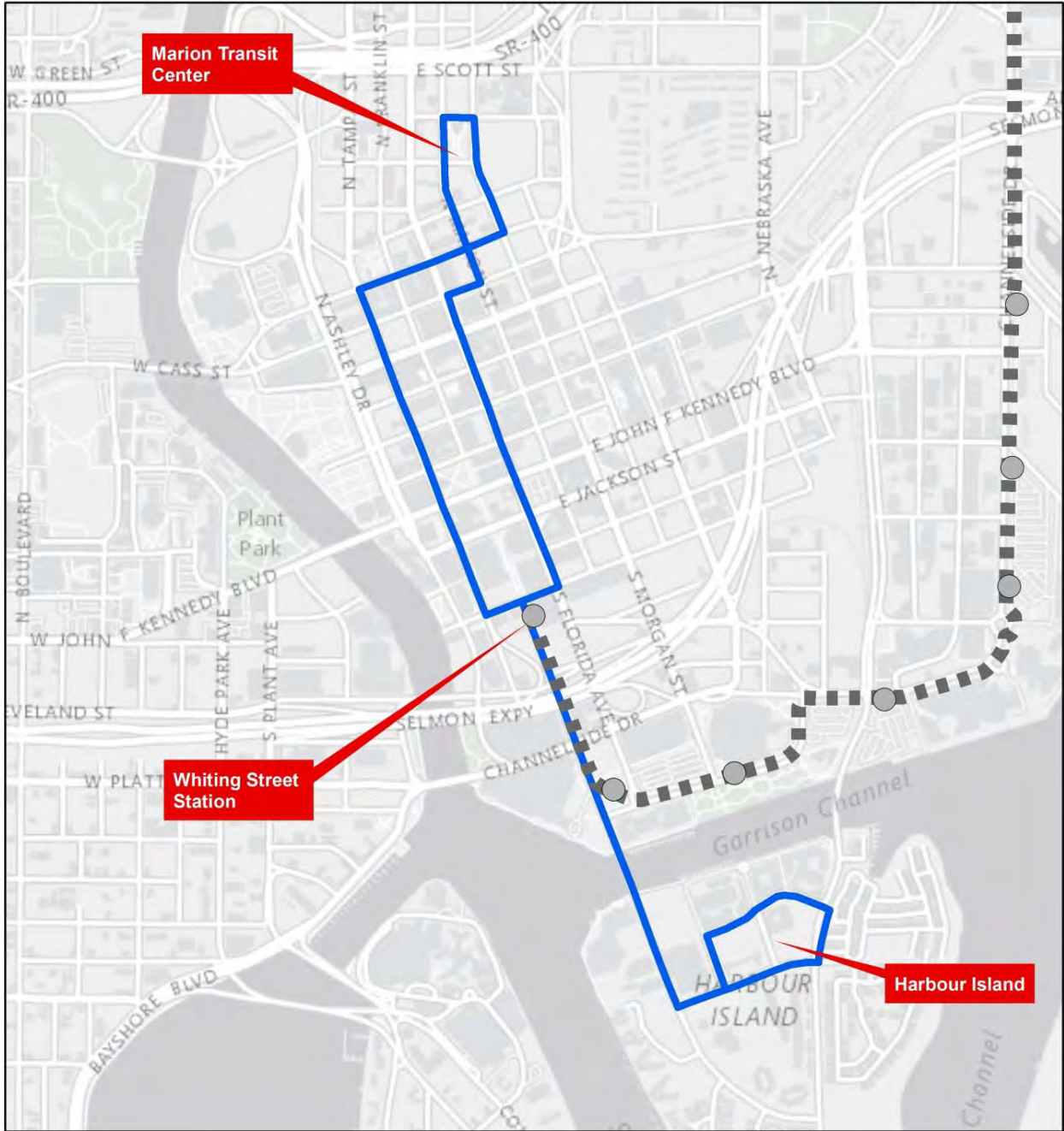
A second system focused on the movement of travelers in Downtown Tampa is the TECO Line Streetcar. The TECO Streetcar operates on 2.7 miles of dedicated ROW. The system extends from Whiting Street in Tampa’s central business district through the Channel District to Centennial Park in Ybor City. The service operates at 20-minute headways on a variable schedule as described in **Table 2-2**. The late hours of operation suggest that the TECO Line Streetcar is a non-commuter focused, visitor based system. **Figure 2-14** depicts the streetcar.

**TABLE 2-2
TECO LINE STREETCAR HOURS OF OPERATION**

Monday - Thursday	Noon to 10 p.m.
Friday - Saturday	11 a.m. to 2 a.m.
Sunday	Noon to 8 p.m.

Source: TECO Line Streetcar System Website, Streetcar Hours

FIGURE 2-13
IN-TOWN TROLLEY RUBBER-WHEELED CIRCULATOR ROUTE



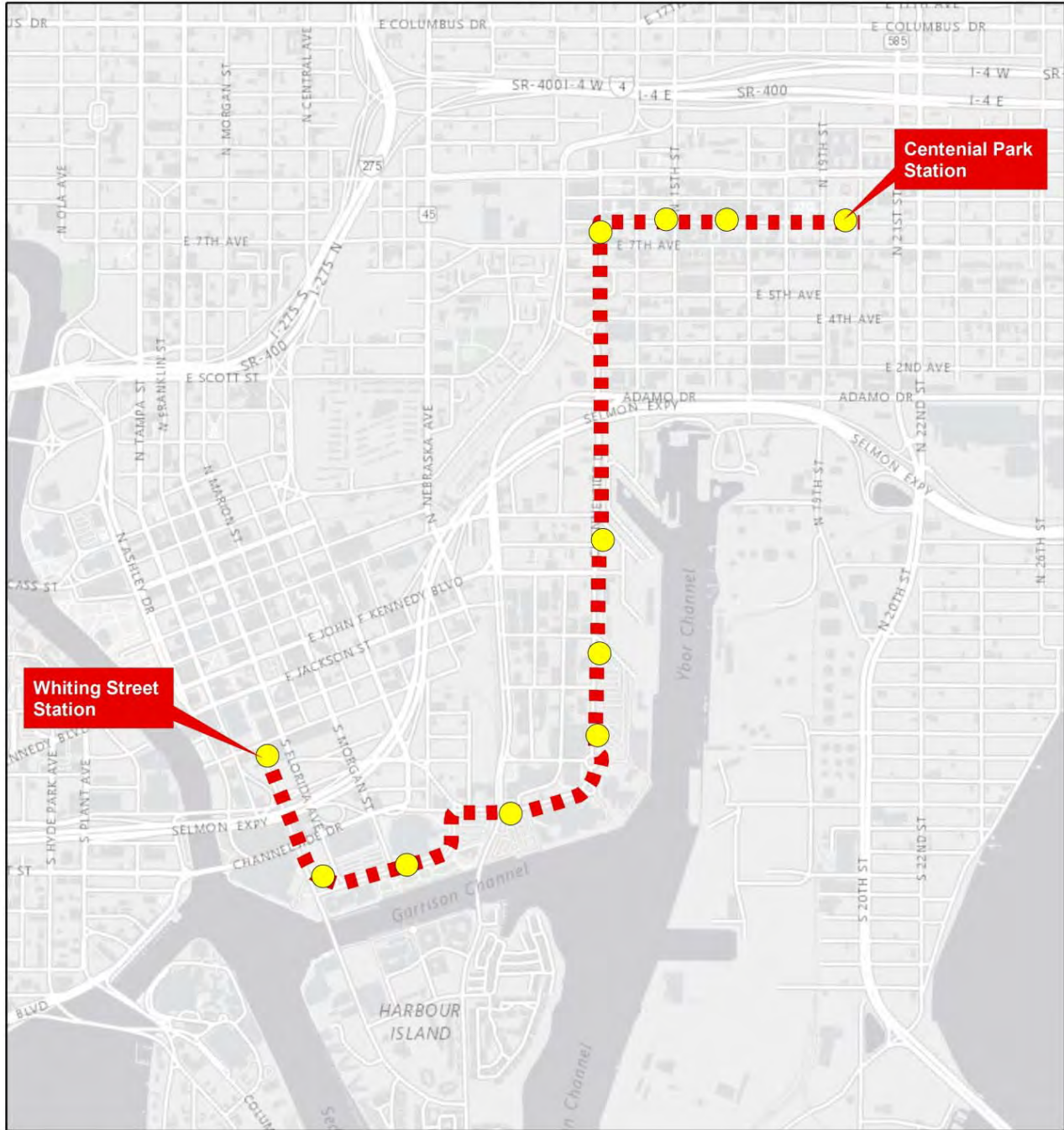
Legend

- In-Town Trolley Route
- TECO Streetcar Route
- Streetcar Stops



Data Source:
 HART Routes, ESRI Basemap

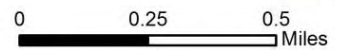
**FIGURE 2-14
TECO LINE STREETCAR ROUTE**



Legend

Existing Streetcar System

- ■ ■ TECO Streetcar Route
- Streetcar Stops



Data Source:
HART Routes, ESRI Basemap

3.0 PREVIOUS WORK

Increasing congestion and reduced efficiency of an already stressed transportation system are not new outcomes for studies detailing the state of Tampa Bay's roadways. Reports spanning more than a decade have identified the many challenges related to the improvement of the region's transportation system, particularly in Tampa's urban core.

Through differing means, previous efforts have identified activity centers, travel patterns, and looked for solutions to reduce congestion and improve performance of the system. Several have concluded that based on constraints (financial and physical), continued expansion of the roadway system alone is not a feasible course of action to meet travel demand. The major previous planning efforts reviewed for this study include:

- Tampa Rail Project (HART, 2002)
- Hillsborough County Metropolitan Planning Organization 2035 Long Range Transportation Plan – Supporting Needs Assessment Segment Summaries (Hillsborough MPO, 2009)
- HART Northeast and West Corridors Alternatives Analysis (HART, 2010)
- Tampa Bay Area Regional Transportation Authority (TBARTA) Master Plan (TBARTA, 2013)

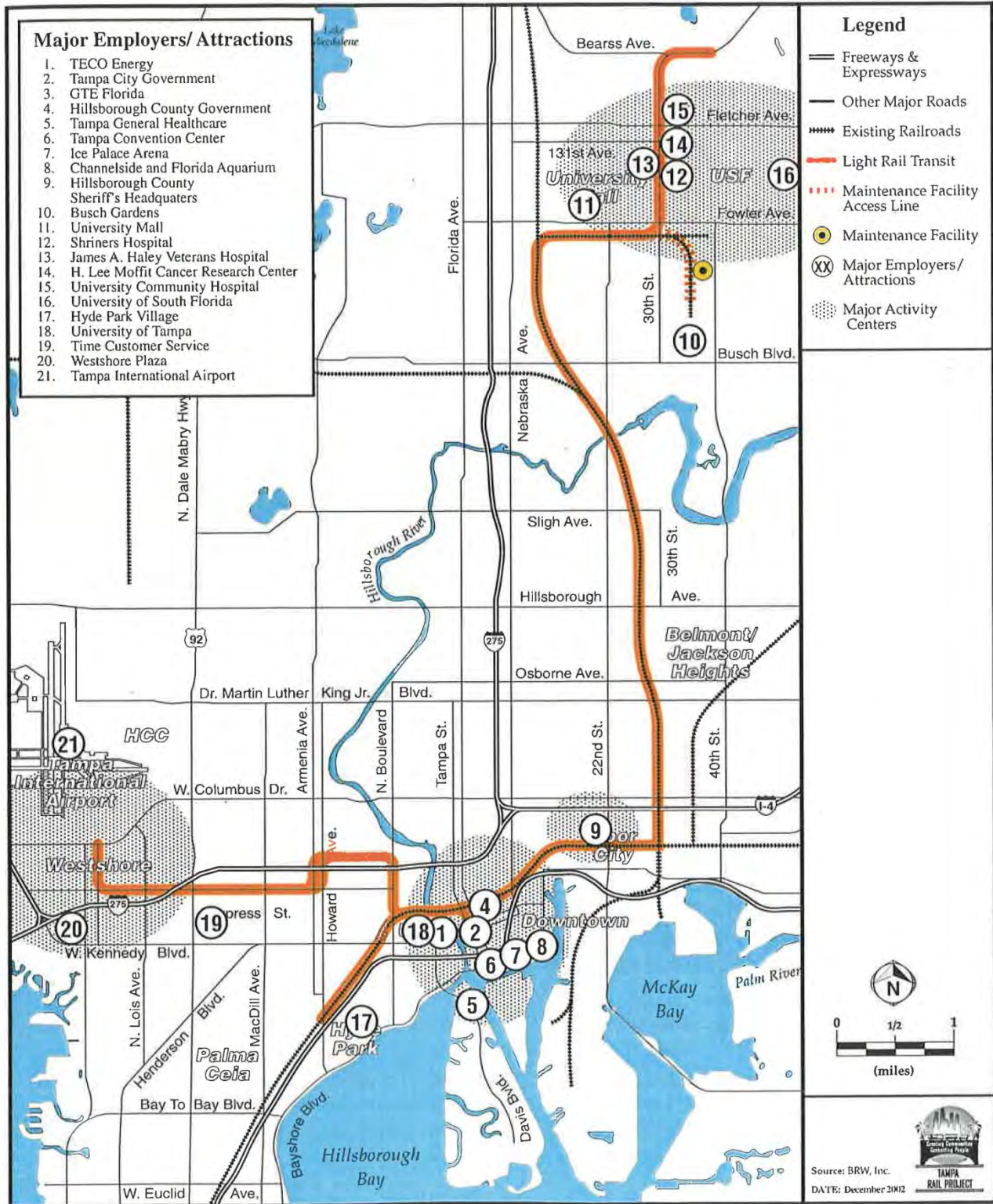
These previous plans have consistently come to the conclusion that along with roadway improvement, additional modes of transportation (including rail) are needed to meet forecast travel demands. Several efforts have proposed rail systems to support this demand. **Figures 3-1 through 3-3** depict the rail systems recommended by the Tampa Rail Study, HART AA, and TBARTA Master Plan.

The centers of activity, major corridors, and systems defined in previous work serve as the basis for the analysis contained in this study.

In addition to the previous plans to define a future rail system in Hillsborough County, several additional plans that influence the development of the transportation system were reviewed. Other important plans include:

- Downtown Tampa Transportation Vision (Hillsborough MPO, 2006)
- ULI Advisory Services Panel Report, Downtown Tampa (ULI, 2011)
- Greenlight Pinellas, Pinellas Alternatives Analysis (Pinellas MPO, 2012)
- InVision Tampa, The Tampa Center City Plan (City of Tampa, 2012)
- Tampa International Airport 2012 Master Plan Update (TIA, 2013)

**FIGURE 3-1
TAMPA RAIL STUDY LOCALLY PREFERRED ALTERNATIVE (2002)**



Source: Tampa Rail Project, 2002

FIGURE 3-2
HART AA LOCALLY PREFERRED WEST AND NORTH ALTERNATIVES (2010)

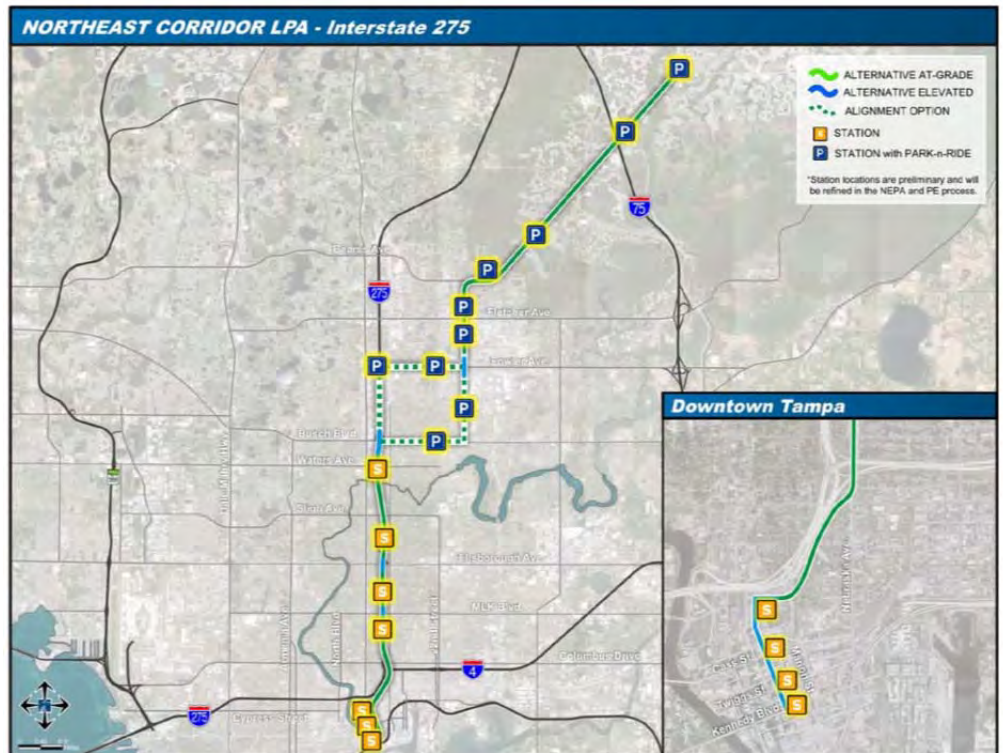
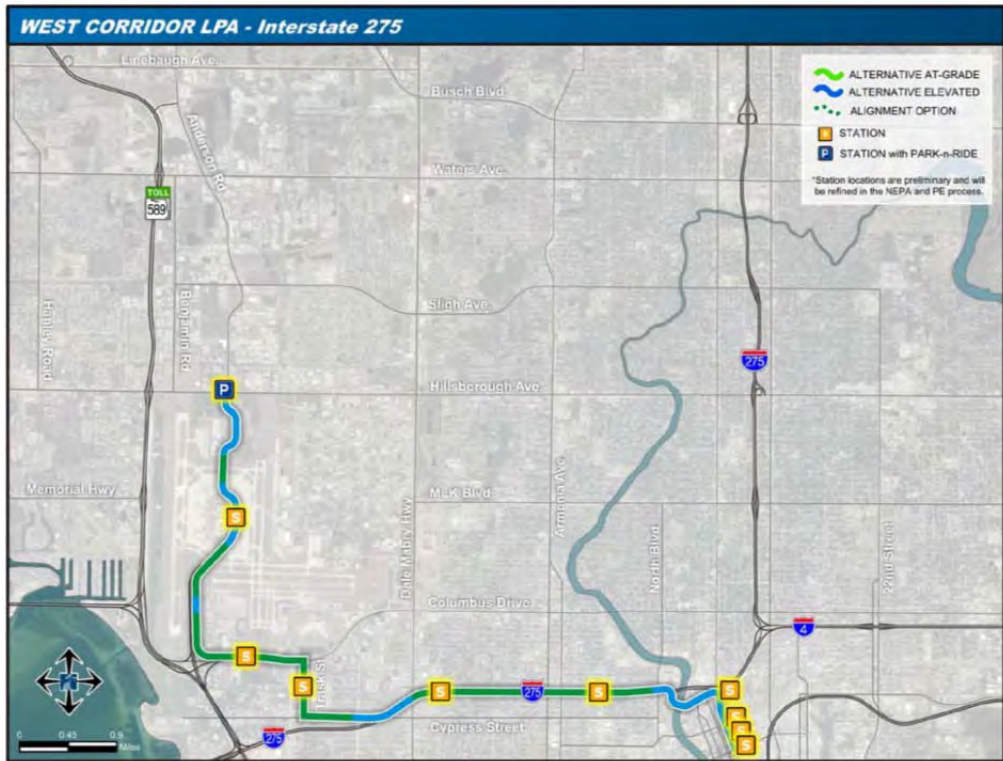


FIGURE 3-3
TBARTA MASTER PLAN MID-TERM REGIONAL TRANSIT NETWORK (2013)



4.0 OPPORTUNITIES

Having reviewed the condition of the existing transportation system and results of the previous studies, the assessment for the opportunity of a new system builds on the work done to identify the major activity centers and connecting corridors of central Hillsborough County (Downtown Tampa, Westshore, and USF).

Starting with the systems defined in earlier studies, additional analysis was conducted to identify opportunities for new alignments or potential modification of the previously identified alignments to achieve the following:

- Reuse of Existing Infrastructure
- Connect to Diverse Uses
- Encourage Redevelopment
- Reduce Liability of TECO Line Streetcar crossing of CSX

4.1 REUSE OF EXISTING INFRASTRUCTURE

In an effort to minimize costs, options that limit the need for additional ROW were sought out. Analysis was conducted to identify existing elements of the built environment capable of supporting rail. The analysis focused on existing linear corridors that generally connect major activity centers. Use of existing roadways was avoided in an effort to preserve existing roadway capacity. The analysis revealed four opportunities within central Hillsborough County to utilize existing infrastructure in support of a new passenger rail system. These elements include:

- Existing CSX Rail,
- Existing Tampa TECO Line Streetcar Track,
- Marion Street Transitway, and
- Planned I-275 Multi-Modal Corridor

Existing CSX Rail

A logical starting point for the expansion of passenger rail service in Hillsborough County is an evaluation of the existing rail system. As noted in Section 2.3, and shown in Figure 2-12, Hillsborough County contains nearly 245 miles of freight rail. The linear corridors that support the existing rail system vary in ROW width from less than 50 to more than 200 feet. Previous discussion with CSX, as part of other planning efforts, suggests limited opportunity for the use of existing rail in Downtown Tampa and east of Union Station. However, some opportunity for use or purchase of other segments of the CSX system may exist.

If current utilization of the CSX system is an indicator of potential availability, the Brooksville Subdivision, Clearwater Subdivision, and Port Tampa Spur may be open for inclusion in a future passenger rail system. Note no discussions with CSX took place as part of this study and additional coordination with CSX is needed to identify the feasibility of the use of any portion of their network. However, previous coordination as part of other planning efforts has indicated a willingness on the part

of CSX to consider use of elements of their system at a subdivision level. Use of any portion of a subdivision would require an agreement with CSX for the use of their tracks or ROW.

Use of the Brooksville Subdivision would provide access between Downtown Tampa and USF as well as areas further north including Pasco and Hernando counties. Use of the Clearwater subdivision would provide access to Carrollwood, West Hillsborough County, and areas in North Pinellas County. Use of the Port Tampa Spur would provide access across the Hillsborough River and into South Tampa.

Existing Tampa TECO Line Streetcar Track

In addition to the freight rail network present in the county, a 2.7-mile streetcar operates on rail in dedicated ROW on the streets of Downtown Tampa (as shown in Figure 2-14). As described previously, the TECO Line Streetcar connects Ybor City and Downtown Tampa. The Streetcar passes several of Tampa's largest attractors including the Tampa Convention Center, Tampa Bay Times Forum, cruise ship terminals, and Channel District residential area. The existing streetcar line presents an opportunity to utilize this existing system (with existing ridership) as the core of a passenger rail network, that could be expanded beyond Downtown to connect with the Westshore and USF activity centers.

Marion Street Transitway

The Marion Street Transitway is a bus-only street that extends through the center of Tampa's Central Business District from Whiting Street to the Marion Transit Center. The transitway serves the core of office use in Hillsborough County passing within ¼ mile of more than 8 million square feet of government and commercial office space. The transitway is located just two blocks east of the northern terminus of the TECO Line Streetcar. The 80-foot-wide corridor provides the opportunity to extend the streetcar/rail line along the transitway and limit the impacts to the capacity of other roadways in Downtown Tampa.

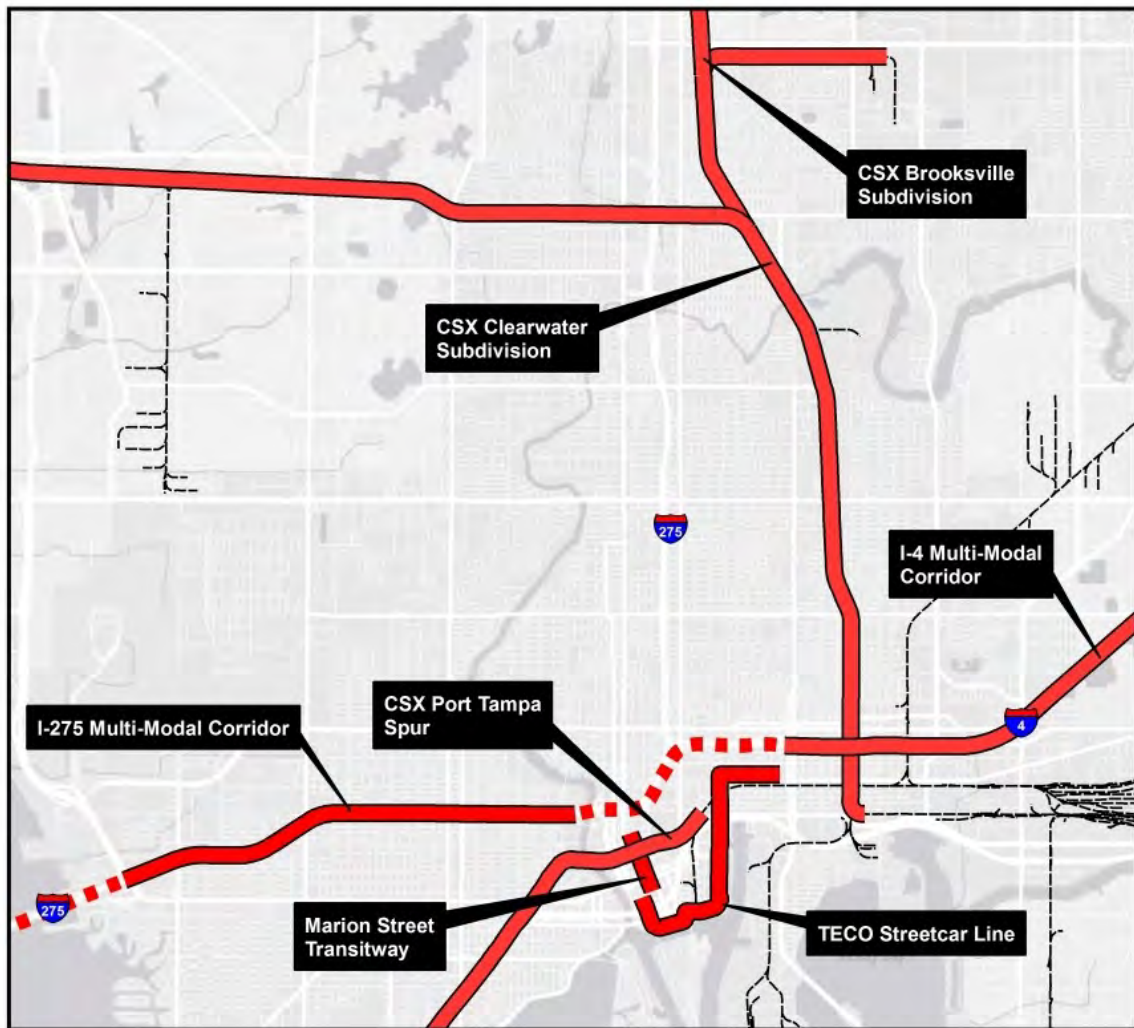
Planned Interstate Multi-Modal Corridors

Both I-4 and I-275 in central Hillsborough County encompass designated multi-modal envelopes (44 feet in width). The corridors are intended to support inter-city rail and could be used to support a future Hillsborough County rail system. The corridor along I-4 is complete and extends from east of the I-275 interchange to Orlando. The I-275 corridor, currently under construction, will extend from just west of the Hillsborough River to SR 60. Additional extensions of the reserved multi-modal envelopes are planned as part of the interstate system's final design. No multi-modal envelope is available in the I-275 ROW north of the I-4 interchange.

Additionally, two stations would be located within the multi-modal envelope (Downtown Tampa and Westshore) to provide opportunity for a connection with local bus, potential extension of the Pinellas Light Rail System, and Automated People Mover that connects to TIA.

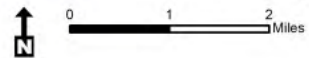
Figure 4-1 summarizes the existing corridors that were identified as candidates for reuse in the development of an expanded passenger rail system in central Hillsborough County.

**FIGURE 4-1
"REUSE" OPPORTUNITIES IN CENTRAL HILLSBOROUGH COUNTY**



Legend

- Potential Corridor
- Potential Future Corridor
- Interstate



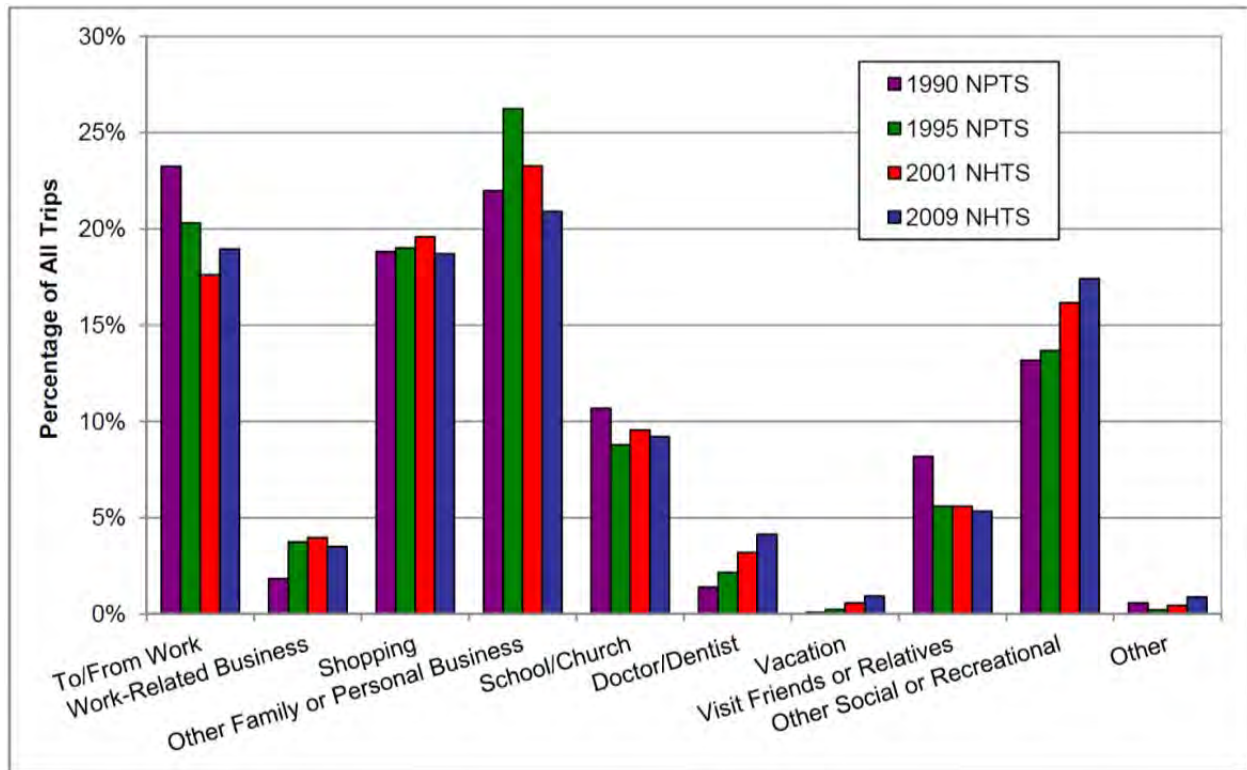
Source: FDOT Interstates, ESRI Basemap

4.2 CONNECT TO DIVERSE USES

One motivation driving the development of a rail system in central Hillsborough County is the need to reduce the dependency of residents on automobiles for the completion of daily trips. As noted above, approximately 4.8 million trips are made each day by Hillsborough County residents (3.93 trips per person per day) with the vast majority supported by the local roadway system. However, trends show that travel demand is quickly outpacing the capacity of the County’s constrained roadway network. To facilitate a reduction in auto use, the proposed rail system must look for opportunities to connect users to a diverse range of destinations to support daily household needs.

Reference was made to the 2009 National Household Travel Survey (NHTS) to gain insight into the type of trips the average US household makes each day. A summary of the survey results is provided in **Figure 4-2**. As indicated in the data, the majority of daily household trips are focused on a few typical activities. To support the development of a rail system that provides access to a diversity in use, a series of maps were produced that help identify the location of areas that support the primary daily trip destinations.

**FIGURE 4-2
U.S. HOUSEHOLD PRIMARY DAILY TRIPS**



Source: FDOT and CUTR, Trends and Conditions Report, 2013

Figures 4-3 through 4-5 identify the location and intensity of several of the primary trip origins and destinations outlined in the NHTS. The maps below depict the location and intensity of residential, commercial office, and retail use within central Hillsborough County. Assessment of the clusters of use when laying out potential rail alternatives helps in the development of a system that provides access to the locations supporting the range of activities needed by the average household.

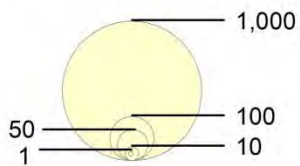
4.3 ENCOURAGE REDEVELOPMENT

Defined as one of the primary goals of the system, redevelopment potential was also considered in the opportunities assessment. For varying reasons, much of the property located in central Hillsborough County remains vacant or underutilized. This property represents an opportunity for infill development.

**FIGURE 4-3
LOCATION AND INTENSITY OF RESIDENTIAL USE**

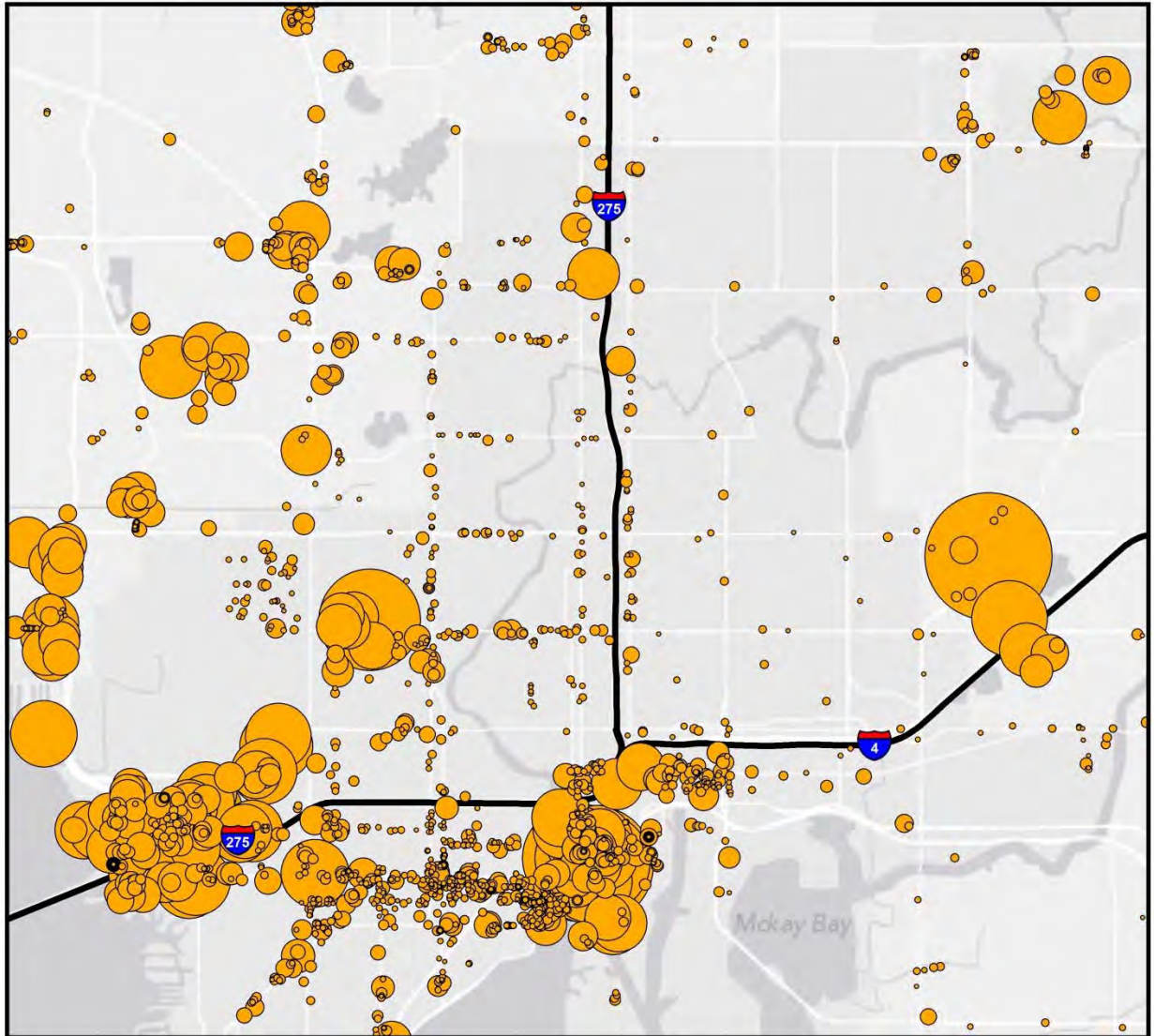


Number of Housing Units

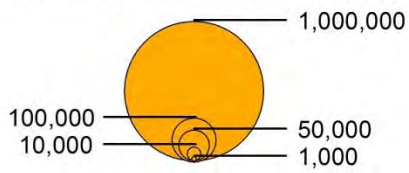


Source: Hillsborough Prop Appraiser, DOR Codes
FDOT Interstates

FIGURE 4-4
LOCATION AND INTENSITY OF COMMERCIAL OFFICE USE

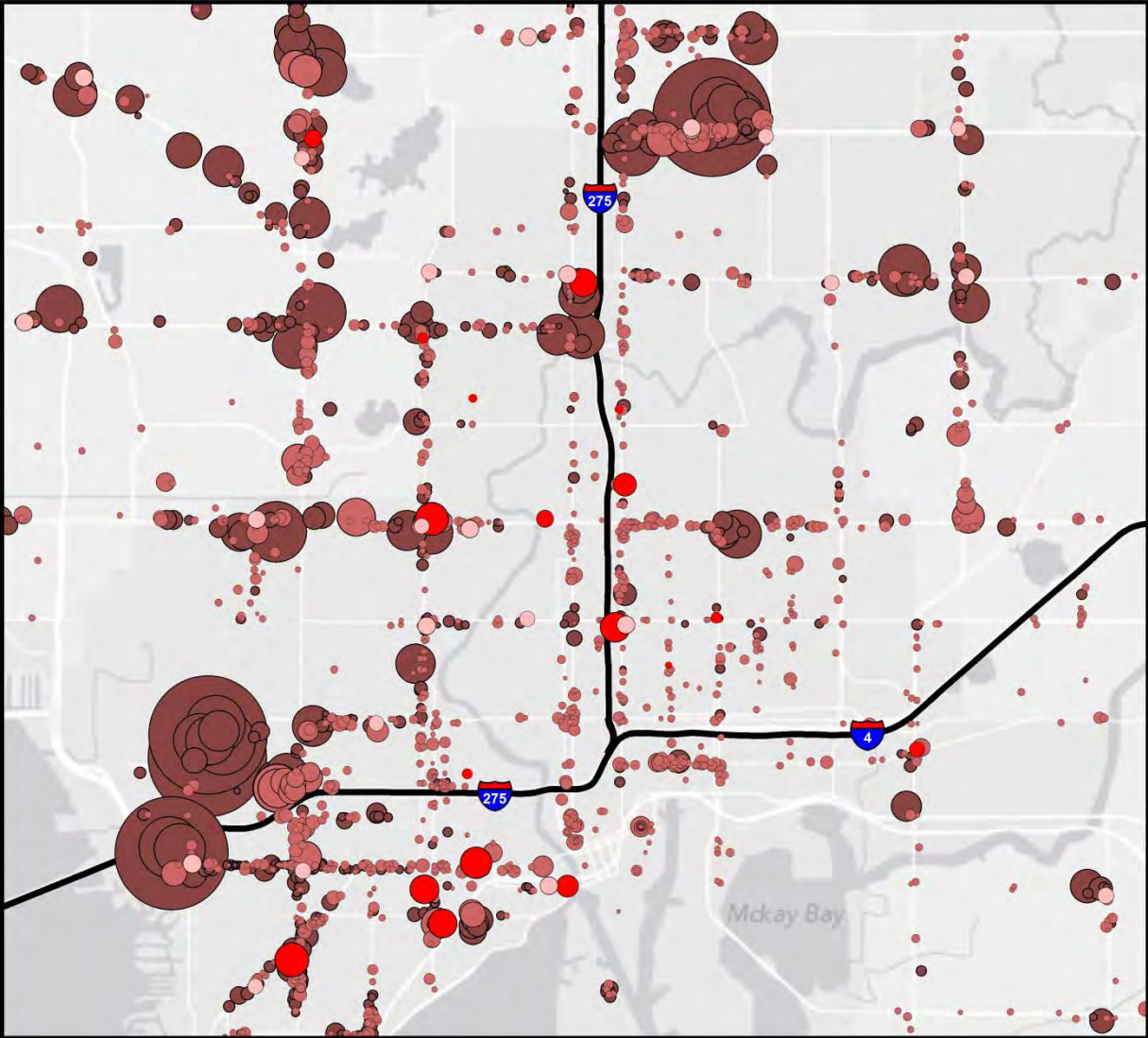


Building Area (SF)

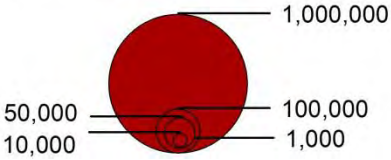


Source: Hillsborough Prop Appraiser, DOR Codes
FDOT Interstates

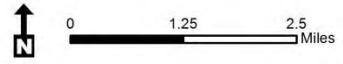
**FIGURE 4-5
LOCATION AND INTENSITY OF RETAIL USE**



Building Area (SF)



- Regional and Community Shopping
- Other Retail
- Supermarket
- Pharmacy or Drug Store



Source: Hillsborough Prop Appraiser, DOR Codes
FDOT Interstates

Two categories of land were identified in the infill development opportunities analysis: vacant and underutilized land. Vacant land includes property with no improvement. This category of land generally offers the most readily available space for redevelopment in an urban environment. The underutilized land classification consists of two subgroupings. The first includes properties designated for parking. The analysis limits the identification of these parcels based on building value. Parcels with structures worth more than \$250,000 were excluded from the tally of developable lands as this level of investment in a property was assumed to potentially be a disincentive for redevelopment. The second grouping includes more developed parcels. The analysis identifies those properties that have a land value that exceeds the structure value by 2.5 times or more. Identification of properties where the land value greatly exceeds the structure value was intended to identify underutilized parcels where an opportunity for redevelopment may exist.




The vacant and underutilized lands were identified to provide planners with an opportunity to maximize development and redevelopment when considering expanded passenger rail service. **Figure 4-6** provides a depiction of the vacant and underutilized land in central Hillsborough County.

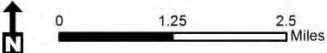
4.4 REDUCE LIABILITY OF TECO LINE STREETCAR CROSSING CSX

The TECO Line Streetcar system maintains a costly liability insurance policy as a condition of crossing the CSX tracks in Ybor City. By maximizing the reuse of existing infrastructure, connecting to diverse uses and encouraging redevelopment the opportunity to create a truly regional transit system emerges. Creation of a regional transit system would allow the TECO Line Streetcar to approach the FDOT with the possibility of entering into an agreement similar to the “Central Florida Operating and Management Agreement,” and “South Florida Operating and Management Agreement.” If defined as part of a regional system and if a similar operating and maintenance agreement were negotiated between the State and CSX, then the Streetcar’s liability within the corridor could be shared on a no-fault basis. Under such a scenario, it is reasonable to assume that there could be an allocation of liability and insurance coverage between those parties, which could help spread the cost of the Streetcar system’s insurance coverage.

FIGURE 4-6
VACANT AND UNDERUTILIZED LANDS IN HILLSBOROUGH COUNTY



-  Vacant Land
-  Parking With Bldg Value < \$250,000
-  Land Value $\geq 2.5 \times$ Bldg Value



Source: Hillsborough Prop Appraiser, DOR Codes
FDOT Interstates

5.0 TECHNOLOGY ASSESSMENT

One of the first steps in the planning process of this study included assessing various transit modes and their applicability within the project corridors. This is not an exhaustive list of all transit modes, but rather those that were determined to be most viable for the corridors studied based on technical analysis, industry standards, potential for federal funding, and history as proven technologies.

5.1 RAIL TECHNOLOGIES

In general, when compared with bus transit systems, rail technologies are a higher investment, but can offer greater long-term benefits in terms of service expandability, capacity, and reliability. For high-demand, high-capacity transit services, rail systems are less costly to operate per rider. Rail vehicles also have a longer lifespan before replacement is required.

5.1.1 Commuter Rail

Commuter rail transports riders between work and home, and is typically used to travel between suburbs and central cities.

System Characteristics

Greater stop spacing (2 to 5 miles) allows this service to move people at higher speeds from more distant locations (such as suburbs). Higher-capacity trains at lower frequency are appropriate because people can plan their daily commute based on the train schedule; in other words, commuter rail usually caters to regular, planned trips rather than impromptu, spontaneous trips.

Operational Opportunities and Constraints

The opportunity with commuter rail is that, technically, FRA-compliant, as per 49 CFR Part 238⁶, passenger equipment can be operated on existing freight railroad lines with relatively minimal improvements and low cost. Commuter rail service requires planning and coordination between private freight railroads, the sponsoring agency, and the various municipalities served.

DMU Technology

Diesel multiple-unit (DMU) commuter rail technology uses a relatively small self-powered passenger vehicle. These vehicles can be more compatible with an urban environment than traditional locomotive-hauled trains and also offer some flexibility if the initial demand for the service doesn't justify the high capacity of locomotive-hauled commuter rail. As future demand rises, capacity can be increased without losing performance by adding more DMU vehicles or modules, creating a longer train set. FRA-compliant vehicles are available that can operate concurrently with freight railroad traffic.

⁶ FRA compliance is based upon a series of structural parameters which define a vehicle's crash worthiness. If a vehicle is deemed crashworthy under these parameters, it is allowed to operate within a freight corridor and in mixed traffic with heavy rail freight vehicles.



The Capital Metro MetroRail Red Line, which operates between Leander and Downtown Austin, Texas, is an example of a DMU Commuter Rail service.

LHC Technology

Locomotive-hauled coach (LHC) commuter rail technology is commonly used in the US and is derived from traditional heavy railroading practice. LHC commuter rail has evolved to suit the needs of transit systems with specialized high-g geared locomotives designed for quick acceleration and bi-level, high capacity passenger coaches with amenities like bicycle racks and wireless internet access. The benefits of this technology are that it is highly proven in the US with readily available equipment and suppliers and is easily expandable to meet capacity demands by adding coaches. The scale and noise of the equipment, though, may not be acceptable in some urban environments, and it also has less flexibility in terms of track alignment. LHC commuter rail is typically operated exclusively on existing freight alignments.



Tri-Rail in the Miami-Fort Lauderdale area is an example of an LHC Commuter Rail service.

5.1.2 Light Rail Transit

Light rail transit (LRT) is an electrified system uses poles and overhead catenary wires and typically operates in its own road lane or in a separated ROW. This type of transit is typically used to circulate within densely urbanized areas and travel to nearby activity centers. It is often used to link numerous elements of transit systems and even serve commuters from close-in suburbs. Pinellas County is planning LRT to provide service into, throughout, and out of the County.

System Characteristics

Light rail typically offers some of the higher speed characteristics of commuter rail but with more closely spaced (0.5 to 1.0 mile) stops and higher frequency to serve different types of trips and circulate people within an urbanized area.

Operational Opportunities and Constraints

LRT is a high cost system because it typically requires a new support infrastructure and may adhere to high operational standards. It offers flexibility within the operation to increase capacity and also is seen as a high-quality service that is unaffected by automobile congestion.



Phoenix METRO is an example of a Light Rail System.

5.1.3 Tram

System Characteristics

Tram systems offer greater flexibility by operating at lower speeds and having more frequent stops. Providing high frequency helps the system cater to “convenience” trips and allows riders to transfer easily between other modes. A typical rider might travel from a suburb or elsewhere in the city using commuter or light rail, then use the tram as the “last mile” connection to get where they need to go within the central city.

Operational Opportunities and Constraints

Tram is a flexible technology that can be used in a wide variety of settings. One of the major operational benefits associated with tram service is the operation within the existing street network. Tram can operate in dedicated ROW or mixed traffic resulting in the ability to add tram service within high density, narrow ROW with minor ROW impacts and less impacts to the existing environment compared to other rail modes. While this operational characteristic eliminates the cost associated with purchasing additional ROW, it also presents operational issues that require additional planning in order to avoid potential conflicts between the various modes that share the ROW. Operation in shared ROW also results in a reduced ability for the mode to operate consistently on schedule.

Modern Tram

The modern tram technology and service is typically used to circulate within densely urbanized areas and travel to nearby activity centers and is often used to link numerous elements of transit systems. Current modern tram technology was derived from European tram systems, first by Portland Tram in the early 2000s, and was dubbed “modern” tram to distinguish it from original historic tram systems such as New Orleans and various existing heritage and tourist systems around the country. The technology is similar to LRT but with typically smaller vehicles and thus lower power requirements and lighter weight. Also, in the US they are typically operated in one-car consists whereas LRT vehicles are often run in two or three car consists. Depending on local preference, the overhead wires can also be a lighter-duty “trolley wire” system that is less visually obtrusive in urban areas than the overhead wire system typically used for LRT.



The Portland Tram was the first modern tram system in the United States.

Heritage Streetcar

The current TECO Line Streetcar operates “vintage replica” streetcars on a modern track infrastructure, overhead contact system, and stations, typical of heritage streetcar systems built within the last 10-20 years to serve downtown circulator and/or tourist markets with unique vehicles that are reminiscent of the streetcar vehicles that operated in most major American cities circa 1900.

By definition, the only thing different about the TECO Line Streetcar and a modern streetcar system would be the vehicle itself, but the track alignment was designed only to accommodate the heritage vehicles, thus the curve radii on several curves is too tight for anything other than a smaller vehicle. Typical of heritage systems, the TECO vehicles are high-floor and thus require an ADA ramp system on each station platform, which would not be necessary for modern streetcar operations.






The existing TECO Line Streetcar is an example of a Heritage Streetcar system.


5.2 RUBBER-WHEELED TECHNOLOGIES

Rubber-wheeled technologies include, but are not limited to: local bus service, circulator systems, limited stop service, and bus rapid transit (BRT). **Table 5-1** depicts these services and different vehicle types considering limitations and benefits of each.

**TABLE 5-1
EXAMPLES OF RUBBER-WHEELED VEHICLES**

Service	Vehicle Type	Constraints	Benefits	
BRT	40-60 foot bus	Limited stops. If exclusive guideway is unavailable, it is difficult to increase operating speed much beyond local service.	Branded. Allows for unique experience for riders and could attract non-traditional transit patrons. Seats 50-200 passengers	
Local	40-foot bus	Turning radii must be wide	Most common bus in the fleet. Vehicles can be used on multiple routes in case of maintenance or other aspect that would cause vehicle to be out of service. Will seat 40+ passengers.	
Local	60-foot Articulated Bus	Maintenance facility has to accommodate larger vehicles. Usually requires improvement.	More flexible with turns, Allows for larger loads approximately 60 passengers	
Local/ Circulator	30/35-foot bus	Can fit only 30-35 passengers	More flexible on neighborhood streets, less expensive.	
Circulator/ Flex Service	Cut Away Vans	Limited seating Typically only 12-18 passengers.	Very flexible on streets not normally suitable for larger buses.	

**TABLE 5-1 (CONTINUED)
EXAMPLES OF RUBBER-WHEELED VEHICLES**

Service	Vehicle Type	Constraints	Benefits	
Circulator Service	Rubber-wheeled Trolley	Traditionally designed for short distances. Seats are not as comfortable as more traditional buses.	Can be branded to provide a unique appeal to serve a wide range of customers.	

6.0 FEASIBILITY

The TAOS Project Management Team (PMT) worked with consultant staff to identify a series of potential rail alternatives for study within Hillsborough County. The team based the preliminary alternative selection on an evaluation of existing/future conditions, previous study, stakeholder input, and assessment of new opportunities.

Figure 6-1 provides a depiction of the “universe” of alternative routes identified in the previous studies. To begin to assess the feasibility of the proposed system, the universe of alternatives was divided into a series of segments each with some independent utility. Breaks in the system were established at the intersection of two or more routes where the path of a future system could diverge. These segments were then evaluated to assess for elements to include: engineering constraints, potential ROW impacts, capital cost, and overall mode suitability.

The technical feasibility of these alternatives was determined in two stages, with 1) a high level screening of modes, potential routes, and combinations thereof, and 2) a more detailed evaluation of those routes and combinations of routes that formed systems to determine if there were any fatal flaws. The following is a high-level discussion of the technical feasibility of the recommended alternatives and documentation of technical concerns that may be moving forward.

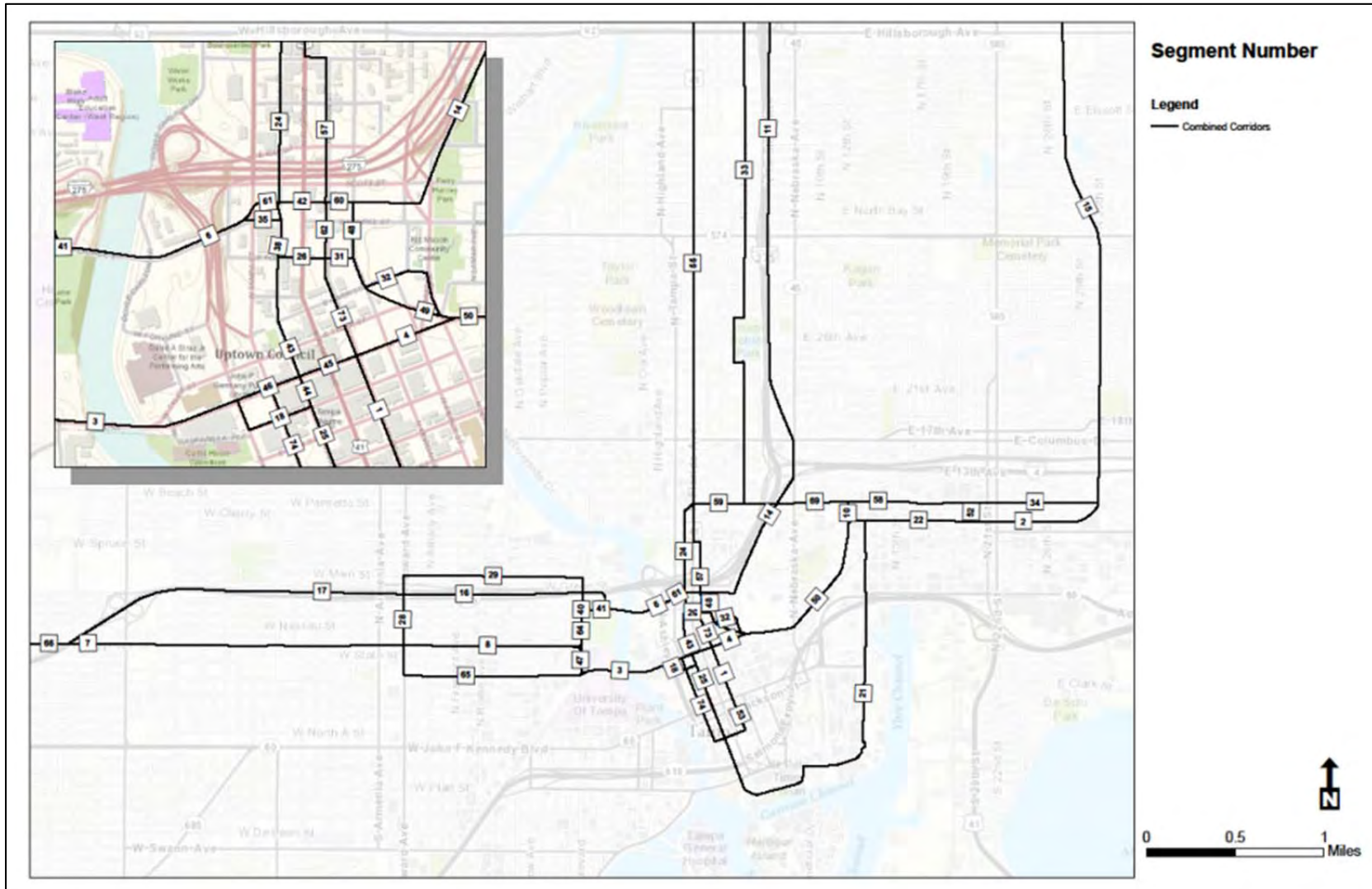
6.1 CSX CORRIDOR

In terms of technical feasibility, the existing CSX freight corridor to the north is ideal for commuter rail operations because of the existing track grades and geometry. Furthermore, use of a FRA-compliant commuter rail vehicle (DMU and Locomotive Haul, Section 5.1.1) will offer the most flexibility on this line if existing freight operations were to remain.

The greatest technical challenges would include:

- Evaluation of existing passing tracks, sidings, and freight spurs to determine what operational improvements would need to be made to the track infrastructure. Negotiations with the freight operator are critical to determine whether or not the existing track could be used or if full double-tracking would be necessary to accommodate freight traffic. Freight traffic is known to be relatively low in this corridor but managing the level of improvements required by the freight operator would be critical. Comparatively, the Brooksville and Clearwater subdivision and the Port Tampa Spur there are only one to six trains per day, whereas the Tampa Terminal, Lakeland (A-Line), and Yeomans (S-Line) average 16 to 30 trains per day. Florida East Coast Railroad (FECR) operates 14 to 27 freight trains per day along the same corridor they will be running 16 passenger trains per day into the All Aboard Florida (AAF) system. CSX operates an average of 10 to 24 freight trains per day along the former Miami Subdivision now owned by FDOT for operation of Tri-Rail. It is worth noting that South Florida’s Tri-Rail started as a single-track system with passing tracks, but added a second track as demand grew.
- Station siting and ROW for improvements – depending on the amenities desired at stations such as park and rides, drop-off areas, etc., ROW may be required beyond the current railroad ROW. Traffic analysis would be required to determine effects to adjacent surface streets and neighborhoods.

FIGURE 6-1
SEGMENTATION OF POTENTIAL ALTERNATIVES



- Quiet zone⁷ improvements to existing at-grade crossing (approx.. \$250,000 per crossing) with surface streets would allow the project to reduce the noise levels experienced by adjacent neighborhoods from a new transit service that is more frequent than existing freight operations.
- Grade separation analysis would be undertaken to determine if any major roadways would need to be raised above or below the tracks with the introduction of the transit service that is more frequency than existing freight traffic.

Other issues to be considered include:

- Liability issues
- Shared-use governments
- Temporal separation

Engagement of railroad and neighborhood stakeholders will determine what many of the technical challenges may be moving forward with implementation of commuter rail on the existing CSX corridor to the north.

6.2 INTERSTATE CORRIDORS

The interstate highway corridors of I-275 to the west and north can accommodate transit guideways effectively assuming that ROW is available, because most other urban constraints such as utilities, traffic, etc., are not present. If ROW is not sufficient, the only way to traverse the corridor would be with an expensive aerial or underground solution.

- I-275 north is being expanded to fill most of the available ROW and flanks historic neighborhoods close to downtown. This makes the corridor essentially infeasible because access to the corridor from the south would have unacceptable effects to ROW and historic resources, and there is insufficient ROW width continuing to the north for an at-grade transit guideway.
- I-275 west has preserved ROW for a dedicated 44-foot transit guideway and has areas where it would be feasible to penetrate the corridor near Cypress Street, Howard Avenue, and North Boulevard, depending on the final alignment.

The challenging part of I-275 west interstate corridor are the access points which may require expensive aerial or underground fly-overs or -unders to access the corridor from the surface streets on either end. These points should be studied in greater detail but no “fatal flaws” have been identified by this study.

6.3 USE OF EXISTING TECO LINE STREETCAR SYSTEM AND ASSETS

The existing heritage streetcar system, opened in 2002 and extended in 2010, consists of a modern in-street track slab and overhead contact system that are compatible with modern vehicle technology. It is a single-tracked alignment with passing tracks that are capable of supporting a 10-minute headway service in each direction. The system is limited in that it was designed for smaller heritage streetcars and it includes a complex at-grade crossing with CSX railroad. Considerations for use of this infrastructure by a different type of technology include:

⁷ Under the Train Horn Rule (49 CFR 222), quiet zones must be at least 0.5 mile long and provide safety improvements to grade crossings to remove the possibility of vehicles crossing while gates are down.

- **Geometry** – the existing track geometry has small-radius curves at four locations. The curve radii at these locations are well under 82' which is typically the minimum for a modern tram or light rail vehicle: most of the curves are between 50 and 60-foot radii. The curves are located at Channelside/Old Water, Channelside/Cumberland, the TECO Line Streetcar/CSX crossing, and N. 13th/E. 8th. It appears that modifications could be made to the streetscape, etc. to expand the curve radii to accommodate modern tram or light rail vehicles. The most challenging locations would be the CSX crossing and the turn from 13th to 8th, which are constrained by adjacent historical properties.
- **Traction Power** – The overhead contact wire and traction power substations that power the existing TECO Line Streetcar vehicles should undergo an evaluation including a “load flow” analysis to determine if additional substations would be needed to power a service with higher frequency and/or larger vehicles
- **Stations** – It would likely be necessary to reconfigure the existing TECO Line Streetcar stations and modify the platform height to accommodate a different vehicle. The existing ADA access facilities built into the platforms may require modification in case of conflict with vehicle clearances or door locations. Most modern vehicles include “level boarding” and would not require the use of the specialized ADA access. The infrastructure could remain if the heritage streetcars were still operated on the line.
- **Capacity** – the existing line may be capable of 10-minute headways but it should be evaluated whether or not to double-track the existing TECO Line Streetcar line. Considerations include:
 - Operation of heritage and modern tram simultaneously;
 - The ability to introduce street-running trackwork if the trams are traveling in the same direction of traffic to increase roadway capacity or expand other amenities; and
 - Additional length of track to maintain, but reduced costs, due to reduced maintenance and operation of special trackwork and passing tracks.

If a modern tram or LRT technology is proposed to be integrated with the existing TECO Line Streetcar alignment, the considerations above should be explored in greater details with area stakeholders to determine the nature of the improvements that should be implemented.

6.4 USE OF EXISTING ARTERIAL STREET NETWORK

Certain types of arterial streets tend to be well suited for tram or LRT technology, provided that there is adequate ROW to introduce the transit guideway, maintain traffic capacity, and still offer “complete street” amenities (e.g. sidewalks, landscaping, bike lanes). Considerations and fatal flaws include the following:

- **ROW width** – Typical dual track LRT technology can operate within as little as 28 feet. If the width of the existing public ROW is not enough for the transit guideway plus the necessary traffic lanes and other amenities, such as sidewalks, bike lanes, and/or transit stations, ROW acquisition would be required which is not feasible in many urban situations, especially when existing buildings or other improvements abut to the existing ROW.
- **Driveways** – Driveways can present a safety concern especially for tram systems that operate in mixed traffic and/or in the curb-side lane. Frequent driveways may also indicate a high left-turning movement from a median or two-way left-turn lane which may need to be closed to accommodate a median-running transit guideway.

- **Median** – A wide median can accommodate a transit guideway but is often used for left-turning vehicular movements. Introduction of the transit guideway typically requires closure of frequent left-turning movements, particularly for driveways.
- **Intersections** – The transit service could cause additional delay at traffic signals depending on the operational configuration. If the service can operate within the existing signal phasing (based on average speed, length of train set and operational movement through the intersection), additional delay might be minimal or non-existing. If the service makes a special movement through the intersection and requires a “transit-only” phase, the delay may be more significant. This situation should be avoided in congested areas, where conditions cannot accommodate such a delay without causing further delay at adjacent intersection.

The screening analysis took these factors into account and established whether a proposed route segment has “low,” medium or “high” constraints or contained a “fatal flaw.”

Streets that were eliminated from consideration due to these considerations include:

- Central Avenue due to frequent driveways and limited ROW width and
- E. 8th Avenue east of N. 20th Street due to frequent driveways and limited ROW width.

Figures 6-2 through 6-7 summarize the results of this assessment.

Additionally, the project team identified a series of evaluation criteria to support a more detailed assessment of potential impacts related to the development of a new rail system. The detailed evaluation criteria were structured to answer four system goals to include:

- Establish a technically feasible and cost effective transit system;
- Maximize system flexibility and utilization of assets;
- Support redevelopment, economic development, and create revenue; and
- Enhance mobility into and within Downtown Tampa.

Figure 6-2 depicts the results of the evaluation of engineering constraints per segment. Engineering constraints included:

- Existing horizontal and vertical geometry
- Existing horizontal and vertical clearances
- Existing driveways
- Existing traffic signals

**FIGURE 6-2
ENGINEERING CONSTRAINTS**

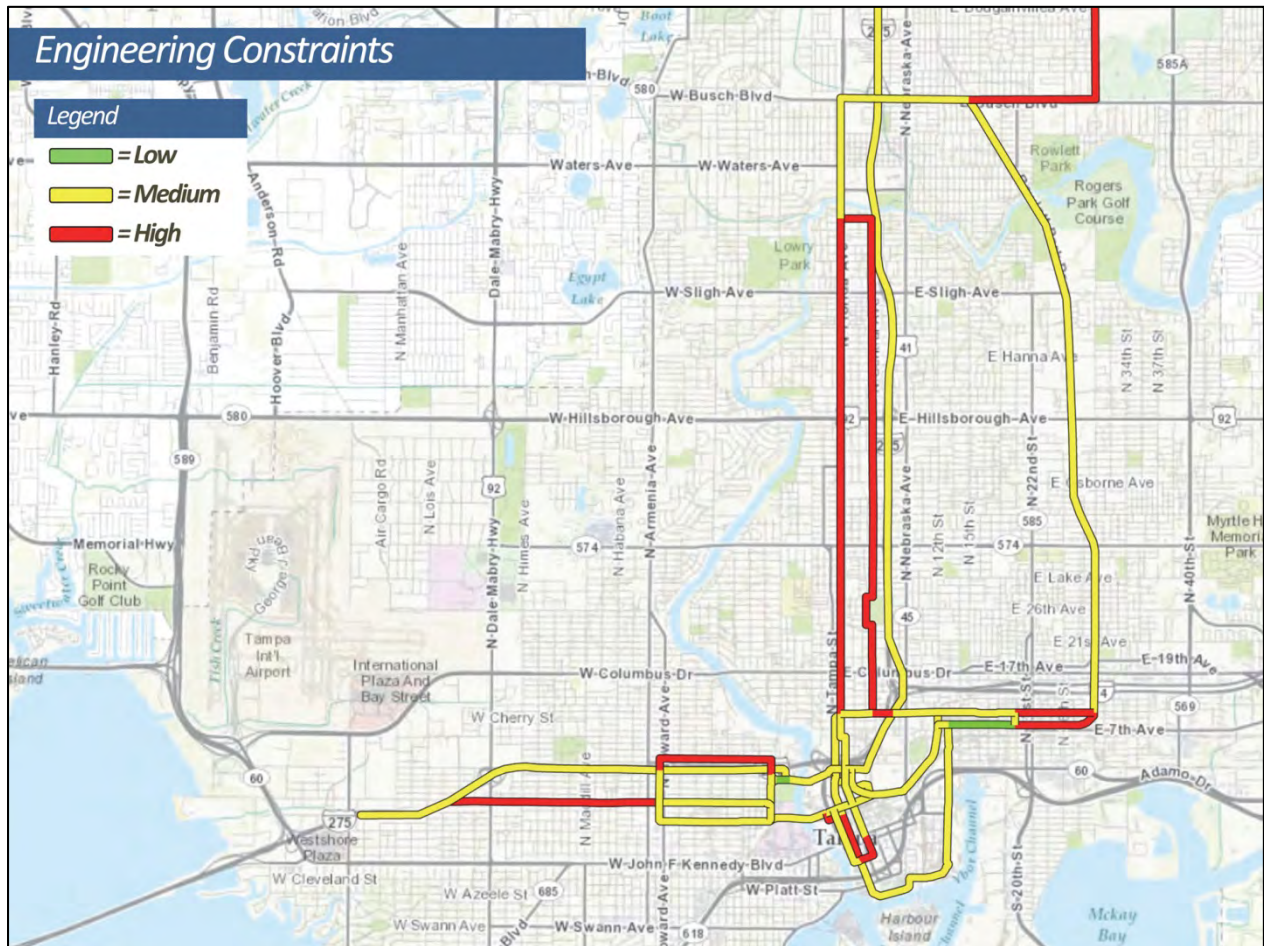


Figure 6-3 depicts the results of the evaluation of potential ROW impacts per segment. ROW impacts included:

- Available existing ROW along and/or within roadways
- Future dedicated ROWs

**FIGURE 6-3
POTENTIAL FOR ROW IMPACTS**

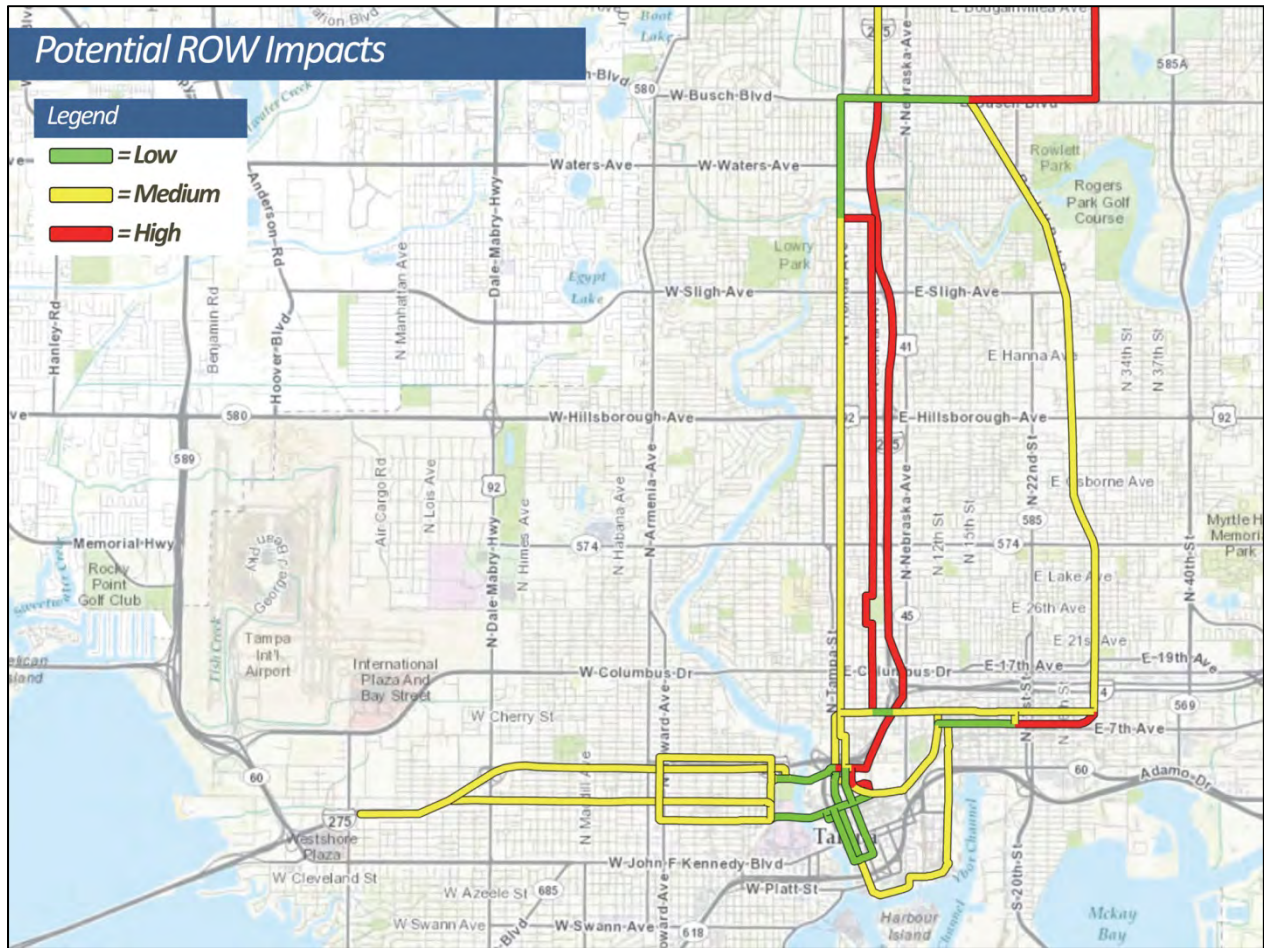


Figure 6-4 depicts the results of the evaluation of estimated capital costs per segment. Capital cost considerations included:

- New and/or modified roadway and/or transit structures
- Potential utility relocations
- Stations
- Proposed system infrastructure (i.e. substations)

**FIGURE 6-4
PROJECTED CAPITAL COSTS**

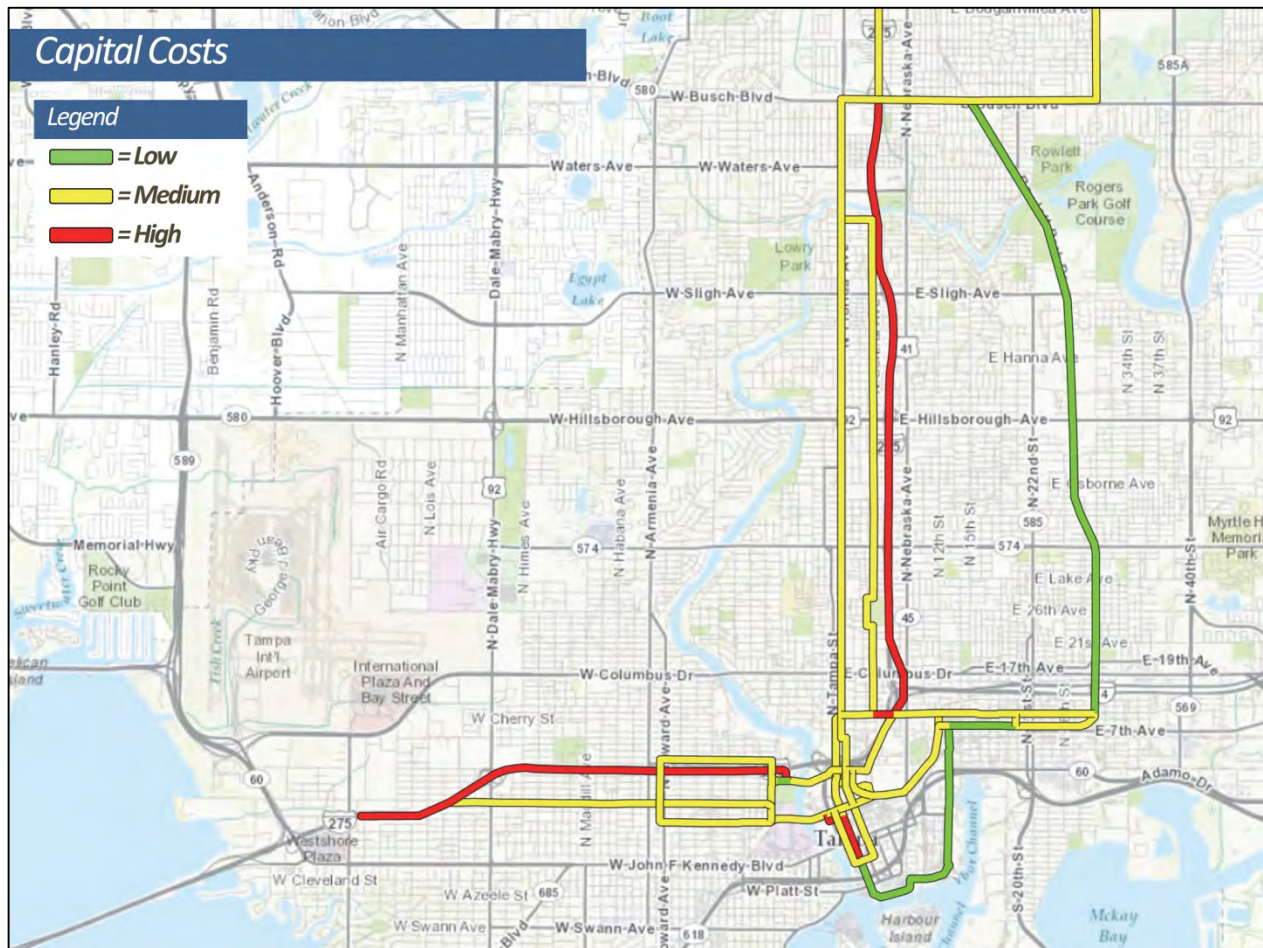


Figure 6-5 depicts the results of the evaluation of potential for Tram expansion per segment. Tram expansion opportunities included:

- Existing horizontal and vertical geometry
- Existing horizontal and vertical clearances
- Available ROW
- Appropriate use of technology within segment

**FIGURE 6-5
POTENTIAL FOR TRAM EXPANSION**

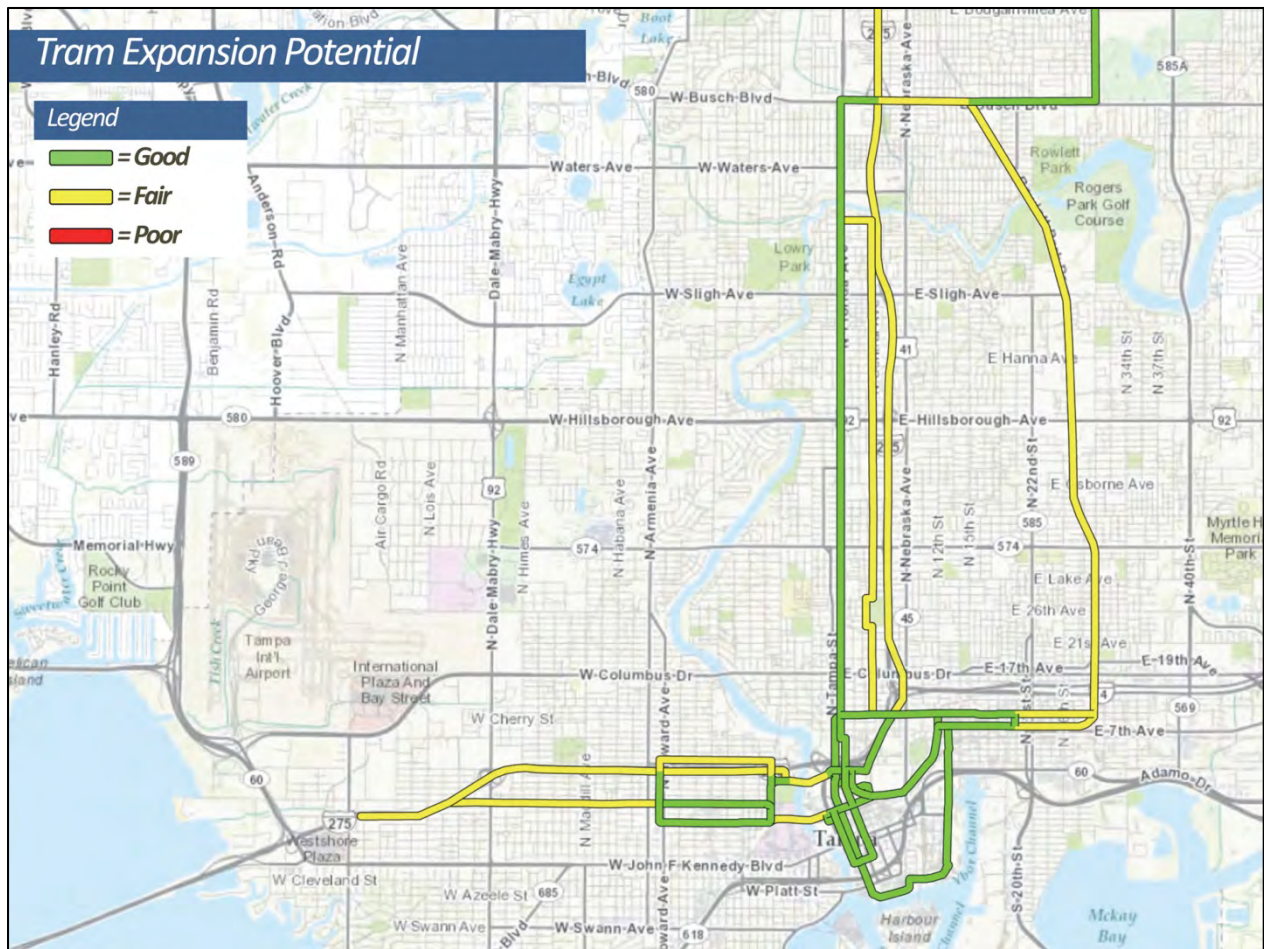


Figure 6-6 depicts the results of the evaluation of potential for Light Rail expansion per segment. Light Rail expansion opportunities included:

- Existing horizontal and vertical geometry
- Existing horizontal and vertical clearances
- Available ROW
- Appropriate use of technology within segment

**FIGURE 6-6
POTENTIAL FOR LIGHT RAIL EXPANSION**

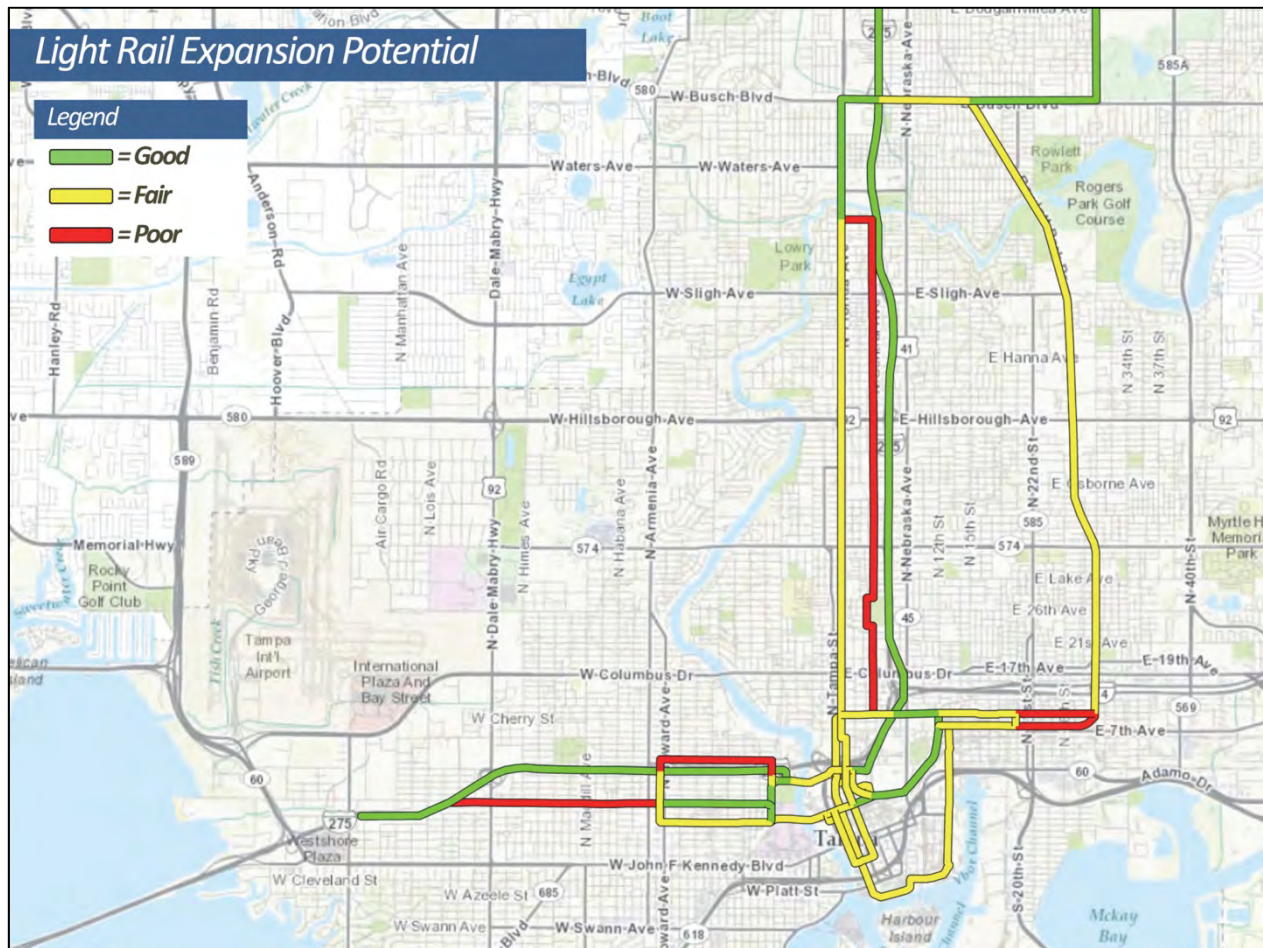
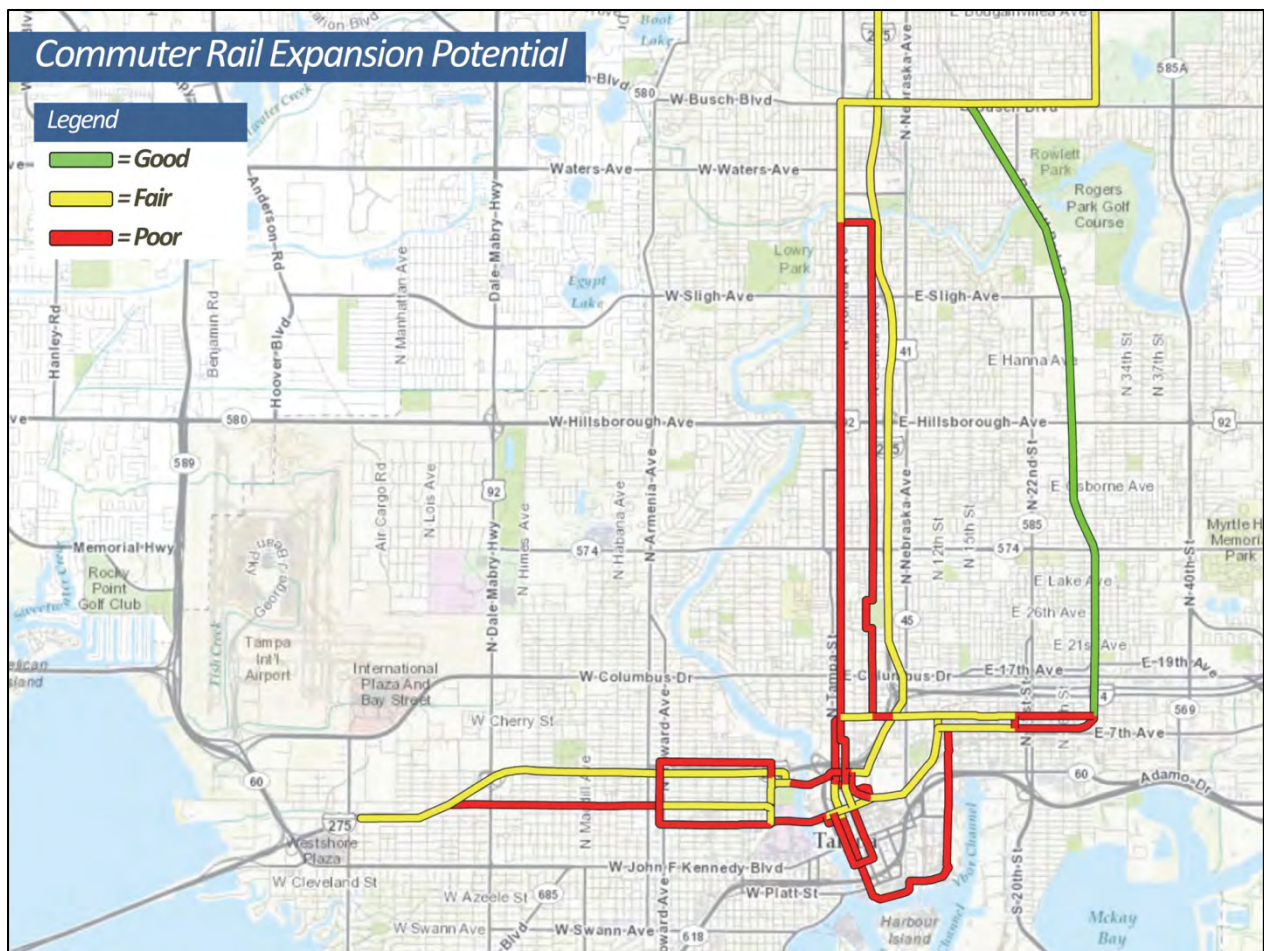


Figure 6-7 depicts the results of the evaluation of potential for Commuter Rail expansion per segment. Commuter expansion opportunities included:

- Existing horizontal and vertical geometry
- Existing horizontal and vertical clearances
- Available ROW
- Appropriate use of technology within segment

**FIGURE 6-7
POTENTIAL FOR COMMUTER RAIL EXPANSION**



The specific criteria supporting the assessment of these goals are discussed in more detail in Section 8.2.1. However, **Table 6-1** below presents the results of the detailed evaluation. The table classifies the results of the evaluation as High (green), Medium (yellow), or Low (red) (with High being the preferred outcome) for each segment of the system for each of the criteria.

TABLE 6-1
SEGMENT EVALUATION RESULTS

		Phase I: Initial Screening														Phase II: Secondary Screening																							
		"Establish a technically feasible and cost effective transit system"							"Maximize System Flexibility and Utilization of Assets"							"Support Redevelopment, Economic Development, and Create Revenue"				"Enhance Mobility Into and Within Downtown Tampa"																			
		Geometric Analysis	Cost Range	Reduce CSX liability	Potential for Sociocultural Impacts				Potential for Natural Feature Impacts	Utilization of existing assets			Ability to expand through extensions	Maximize redevelopment and infill development	Serve areas of future population and employment densities	Enhance connection to TECO Streetcar and expand its reach	Provide connections between major activity centers	Provide Service to Historically Disadvantaged Populations				Serve areas of existing population and employment densities				Enhance existing and future transit service			Enhance multimodal connections										
Segment ID	Description				SC	LRT	CR	Length of the segment that passes through a Resource Group		Number of Structures Within 100 Feet	Number of Bridges Within 100 Feet	Number of Cemetery Within 100 Feet						Potential to Have a Negative Effect on a Park	Potential to Have a Negative Effect on a Wetland	Potential to Have a Negative Effect on a Floodplain	Percent of the alignment that utilizes dedicated transit envelope (Marion St. or I-275)	Percent of the alignment that utilizes an existing CSX corridor	Percent of the alignment that utilizes existing streetcar corridor	Does the alignment either enhance, limit, or have no effect the development of other rail alternatives.	Underutilized land: Land designated for use as parking with a structure value less than 250,000 in value or a lot value that exceeds the building value by 2.5x or more. Infill Development Opportunity - Vacant Land	Future Population (2040) within one-quarter mile	Future Employment (2040) within one-quarter mile	Number of direct connections to existing TECO Streetcar Stations	Number of connections to existing TECO Streetcar stations within 3 blocks or one-quarter mile.	Number of quadrants to which the service has direct connection	Number of Major Activity Centers served by each facility within one-quarter mile of each alignment.	Provides Service to Racial Minority Group	Provides Service to Ethnic Minority Group	Provides Service to Low Income Group	Existing Residential Units Within One-Quarter Mile	Existing Commercial Use Within One-Quarter Mile	Serves Existing Population Centers	Serves Existing Employment Centers	Does the alignment connect to the Marion Transit Center (Downtown Intermodal Site)
		(1=good, 2=ok, 3=poor)																																					
1	Marion from Kennedy to Cass	1	2	3	2	1	1	1	1	1	1	1	3	3	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	8th East of 20th Cypress from North to Ashley	2	3	3	3	2	1	2																															
3	Cass from Marion to Jefferson	1	1	2	2	1	2																																
4	North Blvd. segment Laurel from Green to Tampa St.	1	1	2	2	2	2																																
5	Cypress from 275 to Howard	2	2	3	3	2	1	2																															
6	Cypress from Howard to North	1	1	2	2	2	2																																
7	North Blvd. segment Nuccio from 7th to Palm	1	1	2	2	2	2																																
8	275 from Palm to Busch	2	1	2	2	2	3																																
9	275-Fowler from Busch to 30th	2	1	2	2	2	2																																
10	Bruce B Downs from Fowler to New	2	1	2	1	1	1																																
11	Along 275 from Morgan to Palm	1	1	2	2	3	2																																
12	CSX north 275 from Howard to North	2	2	1	2	2	1																																
13	275 from Cypress to Howard	2	1	2	2	2	3																																
14	Ashley-Polk Airport - Spruce & Besse Coleman from	1	2	3	4	1	3																																
15	N. Trask St.	1	1	2	2	2	2																																
16	TECO streetcar - Whiting to 8th	1	2	3	2	2	1																																
17	TECO streetcar - 8th Franklin from 275 to Palm	1	2	3	2	2	2																																
18	Franklin from Whiting to Polk	1	2	3	3	1	3																																
19	Fortune from Franklin to Marion	1	2	3	2	2	2																																
20	North Blvd. segment Howard(Armenia?) from Cass-Cypress to Howard-Main to North	1	2	3	3	2	2																																
21	Fortune from Marion to Morgan	1	2	3	2	2	2																																
22	Harrison-Cass-Orange Connector	1	2	3	2	3	2																																

**TABLE 6-1 (CONTINUED)
SEGMENT EVALUATION RESULTS**

33	Central from Palm to Hanlon	2	3	3	3	2				1	3	1	1	3	1	3	3	3	
34	10th East of 20th	2	3	3	3	2			2	3	1	1	1	1	3	3	3		
35	Laurel from Tampa to Franklin	1	2	3	2	1			1	1	1	1	1	1	3	3	3		
36	North Blvd. segment	1	2	2	2	2			1	1	1	1	1	1	3	3	3		
37	North Blvd. segment	1	2	2	2	2			1	1	1	1	2	1	3	3	3		
38	Franklin from Fortune to Laurel	1	2	3	2	1			1	3	1	1	1	1	3	3	3		
39	Franklin from Laurel to N. of Laurel	1	2	3	2	1			1	1	1	1	1	1	3	3	3		
40	North Blvd. segment	1	2	2	2	2			1	1	1	1	1	1	3	3	3		
41	North - Laurel connector	1	1	2	1	1			1	1	1	1	2	1	3	3	3		
42	From Franklin to Marion N. of Laurel	1	2	3	2	3			1	1	1	1	1	1	3	3	3		
43	Franklin from Cass to Fortune	1	2	2	2	1			1	3	1	1	1	1	3	3	3		
44	Franklin from Cass to Polk	1	2	2	2	1			1	3	1	1	1	1	3	3	3		
45	Cass from Franklin to Marion	1	2	2	2	1			1	3	1	1	1	1	3	3	3		
46	Cass from Ashley to Franklin	1	2	2	2	1			1	3	1	1	1	1	3	3	3		
47	North Blvd. segment	1	1	2	2	2			1	1	1	1	1	1	3	3	3		
48	Morgan St. from	1	2	3	2	3			1	1	1	1	1	1	3	3	3		
49	Morgan/Harrison to	1	2	3	2	2			1	1	1	1	1	1	3	3	3		
50	Cass-Nuccio	1	1	2	2	2			1	3	1	1	1	1	3	3	3		
51	8th from Nuccio to 13th	1	2	2	2	1			1	1	1	1	1	1	3	3	3		
52	N 20th St.	1	2	3	2	2			3	1	1	1	1	1	3	3	3		
53	Whiting-Marion	1	2	3	3	1			1	1	1	1	1	1	3	3	3		
54	Florida-Busch from Hanlon to 275	1	1	2	2	1			1	1	3	1	2	1	3	3	3		
55	Florida from Palm to Hanlon	1	2	3	3	2			1	2	1	1	3	1	3	3	3		
56	Busch from 275 to CSX	2	2	2	2	1			1	1	1	1	1	1	3	1	3		
57	Marion/Florida from 275 to Palm	1	2	3	2	2			1	2	1	1	1	1	3	3	3		
58	Palm from Nuccio to 20th	1	2	2	2	2			3	3	1	1	1	1	3	3	3		
59	Palm from Florida to Central	1	2	2	2	2			2	3	1	1	1	1	3	3	3		
60	From Marion to Morgan N. of Laurel	1	2	3	2	2			1	1	1	1	1	1	3	3	3		
61	From Tampa to Franklin thru City	1	2	3	2	1			1	1	1	1	1	1	3	3	3		
62	Marion from Fortune to N. of Laurel	1	2	3	2	1			1	1	1	1	1	1	3	3	3		
64	North Blvd. segment	1	1	2	2	2			1	1	1	1	1	1	3	3	3		
65	Howard-Cassto North	1	2	3	2	2			1	3	1	1	1	1	3	3	3		
66	Cypress from Westshore to 275	1	1	2	2	2			1	1	1	1	1	1	3	3	3		
67	Westshore Blvd.	1	1	2	2	2			1	1	1	1	1	1	3	3	3		
68	Palm from Central to 275	1	2	3	3	1			2	3	1	1	1	1	3	3	3		
69	Palm from 275 to Nuccio	1	1	2	2	2			1	3	1	1	1	1	3	3	3		
70	Busch from CSX to 30th; 30th to Fowler	1	1	2	3	3			1	1	1	1	1	1	3	3	3		
71	North Blvd. segment	1	1	2	2	2			1	1	1	1	1	1	3	3	3		
72	North Blvd. segment	1	1	2	2	2			1	1	1	1	1	1	3	3	3		
73	Marion from Cass to Fortune	1	2	2	2	1			1	1	1	1	1	1	3	3	3		
74	Tampa-Whiting Tampa between Cass and Polk	1	2	3	2	1			1	3	1	1	2	1	3	3	3		
75		1	2	3	2	1			1	1	1	1	1	1	3	3	3		

3	3	3	3	3	3	3			2	2	2	2	3	3	3	3	3	3	2	3	3
3	3	2	3	3	1	2			1	1	1	1	3	1	2	3	2	2	3	3	3
3	3	1	1	3	3	1			3	3	1	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	1	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	1	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
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3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
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3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
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3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
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3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
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3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
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3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1
3	3	1	1	3	3	1			3	3	3	1	1	1	1	1	3	3	1	1	1

7.0 DEFINITION OF ALTERNATIVE SYSTEMS

With the information gained in the Opportunities Assessment, Technology Assessment, and Segment Analysis, the TAOS Project Management Team (PMT) worked to identify a series of viable alternative systems within Hillsborough County.

Based on the analysis and evaluation of the segments and criteria discussed in Section 6.0, the following segments that contained critical/fatal flaws, and/or encountered extraordinary engineering/ROW/cost constraints were dropped from further consideration. The remaining segments were used to develop alternatives that utilized reasonable and functional combinations of segments and technologies. The following sections define those alternative systems (rail and rubber-wheeled), and their evaluation.

- 18 – Existing CSX along Polk Street in Downtown Tampa
- 19 – W. Spruce Street
- 20 – N. Trask Street
- 25 – Franklin Street
- 32 – E. Harrison Street
- 34, 58, 59, 68, 69 – Palm Avenue
- 65 – W. Cass Street

7.1 ALTERNATIVE SYSTEMS CONSIDERED

Both rail and rubber-wheeled alternative systems were considered in this step of the evaluation process. Rail alternatives focused on optimizing existing transportation infrastructure to connect the concentrations of population and employment discussed in Section 2.0. Those segments that were addressed for further analysis were assembled into alternative systems based on engineering and operational effectiveness and practicability. Rubber-wheeled alternatives included the expansion and enhancement of the existing In-Town Trolley service in Downtown Tampa. Alternatives considered include:

- Alternative 1: I-275/TECO Palm Loop - Light Rail with Tram
- Alternative 2: I-275/TECO Line/CSX – Light Rail with Tram
- Alternative 3: Cypress/I-275/TECO Line – Light Rail
- Alternative 4: Laurel/I-275/TECO Line – Light Rail
- Alternative 5: Cypress/I-275/TECO Line/CSX – Light Rail with DMU
- Alternative 6: Cypress/I-275/Florida/CSX – Tram with DMU
- Alternative 7: Main/I-275/Central/CSX – Tram with DMU
- Alternative 8: I-275/TECO Nuccio Loop – Light Rail
- In-Town Trolley: Enhancement of Existing Service
- In-Town Trolley: East-West Circulator

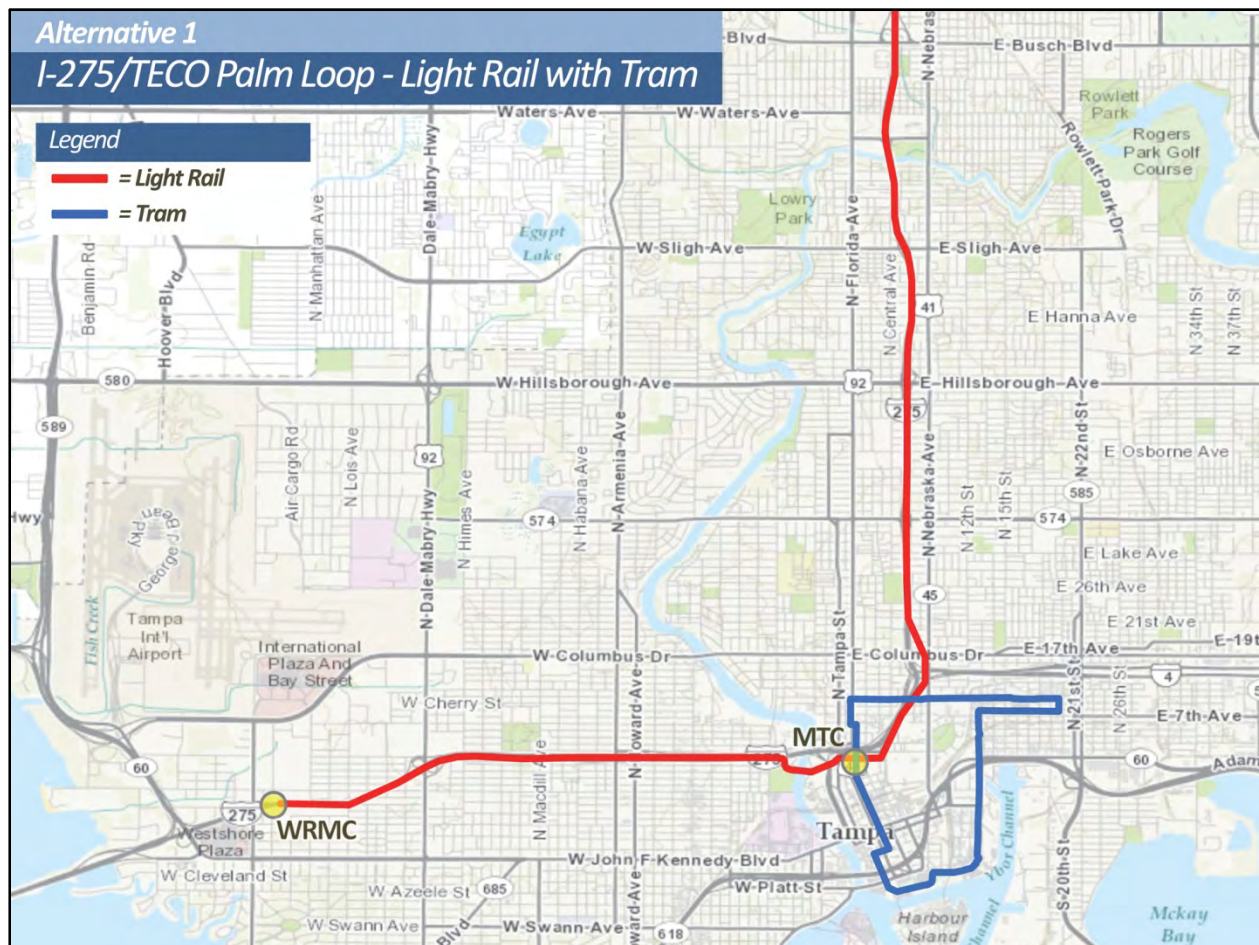
7.1.1 Alternative 1 – I-275/TECO Palm Loop – Light Rail with Tram

Alternative 1 takes advantage of the existing TECO Line Streetcar system and extends it north along Marion Street through the MTC/Downtown Tampa Intermodal Center (DTIC) to Palm Avenue then east along Palm Avenue to 20th Street then south to 8th Avenue, completing the TECO Line Streetcar system as an independent loop. The loop could use heritage streetcar, modern tram or a combination of both.

West from the MTC/DTIC along a new alignment for Light Rail Transit (LRT) vehicles, Alternative 1 would cross the Hillsborough River on a new dual-track bascule bridge near the existing Laurel Street Bridge. Once across the river Alternative 1 turns north along North Boulevard to I-275. At I-275 it would enter the I-275 median transit envelop and continue west to the Westshore Regional Multimodal Center (WRMC).

North from the MTC/DTIC, Alternative 1 would follow the outside eastern edge of the I-275 corridor to east on Busch Boulevard to north on 30th Street, terminating just south of Fowler Avenue near USF. **Figure 7-1** depicts the routing for Alternative 1.

**FIGURE 7-1
ALTERNATIVE 1**

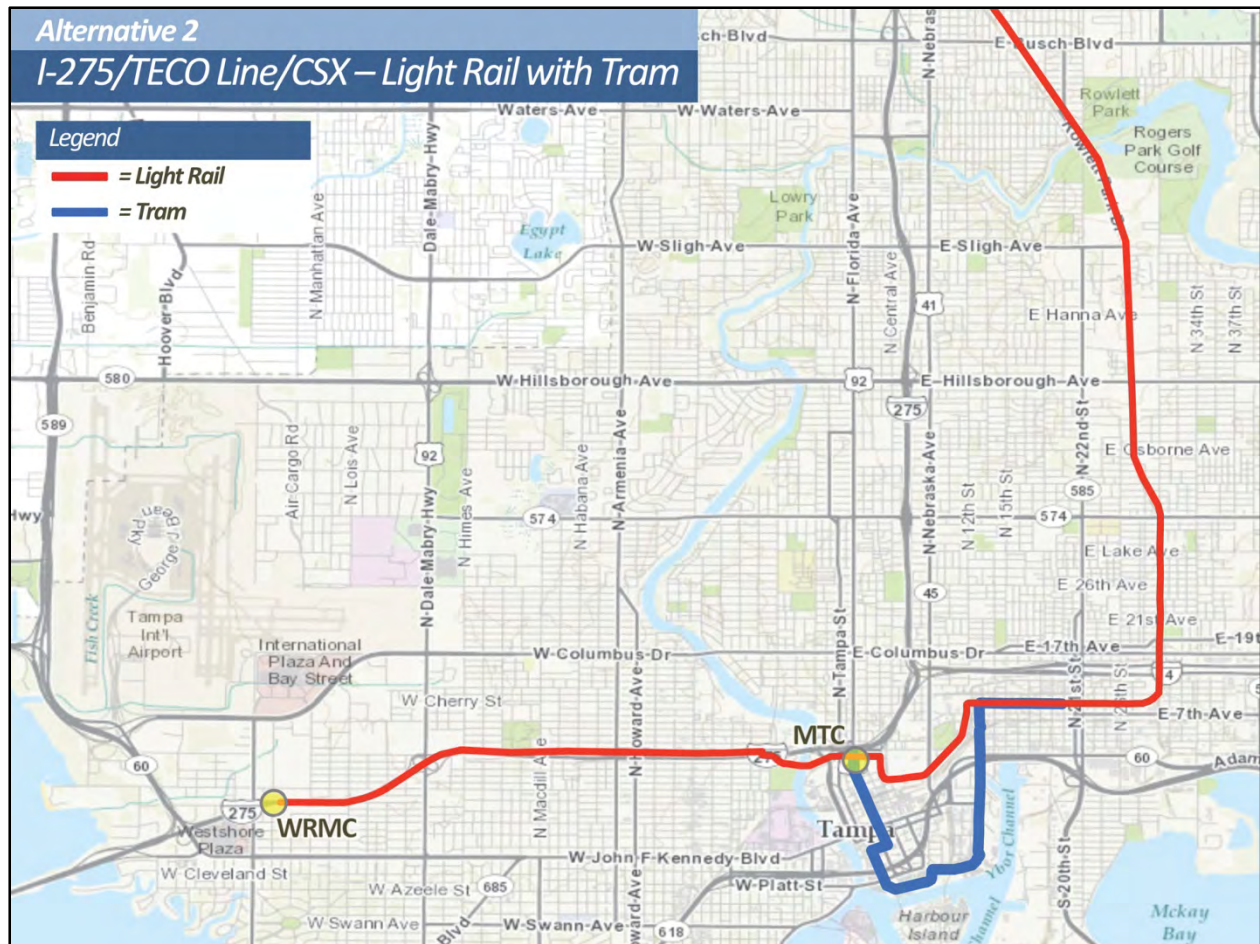


7.1.2 Alternative 2 – I-275/TECO Line/CSX – Light Rail with Tram

Alternative 2 also takes advantage of the TECO Line Streetcar track but only extends the existing system north along Marion Street to the MTC/DTIC. The extension could use heritage streetcar, tram, or a combination of both.

Alternative 2 uses the same western route as Alternative 1. East of the MTC/DTIC, Alternative 2 follows the southern edge of the Encore development to north on Nuccio Parkway to east on 8th Avenue. Along 8th Avenue the LRT would share the same tracks as the TECO Line Streetcar system but continue east to approximately 30th Street where it would turn north and follow the existing CSX corridor (Clearwater and Brooksville subdivisions) to just south of Fowler Avenue near USF. **Figure 7-2** depicts the routing for Alternative 2.

**FIGURE 7-2
ALTERNATIVE 2**

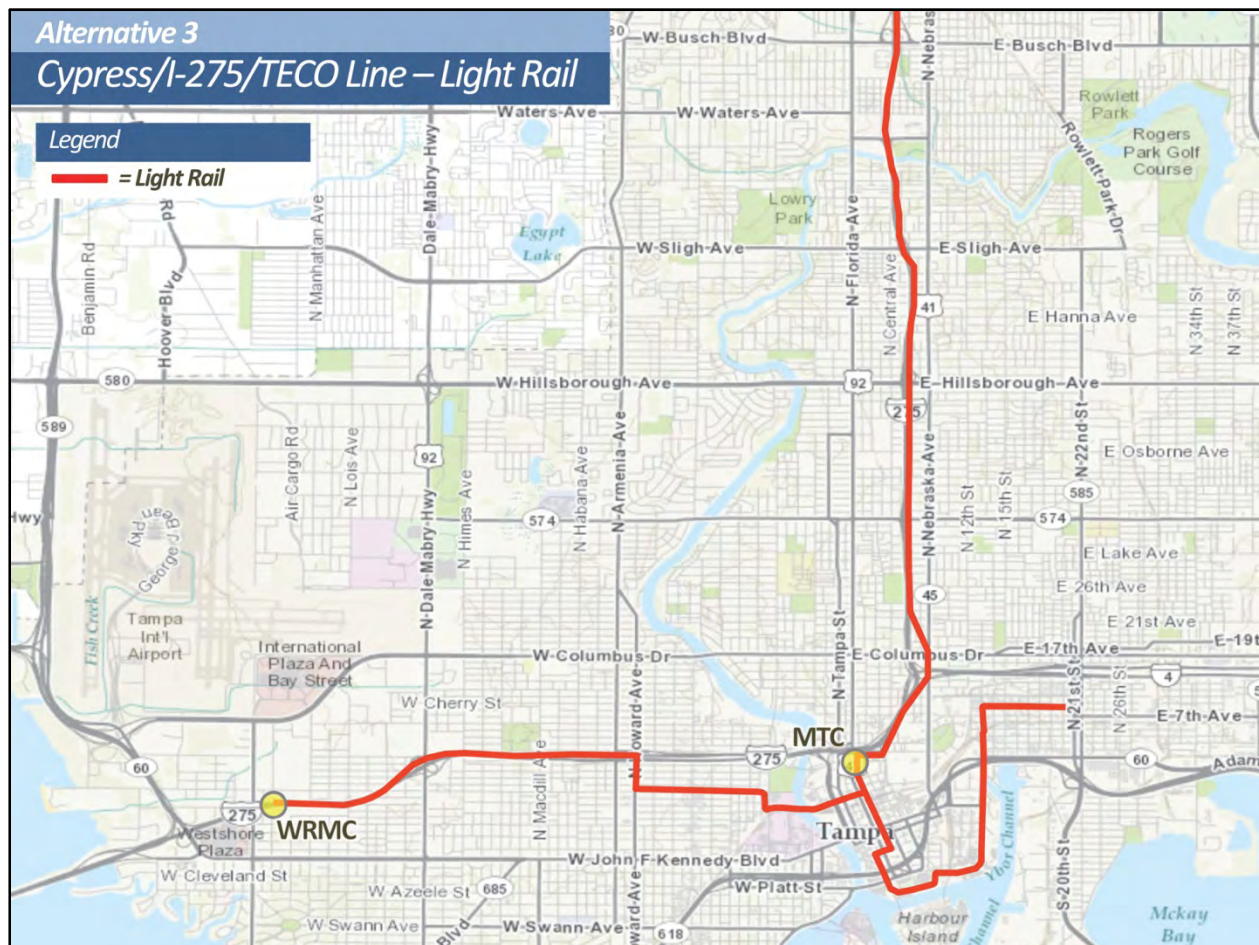


7.1.3 Alternative 3 - Cypress/I-275/TECO Line - Light Rail

Alternative 3 also takes advantage of the TECO Line Streetcar tracks and extends the existing tracks north along Marion Street to the MTC/DTIC. This alternative would convert the vehicle technology to LRT.

Alternative 3 would extend westbound using a new dual-track bascule crossing in the area of the Cass Street Bridge from the Marion Street extension of the TECO Line Streetcar system. Once across the river it would travel north to Cypress Street then west to north on Howard Avenue. At I-275 it would enter the I-275 median transit envelop and continue west to the WRMC. North from the MTC/DTIC, Alternative 3 would follow the outside eastern edge of the I-275 corridor to east on Busch Boulevard to north on 30th Street, terminating just south of Fowler Avenue near USF. **Figure 7-3** depicts the routing for Alternative 3.

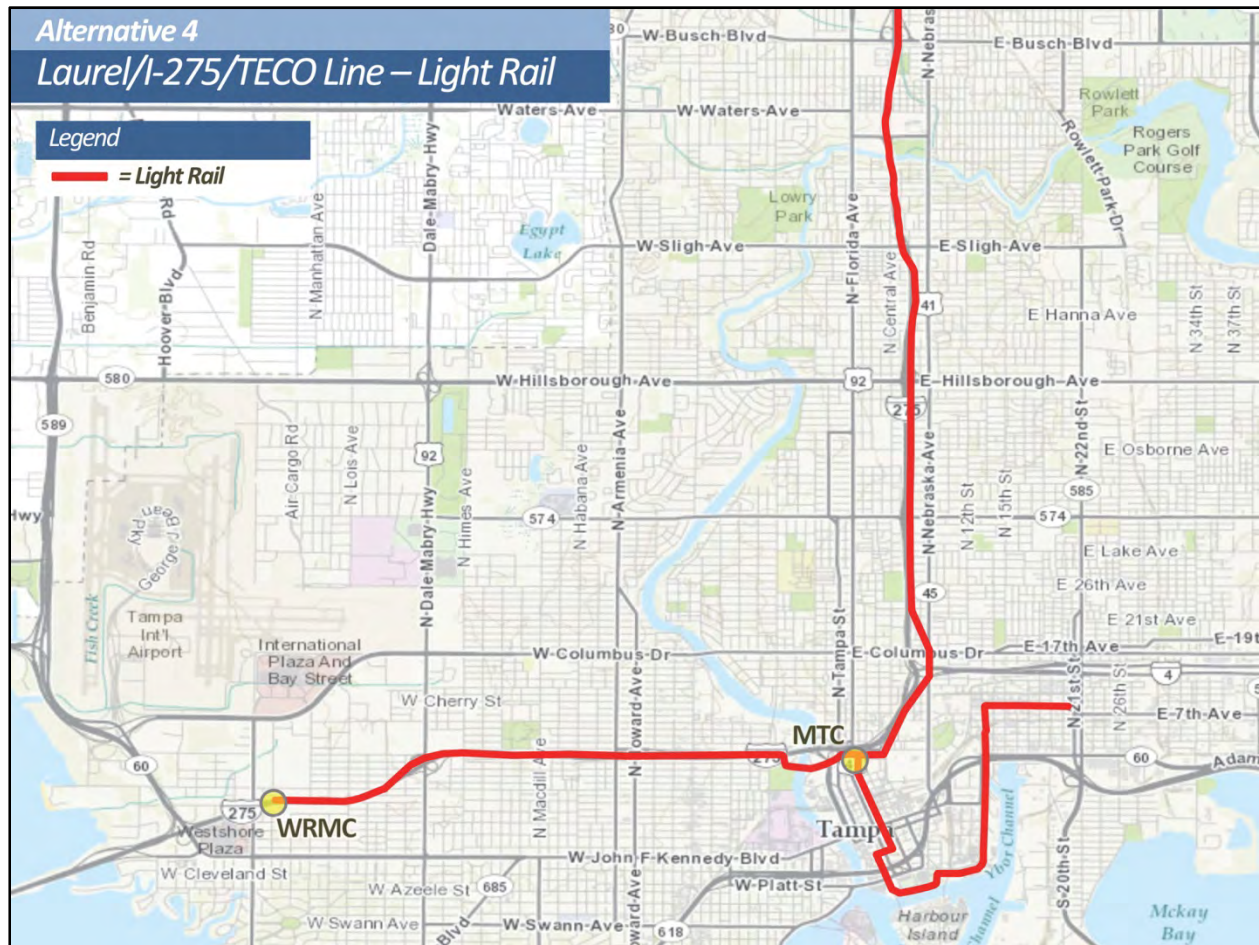
**FIGURE 7-3
ALTERNATIVE 3**



7.1.4 Alternative 4 – Laurel/I-275/TECO Line – Light Rail

Alternative 4 is also a LRT alternative similar to Alternative 3, with the exception of where it crosses the Hillsborough River and enters the I-275 transit envelope. Travelling west from the MTC/DTIC, Alternative 4 crosses the Hillsborough River in the proximity of the Laurel Street Bridge and enters the I-275 median at North Boulevard on the same alignment as Alternative 1. **Figure 7-4** depicts the routing for Alternative 4.

**FIGURE 7-4
ALTERNATIVE 4**

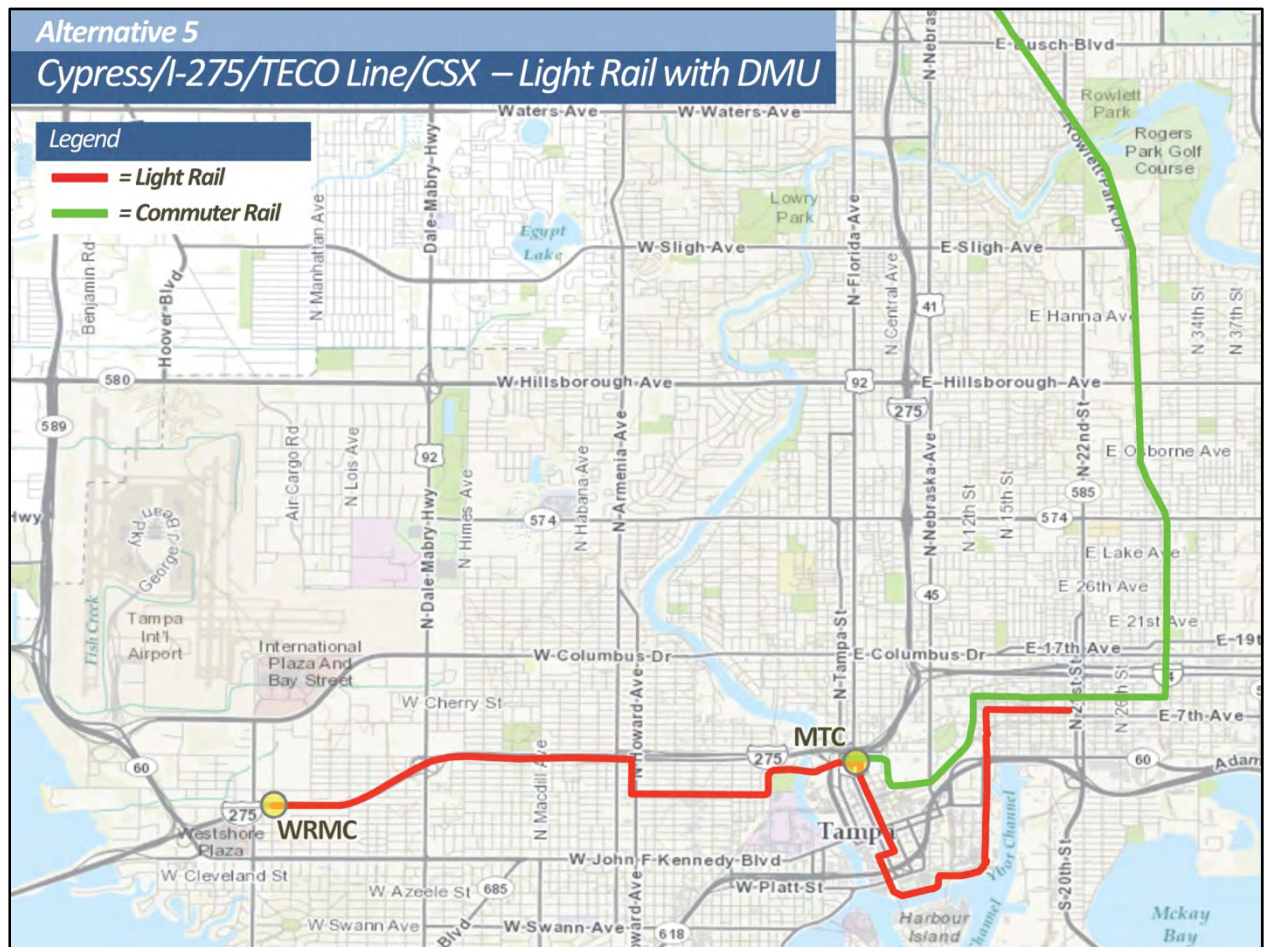


7.1.5 Alternative 5 – Cypress/I-275/TECO Line/CSX – Light Rail with DMU

Alternative 5 combines segments from all four alternatives detailed previously. This alternative utilizes the existing TECO Line Streetcar tracks, but converts it to LRT and extends it westward. Travelling west out of the MTC/DTIC, Alternative 5 crosses the Hillsborough River in the proximity of the Laurel Street Bridge on new dual-track bascule bridge like Alternatives 1, 2 and 4. The LRT would then turn south along North Boulevard to Cypress, then west to north on Howard Avenue. At I-275 it would enter the I-275 transit envelope and continue west to the WRMC like Alternative 3.

North from the MTC/DTIC, Alternative 5 would follow the Alternative 2 alignment on the existing CSX ROW utilizing DMU commuter rail technology. **Figure 7-5** depicts the routing for Alternative 5.

**FIGURE 7-5
ALTERNATIVE 5**

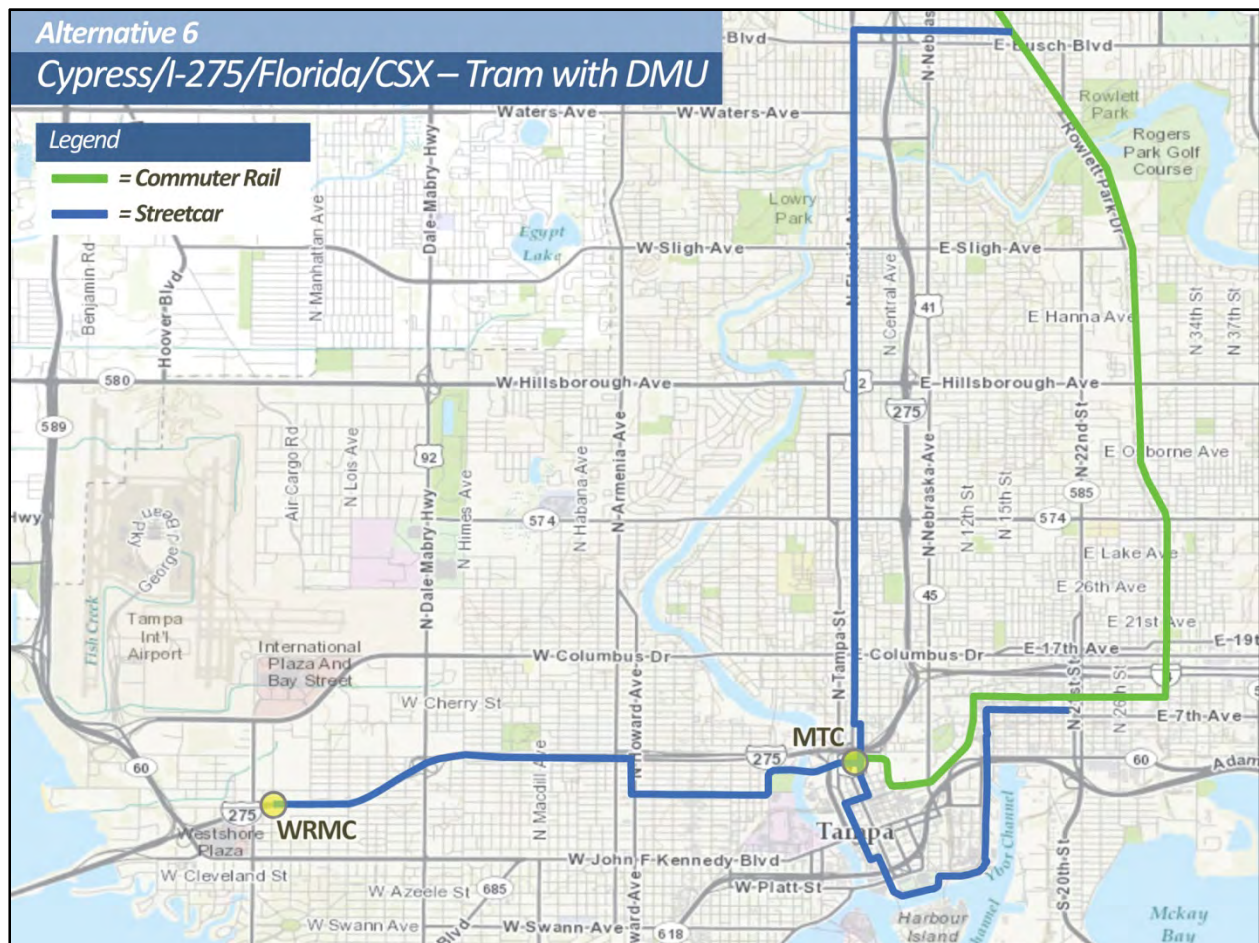


7.1.6 Alternative 6 – Cypress/I-275/Florida/CSX – Tram with DMU

Alternative 6 is very similar to Alternative 5, utilizing the same routing west of the MTC/DTIC but uses modern tram instead of LRT technology. The downtown routing would remain the same, however, the segment between the existing TECO Line Streetcar and the MTC/DTIC would utilize Tampa Street instead of Marion Street between Whiting Street and Cass Street. This alignment would travel west on Whiting Street to north on Tampa Street to east on Cass Street to north on Marion to access the MTC/DTIC.

This alternative uses the same commuter rail segment as Alternative 5 north of downtown. In addition, it introduces a modern tram alignment on Florida Avenue. This alignment travels north on Marion Street from the MTC/DTIC to west on Henderson Avenue to north on Florida Avenue to east on Busch Boulevard to the intersection with CSX commuter rail. **Figure 7-6** depicts the routing for Alternative 6.

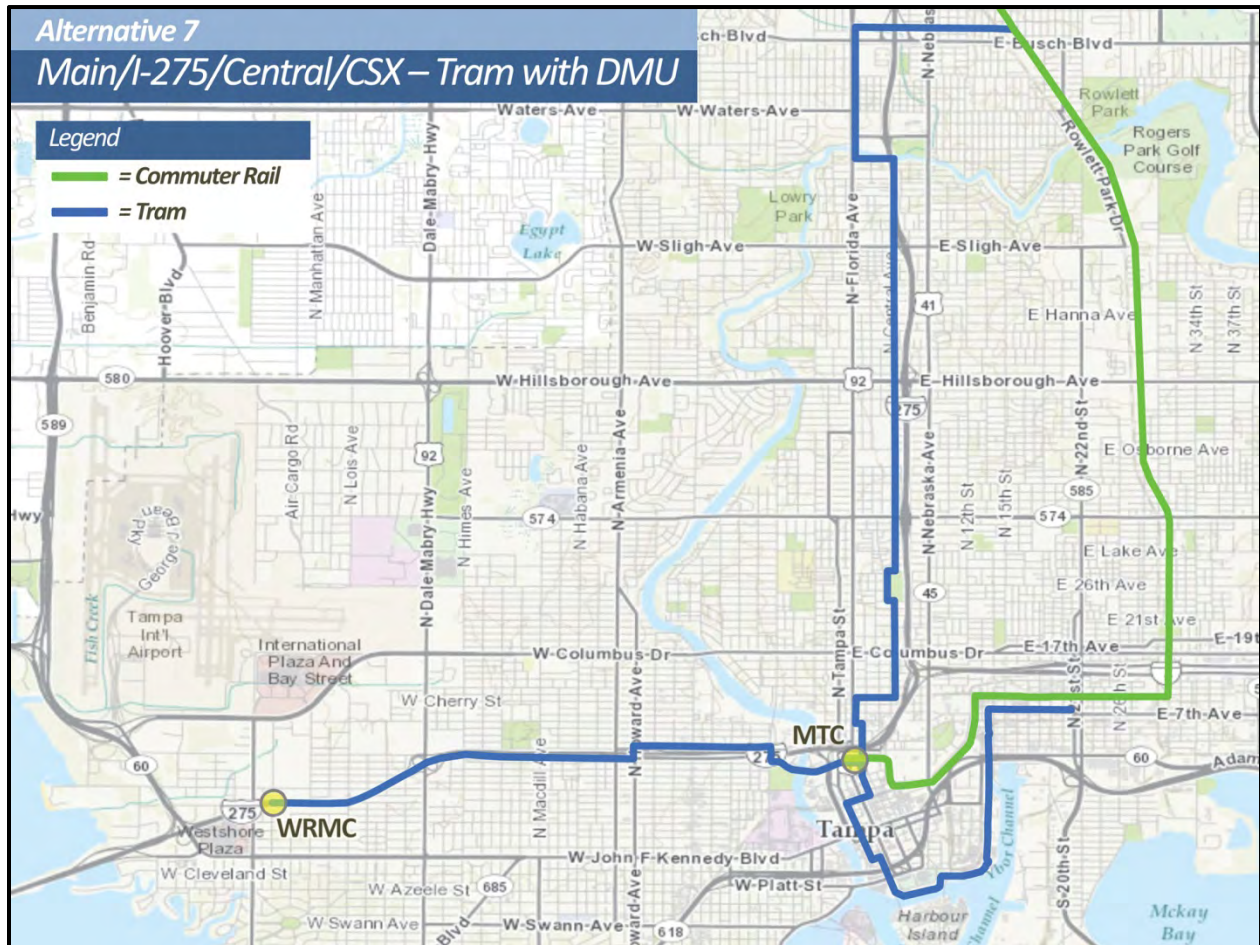
**FIGURE 7-6
ALTERNATIVE 6**



7.1.7 Alternative 7 – Main/I-275/Central/CSX – Tram with DMU

Alternative 7 is very similar to Alternative six with two exceptions. Similarly, the west route would utilize the same bridge over the Hillsborough River and utilize the same modern tram and commuter rail technologies. Conversely, the west alignment would proceed north on North Boulevard to Main Street and south on Howard to the I-275 transit envelope. The north alignment would utilize Central Avenue by travelling east on Palm Avenue then north on Central Avenue to west on Hanlon Street to resume the Florida Avenue routing north. **Figure 7-7** depicts the routing for Alternative 7.

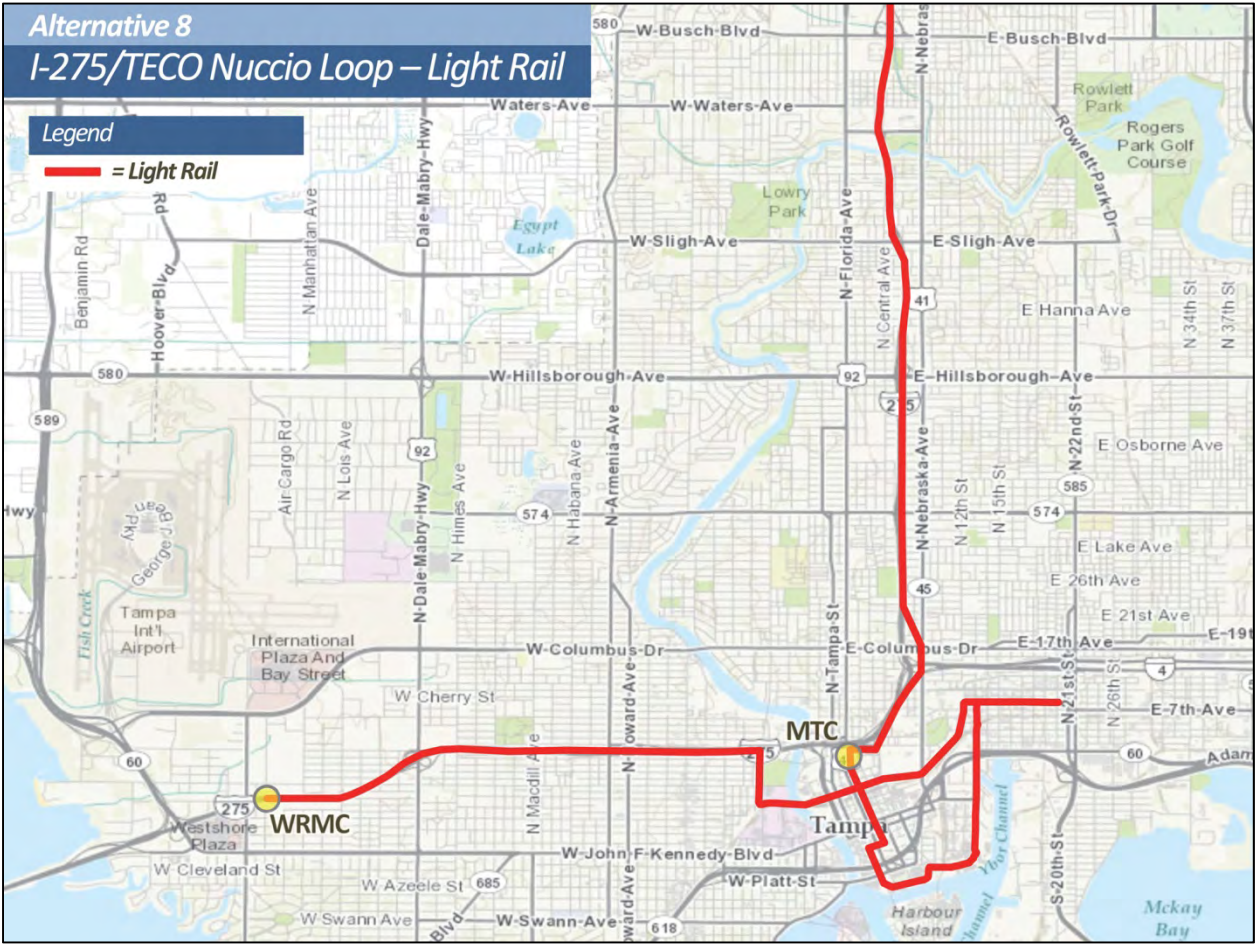
**FIGURE 7-7
ALTERNATIVE 7**



7.1.8 Alternative 8 – I-275/TECO Nuccio Loop – Light Rail

Alternative 8 is very similar to Alternative 3 as it utilizes only LRT technology and utilizes the transit envelope west on I-275 and N. Tellaferro Avenue adjacent to the east of I-275 north as well as the new bascule bridge over the Hillsborough River at Cass Street. Downtown, however, it would follow Cass Street eastward continuing past Marion Street to Nuccio Parkway and then connecting to the eastern portion of the existing TECO Line Streetcar system at 8th Avenue and 13th Street. **Figure 7-8** depicts the routing for Alternative 8.

**FIGURE 7-8
ALTERNATIVE 8**



7.1.9 In-Town Trolley – Enhancement of Existing Service

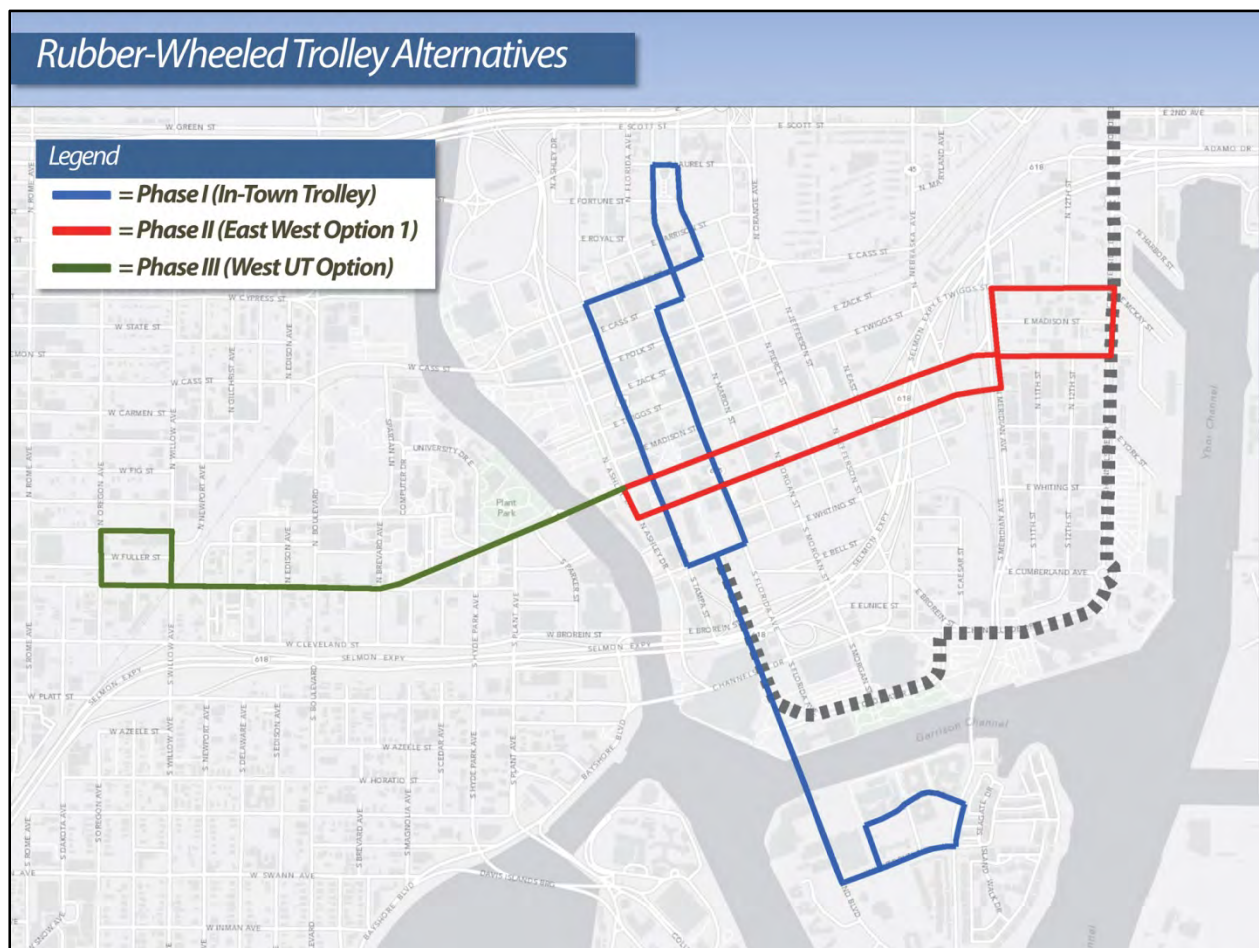
The In-Town Trolley enhancement is considered Phase I of the rubber-wheeled alternatives and would include decreasing the existing headway from 15 minutes to 10 minutes. In addition, the hours of operation would increase from 5 hours a day weekdays only to 15 hours Monday through Saturday and 11 hours on Sunday.

7.1.10 In-Town Trolley – East-West Circulator

To complement the In-Town Trolley, which runs north and south, a new east-west circulator is proposed as a phased approach. Phase II (East-West Option 1) includes an east-west routing on Kennedy Boulevard and Jackson Street downtown to serve the major employment centers between Ashley and Meridian Avenue. The route would then travel north to Twiggs Street, east to south on Channelside and back to Kennedy Boulevard to allow connections to the existing TECO Line Streetcar system and Channelside residential areas.

Phase III, the West UT Option, would continue west of Ashley Drive to north on Oregon Avenue, east on North B Street and south on Willow Avenue to connect back with Kennedy Boulevard. This extension would provide direct service to University of Tampa students and the Walmart at Oregon and Kennedy. The headways and service spans on the east-west circulator would be the same as the improvements to the existing In-Town Trolley. **Figure 7-9** depicts the rubber-wheeled trolley options.

**FIGURE 7-9
RUBBER-WHEELED TROLLEY ALTERNATIVES**



7.2 EVALUATION OF ALTERNATIVES SYSTEMS

The following section explains the evaluation process that was developed and followed to screen and rank the eight alternative rail systems.

To facilitate an evaluation of alternatives, the project team identified specific high-capacity transit criteria, using a two-phase screening approach that first assessed technical feasibility and then potential system benefit. The major evaluation categories used in Phase I of the screening process included:

- 1) Establish a Technically Feasible and Cost Effective Transit System and
- 2) Maximize System Flexibility and Utilization of Assets.

The major criteria categories used in Phase II were:

- 1) Support Redevelopment, Economic Development, and Create Revenue and
- 2) Enhance Mobility Into and Within Downtown Tampa.

Each category included 4-16 screening criteria aimed at attaining that objective.

Using available data, the team applied screening criteria to each alternative, resulting in a rating of High, Medium, or Low. Higher scoring alternatives represented a more feasible and beneficial system. The system evaluation matrix was used to determine which alternatives would move forward for further evaluation.

As discussed previously, the TAOS Project Management Team identified eight alternatives to be evaluated as potential high-capacity transit systems. These transportation alternatives are outlined in Figures 7-1 through 7-8 and include:

- Alternative 1: I-275/TECO Palm Loop - Light Rail with Tram
- Alternative 2: I-275/TECO Line/CSX – Light Rail with Tram
- Alternative 3: Cypress/I-275/TECO Line – Light Rail
- Alternative 4: Laurel/I-275/TECO Line – Light Rail
- Alternative 5: Cypress/I-275/TECO Line/CSX – Light Rail with DMU
- Alternative 6: Cypress/I-275/Florida/CSX – Tram with DMU
- Alternative 7: Main/I-275/Central/CSX – Tram with DMU
- Alternative 8: I-275/TECO Nuccio Loop – Light Rail

The results of the evaluation are summarized in the three Matrix elements shown as **Tables 7-1 through 7-3**. The green, yellow, and red blocks depicted in the matrix represent high, medium, and low scores respectively. Table 7-3 provides a cumulative score for each alternative. A more detailed discussion of the systems evaluation process is included in **Appendix B**.

7.3 COSTS ESTIMATION METHODOLOGY

Rough order-of-magnitude (ROM) costs were calculated with a “top-down” method. Total capital cost data from similar systems in the U.S. were extrapolated and adjusted according to the conditions of this study. See **Appendix C** for methodology details. Operating and maintenance (O&M) costs were based

on the total revenue miles per alternative multiplied by the FTA National Transportation Database (NTD).

- LRT = \$255.50 per revenue mile
- Modern Tram = \$188.50 per revenue mile
- Commuter Rail/DMU = \$507.70 per revenue mile

**TABLE 7-1
PHASE I INITIAL SCREENING RESULTS**

		Phase I: Initial Screening															
		"Establish a technically feasible and cost effective transit system"										"Maximize System Flexibility and"					
		Geometric Analysis		Reduce CSX liability	Potential for Sociocultural Impacts					Potential for Natural Feature Impacts			Utilization of existing assets			Ability to expand through extensions	
		Engineering constraints	Potentially significant impacts to ROW	Opportunity to avoid, minimize, or mitigate required liability insurance provisions	Potential to Have a Negative Effect on a Historic District or Resource Group	Potential to Have a Negative Effect on a Historic Structure	Potential to Have a Negative Effect on a Historic Bridge	Potential to Have a Negative Effect on a Historic Cemetery	Potential to Have a Negative Effect on a Park	Potential to Have a Negative Effect on a Wetland	Potential to Have a Negative Effect on a Floodplain	Percent of the alignment that utilizes dedicated transit envelope (Marion St. or I-275)	Percent of the alignment that utilizes an existing CSX corridor	Percent of the alignment that utilizes existing streetcar corridor	Does the alignment either enhance, limit, or have no effect on the development of other rail alternatives		
System	Description	Low, Medium, High, Fatal	Low, Medium, High	Avoid, Minimize, Mitigate, or none	Length of the segment that passes through a Resource Group	Number of Structures Within 100 Feet	Number of Bridges Within 100 Feet	Number of Cemeteries Within 100 Feet	Number of Parks Impacted	Length of Segment in Wetland	Length of Segment in Floodplain	Percent of the alignment that utilizes dedicated transit envelope	Percent of the alignment that utilizes an existing CSX corridor	Percent of the alignment that utilizes existing streetcar corridor	Enhance, Limit, No Effect		
1	I-275 Light Rail with Streetcar	Red	Red	Red	Yellow	Yellow	Yellow	Green	Red	Yellow	Green	Red	Yellow	Red	Red		
2	I-275/CSX Light Rail with Streetcar	Red	Yellow	Green	Yellow	Yellow	Yellow	Red	Yellow	Green	Yellow	Red	Yellow	Red	Green		
3	Cypress/I-275/Streetcar Light Rail	Green	Green	Green	Yellow	Yellow	Yellow	Green	Yellow	Red	Yellow	Yellow	Green	Yellow	Yellow		
4	I-275/Laurel/Streetcar Light Rail	Green	Yellow	Green	Green	Yellow	Yellow	Green	Yellow	Yellow	Green	Yellow	Red	Yellow	Yellow		
5	Cypress/I-275 Light Rail-CSX DMU	Green	Green	Green	Yellow	Yellow	Yellow	Green	Yellow	Green	Yellow	Yellow	Green	Yellow	Green		
6	Cypress/I-275/Florida Streetcar - CSX DMU	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Red	Yellow	Yellow	Red	Yellow	Green		
7	Main/I-275/Central Streetcar - CSX DMU	Red	Red	Green	Yellow	Yellow	Yellow	Green	Yellow	Red	Yellow	Yellow	Red	Yellow	Green		
8	I-275/Streetcar Light Rail	Yellow	Green	Green	Yellow	Yellow	Yellow	Green	Yellow	Red	Yellow	Yellow	Red	Yellow	Yellow		

**TABLE 7-2
PHASE II SECONDARY SCREENING RESULTS**

		Phase II: Secondary Screening																			
		"Support Redevelopment,"				"Enhance Mobility Into and Within Downtown Tampa"															
		Maximize	Serve areas of		Enhance connection	Provide connections		Provide Service to Historically			Serve areas of existing population and			Enhance existing and future		Enhance multimodal					
System	Description	Land designated for use as parking with a bidg value < \$250,000 or a lot value that exceeds the bidg value by 2.5x or more	Infill Development Opportunity - Vacant Land	Future Population (2040) within one quarter-mile	Future Employment (2040) within one quarter-mile	Number of direct connections to existing TECO Streetcar Stations	Number of connections to existing TECO Streetcar stations within 3 blocks or one quarter-mile	Number of districts to which the service has direct connection	Number of Major Activity Centers served by each facility within one quarter-mile of each alignment	Provides Service to Racial Minority Group	Provides Service to Ethnic Minority Group	Provides Service to Low Income Group	Existing Residential Units Within One Quarter-Mile	Existing Commercial Use Within One Quarter-Mile	Serves Existing Population Centers	Serves Existing Employment Centers	Does the alignment connect to the Marion Transit Center (Downtown Intermodal Site)	Does the alignment connect to the HART MetroRapid	Bus Stops that fall within one quarter-mile of the alignments	Major Pedestrian and Bike facilities that intersect alignment	Major Pedestrian and Bike facilities are within one quarter-mile of alignment
		SF Within 1/4 mile of Alignment	SF Within 1/4 mile of Alignment	Population by Affected IAZ	Population by Affected IAZ	Number of connections	Number of connections	Number of Districts Served	Number of Activity Centers	Length of Alternative Within EJ Block Group	Length of Alternative Within EJ Block Group	Length of Alternative Within EJ Block Group	Number of Units	Total Square Feet	2010 Population Within 1/4 mile of a segment	2010 Employment Within 1/4 Mile of a segment	Y or N	Y or N	Number of Stops	Number of Connections	Number of Connections
1	I-275 Light Rail with Streetcar																				
2	I-275/CSX Light Rail with Streetcar																				
3	Cypress/I-275/Streetcar Light Rail																				
4	I-275/Laurel/Streetcar Light Rail																				
5	Cypress/I-275 Light Rail-CSX DMU																				
6	Cypress/I-275/Florida Streetcar - CSX DMU																				
7	Main/I 275/Central Streetcar - CSX DMU																				
8	I 275/Streetcar Light Rail																				

**TABLE 7-3
ALTERNATIVE RANKING AND COST RANGE ESTIMATES**

		Resulting Rank		Cost Range			
		Technical Analysis Project Rank		System Cost			
				Order of magnitude capital cost range		Operations and maintenance annual cost range	
System	Description	Transit Points	High/Medium/Low	Capital Cost Cost Range		Annual Operations Cost Range	
1	I-275 Light Rail with Streetcar	33	High	\$1.5 B to \$2.0 B	\$28.6 M to \$34.4 M		
2	I-275/CSX Light Rail with Streetcar	33	High	\$1.0 B to \$1.3 B	\$25.6 M to \$30.7 M		
3	Cypress/I-275/5 Streetcar Light Rail	40	Medium	\$1.5 B to \$2.0 B	\$31.7 M to \$38.0 M		
4	I-275/Laurel/Streetcar Light Rail	38	Medium	\$1.5 B to \$2.0 B	\$31.7 M to \$38.0 M		
5	Cypress/I-275 Light Rail - CSX DMU	42	Medium	\$800 M to \$1 B	\$16.1 M to \$19.3 M		
6	Cypress/I-275/Florida Streetcar - CSX DMU	47	Low	\$1.0 B to \$1.3 B	\$14.1 M to \$16.9 M		
7	Mary/I-275/Central Streetcar - CSX DMU	43	Medium	\$1.0 B to \$1.3 B	\$14.1M to \$16.9 M		
8	I-275/Streetcar Light Rail	44	Low	\$1.6 B to \$2.0 B	\$34.7 M to \$41.7 M		

8.0 PUBLIC AND AGENCY INVOLVEMENT

From October 2013 to June 2014, the TAOS project involved three major constituencies to support the development of a recommended transit assets and opportunities strategy:

- Participation by a Project Management Team throughout TAOS project
- Presentations to Interested Groups
- Participation by a Stakeholders Group

8.1 PROJECT MANAGEMENT TEAM

The Hillsborough MPO and the Tampa Downtown Partnership developed a Project Management Team that included agencies directly responsible for the operations, management, planning (short-term and long-term), and funding for the identified transit assets. The Project Management Team included the following agencies:

- Hillsborough Metropolitan Planning Organization (MPO)
- Tampa Downtown Partnership
- City of Tampa
- Tampa Historic Streetcar, Inc. (Not-for-Profit Agency)
- Hillsborough Area Regional Transit Authority (HART)
- FDOT, District Seven
- URS (Consultant)

The Project Management Team held a kick-off meeting on Friday, October 11, 2013. During the study, the Project Management Team met periodically to discuss findings, coordination with other entities, including the Stakeholders Group, as well as recommendations.

8.2 PRESENTATIONS TO INTERESTED DOWNTOWN GROUPS AND AGENCIES

The project team made presentations to interested Downtown Tampa groups as scheduled by the Hillsborough MPO and the Tampa Downtown Partnership. These presentations were conducted early in the process to brainstorm for “new” ideas and “recurring” desire lines for transit alignments prior to conducting the first stakeholders meeting in December. In addition, URS conducted project update meetings to interested agencies and staff. The meetings held throughout the process included presentations to these groups:

- Downtown Partnership Transportation Committee on October 11, 2013
- Hyde Park Homeowner’s Association – Speakers Bureau on November 8, 2013
- Downtown Partnership Merchants Association on November 19, 2013
- Downtown Partnership Transportation Committee on March 14, 2014
- Tampa Historic Streetcar Board of Directors on March 19, 2014
- City of Tampa Planning Staff on April 3, 2014
- City of Tampa Mayor’s Chief of Staff Briefing on April 23, 2014
- Hillsborough County Staff on May 6, 2014
- Hillsborough County Staff on May 15, 2014
- Planning Commission on June 9, 2014

- MPO and Committees:
 - CAC December 11, 2013 and June 11, 2014
 - TAC December 11, 2013 and July 21, 2014
 - BPAC December 11, 2013
 - Livable Roadways December 11, 2013 and June 18, 2014
 - MPO January 7, 2014 and June 3, 2014

The early outreach meetings included an open discussion using the topics listed below.

Discussion Topics for Outreach Early in Study
Which area(s) of Downtown Tampa is the <i>current focus</i> of development?
Which area(s) of Downtown Tampa is the <i>future focus</i> of development?
How would a more robust transit network improve/accelerate the rate of development?
How do you feel transit best serves development?
What is the transit network in Downtown Tampa lacking?
What are two things you feel could make transit work better?
What role do you see development opportunities playing in possible revenue streams for the transit network?
In your opinion, does a transit network enhance the development of does the development enhance the transit network?

As part of the discussion, the attendees were asked to participate in a mapping exercise. They were each given a map of Downtown Tampa with the current transit assets included and asked to follow these parameters:

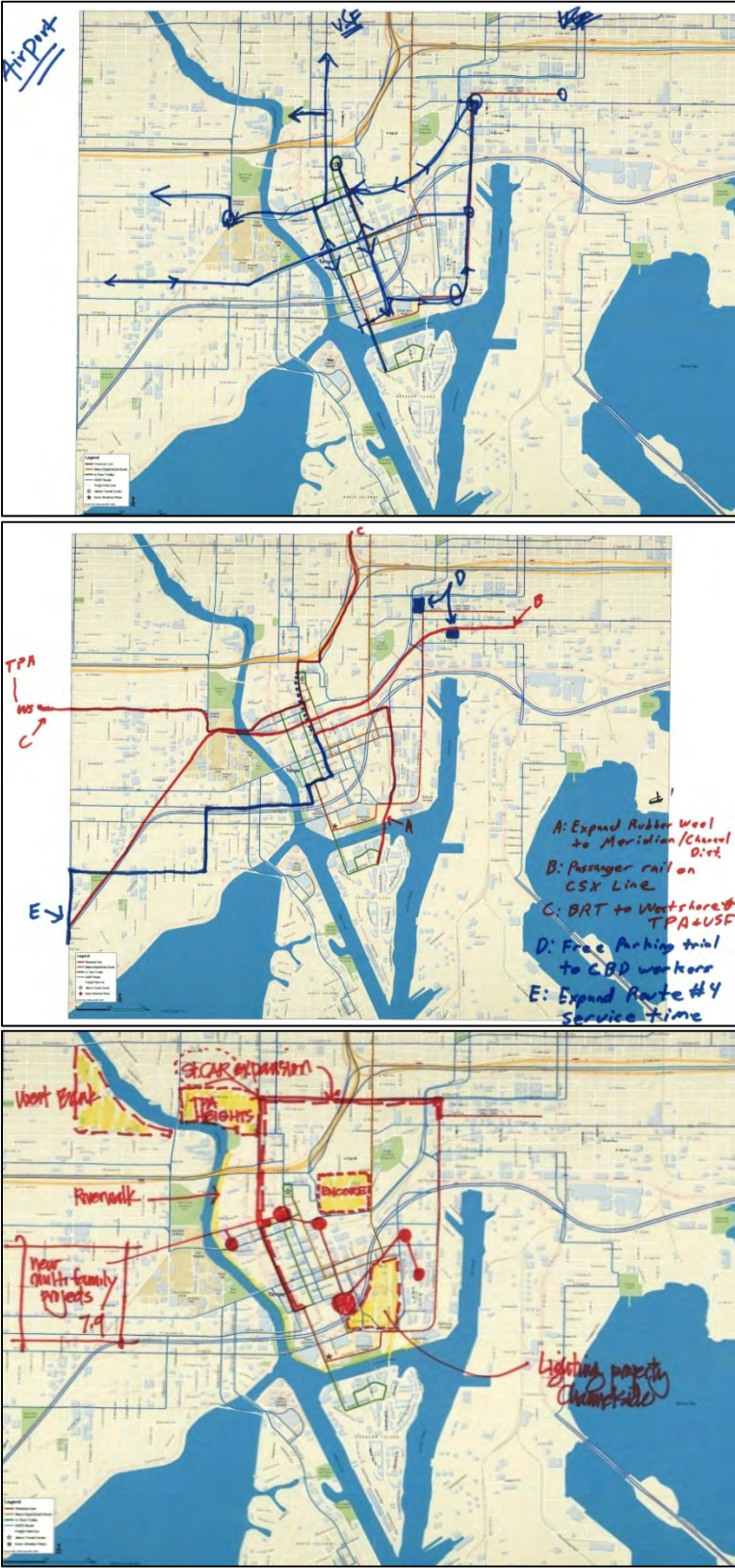
Using the existing transit assets on the map, draw your ideas on how to connect the TECO Line Streetcar to the other systems in Downtown. Do not worry about how to mix technologies, just brainstorm on possible connections to support current and planned development:

- Draw what you know about current development in Downtown.
- Draw what you know may be future development in Downtown.
- Using the TECO Line Streetcar as your starting point, where would you make it go? Draw these extensions to respond to current and future development.
- How would you integrate or expand the existing transit systems (both rail and rubber-wheel) to make a more regional system?
- How would you connect these systems with the TECO Line Streetcar?
- Would you consider using the existing CSX line if it were available?

The information from this mapping exercise was used throughout the study to identify new ideas or concepts for routes and opportunities to connect the existing systems, as well as common themes for potential alignments and specific nodes for stops and system connections.

This mapping exercise was used during the early individual outreach meetings as part of the kick-off of the study and also used during Stakeholder Meeting #1 in December 2013 and Stakeholder Meeting #2 in January 2014. Samples from the mapping exercise conducted at these meetings are included as **Figure 8-1**.

**FIGURE 8-1
SAMPLES OF PUBLIC OUTREACH MAPPING EXERCISE**



8.3 STAKEHOLDERS GROUP OUTREACH

The TAOS project included conducting four (4) Stakeholder Group Outreach Meetings, starting in December 2013 and ending in June 2014. The Hillsborough MPO and the Tampa Downtown Partnership developed a list of public officials and agencies, civic groups, neighborhood organizations, businesses, educational, and cultural interests that were based in downtown or the surrounding urban core. A complete list is included in Appendix A. Each agency and/or individual representatives were invited to participate in the process and the Stakeholder Meetings were advertised through the MPO's and TDP's email distribution system to broaden participation. Examples of the diverse groups and agencies invited to participate included the Straz Center, Hillsborough Community College-Ybor Campus, University of Tampa, Tampa Housing Authority, Hyde Park Village, Tampa Bay Bike Share, Pinnacle Group, BDG Architects, Earth First Development Group, Tampa Heights, HART, Hillsborough County, City of Tampa, Tampa-Hillsborough Expressway Authority, FDOT, Tampa Downtown Partnership, and the Hillsborough MPO.

8.3.1 Process

The flow of information and decision-making process used in the Stakeholder meetings is represented by **Figure 8-2**. Each Stakeholder meeting incorporated information from the prior meeting and new ideas and opportunities for connecting existing infrastructure, and creating a viable regional system to support current and future development. The stakeholder meetings also provided a summary of information from previous transit/transportation plans and studies to further support the strategies to utilize existing infrastructure to create a regional system within available and projected resources.

Sign-in sheets and presentation materials from each stakeholder meeting are available in Appendix A.

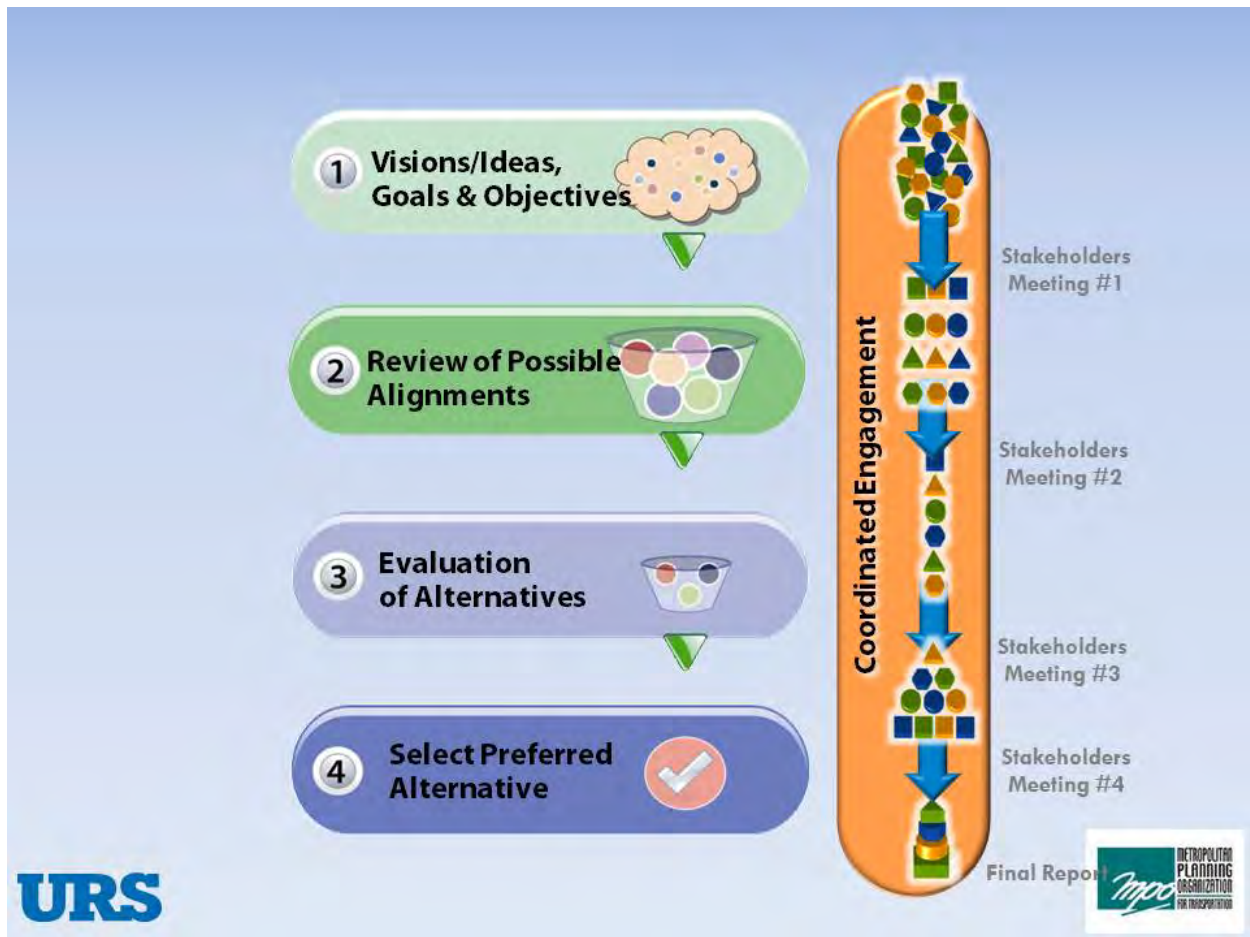
8.3.2 Stakeholder Meeting #1

The first stakeholder meeting was held on December 9, 2013 at the Florida Aquarium from 4 p.m. to 6 p.m. Thirty-two (32) persons attended representing agencies, local community groups, and private citizens.

Stakeholder Meeting #1 included a discussion of the purpose of the study and Goals and Objectives for general approval by the attendees. The meeting included an open discussion on the vision for transit and specific dialogue on the topics to solicit new ideas on the use of transit, as well as a hands-on mapping exercise.

Appendix A includes a copy of the sign-in sheet and the presentation material. A summary of the comments made by the attendees are provided by discussion topic.

**FIGURE 8-2
TAOS DEVELOPMENT OF RECOMMENDED ACTION**



What Did We Hear from Stakeholders?

Discussion Topics

- What is the best use of current assets?
- How does transit best serve development?

Stakeholder Responses

- Transit moves more people.
- It is a low-cost transportation option.
- It provides service to uses beyond home and work.
- Serving near-term development that will come in 0 to 3 years is the best use of current assets.
- Near-term development in Downtown will be in the areas of North Downtown/Westside of Ashley/Tyler/Cass/ and the Straz Center.
- Rubber-wheel options need to connect events at the Tampa Bay Times Forum with dining throughout Downtown.

Discussion Topics

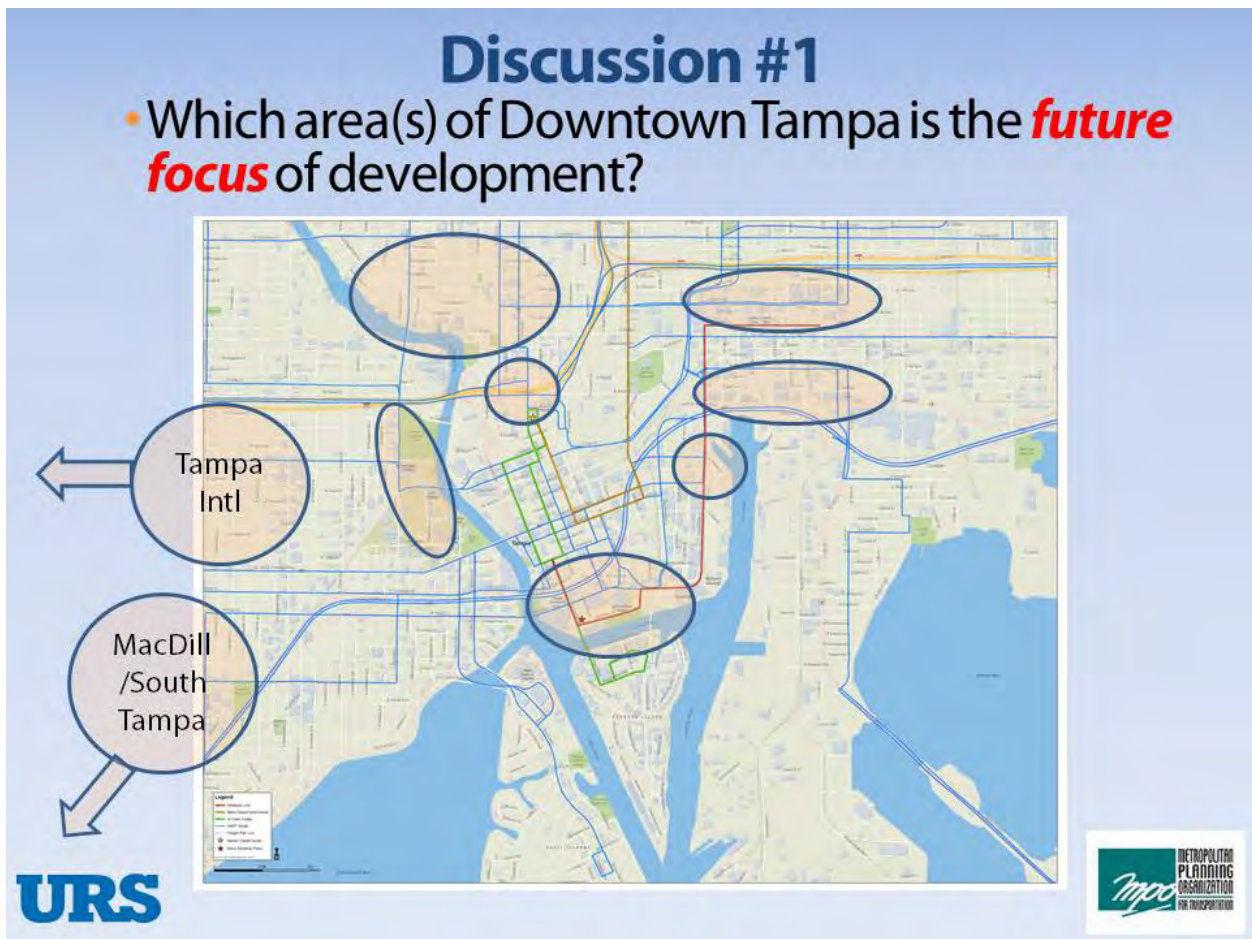
- What is most important in planning for 5-15 years?
- Which area (s) of Downtown Tampa is the future focus of development?

Stakeholder Responses

- The transit system needs to be connected to the Tampa International Airport and coordinated with ramps for the FDOT’s Managed Lanes Master Plan.
- The system should include connections to Encore Development, development along the East Side of Ybor 21st Street/22nd Avenue, and the West Side of the River next to University of Tampa.
- If high-speed rail comes to this area, the local transit system should include a connection to possible high-speed station locations.

Figure 8-3 provides the general areas that the attendees targeted as future development locations around Downtown Tampa using the hands-on mapping exercise conducted during the meeting.

**FIGURE 8-3
DISCUSSION SUMMARY FROM STAKEHOLDER MEETING #1**



Discussion Topics

- What are we lacking in our current transit system?

Stakeholder Responses

- Limited mobility internally and externally within Downtown Tampa.
- Speed of service, frequencies, hours of operation.
- Difficult transfers.
- Lacking connections to destinations.
- The blocks of times the In-Town Trolley runs are too short to be dependable throughout the day and the service is too infrequent.
- Work, shopping and leisure trips need to be coordinated for the TECO Line Streetcar and In-Town Trolley as changes occur with businesses in Downtown.
- Need more strategically-located transit centers; now only one.
- The first mile and the last mile within Downtown are the most critical and system needs to be complete for walking and biking the last mile.
- In-Town trolley needs to go to University of Tampa and help students find jobs in downtown and at Straz Center.
- System needs to provide better connectivity between the Straz Center and central locations for shopping and dining.

Discussion Topics

- What are two quick fixes for transit?

Stakeholder Responses

- Consumer-oriented service with times and routes.
- More shelters to account for Florida weather.
- Inconsistencies in cost of passes.
- Market as a “mobility” option for all trips/destinations.
- Operational times need to be increased and timed for work and after-hour events.
- Need pedestrian-friendly and bike-friendly connections in Downtown.
- Discussion as to why a consumer will use transit; to reach entertainment venues at night from parking or even from home; connection to Airport (although might be afraid at night because of security); use transit to avoid problems with parking at Straz Center; use it for work; and to avoid using a car whenever possible.
- Need to use transit to create a village.

The results of Meeting #1 and the mapping exercise were summarized for common themes and used to identify “new” concepts for routes and desired areas for connecting and/or extending the existing systems. The exercise was also used to compare the results from prior outreach meetings held at the Downtown Partnership and Hyde Park to determine if a new idea or concept was offered that had not been considered before.

8.3.3 Stakeholder Meeting #2

The Stakeholder Meeting #2 was held on January 22, 2014 at the Straz Center for the Performing Arts in Downtown Tampa. Forty-two (42) persons attended representing many of the same organization as with the first Stakeholders Meeting, but many also brought additional staff to hear the discussions and provide input.

Appendix A includes a copy of the sign-in sheet and the presentation material. A brief overview of meeting is provided.

What Did We Hear from Stakeholders?

Discussion Topics Based on Presentation Material

- A discussion on regional opportunities based on previous studies and plans,
- A discussion on developing a Needs Assessment based on previous studies and current land development database information,
- A discussion on current technology and the feasibility of using that technology on the existing Downtown infrastructure, and
- Possible alignments to be considered.

Previous Studies and Plans

Stakeholder Meeting #2 summarized relevant major transit/transportation studies that were conducted in Hillsborough County over the last 15 years, and focused on what common alignments were recommended and how the previous recommendations tied into Downtown. At the meeting, it was emphasized that this TAOS exercise did not include developing new ridership projections or detailed operational analysis. The purpose was to use previous work and use previous data to support how best to connect the existing systems for inclusion in the 2040 LRTP. Once the 2040 LRTP process is complete and an updated travel demand model has been approved, the MPO will move forward with conducting a more detailed analysis of transit options.

Stakeholder Responses

The group was very interactive in discussing what recommendations from these studies were still considered current, and how best to use the information for developing a regional transit recommendation for the 2040 LRTP. Many of the attendees had participated in conducting the prior projects and were very familiar with the opportunities and challenges included with each project. The comment was made that Hillsborough County is a very large area to cover, and it is not possible for one type of transit system to respond to all of the travel needs of a diverse community. As the MPO moves forward after the adoption of the 2040 LRTP, the MPO will need to define what types of technology best serve a local transit need, and what types of technology best serve a regional transit need, as they are often in conflict with each other. As the MPO refines these general recommendations, the technology chosen will depend on many factors.

The group openly discussed what the end result of this project should be general recommendations on where the major nodes of opportunity exist “today”, not 5 to 10 years ago, and a general assessment if our current systems are connecting to these areas, and where we are lacking in connectivity.

Discussion Topic: Needs Assessment Based on Current Data

The Needs Assessment was discussed by showing a series of maps that illustrated existing population and activity centers and intensity of location and land uses based on the most current data available. URS applied Hillsborough County Property Appraiser data and Department of Revenue Code information at the parcel level to identify the square footage of commercial use and number of units of residential present. This exercise was conducted to show the group concentrations of land uses for housing, office, industrial, retail, recreational and tourism.

In addition, an analysis of transit travel time to and from MTC and an analysis of accessibility was conducted as part of the study and presented at the meeting. The accessibility analysis modeled HART's existing transit system to identify the distance a traveler could cover using a combination of both transit and walking in a given period of time from the MTC back to the office. **Figures 8-4 and 8-5** show a concentration of office space by square foot and then the area accessible to a transit user that departs the MTC during lunch (12:00 p.m.) in relation to a concentration of office space.

Stakeholder Responses

The attendees were excited to see this type of analysis as it matched current day land use development with the current local and express bus system and the TECO Line Streetcar system. This project focuses on approved development that may present opportunities for connectivity and the group openly discussed the areas shown for each land use and possible new developments on the horizon. The attendees emphasized that the MPO should continue using type of analysis with new projects that may be commissioned by the MPO.

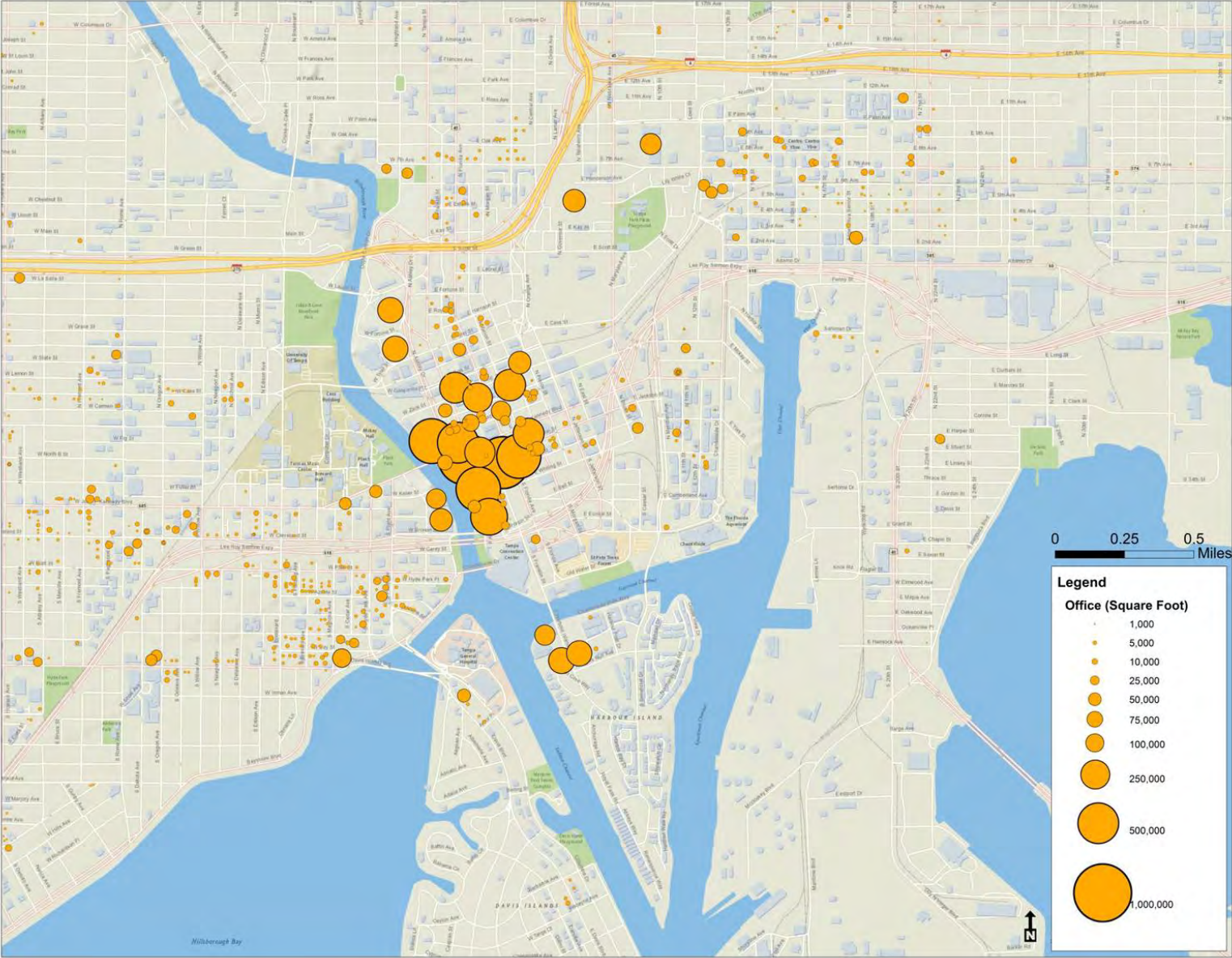
Discussion Topic: Current Technologies

The Stakeholders Meeting #2 included a summary of current transit technologies and how they could be utilized on the existing TECO Line Streetcar with the intent of building a regional system. The meeting included a discussion of where potential connections could be made to the other systems in Downtown and what function each technology served in moving people.

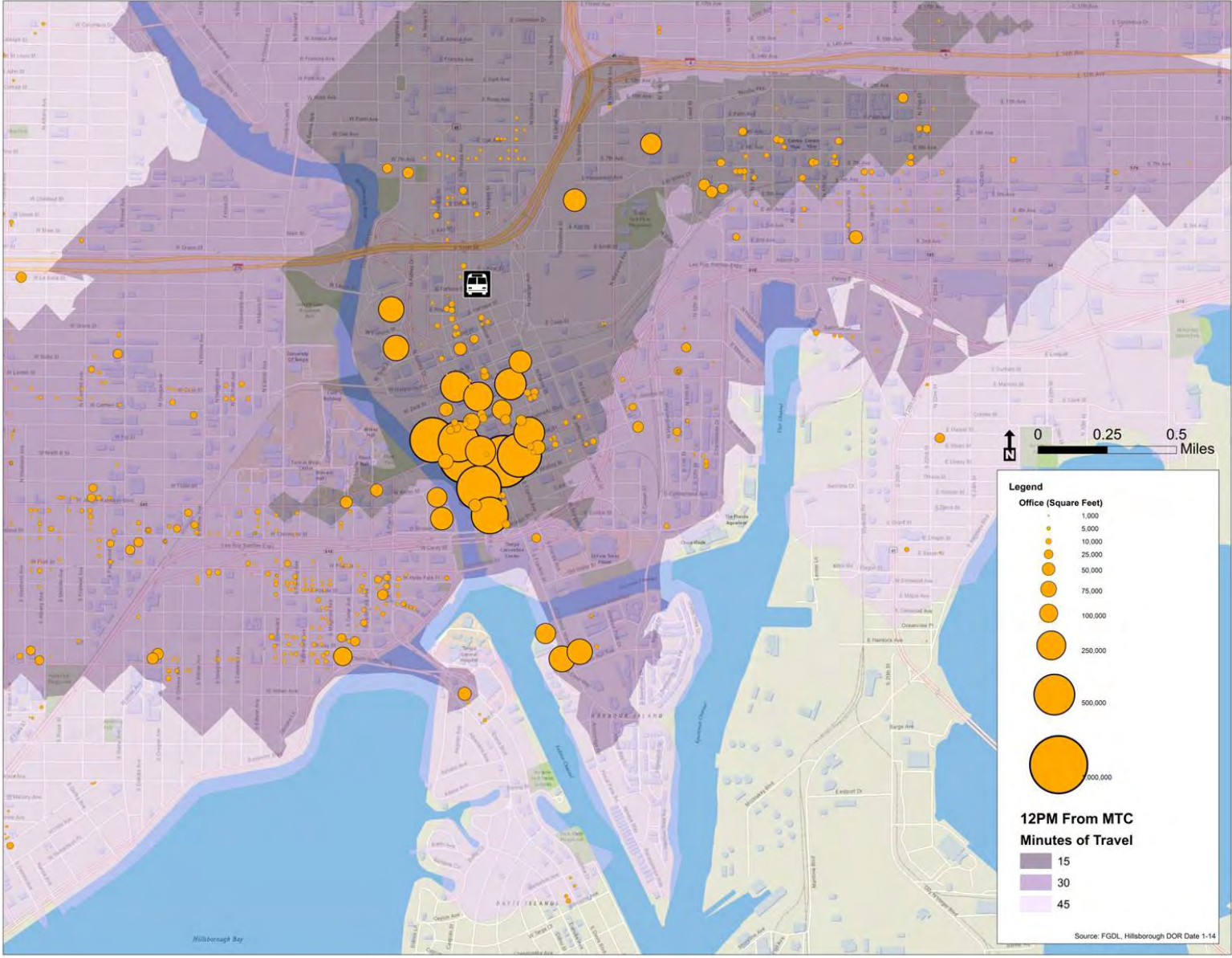
Stakeholder Responses

As mentioned before, several of the attendees had participated in the conduct of previous transit studies. The group discussed each technology and made comments on their own preferences for the downtown area. Connectivity to the technology proposed by the Pinellas Suncoast Transit Authority (PSTA) Greenlight Plan was emphasized. PSTA is proposing Light-Rail across the Howard Frankland Bridge. The discussion also included the point made previously, the technology chosen may not address all of the transportation needs of the community, with local needs often at odds with regional transit needs. As the MPO refines these general recommendations, the technology chosen will depend on many factors. The group understood this was a general discussion of what transit technology is currently on the market.




















FIGURE 8-4
CONCENTRATIONS OF OFFICE SPACE BY SQUARE FOOT



**FIGURE 8-5
TRAVEL TIME FROM MTC AT NOON WITH OFFICE DENSITY**



High-Capacity Transit Modes

WHAT ARE OUR HIGH-CAPACITY OPTIONS FOR TRANSIT?	WHAT IS IT, WHERE DOES IT GO, AND WHEN DO I USE IT?	HOW MANY PEOPLE CAN IT CARRY PER HOUR DURING RUSH HOUR?*	HOW FAST DOES IT GO ON AVERAGE?	HOW OFTEN DOES IT STOP?	WHEN CAN I GET ON?
 <p>Commuter Rail</p>	<p>Commuter Rail trains operate on railroad tracks that carry riders to and from work in a region.</p> <ul style="list-style-type: none"> Typically used to travel from suburbs to central cities. 	 <p>400 - 1,400 passengers</p>	 <p>30-50mph</p>	 <p>1 to 5 miles apart</p>	<p>RUSH HOUR</p>  <p>Every 30 min during rush hour and every hour all other times</p>
 <p>Light Rail</p>	<p>Light Rail is an electrified service that uses a steel-tracked fixed guideway and operates primarily along an exclusive right of way.</p> <ul style="list-style-type: none"> Typically used to travel in urban locations 	 <p>700 - 2,000 passengers</p>	 <p>10-30mph</p>	 <p>2 to 4 blocks up to 1/2 mile apart</p>	<p>RUSH HOUR</p>  <p>Every 10 min during rush hour and every 15 min all other times</p>
 <p>Bus Rapid Transit</p>	<p>Bus Rapid Transit (BRT) operates in mixed traffic or its own lane. It usually consists of longer buses with more technology in them to speed up your trip. For example, many BRT buses communicate with traffic lights to keep lights green longer.</p> <ul style="list-style-type: none"> Typically used to travel within a city and between close-in suburbs and the city. 	 <p>700 - 1,300 passengers</p>	 <p>15-30mph</p>	 <p>1/2 to 1 mile apart</p>	<p>RUSH HOUR</p>  <p>Every 10 min during rush hour and every 15 min all other times</p>
 <p>Express Bus</p>	<p>Express buses carry riders to and from work in a region. They make fewer intermediate stops and operate in mixed traffic on highways and sometimes in HOV/managed lanes.</p> <ul style="list-style-type: none"> Typically used to travel within a city and between close-in suburbs and the city. 	 <p>400 - 900 passengers</p>	<p>Varies depending on traffic</p>	 <p>Multiple stops within close proximity near termini with 5-25 miles of non-stop service in between</p>	<p>RUSH HOUR</p>  <p>Every 10 min during rush hour and every 30 min all other times</p>



Discussion Topic: Proposed Alignments

Stakeholders Meeting #2 concluded with a discussion on proposed alignments. The alignments were suggested based on the common themes suggested from the mapping exercise and based on feasibility of connecting systems, using available ROW, and using the CSX corridor.

North Corridor

CR: 11 miles

- 3 Park-and-Rides
- 2 Walk-Up stations
- CR in CSX ROW sharing track
- Serves: Downtown, Ybor, Hillsborough, Bush Gardens, USF
- Travel time USF from Downtown: 35 min

LRT: 11 miles

- 9 Park-and-Rides
- 1 Walk-Up
- LRT in-street (Florida)
- Serves: Downtown, Tampa Heights, Busch Gardens, Tampa Industrial Park, USF
- Travel time USF from Downtown: 36 min



West Corridor

- CR: 5 miles
 - 1 Park-and-Rides
 - 1 Walk-Up
 - 1 Aerial
- In I-275 ROW
- Serves: Downtown, WMC, Armenia, TIA
- Travel time WMC from Downtown: 14 min

- LRT: 5 miles
 - 4 Park-and-Rides
 - 4 Walk-Up
- LRT in-street (Cypress)
- Serves: Downtown, UT, Armenia, Dale Mabry, WMC, TIA
- Travel time WMC from Downtown: 18 min



Stakeholder Responses

The group openly discussed the general alignments identified during the presentations. The MPO emphasized the need to capitalize on existing infrastructure, and that FDOT was in discussions with CSX as to options for using their rail lines. No definitive answer was available from CSX, but the MPO requested that the corridor be a part of this project analysis, and the technologies available to run on CSX lines be considered. The group generally agreed that these alignments served a definite regional need.

8.3.4 Stakeholder Meeting #3

Stakeholder Meeting #3 was held on March 27, 2014 at Hillsborough County Center, 26th Floor, Tampa, FL. Twenty-two (22) persons attended, in addition to staff and representatives from the MPO and Partnership.



What Did We Hear from Stakeholders?

The next step in the study process included an evaluation of possible alternatives. The meeting included a summary of the alternatives and proposed capital and operation and maintenance costs, as listed in the Evaluation of Alternatives Slide.

Evaluation of Alternatives Results

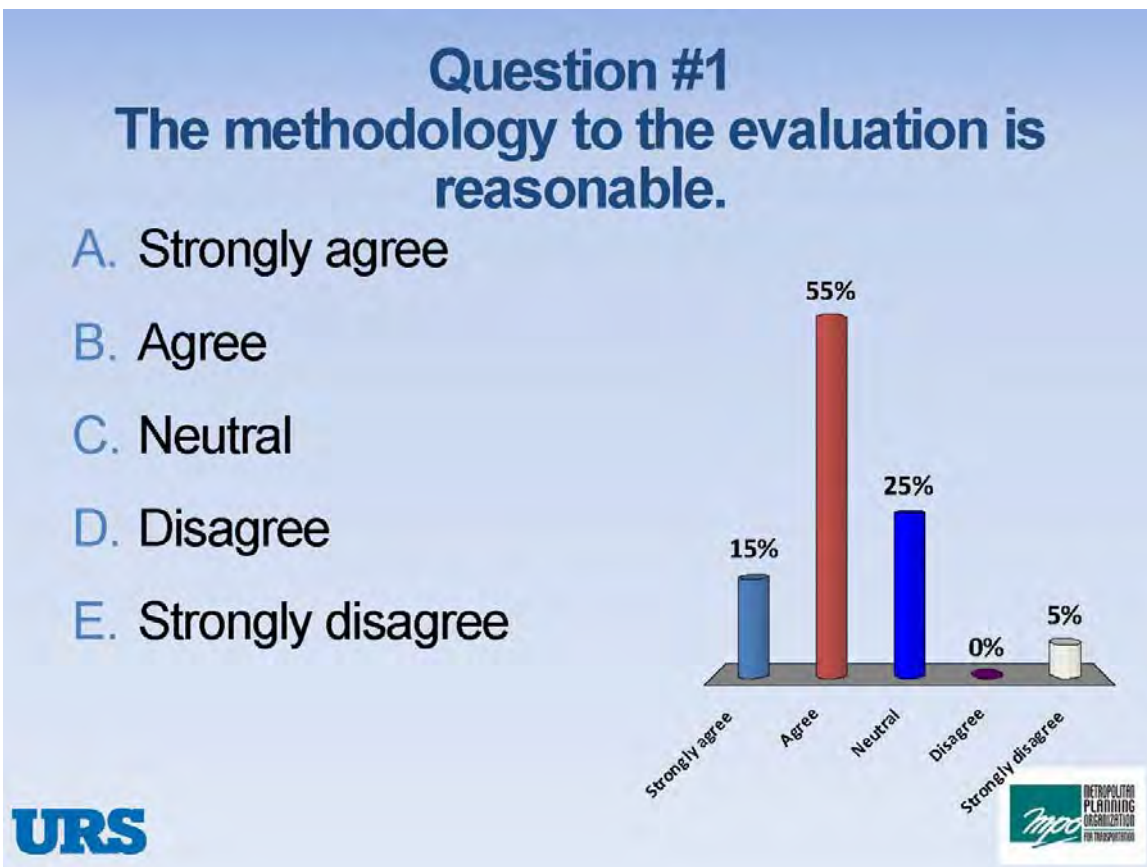
Alt	Technical Ranking	Systems Cost		
		Total Score	Capital Costs	O&M Costs
1	33	Red	\$1.5 - \$2.0 B	\$28.6 - \$34.4 M
2	33	Red	\$1.0 - \$1.3 B	\$25.6 - \$30.7 M
3	40	Yellow	\$1.5 - \$2.0 B	\$31.7 - \$38.0 M
4	38	Yellow	\$1.5 - \$2.0 B	\$31.7 - \$38.0 M
5	42	Yellow	\$800 M - \$1.0 B	\$16.1 - \$19.3 M
6	47	Green	\$1.0 - \$1.3 B	\$14.1 - \$16.9 M
7	43	Yellow	\$1.0 - \$1.3 B	\$14.1 - \$16.9 M
8	44	Green	\$1.6 - \$2.0 B	\$34.7 - \$41.7 M




The format for this presentation included a survey using real-time voting to narrow down the range of alternatives under consideration. The real time voting process permitted each participant to vote anonymously. The stakeholder meeting included a voting exercise on the overall parameters of the study, as well as voting on the various alternatives presented.

Stakeholder Responses

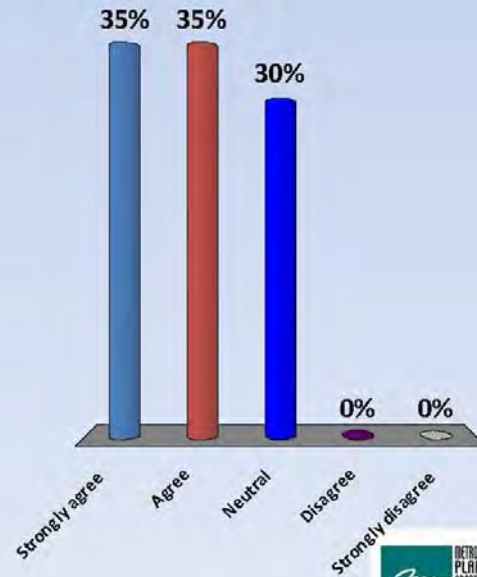
The results of the voting process are shown here with each presentation slide. The full presentation is included in Appendix A, which includes a description of each alternative studied.



Question #2

The segments considered are reasonable for further study.

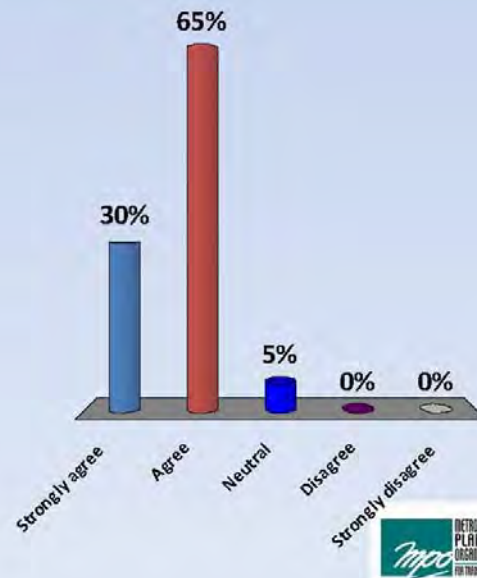
- A. Strongly agree
- B. Agree
- C. Neutral
- D. Disagree
- E. Strongly disagree



Question 3

The modes considered are reasonable for further study.

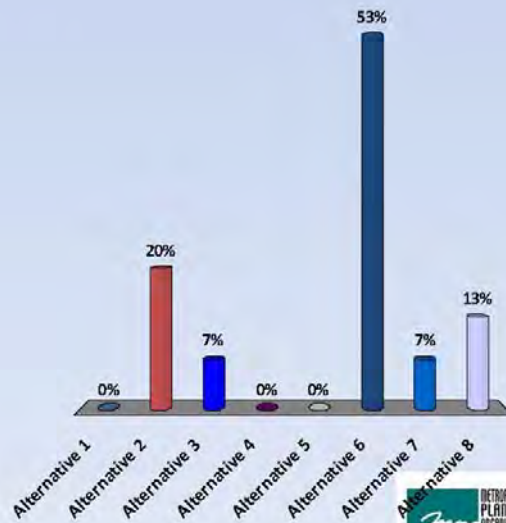
- A. Strongly agree
- B. Agree
- C. Neutral
- D. Disagree
- E. Strongly disagree



Question #4

Which alternative should be moved forward?

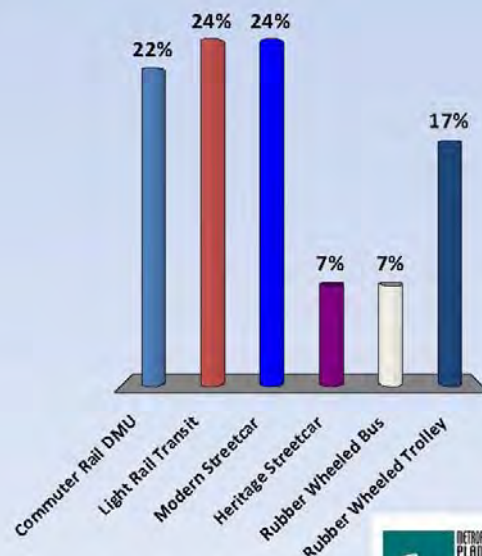
- A. Alternative 1
- B. Alternative 2
- C. Alternative 3
- D. Alternative 4
- E. Alternative 5
- F. Alternative 6
- G. Alternative 7
- H. Alternative 8



Question #5

Pick 3 modes that should be moved forward for further study.

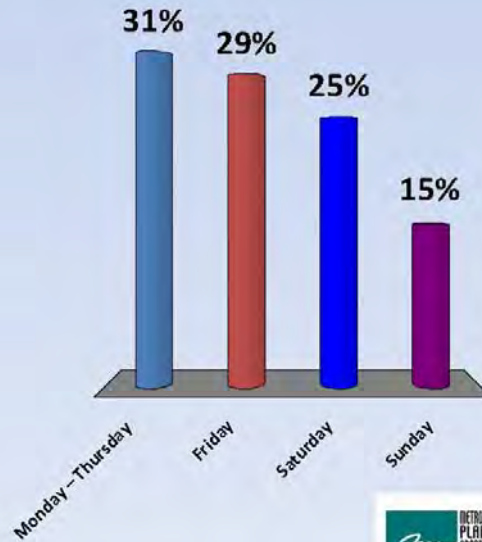
- A. Commuter Rail DMU
- B. Light Rail Transit
- C. Modern Streetcar
- D. Heritage Streetcar
- E. Rubber Wheeled Bus
- F. Rubber Wheeled Trolley



Question #6

Rank the days of the week you would use the system.

- A. Monday – Thursday
- B. Friday
- C. Saturday
- D. Sunday



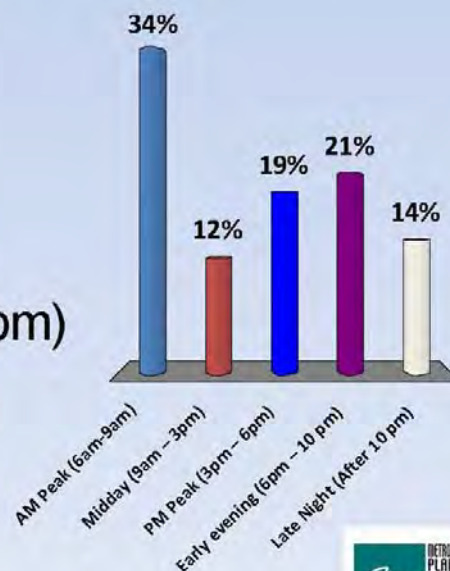
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Question 7

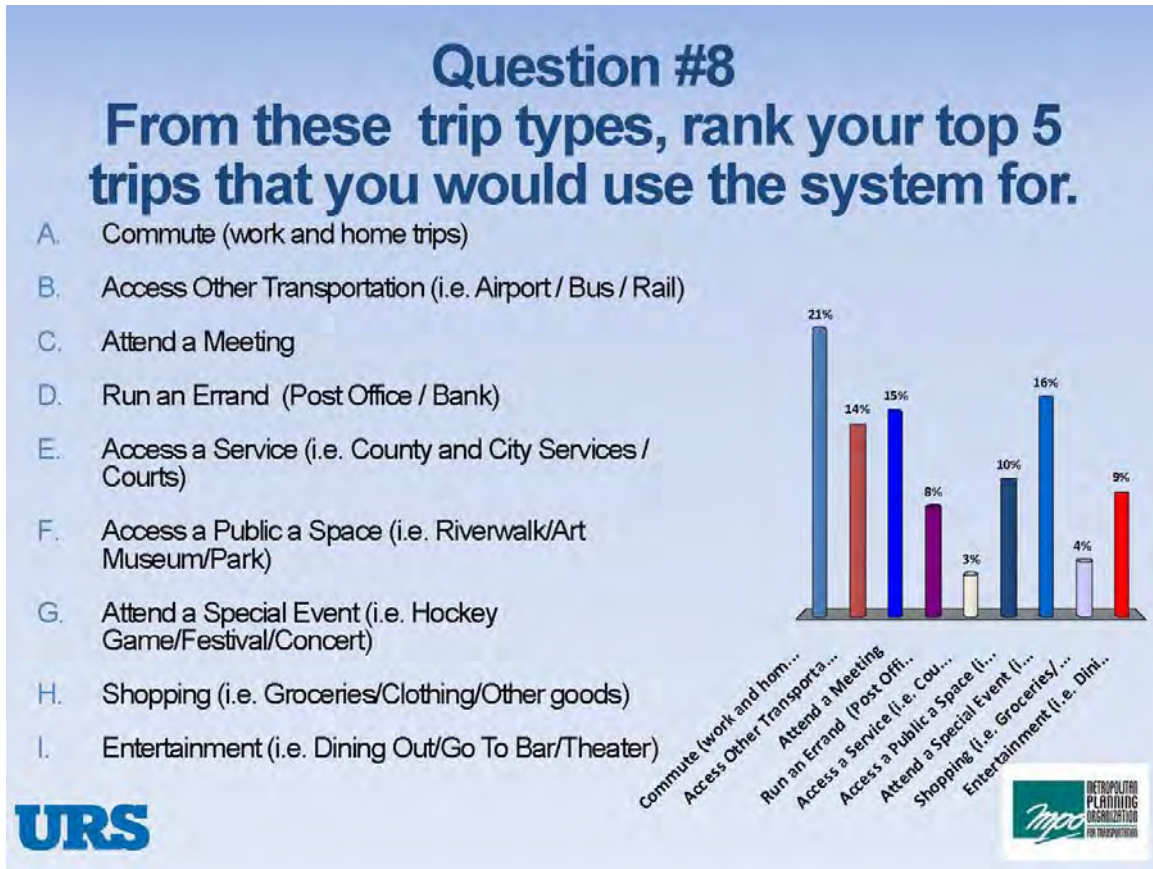
Rank the times of day you would use the system.

- A. AM Peak (6am-9am)
- B. Midday (9am – 3pm)
- C. PM Peak (3pm – 6pm)
- D. Early evening (6pm – 10 pm)
- E. Late Night (After 10 pm)



URS





8.3.5 Stakeholder Meeting #4

Stakeholder Meeting #4 was held on June 23, 2014 at the Tampa Bay History Center. Thirty (30) persons attended.

What Did We Hear from Stakeholders?

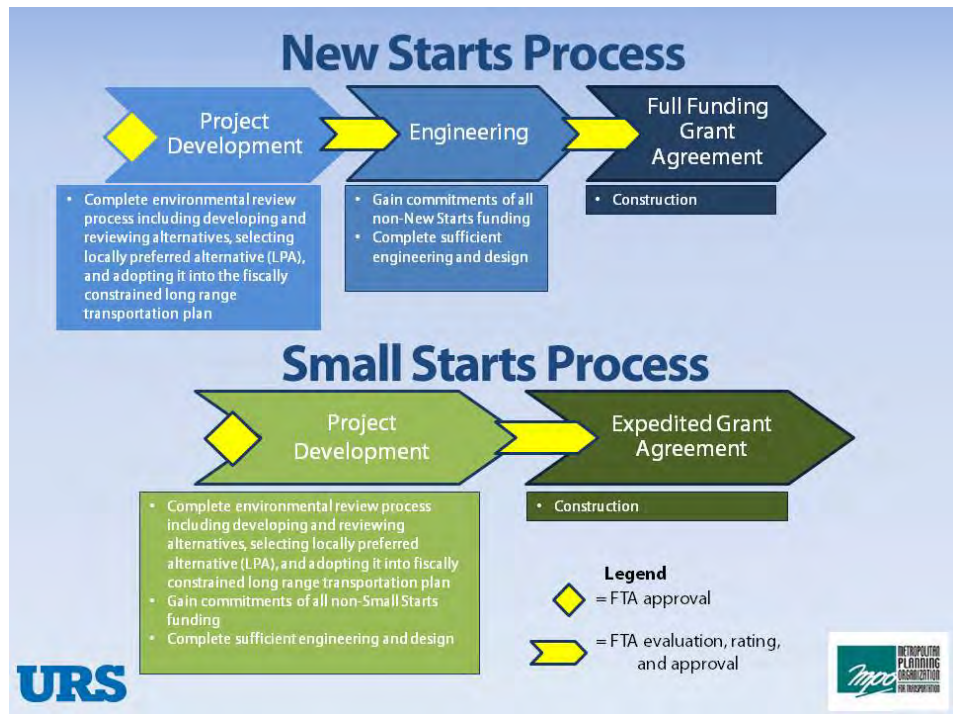
The presentation included a review of previously presented information such as:

- Purpose of study,
- Goals and Objectives,
- Previous Plans,
- Existing and Emerging Development,
- The study Process,
- Alternatives Evaluated,
- Modes Considered,
- Evaluation Process, and
- Recommended Alternatives.



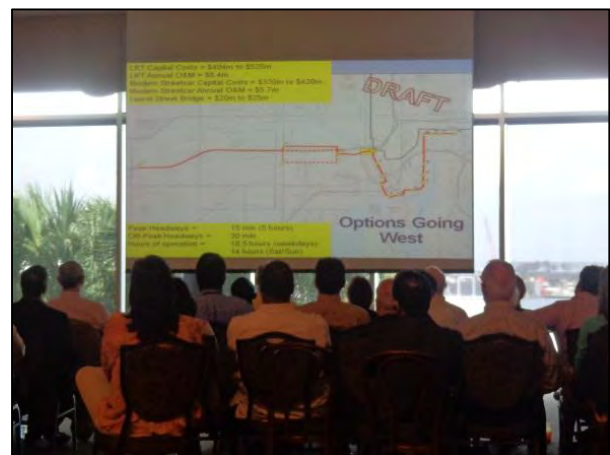
The 2040 LRTP activities were discussed and Next Steps to developing a system in Hillsborough County were discussed. Federal Funding opportunities and MAP-21 Eligible projects including New Starts and Small Starts processes and timelines associated with these opportunities were presented.

Next, a Strengths, Opportunities, Weakness and Threat (SWOT) analysis was conducted through open discussion. Some issues that were identified are listed below.



Stakeholder Responses

- 1) The systems depicted have no connection to the “Cultural District” (NW Downtown), and run several blocks west of the river.
- 2) Why no stop/station at Dale Mabry between Howard Ave and the Westshore Intermodal Center?
 - a. Future BRT on Dale Mabry would connect area north-south of interstate to rail. Also major opportunity for shopping at the interchange.
- 3) Currently no on-off ramps at MacDill Avenue. Consider stop at this location. May be easier to access rail station.
- 4) Seems a decision has been made to prioritize travel time over other benefits.
- 5) It’s a “bad idea” to have transit stations in I-275 ROW. From experience gained in Pinellas station development that location can be difficult / expensive to accommodate.
- 6) West Alternative as depicted misses out on opportunity for redevelopment if rail passes exclusively within interstate. Doesn’t increase mobility for community.
- 7) People need to consider that a background circulator system would be developed to support access in areas along corridor.



- 8) Can smaller pieces of the system be implemented, or is the “Corridor” the smallest scale for viable development?
- 9) The planned managed lanes on I-275 with BRT will support a direct connection between downtown and airport. Rail in the I-275 median will then do the same thing. Potentially redundant service.
- 10) In describing rail costs, need to provide a point of comparison. Don’t present the transit costs alone. They seem large when not put in the context of roadway costs. \$1.5 billion for a new interchange. \$500 million for a 3-mile lane extension. \$500 million for a 5-mile rail system.
- 11) Need to better demonstrate regional importance of CSX connection.
- 12) Continue to depict 2 viable options for the north corridor. This is necessary to have a more balanced negotiation with CSX. If they think they are the only option, they will charge more.
- 13) Need to move forward multiple options for each corridor to the LRTP that will be examined in the AA process. One line suggests the decision on routes has been made.
- 14) Need to present the rail component of the transportation system from a regional standpoint. How will it serve people from outside the city limits? Need to sell the project to the people in the county. The city residents already want the improvement. They don’t carry the majority of the votes. Specifically north county, east county, and west county. Make sure supporting bus network serves county as a whole and show benefit to all moving forward.
- 15) Consider discussing the amount of money spent on roadways in the county in the last 10 years then compare the amount spent on transit. Powerful comparison used in Pinellas by identifying more than \$2 billion spent on US 19.
- 16) Add the proposed ferry service to the regional connections map. Potentially a way to sell investment to south county residents.
- 17) Be careful on nomenclature used for transit vehicles. “Modern Tram” may mean different things to members of the public. Need to educate on mode. Be very clear with definitions when presenting this information to the public. Don’t assume the public understands terms, etc.
- 18) Do we have to complete an alternatives analysis? Response: No, but we need a process to identify a LPA.
- 19) Is it better to move forward (into FTA process) with larger or smaller systems elements. What is the smallest viable segment?
- 20) Consider Express trains at peak hours.



9.0 RECOMMENDATIONS

For purposes of this study, recommendations were developed in two categories, short-term and long-term.

- Short-term recommendations are defined as those that are:
 - Low to minimal cost;
 - Easily or immediately implementable;
 - Require minimal additional planning, design, permitting, and/or construction; and/or
 - Can be accomplished in less than 5 to 7 years.

- Long-term recommendations are defined as those that are:
 - Capital intensive;
 - Longer implementation schedule;
 - Require potentially extensive additional planning, design, permitting, and/or construction; and/or
 - Require more than 7 years to implement.

9.1 SHORT-TERM RECOMMENDATIONS

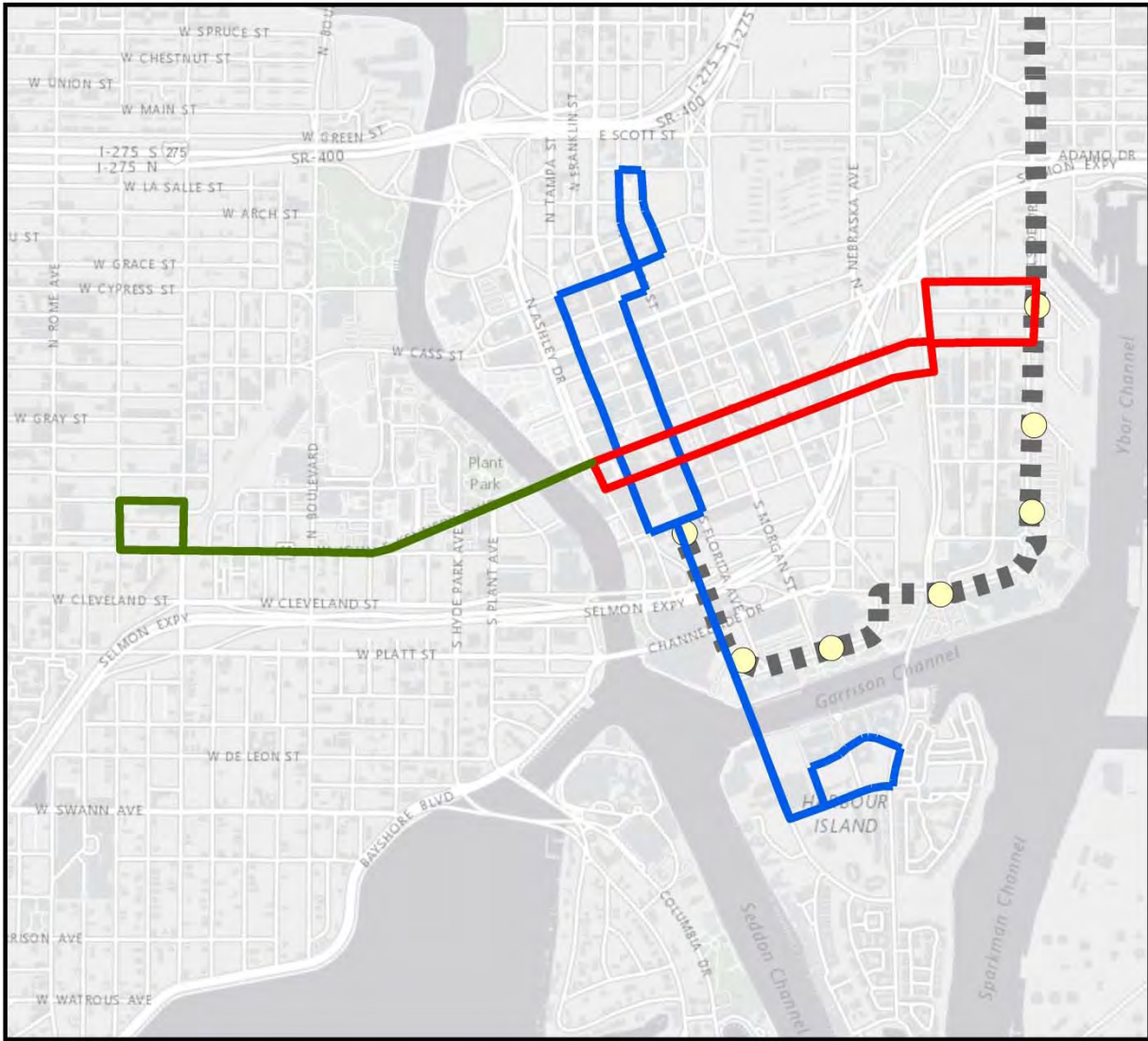
Phase I: Expansion and enhancement of the In-Town Trolley service hours

The existing In-Trolley shown in **Figure 9-1**, currently runs Monday through Friday during the AM peak (6:00 – 8:30 a.m.) and the PM peak (3:30 – 6:00 p.m.) with 15 minute headways, a total of 5 hours of operation per day. This service has been successful, with approximately 210 riders per day, but input from Stakeholders and users of the service indicates that expanded and enhanced service hours would increase ridership and provide for travel options outside of the AM and PM commuter peaks.

It is recommended that the In-Town Trolley expand and enhance its operational schedule as follows:

- Increase service to operate from to 6:00 a.m. to 9:00 p.m. Monday through Saturday and 9:00 a.m. to 8:00 p.m. on Sunday.
- Decrease headways to 10 minutes.
- Maintain the current route and stop structure.
- Explore the expansion of the In-Town Trolley through a private contractor.
- Estimated Costs
 - Capital Costs: \$1,600,000 – cost of additional vehicles (four trolleys)
 - Annual Operational Costs: \$1,250,000 (based on 2013 HART NTS costs plus administration)

**FIGURE 9-1
IN-TOWN TROLLEY**



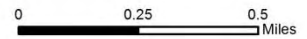
Legend

Circulators

- IN-TOWN TROLLEY (PHASE I)
- EAST-WEST OPTION (PHASE II)
- UT WEST OPTION (PHASE III)

Existing Streetcar

- TECO STREETCAR LINE
- EXISTING STREETCAR STOP



Source: Hillsborough Prop Appraiser, DOR Codes
FDOT Interstates

Phase II: Development of an East-West Circulator

To complement the existing In-Town Trolley and provide options for the rapidly growing Channelside residential district, it is recommended that an East-West Circulator be developed.

- The East-West Circulator would utilize rubber-wheeled technologies similar to the In-Town Trolley serve the routes as shown in **Figure 9-2**.
- This route would serve the highest concentration of office space in downtown, including City Hall, the County Building, County Courthouse, County School Board, the northern end of the Channelside District and a proposed Publix store near Meridian Avenue and Twiggs Street.
- Hours of Operation of the East-West Circulator would be the same as the expanded In-Town Trolley hours of operation:
 - Monday - Saturday operations
 - 6:00 a.m. – 9:00 p.m.
 - Headways – 10 minutes
 - Sunday operations
 - 9:00 a.m. – 8:00 p.m.
 - Headways – 10 minutes
- Development of the East-West Circulator may be through a private operator.
- Estimated Costs
 - Capital Costs: \$1,200,000 – cost of additional vehicles (three trolleys)
 - Annual Operational Costs: \$800,000 (based on 2013 HART NTD costs plus administration)

Phase III: Development of a West UT Circulator

To further develop east-west connections within Tampa’s urban core and provide a multi-modal link between the activity centers that exist west of the Hillsborough River and the CBD, it is recommended that a West UT Circulator be developed.

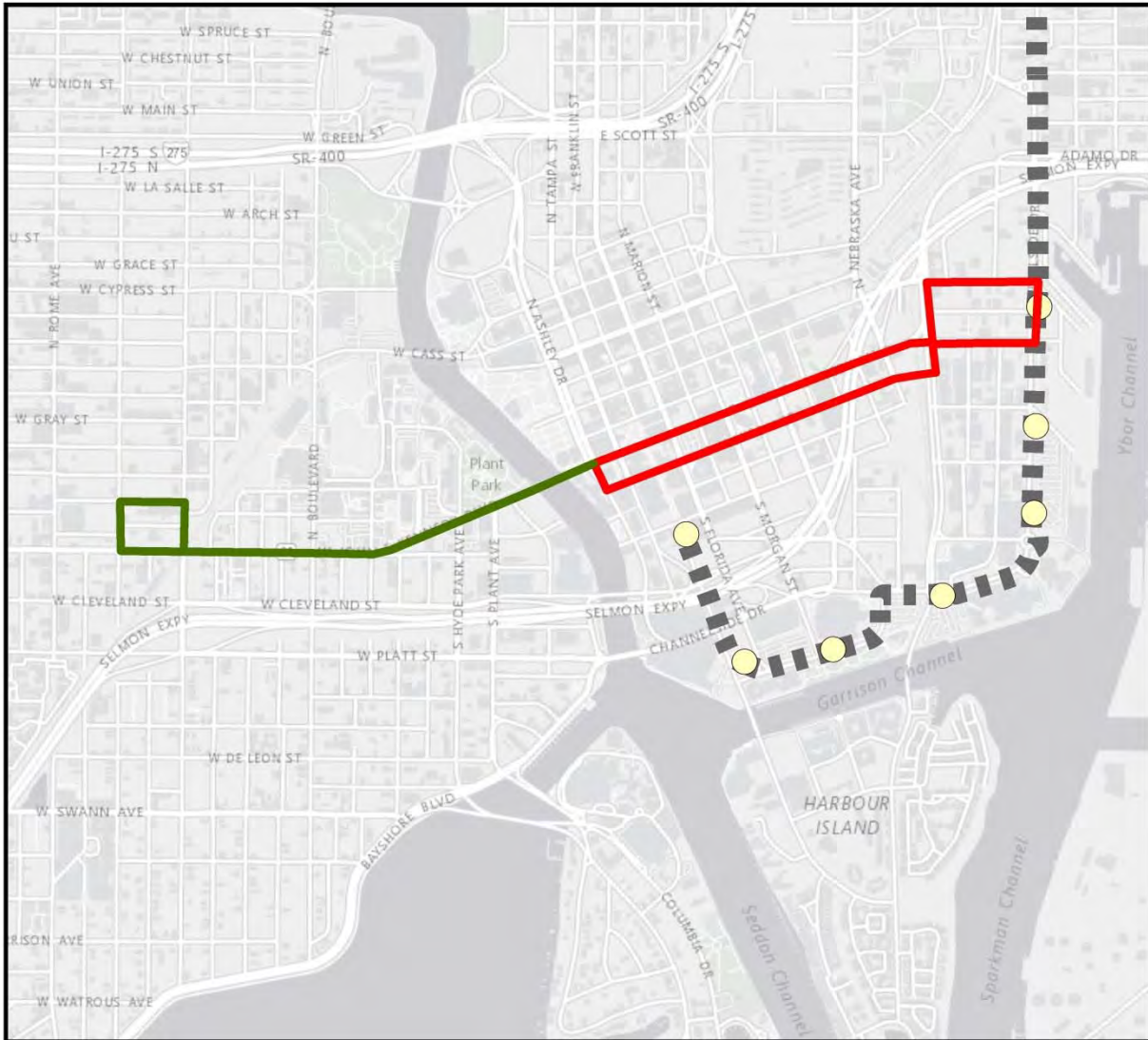
- The West UT Circulator would utilize rubber-wheeled technologies similar to the In-Town Trolley serve the routes as shown in **Figure 9-2**.
- This route would serve to extend frequent transit service west of the Hillsborough River connecting the CBD with University of Tampa, commercial use along Kennedy Blvd, Wal Mart Neighborhood Market, and proposed Tampa General Rehabilitation Hospital.
- Hours of Operation of the West UT Circulator would be the same as the expanded In-Town Trolley hours of operation:
 - Monday - Saturday operations
 - 6:00 a.m. – 9:00 p.m.
 - Headways – 10 minutes
 - Sunday operations
 - 9:00 a.m. – 8:00 p.m.
 - Headways – 10 minutes
- Development of the West UT Circulator may be through a private operator.
- Estimated Costs
 - Capital Costs: \$1,200,000 – cost of additional vehicles (three trolleys)
 - Annual Operational Costs: \$800,000 (based on 2013 HART NTD costs plus administration)

Improve integration between In-Town Trolley, East-West Circulator, and TECO Line Streetcar

In conjunction with the expansion of service hours for the In-Trolley and development of an East-West Circulator, the integration of these systems and the TECO Line Streetcar needs to be improved. Improved integration between and across these existing systems will allow users greater flexibility for downtown mobility and potentially increase ridership. The In-Trolley and TECO Line Streetcar routes are collocated along Franklin Street between Whiting Street and Old Water Street. The current route map for the In-Town Trolley (Route 96) identifies the TECO Line Streetcar as a “Point of Interest” and not as a “Connecting Route.” Recommendations include:

- Relocate stop 7719 along Whiting Street, just east of Franklin Street:
 - Southbound In-Town Trolley – to the southwest corner of Whiting Street and Franklin Street
 - Northbound In-Town Trolley – collocate with the existing Whiting Station stop for the TECO Line Streetcar
- Relocate stops 5798 and 5872 slightly north to be more proximate to the East-West Circulator along Kennedy Boulevard and Jackson Street.
- Enhance signage/wayfinding from stop 5799 directing patrons to the East-West Circulator just north and south along Kennedy Boulevard and Jackson Street.
- Identify the TECO Line Streetcar as a “Connecting Route” on the Route 96 map.
- Identify the In-Town Trolley and East-West Circulator as “Connecting Routes” on the TECO Line Streetcar map.
- Enhance signage at these two locations to inform passengers of the connecting routes (In-Town Trolley and TECO Line Streetcar).

**FIGURE 9-2
EAST-WEST CIRCULATOR**



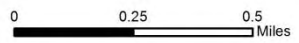
Legend

Circulators

- EAST-WEST OPTION (PHASE II)
- UT WEST OPTION (PHASE III)

Existing Streetcar

- TECO STREETCAR LINE
- EXISTING STREETCAR STOP



Source: Hillsborough Prop Appraiser, DOR Codes
FDOT Interstates

Integration between HART and TECO Line Streetcar

Similar to the proposed integration between the In-Trolley, East-West Circulator and the TECO Line Streetcar, improved integration between several HART local routes and the TECO Line Streetcar should be improved:

- Routes 4 and 19 (Westbound): these routes pass the Whiting TECO Line Streetcar Station at the north side of Whiting Street. Signage at this stop should be improved to include information regarding connections to the In-Town Trolley and TECO Line Streetcar stops at this location.
- Route 30 (Eastbound): this route passes the Whiting TECO Line Streetcar Station at the north side of Whiting Street. Signage at this stop should be improved to include information regarding connections to the In-Town Trolley and TECO Line Streetcar stops at this location.
- Route 8 (Eastbound): this route turns north onto Meridian Avenue approximately 300 feet west of the Channelside (Tampa Tribune) TECO Line Streetcar Station. Signage at this stop should be improved to include information regarding connections to the TECO Line Streetcar stop at this location.
- Route 8 (Northbound and Southbound): this route returns to Channelside Drive northbound and southbound north of Kennedy Boulevard. Consideration should be given to collocating the northbound Route 8 stop on Kennedy with the existing Port Authority TECO Line Streetcar Station and improved integration from the southbound Route 8 stop on the west side of Channelside Drive.
- Route 46: this route travels north/south along Channelside Drive and east/west along Twiggs Street. Similar to the stops for Route 8, stops for Route 46 should include improved signage to include information regarding connections to the nearby TECO Line Streetcar stop.
- Route 8 (Eastbound and Westbound): this route travels east/west along 7th Avenue in Ybor City immediately south of the Cadrecha Plaza TECO Line Streetcar Station at 13th Street. Stops for Route 8 should include improved signage to include information regarding connections to the nearby TECO Line Streetcar stop.
- Route 8 (Eastbound and Westbound): this route travels east/west along 7th Avenue in Ybor City immediately south of the Centennial Park TECO Line Streetcar Station just west of 20th Street. Stops for Route 8 should include improved signage to include information regarding connections to the nearby TECO Line Streetcar stop.

Improved pedestrian/bicycle amenities connecting HART and TECO Line Streetcar

For those routes proximate to the In-Trolley, East-West Circulator and TECO Line Streetcar, it is recommended that pedestrian and bicycle amenities connecting the services be improved.

- Enhance signage and/or wayfinding at and between stops/stations.
- Ensure paths between stops/stations are safe and intuitive.
- Improve lighting between and at stops/stations.
- Provide bicycle racks/bicycle lockers.
- Where possible, provide shelter from weather.

Develop integrated rail and bus intermodal hubs at concentrations of stops/stations

As noted in several recommendations above, the existing In-Town Trolley, East-West Circulator, TECO Line Streetcar and HART system provide service into, out of and within the downtown area; however, interconnection between these 3 transit options has not been optimized. It is recommended integrated

stops or stations be studied for implementation at locations where two or more of these systems are proximate to one another. Features of these hubs could include the following:

- Thematic/stylized hardscape/landscape to identify it as a destination or landmark
- Modified/enhanced transit electronic information kiosks with:
 - System(s) information
 - Next vehicle arrival time(s)
 - Walking distance to destinations proximate to hub
 - Current day and upcoming event schedule
 - Weather information
- Collocation of taxi stands

Locations of these hubs are suggested at in the following area (see **Figures 9-3 and 9-4**):

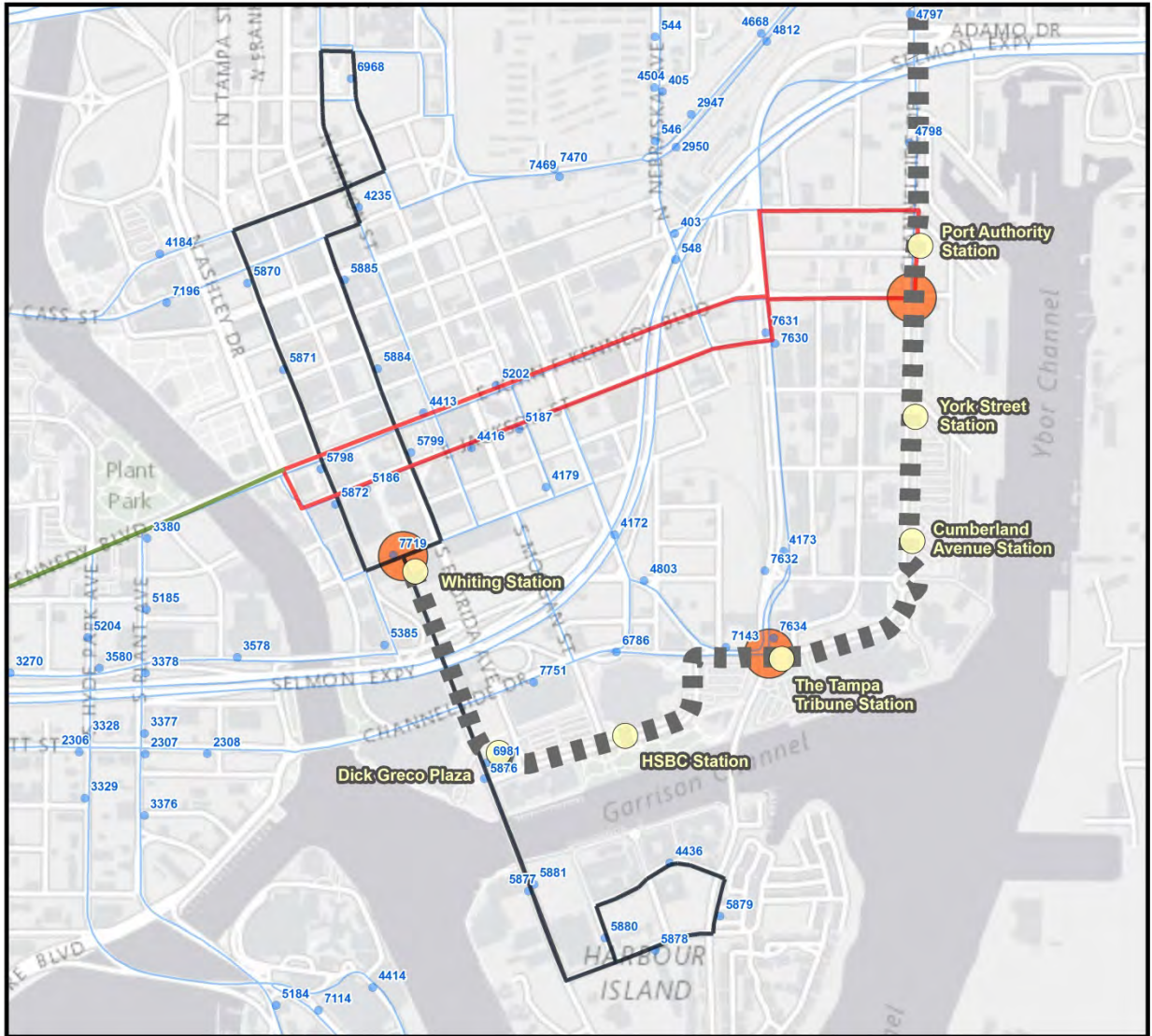
- Franklin Street and Whiting Street
 - TECO Line Streetcar, In-Town Trolley, and HART routes 4, 19 and 30
 - Adjacent to the Fort Brooke Municipal Parking Garage
 - Proximate to office core of downtown, City Hall, Franklin Street Pedestrian Mall and the Riverwalk
- Channelside Drive and Meridian Avenue
 - TECO Line Streetcar and HART route 8
 - Centrally located between Tampa Bay Times Forum, Tampa Bay History Center, Channelside Bay Plaza, Florida Aquarium, Cruise Terminals, the Riverwalk and southern end of Channelside residential district.
- Channelside Drive and Kennedy Boulevard
 - TECO Line Streetcar and HART routes 8 and 46
 - Connection to the East-West Circulator
 - Proximate to Port Authority Headquarters, USF Downtown Centers, central area of Channelside residential district and eastern edge of future east-west downtown circulator (see Long-Term Recommendations)
- 7th Avenue and 13th Street
 - TECO Line Streetcar and HART route 8
 - Proximate to Encore development, Ybor Square, Ybor City 7th Avenue entertainment district and HCC Ybor campus
- 8th Avenue and 20th Street
 - TECO Line Streetcar and HART route 8
 - Proximate to Ybor City 7th Avenue entertainment district Ybor City Museum and Centennial Park

9.2 LONG-TERM RECOMMENDATIONS

Long-term recommendations are defined as those that are:

- Capital intensive
- Longer implementation schedule

**FIGURE 9-3
LOCATION OF PROPOSED MULTI-MODAL HUBS – DOWNTOWN CORE**



Legend

Proposed Multi-Modal Nodes

Proposed Transportation Hub

Proposed Circulators

East-West Option
 UT West Option
 In-Town Trolley

Existing Bus

HART Routes
 HART Stops

Existing Streetcar

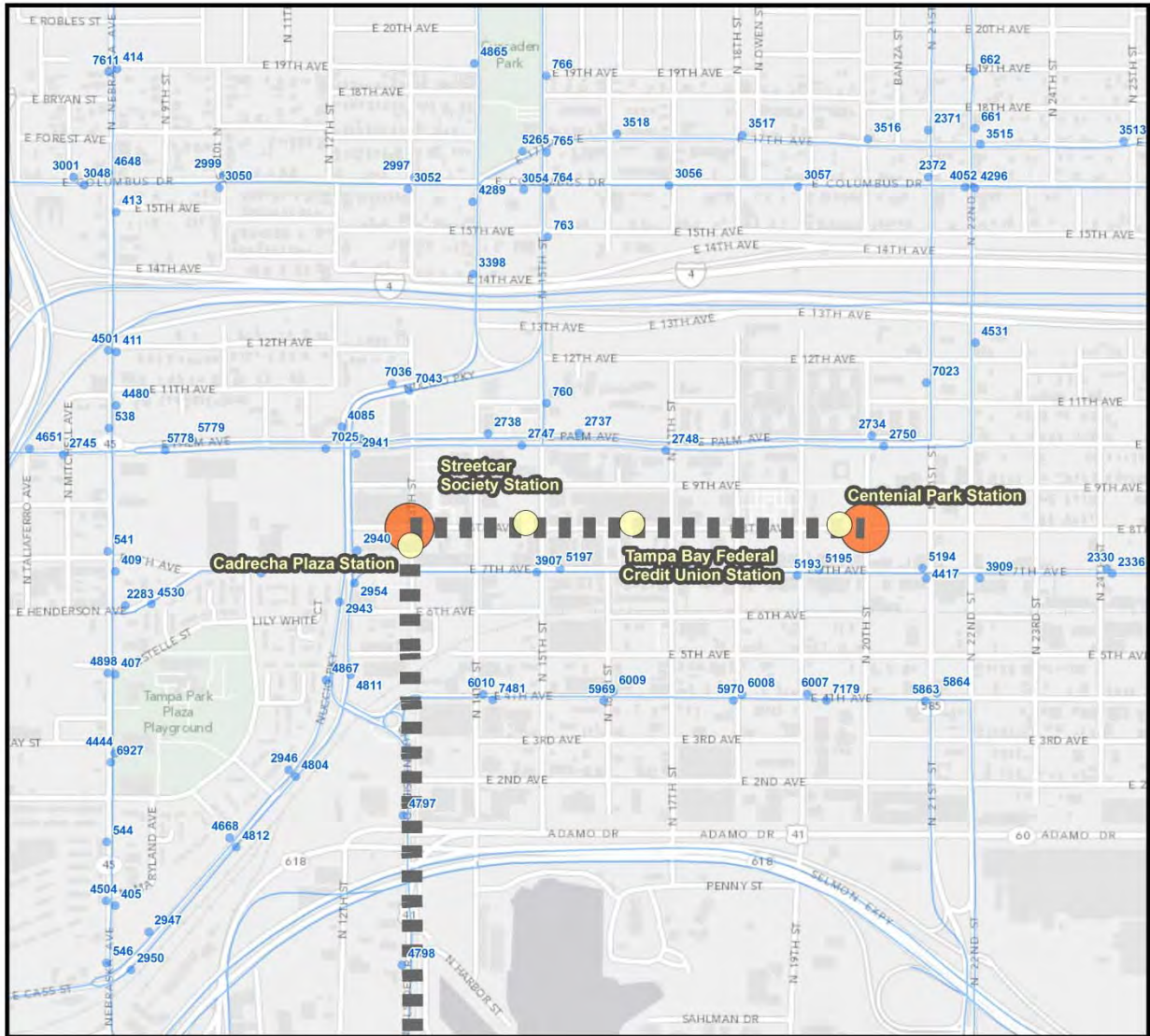
TECO Line Streetcar
 Existing Streetcar Stop

0 0.25 0.5 Miles



Source: 2014 HART Stops and Routes Data
 URS Created Streetcar and Stops Data
 ESRI Basemap

**FIGURE 9-4
LOCATION OF PROPOSED MULTI-MODAL HUBS – YBOR**



Legend


Proposed Multi-Modal Nodes

 Proposed Transportation Hub



Proposed Circulators

-  East-West Option
-  UT West Option
-  In-Town Trolley

Existing Bus

-  HART Routes
-  HART Stops

Existing Streetcar

-  TECO Line Streetcar
-  Existing Streetcar Stop

0 0.25 0.5 Miles



Source: 2014 HART Stops and Routes Data
URS Created Streetcar and Stops Data
ESRI Basemap

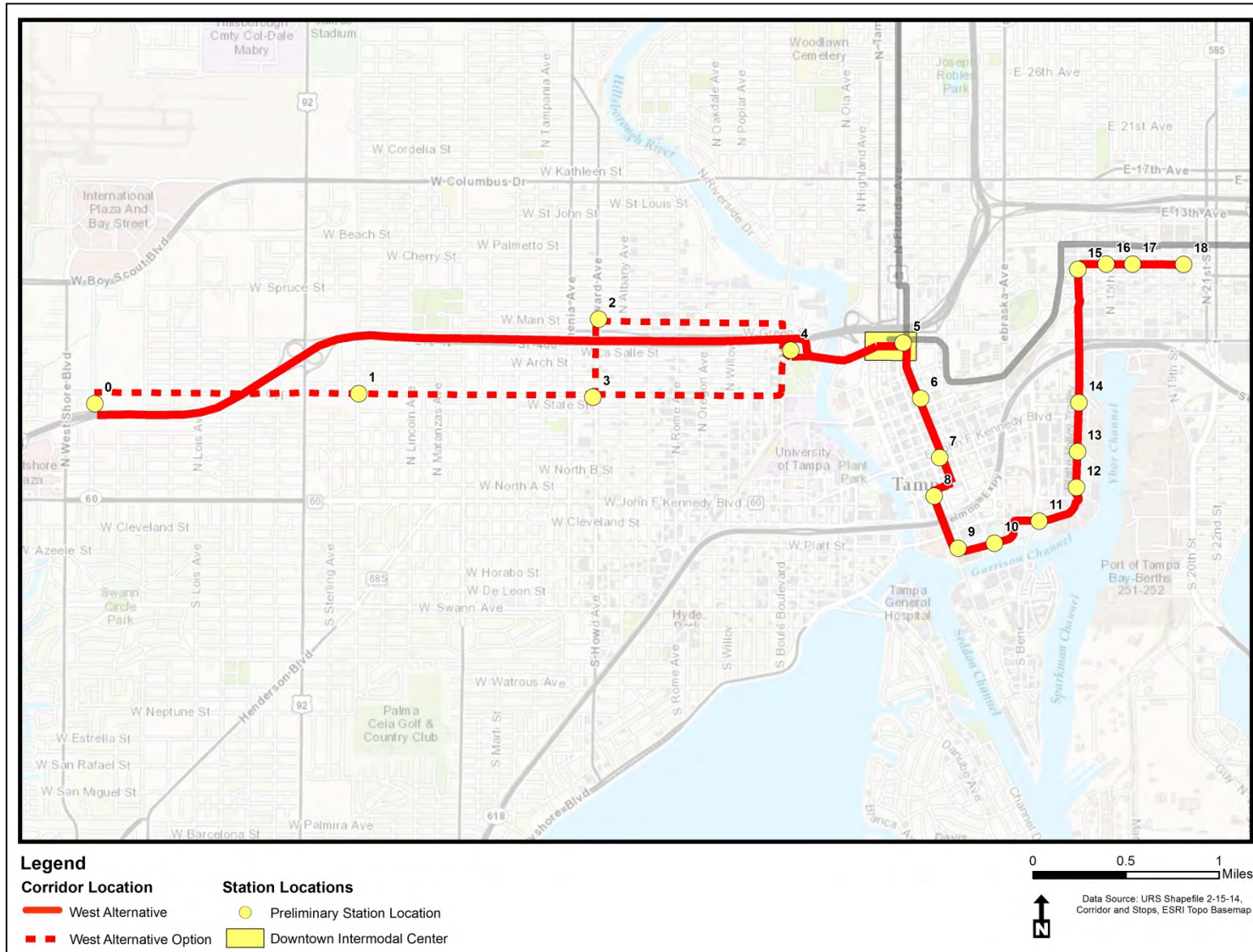
- Requires potentially extensive additional planning, design, permitting, and/or construction

Development of a fixed guideway premium transit connection between Downtown and Westshore/Airport

Development of a west corridor connecting Downtown and Westshore/Airport would consist of the following (see **Figure 9-5**):

- Improvements to the existing TECO Line Streetcar system to accommodate either Light Rail Transit vehicles (LRT) or Modern Tram vehicles to include:
 - Track geometrics at 8th Avenue, approached to CSX interlock, and Channelside Drive/Beneficial Drive.
 - Extension from the current terminus at Whiting Station east along Whiting Street (under the Fort Brooke Municipal Parking Garage) and then north along Marion Street to the MTC.
 - It is assumed that the DTIC, located at the north end of Marion Street along Scott Street would be completed as a separate project, in conjunction with this extension.
 - Potential Station Locations:
 - Between Jackson Street and Kennedy Boulevard on Marion Street
 - Cass Street and Marion Street
 - MTC/DTIC
 - These improvements could be the first step in an incremental development approach ultimately reaching the Westshore/Airport area with premium transit service.
- Development to west from the MTC/DTIC:
 - Would cross the Hillsborough River at approximately Laurel Street over a new dual track low-level bascule bridge.
 - Once west of the river there would be three (3) options:
 - (1) North Boulevard south to Cypress Avenue, west on Cypress Avenue to Howard Avenue, then north on Howard Avenue
 - Potential Station Locations:
 - ◇ Southeast quadrant of I-275 and North Boulevard
 - ◇ Howard Avenue and Cypress Street
 - (2) North Boulevard north to the I-275 median transit envelope to west to Howard Avenue
 - Potential Station Locations:
 - ◇ Southeast quadrant of I-275 and North Boulevard
 - ◇ Within the I-275 median between Howard Avenue and Armenia Avenue
 - (3) North Boulevard north to Main Street, west on Main Street to Howard Avenue
 - Potential Station Locations:
 - ◇ Southeast quadrant of I-275 and North Boulevard
 - ◇ Main Street and Howard Avenue
 - Once at Howard Avenue all three (3) options could utilize the I-275 median transit envelope to continue west to the WRMC in the Westshore/Airport area, or move south on Howard Avenue to Cypress Avenue to continue west to the WRMC with an additional stop at Himes Avenue.
- Technology Options for the West Corridor
 - Modern Tram or
 - LRT vehicle

**FIGURE 9-5
WEST CORRIDOR – DOWNTOWN TO WESTSHORE/AIRPORT**



- Operational Characteristics of the West Corridor
 - Monday – Saturday operations:
 - 6:00 a.m. – 1:30 a.m.
 - Peak headways (5 hours) – 15 minutes
 - AM Peak = 6:00 a.m. – 8:30 a.m.
 - PM Peak = 4:00 p.m. – 6:30 p.m.
 - Off-peak headways – 30 minutes
 - Sunday operations
 - 8:00 a.m. – 10:00 p.m.
 - Headways = 30 minutes
 - End-to-end travel time approximately 23:30 minutes (This time estimate assumes signal prioritization and selected station stops during peak hour operations.)

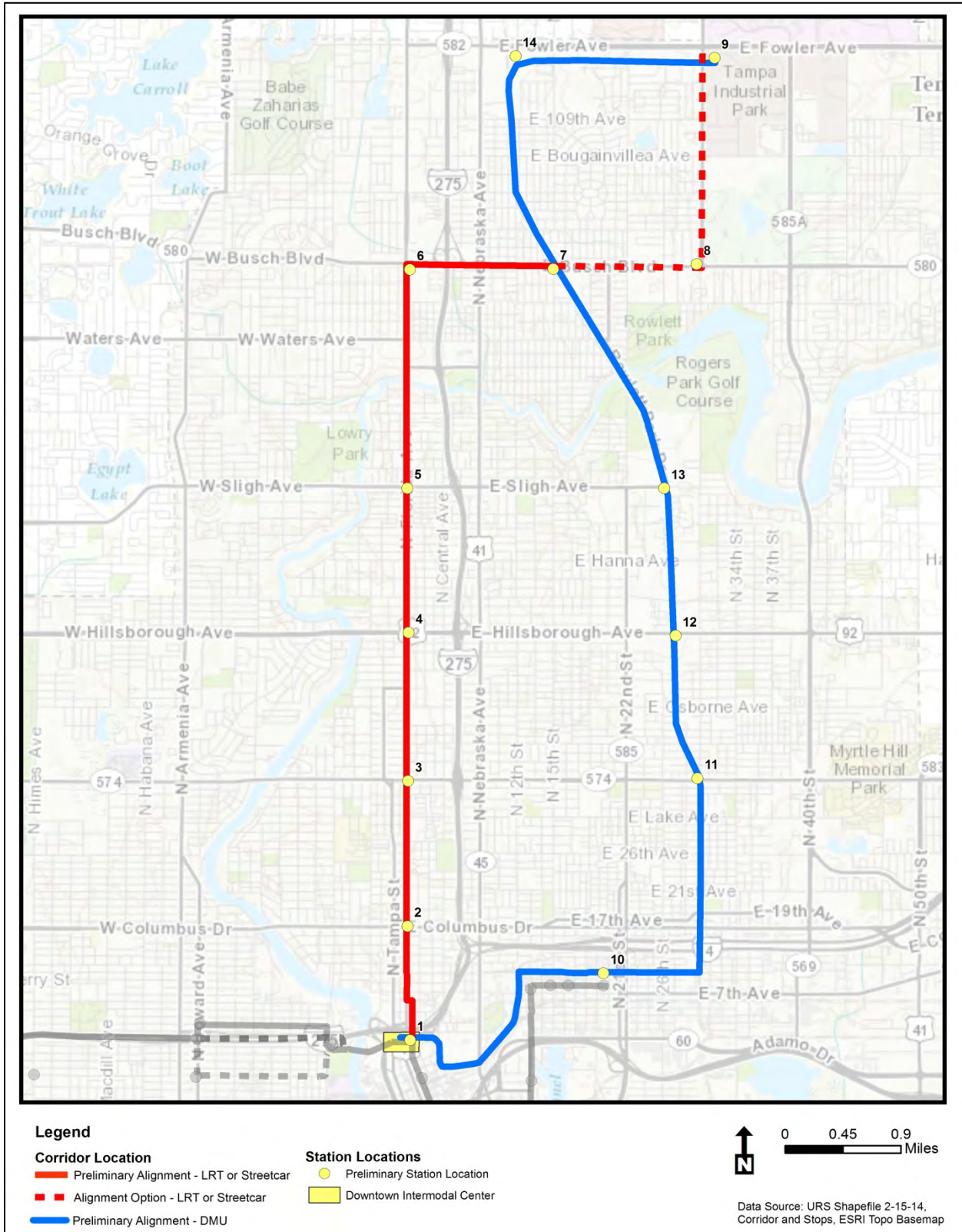
- Estimated Costs
 - Capital Costs
 - Modern Tram - \$320 million to \$420 million
 - LRT - \$404 million to \$525 million
 - New Rail-Only Bascule Crossing of Hillsborough River - \$20 million to \$25 million
 - Operational and Maintenance (O&M) Costs
 - Modern Tram - \$5.7 million (annually)
 - LRT - \$8.4 million (annually)

Development of a north corridor connecting Downtown to USF

Development of a north corridor connecting Downtown and USF could be achieved with one of two alternatives that are based on different technologies, see **Figure 9-6**.

- (1) Diesel Multiple Unit (DMU) using CSX corridor (Clearwater Subdivision/Brooksville Subdivision)
 - Traveling on new alignment east from the DTIC, around the southern perimeter of the Encore Development to north along Nuccio Parkway to east along Palm Avenue to the existing CSX corridor (Clearwater Subdivision/Brooksville Subdivision) immediately west of the Crosstown Connector then north to 30th Street just south of Fowler Avenue near USF.
 - This alternative assumes the ability to utilize the CSX corridor either through a shared-use agreement or purchase of track.
 - Potential Station Locations:
 - Palm Avenue and 20th Street
 - CSX and Martin Luther King (MLK) Boulevard
 - CSX and Hillsborough Avenue
 - CSX and Sligh Avenue
 - CSX and Busch Boulevard
 - CSX and Fowler Avenue (immediately east of Nebraska Avenue)
 - CSX and 30th Street (immediately south of Fowler Avenue)

FIGURE 9-6
NORTH CORRIDOR – DOWNTOWN TO WESTSHORE/AIRPORT



- Operational Characteristics of the Northern Corridor - DMU on CSX Alternative
 - Monday – Saturday operations:
 - 6:00 a.m. – 1:30 a.m.
 - Peak headways (5 hours)– 15 minutes
 - AM Peak = 6:00 a.m. – 8:30 a.m.
 - PM Peak = 4:00 p.m. – 6:30 p.m.
 - Off-peak headways – 30 minutes Sunday operations
 - 8:00 a.m. – 10:00 p.m.
 - Headways = 30 minutes
 - End-to-end travel time approximately 32:00 minutes

- Estimated Costs - DMU on CSX Alternative
 - Capital Costs
 - DMU - \$175 million to \$228 million (excluding ROW)
 - Operational and Maintenance (O&M) Costs
 - DMU - \$5.4 million (annually)

- (2) Modern Tram along Florida Avenue/Busch Boulevard/30th Street
 - Using on-street operations north from the DTIC along Florida Avenue to east on Busch Boulevard to north of 30th Street to just south of Fowler Avenue near USF.
 - This alternative assumes the ability to utilize/cross the CSX corridor either through a shared-use agreement.
 - Potential Station Locations:
 - Florida Avenue and Columbus Drive
 - Florida Avenue and MLK Boulevard
 - Florida Avenue and Hillsborough Avenue
 - Florida Avenue and Sligh Avenue
 - Florida Avenue and Busch Boulevard
 - Busch Boulevard and CSX
 - Busch Boulevard and 30th Street
 - CSX and 30th Street (immediately south of Fowler Avenue)

- Operational Characteristics of the Northern Corridor – DMU on CSX Alternative
 - Monday – Saturday operations:
 - 6:00 a.m. – 1:30 a.m.
 - Peak headways (5 hours) – 15 minutes
 - AM Peak = 6:00 a.m. – 8:30 a.m.
 - PM Peak = 4:00 p.m. – 6:30 p.m.
 - Off-peak headways – 30 minutes
 - Sunday operations
 - 8:00 a.m. – 10:00 p.m.
 - Headways – 30 minutes
 - End-to-end travel time (tram) approximately 35:30 minutes
 - End-to-end travel time (LRT) approximately 37:00 minutes

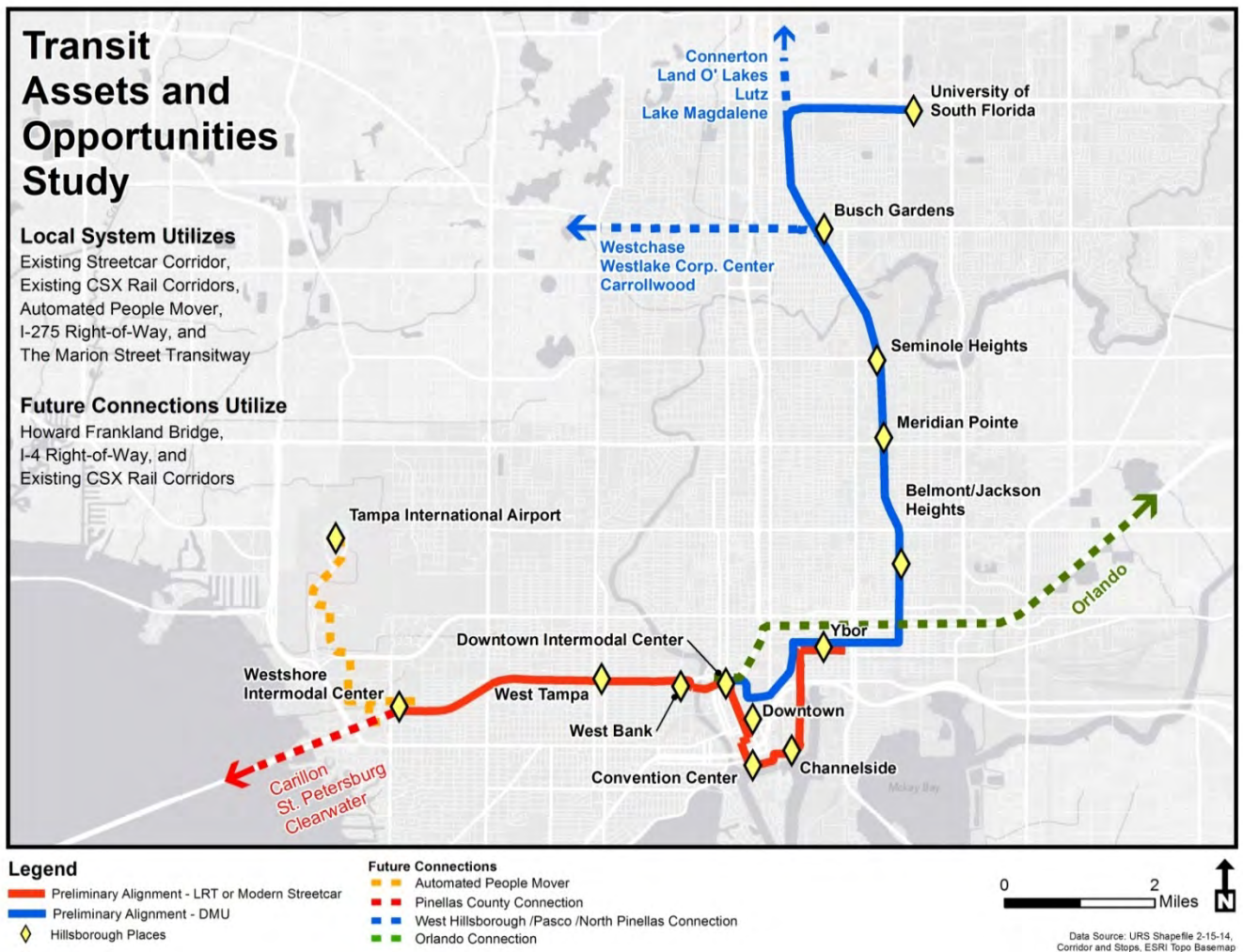
- Estimated Costs – Modern Tram on Florida Avenue/Busch Boulevard/30th Street
 - Capital Costs
 - Modern Tram – \$280 million to \$360 million
 - Operational and Maintenance (O&M) Costs

- Modern Tram – \$4.0 million (annually)

Potential for regional connections, (see Figure 9-7)

The proposed recommended alternatives lay the foundation for a regional transit system. Currently, Pinellas County is planning a transit system with a corridor crossing Tampa Bay to connect with Tampa International Airport, and SunRail and AAF has long-range plans to extend their systems west from Orlando to Tampa. Once in plan, this would create a potential link from the Gulf beaches through Tampa to Orlando and Miami.

**FIGURE 9-7
REGIONAL CONNECTIONS**



- Pinellas County
 - Utilization of the I-275 median transit envelope in the West Corridor provides the opportunity to develop future regional connections to Pinellas County via the I-275 corridor crossing of Old Tampa Bay on Howard Frankland Bridge.

- Pasco and Hernando Counties
 - Utilization of the CSX corridor (Clearwater Subdivision/Brooksville Subdivision) in the North Corridor provides the opportunity to develop future regional connections to Pasco and Hernando Counties.
- Westchase/Carrollwood/Northern Pinellas County
 - Utilization of the CSX corridor (Clearwater Subdivision) in the North Corridor provides the opportunity to develop future regional connections north of Tampa International Airport and possibly provide a terrestrial connection to northern Pinellas County.

Develop strategies to attract intercity/interregional connection with SunRail and/or All Aboard Florida

As of the date of this report two (2) intercity/interregional systems are being developed in Florida:

- *SunRail*, operated by the FDOT, is operating intercity service between the cities of DeBary, in Volusia County and Orlando, in Orange County, with future expansion (2016) south to Kissimmee, in Osceola County.
- *All Aboard Florida*, a private entity, is designing the first phase of its system between Miami and West Palm Beach (service in 2016) and the second phase extending to the Orlando International Airport (service estimated in 2018).
- Both systems have the potential of expansion west to Tampa.
- Implementation of the short- and long-term recommendations found within this report assist in developing a strategy to attract one (or both) of these two systems to Tampa by providing premium regional service to intercity/interregional commuters.

9.3 KEY DECISIONS AND NEXT STEPS

As stated in Section 1.4 (Goals and Objectives) two of the primary objectives of this study were to:

- Identification of projects for the 2014 HART Transportation Development Plan
- Identification of projects for the 2040 L RTP

The short- and long-term recommendations detailed in Section 9.1 and 9.2 fulfill those objectives by identifying:

- Expansion of rubber-wheeled trolley service in Downtown Tampa
- Selection of feasible west and north corridors for a fixed guideway premium transit system

Once these projects are entered into their respective plans the next step will be the initiation of the Project Development Phase which will include:

- Development of an Alternatives Analysis
- Environmental review and documentation
- Public, agency and stakeholder outreach
- Selection of a Locally Preferred Alternative

During the Project Development Phase, discussions between the FDOT and CSX would be initiated. These discussions would be based upon the proposed Locally Preferred Alternative, its potential use of

CSX tracks and/or corridors, and the need for acquisition of track, development of a joint use agreement or a combination of the two.

Having completed the Project Development Phase, the pursuit of funding sources can begin. Funding sources may include:

- Federal funding
 - FTA New Starts
 - FTA Small Starts
- State funding
- Local funding
- Voter referendum
- Public-Private Partnership(s)

When funding has been secured, the project can be placed on the local Cost Affordable Plan and moved into the Engineering and Design Phase. If Federal funds have been identified, a Full Funding Grant Agreement is negotiated as the final step of this phase.

Upon receipt of the Full Funding Grant Agreement, acquisition of ROW and construction can commence.