TAMPA BAY REGIONAL STRATEGIC FREIGHT PLAN

AN INVESTMENT STRATEGY FOR FREIGHT MOBILITY AND ECONOMIC PROSPERITY IN TAMPA BAY

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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

FDOT District Seven

FDOT District One

Table of Contents

LIST OF TABLES iv
LIST OF FIGURES v
LIST OF MAPS vi

CHAPTER 1: REGIONAL GOODS MOVEMENT: LINKS TO OUR PAST AND TO OUR FUTURE

Strategic Freight Plan Intent 1-2
Study Area 1-4

CHAPTER 2: THE NATIONAL, STATE AND REGIONAL FREIGHT PICTURE

National Freight Policy 2-1
Moving Florida to a Greater Economic Activity 2-3
Office of Freight, Logistics, and Passenger Operations 2-4
Strategic Intermodal System 2-4
Positioning the Tampa Bay Region for Success 2-5
Growth of the Interstate-4 Corridor as a Distribution Hub 2-5
Panama Canal 2-6
Free Trade with Cuba 2-6
Other Latin American and Caribbean Markets 2-7

CHAPTER 3: THE ECONOMIC VALUE OF ENHANCED FREIGHT MOBILITY

Regional Freight Related Employment 3-2

CHAPTER 4: REGIONAL FREIGHT INFRASTRUCTURE AND MODAL ASSETS

Regional Freight Activity Centers 4-1
Seaports 4-2
Airports 4-3
CSXT Intermodal Facilities 4-4
Distribution Centers 4-5
Mining Activities 4-6
Regional Freight Transportation Network 4-7
Roadways 4-7
Seaports and Waterways 4-8
Railroads 4-9
Aviation 4-9
Pipelines 4-9

Commodity Flows 4-10
Major Inbound Commodities 4-10
Major Outbound Commodities 4-10
Major Internal Commodities 4-11
Summary of Major Regional Commodities 4-12
Diversity of Products, Diversity of Freight Modes 4-12
Modal Trends and Projections 4-12

CHAPTER 5: INVESTMENT IN THE REGIONAL FREIGHT NETWORK

Programmed Roadway Capacity Improvement Projects 5-1
Programmed Roadway Operational Improvements 5-2
Programmed Multimodal Improvements 5-3

CHAPTER 6: CHALLENGES TO EFFICIENT GOODS MOVEMENT

Infrastructure Conditions 6-1
Infrastructure Capacity 6-3
Transportation Regulations 6-4
Market Conditions 6-6
NIMBYism 6-7
Conflicting Public and Private Goals 6-8
Local and Regional Focus of Transportation Planning 6-9
Freight Does Not Vote 6-10

CHAPTER 7: ASSESSMENT OF FREIGHT MOBILITY NEEDS

Plan Objectives 7-1
Freight Mobility Needs 7-2
Types of Freight Mobility Needs 7-3
Measuring Freight System Performance 7-5
Regional Priority Needs 7-6

CHAPTER 8: POLICY FRAMEWORK AND PRIORITY INVESTMENT STRATEGIES

Policy Framework for Freight Strategy Development 8-1
Facility Function 8-1
Freight Activity and Land Use Compatibility 8-3
Context Areas 8-4
Priority Freight Investment Strategies 8-5

CHAPTER 9: IMPLEMENTATION GUIDANCE

Plan Objectives and Policy Topics 9-1

Freight Compatibility and Livability 9-2
How to Use this Guidance 9-3
Freight Strategy Applicability 9-5
Strategies by Facility and Context 9-7
Design Guidance 9-11
Freight Oriented Area 9-15
Diverse Activity Area 9-16
Community Oriented Area 9-17
Freight Facility Design Considerations 9-18
Design Vehicle 9-18
Lane Widths 9-19
Intersections 9-19
Turn Radii and Curbs 9-21
Accounting for Non-Motorized System Users 9-22
Fixed Objects 9-24
Special Median Considerations 9-24
Designated Truck Turn Around Locations 9-24
Design Element Applicability 9-25

CHAPTER 10: WORKING TOGETHER: A COORDINATED APPROACH

Goods Movement Advisory Committee 10-2
Transportation Providers Committee 10-3
Coordination with Regional Plans 10-3
Freight Planning Tools and Resources 10-4
Tampa Bay Regional Goods Movement Study Web Site 10-4
Comprehensive Freight Improvement Database 10-5
Freight Corridor Study Guidelines 10-5

APPENDICES (UNDER SEPARATE COVER):

Appendix A: Freight Strategy Evaluation Process
Appendix B: Freight Travel Markets
Appendix C: Freight Activity and Land Use Compatibility Analysis
Appendix D: Truck Volume Forecasting Methodology for Polk, Sarasota and Manatee Counties
Appendix E: Goods Movement Advisory Committee Meetings

List of Tables

Table 3-1: Freight Transportation Employment in the Tampa Bay Region 3-2
Table 5-1: Committed Capacity Improvement Projects on Freight Network 5-4
Table 5-2: Committed Operational Improvement Projects on Freight Network 5-6
Table 5-3: Committed Freight Multimodal Improvement Projects 5-10
Table 7-1: Corridor-Based Project Evaluation - Performance Indicators and Supporting Data 7-7
Table 7-2: Freight Hot Spot Evaluation - Performance Indicators and Supporting Data 7-9
Table 8-1: Freight Facility Type and Function 8-2
Table 8-2: Regional Freight Investment Priorities 8-9
Table 9-1: Applicability of Selected Freight Mobility Strategies for Limited Access Facilities 9-8
Table 9-2: Applicability of Selected Freight Mobility Strategies for Regional Freight Mobility Corridors 9-8
Table 9-3: Applicability of Selected Freight Mobility Strategies for other Freight Distribution Routes 9-9
Table 9-4: Applicability of Selected Freight Mobility Strategies for Freight Activity Center Streets 9-9
Table 9-5: Applicability of Freight Facility Design Considerations on Non-Limited Access Roadways 9-10
Table 9-6: Freight Mobility Corridor Design Elements 9-12
Table 9-7: Freight Distribution Route Design Elements 9-13
Table 9-8: FAC Streets Design Elements 9-14
Table 9-9: Design Truck Types for Throughway Facilities 9-18
Table 9-10: Applicability of Freight Facility Design Considerations on Non-Limited Access Roadways by Context Area Type 9-25

List of Figures

Figure 1-1: Average Cost per Hour of Delay (2010) 1-2
Figure 1-2: Study Area 1-4
Figure 2-1: Estimated Commodity Flows in Florida (2009 Annual Tons) 2-3
Figure 3-1: Transportation and Economic Growth 3-1
Figure 3-2: Establishments Directly Involved in the Goods Movement Industry 3-3
Figure 3-3: Direct Employment Affected by the Goods Movement Industry 3-3
Figure 3-4: Annual Payroll Affected by the Goods Movement Industry 3-4
Figure 4-1: Top Five Inbound Commodities by Weight to Tampa MSA, 2009 4-10
Figure 4-2: Top Five Outbound Commodities by Weight from Tampa MSA, 2009 4-11
Figure 4-3: Top Five Internal Commodities by Weight within the Tampa MSA, 2009 4-11
Figure 4-4: Estimated Total Tonnage Growth, 2009-2040 4-13
Figure 6-1: Retail Diesel Price 6-6
Figure 7-1: Freight Needs Assessment Sources 7-2
Figure 7-2: Freight Mobility Strategies 7-4
Figure 8-1: Context Areas and Freight Activity Matrix 8-4
Figure 9-1: Expanded Outside Lane Widths 9-19
Figure 9-2: Trucks Turning from Departure Lane with a Bicycle Lane 9-20
Figure 9-3: Trucks Turning from Departure Lane with no Bicycle Lane 9-20
Figure 9-4: Stop Bar Locations 9-21
Figure 9-5: Extended Right and Left Turn Lanes 9-21
Figure 9-6: Tapered Curbs 9-22
Figure 9-7: Multiple Radius Curbs 9-22
Figure 9-8: Typical Truck Channel 9-23
Figure 9-9: Curb Extensions 9-23
Figure 9-10: Sidewalk Setbacks and Tree Buffers 9-23
Figure 9-11: Channelized Left Turn 9-24
Figure 9-12: Truck Turn Around 9-24
Figure 10-1: Interagency Coordination 10-2

List of Maps

Map 4-1: Regional Freight Transportation Network ..... Maps follow page 4-13
Map 4-2: Citrus/Hernando/Pasco County Freight Transportation Network
Map 4-3: Pinellas/Hillsborough County Freight Transportation Network
Map 4-4: Polk County Freight Transportation Network
Map 4-5: Sarasota/Manatee County Freight Transportation Network
Map 5-1: Committed Investments on the Regional Freight Transportation Network ..... Maps follow page 5-3
Map 5-2: Citrus/Hernando/Pasco County Committed Investments on the Regional Freight Transportation Network
Map 5-3: Pinellas/Hillsborough County Committed Investments
Map 5-4: Polk County Committed Investments on the Regional Freight Transportation Network
Map 5-5: Sarasota/Manatee County Committed Investments on the Regional Freight Transportation Network
Map 7-1: Regional Corridor Based Project Priority Needs ..... Maps follow page 7-10
Map 7-2: Citrus/Hernando/Pasco County Corridor Based Project Priority Needs
Map 7-3: Pinellas/Hillsborough County Corridor Based Project Priority Needs
Map 7-4: Polk County Corridor Based Project Priority Needs
Map 7-5: Sarasota/Manatee County Corridor Based Project Priority Needs
Map 7-6: Regional Freight Hot Spot Project Priority Needs
Map 7-7: Citrus/Hernando/Pasco County Freight Hot Spot Project Priority Needs
Map 7-8: Pinellas/Hillsborough County Freight Hot Spot Project Priority Needs
Map 7-9: Polk County Freight Hot Spot Project Priority Needs
Map 7-10: Sarasota/Manatee County Freight Hot Spot Project Priority Needs
Map 8-1: Freight and Land Use Compatibility Analysis ..... Maps follow page 8-7
Map 8-2: Regional Priority Freight Investment Strategies
Map 8-3: Citrus/Hernando/Pasco County Priority Freight Investment Strategies
Map 8-4: Pinellas/Hillsborough County Priority Freight Investment Strategies
Map 8-5: Polk County Priority Freight Investment Strategies
Map 8-6: Sarasota/Manatee County Priority Freight Investment Strategies

REGIONAL GOODS MOVEMENT: LINKS TO OUR PAST AND TO OUR FUTURE

Highways. Seaports. Waterways. Airports. Railroads. Distribution Centers. Pipelines. These are the elements that comprise the freight system of the Tampa Bay region which have long governed the area's economic prosperity. Markets emerged in a young, growing nation with the successful development of rail lines and seaport facilities that transported goods from growing industries. Eventually, markets in Europe, the Caribbean, and ultimately Asia, also became destinations for local agricultural products and manufactured goods. The early freight delivery system met consumer demands through a multimodal approach to goods movement, a model that is still used today.

The economic productivity of the Tampa Bay region relies on a transportation system that can accommodate market expansion at regional, national and international levels.

The economic productivity of the region relies on a transportation system that can accommodate market expansion at regional, national, and even international levels. As business markets become more diverse, the need to reach global markets and access international consumers is paramount. The region's freight infrastructure provides a critical link to these expanding markets.

To meet anticipated increased production and logistics demands, the freight intermodal activity centers within the region are projected to intensify their activities and expand operations. As in the past, the anticipated growth and the ability to meet the demands of changing world markets will largely depend on the capacity to improve and maintain efficient transportation connections.

Virtually every business and household in the region is dependent on the freight delivery system for shipping and receiving goods. The area's highways, seaports, waterways, airports, railroads, and pipelines sustain the region's economic productivity through the following activities:

- Delivering products consumers demand to stores
- Transporting raw materials and finished products from industries
- Hauling materials for the construction of roads, schools, businesses, and homes
- Distributing energy resources that power our cities

Trailers and containers represent jobs and production, and indicate a thriving economy. But as the amount of freight increases and the scale and number of facilities required expands, the activities associated with freight transport increasingly – and perhaps inevitably – begin to impact the local communities that host them. While both freight interests and communities are concerned with improving the safety, accessibility, and mobility provided by the regional transportation system, the priorities and perspectives of the two sides can be very different. Communities are also affected by unintended impacts to land uses as well as social and business activities within freight corridors. These impacts resulting from freight transport activities are both real and perceived. Thoughtful solutions that provide for good freight accessibility and are sensitive to the land uses and activities

within freight corridors are needed to support economic growth and prosperous communities in the Tampa Bay region.

STRATEGIC FREIGHT PLAN INTENT

The Tampa Bay Regional Strategic Freight Plan defines an integrated and connected regional freight transportation network and identifies regional freight investment priorities needed to sustain economic growth in the Tampa Bay region. The plan identifies strategic transportation investments needed for better mobility and accessibility for trucks. It also identifies improvements to address the unique operational characteristics of trucks that can often be implemented at relatively low costs. Additionally, guidance is provided to assist planners and engineers to define and develop freight improvement strategies that are appropriate given the freight corridor function, the land uses and activities within the corridor, and the shared uses of the corridor.

The Strategic Freight Plan was undertaken in response to steadily increasing emphasis on freight mobility concerns and economic development in recent years. The Strategic Freight Plan accomplishes the following objectives:

Identify strategic freight transportation investments that promote and foster economic development in the region

Providing a well-planned transportation system to efficiently move goods while preserving personal mobility is a significant concern as our roads become more congested. The Tampa Bay region's economic productivity relies on a transportation system that can handle goods efficiently and safely. Priority transportation investment strategies that improve accessibility and reliability of freight transport and support growth in the region's economic centers have been defined.

Respond to the inherent tension between goods movement and community livability and to the rising cost of traffic congestion

Truck freight volumes in the Tampa Bay area are projected to increase by as much as 65 percent by the year 2040[1]. Goods movement and personal travel are increasing simultaneously. Freight industry needs and community livability are at a crossroads. Creative solutions are needed to balance freight accessibility and personal mobility.

Nationally, the effect of traffic congestion on economic productivity is notable. As shown in **Figure 1-1**, the average cost per hour of delay for trucks is $88 compared to $16 for personal vehicles. For large semi-trucks that transport the overwhelming majority of freight, the cost exceeds $250 per hour of delay. In the Tampa Bay area, truck congestion costs total $210 million annually. These added transportation costs are passed on to consumers in the form

1 *Freight Analysis Framework 3.1.2, 2010 / Federal Highway Administration Office of Freight Management and Operations*

Strategic Freight Plan Emphasis

- Accessibility to Freight Activity Centers
- System mobility
- Roadway operating conditions
- Freight and commuter conflicts
- Freight and land use compatibility

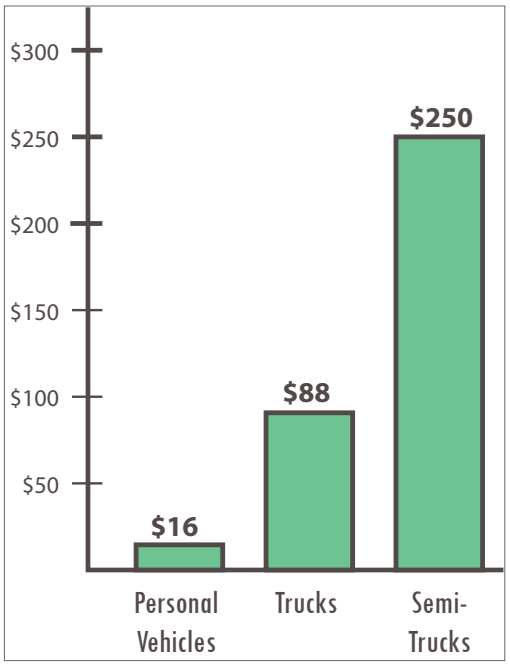


Figure 1-1: Average Cost per Hour of Delay (2010)

Source: Texas Transportation Institute, Texas A&M University

of increased costs for most products sold on the open market.

The Strategic Freight Plan identifies investment strategies to facilitate freight transport on the region's priority freight corridors with thoughtful consideration of the effects that the particular strategies have on roadway congestion, adjacent land uses, and social and business activities.

Position the Tampa Bay region to take advantage of the rapid growth in the global economy

Tampa Bay is geographically situated to benefit from the emerging economies of Central and South America and other events including the widening of the Panama Canal and anticipated opening of Cuba to trade with the United States. However, in order for our region to take advantage of a constantly changing world economy, infrastructure improvements are needed to the freight transportation system, especially the facilities serving the region's seaports and major intermodal freight activity centers. A transportation system that provides good accessibility and travel flow is a key factor affecting a region's business costs, market access, and overall competitiveness for attracting large-scale business investments. Implementing policies, strategies, and actions that improve transportation accessibility and provide a seamless conduit between intermodal facilities can stimulate economic growth.

The Strategic Freight Plan will guide the Tampa Bay region in creating a freight transportation network capable of handling regional and global market expansion.

Position the region for new funding opportunities to implement infrastructure improvements on the regional freight network

Since the passage of the landmark Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, subsequent federal legislation has increasingly emphasized the importance of planning for and implementing a transportation system that supports freight mobility and economic development. The latest federal transportation legislation, Moving Ahead for Progress in the 21st Century (MAP-21), provides incentives for states to prioritize projects that improve freight movement and foster economic development. The Strategic Freight Plan identifies priority investments to position the region to leverage these potential new opportunities for federal funding.

Integrate freight considerations into the planning, project development, and roadway design processes

There is an increasing awareness of the need to address freight mobility concerns when planning and improving our transportation system. To that end, a framework for integrating freight mobility considerations into the regional and local planning processes has been defined. It includes the processes, information, and tools that decision-makers and planners will need for effectively addressing freight mobility issues.

As with most transportation issues, freight mobility issues are multi-faceted in nature and span a diverse spectrum of topics. However, as freight mobility concerns grow in importance, gaining a true

understanding of regional freight dynamics in the Tampa Bay area is parmount for our decision-makers and planners. A continued dialogue among the region's transportation, economic, and land use planning experts, as well as with private freight providers and intermodal agencies is needed to properly plan for and implement strategies and policies that address freight transport needs.

STUDY AREA

Major economic generators within the Tampa Bay region including the Port of Tampa, Port Manatee, CSX Intermodal yards, as well as significant existing and planned distribution activities in Polk County and other areas in the region, rely on an efficient transportation system to transport freight to destinations within and outside the region. The freight transportation network includes the roadways, rail lines, waterways, and pipelines that provide connections between the region's freight activity centers and to destinations outside the area.

Recognizing the regional dynamics of goods movement, the Strategic Freight Plan study area includes all of the counties (Citrus, Hernando, Hillsborough, Pasco, and Pinellas) that comprise Florida Department of Transportation (FDOT) District Seven and the counties of Polk, Manatee and Sarasota in FDOT District One. The study area is shown in **Figure 1-2.**

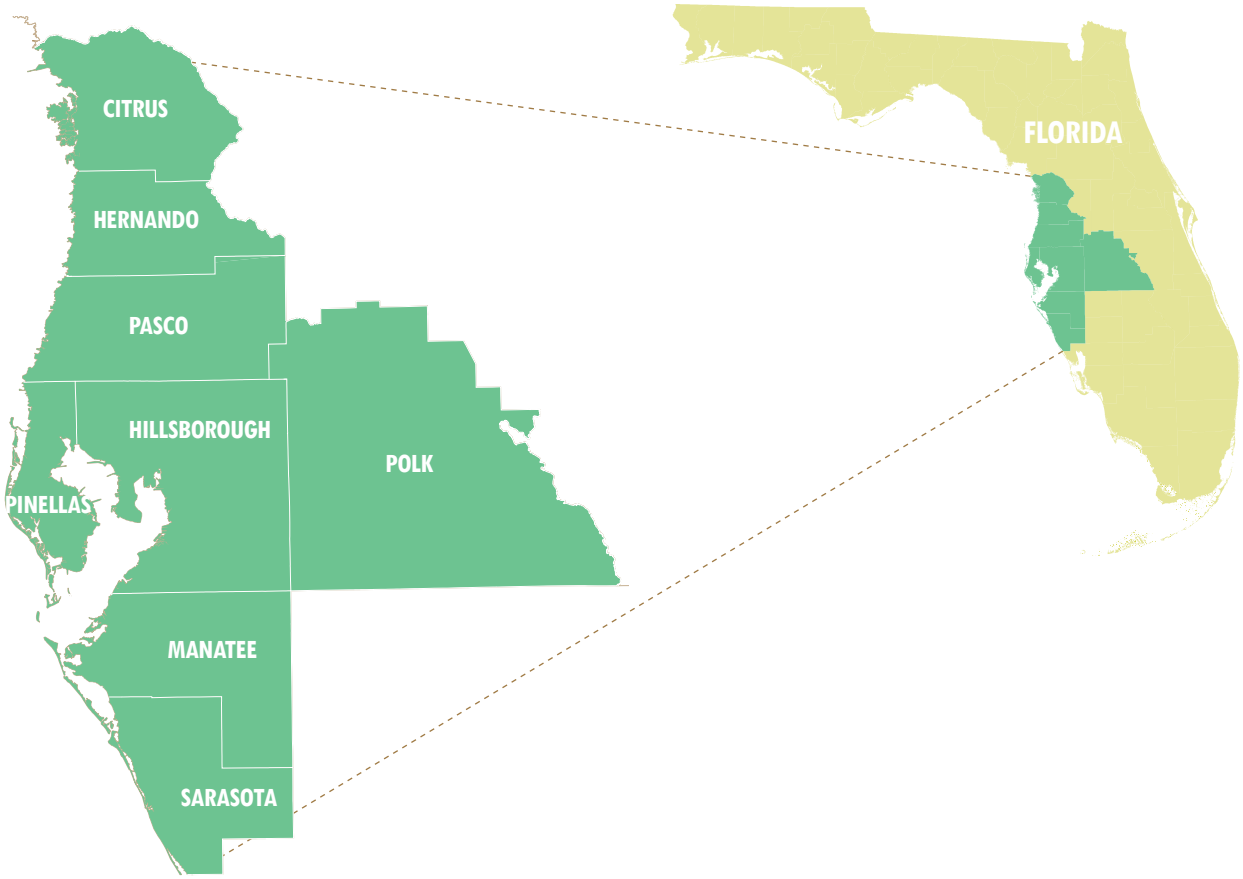


Figure 1-2: Study Area

United States domestic and international freight movements are projected to grow by over 45 percent by 2040.

Combined domestic and international United States freight movements are projected to grow by over 45 percent by 2040. During this same time period, our nation's seaports are anticipated to handle more than twice the amount of freight at their facilities[1]. A major factor for this dramatic growth is the ever-increasing globalization of U.S. business markets. With the opening of more international markets to U.S. businesses and consumers, the need for diverse goods and services worldwide has placed increasing demands on the existing freight network.

The nation's transportation network serves as a large "rolling" warehousing facility. Trucks, trains, ships, and planes used for transport also store large volumes of goods until final distribution. As inventory systems become more efficient and accurate in responding to market demands, more and more products will be "stored" on the freight network than ever before.

As the nation prepares for increased freight activity, issues such as national security, aging infrastructure, intermodal access, capacity constraints, and increasing congestion will become fixtures in national transportation discussions. The compatibility of freight transport with residential, office and mixed-use developments will also become more prevalent. Transportation solutions that provide good freight accessibility to intermodal, distribution, and industrial centers, and are also sensitive to community livability issues, need to be a focus of our freight transportation investment strategy.

NATIONAL FREIGHT POLICY

The policy basis for freight planning at the federal level is built on a foundation of legislation that extends back to the landmark Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. ISTEA established a framework that has been refined and expanded upon by the Transportation Equity Act for the 21st Century (TEA-21) and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). As a result of these bills metropolitan planning organizations (MPOs) must take into consideration economic development and freight movement in long-range plans and short-range transportation improvement programs for their regions. It has long been recognized, however, that freight issues transcend regional, state, and international boundaries. National level freight planning and policy is necessary to deal with issues such as the expansion of the Panama Canal or increasing American exports. The scale of freight issues is a strong argument for greater federal involvement in this area of transportation.

The latest federal transportation bill, Moving Ahead for Progress in the 21st Century (MAP-21), was adopted by Congress and approved by the President in June 2012. It recognizes the importance of a

1 *Freight Analysis Framework 3.1.2, 2010, FHWA Office of Freight Management and Operations*

more unified national policy on freight and makes greater strides than prior legislation at establishing these policies. MAP-21 places more emphasis on the federal role in freight transportation and includes several provisions to facilitate freight transportation across state and national boundaries. The Secretary of the United States Department of Transportation (US DOT) is required by MAP-21 to identify a National Freight Network, to develop a National Freight Strategic Plan, and to report regularly on the condition and performance of the National Freight Network.

The National Freight Network will consist of a primary network of 27,000 miles of existing highways that are the most critical to the movement of freight. An additional 3,000 miles of highway may be designated by the Secretary as being critical to the future movement of freight. Railroads, as largely private entities, are not included in the network. However, intermodal connectors that provide access to important rail, port, and airport facilities will be important pieces of the National Freight Network. Every 10 years the Secretary will be required to redesignate the Network.

The National Freight Strategic Plan must be established within three years and will be updated every five years. The plan will assess the condition and performance of the freight network, identify key highway bottlenecks, forecast future freight volumes, and assess barriers to improve freight transportation performance. The Secretary will be required to report on the conditions and performance of the National Freight Network every two years.

A freight funding program was proposed during the development of MAP-21. While it was not included in the final bill, Congress and the President provided an incentive for states to prioritize projects that improve freight movement. Typically, the federal government funds 80 percent of projects that are eligible for federal aid. However in some instances, such as interstate maintenance, the federal government has historically paid a higher share. Likely the most significant provision of MAP-21 for states and metropolitan planning organizations is that the bill authorizes a 90 percent federal share for freight projects, which increases to 95 percent if the project is on the Interstate Highway System. To be eligible for the higher federal share a project must be identified in a state freight plan and make progress towards performance targets for freight movement.

MAP-21 also encourages states to establish freight advisory committees and state freight plans. The state freight plan may be a stand-alone document, or incorporated into a statewide long-range transportation plan.

While MAP-21 is a step forward for federal freight planning, it remains to be seen what effect the bill will ultimately have on project selection. What has largely been a process of negotiation and collaboration between state departments of transportation and metropolitan planning organizations will now likely include a more

MAP-21 places more emphasis on the federal role in freight transportation. The bill authorizes a 90 percent federal funding share for freight projects, which increases to 95 percent if the project is on the Interstate Highway System.

substantial role for the Federal Highway Administration (FHWA). FHWA's primary role is to provide oversight of the planning, programming, and construction process related to federal-aid highways. In the future, the FHWA may be a more active player in the selection of freight projects. How the new federal role plays out remains to be seen, but it is certainly a milestone in the evolution of the nation's freight policy.

MOVING FLORIDA TO A GREATER ECONOMIC ACTIVITY

Florida serves as a freight gateway to the nation. Products produced in the United States are exported to other countries through Florida roads, ports, rail lines, and airports. Conversely, this freight infrastructure serves to transport products imported from other nations to be distributed in Florida and other parts of the country. In 2009, Florida moved approximately 1.89 billion tons of freight to, from, and within its borders, as shown in **Figure 2-1**. It is anticipated that in the year 2040, Florida will move approximately 3.2 billion freight tons supporting greater economic activity within the state.

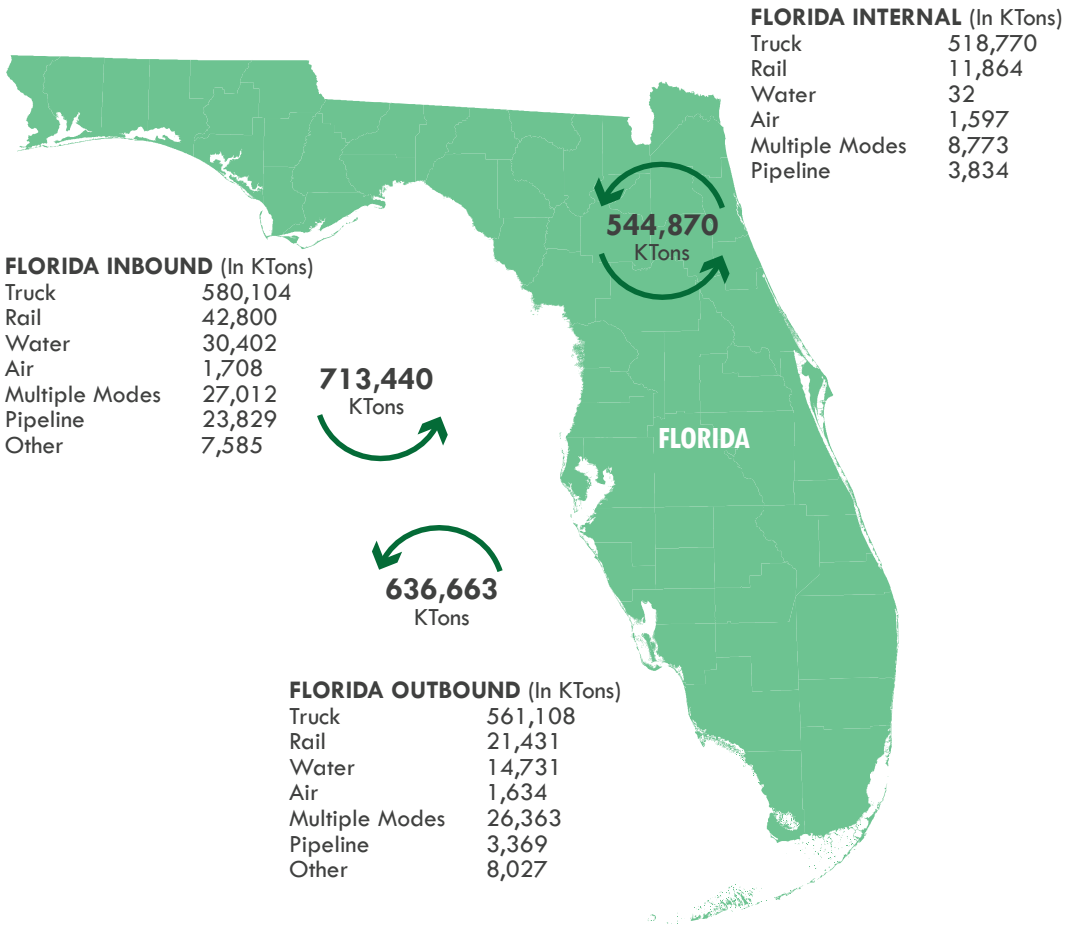


Figure 2-1: Estimated Commodity Flows in Florida (2009 Annual Tons)

Source: Freight Analysis Framework 3.1.2, 2010, FHWA Office of Freight Management and Operations

Economically, the state of Florida is poised to take advantage of the growing international trade with Central and South America as well as with Asia and Europe. Florida is positioned to be the gateway to Cuba when friendly relations resume. In the shorter term, the planned opening of an expanded Panama Canal in 2014 has the potential to realign global trade flows and strengthen Florida and eastern seaboard ports in their competition with west coast ports to capture a greater share of Asia's commerce with the eastern United States and Canada. The widened canal will also enhance connections with Florida's existing trading partners along the western coast of South America. To remain competitive in emerging and expanding business markets, investments in Florida's freight infrastructure are critical.

Office of Freight, Logistics, and Passenger Operations

The FDOT has recently created the Office of Freight, Logistics and Passenger Operations in recognition of the significant role that freight mobility has on Florida's economic prosperity. The office will coordinate, develop and implement a freight planning process that integrates transportation modes and maximizes the use of existing facilities. The office will play a prominent role in advancing Florida's trade, logistics, and export-oriented manufacturing activities nationally and globally. It will work in conjunction with the Office of State Transportation Development in the development and planning of the Strategic Intermodal System.

Strategic Intermodal System

Florida's Strategic Intermodal System (SIS) is a network of critical transportation facilities and services supporting statewide and interregional movement of people and goods. The SIS encompasses all modes of transport and includes linkages between modes and facilities to provide a single, comprehensive integrated transportation network. The SIS handles almost all of the state's air and maritime passengers and cargo and freight rail activity, as well as 89 percent of interregional rail and bus passengers, 70 percent of truck traffic and 55 percent of total traffic.[2] The SIS was established to enhance Florida's overall economic competitiveness by serving the mobility needs of residents, visitors, and businesses.

Since the SIS carries the vast majority of the state's freight traffic, strategies enhancing the ability of these facilities to move goods quickly and efficiently are emphasized in the Strategic Freight Plan.

The Office of Freight, Logistics and Passenger Operations was recently created by the FDOT in recognition of the significant role of freight mobility in Florida's economic prosperity.

2 *FDOT Strategic Intermodal System Plan, 2010*

POSITIONING THE TAMPA BAY REGION FOR SUCCESS

The Tampa Bay region's central location within Florida positions it to increase trading activity with Florida, national, and international markets. The anticipated population growth of West Central Florida, the continued development of the Interstate-4 corridor as a distribution hub, the widening of the Panama Canal in 2014, the potential for resumed trade with Cuba, and the expansion of Latin American and Caribbean markets will spur increased goods movement across the state and in the Tampa Bay region. Florida has the opportunity to emerge as an important trade hub linking the southeastern U.S. with trading partners to the south, west, and east.

Growth of the Interstate-4 Corridor as a Distribution Hub

Hillsborough County has historically served as a freight distribution hub for the Tampa Bay region and beyond mainly due to the intense freight activities supporting the Port of Tampa and the CSX freight rail operations. These significant freight distribution activities have expanded along the Interstate-4 corridor, and its attractiveness to distribution companies can be attributed to several conditions:

- Polk County's centralized location to Florida markets and reduced transportation costs
- Abundant available land for distribution services with a relatively low land value
- Large workforce and technical training institutions that develop skills needed for the freight distribution industry
- Business friendly environment that incentivizes companies to locate

Complementing the many companies that have distribution facilities in the Interstate-4 corridor is one of the largest intermodal distribution centers in the state that is planned for the Winter Haven area - the CSX Integrated Logistics Center (ILC). The ILC will serve as a centralized transportation and logistics hub for CSX Transportation. It will be centered on a new rail and truck based intermodal terminal. As part of consolidating its operations to the ILC in Winter Haven, CSX plans to move a portion of the existing automotive distribution operation located in Taft, Florida and another located just north of Tampa International Airport. The ILC terminal will be the first of its kind in the southeastern United States. It will handle the transfer of new automobiles as well as containers from railcars to trucks. The contents of the containers will consist of consumer goods such as merchandise, food products, and building materials. Value-added manufacturing will include assembly and packaging activities. Shipments from the ILC are anticipated to be distributed to retailers throughout Florida. The ILC is intended to increase reliability and efficiency of freight movement, while significantly decreasing transport costs.

The larger Post Panamax ships passing through the Panama Canal will not call on the Port of Tampa or Port Manatee due to the inadequate depth of its navigation channels and insufficient clearance under the Skyway Bridge. However, both Ports are positioning themselves to handle higher volumes of container cargo through the Panama Canal to and from Asian markets, as well as Caribbean and South American markets that also serve as transshipment points for Post Panamax ships. The Port of Tampa is expected to continue to experience growth in bulk, break bulk, roll-on/roll-off and other general cargoes, which will result from the increased shipments through the Panama Canal.

Panama Canal

Begun in 2009, the widening of the Panama Canal will improve travel times for waterborne cargo between Asia and seaports in the Gulf of Mexico and along the Eastern Seaboard, continuing and augmenting the trend of increased all-water trade between these regions. For certain lines of trade/cargoes, the all-water shipping routes offer economic advantages for accessing the Eastern Seaboard and Gulf Coast regions of the U.S. compared to moving imported Asian goods by rail or truck from Pacific ports. The comparative advantages of all-water trade routes to Asia are likely to be augmented by rising fuel costs and initiatives to create more environmentally-friendly supply lines.

The Panama Canal expansion will create opportunity for continued growth in container operations as well as general cargo and bulk commodity trade at the Port of Tampa and Port Manatee. The widened canal will allow more ships to transport cargo through the canal at competitive costs due to greater accessibility to ports in the Gulf of Mexico and Eastern Seaboard. Moreover, the development of hub ports in Panama and the Caribbean able to handle larger Post Panamax container vessels will lead to transshipment opportunities which will then call on ports such as Tampa and Manatee.

Free Trade with Cuba

The opening of Cuba for travel and trade with the United States has the potential to have a positive impact on the economy of the region. Tourism is now the number one industry in Cuba, and the synergies with Florida and the Tampa Bay area are obvious. With respect to the movement of goods, the long term prospects are very positive, but even with free trade, short-term growth would be limited by the relatively low level of economic activity in Cuba. Florida's Gross Domestic Product (GDP) was approximately $734.7 billion for 2009; the GDP of Cuba was approximately $57.5 billion for the same period. Per capita GDP in Florida was $35,603[3]; per capita GDP in Cuba was $8,500.[4]

In addition to low economic activity, it may be some time until Cuba can develop a strong system of finance and credit to be an internationally significant economic engine. However, there are some products produced in Florida that will find a ready marketplace within an increasingly market-based economy in Cuba: agricultural products (excluding sugar and citrus), fertilizer, feed, building materials and fuel. Cuba's current major exports include sugar, nickel, tobacco, fish, medical products, citrus, and coffee. The Port of Tampa is likely to serve ships that call on Cuba as well as ships that use Cuba as a hub for transshipments from new or improved Cuban ports envisioned to serve as cargo hubs for international trade.

As the economy recovers and as population grows in Florida, much of the all-water cargo transport from Asia will divert from the ports on the U.S. West Coast to a host of ports in the Gulf of Mexico and on the Eastern Seaboard. While there is potential for increased freight activity as a result of renewed trade with Cuba, there is no clear indication of when that possibility will emerge. Currently, trade with Cuba is heavily restricted by U.S. law that limits commerce to agricultural and medical products in cash advance deals. Nevertheless, the Port of Tampa and Port Manatee are laying the groundwork for trade with Cuba in anticipation of lessened trade restrictions. They are very well positioned for an expansion of maritime business with Cuba given its geographic location, historic ties, and the modern cargo facilities in place to serve this trade.

3 *U.S. Bureau of Economic Analysis*
4 *U.S. Central Intelligence Agency World Fact Book*

Caribbean and Latin American economies will continue to benefit from increased global trade, especially with the expansion of the Panama Canal. Free trade agreements will facilitate economic expansion and diversification in the region. Given that the major cargoes moving between the U.S. and Latin American and Caribbean markets are primarily bulk and liquid bulk commodities, the Tampa Bay region is well positioned – geographically and functionally – to grow as a result of the increased activity.

Other Latin American and Caribbean Markets

Trade with South America has been getting more and more attention as Brazil continues to lead the continent through a period of economic expansion. Florida already leads all states in the percentage of goods exported from the U.S. to South America. The opportunity for increased trade of commodities and finished goods is significant given the industrial and technological expansion that is taking place in South America. To put it in perspective, the combined GDP of the countries in South America is almost sixty times that of Cuba. In dollar terms the U.S. is a net exporter to Brazil with a total trade of almost $60 billion, making it the 10th largest trading partner in the world.[5]

Additionally, two free trade agreements between the U.S. and Colombia and the U.S. and Panama stand to boost the prospects for Latin American trade. Both are comprehensive free trade agreements that will eliminate most tariffs on U.S. exports, reduce technical and regulatory barriers to trade, and drop the prices consumers in those countries pay for commodities shipped from the U.S. U.S. imports from Colombia totaled $15.6 billion in 2010; exports totaled $12 billion. Imports from Panama were valued around $380 million and exports near $6.1 billion in 2010.[6] The potential for increased trade in agricultural goods and related commodities will likely have the greatest impact on goods movement in the Tampa Bay region.

Finally, through the Caribbean Basin Initiative (CBI) and the Dominican Republic-Central America-United States Free Trade Agreement (CAFTA-DR), the U.S. continues to strengthen economic ties with Caribbean and Central American nations. The CBI was initially envisioned as a collection of programs to spur economic development and export diversification in Caribbean countries, but has brought the ancillary benefit of increased U.S. exports throughout the region. The CBI region was the 14th largest export market for the U.S. in 2008, absorbing 1.9 percent of the nation's exports to the world, valued around $25.1 billion. Meanwhile, CBI countries supplied slightly less than one percent of U.S. imports, valued $19.6 billion in 2008. Major imports from the CBI region include produce, apparel articles, and fuels, including petroleum, natural gas (methanol), and fuel grade ethanol; the primary U.S. exports include refined petroleum products, semiconductors, corn, jewelry, and aircraft.[7]

5 *U.S. Census 2010*
6 *ibid.*
7 *Eighth Report to Congress on the Operation of the Caribbean Basin Economic Recovery Act, 2009*

The prospects for increased goods movement through the Tampa Bay region are considered not only for the potential impacts they may have on the transportation system but also for their effects on the regional economy. The freight transportation system is a critical component of the regional economy. Efficient and safe freight mobility supports commercial and industrial growth, job creation, and a high quality of life. The freight transportation system encompasses the trucking industry, maritime shippers and supportive trades, air cargo providers, freight rail carriers, intermodal terminals, warehousing facilities and distribution centers. These activities directly account for over 31,800 basic sector jobs in the region and support additional non-basic sector employment[1].

Investments in freight transportation improvements that reduce the cost of moving goods to and from markets increase and sustain economic growth. Transportation congestion levels and site accessibility are key site location considerations as they affect an area's business costs, market, and overall competitiveness for attracting large-scale business investments. To capture its share of future economic opportunities, it is important for the Tampa Bay region to integrate county and regional economic development plans with transportation and comprehensive plans.

The success of airports, seaports, and rail intermodal facilities to attract new clients, satisfy existing clients, and remain competitive for world trade is highly dependent on the effectiveness of the local transportation system to serve facilities. A transportation system that provides for efficient freight transport increases the area's business attractions, expansions, retentions, and startups. Implementing policies, strategies, and actions that improve transportation accessibility and provide a seamless conduit between intermodal facilities can stimulate economic growth.

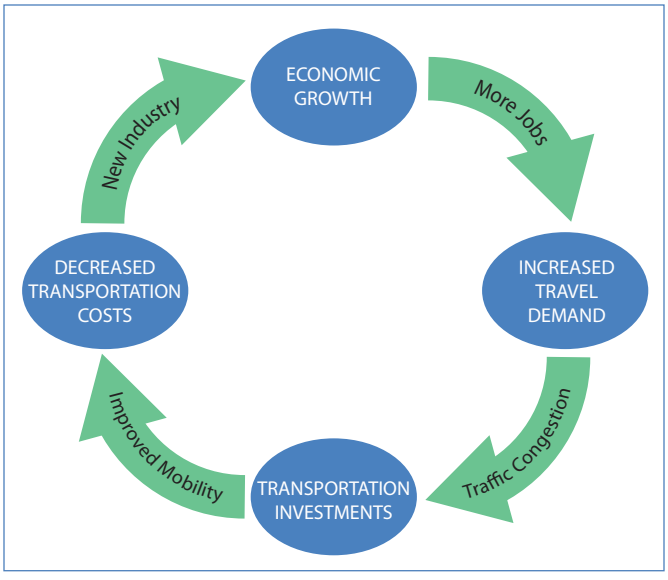


Figure 3-1: Transportation and Economic Growth

The efficient movement of goods throughout the region relies on the integration of freight infrastructure, equipment, personnel, and information systems. All of these components must work together in order to sustain the regional economy. Therefore, the movement of freight, as it relates to economic development, should be considered an important factor when developing annual priorities for transportation improvement projects. **Figure 3-1** shows the relationship between transportation infrastructure and economic growth.

Economic development and transportation are closely linked. Economic development stimulates transportation demand by increasing the number of workers commuting to and from work, customers traveling to and from service areas, and products being transported between produc-

1 *Basic jobs rely on external factors to fuel demand, such as mining and logging jobs. Non-basic jobs rely on local demand and usually employ local workers, such as grocery store and restaurant jobs.*

ers and consumers. Additional travel demand triggers the need for investment in the transportation system. Investments that decrease transportation costs, increase safety, and make transportation more reliable may, in turn, stimulate further economic development. A proper economic climate must also exist, as well as other support services. With these factors in place transportation improvements can become catalysts for economic growth.

The freight transportation industry directly employs nearly 32,000 people in the Tampa Bay region.

REGIONAL FREIGHT RELATED EMPLOYMENT

The freight transportation industry is a major employer in the Tampa Bay region. Freight transportation providers, warehouses, and distribution centers directly employ nearly 32,000 people working to expedite the movement of goods to consumers and businesses, as shown in **Table 3-1**. When other freight generating activities including manufacturing, mining, and wholesale trades are included, employment in industries affected by the movement of goods for the eight-county Tampa Bay area reaches over 240,000 workers.

Table 3-1: Freight Transportation Employment in the Tampa Bay Region

COUNTY	TRUCK	WAREHOUSING	WATER	AIR	RAIL	SUPPORT
Citrus	71	22	10*	0	N/A	10*
Hernando	453	750*	0	10*	N/A	52
Hillsborough	4,814	2,191	960	3,750*	N/A	2,615
Manatee	411	750*	N/A	10*	N/A	270
Pasco	482	60*	10*	10*	N/A	108
Pinellas	788	392	60*	375*	N/A	1,048
Polk	5,162	4,821	10*	10*	N/A	521
Sarasota	326	244	10*	66	N/A	176
TOTAL	12,507	9,230	1,060	4,231	N/A	4,800

Source: U.S. Census Bureau, 2009 County Business Patterns

**Median selected from range given by U.S. Census Bureau*

Figure 3-2 shows the number of establishments in 2010 in the freight-affected industries of transportation, manufacturing, and wholesale trade for each of the counties in the Tampa Bay area. The chart indicates that in 2010, a total of 10,816 freight-affected establishments were doing business in the region, representing around 19.37% percent of the statewide total.

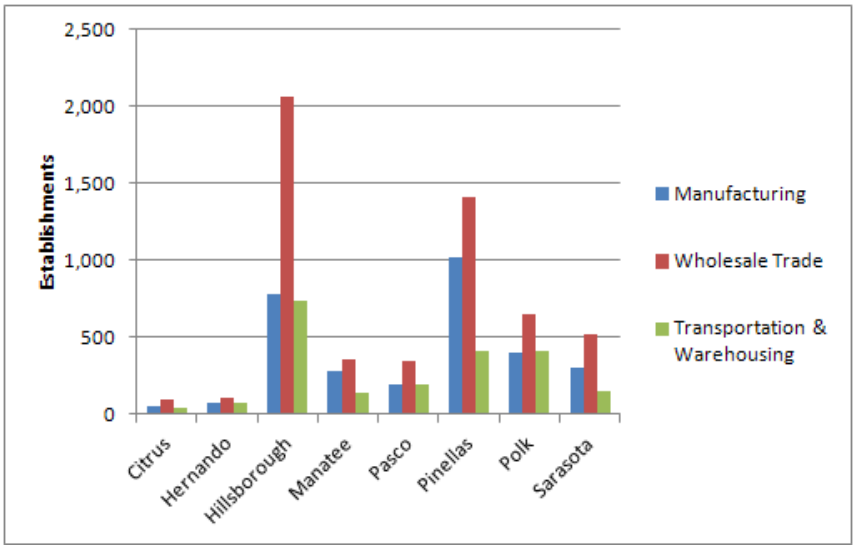


Figure 3-2: Establishments Directly Involved in the Goods Movement Industry

Source: U.S. Census Bureau, 2009 County Business Patterns

Figure 3-3 depicts the total number of employees within each of the three freight-affected industries for each of the counties. In 2010, a total of 243,882 employees worked in industries affected by the movement of goods in the region.

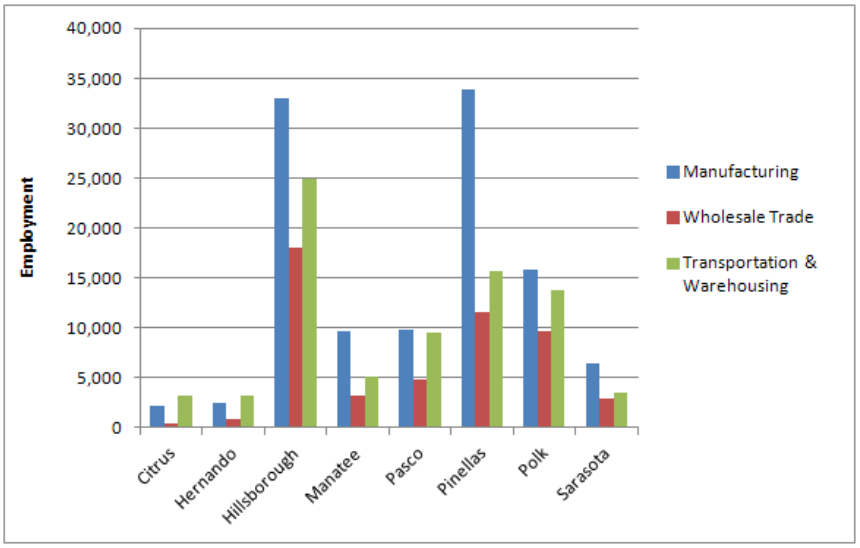


Figure 3-3: Direct Employment Affected by the Goods Movement Industry

Source: U.S. Census Bureau, 2010 American Community Survey

Figure 3-4 shows the annual payroll of the freight-affected industries for each county of the Tampa Bay area. The total payroll across all three freight-affected industries amounted to around $7.7 billion in 2009.

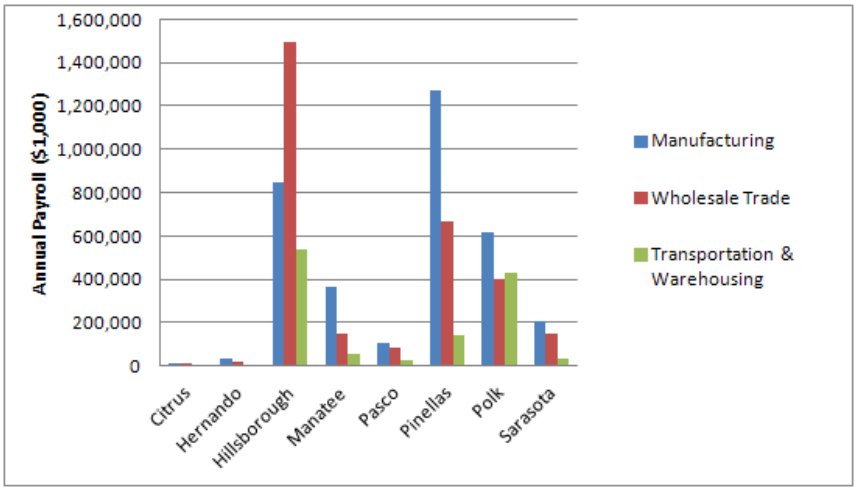
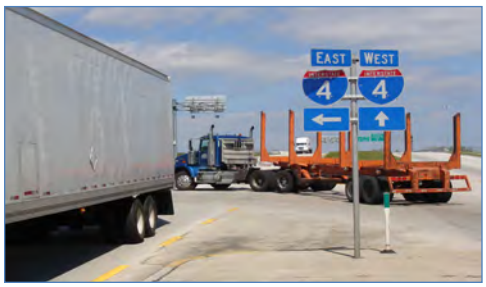


Figure 3-4: Annual Payroll Affected by the Goods Movement Industry

Source: U.S. Census Bureau, 2010 American Community Survey

The region's economic health is directly related to the efficiency of the regional freight transportation network. An accessible freight network produces economic stability by reducing transportation costs and allowing industries to concentrate on investments in infrastructure and operations. The ability to move goods and improve access to new markets is crucial to industry retention and development in the Tampa Bay region.



The Tampa Bay region's freight transportation network is an extraordinary resource for the promotion of commerce, the creation of jobs, and the improvement in the quality of life of our residents. The efficiency of the freight network to seamlessly transport goods throughout the region and across modes directly affects the region's economic prosperity. Preserving transportation access to the region's freight activity centers including the seaports, airports, intermodal freight rail facilities, as well as freight terminals, warehouses, and local and regional distribution centers, is vital to the region's success in attracting new industries.

Tampa Bay's freight transportation system includes regional freight activity centers (FACs) and the freight transportation network that connects FACs to each other and to markets across the state and country. The types of facilities that comprise the freight transportation network serving the region's FACs include roadways, railroads, shipping channels, and pipelines. The Tampa Bay Regional Freight Transportation Network is shown on **Map 4-1**. The regional freight transportation network and freight activity centers are also portrayed for certain areas of the region on **Maps 4-2 through 4-5**.

This section describes the Tampa Bay region's freight transportation network and the major FACs and their role in supporting economic development in the region. It describes general commodity flows to, from and within the region to reveal the various roles played by different types of FACs and each of the modal networks.

REGIONAL FREIGHT ACTIVITY CENTERS

Regional Freight Activity Center Intensity Variables

- Level of existing freight activity
- Level of intermodal transshipment
- Geographic extent of the market served by the center
- Existing industrial and freight-supportive land uses
- Capacity for expansion and growth
- Consistency with region's vision for economic growth
- Future industrial and related land use designation
- Estimated future truck, rail, and other freight traffic
- Existing or emerging role in the regional economy

As important "economic engines" of the Tampa Bay region, freight activity centers are a critical component of the region's freight transportation network. These centers contribute to the area's base employment and typically generate intense freight activity, including long-haul shipments to areas outside of the region. Freight activity centers have been identified throughout the Tampa Bay region to provide context for where industrial and freight logistics activity is heaviest and to define strategies for preserving and improving mobility on the transportation corridors that serve them.

While all of the regional freight activity centers generate high levels of truck traffic, many of the centers also have significant transshipment operations supporting multiple modes including freight rail, air cargo, and sea vessels. With some exceptions, most of the region's FACs have sufficient capacity for expansion and future industrial land use designations that provide for this growth. The intensity of the region's freight activity centers varies primarily depending on the types of freight activities, but each center is important to the local and regional economy.

The majority of the region's FACs are proximate to the Interstate-4 (I-4) corridor that provides high grade transportation facilities for the transport and distribution of goods. These include high speed

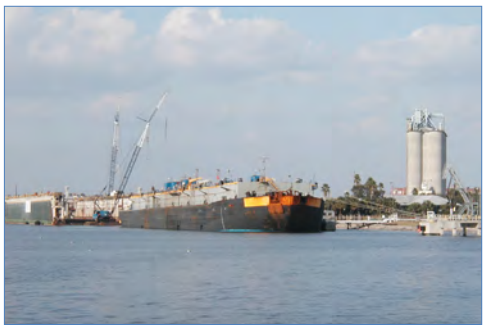
limited access facilities such as I-4, Selmon Expressway, and Polk Parkway, as well as CSXT freight rail lines. Freight terminals at the Port of Tampa and the air cargo operations at Tampa International and St. Petersburg/Clearwater International Airports anchor the western part of the corridor. Major CSXT intermodal yards are located north of Tampa International Airport in the Anderson Road Industrial Park, northeast of the Port in the South East Tampa Industrial area, and in the distribution hubs of Plant City and Polk County.

The Interstate-75 (I-75) corridor is also an important freight corridor serving the Port of Tampa, Port Manatee, and distribution facilities in Sarasota, Manatee, Hillsborough and Hernando Counties. While I-75 is the primary limited access facility serving FACs in the corridor, US 41 and US 301 both serve as important regional freight mobility corridors. In addition, CSXT freight rail lines provide service to both seaports and to the distribution centers in the I-75 corridor.

Seaports

The most significant economic generators in the Tampa Bay region are the Port of Tampa and Port Manatee. These ports are the region's principal gateways for goods bound for and arriving from foreign and other domestic producers and markets. These ports have favorable geography as the closest U.S. deepwater seaports to the Panama Canal, and over 50 percent of Florida's population is within their primary market areas. With nine million residents and 50 million tourists visiting annually within a 100 mile radius, both ports have a large market for expansion and growth.

The **Port of Tampa** is Florida's largest deepwater port in terms of tonnage, handling approximately 40 percent of all waterborne commerce passing through the state. In 2010, the Port of Tampa handled over 37 million tons of cargo, primarily liquid fuels, fertilizer and other bulk and liquid bulk commodities. The port's container business also has good growth potential. The number of containers handled at the port grew significantly from 2003 to 2007 with a subsequent modest decline due to the downturn in the economy. The port has made substantial recent investments in preparation for expanding its container business, including the addition of new wharfs, the purchase of several transloading cranes, the expansion of the container yard to over 60-acres, and the addition of new rail tracks that will facilitate the on-port loading of intermodal trains. The Port of Tampa is the most diverse port in Florida in terms of the types of commodities that are handled. It is home to over 100 tenants, which is more than the number of tenants at all other Florida ports combined. An economic impact study based on 2005 data found that the port contributes nearly $8 billion to the regional economy and supports around 100,000 direct and indirect jobs. [1]



Port of Tampa

- The largest, most diversified port in Florida
- Contributes nearly $8 billion annually to the Tampa Bay region's economy
- Encompasses 5,000 acres, the largest in the US
- Pays approximately $570 million in taxes
- Directly or indirectly responsible for almost 100,000 jobs
- Handles 40 percent of Florida's waterborne cargo
- In 2009, handled 37.8 million tons of inbound and outbound cargo

1 *Tampa Port Authority*

Port Manatee

- Contributes $2.3 billion to the regional economy and $2.4 billion statewide (2012)
- Paid taxes of $64 million in Manatee County, $79.9 million in six-county area, and $85.9 million statewide (2006)
- In 2008, handled 8.3 million tons of cargo
- Supports more than 24,000 jobs regionally (2012)

Encompassing 5,000 acres, the Port of Tampa is the largest port in the country in terms of acreage. Much of this land remains undeveloped, positioning the port for further expansion in the future. All of these variables position the port for steady, sustainable growth.

Through the development of their Master Plan, the Port of Tampa defined the Port Activity Center that encompasses the port-related uses in area and provides for agency coordination in the designation of land uses in the area. This planning tool ensures land use compatibility in the port area and allows for the preservation and future growth of the port supportive uses and the transportation corridors that serve them.

Port Manatee is another major seaport in Tampa Bay. Though not as large as the Port of Tampa, Port Manatee is expanding rapidly and handles over eight million tons of cargo annually. Major imports and exports traveling through Port Manatee include liquid fuels, cement, forestry products, fertilizer, fruit and juices, natural gas, and automobiles.[2]

The Port Manatee Improvement District, which includes the Port Manatee Encouragement Zone, consists of almost 5,000 acres of largely undeveloped land. Extensive incentives for development such as logistically focused manufacturing, processing, warehousing and distribution facilities are offered to attract port-compatible uses to the area.

The tonnage of cargo transported through the Port of Tampa and Port Manatee is anticipated to grow in the coming years, with emphasis on bulk, break bulk, Roll-On/Roll-Off, and project cargoes. Both ports have available land to develop new lines of business and expand current operations. Expansion of container trade can be facilitated as both ports are expanding terminal capacity, acquiring new equipment, and streamlining landside access for containerized cargo. Expanding markets in the southeastern U.S., Latin America, and the Caribbean as well as the expansion of the Panama Canal will bolster Tampa Bay as a regional trading center in the global economy. However, limited channel depth, the Ports' relatively long distance to North American markets other than the southeast, major capital improvements at competing ports around the country, and scarce funding resources for infrastructure improvements will temper growth at both Port Manatee and the Port of Tampa. Nonetheless, the seaports will continue to generate and facilitate high levels of industrial and freight activity and increase demand for freight roadway, rail, and pipeline capacity in the foreseeable future.

Over 180 million pounds of cargo and 11.9 million pounds of mail were transported through Tampa International Airport in 2010. Over 146 million pounds of cargo are estimated to be transported in 2025.

Airports

Airports provide fast connections between Tampa Bay and distant origins and destinations for certain types of cargo. While relatively low volumes of freight are handled by airports, they provide

2 *Manatee County Port Authority*

a critical link in national and international supply chains for time-sensitive relatively high value cargoes. Major air cargo providers in the Tampa Bay region include Federal Express, UPS, Flight Express, and the U.S. Postal Service. The region's two major cargo airports, Tampa International Airport and St. Petersburg-Clearwater International Airport, handled over 100,000 total tons of cargo in 2010.[3]

Other airports in the region with smaller cargo operations or with the potential for future cargo operations include Inverness Airport, Hernando County Airport, Zephyrhills Municipal Airport, Tampa Executive Airport, Sarasota-Bradenton International Airport, Lakeland Linder Regional Airport and Bartow Municipal Airport. Most all of these airports are adjacent to industrial and warehousing land use clusters. These uses generate substantial truck traffic and are included within the FACs that encompass the airports. While heightened security requirements and rising fuel costs are factors in the air cargo market, moderate growth in air cargo and supporting trucking and freight activity around airports is expected as a result of industrial recruiting and economic development strategies throughout the Tampa Bay region promoting these FACs and providing incentives for their development.

St. Petersburg-Clearwater International Airport processed 15,591 tons of air cargo in 2010, has an estimated economic impact of $748 million (annually) and is directly or indirectly responsible for an estimated 9,580 jobs in the region.

CSXT Intermodal Facilities

While CSXT serves clients in many of the freight activity centers throughout the Tampa Bay region, it operates several rail facilities that generate significant rail and truck freight activity. The primary intermodal facility is the Uceta Yard south of Broadway Avenue in East Tampa. The CSXT intermodal facility is divided into two rail yards. At the north yard, approximately 85,000 containers are transferred between CSXT rail cars and trucks annually. The south yard is used for bulk transfer and to marshal phosphate and other product-specific trains. Nearby, the CSXT TRANSFLO Yard south of SR 60 is used for intermodal transfer of chemicals, petroleum, and other bulk products from rail to truck.

CSXT also operates the Total Distribution Services, Inc. (TDSI) Auto Yard, a 100 acre facility extending along both sides of Sligh Avenue east of Anderson Road and north of Tampa International Airport. The Auto Yard is a 75-acre facility used to unload new automobiles and has a capacity of 3,600 vehicles. The new automobiles are transported by truck to automobile dealerships throughout the region. The new Integrated Logistics Center (ILC) in Winter Haven provides additional capacity to relocate some of the intermodal activities at the TDSI Auto Yard, but existing facilities will continue to generate substantial amounts of freight rail and trucking activity in the near future.

3 http://www.tampaairport.com/about/facts/tia_fact_sheet_short.pdf and http://www.fly2pie.com/media/statistics/cargo_stats_2010.pdf

Additional freight rail activity is generated by other CSXT yards. The East Tampa yard, located west of US 41 and north of the Alafia River, serves the Mosaic Company fertilizer plant, delivering bulk phosphate rock and ammonia. The Rockport bulk loading facility, located east of US 41 and south of Causeway Boulevard, is used to transfer bulk phosphate products from trains to ships. Near the Hillsborough County - Pasco County line, the CF Industries Plant City phosphate fertilizer manufacturing plant is served by a rail yard linked to the CSXT Yeoman Subdivision.

Manatee County houses a small CSXT yard located south of the Hillsborough County line that serves Port Manatee. The Tropicana Products plant also has a yard for assembling the transport of juice concentrate to processing plants in the northeast and the Midwest to merchants.

There are also several CSXT yards located in Polk County. The Winston Yard in the West Lakeland FAC just to the northeast of the Lakeland Airport serves the phosphate mines to the south and connects to the A-line in Lakeland. In addition to phosphate, general mixed cargo trains are transported through the yard. There are also several CSXT yards in Mulberry in western Polk County associated with the transport of phosphate to the Mosaic Company fertilizer plant between Mulberry and Bartow on the north side of SR 60.

In addition, the planned CSX Integrated Logistics Center (ILC) in Winter Haven will serve as a centralized transportation and logistics hub for CSXT. The ILC terminal will handle the transfer of new automobiles as well as containers from railcars to trucks. The contents of the containers will consist of consumer goods such as merchandise, food products, and building materials. Shipments from the ILC are anticipated to be distributed to retailers throughout Florida.

Distribution Centers

Distribution centers are specialized warehouses where goods are stocked for redistribution to retailers, wholesalers, or in some cases, individual customers. These warehouses are critical components of an evolving supply system in which goods are delivered to markets on an as-needed basis, reducing in-store inventories and providing cost efficiencies to retailers and consumers. Distribution centers have emerged as major employment centers throughout central Florida - in the Tampa Bay and Orlando metropolitan areas, and most notably in Polk County and Plant City. Companies such as Advance Auto Parts, Best Buy, Haverty's, Home Depot, JC Penny, Publix, Rooms to Go, Wal-Mart, and many others have located major distribution centers in the area.

Extensive additional growth in distribution activity is expected in the Interstate-4 corridor, particularly in Polk County and Plant City. These areas are centrally located to large regional markets and served by high-speed, high-volume roadways and long haul rail-

roads, providing a high level of accessibility to Florida markets and to the southeastern U.S. Additionally, land values in these areas are more affordable than in the Tampa and Orlando markets, while public-private partnerships like the Central Florida Development Council and Plant City Economic Development Council offer incentives to spur industrial development. Finally, Polk County boasts a growing logistics workforce with specialized training through institutions like the Florida Polytechnic University and Polk State College, bolstering its attractiveness as a site for distribution activity.

Many of the FACs with significant distribution activities in the Tampa Bay region are found in Polk County or Plant City. These include existing and emerging areas where distribution activities are concentrated and/or are expected to grow. These distribution activities will serve an increasingly important role in streamlining supply chains and ensuring the efficient and affordable delivery of goods to markets throughout the state, especially as container cargo traffic increases through the Port of Tampa and Port Manatee.

Mining Activities

A major industry that generates significant truck and rail freight traffic in the Tampa Bay region is the mining of rocks and minerals, most notably phosphate and limestone. Mining is land intensive, and once extraction of minerals at various sites has been completed, the land is reclaimed and restored for other useable purposes and new mining areas are identified. Due to these characteristics of the mining industry, the mining areas in the region have not been identified as regional freight activity centers. However, mining is one of Florida's oldest industries and remains a substantial contributor to the state economy as well as a key driver of seaport, rail, and trucking activity in the Tampa Bay region.

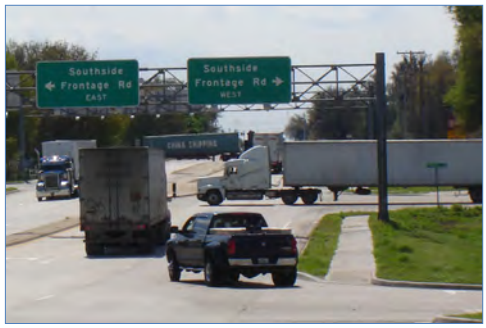
Phosphate mining occurs in central Florida's "Bone Valley" region, which includes portions of Polk, Hillsborough, Manatee, Hardee, and DeSoto Counties. Phosphate is a key component of agricultural fertilizers and the region's primary export. The phosphate is mined and fertilizer is manufactured in proximity to the mines. Approximately 8.3 million tons of phosphate products were shipped through the Port of Tampa in 2010.[4] To a lesser extent, finished phosphate and fertilizer products are also shipped through Port Manatee.

Rock quarrying is the primary mining activity in Hernando County, with over 16,000 acres dedicated to or available for that use.[5] The quarries primarily support the construction industry, providing materials such as limestone that are critical to the creation of concrete and asphalt, while some of the soft rocks and minerals extracted (including phosphate) are used in agricultural products.

In 2010, approximately 8.3 million tons of phosphate products were shipped through the Port of Tampa.

4 *Tampa Port Authority*
5 *Hernando County Future Land Use map, July 2010*

The significance of phosphate and rock mining to the Tampa Bay region's economy and freight activity is expected to continue for the foreseeable future. However, there is uncertainty about the level of new permitted mining activity for recoverable phosphate and rock over the coming decades. For phosphate, a non-renewable resource, the prime mining areas of the Bone Valley have largely been tapped, and although additional extraction remains viable at new sites, the quality of the rock tends to be lower and presents technological challenges. Moreover, population growth and hinterland development in Florida have rendered other minable sites inaccessible, and development pressures could continue to constrain potential mining areas in the years to come. Meanwhile, advancements in agricultural practices may diminish demand for phosphate fertilizers in the future, contributing to the longevity of the mines, but potentially limiting their output over the years.[6]



The freight roadway network supports the vast majority of freight tonnage moving through the Tampa Bay region.

REGIONAL FREIGHT TRANSPORTATION NETWORK

The freight transportation network provides for the mobility of the broad range of goods traveling through the Tampa Bay region. The capacity and efficiency of the roads, railroads, waterways, pipelines, and freight aviation facilities that compose the freight network – and how well these modes interact with each other – influences the region's economic competiveness. The various roles and characteristics of the component modes of the freight network are described below.

Roadways

The regional freight roadway network supports the vast majority of freight tonnage moving through the Tampa Bay region. Roadways serve most overland freight traffic between Tampa Bay and other markets across the state and nation, and it handles most freight movements within the region. Much of the delay in the delivery of cargo and goods to their destination is experienced on the freight roadway network because this is the only part of the freight network that is shared with other uses. Trucks almost always share the same roadway with commuters. This reality also presents opportunity for roadway design strategies to move freight and commuter traffic more efficiently on the roadway network.

The freight roadway network consists of a variety of facility types, each of which performs an assortment of overlapping and mutually supportive roles in providing regional mobility and access to FACs. The hierarchy of the regional freight roadway network includes limited access facilities, regional freight mobility corridors, freight distribution routes, and freight activity center streets. The regional freight roadway network is shown on **Map 4-1**.

6 *University of South Florida Polytechnic, Florida Industrial and Phosphate Research Institute*

Limited access facilities provide uninterrupted flows for high volumes of traffic and serve as primary trade corridors connecting the Tampa Bay region to the rest of the state and country. These limited access facilities are part of the Strategic Intermodal System and include all Interstate highways and tolled roadways within the Tampa Bay region. These facilities include I-4, I-75, I-275, and I-375 as well as the Selmon Expressway, Veterans Expressway, Suncoast Parkway and Polk Parkway. The I-4/Selmon Expressway Connector, a toll facility currently under construction, will include dedicated truck lanes providing direct access between I-4 and major freight terminals at the Port of Tampa.

Regional freight mobility corridors provide high capacity connections between freight activity centers and limited access facilities. These facilities carry long-haul truck trips and host high volumes of truck traffic. Regional freight mobility corridors serve as a vital part of the freight roadway network and are a subset of the freight distribution routes. All of the regional freight mobility corridors in the Tampa Bay region also serve as important corridors for commuters traveling to major employment centers.

Freight distribution routes include state roadways and other truck routes designated in local ordinances at the county and municipal levels. Freight distribution routes distribute truck traffic from regional freight mobility corridors to local delivery areas. By law, trucks must remain on freight distribution routes until they reach the closest point to their final destination before turning on to local streets for delivery. The freight distribution routes provide an adequate network for trucks to deliver goods, while also minimizing truck traffic on other local roads within populated areas.

Freight activity center streets are local and collector streets that provide direct access to freight activity centers and other streets located within the boundaries of a freight activity center. Their primary purpose is to provide truck circulation within industrial areas and provide direct access to destinations within freight activity centers. These streets often are the "last link" to a freight destination and thus are an important part of the freight roadway network.

Types of Freight Roadways

- Limited Access Facilities
- Regional Freight Mobility Corridors
- Freight Distribution Routes
- Freight Activity Center Streets

Seaports and Waterways

The water component of the freight system is the primary means of exporting large quantities of goods overseas. Deep-draft ships entering and leaving Tampa Bay use the Egmont Channel and Mullet Key Cut, which link the shipping channels and turning basins at all Port of Tampa and Port Manatee berths to oceanic trade lanes. The planned expansion of Cut A and Cut B in the main navigation channel from widths of 500 feet to 600 feet will provide sufficient width at the mouth of Tampa Bay to accommodate two-way traffic for all cruise and cargo vessels calling on the region's ports. **Map 4-1** displays the location of the shipping channels and port facilities.

Railroads

Railroads are an efficient mode for transporting containerized, bulk, and break bulk cargoes between the region's freight activity centers and statewide and national destinations. The freight railroad network in the Tampa Bay region consists primarily of CSXT mainline tracks, sidings, branch lines, and spurs serving FACs and other industrial activity areas. CSXT owns 1,508 rail miles across Florida, with a large number of those miles serving the Tampa Bay region. Imported and domestic automobiles and Tropicana Orange Juice constitute the commodities transported by CSXT in the study area.

In addition to the CSXT lines, there are several short line freight rail operations in the Tampa Bay region. The regional rail network is shown on **Map 4-1**. The Florida Northern Railroad operates a short line track in Citrus County, serving the Crystal River energy complex. The Seminole Gulf Railway is located along the Western edges of Sarasota and Manatee Counties, stretching from Oneco to Venice. The primary commodities transported on this rail line include building materials, newsprint, beer, liquefied petroleum (LP) gas, pulpwood, logs and stone. The Florida Midland Railroad in eastern Polk County consists of two lines that comprise over 28 route miles. One line runs between Gordonville and Winter Haven while the other connects Frostproof and Lake Wales. The primary commodities the railroad transports include food-related products, chemicals, lumber, stone, building products, fertilizer, citrus juices, pumice, and limestone. The Florida Power and Light Railroad in northwestern Manatee County is a 17-mile rail line that stretches from Parrish to Palmetto. The railroad is used by Florida Power and Light to transfer large mechanical parts to its Unit 3 power plant in Parrish.

CSXT owns 1,508 rail miles across Florida, with a large number of those miles serving the Tampa Bay region.

Aviation

Freight aviation allows for the quick transport of time-sensitive goods over long distances. In the Tampa Bay region, the primary airports handling air freight are Tampa International Airport and St. Petersburg-Clearwater International Airport. Other airports with growing freight activity are Hernando County Airport, Zephyrhills Municipal Airport, Lakeland Linder Regional Airport, and Sarasota-Bradenton International Airport. Airport locations are displayed on **Map 4-1**.

Pipelines

Pipelines provide efficient, cost-effective transportation of imported fuels to major users. Pipelines in the Tampa Bay region link fuel terminals at Port Tampa and Hookers Point to MacDill Air Force Base, Tampa International Airport, and Orlando International Airport, keeping thousands of tanker trucks off of the regional freight roadway network every day.

COMMODITY FLOWS

The FACs are responsible for the vast majority of freight vehicle trip origins and destinations in the Tampa Bay region, including a diverse array of commodities using a variety of transportation modes. In 2009, a total of over 270 million tons of freight was estimated to originate, terminate, or circulate within the Tampa Metropolitan Statistical Area (MSA), which includes Hillsborough, Pinellas, Pasco, and Hernando Counties.[7] By 2040, that figure is projected to climb to over 430 million tons.[8] Brief descriptions of the major commodity flows into, out of, and around the region are provided below.

Major Inbound Commodities

Daily activity in the Tampa Bay region depends on the influx of a variety of goods from other areas. Inbound cargoes account for almost half of all freight activity in the region (125 million tons in 2009 for the Tampa MSA). The top five inbound commodities by weight are shown in **Figure 4-1**.

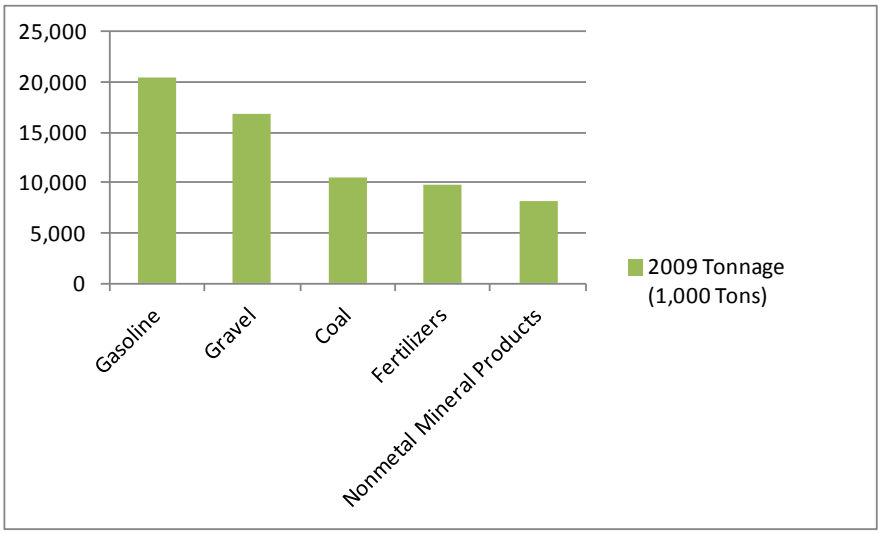


Figure 4-1: Top Five Inbound Commodities by Weight to Tampa MSA, 2009

Source: Freight Analysis Framework 3.1.2, 2010, FHWA Office of Freight Management and Operations

Major Outbound Commodities

The influx of diverse cargoes from other areas is complemented by the outbound flow of commodities originating in the Tampa Bay region. The area's FACs and mining operations produce a substantial amount of freight to be distributed to international and domestic destinations. In 2009, over 95 million tons of freight left the Tampa MSA. The top five outbound commodities by weight are shown in **Figure 4-2**.

7 *Similar metropolitan level data for Citrus, Polk, Sarasota, and Manatee Counties were not available.*

8 *2009 Estimates and 2040 projections based on 2009 FAF tables – same for all tonnage citations.*

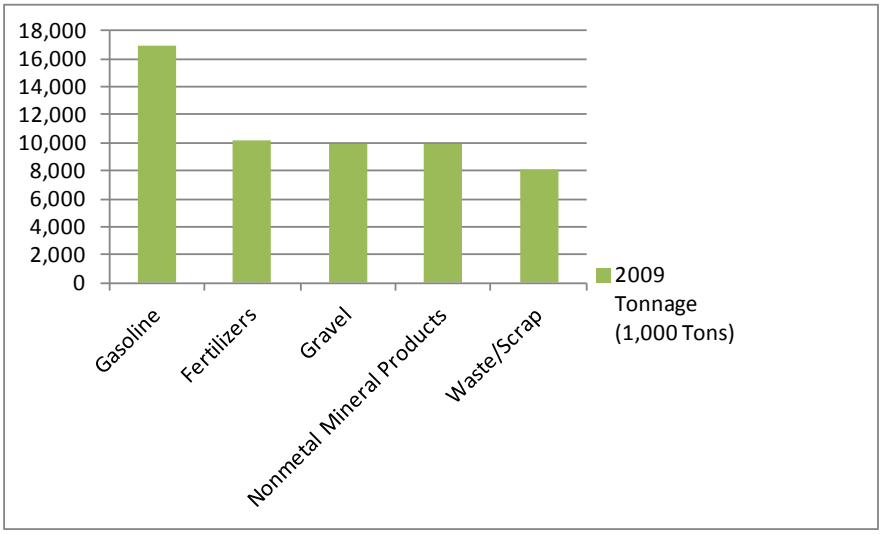


Figure 4-2: Top Five Outbound Commodities by Weight from Tampa MSA, 2009

Source: Freight Analysis Framework 3.1.2, 2010, FHWA Office of Freight Management and Operations

Major Internal Commodities

Finally, many of the raw materials and finished goods produced within the Tampa Bay region stay within the region for use by local businesses and residents. Over 52 million tons of freight originated and terminated in the Tampa MSA in 2009. The top five commodities circulated within the region by weight are shown in **Figure 4-3**.

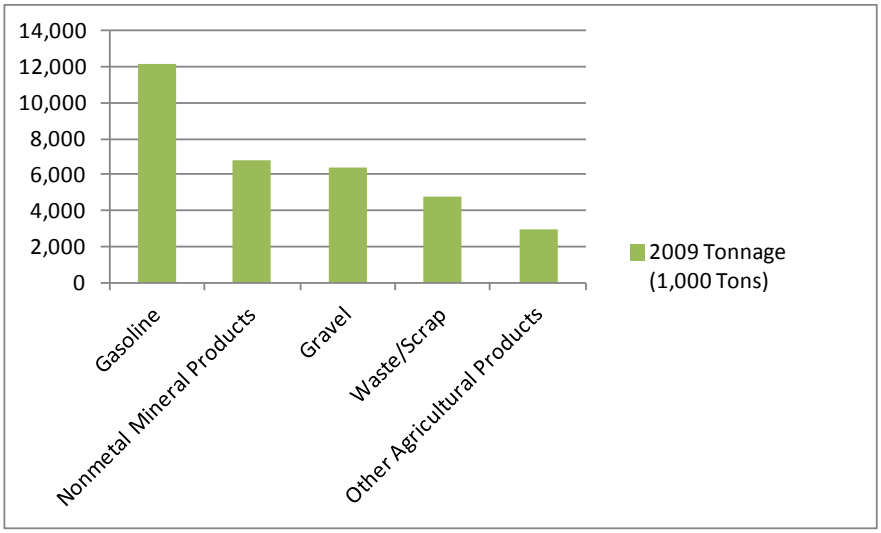


Figure 4-3: Top Five Internal Commodities by Weight within the Tampa MSA, 2009

Source: Freight Analysis Framework 3.1.2, 2010, FHWA Office of Freight Management and Operations

Summary of Major Regional Commodities

Several principal commodities account for the majority of overall freight traffic in the Tampa Bay region. Gasoline refers to motor vehicle and aviation turbine fuel. These fuels accounted for over 18 percent of the Tampa MSA's total freight tonnage in 2009. Fertilizers are primarily phosphate derived and move into the Tampa MSA from the Bone Valley area and are distributed across the country and the world from Tampa. Coal is brought into the region to provide fuel for electrical power generation. Gravel and nonmetal mineral products, including stone, crushed stone, concrete and other materials, also support the construction industry. Other agricultural products, as shown in the graph on the previous page, includes citrus and other produce. In the Tampa Bay region, waste/scrap refers primarily to scrap metals such as steel and aluminum that are shipped abroad for use in manufacturing processes.

Together, these principal commodities represented more than 56 percent of freight tonnage moved through the Tampa MSA in 2009. These bulk commodities drive the economic activity at the Port of Tampa and support numerous industries in the region. They are likely to remain the region's primary cargoes for the foreseeable future. However, the anticipated growth in container traffic at the Port of Tampa and Port Manatee will likely increase the tonnage of break bulk cargoes like manufactured goods, electronics, and furniture flowing through the region and generate additional truck traffic in the coming decades.

DIVERSITY OF PRODUCTS, DIVERSITY OF FREIGHT MODES

The various commodities moving through the Tampa Bay region are carried by a variety of transportation modes, including trucks, sea vessels, freight trains, cargo planes, and pipelines or some combination of these modes.

Modal Trends and Projections

The vast majority of freight – over 217 million tons or about 80 percent of the total – is moved by the truck mode alone, and trucks are expected to absorb most of the growth in freight traffic in the future. **Figure 4-4** shows the anticipated growth in freight traffic between 2009 and 2040 by mode.

The chart reflects the domestic mode only, not the mode by which foreign imports and exports are carried, which understates the importance of the water and air modes. However, the graph demonstrates that trucks are the primary freight vehicles serving the area's seaports and airports and underscores the importance of maintaining good roadway freight access to international terminals.

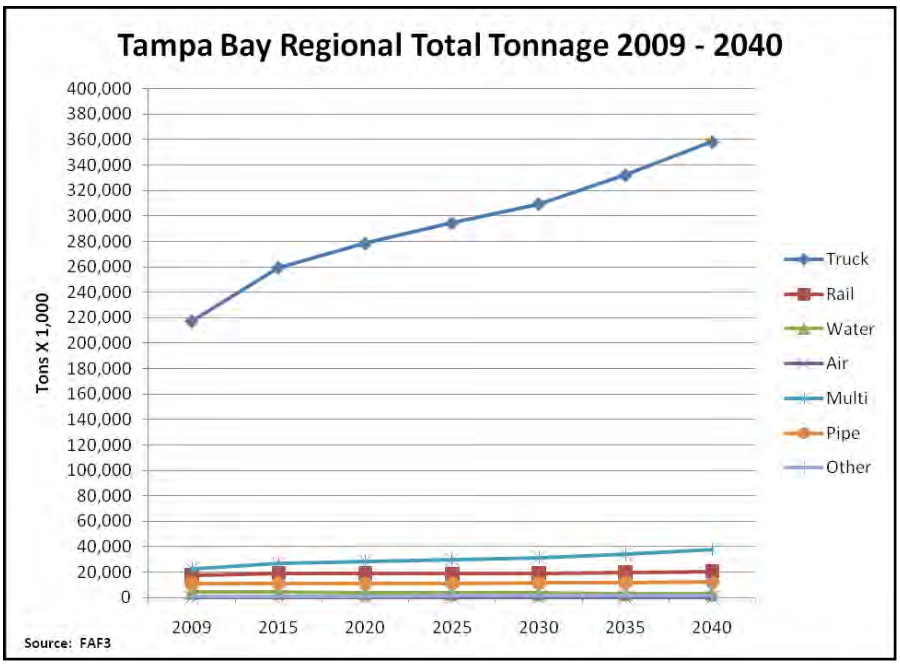


Figure 4-4: Estimated Total Tonnage Growth, 2009-2040

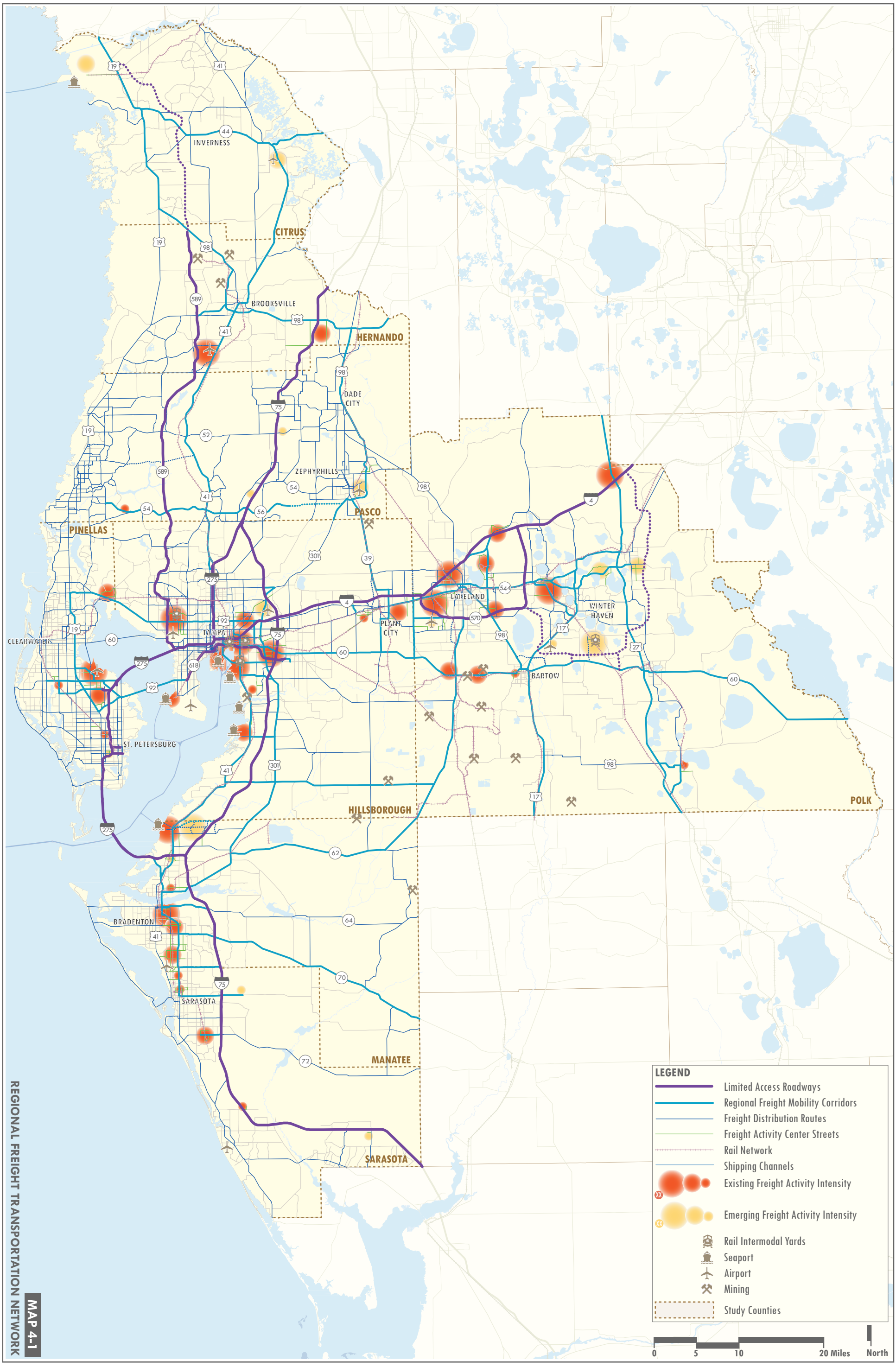
Source: Freight Analysis Framework 3.1.2, 2010, FHWA Office of Freight Management and Operations

One of the major reasons for the dominance of truck shipping is the fact that gasoline is distributed to the Tampa Bay region and other parts of Florida from seaport terminals at the Port of Tampa by truck. In many U.S. regions, gasoline is distributed by pipeline, alleviating the need for trucks to distribute fuels for general consumption. While the Port of Tampa, including Port Tampa, is connected by pipeline to Tampa International Airport, MacDill Air Force Base, and Orlando International Airport, the pipelines are used primarily for the shipment of aviation fuels. Thus, fuel for motor vehicles is almost exclusively delivered by truck.

Other key commodities carried primarily by the truck mode include gravel and nonmetal mineral products (building materials), waste/scrap (metals), other agricultural products (produce), fertilizers (phosphate derived), and other foodstuffs.

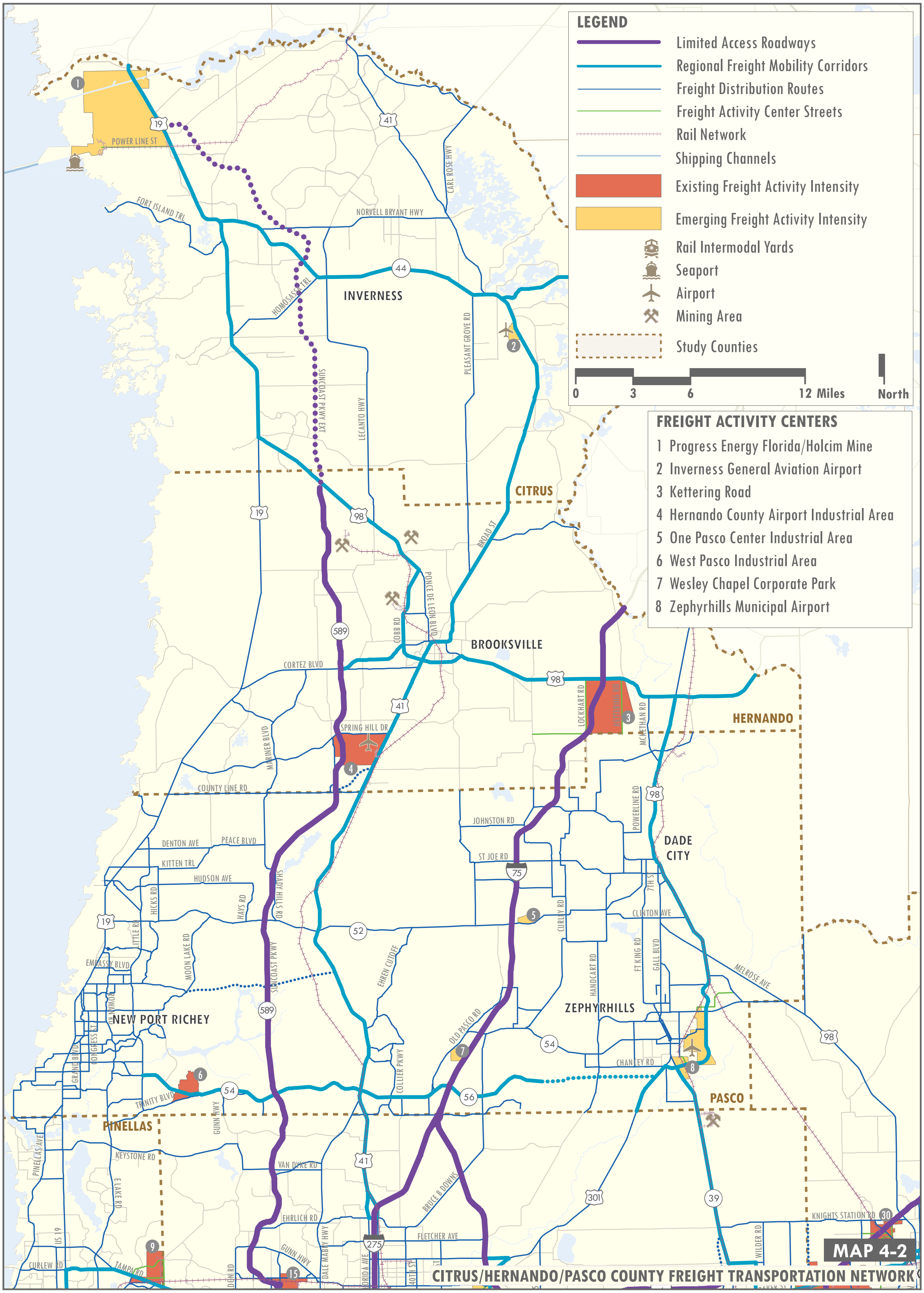
The rail mode is the other major overland carrier of goods. In 2009, railroads carried more than 16 million tons of freight (not including multimodal cargoes). The primary commodity moved by rail is coal, brought into the region to fuel electrical power generation. Other major commodities served by rail include nonmetallic minerals, fertilizers, and basic chemicals.

Many commodities are moved by a combination of modes, usually truck and rail. In 2009, at total 22.5 million tons were moved into, out of, or around the Tampa MSA by multiple modes. Major multimodal commodities include fertilizers, gasoline, nonmetallic minerals, coal, and animal feed. Multimodal freight tonnage is expected to increase between 2009 and 2040 at a faster rate than the rail only mode, but not as rapidly as the truck only mode.

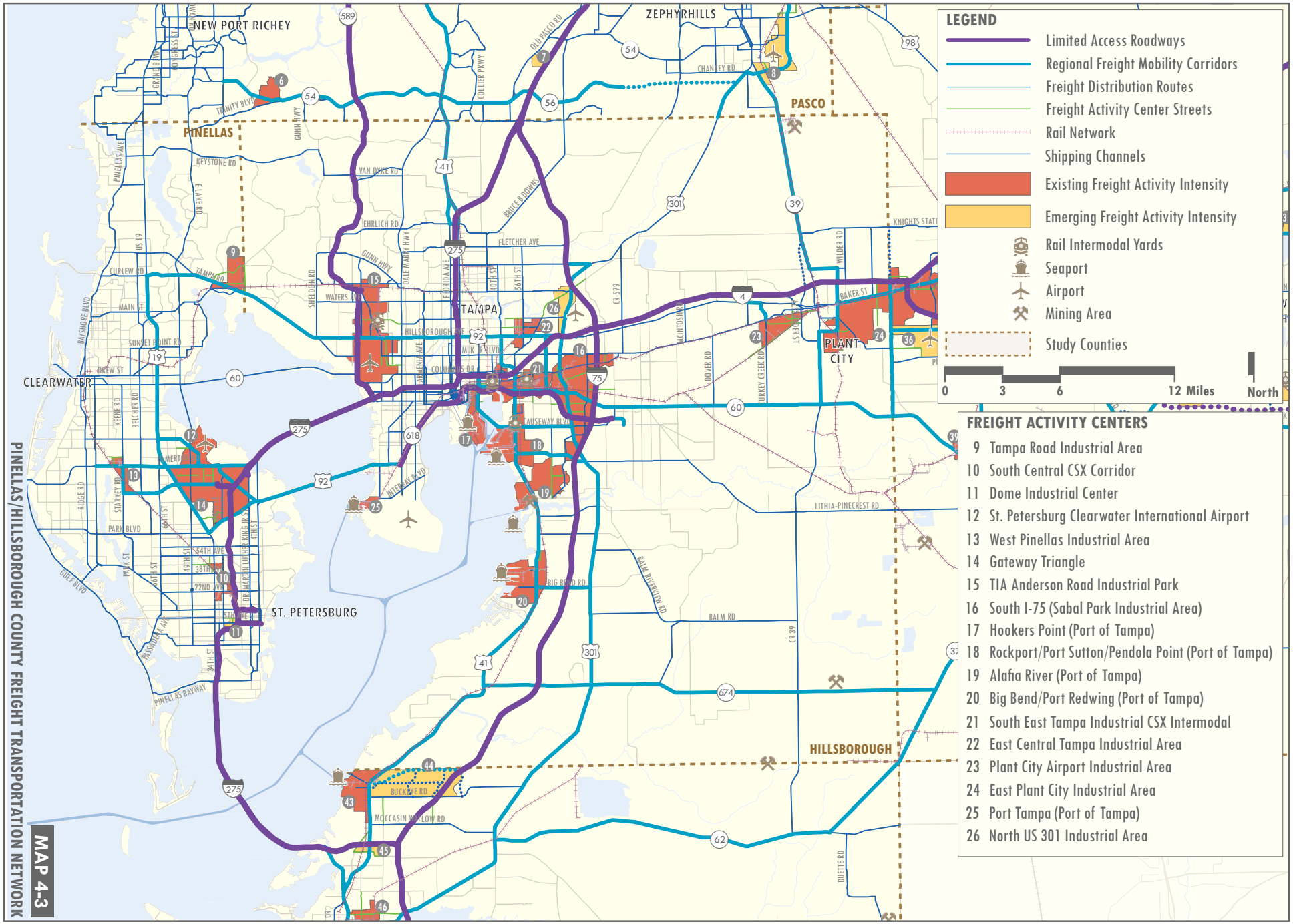


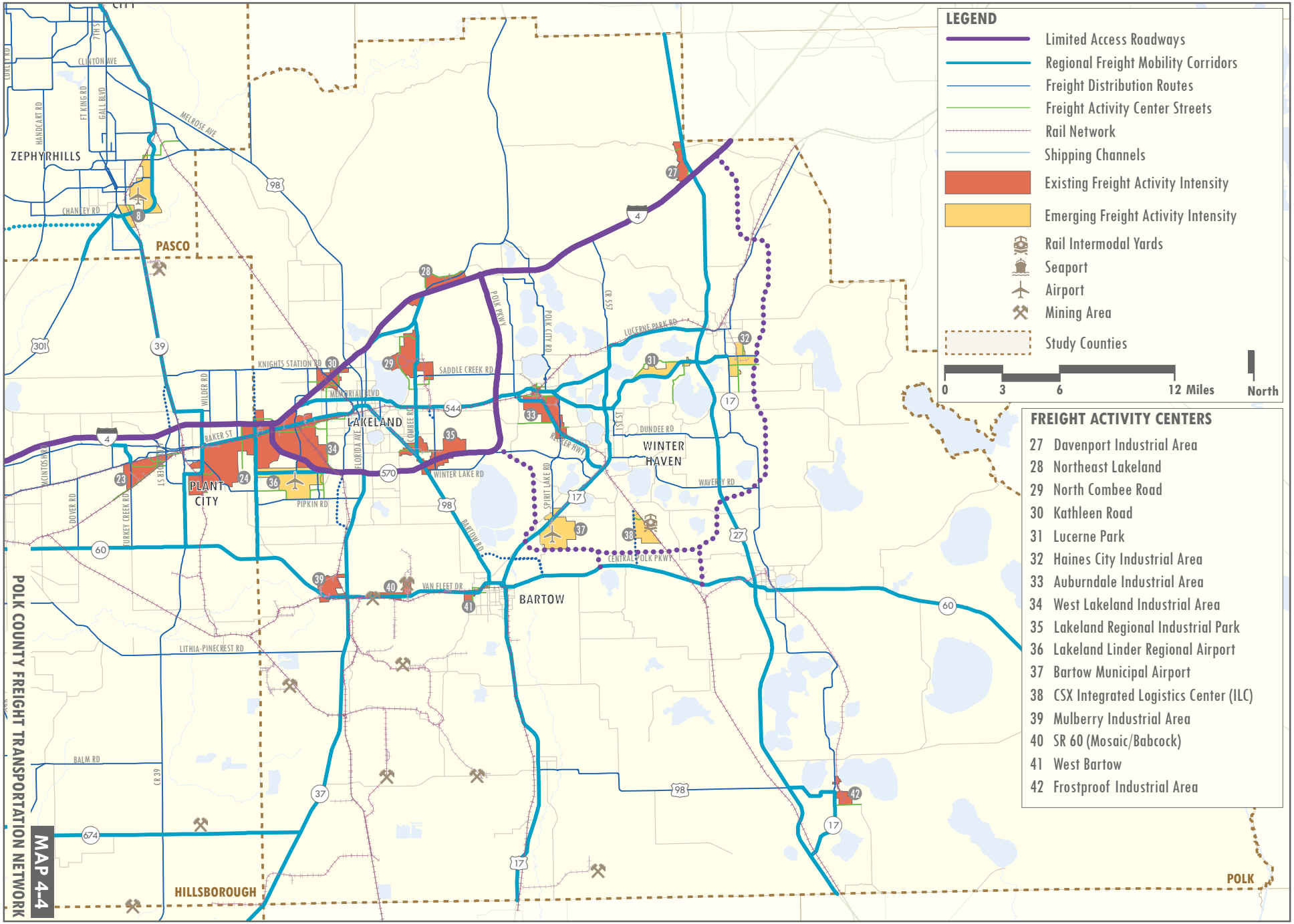
REGIONAL FREIGHT TRANSPORTATION NETWORK

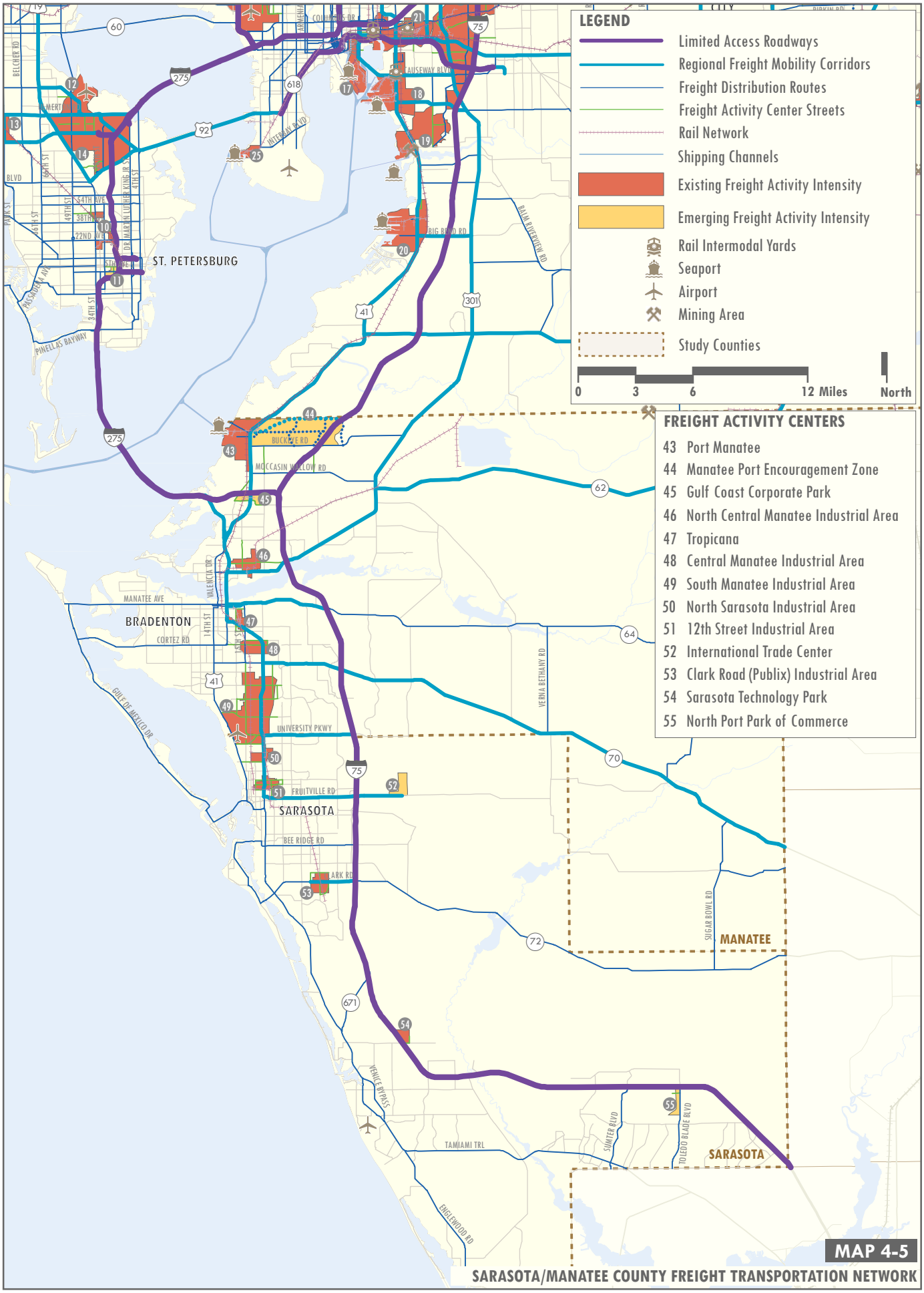
MAP 4-1



MAP 4-2
CITRUS/HERNANDO/PASCO COUNTY FREIGHT TRANSPORTATION NETWORK


LEGEND
Limited Access Roadways
Regional Freight Mobility Corridors
Freight Distribution Routes
Freight Activity Center Streets
Rail Network
Shipping Channels
Existing Freight Activity Intensity
Emerging Freight Activity Intensity
Rail Intermodal Yards
Seaport
Airport
Mining Area
Study Counties
0 3 6 12 Miles
North
FREIGHT ACTIVITY CENTERS
9 Tampa Road Industrial Area
10 South Central CSX Corridor
11 Dome Industrial Center
12 St. Petersburg Clearwater International Airport
13 West Pinellas Industrial Area
14 Gateway Triangle
15 TIA Anderson Road Industrial Park
16 South I-75 (Sabal Park Industrial Area)
17 Hookers Point (Port of Tampa)
18 Rockport/Port Sutton/Pendola Point (Port of Tampa)
19 Alafia River (Port of Tampa)
20 Big Bend/Port Redwing (Port of Tampa)
21 South East Tampa Industrial CSX Intermodal
22 East Central Tampa Industrial Area
23 Plant City Airport Industrial Area
24 East Plant City Industrial Area
25 Port Tampa (Port of Tampa)
26 North US 301 Industrial Area
NEW PORT RICHEY
ZEPHYRHILLS
PASCO
PINELLAS
TAMPA
CLEARWATER
ST. PETERSBURG
PLANT CITY
HILLSBOROUGH
PINELLAS/HILLSBOROUGH COUNTY FREIGHT TRANSPORTATION NETWORK
MAP 4-3


LEGEND
Limited Access Roadways
Regional Freight Mobility Corridors
Freight Distribution Routes
Freight Activity Center Streets
Rail Network
Shipping Channels
Existing Freight Activity Intensity
Emerging Freight Activity Intensity
Rail Intermodal Yards
Seaport
Airport
Mining Area
Study Counties
0 3 6 12 Miles
North
FREIGHT ACTIVITY CENTERS
27 Davenport Industrial Area
28 Northeast Lakeland
29 North Combee Road
30 Kathleen Road
31 Lucerne Park
32 Haines City Industrial Area
33 Auburndale Industrial Area
34 West Lakeland Industrial Area
35 Lakeland Regional Industrial Park
36 Lakeland Linder Regional Airport
37 Bartow Municipal Airport
38 CSX Integrated Logistics Center (ILC)
39 Mulberry Industrial Area
40 SR 60 (Mosaic/Babcock)
41 West Bartow
42 Frostproof Industrial Area
ZEPHYRHILLS
PASCO
LAKELAND
PLANT CITY
WINTER HAVEN
BARTOW
HILLSBOROUGH
POLK
MAP 4-4
POLK COUNTY FREIGHT TRANSPORTATION NETWORK


LEGEND
Limited Access Roadways
Regional Freight Mobility Corridors
Freight Distribution Routes
Freight Activity Center Streets
Rail Network
Shipping Channels
Existing Freight Activity Intensity
Emerging Freight Activity Intensity
Rail Intermodal Yards
Seaport
Airport
Mining Area
Study Counties
0 3 6 12 Miles
North
FREIGHT ACTIVITY CENTERS
43 Port Manatee
44 Manatee Port Encouragement Zone
45 Gulf Coast Corporate Park
46 North Central Manatee Industrial Area
47 Tropicana
48 Central Manatee Industrial Area
49 South Manatee Industrial Area
50 North Sarasota Industrial Area
51 12th Street Industrial Area
52 International Trade Center
53 Clark Road (Publix) Industrial Area
54 Sarasota Technology Park
55 North Port Park of Commerce
ST. PETERSBURG
BRADENTON
SARASOTA
MANATEE
SARASOTA
MANATEE AVE
CORTEZ RD
UNIVERSITY PKWY
FRUITVILLE RD
BEE RIDGE RD
TAMIAMI TRL
VENICE BYPASS
ENGLEWOOD RD
SUGAR BOWL RD
SUMTER BLVD
TOLEDO BLADE BLVD
VERNA BETHANY RD
MOCCASIN WALLOW RD
BUCKEYE RD
GULF OF MEXICO DR
PINELLAS BAYWAY
MAP 4-5
SARASOTA/MANATEE COUNTY FREIGHT TRANSPORTATION NETWORK

The freight transportation network is part of a larger multimodal transportation system that is continually being expanded and improved. Each year, projects are undertaken to build new roads and widen existing ones; improve roadway and railroad safety, operations, and reliability; enhance airport and seaport capacity and operational efficiency; and maintain existing transportation infrastructure. These investments to the freight transportation network are needed to maintain the region's economic competiveness through improved freight mobility and accessibility.

I-4/Selmon Expressway Connector

The I-4/ Selmon Expressway Connector is a new north-south elevated toll road that will connect Interstate 4 with the Selmon Expressway west of 31st Street in Tampa. About one mile in length, the project is designed to provide continuous traffic flow between Tampa's two major east-west expressways and substantially reduce traffic – especially heavy truck traffic – along surface streets in Ybor City, a National Historic District. The I-4/Selmon Connector project will feature exclusive truck lanes to provide trucks direct access to the Port of Tampa. All tolls will be collected electronically to maintain high speed traffic flow throughout the facility.

PROGRAMMED ROADWAY CAPACITY IMPROVEMENT PROJECTS

Maps 5-1 through 5-5 display capacity improvement projects on the regional freight roadway network that are programmed for construction over the course of the next five years. These projects are listed in **Table 5-1**. Capacity improvements include roadway widening projects and new roadway construction. Most of these projects are focused on adding capacity to the region's limited access highways and widening roads in strategic areas in response to recent and projected growth and increased demand for improved freight accessibility.

Notable new road construction - in terms of centerline miles of new roadway - is programmed in Pasco County to enhance east-west connectivity. The Ridge Road Extension will provide improved connectivity between US 41 and the Suncoast Parkway with the communities of Port Richey and New Port Richey to the east. The extension of SR 56 will provide direct access to the Zephyrhills Municipal Airport, an emerging regional freight activity center. Other new roadway projects are shorter in length, but some will have a significant impact on regional goods movement.

One such roadway that is currently under construction is the I-4/ Selmon Expressway Connector in Hillsborough County. The new toll road will provide a limited access connection between I-4 and the Selmon Expressway in eastern Tampa. It will also provide trucks direct access between terminals at the Port of Tampa's Hookers Point and I-4 and the Selmon Expressway, substantially reducing truck traffic on the 21st/22nd Street one-way pair through Ybor City. Scheduled for completion in 2013, the project will greatly improve travel speeds and reliability for trucks accessing the Port of Tampa and nearby industrial/freight-oriented activities.

The Alexander Street extension in Plant City will provide enhanced north-south movement for trucks and vehicular traffic in the area. This project will reduce truck traffic on SR 39 through Plant City's historic downtown preserving the walkable environment in the downtown core.

In Polk County, a major distribution hub for the region and state, two other short but significant projects are programmed for construction or have recently been completed.

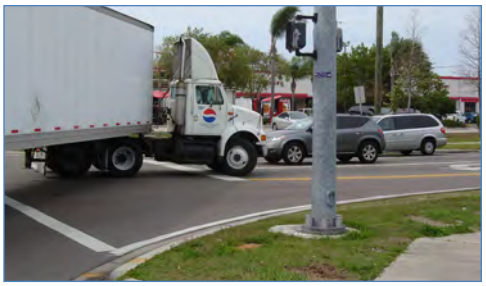
- The final phase of improvements to County Line Road (between SR 60 and Ewell Road) has recently been completed. County Line Road provides a four-lane connection between SR 60 and I-4 that will enhance truck and commuter travel times in a heavily utilized trucking corridor. The project will bolster the competiveness of the Plant City and West Lakeland Freight Activity Centers to attract additional growth in industrial and warehousing activities.
- Phase I of the Bartow Northern Connector will connect US 98 with US 17 north of downtown Bartow. Phase II - which is not funded for construction in the next five years – will continue the new roadway from US 17 to SR 60. Once completed, the Bartow Northern Connector will allow trucks to make the connection from SR 60 to US 98 without having to go through downtown Bartow. The project will reduce truck delay in the area and enhance the livability of downtown Bartow by reducing the number of trucks passing through the area.

PROGRAMMED ROADWAY OPERATIONAL IMPROVEMENTS

In many cases, roadway performance can be enhanced through operational treatments that improve the flow of traffic along a facility. Operational treatments can include the implementation of Intelligent Transportation Systems (ITS) along a major corridor or improving intersections by updating signal timings or adding new turn lanes at specific locations. **Maps 5-1 through 5-5** display the numerous operational improvements to the regional freight network that are programmed throughout the study area. These operational strategies are also listed in **Table 5-2**.

ITS projects are programmed for I-75 and I-275 in Hillsborough, Pinellas, Manatee, and Sarasota Counties. The ITS strategies planned for these corridors include providing real-time information to drivers about traffic flow and delay, inclement weather and other safety advisories, and detour information when needed. In addition to the Interstate highways, ITS projects are also programmed for many of Pinellas County's major corridors.

Other operational improvements programmed for the region include traffic signal updates, turn lane improvements, and other improvements at intersections and interchanges. Projects that address overhead signs can assist truckers and motorists with wayfinding and improve traffic flow on limited access highways. Most of the safety projects displayed in **Map 5-2** address hazards at specific railroad crossings. One recently completed operational improvement provides substantial improvement to traffic flows on one of the



Roadway operational strategies, such as Intelligent Transportation Systems, traffic signal updates, and roadway geometric improvements can improve travel conditions at relatively low cost.

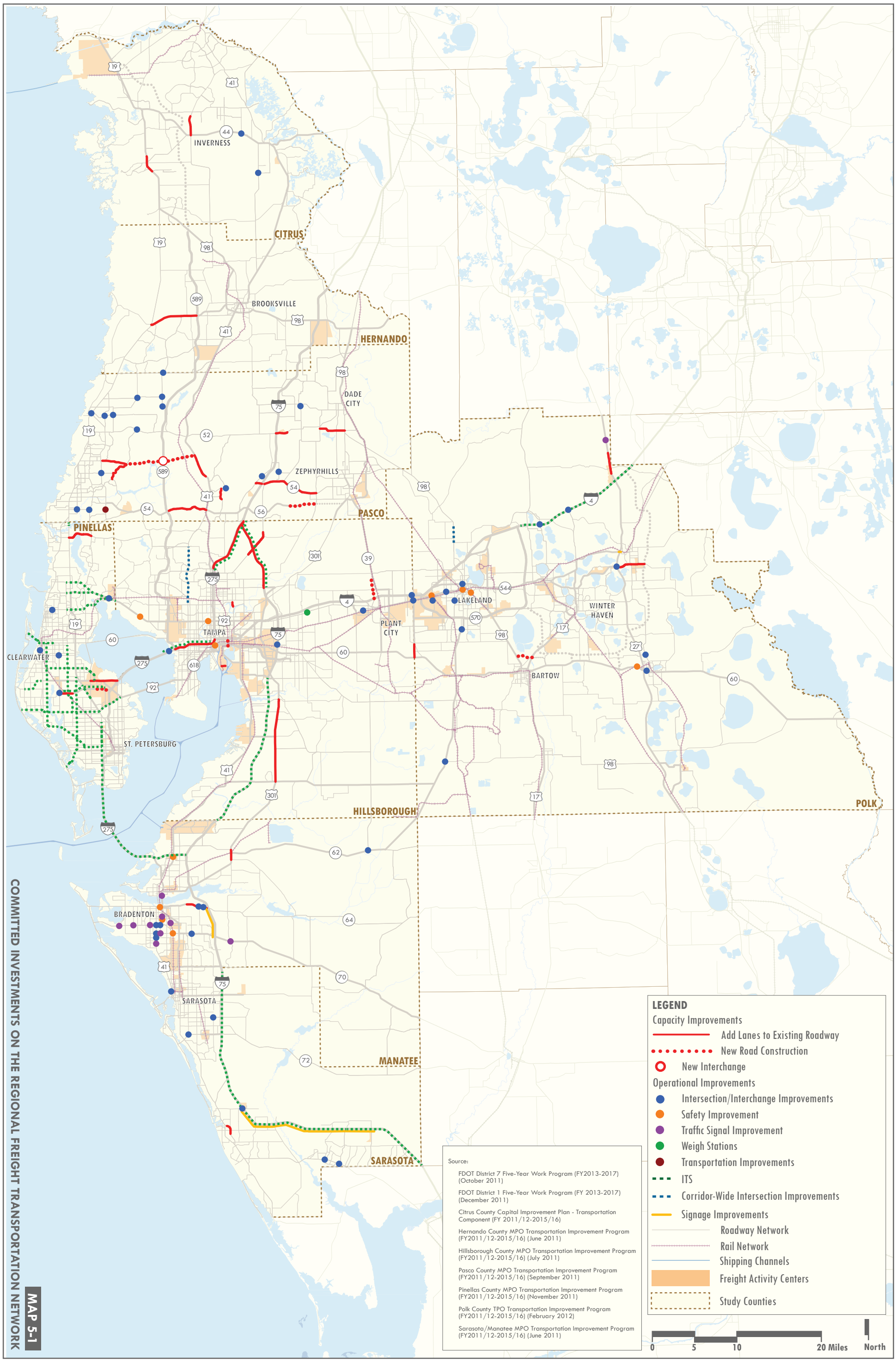
Tampa Gateway Rail Project

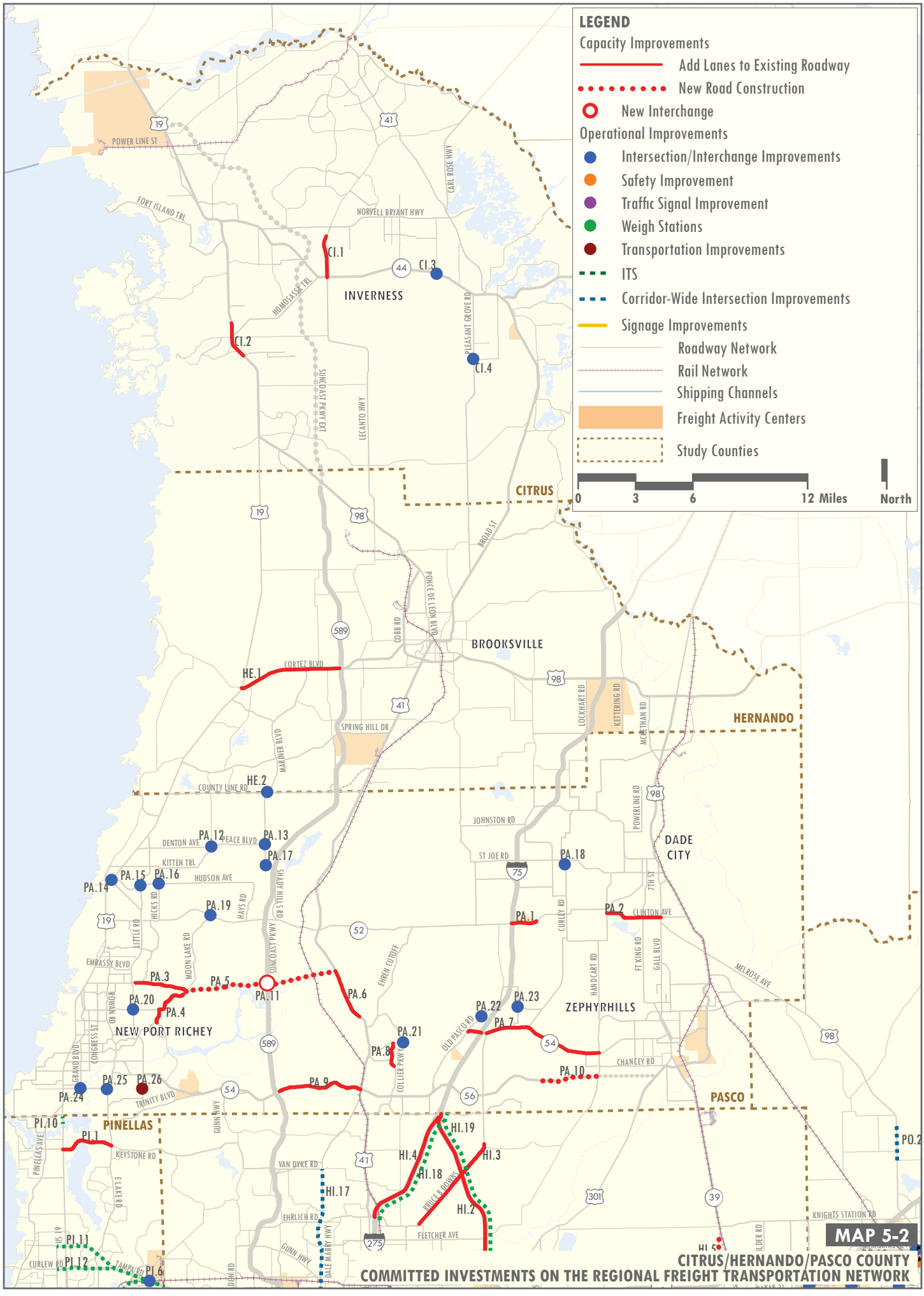
A major strategic investment at the Port of Tampa, the Tampa Gateway Rail project is a multipurpose rail terminal at Hookers Point that will provide capacity for 100-car unit trains delivering ethanol from the Midwest. The project is the only on-dock unit train service in the State of Florida at the Port of Tampa's container terminal. It greatly enhances the Port's capacity and competitiveness in the container sector by providing direct access to CSX Transportation's national railroad network. The project builds or enhances 13,244 linear feet of rail infrastructure to serve a variety of general cargoes in addition to ethanol and containers. The Tampa Port Authority, CSX Transportation, and Kinder Morgan have partnered to develop the $10.9 million project.

region's limited access highways. Improvements at the weigh station located on eastbound I-4 between the CR 579 and McIntosh Road exits includes weigh in motion technology. This technology allows trucks to be weighed at normal or slightly reduced travel speeds instead of requiring the vehicle to stop as with normal static scales.

PROGRAMMED MULTIMODAL IMPROVEMENTS

As with roadways, the other major modes of goods movement are constantly changing to meet growing regional travel demand and respond to localized issues. Programmed improvements to the region's railroads, seaports, and airports are listed in **Table 5-3**. Many of the projects listed are derived from the FDOT's First Five Year Plan for the SIS. The First Five Year Plan delineates projects on the SIS that are funded by the legislature in the Work Program (Year 1) and projects that are programmed for proposed funding in the next two to five years. Additional multimodal improvements impacting the freight transportation system were identified from the local Transportation Improvement Programs (TIPs) prepared by each of the region's MPOs.


INVERNESS
CITRUS
BROOKSVILLE
HERNANDO
DADE CITY
ZEPHYRHILLS
PASCO
PINELLAS
TAMPA
CLEARWATER
ST. PETERSBURG
PLANT CITY
LAKELAND
WINTER HAVEN
BARTOW
POLK
HILLSBOROUGH
BRADENTON
SARASOTA
MANATEE
COMMITTED INVESTMENTS ON THE REGIONAL FREIGHT TRANSPORTATION NETWORK
MAP 5-1
LEGEND
Capacity Improvements
Add Lanes to Existing Roadway
New Road Construction
New Interchange
Operational Improvements
Intersection/Interchange Improvements
Safety Improvement
Traffic Signal Improvement
Weigh Stations
Transportation Improvements
ITS
Corridor-Wide Intersection Improvements
Signage Improvements
Roadway Network
Rail Network
Shipping Channels
Freight Activity Centers
Study Counties
Source:
FDOT District 7 Five-Year Work Program (FY2013-2017) (October 2011)
FDOT District 1 Five-Year Work Program (FY 2013-2017) (December 2011)
Citrus County Capital Improvement Plan - Transportation Component (FY 2011/12-2015/16)
Hernando County MPO Transportation Improvement Program (FY2011/12-2015/16) (June 2011)
Hillsborough County MPO Transportation Improvement Program (FY2011/12-2015/16) (July 2011)
Pasco County MPO Transportation Improvement Program (FY2011/12-2015/16) (September 2011)
Pinellas County MPO Transportation Improvement Program (FY2011/12-2015/16) (November 2011)
Polk County TPO Transportation Improvement Program (FY2011/12-2015/16) (February 2012)
Sarasota/Manatee MPO Transportation Improvement Program (FY2011/12-2015/16) (June 2011)
0
5
10
20 Miles
North


LEGEND
Capacity Improvements
Add Lanes to Existing Roadway
New Road Construction
New Interchange
Operational Improvements
Intersection/Interchange Improvements
Safety Improvement
Traffic Signal Improvement
Weigh Stations
Transportation Improvements
ITS
Corridor-Wide Intersection Improvements
Signage Improvements
Roadway Network
Rail Network
Shipping Channels
Freight Activity Centers
Study Counties
0 3 6 12 Miles
North
CITRUS
HERNANDO
PASCO
PINELLAS
INVERNESS
BROOKSVILLE
DADE CITY
ZEPHYRHILLS
NEW PORT RICHEY
CI.1
CI.2
CI.3
CI.4
HE.1
HE.2
PA.1
PA.2
PA.3
PA.4
PA.5
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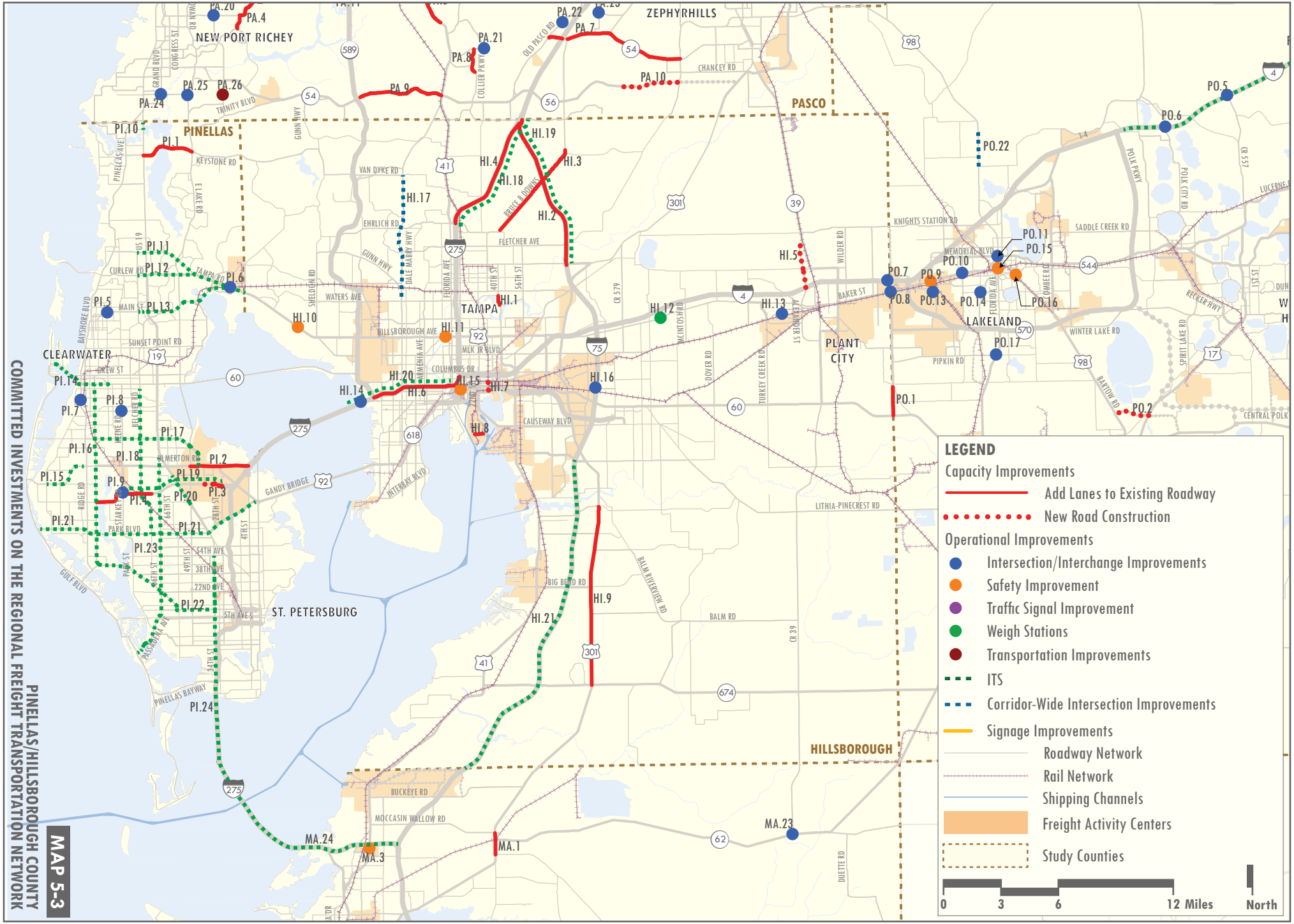
PA.23
PA.24
PA.25
PA.26
PI.1
PI.6
PI.10
PI.11
PI.12
HI.1
HI.2
HI.3
HI.4
HI.5
HI.17
HI.18
HI.19
PO.2
POWER LINE ST
FORT ISLAND TRL
NORVELL BRYANT HWY
CARL ROSE HWY
HOMOSASSA TRL
SUNCOAST PKWY TOLL
LECANTO HWY
PLEASANT GROVE RD
BROAD ST
PONCE DE LEON BLVD
COBB RD
CORTEZ BLVD
SPRING HILL DR
MARINER BLVD
COUNTY LINE RD
LOCKHART RD
KETTERING RD
MCKETHAN RD
POWERLINE RD
JOHNSTON RD
ST JOE RD
7TH ST
CLINTON AVE
CURLEY RD
DENTON AVE
PEACE BLVD
KITTEN TRL
HUDSON AVE
HICKS RD
HAYS RD
LITTLE RD
MOON LAKE RD
SUNCOAST PKWY
SUNCOAST PKWY 2
EMBASSY BLVD
ROWAN RD
CONGRESS ST
GRAND BLVD
TRINITY BLVD
EHREN CUTOFF
COLLIER PKWY
OLD PASCO RD
HANDCART RD
FT KING RD
GALL BLVD
MELROSE AVE
CHANCEY RD
GUNN HWY
KEYSTONE RD
VAN DYKE RD
EHRLICH RD
DALE MABRY HWY
FLETCHER AVE
BRUCE B DOWNS
KNIGHTS STATION RD
ELDER RD
PINELLAS AVE
ELAKERD
CURLEW RD
TAMPA RD
DONA RD
US 19
MAP 5-2
CITRUS/HERNANDO/PASCO COUNTY
COMMITTED INVESTMENTS ON THE REGIONAL FREIGHT TRANSPORTATION NETWORK


PINELLAS/HILLSBOROUGH COUNTY
COMMITTED INVESTMENTS ON THE REGIONAL FREIGHT TRANSPORTATION NETWORK
MAP 5-3
LEGEND
Capacity Improvements
Add Lanes to Existing Roadway
New Road Construction
Operational Improvements
Intersection/Interchange Improvements
Safety Improvement
Traffic Signal Improvement
Weigh Stations
Transportation Improvements
ITS
Corridor-Wide Intersection Improvements
Signage Improvements
Roadway Network
Rail Network
Shipping Channels
Freight Activity Centers
Study Counties
0
3
6
12 Miles
North
PINELLAS
PASCO
HILLSBOROUGH
NEW PORT RICHEY
ZEPHYRHILLS
CLEARWATER
ST. PETERSBURG
TAMPA
LAKELAND
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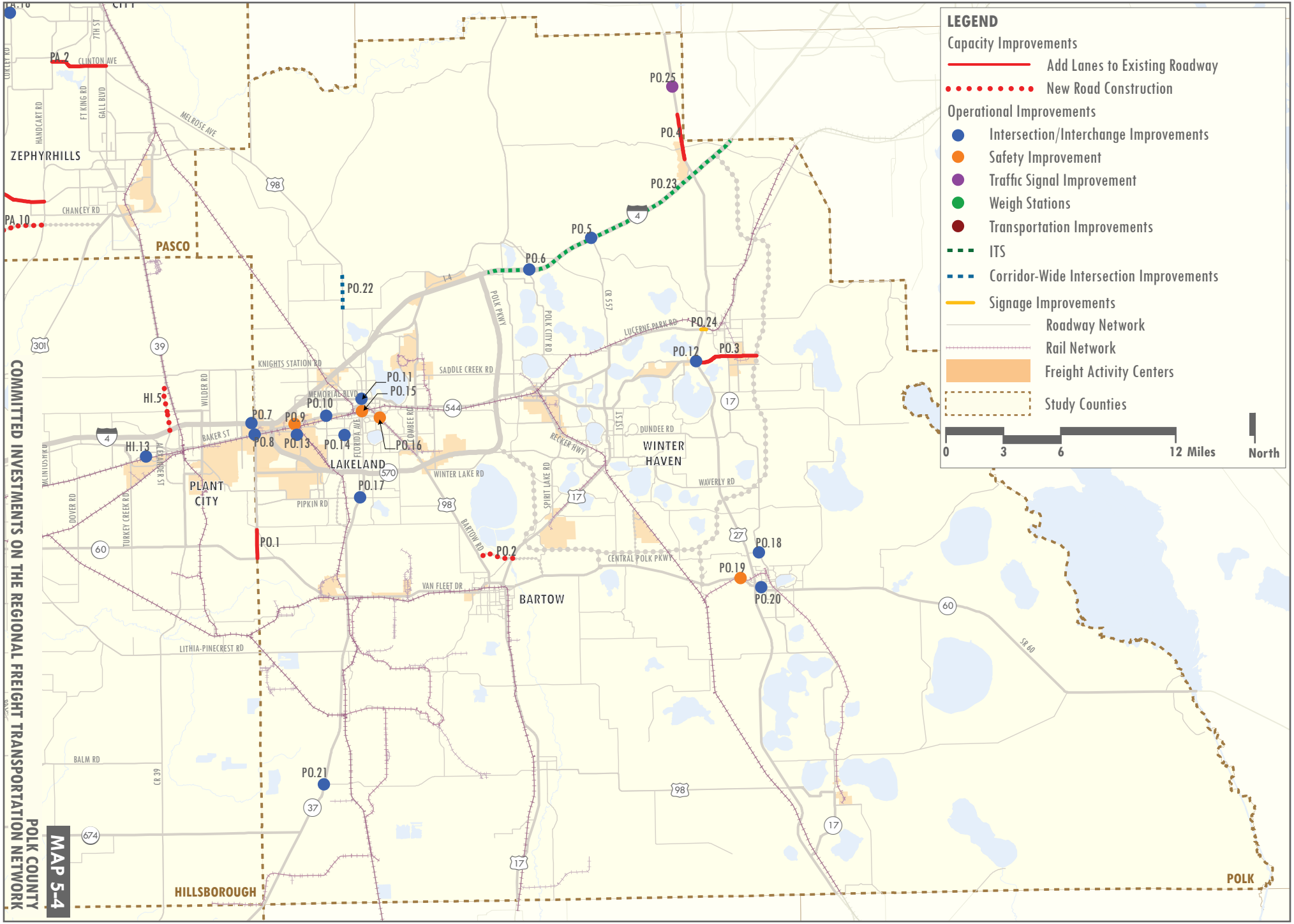
LEGEND
Capacity Improvements
Add Lanes to Existing Roadway
New Road Construction
Operational Improvements
Intersection/Interchange Improvements
Safety Improvement
Traffic Signal Improvement
Weigh Stations
Transportation Improvements
ITS
Corridor-Wide Intersection Improvements
Signage Improvements
Roadway Network
Rail Network
Freight Activity Centers
Study Counties
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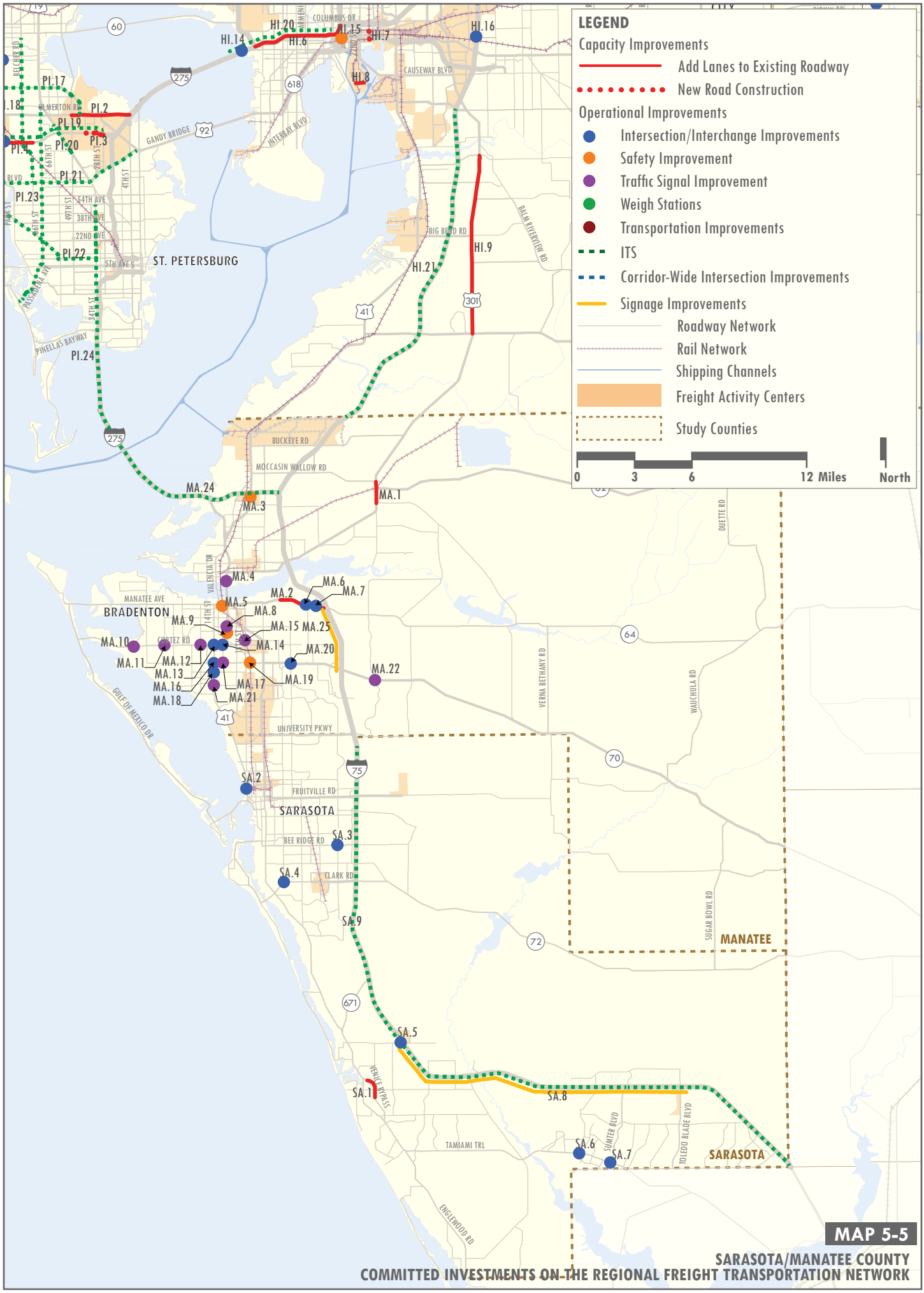
ZEPHYRHILLS
PASCO
PLANT CITY
LAKELAND
WINTER HAVEN
BARTOW
HILLSBOROUGH
POLK
CLINTON AVE
MELROSE AVE
CHANCEY RD
KNIGHTS STATION RD
SADDLE CREEK RD
MEMORIAL BLVD
BAKER ST
PIPKIN RD
WINTER LAKE RD
DUNDEE RD
WAVERLY RD
LUCERNE PARK RD
RECKER HWY
POLK PKWY
CENTRAL POLK PKWY
VAN FLEET DR
BARTOW RD
LITHIA-PINECREST RD
BALM RD
SR 60
POLK CITY RD
SPIRIT LAKE RD
DOVER RD
TURKEY CREEK RD
WILDER RD
FLORIDA AVE
COMBEE RD
I-4
98
301
39
4
544
570
60
27
17
37
674
MAP 5-4
POLK COUNTY
COMMITTED INVESTMENTS ON THE REGIONAL FREIGHT TRANSPORTATION NETWORK


LEGEND
Capacity Improvements
Add Lanes to Existing Roadway
New Road Construction
Operational Improvements
Intersection/Interchange Improvements
Safety Improvement
Traffic Signal Improvement
Weigh Stations
Transportation Improvements
ITS
Corridor-Wide Intersection Improvements
Signage Improvements
Roadway Network
Rail Network
Shipping Channels
Freight Activity Centers
Study Counties
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BRADENTON
SA.2
SARASOTA
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MANATEE
SARASOTA
MAP 5-5
SARASOTA/MANATEE COUNTY
COMMITTED INVESTMENTS ON THE REGIONAL FREIGHT TRANSPORTATION NETWORK

Table 5-1: Committed Capacity Improvement Projects on Freight Network

Project ID	Roadway	From	To	Existing Lanes	Future Lanes	County
Ci.1	CR 491	SR 44	Horace Allen St	2U	4D	Citrus
Ci.2	US 19	Green Acres St	Longfellow St	4D	6D	Citrus
He.1	Cortez Blvd (SR 50)	US 19	S Suncoast Pkwy Ramp	4D	6D	Hernando
Hi.1	40th St	Riverhills Ave	Yukon St	2U	4D	Hillsborough
Hi.2	I-75	South Of Fowler	Pasco Co	4F	6F	Hillsborough
Hi.3	Bruce B Downs Blvd	Bearss Ave	Palm Springs Blvd	4D	6D	Hillsborough
Hi.3	Bruce B Downs Blvd	Palm Springs Blvd	Pebble Creek Dr	4D	8D	Hillsborough
Hi.4	I-275	Bearss Ave	I-75	4F	6F	Hillsborough
Hi.5	Alexander St	I-4	SR 39	0	4D	Hillsborough
Hi.6	I-275	Memorial Hwy	I-4 Interchange	6F	8F	Hillsborough
Hi.7	I-4/Selmon Expwy Connector	Selmon Expwy	I-4	0	6F	Hillsborough
Hi.8	Gatx Dr	Maritime Dr	Guy N Verger Blvd	2U	4U	Hillsborough
Hi.9	US Hwy 301	SR 674	Gibsonton Dr	2U	6D	Hillsborough
Ma.1	US 301	Rutland Rd	Moccasin Wallow Rd	2U	4D	Manatee
Ma.2	SR 64	I-75	39th St E	4D	6D	Manatee
Pa.1	SR 52	I-75 SB Ramps	Emmus Cemetary Rd	2U	4D	Pasco
Pa.2	CR 52A (Clinton Ave)	CR 579-Prospect Rd	US 301	2U	4D	Pasco
Pa.3	CR 587 (Ridge)	Broad St	CR 587 (Moonlake)	2U	4D	Pasco
Pa.4	Starkey Blvd	River Crossing Blvd	Town Ave	2U	4D	Pasco
Pa.5	Ridge Rd Ext	Moon Lake Rd	US 41	0NA	2U	Pasco
Pa.6	US 41	Tower Rd	Ridge Rd Ext	2U	4D	Pasco
Pa.7	CR 54 (E)	Pasco Rd	I-75	4D	6D	Pasco
Pa.7	SR 54	SR 581	CR 577 (Curley Rd)	2U	6D	Pasco
Pa.7	SR 54	CR 577 (Curley Rd)	CR 579 (Morris Bridge)	2U	4D	Pasco
Pa.8	Collier Pkwy	Parkway Blvd	Hale Rd	2U	4D	Pasco
Pa.9	SR 54	Ashley Glen Blvd	US 41	4D	6D	Pasco
Pa.10	SR 56	Meadow Pointe Blvd	CR 579 (Morris Bridge Rd)	0	4D	Pasco
Pa.11	Suncoast Pkwy	at Ridge Rd Ext. (New Interchange)				Pasco
Pi.1	Keystone Rd	US 19	East Lake Rd	2U	4D	Pinellas
Pi.2	SR 688 | Ulmerton Rd	49th St	Roosevelt Blvd	4D	6D	Pinellas
Pi.2	Ulmerton Rd	Roosevelt Blvd	I-275	4D	6D	Pinellas
Pi.3	SR 690 (SR 686)	East of 40th St	East of 28th St	0	2F	Pinellas
Pi.3	SR 690 (SR 686)	East of 34th St	West of 28th St	0	1F	Pinellas
Pi.4	Bryan Dairy Rd	Seminole Blvd/Alt. 19	66th St N West Ramps	4D	6D	Pinellas
Po.1	County Line Rd	SR 60	Ewell Rd	2U	4D	Polk
Po.2	Bartow Northern Connector - Phase 1	US 98	US 17	0	4D	Polk

Table 5-1: Committed Capacity Improvement Projects on Freight Network

Project ID	Roadway	From	To	Existing Lanes	Future Lanes	County
Po.3	SR 544|Lucerne Park Rd	US 27	Future Central Polk Pkwy	2U	4D	Polk
Po.4	US 27	Ritchie Rd	South of Barry Rd	4D	6D	Polk
Sa.1	US 41|Venice Bypass	Gulf Coast Blvd	Bird Bay Dr	4D	6D	Sarasota

**U=Undivided; D=Divided; F=Freeway*

Source: FDOT District 7 Five-Year Work Program (FY2013-2017) (October 2011)
FDOT District 1 Five-Year Work Program (FY 2013-2017) (December 2011)
Citrus County Capital Improvement Plan - Transportation Component (FY 2011/12-2015/16)
Hernando County MPO Transportation Improvement Program (FY2011/12-2015/16) (June 2011)
Hillsborough County MPO Transportation Improvement Program (FY2011/12-2015/16) (July 2011)
Pasco County MPO Transportation Improvement Program (FY2011/12-2015/16) (September 2011)
Pinellas County MPO Transportation Improvement Program (FY2011/12-2015/16) (November 2011)
Polk County TPOTransportation Improvement Program (FY2011/12-2015/16) (February 2012)
Sarasota/Manatee MPO Transportation Improvement Program (FY2011/12-2015/16) (June 2011)

Table 5-2: Committed Operational Improvement Projects on Freight Network

Project ID	Roadway	From	To	Improvement Description	County
Ci.3	SR 44	at Croft Rd		Intersection Improvements	Citrus
Ci.4	CR 581	at Anna Jo Drive		Intersection Improvements	Citrus
He.2	County Line Rd	at Mariner Blvd		Intersection Improvements	Hernando
Hi.10	Hillsborough Ave	W Longboat Blvd	Elliot Dr	Rail Safety Project	Hillsborough
Hi.11	SR 600 (Hillsborough Ave)	Lee Place	Florida Ave	Skid Hazard Overlay	Hillsborough
Hi.12	US 92	Virtual Weigh-in-Motion (WIM) Station		Mcco Weigh Station Static/WIM	Hillsborough
Hi.13	SR 574	at Sammonds Rd		Intersection Improvements	Hillsborough
Hi.14	SR 60 (Memorial Hwy)	WB Ramp	I-275 SB	Interchange/Ramp Improvements	Hillsborough
Hi.15	US 41/SR 45 (Nebraska Ave)	At CSX Rail Crossing (626893P)		Rail Safety Project	Hillsborough
Hi.16	I-75 SB Exit Ramp	SR 60		Interchange/Ramp Improvements	Hillsborough
Hi.17	SR 597 (Dale Mabry)	Humphrey St	Van Dyke Rd	Update Intersection Signalization At Multiple Locations	Hillsborough
Hi.18	I-275	Bearss Ave	I-75	Intelligent Transportation Systems (ITS)	Hillsborough
Hi.19	I-75	S Of Fowler	Pasco Co	ITS	Hillsborough
Hi.20	I-275 (SR 93)	Howard Frankland Bridge	Hillsborough River	ITS	Hillsborough
Hi.21	I-75 (SR 93A)	Port Manatee Connector	Bloomingdale Ave	ITS	Hillsborough
Ma.3	US 41	RR Crossing Near Erie Rd		Rail Safety Project	Manatee
Ma.4	US 41	at Haben Blvd		Traffic Signal Update	Manatee
Ma.5	6th Ave	at Csx		Rail Safety Project	Manatee
Ma.6	SR 64	at 57th St E		Intersection Improvements	Manatee
Ma.7	SR 64	at 66th Ct E		Intersection Improvements	Manatee
Ma.8	US 41	at 26Th Ave		Traffic Signal Update	Manatee
Ma.9	1st St	Cortez Rd	US 301	Skid Hazard Overlay	Manatee
Ma.10	Cortez Rd	at Palma Sola Blvd		Traffic Signal Update	Manatee
Ma.11	SR 684|Cortez Rd	at 59th St W		Traffic Signal Update	Manatee
Ma.12	SR 684|Cortez Rd	at 26th St W		Traffic Signal Update	Manatee
Ma.13	US 41	at Cortez Rd		Intersection Improvements	Manatee
Ma.14	SR 684|Cortez Rd	at 5th St W		Add/Improve Turn Lanes	Manatee
Ma.15	SR 70A|15th St E	at 38th Ave E		Traffic Signals	Manatee

Table 5-2: Committed Operational Improvement Projects on Freight Network

Project ID	Roadway	From	To	Improvement Description	County
Ma.16	US 41	at SR 70		Intersection Improvements	Manatee
Ma.17	SR 70|53rd Ave	at 5th St W		Traffic Signal Update	Manatee
Ma.18	US 41	at 57th Ave W		Intersection Improvements	Manatee
Ma.19	SR 70	17th Ct	18th St	Rail Safety Project	Manatee
Ma.20	SR 70	at Lockwood Ridge Rd		Intersection Improvements	Manatee
Ma.21	US 41|Tamiami Trl	at Bayshore Gardens Pkwy		Traffic Signal Update	Manatee
Ma.22	SR 70	at Lakewood Ranch Blvd		Traffic Signal Update	Manatee
Ma.23	SR 62	at CR 39		Intersection Improvements	Manatee
Ma.24	I-275	I-75	Sunshine Skyway Bridge	ITS	Manatee
Ma.25	I-75	SR 70	SR 64	Overhead Signage	Manatee
Pa.12	Denton Ave	at East Road		Intersection Improvements	Pasco
Pa.13	Shady Hills Rd	at Peace Blvd		Intersection Improvements	Pasco
Pa.14	Hudson Ave	at US 19		Add/Improve Turn Lanes	Pasco
Pa.15	Hudson Ave	at Little Road		Intersection Improvements	Pasco
Pa.16	Hudson Ave	at Hicks Rd		Intersection Improvements	Pasco
Pa.17	Shady Hills Rd	at Softwind Ln		Intersection Improvements	Pasco
Pa.18	Curley Rd	at Old St Joe St		Intersection Improvements	Pasco
Pa.19	Moon Lake Rd	at SR 52		Intersection Improvements	Pasco
Pa.20	Little Rd	at Decubellis Rd		Intersection Improvements	Pasco
Pa.21	Parkway Blvd	at Shining Star Dr		Intersection Improvements	Pasco
Pa.22	Old Pasco Rd	at Quail Hollow Blvd		Intersection Improvements	Pasco
Pa.23	Boyette Rd	at Wells Rd		Intersection Improvements	Pasco
Pa.24	Perrine Ranch Rd	at Grand Blvd		Intersection Improvements	Pasco
Pa.25	Perrine Ranch Rd	at Seven Springs Blvd		Intersection Improvements	Pasco

Table 5-2: Committed Operational Improvement Projects on Freight Network

Project ID	Roadway	From	To	Improvement Description	County
Pa.26	Little Rd	at Jaguar Trail		Transportation Improvements	Pasco
Pi.5	SR 580|Main St	at Patricia Ave		Intersection Improvements	Pinellas
Pi.6	SR 580|Tampa Rd	at State Street		Intersection Improvements	Pinellas
Pi.7	Ft Harrison Ave	at Lakeview Rd		Intersection Improvements	Pinellas
Pi.8	Keene Road	at Belleair Road		Intersection Improvements	Pinellas
Pi.9	Starkey Road	at Bryan Dairy Road		Intersection Improvements	Pinellas
Pi.10	US 19	Beckett Way	Pasco County Line	ITS	Pinellas
Pi.11	Tampa Rd	Belcher Rd	Race Track Rd	ITS	Pinellas
Pi.12	Curlew Road	Belcher Road	Tampa Road	ITS	Pinellas
Pi.13	Main Street	Belcher Road	Tampa Road	ITS	Pinellas
Pi.14	SR 60	Gulf Blvd	Highland Ave	ITS	Pinellas
Pi.15	Walsingham Rd/ Ulmerton Rd	Indian Rocks Rd	W. Of Ridge Rd	ITS	Pinellas
Pi.16	Seminole Blvd	150th Ave	SR 60	ITS	Pinellas
Pi.17	E Bay Dr/Roosevelt Blvd	Seminole Blvd	Ulmerton Rd	ITS	Pinellas
Pi.18	Belcher Rd	Park Ave	Druid Rd	ITS	Pinellas
Pi.19	Bryan Dairy Road	Starkey Rd	28th St	ITS	Pinellas
Pi.20	US 19	49th St	126th Ave	ITS	Pinellas
Pi.21	Park Blvd	Gulf Blvd	Roosevelt Blvd	ITS	Pinellas
Pi.22	Tyrone Blvd/5th Ave N	150th Ave	34th St	ITS	Pinellas
Pi.23	66th St/Passadena Ave	Gulf Blvd	US 19	ITS	Pinellas
Pi.24	34th St	5th Ave N	46th Ave N	ITS	Pinellas
Po.5	I-4	at CR 557		Interchange/Ramp Improvements	Polk
Po.6	I-4	at Polk City Rd		Interchange/Ramp Improvements	Polk
Po.7	I-4	at County Line Rd		Interchange/Ramp Improvements	Polk
Po.8	County Line Rd	at US 92		Intersection Improvements	Polk
Po.9	SR 572|Airport Rd	CR 542|Old Tampa Hwy	US 92|New Tampa Hwy	Rail Safety Project	Polk
Po.10	New Tampa Hwy	at Wabash Ave		Intersection Improvements	Polk
Po.11	US 92	at US 98		Intersection Improvements	Polk
Po.12	SR 544	at US 27		Add/Improve Turn Lanes	Polk

Table 5-2: Committed Operational Improvement Projects on Freight Network

Project ID	Roadway	From	To	Improvement Description	County
Po.13	SR 572|Airport Rd	at Old Tampa Hwy		Add/Improve Turn Lanes	Polk
Po.14	SR 563	at Ariana St		Intersection Improvements	Polk
Po.15	Florida Ave	at CSX Railroad Crossing		Rail Safety Project	Polk
Po.16	US 98|Lake Parker Ave	US 98|Bartow Rd	Jaffa St	Rail Safety Project	Polk
Po.17	SR 37	at Pipkin Rd		Intersection Improvements	Polk
Po.18	SR 17	at Mountain Lake Cutoff Rd		Intersection Improvements	Polk
Po.19	SR 60	Old Bartow Rd	Central Ave	Rail Safety Project	Polk
Po.20	SR 60	at Dr MLK Jr Blvd		Intersection Improvements	Polk
Po.21	SR 37	at CR 630		Intersection Improvements	Polk
Po.22	US 98	Marcum Rd	Banana Rd	Update Intersection Signalization At Multiple Locations	Polk
Po.23	I-4	E Of Polk Pkwy	Osceola County Line	ITS	Polk
Po.24	US 27	at US 17/US 92		Overhead Signage	Polk
Po.25	US 27	at Student Dr		Traffic Signal Update	Polk
Sa.2	US 41	10th St	14th St	Intersection Improvements	Sarasota
Sa.3	Honore Ave	at Bee Ridge Rd		Intersection Improvements	Sarasota
Sa.4	SR 72	at Swift Rd		Intersection Improvements	Sarasota
Sa.5	I-75	at Laurel Rd Ramps		Interchange/Ramp Improvements	Sarasota
Sa.6	Biscayne Dr	at US 41		Intersection Improvements	Sarasota
Sa.7	US 41	at Sumter Blvd		Add/Improve Turn Lanes	Sarasota
Sa.8	I-75	Toledo Blade Blvd	Laurel Rd	Overhead Signage	Sarasota
Sa.9	I-75	Charlotte County	Manatee County	ITS	Sarasota

Source: FDOT District 7 Five-Year Work Program (FY2013-2017) (October 2011)
FDOT District 1 Five-Year Work Program (FY 2013-2017) (December 2011)
Citrus County Capital Improvement Plan - Transportation Component (FY 2011/12-2015/16)
Hernando County MPO Transportation Improvement Program (FY2011/12-2015/16) (June 2011)
Hillsborough County MPO Transportation Improvement Program (FY2011/12-2015/16) (July 2011)
Pasco County MPO Transportation Improvement Program (FY2011/12-2015/16) (September 2011)
Pinellas County MPO Transportation Improvement Program (FY2011/12-2015/16) (November 2011)
Polk County TPOTransportation Improvement Program (FY2011/12-2015/16) (February 2012)
Sarasota/Manatee MPO Transportation Improvement Program (FY2011/12-2015/16) (June 2011)

Table 5-3: Committed Freight Multimodal Improvement Projects

Project ID	Location	Project Name	Description	County	FDOT District	Source
Rail*						
N/A	Port of Tampa/CSX	Tampa Gateway Rail Project	Rail	Hillsborough	7	Tampa Port Authority
4271532	US 41	Miscellaneous Structure	Railroad Bridge from N of Hale Rd to End of Bridge (0.028 mi)	Hernando	7	SIS First Five Year Plan
Seaport						
4127461	Port of Tampa	Seaport Capacity Project	Intermodal Cargo Handling	Hillsborough	7	Hillsborough TIP
4225001	Port of Tampa	Seaport Capacity Project	Port Infrastructure Improvements	Hillsborough	7	Hillsborough TIP
4206102	Port of Tampa	Seaport Capacity Project	Rail	Hillsborough	7	SIS First Five Year Plan
4228261	Port of Tampa	Seaport Capacity Project - Container Yard Improvements	Dredge Channel	Hillsborough	7	SIS First Five Year Plan
4228262	Port of Tampa	Seaport Capacity Project - Container Yard Improvements	Seaport Container Yard	Hillsborough	7	SIS First Five Year Plan
4225901	Port Manatee	Seaport Capacity Project	Cold Storage Warehouse	Manatee	1	SIS First Five Year Plan
4206101	Port Manatee	Container and Cargo Transfer Yard Phase 1	Intermodal	Manatee	1	Sarasota/ Manatee MPO TIP
4225901	Port Manatee	Container and Cargo Transfer Yard Phase 2	Intermodal	Manatee	1	Sarasota/ Manatee MPO TIP
4224861	Port Manatee	Seaport Capacity Project	Intermodal	Manatee	1	Sarasota/ Manatee MPO TIP
Aviation						
4157771	Hernando County Airport	Aviation Revenue/ Operational	Construct T/Corporate Hangars in Southeast Hangar Area	Hernando	7	Hernando TIP
4157781	Hernando County Airport	Aviation Capacity Project	Construct Apron	Hernando	7	Hernando TIP
4241043	Hernando County Airport	Aviation Preservation Project	Rehab Runway 9-27	Hernando	7	Hernando TIP
4259241	Hernando County Airport	Aviation Capacity Project	Design and Construct GA Apron	Hernando	7	Hernando TIP
4259242	Hernando County Airport	Aviation Preservation Project	Spall Repair on Runway 3-21	Hernando	7	Hernando TIP
4296181	Hernando County Airport	Aviation Safety Project	Replace Runway 9/27 & Taxiway A Airfield Guidance Signage	Hernando	7	Hernando TIP

*Projects listed exclude crossing improvements and safety projects included among committed roadway operational improvements

Table 5-3: Committed Freight Multimodal Improvement Projects (Continued)

Project ID	Location	Project Name	Description	County	FDOT District	Source
4296201	Hernando County Airport	Aviation Safety Project	Replace Runway 3/21 & Taxiway B Airfield Guidance Signage	Hernando	7	Hernando TIP
4208081	Tampa International Airport	Aviation Capacity Project	Taxiways/Airfield/ Airside/Terminal Infrastructure Rehabilitation	Hillsborough	7	SIS First Five Year Plan
4283621	Tampa International Airport	Aviation Capacity Project	Airports	Hillsborough	7	SIS First Five Year Plan
4157591	Tampa International Airport	Aviation Preservation Project	Automatic Gates Rehabilitation	Hillsborough	7	Hillsorough TIP
4207031	Tampa International Airport	Aviation Capacity Project	Reconstruct Taxiway B	Hillsborough	7	Hillsborough TIP
4225521	Tampa International Airport	Aviation Preservation Project	Taxiway/Runway Rehabilitation	Hillsborough	7	Hillsborough TIP
4225526	Tampa International Airport	Aviation Preservation Project	Taxiway Rehabilitation	Hillsborough	7	Hillsborough TIP
4225527	Tampa International Airport	Aviation Preservation Project	Pavement Rehabilitation	Hillsborough	7	Hillsborough TIP
4259201	Tampa International Airport	Aviation Capacity Project	Terminal and Airfield Rehabilitation	Hillsborough	7	Hillsborough TIP
4259202	Tampa International Airport	Aviation Security Project	Access Control System Replacement	Hillsborough	7	Hillsborough TIP
4259203	Tampa International Airport	Aviation Preservation Project	Taxiway J Pavement Repl. W of Runway 18L Slab/Joint Repl	Hillsborough	7	Hillsborough TIP
4259205	Tampa International Airport	Aviation Preservation Project	Structural and Pavement Repairs	Hillsborough	7	Hillsborough TIP
4259207	Tampa International Airport	Aviation Preservation Project	Project Cargo and Airfield Maintenance	Hillsborough	7	Hillsborough TIP
4283621	Tampa International Airport	Aviation Capacity Project	Taxiway M from Taxiway V to Taxiway C	Hillsborough	7	Hillsborough TIP
4296031	Tampa International Airport	Aviation Preservation Project	Rap F Concrete Joint and Slab Replacement	Hillsborough	7	Hillsborough TIP
4296041	Tampa International Airport	Aviation Preservation Project	Airfield Slab Replacement	Hillsborough	7	Hillsborough TIP
4182281	Sarasota/ Bradenton International Airport	Aviation Revenue/ Operational	Aviation	Manatee	1	Sarasota/ Manatee MPO TIP
4225101	Sarasota/ Bradenton International Airport	Aviation Preservation Project	Aviation	Manatee	1	Sarasota/ Manatee MPO TIP
4255111	Sarasota/ Bradenton International Airport	Aviation Safety Project	Aviation	Manatee	1	Sarasota/ Manatee MPO TIP

Table 5-3: Committed Freight Multimodal Improvement Projects (Continued)

Project ID	Location	Project Name	Description	County	FDOT District	Source
4260561	Sarasota/ Bradenton International Airport	Aviation Capacity Project	Aviation	Manatee	1	Sarasota/ Manatee MPO TIP
4279431	Sarasota/ Bradenton International Airport	Aviation Capacity Project	Aviation	Manatee	1	Sarasota/ Manatee MPO TIP
4279781	Sarasota/ Bradenton International Airport	Aviation Capacity Project	Aviation	Manatee	1	Sarasota/ Manatee MPO TIP
4259181	St. Petersburg/ Clearwater International Airport	Aviation Capacity Project	Construct Air Cargo Ramps	Pinellas	7	Pinellas TIP
4296051	St. Petersburg/ Clearwater International Airport	Aviation Capacity Project	Construct New GA Apron and Taxiways	Pinellas	7	Pinellas TIP
4296121	St. Petersburg/ Clearwater International Airport	Aviation Preservation Project	Rehabilitate Runway 17/35	Pinellas	7	Pinellas TIP
4296131	St. Petersburg/ Clearwater International Airport	Aviation Revenue/ Operational	New Airport Maintenance Building	Pinellas	7	Pinellas TIP
4223471	Venice Airport	Reinforce Hangars	Aviation	Sarasota	1	Sarasota/ Manatee MPO TIP

Source: FDOT District 7 Five-Year Work Program (FY2013-2017) (October 2011)
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Pasco County MPO Transportation Improvement Program (FY2011/12-2015/16) (September 2011)
Pinellas County MPO Transportation Improvement Program (FY2011/12-2015/16) (November 2011)
Polk County TPOTransportation Improvement Program (FY2011/12-2015/16) (February 2012)
Sarasota/Manatee MPO Transportation Improvement Program (FY2011/12-2015/16) (June 2011)

Rules limiting the number of hours a truck driver may operate a vehicle before needing to stop are appropriately intended for public safety, but also increase demand for rest areas.

Efficiency is the primary goal of goods movement for the private sector. Unlike people, freight does not take a recreational Sunday drive. There are many ways to describe efficiency, but it is ultimately about using scarce transportation resources wisely. This requires freight to move between two points at a speed and cost best suited for the shipment. The relative importance of speed and cost is determined by the type of freight and helps determine the most appropriate mode for a shipment. Shipment by plane or truck typically costs more than a slower shipment by ship or rail. For many heavy commodities, such as coal, a slower travel time is acceptable and rail is the preferred mode of travel. Meanwhile, high value medical supplies or produce may be moved more efficiently by truck or plane.

There are many challenges to moving freight quickly and at a low cost. Some of these may require the attention of public officials to fix. Meanwhile, some of the challenges are created through public policies that are designed to protect public health, safety, and welfare. These policies are implemented with an acknowledgement that they reduce the efficiency of freight transportation. A policy example is the hours-of-service regulations of the Federal Motor Carrier Safety Administration. These rules limit the number of hours a truck driver may operate a vehicle before needing to stop and rest. Such regulations protect public safety, but may also increase travel time and increase the cost of moving freight. The intent of this chapter is to raise awareness of some of the policy and infrastructure issues that reduce efficiency. These issues encompass topics such as infrastructure condition and capacity, regulations, market conditions, conflicting public and private goals, the lack of visibility for freight issues, and opposition to freight projects and land uses.

INFRASTRUCTURE CONDITIONS

Highways, railroads, airports, and seaports are the circulatory system of freight transportation. The efficiency of freight movement depends on the health of this system. However, its condition is a growing concern throughout the United States. A building boom of new highway infrastructure was led by the federal government in the 1950s. Much of that infrastructure is now in need of repair. At the same time there are also capacity demands unrelated to maintenance that could be addressed through expansion and different operations policies. Simultaneously funding maintenance and expansion in an era of stagnant transportation revenue and rising material costs is a big challenge. Freight railroads, as private and profitable entities, have managed to maintain their most utilized lines well, but the nation's freight rail system could also be improved to handle more capacity.

The condition of the system reduces efficiency in several ways. Poor pavement condition increases wear and tear on trucks and passenger vehicles. Vehicles then require more frequent and costly repairs,

which takes vehicles out of service and raises costs for freight service providers and customers. Weight restrictions on highways and bridges also increase transportation costs. The transportation cost per unit or ton of freight increases for a delivery if a truck cannot utilize its full capacity. Additionally, bridge weight restrictions can force trucks to use circuitous routes that increase cost. One example is a key bridge between New York State and Vermont that was closed in 2009 due to its poor condition, forcing commuters to rely on slow ferries or take detours nearly 100 miles in length[1].

Weight restrictions on highways, bridges, and rail lines are needed, but such restrictions may increase freight transportation costs when the full capacity of vehicles is not utilized.

Weight restrictions also affect freight railroads. The industry weight standard for tracks is to accommodate a loaded rail car weighing 286,000 pounds. However, some tracks and bridges cannot accommodate this weight standard due to poor maintenance, the age of the infrastructure, or even policy. Therefore freight must be distributed among more rail cars, which directly increases costs for customers, who may pay for services based on the number of cars necessary for a shipment. Speed restrictions are another problem on railroad tracks and bridges. These restrictions increase travel time and harm the ability of rail to compete with trucks in a highly competitive freight market.

Low overhead clearances are another condition that affects freight rail and trucks. Freight railroads can improve efficiency by double stacking on rail cars. Double stacking refers to placing a second container on top of a previously loaded container on a specialized railcar. This method is becoming more common as railroads compete with trucks for container transportation. Stacking containers reduces the transportation cost per container. However, this requires a greater vertical clearance above the tracks than was historically necessary. The desirable clearance for double stack rail is greater than 20 feet. Many railroads throughout the nation are in the process of increasing the clearance of bridges and tunnels in order to accommodate double stack rail freight. There are no height restricted clearances along Florida's main line rail corridors. Vertical clearance restrictions can also force trucks to take less direct routes to their destinations, which increases mileage and therefore cost.

Airports and seaports are also affected by infrastructure conditions. Freight commonly moves on large cargo jets and in the belly of passenger jets. Their access to an area can be limited by the airport infrastructure. For instance, the runway length restricts access to certain large aircraft at Hernando County Regional Airport and Zephyrhills Airport. Seaports must have modern equipment, such as cranes capable of handling containers on modern vessels, in order to maximize efficiency.

1 *Syracuse Post-Standard, Explosions bring down aging New York-Vermont bridge, Accessed July 18, 2012, http://www.syracuse.com/news/index.ssf/2009/12/explosions_bring_down_aging_ne.html*

INFRASTRUCTURE CAPACITY

Closely related to infrastructure condition is infrastructure capacity, which is a concern as the volume of freight movements continues to increase. In 2007, the last year for which Commodity Flow Survey data are available from the Federal Highway Administration, nearly $46 billion worth of freight weighing 52 million tons was moved daily in the United States. The Federal Highway Administration estimates that freight volume will increase by 1.4 percent per year through 2040[2]. As demand increases, capacity issues will grow more severe without policies or infrastructure improvements to address them.

The lack of a sufficient supply of transportation infrastructure also creates capacity problems. Congestion occurs when supply cannot meet demand. This can be a temporary situation brought about by peak periods of demand, or a long-running problem created by a bottleneck in the system or lack of infrastructure. Capacity constraints increase the amount of time it takes for a freight shipment to move through an area, therefore increasing cost.

Highways in the Tampa Bay region are congested for more than four hours per day, draining more than $1 billion per year from the regional economy.

Peak period highway congestion is a major problem on highways in urban areas. While freight movements are spread out more evenly throughout the course of the business day, passenger travel tends to experience peak travel during the morning and evening rush hours. Congestion increases time and delivery costs for companies, which has a ripple effect that increases prices for consumer goods. According to the Texas Transportation Institute, highways in the Tampa region are congested for more than four hours per day, draining more than $1 billion per year[3] from the regional economy.

In addition to simple demand, the shared use of infrastructure by different types of users can cause congestion. For example, most rail infrastructure in the United States is owned by private freight rail companies. CSX Transportation owns a large share of the tracks in the Tampa region. Sharing these assets with passenger rail service can limit the windows available for freight deliveries. Passenger trains must run on tight schedules to attract passengers and often they have reserved windows when freight trains cannot access the rails. Delivery times may increase as flexibility decreases. If the commuter rail service is frequent throughout the day, freight trains may be forced to make deliveries at night, which may not be acceptable to some firms receiving or sending shipments. Rail congestion is due in part by the limited capacity (length) of passing sidings that restrict the length of trains to the length of the shortest passing siding along the corridor.

2 *Federal Highway Administration, Freight Facts and Figures 2011, Accessed July 18, 2012, http://www.ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/11factsfigures/table2_1.htm*

3 *Texas Transportation Institute, Annual Urban Mobility Report, Accessed July 17, 2012, http://mobility.tamu.edu/files/2011/09/tampa.pdf.*

Seaports and airports can also be hampered by infrastructure capacity. A looming issue in shipping is the expansion of the Panama Canal, which is set to open to larger ships in 2014 or 2015. Only a handful of ports in the eastern United States will be able to accommodate the new Panamax ships (the largest ships that can traverse the Panama Canal), which will have a draft of about 50 feet and be able to carry more than 12,000 twenty-foot equivalent containers[4]. Tampa is not among the ports that can accommodate the larger ships, but the port is well positioned to attract some of the increased Asian trade coming through the expanded canal in smaller vessels. Many ports in the United States are preparing for the larger ships that may use east coast ports rather than congested West Coast ports that require a cross-country trip by rail to reach East Coast markets.

Another capacity issue affecting seaports and airports is storage space for freight and the trucks, vessels, and airplanes that move it. Land-side storage space is not an issue for the Port of Tampa and Port of Manatee, which both have available land. This is a competitive advantage for the two ports, but a lack of space can be a major drag on efficiency at other East Coast ports.

TRANSPORTATION REGULATIONS

Infrastructure is accompanied by regulations that govern its use. In transporting freight there are costs that are not reflected in the price of the service. These costs, such as air pollution or congestion, affect the entire population. Economists call these costs externalities. Government or private-sector regulations often intentionally reduce efficiency in order to reduce these externalities and protect public health, safety, and welfare. Public policies may also seek to help a freight service provider overcome a market obstacle that reduces efficiency, such as helping truckers pay the capital cost of new cleaner trucks through popular Clean Truck programs at many ports. However, this chapter is focused on challenges to efficient freight movement, and there are several regulations that reduce efficiency.

A much publicized set of regulations are those that limit the number of hours truck drivers may work without stopping for rest. These hours-of-service regulations, which are periodically updated, limit an operator from driving more than 11 hours after 10 consecutive hours off duty. They also place limits on the amount of time an operator may drive in a seven-day period. A trucking firm could be more efficient by forcing its drivers to put in more hours on the road, but this could have dangerous safety consequences for the drivers and the general public. The regulations are good for public safety considerations, but they also increase the demand for more truck parking along the interstates and other major highways.

A TEU is 20 feet long, 8 feet wide, and 8.5 feet tall.

A two TEU is 40 feet long and is equivalent to two single containers.

A 53-foot-long trailer is equal to 2.6 TEUs.

4 *Twenty-foot equivalent unit (TEU) is a common measure of container capacity for ships and ports.*

Federal limits are also placed on the weight of trucks operating on the Interstate Highway System in order to preserve its condition and safety. The current gross vehicle weight limit is 80,000 pounds. Bills were recently introduced in Congress to increase the weight limit. This would increase the efficiency of some shipments, such as heavy commodities, and reduce cost. But it would increase wear and tear on highways and bridges, which can have an adverse effect on the public and increase the maintenance costs of trucking firms. Likewise there are limitations imposed on trailer length (the maximum trailer/domestic container length of a single unit is 53 feet) and the number of trailers that a single tractor may pull. Tandem and triple trailers can improve efficiency by reducing the need for multiple drivers, which are becoming more difficult to hire and retain. However, these multiple units are highly restricted and limited to only a few corridors in the United States.

Stronger security measures put in place for public safety since September 11, 2001 are necessary but have created costly delays for freight coming into seaports and airports.

Congress has also passed laws that have unintentionally reduced the efficiency of shipping. Recent attempts to reduce highway congestion have focused on the marine highway. These are federally-designated shipping routes between American ports that follow some routes of the Interstate Highway System. For instance, M-10 travels through the Gulf of Mexico between Tampa and ports in Texas, roughly following Interstate 10 and Interstate 75. The potential of these maritime routes is somewhat hampered by the Merchant Marine Act of 1920, which is also known as the Jones Act. This law requires ships transporting cargo between two American ports to use an American crew, an American-owned vessel, and an American-built vessel. While these laws have helped preserve the nation's ship-building capability, they increase the cost of shipping between American ports, and make it cost infeasible in many circumstances.

Another federal issue that has become more pressing since September 11, 2001 is security. Stronger security measures in the aftermath of September 11 can slow the passage of freight across the American border as well as into our ports and airports. The Transportation Security Administration now inspects all freight traveling in the belly of cargo planes, which also slows down the movement of freight and makes this efficient use of space on passenger jets less attractive. New infrastructure for these screening actions requires space and funding. These policies and equipment purchases improve public safety, but come at a cost.

Regulations passed at the local level also affect freight efficiency. Cities and towns may seek to restrict trucks from certain areas in the interest of public health, safety, and welfare. However, this often increases the number of miles trucks must travel to make deliveries, which leads to more fuel consumption and higher costs. Cities and towns may also limit where trucks can park, or fail to provide enough space for loading and unloading, which can lead to truck drivers receiving many parking tickets. A study of off-hour deliveries in New York City found that delivery drivers often received more

than $1,000 in parking fines each month[5]. FedEX and UPS drivers accumulate thousands of dollars in fines monthly and these companies and others figure these fines into their costs that are eventually passed on to consumers in the form of higher prices. Nighttime deliveries eliminated parking tickets and improved travel speeds by up to 75 percent.

MARKET CONDITIONS

Market conditions are forces mostly outside the control and influence of freight service providers and government regulators. The efficiency of freight transportation is heavily influenced by market conditions, which affect the cost of labor, inputs such as fuel and materials, and infrastructure. For example, labor is becoming an important issue for trucking firms[6]. A shortage of qualified drivers is expected to substantially increase wages, which will lead to higher transportation costs and thus more expensive prices for consumers.

Fuel cost is also a factor that influences efficiency for all of the freight modes. Freight transportation relies heavily on diesel fuel, which has been increasing in price and experiences greater price volatility. The cost of a gallon of diesel fuel reached nearly $5 during the summer of 2008 before falling to nearly $2 per gallon during the winter of 2009 and eventually climbing back to more than $4 per gallon in the spring of 2012. Data from the U.S. Energy Information Administration show that between May of 1994 and May of 2004 prices ranged only from $0.95 to $1.77 per gallon (in nominal dollars). Between May 2004 and July 2012 prices have ranged from $1.70 to $4.76 per gallon. Price volatility makes planning more difficult. **Figure 6-1** shows how volatility has increased during the last eight years.

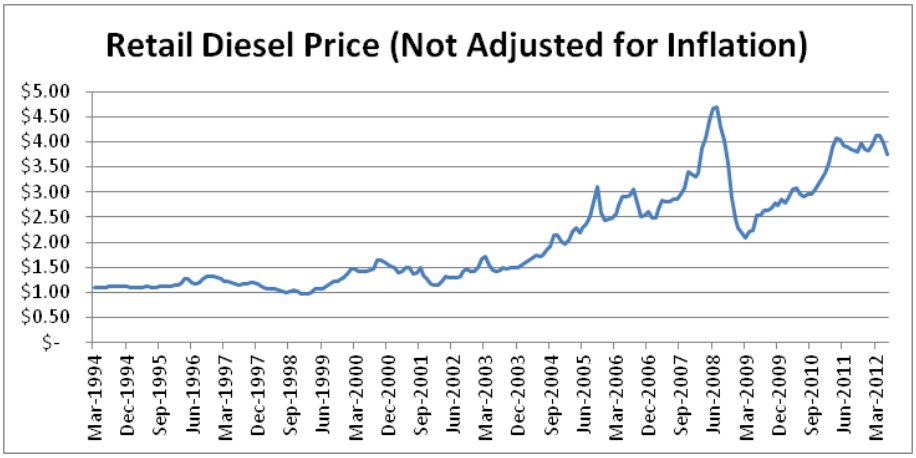


Figure 6-1: Retail Diesel Price

Source: U.S. Energy Information Administration

5 *New York City Department of Transportation, NYC DOT Pilot Program Finds Economic Savings, Efficiencies For Truck Deliveries Made During Off-hours, Accessed July 17, 2012, http://www.nyc.gov/html/dot/html/pr2010/pr10_028.shtml.*

6 *Bloomberg, Driver Shortage Shows Gain in U.S. Truck Cargo: Freight Markets, Accessed July 17, 2012, http://www.nyc.gov/html/dot/html/pr2010/pr10_028.shtml.*

Fuel price fluctuation is occurring in an environment in which goods are moving longer distances than several decades ago. Manufacturing in Asia has become more attractive because of low labor costs despite the long distance to American markets and the fuel consumption necessary to move goods to markets. However, fuel costs would need to rise much more to shift manufacturing closer to U.S. markets. Clearly, labor and land costs are more important than transportation costs in decisions about where to locate manufacturing. However, it is less efficient from strictly a transportation perspective to manufacture goods far from their point of consumption.

Coastal cities, such as Tampa, have desirable waterfront locations that are attractive to mixed-use developments as well as port-related uses, which can create some political tension.

Closer to home land prices and uses, which are set by the market, also influence freight transportation costs. Many urban markets in the United States are experiencing renewed interest in people living closer to the jobs and entertainment options that exist in central cities. Housing, office space, and retail uses are often viewed by government officials and the general public as better uses of land than older manufacturing buildings, warehouses, and freight activity centers. Some freight companies are flexible and gladly relocate while taking advantage of rising land prices in the urban core. In coastal cities, such as Tampa, waterfront locations are especially desirable for new residential, commercial, and retail development, as well as seaport activities. It is much easier, politically, to convert land from a freight use to these uses. However, this problem is not as pressing in the Tampa Bay region as in other major eastern markets. The ports are a well established and vital component of the region's economy.

NIMBYISM

While freight may lose ground in some urban core areas, there continues to be demand for freight activities. Conflicts between land uses may arise when a freight activity is planned for an area. Private property owners may fear that the construction or expansion of a freight use, such as a rail yard, truck terminal, distribution center, or warehouse will lead to traffic and cause property value to decline. While they may recognize the importance of these facilities, and feel that they contribute to the economy in a positive manner, they would prefer that the facility be located somewhere else. This phenomenon is known as "Not in My Back Yard" or "NIMBYism." While these fears may be warranted, they can make it difficult to site a freight-intensive land use. Efficiency of goods movement can be harmed when these facilities cannot be located in the preferred location.

CONFLICTING PUBLIC AND PRIVATE GOALS

The potential for conflict between public and private goals is explained to some extent in the transportation regulations section. Private sector companies are responsible for maximizing their profits. Meanwhile, government's responsibility is to protect the public health, safety, and welfare. These different objectives can create conflicts between the public and private sector.

A private freight transportation provider, such as a railroad, may decide to take an action that is good for the company's financial health. For example, a railroad may decide to abandon a line that is carrying no traffic, or carrying so little traffic they are losing money. While this may be in the best interest of the railroad, other companies or public agencies may wish to keep the line operating because they feel it is in the public interest. Their rationale may be that more trucks will be on the highways as a result, or that companies along the line will be economically harmed. In this example the federal Surface Transportation Board is responsible for adjudicating the dispute.

Another example is the location of warehouses and distribution facilities. These were traditionally located close to centers of population. However, private companies have discovered that they can save money and make greater profits by centralizing their operations and moving them out of urban core areas. Land is cheaper on the periphery and there is more room to grow. Land in the urban core is also likely more valuable. However, relocating to the periphery may lead to more truck vehicle miles traveled as the distribution facilities are further from the points of consumption, such as large retailers. As is the case with manufacturing, decisions about where a company should locate are often made for a variety of reasons and transportation efficiency may not be the most important. The cost of labor and inputs are also major factors. Greater truck vehicle miles traveled will lead to more wear and tear on highways and increase emissions, which are external costs that do not affect the company's bottom line, but can have a negative effect on the public.

A third example with relevance in the Tampa area is the desire by government officials to use rail for commuter transportation. However, the desire to reduce commuter traffic is often at odds with the desire to reduce truck traffic by increasing rail shipments. Freight railroads may be leery of proposals to share tracks between freight services and commuter or passenger services. Sharing tracks may limit the flexibility of freight rail service, which is expected to increase once the economy improves and more long distance loads are transported into and out of the region by intermodal rail. However, it can give commuters an alternative to traffic congestion, which can increase the capacity of an urban area to accommodate commercial space and make an area more attractive to firms. There are many successful examples of commuter and freight rail sharing space, but it can

Rail lines abandoned for company financial reasons may sometimes be negatively viewed by other companies and public agencies since they believe more trucks will be on the highways and companies along the former line will be economically harmed.

also lead to a loss of freight rail capacity if not carefully planned. Each of these examples requires a dialogue between public and private sectors in order to find a balance between their objectives.

LOCAL AND REGIONAL FOCUS OF TRANSPORTATION PLANNING

The last two sections of this chapter focus on the political elements of transportation decision making and how these can affect efficiency. The federal government plays a strong role in transportation planning and improvements. They provide a large amount of highway and transit funding, and establish design and planning rules. Through the power of the purse they are able to ensure we have a fairly uniform system of highways. However, the federal government does not actively plan or design facilities. These are responsibilities of metropolitan planning organizations and state departments of transportation. Understandably their focus is on regional and state mobility and other parochial issues. The Federal Highway Administration and Federal Transit Administration are largely responsible for oversight of the federal-aid programs. As a result, there is not a clear national freight policy.

In the United States, there has traditionally been no clear national freight policy. However, MAP-21, signed into law in June 2012, requires the USDOT to develop a national freight plan. Incentives provided to states to improve their freight networks are anticipated to lead to improved freight travel times and reduced costs.

In the past, the federal government did not apportion funding to implement projects that are of national significance for the freight system. Most funding was distributed to the states through formulas and congressionally mandated special projects referred to as "earmarks." Additionally, there were no incentives in place for states to cooperate and share funding to solve transportation problems that affect or span more than one state. There are indications of change though. Congress passed a new surface transportation law, Moving Ahead for Progress in the 21st Century (MAP-21) in June 2012. The bill requires the United States Department of Transportation to develop a national freight plan. It also provides incentives to states for improving their freight network. Projects that are identified in a state freight plan are eligible for greater federal support. While the federal share of a project is typically 80 percent, identified freight projects are eligible for a 90 percent federal share, and those on the Interstate Highway System are eligible for a 95 percent federal share. This incentive may lead states to invest more funds in critical freight projects, which may improve freight travel time and reduce the cost of moving freight.

FREIGHT DOES NOT VOTE

A final challenge, which encompasses several issues described in this chapter, is that freight transportation providers may have less of a voice in political debates about transportation than the general public. Clearly the transportation system is critical for moving both people and goods to the places they need to travel. However, only one of these groups – people – has a vote in their local, state, and federal government. People notice how transportation affects their lives and finances and are likely to pay attention to what political candidates say about the issue. Additionally, elected officials are people and they use the transportation system on a daily basis as well. They understand the major issues through their own experiences. While freight transportation providers and companies make political contributions and have a voice that is heard by elected officials, there may be a bias towards passenger transportation because people have more familiarity with it. Freight is often out of sight and out of mind until something bad happens.

There may also be a bias towards passenger transportation among urban planners. Much of their work entails public outreach and meetings with citizens and developers. Freight providers and transportation are sometimes an afterthought. For instance, improvements may be recommended for a street or area that improves travel for people, but impedes travel for freight. An example could be a road diet or curb extension. While these are important improvements for people, they are often designed without trucks and freight in mind. There are areas of intense freight activity where such improvements should be avoided.

These conflicts between passenger and freight transportation are not only a result of political influences. There is also a lack of understanding among the public and professionals alike as to the importance of freight transportation to economic strength. Freight is sometimes viewed as a nuisance and something to reduce or marginalize. However, the presence of trucks, trains, planes, and ships carrying freight are signs of a vibrant economy that is creating and trading goods and supplies. Improving the efficiency of freight transportation is one very clear way to improve the region's economy.

The general public and elected officials may be more biased towards passenger transportation issues because they are more familiar with it and less familiar with freight issues.

PLAN OBJECTIVES

The Strategic Freight Plan is guided by the overarching goal of providing a safe, secure, effective and efficient freight transportation system that fosters the economic vitality and livability of the Tampa Bay region. Eight objectives define the structure of the plan. The Goods Movement Advisory Committee (GMAC) developed plan objectives addressing freight mobility concerns and others addressing the compatibility of freight transport activities with the livability of communities and prosperity of the region's business centers. Freight mobility objectives focus on the performance of the freight transportation network, emphasizing safety, security, connectivity, and mobility, so that goods can be efficiently transported to destinations. Compatibility objectives address the preservation of community, economic and environmental assets to ensure the economic competiveness and quality of life for the Tampa Bay region.

Strategic Freight Plan Objectives

Freight Mobility Objectives

1. Improve safety conditions on the freight transportation system.
2. Improve accessibility and connectivity for freight transport to designated freight activity centers.
3. Improve mobility conditions and the overall performance of the freight transportation system.
4. Improve the security of the freight transportation system for efficient and reliable goods movement.

Freight Compatibility Objectives

1. Improve safety, accessibility, and mobility conditions where the freight and passenger transportation systems interact.
2. Improve protection and mitigation for communities, neighborhoods, and natural resources which are impacted by the freight transportation system.
3. Improve the freight transportation system's contribution to the economic competitiveness of the region and its communities.
4. Implement regional and local coordination of plans and policies that encourage an integrated approach to freight and livability issues.

The plan objectives guided the development and evaluation of freight mobility needs throughout the region. Performance measures were defined and applied in the evaluation of freight mobility needs to determine how well certain freight transportation improvement needs and strategies achieve the plan objectives. This analysis resulted in the identification of priority transportation investments for the region.

FREIGHT MOBILITY NEEDS

Several recent initiatives and evaluations conducted by planning and intermodal agencies in the Tampa Bay region have identified transportation improvement needs to facilitate the mobility of people and goods on the freight transportation network. These needs and other needed freight mobility improvements defined through a capacity analysis and an issue assessment undertaken as part of the Strategic Freight Plan comprise the inventory of freight mobility needs for the region. The sources of freight capacity, operational, and maintenance needs are illustrated in **Figure 7-1** and described below. A detailed overview of the freight needs identification and strategy evaluation process is provided in **Appendix A**.

Freight Issues and Opportunities were identified through collaboration with planning and intermodal agencies within the region. Many of these issues and opportunities related to freight mobility and economic development translated into freight transportation improvement needs and strategies.

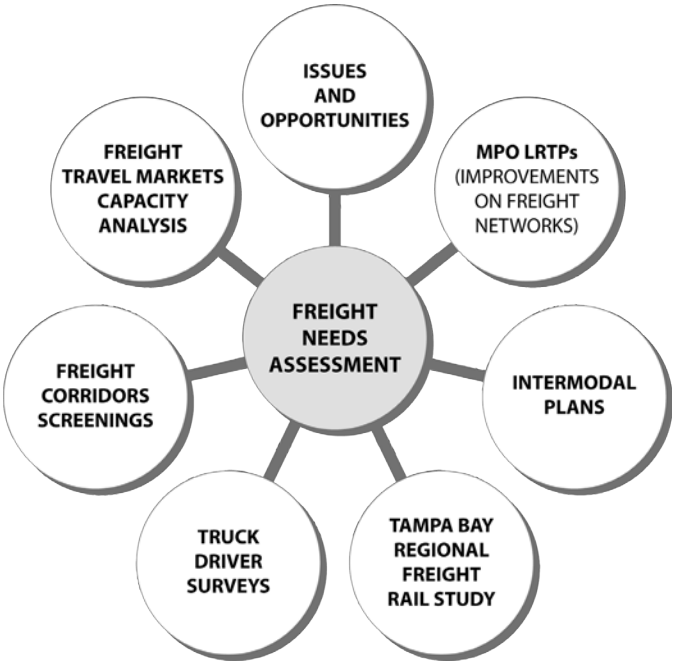


Figure 7-1: Freight Needs Assessment Sources

MPO Long Range Transportation Plans. The transportation needs assessment conducted in support of the development of the 2035 Cost Feasible Long Range Transportation Plans (LRTP) for all of the MPOs within the region identified needed roadway capacity improvements on the regional freight transportation network. These needs were evaluated as part of the freight needs assessment. Many of these transportation improvements serve to support both freight transport and commuter travel in some of the region's most congested travel corridors.

Intermodal Plans and Strategic Intermodal System. The Port of Tampa Transportation Study, Port of Tampa Master Plan, Port Manatee Master Plan, Tampa International Airport Master Plan, St. Petersburg-Clearwater Airport Master Plan, and other intermodal planning studies were reviewed to identify needed freight transportation infrastructure to support freight accessibility to these intermodal centers. Transportation improvement strategies defined in these studies were evaluated as part of the freight transportation needs assessment. Additionally, roadway improvement projects included in the 2040 Strategic Intermodal System (SIS) Needs Plan for the State of Florida were included in the needs assessment.

Tampa Bay Regional Freight Rail Study. This study, completed in an initial phase of the Tampa Bay Regional Goods Movement Study, defined several improvement strategies to improve freight rail transport and minimize conflicts between freight rail movements and vehicular travel on the region's roadways. Most of these strategies included separated grade crossing improvements at key loca-

tions throughout the region. The 2040 SIS Needs Plan was also referenced for additional railroad grade separation needs in Polk, Manatee, and Sarasota Counties, which were not addressed in the Freight Rail Study.

Freight Travel Markets Capacity Analysis. Twelve freight travel markets serving primary freight movements in the region were defined. The roadway network within each travel market was evaluated to determine the existing and future roadway capacity on the limited access roadways, the regional freight mobility corridors, the freight distribution routes, and other arterial and collector roadways. Each of these networks were isolated and evaluated to determine which networks were congested and which networks were underutilized. This analysis assisted to define opportunities and potential strategies to maximize the use of existing transportation infrastructure within each travel market. The freight travel markets and relevant freight network performance statistics are provided in **Appendix B**.

Freight Corridor Screenings were conducted on all of the defined Regional Freight Mobility Corridors within the region. The screenings identified potential issues within each corridor related to freight travel conditions and operations. Corridor-based freight needs as well as freight "hot spots" were identified during the corridor screenings, and these were evaluated as part of the freight needs assessment.

Truck driver surveys helped identify freight "hot spots" in the region where operational constraints, such as traffic signals optimized for automobiles, hinder the ability for trucks to travel through a corridor.

Truck Driver Surveys. In the initial phase of the study, surveys were conducted with truck drivers to identify locations where they experience operational problems on the transportation network. These include locations where the existing roadway geometry or traffic operational controls hinder their ability to travel through a corridor or navigate turns at intersections and driveways. This resulted in the identification of many freight "hot spots" throughout the region. These locations were field verified to confirm that a traffic operational problem exists and to identify other potential issues.

Types of Freight Mobility Needs

Through the needs assessment, four categories of freight-related needs were identified. These include: capacity, operational, maintenance, and safety and security needs. The capacity and operational needs were evaluated as part of the Strategic Freight Plan to determine the most pressing freight mobility needs in the region. The maintenance, safety and security needs were inventoried and coordinated with state and local agencies so that these needs could be considered in their respective roadway maintenance programs. The various types of freight mobility needs are shown in **Figure 7-2** and described below.

Capacity Needs

Capacity needs include adding new travel lanes, special purpose truck lanes, or frontage roads to existing roadways and constructing new roadways or interchanges to better enable a facility or network to meet travel demand, reduce congestion and enhance system reliability. It also includes separated grade crossings at freight railroads through the construction of bridge overpasses. Capacity needs are generally recommended in response to or in anticipation of congestion resulting from roadway volumes that are too high to be served efficiently by the existing facility or network.

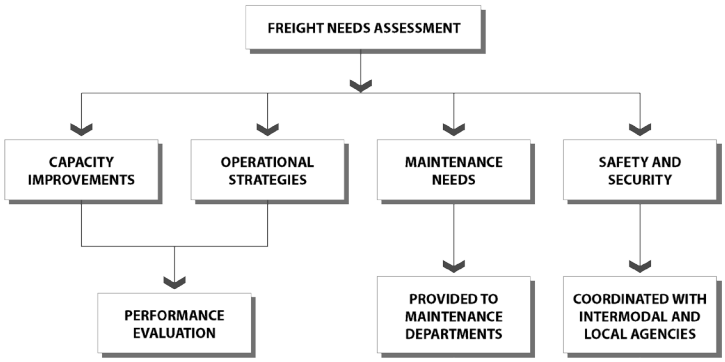


Figure 7-2: Freight Mobility Strategies

Operational Needs

In many cases, the flow of traffic along a roadway can be improved through operational strategies such as, signal timing optimization, Intelligent Transportation System (ITS) strategies, improved signage and wayfinding, or enhancements to throughway and/or intersection geometry. From a goods movement perspective, operational improvements account for the unique operational characteristics of trucks – including wide turning movements and slow acceleration. Addressing truck operations issues along a corridor or at an intersection can significantly improve travel time reliability along a roadway as well as accessibility to industrial and commercial uses. Operational needs for both roadway corridors (corridor-based) and at specific locations (freight hot spots) were identified.

Maintenance Needs

In addition to the capacity and operational needs, freight-specific maintenance needs have been identified through the needs assessment process. The ongoing maintenance of transportation facilities is a significant factor in providing efficient and economical goods movement. Facility maintenance is typically scheduled by implementation agencies, public works departments, private owners (CSXT, e.g.), or port and aviation authorities on a separate basis from capacity and operational improvements implementation. The identified maintenance needs have been catalogued and will be provided to the appropriate entities for review and inclusion in future maintenance work.

Safety and Security Needs

The needs assessment process yielded several needed improvements that address safety and security issues. Safety needs address potential hazards posed by freight operations to industry and/or logistics personnel, non-freight users of the shared transportation network, or property. Security needs address measures taken to protect strategic transportation infrastructure, vehicles, cargoes, and personnel from potential threats posed by nature and people. Issues potentially impacting safe railroad and roadway opera-

Grade Separation Needs

Among the many changes the Tampa Bay region can expect to see as goods movement increases over the coming decades is a substantial increase in freight rail traffic. Many of the region's busiest rail lines cross critical trucking and commuter roadway corridors at grade. As trains increase in length and operate more frequently in key industrial areas, many of the area's roadways will experience significant delays at these crossings. The freight needs assessment process identifies potential grade separation improvements at freight railroad crossings to allow railroad tracks to cross over or under major roadways, thereby improving travel time reliability on those roads and improving safety at the crossings.

tions were identified in the corridor screening process. Security needs were identified through coordination with intermodal entities (airports and seaports), whose facilities and operations are subject to security requirements stipulated in federal legislation.

MEASURING FREIGHT SYSTEM PERFORMANCE

Damaged pavement is common in the Tampa Bay region due to inadequate truck turn radii at intersections.

Freight capacity and operational needs were organized as either a corridor-based need or a freight hot spot need. Corridor-based needs are linear in nature and address existing or anticipated capacity deficiencies and/or operational issues. Freight hot spot needs are specific locations, such as an intersection, where roadway geometric or operational conditions inhibit truck movements in one or more directions have been observed. Because corridor-based needs address issues along a stretch of roadway, they generally represent long-term improvements that require substantial planning and financial resources. By contrast, many freight hot spot projects are located at a single intersection or other specific location and may be addressed relatively quickly and affordably.

A set of weighted criteria was developed to evaluate the relative priority of the identified freight-related needs. In general, the criteria address safety, accessibility, mobility, modal conflicts, land use compatibility, and economic factors within the limits of each corridor-based need and in the immediate vicinity of each freight hot spot need. Since corridor-based and freight hot spot needs are different in nature, the two categories of needs were evaluated separately using slightly different indicators. **Table 7-1** and **Table 7-2** display the performance indicators and scoring rubrics used for evaluating corridor-based needs and hot spot needs, respectively. The principal difference between the evaluation process used for corridor-based needs and freight hot spot needs is that corridor-based needs are more strategic in nature and therefore primarily uses long-term trend data to estimate the performance of the freight transportation system, while the performance evaluation for freight hot spot needs relies on existing conditions data.

Appendix A provides a full description of the evaluation of freight mobility needs. It outlines each evaluation criterion's relationship to the study objectives, the scoring process, the need for and method of standardizing scores, weighting the indicators, and the data used to support the evaluation process.

REGIONAL PRIORITY NEEDS

The freight system performance evaluations indicate the relative priority of the identified corridor-based and hot spot needs as they pertain to supporting regional goods movement. The regional priority corridor-based needs are displayed in **Map 7-1** (with sub-regional detail maps in **Maps 7-2 through 7-5**). Regional freight hot spot priorities are shown in **Map 7-6** (with sub-regional detail maps in **Maps 7-7 through 7-10**). The maps display needs as high, medium, or low priorities from a freight mobility perspective. Complete tables of corridor-based and hot spot needs that include the project limits/locations, scoring details, and regional rankings are presented in **Appendix A**.

Table 7-1: Corridor-Based Project Evaluation - Performance Indicators and Supporting Data

OBJECTIVES	PERFORMANCE INDICATORS	SCORE	STANDARDIZATION	WEIGHT	SUPPORTING DATA	DATA SOURCE
Freight Mobility Objectives						
Mobility Objective 1 Improve safety conditions on the freight transportation system	Percent crashes involving trucks/ Percent truck traffic (200' buffer)	Ratio	Value/Max (1.00)	10%	2006-2009 Crash Statistics; 2014 loaded highway network (E+C)	FDOT D7; TBRPM (2010); Polk TPO model; Sarasota/ Manatee/Charlotte model (2011)
Mobility Objective 2 Improve accessibility and connectivity for freight transport to designated freight activity centers	Intensity of freight activity center(s) served by project	Multiple or High/Medium/Low	1.00/0.67/0.33	10%	Freight activity center shape file	TBRGMS freight activity center database (2009)
	Emerging or existing freight activity center	Existing/Emerging	1.00/0.00	5%		
	Facility connecting freight activity center and limited access highway	Yes/No	1.00/0.00	10%		
Mobility Objective 3 Improve mobility conditions and the overall performance and reliability of the freight transportation system	Future congested to free flow speed ratio	(1/Ratio)	Value/Max (1.00)	15%	2014 loaded highway network (E+C)[1]	TBRPM (2010); Polk TPO model; Sarasota/Manatee/ Charlotte model (2011)
	Future AADTT	Number	Value/Max (1.00)	15%		
	Freight Facility Type served by project	RFMC/Freight Distribution Route	1.00/0.00	10%	Regional Freight Roadway shapefiles	TBRGMS (2010); Polk TPO model; Sarasota/Manatee/ Charlotte model (2011)

1 *Prospective new facilities not coded in the Existing + Committed highway network were evaluated based on the same statistics on parallel facilities expected to be improved by the addition of the new facility*

Table 7-1: Corridor-Based Project Evaluation - Performance Indicators and Supporting Data (Continued)

OBJECTIVES	PERFORMANCE INDICATORS	SCORE	STANDARDIZATION	WEIGHT	SUPPORTING DATA	DATA SOURCE
Mobility Objective 4 Improve the security of the freight transportation system, balancing the need for efficient and reliable goods movement	Potential projects, programs, and/or processes addressing this objective are fundamentally different than those addressing the other Strategic Freight Plan objectives. As a result, performance indicators for this objective were not incorporated into the project evaluation process. Efforts to enhance the security of the goods movement transportation system are described on page 7-1.					
Freight Compatibility Objectives						
Compatibility Objective 1 Improve safety, accessibility, and mobility conditions where the freight and passenger transportation systems interact.	Future average percent truck traffic	Percent	Value/Max (1.00)	7.5%	2014 loaded highway network (E+C)[2]	TBRPM (2010); Polk TPO model; Sarasota/Manatee/ Charlotte model (2011)
Compatibility Objective 2 Minimize impacts to ecosystems and communities which are impacted by the freight transportation system.	Percent of project in livability/ freight conflict areas	Percent	Value/Max (1.00)	5.0%	Freight Activity and Land Use Compatibility Analysis	TBRGMS (2010); Polk TPO model; Sarasota/Manatee/ Charlotte model (2011)
Compatibility Objective 3 Maximize the freight transportation system's contribution to the economic competitiveness of the region and its communities.	Future industrial employment served by project (jobs within quarter-mile buffer)	Number	Value/Max (1.00)	12.5%	2035 SE data (TAZ)	TBRPM (2010); Polk TPO model; Sarasota/Manatee/ Charlotte model (2011)

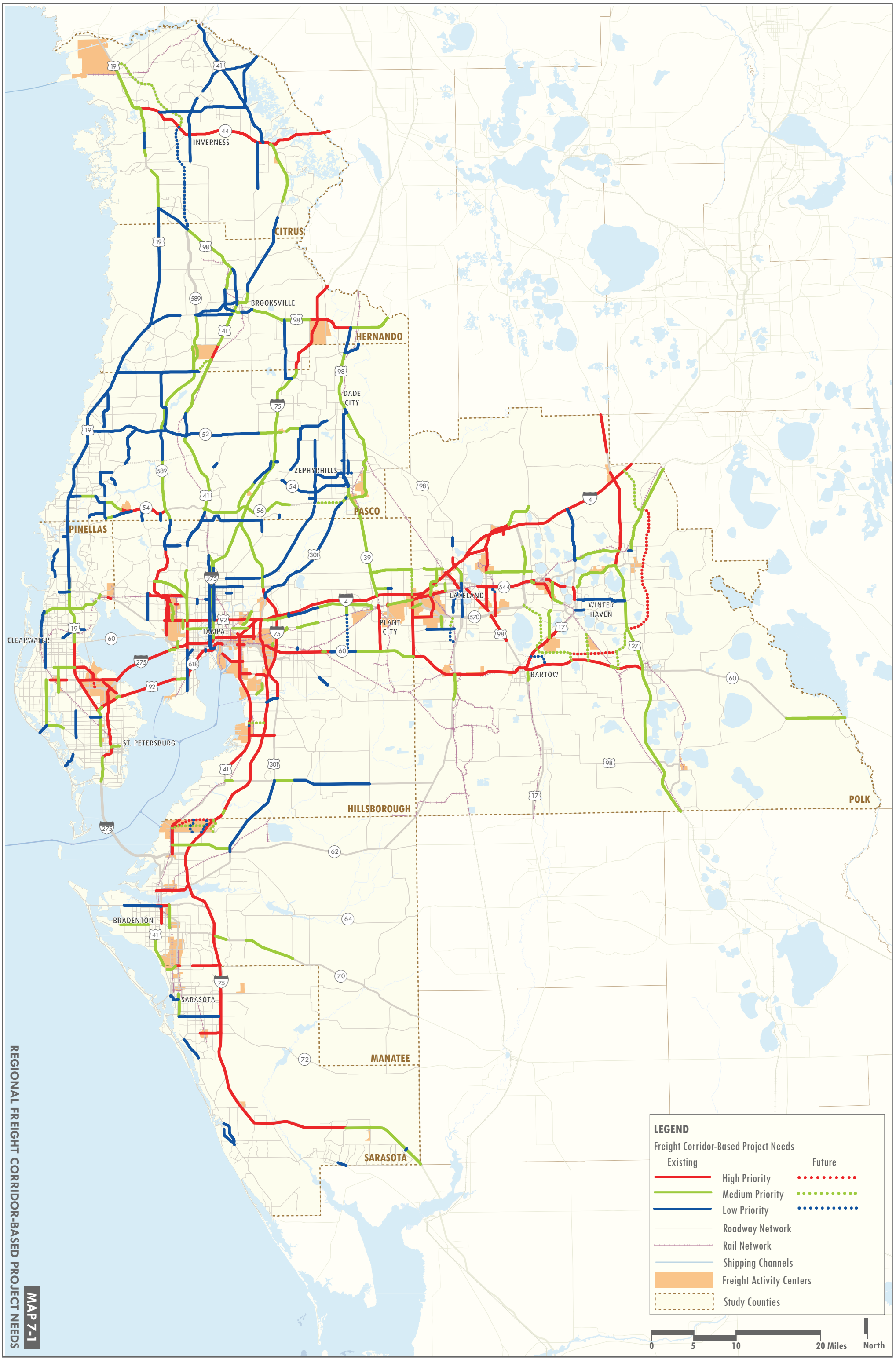
2 *Future truck traffic statistics (volumes and percentages) for Polk, Sarasota, and Manatee were based on off-model projections documented in Appendix D*

Table 7-2: Freight Hot Spot Evaluation - Performance Indicators and Supporting Data

OBJECTIVES	PERFORMANCE INDICATOR	SCORE	STANDARDIZATION	WEIGHT	SUPPORTING DATA	DATA SOURCE
Freight Mobility Objectives						
Mobility Objective 1 Improve safety conditions on the freight transportation system	Number of crashes involving trucks (200' buffer)	Number	Value/Max (1.00)	15.0%	Crash Statistics	FDOT D1 and D7 crash database (2007)
Mobility Objective 2 Improve accessibility and connectivity for freight transport to designated freight activity centers	Intensity of freight activity center served by project	Multiple or High/Medium/Low	1.00/0.67/0.33	10.0%	Freigth activity center shape file	TBRGMS freight activity center database (2009)
	Emerging or existing freight activity center	Existing/Emerging	1.00/0.00	5.0%		
	Facility connecting freight activity center and limited access highway	Yes/No	1.00/0.00	5.0%		
Mobility Objective 3 Improve mobility conditions and the overall performance and reliability of the freight transportation system	Existing V/C ratio	Ratio	Value/Max (1.00)	20.0%	2006 loaded highway network (Base)	TBRPM (2010); Polk TPO model; Sarasota/Manatee/ Charlotte model (2011)
	Average delay per vehicle at hot spot location * AADTT	Minutes	Value/Max (1.00)	20.0%		
Mobility Objective 4 Improve the security of the freight transportation system, balancing the need for efficient and reliable goods movement	Potential projects, programs, and/or processes addressing this objective are fundamentally different than those addressing the other Strategic Freight Plan objectives. As a result, performance indicators for this objective were not incorporated into the project evaluation process. Efforts to enhance the security of the goods movement transportation system are described on page 7-1.					

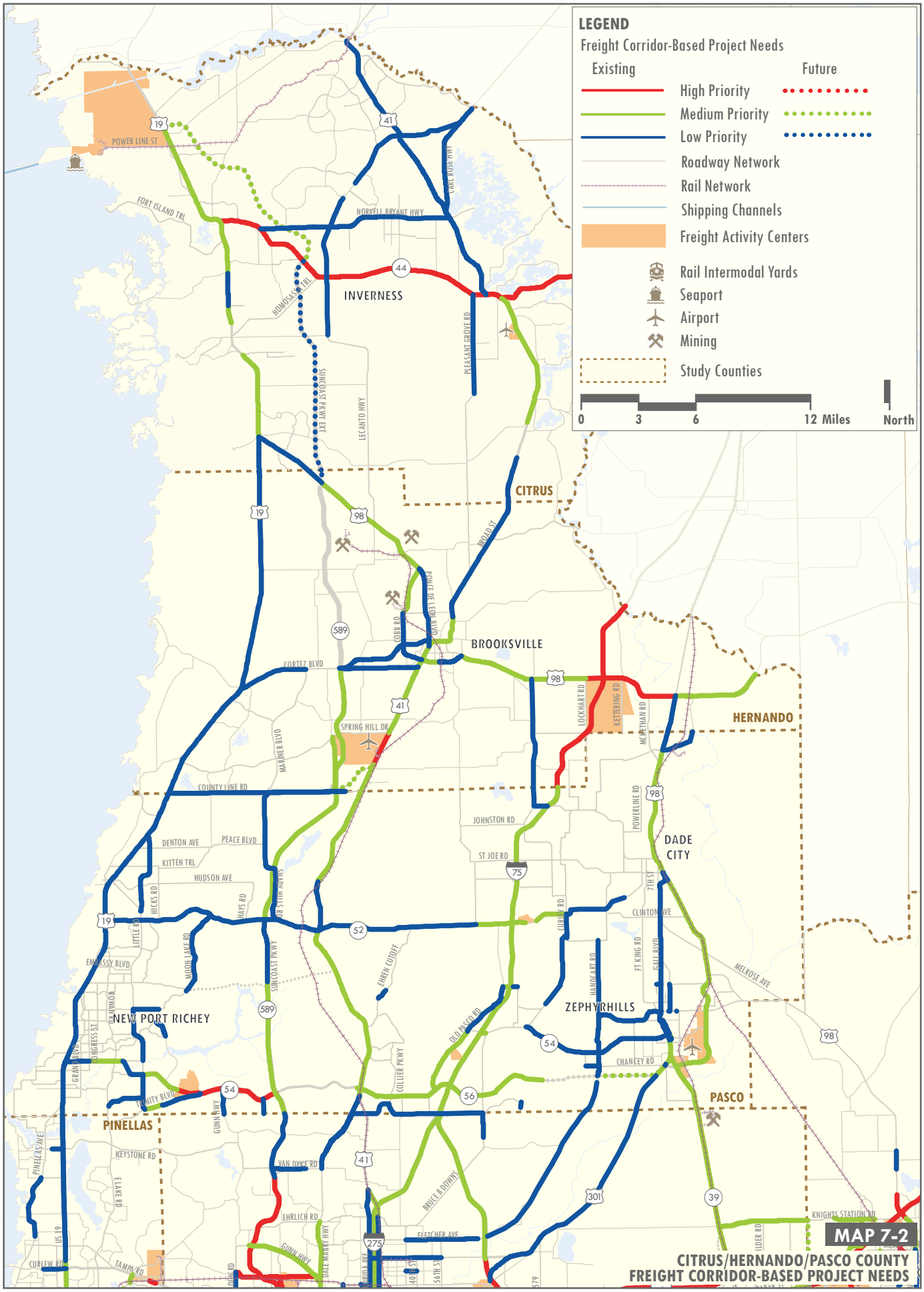
Table 7-2: Freight Hot Spot Evaluation - Performance Indicators and Supporting Data (Continued)

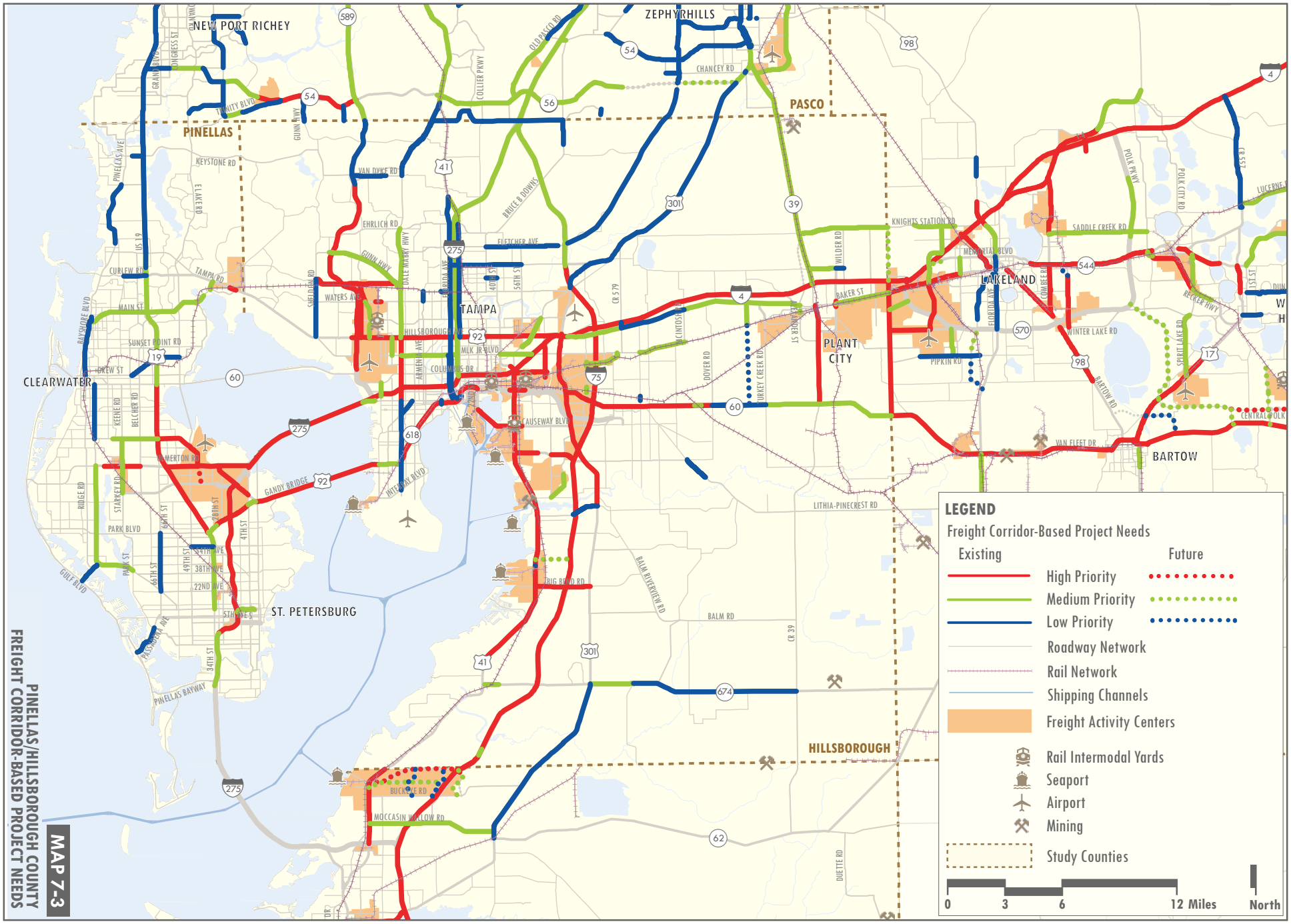
OBJECTIVES	PERFORMANCE INDICATOR	SCORE	STANDARDIZATION	WEIGHT	SUPPORTING DATA	DATA SOURCE
Freight Compatibility Objectives						
Compatibility Objective 1 Improve safety, accessibility, and mobility conditions where the freight and passenger transportation systems interact.	Existing average percent truck traffic (AADT 10,000 or greater)	Percent	Value/Max (1.00)	7.5%	2009 traffic counts (or base loaded highway network in absence of count data)	FDOT (2010) or TBRPM (2010); Polk TPO model; Sarasota/Manatee/ Charlotte model (2011)
Compatibility Objective 2 Minimize Impacts to ecosystems and communities which are impacted by the freight transportation system.	Project in livability/ freight conflict area	Yes/No	1.00/0.00	5.0%	Livability/freight conflicts/analysis	TBRGMS (2010); Polk TPO model; Sarasota/Manatee/ Charlotte model (2011)
Compatibility Objective 3 Maximize the freight transportation system's contribution to the economic competitiveness of the region and its communities.	Existing industrial and commercial employment served by project (jobs within quarter-mile buffer)	Number	Value/Max (1.00)	12.5%	Base year SE data (TAZ)	TBRPM (2010); Polk TPO model; Sarasota/Manatee/ Charlotte model (2011)
Compatibility Objective 4 Implement regional and local coordination of plans and policies that encourage an integrated approach to freight and livability issues.	Potential projects, programs, and/or processes addressing this objective are fundamentally different than those addressing the other Strategic Freight Plan objectives. As a result, performance indicators for this objective were not incorporated into the project evaluation process. Efforts to facilitate local and regional plan coordination are described on page 7-1.					
Total Project Score			**Max Sum Total = 11**	**100.0%**		



REGIONAL FREIGHT CORRIDOR-BASED PROJECT NEEDS

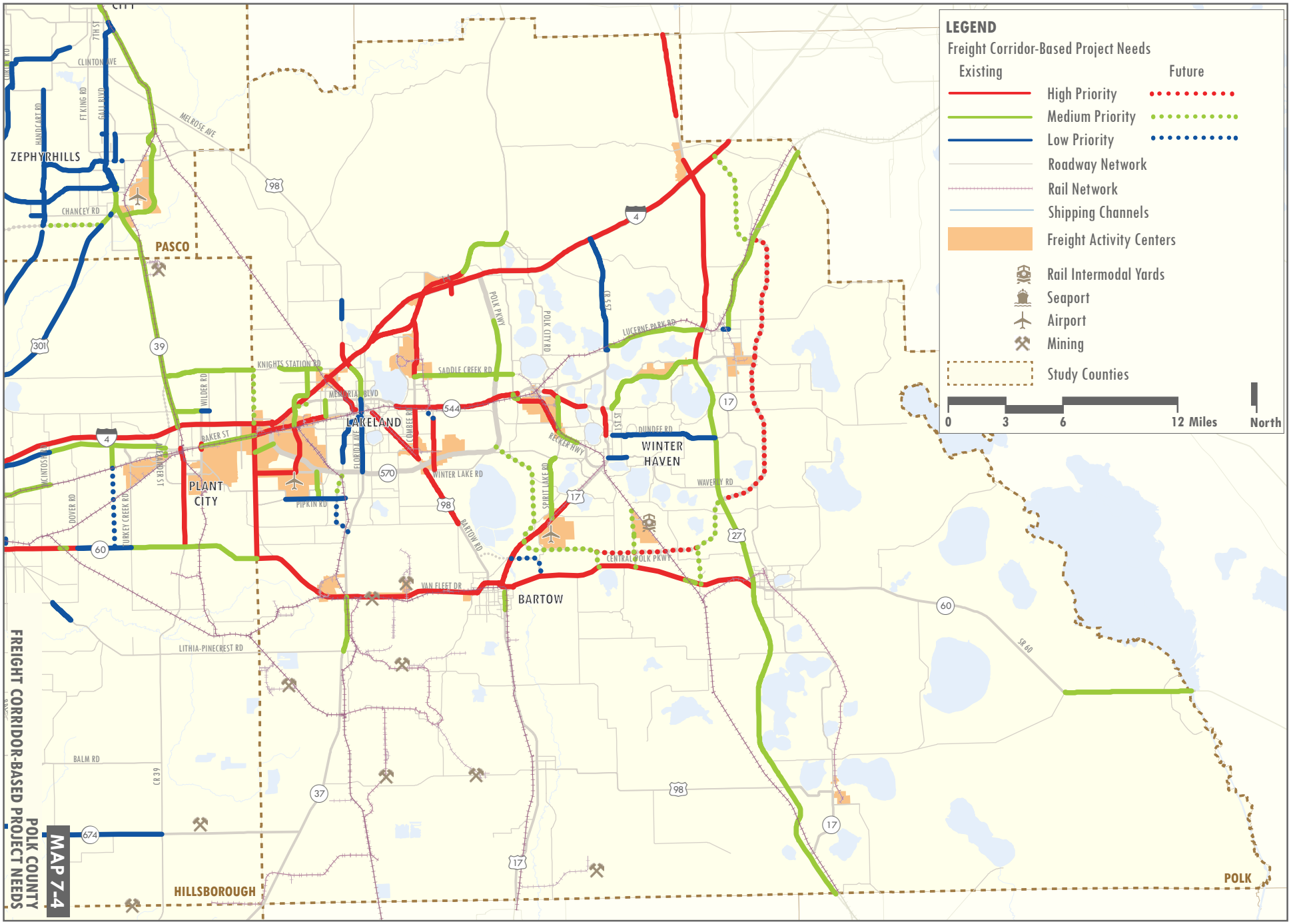
MAP 7-1


LEGEND
Freight Corridor-Based Project Needs
Existing
Future
High Priority
Medium Priority
Low Priority
Roadway Network
Rail Network
Shipping Channels
Freight Activity Centers
Rail Intermodal Yards
Seaport
Airport
Mining
Study Counties
0
3
6
12 Miles
North
INVERNESS
CITRUS
BROOKSVILLE
HERNANDO
DADE CITY
ZEPHYRHILLS
NEW PORT RICHEY
PASCO
PINELLAS
POWER LINE ST
FORT ISLAND TRL
NORVELL BRYANT HWY
CARL ROSE HWY
HOMOSASSA TRL
SUNCOAST PKWY EXT
LECANTO HWY
PLEASANT GROVE RD
BROAD ST
POWELL CEMETERY RD
COBB RD
CORTEZ BLVD
SPRING HILL DR
MARINER BLVD
COUNTY LINE RD
LOCKHART RD
KETTERING RD
MCMETHAN RD
POWERLINE RD
JOHNSTON RD
ST JOE RD
DENTON AVE
PEACE BLVD
KITTEN TRL
HUDSON AVE
HICKS RD
LITTLE RD
MOON LAKE RD
HAYS RD
SUNCOAST PKWY
EMBASSY BLVD
ROWAN RD
CONGRESS ST
GRAND BLVD
TRINITY BLVD
GUNN HWY
EHRLICH CUTOFF
COLLIER PKWY
OLD PASCO RD
CURLEW RD
7TH ST
CLINTON AVE
FT KING RD
GALL BLVD
HANDCART RD
MELROSE AVE
CHANCEY RD
KEYSTONE RD
VAN DYKE RD
ELLAKE RD
PINELLAS AVE
EHRLICH RD
DALE MABRY HWY
BRUCE B DOWNS
FLETCHER AVE
KNIGHTS STATION RD
TAMPA RD
CURLEW RD
IDER RD
MAP 7-2
CITRUS/HERNANDO/PASCO COUNTY
FREIGHT CORRIDOR-BASED PROJECT NEEDS



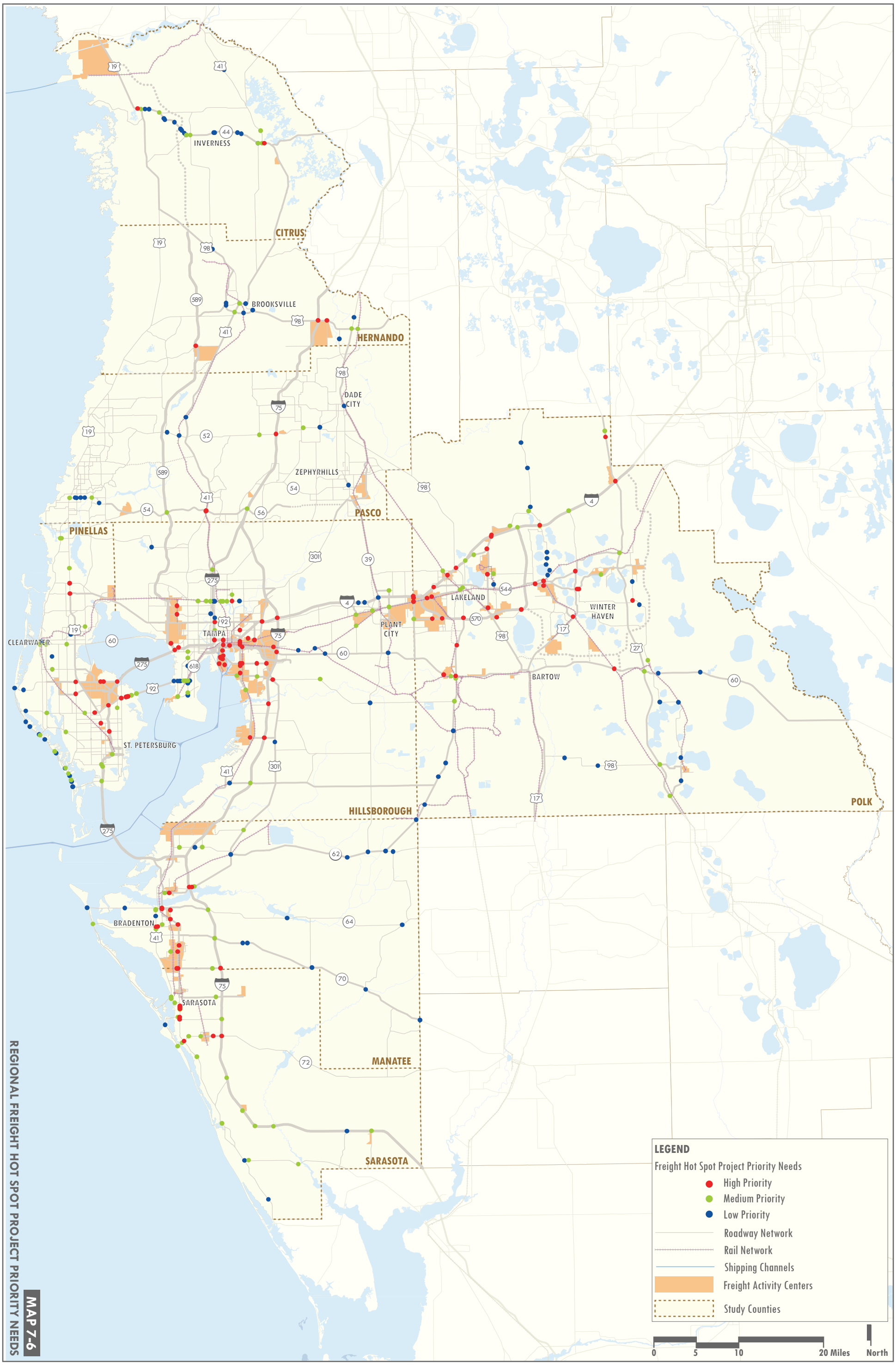
PINELLAS/HILLSBOROUGH COUNTY
FREIGHT CORRIDOR-BASED PROJECT NEEDS

MAP 7-3


LEGEND
Freight Corridor-Based Project Needs
Existing
Future
High Priority
Medium Priority
Low Priority
Roadway Network
Rail Network
Shipping Channels
Freight Activity Centers
Rail Intermodal Yards
Seaport
Airport
Mining
Study Counties
0
3
6
12 Miles
North
ZEPHYRHILLS
PASCO
LAKELAND
PLANT CITY
WINTER HAVEN
BARTOW
HILLSBOROUGH
POLK
CLINTON AVE
MELROSE AVE
CHANCEY RD
KNIGHTS STATION RD
SADDLE CREEK RD
MEMORIAL BLVD
WILDER RD
BAKER ST
DOVER RD
TURKEY CREEK RD
PIPKIN RD
WINTER LAKE RD
DUNDEE RD
WAVERLY RD
RECKER HWY
SPIRIT LAKE RD
POLK PKWY
POLK CITY RD
LUCERNE PARK RD
CENTRAL POLK PKWY
VAN FLEET DR
BARTOW RD
LITHIA-PINECREST RD
BALM RD
SR 60
FREIGHT CORRIDOR-BASED PROJECT NEEDS
POLK COUNTY
MAP 7-4

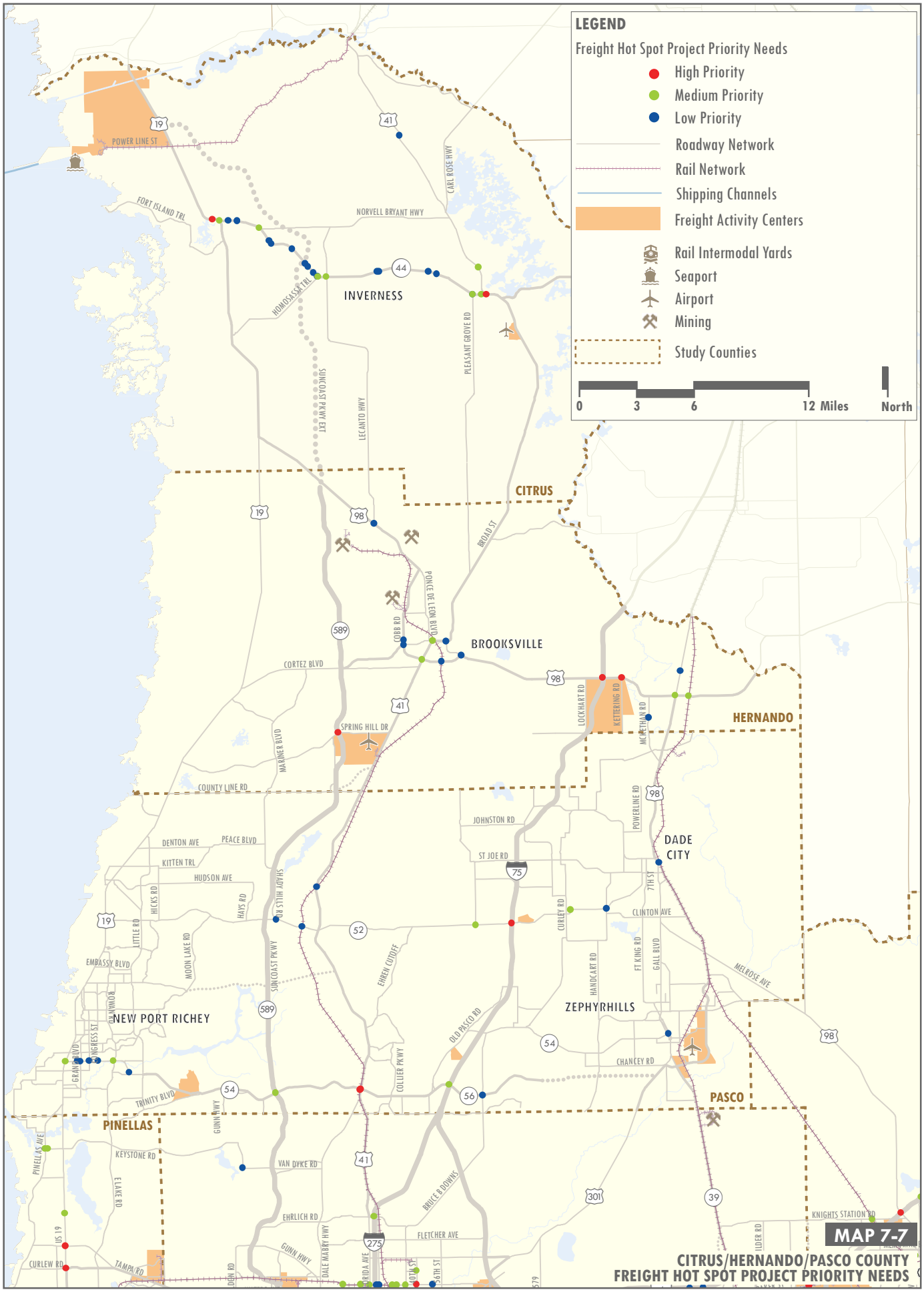
MAP 7-5

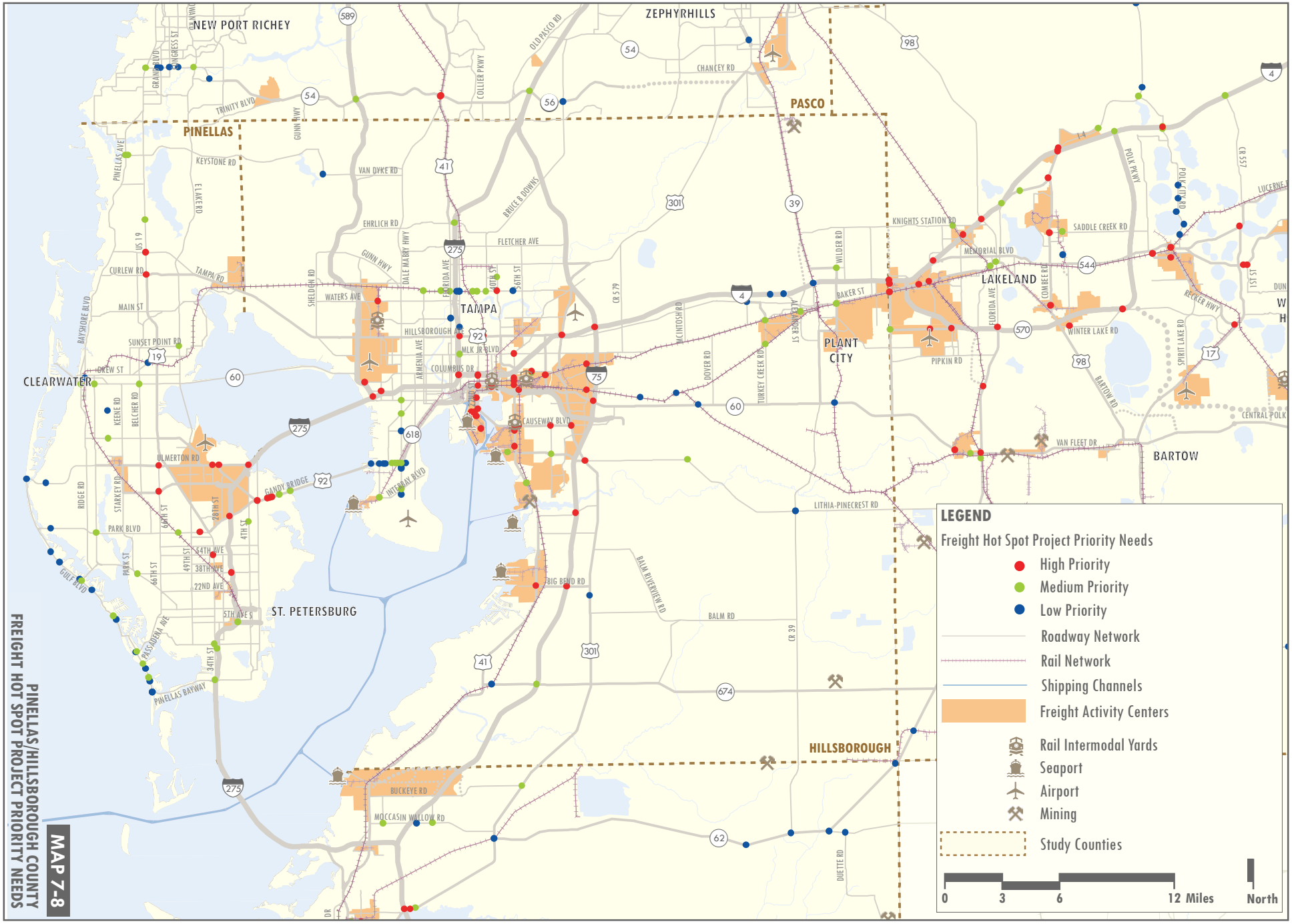
SARASOTA/MANATEE COUNTY
FREIGHT CORRIDOR-BASED PROJECT NEEDS



REGIONAL FREIGHT HOT SPOT PROJECT PRIORITY NEEDS

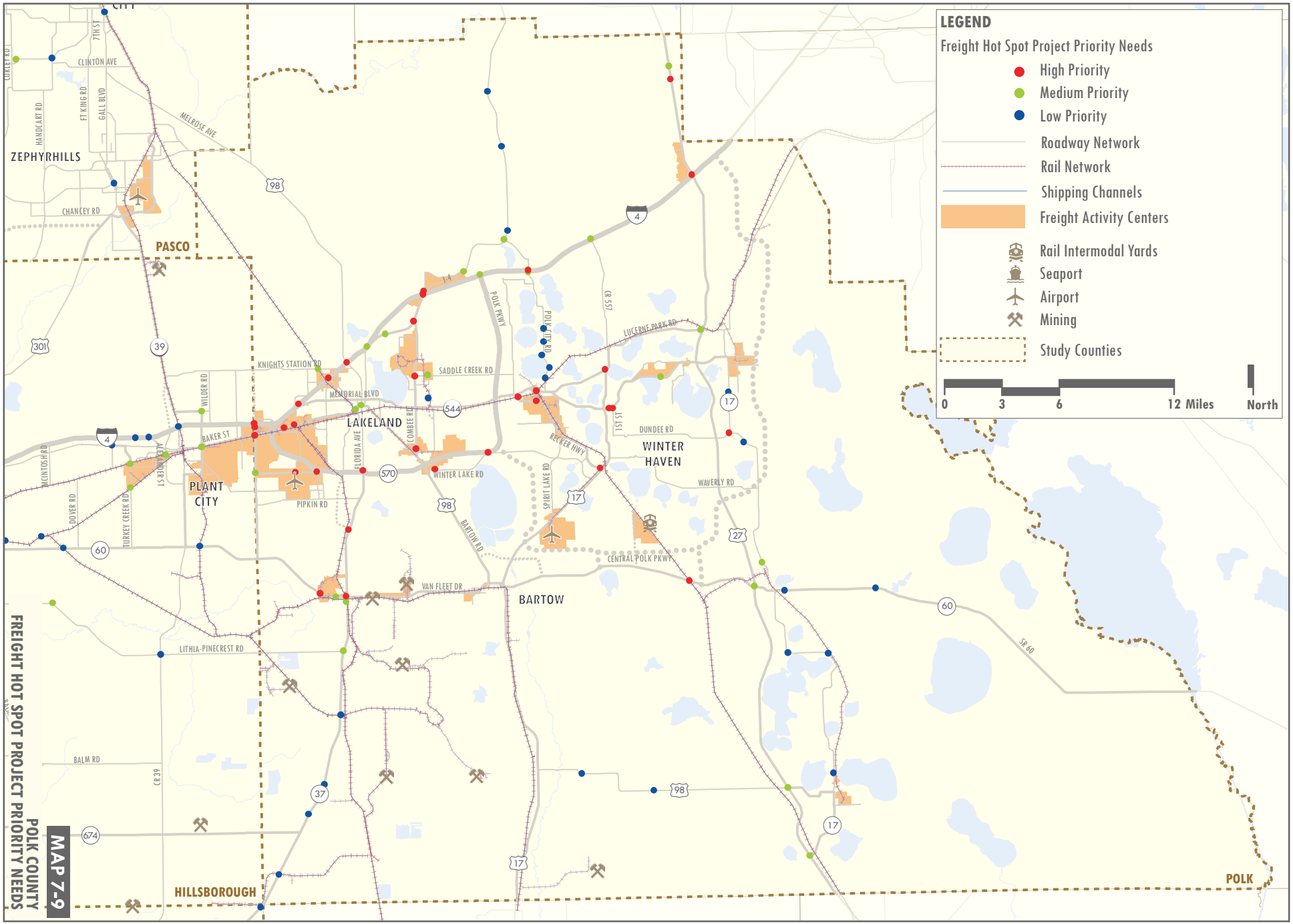
MAP 7-6


LEGEND
Freight Hot Spot Project Priority Needs
High Priority
Medium Priority
Low Priority
Roadway Network
Rail Network
Shipping Channels
Freight Activity Centers
Rail Intermodal Yards
Seaport
Airport
Mining
Study Counties
0
3
6
12 Miles
North
CITRUS
HERNANDO
PASCO
PINELLAS
INVERNESS
BROOKSVILLE
DADE CITY
ZEPHYRHILLS
NEW PORT RICHEY
POWER LINE ST
FORT ISLAND TRL
NORVELL BRYANT HWY
CARL ROSE HWY
HOMOSASSA TRL
SUNCOAST PKWY EXT
LECANTO HWY
PLEASANT GROVE RD
BROAD ST
PONCE DE LEON BLVD
COBB RD
CORTEZ BLVD
SPRING HILL DR
MARINER BLVD
COUNTY LINE RD
LOCKHART RD
KETTERING RD
MCKETHAN RD
POWERLINE RD
JOHNSTON RD
ST JOE RD
DENTON AVE
PEACE BLVD
KITTEN TRL
HUDSON AVE
HICKS RD
HAYS RD
SHADY HILLS RD
LITTLE RD
MOON LAKE RD
EMBASSY BLVD
SUNCOAST PKWY
EHREN CUTOFF
CURLEY RD
7TH ST
CLINTON AVE
HANDCART RD
FT KING RD
GALL BLVD
MELROSE AVE
OLD PASCO RD
COLLIER PKWY
CHANCEY RD
TRINITY BLVD
GUNN HWY
KEYSTONE RD
VAN DYKE RD
EHRLICH RD
FLETCHER AVE
BRUCE B DOWNS
DALE MABRY HWY
TAMPA RD
CURLEW RD
US 19
ELAKE RD
PINELLAS AVE
KNIGHTS STATION RD
ILDER RD
MAP 7-7
CITRUS/HERNANDO/PASCO COUNTY
FREIGHT HOT SPOT PROJECT PRIORITY NEEDS



PINELLAS/HILLSBOROUGH COUNTY
FREIGHT HOT SPOT PROJECT PRIORITY NEEDS

MAP 7-8



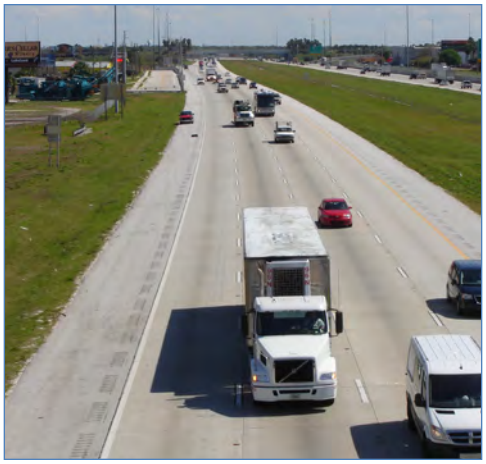
MAP 7-9

POLK COUNTY FREIGHT HOT SPOT PROJECT PRIORITY NEEDS


LEGEND
Freight Hot Spot Project Priority Needs
High Priority
Medium Priority
Low Priority
Roadway Network
Rail Network
Shipping Channels
Freight Activity Centers
Rail Intermodal Yards
Seaport
Airport
Mining
Study Counties
0
3
6
12 Miles
North
ST. PETERSBURG
BRADENTON
SARASOTA
MANATEE
SARASOTA
COLUMBUS DR
CAUSEWAY BLVD
ULMERTON RD
GANDY BRIDGE
INTERWAY BLVD
BIG BEND RD
BALM RIVERVIEW RD
5TH AVE S
PINELLAS BAYWAY
BUCKEYE RD
MOCCASIN WALLOW RD
DUETTE RD
MANATEE AVE
VALENCIA DR
14TH ST
15TH ST
CORTEZ RD
GULF OF MEXICO DR
VERNA BETHANY RD
WAUCHULA RD
UNIVERSITY PKWY
FRUITVILLE RD
BEE RIDGE RD
CLARK RD
SUGAR BOWL RD
VENICE BYPASS
TAMIAMI TRL
SUMTER BLVD
TOLEDO BLADE BLVD
BIGELOW RD
MAP 7-10
SARASOTA/MANATEE COUNTY
FREIGHT HOT SPOT PROJECT PRIORITY NEEDS

POLICY FRAMEWORK FOR FREIGHT STRATEGY DEVELOPMENT

The Strategic Freight Plan includes a policy framework that is used to guide the development of specific strategies to address identified freight mobility needs in the Tampa Bay region. The Plan identifies four types of freight improvement strategies including roadway capacity improvements, operational management practices, freight network maintenance, and safety and security strategies. The policy framework provides guidance for the implementation of roadway capacity and operational strategies on the freight transportation network. Potential strategies for a given roadway facility should support the primary function(s) of the facility and consider the land uses and activities within the corridor as well as the shared uses of the corridor.



Strategies to address the freight mobility needs in the Tampa Bay region identified by the Strategic Freight Plan should consider the primary function(s) of the facility type and the adjacent land uses and activities within the corridor.

FACILITY FUNCTION

A key consideration in defining appropriate transportation improvement strategies to address defined mobility needs on the freight transportation roadway network is the primary function of the roadway. To maintain and improve freight travel conditions on the roadway network, the improvement strategies considered within the corridor should support the primary freight function of the roadway. The freight transportation network serves four primary freight transport functions - mobility, connectivity, circulation, and accessibility.

The mobility function refers to the need to move high volumes of truck traffic at relatively high speeds over long distances. Connectivity refers to the need to provide efficient connections between major freight destinations, such as regional Freight Activity Centers (FAC), and limited access facilities, and between FACs where warranted. Circulation refers to the need for a transportation network that provides for efficient distribution of truck delivery and/or collection points throughout the region. Finally, access refers to providing direct access for trucks entering and leaving specific destinations.

The freight transportation network has been organized into four facility types, each providing primary and secondary freight transport functions. These facility types and their primary functions include the following:

- **Limited access facilities** provide uninterrupted flows for high volumes of traffic at high speeds and primarily serve the mobility role of the freight network. This facility type includes all of the region's Interstate highways and toll roads. These roadways are the primary trade corridors for trucks and connect the Tampa Bay region with the rest of Florida as well as the United States. They also serve

as major commuter corridors. Preserving capacity and maintaining safe, high speed travel conditions for trucks and commuters is a primary objective for improvement strategies employed in these corridors.

- **Regional freight mobility corridors** primarily serve the mobility and connectivity roles of the freight network, providing high capacity connections between freight activity centers and limited access facilities. These facilities typically carry long-haul truck trips and host high volumes of truck traffic, serving as the primary connectors and access routes for trucks destined to large industrial, distribution and intermodal centers throughout the region. These corridors are often lined with commercial uses and carry high volumes of commuter and localized traffic.
- **Freight distribution routes** primarily serve the circulation function of the freight mobility network. Freight distribution routes distribute truck traffic from limited access facilities and regional freight mobility corridors to local delivery areas. These roadways are intended to provide truckers with reasonable accessibility to delivery areas, while minimizing through traffic in neighborhoods. These roadways are often lined with commercial and residential uses, and therefore improvement strategies should consider the mix of uses and activities within the corridor.
- **Freight activity center streets** provide direct access to freight activity centers and other streets located within the boundaries of a freight activity center. Their primary purpose is to provide truck circulation within industrial areas and provide direct access to freight destinations. These roadways are often local and collector streets serving major freight activity centers.

Interstates and highways provide uninterrupted flows at high speeds and primarily serve the mobility role of the freight network. Opportunities exist to improve the efficiency of freight transport on the Interstate System.

Table 8-1 summarizes the freight facility types and the functions they serve.

Table 8-1: Freight Facility Type and Function

Facility Type	Freight Facility Function			
	Mobility	Connectivity	Circulation	Access
Limited Access Facilities	Primary	Secondary	Limited	Limited
Freight Mobility Corridors	Primary	Primary	Secondary	Secondary
Other Freight Distribution Routes	Secondary	Secondary	Primary	Secondary
Freight Activity Center Streets	Limited	Limited	Primary	Primary

FREIGHT ACTIVITY AND LAND USE COMPATIBILITY

The particular set of improvement strategies appropriate for a given freight roadway facility depends not only on its freight transport function but also on the existing and planned land uses and activities within the corridor. The Strategic Freight Plan study area covers a sizeable region that includes eight counties and more than 50 municipalities. Each jurisdiction has its own plans for growth and development documented in comprehensive plans and detailed in other documents like neighborhood or special area plans. These plans express the long-term livability visions for these communities. Investment strategies developed to improve freight travel conditions within freight corridors should also consider and support the existing land uses and long-term growth vision for the area. To understand the geography of freight activity and livability planning initiatives throughout the region, a freight and land use compatibility analysis was performed that utilizes local land use and special planning area data and truck traffic statistics.

The compatibility analysis provides a general sense of the land use character in the vicinity of each of the identified freight mobility needs. The analysis guides the development of strategies and freight-friendly roadway design given the constraints and opportunities presented by the local context of a specific facility. The compatibility analysis utilizes regional and local land use planning data and regional truck traffic data to identify areas where potential conflicts exist between freight activity and community livability. The general kinds of data used in the analysis include the following:

- Future land use
- Planned rapid transit station areas (quarter-mile buffers around station locations)
- Community redevelopment areas
- Local activity centers defined in MPO LRTPs
- Regional activity centers defined in regional LRTPs
- Intensity of freight activity centers
- Projected future truck traffic

The data were collected from the region's MPOs, local jurisdictions, FDOT, and other entities. Using Geographic Information System (GIS) applications, the planning information was mapped on a countywide grid for each county in the study area; each cell in the grid was scored according to the type of land uses and intensity of freight activity in the area to identify areas of the county where livability and freight activity is emphasized, and areas where livability and freight activity conflict with each other. The analysis resulted in the identification and designation of four area types (context areas) with different considerations for roadway design appropriate for freight-related transport and commuter travel.

Freight investment strategies should consider and support the existing land uses and long-term growth vision of the eight counties and more than 50 municipalities in the region.

Context Areas

The freight activity and land use compatibility analysis identified four general area types characterized by the land uses and activities that exist or are anticipated in areas throughout the region. It identified areas with higher densities or residential and employment centers that are characterized with a certain emphasis on livability and other areas that are characterized by higher levels of freight activity, such as industrial or distribution centers. Comparing these designations revealed areas where livability or freight activity is emphasized exclusively as well as areas where both livability and freight activity are important. **Figure 8-1** shows the context areas matrix used to perform the analysis. The context areas are described below.

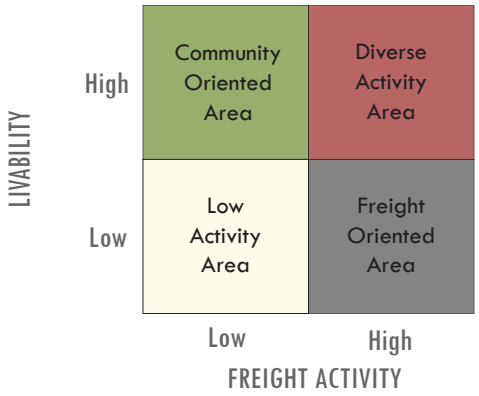
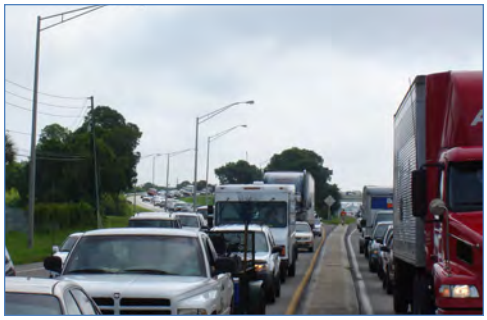


Figure 8-1: Context Areas and Freight Activity Matrix

- **Low activity areas** are characterized by land uses that would generally be compatible with freight mobility, but actual freight activity (truck traffic) in these areas is low. Therefore, these areas are not targeted for freight improvement strategies.
- **Community oriented areas** have low freight traffic and are characterized by medium- to high-density residential, office, and mixed uses that engender pedestrian, bicycle, and automotive traffic. Designing transportation facilities for these user groups generally impedes freight mobility, incorporating elements like fewer and narrower travel lanes, tight turn radii at intersections, and low travel speeds. Freight mobility strategies in these areas should be focused to a limited number of corridors that provide good freight accessibility to the area and limit impacts to other travel modes and the community character.
- **Freight oriented areas** have high levels of truck traffic and land uses that are supported by goods movement, such as industrial and commercial designations. These are areas where roads should generally be designed to facilitate truck movements, including design elements like wide travel lanes and wide turn radii at intersections. Implementing freight mobility improvements in these areas would likely have few, if any, negative sociocultural impacts. Indeed, such improvements would generally bolster the productivity of the industrial and commercial uses along the corridor.
- **Diverse activity areas** have elements of both community oriented and freight oriented areas. Freight activity is high in these areas, either in terms of truck traffic or industrial and commercial land uses (or both), but there are also fairly dense residential and/or office uses. In such areas, freight mobility improvements would warrant special consideration to accommodate trucks, emphasizing the primary role of the freight facility

and catering to the needs of other users of the facility, including motorists, bicyclists, and pedestrians.

Map 8-1 shows the results of the compatibility analysis conducted for the Tampa Bay Region. Additional details about the freight activity and land use compatibility analysis are available in **Appendix C**. It documents the methods and data sets employed for performing the compatibility analysis. It describes the data sets and sources that were overlaid, how these data sets were scored to establish ordinal levels of freight activity and livability in each county, and the mapping of the analysis results. The results of the process and details about data sets and sources are documented for each county within the Strategic Freight Plan study area.



Diverse activity context areas should accomodate the special needs of trucks while also catering to the many other users within the area including motorists, bicyclists, and pedestrians.

PRIORITY FREIGHT INVESTMENT STRATEGIES

The evaluation of freight mobility needs identified the relative importance of various potential improvement strategies to the regional freight roadway network, primarily based on the existing or estimated future travel conditions in that corridor. The analysis accounts for the proximity and relationship of a given roadway to the region's freight activity centers, the intensity of the freight activity centers, accessibility to industrial employment areas, and the compatibility of goods movement with the land use contexts of the corridor. Although preliminary recommendations for the type of improvement associated with each freight mobility need were developed, the ultimate improvement strategies should be designed to safely, effectively, and efficiently serve freight mobility while being compatible with the character of the local community and the needs of other transportation system users, such as commuters, bicyclists and pedestrians.

With an understanding of the primary freight function of the various components of the freight transportation network and the land use character within the freight corridors, the freight improvement needs were scrutinized to determine the appropriate type of investment strategy to address the freight mobility need and compatibility with the corridor land use character. Investment strategies include new and expanded roads to provide more capacity for freight and commuter travel; operational strategies to improve travel conditions within corridors while minimizing impacts to adjacent land uses; separated grade crossings to relieve traffic bottlenecks on key freight and commuter corridors; and focused subarea studies to identify solutions for improved freight access and mobility. The priority freight investment strategies for the region are depicted in **Table 8-2** and portrayed on **Maps 8-2 through 8-6**.

Many of the regional freight investment priorities are focused within the Interstate-4 corridor, serving major regional freight activity centers such as the Port of Tampa, CSXT Intermodal yards, and

the freight distribution centers in Plant City, Lakeland and Winter Haven. Other priority investments will improve freight access to significant freight centers such as Tampa International Airport, St. Petersburg Clearwater International Airport, Hernando County Airport, Port Manatee, the future Integrated Logistics Center (ILC) in Winter Haven, and major distribution centers in the region.

On I-4 and parts of I-275, the consideration of managed lanes is recommended as part of a managed lanes improvement strategy. Managed lanes are considered a viable strategy for improving the safety and operating conditions for trucks and passenger vehicles, particularly when the mix of truck traffic approaches 30 percent or the total truck traffic exceeds 20,000 vehicles daily. As the population in the Tampa Bay area grows and with projected growth in cargo operations at the Port of Tampa and distribution facilities in the I-4 corridor, truck volume on the interstate is expected to approach 20,000 by the year 2035. Managed lanes on I-4 would complement truck-only lanes being implemented as part of the I-4/ Selmon Expressway Connector project and provide unimpeded travel for trucks using I-4 to access the Port of Tampa.

Other roadway capacity improvements serving the Port of Tampa and port related uses within the Port Activity Center boundary include the widening of portions of Causeway Boulevard, US 41, Madison Ave/Progress Blvd, Orient Road, and Big Bend Road. Operational strategies are also recommended on most of these facilities. Separated grade crossings are recommended at freight rail crossings on US 41, Causeway Boulevard, and SR 60 in the area near the Port of Tampa.

On the study area's eastern end of the I-4 corridor in Polk County, several roadway improvement projects are needed to improve freight accessibility to distribution centers in the area, including the future Integrated Logistics Center in Winter Haven. The Central Polk Parkway is the most significant investment in terms of scale and cost in the area. This planned new toll facility would provide premium access to the ILC and the area's distribution centers while also lessening potential impacts to area roadways by removing trucks from the local street network. Other capacity improvement projects in the area include widening parts of SR 33 and US 92, as shown on **Map 8-5**. Operational strategies are needed on sections of US 27 and US 98.

The most pressing freight roadway improvement needs in Manatee County are the Port Manatee Connector and the E-Z Access Road. These capacity improvement projects are needed to support growth in cargo operations at Port Manatee and the port related uses within the Port Manatee Encouragement Zone. The Port Manatee Connector is a proposed east-west limited access highway providing a direct link for trucks between the port and I-75. The E-Z Access Road would provide enhanced access and circulation for trucks

Freight improvements proposed on US 41, one of the major roadways serving the region's ports, include capacity improvements and separated grade crossings at freight rail crossings.

to port related uses within the Encouragement Zone. It would be constructed to specifications required for consistent heavy truck use.

In the northern part of the study area, several roadway capacity improvements are needed to improve accessibility to the Hernando County Regional Airport and industrial uses in the area. These include widening US 41 and extending Ayers Road to provide better connectivity between the Suncoast Parkway and US 41. Other priority freight needs in the area include the widening of SR 50 east of I-75 to serve the distribution center along Kettering Road. A separated grade crossing at the CSX rail-line on SR 50 east of US 98 is also a priority freight investment, particularly with expected increased freight traffic using this line serving the future ILC in Winter Haven.

The priority freight investment strategies identified on **Table 8-2** provide a plan for improved freight mobility and accessibility to economic centers in the region. Recent federal and state policy has incentivized projects that support freight mobility and economic development. The FDOT, MPOs and freight planning partners should use the recommendations in this plan to leverage funding opportunities to implement the priority investment strategies.

The Port Manatee Connector and E-Z Access Road are needed to support growth at Port Manatee and within the Port Manatee Encouragement Zone.

FREIGHT AND LAND USE COMPATIBILITY ANALYSIS

MAP 8-1

INVERNESS
CITRUS
BROOKSVILLE
HERNANDO
DADE CITY
ZEPHYRHILLS
PASCO
PINELLAS
CLEARWATER
TAMPA
PLANT CITY
LAKELAND
WINTER HAVEN
BARTOW
POLK
ST. PETERSBURG
HILLSBOROUGH
BRADENTON
SARASOTA
MANATEE
SARASOTA

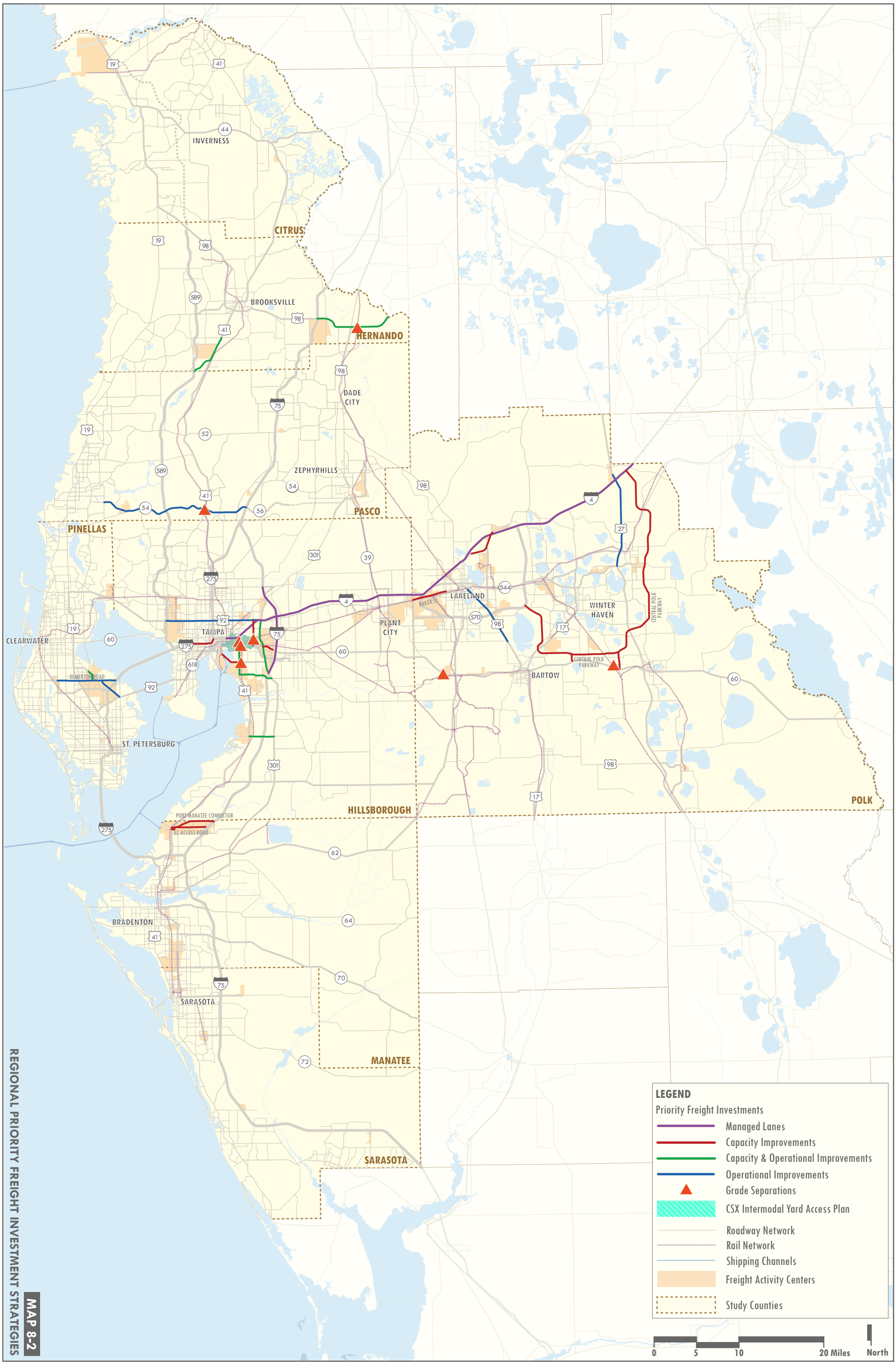
LEGEND

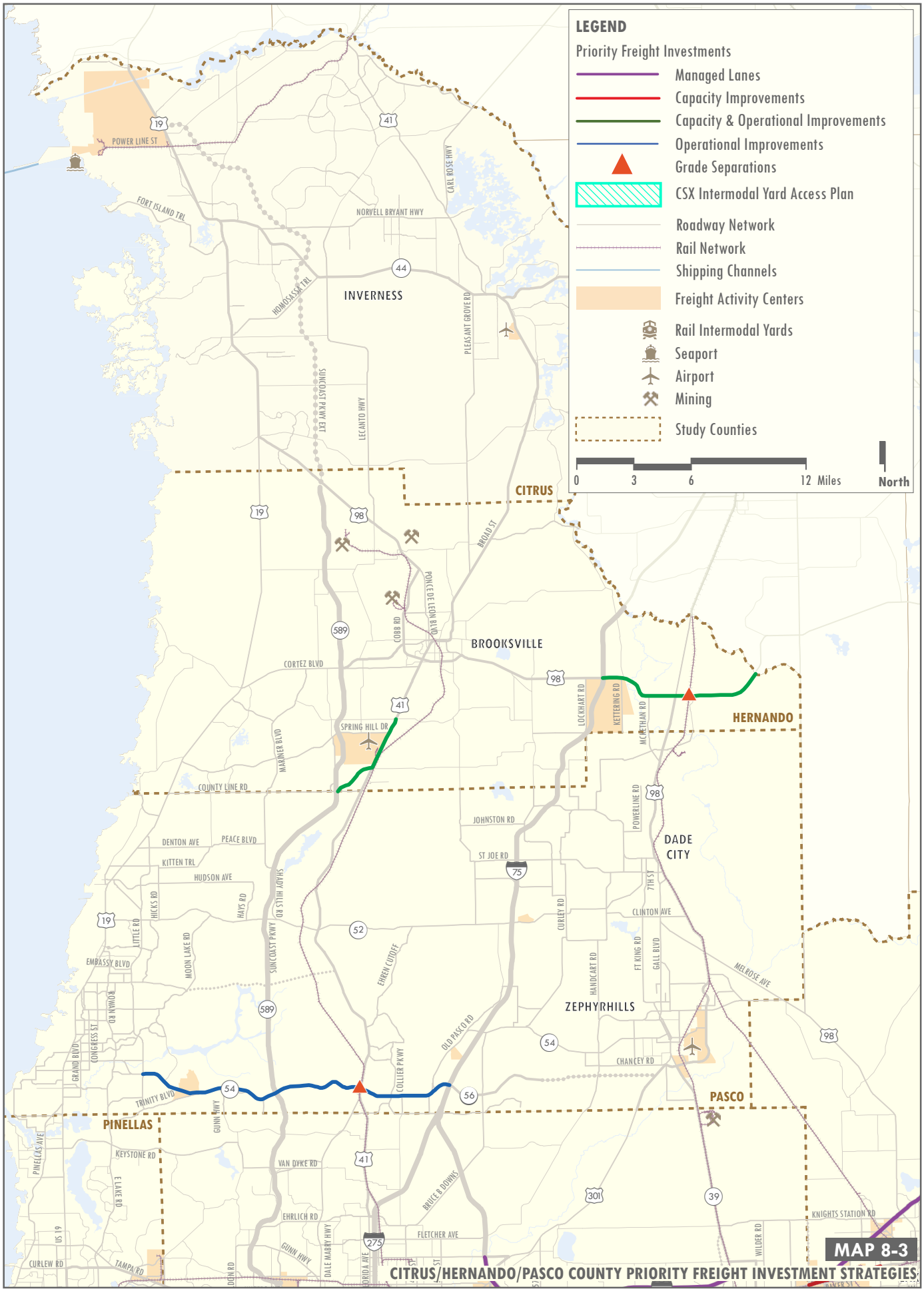
- Limited Access Freight Mobility Corridors
- Rail Network
- LIVABILITY: High / Medium / Low
- FREIGHT ACTIVITY: Low / Medium / High
- Study Counties

Note: This map is intended to generally define areas of conflict between freight activity and livability. It is based on readily available county and regional data sets.

0 5 10 20 Miles

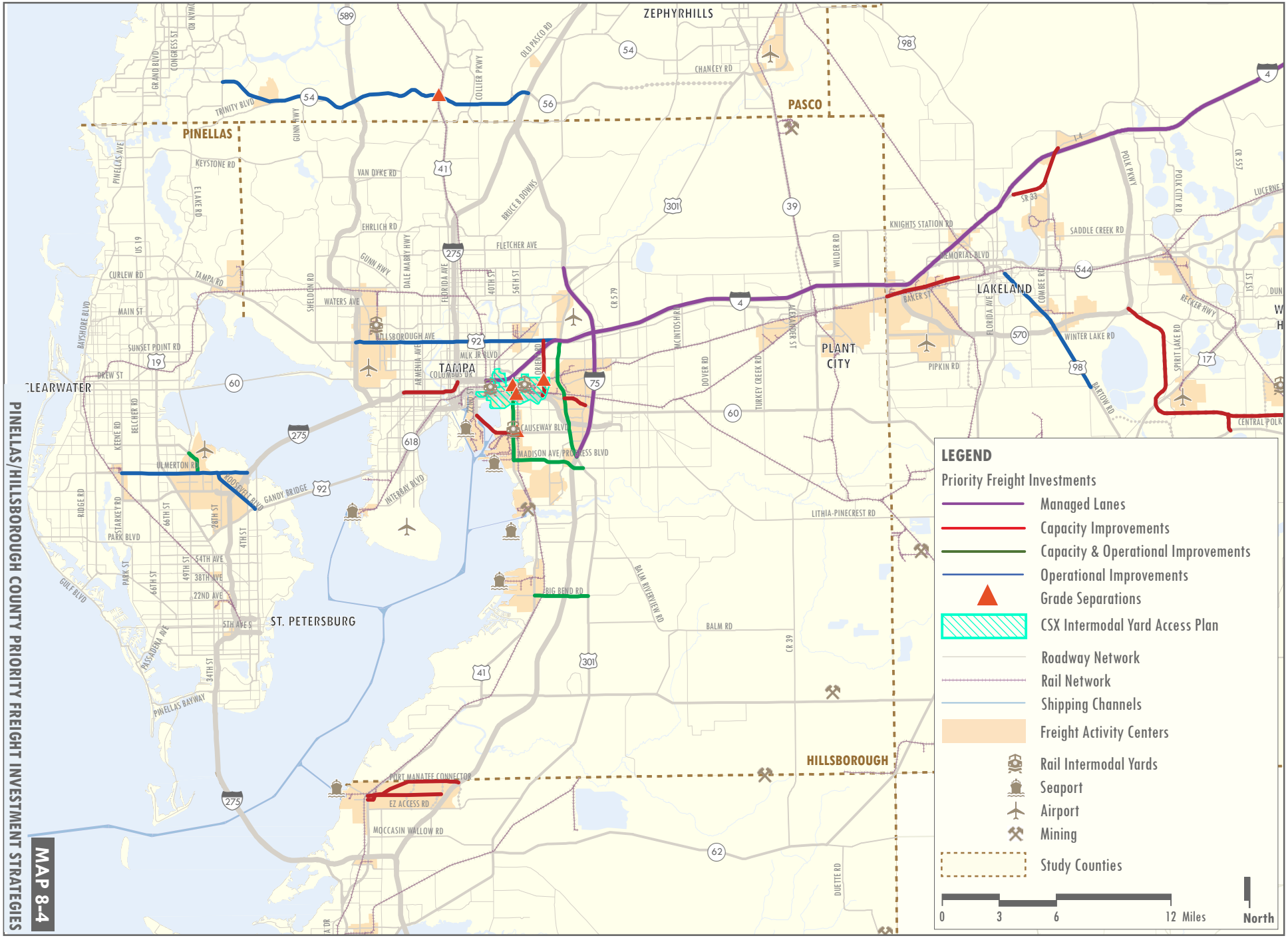
North

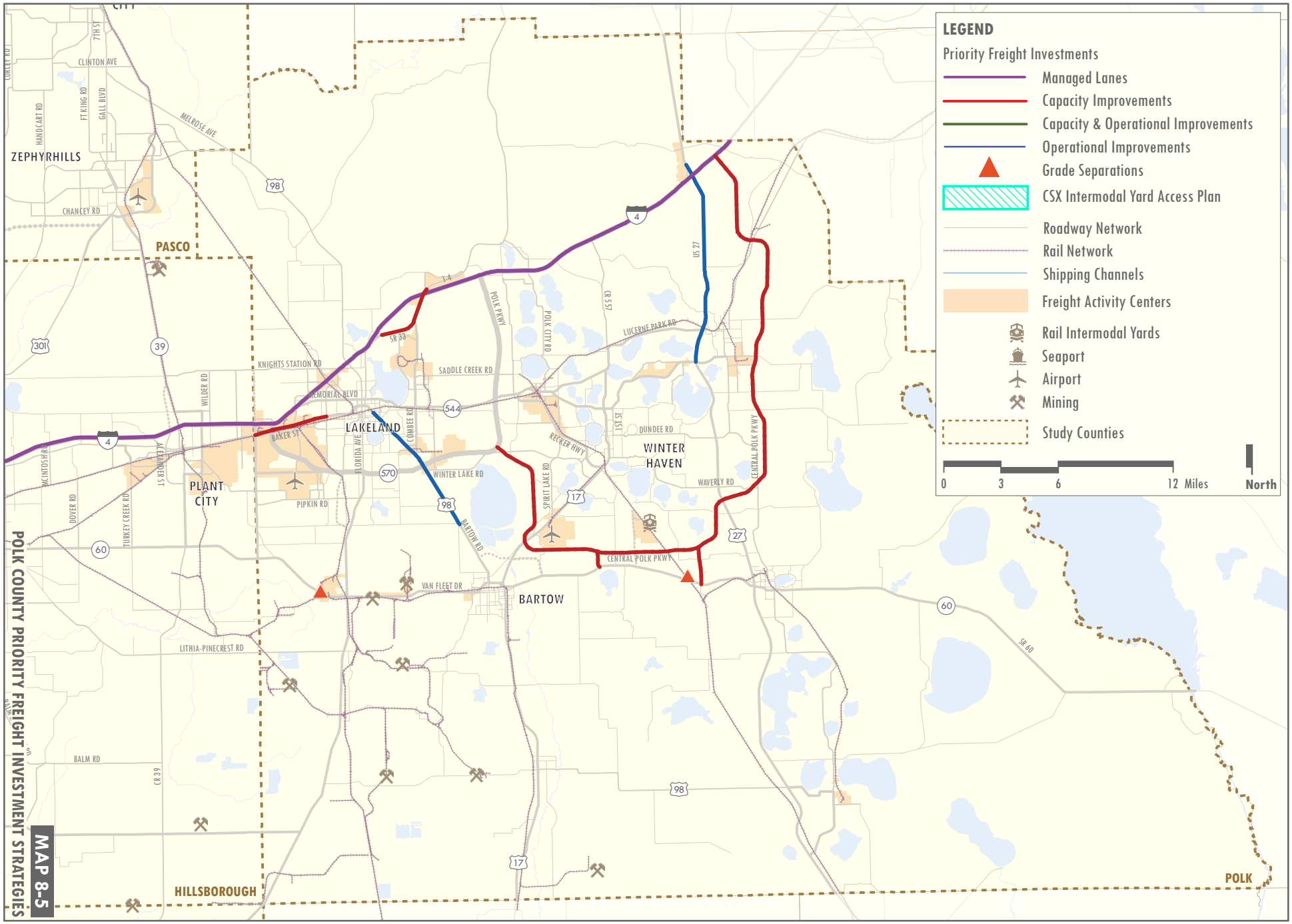

INVERNESS
CITRUS
BROOKSVILLE
HERNANDO
DADE CITY
ZEPHYRHILLS
PASCO
PINELLAS
TAMPA
CLEARWATER
ST. PETERSBURG
ULMERTON ROAD
PORT MANATEE CONNECTOR
EZ ACCESS ROAD
HILLSBOROUGH
BRADENTON
SARASOTA
MANATEE
PLANT CITY
LAKELAND
BAKER ST
WINTER HAVEN
CENTRAL POLK PARKWAY
BARTOW
POLK
REGIONAL PRIORITY FREIGHT INVESTMENT STRATEGIES
MAP 8-2
LEGEND
Priority Freight Investments
Managed Lanes
Capacity Improvements
Capacity & Operational Improvements
Operational Improvements
Grade Separations
CSX Intermodal Yard Access Plan
Roadway Network
Rail Network
Shipping Channels
Freight Activity Centers
Study Counties
0
5
10
20 Miles
North

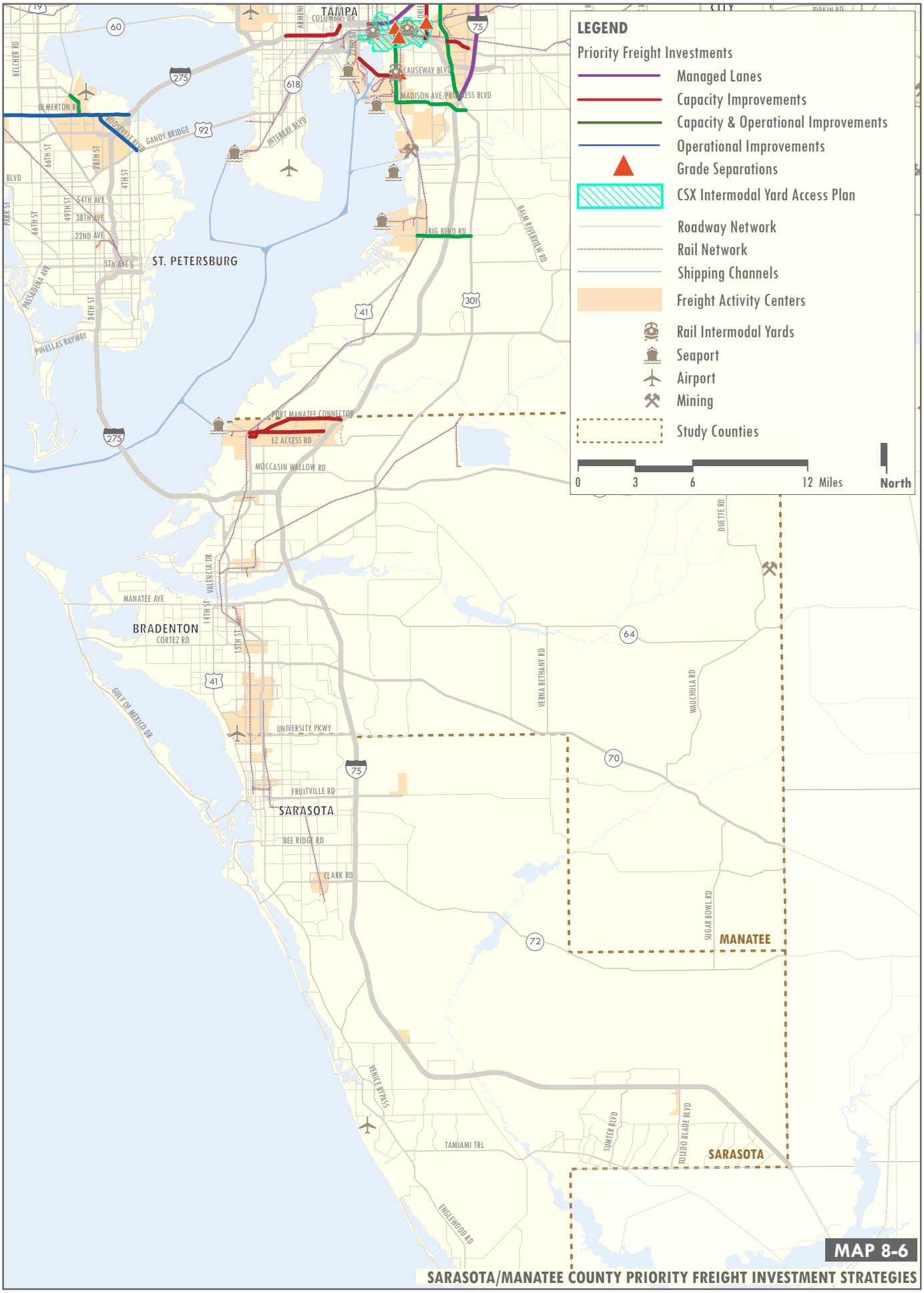


MAP 8-3

CITRUS/HERNANDO/PASCO COUNTY PRIORITY FREIGHT INVESTMENT STRATEGIES


PINELLAS/HILLSBOROUGH COUNTY PRIORITY FREIGHT INVESTMENT STRATEGIES
MAP 8-4
ZEPHYRHILLS
PASCO
PINELLAS
HILLSBOROUGH
LAKELAND
PLANT CITY
TAMPA
CLEARWATER
ST. PETERSBURG
LEGEND
Priority Freight Investments
Managed Lanes
Capacity Improvements
Capacity & Operational Improvements
Operational Improvements
Grade Separations
CSX Intermodal Yard Access Plan
Roadway Network
Rail Network
Shipping Channels
Freight Activity Centers
Rail Intermodal Yards
Seaport
Airport
Mining
Study Counties
0
3
6
12 Miles
North


LEGEND
Priority Freight Investments
Managed Lanes
Capacity Improvements
Capacity & Operational Improvements
Operational Improvements
Grade Separations
CSX Intermodal Yard Access Plan
Roadway Network
Rail Network
Shipping Channels
Freight Activity Centers
Rail Intermodal Yards
Seaport
Airport
Mining
Study Counties
0 3 6 12 Miles
North
ZEPHYRHILLS
PASCO
LAKELAND
PLANT CITY
WINTER HAVEN
BARTOW
HILLSBOROUGH
POLK
CLINTON AVE
MELROSE AVE
CHANCEY RD
KNIGHTS STATION RD
SADDLE CREEK RD
MEMORIAL BLVD
BAKER ST
WINTER LAKE RD
PIPKIN RD
LUCERNE PARK RD
DUNDEE RD
WAVERLY RD
CENTRAL POLK PKWY
VAN FLEET DR
LITHIA-PINECREST RD
BALM RD
SR 60
POLK PKWY
I-4
MAP 8-5
POLK COUNTY PRIORITY FREIGHT INVESTMENT STRATEGIES



MAP 8-6

SARASOTA/MANATEE COUNTY PRIORITY FREIGHT INVESTMENT STRATEGIES

Table 8-2: Regional Freight Investment Priorities

Ref #	On Street	From Street	To Street	Improvement Need	Base Year Lanes	Future Year Lanes*	County
FDOT District 7							
1	SR 50	I-75	Mckethan Rd	Capacity	4	6	Hernando
		Mckethan Rd	Sumter County Line	Capacity	2	4	Hernando
		West of CSX	East of CSX	Grade Separation	2	4	Hernando
2	US 41/Ayers Rd Extension	County Line Rd	US 41	Capacity (New Road)	0	4	Hernando
		US 41	Spring Hill Dr	Capacity	4	6	Hernando
3	Big Bend Rd	US 41	US 301	Capacity And Operational Improvements	4	6	Hillsborough
4	Causeway Blvd	Maritime Blvd	50th Street (US 41)	Capacity	4	6	Hillsborough
		West of US 41/ CSX	East of US 41/CSX	Grade Separation	4	6	Hillsborough
5	Hillsborough Ave	SR 589	Highlands Ave	Operational Improvements	6	6	Hillsborough
		Highlands Ave	Nebraska Ave	Capacity And Operational Improvements	4	6	Hillsborough
		Nebraska Ave	50th St	Operational Improvements	6	6	Hillsborough
		50th St	Orient Rd	Capacity And Operational Improvements	4	6	Hillsborough
		Orient Rd	I-4	Operational Improvements	4	4	Hillsborough
6	I-4	I-4/Selmon Connector	I-75	Managed Lanes	6	6 + ML	Hillsborough
7	I-4	I-75	County Line Rd	Managed Lanes	6	6 + ML	Hillsborough
8	I-75	US 301	Fowler Ave	Managed Lanes	6	6 + ML	Hillsborough
9	I-275	Himes Ave	I-275/I-4 Interchange	Capacity	8	10	Hillsborough
10	Intermodal Yard Access Plan			Subarea Study			Hillsborough
11	Madison Ave/ Progress Blvd	US 41	US 301	Capacity And Operational Improvements	2/3	4	Hillsborough
12	Orient Rd	Broadway Ave	I-4	Capacity	2	4	Hillsborough
		South of CSX "A" Line	North of CSX "A" Line	Grade Separation	2	4	Hillsborough
13	SR 60	US 301	Falkenburg Rd	Capacity	4	6	Hillsborough
14	SR 60	West of US 41	East of US 41	Grade Separation	4	4	Hillsborough

*ML = Managed Lanes

Table 8-2: Regional Freight Investment Priorities (Continued)

Ref #	On Street	From Street	To Street	Improvement Need	Base Year Lanes	Future Year Lanes*	County
15	US 41	Madison Ave	Causeway Blvd	Capacity And Operational Improvements	4	6	Hillsborough
		Causeway Blvd	I-4	Operational Improvements	6	6	Hillsborough
		South of CSX "S" Line	North of CSX "A" Line	Grade Separation	6	6	Hillsborough
16	US 301	I-75	Selmon Expressway	Operational Improvements	6	6	Hillsborough
		Selmon Expressway	I-4	Capacity	4	6	Hillsborough
17	SR 54	Little Rd	SR 589|Suncoast Pkwy	Operational Improvements	6	6	Pasco
		SR 589|Suncoast Pkwy	US 41	Operational Improvements	4	4	Pasco
		US 41	I-75	Operational Improvements	6	6	Pasco
		West of US 41/ CSX	East of US 41/CSX	Grade Separation	6	6	Pasco
18	SR 686|Roosevelt Blvd	Gandy Blvd	SR 688/Ulmerton Rd	Operational Improvements	4	4	Pinellas
19	SR 686|Roosevelt Blvd	SR 688/Ulmerton Rd	49th St	Capacity And Operational Improvements	4	6	Pinellas
20	SR 688|Ulmerton Rd	Starkey Rd	I-275	Operational Improvements	6	6	Pinellas
FDOT District 1							
21	E-Z Access Road	US 41	Port Manatee E-Z	Capacity (New Road)	0	2	Manatee
22	Port Manatee Connector	US 41	I-75	Capacity (New Road And Interchange At I-75)	0	4	Manatee
23	Central Polk Parkway	Polk Parkway	I-4	Capacity (New Toll Freeway)	0	6	Polk
24	I-4	County Line Rd	Osceola County Line	Managed Lanes	6	6 + ML	Polk
25	SR 33	Old Combee Rd	Tomkow Rd	Capacity	2	4	Polk
26	SR 60	West of CR 676/ CSX	East of CR 676/ CSX	Grade Separation	4	4	Polk
27	US 27	CR 544	Dunson Rd	Operational Improvements	6	6	Polk
28	US 92	County Line Rd	Wabash Ave	Capacity	2	4	Polk
29	US 98	Old Bartow/ Eagle Lake Rd	In-Town Bypass (Lakeland)	Operational Improvements	4	4	Polk
30	SR 60 @ CSX	West of Lake Wales	East of Bartow	Grade Separation	4	4	Polk

*ML = Managed Lanes

This chapter outlines the process for identifying, emphasizing, and applying freight-supportive transportation strategies, facility design guidelines, and policies within freight corridors and subareas. The strategies and guidance suggest the best way to integrate freight planning issues into the transportation planning and project development process. The guidance provides methods for identifying and responding to freight needs as FDOT and their partner agencies advance transportation projects from planning concepts to design and as communities engage in and partner with FDOT during long-range and comprehensive planning.

Integrating freight planning issues into the initial phases of regional and local transportation planning processes will help save time and money in the long-term.

The guidance complements existing processes and takes advantage of freight-specific resources, including a multifunctional Comprehensive Freight Improvement Database (CFID) and a set of Freight Corridor Study Guidelines. It builds on the standards in the FDOT Plans Preparation Manual and other adopted documents that regulate the design of roadways, emphasizing design solutions that support freight vehicle mobility, access and operations in a number of urban environments. The guidance provides planners and engineers with considerations in defining strategies that respond to freight needs while respecting the various functions of the roadway network and sensitivities of the context and character of the freight corridors.

PLAN OBJECTIVES AND POLICY TOPICS

The freight mobility and compatibility objectives described in Chapter 7 provide the framework for developing context sensitive freight transportation strategies and concepts. The freight mobility objectives imply the need to understand facility functions to streamline freight movements, provide high levels of accessibility between freight activity areas and major highways, and enhance truck mobility through and beyond the Tampa Bay region. Strategies and guidance that emerge from these objectives emphasize freight network connectivity, ease of truck operation, effectively processing traffic, circulation within activity centers and access to sites that generate and attract freight traffic. While the freight mobility objectives give rise to functional considerations, the compatibility objectives imply the need to understand the geography of local livability initiatives and significant freight activity areas and corridors. The fourth compatibility objective, in particular, calls for coordination with local planning entities to ensure that improvements to the regional freight transportation network support local community livability goals.

FREIGHT COMPATIBILITY AND LIVABILITY

When used in the context of transportation and community planning, the term "livability" is used to describe community goals and objectives or multimodal facility needs that may conflict with high speed and high volume vehicular movement, roadway geometry, and traffic operations. Design standards for roadways have traditionally focused on optmizing the functionality and safety of the roadway network while accommodating vehicular traffic at the highest speed possible. Over the past twenty years, the considerations for pedestrians, bicyclists and transit patrons have been elevated in the roadway planning and design process. In FDOT's Plans Preparation Manual Volume I Chapter 21, transportation planning for livable communities considers the following principles:

1. Safety of pedestrians, bicyclists, motorists and public transit users
2. Balancing community values and mobility needs
3. Efficient use of energy resources
4. Protection of the natural and manmade environment
5. Coordinated land use and transportation planning
6. Local and state economic development goals
7. Complementing and enhancing existing Department standards, systems and processes

While the purpose of this guidance is not to address freight issues within the context of the PPM Volume I Chapter 21, these principles do reflect the intent of the freight compatibility objectives and provide specific topics that should be considered within the context of any roadway improvement project, including those aimed at improving conditions for freight. With these considerations in mind, the guidelines that follow direct transportation planners and engineers how to best support freight where livability principles are emphasized in the region and where freight movements and industrial activities are emphasized. In some cases, especially in the established urban areas in the region, these areas overlap, presenting potential conflicts among freight activities and the adjacent land uses. The guidelines describe suitable approaches to freight facility design for various land use contexts including areas with high freight activity, areas where pedestrians and commuter traffic is of high importance, and areas where livability-freight activity conflict. Taken within a variety of urban contexts, this varied approach to design ultimately enhances freight, while mitigating or avoiding freight impacts on the community.

The strategies and guidelines provided in this chapter emphasize ways that the impact of freight on communities will be mitigated or avoided while also enhancing necessary freight movements.

Low Activity

Community Oriented

Freight Oriented

Diverse Activity

These images display examples of the four context areas from low livability/low freight activity to high livability/high freight activity (top to bottom).

HOW TO USE THIS GUIDANCE

A policy framework has been developed that considers roadway function and geographical contexts and identifies tiers of strategies and policies for enhancing the freight transportation network in ways that are consistent with the goals and objectives of the Strategic Freight Plan. The policy framework is dictated by both the freight facility types and land use context. The freight facility types include:

- Limited Access Facilities
- Freight Mobility Corridors
- Freight Distribution Routes
- Freight Activity Center Connectors
- Freight Activity Center Streets

The four areas that account for land use compatibility and define the geographical context include:

- Low Activity - Low Livability/Low Freight Activity
- Community Oriented - High Livability/Low Freight Activity
- Freight Oriented - Low Livability/High Freight Activity
- Diverse Activity - High Livability/High Freight Activity

The following considerations should be used to identify freight strategies within the policy framework of the Strategic Freight Plan. The considerations support the identification of strategies for a corridor study or design project, but generally apply to other planning efforts as well. Information needed to support the identification of strategies is available through interactive mapping and database tools on the Tampa Bay Regional Goods Movement Web Site, which is www.tampabayfreight.com. The freight facility classifications and context areas are available with interactive mapping supported by the existing mapping tool on the site.

Freight facility functionality

The Strategic Freight Plan defines a freight roadway network and facility types listed above and described in Chapter 8. The classification of the primary roadway and cross streets needs to be considered in a typcial corridor study. Knowledge of the freight roadway network facilities and function is also important for areawide or systemwide planning and analysis. Each freight facility type has a primary function that should be a focus of strategies and design solutions that are considered. The guidance that follows is organized in large part by freight facility type.

Freight and land use compatibility

The Strategic Freight Plan has defined context areas as listed above and described in Chapter 8. These areas consider the relationship between freight activities and various urban contexts. These contexts can vary considerably within localized areas, making it likely that there will be more than one context area within the limits of a given roadway corridor. The freight-related strategies and guidelines appropriate for each project should vary accordingly. For issues that affect the entire length of a project, strategies and roadway design solutions will have to be applied within the context of all of the user needs within the corridor, being mindful of the freight function and how the facility fits within the overall function of the freight roadway network.

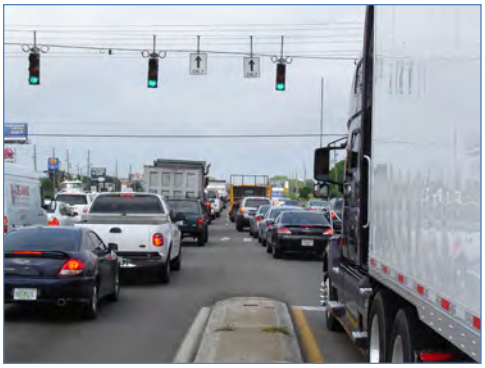
Information available in freight database

The CFID and map series on the Tampa Bay Regional Goods Movement Web Site include freight hot spots that represent discrete locations where geometrics or traffic operations present barriers to truck mobility and accessibility. When conducting a corridor study, including a Project Development and Environment (PD&E) study or design engineering project, the CFID should be queried to identify freight hot spots and issues that have been identified in the corridor. The freight needs in the database include corridor-based strategies, operational improvements, maintenance needs and safety strategies.

Freight corridor screening results

In conjunction with the Strategic Freight Plan, a preliminary Freight Corridor Screening Process was developed to evaluate operations and travel conditions on freight corridors within the Tampa Bay region. Almost all of the roads on the freight roadway network have been screened, and the results are posted on the Tampa Bay Regional Goods Movement Web Site in the CFID. A map series shows the corridors that have been screened. When conducting a detailed study of an individual corridor, the results of the preliminary Freight Corridor Screening Process should be reviewed to become aware of the freight related issues that have been identified in the corridor.

The above considerations support the identification of appropriate strategies and roadway design solutions for the corridor or area of interest. The strategies that follow are types of roadway and system improvements and operational management practices that can be applied to the freight roadway network to support mobility, connectivity, circulation and access. The guidelines demonstrate how specific roadway design elements should be implemented for freight transport within the context of existing standards, such as the FDOT Plans Preparation Manual.



The Comphrehensive Freight Improvement Database (CFID) includes an inventory of freight hot spots in the Tampa Bay region such as those on Ulmerton Road in Pinellas County.

FREIGHT STRATEGY APPLICABILITY

A menu of potential strategies for addressing freight mobility needs on the regional freight transportation roadway network is provided below, along with a description of what each strategy entails.

- **Roadway widening** involves adding through travel lanes to increase capacity on the freight facility. It often requires the acquisition of right-of-way and substantial study of the feasibility and potential impacts posed by the project. As a freight mobility strategy, roadway widening would generally be deployed to provide additional capacity on congested freight facilities to improve travel speeds and accessibility for trucks.
- **New road construction** is similar to roadway widening in that it adds capacity to the freight transportation network, but it involves the development of an entirely new facility. This strategy may be appropriate when widening an existing congested facility is not feasible, when network redundancy is needed to alleviate congestion or circumvent choke points, or when emerging freight activity centers or freight travel patterns are inadequately served by the existing freight network.
- **Interchange upgrades** pertain primarily to limited access facilities, where they interact with regional freight mobility corridors and other freight distribution routes. Improvements to interchange design can improve capacity and/or operations to enhance the flow of goods entering or exiting limited access highways that provide high speed connections to the rest of the state and nation.
- **Exclusive truck lanes** involve the designation of travel lanes for use by trucks alone. This may include the creation or adaptation of auxiliary lanes, usually on limited access facilities, to separate truck traffic from commuter traffic and cater to the specific operational needs of trucks.
- Use of **High Occurpancy Vehicle (HOV)/High Occupancy Toll (HOT) lanes** for trucks is similar to providing exclusive truck lanes, but does not necessarily involve a complete separation of truck and commuter traffic. In this case, HOV lanes (or high-occupancy toll lanes) would be used by carpoolers (or solitary motorists who purchase the right to access HOT lanes) during peak commuting hours, but would be available for carpoolers, paying motorists, and trucks during non-peak travel periods. Such a plan would require clear communication

A potential strategy to reduce the conflicts between motorists and freight trucks on limited access facilities includes exclusive truck lanes.

of what restrictions exist at various times, but would provide additional capacity on the freight transportation network throughout the day while catering to the needs of commuters during the peak period. There are currently no HOV or HOT lanes in the Tampa Bay region.

- **Intelligent Transportation System** projects such as variable message signs throughout the project corridor provide motorists and truckers with real time traffic information, apprising them of anticipated travel times, alerting them about delays cause by accidents or construction, and in some cases, providing detour information. ITS projects are most effective on regional corridors where parallel facilities exist to enable trucks to circumvent delays.

- **Geometric improvements** refer to design enhancements at intersections to expedite truck movements and may include wide turn radii, compound turn radii (to accommodate trucks and pedestrians), or lane configurations that create additional space for turning trucks.

- **Signal timing optimization** means coordinating traffic signals in a freight corridor to account for the slow acceleration of trucks and allow for the continuous movement of through trucks to achieve higher travel speeds in the corridor.

- **Grade-separated crossings** eliminate conflicts between railroad and roadway operations or between two roadways. Grade separation of railroads prevents temporary road closures resulting from train operations, enhancing the reliability and efficiency of goods movement, as well as improving circulation for vehicular traffic. Grade separating two roads can alleviate traffic signal delays, expedite turning movements, and improve safety at congested intersections.

- **Truck bypass routes** may be appropriate where a freight need is identified in a community oriented or diverse activity area. Opportunities for capacity enhancements on the facility may be constrained by surrounding land uses, public opposition, costs, or a variety of other factors, while truck traffic competes with commuter traffic for use of the facility. In these cases, the identification and/or creation of alternative routes bypassing the conflict area may represent the most efficient means of enhancing regional goods movement and may create new industrial and commercial development opportunities.

Intelligent transportation system projects will help truckers and motorists by providing real time traffic information and alerting drivers to roadway incidents, which may cause them delay, such as accidents or construction.

- **Access and circulation plans** help to manage freight flows in a particular area, especially in community oriented and diverse activity areas where freight access is important for specific uses, but where designing for trucks may conflict with the community character or present problems for other users of the transportation system. A freight access and circulation plan would address issues like defining a localized street hierarchy for goods movement, governing driveway placement and design to allow adequate truck access while protecting other users, and managing parking and loading zones for trucks.
- **Way-finding signage** programs may be needed to channel truck traffic on to target freight facilities and assist truckers in taking the safest and most efficient routes through particular areas. A signage program may, for example, be part of the implementation of an access and circulation plan.
- **Pedestrian street crossing protection** is warranted as part of freight mobility enhancements undertaken in community oriented and diverse activity areas to ensure the safety of pedestrians while accommodating truck movements.
- **Increased roadway lane widths** may be appropriate in some instances on freight facilities. Increasing lane widths improves safety, operations, and average speeds by providing more space for all vehicles, eliminating delays and hazards posed by wide vehicles like trucks.

Freight improvements in community and diverse activity areas need to also emphasize the safety of pedestrians within the area.

STRATEGIES BY FACILITY AND CONTEXT

Not all of the strategies described above are appropriate for a given facility type or within certain community contexts. **Table 9-1** through **Table 9-5** provide guidance on the applicability of certain strategies for each freight facility type by community context area type. While the set of strategies that would be deployed to address a freight mobility need would be decided on a case by case basis and tailored to the specific circumstances of the identified need, these tables provide a general sense of what strategies would be most efficient and effective for a particular facility function and land use context. Strategies that are not generally applicable to the facility type in question are omitted from the table.

When a strategy is said to be "applicable", the implication is that there would be few, if any, major obstacles to the implementation of that strategy in the specified context area. These would generally be thought of as "first choice" strategies for a given facility and area type combination.

A strategy that is "somewhat applicable" would likely face some community and/or physical obstacles to its implementation. These strategies would be thought of as "second choice" options, which may be deployed alone or in conjunction with a set of other strategies to address the freight need.

A strategy that has "limited applicability" would likely face substantial community and/or physical obstacles to its implementation. These would be considered "third choice" strategies that would generally require substantial coordination and additional costs to mitigate their environmental and sociocultural impacts. However, these strategies may still warrant consideration in addressing a freight need depending on the specific circumstances in the area.

Table 9-1: Applicability of Selected Freight Mobility Strategies for Limited Access Facilities

Limited Access Facilities				
Strategies	Context Areas			
	Low Activity	Community Oriented	Freight Oriented	Diverse Activity
Roadway widening	2	2	1	2
Interchange upgrades	2	2	1	2
Exclusive truck lanes	2	2	1	2
Use of HOV/HOT lanes for trucks	2	2	1	2
ITS projects	2	1	1	1

Legend: 1 - Applicable
2 - Somewhat Applicable
3 - Limited Applicability

Table 9-2: Applicability of Selected Freight Mobility Strategies for Regional Freight Mobility Corridors

Regional Freight Mobility Corridors				
Strategies	Context Areas			
	Low Activity	Community Oriented	Freight Oriented	Diverse Activity
Roadway widening	2	3	1	2
Geometric improvements	2	3	1	2
Signal timing optimization	2	2	1	2
ITS projects	2	1	1	1
Grade-separated crossings	3	3	1	2
Truck routes bypassing conflict areas	3	2	3	2
Access and circulation plan	3	3	1	1
Way-finding signage program	3	2	2	1
Exclusive truck lanes	3	3	1	2
Pedestrian street crossing protection	3	1	3	1

Legend: 1 - Applicable
2 - Somewhat Applicable
3 - Limited Applicability

Table 9-3: Applicability of Selected Freight Mobility Strategies for other Freight Distribution Routes

Other Freight Distribution Routes				
Strategies	Context Areas			
	Low Activity	Community Oriented	Freight Oriented	Diverse Activity
Roadway widening	2	3	1	2
Geometric improvements	2	3	1	2
Signal timing optimization	2	3	1	2
Grade-separated crossings	3	2	1	2
Truck routes bypassing conflict areas	3	2	3	2
Access and circulation plan	3	1	1	1
Way-finding signage program	3	3	2	1
Pedestrian street crossing protection	3	1	3	1

Legend: 1 - Applicable
2 - Somewhat Applicable
3 - Limited Applicability

Table 9-4: Applicability of Selected Freight Mobility Strategies for Freight Activity Center Streets

Freight Activity Center Streets				
Strategies	Context Areas			
	Low Activity	Community Oriented	Freight Oriented	Diverse Activity
Increase roadway lane widths	2	3	1	2
Signal timing optimization	2	3	1	2
Geometric improvements	2	3	1	2
Access and circulation plan	3	1	1	1
Way-finding signage program	3	3	2	1
Pedestrian street crossing protection	3	1	3	1

Legend: 1 - Applicable
2 - Somewhat Applicable
3 - Limited Applicability

Table 9-5 provides a general assessment of the applicability of the design considerations described above for non-limited access freight facilities (regional freight mobility corridors, other freight distribution routes, and FAC streets) based on area type. Even though all non-limited access freight facilities are addressed in a single table here, the facility type and function will still influence roadway design. Limited access facilities are not addressed because they have unique typical design elements that are not usually contingent on area type considerations.

Table 9-5: Applicability of Freight Facility Design Considerations on Non-Limited Access Roadways

Non-Limited Access Regional Freight Network Facilities				
Strategies	Context Areas			
	Low Activity	Community Oriented	Freight Oriented	Diverse Activity
Roadway widening	2	3	1	2
Geometric improvements	2	3	1	2
Signal timing optimization	2	2	1	2
ITS projects	2	1	1	1
Grade-separated crossings	3	3	1	2
Truck routes bypassing conflict areas	3	2	3	2
Access and circulation plan	3	3	1	1
Way-finding signage program	3	2	2	1
Exclusive truck lanes	3	3	1	2
Pedestrian street crossing protection	3	1	3	1

Legend: 1 - Applicable
2 - Somewhat Applicable
3 - Limited Applicability

DESIGN GUIDANCE

The strategies described above are best identified during the system planning phase by outlining a tailored conceptual approach to addressing an identified freight mobility need (system deficiency) or opportunity (emerging travel pattern). Freight mobility projects and conceptual strategies should be incorporated into long term planning documents such as a LRTP. When a project proceeds to a PD&E Study, more specific freight design considerations are needed to address the configuration and number of lanes and how freight vehicle operations affect the facilities that serve other users. In the subsequent design phase, the implementation of freight strategies involves addressing a number of more specific design considerations, especially at intersections.

The particular approach to freight-friendly roadway design will vary depending on the specific set of circumstances surrounding the project. However, the facility design should generally reflect both the freight facility function and the context area type. This guidance is designed to assist with the identification of viable approaches to design that serve a number of different situations and purposes, such as the following.

1. Throughput/Movement
2. Right Turn – Departing
3. Right Turn – Receiving
4. Right Turn – Side Street
5. Left Turn – Departing
6. Left Turn – Receiving
7. Left Turn – Side Street
8. Queuing
9. Miscellaneous/Special Circumstances
10. Multimodal Accommodations (Pedestrian, Bicycle, Transit)

Table 9-6 through **Table 9-8** show the typical elements of a roadway and how those elements should be scaled and located depending on the freight facility type and community context. The tables also show which of the purposes listed above are served or affected by the roadway element. These tables are followed by example intersections that demonstrate the types of elements that would be included on freight facilities with varying characteristics and in different community contexts.

Table 9-6: Freight Mobility Corridor Design Elements

Design Elements		Context Areas			
		Purpose	Community Oriented	Freight Oriented	Diverse Activity
Lane Widths	Outside Lane	1, 2	11-12 ft	12-13 ft	11-13 ft
	Other/Inside Travel Lanes	1, 5	11-12 ft	11-12 ft	11-12 ft
	Turn Lanes	1, 2, 5, 8	Min 11 ft	Min 12 ft	Min 11 ft
Turning Radii (Right Turn)	One Receiving Lane	1, 2, 3	Taper or limit truck turns	Taper or multiple radius	Taper or multiple radius
	Two Receiving Lanes	1, 2, 3	Up to 45 ft	Up to 65 ft	Taper or multiple radius
	Three Receiving Lanes	1, 2, 3	Up to 30 ft	Up to 45 ft	Taper or multple radius
Right Turn Corner Islands		9, 10	Not Recommended	Optional	Optional
Turn Lane Length		1, 8	Min 160 ft	Min 480 ft	Min 400 ft
Tapered Curbs		1, 2, 3, 4	Recommended	Recommended	Recommended
Raised Medians	Width	1, 5, 6	13-14 ft	14-16 ft	13-16 ft
	Nosing	1, 5, 6	Set back	Set back	Set back as needed
Refuge Islands		9, 10	Optional	Optional	Optional
Bicycle Lanes		1, 2, 3, 10	Include	Consider alternative route	Consider other route where there are 6 or more lanes
Bulb-Outs		9, 10	Optional	Not Recommended	Not Recommended

Table 9-7: Freight Distribution Route Design Elements

Design Elements		Context Areas			
		Purpose	Community Oriented	Freight Oriented	Diverse Activity
Lane Widths	Outside Lane	1, 2	11-12 ft	11-13 ft	11-12 ft
	Other/Inside Travel Lanes	1, 5	10-12 ft	11-12 ft	10-12 ft
	Turn Lanes	1, 2, 5, 8	Min 10 ft	Min 11 ft	Min 10 ft
Turning Radii (Right Turn)	One Receiving Lane	1, 2, 3	Taper or limit truck turns	Taper or multiple radius	Taper or multiple radius
	Two Receiving Lanes	1, 2, 3	30 ft max or taper	Up to 65 ft	Taper or multiple radius
	Three Receiving Lanes	1, 2, 3	Up to 30 ft	Up to 45 ft	Taper or multple radius
Right Turn Corner Islands		9, 10	Not Recommended	Optional	Optional
Turn Lane Length		1, 8	Min 120 ft	Min 400 ft	Min 320 ft
Tapered Curbs		1, 2, 3, 4	Optional	Recommended	Recommended
Raised Medians	Width	1, 5, 6	8-14 ft	13-16 ft	12-14 ft
	Nosing	1, 5, 6	Set back	Set back as needed	Set back as needed
Refuge Islands		9, 10	Optional	Optional	Recommended
Bicycle Lanes		1, 2, 3, 10	Include	Consider other route where there are 6 or more lanes	Consider other route where there are 6 or more lanes
Bulb-Outs		9, 10	Optional	Not Recommended	Optional

Table 9-8: FAC Streets Design Elements

Design Elements		Context Areas			
		Purpose	Community Oriented	Freight Oriented	Diverse Activity
Lane Widths	Outside Lane	1, 2	11-12 ft	11-13 ft	11-12 ft
	Other/Inside Travel Lanes	1, 5	10-12 ft	11-12 ft	10-12 ft
	Turn Lanes	1, 2, 5, 8	Min 10 ft	Min 11 ft	Min 10 ft
Turning Radii (Right Turn)	One Receiving Lane	1, 2, 3	Taper or limit truck turns	Taper or multiple radius	Taper or multiple radius
	Two Receiving Lanes	1, 2, 3	30 ft max or taper	Up to 65 ft	Taper or multiple radius
	Three Receiving Lanes	1, 2, 3	Up to 30 ft	Up to 45 ft	Taper or multple radius
Right Turn Corner Islands		9, 10	Not Recommended	Optional	Optional
Turn Lane Length		1, 8	Min 120 ft	Min 400 ft	Min 320 ft
Tapered Curbs		1, 2, 3, 4	Optional	Recommended	Recommended
Raised Medians	Width	1, 5, 6	8-14 ft	13-16 ft	12-14 ft
	Nosing	1, 5, 6	Set back	Set back as needed	Set back as needed
Refuge Islands		9, 10	Optional	Optional	Recommended
Bicycle Lanes		1, 2, 3, 10	Include	Include	Include
Bulb-Outs		9, 10	Optional	Not Recommended	Optional

Freight Oriented Area

Intersections in Freight Oriented context areas should be designed to optimize the operational efficiency of trucks. This is particularly important where two facilities on the Freight Network meet, but applies generally to all intersections. The above graphic demonstrates the following recommended stratgies:

1. **Truck channels** facilitate right turn movements for trucks while providing space for pedestrian refuge and signal poles and equipment. They give the truck storage space that is outside the departing through lane for the yield condition, creating better operating and safety conditions for through traffic.

2. **Median nosings** can be designed to allow additional space for trucks making left turns on or off the mainline facility. They assist trucks in departing left turn lanes and entering recieving lanes. They can be set back from the crosswalk further than normal or striped, depending on the width of the median and the need to guide vehicles into a particular turning pattern.

3. **Left turn lanes** should be designed as single lanes where volumes and the intersection signal phasing and timing strategy support it. Dual lefts can be problematic for traffic in adjacent lanes and opposing traffic in the middle of the intersection where the truck wheel tracking distance is the greatest. Dual lefts can also make it difficult for trucks to enter the recieving lane.

4. **Extended left turn lanes** provide additional storage for trucks and other vehicles. Signal timing and phasing should be designed to allow for processing slower-moving trucks.

5. **Corner radii** should be designed to accommodate trucks turning on and off the mainline facility. In most cases, trucks will use two recieving lanes to complete the turn and each intersection radius can be sized accordingly.

Diverse Activity Area

Intersections in Diverse Activity context areas should be designed to facilitate truck movements while balancing the needs of other users of the roadway. This often has to occur in constrained rights-of-way where established curb lines, existing infrastructure and equipment and limited right-of-way widths shape truck-friendly solutions. The above graphic demonstrates the following recommended stratgies:

1. **Corner radii** should be designed to accommodate trucks turning on and off the mainline facility while maximizing the use of recieving lanes to complete the turn. Tapered curbs and multiple-radius curbs can be used in lieu of increasing a single radius curb to accommodate the truck turn.

2. **Tapered medians** or **expanded recieving lanes** on the side street provide additional turning space where the recieving lanes are inaddequate and/or where the corner radius cannot or should not be increased. Tapered medians and expanded recieving lanes do not increase the crossing distance for pedestrians like increased corner radii do. They also do not require additional right-of-way in retrofit conditions.

3. **Tapered curbs** can expand the area for trucks to make left and right turns from the mainline facility to the side street. They do increase the crossing distance for pedestrians. Tapered curbs need to be considered as retrofits in light of a number of conditions, including right-of-way, sidewalk width, drainage and location of equipment.

4. **Bicycle lanes** provide a secondary benefit for trucks beyond their primary function. When trucks are turning right out of a shared through lane, the offset from the curb provides the truck more room to trun by shifting the inside wheel tracking away from the corner radius. When present on the side street, bicycle lanes increase the effective recieving area width.

Community Oriented Area

Intersections in Community Oriented context areas should be designed to accommodate trucks while optimizing the roadway operations for other vehicles and facilitating safe, comfortable and convienent pedestrian access. These areas often have constrained rights-of-way, a limited number of through lanes and shared turn lanes. Roadways should be designed so that smaller trucks can operate. Larger trucks need to be anticipated on the mainline facility, but may not be the appropriate design vehicle for side street conditions and turns due to physical limitations or lack of need due to very low large truck volumes. The above graphic demonstrates the following recommended stratgies:

1. **Median nosings** can be set back from the crosswalk further than normal on the mainline facility where large truck turns are anticipated. Extended median nosings with crosswalks in advance of the nosing do not typically interfere with small truck turning movements.

2. **Curb extensions/bulb outs** and **on street parking** should be avoided in the portions of receiving lanes that would allow for expanded outside wheel tracking. Providing this space makes it easier for trucks to turn right and left off the mainline facility onto the side street. On street parking should be avoided on mainline facilities on the Freight Network.

3. **Corner radii** should be designed to accommodate larger trucks on and off the mainline facility at intersections with other facilities on the Freight Network and at major arterials. Radii should be designed to accommodate smaller trucks turning on and off the mainline facility at secondary side streets.

4. **Stop bar set backs** allow for larger trucks to make left turns from the mainline facility onto the side street by providing more space for inside wheel tracking. Depending on the departure lane and corner condition, they can also help facilitate right turns from the mainline facility onto the side street. The stop bar can be staggered for multiple lane approaches with no median such that only the stop bar on the outside lane is set back from the crosswalk.

FREIGHT FACILITY DESIGN CONSIDERATIONS

The major design topics relating to freight are described below, along with general information about how variations in these elements relate to the context areas and the affect on the mobility of trucks and other system users. **Table 9-10** at the end of this section outlines the general applicability of each design element on non-limited access facilities based on the context area type.

Design Vehicle

It is important to understand and accommodate the types of trucks that will be using a particular freight facility. The types of trucks using a freight facility will depend on a number of factors, including the surrounding land use context, throughway facility type, and cross-street facility type. For the purposes of these design guidelines, the Wheel Base-67 and Wheel Base-40 trucks were used in the graphics accompanying the recommendations for freight facility design. **Table 9-9** provides recommendations for the type of design truck to be used at the various combinations of throughway facility types and cross-street facility types.

Table 9-9: Design Truck Types for Throughway Facilities

Cross-Street Facility Type	Throughway Facility Type			
	Limited Access	Freight Mobility Corridor	Other Freight Distribution Routes	FAC Streets
Limited Access Facilities	WB 67	WB 67	WB 62	WB 62
Freight Mobility Corridors	WB 67	WB 67	WB 62	WB 62
Other Freight Distribution Routes	WB 67	WB 67	WB 62	WB 62
Freight Activity Center Streets	WB 67	WB 67	WB 62	WB 62
Other Major Arterials	WB 62	WB 62	WB 40	WB 40
Other Minor Arterials and Collectors	N/A	WB 62	WB 40	WB 40
Local Roads	N/A	WB 40	WB 40	WB 40

Lane Widths

In general, design engineers should consider maximizing lane widths to enhance truck mobility and maneuverability in freight oriented areas where there would generally be few obstacles to implementing wide lanes. However, in community oriented and diverse activity areas, wider lane widths may be undesirable because of their impact on the availability of right-of-way and curb to curb space available to accommodate pedestrian and bicycle facilities. Wide lanes increase crossing distances for pedestrians and promote higher travel speeds for automobiles, which creates an uncomfortable and potentially unsafe environment for non-motorized users. In these context areas, lane widths should be assessed in terms of the facility's primary freight function (mobility, connectivity, circulation, or access) and in light of local land use and urban design considerations.

Lane width can vary depending on whether a lane is the outside or inside lane of a street. Outside travel lanes are the preferred location for trucks and buses due to slower acceleration and travel speeds. Therefore, they are typically wider than inside travel lanes to accommodate these larger vehicles. In addition to providing a travel lane, outside lanes can also serve as parking lanes, bus lanes, bicycle lanes, or a combination of each.

In **Figure 9-1** shown below, the outside travel lanes are 12 feet wide, while the inside travel lanes are 11 feet wide.

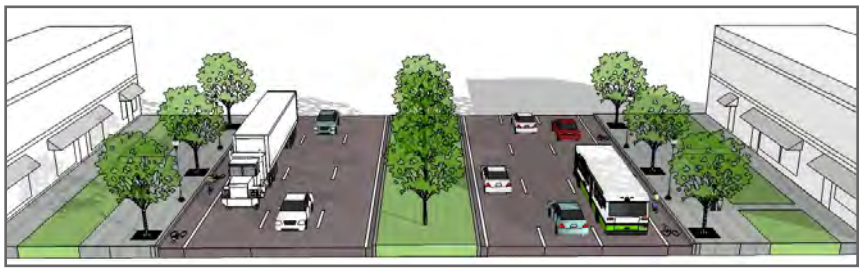


Figure 9-1: Expanded Outside Lane Widths

Intersections

Lane Configuration

Intersection design is one of the most critical factors affecting freight circulation and accessibility. Because large trucks require more space to make right turns than passenger vehicles, truck turning movements often utilize multiple travel lanes. Depending on the traffic and land use conditions at an intersection, these maneuvers can present significant operational difficulties and/or safety hazards. In freight oriented areas, intersection design should accommodate the largest design vehicle, the WB-67 truck. Where intersection improvements are needed to facilitate truck turning movements, a number of design options are available to enhance the intersection's freight functionality while providing for the safety of other system users.

Expanded Departure and Receiving Lanes

One factor that affects truck maneuverability at intersections is the number and width of departure and receiving lanes. Trucks making right turns may hug the lane line or encroach upon the adjacent lane to the left to position the vehicle to complete the turn without entering opposing travel lanes or tracking over the curb when turning. Providing additional width to the departure and/or receiving lanes may alleviate this condition at some intersections (depending on their existing configuration), but often additional lanes – especially receiving lanes – are needed to provide adequate space for trucks to safely and efficiently complete turning movements. Special receiving lanes may be incorporated into the intersection design to provide extra maneuvering space for trucks to complete turns while accommodating turning passenger vehicles simultaneously.

There would generally be few, if any, prospective issues posed by adding lanes at intersections in freight oriented areas. However, in community oriented and diverse activity areas consideration of right-of-way constraints and pedestrian comfort and safety is warranted. Design options for addressing the needs of non-motorized users at intersections are described later in this chapter. **Figure 9-2** and **Figure 9-3** display the different turning movements and curb radii for the WB-67 and WB-40 trucks.

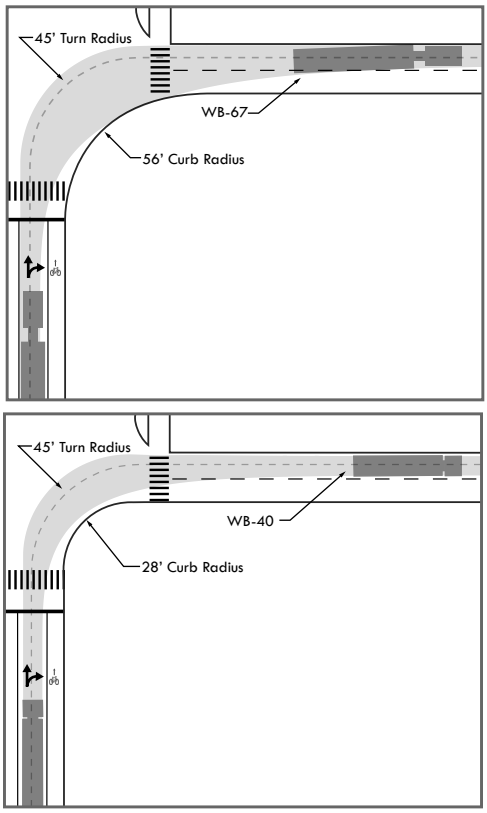


Figure 9-2: Trucks Turning from Departure Lane with a Bicycle Lane

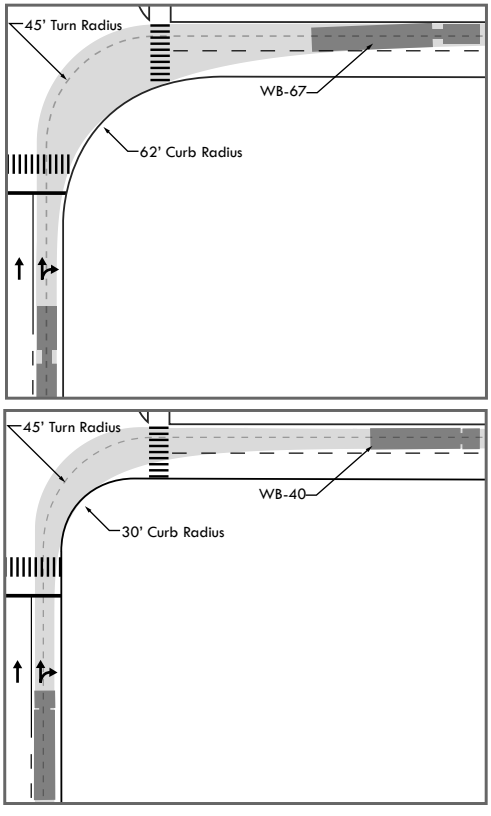


Figure 9-3: Trucks Turning from Departure Lane with no Bicycle Lane

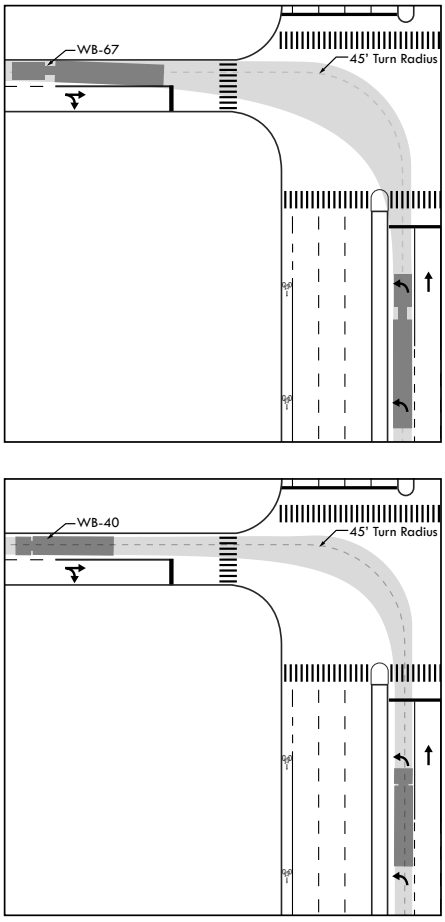


Figure 9-4: Stop Bar Locations

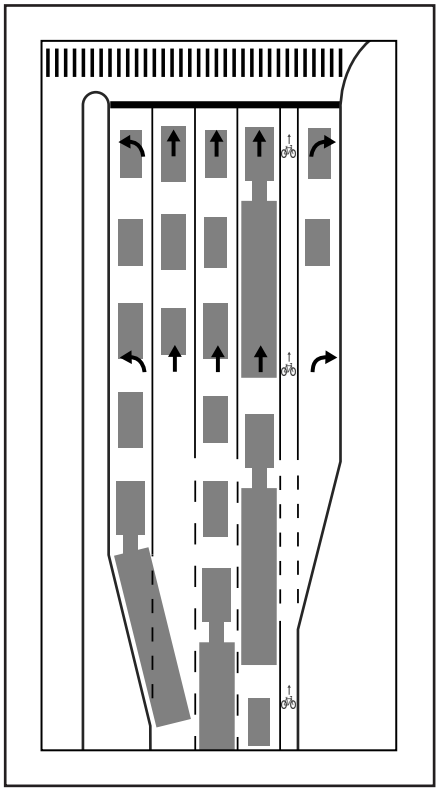


Figure 9-5: Extended Right and Left Turn Lanes

Stop Bars

Another design option for accommodating turning trucks at intersections is to set back stop bars for the travel lanes that oppose the turning vehicle's ultimate trajectory. This provides space for trucks to complete the turn without encroaching on the opposing travel lanes and may be an alternative to adding receiving lanes at constrained intersections. This design treatment also improves pedestrian safety by separating vehicles at the stop bar from the crosswalk. **Figure 9-4** shows how stop bar placement can accommodate left turning movements for both the WB-67 and WB-40 trucks.

Extended Turn Lane Length

Besides requiring additional space to complete turning movements, trucks require more storage space and have slower acceleration than passenger vehicles. Trucks queued to make right or left turns in medians or at signalized intersections may back up into through travel lanes if turn lane storage is inadequate. The backups may also impair the operational efficiency of signalized intersections where turn lane length and/or green times are insufficient to keep the through travel lanes clear. In such cases, it may be appropriate to extend turn lanes to maintain the overall efficiency of an intersection. **Figure 9-5** demonstrates how a short turn lane length can affect the efficiency of an intersection by blocking lanes.

Turn Radii and Curbs

Coupled with lane configuration and addressing the space requirements of turning trucks, turn radii and curb construction at intersections can affect the efficiency of truck movements. A wider turn radius at an intersection diminishes the need for trucks to encroach upon adjacent travel lanes when making right turns. On major regional roads and in freight oriented areas, turn radii are generally wide; on local streets – including some freight distribution routes – and in diverse activity or community oriented areas, turn radii tend to be narrower.

As is the case with lane width, design engineers should generally look to maximize turn radii at intersections with significant volumes of turning trucks and inadequate room for maneuverability in departure and/or receiving lanes. Ultimately, the appropriate turn radius will be determined by the design vehicle (based on the type and size of trucks most often making the turn), the freight facility type and freight function, the context area type, and the presence and needs of other system users.

Tapered curbs and multiple radius (compound) curbs

Where providing an optimally wide turn radius is infeasible (such as in community oriented or diverse activity areas), tapered curbs and multiple radius (or compound) curbs may present acceptable design alternatives. A tapered curb, as shown in **Figure 9-6** provides a short receiving space (like an abbreviated acceleration lane) to maintain a relatively tight turn radius while allowing the rear inside wheels of the truck to track over pavement. This diminishes the need for trucks to encroach on adjacent lanes when turning without increasing crossing distances for pedestrians. Multiple radius curbs, shown in **Figure 9-7**, are similar to tapered curbs but do not include the short receiving lane. The radius of the curb is narrow at the beginning of the turn to accommodate pedestrians but then flattens out to provide additional space for turning trucks.

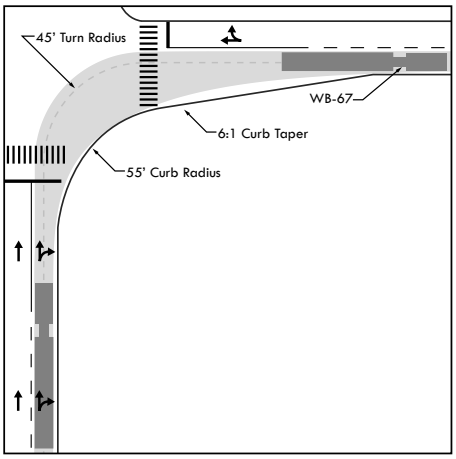


Figure 9-6: Tapered Curbs

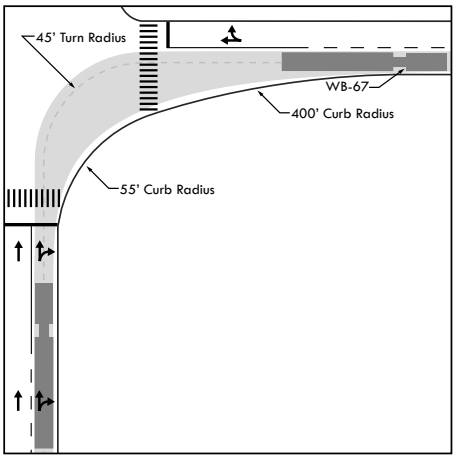


Figure 9-7: Multiple Radius Curbs

Finally, mountable curbs (sometimes referred to as roll curbs) are designed to allow trucks to drive over the curb when making turns without causing damage to the vehicle, trailer, or curb. Mountable curbs may be appropriate in community oriented and diverse activity areas where significant space constraints exist, where the volume of turning trucks is relatively low, and where existing curb lines are prohibitively expensive to move. Mountable curbs can be problematic for pedestrians, who do not anticipate the area back of curb to be potential shared space with turning trucks.

Accounting for Non-Motorized System Users

When implementing a freight mobility improvement, the design engineer should emphasize the primary freight function of the improved facility. However, it is also important to provide for the needs of other system users, including non-motorized users, especially in community oriented and diverse activity areas. Non-motorized users are bicyclists and pedestrians. Some design options for balancing the maneuverability needs of trucks with pedestrian-friendly treatments at intersections through turn radii and curb design are described above. Additional corridor and intersection design elements that address the needs of bicyclists and pedestrians are described below.

With the exception of limited access facilities, it may be appropriate to incorporate bicycle lanes or paved shoulders along a freight corridor. These spaces improve bicyclist safety by limiting conflicts between bicyclists and motor vehicles, including trucks. Bicycle lanes and paved shoulders provide a benefit for larger vehicles, which take advantage of the additional space when making right turns at intersections and driveways. The decision to incorporate bicycle lanes may be based on the context area, a local bicycle master plan, and state or local policies.

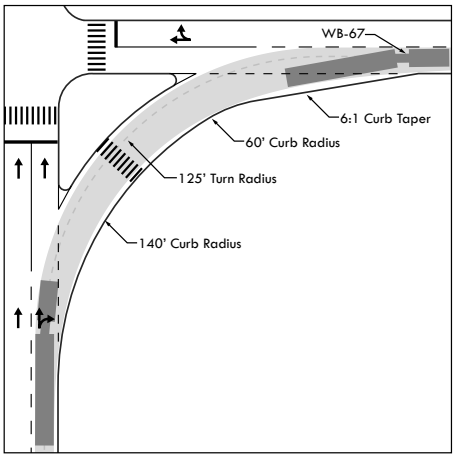


Figure 9-8: Typical Truck Channel

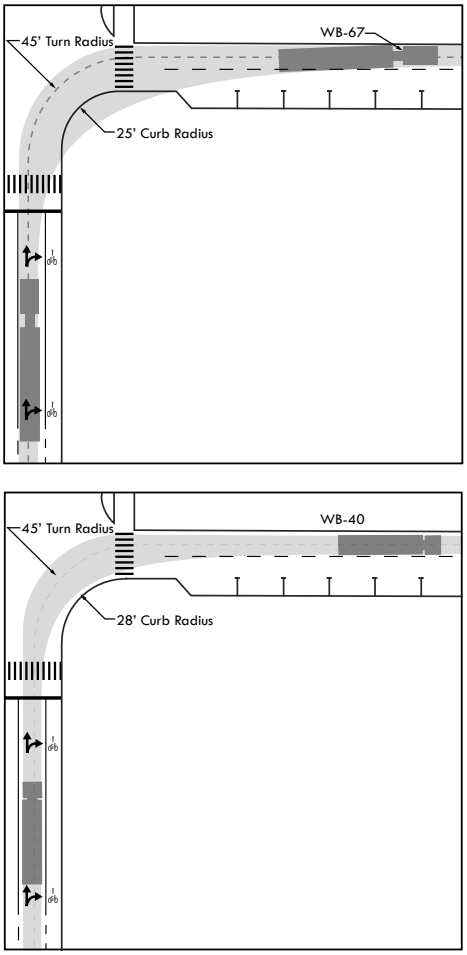


Figure 9-9: Curb Extensions

Channelized Turns

At intersections with wide turning radii or where pedestrian crossings span numerous lanes, it may be appropriate to include median and/or right turn corner pedestrian refuge islands. The islands allow pedestrians to make crossings in stages, as shown in **Figure 9-8**, which may be necessary at large and busy intersections, especially those with high volumes of turning traffic. If designed appropriately accounting for inside and outside truck wheel tracking, right turn islands can be used to provide a wide turning radius for trucks while accommodating pedestrian needs.

Curb extensions

A curb extension (or bulb out) can be used as a traffic calming device and to enhance pedestrian visibility at intersections and midblock crossings. Curb extensions also narrow the crossing distance for pedestrians and provide protection for boarding and alighting transit passengers. Additionally, they define areas for on-street parking. On freight facilities, curb extensions should only be considered at intersections where there is adequate space for truck right turns in departure and receiving lanes and where cross streets prohibit trucks. As shown in **Figure 9-9** , WB-67 trucks cannot avoid driving over a typical curb extension with a 25 foot curb radius while making a right turn. This poses a danger to pedestrians on street corners and adds to the wear-and-tear of the curb. Because of this, curb extensions in freight oriented areas should have larger curb radii than usual.

Buffers

Where there is sufficient right-of-way and depending on the urban design contexts, pedestrian safety and comfort can be enhanced by setting back sidewalks, especially on facilities with high traffic volumes and/or operating speeds. A buffer of trees, vegetation, parking, or other streetscape elements between the road and the sidewalk may further enhance the pedestrian experience. In **Figure 9-10** below, the sidewalk and multi-use trail bordering the street are buffered from the traffic by trees and strips of grass to provide protection and comfort to pedestrians and bicyclists on sidewalks and trails.

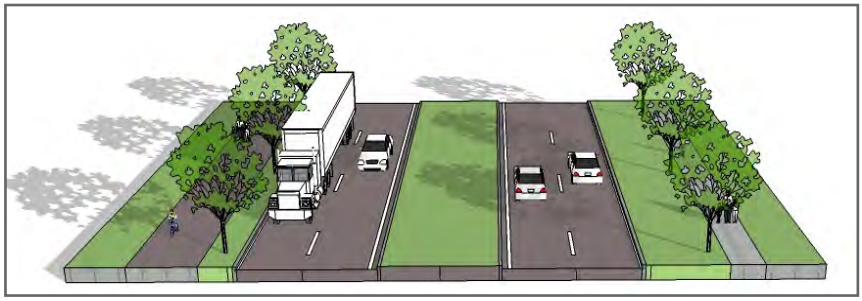


Figure 9-10: Sidewalk Setbacks and Tree Buffers

Fixed Objects

In general, design engineers should offset fixed objects, such as traffic poles, utility poles, street trees, or fire hydrants so that, in the event that a turning truck drives over the curb, these features and the vehicle are not damaged. The location of fixed objects is especially important at intersections with tight turn radii and/or few or narrow lanes. The location of fixed objects, especially trees and the ultimate growth pattern of their branches, needs to be considered relative to the width of the outside lane.

Special Median Considerations

Medians provide important access management and safety functions on major roadways. However, special median considerations for trucks are needed on the freight network. At intersections, medians, pedestrian refuge areas and median nosings adjacent to turn lanes can present difficulties for left turning trucks coming from side street approaches. In these cases, colorized flush medians and medians without nosings may be needed to keep trucks from tracking over the median space. Channelized left turn lanes in medians between signalized intersections need to be designed to accommodate truck movements where significant truck traffic is anticipated, as displayed in **Figure 9-11**.

Designated Truck Turn Around Locations

Depending on the number of lanes and lane configuration on a freight facility, trucks can be limited in opportunities to perform U-turns. Medians can result in the need for U-turns to access side streets and properties. In areas where there are significant barriers and limitations to U-turns, designated truck turn around locations with tapered-curb receiving lanes should be considered. A typical U-turn condition is shown in **Figure 9-12**.

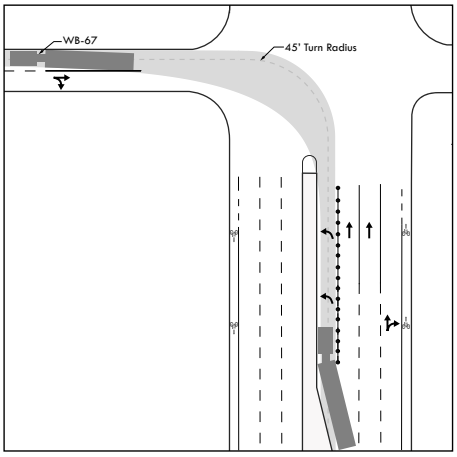


Figure 9-11: Channelized Left Turn

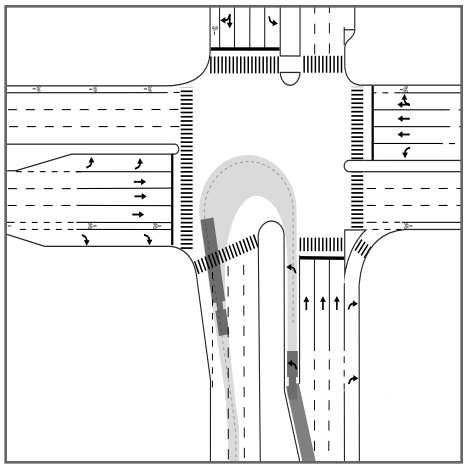


Figure 9-12: Truck Turn Around

Design Element Applicability

The major design topics described abve are listed in **Table 9-10**. The table shows the general applicability of each design element on non-limited access facilities based on the context area type. The particular roadway design strategy will vary depending on the specific set of circumstances surrounding the project. However, the facility design should generally reflect both the freight facility function and the context area type.

Table 9-10: Applicability of Freight Facility Design Considerations on Non-Limited Access Roadways by Context Area Type

Non-Limited Access Regional Freight Network Facilities				
Strategies	Context Areas			
	Low Activity	Community Oriented	Freight Oriented	Diverse Activity
Maximize lane widths	2	3	1	3
Widen/Add Departure, Receiving Lanes	1	3	1	2
Special receiving lanes	2	2	1	2
Set back stop bars	3	3	1	2
Extend turn lanes	2	1	1	2
Maximize turning radii	1	2	1	3
Tapered and multiple radius curbs	2	2	1	2
Bicycle lanes or paved shoulders	2	1	2	1
Modified right turn corner islands	2	2	1	3
Set back sidewalks	2	2	2	1
Curb extensions	3	2	3	1
Offset fixed objects	1	2	1	3
Flush medians/medians without nosings	2	2	1	2
Channelized left turn lanes	1	2	1	2
Designated truck turn around locations	3	3	1	3

Legend: 1 - Applicable
2 - Somewhat Applicable
3 - Limited Applicability

The creation of the Strategic Freight Plan required the coordination of planning agencies, intermodal transshipment agencies, economic development groups, and the trucking community, and sets the framework for future collaboration among these groups.

Planning agencies, intermodal transshipment agencies, economic development groups, and the trucking community have coordinated together to define investment strategies to move freight in the Tampa Bay region more efficiently. Each of these groups provided knowledge and perspective from their different areas of expertise that shaped the development of this plan, but this collaboration does not end with the publishing of the plan. The plan sets the framework for future collaboration between the different agencies and stakeholders to actively pursue and implement diverse solutions for improving freight accessibility and mobility in the Tampa Bay region.

Federal and state regulations for transportation planning give the Florida Department of Transportation (FDOT) and MPOs in the Tampa Bay region broad responsibility for planning and programming transportation projects, including those projects that benefit freight mobility. The integration of freight mobility considerations into the transportation planning process, at all levels, is fundamental to economic prosperity and quality of life for the Tampa Bay region.

Planning for improved mobility and accessibility for freight cannot be done effectively without full consideration of how various improvement strategies will support the region's diverse land use contexts. The design of roadways must support the primary transportation functions of the corridor whether it be for freight accessibility to destinations within the corridor, for person accessibility within employment and residential centers, or for both freight and person mobility. The land use character of the corridor and the types of activities that occur within the corridor are important considerations in the development of balanced transportation solutions supporting the vision for the corridor.

Ideally, transportation strategies are implemented within a corridor to support the transportation and land use vision for the corridor. In certain areas, such as industrial areas with few residences, transportation solutions that maximize freight accessibility should be emphasized. In other areas with few large freight destinations and more pedestrian activities, solutions that accommodate trucks but emphasize person accessibility should be considered. Implementing balanced transportation solutions for both freight and people within corridors under varying land use contexts will assist communities within the region to achieve their economic and quality of life goals.

This balanced approach to corridor planning needs to include collaboration among transportation planners, land use planners, and economic development interests, as shown in **Figure 10-1**, to identify proper transportation and land use solutions that support the vision for the area. Each of these groups provides different perspectives for developing and refining policies and strategies that improve the livability and economic prosperity for the region. The GMAC and Transportation Providers Committee (TPC) assembled for the Strategic Freight Plan provide effective forums for continued collaboration in addressing the region's freight mobility needs.

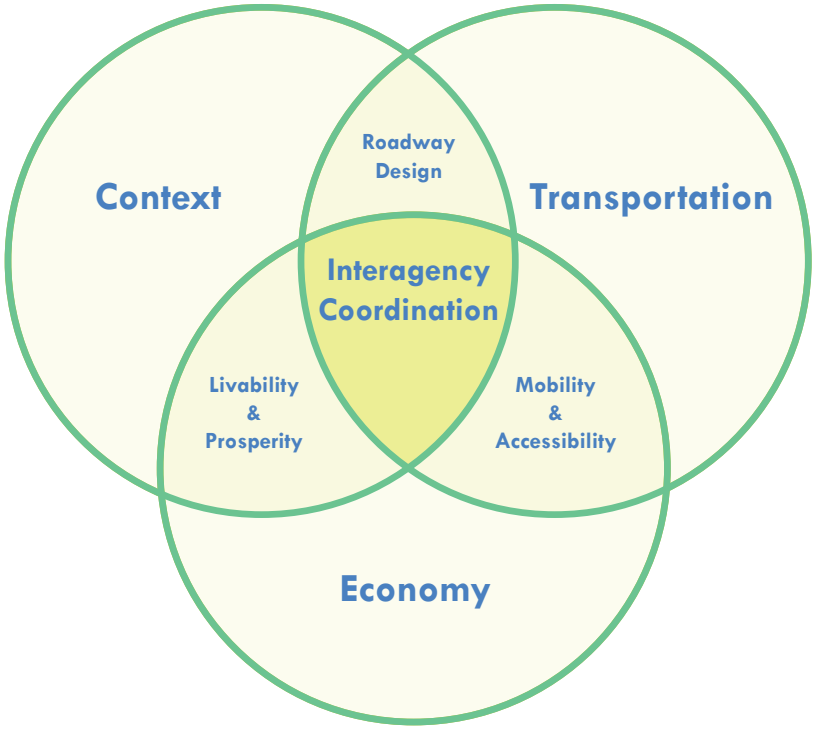


Figure 10-1: Interagency Coordination

GOODS MOVEMENT ADVISORY COMMITTEE

The GMAC guides and informs the freight planning process in the Tampa Bay region. It includes representation from transportation and land use planning agencies, intermodal entities, economic development groups, and the trucking industry within the Tampa Bay region. The GMAC has the following key roles in support of the coordinated planning process in the region:

- Provide a framework to address freight mobility issues in the transportation planning process
- Ensure meaningful participation of the freight industry and economic development interests in the planning process
- Identify improvements and strategies to facilitate the safe and efficient movement of freight while minimizing impacts to community and environmental assets
- Recognize and develop transportation and land use policies that support freight mobility and economic development

The GMAC met six times during the Strategic Freight Plan development process at key project milestones. **Appendix E** provides an overview of the six meetings, including a summary of the issues discussed and the outcomes of the meetings, the presentations given, and the materials provided.

GMAC Representation

- Planners
  - Land Use Planners
  - Transportation Planners
- Intermodal Entities
  - Port Authorities
  - Aviation Authorities
  - CSX Transportation
- Economic Development Groups
  - Chambers of Commerce
  - Regional and Local Economic Development Departments
- Trucking/Shipping Groups
  - Trucking Companies and Associations
  - Distribution and Warehousing Companies

TRANSPORTATION PROVIDERS COMMITTEE

The TPC consists of freight providers including trucking companies, warehousing/distribution industries, and other members of the regional freight industry. It serves as an ad-hoc committee to the GMAC and is relied upon to provide firsthand insights about conditions and issues impacting freight transportation in the Tampa Bay region. The TPC shares challenges and opportunities for improved freight transport from the perspective of the private freight provider.

COORDINATION WITH REGIONAL PLANS

Freight mobility and economic development has a regional focus. The regional freight transportation network, defined freight needs, performance measures used to evaluate freight mobility needs, and the recommended priority investment strategies defined in the Strategic Freight Plan provide relevant information to support other regional planning initiatives. Of particular relevance are the Tampa Bay Area Regional Transportation Authority's (TBARTA) Master Plan and the LRTPs for the six MPOs in the region.

The TBARTA Master Plan adopted on June 24, 2011 has identified designated freight corridors that are crucial to supporting continued economic growth in the region. Coordinating closely with the development of this Strategic Freight Plan, TBARTA designated freight corridors and a freight rail system in the region that support the guiding principles and vision of TBARTA. Continued collaboration with TBARTA will ensure that regional priorities in support of freight mobility and economic development are developed in support of TBARTA's vision for freight and passenger transport in the region.

The Strategic Freight Plan also provides a framework for integrating freight needs and strategies into the LRTP development process for the six MPOs within the region. Freight needs, performance measures, and priority strategies defined in the Strategic Freight Plan should be considered in the development of policies and transportation investments that foster economic development and our quality of life by improving accessibility and reliability for both person travel and freight transport. Representatives from the GMAC or other freight stakeholders should be active participants in the plan development process to ensure that freight mobility needs are considered in the development of policies and investment strategies.

A successful and established process for regular and direct communication between the GMAC and other transportation decision-makers to voice their issues, concerns, and recommendations is essential to effectively plan for freight mobility. Regular, established channels of communication between the GMAC and decision-makers are important to inform public officials of the challenges and opportunities for improving freight transport and to secure funding for priority freight investments in the region. It also ensures that the voice of the freight community is heard in the transportation decision making process.

FREIGHT PLANNING TOOLS AND RESOURCES

Recognizing the need to integrate freight planning considerations into the planning and project delivery process, technical tools and resources have been developed to assist planners and engineers to create plans that respond to the challenges of providing good freight access, while also preserving and improving person mobility and our quality of life in the region. The following resources have been developed that provide information characterizing current and anticipated freight activity within the Tampa Bay region as well as tools and guidance to plan for and identify solutions for a functional transportation system that provides accessibility for people and goods :

- Tampa Bay Regional Goods Movement Study Web Site
- Comprehensive Freight Improvement Database (CFID)
- Freight Corridor Study Guidelines

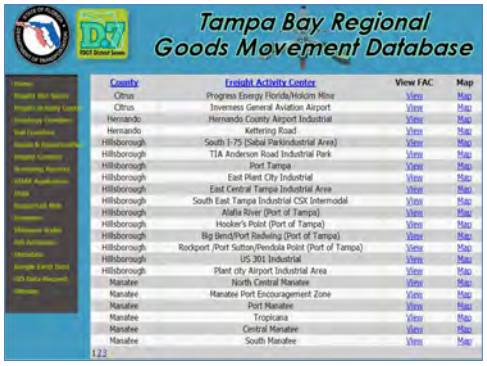
Tampa Bay Regional Goods Movement Study Web Site

The Tampa Bay Regional Goods Movement Study Web site has been developed to provide planning practitioners, decision-makers, and the public with a comprehensive resource of freight activity and related information in the Tampa Bay region. The Web site provides maps and data characterizing the following primary elements of the Strategic Freight Plan:

- Regional freight activity centers
- Regional freight transportation system
- Plan objectives and performance measures
- Freight mobility needs
- Freight compatibility analysis
- Regional priority freight investment strategies
- Freight strategy implementation guidance

Additionally, the Web site includes information to further the understanding of key issues affecting freight transport and economic development in the region. Several brief "white papers" have been prepared describing topics relevant to the freight industry and economic opportunity for the region. Web links to relevant national data and information about freight planning and logistics are located on the Web site, as well as the Comprehensive Freight Improvement Database developed to support further planning of freight transport in the region.

The Tampa Bay Regional Goods Movement Study Web site at ***www.tampabayfreight.com*** *provides planners, decision-makers, and the public with a comprehensive resource of freight activity and related information in the Tampa Bay region.*



The Comphrehensive Freight Improvement Database (CFID) provides information about freight activity centers (FACs) and freight corridors within the Tampa Bay region.

Comprehensive Freight Improvement Database

The Comprehensive Freight Improvement Database (CFID) is a current and well-maintained body of information about goods movement activity and resources in the Tampa Bay region available to assess and effectively plan for the region's goods movement needs. The database provides a single-source of information for use by the FDOT, local governments, intermodal agencies, and other freight stakeholders to support a multitude of planning and economic development initiatives. The database and other information available on the Tampa Bay Regional Goods Movement Study Web site provides a descriptive inventory of all freight activity centers, intermodal facilities, regional freight mobility corridors, and the SIS.

It also provides an inventory of identified freight mobility problems and needs at specific locations throughout the region (freight hot spots) and on certain corridors that are part of the region's freight transportation network. Strategies and projects identified to address these needs are monitored by maintaining an inventory of transportation improvement projects and schedules for current and planned projects.

Freight Corridor Study Guidelines

Traditional corridor and subarea studies have often focused on improving travel conditions for people, without fully considering the unique operating characteristics of trucks and the opportunities for efficient freight transport. This has led to mobility solutions in certain corridors that improve operational conditions for automobiles, but has sometimes deteriorated travel conditions for large trucks. Mobility solutions that address the needs of both people and goods within freight corridors are needed to optimize the functionality of the transportation network. To help address this concern, Freight Corridor Study Guidelines have been developed to identify and raise awareness of freight activities and operational issues within transportation corridors so that cost-effective solutions can be defined that address mobility needs of both people and freight.

The guidelines provide direction and methods for incorporating the evaluation of issues affecting freight mobility into corridor studies. The guidance includes an initial screening of freight corridors to document observed freight-related problems and issues. The following characteristics of freight corridors are defined and documented early in the planning process through an initial corridor screening:

- Truck volumes and activities
- Infrastructure issues that impede efficient truck flow
- Operational issues that affect truck operations
- Potential safety issues
- Businesses and industrial areas that generate significant amounts of truck traffic

- Potential solutions to freight operational deficiencies
- Issues that warrant further evaluated in detailed corridor or Project Development and Environmental (PD&E) studies

Freight corridor screenings have been conducted on all of the state roadways and other local freight corridors within the Tampa Bay region. In all, 285 corridor screenings covering 1,588 roadway miles were conducted. The freight mobility issues and opportunities have been documented in summary reports and have been compiled within the Comprehensive Freight Improvement Database accessible on the Tampa Bay Regional Goods Movement Study Web site. The freight information inventoried in the corridor screenings will be used to support future corridor analyses and other state, regional and local planning initiatives.