

Appendix E

Multimodal Needs Development



Long Range Transportation Plan



Multimodal Needs Development

NOTE: This document is a summary of technical work that informed the development of the 2050 update of the LRTP. Some information may differ in material ways due to changes to the final LRTP document following the completion of this technical memo. The information found within this memo was accurate at the time of completion.

August 2024

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Multimodal Needs Plan

In recognition that long-range planning is an exercise of directing constrained financial resources where they will achieve maximum benefit, the TPA has developed this document to summarize comprehensive regional needs by transportation mode. These needs were identified through an evaluation of currently available data, and in support of the Vision 2050 goals and objectives. It is important to emphasize that multimodal needs are not projects, but rather are helpful tools to direct resources where respective needs are greatest and will often achieve multiple benefits when projects are identified or advanced.

This document summarizes current assumptions of multimodal needs in Palm Beach County, based on the following identified modes or need types:

- Pedestrian
- Bicycle and Micromobility
- Transit and Local Circulators
- Automobile and Motor Vehicles
- Road Capacity
- Freight
- Intelligent Transportation Systems (ITS)
- Electric and Alternate Fuels
- Emerging Technologies
- Urban Air Mobility
- Operations and Maintenance of Existing Infrastructure

The TPA has created this “Needs Plan” to comply with applicable federal, state, and local requirements and guidance, as highlighted in the following sections.

Regional Transportation Focus

The TPA places a significant emphasis on the regional network of classified streets where federal funding can be directed. Smaller, local roadways contribute to connectivity, but the focus lies on enhancing larger connectivity within the region. By prioritizing the development and improvement of the regional network, the TPA aims to maximize the impact of federal funding and promote efficient, connected transportation systems.

Modes of Transportation

The purpose of the Palm Beach TPA 2050 LRTP Multimodal Needs Plan is to provide a thorough assessment of the multimodal needs within the County to help guide project funding decisions in the future. The FDOT QLQS handbook also acts as a supplemental resource to guide decision making. The different multimodal needs are wide ranging, so it is important to highlight the different modes of transportation, why they are important, and how they were analyzed. This creates a clear vision of the data needed for the evaluation process, resulting maps, and project identification/prioritization process.

Complete Streets refers to streets that are designed to provide safe access for all people including pedestrians, bicyclists, motorists, freight and service operators, and transit riders of all ages and

abilities. Six municipalities within Palm Beach County have adopted Complete Streets Policy based on the FDOT’s Complete Streets, and the recommended funding approach for delivering projects through the TPA’s funding programs is their Complete Streets Design Guidelines.

The data resources utilized to establish multimodal needs have been framed through the Vision 2050 Goals: “Safe,” “Efficient”, “Connected”, “Multimodal”, and “Resilient”. The results of this analysis should be referenced against proposed transportation projects, to ensure that opportunities for such projects to address an identified modal need is not overlooked.

The geographic areas identified by review of data for each mode are reflected in the associated Needs Maps. This data is available in both print map format, and as a GIS shapefile for geospatial reference.

Pedestrian

Travel on foot as a pedestrian is perhaps the most fundamental mode of transportation in daily life. It is commonly said that “everyone is a pedestrian,” an acknowledgement that most journeys would not be possible without some degree of walking to complete the trip.

Pedestrians are sensitive to input from high-speed, or high-volume vehicular traffic near the facilities that accommodate pedestrian travel. Measures that standardize a level of traffic stress (LTS) have been developed to quantify pedestrian comfort in a facility. Higher stress (LTS 3 or LTS 4) pedestrian facilities may discourage travel on a road segment, shifting demand to another corridor or mode.

The TPA provides lower stress facilities (LTS 1 or LTS 2) for a wide range of pedestrian users. These may include occasional shared accommodations for bicycle or micromobility users. Special attention should be given to accommodations at intersections, including traffic controls, to maintain a low-stress environment and reduce potential conflicts with vehicular traffic.

The following table summarizes areas where investments in pedestrian accommodation are currently of greatest need in Palm Beach County, based on data available to the TPA. The areas identified by review of this information are reflected in the Pedestrian Needs Map.

Table 1. Methodology for Identifying Pedestrian Needs

Goal	Objective
Safe	Improve pedestrian accommodation and emphasize walking activity on Federal Aid eligible roadway segments identified by: <ul style="list-style-type: none"> ▪ FDOT’s Vulnerable Road User (VRU) Safety Assessment
Efficient	Provide convenient access through areas with greatest population or employment densities by: <ul style="list-style-type: none"> ▪ closing all sidewalk gaps on lower stress Federal Aid eligible road segments that achieve LTS 1 or 2 designated by FDOT as C2T (Rural Town), C4 (Urban General), C5 (Urban Center) or C6 (Urban Core)
Connected	Provide safe pedestrian accommodation on all Federal Aid eligible roadway segments by: <ul style="list-style-type: none"> ▪ closing all sidewalk gaps on The TPA’s Tier 1 Pedestrian Network ▪ Where sidewalk gaps will remain, provide controlled crossings of the Federal Aid eligible roadway segment so users may access available sidewalks or pathways where the sidewalk discontinues

Pedestrian accommodation needs were assessed by analyzing safety, efficiency, and connectedness. The FDOT’s Vulnerable Road User (VRU) Safety Assessment for pedestrian segments were used to identify areas with the greatest pedestrian safety needs. Providing convenient access through areas with the greatest employment density will improve efficiency. All sidewalk gaps on Federal Aid eligible road segments designated by FDOT as C2T (Rural Town), C4 (Urban General), C5 (Urban Center) or C6 (Urban Core) will be closed to provide convenient access. Providing safe pedestrian accommodation on all Federal Aid eligible roadway segments will improve connectedness. To achieve connectedness, all sidewalk gaps on the TPA’s Tier 1 Pedestrian Network will be closed. Where sidewalk gaps remain, controlled crossings of Federal Aid eligible roadway segment will be provided, allowing user access to sidewalks or pathways where the sidewalk discontinues.

While closing the gaps in sidewalks helps ensure a thoroughly connected pedestrian network, there remains additional need for crosswalks at locations other than exclusively where sidewalk gaps remain. For instance, the ability to cross from one end of the street within reasonable distances for pedestrians is a significant measure towards improving safety for pedestrians.

The needs determined through this analysis form the foundation of the implementation plan. The identified pedestrian facilities will be assessed along with bike facilities for level of need. Level of need refers to whether the facility will be identified as a full complete street design, or a specific sidewalk improvement. The results of this analysis should be referenced against proposed transportation projects to ensure that opportunities for such projects to address an identified modal need is not overlooked.

Designing pedestrian improvements requires a holistic approach that considers ADA accessibility, Complete Streets Design Guidelines, level of traffic stress, and Vision Zero (HIN) principles. This approach ensures that improvements are made for users of all ages and abilities and will help to determine and prioritize pedestrian and bicyclist safety needs. Pedestrian needs are shown in **Figure 1**.



Bicycle and Micromobility

Travel by bicycle or micromobility devices like electric scooters affords numerous benefits that may include reduced competition for roadway capacity, more livable environments in our communities, and improved public health. Leveraging these benefits is dependent on providing a safe and comfortable travel environment in a complete and connected network of dedicated facilities, or slow streets where shared travel can be accommodated.

Measures that standardize a level of traffic stress (LTS) have been developed to quantify bicycle comfort in a facility. Higher stress (LTS 3 or LTS 4) bicycle facilities expose these road users to high-speed and/or high-volume traffic, making these modes unrealistic for those who would choose to ride on a regular basis. The resulting shift in demand to another corridor or mode is often stigmatizing and reinforces a cycle of dependency on higher cost choices. The TPA's objective is to provide lower stress facilities (LTS 1 or LTS 2) that accommodate travel by a wide range of bicycle and micromobility users.

The following table summarizes areas where investments in bicycle and micromobility accommodation are currently of greatest need in Palm Beach County, based on measurable data available to the TPA. Areas identified by review of this information are reflected in the Bicycle and Micromobility Needs Map.

Table 2. Methodology for Identifying Bicycle and Micromobility Needs

Goal	Objective
Safe	Improve bicycle and micromobility accommodation and emphasize bicycling activity on Federal Aid eligible roadway segments identified by: <ul style="list-style-type: none"> ▪ FDOT's Vulnerable Road User (VRU) Safety Assessment
Efficient	Provide convenient access through areas with greatest population or employment densities by: <ul style="list-style-type: none"> ▪ providing dedicated facilities for bicycle and micromobility users that achieve LTS 1 or LTS 2 on road segments designated by FDOT as C2T (Rural Town), C4 (Urban General), C5 (Urban Center) or C6 (Urban Core) that are included in The TPA's Tier 1 and Tier 2 Bicycle Network
Connected	Support regional connectivity by: <ul style="list-style-type: none"> ▪ completing the SUN Trails network ▪ completing the East Coast Greenway Link areas with greatest population or employment densities by: <ul style="list-style-type: none"> ▪ providing dedicated facilities for bicycle and micromobility users that achieve LTS 1 or LTS 2 on road segments designated by FDOT as C3R (Suburban Residential), C3C (Suburban Commercial) that are included in The TPA's Tier 1 Bicycle Network

Bicycle and Micromobility accommodation needs were determined by analyzing the current state of safety, efficiency, and connectedness. The FDOT's Vulnerable Road User (VRU) Safety Assessment for bicycle segments were used to identify areas with the greatest need for safety. Providing convenient access through areas with the greatest population or employment density will improve efficiency. Dedicated facilities for bicycle and micromobility users that achieve LTS 1 or LTS 2 on road segments designated by FDOT as C2T (Rural Town), C4 (Urban General), C5 (Urban Center) or C6 (Urban Core) that are included in The TPA's Tier 1 and Tier 2 Bicycle Network will be provided to ensure convenient access. Supporting regional connectivity and linking areas with the greatest population or employment densities will improve connectedness. The SUN Trails network and the East Coast Greenway will be completed to support regional connectivity, and dedicated facilities for bicycle and micromobility users that achieve LTS 1 or LTS 2 on road segments designated by FDOT as C3R (Suburban Residential) or C3C (Suburban Commercial) that are included in the TPA's Tier 1 Bicycle Network will be provided to link areas with the greatest population and employment densities. Bicycle and Micromobility needs are shown in **Figure 2**.

The needs determined by this analysis form the foundation of the implementation plan. The identified bicycle and micromobility facilities will be assessed along with pedestrian facilities for level of need. Level of need refers to whether the facility will be identified as a full complete street design, or a specific sidewalk improvement. The results of this analysis should be referenced against proposed transportation projects, to ensure that opportunities for such projects to address an identified modal need is not overlooked.

Design for micromobility options such as golf carts, scooters, and e-bikes should be considered as they become increasingly popular modes of transportation. The Federal Highway Administration has identified that "many jurisdictions are exploring micromobility as an alternative mode for short trips and active transportation." Future design considerations should be made regarding infrastructure integration, safety measures, and accessibility. The Governor's Highway Safety Association produced a report discussing need for speed management, improved roadway design, education, and other ways to help mitigate safety concerns as micromobility users increase. Some examples of infrastructure integration and safety measures may include dedicated/shared lanes, designated parking areas, traffic calming techniques, reduced speed limits, and improved visibility through signage and adequate lighting. Designing bicycle and micromobility improvements requires a holistic approach that considers ADA accessibility, level of traffic stress, Vision Zero (HIN) principles, and Complete Streets Design Guidelines. This approach ensures that improvements are made for users of all ages and abilities and helps determine and prioritize pedestrian and bicyclist safety needs. Despite overlaps in design principles between how micromobility options for automotive vehicles and active transportation modes are devised, variations in modal speed in relation to where hubs or pick-up and drop-off locations are needs to be considered.

Transit and Local Circulators

Transit modes provide opportunity to move more people more efficiently, when compared with single occupant vehicles that commonly utilize transportation network at times when travel demand is greatest. Transit may include a range of operating types, from bus service on shared roadways, to bus or rail operating in dedicated guideways. As roads become congested, the ability to move more people through the system using a shared mode with dedicated guideway leverages the full benefit of transit opportunity. Other factors that may be considered include equity to account for the cost of car ownership, or individual's ability for travelers who are unable to drive.

The 2045 LRTP Transit Modal Analysis used the active transportation demand analysis results, Palm Tran's high ridership routes, and 2045 forecasted jobs and population to identify the transit corridors of the 561 Plan consistent with the Southeast Florida Regional Transportation Plan. Eleven (11) enhanced transit facilities were identified based on a thorough analysis of density, transit propensity, social equity, and existing and projected highest transit ridership corridors. The prioritization of the transit corridors was based primarily on the stop-level statistics calculated during the selection of station locations, but also uses Longitudinal Employer-Household Dynamics (LEHD) work trips as a corridor-level measure. A weighted score ranking system was utilized to prioritize the corridors by potential ridership demand. Each category used a quarter mile buffer to aggregate data and generate the final weighted score. Population and employment data were aggregated based on the intersection of Traffic Analysis Zones (TAZ) with the quarter mile buffer. The final weighted scores were built on a 100-point scale and assigned to each corridor based on how they ranked amongst each corridor by category. A normalization factor was applied to several categories to account for corridor length and the number of station variability. The methodology used to prioritize each corridor was a comparative analysis exercise that ranks corridors by potential ridership demand. The weighted scores were used for ranking purposes but may not directly correlate to actual ridership estimates due to a lack of corridor specific origin and destination knowledge.

The "Mobility Vision" initiative undertaken by the Palm Beach TPA further explores the 561 Plan and outlines a vision for the identified corridors resulting in one complete transit system. Factors considered in this enhanced analysis include land use surrounding the corridors, potential redevelopment, and integration with existing transportation assets. The Mobility Vision presents an ambitious planned transit system that has the potential to be realized on the 25-year horizon of Vision 2050, with substantial Federal or State investments through discretionary funding sources, and identification of a local source to fund operations and maintenance.

In the near-term, transit improvements are guided by the transit operators, primarily Palm Beach County's bus operator Palm Tran, and the South Florida Regional Transportation Authority who operate the regional commuter Tri-Rail system. Each operator maintains a Transit Development Plan (TDP) that presents capital and operating budget for transit operations within Palm Beach County. Transit investment over the 25-year Vision 2050 horizon will generally build on the capital investments included in each transit agency's TDP, as each contributes to the ultimate goal of building out the 561 Plan.

Innovation is also influencing the transit mode, both with introduction of private rail service by Brightline, and the introduction of multiple on-demand transit service operators by both

municipalities within Palm Beach County, and by PalmTran. Current and expected service areas provided by these partners have been captured in the development of Vision 2050.

Plans to achieve the Mobility Vision and implement the transit agency’s TDP’s are reflected in the Transit and Local Circulators Needs Map.

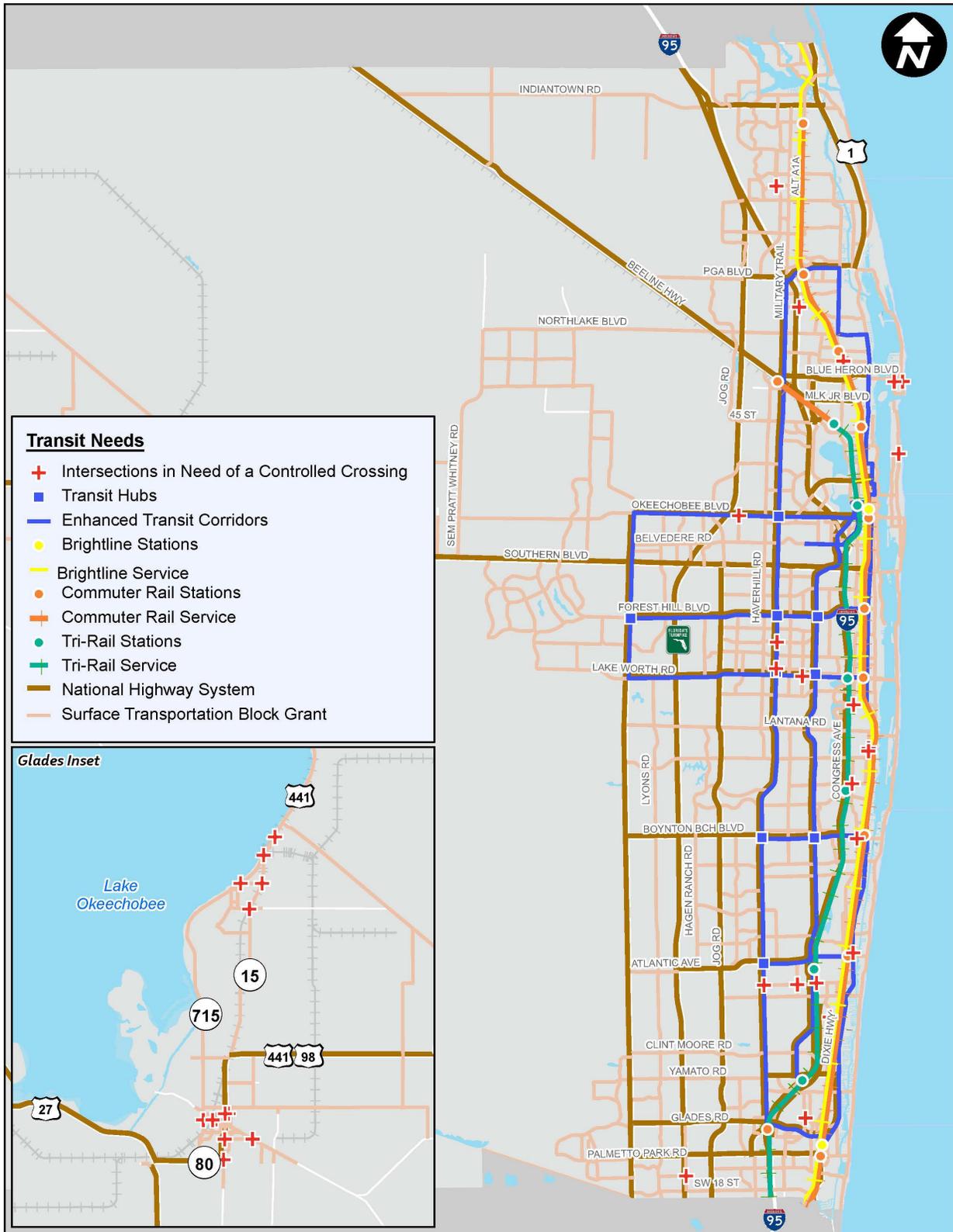
Table 3. Methodology for Identifying Transit and Local Circulator Needs

Goal	Objective
Safe	Support safe access to transit stops by: <ul style="list-style-type: none"> • Providing controlled crossings at, or withing proximity (300 ft) of transit stops located on Federal Aid eligible road segments, or consolidate bus stops to an intersection where controlled crossings are provided Support safe accommodation at transit stops by: <ul style="list-style-type: none"> • Providing shelters and shade at transfer stops, intermodal centers and high ridership transit stops
Efficient	Improve transit operations by: <ul style="list-style-type: none"> ▪ Providing connected technologies along key routes to prioritize transit operations
Connected	Provide convenient access to and surrounding transit stops by: <ul style="list-style-type: none"> ▪ Closing sidewalk gaps within ½ mile along Federal Aid eligible road segments

To improve safe access to transit, controlled crossing at, or within proximity of transit stops located on Federal Aid eligible roads segments can be provided. In addition, providing shelter and shade will support safe accommodation for riders. Connected technologies prioritize transit operations and improve efficiency, while connected sidewalks provide convenient access and connectedness to transit. Transit needs are shown in **Figure 3**.

Short term improvements that focus on improving ridership experience include shelters, transit signal priority, queue jumps, frequency increases, shifting to feeder Mobility on Demand (MOD) zones and eliminating routes that don’t service the public at large. New services, along with typical fixed-route bus service, like express or rapid transit services, would be effective, long-term improvements to the transit system and aid in efficiency and connectedness. Express or rapid transit options would be particularly beneficial during AM/PM peak hours for commuters. Typically, these AM/PM hours are from 6 AM to 9 AM and 4PM to 7PM. MOD zones can improve efficiency and connectedness by helping individuals utilize multiple modes of both private and public transportation.

Figure 3. Transit Needs



Roadway Capacity

Palm Beach County is bounded by the Everglades and Agricultural Areas to the West and the Atlantic Ocean to the east. Much of the area is already developed and available right-of-way widths are nearly exhausted. The remaining available capacity projects identified within this plan should seek to provide a complete capture of needs, with specific emphasis on active transportation, complete streets, emerging technology, and resilience.

Palm Beach County’s existing roadway congestion varies during peak hours causing delays, queueing, and factors into some crashes. The roadway conditions analysis identifies factors that are the cause of crash occurrence, such as:

- Posted Speed Limit
- Intersections
- Number of Lanes
- Lane Departure
- Surface Conditions
- Lighting Conditions
- Rail Crossing

The Vision 2050 LRTP prioritizes only the necessary capacity required to ensure the movement of goods and services without sacrificing the ability to provide a complete and connected network of streets. Special care should be considered in the development of all TPA supported projects to low stress facilities and reduced or eliminated conflict points.

Automobiles and Motor Vehicles

The automobile and motor vehicle infrastructure in Palm Beach County is a largely built out network, with access to major interstates, FDOT SIS, and connected arterial and local roadways. FDOT’s SIS is a high priority network that serves as the backbone of the state’s economy and mobility.

In Palm Beach County, the local priorities are delivered through the County’s 5-year road program. This program addresses the county’s transportation needs and focuses on road projects to be designed, funded and constructed by the county over the next five years. Additionally, the County’s Thoroughfare Right-of-Way Identification map plays an important role in guiding roadway capacity projects by identifying ROW widths and overpasses, which can aid in project selection.

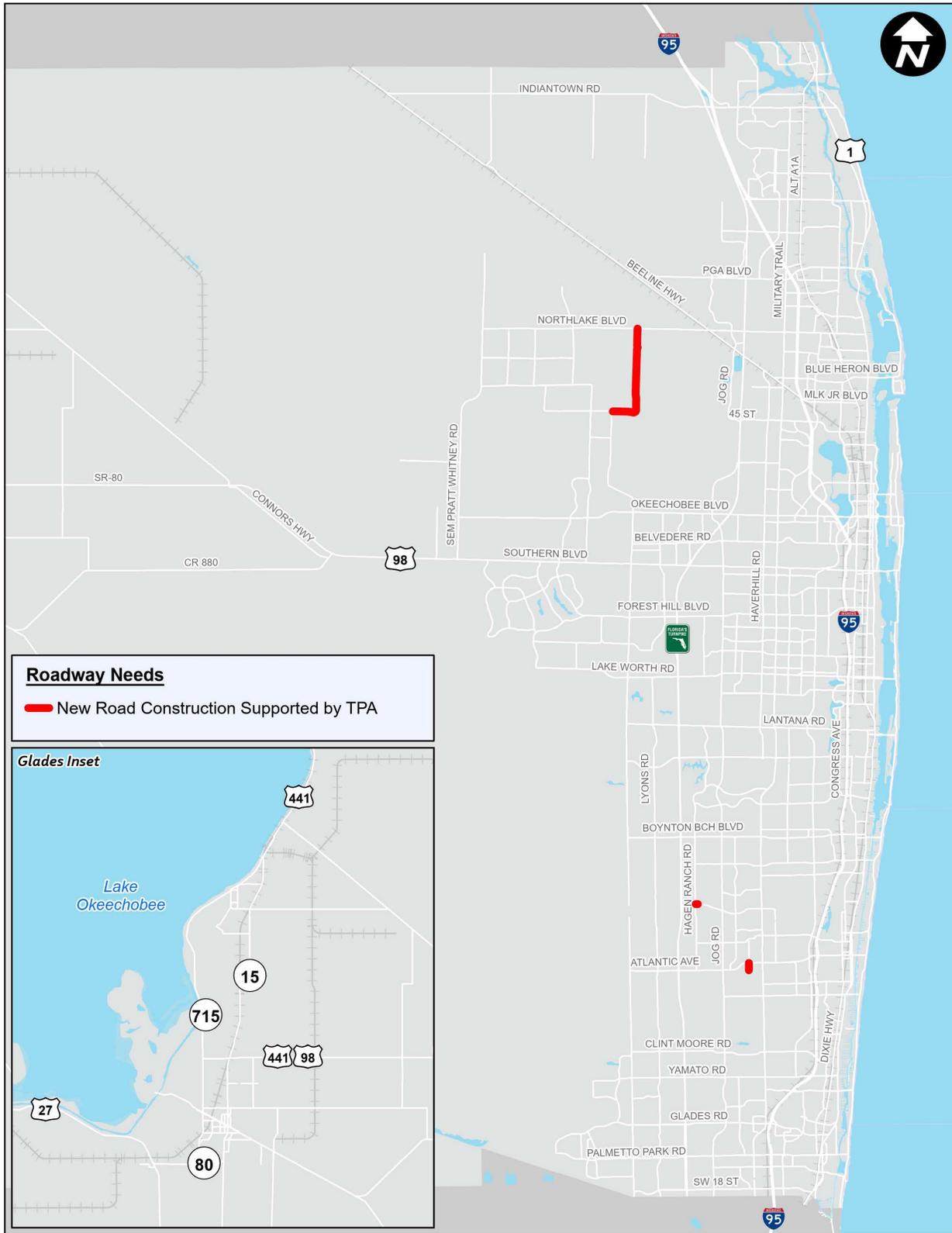
Due to travel demand increasing and the need to reduce congestion, transportation demand management strategies must be implemented. Strategies supported by Federal law 23 CFR 450.322(d)(4) include growth management and congestion pricing, traffic operational improvements, improvements to public transportation, and ITS technologies as relate to the regional ITS architecture. The law dictates capacity should be the last option to manage demand. The motor vehicle needs are shown in **Figure 4**.

Table 4. Methodology for Identifying Automobile and Motor Vehicle Needs

Goal	Objective
Connected	Support regional connectivity by: <ul style="list-style-type: none"> ▪ Closing critical gaps in the planned road network that has been supported by the TPA.



Figure 4. Roadway Needs

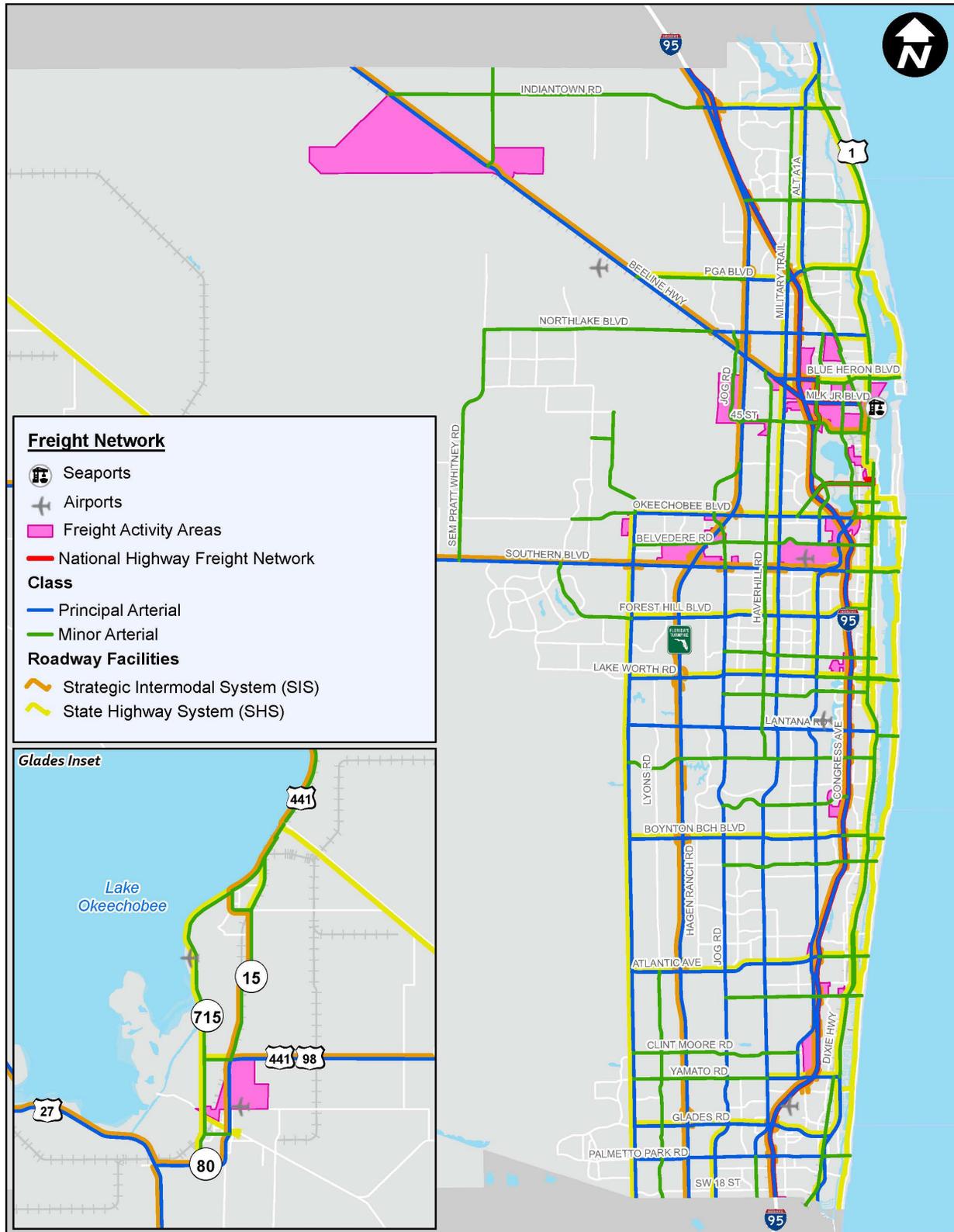


Freight

Freight transportation and mobility plays a key role in the economy and society. Efficient movement of goods is essential for businesses to thrive, supply chains to operate smoothly, and consumers to have access to necessary products. Additionally, an efficient freight transportation system helps reduce congestion and minimize the environmental impact of transportation.

Although many freight suppliers in the rail and intermodal business provide rail-based transportations services for Palm Beach County, there is still a need for roadway reconstruction and widening to support the regional mobility needs of Palm Beach. The FDOT Freight and Mobility Plan highlights issues with the current freight system including bottlenecking and congestion, and highlights areas in District 4 as having high to medium freight activity. Major Freight Activity Areas in District 4 are located at Belle Glade, Palm Beach Park of Commerce, Riviera Beach, and Palm Beach International Airport. Other Freight Activity Areas are located at Lake Worth, Boynton Beach, Delray Beach/Linton Boulevard, and Yamato Road. Important freight and rail corridors include the Florida East Coast Railway (facilities used by Brightline), the South Florida Rail Corridor (facilities used by Amtrak), the South Central Florida Express (primarily used for commodity movement), and Chessie Seaboard Consolidated Transportation (facilities used for tri-rail commuter trains). Additional vehicle capacity on major corridors improves efficiency and safety along freight corridors while also improving access. The freight network of Palm Beach County is shown in **Figure 5**.

Figure 5. Freight Network



Electric and Alternative Fuel Infrastructure

As the need to create a resilient and adaptive transportation system continues to grow, the adoption of electric vehicles and alternative fuel infrastructure has become increasingly popular. To support the widespread adoption of EVs, powerful and accessible charging infrastructure is crucial. Furthermore, alternative fuel infrastructure offers additional options for reducing the environmental impact of transportation. The expansion of these alternatives is key to promoting sustainable mobility.

The U.S. Department of Transportation Federal Highway Administration (FHWA) designates a national network of alternative fuel corridors (AFCs). The national networks apply to several alternative fuel sources including electric vehicles (EVs), hydrogen, propane, and natural gas. Once designated, areas along the AFCs are eligible for grants to fund the construction of alternative fuel stations.

Each fuel type has specific requirements to designate an AFC as pending or ready. A designation of 'pending' indicates that the corridor does not meet the minimum criteria for alternative fuel spacing, siting, and capacity. A 'ready' designation indicates corridors have met the minimum fuel station requirements and are either no longer eligible for grant funds or have a lower priority for additional grant-funded fueling infrastructure. **Table 5** provides a summary of the status of AFC designations in Palm Beach County. Maps on the subsequent pages show the corridors designated and what the status is for each alternative.

Table 5. Alternative Fuel Comparison

Alternative Fuel	Pending Status	Ready Status	Ready Criteria	Notes
EV	I-95 Florida Turnpike/SR91 US1 SR710 SR80 US441	N/A	Public DC Fast Charging, no greater than 50 miles between one station and the next on the corridor, and no greater than 5 miles off the highway. Additionally, each DC Fast Charging site should have both J1772 combo (CCS) and CHAdeMO connectors. Because Tesla stations are proprietary, we are unable to include them.	There are 285 public EV charging stations in Palm Beach County. There are no stations that meet the EV AFC Ready Criteria.
Compressed Natural Gas (CNG)	I-95 Florida Turnpike/SR91	N/A	Public, fast fill, 3,600 psi CNG stations no greater than 150 miles between one station and the next on the corridor, and no greater than 5 miles off the highway.	There are no public CNG stations in Palm Beach County.
Propane	I-95 Florida Turnpike/SR91	I-95 Florida Turnpike/SR91	Public, primary propane stations no greater than 150 miles between one station and the next on the corridor, and no greater than 5 miles off the highway.	There are two public propane fueling stations in Palm Beach County
Liquid Natural Gas (LNG)	n/a	N/A	Public LNG stations no greater than 200 miles between one station and the next on the corridor, and no greater than 5 miles off the highway.	There are no LNG AFCs in Palm Beach County. There are no public LNG stations in Palm Beach County. There are two in Florida – one in Ocala and one in Jacksonville.
Hydrogen	n/a	N/A	Public, hydrogen stations no greater than 100 miles between one station and the next on the corridor, and no greater than 5 miles off the highway.	There are no hydrogen designated AFCs in Palm Beach County. Currently, the only hydrogen AFCs in Florida are in the Jacksonville area. There are no public hydrogen fueling stations in Florida



Figure 7. Compressed Natural Gas Alternative Fuel Corridors

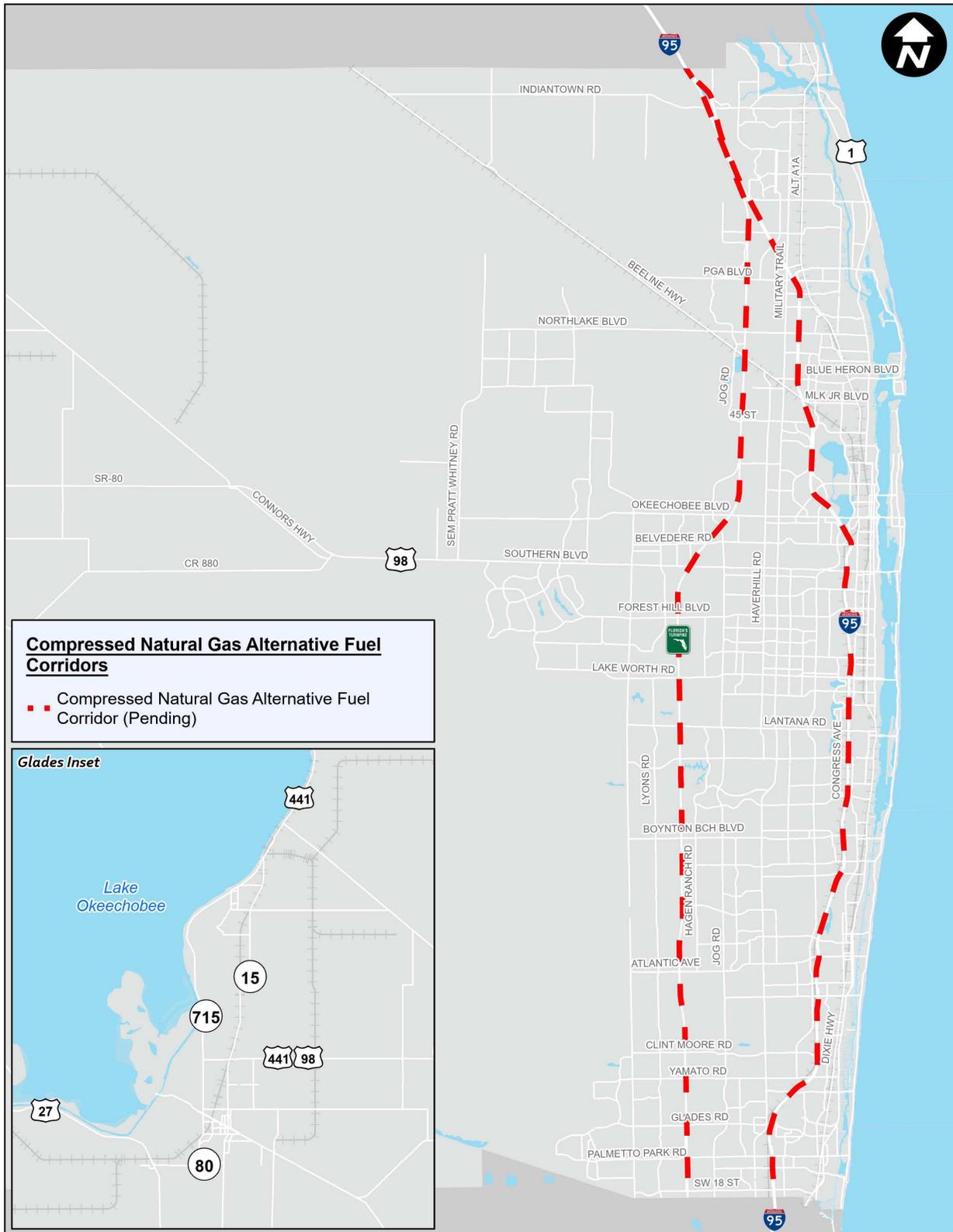
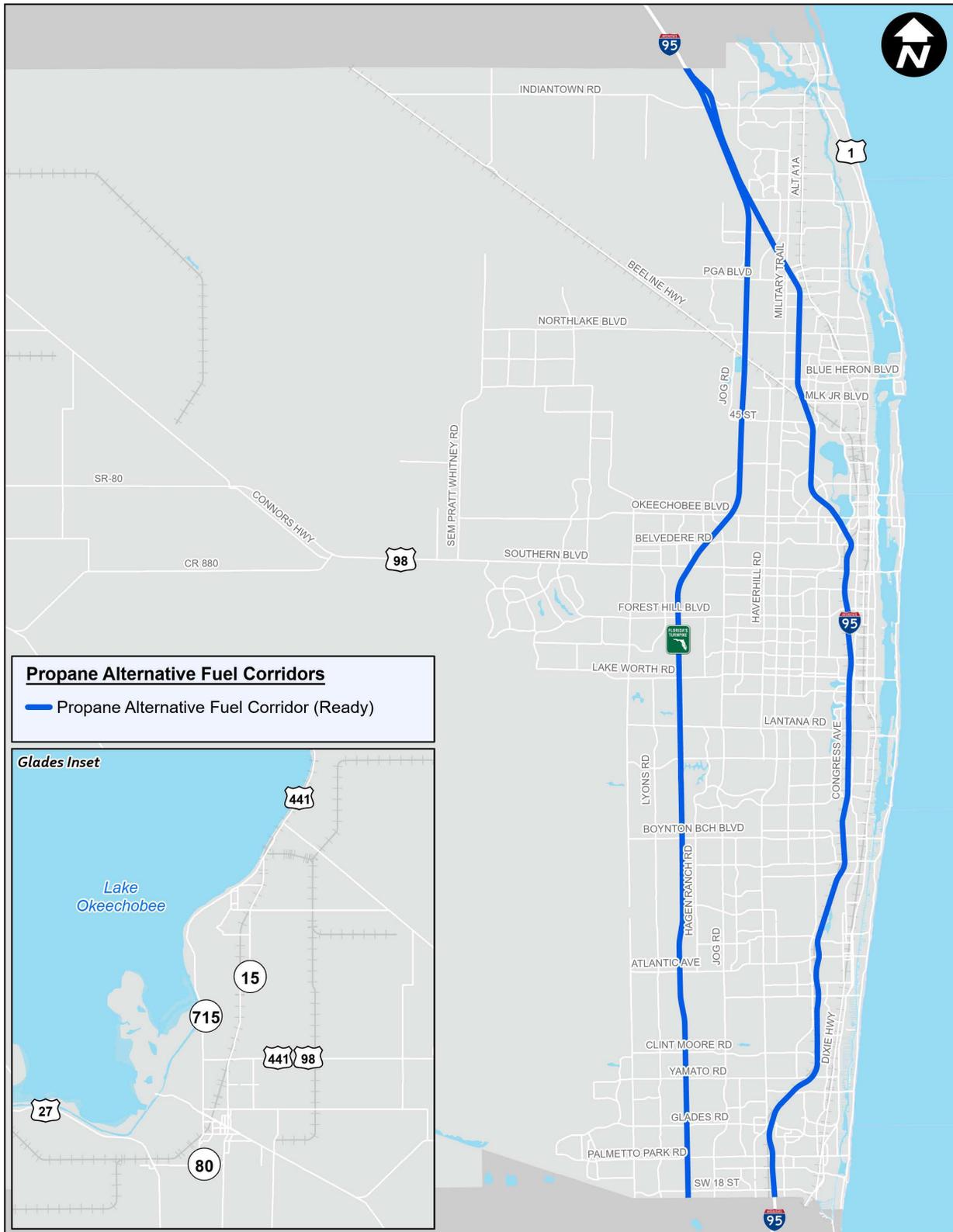


Figure 8. Propane Alternative Fuel Corridors



As of October 2023, there are 285 public EV charging stations in Palm Beach County, 65% of which have been built in the last three years (**Figure 10**). The largest public EV charging network provider is ChargePoint, which represents 54% of the charging stations in Palm Beach County. The three largest operators in Palm Beach County – Blink, Tesla, and ChargePoint – combined operate 84% of the public EV charging stations. Additionally, 8 of the 15 network providers in Palm Beach County started operating public EV charging stations in the county for the first time in 2023. The number of stations and network providers is projected to continue increasing rapidly in the coming years. This trend indicates improving access and more choice for public charging consumers.

Figure 10. Growth in Palm Beach County Public EV Charging Stations by Year and Network Provider

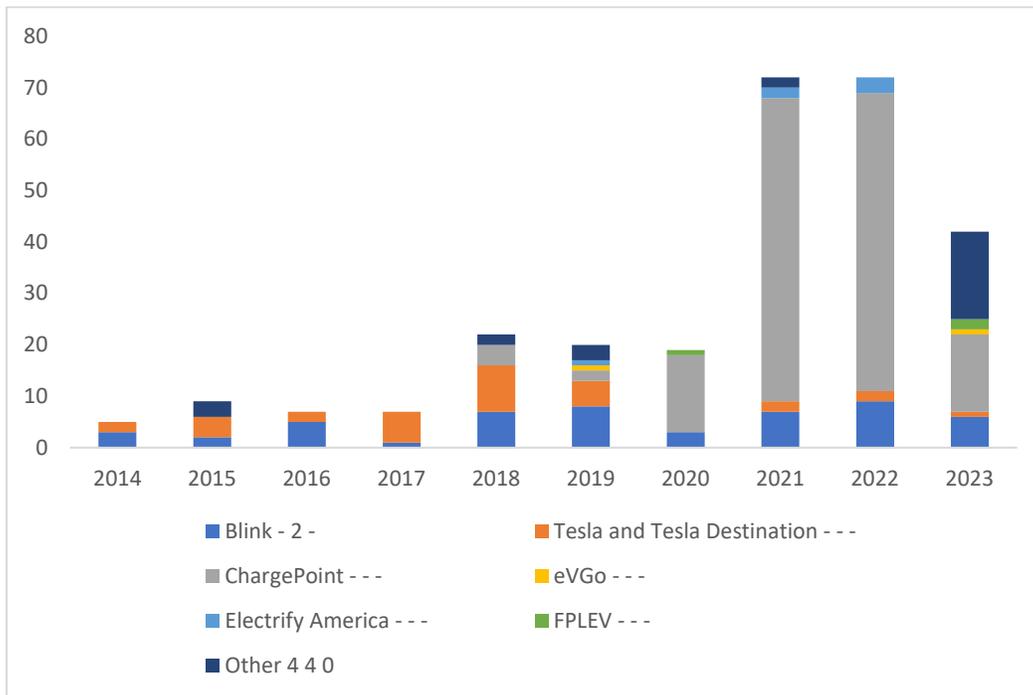
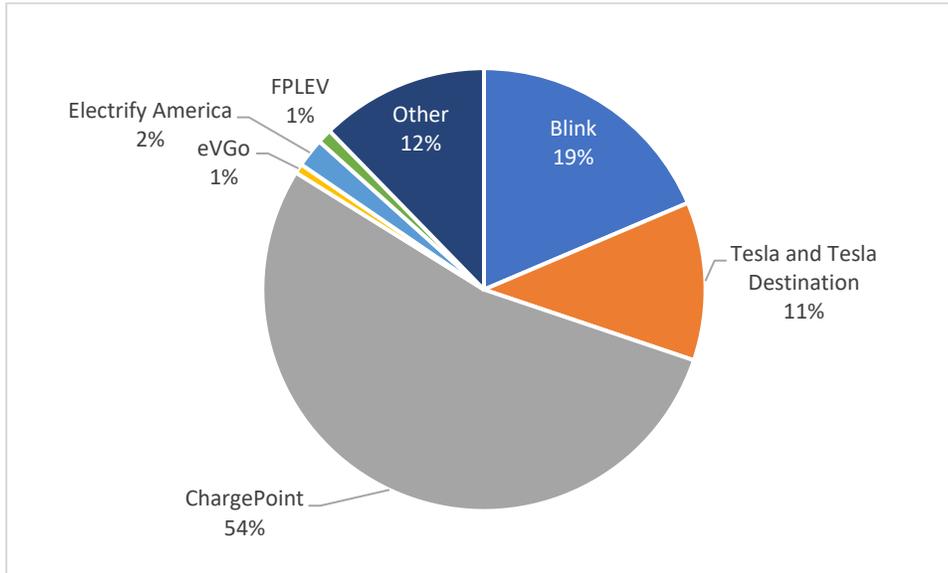
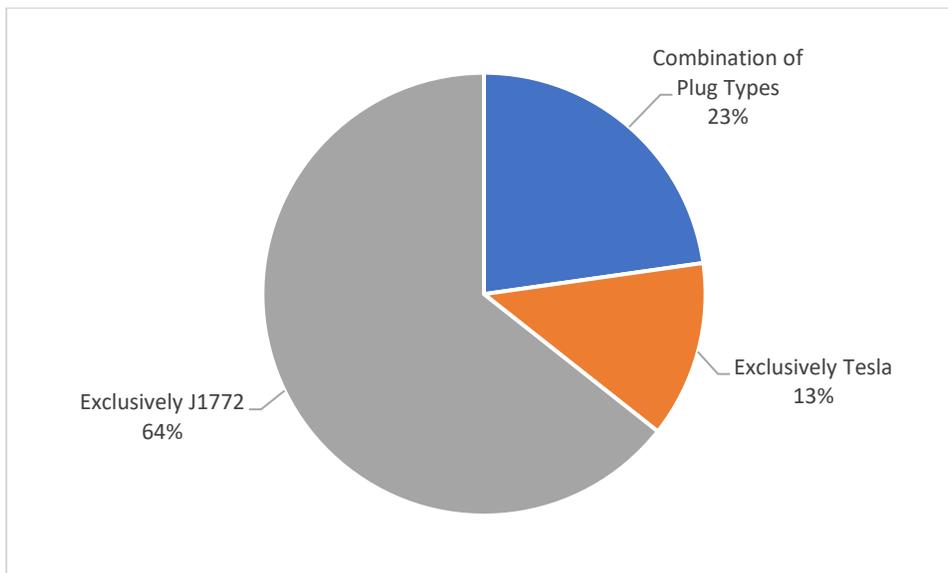


Figure 11. Share of Total Public EV Charging Stations in Palm Beach County by Network Provider



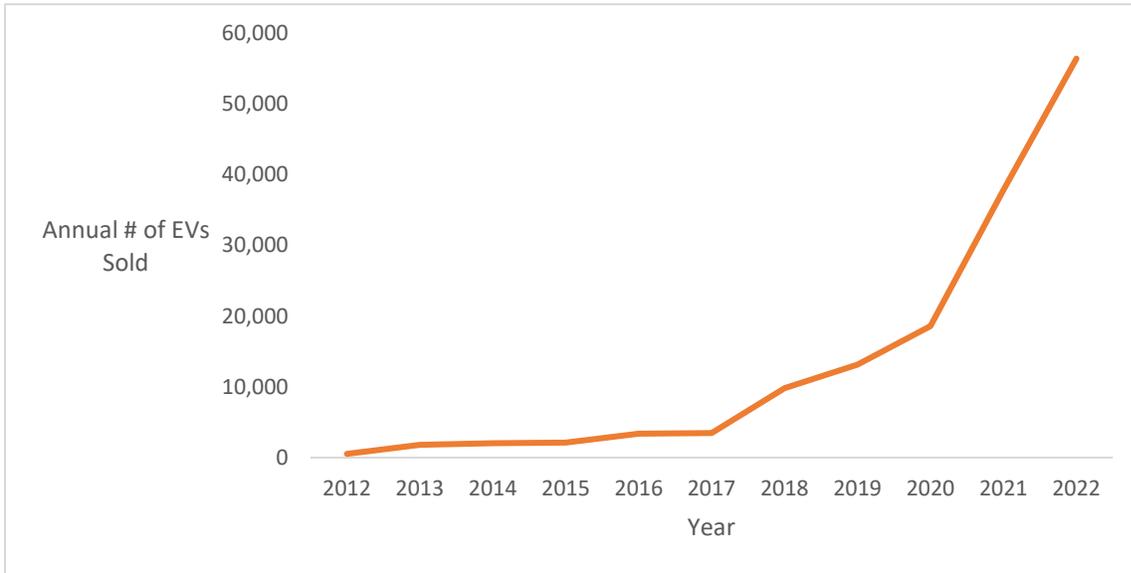
There are 822 public EV charging ports in Palm Beach County. 17% are DC Fast Charging (DCFC) and 83% are Level 2. One of the biggest challenges currently in the EV industry is standardization of charging plugs. **Figure 12** highlights the types of plugs available at public EV charging stations in Palm Beach County. Some stations offer just one type, while others provide multiple types. Additionally, Tesla has historically been a closed network (only available to Tesla drivers) with a propriety plug unique to Tesla vehicles. In 2023, many of the major car manufacturers, such as Ford, Mercedes-Benz, and Toyota have said they are adopting Tesla's plug standard for their vehicles. Plug standardization is one of the factors that will influence access to public EV charging in the coming years.

Figure 12. Share of Total Public EV Charging Plugs by Type of Plug in Palm Beach County



Nationally, the number of EVs on the road is projected to increase by 1,000% by 2030. Florida is the second largest state for EV adoption after California, with 167,990 vehicles on the road. Over the past 10 years EV sales have increased by 10,600%. This trend is consistent with the growth of EV charging stations in Palm Beach County (**Figure 13**)

Figure 13. Annual # of EVs Sold (2012-2022)



Today, there are an estimated 11,000 EV vehicles registered in Palm Beach County. Based on the number EVs on the road, the estimated number of Level 2 ports needed today is 631 and DCFC is 77 (**Table 6**). The current number of Level 2 ports in Palm Beach County exceeds this estimate by 7% and the current number of DCFC ports exceeds this estimate by 85%. To keep pace with a 1,000% increase in the number of EVs on the road by 2030, the number of Level 2 ports will need to be 5,901 and DCFC ports will need to be 478 by 2030 (Figure 10). This increase translates to adding 810 ports per year for the next seven years. These estimates and scenarios were developed using the US Department of Energy Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite.

Table 6. Palm Beach County Public Charging Scenario 2030

Port Type	Projected Need		
	Existing 2022	2022	2030
L2	678	631	5,901
DCFC	143	77	478

Plug standardization is one factor that will influence and affect the need for charging stations. Additionally, home charging programs expansion may reduce this need.



Intelligent Transportation Systems

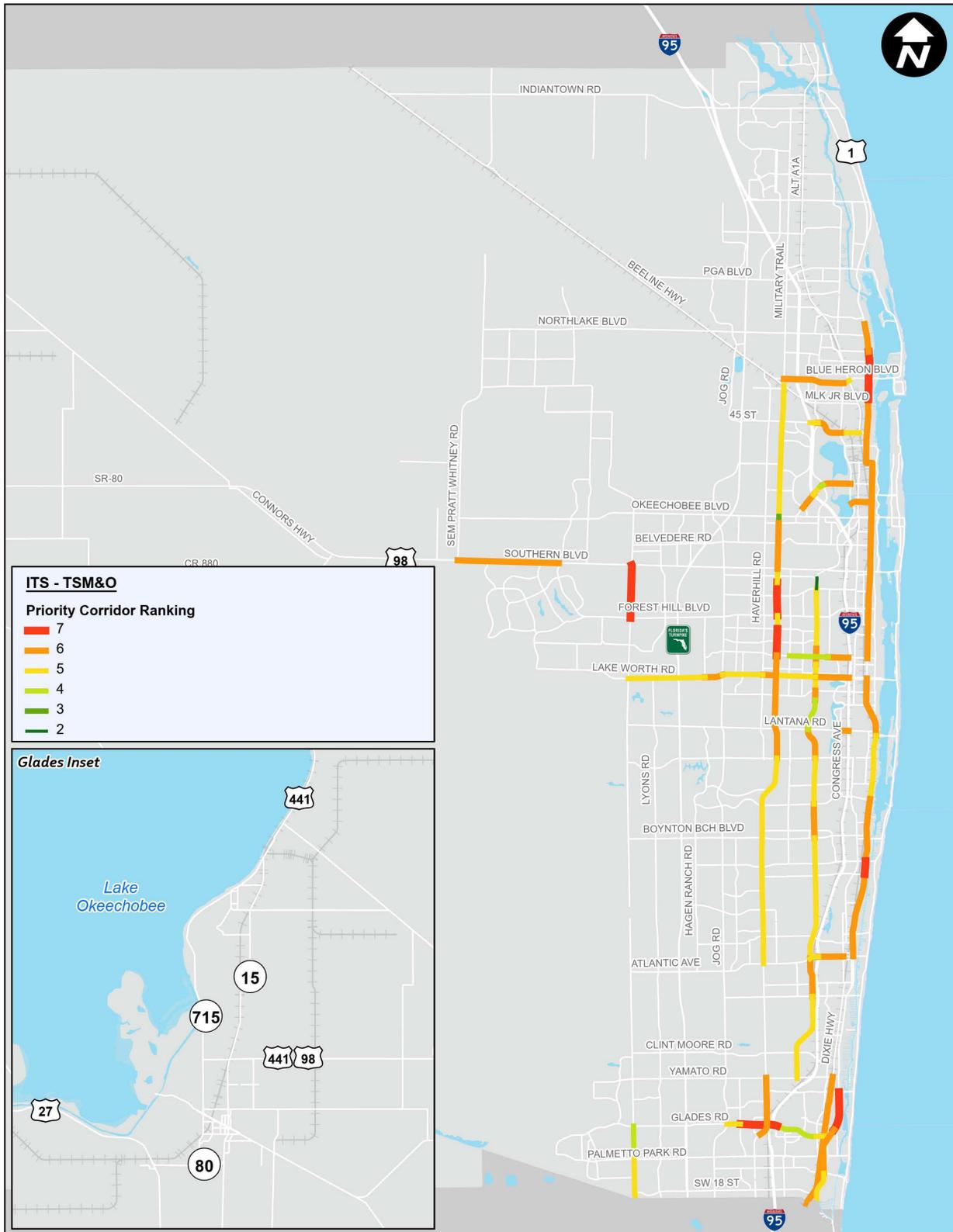
Intelligent Transportation Systems technologies can provide real-time information about traffic conditions, weather conditions, and potential hazards, all of which contribute to increased safety, reduced congestion, and increased efficiency and mobility.

The Palm Beach County ITS Group is responsible for the design, operations, and maintenance of the County's ITS infrastructure, which includes CCTV cameras, fiber optic communications network, travel time detectors, arterial dynamic messaging signs and video vehicle detection systems. The Transportation Systems Management & Operations (TSM&O) software program is responsible for developing systems that ensure a seamless network of ITS functions along Florida's major transportation corridors. In addition, the FDOT and the ITS Group operate the Traffic Management Center (TMC). The ITS Group is working on incorporating future technological enhancements, including transit signal priority for priority networks, to support current efforts from the County to improve traffic efficiency. ITS needs are shown in

Table 7. Methodology for Identifying Needs

Goal	Objective
Safe	Enhance multimodal safety by: <ul style="list-style-type: none"> ▪ Deploying monitoring technologies along key regional routes to aid in emergency response and evacuation.
Efficient	Support multimodal travel by: <ul style="list-style-type: none"> ▪ Deploying transportation systems management & operations (TSM&O) along key regional routes.
Connected	Support transportation operations by: <ul style="list-style-type: none"> ▪ Deploying connected technology that supports emergency response and transit operations. ▪ Closing gaps in the transportation communications network.

Figure 14. ITS TSM&O Priority Corridor Ranking



Emerging Technologies

Technology is playing an increasing role in enhancing how traditional modes of travel are used, as well as creating new ways to connect people, goods, and places. Traditional transportation technologies have focused on system management and operations. This type of technology is often referred to as Transportation Systems Management and Operations, or TSM&O. These types of approaches have largely focused on managing vehicular efficiency and capacity and emergency response.

These trends are largely the result of mobile device technology, cloud computing, and electrification. Additionally, where traditional transportation technology is largely the responsibility of public agencies and funded with public dollars, emerging technologies are resulting in public-private partnerships and a wider range of transportation outcomes.

A technology matrix was developed to assess TSM&O strategies as well as emerging technologies in Palm Beach County, since many of these applications have overlapping goals, funding, and operational responsibility. Most of the technologies are already in use today, and others are in various stages of planning, testing, and regulatory approval.

Key findings from the technology scan are:

- Traditional TSM&O strategies are almost exclusively focused on driving and are the responsibility of the public sector.
- The primary 2045 LRTP goals supported by TSM&O and emerging technologies are efficiency and connectivity. Some of the technologies address safety and multimodal outcomes.
- Emerging technologies present an opportunity to expand travel choices beyond driving, but often require private investment and operations to implement.
- Most of the technologies reviewed are already in use in Palm Beach County today, and ones that are not are in various stages of testing and planning.

New and emerging transportation technologies can be difficult to align with public responsibilities and public funding, particularly with federal dollars. They often do not fit into a particular category or mode, and often are not the sole responsibility of a public agency. To provide guidance for how public funds for emerging and established transportation technology can be prioritized, the following framework can be used to determine what emerging technologies should receive public funding and policy support.

- **Address or connect more than one mode of travel or goods movement.** Multimodal options are a primary goal for transportation in Palm Beach County and new technologies should support this goal.
- **Enhance regional connectivity.** Transportation technology should enhance regional travel, like public transit, or connect to regional travel options, like microtransit that connects to public transportation.
- **Enhance travel safety.** Many of the emerging technologies have outstanding questions about their efficacy in reducing serious injury and fatal crashes. Any investment or

regulatory strategies for new transportation technologies should focus on positive safety outcomes.

- **Focus on policy and regulatory support.** Not all emerging technologies need to be the responsibility of public agencies to fund and operate. Local and state policies and regulations should create the framework for sustainable and productive operations by public and private operators.

Urban Air Mobility

Urban Air Mobility (UAM) is an example of an emerging technology usage of air travel for short-distance trips. Although often used interchangeably with the term Advanced Air Mobility (AAM), UAM is primarily concerned with urban connections, whereas AAM also seeks to include rural and suburban applications. UAM is designed to operate most effectively in urban areas by circumventing significant congestion issues faced by ground transportation. As such, most concepts are based around the utilization of electric vertical takeoff and landing (eVTOL) aircraft, which envisions a network of electric-powered, helicopter-like aircraft that can land and take-off vertically, operating in coordination with the existing transportation network.

The technology behind eVTOL is rapidly developing, with companies identifying high potential for UAM to combat existing bottleneck issues related to ground transportation, such as heavy traffic delays and significant greenhouse gas emissions. The small size and electric-power dependence of eVTOL vehicles positions it as an alternative to helicopters that use more expensive, and less clean jet fuel.

The major implementational difficulties for Urban Air Mobility concern its significant upfront costs due to the purchase of the eVTOL vehicles themselves as well as necessary infrastructure (vertiports or landing pads), in addition to coordination and obedience with existing regulatory frameworks. There is currently a lack of appropriate regulation for UAM, with the closest form of policy relating to Small Unmanned Aircraft Systems that are of lower weight and held to specific airspace constraints, enumerated in 14 CFR Part 107.

Maintenance

Operations and Maintenance (O&M) is one of many programs where revenues are set aside to fulfill goals to meet county needs by the Transportation, Community, and System Preservation (TCSP) Program. This program is set in place to support and maintain transportation infrastructure once the changes are implemented and constructed. Transportation infrastructure such as principal, arterial, and collector roadways serve as the basis for the county's roadway network. O&M is additionally used to oversee the existing traffic signals operations within Palm Beach County, as well as any necessary infrastructural repairs. O&M of existing and owned facilities is funded through state and county taxes.

The TPA uses performance measures to track the progress towards meeting the vision of a safe, efficient, and connected multimodal transportation system. They were developed in the 2045 LRTP

and are reported annually in June on the Annual Systems Report Card. This aids in summarizing progress over the past year and monitoring project statuses and major milestones, which allows stakeholders to remain informed and involved.

Operations and maintenance can represent a significant long-term investment, especially when it comes to widening roadways. However, large maintenance jobs can also provide opportunities to link other enhancements to facilities, which can provide long term benefits and contribute to sustainability.