Miami River Commission
Public Meeting Minutes
June 3, 2024

The Miami River Commission's (MRC) public meeting convened at noon, June 3, 2024, in the Downtown Library Auditorium, 101 W Flagler. Sign in sheets are attached.

Miami River Commission (MRC) Policy Committee Members and/or Designees attending:
Horacio Stuart Aguirre, Chairman, Appointed by the Governor
Jim Murley, Vice Chairman, designee for Miami-Dade County Mayor Cava
City of Miami Commissioner Miguel Angel Gabela
Eddie Marti Kring, designee for County Commissioner Eileen Higgin
Betty Hermida, designee for City of Miami Commissioner Gabela
Patty Harris, Appointed by the Governor
Megan Kelly, designee for City of Miami Mayor
Barrett Long, designee Neighborhood Representative appointed by Board of County Commissioners
Eileen Broton, Neighborhood Representative Appointed by City of Miami Commission
Alvaro Coradin, designee for Sara Babun appointed by Miami-Dade County
Bruce Brown, Miami River Marine Group
Neal Schafers, designee for the Downtown Development Authority
Philip Everingham, designee for the Marine Council
Spencer Crowley, Member at Large Appointed by City Commission

MRC Staff:
Brett Bibeau, Managing Director

I) Chair's Report and Vice Chair's "Voluntary Improvement Plan" (VIP) Update

The Miami River Commission unanimously adopted the May 6 public meeting minutes.

MRC Chairman Horacio Stuart Aguirre stated the MRC has a very full and exciting agenda ahead today, so he quickly turned it over to MRC Vice Chairman Murley to provide his brief Miami River Voluntary Improvement Plan (VIP) update before we start today's agenda items.

MRC Vice Chairman Jim Murley, provided the following Voluntary Improvement Plan (VIP) Report:

The Miami River Commission has been actively assisting the efforts of the City, County, State, and private sector to clean up the Miami River District. The MRC pays professional maintenance companies every day to remove litter, invasive plant species, graffiti and provide landscaping, pressure washing, vac truck, and Scavenger Water Decontamination Vessel services along the Miami River. The MRC thanks the Hands on Miami volunteers for picking up garbage along the Miami River in Curtis Park on May 26 and in Sewell Park on May 19.

II. Discussion Regarding City of Miami Owned Public Riverfront at 20 NW North River Dr. and Casa Neo at 40 SW North River Dr.

The following documents were links to the MRC's June 3 public meeting agenda and then were presented on the AV screen and discussed:

a. City of Miami's 20 NW North River Dr - Aerial Photo and Info

b. Casa Neo's 40 SW North River Dr. - Aerial Photo and Info

c. Aerial photo of City Owned 20 NW North River Dr. – Depicting Casa Neo construction equipment on City and FDOT owned parcels.

d. Plans presented to MRC January 9, 2017 – Included the publicly accessible riverwalk as required by Miami 21 Section 3.11 with side yard connectors and view corridors on both sides of the private property.

e. Plans presented to MRC May 2, 2022 - – Included the publicly accessible riverwalk as required by Miami 21 Section 3.11 with side yard connectors and view corridors on both sides of the private property, featuring an 8 foot wide unobstructed public Riverwalk circulation zone with no tables nor chairs.

f. MRC May 2, 2022 Public Meeting Minutes – Casa Neo provided Voluntary Declaration of Restrictive Covenant stating they would provide public Riverwalk required by code (no dead ends).

g. MRC May 1, 2023 Public Meeting Minutes

h. Voluntary Declaration of Restrictive Covenants presented on the MRC on May 1, 2022 - Casa Neo provided Voluntary Declaration of Restrictive Covenant stating they would provide public Riverwalk required by code (no dead ends).

i. Voluntary Declaration of Restrictive Covenants presented on the MRC on June 3, 2024 - Casa Neo provided revised Voluntary Declaration of Restrictive Covenant stating they would no longer provide public Riverwalk required by code because now they would have a dead-end on the City side until the City constructs a new seawall and Riverwalk to improve the connection.

j. June 3, 2024 Plans Sheet 1 of 2 – Depicting Casa Neo public Riverwalk connecting into a 5' wide public Riverwalk on the adjacent City of Miami property.

k. June 3, 2024 Plans Sheet 2 of 2 - Depicting Casa Neo public Riverwalk connecting into a 5' wide public Riverwalk on the adjacent City of Miami property.

l. Pictures Taken May 18, 2024 - Depicting Casa Neo construction equipment, overflowing 30 yard dumpster and piles of loose trash on City and FDOT owned parcels and the location where it is feasible to make the public Riverwalk connector into the City owned parcel as required by code.

m. City of Miami Zoning Code's Section 3.11 Waterfront Standards https://codehub.gridics.com/us/fl/miami#/cd9d9570-550f-47be-b530-33c1d29c4db3/ce42359c-c251-47bc-abc8-7a64b3b5a237

The City of Miami's zoning code Section 3.11 states in part:

"Waterfront walkways shall connect to abutting public walkways, neighboring walkways, and Open Space at a consistent A.D.A. compliant width and grade to allow clear pedestrian circulation along the water's edge. Properties abutting a Thoroughfare or Public Frontage shall coordinate with the appropriate agency or organization on improvements and connections to Waterfront walkways required on those properties.

Waterfront Side Setbacks consisting of one (1) or more lot lines generally perpendicular to the greatest adjacent body of water shall be equal in aggregate to at least twenty-five percent (25%) of the water frontage of each Lot based on average Lot Width, to allow View Corridors open from ground to sky and to allow public access to the Waterfront"

Neither of these code requirements are being met in the revised proposal because Casa Neo's public Riverwalk is not connecting into the adjacent City of Miami owned publicly accessible "Open Space", and Casa Neo is not providing Waterfront Side setbacks to allow view corridors "open from ground to sky and to allow public access to the Waterfront" which is also a requirement of the City Charter.

n. MRC Urban Infill and Greenways Subcommittee January 22, 2024

The public meeting minutes state in part:

"**Public Riverwalk Connection Between Casa Neo and City Owned Riverfront Site** – Guillaume Vidallet, Fabien Guandiola, Riviera Dining Group and Attorney Marc Sarnoff stated there 3 restaurants are nearing construction completion on North River Drive between the Flagler and 1 St Bridges. They presented plans for the desire to fund and construct a 5' wide public Riverwalk featuring a new needed seawall (estimated $1,000,000) on City owned riverfront at 20 NW North River Drive located between their restaurants public Riverwalk and the Flagler Bridge, plus $1,000 a month in rent to the City, in return for expanding the area for their restaurant tables and chairs onto the City property. Ms. Hannah Manzo, City of Miami Department of Real Estate and Asset Management, stated the City of Miami ordered an appraisal of the City owned site, which is required in order to determine the market rate prior to negotiations.

Attendees reviewed the City of Miami's awarded 2022 Grant Application to the Florida Inland Navigation District (FIND) titled "20 NW North River Drive Rip Rap and Boat Slip 40-B223800". The Phase I grant was awarded for design and engineering estimated to cost $128,250 of which FIND awarded $43,200 and the City match is $85,050. After the design is permitted, the City may apply to FIND for 50% of the funding needed for construction. Attendees reviewed the City of Miami's Quarterly Status Report for this awarded grant which the City submitted to FIND

indicating the awarded design is 0% complete. The City of Miami is yet to contract an engineering because the estimated design cost is now $388,580, therefore the City needs to secure an additional $206,330 in order to be able to hire an engineer."

Ben Fernandez stated the distributed proposed revised Voluntary Restrictive Covenant still provides the same original public Riverwalk on the private property consistent with City Code, with the exception that their will be a dead end until the City constructs a new connecting seawall and public riverwalk.

The following is a chronological timeline of Casa Neo:

- 2017 - City of Miami permitted construction of Casa Neo including 2 required public Riverwalk connectors on private property as required by City Code 3.11 (neither of which were constructed) and no Riverwalk dead-ends as required by code although now they are proposing a dead-end which is not allowed in code.

- 2022 - City of Miami awarded a FIND grant for design and permitting of a new seawall and public Riverwalk on the subject City property

- January 2024 - Casa Neo presented at MRC subcommittee public meeting their desire for the City of Miami Commission to consider a month-to-month Revocable License Agreement to lease riverfront City owned 20 NW North River Drive for additional restaurant tables, including a 5-foot-wide public Riverwalk.

The MRC adopted a unanimous resolution recommending a minimum 8-foot-wide public Riverwalk be provided on the City, private, and FDOT parcels before the City and or private parcels are opened as a restaurant (which does not necessarily need a new seawall on day 1, rather the new needed seawall maybe added after designed and permitted, which may take 2 years). In addition, the MRC recommended that as required by City Code the public Riverwalk at the restaurant building should not have a dead end, rather should connect with the currently publicly accessible adjacent City parcel / "Open Space" as required by City Code Section 3.11, before the structure gets a TUP and is allowed to operate as a restaurant, and that at the City parcel there should be no blocking the view of the River to the general public from the sidewalk and street. The MRC is not opposed to losing the City owned 20 NW North River Drive currently 100% publicly accessible City owned riverfront greenspace for a private restaurant, subject to the conditions of including an 8-foot wide unobstructed public riverwalk, no Riverwalk dead-ends at Casa Neo, and not blocking the view of the Miami River from the sidewalk / street.

III. Discussion regarding Archaeological and Historical Conservancy, Inc.'s State Grant Application to Plan the "Tequesta Trail"

The MRC unanimously authorized the following MRC letter of support:

To Whom It May Concern:
"We are pleased to support the Special Category grant submitted by the Archaeological and Historical Conservancy for developing a plan and designs for the proposed Tequesta Trail.

We believe that an interpretative trail highlighting Miami's unique prehistory will become a focal point for visitors and tourists. The Miami Circle, a National Landmark, highlights Miami's archaeological heritage, and creating the Tequesta Trail will place a spotlight on Miami's cultural history.

The Miami River Commission will be an important part of the planning and review process since much of the Trail will follow the Riverwalk.

Thank you for your consideration for this important Florida project."

Mia Laurenzo, Arch. Conservancy, spoke in support of the item on behalf of Bob Carr whom was unavailable to attend, and Miami River resident Christine Michaels spoke in favor of the item.

IV. Florida Department of Transportation Funded Plans to Improve the Existing On-Road Miami River Greenway along NW 7 / NW 8 Ave from NW 3 ST to NW 8 ST

Patricia Quintela, FDOT, distributed and presented a detailed PowerPoint "State Road 7 / NW 8 Avenue / NW 7 Avenue From north of NW 3 ST to NW 8 ST Design Roadway Project". The project will "replace damages sidewalks, close abandoned driveways, upgrade pedestrian curb ramps, upgrade traffic signs repave and restripe the road". The reconstructed on-road Miami River Greenway will maintain its current and designed "mesa beige" color.

V. Informational Presentation Regarding "Kind Designs", 3007 NW South River Drive

Anya Freeman distributed and presented information regarding "Living Seawalls" constructed by "Kind Designs" stating in part, "Our code-compliant, 3D-printed Living Seawalls are structurally identical to traditional seawall panels, but also function as artificial reefs! 3D printing technology allows for greater design freedom and faster production than traditional construction." Ms. Freeman stated at their new Miami River location they have 2 arms which are the world's fastest and highest resolution concrete 3D printers. Ms. Freeman stated their 1st Living Seawall was installed along 100 linear feet of a private residence in Miami Beach, and they are currently working on a 1,500 linear foot "Living Seawall" at the "Jockey Club", 1111 Brickell Ave.

VI. New Business - The public meeting adjourned.

Miami River Commission

Public Meeting

June 3, 2024 – 12:00 PM

101 W Flagler, Miami FL - Main Library Auditorium

Name	Organization	Telephone	Email
Barrett Long		3052758813	Barrett@Longsmc.com
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Edward Marti Kring	D5-BCC	305-972-4957	Eddie.MartiKring@miamidade.gov
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Horacio Stuart Aguirre			

Miami River Commission

Public Meeting

June 3, 2024 – 12:00 PM

101 W Flagler, Miami FL - Main Library Auditorium

Name	Organization	Telephone	Email
Mark Bailey	Miami River Marine Group	305 [illegible]	markbailey@miamirivermarinegroup.org
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Martin Lastre	"	(305) 372-4588	garaimr@ "
Anya Freeman	Kind Designs	305-851-1133	anya@kinddesigns.com
Charlotte Hoffman	"		charlotte@ "
Mia Lawrenzo on behalf of Bob Carr	Arch Conservancy	954-326-1546	
Christine Michaels	Indigenous Whispers	305-218-9952	preservemiamihistory@gmail.com
ALFREDO CELY	ALFKA	813 544 2866	ALFREDO@ALFKA.com
Patricia Quintela	FDOT	305-640-7390	patricia.quintela@dot.state.fl.us
Rodolfo Roman	FDOT	786-519-7160	Rodolfo.Roman@dot.state.fl.us

Miami River Commission

Public Meeting

June 3, 2024 – 12:00 PM

101 W Flagler, Miami FL - Main Library Auditorium

Name	Organization	Telephone	Email
Gavin Burnett	SGCIT	323-369-3351	gavinjamesburnett@gmail.com
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Alexandra Alexieva	City - D2	703-944-5590	aalexieva@miamigov.com
Jim Murley	MDC-OOR	786-79-9155	JAmes.Murley@miamidade.gov
Spencer Crowley	FIND	305 982 5549	tscrowley@aicw.org
MEGAN KELLY	MRC	786 556 5620	

Miami-Dade Transportation Planning Organization

DOWNTOWN MIAMI TRANSPORTATION MASTER PLAN

TECHNICAL MEMORANDUM #1

Assessment of the 2003 Miami Downtown Transportation Master Plan

THE CORRADINO GROUP

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INTRODUCTION

In 2003, the Miami-Dade Transportation Planning Organization (MDTPO) initiated the Miami Downtown Transportation Master Plan (MDTMP), creating a framework for transportation system improvements in the area through 2020. Since then, Downtown Miami has witnessed remarkable growth and development. This study builds upon the MDTPO's prior efforts in the MDTMP, aiming to evaluate and enhance proposed recommendations for the study area, defined by I-95 to the west, Biscayne Bay to the east, SE 26 Road to the south, and I-195 to the north.

The analysis begins by revisiting the 2003 MDTMP, and cataloging the recommended improvements provided in the report that have either been completed or programmed in the 2045 Long Range Transportation Plan (LRTP). Initial findings reveal that ten (10) recommendations from the 2003 study have been successfully implemented, four (4) are currently in progress, twelve (12) have been programmed in the 2045 LRTP, and the remaining seventeen (17) recommendations are pending or require further analysis for implementation. Those recommendations from the 2003 that have been completed have improved pedestrian connections and expanded transit routes.

Figure 1. Map of Study Area.

This report also evaluates the housing and employment projections formulated under the three 2003 development scenarios-- Baseline, Enhanced, and Visionary. An analysis of the 2020 Census Data highlights that housing development has exceeded projections for all three models. Presently, the study area accommodates 70,805 housing units, a substantial increase from the original forecasts. Using 2020 US Census data, the work area profile identifies 189,165 jobs within the study area, closely aligning with the employment forecasts. Notably, the total employment forecast exhibits only a 15% variation from the Visionary scenario.

Furthermore, our analysis includes an in-depth review of relevant studies to uncover key short-, mid-, and long-range projects not considered in the 2003 MDTMP within the study area. Building on these findings and considering the impacts of emerging development and growth patterns, the next step is to engage in a comprehensive discussion on state-of-the-art mobility methods and essential improvements for adapting to evolving technologies. This holistic approach enables us to provide recommendations for short-, mid-, and long-term improvements, along with identifying future-ready areas for strategic implementation.

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Table 1: 2003 Development Scenarios

	2020 Baseline	2020 Enhanced	2020 Visionary
Employees	**18,000**	**30,000**	**48,000**
Dwelling Units	**15,000**	**23,000**	**34,000**

[1] Source

Table 2: Housing

Development Scenarios	Total Housing	Difference
1999	8,200	62,605
2020 Baseline	23,200	47,605
2020 Enhanced	31,200	39,605
2020 Visionary	41,800	29,005
2020 Census	**70,805**	-

[2] Source

Table 3: Employment

Development Scenarios	Total Employment	Difference
1999	116,000	73,165
2020 Baseline	134,000	55,165
2020 Enhanced	146,000	43,165
2020 Visionary	164,000	25,165
2020 Census	**189,165**	-

[3] Source

[1] 2003 Miami Downtown Transportation Master Plan

[2] 2003 Miami Downtown Transportation Master Plan, and the U.S. Census Bureau. 2023. LEHD Origin-Destination Employment Statistics (2002-2021) [computer file]. Washington, DC: U.S. Census Bureau, Longitudinal-Employer Household Dynamics Program [distributor], accessed at https://onthemap.ces.census.gov. LODES 8.1 [version]

[3] 2003 Miami Downtown Transportation Master Plan, and the U.S. Census Bureau. 2023. LEHD Origin-Destination Employment Statistics (2002-2021) [computer file]. Washington, DC: U.S. Census Bureau, Longitudinal-Employer Household Dynamics Program [distributor], accessed at https://onthemap.ces.census.gov. LODES 8.1 [version]

The following section summarizes and catalogs the Specific Recommendations from the 2003 Miami Downtown Transportation Master Plan to identify which recommendations have been completed, are in process, are programmed in the 2045 LRTP, or require further analysis for future implementation. The original forty-three recommendations were cataloged into three phases: Phase 1, with implementation targeted by 2010; Phase 2, with a goal of implementation by 2015; and Phase 3, with a target implementation date by 2020. The evaluation determined that there are 17 policies that are completed or in process, 11 that have been included in the 2045 LRTP for implementation, and 15 that require further analysis for implementation or may no longer be an appropriate solution given the change in form and demographics observed in the study area.

Table 4: Summary of 2003 Recommendations

●-Completed ●-In-Progress ●-Programmed in 2045 LRTP ●-Not Complete

7.2: SPECIFIC RECOMMENDATIONS		COMPLETED	IN-PROCESS	PROGRAMMED IN 2045 LRTP	NOT COMPLETE FURTHER ANALYSIS REQUIRED
7.2.1	Implement a Free-Fare Transit Zone.				●
7.2.2	Construct pedestrian connection from Bayside to AA Arena	●			
7.2.3	Extend Baylink light rail down Biscayne to Flagler.			●	
7.2.4	Implement a two-way road system.			●	
7.2.5	Improve transit amenities and attributes in the area.	●			
7.2.6	Connect to other neighborhoods with transit.	●			
7.2.7	Implement Intelligent Transportation System (ITS) technology alternatives to help with bridge openings.	●			
7.2.8	Develop an extensive network of pedestrian corridors.			●	
7.2.9	Implement the recommendations from the Miami River Greenway Action Plan.		●		
7.2.10	Connect Brickell Shuttle to Flagler Shuttle.	●			
7.2.11	Reconfigure Metromover in the Dupont Plaza Area				●
7.2.12	Implement ITS for Special Events			●	
7.2.13	Provide a pedestrian walkway along Biscayne Bay from Pace Park to Bayside		●		

7.2: SPECIFIC RECOMMENDATIONS		COMPLETED	IN-PROCESS	PROGRAMMED IN 2045 LRTP	NOT COMPLETE FURTHER ANALYSIS REQUIRED
7.2.14	Implement Biscayne Boulevard Improvements from NE 6 Street to NE 14 Street	●			
7.2.15	Build a new tunnel under the Miami River at SW 1 Avenue			●	
7.2.16	Improve pedestrian connections in Bicentennial Park	●			
7.2.17	Improve NE 1 and 2 Avenues for truck traffic				●
7.2.18	Complete Downtown Miami DDA signage plan		●		
7.2.19	Provide a truck-only tunnel from the Seaport to Watson Island	●			
7.2.20	Widen and extend West 1 Avenue				●
7.2.21	Extend SE 1 Avenue from SE 8 Street to SE 5 Street				●
7.2.22	Improve bicycle facilities			●	
7.2.23	Extend Metrorail to AA Arena and Seaport			●	
7.2.24	Remove I-95 Distributor Ramps and provide a “Grand Boulevard” on South 3 Street				●
7.2.25	Provide a shuttle system into Wynwood	●			
7.2.26	Provide a Shuttle to Watson Island			●	
7.2.27	Extend the Metromover through the Brickell Financial District			●	
7.2.28	I-395/ SR 836/ I-95 Design Build Project (Depress I-395)		●		
7.2.29	Implement Flagler Shuttle				●
7.2.30	Provide a Port Boulevard U-Turn				●
7.2.31	Create a Shuttle System for the Brickell residential area (from 13 Road to 26 Road)	●			

7.2: SPECIFIC RECOMMENDATIONS		COMPLETED	IN-PROCESS	PROGRAMMED IN 2045 LRTP	NOT COMPLETE FURTHER ANALYSIS REQUIRED
7.2.32	Provide a transit greenway				●
7.2.33	Implement traffic calming alternatives through Brickell residential areas	●			
7.2.34	Extend Metromover into Wynwood				●
7.2.35	Extend the Metromover to 26 Road				●
7.2.36	Build an I-95 northbound on-ramp at North 6 Street to provide access to westbound SR 836				●
7.2.37	Improve North 14 Street from I-95 to Biscayne Boulevard				●
7.2.38	Provide Commuter Rail to Broward County	●			
7.2.39	Provide a Brickell Key Water Taxi			●	
7.2.40	Provide a Water Taxi/Ferry to Watson Island			●	
7.2.41	Provide a partial I-95 Interchange at NW 29 Street				●
7.2.42	Construct an interchange on I-95 at NW 14 Street	●			
7.2.43	Depress I-95				●

2003 PHASE I RECOMMENDATIONS: IMPLEMENTATION BY 2010

Implement a Free-Fare Transit Zone in Downtown Miami (recommendation 7.2.1)

Free transit service and excellent service quality play a vital role in boosting public transit ridership. Downtown Miami's transit infrastructure, including the Metromover, makes it an ideal candidate for this concept. At the time of the initial recommendation, the Metromover had transitioned to a free service, which reportedly led to a ridership increase of over 40%, as indicated by Miami-Dade Transit. Eliminating fares draws more riders and offers intangible benefits like convenience and reduced delays. This improves the system efficiency by cutting administrative and equipment costs. Implementing the Free-Fare Transit Zone throughout the study area was originally recommended, enabling free use and transfers between the local transit systems.

Status: Currently, both Metromover and the City of Miami Trolley services provide free transit within the study area. A recommendation for a free-fare transit zone in Downtown Miami was not programmed in the 2045 LRTP, and it requires further analysis for future implementation.

Construct a pedestrian connection from Bayside to Kaseya Center, formerly known as the American Airline Arena (recommendation 7.2.2)

Bayside Marketplace and the Kaseya Center are prominent attractions in Downtown Miami, and they often draw overlapping visitors, with many arena attendees also exploring the Bayside Marketplace. A pedestrian connection connecting the two properties was recommended for Phase 1, where the idea of building a pedestrian bridge over Port Boulevard to improve connectivity between these two destinations was contemplated.

Status: Figure 2 highlights the constructed paved path connecting Bayside to the Kesaya Center and the Pérez Art Museum Miami (PAMM), with the trail path routed under the Port Miami Bridge connecting the two properties.

Figure 2. Paved path from Bayside to Kesaya Center

Implement a Two-Way Road System in Downtown Miami (Recommendation 7.2.4)

The shift from one-way to two-way streets is part of a broader trend in downtown planning that emphasizes pedestrian-friendly environments and reduced vehicle speeds. Proposed street conversions from the original recommendation included several key routes within Downtown Miami. Some conversions, like the conversion of SE/SW 7th and 8th Streets were envisioned to help address specific issues, such as congestion resulting from the Brickell Bridge openings. Feasibility studies and early implementation stages were completed for several of these changes, with Flagler Street's conversion to two-way traffic being one example. The transition to a two-way system would simplify navigation for motorists and enhance pedestrian safety. While critical arteries like NE/NW 5 Street and NE/NW 6 Street are suggested to remain one-way for high capacity and minimal disruption of access patterns. Conversion of streets was determined to be cost-effective, primarily involving adjustments to pavement markings, signs, and traffic signals, with lane and parking availability mostly unaffected. Some streets, like Flagler Street depicted in Figure 3, were identified to offer opportunities for additional enhancements, such as landscaped medians, wider sidewalks, more on-street parking, and pedestrian amenities, further improving the overall urban environment. The following streets were part of the original recommendation for conversion from one-way to two-way operation:

Figure 3. A photograph of Flagler Street in the past and a rendering of proposed improvements.

- SE 8th Street (US-41/Tamiami Trail) from Brickell Avenue (SR 5/US-1) to South Miami Avenue
- SW 8th Street (US-41/Tamiami Trail) from South Miami Avenue to I-95
- SE/SW 7th Street (US-41/Tamiami Trail) from Brickell Avenue to I-95
- Biscayne Boulevard Way (SE 4th Street) from SE 2nd Avenue to Biscayne Boulevard (SR 5/US-1)

- SE 3rd Street from SE 2nd Avenue to Biscayne Boulevard (SR 5/US-1)
- SE 2nd Street from SE 2nd Avenue to Biscayne Boulevard (SR 5/US-1)
- SE/SW 1st Street from SW 2nd Avenue to Biscayne Boulevard (SR 5/US-1)
- Flagler Street from Biscayne Boulevard (SR 5/US-1) to NW/SW 3rd Avenue—in process, undergoing street improvements
- NW 1st Street from NW 3rd Avenue to Biscayne Boulevard (SR 5/US-1)
- NW 2nd Street from NW 1st Avenue to Biscayne Boulevard (SR-5/US-1)
- NW 3rd Street from NW 3rd Avenue to Biscayne Boulevard (SR 5/US-1)—NW 3rd Avenue to NW 1st Avenue is a two-way road, with the remainder of the corridor being one-way
- Miami Avenue from Miami River to NE 14th Street
- SE/NE 1st Avenue from SE 3rd Street to NE 15th Street
- SE/NE 2nd Avenue from Biscayne Boulevard Way (SE 4th Street) to NE 13th Street
- SE 3rd Avenue from Biscayne Boulevard Way (SE 4th Street) to Flagler Street—SE 3rd Avenue is a 2-way corridor from Biscayne Boulevard Way to SE 1st Street
- Biscayne Boulevard (SR 5/US-1) from SE 2nd Street to Biscayne Boulevard Way (SE 4th Street)

Status: Programmed in the 2045 LRTP. Flagler Street's improvements currently underway will provide east and west vehicular access and will include enhanced pedestrian features like wide sidewalks, landscaping, and multimodal facilities from the segment of NW 1st Avenue to Biscayne Boulevard (SR 5/US-1).

Improving Transit Service in Downtown Miami (Recommendation 7.2.5)

The recommendation for improving transit service to and from Downtown Miami focused on systematic enhancements, user convenience, and cost-effective measures. It prioritized training, quality control, efficient scheduling, and exploring exclusive right-of-way systems, all elements for enhancing transit service. The 2003 study encouraged investing in Advanced Public Transportation Systems (APTS) to monitor and improve system performance, along with using APTS technologies for real-time information sharing and Smart Cards for transfers. These recommendations collectively aimed to make transit service a more effective and convenient option for travel in and out of Downtown Miami, benefiting the region's transportation network.

The success of a transit system relies on both transit amenities and transit level of service (TLOS) attributes. The 2003 recommendation also identified key transit amenities and transit level of service (TLOS) attributes that the transit system relied on.

Transit Amenities:

- Comfortable shelters to protect patrons from the weather
- Adequate lighting and safety measures at shelters
- Clean and safe vehicles

Transit Level of Service (TLOS) Attributes:

- High frequency and long operating hours
- Reliable schedules and reasonable walking distances
- Availability of seats on vehicles
- Courteous drivers and ease of use for riders
- Economical fares

Status: The County's Better Bus Network, Better Bus Routes, was fully implemented in November 2023. This network will enhance connections between Downtown Miami and various areas countywide, featuring improved route alignment and increased frequency. The number of frequent routes within the network will expand significantly, rising from five to nineteen, resulting in an extensive network of frequent lines that serve most of Miami-Dade County. The Bus Passenger Shelter Program is aligned with the county's transit system, involving the installation of new shelters, trash containers, bicycle racks, and accessibility improvements. As of February 2023, 270 bus shelters, 266 trash containers, 246 illumination systems, and 310 bicycle racks have been installed, contributing to a safer, cleaner, and more connected transit experience, with completion expected by summer 2023.

Connect Other Neighborhoods with Transit (Recommendation 7.2.6)

A thriving Downtown Miami relies on an efficient transit system for residents, workers, and visitors. The 2003 recommendations included a proposed neighborhood transit system aimed to connect neighborhoods near Downtown Miami, including Brickell, Liberty/Model City, Little Haiti, and Wynwood. It envisioned the employment of small buses with high frequencies and a decent capacity to cater to the intermediate-length transit needs in the region, enhancing overall accessibility.

Status: Today, the City of Miami offers a trolley service to connect neighborhoods like Coral Way, Wynwood, Model City, and Little Haiti with Downtown Miami. During fiscal year 2022-2023, the Wynwood, Brickell, Biscayne, and Coral Way Trolley routes had a total ridership of 1.75 million. The Wynwood trolley route had a total ridership of 97,554; the Brickell route had a total ridership of 356,348; a total of 574,604 riders was counted for the Biscayne route; and 726,741 riders on the Coral Way trolley route.

Implement Intelligent Transportation System (ITS) Technology Alternatives to Help with Bridge Openings. (Recommendation 7.2.7)

To mitigate traffic disruptions in Downtown Miami, particularly in the Brickell area caused by bridge openings, this recommendation proposed an integrated communication system using Intelligent Transportation System (ITS) technology. This system would provide advance warnings to motorists, facilitate communication between vessels, bridge tenders, and the control center, as well as integrate with the Miami-Dade Traffic Control Center. Real-time adjustments during bridge openings would be made possible through Closed Circuit TV cameras. ITS traffic handling strategies would be employed, such as variable message signs, alternate route indications, and adaptive signal retiming. The primary goal of the recommendation was to reduce midday traffic delays resulting from drawbridge openings in the Brickell area.

Status: Completed. The Florida Department of Transportation (FDOT) has implemented traffic alert features for the Brickell Bridge, including the Florida 511 Advanced Traveler Information System (FL511). Users can subscribe to receive email or text message notifications regarding the status of the drawbridge, whether it is open or closed to traffic. Furthermore, these drawbridge notifications are accessible on the website and the WAZE mobile application, ensuring widespread availability.

Develop an Extensive Network of Pedestrian Corridors. (Recommendation 7.2.8)

Vibrant city areas are known for their bustling pedestrian activity, and Downtown Miami is no exception. An extensive network of pedestrian corridors was recommended to promote this vibrancy and ensure pedestrian safety. The systematic effort encompassed various elements, including wider, obstruction-free sidewalks, enhanced sidewalk connectivity, street furniture, ADA compliance, landscaping, shade provision, distinctive paving, marked crosswalks, curb extensions, sidewalk lighting, signal timing adjustments, median refuges, pedestrian detectors, and recessed stop lines. Streets recommended for pedestrian corridor improvement with amenities included:

- Brickell Avenue (SR 5/US-1) from Miami River to SW 26th Road (Rickenbacker Causeway)
- Brickell Bay Drive from SE 8th Street (Carlos Arboleya Boulevard/Brickell Key Drive) to SE 15th Road
- Miami Avenue from SE/SW 12th Street to NE/NW 36 Street (US-27)
- Miami Avenue/SE 1st Avenue (Brickell Plaza) from SE/SW 12th Street to SE/SW 26th Road (Rickenbacker Causeway)
- Biscayne Boulevard (SR 5/US-1) from Biscayne Boulevard Way (SE 4th Street) to NE 36th Street
- SE/SW 13th Street from I-95 to Brickell Avenue (SR 5/US-1)
- SE/SW 10th Street from I-95 to Brickell Avenue (SR 5/US-1) *(Corridor is divided by the Underline's Brickell Backyard)*
- SE/SW 8th Street (US-41/Tamiami Trail/ Carlos Arboleya Boulevard/Brickell Key Drive) from I-95 to Brickell Bay Drive
- SE/SW 15th Road from I-95 to Brickell Bay Drive
- Flagler Street from I-95 to Bayfront Park
- NE 5th Street from NE 1st Avenue to Biscayne Blvd (SR 5/US-1)
- NE 3rd Street from NE 1st Avenue to NE 2nd Avenue
- NE/NW 2nd Street from NW 2nd Avenue to Biscayne Blvd (SR 5/US-1)
- NE/NW 4th Street from I-95 to Biscayne Blvd (SR 5/US-1)
- NW 5th Avenue from NW 21st Street to NW 36th Street (US-27)
- SW/NW 2nd Avenue from SW 15th Road to NW 36th Street (US-27)
- NE 2nd Avenue from NE 3rd Street to NE 5th Street
- NE 1st Avenue from NE 3rd Street to NE 5th Street
- NE/NW 9th Street from I-95 to Biscayne Blvd (SR 5/US-1)
- NE/NW 11th Street from I-95 to Biscayne Blvd (SR 5/US-1)
- NE/NW 14th Street from I-95/I-395 Interchange to Biscayne Blvd (SR 5/US-1)
- NE/NW 17th Street from I-95 to NE 2nd Avenue
- NE/NW 20th Street from I-95 to Biscayne Blvd (SR 5/US-1)
- NE/NW 29th Street from I-95 to Biscayne Blvd (SR 5/US-1)
- NE/NW 36th Street (US-27) from I-95 to Biscayne Blvd (SR 5/US-1)

Status: Various streets are programmed in the 2045 LRTP for pedestrian facilities and improvements. Including: Off-road bicycle and pedestrian facilities improvements to the M-Path Greenlink providing a regional connection to the study area connecting SW 67th Avenue and the Miami River Greenway system for a total project cost of $141 million (2018); Pedestrian and on-road bicycle facility improvements for the SMART Terminal Connector along NW 20 Street from NW 27 Avenue to Biscayne Boulevard (SR 5/US-1) with a 2018 project cost of $2,703,255 ; and the SMART Trails SE/SW 26 Road off-bicycle and pedestrian enhancements from the Rickenbacker Causeway to The Underline with a project cost of $837,520 as of 2018.

IMPLEMENT THE RECOMMENDATIONS FROM THE MIAMI RIVER GREENWAY ACTION PLAN (RECOMMENDATION 7.2.9)

The Miami River Greenway Action Plan outlines the establishment of a pedestrian corridor along both banks of the Miami River, spanning from the Miami Intermodal Center (MIC) to Biscayne Bay. It is enforced through the City of Miami ordinances, which require a 50-foot reservation along the riverbanks for the greenway and requires new development to actively contribute to its creation. While there are still gaps, ongoing development in Downtown Miami is steadily filling them, solidifying the greenway's presence. Figure 4 highlights the extent of the proposed trail network running parallel to the Miami River.

Status: The Miami River Greenway Trail system has been established within the study area, running along the north and south banks of the Miami River from South Miami Avenue towards Brickell Key (south) and Bayfront Park (north). However, west of South Miami Avenue, on both banks, the trail is fragmented due to the ongoing development of riverfront properties. As these properties undergo redevelopment, the trail network is being developed in tandem to ensure continuity. Additional segments outside the study area, connecting to the greenway system, have been programmed in the 2045 LRTP as priority bicycle and pedestrian projects.

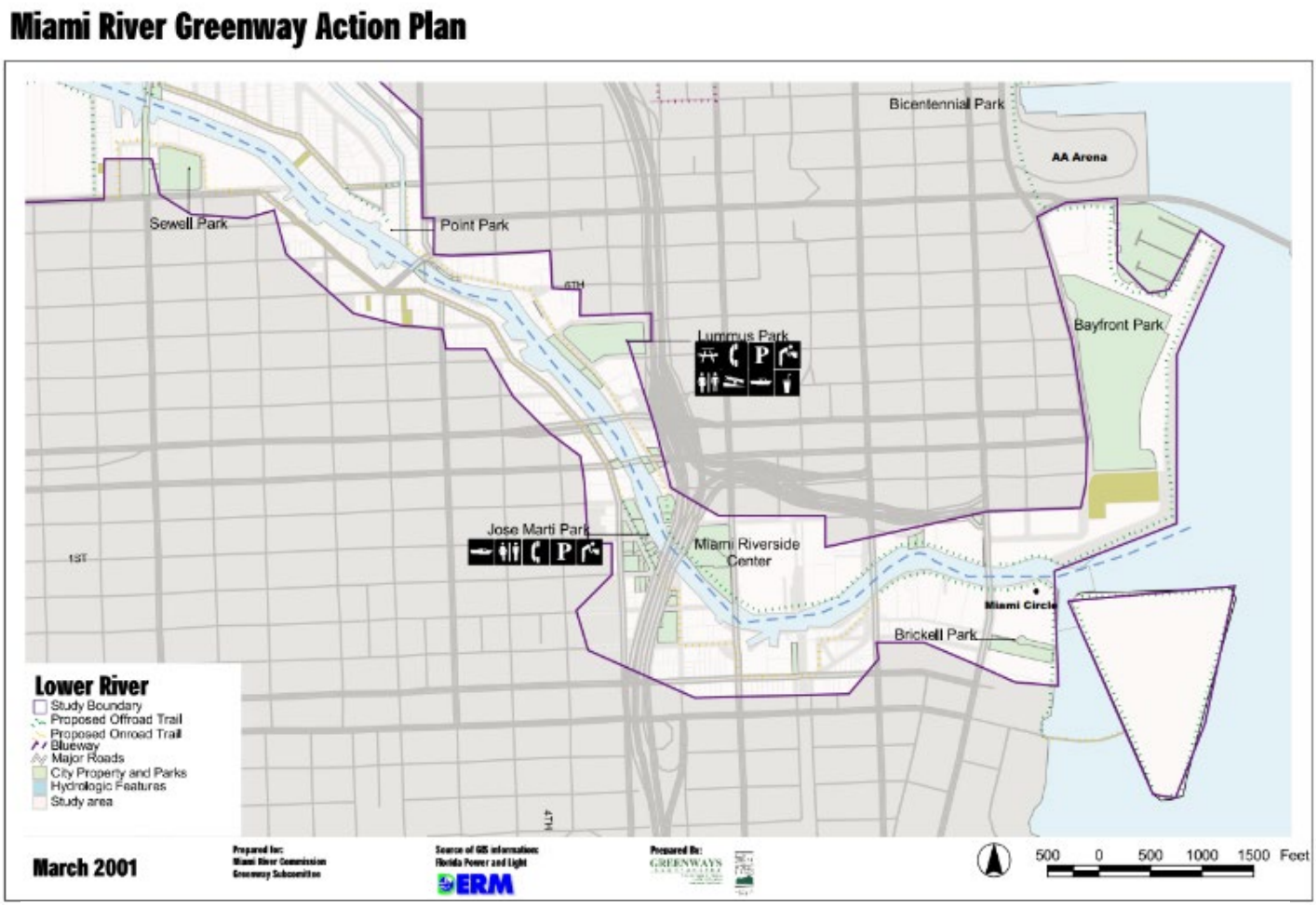


Figure 4. Route Map for the Miami River Greenway Action Plan, April 2001

CONNECT BRICKELL SHUTTLE TO FLAGLER SHUTTLE (RECOMMENDATION 7.2.10)

The goal of this 2003 recommendation was to create a seamless transit experience in Downtown Miami by 2010, prioritizing user-friendliness and efficient connections to final destinations. This involved integrating all shuttles in the area without compromising service quality or frequency. Specifically, the plan included establishing connections to connect the eastern part of Brickell with the core of Flagler Street, enabling efficient bi-directional service on the same roads with loops at both ends

Status: Completed. The City of Miami provides trolley service connecting the eastern part of Brickell with the core of Flagler Street through the Biscayne and Brickell routes. The Brickell route's southern terminus at Dinner Key travels up along Bayshore Drive/S. Miami Avenue to Brickell Avenue, culminating at Brickell Key. The two routes overlap on several streets between SE 15th Road and the Miami River, allowing those on the Brickell route to

seamlessly transfer to the Biscayne route to access Flagler Street. For transit users within the core of the Brickell neighborhood, the Biscayne routes allow for a commute from Brickell to Flagler Street completed in a one-seat trip. The Biscayne route reaches as south as SE 15th Road and travels north up to NE 36th Street and the Midtown neighborhood.

RECONFIGURE METROMOVER IN THE DUPONT PLAZA AREA (RECOMMENDATION 7.2.11)

Metromover has an awkwardly aligned segment in Downtown Miami, along SE 3 Street between SE 2 Avenue and Biscayne Boulevard (SR 5/US-1). Figure 5 illustrates the existing configuration from the I-95 distributor ramp exit onto SE 2 Avenue and SE 3 Street. This segment disrupts traffic flow on the high-volume, and it is considered unsightly. The 2003 recommendation included building a new Metromover station under the redevelopment plans for DuPont Plaza.

Status: Not programmed in the 2045 LRTP. Improvements require further analysis for future implementation.

Figure 5. Google Street View, heading east on SE 3 ST from I-95 exit onto SE 2 AVE

IMPLEMENT ITS FOR SPECIAL EVENTS. (RECOMMENDATION 7.2.12)

Efficient management of traffic during special events in Downtown Miami is crucial due to its defining character and positive economic impact. These events, spanning between fixed and occasional venues, add vibrancy to the city. In 2003, the implementation of Intelligent Transportation Systems (ITS) was determined to be an ideal solution to handle event-related traffic, simplifying control plans, ensuring access to essential areas like the PortMiami and Miami-Dade College (MDC), and enabling real-time traffic adjustments based on feedback.

Status: Programed in the 2045 LRTP under Future Technology.

PROVIDE A PEDESTRIAN WALKWAY ALONG BISCAYNE BAY FROM MARGARET PACE PARK TO BAYSIDE MARKETPLACE (RECOMMENDATION 7.2.13)

A pedestrian walkway along Biscayne Bay was recommended in 2003 to connect Margaret Pace Park in the north Omni area to Bayside Marketplace to the south. The recommended path aligned with other trails would create a continuous waterfront path from Pace Park to the Miami River.

Status: The recommendation is partially complete. There is a missing segment between N. Bayshore Drive to NE 13th Street that would connect the Margaret Pace Baywalk to the Museum Park Baywalk and to Bayside Marketplace.

IMPLEMENT BISCAYNE BOULEVARD (SR 5/US-1) IMPROVEMENTS FROM NE 6 STREET TO NE 14 STREET. (RECOMMENDATION 7.2.14)

The 2003 recommended improvements along Biscayne Boulevard (SR 5/US-1), spanning from NE 6 Street to NE 14th Street, were started at the time of the study. This corridor connects Downtown Miami's core to I-395 and serves a substantial number of residents, workers, and visitors. Unlike the immediate south segment, at the time of the study, this portion lacked raised medians and landscaping and featured narrow sidewalks. The rapid changes in the area, including the new

arena and the Bicentennial Park improvements, made enhancements vital for pedestrian safety, operational efficiency, and aesthetics for this corridor. The City of Miami, in collaboration with FDOT, developed a plan that included wider sidewalks, a spacious median, safe pedestrian crossings, and landscaping. At the time, decisions on the number of traffic lanes and provisions for on-street parking were under consideration. Final studies were pending, with construction plans to follow, ultimately transforming this part of Biscayne Boulevard (SR 5/US-1) into a welcoming entrance to the core of Downtown Miami.

Status: Completed.

Improve Pedestrian Connections in Bicentennial Park (Recommendation 7.2.16)

The original study recognized the need for improved pedestrian connections to Maurice A. Ferré Park (formerly known as Bicentennial Park). Areas west of Ferré Park faced challenges due to high-speed traffic lanes on Biscayne Boulevard (SR 5/US-1), while a disconnect was noted between the Omni area north of I-395 to Ferré Park and the general Downtown Miami area. To address this issue, recommendations included extending the Bayfront Park Baywalk to the north, linking the Omni area with Bayfront Park, Bayside Marketplace, and the Miami River Greenway.

Status: Completed. Baywalk and improved connectivity from the west (across Biscayne Boulevard (SR 5/US-1) to Ferré Park was provided with the Biscayne Boulevard streetscape improvements post-2003.

Complete Downtown Miami DDA Signage Plan (Recommendation 7.2.18)

At the time of the 2003 study, the Miami Downtown Development Authority (DDA) launched a signage plan for Downtown Miami. The plan divided the area into sectors, each distinguished by district graphic symbols or color "*logos*". Phase I, involving sector signs was successfully implemented, while Phases II and III, covering expressway signs, directional signs, kiosks, and parking signs are still awaiting implementation.

Status: In process. In Phase 1 (FDOT), 61 out of 62 signs have been installed. During Phase 2 (City), 92 out of 104 signs have been installed. However, for Phase 3 (County), none of the 63 total signs have been installed yet.

Improve Bicycle Facilities (Recommendation 7.2.22)

Bicycle facilities in Downtown Miami provide an important transportation option. The 2003 study considered enhancement possibilities like installing bicycle racks and lockers, encouraging businesses to offer showers and changing rooms for cyclists, marking designated bicycle routes with appropriate signage, creating dedicated bicycle lanes, and implementing educational programs. Specific areas in Downtown Miami that were targeted for these improvements include NE/NW 4 Street, Flagler Street, NE/NW 20 Street, and Biscayne Blvd (SR 5/US-1). Notably, the plans envisioned extending the M-Path along the SE 1 Avenue extension to SE 5 Street, then east to Brickell Avenue (SR 5/US-1) and south to the Rickenbacker Causeway. Further extensions were recommended along Brickell Avenue (SR 5/US-1), Biscayne Boulevard Way (SE 4 Street), and north on Biscayne Boulevard (SR 5/US-1) to Ferré Park. Additionally, expansion into the Omni area was recommended to connect with the Venetian Causeway and Margaret Pace Park.

Status: Bicycle access to the Rickenbacker Causeway is provided via the M-Path/The Underline. A shared-use path connecting The Underline from SE 32 Road to Brickell Avenue was programmed in the LRTP 2045 Cost Feasible Plan. An additional connection from The Underline to the Rickenbacker Causeway multi-use trail and bicycle lanes is proposed via a shared-use path on SE/SW 26th Road. Improvements to the M-Path and The Underline were programmed in the 2045 LRTP, including dedicated bike lane segments from Brickell Avenue (SR 5/US-1) to Hobie Island under Plan Z. Bicycle improvements recommended for NE/NW 4th Street and NE/NW 20th Street were not completed. Dedicated bicycle facilities connecting Margaret Pace Park and Venetian Causeway are pending.

PROVIDE A SHUTTLE SYSTEM INTO WYNWOOD (RECOMMENDATION 7.2.25)

This recommendation aimed at improving transit access between Wynwood, the Design District, and Downtown Miami, which at the time were recognized as being somewhat detached from each other. It suggested a shuttle service along NW 2nd Avenue to NW 36th Street (US-27), returning on Biscayne Boulevard (SR5/US-1) to the Omni/Overtown/Park West area. The shuttle would enhance convenience for residents and encourage interaction between these neighborhoods and Downtown.

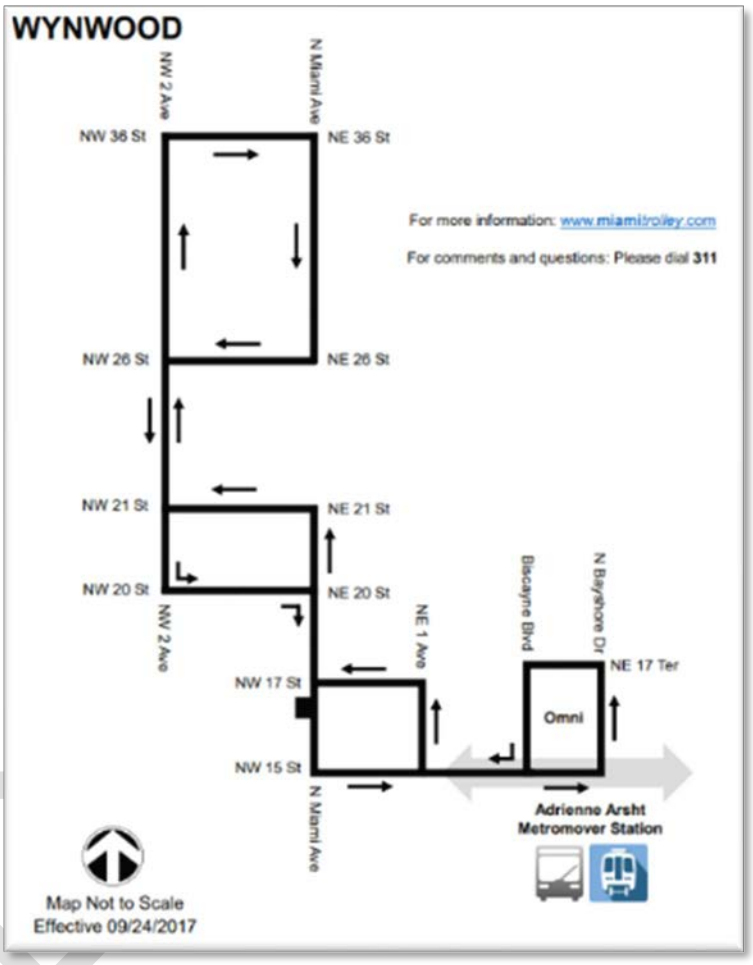


Figure 6. City of Miami Wynwood trolley route map

Status: Completed. The City of Miami trolley system provides the Wynwood route connecting the Adrienne Arsht Metromover Station to Wynwood through NW 2 Avenue and up to NW 36 Street (US-27). The Wynwood trolley route map is illustrated in Figure 6. During fiscal year 2022-2023, the Wynwood trolley route had a ridership of 97,554.

PROVIDE A SHUTTLE TO WATSON ISLAND (RECOMMENDATION 7.2.26)

At the time of the original study, Watson Island, situated to the east of Downtown Miami, was transforming into a distinctive destination with existing attractions like the Parrot Jungle and a children's museum and planned mixed-use developments including restaurants and a mega-yacht marina. The anticipated demand for travel to and from Watson Island necessitated an efficient transit connection, resulting in the proposed recommendation for a dedicated shuttle.

Status: The Baylink project is set to be replaced by the SMART Plan's Bus Rapid Transit (BRT) services for the Beach Corridor and is included in the 2045 LRTP.

Implement Flagler Shuttle (Recommendation 7.2.29)

The recommendation proposed a shuttle system designed to serve the corridor between Biscayne Boulevard (SR 5/US-1) and the Miami-Dade Cultural Center on SW 1st Avenue, primarily catering to Downtown Miami's workforce and visitors. The envisioned shuttle will utilize electric buses, building on the success of similar systems that had been implemented in Miami Beach at the time.

Status: A Flagler shuttle, as envisioned in the 2003 recommendation was not implemented in the study area.

Provide a Port Boulevard U-Turn (Recommendation 7.2.30)

At the time of the original study, the Kaseya Center and Bayside Marketplace shared a common challenge related to access from Port Boulevard. Recognizing their interaction, there was a desire to establish a direct vehicular connection between the two sites. A connecting roadway along Biscayne Bay was proposed under the Port Boulevard Bridge, with the goal of providing continuity between the frontage road on the south side of Port Boulevard (adjacent to Bayside Marketplace) and the frontage road on the north side (adjacent to the Kaseya Center).

Status: While the Port Boulevard U-Turn was not developed and is not programmed in the 2045 LRTP, the PortMiami Tunnel opened in 2014 and includes three key components for improved transportation:

1. ***Tunnel connection linking Watson Island and PortMiami (Dodge Island)***
2. ***Connections to the PortMiami roadway system***
3. ***Widening of the MacArthur Causeway bridge***

Create a Shuttle System for the Brickell Residential Area (from 13th Road to 26th Road) (Recommendation 7.2.31)

A transit shuttle had been introduced in the Brickell area by the time the 2003 study was prepared. The Brickell shuttle primarily served commercial areas, leaving a missing connection for many residents in the southern areas, who often work in the Brickell Business District or in Downtown Miami. To address this gap, a proposed residential Brickell transit shuttle was recommended in 2003 for the Brickell Avenue (SR 5/US-1) corridor from SE 14th Street to SE 26th Road. The proposed shuttle would seamlessly connect to the existing commercial area shuttle route without compromising frequency or convenience for users.

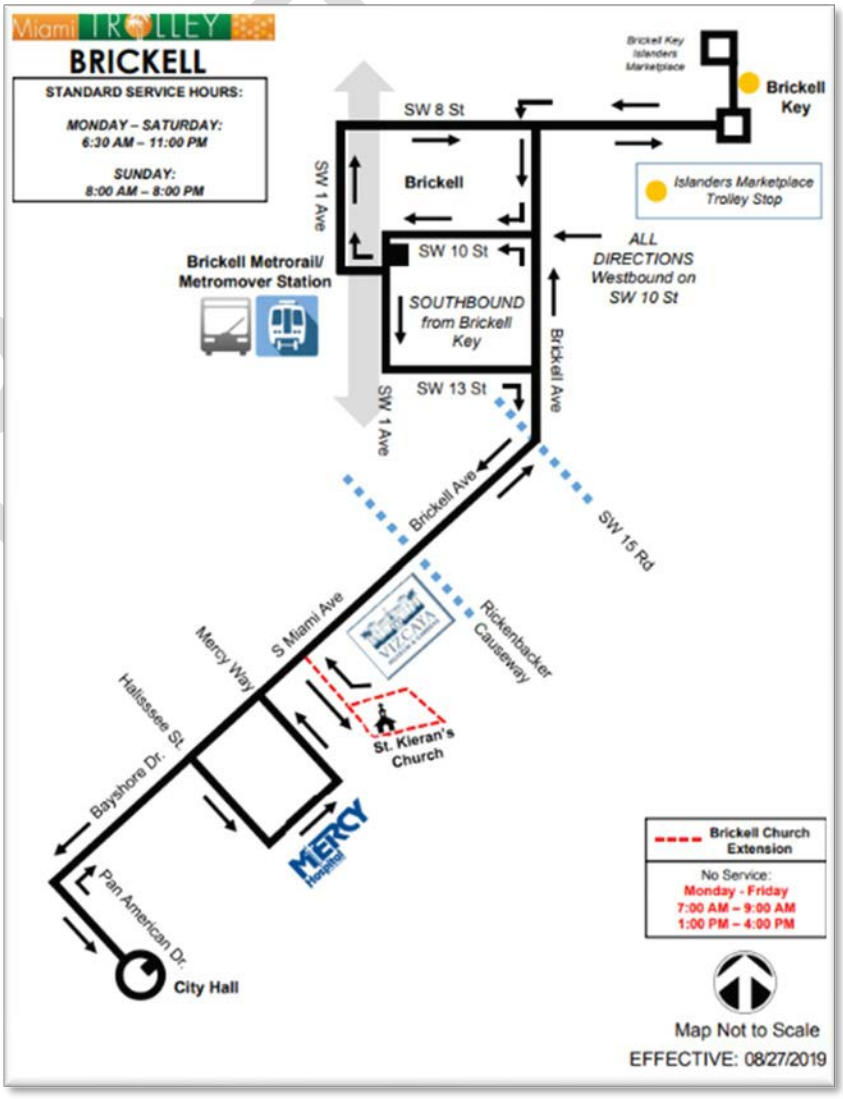


Figure 7. City of Miami Brickell route map

Status: Completed. The City of Miami Trolley Brickell Route, from the City of Miami City Hall to Brickell Key has been implemented. The route map for the Brickell trolley is depicted in Figure 7. In fiscal year 2022-2023, the Brickell trolley route had a total ridership of 356,348 people.

Implement Traffic Calming Alternatives Through Brickell Residential Areas (Recommendation 7.2.33)

The 2003 recommendation looked to provide traffic calming improvements in the Brickell area aimed at enhancing the quality of life and user-friendliness of streets and sidewalks for residents. At the time, the primary concern revolved around the high volume and speed of commuter traffic in residential zones. To address this, the recommendation included the implementation of roundabouts, chokers, curb extensions, and landscaping. The specific treatments and locations were to be determined through collaboration with the local community.

Status: Completed and ongoing as needed. Traffic calming measures, like roundabouts, have been installed on SW 15th Road, including at the intersection with S. Miami Avenue. Figure 8 illustrates a more recent traffic calming project- a roundabout at the intersection of SW 3rd Avenue, SW 13th Street, and SW 15th Road.

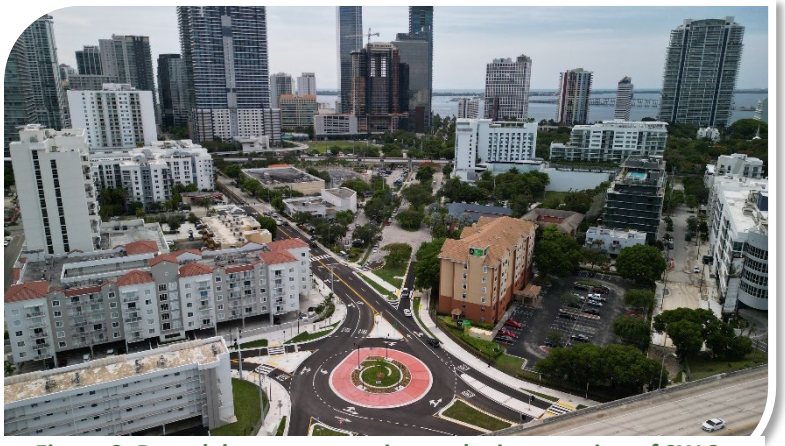


Figure 8. Roundabout construction at the intersection of SW 3 Avenue, SW 13 Street, and SW 15 Road as of January 2023.

Improve NE/NW 14 Street from I-95 to Biscayne Boulevard (SR 5/US-1) (Recommendation 7.2.37)

This recommendation focused on enhancing NE/NW 14th Street, which at the time of the study, was noted as offering limited circulation and inefficient east-west travel in the area. The recommendation envisioned transforming NE/NW 14th Street into a four-lane undivided facility from east of I-95 to Biscayne Boulevard (SR 5/US-1). Significant intersections would be equipped with coordinated signalization, with a priority for east-west traffic. This improvement will provide rapid vehicular access to the proposed NW 1st Avenue corridor from Biscayne Boulevard (SR 5/US-1) and the Venetian Causeway, contributing to more efficient transportation in the region.

Status: The recommendation was not implemented and is not programmed in the 2045 LRTP. However, unprotected bicycle lanes were installed on NE/NW 14th Street from NW 7th Avenue to NE 1st Avenue.

Provide a Brickell Key Water Taxi (Recommendation 7.2.39)

The study area faces natural barriers, including water bodies such as islands to the east and the Miami River through the center. Water-borne transportation offers an effective means to overcome these barriers and provide an alternative mode of travel. Fisher Island, for instance, relies on a ferry service for round-the-clock transportation to and from the island. Water taxi services, operated for profit, have proven successful in other cities like Fort Lauderdale. The 2003 recommendations included establishing a water taxi or ferry connection between Brickell Key and the Central Business District. The ideal funding model for such a service would involve self-supporting fares managed by a private company, or it could be subsidized through cooperative efforts by local businesses looking to enhance convenience for their customers, workers, and visitors.

Status: Programmed in the 2045 LRTP. Water Borne Transit Services in Biscayne Bay aims to offer alternatives to local commuters while also providing appealing mobility choices for tourists and visitors. It is an unfunded project with a cost of $10 million (2018).

PROVIDE A WATER TAXI/FERRY TO WATSON ISLAND (RECOMMENDATION 7.2.40)

Watson Island features attractions like Jungle Island, a children's museum, yacht marinas, restaurants, and event spaces. Access to Watson Island primarily relies on the MacArthur Causeway by car, with several Metrobus routes serving the route to and from Miami Beach. At the time of the original study, the Miami-Dade Transportation Master Plan (MDTMP) already included recommendations for a light-rail system connecting Downtown Miami and south Miami Beach. As a temporary, high-frequency transit solution, a conventional transit shuttle service was contemplated until the implementation of the light-rail system. A water-borne connection through a water taxi service was suggested in the 2003 study to enhance accessibility and strengthen the link between Watson Island and Downtown Miami. Possible connections included Bayside Marketplace Marina, the PortMiami, Omni/Overtown/Park West, Bicentennial Park, Bayfront Park, Brickell Key, and other destinations along the Miami River.

Status: Waterborne Transit Services in Biscayne Bay are programmed in the 2045 LRTP. It remains an unfunded project with a cost of $10 million (2018).

PROVIDE A PARTIAL I-95 INTERCHANGE AT NW 29TH STREET (RECOMMENDATION 7.2.41)

The 2003 study recognized the Wynwood area and the southern end of the Design District encountered difficulties in accessing I-195 due to partial interchanges at Miami Avenue and Biscayne Boulevard (SR 5/US-1), causing frustration for residents and businesses. The recommendation suggested creating a more direct connection through the construction of a frontage road or a collector-distributor road system adjacent to the I-95 lanes. A potential interchange was recommended around NW 29th Street.

Status: The recommendation was not implemented and is not included in the 2045 LRTP. This area was location is unsuitable for a interchange based on the minimum spacing criteria between interchanges. An FDOT PD&E study for the I-195 corridor is currently underway, evaluating the possibility of an interchange in the vicinity of the one proposed by the recommendation.

2003 PHASE II RECOMMENDATIONS: IMPLEMENTATION BY 2015

EXTEND *BAYLINK* LIGHT RAIL TO FLAGLER STREET (RECOMMENDATION 7.2.3)

Downtown Miami and Miami Beach are crucial economic centers but currently lack enhanced transit options between them. The recommendation to extend the Baylink Light Rail to Flagler Street aimed at connecting Downtown Miami's hotels and tourist attractions to the Miami Beach Convention Center and the beaches, as well as linking Miami Beach with the broader Miami-Dade County transit system and to the Miami International Airport (MIA). The proposed alignment under the original recommendation extends the *Baylink* system from South Beach along the causeway, down Biscayne Boulevard (SR 5/US-1), and westward to connect with the Government Center Metrorail/Metromover Station. The preferred alignment for the final leg was along or near Flagler Street, aligning with the objectives of the proposed Flagler Street shuttle recommendation, which is a high priority in the Miami-Dade Transit Master Plan.

Status: Programmed in the 2045 LRTP. The SMART Plan Beach Corridor, formerly known as Baylink, serves as a crucial connection between Miami Beach and the mainland. It will seamlessly integrate with existing and proposed transit services on both sides of Biscayne Bay. Currently, Metrorail services link MIA and Downtown Miami, and this SMART

Plan Corridor will provide the essential link to popular visitor destinations. Figure 9 illustrates the route map for the SMART Plan Beach Corridor.

Figure 9. SMART Plan Beach Corridor Route

BUILD A NEW TUNNEL UNDER THE MIAMI RIVER AT SW 1 AVENUE (RECOMMENDATION 7.2.15)

The recommendation suggested the construction of a tunnel under the Miami River at SW 1st Avenue to combat the transportation challenges presented by the Miami River. Preliminary feasibility studies supported the recommendation, with the alignment near SW 1st Avenue seen as highly beneficial and worth pursuing. The Miami River remains home to numerous marine-oriented businesses,making it expensive to maintain vessel clearancess. Options like high-level bridges, with their substantial vertical clearances, come with high costs and can impact the local community. Drawbridges, while a more cost-effective option, entail operational expenses and can disrupt traffic flow, as evidenced by the Brickell Bridge, leading to traffic congestion in Downtown Miami and the Brickell area.

Status: The recommendation to build a new tunnel at SW 1st Avenue was not implemented. The City of Miami/FDOT Miami River Tunnel project from SE 12th Street to NE 4th Street is included in the 2045 LRTP as an unfunded initiative. The total project cost was estimated at $1,168 billion in 2018.

WIDEN AND EXTEND NW 1ST AVENUE (RECOMMENDATION 7.2.20)

The recommendation focused on widening and extending NW 1st Avenue to a four-lane divided arterial from NW 10th Street to NW 14th Street to enhance circulation within Downtown Miami and improve north-south traffic flow. It also included extending the roadway south from SW 1st Street to the recommended tunnel under the Miami River. The alignment will be "*straightened*" between NW 10th Street and NW 14th Street to encourage corridor use. To facilitate this project, the removal of the I-95 Distributor ramps is necessary, with their conversion into a grand boulevard to improve traffic flow and connectivity in the area.

Status: This recommendation was not implemented and is not programmed in the 2045 LRTP. The roadway segment on NW 1st Avenue from NW 10th Street to NW 14th Street remains a two-lane street providing north and south access within the study area. Improvements require further analysis for future implementation.

EXTEND SE 1ST AVENUE FROM SE 8TH STREET TO SE 5TH STREET (RECOMMENDATION 7.2.21).

The proposal recommended extending SE 1st Avenue from SE 8th Street to SE 5th Street in the Brickell area. Circulation between and within city blocks in the area was noted to be challenging at the time of the original study, and the recommended extension would enhance street continuity north of SE 8th Street, offering an alternate route for several buildings to the south. This extension would also help alleviate traffic congestion on Brickell Avenue (SR 5/US-1) and simplify circulation for buildings both to the north and south of SE 8th Street. The extension was proposed to be installed within the Metromover rights-of-way, under the guideway, between SE 5th Street and SE 8th Street, with additional right-of-way required at the southern end of the extension where it would connect to SE 8 Street.

Status: The recommendation was not implemented and is not programmed in the 2045 LRTP. Improvements to the area have included the development of the Miami River Greenway on SE 1st Avenue between the south river bank and SE 5th Street and a connection to a sidewalk running under the guideway of the Metromover from SE 5th Street to SE 8th Street.

REMOVE I-95 DISTRIBUTOR RAMPS AND PROVIDE A "*GRAND BOULEVARD*" ON SOUTH 3RD STREET (RECOMMENDATION 7.2.24)

The "*Grand Boulevard*" recommendation for Downtown Miami aimed to eliminate the barrier created by the I-95 distributor ramps, encouraging integrated development near the Miami River, enhancing the area's visual appeal, creating an impressive boulevard entrance to Downtown Miami, and restoring a traditional, pedestrian-friendly environment. While it was found feasible in prior studies, it was not included as a project recommendation in past LRTPs.

Status: The recommendation was not implemented and has not been programmed in the 2045 LRTP. Improvements require further analysis for future implementation.

BUILD A NORTHBOUND I-95 ON-RAMP AT NW 6TH STREET TO PROVIDE ACCESS TO WESTBOUND SR 836/DOLPHIN EXPRESSWAY (RECOMMENDATION 7.2.36)

Access to SR 836/Dolphin Expressway from Downtown Miami's core can be challenging, as SR 836/Dolphin Expressway continues to serve as the main freeway route to west Miami-Dade County. At the time of the original study, access to SR 836/Dolphin Expressway was only possible through the I-95 Distributor Ramps at the south end of Downtown Miami's core. To address this issue, a recommendation was provided to build a new left entrance on-ramp to westbound SR 836/Dolphin Expressway, commencing at NW 6 Street. As of the 2003 MDTMP, funding for design and construction was included in the Transportation Improvement Program (TIP).

Status: Access to SR 836/Dolphin Expressway is provided through the on-ramp on NE 1st Avenue. The original 2003 recommendation was not implemented and is not programmed in the 2045 LRTP. Improvements require further analysis for future implementation.

CONSTRUCT AN INTERCHANGE ON I-95 AT NW 14TH STREET (RECOMMENDATION 7.2.42)

At the time of the 2003 study, residents and businesses north of I-395 and east of I-95 were recognized for needing a more direct connection to I-95. The recommendation proposed a new I-95 interchange at NW 14th Street, offering a direct connection to and from I-95 for the Omni/Overtown/Park West area. This interchange aligned with the recommendations proposed for NW 14th Street and NW 1st Avenue, aiming to improve accessibility and connectivity in the region.

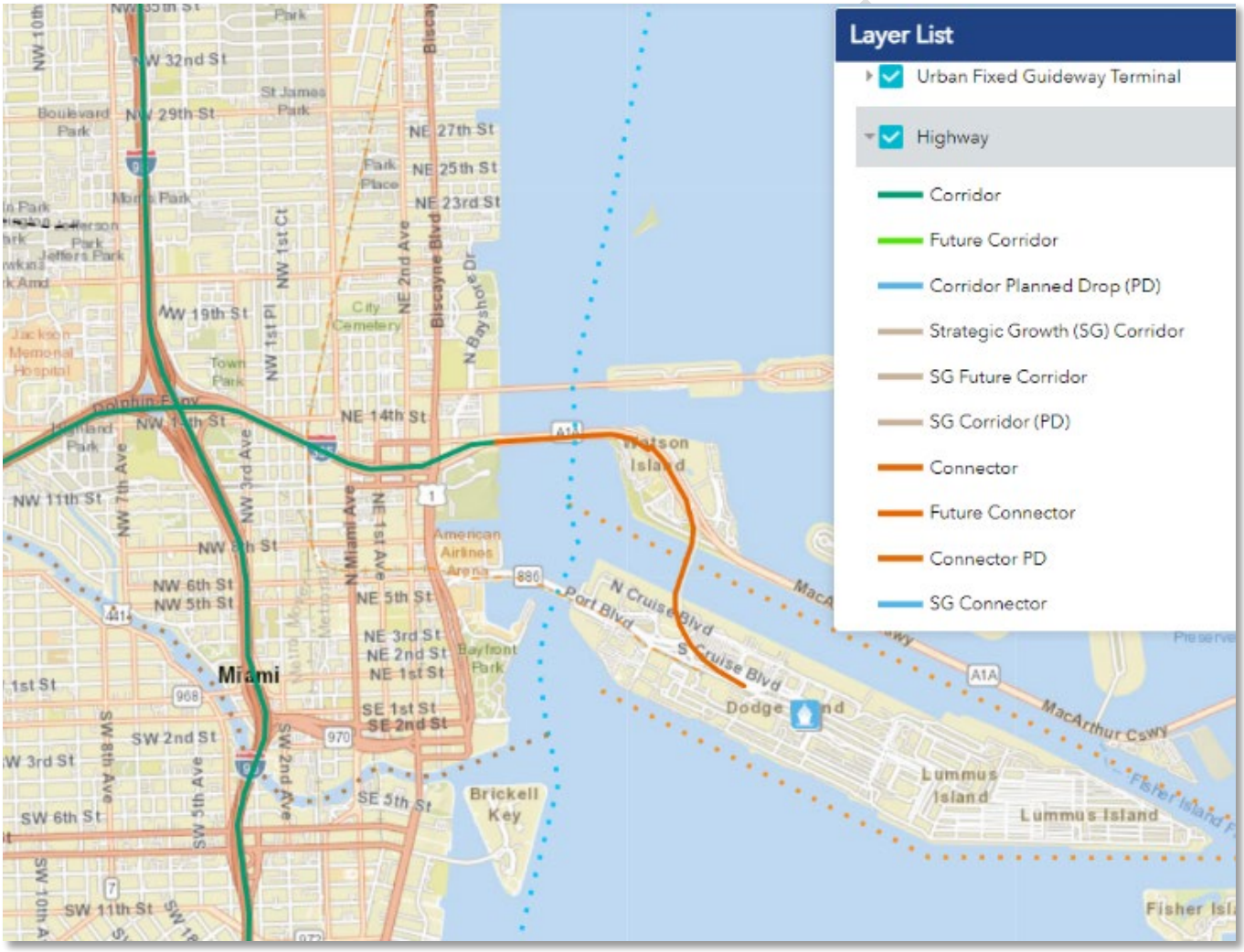
Status: Completed. An interchange was developed at this location, connecting I-95 and I-395.

2003 PHASE III RECOMMENDATIONS: IMPLEMENTATION BY 2020

IMPROVE NE 1ST AVENUE AND NE 2ND AVENUE FOR TRUCK TRAFFIC. (RECOMMENDATION 7.2.17)

An interim traffic operations improvement project was recommended in 2003 to enhance the efficient and safe movement of trucks through Downtown Miami until completion of the PortMIami Tunnel. Due to the location of the PortMiami entrance within the downtown core, heavy truck traffic in the area was inevitable. The improvements under the recommendation focused on enhancing turning radius and curb returns along NE 2nd Avenue and NE 1st Avenue and providing access to I-95 and SR 836/Dolphin Expressway.

Status: The recommendation is not programmed in the 2045 LRTP. Today, NE 5th Street and NE 6th Street serve as surface street options to access Port Boulevard. Future recommendations for truck traffic shall consider the newer routes highlighted in light green and orange in Figure 10.



PROVIDE A TRUCK-ONLY TUNNEL FROM THE SEAPORT TO WATSON ISLAND (RECOMMENDATION 7.2.19)

This recommendation suggested constructing a truck-only tunnel connecting PortMiami to Watson Island. This tunnel was envisioned to provide several advantages, including easing truck access to and from the port, enhancing vehicular access

Figure 10. FDOT Strategic Intermodal System, Highways, accessed 2023.

capacity, and relocating port-related truck traffic away from Downtown Miami streets. The redirection of trucks to the tunnel would also lead to a more pleasant pedestrian environment while also decreasing noise and emissions in the Downtown Miami area. At the time of the original recommendation, the project was part of the LRTP (Long-Range Transportation Plan) and lacked funding.

Status: Completed. Opened in 2014, the Port of Miami Tunnel provides truck and standard vehicle access directly from I-395 to the port. However, truck access to Port Boulevard via NE 5th Street and NE 6th Street remains necessary as these roads provide an alternate route when the tunnel is closed.

Extend Metrorail to Kaseya Center (formerly known as American Airline Arena) and Seaport (Recommendation 7.2.23)

In 2003, it was recognized Downtown Miami's full potential relied on significantly increased mass transit usage. Today, the absence of an East-West Metrorail line still hinders direct access to Downtown from the western suburbs. The recommendation to extend the Metrorail along this East-West corridor was deemed crucial to link suburbs, Miami International Airport (MIA), Florida International University (FIU), and other important areas, as well as enhance accessibility for both residents and businesses in Downtown Miami. Priority connections in the original recommendation included the Government Center Station to integrate the line with the rest of the system properly, The Kaseya Center for high-capacity event service, and the PortMiami to serve employees and visitors efficiently, relieve congestion at the port entrance, and enhance the connection to Downtown Miami.

Status: Programmed in the 2045 LRTP as a partially funded East-West Corridor Rapid Transit project connecting western Miami-Dade County to Downtown Miami via the Miami Intermodal Center (MIC). The Rapid Transit system connects users to the MIC, providing Metrorail access to the Government Center Station and Downtown Miami.

Extend the Metromover Through the Brickell Financial District (Recommendation 7.2.27)

Metromover currently serves the Brickell Financial District, yet its alignment is situated one block west of Brickell Avenue (SR 5/US-1). However, most of the major buildings and workers are on the east side of Brickell Avenue (SR 5/US-1), requiring Metromover users to walk a block and cross the bustling Brickell Avenue (SR 5/US-1). The proposed extension aimed to establish a two-way Metromover loop on the east side of Brickell, significantly improving coverage and accessibility. This extension is designed to reduce walking distances and eliminate the need to cross Brickell Avenue (SR 5/US-1), enhancing the system's overall usability for commuters.

Status: Programmed in the 2045 LRTP as an unfunded project with a budget of $268 million (2018). The Metromover Brickell Loop Extension at the Financial District Metromover Station is a project aimed at enhancing regional and local connectivity. It seeks to improve the speed, reliability, comfort, and overall convenience of transit services in the area.

Depress I-395 (Recommendation 7.2.28)

The Omni/Overtown/Park West area in Downtown Miami has historically been disconnected from Downtown Miami's core due to the presence of I-395. The 2003 study recognized the growing need to integrate these areas with the central business district, with recommendations driven by urban design, aesthetics, and pedestrian circulation, particularly near the Arsht Performing Arts Center. Two primary concepts were proposed in the 2003 study to address this issue: operational improvements to the elevated freeway section (developed by FDOT) and depressing I-395 to create an at-grade grand boulevard (developed by a group of individuals with interest in the area). The latter concept, involving the depression of I-395 and the creation of an at-grade grand boulevard, aligned more closely with the goals and concerns of area residents, workers, businesses, and visitors.

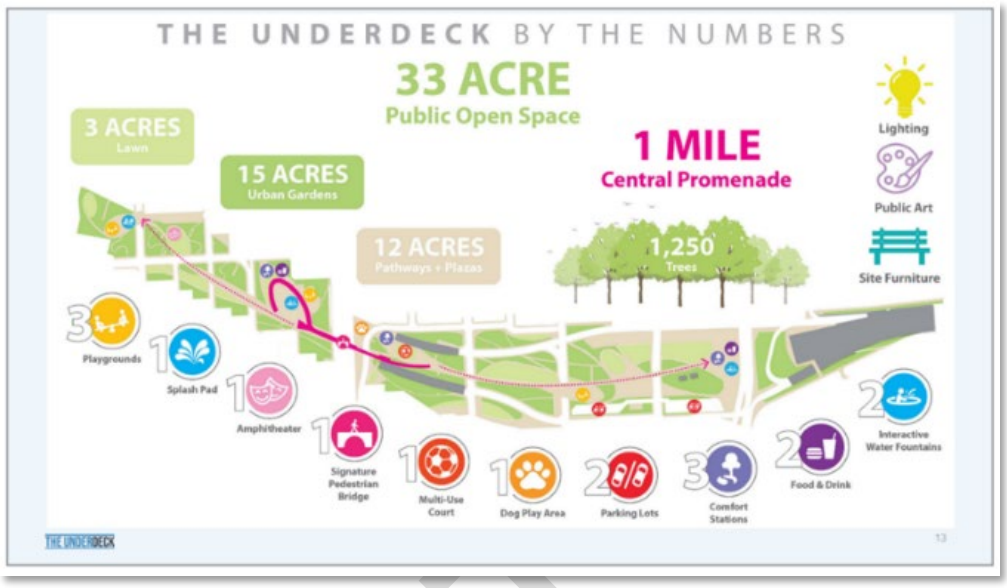


Figure 11. Underdeck by the Numbers, Underdeck Committee Report

Status: A combination of the two primary concepts, including operational improvements and an at-grade pedestrian boulevard, was developed and is currently underway. The Underdeck project, illustrated in Figure 11, is a collaborative endeavor between the Florida Department of Transportation (FDOT) and the City of Miami, and it is supported by a federal grant it is designed as a 33-acre multi-purpose green space connecting Overtown in the West to Biscayne Bay in the East. The Underdeck open space will be located under the reconstructed I-395, and it will feature various outdoor amenities, such as an amphitheater, event lawn, community plaza, children's play area, dog play area, multi-use court, and a water feature to create an at-grade, east-west pedestrian boulevard connecting Gibson Park in Overtown with Maurice A. Ferré Park on the bay.

Provide a Transit Greenway (Recommendation 7.2.32)

Transit greenways are a low-speed conveyance system designed to complement pedestrian travel. These systems offer continuous circulation, enabling passengers to board or disembark at their convenience without frequent stops. A suitable location for implementing this technology was recommended for the Miami-Dade College Wolfson Campus, with a focus on NE 4th Street. The proposed greenway would extend from NE 1st Avenue to Biscayne Blvd (SR 5/US-1) and align with Bayside Marketplace. It was recommended that this project be included in the Long-Range Transportation Plan (LRTP), and there may be an opportunity to seek a demonstration project grant due to its innovative nature.

Status: The recommendation was not implemented and is not programmed in the 2045 LRTP. Improvements require further analysis for future implementation.

Extend Metromover into Wynwood (Recommendation 7.2.34)

The original Downtown study recognized the Wynwood area required additional transit service to meet its growing needs. At the time of the 2003 study, a proposed shuttle system for Wynwood was being considered as a precursor to the recommended Metromover extension to improve accessibility and convenience for residents and visitors. The envisioned loop alignment for the shuttle would expand coverage, reduce walking distances, and enhance convenience for passengers. The loop alignment would traverse the NW 2nd Avenue and Biscayne Boulevard (SR 5/US-1) corridors, ensuring that key areas were well-connected within Wynwood.

Status: Not programmed in the 2045 LRTP. Improvements require further analysis for future implementation. However, a Metromover Omni Extension from the School Board Station is included as an unfunded project in the LRTP with a cost of $455.130 million (2018)

EXTEND THE METROMOVER TO SE/SW 26TH ROAD (RECOMMENDATION 7.2.35)

The recommendation to extend the Metromover system in the Brickell residential area south of SE/SW 14th Street was driven by the same reasons as the recommendation for the need for a shuttle system. Metromover was chosen due to its superior capacity and reliability in serving this area.

Status: The recommendation was not implemented. The City of Miami trolley service helps to fill the gap by connecting the residential areas to commercial zones. The recommendation is not programmed in the 2045 LRTP. Improvements require further analysis for future implementation.

PROVIDE COMMUTER RAIL TO BROWARD COUNTY (RECOMMENDATION 7.2.38)

At the time of the 2003 study, the Tri-Rail system lacked a direct and convenient connection to Downtown Miami, terminating near Miami International Airport (MIA). The only rail link to Downtown Miami required a cumbersome transfer from Tri-Rail to Metrorail at the Metrorail Transfer Station on NW 79th Street/E 25th Street or at the MIC at the MIA Tri-Rail Station. Several alignment options, including repurposing an existing railroad corridor, were under consideration at the time of the study. Regardless of the corridor's ultimate use, the original study identified the development of a significant commuter connection as a top priority.

Status: Completed. Downtown Miami is connected to Broward and Palm Beach counties as well as the Orlando International Airport (MCO) via the Brightline express train service along the FEC Railway departing from MiamiCentral Station in Downtown Miami, which serves as the terminus for passenger rail services. This privately operated express train service provides rail connections between Miami, Aventura, Fort Lauderdale, Boca Raton, West Palm Beach, and MCO. Additionally, the South Florida Regional Transportation Authority (SFRTA) extended Tri-Rail commuter train service to MiamiCentral Station, which began service in January 2024.

DEPRESS I-95 (RECOMMENDATION 7.2.43)

The recommendation to depress I-95 (lowering it below ground) would address the challenges posed by freeways in Downtown Miami, aiming to create a more pedestrian-friendly, aesthetically pleasing, and less noisy environment. The proposal suggested depressing I-95 north of the SR 836/I-395 Interchange, allowing the I-95 mainline to run underground while constructing frontage roads at ground level to connect with the street grid of Downtown Miami. The plan also included a tunnel for the I-95 mainline lanes, replacing the high-level bridge over the Miami River. The creation of frontage road systems and the reconstruction of existing interchanges north of its terminus (SR-5/US-1) were also part of the vision. This infrastructure investment was deemed essential to facilitate Downtown Miami's growth and its role as a global center of commerce, with a focus on promoting transit use and enhancing the pedestrian environment.

Status: The recommendation was not implemented and is not programmed in the 2045 LRTP. Recent analysis by FDOT for improvements to I-95 does not include any alternatives from the planning study that involve depressing I-95.

COMPARISON OF 2000 AND 2020 EMPLOYMENT AND HOUSING PROJECTIONS

The following section evaluates the 2020 scenario employment and housing projections, as presented in the 2003 Downtown Miami Transportation Master Plan, in comparison with the 2020 Census Data.

The process of projecting land use in Downtown Miami for future scenarios, as outlined in the 2003 master planning effort, involved a comprehensive methodology. It commenced with an inventory and analysis of existing and approved projects in the area, coupled with an evaluation of trends and development potential in specific sub-areas. Foundational data included existing county and downtown development patterns, recent trends, local area dynamics, city regulations, policies, and relevant documents such as the Miami Comprehensive Neighborhood Plan and Downtown Master Plan.

The Baseline Scenario's initial projections were derived from values extracted from transportation models and validated against recent development approvals. The Land Use Committee then conducted further analysis, leading to the formulation of land use forecasts for Enhanced and Visionary development scenarios. These forecasts considered parcel-level development potential within sub-areas. Moreover, housing and employment growth forecasts for 2020 were refined, with adjustments made based on potential development and revitalization opportunities. Reasonableness checks were applied to dwelling unit types, sizes, and socioeconomic characteristics of residents in the final forecasts.

The three development scenarios for the Downtown Miami area by 2020 are shown in Table 5 below.

Table 5: 2003 Development Scenarios

	2020 Baseline	2020 Enhanced	2020 Visionary
Employees	**18,000**	**30,000**	**48,000**
Dwelling Units	**15,000**	**23,000**	**34,000**

[4] Source

The 2020 projections are categorized into three scenarios: The conservative baseline envisions 18,000 more employees and 15,000 more dwelling units. The enhanced scenario adopts a more aggressive stance, anticipating 30,000 additional employees and 23,000 more dwelling units. Lastly, the visionary outlook is highly optimistic, predicting 48,000 extra employees and 34,000 more dwelling units.

The report's update involves evaluating the precision of the 2020 employment and housing projections by comparing them with the 2020 Census Data. This assessment focuses on data from 38 specific census tracts within the study area. Figure 12 illustrates the map census tracts used to perform the assessment and highlights the boundaries of the study area (I-95 to the east, I-195 to the north, SW 26th Road to the South, and the Biscayne Bay to the west). The study area, as defined by census tracts, utilized 2020 US Census data to comprehensively analyze total housing. The results revealed that housing development surpassed the forecasts of all three models. According to the 2020 US Census count, approximately 70,805 housing units are within the study area. Table 6 provides a comparison of the three development scenarios for housing compared to the results of the 2020 census.

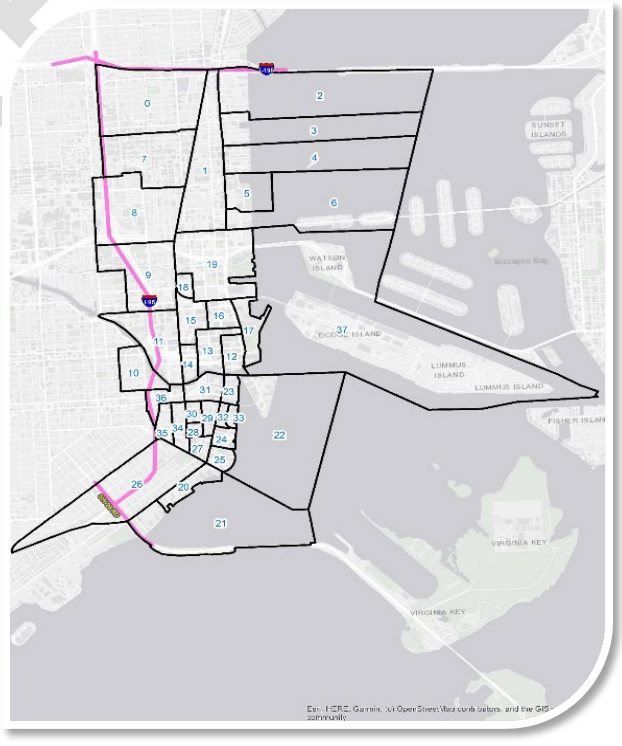


Figure 12. Map of Census Block Groups Analyzed

Table 6: Housing

[4] 2003 Miami Downtown Transportation Master Plan

Development Scenarios	Total Housing	Difference
1999	8,200	62,605
2020 Baseline	23,200	47,605
2020 Enhanced	31,200	39,605
2020 Visionary	41,800	29,005
2020 Census	**70,805**	-

[5] Source

Table 7: Employment

Development Scenarios	Total Employment	Difference
1999	116,000	73,165
2020 Baseline	134,000	55,165
2020 Enhanced	146,000	43,165
2020 Visionary	164,000	25,165
2020 Census	**189,165**	-

[6] Source

The work area profile for the study area in 2020 was established by employing the US Census on the Map, illustrated in Figure 13. This profile, utilizing the same census tracts as the housing analysis, identified a total of 189,165 jobs within the study area. The findings reveal that total employment closely matched the forecast, with only a 15% variation from the Visionary scenario. Table 7 summarizes the development scenarios against the 2020 employment numbers. In contrast, the housing forecast significantly underestimated the demand for this type of development, with an approximately 41% variation from the Housing Visionary scenario.

[5] 2003 Miami Downtown Transportation Master Plan, and the U.S. Census Bureau. "HOUSING UNITS." *Decennial Census, DEC Demographic and Housing Characteristics, Table H1*, 2020

[6] 2003 Miami Downtown Transportation Master Plan, and the U.S. Census Bureau. 2023. LEHD Origin-Destination Employment Statistics (2002-2021) [computer file]. Washington, DC: U.S. Census Bureau, Longitudinal-Employer Household Dynamics Program [distributor], accessed at https://onthemap.ces.census.gov. LODES 8.1 [version]

Figure 13. Work Area Profile Report for Study Area

United States Census Bureau OnTheMap

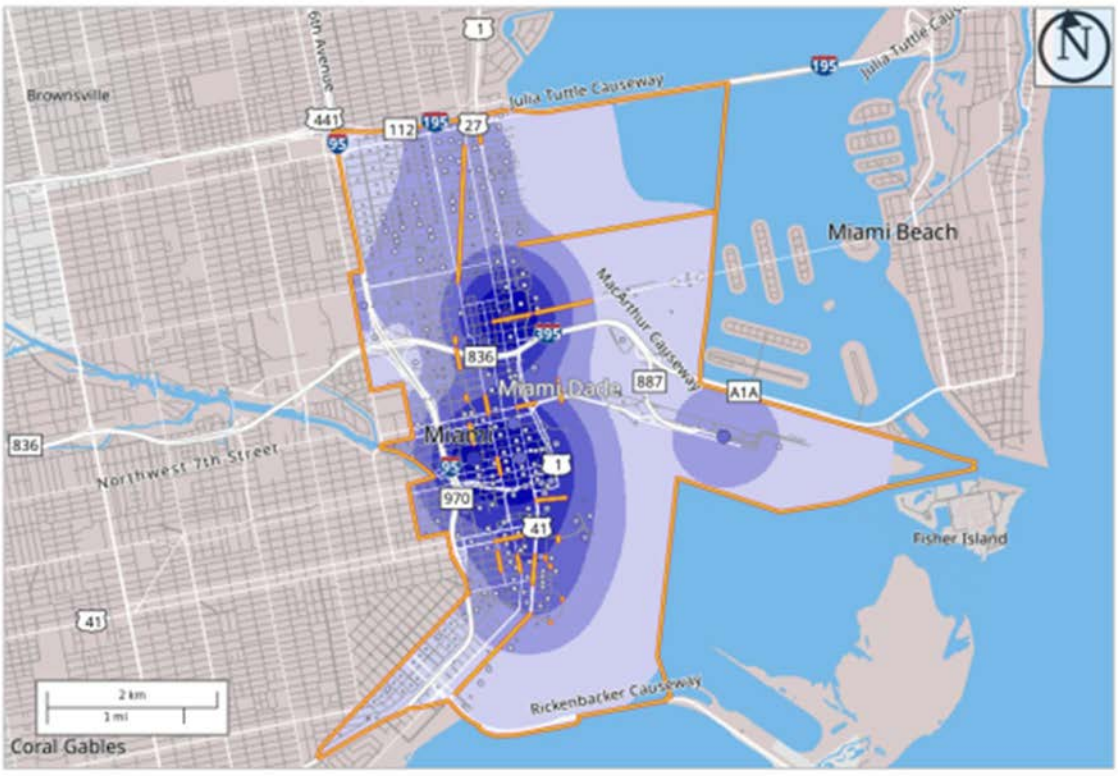
Work Area Profile Report

All Jobs for All Workers in 2020

Created by the U.S. Census Bureau's OnTheMap https://onthemap.ces.census.gov on 10/31/2023

Counts and Density of All Jobs in Work Selection Area in 2020

All Workers



Map Legend

Job Density [Jobs/Sq. Mile]
- 5 - 5,284
- 5,285 - 21,121
- 21,122 - 47,517
- 47,518 - 84,470
- 84,471 - 131,983

Job Count [Jobs/Census Block]
- 1 - 70
- 71 - 1,117
- 1,118 - 5,652
- 5,653 - 17,861
- 17,862 - 43,606

Selection Areas
- Work Area

LEGACY OF REDLINING AND SOCIAL EQUITY

The legacy of segregation remains persistent in today's Miami. The first practices of segregation in Miami can be traced back to the founding of the city in the 1880s, where an enclave of black settlers from the Bahamas settled and helped develop Coconut Grove. The black settlers were even part of the founding charter vote in Miami.

By 1896, by mandate of the state charter, a designated colored section of the city was required. In Mami's Colored Town, that area was defined by being west of the Flagler railroad tracks and north of the Miami River. Up to the 1930's Colored Town and Coconut Grove remained the only two places in Miami where black people could live.

Colored Town or Historic Overtown saw a great boon due to the railroad and the hospitality industry that it supported. Many significant African-American cultural figures like Cab Calloway, Zora Neale Hurston, Sam Cooke, Ella Fitzgerald, Nat King Cole visited, and NW 2 Avenue was soon known as "Little Broadway". Historic Overtown thrived into the 1940s as a center of culture and commerce for the black community, as seen in Figure 14.

Disinvestment in Historic Overtown and Coconut Grove's black communities began with the housing projects introduced under the New Deal programs. In efforts to relocate African Americans to the outskirts of the City, in 1937 the Liberty Square project in what is now Liberty City was developed. The 200-housing unit property was intended to serve middle-class back families and a small suburb developed in the area. Additional disfranchisement of the black community came through the practice of redlining. Redlining consisted of maps developed by the Homeowners Loan Corporation to grade the areas in the city from an 'A' to a 'D' based on factors like amenities, zoning, housing stock, and racial makeup.

Figure 14. Little Broadway in Overtown.

The redlining map for Miami is shown in Figure 15. 'A'-graded areas (shown in green) were seen as "desirable" and were extremely wealthy areas. Parts of Miami Beach and Coral Gables are examples of A-grade communities. These locations had no trouble receiving housing loans. 'D'-graded areas (shown in red) were deemed "hazardous" and were characterized by a large minority or poor white population. These places often had poor sanitation, industrial land uses, incinerators, railroads, and trash dumps nearby. Areas with 'C' and 'D' neighborhoods had a slim chance of getting mortgage lenders to invest. An example of a D-graded community is Hialeah. Areas without color on the map were used as farmland or for commercial/industrial purposes. These practices from the 1930s still impact Miami-Dade neighborhoods today and create current health inequalities due to temperature and environmental differences.

During the 1950s and 1960s urban renewal of Downtown Miami, the construction of I-95 and then the I-395/SR 836 decimated the black enclave in Overtown. There was an almost 80% decline in the black population, with population numbers dwindling from 50,000 to 10,000 residents. The area became economically destitute and suffered from extreme crime and poverty well into the 1980s.

Redevelopment and reinvestment in the area during the 1990s and 2000s brought about transit-oriented development, revitalization of historic properties, and gentrification to Overtown. The area has seen significant development and remains predominately black. Efforts are ongoing to preserve Overtown's history and limit its residents' displacement.

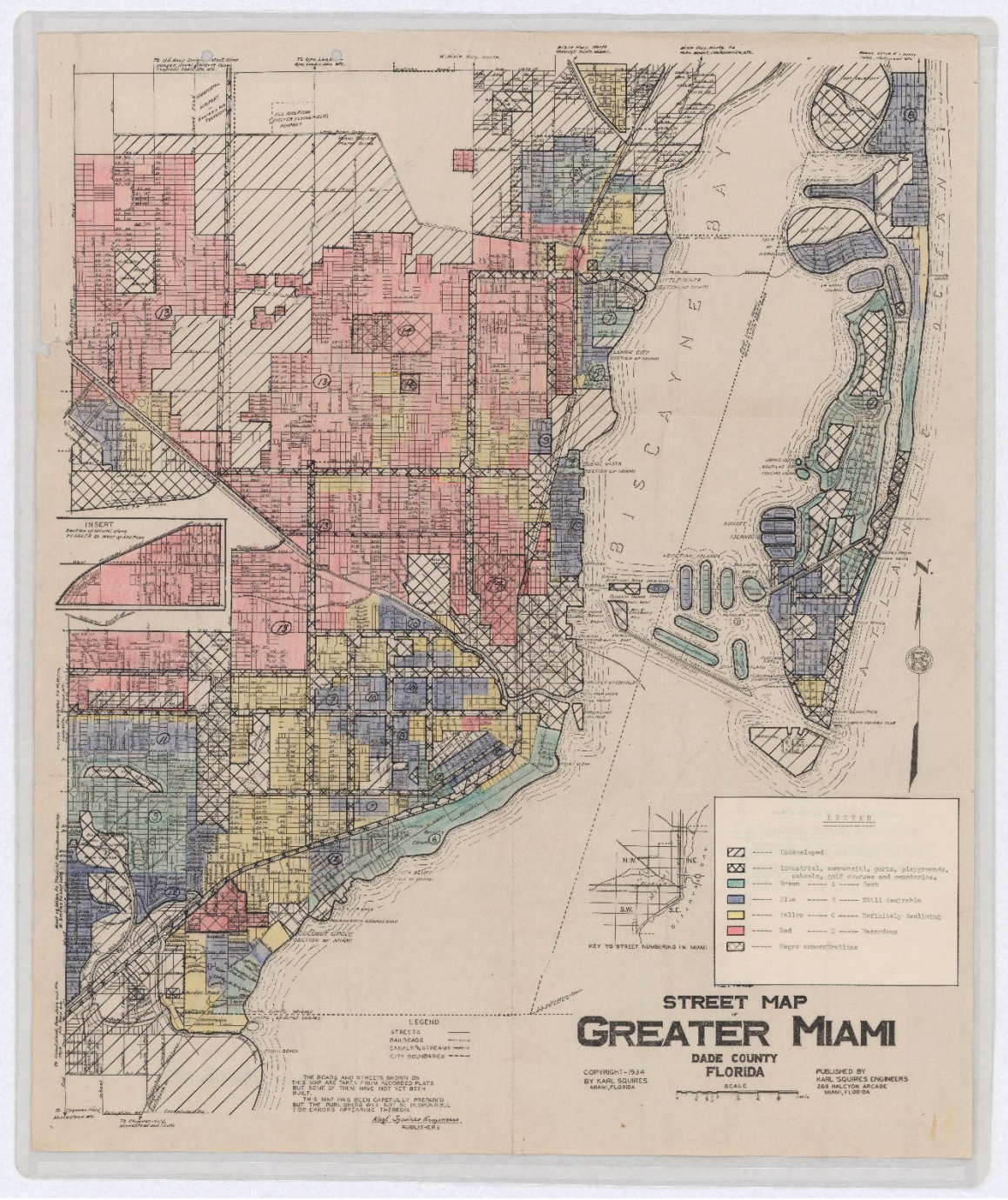


Figure 15. The Federal Home Loan Bank Board redlining map of Miami, Florida in 1934.

JUSTICE40 INITIATIVE

The Biden-Harris Administration created the Justice40 Initiative to confront and address decades of underinvestment in disadvantaged communities in the US. The initiative includes a series of changes to improve how the government ensures equitable distribution of the benefits of many federal programs. The categories of the Justice40 Initiative as seen in Figure 16, include climate change, clean energy and energy efficiency, clean transit, affordable and sustainable housing, training and workforce development, remediation and reduction of legacy pollution, and the development of critical clean water and wastewater infrastructure. Covered Federal investments include any grant or procurement spending, financing, staffing costs, or direct spending or benefits to individuals for a covered program in a Justice40 category.

Figure 16. Seven areas of federal investment are covered by the Justice40 Initiative. Link to the USDOT Justice40 covered program list.

To assist with identifying disadvantaged communities, a Justice40 analysis was completed in which disadvantaged census tracts within or adjacent to the study area were identified. In Florida, there are a total of 1721 disadvantaged census tracts; of those, 340 are located within Miami Dade. Within or adjacent to the study area, 13 disadvantaged tracts were identified. Figure 17 shows the census tracts in relation to the local communities they cover. Tracts have been identified as disadvantaged across eight different categories:

Table 8 shows the disadvantaged census tracts identified within and adjacent to the study area. The neighborhoods that fell within the census tracts, as well as the disadvantaged categories for each census tract are provided. The majority of the census tracts identified as disadvantaged were located at the periphery of the study area and reflect the historic redlining maps, as areas further from the City's demonstrated symptoms of the categories above.

Table 8. Justice40 Disadvantaged Census Tracts

Map ID	Census Tract ID	Neighborhoods	Total population	Disadvantaged Categories
1	12086002600	Midtown Old San Juan	7,025	1) Climate Change 2) Housing 3) Legacy pollution 4) Transportation 5) Water and wastewater 6) Workforce development
2	12086002300	Hadley Park	5,571	1) Health 2) Legacy pollution 3) Transportation 4) Water and wastewater 5) Workforce development
3	12086002202	Edison Buena Vista West Buena Vista Heights	6,020	1) Climate Change 2) Health 3) Legacy pollution 4) Transportation

Map ID	Census Tract ID	Neighborhoods	Total population	Disadvantaged Categories
				5) Water and wastewater 6) Workforce development
4	12086006601	East Little Havana The Roads	7,367	1) Climate Change 2) Housing 3) Transportation 4) Water and wastewater 5) Workforce development
5	12086003601	Culmer Lumus Park Government Center Riverfront	4,608	1) Climate Change 2) Health 3) Housing 4) Legacy pollution 5) Transportation 6) Water and wastewater 7) Workforce development
6	12086003001	Spring Garden Highland Park Civic Center	2,497	1) Climate Change 2) Health 3) Housing 4) Legacy pollution 5) Transportation 6) Water and wastewater 7) Workforce development
7	12086002800	Fashion District Wynwood Industrial District Old San Juan	1,083	1) Health 2) Housing 3) Legacy pollution 4) Transportation 5) Water and wastewater 6) Workforce development
8	12086002502	Santa Clara	3,667	1) Climate Change 2) Health 3) Housing 4) Legacy pollution 5) Transportation 6) Water and wastewater 7) Workforce development
9	12086002900	Santa Clara Allapattah Industrial District	6,506	1) Climate Change 2) Health 3) Housing 4) Legacy pollution 5) Transportation 6) Water and wastewater 7) Workforce development
10	12086003400	Culmer Southeast Overtown	2,756	1) Climate Change 2) Health 3) Housing 4) Legacy pollution 5) Transportation

Map ID	Census Tract ID	Neighborhoods	Total population	Disadvantaged Categories
				6) Water and wastewater 7) Workforce development
11	12086003100	Northeast Overtown Town Park Rainbow Village	5,115	1) Climate Change 2) Energy 3) Health 4) Housing 5) Legacy pollution 6) Transportation 7) Water and wastewater 8) Workforce development
12	12086006602	East Little Havana West Brickell	6,956	1) Climate Change 2) Housing 3) Legacy pollution 4) Transportation 5) Water and wastewater 6) Workforce development
13	12086003602	East Little Havana West Brickell Little Managua	6,933	1) Climate Change 2) Health 3) Housing 4) Legacy pollution 5) Transportation 6) Water and wastewater 7) Workforce development

[7] Source

[7] Justice40 November 2022 Version 1.0

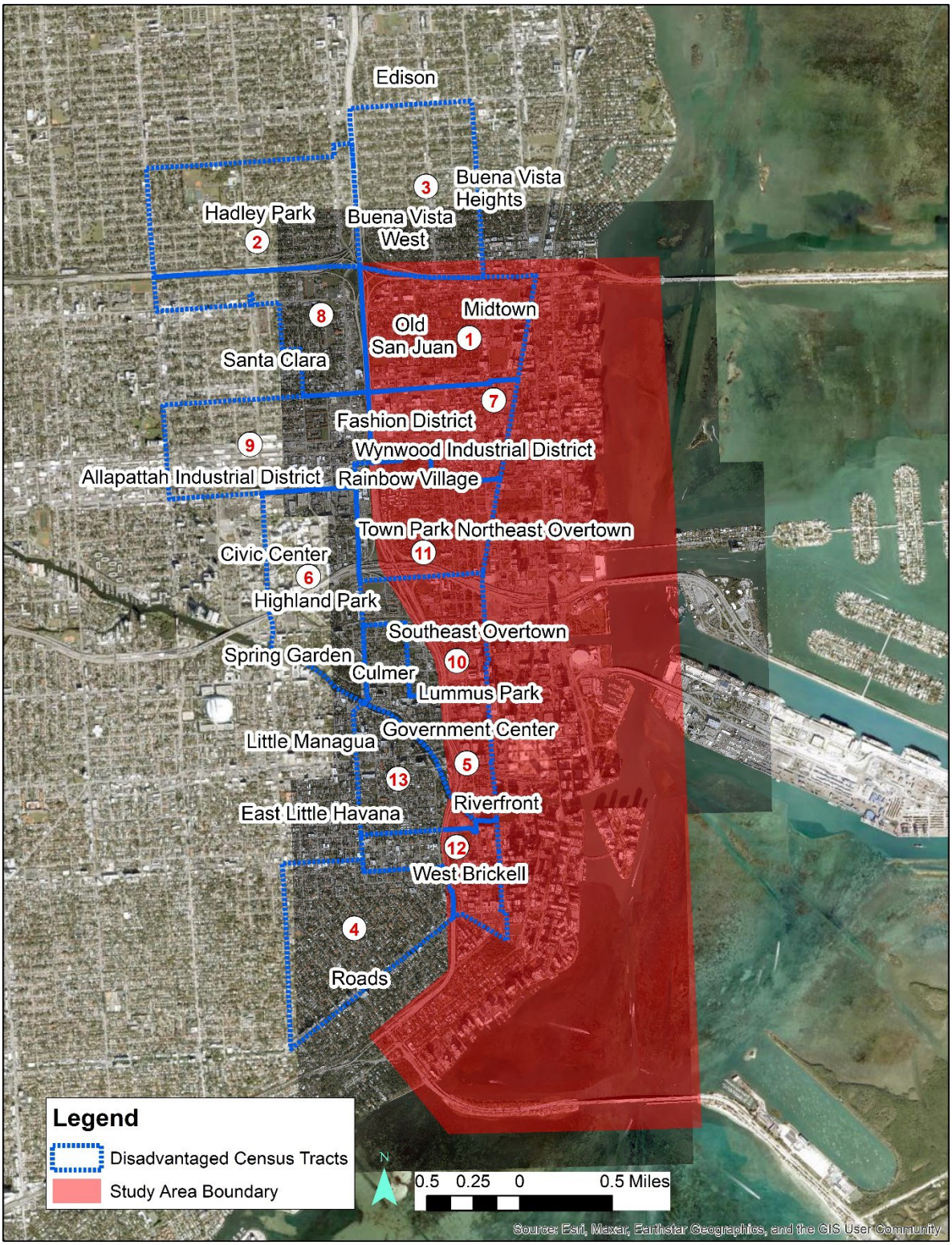


Figure 17. Map of Justice40 Disadvantaged Census Tracts within or adjacent to the study area.

COMPARISON OF 2003 PROJECTIONS & 2020 SERPM MODEL

The following task entails assessing the 2020 volumes of some of the major roadway segments specified in the earlier 2003 Downtown Master Plan (2003 MDTMP). A total of 40 locations were identified for the study team's evaluation of the 2020 conditions for the current master plan update. The task primarily includes the use of the original 2003 MDTMP 2020 projections being compared to the revised 2020 volumes, and developing a new set of 2020 projections.

As part of this task, the 2020 projections were developed based on the review of various data points, which are presented in Table 9. The table illustrates the 2003 MDTMP volumes, the Southeast Florida Regional Planning Model (SERPM) 2019 and 2015 volumes, and the 2019 and 2015 traffic counts as coded in the SERPM models. A thorough review of all these data points was conducted, and the final 2020 projections were developed based on reasonableness checks. Where necessary, the Florida Traffic Information Online (FTO) historic traffic counts were reviewed in conducting reasonableness checks.

The "Volume Location" column indicates the nearest points where the volumes are reported.

2020 Projections Methodology:

2020 projections are the final product of task 1.3. As described earlier, multiple data points were reviewed for developing these projections, and the most reasonable volumes were estimated. In the instances of missing 2019 counts, the SERPM 2019 volumes were used. Historical counts were cross-checked, especially when significant differences were observed between the 2003 MDTMP volumes and the updated SERPM counts and volumes.

Color Coding:

It was found that for some of the locations in 2003 MDTMP, the exact location of the data entry was not specified. For these corridors, the study team found reasons to include multiple entries for the same corridor, as the volumes are different among different segments. The yellow highlight in the table indicates the locations with multiple entries in the same corridor. As can be noted from the Table, the 2003 MDTMP volumes were specified in only one of the rows of these entries based on reasonableness checks.

In addition, the orange highlights were made to NW 2nd Avenue and NE 2nd Avenue entries, with the intention of highlighting significant differences in the current 2020 projections compared to the 2003 MDTMP volumes.

Comments Column:

The "Comments" column in the table provides a detailed rationale behind the use of separate estimates from those derived from 2019 counts.

Table 9. SEPRM 8 and SERPM 9 Volumes Comparison

Entry/Exit Station	2003 MDTMP FSUTMS Runs				Volume Location	SERPM9 2019		SERPM8 2015		2020 Projection	Comments
	1999 MUATS	2020 Baseline	2020 Enhanced	2020 Visionary		2019 Volumes	2019 Count	2015 Volumes	2015 Count		
1. Brickell Ave (South)	25,152	33,405	33,132	33,615	SE 25th Rd	18,953	27,000	1,322	26,500	27,000	
2. Miami Ave (South)	14,059	16,288	16,068	17,295	Halissee St	21,120	15,900	18,421	18,000	15,900	Historical counts reducing each Year

Entry/Exit Station	2003 MDTMP FSUTMS Runs				Volume Location	SERPM9 2019		SERPM8 2015		2020 Projection	Comments
	1999 MUATS	2020 Baseline	2020 Enhanced	2020 Visionary		2019 Volumes	2019 Count	2015 Volumes	2015 Count		
3. SW 3 AVE	32,693	30,488	32,292	39,271	SW 31st Ave	35,774	22,500	42,262	21,000	22,500	
4. I-95 off ramp/8 ST	952	3,474	2,629	13,366	8th St	6,918	4,700	6,506	4,400	4,700	
4. I-95 off ramp/8 ST					7th St	10,054	23,500	25,073	23,500	23,500	
5. I-95 on ramp/8 ST	11,849	11,311	10,884	32,885	Merge to outer lane	16,658	8,500	8,990	7,600	10,500	AADT in 2021 increased to 10500
5. I-95 on ramp/8 ST					Merge to inner lane	9,091	15,500	10,539	17,500	15,500	
5. I-95 on ramp/8 ST					South Bound	5,103	2,800	4,323	2,800	2,800	
6. SW 8 ST	25,707	30,778	27,341	23,212	SW 16th Ave	24,719	21,500	23,882	24,000	23,500	2020 AADT count is 23,500
7. SW 7 ST	13,768	11,116	20,124	17,141	SW 16th Ave	16,854	17,000	23,852	15,000	17,000	
8. SW 3 ST	6,442	9,145	9,208	21,958	SW 1st CT	3,334	-	3,051	-	3,334	
9. SW 2 ST	3,446	1,953	3,355	19,722	SE 1st Ave	14,070	-	18,587	-	14,070	
10. SW 1 ST	15,019	18,175	15,614	18,614	SW 24th Ave Entry	17,948	19,500	13,585	20,000	19,500	
11. Flagler St	17,822	16,296	17,777	32,362	NW 21st Ave	17,779	17,000	22,632	-	17,000	
12. NW 1 ST	12,443	18,175	23,480	23,270	NW 3rd Ave	6,315	17,000	9,310	20,000	17,000	
13. NW 3 AVE (NB)	5,897	5,204	8,591	20,954	NW 20th St	1,942	6,600	1,749	-	6,600	
14. I-95 off ramp	8,508	10,907	9,383	7,767	North Bound to CBD	6,272	15,000	4,135	19,500	15,000	
14. I-95 off ramp					South Bound to CBD	25,549	26,000	29,759	21,500	26,000	
15. NW 2 ST	6,787	9,755	11,373	13,890	N Miami Ave	1,098	6,700	2,064	6,600	6,700	
16. NW 3 ST	11,258	13,031	12,608	11,761	NW 2nd Ave	1,153	10,000	2,508	9,000	10,000	
17. NW 5 ST	10,008	9,595	10,687	14,775	NW 3rd Ave	13,766	7,200	21,102	10,500	9,000	2022 count from FTO website
18. NW 6 ST	10,118	10,714	12,231	9,681	NW 3rd Ave	10,455	4,000	18,739	4,600	5,500	2022 count from FTO website

Entry/Exit Station	2003 MDTMP FSUTMS Runs				Volume Location	SERPM9 2019		SERPM8 2015		2020 Projection	Comments
	1999 MUATS	2020 Baseline	2020 Enhanced	2020 Visionary		2019 Volumes	2019 Count	2015 Volumes	2015 Count		
19. NW 7 ST	7,509	6,981	6,663	12,752	S9-> NW 3rd Ave S8-> NE 2nd Ave	2,497	3,000	6,152	1,600	3,000	
20. NW 8 ST	11,888	13,967	16,686	16,337	NW 11th St	9,529	11,000	13,668	10,500	11,000	
21. I-95 on ramp	19,246	12,878	14,268	16,674	CBD to I95 North Bound	14,540	13,500	37,588	9,500	13,500	
21. I-95 on ramp					CBD to I95 South Bound	9,739	3,600	14,356	2,600	3,600	
22. NW 10 ST	3,494	9,285	9,108	12,536	NW 7th Ave	3,007	4,000	9,665	3,800	4,000	
23. NW 11 ST	1,753	9,632	10,114	13,396	NW 7th Ave	2,478	2,900	6,185	2,020	2,900	
24. NW 14 ST	5,992	2,812	10,572	12,099	N Miami Ave	1,933	8,800	8,935	4,900	8,800	
25. NW 17 ST	2,400	1,625	2,052	1,100	NW 7th Ave	1,609	3,400	5,913	2,700	3,400	
26. NW 20 ST	19,615	24,047	25,796	22,406	NW 12th Ave	13,340	27,500	8,595	37,000	27,500	
27. NW 2 AVE	28,077	35,895	41,772	55,539	NW 8th St	3,556	7,100	8,163	7,200	7,100	2022 count from FTO website
28. N Miami AVE	11,643	20,650	18,151	25,831	NW 20th St	21,925	17,200	16,114	32,000	17,200	
29. NE 2 AVE	29,991	36,800	39,307	46,859	NE 10th St	16,769	14,500	21,719	16,530	14,500	Count is reducing over years
30. Biscayne Blvd. (north)	29,279	37,065	37,657	46,525	Julia Tuttle CSWY	26,061	42,500	37,956	42,500	42,500	
31. NE 15 ST /Venetian Way	5,009	8,151	8,673	10,487	Venetian Way	5,109	12,500	10,279	11,500	12,500	
32. I-395 WB off ramp	11,022	5,495	5,723	66,426	I95 South	9,683	16,500	10,200	16,000	16,500	
32. I-395 WB off ramp					I95 North	16,110	23,500	17,803	24,300	23,500	
33. I-395 EB off ramp	10,660	2,353	2,809	163	EB off ramp	8,286	15,500	24,086	13,700	15,500	
34. I-395 WB on ramp	23,928	32,689	34,945	48,367	I95 South Bound	26,643	39,500	35,376	40,000	39,500	
34. I-395 WB on ramp					I95 North Bound	13,305	21,500	25,834	21,000	21,500	
35. I-395 EB on ramp	25,081	33,454	32,421		I95 South Bound	15,830	26,500	26,475	23,000	26,500	
35. I-395 EB on ramp					I95 North Bound	6,956	15,000	14,897	12,500	15,000	

Entry/Exit Station	2003 MDTMP FSUTMS Runs				Volume Location	SERPM9 2019		SERPM8 2015		2020 Projection	Comments
	1999 MUATS	2020 Baseline	2020 Enhanced	2020 Visionary		2019 Volumes	2019 Count	2015 Volumes	2015 Count		
36. CBD WB on Miami AVE	15,856	17,659	17,266		S Miami Ave and SW 2nd st	22,976	13,500	39,094	9,500	13,500	
37. CBD EB off Miami AVE	4,630	12,808	13,032		S Miami Ave and I 95 and SE 1st Pl	3,443	4,700	276	7,100	4,700	
38. CBD EB off NE 1 AVE	5,046	2,405	1,742		NE 4th St	3,443	3,500	276	2,500	3,500	
39. CBD WB on SE 2 AVE	8,010	8,234	8,441		SE 2nd St and SE 2 Ave	13,065	14,500	13,038	16,500	11,500	2022 count from FTO website
40. CBD EB off SE 2 AVE	16,637	19,222	18,631		I95 Highway and SE 2nd Ave	21,983	20,000	25,751	25,000	20,000	

Appendix:

NW 2nd Avenue Example of Historical Data Verification

FLORIDA DEPARTMENT OF TRANSPORTATION
NM TRANSPORTATION STATISTICS OFFICE
2022 HISTORICAL AADT REPORT

COUNTY: 87 - MIAMI-DADE

SITE: 7062 - NW 2ND AVE 100 FT SOUTH OF NW 8TH ST

YEAR	AADT	DIRECTION 1		DIRECTION 2		*K FACTOR	D FACTOR	T FACTOR
2022	7100 F	N	4000	S	3100	9.00	54.70	3.20
2021	7200 C	N	4100	S	3100	9.00	54.30	3.20
2020	5500 E					9.00	54.20	15.90
2019	5500 S	N	2700	S	2800	9.00	54.60	4.90
2018	5500 F	N	2700	S	2800	9.00	54.30	4.90
2017	5500 C	N	2700	S	2800	9.00	55.00	4.90
2016	6500 F	N	3800	S	2700	9.00	54.50	6.70
2015	6200 C	N	3600	S	2600	9.00	54.70	6.70
2014	4600 S	N	2400	S	2200	9.00	54.50	8.10
2013	4600 F	N	2400	S	2200	9.00	52.40	8.10
2012	4600 C	N	2400	S	2200	9.00	55.70	8.10
2011	7200 F	N	3700	S	3500	9.00	55.10	7.80
2010	7200 C	N	3700	S	3500	8.98	54.08	7.10
2009	7100 C	N	3700	S	3400	8.99	53.24	5.40

NE 2nd Avenue Example of Historical Data Verification

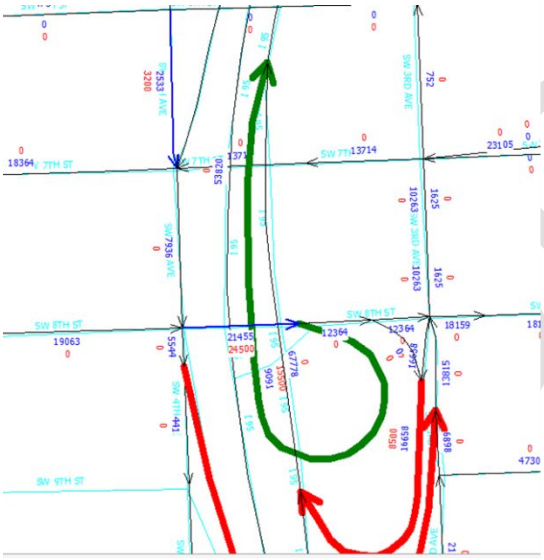
FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION STATISTICS OFFICE
2022 HISTORICAL AADT REPORT

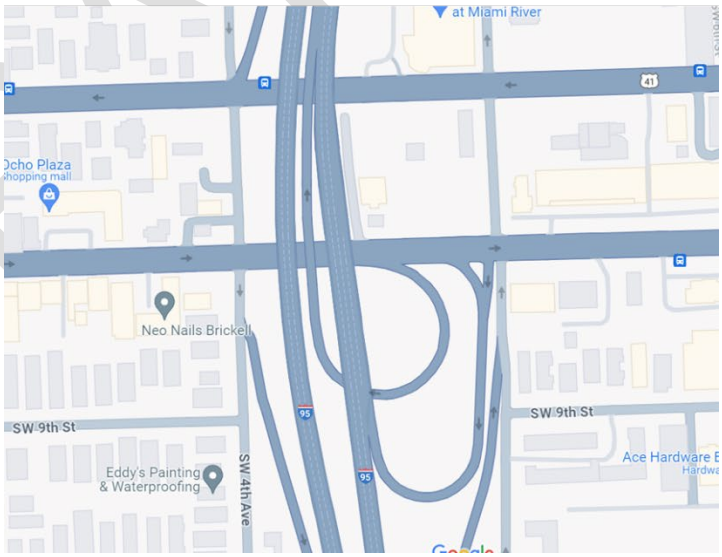
COUNTY: 87 - MIAMI-DADE

SITE: 3060 - NE 2 AVE, 200'N OF NE 9 ST.

YEAR	AADT	DIRECTION 1	DIRECTION 2	*K FACTOR	D FACTOR	T FACTOR
2022	11500 C	S 11500	0	9.00	99.90	6.90
2021	10000 C	S 10000	0	9.00	99.90	8.10
2020	8200 C	S 8200	0	9.00	99.90	7.20
2019	14500 C	S 14500	0	9.00	99.90	3.90
2018	15000 C	S 15000	0	9.00	99.90	3.50
2017	13500 C	S 13500	0	9.00	99.90	4.10
2016	13000 C	S 13000	0	9.00	99.90	13.70
2015	16500 C	S 16500	0	9.00	99.90	9.60
2014	16000 S			9.00	99.90	16.30
2013	16000 F	0	0	9.00	99.90	16.30
2012	16500 C	S 16500	0	9.00	99.90	16.30
2011	19000 C	S 19000	0	9.00	99.90	16.30
2010	15000 C	S 15000	0	8.98	99.99	16.30
2009	12000 C	S 12000	0	8.99	99.99	13.80
2008	10500 C	S 10500	0	9.09	99.99	16.70
2007	13500 F	0	0	8.01	99.99	13.70

I-95 SW 8th Street on Ramp (NB on ramp multiple entries demonstration)





OTHER SIGNIFICANT SHORT-, MID-, AND LONG-TERM PROJECTS

The next section consists of a review to identify all significant short--, mid-, and long-term projects that were not considered in the 2003 MDTMP within the study area. This assessment includes an examination of the following documents:

- 2024 Transportation Improvement Program (TIP)
- 2045 Long Range Transportation Plan (LRTP)

- FDOT – D6 Five-Year Work Program
- 2023 – 2032 DTPW Transit Development Plan (TDP)
- 2021 Miami-Dade County Vision Zero Framework Plan
- 2045 Miami-Dade County Downtown Bike Master Plan
- 2025 Downtown Miami Masterplan
- Commodore Trail Master Plan
- 2015 The Underline Master Plan
- 1989 City of Miami Comprehensive Neighborhood Master Plan (amended through Oct. 2019)
- FDOT District 6 Bike Network Plan
- Better Bus Project

THE UNDERLINE MASTER PLAN

The Underline is a transformative project in Miami, spanning from the Miami River near Brickell Avenue (SR 5/US-1) to the Dadeland South Metrorail Station. Figure 18 depicts the cover of the original Underline Plan in 2015. This ambitious initiative serves a dual purpose as an urban trail and a linear park, with the potential to significantly boost economic development by increasing property values along its corridor. Beyond economics, The Underline aims to promote a healthier lifestyle, offering alternatives to driving through walking and biking options, complemented by various recreation features like walking/running and biking trails, basketball courts, and soccer fields. With its generous width and strategic location beneath the Metrorail line and parallel to SR 5/US-1, The Underline is poised to become a vital transportation solution, encouraging public transportation use and off-road cycling within a beautiful natural setting. Moreover, it acts as a gateway to surrounding communities, fostering connectivity and community identity. Ultimately, The Underline envisions itself as a signature linear park, urban trail, and living art destination that embodies the spirit of Miami, promoting mobility, recreation, community engagement, and a healthier lifestyle while inspiring innovation in open space and transportation planning. The Miami DDA increased its boundaries to include the Underline in 2019.

Figure 18. The Underline Master Plan

Status:

Phase 1 – *the ½ mile section from the Miami River to SW 13th Street was completed and opened in February 2021. Phase 3,*

Phase 2 – *with a length of more than 2 miles from SW 13th Street to SW 19th Avenue, this segment is currently under construction, and it is expected to be completed in the Spring of 2024.*

Phase 3 – *spanning approximately 7 miles from SW 19th Avenue to Dadeland South Metrorail Station, this segment began construction in October 2023 and is expected to be completed in 2026.*

MAJOR PROJECTS IN THE STUDY AREA

Short-range/Minor Improvements

1. For SW 7th Street, the suggested enhancements involve incorporating early indicators and ensuring an 18-foot crossing width.
2. The proposed changes for the Brickell Bus Turnaround involve relocating the pedestrian path to SW 1st Avenue and ensuring a 10-foot crossing width for the bike path at SW 1st Court. It also includes the installation of early indicators and buffer space. The bus turnaround will be rebuilt to reduce elevation changes at the crossing. The cross-slope in the bike path should be as flat as possible, and a flat-channel curb ramp opening designed for the bike path is preferred over a pedestrian design.
3. For SW 15th Road, SW 25th Road, and SW 26th Road, the proposed improvements include installing early indicators and buffer space, and there is a recommendation to provide 18-foot wide crossings on these roadways.

Mid-range/ Medium Improvements:

1. For SW 8th Street, the proposed measures include maintaining a straight approach, incorporating early indicators, and adding a crosswalk on the SW 1st Court. There is a consideration that signalizing SW 1st Court may be necessary, operating it as part of the SW 1st Avenue signalized intersection.
2. For SW 13th Street (Coral Way), the improvement actions involve maintaining a straight approach, incorporating early indicators, and considering either a tabled crossing or re-aligning SW 13th Street to create a median refuge for the existing mid-block crossing. Additionally, a minimum 18-feet crossing width is advised.

Long-range/Major Improvements: None

2025 DOWNTOWN MIAMI MASTERPLAN

The goal of the Downtown Miami Master Plan is to seamlessly connect and harness the full potential of the Central Business District (CBD), the Arts & Entertainment (A+E) District, Brickell, and Miami's waterfront. Drawing upon prior planning efforts and comprehensive studies, the Master Plan (accessible via the caption for Figure 19) delineates actionable steps designed to enhance the downtown experience, incentivize private sector investments, and ensure the proper allocation of public resources. Rooted in the vision that Downtown Miami should stand as the ultimate business, social, and cultural epicenter of the Americas, this plan strategically leverages its unique status as a major World city nestled within a tropical waterfront environment. The plan is framed by the following goals:

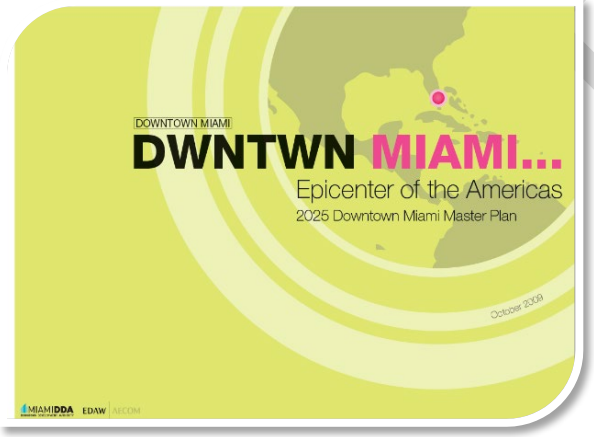


Figure 19. 2025 Downtown Miami Master Plan

1. Enhance Downtown Miami's position as the business and cultural hub of the Americas with ongoing development, cultural institutions like the Peréz Art Museum Miami, a planned convention center, and the attraction of major corporations reinforcing its status.
2. Leverage the stunning tropical waterfront of Biscayne Bay and the Miami River, providing unique opportunities for serenity and commercial activity, with numerous access points, public parks, and waterfront walks enhancing its appeal.

3. Elevate two iconic streets, Biscayne Boulevard (SR 5/US-1) and Brickell Avenue (SR 5/US-1), to international prominence by transforming them into vibrant and attractive public spaces comparable to renowned streets like Champs- Élysées in Paris, France or Las Ramblas in Barcelona, Spain.

4. Create exceptional streets and community spaces downtown, recognizing that it is not just buildings but the people and their experiences that define its character, emphasizing the importance of high-quality public realms.

5. Promote transit and regional connectivity to ensure convenient access to Downtown Miami, with a focus on developing diverse transportation options that facilitate movement within the downtown area, making it easier for people to conduct business, shop, work, and live in the region.

Major Projects in the Study Area

Short-range/Now & Short

1. Redevelop Flagler Street into Miami's Pedestrian-Oriented Main Street
2. Enhance Connectivity to Neighborhoods Surrounding Downtown
3. Enhance Downtown Corridors through the Development and Implementation of Streetscape Guidelines
4. Connect and Promote Downtown Parks, Open Spaces, and Greenways
5. Rebalance Roadways Towards Transit, Pedestrians, and Cyclists.
6. Promote Neighborhood Level Transit such as Streetcar, Expanded Metromover, and Trolley Services
7. Support Transit with Carsharing, Bike Rentals/Bikesharing, PediCabs, and Other Creative Mobility Solutions

Mid-range/Medium

1. Promote Metropolitan Level Transit such as *Baylink*, Expanded Metrorail, and Light Rail

Long-range:

1. Promote Regional Level/Commuter Transit such as the FEC Corridor, Tri-Rail, and High-Speed Rail
2. Develop a Viable Downtown Intermodal Center at the Government Center or Historic Overtown/Lyric Theater Metrorail Stations

2045 MIAMI-DADE COUNTY LONG RANGE TRANSPORTATION PLAN

The Miami-Dade County Long-Range Transportation Plan (LRTP) is a crucial component of Miami-Dade County's transportation planning process. Federal and state regulations mandate an LRTP update every five years, and it requires the LRTP to encompass a planning horizon of at least 20 years from the Miami-Dade TPO adoption date. The 2045 LRTP received approval from the Miami-Dade TPO Governing Board in September 2019. It outlines four distinct planning periods, each with its implementation years: Plan Period I (2020-2025), Plan Period II (2026-2030), Plan Period III (2031-2035), and Plan Period IV (2036-2045). Additionally, the plan includes a list of partially funded and unfunded projects, as well as projects funded by the private sector, developers, and set-aside funds. Figure 20 leads to the document's TPO webpage.

Figure 20. 2045 Miami Dade County Long Range Transportation Plan

Major Projects in Study Area

1. SR 5/US-1 from SW 72nd Street to SE 13th Street: Install Fiberoptic Communications for Traffic Surveillance and Control Systems:

Priority 1: TIP and 2025

1. Implement Bus Express Rapid Transit Service:
    a. Beach Express North: from the Miami Beach Convention Center to the Golden Glades Multimodal Transportation Facility
    b. Beach Express Central: from the Miami Beach Convention Center to the Civic Center Metrorail Station
    c. Beach Express South: from the Miami Beach Convention Center to the Downtown Intermodal Terminal
2. Construct Transit Terminal with six bus bays at Mount Sinai Transit Terminal - SMART Terminal: I-195 (SR 112)/907
3. Interchange Improvement: at the SB SR 9A (I-95) towards WB SR 836 (Dolphin Expressway)
4. Bridge Replacement and Add Lanes: SR 836 (Dolphin Expressway)/I-395 (SR 836): West of I-95 (SR 9) to MacArthur Causeway Bridge
5. New Express Bus Service: I-195 (SR 112) Bus on Shoulders (Roadway Improvements): I-95 (SR 9) to SR 907 (Alton Road)
6. New Road: I-195 (SR 112) Frontage Road and Ramp Realignment (Miami Design District)

Priority 2: 2026-2030

1. Construct a park-and-ride/transit terminal with 100 surface parking spaces
    a. Midtown Station - SMART Terminal: US 1 (Biscayne Blvd/SR 5/US-1) and NE 39th Street
2. Modify Interchange: I-95 (SR 9) Interchange: at SW 7th Street and SW 8th Street (Tamiami Trail/ SR 90/US-41)
3. Operational and Capacity (PD&E and Design): I-195 (SR 112) Corridor Improvements: NW 12th Avenue (SR 933) to SR 907 (Alton Road)

Priority 3: 2031-2035 - none

Priority 4: 2036-2045

1. PortMiami Tunnel Oversight Consultant for PortMiami Tunnel: MacArthur Causeway to PortMiami
2. Project Financing: PortMiami Tunnel-Phase 52, 82, and A8, Watson Island to MacArthur Causeway Bridge
3. Ultimate Plan Study (Managed Lanes /Capacity /Operations) for I-95 (SR 9): US 1(South Dixie Highway/SR 5) to Broward County Line
4. Planning Study Segment 1 for I-95 (SR 9) Corridor: SR 5 (US-1/ Dixie Highway) to South of I-395 (SR 836/Dolphin Expressway)
5. Planning Study Segment 2 for I-95 (SR 9) Corridor: North of I-395 (SR 836/Dolphin Expressway) to South of NW 62nd Street (Dr. Martin Luther King Jr. Boulevard)

Partially Funded:

1. Rapid Transit connecting Midtown/Miami CBD to the Miami Beach Convention Center area.
    a. Beach Corridor: Midtown Miami and Downtown to Miami Beach Convention Center
2. Project Development & Environmental for SR 9A (I-95): SR5 (US 1/South Dixie Hwy) to South of NW 62nd Street (Dr. Martin Luther King Jr. Boulevard)
3. Modify (IMR) SR 112 (I-195) at Miami Avenue Interchange Improvement

Unfunded:

1. Preserve existing transit facilities and equipment, including improving service reliability, safety, quality, convenience, and comfort.
    a. Government Center Station (Downtown Miami Development of Regional Impact - Increment III)
2. Improve the speed, reliability, identity, comfort, and convenience of transit.
    a. Coral Way (SR 972) Enhanced Bus: SW 147th Avenue and SW 8th Street to Brickell Metrorail Station
    b. NW 7th Avenue Enhanced Bus: from Downtown Miami to the Golden Glades Interchange and from the Dolphin Station to the Government Center
3. Improve regional and local connectivity, including improving the speed, reliability, comfort, and convenience of transit while serving new markets and supporting economic vitality.
    a. Metromover Brickell Loop Extension: Financial District Metromover Station
    b. Metromover Omni Extension: School Board Station
4. Enhance regional connectivity by developing a multimodal transit hub with convenient access to jobs, housing, goods, and services. This also includes improving quality, safety, convenience, comfort, and accessibility while serving new markets and increasing system integration.
    a. Metrorail/Tri-Rail Bus Hub Improvements: Metrorail/Tri-Rail Transfer Station
5. Improve the speed, reliability, identity, comfort, and convenience of transit.
    a. SW 8th Street Enhanced Bus: FIU-Modesto A. Maidique Campus to Brickell Metrorail Station
    b. Systemwide Off-street Bus Stop Enhancement
6. Provide alternatives to local commuters driving single-occupancy private automobiles while providing viable as well as attractive mobility options for tourists and other visitors

a. Water Borne Transit Service for the Biscayne Bay

7. Electric Car Charging Stations Countywide
8. Exclusive transit lanes, barrier-separated bicycle lanes/shared-use paths, and widened sidewalks connecting with the Government Center

a. MacArthur Causeway (SR A1A) TSM&O: from US-1(South Dixie Highway/SR-5) to Ocean Drive.

MDTPO TRANSPORTATION IMPROVEMENT PROGRAM (TIP): FISCAL YEARS 2024-2028

The Transportation Improvement Program (TIP) for Fiscal Years 2023/2024 to 2027/2028 is an annual document mandated by federal regulations, ensuring that transportation projects are eligible for federal funding in Miami-Dade County. The TIP serves as a strategic roadmap, ensuring project consistency with broader planning documents and facilitating periodic evaluations by the TPO. Aligned with the Long-Range Transportation Plan (LRTP) the TIP prioritizes key transportation projects over a five-year period.

Emphasizing the initial three years but spanning five, the TIP outlines proposed transportation improvements, including Intermodal, Highway, Transit, Aviation, Seaport, and Non-Motorized projects totaling $11.702 billion. Projects are classified by funding sources. During the 2024-2028 period, a notable portion of funding has been secured for public transit projects. The following is a list of major projects within the study area included in the 2024-2028 TIP document for funding.

PART 1: 4- YEAR FEDERALLY FUNDED MAJOR PROJECTS

TPO Project No. DT2516881: A total of $62 million in funding was secured for Bridge Replacement and Additional Lanes along SR 836/I-395 for the segment west of I-95 to the MacArthur Causeway Bridge.

TPO Project No. TA4522391: The Northeast Corridor Smart Commuter Rail secured a total of $207 million of funding from the Federal Transit Administration (FTA) for the Urban Corridor Improvements.

TPO Project No. DT4227135: The Venetian Causeway Bridge Replacement (#874461) secured a total of $150,000 from the Advance Construction (BRT) (ACBR) for Preliminary Engineering.

TPO Project No. DT4227137: The Venetian Causeway Bridge Replacement (#874465) secured a total of $150,000 from ACBR for Preliminary Engineering.

TPO Project No. DT4460531: The City of Miami, I-395 Pedestrian Baywalk Connection, secured a total of $1.05 million from Transportation ALTS -Any Area, and Transportation ALTS- >200K for the construction of a Pedestrian/Wildlife Overpass.

TPO Project No. DT4507331: The Flagler Street Smart Demonstration Project secured a total of $5.126 million from STP Urban Areas > 200k for Preliminary Engineering construction.

The TIP also includes a list of FDOT, District 6 major projects that are located within Miami-Dade, related to improvements to highways, transit, aviation, rail, seaport, freight, and bicycle/pedestrian modes over the 2023 through 2028 period. The section below lists the major projects located within the study area.

PART 2: 5- YEAR PROJECT LISTINGS STATE TRANSPORTATION SYSTEMS AND MAJOR PROJECTS

TPO Project No. SP4333631: The Port of Miami Cruise Terminal Improvements under the Seaport Capacity Project has a proposed funding total of $67.385 million.

TPO Project No. TA4204625: The Urban Corridor Improvements for the I-95 Express Downtown Miami transit route, a Miami Central Business District, has a proposed funding total of $40.658 million.

TPO Project Nos. TA366951 to TA366957: The City of Miami has a proposed funding total of $7.128 million for the purchase and replacement of trolley vehicles and equipment.

TPO Project No. TA4522391: The Northeast Corridor Smart Commuter Trail, Urban Corridor Improvements has proposed total funding of $414 million.

TPO Project No. DT2511562: The Port of Miami Tunnel has proposed funding of $17.749 million for the construction of a new road between the Port and SR 836/I-395.

TPO Project No. DT2516881: FDOT has proposed total funding of $952 million for bridge replacement and additional lanes on SR 836/ I-395 for the segment West of I-95 to the MacArthur Causeway Bridge.

TPO Project No. DT4227131: FDOT has a proposed total funding of $38.227 million for the rehabilitation of bridges along the Venetian Causeway from NE 15th Street (City of Miami) to Dade Boulevard (City of Miami Beach).

TPO Project No. DT4234521: FDOT has proposed funding of $1.697 million to provide landscaping along SR 9A/I-95 for the segment between NW 8th Street and NW 17th Street.

TPO Project No. DT4234522: FDOT has proposed funding of $2.288 million to provide landscaping along SR 9A/I-95 for the segment between NW 32nd Street and NW 47th Terrace.

TPO Project Nos. DT4295361 to DT4295367: FDOT has proposed total funding of $6.632 million to provide pedestrian safety improvements in Miami-Dade County, including sidewalks and ADA-compliant push buttons at crosswalks.

TPO Project No. DT4234522: FDOT has proposed funding of $2.288 million to provide landscaping along SR 9A/I-95 for the segment between NW 32nd Street and NW 47th Terrace.

TPO Project No. DT4352011: FDOT has proposed total funding of $22.280 million for the FDOT District 6, Districtwide Traffic Signal Systems Retiming Project.

TPO Project No. DT4355732: FDOT has proposed total funding of $6.389 million for the FDOT District 6, Districtwide Pedestrian & Bicycle Safety Program's Traffic Engineer Study.

TPO Project No. DT4364261: FDOT has proposed total funding of $2.112 million for Modal System Planning for SR 948/NW 36th Street for the segment between SR 826/Palmetto Expressway and SR5/US 1.

TPO Project No. DT4377821: FDOT has proposed total funding of $15.565 million for Project Development and Environmental (PD&E)/Environmental Management Office (EMO), Bus Rapid Transit Study for SR968/Flagler from SR 821/ Homestead Extension of the Florida Turnpike to SR 5/Biscayne Boulevard.

TPO Project No. DT4402281: FDOT has proposed total funding of $7.629 million for Transportation Planning and a PD&E/EMO study for I-195 /SR 112 for the segment between NW 12th Avenue to SR 907/ Alton Road.

TPO Project No. DT4424322: FDOT has a proposed total funding of $11.689 million for a Bicycle Path/Trail on MacArthur Causeway from east of SR 5/ Biscayne Boulevard to west of SR 907/ Alton Road.

TPO Project No. DT4438901: FDOT has a proposed total funding of $3.009 million for Rigid Pavement Rehabilitation of the SR 970/SR 5/Downtown Distributor Ramp from South Miami Avenue to SE 2nd Avenue.

TPO Project No. DT4438941: FDOT has proposed total funding of $3.974 million for Rigid Pavement Rehabilitation of the SR 9A/ I-95 Ramps at SR 90/ SW 8th Street and SW 7th Street.

TPO Project No. DT4438961: FDOT has proposed total funding of $5.483 million for Rigid Pavement Rehabilitation of the SR 9A/ I-95 Southbound Off-Ramp to SW 25th Road.

TPO Project No. DT4439051: FDOT has proposed total funding of $1.928 million for Resurfacing SR 90/US 441/SW 7th Street from Brickell Avenue to the west of SW 2nd Avenue.

TPO Project No. DT4439111: FDOT has proposed total funding of $3.552 million for Resurfacing SR 5/US 1/Biscayne Boulevard from south of NE 5th Street to NE 11th Street.

TPO Project No. DT4439131: FDOT has proposed total funding of $4.306 million for Rigid Pavement Rehabilitation of SR 886/ Port Boulevard, from Biscayne Boulevard to Port Miami.

TPO Project No. DT4444501: FDOT has a proposed total funding of $5.873 million for the installation of a Roundabout at SR 972/SW 13th Street/SW 3rd Avenue/Coral Way on SW 15th Road.

TPO Project Nos. DT4446221 FDOT has proposed total funding of $16.254 million for Miscellaneous Construction on SR 112/ I-95/ Julia Tuttle Causeway from East of SR 5/Biscayne Boulevard to Alton Road.

TPO Project No. DT4448011: FDOT has proposed total funding of $5.976 million to Paint the westbound SR 913 Ramp to the I-95 northbound bridge.

TPO Project No. DT4448021: FDOT has proposed total funding of $3.060 million to Paint the westbound SR 913 Ramp to the US 1 southbound bridge.

TPO Project No. DT4460531: The City of Miami, I-395 Pedestrian Baywalk Connection, has a proposed total funding of $4.279 million for the construction of a Pedestrian/Wildlife Overpass.

TPO Project No. DT4477511: FDOT has proposed total funding of $2.373 million to Paint the SR 970/ Downtown Distributor bridge from US 1 to I-95 northbound bridge #870475.

TPO Project No. DT2506103: FDOT has proposed total funding of $30,000 to Landscape SR 5/US 1 from SE 5th Street to SE 25th Road.

TPO Project No. DT4476011: Miami-Dade County has proposed total funding of $460,000 for Pedestrian and Safety Improvements under the Safe Routes to School program for Booker T. Washington Senior High School.

TPO Project No. DT4522031: FDOT has proposed total funding of $2.4 million for the FDOT District 6 Electric Vehicle ChargingProgram.

MIAMI-DADE 2045 BICYCLE AND PEDESTRIAN MASTER PLAN

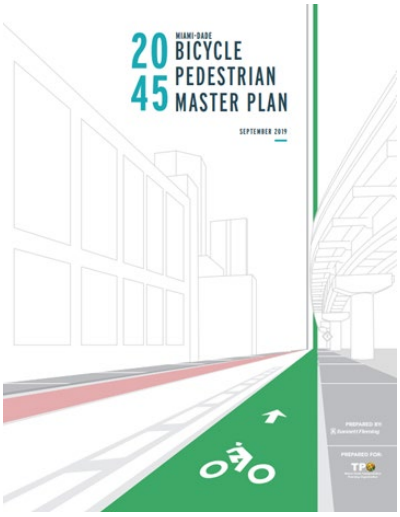


Figure 21. 2045 Miami Dade Bicycle and Pedestrian Master Plan

The Miami-Dade 2045 Bicycle and Pedestrian Master Plan, as seen in Figure 21, is a comprehensive strategy that evaluates opportunities within the SMART Plan transit hubs and stations to extend the reach of bicycle and pedestrian trips throughout the entire county, with the support of transit connections. The primary objective of this plan is to prioritize the needs of daily commuters and encourage projects that provide safe and convenient connections for the maximum number of individuals, especially those who rely on these modes of transportation the most, to a wide range of destinations on a daily basis.

In addition to facilitating daily commutes, the plan also considers other important pedestrian and bicycle trip destinations, including educational institutions, major medical centers, high-employment areas, and outdoor recreational locations. The plan realizes that these opportunities will contribute to addressing the ongoing issue of traffic congestion that is common in metropolitan areas and promote the development of healthy and sustainable communities within Miami-Dade County.

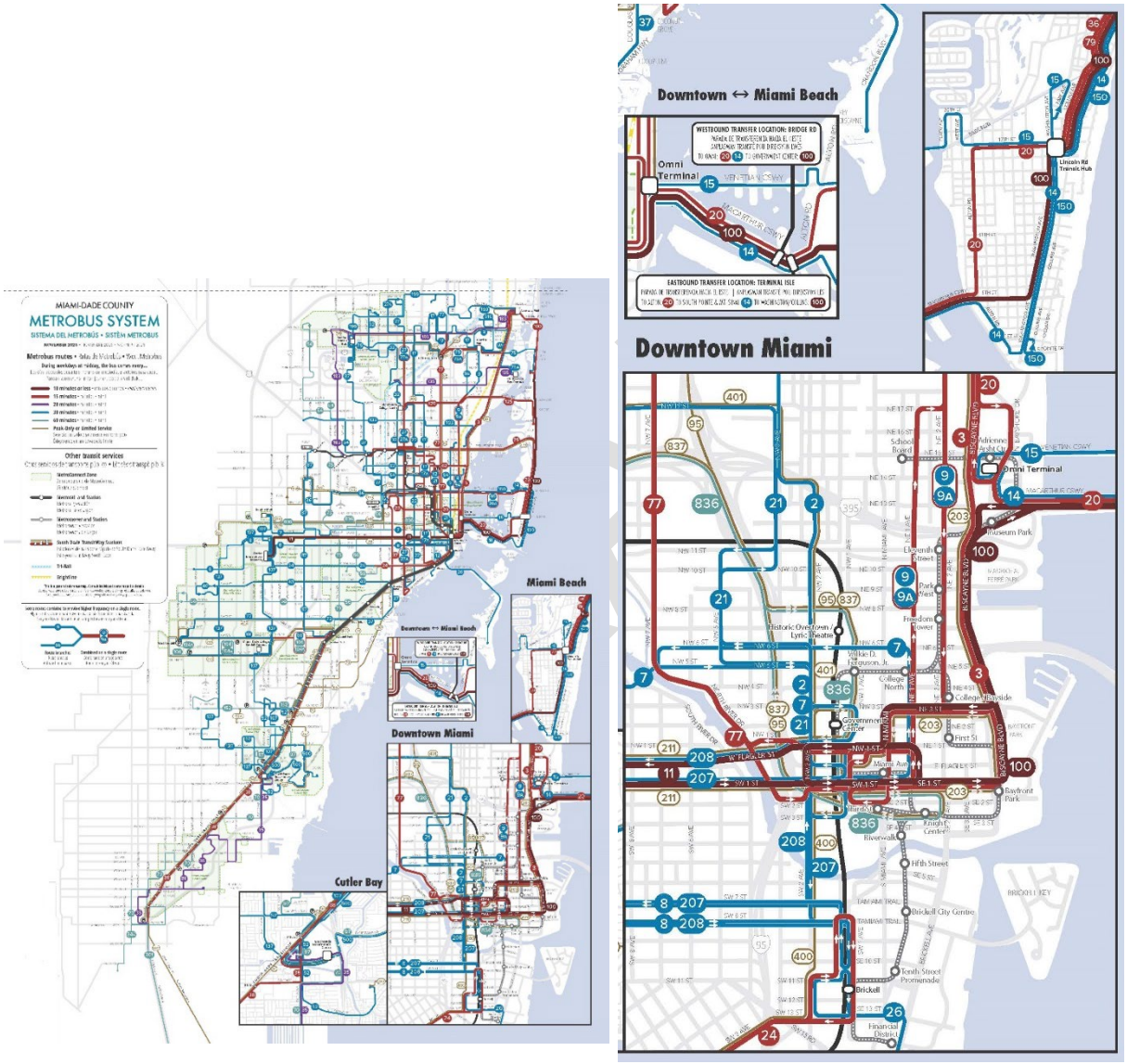
This plan serves as the non-motorized component of the 2045 Long Range Transportation Plan (LRTP), emphasizing the significance of enhancing non-motorized transportation options within the county's transportation network. The following is a list of the projects included in the 2045 Bicycle Pedestrian Master Plan that also fall within the study area.

- Safe Routes to School, Jose de Diego (Project #4): Improvements to create safe routes to school for students.
- The Underline, Dadeland South to Miami River, Trail Improvements (Project #55): Enhancements to The Underline trail from Dadeland South to the Miami River.
- Hobbie Island Beach Park, Island Western Limit to Island Eastern Limit, dedicated on-road bicycle facility (Project #58): On-road bicycle facility improvements on Hobbie Island Beach Park.
- NW 17th Street, NW 7th Avenue to NW 7th Court: off-road bicycle and pedestrian Facility Improvements (Project #59): Enhancements to off-road bicycle and pedestrian facilities.
- Rickenbacker Causeway, Green Bike Lanes Segment A- Phase 1, Brickell Ave to Hobbie Island, dedicated on-road bicycle facility improvement (Project #78): On-road bicycle facility improvements, including green bike lanes on Rickenbacker Causeway.
- North Bay Village_ Baywalk Plaza Area Phase 1: NE 6th Street to NE 11th Street: off-road bicycle and pedestrian facility improvement (Project #80): Enhancements to off-road bicycle and pedestrian facilities in the North Bay Village area.
- SMART Terminal Connector, SW 12th Avenue, SW 13th Street to NW 46th Street, protected on-road bicycle facility and pedestrian improvements (Project #88): Development of protected on-road bicycle facilities and pedestrian enhancements in the SMART Terminal Connector area.
- SMART Terminal Connector, SW 24th Avenue to US-1, protected on-road bicycle facility and pedestrian improvements (Project #90): Development of protected on-road bicycle facilities and pedestrian enhancements in the SMART Terminal Connector area.

- SMART Terminal Connector US-27, NW 19th Avenue to US-1, protected on-road bicycle facility and pedestrian improvements (Project #94): Development of protected on-road bicycle facilities and pedestrian enhancements in the SMART Terminal Connector area.
- SW/NW 1st Avenue, SW 2nd Street to SW 11th Street, dedicated on-road bicycle facility improvement (Project #95): Improvements to on-road bicycle facilities on SW/NW 1st Avenue.
- SR 925/NW 3rd Avenue, NW 1st Street to NW 8th Street, dedicated on-road bicycle facility improvement (Project #98): On-road bicycle facility improvements on SR 925/NW 3rd Avenue.
- SW 1st Street, SW 5th Avenue to SW 2nd Avenue, dedicated on-road bicycle facility improvement (Project #108): Improvements to on-road bicycle facilities on SW 1st Street.
- NW 11th Street, NW 12th Avenue to SW 2nd Avenue, dedicated on-road bicycle facility improvement (Project #112): On-road bicycle facility improvements on NW 11th Street.
- SMART Trails -SW/SW 26th Road, Route B, SR 913/Rickenbacker Causeway to The Underline, off-road bicycle and pedestrian facility improvement (Project #113): Enhancements to off-road bicycle and pedestrian facilities in the SMART Trails area.
- NW 11th Street, NW 12th Avenue to SW 2nd Avenue, dedicated on-road bicycle facility improvement (Project #115): On-road bicycle facility improvements on NW 11th Street.
- SW 1st Court, SW 11th Street to SW 7th Street, dedicated on-road bicycle facility improvement (Project #116): Improvements to on-road bicycle facilities on SW 1st Court.
- NW 5th Avenue, NW 4thStreet to NW 11th Street, dedicated on-road bicycle facility improvement (Project #117): On-road bicycle facility improvements on NW 5th Avenue.
- SMART Terminal Connector NW 20th Street, NW 27th Avenue to US-1, protected on-road bicycle facility and pedestrian improvements (Project #119): Development of protected on-road bicycle facilities and pedestrian enhancements in the SMART Terminal Connector area.
- SMART Trails, SW 32nd Road/Brickell Avenue, Route A, The Underline to Rickenbacker Causeway, off-road bicycle and pedestrian facility improvement (Project #120): Enhancements to off-road bicycle and pedestrian facilities in the SMART Trails area.
- SW 10th Street, Brickell Plaza to SW 1st Avenue, off-road bicycle facility improvement (Project #134): Improvements to off-road bicycle facilities on SW 10th Street.
- SR 925/NW 3rd Court, NW 1st Street to NW 8th Street, dedicated on-road bicycle facility (Project #136): On-road bicycle facility improvements on SR 925/NW 3rd Court.
- NW 3rd Court, NW 2nd Street to NW 8th Street, Pedestrian Facility Enhancement or Expansion (Project #137): Enhancements or expansions
-

BETTER BUS NETWORK PROJECT

The Better Bus Project, as depicted in Figure 22, is a collaborative effort to redesign the bus system in Miami-Dade County, led by the Miami-Dade Department of Transportation & Public Works and Transit Alliance Miami. It aims to improve the bus network, starting from a clean slate, by determining where the bus service should go, when it should operate, and how frequently it should run. The project primarily focuses on the Miami-Dade Transit (MDT) bus network, but it also considers improvements to trolley services in Miami, Miami Beach, and Coral Gables. The project does not mean changing every bus route and stop but aims to create a network designed for the current and future needs of the city and region, not based on the past.



The "Choices Report" is the first step in the Better Bus Project. It assesses the existing network, engages the public, stakeholders, and elected officials in a conversation about transit goals, and develops future recommendations for changing the transit network. The report does not contain specific recommendations but instead presents relevant facts and highlights the need to make difficult decisions to balance competing goals.

Figure 22 Map of the Better Bus Network and routes within the study area.

The project introduces two concepts: the Coverage and Ridership Concepts and the Existing Network. These concepts illustrate a spectrum of possibilities for designing the bus network, emphasizing ridership and coverage goals. Both concepts aim to significantly change the network to improve freedom and access by transit, assume changes to trolley services, and propose more efficient spacing bus stops. These changes aim to provide better job access and convenience for riders.

The project also includes a Resilience Plan to guide the County on how to provide the best possible service, given uncertainties caused by the COVID-19 pandemic and potential future challenges. The Resilience Plan organizes services into priority tiers to guide service reductions if necessary. The highest priority corridors are in dense, active areas, ensuring access to a maximum number of people and jobs in lower funding scenarios.

Ultimately, the Better Bus Project seeks to create a more efficient and resilient bus network that serves the current and future needs of Miami-Dade County.

The Better Bus Network began November 14th, 2023 and the routes within study area are:

- Routes 3 and 93 Consolidation: Routes 3 and 93 have been consolidated into the more frequent Route 3.
- Route 36: Route 36 provides a 15-minute service from the mainland to Collins Avenue and south to Lincoln Terminal.
- Route 7: Routes 9 and 10 are consolidated into an every 15-minute Route 9 along NW 2nd Avenue from downtown to NW/NE 54th Street. Previously, Route 10 ended at Omni Terminal, leaving only half the frequency from points north into the core of downtown.
- Route 15: Route 15 provides service from Omni Terminal across the Venetian Causeway to Lincoln Terminal in Miami Beach every 30 minutes.
- Route 20: Route 20 runs from the Airport, across NW/NE 20th Street NW/NE to Omni Terminal and then to the Beach, providing service every 15 minutes and consolidating service on NW/NE 20th Street.
- Route 11: Route 11 offers 10-minute service from downtown to FIU on Flagler Street.
- Route 24: Route 24 provides a 15-minute service from Brickell to LeJeune Road and a 30-minute service farther west on Coral Way.

MIAMI DADE COUNTY VISION ZERO 2021 FRAMEWORK PLAN

Vision Zero is a paradigm shift that aims to eliminate deaths and severe injuries on all roadways through a system-wide approach. Vision Zero, also referred to as the safe systems approach, establishes a mindset with no tolerance for crashes that result in a fatality or severe injury. Many cities in the U.S. and Europe have seen a drastic reduction in the number of fatal and severe crashes using the Vision Zero approach. The Vision Zero approach is different from the prevailing transportation planning approach in the four distinct ways described below.

The 2021 Vision Zero Framework Plan has been developed collaboratively, incorporating insights from Vision Zero Champions and Implementors while aligning with the guiding values established for the initiative. This comprehensive plan takes a data-driven approach to tackling road safety challenges in Miami-Dade County, acknowledging the influence of socio-economic and demographic factors in these challenges. The report delves into the data analysis, pinpointing which demographics are disproportionately affected and their geographic distribution within the county. It outlines a set of actions categorized as structural, strategic, and systemic, emphasizing the need for leadership at various levels, from county policymakers to the dedicated staff responsible for implementing these policies. The actions are further divided by program timeline, with a focus on immediate, mid-term, and long-term strategies, each with defined responsibilities, funding, resources, and collaboration efforts to propel this Vision Zero framework into action.

Miami-Dade County's safety projects follow a specific process:

- Contiguous Projects: Projects are created by combining nearby high-injury crash locations (within 300 feet) that are not separated by major roadways. In total, 1,957 intersections and 622 segments were combined into 1,140 safety projects.
- Projects Prioritization: Projects are prioritized based on several categories:
- Crash Score: This score combines crash data for bicycles, pedestrians, and vehicles, with a maximum score of 11 points.
- Equitable Outcomes Score: Prioritizes projects in locations with high crash rates, considering factors like low-income households, zero-vehicle households, and minority populations. Scores range from 0 to 5 points.
- Safe Access to Transit Score: Projects near transit stations and stops receive scores based on their proximity, with a maximum score of 6 points. Scores are assigned based on distance.
- Safe Access to Future Transit Score: Projects near future transit projects receive scores based on their proximity, with a maximum score of 6 points. Scores are assigned based on distance and transit plans.
- The top 50 priority Vision Zero safety projects are weighted, with the top five projects in each Commission District to be implemented over the next five years. These are categorized based on right-of-way jurisdiction or ownership.

Tables 10 and 11 highlight the projects that were identified in the literature review for the Vision Zero report for Districts 3 and 5 and are cataloged by priority and jurisdiction.

Table 10 Priority Safety Projects within District for Commission District 3 within the Downtown Miami study area:

MUNICIPAL ROADS		
Priority	**From**	**To**
YEAR 1	NW 14th St & NW 10th Ave	NW 15th St & NW 9th Ave
	NE 1st Ave & NE 11th St	NE 11th St & NE 2nd Ave
YEAR 2	NW 3rd Ave & NW 11th St	
	NW 15th Ave & NW 29th St	NW 14th Ave & NW 29th St
	NW 4th Ave & NW 8th St	
	NW 17th St & NW 7th Ct	NW 1st Ct & NW 17th St
YEAR 4	NW 5th Ave & NW 23rd St	
	NW 1st Ct & NW 22nd St	NW 1st Ct & NW 21st St
YEAR 5	NW 1st Ct & NW 15th St	
	NW 3rd Ave & NW 16th St	

MULTI-JURISDICTIONAL ROADS		
Priority	**From**	**To**
YEAR 1	NW 11th St & NW 2nd Ave	NW 1st Pl & NW 12th St
	NW 2nd Ave & NW 21st St	NW 2nd Ave & NW 20th Ter
	NW 3rd Ave & NW 5th St	NW 3rd Ave & NW 1st St
YEAR 2	NW 3rd Ave & NW 20th St	
	N Miami Ave & NE 20th St	
	NW 3rd Ave & NW 14th St	
	NW 1st Ave & NW 14th St	
	Biscayne Blvd & NE 8th St	Biscayne Blvd & Port Blvd
YEAR 3	NW 7th Ave & NW 11th St	NW 7th Ave & NW 6th St
	NW 29th St & NW 5th Ave	NW 2nd Ave & NW 29th St
YEAR 4	NW 10th Ave & NW 36th St	NW 2nd Ave & NW 36th St
	NW 12th Ave & NW 13th Ct	NW 12th Ave & NW 14th St

Table 11.Priority Safety Projects For Commission District Within The Downtown Miami Study Area

MUNICIPAL ROADS		
Priority	**From**	**To**
YEAR 1	SW 1st Ct & SW 2nd St	SW 1st Ct & SW 3rd St
	NW 2nd St & NW 7th Ave	NW 2nd St & NW South River Dr
	NW 3rd Ct & NW 2nd St	
YEAR 2	NE 2nd Ave & NE 2nd St	Biscayne Blvd & NE 2nd St
	28th St & Indian Creek Dr	28th St & Collins Ave
YEAR 3	SE 10th St & Brickell Ave	
YEAR 4	SE 3rd Ave & SE 3rd St	
	SW 17th Rd & SW 4th Ave	
YEAR 5	SW 2nd St & SW 24th Ave	SW 23rd Ave & SW 2nd St
	NW South River Dr & NW 27th Ave	400' West of NW South River Dr & NW 27th Ave

MULTI-JURISDICTIONAL ROADS		
Priority	**From**	**To**
YEAR 1	NW 11th St & NW 12th Ave	NW 11th St & NW 11th Ct
	NW 2nd Ave & NW 1st St	SW 2nd Ave & SW 3rd St
	NE 2nd Ave & E Flagler St	
YEAR 2	S Miami Ave & SW 1st St	E Flagler St & N Miami Ave
	S Miami Ave & SW 14th St	Brickell Ave & SE 14th St
	S Miami Ave & 8th St	SE 8th St SE & Brickell Key Dr
YEAR 3	SE 2nd Ave & SE 2nd St	SE 3rd Ave & SE 2nd St
	SW 2nd Ave & SW 11th St	
	NW 7th Ave & W Flagler St	
	SW 5th Ave & 8th St	SE 8th St SE & SW 3rd Ave
YEAR 4	SW 5th Ave & SW 7th St	SW 2nd Ave & SW 7th St

COMMODORE TRAIL MASTER PLAN

The Commodore Trail Master Plan is an ambitious project that aims to connect the Old Cutler Trail to the Rickenbacker Trail, providing a continuous 5-mile route for biking, walking, and running. This trail will be a valuable addition to the community and provide numerous connections and benefits:

1. Connections to Other Trails: The Commodore Trail will connect seamlessly with major trails such as the Old Cutler Trail, Rickenbacker Trail, and The Underline Trail.
2. Access to Metrorail Stations: The trail offers easy access to key Metrorail stations, including Douglas, Coconut Grove, and Vizcaya Stations.
3. Proximity to Public Parks: Several public parks, including Wainwright, Steele, Kennedy, Regatta, Kirk Munroe, and more, will be easily accessible from the Commodore Trail.
4. Nearby Schools: The trail will serve as a convenient route for students attending schools like La Salle, Frances S. Tucker, Carrollton, Ransom Everglades, and more.
5. Historic Sites: Residents and visitors can explore local history and heritage by visiting historic sites along the trail, including Vizcaya, City Hall, and the Barnacle.

The Master Plan for the Commodore Trail is divided into several segments, each serving a specific area:

- Segment 1: Coco Plum Circle to N Prospect Drive. (Coral Gables)
- Segment 2: N Prospect Drive. to Darwin Street. (City of Miami)
- Segment 3: Darwin Street. to Mercy Way (Miami-Dade County)
- Segment 4: Mercy Way to SE 26th Road. / Rickenbacker Causeway (City of Miami)

This comprehensive plan will enhance the community's quality of life, providing a safe and attractive environment for various recreational activities and transportation options while preserving and celebrating local history and culture.

Segment 4 of the Commodore Trail Master Plan, with portions located within the Downtown Miami study area, focuses on addressing critical issues related to the existing sidewalks along South Miami Avenue from Mercy Way to 26th Road:

1. Access Enhancement Opportunity: Segment 4 provides a significant opportunity to improve access along South Miami Avenue, catering to the needs of the approximately 300,000 annual visitors to Vizcaya, a popular historic site and museum.

2. Insufficient Sidewalk Space: This segment faces challenges due to the presence of overly wide vehicle lanes, which occupy excessive space and limit the availability of sidewalks and transit access along South Miami Avenue.

3. Obstructions: The existing sidewalk in this area is obstructed by utility poles, trees, and benches, leading to disruptions in the flow of pedestrian traffic and impacting overall comfort and accessibility.

Addressing these issues will create a more pedestrian-friendly environment, improve accessibility, and enhance the experience for Vizcaya visitors and local residents.

The Commodore Trail, which was officially established in 1969 but has historical roots dating back to the 1880s, is a vital component of the network of pathways designed for current and future walking, running, and biking. It is seamlessly linked to a central system referred to as the "Miami Loop," which has been recognized and promoted by the Miami-Dade Trails Alliance. Figure 23 illustrates the Commodore segment within the Miami Loop. This network of trails and pathways enhances accessibility and connectivity for residents and visitors in the Miami-Dade area, providing opportunities for outdoor activities and mobility within the region.

The Master Plan for the Commodore Trail will outline several key priorities and guiding design principles:

- Complete and Upgrade the Trail: Ensure that the trail is accessible and safe for people of all ages and abilities to walk, bike, or roll along it. This includes connecting the trail to Miami's major trails, parks, and landmarks, reducing obstacles and pinch points, providing separation between trail users and vehicular traffic, enhancing lighting and signage, and improving trail crossings and access.
- Grow Community Awareness: Increase awareness of the trail among the community and establish a cohesive identity for it. This involves community engagement in planning and development, creating a clear wayfinding strategy, and adopting a consistent branding for the trail.
- Set up Implementation and Maintenance Plan: Collaborate with local entities, including the City of Miami, Coral Gables, Miami-Dade County, and community advocacy groups, to identify funding mechanisms and responsibilities for both trail construction and ongoing maintenance.

Guiding Design Principles:

- Preserve Trees: Trees should be removed only as a last resort. Efforts should be made to add new shade trees and landscaping wherever possible without creating new maintenance challenges.
- Historic Elements: Historic walls and elements should only be altered if they pose safety risks to trail users or limit accessibility under the Americans with Disabilities Act (ADA).
- Reduce Vehicular Capacity: Where feasible, reduce lane widths, asphalt, and excess vehicular capacity to create a more user-friendly corridor for all types of trail users.

The Commodore Trail Mater Plan is presently undergoing a comprehensive review by key stakeholders before the 30% milestone is presented to the public. Anticipated progress indicates that the report is scheduled for public presentation in Q1 of 2024.

Figure 23. Map of the Commodore Trail.

DTPW TRANSIT DEVELOPMENT PLAN (TDP): MDT MOVING FORWARD TOGETHER 2023-2032

The TDP informs and is informed by other Land Use and Transportation Plans in Miami-Dade County. MDTMovingFwd identifies the county's long-term transit infrastructure needs, which are used in the development of the Miami-Dade Transportation Planning Organization (TPO) Long Range Transportation Plan (LRTP). The TDP also identifies and presents short-term improvements for implementation through the TPO's Five-Year Transportation Improvement Program (TIP), FDOT's Work Program process, the Citizens' Independent Transportation Trust (CITT) Five-Year Implementation Plan, and Miami-Dade County's FY 2022 Adopted Budget and Multi-Year Capital Plan. These planning documents are listed in this section by planning horizon, longest to shortest.

The following is a list of an overview of major projects included in the document, as well as major short-, mid- and long-range projects that DTPW has committed to implement:

BETTER BUS NETWORK

Miami-Dade County collaborated with the Transit Alliance to launch the Better Bus Project in November of 2023, aiming to redesign the bus network based on community input and data-driven insights. The network includes 19 frequent routes, improving accessibility for over 350,000 additional residents and bringing frequent service closer to 175,000 jobs. This initiative enhances connections, increases evening and weekend bus service, and allows more people to reach their destinations quickly.

The Bus Passenger Shelter Program is aligned with the county's transit system vision, involving the installation of new shelters, trash containers, bicycle racks, and accessibility improvements. As of February 2023, 270 bus shelters, 266 trash containers, 246 illumination systems, and 310 bicycle racks have been installed, contributing to a safer, cleaner, and more connected transit experience, with completion expected by summer 2023.

TERMINALS & PARK-AND-RIDES

Miami-Dade County Commissioners have approved an agreement with Brightline Trains Florida to implement the SMART Program Northeast Corridor, introducing high-speed rail service between Aventura Mall and Brightline's downtown train station. The County has invested $76.7 million in this project, completed in December 2022, where high-speed trains operate every half hour during peak hours. The Aventura Station project includes an 860-foot platform, a pedestrian bridge over the railroad and Biscayne Boulevard, a Park-and-Ride facility, bus drop-off/pick-up, and landscaped areas. The station's design allows future accommodation of Tri-Rail or other commuter trains. The County owns the land, while Brightline manages operation and maintenance.

METROMOVER WAYSIDE SYSTEM OVERHAUL

The Metromover, an automated people mover system, commenced operations in April 1986, designed and installed by Bombardier Transportation. Over its 38-year history, the system has expanded, and while the vehicle fleet has been replaced, critical subsystems have reached the end of their design life. These include the Automatic Train Control (ATC) System, Data Transmission System (DTS) with Supervisory Control and Data Acquisition (SCADA), various elements of the Power Distribution System (PDS), guideway switch equipment, and central control equipment. A comprehensive wayside overhaul project is underway to replace or refurbish these subsystems, ensuring the continued reliability and high service availability of the Metromover system. The anticipated completion of this project is set for May 2025.

TRANSIT MAINTENANCE AND MODERNIZATION

Routine maintenance and enhancements to transit infrastructure play a crucial role in enhancing the passenger experience, minimizing delays, and preventing breakdowns, thereby optimizing the overall efficiency of the transit system. Moreover, modernization initiatives contribute to a more environmentally friendly transit system by incorporating new technologies and adopting cleaner, sustainable energy sources. Notable examples of modernization efforts by DTPW include the implementation of electric signage at Metrorail and Metromover stations and installing parking space counters at Metrorail parking garages.

THE UNDERLINE

The Underline is a transformative 10-mile mobility corridor located beneath the existing Miami-Dade County Metrorail, enhancing connectivity to eight Metrorail Stations and bus terminals. Functioning as a multi-modal corridor, The Underline facilitates first and last-mile connections for schools, hospitals, malls, and over 250,000 residents. The project features separate bicycle and pedestrian paths, intersection improvements along US-1, and collaboration between DTPW and FDOT. By promoting active transportation and reducing US-1 traffic, The Underline aims to encourage a healthier lifestyle

and serve as the backbone for a future 180-mile trail network and the 22-mile Miami Loop. Initially planned in nine segments, the project is progressing in three phases, with an estimated completion date in Summer 2026 as of late 2023.

SOUTH BAYSHORE DRIVE

The South Bayshore Drive project aims to enhance pedestrian and bicycle connectivity, particularly to parks, trails, and transit facilities. This initiative involves the construction of a 10-foot wide shared-use path north of Aviation Avenue, integrated into the Commodore Trail—an integral link connecting the Old Cutler Trail to the Rickenbacker Causeway. The project encompasses resurfacing roadway pavement, upgrading signage, and enhancing pavement markings to address pinch points and enhance the overall trail network. By improving trail crossings and ensuring safe access, the project strives to remove deficiencies. The project is Anticipated to be completed by the end of 2027 and spans from Darwin Street to Mercy Way.

SAFETY & VISION ZERO

Vision Zero is a comprehensive countywide safety initiative launched by DTPW with the ambitious goal of eliminating all traffic fatalities and severe injuries by 2040. The program, initiated in late 2021, focuses on systemic changes in the transportation network's planning, design, and construction. The Vision Zero Framework Plan identified over 2,000 locations with fatalities or serious injuries, outlining actions needed to achieve zero incidents. Currently, 24 projects are in the planning and design phase, set for construction in the summer of 2023. With an average of over 300 vehicle crash fatalities annually, including 100 involving vulnerable road users, Miami-Dade County strives to enhance safety, particularly near transit facilities and equity neighborhoods. Embracing a Safe System approach, the Vision Zero Program prioritizes a culture of safety, collaborative processes, safe street design, appropriate speed limits, and data-driven decision-making to achieve its vision. The commitment is to create a transportation network free from traffic deaths and serious injuries by 2040.

VENETIAN CAUSEWAY

The Venetian Causeway, a vital 2.5-mile-long link between Miami and Miami Beach, is undergoing significant infrastructure improvements. Following a PD&E study by FDOT, it was determined that eleven of the twelve bridges on the causeway require replacement. Miami-Dade County has initiated the final design phase for these replacements, aiming to create wider bridges that enhance safety and connectivity for pedestrians, bicyclists, navigable traffic, and vehicles while preserving the historic aesthetic. The design also incorporates resiliency measures to address sea-level rise, ensuring continued connectivity for emergency services, construction, and commerce vehicles. The final design phase is underway and is expected to conclude in the summer of 2025, followed by the construction phase. This strategic initiative aligns with the broader goal of effectively improving the infrastructure to meet current and future needs.

RICKENBACKER CAUSEWAY – BEAR CUT BRIDGE PD&E STUDY

Miami-Dade County will be performing the planning study, also known as a PD&E Study, to assess replacement or substantial rehabilitation options for the Bear Cut Bridge connecting Virginia Key to Key Biscayne. Constructed in part in 1944, the bridge requires attention to ensure its continued service as the primary link between mainland Miami and the Village of Key Biscayne. The comprehensive study will involve public engagement, stakeholder coordination, alternative design development, cost-benefit analysis, long-range cost estimation, and an examination of environmental, archaeological, and socioeconomic impacts. The PD&E process is anticipated to span three and a half years. Following the study, the design or design-build phase is slated to commence in the spring or summer of 2025, with construction scheduled for 2027. This strategic initiative aligns with broader infrastructure improvement goals to address critical transportation links.

NEIGHBORHOOD IMPROVEMENT PROJECTS

DTPW, operating under the People's Transportation Plan mandate, coordinates and executes diverse Neighborhood Improvement Projects. In response to non-site-specific categories outlined in the People's Transportation Plan Ordinance, the Department devised "The Neighborhood Improvement Projects Formula," distributing funds evenly across commission districts. PTP Neighborhood Improvements span a wide range, encompassing intersection modifications, local and arterial road resurfacing, guardrail installations/repairs, school flashing signal installations, greenway and bikeway enhancements, ADA curb cuts/repairs, pavement markings, roadway lighting, traffic calming measures, traffic signals, and traffic sign replacements/repairs. These efforts extend to sidewalk replacement/repair, drainage repairs/installations, and landscape beautification linked to road and bridge development, bus and fixed guideway system expansion, operation, or maintenance. Neighborhood Improvement Projects include Site-Specific and Non-Site-Specific initiatives, along with Countywide efforts and the School Flashing Signals Program.

SHORT (IMPLEMENTATION OCTOBER 2021 TO SEPTEMBER 2022)

New Bus Vehicle Replacement: The Department of Transportation and Public Works (DTPW) is actively implementing its bus replacement program to reduce the average age of its fleet and expand its services. Currently, their fleet includes 577 vehicles acquired between 2016 and 2021. In 2022, DTPW plans to add seventy-five new 40' Battery Electric buses and ten 60' articulated diesel/electric hybrid buses. These efforts aim to enhance transit, promote sustainability, and support various long-term initiatives. DTPW has chosen to transition its bus fleet to clean-burning compressed natural gas (CNG) or battery-electric powered vehicles.

The SMART Program: The SMART Program, which stands for Strategic Miami Area Rapid Transit, is a comprehensive initiative focused on developing six rapid transit corridors within Miami-Dade County. This program aims to establish a robust mass transit infrastructure, offering multiple transportation options while optimizing existing infrastructure and integrating advanced technology. DTPW is committed to advancing the SMART Program during the fiscal year 2021-2022. In October 2017, the Transportation Planning Organization (TPO) passed resolution #47-17, elevating the North and South Corridors to Priority I in the Long-Range Transportation Plan (LRTP) and Transportation Improvement Program (TIP). In 2019, resolution #26-19 extended the limits of Florida's Turnpike Express (FTE) North BERT Route to connect with the North (NW 27th Avenue) Corridor, further enhancing the SMART Program's reach and impact.

Figure 24. SMART Plan Beach Corridor Monorail Rendering

Beach Corridor: The Beach Corridor is a 9.7-mile long transportation route connecting the Miami Design District, Downtown Miami, and the Miami Beach Convention Center, primarily along MacArthur Causeway. This corridor encompasses a trunk line that links the City of Miami and the City of Miami Beach. It features two extensions: one to the Midtown/Design District in the City of Miami and another to the Miami Beach Convention Center. Funding for the Beach Corridor PD&E (Project Development and Environment) study comes from multiple agencies, including Miami-Dade County, FDOT (Florida Department of Transportation), the City of Miami, and the City of Miami Beach. In January 2020, based on the PD&E study's recommendation, the Transportation Planning Organization (TPO) selected elevated Automated

Guideway Transit (AGT) for the trunk line, an extension of Metromover for the Midtown/Design District segment, and dedicated-lane motorbus service on Washington Avenue.

Estimated costs for the design and construction phase include:

- Trunkline (Monorail): $522.4 million
- Design District Extension (APM): $44.5 million
- Convention Center Extension (LRT): $121.6 million

East-West Corridor: The East-West Corridor project will cover approximately 14 miles, connecting the Miami Intermodal Center (MIC) at Miami International Airport (MIA) to Tamiami Station at SW 8 Street and SW 147 Avenue. It will serve significant activity centers, such as MIA, the MIC, and Downtown Miami, as well as key employment areas like Sweetwater, Doral, Health District, Central Business District, and Brickell. This project complements the existing 836 Express service initiated in early 2020. The Miami-Dade TPO Governing Board selected Bus Rapid Transit (BRT) as the Locally Preferred Alternative (LPA) for this corridor on October 22, 2020. The east-west corridor BRT's design and construction phase cost is estimated at $450 million.

BERT Routes: The SMART Plan aims to implement the BERT Network, including various corridors and park-and-ride facilities. Progress is being made toward achieving three milestones:

1. Refining recommended alternatives for the Flagler Corridor PD&E study, with TPO endorsement expected in 2020.
2. Inclusion of the SMART Plan projects in the Transit Development Plan (TDP), TPO Transportation Improvement Program (TIP), and the 2045 Long Range Transportation Plan (LRTP).
3. Implementation of the projects as funding becomes available.

The BERT Network has nine express bus routes supporting the SMART Plan. Route A (Flagler corridor) is under a study by FDOT. Routes C and F1 have been implemented. The PD&E study for Route A recommended Curbside Business Access and Transit (BAT) Lanes.

A demonstration project, the Flagler Street SMART Demonstration, is proposed to collect data for the Tier 3 analysis. It involves repurposing outside lanes into BAT lanes. If approved, construction begins in 2023.

The following is the status of BERT Network corridors within or adjacent to the study area:

- Beach Express North: PD&E study received NTP in March 2019. Included in the TDP Implementation Plan and the 2045 LRTP. The study is in progress.
- Beach Express Central: PD&E study received NTP in March 2019. Included in the 2045 LRTP. The study is in progress.
- Beach Express South: PD&E study received NTP in March 2019. Included in the 2045 LRTP. The study is in progress.

Underline: The Underline is a 10-mile (120 acre) corridor designed to connect the Miami River to Dadeland South Station, offering a secure route for cyclists and pedestrians. The project is executed in three phases. Phase I, known as the Brickell Backyard Project, encompassing 0.5 miles from the southern edge of the Miami River to SW 13th Street, was initiated in

December 2018 and successfully completed in 2021. Phase II, the Hammock Trail, spanning approximately 2.14 miles from SW 13th Street to SW 19th Avenue, is presently under construction, with an expected completion date in May 2024. The extensive Phase III, covering 7.36 miles from SW 19th Avenue to the Dadeland South Kiss-and-Ride Facility, is anticipated to traverse multiple cities, including Miami, Coral Gables, South Miami, and parts of Unincorporated Miami-Dade County, with construction completion expected toward the fourth quarter of 2025.

Waterborne Transportation as A Commuter Service: The Waterborne Transportation as a Commuter Service initiative is a strategy to alleviate traffic congestion. Since 2020, DTPW has been developing plans for these services. In the previous year, the Miami-Dade County Board of Commissioners granted DTPW the authority to negotiate on the county's behalf for an East-West route connecting Miami and Miami Beach, particularly during the construction of I-395.

This new service commenced in November 2020, running between the James L. Knight Center/Hyatt Regency in the Miami River and the Bentley Bay Marina, located just north of I-395. Notably, this service operates entirely through private means and does not receive subsidies from government agencies. Its primary purpose is to serve as a commuter service, operating from 6:00 am to 7:00 pm, Monday through Friday.

Additionally, the City of Miami is in the process of establishing a second route between the James L. Knight Center and Dinner Key Marina in Coconut Grove, and the operator is actively collaborating with the City of Miami to bring this project to fruition.

Committed Bus Service Adjustments: To ensure that service capacity aligns with ridership demand, DTPW regularly reviews and adjusts the bus route network in response to the changing transportation requirements in Miami-Dade County. These revisions aim to enhance the operational efficiency of the entire transit system. In a typical year, these adjustments are planned and included in the Transit Development Plan (TDP). However, since the implementation of the Better Bus Network, these yearly revisions have been paused.

The Better Bus Project: The Better Bus Project is a collaboration between Miami-Dade County and Transit Alliance Miami, a local non-profit advocating for improved public transit and urban infrastructure. Its goal is to overhaul the Miami-Dade County bus system. The project explored two main approaches: one to maximize ridership and the other to extend transit coverage. A cost-neutral hybrid plan, combining elements of both approaches, was presented to the BCC Transportation and Finance Committee in November of 2023.

In October 2020, a draft plan was presented to the Board of County Commissioners (BCC), who directed staff to proceed with implementation. With additional enhancements, the final draft plan was approved in a public hearing in October 2021. Implementation began in November of 2023.

MID-RANGE PROJECTS (TEN YEAR IMPLEMENTATION)

DTPW is committed to a ten-year program aimed at enhancing the current transit system. This initiative involves implementing new Metrobus routes, advancing premium transit corridors across the county, and strategically discontinuing unproductive routes.

Rapid Transit Corridors, Beach Corridor: The Beach Corridor is part of the SMART Plan, a comprehensive initiative for developing six rapid transit corridors to address future population and employment growth. This 9.7-mile project will connect Downtown Miami and Miami Beach, crossing Biscayne Bay. The area is a hub for population and economic growth, a significant employment center, and a key tourist destination. This corridor has long suffered from heavy traffic congestion and is recognized for its high bus transit ridership. In May 2017, a Project Development & Environment (PD&E) Study was launched by DTPW to explore transportation solutions between Downtown Miami and Miami Beach via I-395 and I-195. The locally preferred alternative (LPA), as recommended by the PD&E, includes elevated automated rail transit for the trunk line, an automated people mover for the Midtown/Design District, and dedicated lanes for bus/trolley service on Miami Beach. In October 2020, the Board of County Commissioners approved the contract award for the Interim Agreement (IA) for the Beach Corridor Trunk Line, which became effective on October 31, 2020. DTPW is currently working to complete pre-development work and negotiate the Project Agreement. The project also obtained an Environmental Assessment (EA) as the National Environmental Policy Act (NEPA) Class of Action (COA) for the Beach Corridor Trunkline from the United States Coast Guard (USCG) ,and the report was finalized in July of 2022.

<u>Baylink (Beach) Corridor</u>

- Location: Midtown Miami to Miami Beach Convention Center
- Project Description: Rapid Transit connecting Midtown/Miami CBD to Miami Beach Convention Center area (Light rail)
- Total Capital Cost Est.: $897,000
- Funded Capital Cost: $22,414
- Annual O&M: $33,520

Figure 25. Miami Central Station, the southern terminus of the SMART Plan Northeast Corridor.

Northeast Corridor: The Northeast Corridor project spans roughly along US-1, stretching from Downtown Miami's Miami Central Station (depicted in Figure 25) to the Aventura Mall near the Miami-Dade/Broward County line. This corridor is one of the region's most heavily traveled transit routes, covering about 14 miles and connecting Aventura, North Miami, North Miami Beach, Miami Shores, and the County's Central Business District in Downtown Miami. The first phase of the Northeast Corridor involves regional passenger rail service to the West Aventura Station.

In June 2020, the County initiated efforts to advance the implementation of the Northeast Corridor. In March 2021, the TPO Governing Board designated commuter/passenger rail as the Locally Preferred Alternative (LPA) for the Northeast Corridor. The proposed commuter rail service is designed with 30-minute peak headways and 60-minute off-peak headways in both directions on weekdays and 60-minute headways during weekends. DTPW is actively using the results of the completed National Environmental Policy Act (NEPA) Environmental Assessment to advance the New Starts program.

Bus Express Rapid Transit (BERT) Network: The Bus Express Rapid Transit (BERT) Network is a proposed system of nine express bus routes aligned with the SMART Plan. It aims to provide reliable and convenient bus service connecting

commuters to SMART Plan Rapid Transit Corridors and major job centers. The network offers limited stops, operates on existing roadways with Transit Signal Priority (TSP), and has a frequent service interval of 10-20 minutes. It includes Park-and-Ride facilities at existing and new locations. Some BERT routes are more advanced in their development, like Route A (Flagler Corridor), which is being studied by FDOT with a demonstration project in progress. Route C (I-75 NW Miami-Dade Express) began service in November 2019, and Route E2 is expected to start in 2027. Routes D, E1, F1, F2, and F3 are projected to launch in 2024. For Route F1 (Beach Express North), a pilot route called Route 241 "Tuttle Limited" was initiated in December 2021, testing Bus-on-Shoulder (BOS) operations on the Julia Tuttle Causeway/I-195 to alleviate congestion. The BOS operation transitioned to using the inside shoulder in October 2022, following FDOT's improvement project.

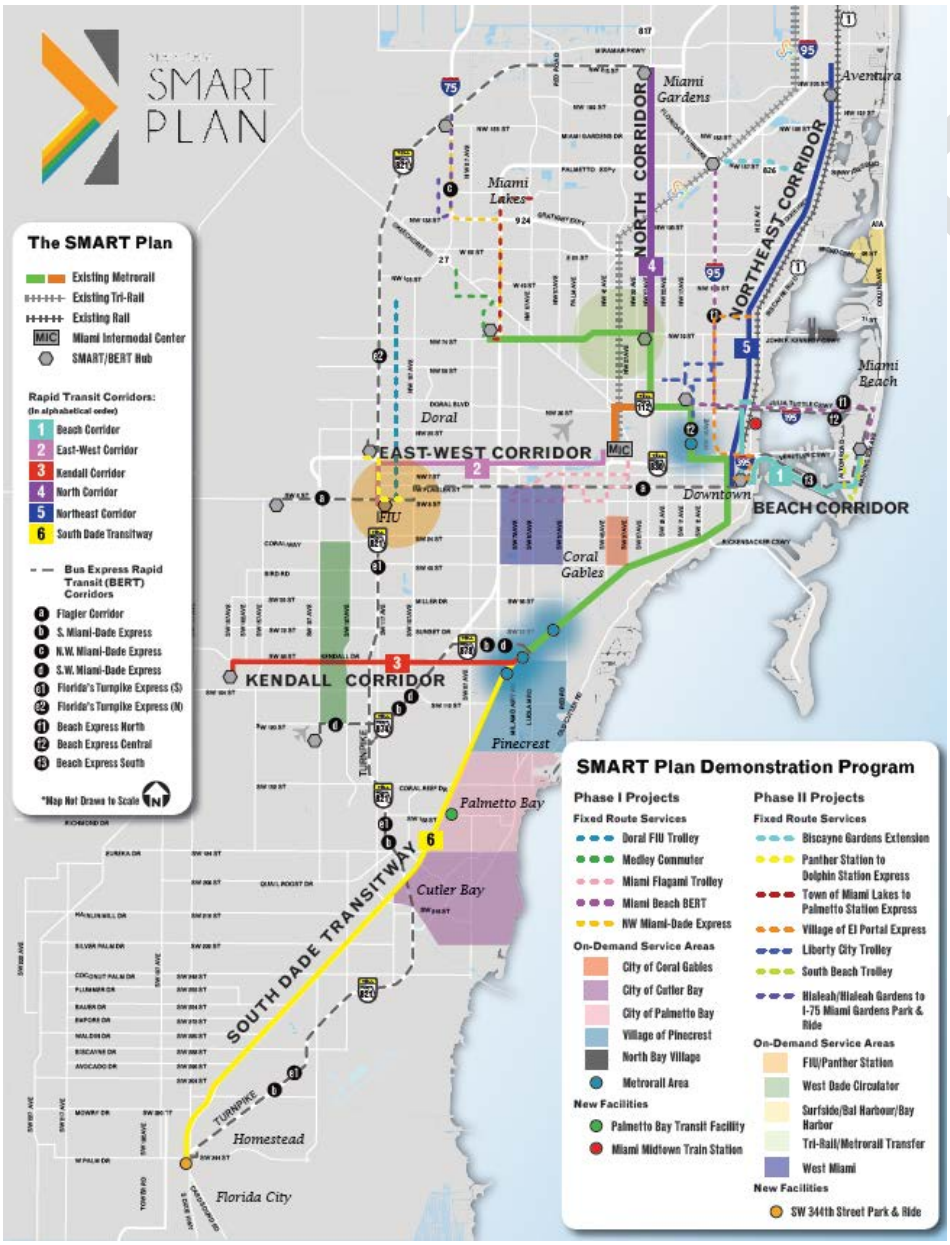


Figure 26. The Strategic Miami Area Rapid Transit SMART Plan, revised November 2020.

The SMART Demonstration Program, a collaborative effort involving the Miami-Dade TPO, FDOT, Miami-Dade County, SFRTA, and local municipalities, aims to implement demonstration projects supporting various aspects of the SMART Plan, including the BERT Network. These projects should be completed within three years or less, and if they prove successful, the agencies involved are committed to providing ongoing funding for their continuation.

Phase I of the program was approved by the TPO board in June 2018 and was part of the Adopted Work Program for fiscal years 2020-2024. Phase II was adopted in October 2019 and is part of the Tentative Work Program for fiscal years 2021-2025.

Within the study area, the Phase I project, sponsored by SFRTA, which involves the NE Corridor Midtown/Design District Station, was postponed due to the COVID-19 pandemic. Regarding Phase II, the Village of El Portal intends to provide express service to MiamiCentral Station.

SR 836 Express Bus A-Line Express

Location: From Tamiami Station (SW 8th Street at SW 147th Avenue) to Downtown Miami Government Center

Description: This project aims to offer premium express transit service along SR 836, connecting Tamiami Station to the Downtown Miami Intermodal Terminal via SW 8th Street, SW 137th Avenue, and SR 836. The service will feature 10-minute headways during peak hours and will operate on weekdays from 6:00 am to 9:00 am and 3:00 pm to 7:00 pm. DTPW is exploring potential collaboration with GMX to operate this service.

- Capital Cost (2021): $31.9 million (includes capital cost for Express Bus B and C)
- Annual Operation and Maintenance Cost (2021): $3.627 million
- Funded Capital Cost (2023-2032) - $31.9 million (includes funding for Express Bus B and C)
- Funded Operation and Maintenance Cost (2023-2032) - $9.120 million (includes funding for O & M of Express Bus B and C)

Beach Express South

- Location: MiamiCentral Station to Miami Beach Convention Center
- Description: This project involves providing express bus service from MiamiCentral Station to the Miami Beach Convention Center. The service will operate all day with 10-minute headways, spanning from 5:00 am to 2:00 am. It will be served by 12 articulated buses.
- Estimated Capital Cost (2021): $6.841 million
- Annual Operation and Maintenance (2021): $3.576 million
- Unfunded Transit Operations Project, included in the 2045 LRTP Plan Period I.

The Underline Phases III - IX

- Location: From SW 19th Avenue to Dadeland Boulevard
- Description: This project extends to Phase 2 and involves collaborating with FDOT to develop a trail alignment, design 24 remaining intersections, conduct surveys, prepare NEPA Type 1 CE documents, establish the standards from Phase 1 and Phase 2, and provide the design guidance for landscaping and amenities. Finalizing this document will enable FDOT to support intersection improvements and allocate funding based on specific scope, facilitating the procurement of additional segments when funding becomes available.
- Estimated Capital Cost (2021): $109.531 million
- Annual Operation and Maintenance (2021): $15.816 million
- Funded Capital Project FY 2023 - 2032

Vision Zero Projects Countywide

- Description: Vision Zero is a comprehensive strategy developed in Sweden in 1997 whose guiding principle is that even one death on a transportation system is unacceptable. Miami-Dade County implemented this systematic approach to improve safety countermeasures and policies aimed at reducing, with the goal of ultimately

eliminating, fatalities and serious injuries related to mobility in the region. This program is targeting 24 critical locations in the county. These locations only account for 20% of total road miles in the county but also account for 86% of all fatal and severe-injury crashes. This program was launched in response to the 40% increase in pedestrian and cyclist crashes between 2012 and 2022. In December of 2023, the county was awarded a $16.2 million grant from the U.S. Department of Transportation under the Safe Streets and Roads for All (SS4A) program. This grant is expected to greatly increase the speed at which the county can finish this initiative.

- Estimated Total Capital Cost (2023): $14.29 million
- Annual Operation and Maintenance (2023): TBD
- Miami-Dade Adopted Budget (2023): In FY 2023-24, the county has allocated $6.5 million, with $6 million from bonds. In the FY 2024-25, the county will allocate $5.637 million and will allocate the remaining $2.107 million in the FY 2025-26 budget.
- Funded Capital Project FY 2022-2027

Metromover Guideway

- Location: Metromover
- Description: Feasibility Evaluation, Simulations, Design Criteria, and Design-Built services to add new switches/crossovers/bypasses and all necessary infrastructure modifications to the existing Metromover Guideway superstructure.
- Estimated Capital Cost (2021): $81.308 million

The Underline Phase II

- Location: From SW 13th Street to SW 19th Avenue
- Description: The future 10-mile Underline Corridor, running below the Metrorail from the Miami River to Dadeland South Station, will create a linear mobility corridor that enhances connectivity, increases mobility, and improves pedestrian and biking safety for residents and visitors. Phase 2 is approximately 2.14 miles long and extends from SW 13th Street to SW 19th Avenue and is expected to be completed in May of 2024.
- Estimated Capital Cost (2021): $20.115 million
- Annual Operation and Maintenance (2021): $2.465 million

Bike Safety - Downtown Micromobility

- Location: Commission District 5
- Description: As part of the ongoing Downtown Micromobility Networks project, DTPW is continuing to increase cyclist safety by installing vertical devices (such as but not limited to delineators, armadillos, rubber curbs, or parking stoppers) between micromobility lanes and vehicular lanes where appropriate. The project is adding

buffered bicycle lanes throughout Downtown Miami. This project aims to provide shared mobility solutions and connect communities while prioritizing bicyclists and pedestrian safety.

- Estimated Capital Cost (2021): $500 million

Flagler Corridor BERT (Flagler Corridor BRT)

- Location: Along Flagler Street from Tamiami Station to Downtown Intermodal Terminal
- Description: Implement Bus Rapid Transit (BRT) Service
- Estimated Capital Cost (2021): $621.400 million
- Funded Capital Cost (2021): $2.011 million
- Annual Operation and Maintenance (2021): $36.951 million

Northeast Corridor MiamiCentral Station to Aventura Station

- Location: Commuter Rail connecting MiamiCentral Station to Aventura Station (Miami-Dade County portion of the project led by FDOT District 4)
- Project Description: Commuter Rail connecting MiamiCentral Station to Aventura Station (Miami-Dade County portion of the project led by FDOT District 4)
- Estimated Capital Cost (2021): $423 million
- Funded Capital Cost (2021): $25 million
- Annual Operation and Maintenance (2021): $18.529 million

SMART Plan Bus Express Rapid Transit (BERT) Networks

- Location: Countywide
- Project Description: The Bus Express Rapid Transit (BERT) Network is a system of eight new express bus routes that are part of the Strategic Miami Area Rapid Transit (SMART) Plan. Through the BERT Network, DTPW will provide reliable and convenient express bus service connecting commuters to and from the six SMART Plan Rapid Transit Corridors and major employment centers. The BERT Network is designed for commuters with limited stops over long distances, providing a money-saving, stress-free transportation option. Currently, the NW Miami-Dade Express Route 175 is operating between the Palmetto Metrorail station and the I-75 Park and Ride.
- Estimated Capital Cost (2021): $82.921 million
- Funded Capital Cost (2021): $2 million
- Annual Operation and Maintenance (2021): $28.245 million

Midtown Station

- Location: Biscayne Boulevard and NE 39th Street
- Project Description: Construct a Park-and-Ride facility with 100 surface parking spaces.
- Estimated Capital Cost (2021): $1.625 million
- Unfunded Capital Project, included in the 2045 LRTP Plan Period II.

Metromover Brickell Loop Extension

- Location: From Financial District Metromover Station
- Project Description: Extension of Metromover service in the Brickell area.
- Estimated Capital Cost (2021): $290.299 million
- Unfunded Capital Project

Metromover Omni Loop Extension

- Location: From School Board Station
- Project Description: Extension of Metromover service in the Omni area.
- Estimated Capital Cost (2021): $492.999 million
- Unfunded Capital Project

Signage Rebranding of Metrorail Stations and Garages

- Location: Metrorail Stations and Garages
- Project Description: Implement modernized and improved signage rebranding at 23 Metrorail stations and 5 Metrorail Garages. Update wayfinding system information to address the needs of locals and visitors using a variety of transportation modes.
- Estimated Capital Cost (2021): $10.832 million
- Unfunded Capital Project

Water Borne Transit Service Biscayne Bay

- Location: Biscayne Bay

- Project Description: Implement two Water Transit Routes:
    - North/South Route - Express route from Haulover Marina (North) to Sea Isle Marina (South) Downtown.
    - East/West Route - Express route from Miami Beach Marina (East) to FEC Inlet/Bay Front Park Trust Dock (West).
- Estimated Capital Cost (2021): $10 million
- Annual Operation and Maintenance (2021): $600,000
- Unfunded Capital Project

LONG (PROJECTS TO BE IMPLEMENTED FROM THE 11TH YEAR ONWARD)

Government Center Station (Downtown Miami Development of Regional Impact - Increment III)

- Location: 101 NW 1st Street
- Project Description: Preserve existing transit facilities and equipment. Improve service reliability, safety, quality, convenience, and comfort.
- Estimated Capital Cost (2021): $15.267 million
- Unfunded Project

Historic Overtown/Lyric Theatre (Downtown Development of Regional Impact - Increment III)

- Location: 100 NW 6th Street
- Project Description: Expand capacity and support connectivity. Preserve existing transit facilities and equipment. Improve service reliability, safety, quality, convenience, and comfort.
- Estimated Capital Cost (2021): $5.802 million
- Unfunded Project

NW 7th St Enhanced Bus Dolphin Station to Government Center

- Location: NW 7th Street
- Project Description: Premium limited-stop transit service along NW 7th Street from the proposed park-and-ride/transit center station at Dolphin Station (HEFT at NW 12th Street) to the Government Center. Service headways: 10 minutes AM/PM peak-hour/20 minutes mid-day.
- Estimated Capital Cost (2021): $63.790 million
- Unfunded Project

SW 8th Street Enhanced Bus FIU Panther Station to Brickell Metrorail Station

- Location: SW 8th Street
- Project Description: Premium limited-stop transit service along SW 8th Street from FIU Panther Station to the Brickell Metrorail Station. Service headways: 10 minutes AM/PM peak/20 minutes mid-day.
- Estimated Capital Cost (2021): $72.873 million
- Unfunded Project

Metrorail / Tri-Rail Bus Hub Improvements

- Location: Tri-Rail/Metrorail Transfer Station
- Project Description: Enhance regional connectivity. Develop a multimodal transit hub with convenient access to jobs, housing, and goods/services. Improve quality, safety, convenience, comfort & accessibility. Serve new markets and increase system integration.
- Estimated Capital Cost (2021): $2.166 million
- Unfunded Project

Systemwide Off-Street Bus Stop Enhancements

- Location: Systemwide (All off-street bus stops, e.g., malls, parks, libraries, hospitals, etc.)
- Project Description: Enhance all off-street bus stops to include new shelters and passenger amenities.
- Estimated Capital Cost (2021): $2.708 million
- Unfunded Project

Brickell Metrorail Station

- Location: 1001 SW 1st Avenue
- Project Description: The Brickell Station serves as an intermodal station that provides passenger connections with the local circulator (City of Miami Trolley), local fixed-route service (Metrobus), regional bus service (BCT I-595 Express) as well as Metromover and Metrorail. The station area is a linear site that spans between SW 8th Street and SW 13th Street. The primary goal of the Brickell Metrorail/Metromover Station improvements is to enhance passenger and pedestrian access. The recommended implementation plan includes additional bus passenger pick-up/drop areas, additional shuttle pick-up/drop-off capacity, a new designated park and ride area, upgraded pedestrian connections, and improved passenger convenience through wayfinding, upgrade/ADA compliant sidewalks, continuous passenger canopies, and additional bike storage.
- Estimated Capital Cost (2021): $4.225 million

SW 11th Street Bicycle/Pedestrian Improvements

- Location: SW 11th Street, Brickell Plaza to SW 1st Avenue
- Project Description: Bicycle/pedestrian improvements from Brickell Plaza to SW 1st Avenue.
- Estimated Capital Cost (2021): $4.421 million

East-West Metrorail

- Location: SW 147th Avenue/ SW 8th Street to Miami Intermodal Center at Miami International Airport
- Project Description: Convert BRT to Heavy Rail
- Estimated Capital Cost (2021): $1.926 billion

Bicycle and Pedestrian Improvements at all Transitway Stations

- Location: Transitway Stations
- Project Description: Improve Pedestrian and Bicycle connections to the Transitway stations.
- Estimated Capital Cost (2021): n/a

Bus Stop ADA Access Countywide

- Location: Countywide
- Project Description: Currently, there are approximately 2,400 bus stops that , approximately 2,400 bus stops are not ADA-compliant countywide. Civil work must be performed around existing bus stop signs currently not ADA compliant or during the installation of a new bus stop sign to make them ADA compliant. Each site where bus stops are located may have different characteristics. Individual ADA compliance analysis should be conducted at each bus stop.
- Estimated Capital Cost (2021): $2 billion

Bus and Rail Operations Maintenance Facility Improvements Countywide

- Location: Countywide
- Project Description: DTPW Metrobus, Metrorail, and Metromover support facilities were largely built in the 1980s. Deterioration due to aging is becoming evident. In addition, expansion in some areas is required. DTPW will develop the Needs Assessment and prepare the design plans for the new Track & Guideway building.
- Estimated Capital Cost (2021): $4.562 million

- Unfunded Project

CITY OF MIAMI COMPREHENSIVE NEIGHBORHOOD MASTER PLAN (CMP)

The Miami Neighborhood Comprehensive Plan stands as a crucial guide, shaping the strategic vision for the City's future. Beyond merely charting the course for Miami's developmental trajectory, it serves as an aspirational framework for residents, employees, visitors, and elected officials alike. In the subsequent section, we will delve into specific policies extracted from the current plan, providing insight into the city's mobility objectives as articulated through its adopted policies.

The City's Neighborhood Comprehensive Plan provides for numerous policies that reinforce the creation of a multimodal environment. Its land use policies encourage the integration and co-location of transportation facilities within private development. It also includes policy guiding the City's land development regulations for the provision of safe and convenient on-site traffic flow by a variety of transportation modes, including pedestrianism, bicycles, automobiles, and transit. Overall, the CMP emphasizes multimodal mobility, coordination with agencies, and design standards to guide the development of Downtown Miami. The CMP was reviewed for pedestrian and mobility-supporting policy, and the selected excerpt is included below.

Land Use and Multimodal Development

Policy LU-1.1.17: Integrate existing and planned multi-modal transportation systems with existing and future developments.

Policy LU-1.1.19: Encourage co-location of transit stations and public common areas of private developments.

Policy LU-1.6.10: Land development regulations and policies for the provision of safe and convenient on-site traffic flow and vehicle parking and will provide access by a variety of transportation modes.

Policy TR-2.1.3: The City will encourage increased density of development within walking distance of transit corridors and Metrorail stations (as referenced in Policy LU-1.1.10. and HO-1.1.9).

Policy TR-2.1.4: The City will ensure a strong interface between (re)developments and the public transportation system by encouraging Multimodal Design Guidelines.

Policy TR-2.2.2: Use land development regulations to designate space in the public right-of-way to accommodate alternative travel modes, consistent with the Miami-Dade County Complete Streets Manual.

Policy TR-2.4.7: The City will require all (re)development in existing and planned transit corridors to be well designed and conducive to pedestrian and transit use.

Water Transportation

Policy TR-2.2.7: Support Miami-Dade County's plans for the provision of water taxi services along Biscayne Bay and the Miami River

Policy TR-2.2.12: Encourage the coordination of the intermodal surface and water transportation access service to the Port of Miami River Working Waterfront.

Expansion of Light Rail

Policy TR-2.2.10: Continue to seek funding opportunities to implement the planned Light Rail that connects downtown to Midtown and support the regional effort for connections to the City of Miami Beach.

Parking Strategies

Policy TR-1.2.2: Support County's efforts to increase reliance on parking at satellite park-and-ride lots to reduce vehicle miles traveled downtown.

Policy TR-1.2.4: Provide reduced, shared or alleviated parking requirements within the Land Development Regulations for developments located within a 1/4 mile of transit corridors or 1/2 mile from Metrorail stations or Metromover station:

Policy TR-1.2.8: Develop a citywide transportation master plan that prioritizes projects based on the needs to improve mobility, reduce congestion, promote public transit, and support economic development.

Policy TR-1.4.3: Develop and implement neighborhood traffic calming measures.

Transportation Management Strategies

Policy TR-1.5.2: The City will require all new developments to implement transportation control measures to promote a general reduction in vehicular traffic by increasing auto occupancy and transit ridership.

Policy TR-1.5.3: The City will continue to utilize and coordinate with FDOT's South Florida Commuter Services (SFCS) program to establish and implement transportation demand management strategies for all future and existing employers with more than 50 employees.

Policy TR-1.5.4: Large employers such as the University of Miami/Jackson Memorial Hospital, Health District/Civic Center stakeholders, and other local facility operators shall be encouraged to participate in transportation management initiatives and strategies to help increase transit ridership and decrease the demand for surface.

Policy TR-1.5.5: The City will require new large-scale developments defined as all projects that exceed 200,000 total square feet and/or a minimum of 199 total dwelling units to adopt and enforce measures that will reduce the generation of new single-occupant passenger car trips in areas of high-density development, and encourage the use of high-occupant vehicles, including public transit, for home-based work trips.

Plan Coordination

Policy TR-1.6.1.2: Prepare a multimodal transportation master plan to identify timing and cost associated with priority solutions vetted during the visioning process.

Policy TR-2.1.2: The City will assist Miami-Dade County in developing the premium transit projects identified in the TPO's Long Range Transportation Plan (LRTP) within the City limits. The City will utilize land development regulations and other incentives to help direct development where it will best support existing and planned transit services.

Policy TR-2.1.5: The City will encourage the utilization of Road/Mobility Impact Fees on arterials/collectors, transit projects and bicycle facilities within the City, and will include said projects in the LRTP. (See Policy TR-2.2.5.)

Policy TR-2.1.7: The City will encourage Miami-Dade Transit to prioritize its transit facility and service improvements along identified transit corridors and adjacent to Metrorail stations.

Policy TR-2.1.8: The Transportation Element will be updated for consistency with the TPO's LRTP.

BICYCLE FACILITIES

Policy TR-2.2.1: The City will continue to foster the development of bicycle and pedestrian friendly neighborhoods and commercial centers.

Policy TR-2.3.3: The City will prioritize bicycle facilities that are protected as a means of providing safe bicycle facilities for cyclists of all ages and abilities.

Policy TR-2.6.2: Develop and encourage more bicycle paths, protected bicycle lanes, bicycle boulevards, cycle tracks, and sharrows; expand the bicycle network and connect any gaps while promoting alternative travel mode; promote the implementation of enhanced bicycle amenities such as bicycle racks, lockers and bicycle wayfinding signage that helps to encourage more bicycle use. Map TR-6 (within Appendix TR-1) illustrates the existing bicycle facilities in the City. (See Policy IC-2.1.15)

Policy TR-2.6.3: The City will in coordination with Miami-Dade Transit and FDOT develop, prioritize, and implement sidewalk and bicycle infrastructure improvements that are adjacent to transit routes/corridors and transit stations in order to improve connectivity between transit and other non-motorized modes of transportation while promoting the use of alternative travel modes. (See Policy IC-2.1.16)

Policy TR-2.2.3: The City will continue to support the trolley system that provides feeder services and first-mile/last-mile connections.

Policy TR-2.2.5: By December 2020, the City will seek to study and determine the feasibility of establishing a mobility impact fee that would be collected to fund or supplement the cost of transportation system improvements including potential investments in the expansion of the Miami Trolley, complete streets improvements, enhanced bicycle and pedestrian facilities, water taxi services, Light Rail/Streetcar plans, and other transportation improvements identified in future plans. (See Policy TR-2.1.5.)

Policy TR-2.2.6: Support cooperation with private transportation network providers in the enhanced delivery of public transportation services.

Policy TR-2.3.1: The City will encourage a balanced streetscape design program that accommodates all roadway users and pays special attention to non-vehicular modes by focusing on landscaping treatments, pedestrian-scaled lighting, and the construction of sidewalks and bicycle paths along city streets. These improvements will be coordinated with major repairs, roadway resurfacing, and other renovations when possible. (See Policy TR-2.1.4)

Policy TR-2.3.2: Prioritize the implementation of Complete Streets improvements for roadways that lead to transit nodes, are within transit corridors, or connect to bicycle/pedestrian paths.

Policy TR-2.4.1: Coordinate with Miami-Dade County's SMART Plan, to provide premium transit service along roadways in the City including Biscayne Boulevard and West Flagler Street.

Policy TR-2.4.2: Improve regional mobility by regularly coordinating with, but not limited to, Miami-Dade County, FDOT, MPO, South Florida Regional Transportation Authority (SFRTA), the Port of Miami, the Miami River Commission, the Miami International Airport and other public agencies to ensure that future improvements to the transportation network within the City from these agencies are consistent with the City of Miami's MCNP.

Policy TR-2.4.3: The City will improve transportation connections by providing a variety of affordable travel options and by being attentive to the needs of vulnerable and historically marginalized populations.

Policy TR-2.4.4: The City will improve connections to transit by prioritizing sidewalk and bicycle infrastructure investments adjacent to transit facilities.

Policy TR-2.4.5: Continue to coordinate with SFRTA, FDOT, Miami-Dade County, and other local agencies to support and develop plans to implement the Tri-Rail Coastal Link South Florida East Coast Corridor (SFECC).

Policy TR-2.4.8: The City will continue to coordinate with Miami-Dade County to promote public transit and shared transportation services by educating and informing the public of these services via app-based technologies, informative websites, and other means of communication to increase transit ridership.

Policy TR-2.4.10: Market and promote the use of multi modal transportation options using social media, educational opportunities, and any other form of public outreach.

Policy TR-2.5.3: The City will require that transit facilities, such as turn-out bays, transit priority signals, high-occupancy vehicle lanes, bus-only lanes, and transit shelter locations, be included in roadway design proposals, as appropriate, especially for proposals within transit corridors or in close to proximity to transit stations.

Policy TR-2.5.4: The City will continue to coordinate with Miami-Dade County to address the transit needs consistent with transit planning guidelines while considering population growth trends within the City and the metropolitan area.

Policy TR-2.5.5: Annual coordination with Miami-Dade County on improving the efficiency of its public bus transit system.

Policy TR-2.6.1: The City will encourage Miami-Dade County and FDOT to include improved connections between all modes of transportation, with emphasis on connections to non-motorized modes, as they are implementing transportation enhancements within City boundaries.

Bicycle Infrastructure

Policy TR-2.7.1: The City will preclude land uses within 1/2 mile of a transit corridors, Metrorail stations, and Metromover stations that are not conducive to public transit ridership such as car dealerships, car-oriented food establishments, and container yards. Conversely, the City will support the expanded development and design of a transit system that helps shape the desired land use patterns.

Policy TR-2.7.2: The City will regularly coordinate with Miami-Dade County to improve the efficiency of its public transit system by supporting transit-oriented development policies and promoting the use of alternative travel modes within the City. (See Policy IC-2.1.17)

Policy TR-2.7.6: The City will work with Miami-Dade County to promote the transit-oriented development (TOD) policies.

Policy TR-2.8.1: Promote recommendations from the adopted Miami Downtown Transportation Master Plan that aim to rebalance downtown roadways toward transit, and pedestrians.

Policy TR-2.8.2: Through coordination with Miami-Dade County and FDOT, the City will continue to support the monitoring of “high crash” locations on city streets and identify design improvements that may alleviate hazardous conditions, especially to pedestrians and bicyclists. The City will utilize safety as an evaluation criterion when improvements are prioritized and incorporated into the City's Capital Improvement Element.

Policy TR-2.8.3: Provide a properly designed and safe system for pedestrian access by adhering to design standards and procedures which comply with the Americans with Disabilities Act of 1990.

Policy TR-2.8.8: Develop a modal hierarchy for all street classifications within the City that prioritizes the use by pedestrians, bicyclists, transit riders, and motorists. This modal hierarchy will be used to determine the types of Complete Streets accommodations that will be provided within each street classification.

Policy TR-2.9.1: The City will continue to support the implementation of The Underline, the Ludlam Trail, and other 'green corridors', and the use of alternative modes of transportation.

Policy TR-2.9.2: The City will continue to support the implementation of the Riverwalk and Baywalk initiatives.

Policy TR-2.9.3: Develop a comprehensive active transportation plan that integrates bicycle, pedestrian, and greenway components.

Policy TR-2.9.4: Sidewalks and other essential non-motorized amenities and facilities shall be included in development plans prior to receiving approval from the City.

Policy TR-2.9.5: Prioritize enhancements of pedestrian and bicycle circulation, access, and safety in the downtown, near activity centers, along transit corridors, near schools, libraries, and parks.

Policy TR-2.9.6: The City will require that pedestrian mobility be included in Maintenance-of-Traffic (MOT) reviews.

Coordination with County and State Agencies

Policy TR-2.9.7: Coordinate with Miami-Dade County and FDOT to design the City's thoroughfares strategically to disperse and reduce the length of automobile trips and to encourage walking and bicycling.

Policy TR-2.9.8: The City will encourage the provision of bicycle support facilities, such as secured bicycle racks, personal lockers and showers for new and existing office developments and employment centers to encourage bicycling as an alternative mode for work commutes.

Policy TR-2.9.9: The City will include the expansion and continuity of the bicycle network in capital projects city-wide with a focused emphasis on areas within transit corridors in an effort to reduce the reliance on automobiles and encourage the use of alternative modes of transportation.

Policy TR-2.9.10: The City will remove barriers that prevent the connection of existing bicycle and pedestrian facilities, which include but are not limited to railroad corridors, inadequate roadway conditions, physical obstructions and unsafe conditions to crossing the Miami River, and other physical and psychological barriers. The City will work to connect the gaps in the existing bicycle and pedestrian facilities as illustrated in Maps TR-6 and TR-7, within Appendix TR-1 of the Miami Comprehensive Neighborhood Plan which can be seen here in figures 27 and 28.

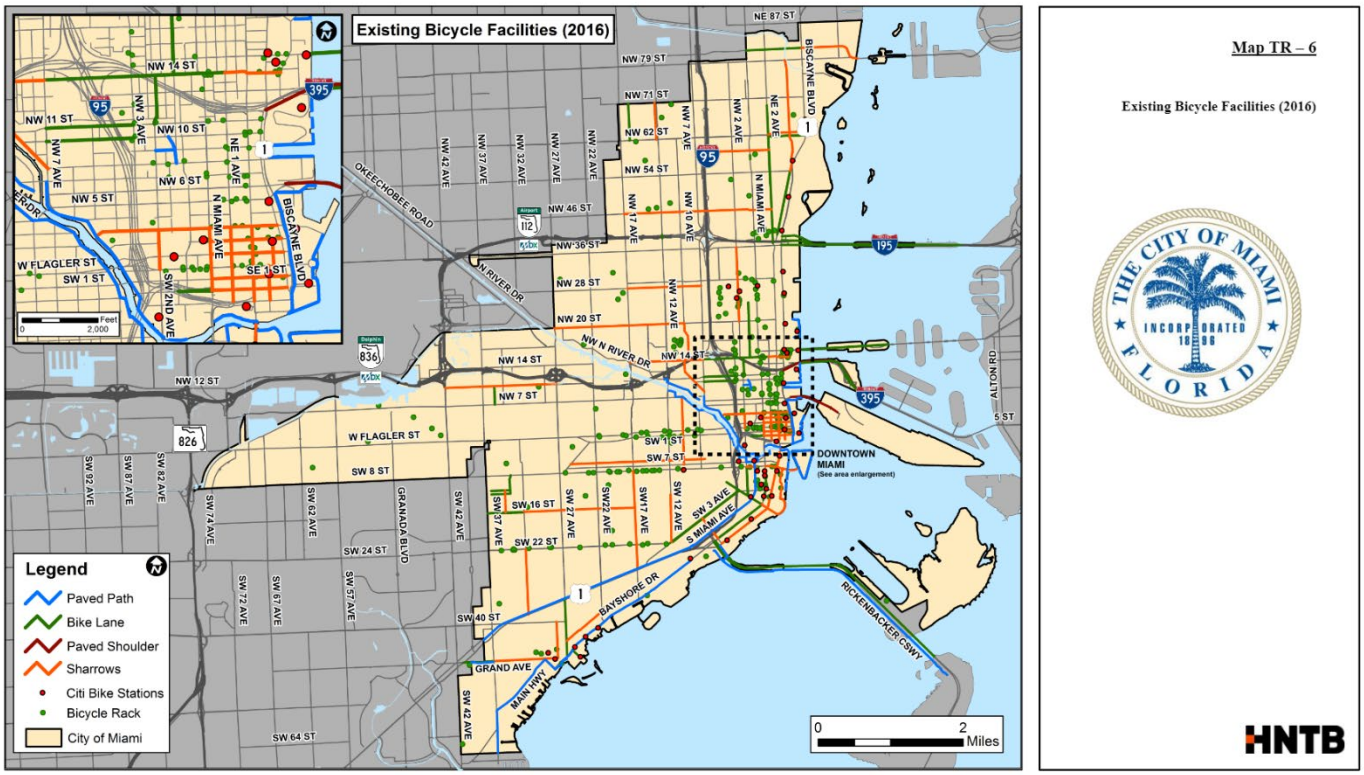


Figure 27. Existing Bicycle Infrastructure in 2016. From the MCNP

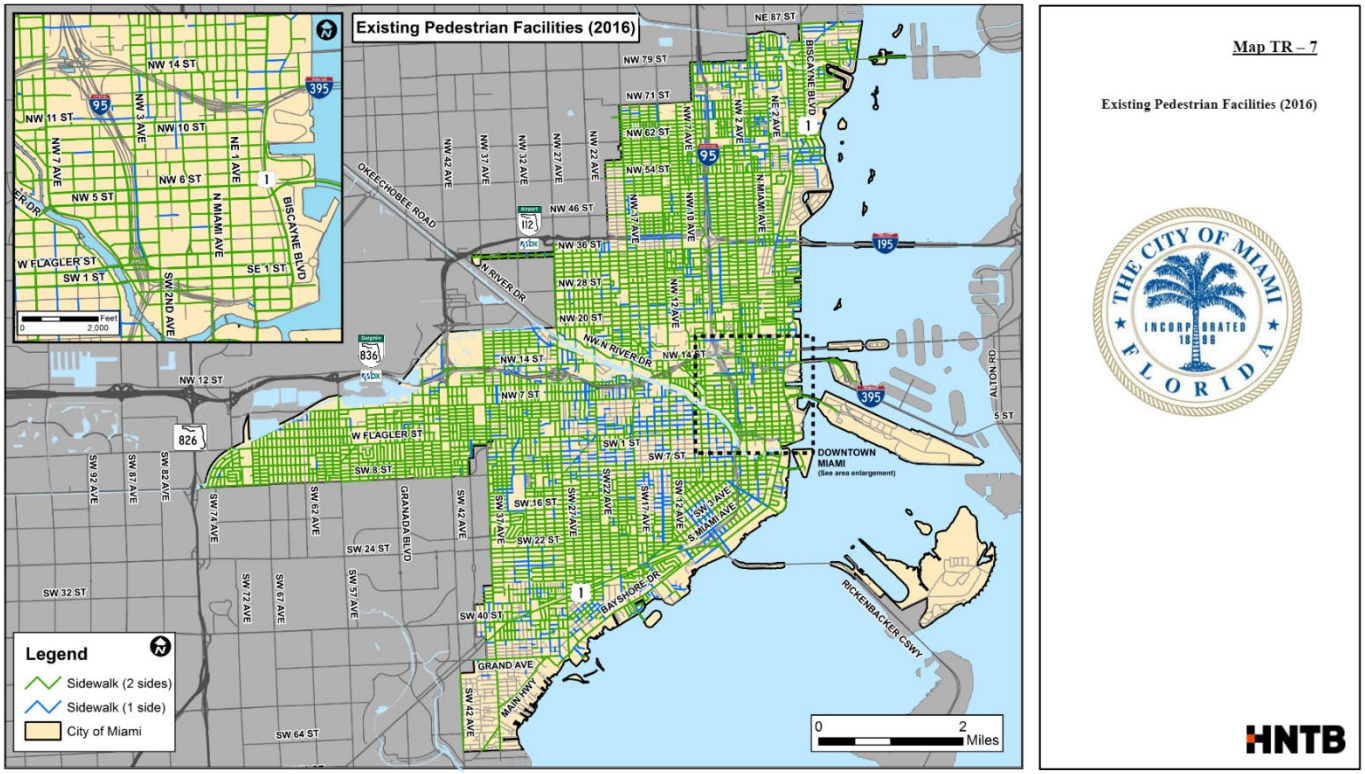


Figure 28. Existing Pedestrian Sidewalks in 2016. From the MCNP

Policy TR-2.9.11: The City will, in coordination with the TPO, FDOT, and Miami-Dade County, update the Bicycle Master Plan every five years to ensure consistency with the LRTP. (See Policy IC-2.1.20)

Policy TR-2.9.12: Bicycle-friendly city as defined by the League of American Bicyclists.

Policy TR-2.10.1: Through the use and integration of cell phone and app-based technologies and in coordination with other public and private agencies, the City will seek to provide real-time travel information to roadway users regarding City services such as parking availability, trolley arrival information, traffic congestion updates, and other transportation related information. The City will aim to build on the individual efforts of universities, the commercial shared-ride sector, commercial data aggregators to generate improved real-time information for public consumption.

Policy TR-2.10.2: The City will, in coordination with Miami-Dade County and FDOT, leverage technology to provide user-friendly trip planning services that include all transportation modes.

Policy TR-2.10.3: The City will, in coordination with Miami-Dade County and FDOT, promote and share all existing transportation-related data, sources, and tools to the public to create an open and user-friendly data repository that could be used for analysis and future private or public technology development that aims to improve the efficiency of the transportation network.

Policy TR-2.10.4: The City will encourage the use and proliferation of electric vehicles for City fleet vehicles and personal automobile and will promote electric vehicle recharge stations in parking garages, park and ride lots, surface parking lots, and strategic on-street parking locations.

Policy TR-2.10.5: The City will seek opportunities to further the implementation of automated and connected vehicle communications technology for City fleet vehicles and personal automobiles to address congestion and safety issues.

Policy TR-2.10.6: In coordination with Miami-Dade County, FDOT, and other public agencies, the City will facilitate the development and maintenance of real-time traffic and traveler data that helps monitor the overall transportation system and evaluate its performance. This information should be made available to the public and should be delivered to users in a familiar way that promotes data sharing, thus benefiting the wider community. (See Policy IC-2.1.23)

Policy TR-2.11.1: The City will, in coordination with Miami-Dade County and FDOT, regularly collect necessary data for better estimating vehicle occupancy rates and means of travel pursuant to updating the person-trip methodology as required. (See Policy IC-2.1.24)

Policy TR-2.11.2: The City will, in coordination with Miami-Dade County and FDOT, periodically collect bicycle and pedestrian count data throughout the City to better understand and analyze the use and demand of the non-motorized transportation network and to develop and implement improvement projects based on needs. (See Policy IC-2.1.25)

Policy TR-2.11.3: The City will, in coordination with Miami-Dade County and FDOT, identify any transit service adjustments and improvements to the bicycle network as to maintain an updated understanding of the existing transit corridors for the interpretation and implementation of the person-trip LOS methodology. (See Policy IC-2.1.26)

PORTS, AVIATION AND RELATED FACILITIES POLICIES

Policy PA-3.2.1: The City shall through the Transportation Element of the comprehensive plan, encourage the coordination of the intermodal surface and water transportation access service to the Port of Miami River Working Waterfront (See Policy TR-2.2.12 and Policy IC-2.1.30).

PARKS, RECREATION AND OPEN SPACE POLICIES

Policy PR-1.1.4: The City of Miami's Level of Service for Parks, Recreation and Open Space is to provide a municipally owned park within a ten-minute barrier-free walk to park entrances by 72% of the city's population as measured by GIS pedestrian network analysis. A ten-minute walk will be defined as a one-half mile, barrier-free distance on a safe pedestrian route. Barrier-free means a continuous walk on a sidewalk or designated pedestrian route that may include crossing streets but does not encounter barriers such as walls or highway embankments that impede passage. Safe pedestrian routes include those that may include crossing of streets with speed limits of up to 40mph. Every three years, the City will develop and update a map that shows which residential areas fall within the ten-minute walk buffer for City-owned parks, and which do not. This map will then be overlaid on a population map showing the most current U.S. Census population data available to calculate if at least 72% of the city's population lives within the ten-minute walk buffer.

Policy PR-1.4.1: The City will continue to work with transit agencies to coordinate the park system and pedestrian connections with opportunities to improve and expand The Underline beneath the Metrorail.

Policy PR-1.4.2: The City will continue to work with transportation agencies to implement the Commodore Trail improvements and the Flagler Trail (FEC Corridor Greenway).

Policy PR-1.4.3: The City will continue to work to implement the Overtown Greenway plan to link the Miami River through Overtown to Downtown.

Policy PR-1.4.4: The City will work with Miami-Dade County and other groups to ensure that greenway, trail and park systems within the City are effectively linked to proposed regional trails such as the Venetian Connector, the Unity Trail, the Perimeter Trail, the Ludlum Trail, and the East-West Trail. The City will continue to advocate for funding of trails identified in the Miami-Dade Metropolitan Planning Organization 2030 LRTP.

Policy PR-1.4.5: The City will designate as scenic transportation corridors those segments of roadways that have significant vegetative features and will encourage the development of bicycle and pedestrian paths along such corridors, where appropriate. Future land development regulations will encourage the provision of sufficient land areas for uses that are compatible with and encourage the flow of bicycle and pedestrian traffic along these corridors.

Policy PR-3.1.1: The City will continue to implement sidewalk and shade tree planting programs along public roadways that connect to parks and other community destinations. The improvements will be targeted to pedestrian routes that provide a ten-minute walk to a park to the greatest number of persons. Tree planting programs will be implemented in accordance with the 2007 City of Miami Tree Master Plan.

Policy PR-3.1.2: The City through the Parks and Recreation Department will work with neighborhood groups to identify the ten-minute pedestrian routes within a half-mile radius of parks that are appropriate for improvements to sidewalks, lighting, street trees, crosswalks and pedestrian count-down signals, and signage, as described in the 2007 Parks and Public Spaces Plan.

Policy PR-3.1.3: Bicycle parking facilities such as bike racks shall be provided in existing and future park projects.

Policy PR-3.2.11: As specified in the City of Miami Charter and Related Laws, and more specifically the Waterfront Charter Amendment, all new development and redevelopment along the downtown waterfront is required to provide a waterfront setback, and those developments that require publicly accessible shoreline walkways, will design them in conformance with the "Baywalk/Riverwalk Design Standards." (See Coastal Management Policy CM-2.1.8.) The City will monitor these areas to ensure continued public access, as required.

Policy PR-3.3.1: All renovations, expansions, and development of park and recreation facilities will be designed in accordance with the Americans with Disabilities Act requirements, including handicapped parking spaces, ramps, handrails, pathways and other accessibility improvements to be appropriately located with respect to recreational facilities.

Policy PR-6.2.2: The City will continue to work toward improving landscaping and pedestrian-oriented amenities along major boulevards, including Biscayne Boulevard, Brickell Avenue, and North 1st Avenue, and other major transportation corridors, to create distinctive images and unifying elements between downtown districts.

Bay Walk and River Walk

Policy CM-2.1.3: Continue development of the river walk and bay walk along City owned property and continue to require development of the bay walk and river walk along private property through its land development regulations.

Policy CM-2.1.4: Continue to implement design guidelines along the Baywalk and Riverwalk in accordance with the Miami River Greenway Action Plan and other adopted plans as appropriate.

Policy CM-2.1.7: As specified in the Waterfront Charter Amendment and Ordinance Zoning Ordinance for the City of Miami all new development and redevelopment along the downtown waterfront is required to provide a waterfront setback, and those developments within Special Districts (SDs) that require publicly accessible shoreline walkways, will be designed in conformance with the "Baywalk/Riverwalk Design Standards."

FDOT – D6 FIVE-YEAR WORK PROGRAM

The Florida Department of Transportation (FDOT) District 6, Five-Year Work Program includes the following projects:

FLAGLER STREET SMART DEMONSTRATION PROJECT (450733-1)

In early 2022, FDOT collaborated with the Miami-Dade County Department of Transportation and Public Works (DTPW) and proposed a joint-agency recommendation for the implementation of a demonstration project to provide additional data for the continuation of the Flagler Street Bus Rapid Transit study from Florida's Turnpike to Biscayne Boulevard.

The demonstration project consists of repurposing the outside lanes on Flagler Street and SW 1st Street, from approximately SW 27th Avenue to Biscayne Boulevard, into Business Access and Transit Lanes, and applying appropriate pavement markings, including red surface treatments on the lanes. Figure 29 details the project area and highlights the area of special concern in Downtown. The implementation of the demonstration project will provide additional key performance data that will allow FDOT, Miami-Dade TPO, and Miami-Dade DTPW to jointly evaluate and determine the feasibility of a dedicated curbside rapid transit lane concept. Design is underway, with construction anticipated in July of 2024 with a projected cost of $5.5 million.

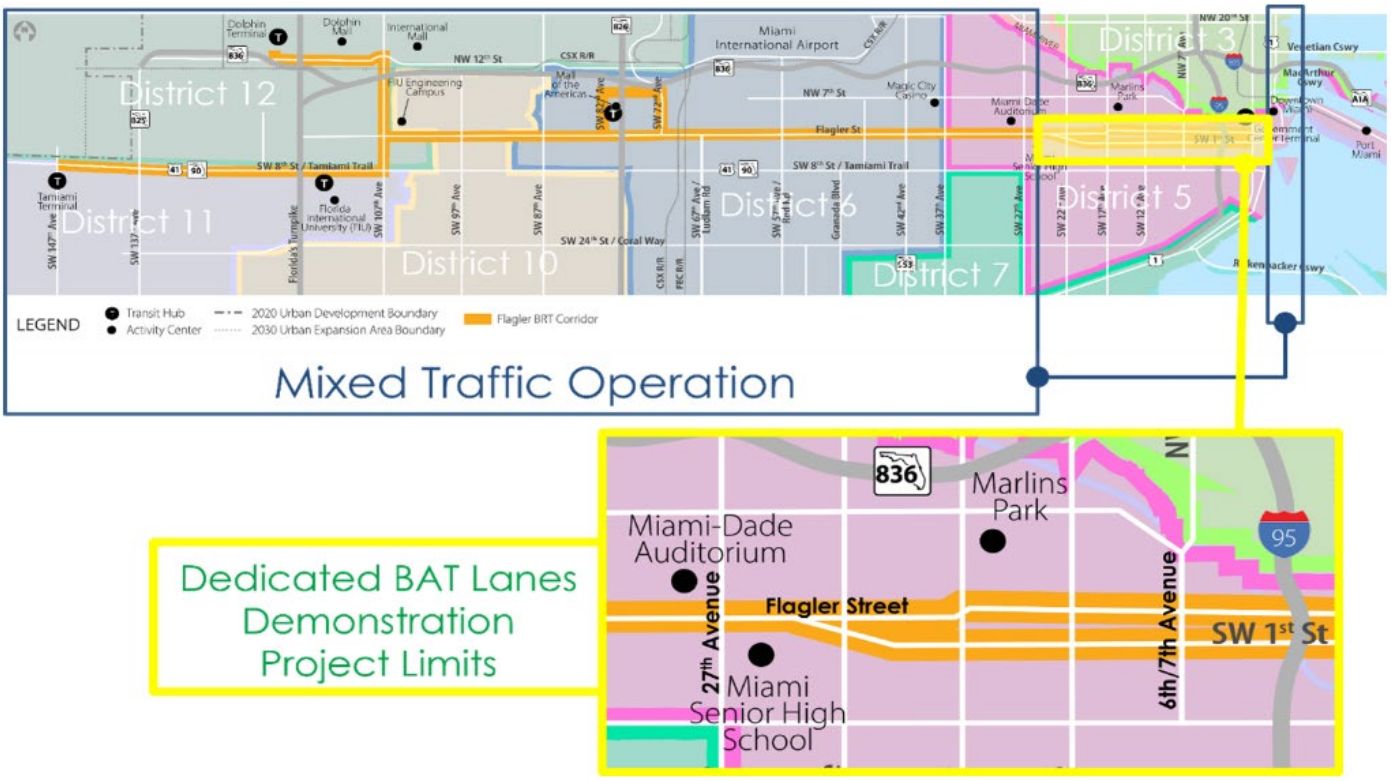


Figure 29.Flagler Street SMART Bus Access and Transit Lanes Demonstration Project

SR 968/FLAGLER STREET PREMIUM TRANSIT PD&E STUY (437782-1)

The Flagler Corridor PD&E Study for implementation of curbside Business Access Transit (BAT) Lane on the easternmost segment of the project corridor. The TPO urged FDOT under TPO Resolution #19-2023 to consider the conversion of travel lanes for Business Access Transit Lanes along the entire Flagler Corridor. The PD&E Study will restart in 2024 at a cost of $2.7 million.

NORTHEAST CORRIDOR SMART COMMUTER RAIL (452239-1)

FDOT, in partnership with MDTPW, is assisting in funding the Northeast Corridor SMART Commuter Rail project, which is one of six transit corridors established for the SMART Program. The Northeast Corridor will provide service along the existing Florida East Coast Railway rail lines that generally run parallel to US 1 and West Dixie Highway between Downtown Miami and the City of Aventura in the northeast corner of Miami-Dade County. The Northeast Corridor is about 13 miles long, traverses seven municipalities, and connects two busy transit terminals.

The southern terminus of the corridor is the MiamiCentral station located at the northwest quadrant of the intersection of NW 1st Avenue and NW 6th Street. The northern terminus of the corridor is the West Aventura station which opened in 2023. The purpose of the project is based on the need to increase regional mobility, reduce congestion, and provide for the transportation needs of residents within the County. The project would provide service to individuals who might otherwise commute by motor vehicles. The project would also benefit local transportation by reducing the number of

vehicle trips taken and is anticipated to positively impact the regional roadway network and local traffic by providing an alternative transit mode. FDOT will contribute $34.5 million a year in 2025, 2026, and 2027 for a total contribution of $103.5 million.

I-95 FROM US-1/SOUTH DIXIE HIGHWAY TO SOUTH OF NW 62 STREET (414964-7)

There are three PD&E projects programmed for improvements along the I-95 corridor to address the deficient operational capacity and relieve existing and future congestion along the SR 9/I-95 corridor. One is within the segment of I-95 from NW 62nd Street to US-1/South Dixie Highway. The analysis reviews the potential impacts of the proposed project on the social, economic, natural, physical, and cultural resources based in the surrounding environment. Other goals of the project include: preserving the operational integrity and regional functionality of I-95 and enhancing emergency evacuation and response times.

Overall, the project will offer more mobility options for motorists and transit users, as it will provide additional capacity along the corridor throughout Miami-Dade. The current PD&E costs in 2025 are proposed at $6.5 million, and the design costs for 2028 are programmed at $9.4 million.

FDOT DISTRICT 6 BIKE NETWORK PLAN

The following is a review of the current Florida Department of Transportation District 6 efforts to improvements to the Bicycle Network Plan.

LITTLE HAVANA EAST-WEST ROUTE ASSESSMENT

The purpose of this project is to assess and create a safe link to connect the Miami Dade College Padrón Campus along SW 6th Street from SW 27th Street to the Miami River Greenway near SW 2nd Street. The plan envisions a shared-use path approximately 2.5 miles long, helping to connect Coral Gables with Downtown Miami.

SEPARATED BICYCLE LANES ON SR A1A/MACARTHUR CAUSEWAY

The project recommendation includes enhanced bicycle lanes (striped buffer, delineators, profiled thermoplastic, green markings) to physically separate bicycles and automobiles along I-395 and the I-395 ramp and providing a safe bicycle connection from Biscayne Boulevard (SR5/US 1) to the MacArthur Causeway Bridge (SR A1A).

BUFFERED/PROTECTED BICYCLE LANES ON SR A1A/MACARTHUR CAUSEWAY

The purpose of this project is to enhance the bicycle facilities along the MacArthur Causeway (SR A1A). Currently, facilities include paved shoulders and unprotected bicycle lanes. The project looks to improve the connection between Miami Beach and Downtown Miami with enhanced cycle lanes (striped buffer, delineators, profiled thermoplastic, green markings) for a segment length of 2.7 miles. The process is currently in the design stage, and construction is anticipated to be completed in 2028.

I-195/SR 112/JULIA TUTTLE CAUSEWAY PD&E STUDY

The Florida Department of Transportation (FDOT), District Six is completing a Project Development and Environment (PD&E) Study for I-195 expressway (SR 112/Julia Tuttle Causeway) from NW 12 Avenue to Alton Road (SR 907), and along the local street network surrounding the ramp terminals. The study is part of the Corridor Planning Study for I-195 to evaluate alternatives for operational deficiencies and to accommodate future travel demands. It also includes improvements for pedestrian, bicycle, and transit connections, increased capacity, and improved safety. This PD&E Study

began in 2022 and is expected to be completed by 2025. After the completion of the PD&E phase, the preferred alternative will move to the final design phase.

Bicycle Lanes on SR 972/Coral Way/SW 13th Street

The project analyzes the feasibility of accommodating bicycle lanes along SW 13th Street or Coral Way (SR 972) from SW 15th Road to Brickell Avenue.

Protected Bicycle/Pedestrian Facilities along SR 913/SW 26th Road

The project completed in December 2021 looked at the feasibility of the installation of separated bicycle and pedestrian facilities along SW 26th Road connecting SW 1 Avenue to the Rickenbacker Causeway.

STAKEHOLDER ENGAGEMENT

A thorough stakeholder engagement was undertaken to meet with individuals who represent organizations entrenched in the transportation and mobility efforts in Downtown Miami and the greater study area. The organizations below participated in stakeholder meetings. During the meetings, many participants repeated some issues.

City of Miami Transportation Department	**Transit Alliance Miami**	**The Underline**	**Miami-Dade County Commission**
Miami-Dade County Office of Management and Budget	**FDOT District 6**	**Miami Dade County Police**	**Overtown CRA**
Brickell Homeowners Association	**Miami-Dade County Office of Resilience**	**Brickell Advocates**	**Miami Parking Authority**
	Downtown Miami Development Authority		

The following are the issues and concerns raised throughout the stakeholder engagement process, as well as the recommendations gathered from the culmination of all the interviews.

ADA

Concerns

- Transit accessibility is reported to be insufficient for users with disabilities. Beginning with sidewalks, poor maintenance and cleanliness issues have created unpleasant and challenging conditions for wheelchair users to navigate. At Metrorail stations, elevator outages may require riders with disabilities to travel to an alternate station to enter or exit the system.
- The County provides a Paratransit service; however, users have expressed a preference for wheelchair-accessible rideshare options through private providers like Uber or Lyft. Paratransit drivers do not provide door-to-vehicle service, which may be necessary for some users.

Recommendations

- Future station designs should prioritize a central platform layout, which enables the installation of a central elevator and facilitates easier transfers between directions.

- Exploring opportunities for a partnership between the County and private rideshare providers can significantly enhance wheelchair-accessible services.
- Reinstating monthly Special Transportation Services meetings, as these provided an opportunity for disabled riders to relate their concerns and experiences to the city on system improvements.

BICYCLE LANES

Concerns

- Bicycle lanes are a contentious subject because although they offer an alternative mode of transportation, they often replace essential on-street parking and loading facilities. Consequently, vehicles such as rideshares, delivery trucks, and service vehicles frequently encroach on bike lanes. There is minimal enforcement to keep lanes clear for cyclists.
- The bicycle network in Downtown Miami is reportedly underutilized.

Recommendations

- Designated and protected bicycle lanes are needed, especially on routes that provide access to Biscayne Boulevard.
- Improved barricades are necessary to protect the bike lanes from vehicle encroachment while ensuring user clearance.
- Increase bicycle lane usage by allowing other riders, such as e-scooters and e-bikes, to operate within these lanes.
- Microdelivery on cargo bikes can increase bicycle lane usage and help reduce the number of delivery vehicles in the area.
- Enforcement of bike lanes through cameras and AI to issue citations could help ensure compliance and safety for cyclists.
- Expand the bicycle network connecting Downtown to Brickell.
- Restructure the bicycle lanes on Biscayne Blvd.
- Enhance bike accessibility between Wynwood and Downtown Miami with protected bicycle lanes.
- NE 5th and NE 6th Streets, N Miami Ave, and NE 1st Avenue could be transformed into a more trail-like experience rather than traditional protected bike lanes.

BRIDGES AND LAND USE

Concerns

- The issue with the bridge is significant, but the broader concern may lie in the land uses along the river.
- The boat repair industry was noted as causing significant traffic disruptions at bridges because they are able to bypass bridge opening and closing time regulations when tugging boats to repair sites.

Recommendations

- Analyzing new locations for port and shipping repairs, with Watson Island and Biscayne Bay representing opportunities to encourage port and bay utilization.
- Encourage the diversification of land uses affronting the Miami River. Instead, the focus should be on businesses that cater to the needs of Downtown residents.
- Retiming signals at the bridges could help alleviate traffic congestion and improve the flow of vehicles across waterways.

EVENT CONGESTION

Concerns

- Events are a significant factor contributing to traffic congestion in downtown Miami. For prolonged events like the Ultra Music Festival, counterflow measures are set up to manage traffic flow. Miami Heat basketball games can also be problematic for up to an hour before and after the events. For more ad hoc events, social media is utilized to notify residents of road closures.
- During events, congestion from I-395 and I-95 off-ramp traffic is significant, and it extends into Biscayne Boulevard, causing major disruptions in traffic in Downtown. Drivers feeling trapped during event traffic may attempt to escape by driving in the wrong direction on roads or using pedestrian or bicycle paths.
- The traffic lights in Downtown are outdated and are recommended for replacement. This becomes especially problematic during special events, as the pre-timed lights lack the technology to adjust their timing according to traffic flow, worsening traffic issues. For instance, the traffic light frequently malfunctions at Flagler Street and NE/NW 2nd Avenue.

Recommendations

- Law enforcement management needs to be increased during special events.
- The signal network in Downtown should be changed to detection-based instead of timing-based, which could greatly improve traffic flow.
- Consider modifying and reducing feeder ramps and addressing vehicle access into the study area.
- Tunnels could serve as a solution to alleviate congestion and gridlock caused by bridges connecting Brickell and Downtown Miami. One recommendation is to reconfigure the I-95 off-ramps to underground tunnels that emerge onto Biscayne Boulevard.
- Encourage to close physical locations early and have employers facilitate telecommuting or remote work to alleviate traffic congestion.

CONNECTIVITY

Concerns

- Accessibility within the study area to other neighborhoods is a concern, particularly the disconnect between Wynwood and other major neighborhoods like Brickell and Downtown. Additionally, bridging the gap between the sprawl in Miami-Dade is critical to connect the outer-lying residential communities with the urban core.

- Within the study area, connecting major neighborhoods, including Wynwood, Brickell, and Downtown, is critical, as there's a pedestrian transit disconnect between these neighboring areas.
- While the Better Bus Network program aimed to make the system more efficient for more users, it has resulted in the discontinuation of certain routes. Due to these changes, residents are voicing concerns because they no longer have access to certain bus routes.

Recommendations

- Encouraging the expansion of the Metrorail and Bus Rapid Transit (BRT) systems would significantly improve public transportation accessibility and connectivity within the area.
- For the North/South Corridor from Wynwood/Design District to Downtown, BRT and bicycle connections are essential to enhance transportation options and connectivity. Similarly, for the East/West Corridor from Downtown to Miami Beach, improving transportation infrastructure is crucial for smoother movement between these areas.

CONSTRUCTION MANAGEMENT

Concerns

Increased construction in Downtown Miami has resulted in traffic disruptions, road closures, noise pollution, and even increased flooding. While growth and development are welcomed, the prolonged closure of vehicular lanes, such as the southernmost lane on SE 3rd Street at the Aston Martin for almost four years, has detrimentally created bottlenecks along SE 3rd Street onto Biscayne Boulevard. This highlights the need for better coordination and management of construction projects to minimize their impact on traffic and local residents.

Recommendations

- Curbside management should address and reroute sidewalks and bike lanes if impacted by construction or other activities to ensure the safety and accessibility of pedestrians and cyclists.

EQUITY

Concern

- Prioritizing Overtown and Allapattah is crucial due to equity concerns, as many residents in these areas rely on cycling for transportation and may resort to cycling on sidewalks due to insufficient infrastructure.
- Developers should prioritize recruiting and encouraging people who live in Overtown to ensure that the community benefits from the development. Despite the influx of new residents, engaging with and uplifting the existing community is essential.
- Expand MetroConnect services in some areas.
- Very difficult for the indigenous people to Overtown to feel as if they are a part of all this growth. Improved housing is being created right next to them with no opportunity for them to move into them. Developers say they do not discriminate, but they also do not offer opportunities for Overtown people to move into these developments.

- Supporting elderly individuals and those with disabilities, including physical disabilities, through permanent supportive housing initiatives is crucial. Addressing homelessness and housing needs in Overtown is also vital. It is concerning to hear that in a new CRA building, there are only 3-4 Black families residing there. This highlights the importance of ensuring equitable access to housing opportunities for all community members.

Recommendation

- Tree canopy in Overtown needs to be addressed. They need trees and flowers, which need to be installed in close coordination with the City and the County. Mr. McQueen will send existing plans for the improved urban forestry initiative.
- Incentivizing construction groups working in the area to hire from within the community can help address unemployment and promote economic empowerment among local residents. This can be achieved through initiatives such as job training programs, apprenticeships, and partnerships with local workforce development organizations. Additionally, providing tax incentives or preferential treatment for contractors who prioritize hiring from the community can further encourage their participation.
- Support Aging in Place policies.
- Bringing MetroConnect or the Liberty City Trolley to the area could greatly enhance transportation options and connectivity for residents.
- Promote financial stability that fosters mixed-income populations and can contribute to the overall well-being and inclusivity of a community.
- Improving living conditions involves designing communities with safety in mind, incorporating principles of Crime Prevention Through Environmental Design (CPTED) to create environments that deter crime and enhance residents' sense of security.
- Work with townhouses and co-ops to implement measures to preserve housing, safeguarding residents' well-being and enhancing living conditions.
- Support housing initiatives in Overtown and focus on branding efforts to promote the neighborhood's unique identity and character.

LOADING

Concerns

- Delivery trucks, rideshares, and even emergency vehicles frequently enter bicycle lanes.
- There are issues with loading and unloading, as well as parking, on SW 1st Street from SW 2nd Avenue to Miami Avenue, specifically east of Miami Avenue. Additionally, buses often park in the designated bus lane.
- Managing curbside activities and loading on sidewalks needs attention.

Recommendations

- Increased implementation of curbside management strategies to optimize the allocation and use of curbside spaces for various activities such as parking, loading, and pick-up/drop-off.
- SMART Loading Zones: Camera-based solutions for loading zones and being able to charge at the loading zones.
- Partner with the City and County for micro-freight loading zones.
- Enforce off-street loading and encourage building design with additional loading infrastructure on site.

- Code enforcement is encouraged to regulate and enforce code policies to promote the use of loading zones in residential buildings.
- Loading zones shall be included in right-of-way areas to deter Amazon and rideshare drivers from encroaching on bike lanes.
- Robodelivery: Policy regarding autonomous vehicle usage on sidewalks for delivery purposes.
- Implementing automated ticketing in areas prone to traffic congestion caused by vehicles standing in no-standing zones. Additionally, there is a faulty signal at SE 1st Avenue, leading to lane blockage by parked vehicles.

MAINTENANCE

Concerns

- The maintenance of public facilities, including sidewalks, public transit stations, and vehicle fleets, is not only important but also essential for ensuring their appeal and functionality.
- DTPW hosts a webpage providing the outage and maintenance status for Metrorail and Metromover station Elevators and Escalators. The information includes the facility's location, the reason for the outage, and the estimated return date.
- Reporting outages is an onerous endeavor.

Recommendations

- One way to improve the alert system is using technology like QR codes to facilitate notifications of downed systems. For example, a QR code at the entrance of an elevator or escalator landing can be proposed so users can scan and report an outage.
- Chicago Transit Authority provides details for the date of the outage and the transit lines that are impacted. Users can also sign up to receive updates about elevator outages, planned maintenance, and updates when elevators are back in service. The Chicago system also centralizes all alerts on one site for a quick snapshot of the system, providing information on route delays, service changes, or reroutes.
- Considerations shall also be made to centralize the various transit systems under one application to eliminate redundancy and provide current and accurate information.
- Make them more welcoming and aesthetically pleasing.
- Maintenance and cleanliness shall be accompanied by improved lighting to make these spaces safer and more attractive to transit users. Improved lighting shall work in conjunction with monitoring through cameras or physical patrol.

METROMOVER

Concerns

- Concerns regarding the age and maintenance of the transit fleet.
- Increased ridership leading to overcrowded trains and slower service.

Recommendations

- Opportunities to expand the Metromover network should consider north and south routes. It should begin with a connection between E 1st Avenue, the Miami River, and SE 2nd Street. This will improve the comfortability and

safety of riders while traversing. This is a huge opportunity corridor for improvement that could connect the MetroMover to the S 3rd Street MetroMover station.

PARKING:

Concerns

- Parking availability and time of day are factors influencing decisions between walking and driving downtown.
- Limited parking spaces for condo residents in Downtown.
- An abundance of parking included with new building options is provided to developers, tilting the scale.
- Lack of encouraging RTZs (Rapid Transit Zones) has caused reliance on parking structures.
- Aging infrastructure of parking garages and concern of structures not being equipped to handle new larger and heavier standard and electric vehicles.
- "Wedding cake" development, which is a style of building with many different tiers that resemble the namesake, requires larger parking pedestals, which adds to the cost of land, which is an impediment to building garages due to the influx of new cars.

Recommendations

- Expand partnerships with private transportation providers to improve connections from parking garages to destinations within downtown.
- Reduce opportunities for inexpensive parking options to encourage alternate modes of transportation.
- Establish public-private partnerships to redevelop aging parking facilities. For instance, the College Station Garage is being redeveloped with a new garage, commercial liner, and a residential component. The garage will be 40% EV-ready.
- Integrate more micromobility and last mile options and carshares like Zip cars and Cars2go.
- Pilot programs are a great way to test emerging technology. It can allow the Parking Authority to test out emerging technologies without the need for County approvals, which can delay the implementation of new technology.

PEDESTRIAN MOBILITY

CONCERNS

- Enhance pedestrian comfort, as walking Downtown can be affected by heat and rain.
- Brightline to Kaseya Center needs a walk-through on NE/NW 6th Street, as it is highly dangerous for visitors to walk from the arena to the stadium. Crossing Biscayne Boulevard remains perilous, particularly at NE 9th Street and NE 11th Streets.
- Closure of sidewalks and lanes in front of new developments forces pedestrians to enter the street to continue their path.

Recommendations

- Where feasible, use reflective pavement and building material that will help cool pedestrian paths and reduce the impact of urban heat island effects.
- Capitalize on the effects of offshore breezes by channeling wind and creating it with tall buildings.
- Internalize the pedestrian experience by using "Skybridges" that allow for a safer street crossing experience for pedestrians while increasing the flow of traffic. The Omni area could benefit the most from this.
- Encourage the installation of wider sidewalks and dedicated pedestrian plazas within the study area.
- Require new buildings and façade improvements to include building awnings and coverings over public walkways for a more comfortable pedestrian experience.
- City streetscapes in Downtown Miami City streetscapes should include a minimum shade or coverage requirement.
- Update the land development regulations to require new trees in the right-of-way to be of larger canopy tree species.
- Reduce traffic speeds to 25 mph within the urban core.
- Prohibit vehicular traffic from turning right on red.
- Better police management enforcing correct use of crosswalks by pedestrians. People are using crosswalks incorrectly.
- Increased access to parks and green spaces. Extend BayWalk towards the former City of Miami Building.
- Digital kiosks are becoming more and more common, and they could be an opportunity to tie in updates to transit info and wayfinding initiatives.

PORTMIAMI

Concerns

- Port and Routes to I-95 are critical and need to be protected. Trucks carrying hazardous material cannot take the tunnel, but rather take NW/NE 6th Street and turn into Port Boulevard.
- PortMiami accommodated over 7 million passengers in 2023 and handled approximately 1.25 million TEUs (twenty-foot equivalent units) of cargo. The port is still a growing- cargo and cruise operator.
- The I-395 signature bridge construction is causing significant traffic in and out of the port, resulting in an increased use of NE 5thStreet and NE 6th Street to access PortMiami through Port Boulevard. Possible considerations include making freight traffic a greater priority and removing existing bike lanes.

Recommendations

- Existing rail infrastructure is actively being used at PortMiami, resulting in an increase in train movements and the potential for a decrease in truck usage.
- It is important to maintain true truck access to I-95, but one that does not have a significant impact on Downtown activities.

- During congestion, the tunnel access closes due to life and safety hazards, and traffic is routed through Downtown and Port Boulevard. Unfortunately, traffic backups cannot be predicted. Improved closure announcements for Miami and Miami Beach are needed.
- A major goal is connecting the Port to mass transit. The SMART plans east/west corridor connection is critical for visitors and connecting major employment centers and facilities like the airport, cargo yards, and the port. The tunnel functionality needs to be optimized.
- Connect Arena to Downtown.

PUBLIC TRANSPORTATION

Concerns

- Existing transit stations for Metrorail and MetroMover are unwelcoming, and the barrier enclosure of these facilities makes them unattractive. This is a major factor in the user experience, and many of these would benefit from beautification and improved signage.
- There is a problem with buses being late in Miami-Dade County: only 38% of buses are on time.
- Delays mostly occur at the start of routes in Downtown Miami.
- Overcoming the hurdle of bus transfers is an issue.
- Public transportation systems may suffer from underutilization, rendering them ineffective and unnecessary. For instance, consider the red bus lane on SW 1st Avenue, which has had low ridership levels for many years.

Recommendations

- More incentives for people to use the program, for example, a discount program for employees of Downtown employers. These can be managed through a central transportation agency.
- Prioritizing the maintenance of existing facilities.
- Installing missing bus shelters, building upon tree canopy network, and enforcing sidewalk clearance.
- Offer a consistent one-stop ride.
- Install dedicated bus lanes for the following corridors: NE 1st Avenue, Biscayne Boulevard, and NE 2nd Avenue.
- Density, ridership, and job centers should be priority areas for bus shelters/stops.
- Give discounts to people who request them because, typically, these individuals are users who are informed, either because of need or because of frequent use. Recommendations made included making transit more expensive in the downtown area, by default, for tourists visiting South Florida.
- Implementing consistent and clear wayfinding signage, including directions to transportation options and expected distances, such as Tri-rail platforms, to enhance engagement with navigation systems.
- Transit fare reduction for Downtown residents.

THE UNDERLINE

Concerns

- The lengthy wait times at push buttons frustrate impatient pedestrians. Prioritizing connectivity to the north, especially building links from the river onwards, can enhance accessibility. This connection should integrate with existing routes like the Flagler Trail and FEC Trail. Notably, Wynwood has already established design guidelines for such developments.

Recommendations

- Existing east-west connections are critical and should be expanded.
- Improved crosswalk facilities.
- Pursuit of technology allowing synchronicity between a trail-user phone and the pedestrian crossing lights to allow users to keep moving preemptively.
- New technology to facilitate the counting of users, demonstrating areas where there are needs.
- Install three-phase signalization for cars, bicycles, and pedestrians, which can be implemented in the future along major crosswalks in preparation for the expected increase in users.

URBAN FORM AND LAND DEVELOPMENT REGULATIONS

Concerns

- Families living downtown have access to many amenities, including shopping, recreational, schooling, dining, and the arts. While these amenities are located within walking distance for many, a car is still necessary to access other parts of South Florida.
- Guidelines for development shall encourage parking behind buildings, enhanced landscaping, and permitting less development that does not contribute to bicycle and pedestrian facilities.
- Residential units in downtown areas are frequently overly commercialized, with residents renting out their units for special events.
- The zoning code is highly prescriptive.
- In the inland area of the downtown urban core, specifically in the Flagler Street project area, several developments have been completed. This includes the eastern section of Flagler Street, which now features a food hall. However, certain land uses in the vicinity discourage activity. Until these are transformed, downtown residents continue to face challenges such as poor pedestrian safety infrastructure, lack of affordable housing, and many “food deserts.”

Recommendations

- Adjusting the land uses to promote a mix of activities between the Brickell and Vizcaya Metrorail stations could enhance the demand for the use of the trail.
- Reviewing the zoning regulations around the Miami River could help encourage non-industrial, water-dependent, and related activities.

SAFETY

Concerns

- The Safe Routes to School program was awarded $60 million to implement over 24 projects to introduce pilot programs and plan for safe routes in Miami-Dade County. The funding includes approximately $460,000 for the implementation of safe routes to school program for Booker T. Washington Senior High School.
- Studies indicate that 33% of vehicular traffic stems from trips under 3 miles.
- At the intersection of NW 19th Street and N Miami Avenue, opposite the Miami City Cemetery, there is a significant safety concern due to bike tires getting stuck in the Brightline tracks, posing a risk to cyclists.
- The downtown urban core experiences relatively few bicycle accidents, largely due to the generally low speed of roadways. However, almost all fatalities are attributed to bicycle or pedestrian errors. Strategies to educate and mitigate inappropriate or dangerous behaviors are essential.
- An emerging trend is parents using e-scooters to drop off their children at school.
- The prevalence of extreme heat poses a significant risk, with temperatures becoming dangerous at 90 degrees Fahrenheit. This danger escalates throughout the year, with an increase in the number of days experiencing a heat index of 105 degrees Fahrenheit, rising from an average of 6-7 days annually to 25 days.
- There's a concerning issue with development projects blocking lanes and sidewalks while working on new developments, which poses safety hazards.

Recommendations

- The School Board and Miami-Dade Police should engage with school officials to provide guidance to parents on safer alternatives. There's a pressing need for enhanced motorist education and promotion of laws that prioritize general safety, such as yielding to emergency vehicles.
- Improved lighting should be complemented by surveillance through cameras or physical patrols. Long-term infrastructure planning should prioritize thermal comfort and safety, incorporating elements like shade structures, green infrastructure, increased permeability, and enhancements to gray infrastructure. Additionally, the design should consider the channeling of breezes and shade by tall buildings, as well as the use of reflective materials for pavers and other cooling materials.
- Access to drinking water should be made available in public areas, especially near stadiums and daytime event locations, to ensure the well-being of pedestrians and cyclists.

SCOOTERS

Concerns

- Over a million scooter rides were recorded within 4 months during their pilot program in Miami, Florida. Scooters are technically classified as bikes by Florida Statute Title XXIII, Chapter 316, Section 2128, and can operate on bicycle lanes. However, riders operate the e-scooters, which can reach speeds of 15 mph on sidewalks, impacting pedestrian flow.

- The scooters pose a threat to pedestrians and to the riders when they are used on sidewalks. Obstacles such as waste bins, benches, or bus stops can cause those riding scooters to crash, potentially causing significant injuries and damage to public/private property.

Recommendations

- More electric scooter-specific facilities are needed to accommodate the increasing demand.
- There is a need for more education and enforcement.

CITY OF MIAMI TROLLEY

Concerns

- The trolley system is in dire need of an update, as it has not been modernized in years or even decades. There is a plan to revisit trolley routes to address concerns driven by the county's desire for modification.
- One issue that needs attention is the redundancy in the current system, particularly regarding access to the port and transportation around Downtown and Brickell. For example, the Coral Way trolley route can take up to 45 minutes, which poses a challenge in encouraging ridership, especially for Brickell residents.

Recommendations

- It is worth considering whether the current route configuration is the most efficient way to serve the needs of Brickell residents and whether adjustments could be made to streamline service and improve accessibility.

WATER TAXIS

Concerns

- In Miami, challenges arise due to the presence of federally regulated waterways, which can complicate the establishment of feasible routes. Past attempts to address this issue have been thwarted by rejections from DERM, often citing the outdated Manatee Protection Program (MPP), which has been in place for 30 years. Additionally, obtaining Marine Operating Permits (MOPs) can be a formidable task, although they are more readily granted to cargo and large-scale passenger ships.

Recommendations

- Broward and Palm Beach Counties serve as excellent models for emulation in terms of their transportation systems.
- Enhancing access to Miami Beach through water taxis could be a promising solution, particularly considering the significant challenge of finding parking in the area.
- Explore opportunities to update the FWC's Manatee Protection Program (MPP) report for consideration of water taxi services to and from designated areas on Biscayne Bay.

PLANNING AND ENGINEERING STUDIES

A review of major planning and engineering studies is provided in the following section, which lists major findings and needs recommended by the study findings.

OVERTOWN WYNWOOD BICYCLE PEDESTRIAN MOBILITY PLAN

Located just north of Downtown Miami, the Overtown and Wynwood areas are generally bounded by NW 36 Street to the north, NW 3rd Street to the south, N Miami Avenue and NW 1st Avenue to the east, and NW 7th Avenue and the Miami River to the west. Overtown and Wynwood are composed of several neighborhoods, including Old San Juan, Midtown, Wynwood Industrial District, Rainbow Village, Northeast Overtown, Town Park, Civic Center, Media Art Entertainment, Culmer, Southeast Overtown, Park West, and Lummus Park.

These central urban neighborhoods have numerous mobility needs to serve the existing population, which largely relies on transit, walking, and bicycling. In addition, the area continues to attract many new residents who want to enjoy an urban lifestyle where walking, bicycling, and convenient access to public transit are the most viable forms of transportation. The study aimed to identify potential and feasible improvements to enhance mobility and safety for pedestrians and cyclists.

	AREA WIDE IMPROVEMENTS
1.	Crosswalks
2.	Sidewalks
3.	Traffic Calming
4.	Curb Extensions
5.	Curb Ramps
6.	Pedestrian Signalization
7.	Bicycle Lanes
8.	Contraflow Bike Lanes
9.	Bike Boxes
10.	Shared Lane Markings (Sharrows)
11.	Bicycle Parking
12.	Neighborhood Slow Zone
13.	Resurfacing/Restriping
14.	Bus Stop Improvements
15.	Enhanced Green Space
16.	Bicycle-Friendly Business Districts
17.	Pedestrian Shade Treatments
	SITE-SPECIFIC IMPROVEMENTS
18.	Bicycle-Friendly Railroad Crossing
19.	Dutch Style Tunnel at FEC
20.	NW 5th Avenue Non-Motorized Connection
21.	NW 5th Street Cycle Track
22.	NW 1st Avenue Bicycle Boulevard
23.	NW 5th Place/NW 21st Terrace Bicycle Boulevard
24.	NW 5th Avenue Road Diet with Bike Lanes
25.	NW 29th Street Road Diet with Bike Lanes
26.	N Miami Avenue Road Diet with Bike Lanes
27.	NW 3rd Court/NW 3rd Avenue Road Diet with Bike Lanes
28.	One-Way Pair Pilot Program
	NON-ENGINEERING IMPROVEMENTS
29.	Education Improvements
30.	Encouragement Improvements
31.	Enforcement Improvements
32.	Evaluation and Monitoring

Table 12.List of Recommended Improvements

Bicycle and pedestrian mobility recommendations were developed based on the prior work tasks of the Plan, field observations, public meeting responses, survey results, and steering committee input. All improvements were developed under an overarching principle to support and prioritize pedestrians and bicyclists within the area through the use of Context Sensitive Solutions (CSS) and complete streets principles. Context-sensitive solutions are an approach to advancing transportation programs and projects in a collaborative manner and in a way that fits into the community and environment.

A survey completed of area residents noted interest in safer biking through reduced speed limits, increased dedicated bicycle facilities, and closing the gap between mixing links in the sidewalk network. A complete list of the recommended improvements is provided in Table 12. The list includes area-wide improvements, site-specific recommendations, and non-engineering improvements. Area-wide and site-specific recommendations like improved sidewalk networks and the NW 5 Street bicycle lanes have been completed. The study also includes recommendations to address the prevalent railroad crossings in Overtown and Wynwood. Table 13 highlights the recommendations from the study.

Project 18: Bicycle-Friendly Railroad Crossing	
Project Description	The Florida East Coast (FEC) railroad crosses N Miami Avenue at an acute angle at N 19th Street, which causes the potential for a bicyclist's front wheel to get caught in the tracks. Installing pavement markings, like the "jug handle" shown below, that lead bicyclists to cross the tracks at a safer angle can reduce the risk of losing steering control.
Lead Agencies	City of Miami, Miami-Dade County Public Works and Waste Management Department
Notes	The additional pavement required to install the "jug handle" pavement markings is available on the west side of the intersection at N 19th Street. Additional pavement may need to be installed on the east side of the intersection.
Implementation Timeframe	Short Term (3-5 years)
Implementation Strategy	Implement as part of the proposed road diet along N Miami Avenue, which includes bike lanes
Implementation Cost	$$


Acute angle railroad crossing on N Miami Avenue at N 19th Street


Example of "jug handle" treatment at a railroad crossing. (Note: the color scheme in the U.S. would be white edge line striping with green color bike lanes)

Project 19: Dutch Style Tunnel at FEC	
Project Description	Create a bicycle and pedestrian connection across the Florida East Coast (FEC) rail line by constructing a Dutch style tunnel underpass. Additional grade crossings along the FEC for pedestrians would help reduce illegal crossings over the rail line.
Lead Agencies	City of Miami, Miami-Dade County Public Works and Waste Management Department, FEC
Notes	A potential lower cost alternative is an at-grade crossing; however, it is likely that existing crossings would need to be closed to add an at-grade crossing. • Recommended crossing location at NE 24th Street
Implementation Timeframe	Long Term (5+ years)
Implementation Strategy	Potentially implemented as part of the Coastal Link project
Implementation Cost	$$$$

Table 13.Recommendations for bicycle and rail infrastructure

The Wynwood Overtown Mobility Study also included a project recommendation for a pilot program to pair one-way streets to improve vehicular and pedestrian flow, east and west, through the northern portion of the study area. Table 14 indicates the roadways recommended for conversion, which include streets from NW 28th Street south to NW 21st Street, between the segments of N Miami Avenue and NW 5th Avenue. The roadway conversions are encouraged to be coupled with bicycle and pedestrian improvements to ensure vehicular traffic does not dominate the area.

Project 28: One-Way Pair Pilot Program	
Project Description	To improve vehicle, bicycle, and pedestrian traffic flow in the Wynwood area, convert the roadway segments listed below to one-way streets with bike lanes.
Lead Agencies	City of Miami, Miami-Dade County Public Works and Waste Management Department
Notes	Features include: • Creates more space for elements for other road users such as bike lanes and wider sidewalks • Reduces the number of conflict points at intersections See Table 15 for recommended locations. A traffic study would be required to assess the impact of these one-way conversions.
Implementation Timeframe	Short Term (3-5 years)
Implementation Strategy	Include proposed study and improvements in Capital Improvements Program (CIP)
Implementation Cost	$$$

Proposed one-way pair street network


Example of a one-way street with bike lane and on-street parking

Table 15: Recommended One-Way Conversions	
NW 28th Street from NW 5th Avenue to N Miami Avenue - EB	NW 27th Street from NW 5th Avenue to N Miami Avenue - WB
NW 26th Street from NW 5th Avenue to N Miami Avenue - EB	NW 25th Street from NW 5th Avenue to N Miami Avenue – WB(1)
NW 24th Street from NW 5th Avenue to N Miami Avenue – EB(1)	NW 23rd Street from NW 5th Avenue to N Miami Avenue - WB(1)

Notes: (1) Included in the Wynwood Industrial District One-Way Street Conversion and Signage Project.

Table 14.From the Overtown Wynwood Bicycle and Pedestrian Mobility Plan, project recommendation for one-way road conversions

THE PROMENADE SPECIAL AREA PLAN

The Promenade Special Area Plan was completed for the City of Miami in January 2004. It envisioned a promenade along the former railroad right-of-way located mid-block between NE 11 Street and NE 10 Street, providing a pedestrian connection between NW 1 Avenue and M. A. Ferré Park. The Promenade plan consist of a series of interconnected pedestrian spaces which lead from Overtown to the park. Following the tradition of pedestrian streets found in European and pre-World War II cities, the Promenade is envisioned as a series of courtyards and plazas connected by pedestrian "paseos" or passages. In Florida, examples include the courtyards of Via Mizner adjacent to Worth Avenue in the Town of Palm Beach, FL, and the passages that connect Center Street to Park Avenue in Winter Park, FL. Each of the Promenade's public spaces will have its own feel and scale and offer opportunities for public art and interpretive installations that are relevant to Miami's culture. Under the plan, redevelopment is proposed in a compact form to encourage new buildings to blend with existing structures and to accommodate a mix of uses. Figures 31 and 32 detail the project area and a rendering of this plan. The plan is envisioned as a five-year transformation that would provide walkable linkages and activities in an underutilized space within the city's urban core. Land use, building heights, and building form need to be refined to enable implementation of the Plan. Recommendations include revisiting maximum building footprints and lot depth requirements for lots 100 feet deep, floor area ratios, requirements, and land assembly to effectuate the project's development. Similarly, the minimum parking requirements are inappropriate given the unique nature of the urban-core district.

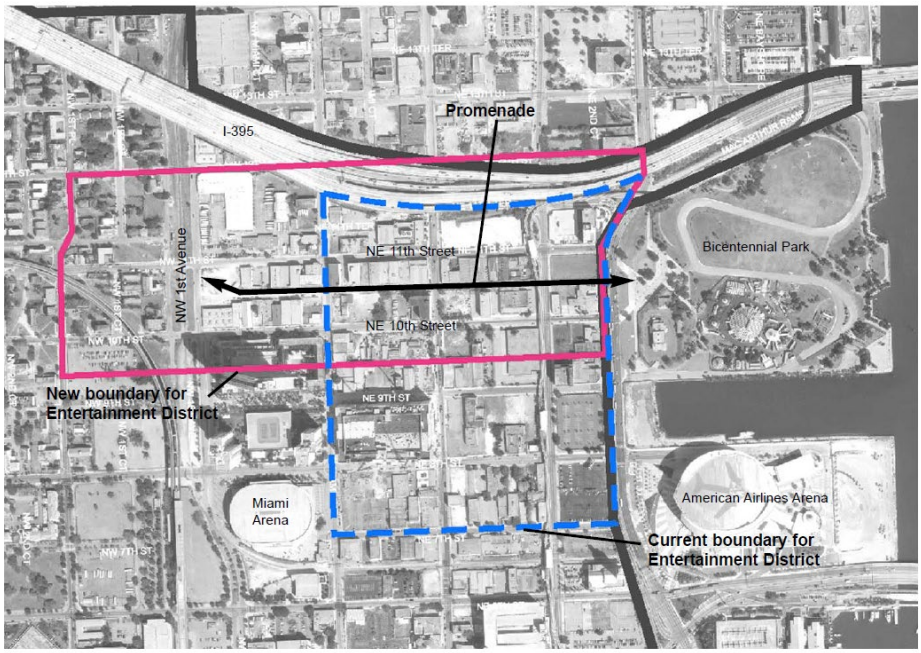


Figure 30.Map of Promenade segment in downtown Miami.

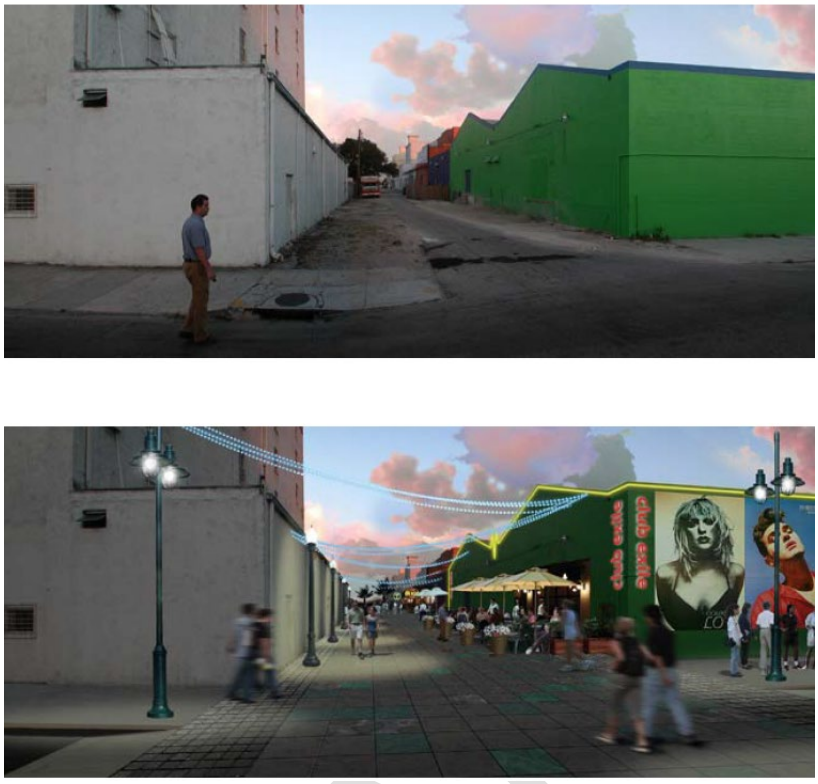


Figure 31.Rendering from the Promenade study showing the existing conditions and proposed improvements under phase 1.

OVERTOWN GREENWAY PLAN

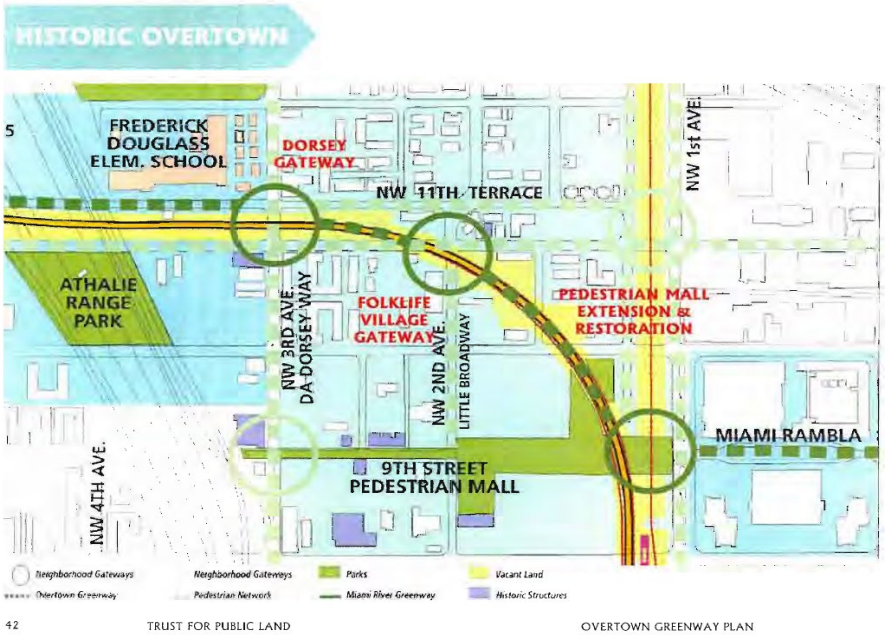


Figure 32.Proposed Overtown greenway segment connecting historic Overtown toto the Bay following the path of the existing railway corridors.

Prepared in 2002, The Overtown Greenway was conceived as a way to complete the necklace of parks encircling the city of Miami and to improve access to amenities like the Miami River Greenway, Bayfront Park, Ferré Park, Margaret Pace Park, and the BayWalk that links these spaces as seen in Figure 33. The Overtown Greenway is envisioned to bring these natural and cultural shoreline amenities within comfortable walking distance of Miami's inland neighborhoods. Major themes of the greenway include connection for pedestrians, cyclists, and transit users, the importance of the existing community, and the future envisioned for the area.

The proposed Overtown Greenway follows the path of the two rail corridors that traverse Overtown, including the Metrorail and Florida East Coast (FEC) railway, as well as NW 1st Avenue, NW 11th Terrace and NW 11th Street -- the streets flanking these corridors. The greenway's key components are improvements within the rail corridors and streetscape. The proposed T-shaped alignment follows the Metrorail from NW 7th Avenue to NW 1st Avenue, where it follows the FEC corridor south, connecting to Flagler Street. To the north, the plan envisioned access up to NW 20th Street and to the Wynwood district via NW 1st Avenue.

Streetscape enhancements to the NW 9th Street Promenade and NW 11th Street were determined by the study to be necessary to link the Overtown Greenway to Manuel A. Ferré Park and the Biscayne Bay. Considerations for improvements include connections to the Ninth Street Pedestrian Mall, a pedestrian bikeway along NW 11 Street, and extending a pedestrian connection from Culmer Station into Overtown. Figure 34 shows the proposed configurations through Historic Overtown, connecting existing points of interest and planned projects.

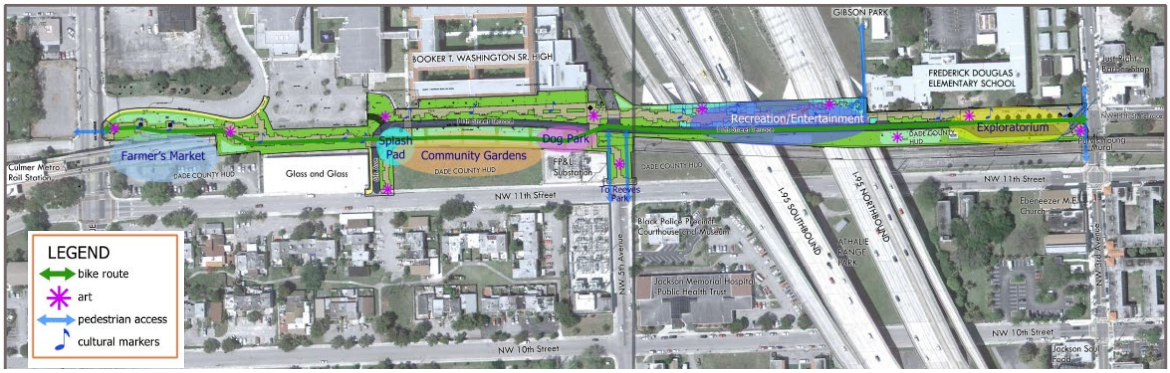


Figure 33.Proposed improvements for the Overtown Greenway segment located on NW 11th Terrace extending from NW 7th Avenue to NW 3rd Avenue.

PAVED PARADISE

The Transit Alliance Miami is spearheading efforts to analyze the local minimum parking requirements and how they impact the urban landscapes. Figure 35 highlights the message underscored by the study, where parking and vehicle-centric design have resulted in a sea of parking within Downton Miami. The study found the United States has approximately 4 parking spots available per car, yet much of it is unused. This harms housing affordability, small business operations, and the environment. The study argues that minimum parking requirements are not rooted in rational studies or account for the local context. For example, nearly 45% of Florida households have one car or no car, yet city codes require an average of 1.5 to 2 parking spaces per new unit. For residential purposes alone, Miami-Dade County's existing codes would require 500,000 excess residential parking spots. Which, according to the findings, is the equivalent of the land area of all of Downtown Miami's office space.

Figure 35. Image from Paved Paradise study highlighting Downtown Miami is about 20% parking lot.

The study finds that consumers visit more local businesses and spend more per month when they can walk versus having to drive to access such spaces. The finding is contrary to development practices today, which often mandate the construction of expansive surface lots, which then typically deter transit and pedestrian accessibility. Radical solutions presented include eliminating minimum parking requirements. In Fayetteville, Arkansas, commercial parking minimums were repealed in 2015, which inversely resulted in multiple new businesses opening in previously abandoned or unused spaces. In Sandpoint, Indiana, the repeal of parking minimums resulted in the protection of small businesses that would otherwise be razed to accommodate new parking.

The Transit Alliance Miami's study also looks into the impact of parking lots on the environment. Parking lots cause urban heat islands by making the air temperature over and around their surface 7 to 9 degrees Fahrenheit hotter than the ambient temperature. The study estimates that over 75% of Miami is considered to be within a heat island. Parking lots also exacerbate stormwater runoff. According to the South Florida Water Management District, polluted runoff from stormwater is one of the most harmful sources of pollution to Florida's waterways, with flows estimated at one inch of rain falling on an acre of hardened surface, producing 27,000 gallons of runoff. Success stories are highlighted in the findings. For instance, in cities where parking minimums were

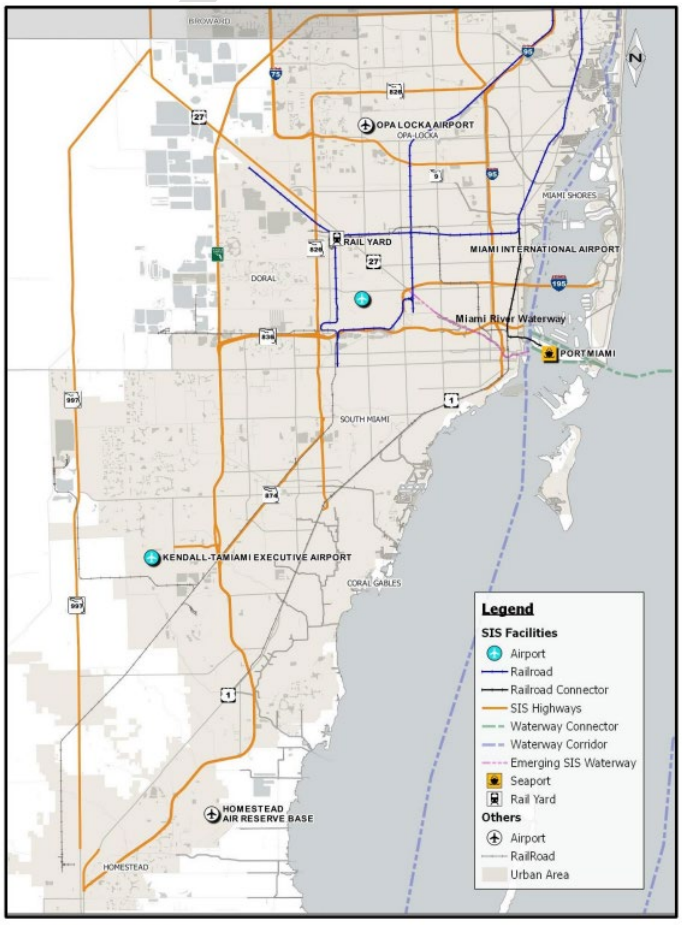
eliminated, affordable housing development proposals increased fivefold. In Cutler Bay, Florida, reducing parking minimums directly contributed to the financial feasibility of new senior living communities.

MIAMI-DADE COUNTY FREIGHT PLAN UPDATE

Miami-Dade County has an extensive freight system encompassing all major modes of transportation. The overall network includes a system of roadways, railways, waterways, connectors, and freight hubs. Many of the freight system network facilities are designated as Florida Strategic Intermodal System (SIS) or Emerging SIS facilities. The SIS was adopted by Florida in 2003 to focus the State's transportation resources on the facilities most significant for interregional, interstate, and international transport of people and goods. The SIS represents the highest priority network of transportation facilities because of their importance to the State's economy and mobility.

The local freight network was updated from the 2014 plan to include the Miami River designation as a SIS Emerging Waterway. Figure 36 shows the extensive Miami-Dade County freight network. The current SIS incorporates all aspects of freight needs: commercial airports, deep-water seaports, rail terminals and corridors, waterways, and highways. The following Miami-Dade County facilities have been designated within the study area as part of the SIS.

- Seaport: PORTMiami
- Waterway: Miami River (Emerging SIS)
- Roadways: Designated highways consist of Interstates, toll roads/expressways, and other key State highways
- Connectors: Each of the freight hubs has roadway, waterway, and/or railway connectors designated to provide access to the SIS corridors.



Source: Marlin Engineering Inc.

Figure 34.Existing County freight System per the Freight Plan Update from 2018.

A review of projects proposed in the document shows the PortMiami improvements for the 2026 to 2030 period. First, it looks to geometrically modify the port access from I-395 to PortMiami via NE 2 Avenue and NE 5 Street. Additional short term freight projects in the study area include signal timing improvement at NE 2 Avenue and NE 5 Street, and at NE 1 Avenue and NE 6th Street; a PD & E study for a Brickell Avenue bridge tunnel, and the installation of PortMiami River wayfinding sign system. Table 15 catalogs the project Needs identified in the 2018 Freight Plan update for the PortMiami Seaport.

2018 MIAMI-DADE COUNTY FREIGHT PLAN UPDATE			
Project Type	**Project**	**Description**	**Source**
Seaport	POM Gantry Crane Rail Repair and Replacement	Maintenance/Other	(13)
	POM Bays 148-195 Seawall Upgrades	Maintenance/Other	(13)
	POM North Bulkhead Repairs	Maintenance/Other	(13)
	POM Bays 0-65 Seawall Rehabilitation	Maintenance/Other	(13)
	POM SFCT Cargo Yard Densification (eRTG)	Capacity	(13)
	POM Cargo Gates	Capacity	(13)
	POM Procurement Super Post-Panamax Gantry Cranes	Capacity	(13)
	POM Seaboard Redevelopment Phase V	Capacity	(13)
	POM Shed E Demolition and Paving	Capacity	(13)
	POM Shed G Demolition and Paving	Capacity	(13)
	POM Seaboard Building 1306 Demolition and Paving	Capacity	(13)
	POM Seaboard Building 1630 Demolition and Paving	Capacity	(13)
	POM Federal Inspection Facility	Capacity	(13)
	POM Inland Terminal	Capacity	(13)
	POM Port Crane Management Facility	Maintenance/Other	(13)
	POM Facilities Move	Maintenance/Other	(13)
	POM Improvements to Gate Complex	Seaport	(18)
	POM Bays 177-183 Sea Wall Construction	Berth	(18)
	POM Repair to Vehicular Bascule Bridge	Seaport	(18)
	POM Redevelopment of Port Blvd.	INROAD	(18)
	POM Gantry Cranes Acquisition Program	BERTH	(18)
	POM Expand and Modernize Port Utilities	Seaport	(18)
	POM Cargo Terminals	Seaport	(18)
	POM Extend Railroad Tracks	Seaport	(18)
	POM Roadway Realignments	Seaport	(18)
	POM Channel Modifications	Seaport	(18)
	POM Berth O - West New Apron	Berth	(18)
	POM Channel Modifications	Seaport	(18)
	POM Crane Maintenance Facility	Seaport	(18)
	POM Cargo Yard Stacker Cranes Program	Seaport	(18)
	POM Cargo Yard Improvements	Yard	(18)
	POM Fill SW Corner (Transhipment Yard)	Transhipment yard	(18)
	POM New Berth SW Corner 1	Berth	(18)
	POM New Berth SW Corner 2	Berth	(18)
	POM Cargo Berth 5	Berth	(18)
	POM Cargo Berth 6	Berth	(18)
	POM Cargo Berth 7	Berth	(18)
	POM Multimodal Terminal	Intermodal Container Transfer Facility	(18)

Sources: (1) 2014 Miami-Dade County Freight Plan Update (2) FDOT JACIP application 2/2018 (3) MDAD meeting 10/4/2017 (4) MIA CORE Program Presentation 11/2/2017 (5) PORTMiami Powerpoint at FTAC 1/10/2018 (6) Bob LeDoux, FEC 1/11/2018 MD Freight Plan Update Study Advisory Committee meeting (7) FTE Tentative 5-year Work Program FY18-23 Summary of Projects as of 9/29/2017 (8) Freight Plan Update SAC mtg 3/8/2018 (9) Draft Doral Area Freight Plan FDOT D6 (10) The Town of Medley Freight Mobility Improvement Plan FDOT 6: Final Report (11) City of Opa Locka Freight Implementation Plan FDOT 6: Final Report (12) FDOT SIS First 5-year Plan Fy 18-22 (13) Alissa Peralozia, PORTMiami, email 8/31/2017 (14) MDX FY 18-22 Work Program Board Approved 1/31/2017 (15) Miami-Dade 2040 LRTP 10/23/2014 (16) FDOT SIS Second 5 - year plan FY 23-27 (17) FDOT Strategic Intermodal System Cost Feasible Plan 2024-2040 (18) FDOT Strategic Intermodal System: 2045 Multi-Modal Unfunded Needs Plan (19) Miami River Freight Improvement Plan (20) FDOT Final Draft Review and comment 05/14/2018

Table 15.PortMiami Seaport Project Needs identified in 2018 Freight Plan.

Conclusion

The South Florida region, particularly Miami, has exploded with development since the original mobility study was completed in 2003. The comparison of population projections and transportation modeling from the original study confirms that the observed growth was not anticipated by the forecasts developed for the study area. Increased housing, employment opportunities, and commercial development have truly transformed the City and its urban core into a top-tier destination for residents and visitors.

While the study evaluated the growth in residential development and employment opportunities in Downtown Miami and Brickell, an equity analysis demonstrated that the trends for improved conditions and successful redevelopment success have not been equally observed in the study area. Census tracts at the periphery of the study area mirror the legacy of redlining and historically racist policies that segregated the neighborhoods in Miami by race and economics. Many of the neighborhoods surrounding the Downtown Core are gentrifying but still face challenges related to pollution, climate, housing needs, and education attainability.

The 2003 recommendations were also evaluated in context with the changes that have occurred in the past 20 years since the study was completed. Approximately a third of the recommendations that were envisioned in the 2003 study were identified to be completed or are in process, another third was programmed in the 2045 LRTP, and the remaining recommendations were either not implemented or need to be further analyzed given the change in conditions.

Interviews and engagement with key stakeholders were held to understand the concerns of those who are actively dealing with traffic and mobility issues in Miami. Virtual meetings were held with organizations like Transit Alliance Miami, the PortMiami staff, representatives from The Underline, and various County and City departments, including Police and Public Works. These interviews gleaned an insight into the concerns faced by such groups and resulted in a series of recommendations accompanying each topic of concern.

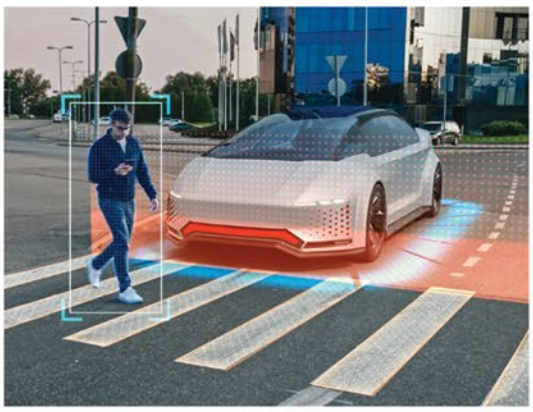
The literature review was supplemented with a review of other major studies completed for the Downtown and Brickell study areas. Projects that were programmed in the 2045 LRTP were cataloged during the review. Findings from other planning and engineering studies were also provided to encourage the development of recommendations for the study area based on existing findings.

The next steps of this research include reviewing emerging technologies and the existing bicycle and pedestrian networks to evaluate areas of need in the study area. We also evaluate proposed improvements included in the 2045 LRTP and 2045 unbuilt needs that are programmed in the 2050 LRTP to be adopted in Summer 2024.

TPO
Miami-Dade Transportation Planning Organization

DOWNTOWN MIAMI TRANSPORTATION MASTER PLAN

TECHNICAL MEMORANDUM #2
EVALUATION OF EMERGING AND FUTURE TECHNOLOGY



THE CORRADINO GROUP

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Tech Memo 2: Evaluation of Emerging and Future Technology

Introduction

This memo explores cutting-edge research on global trends in pedestrian and transit-oriented urban downtown areas. It delves into advancements in mobility, focusing on micro-mobility enhancements, mobility hub technologies, curb and special event management strategies, transit improvements, and safety measures. Additionally, it reviews the Miami-Dade Transportation Planning Organization's (TPO) previous work and assesses how emerging technologies can further enhance their objectives.

Based on this research, an inventory of technologies has been prepared to evaluate their potential for improving mobility in the study area. These recommendations are cataloged to identify the type of improvement, the suggested implementation location (future-ready zone), and the actions required for implementation.

Technologies are categorized into 12 improvement types, including Car Lite technology, curb management strategies, and pedestrian and cyclist safety improvements. The future-ready zones for implementing these technologies were determined through a comprehensive process involving stakeholder engagement, safety and ridership data analysis, transit access, network gap analysis, and review of programmed improvements.

The recommendations are provided with short-, mid-, and long-term timelines to facilitate the adoption of these advancements. Implementation timelines are based on the action items required for each improvement, considering factors such as policy development, enforcement, infrastructure construction, and equipment purchase.

The report begins with an overview of technology from international and national examples, explores the TPO studies and emerging technologies, and culminates with a summary table cataloging the technology recommendations.

EXPLORING EMERGING TECHNOLOGIES

The following is an overview of findings from research on emerging technologies and practices implemented worldwide in urban downtown areas to improve mobility and user experience.

MONTREAL, CANADA

In 2015, the City of Montreal launched a pilot program to introduce a water fountain design that uses its fire hydrants to improve access to drinking water. The installation works by attaching a 4.4-foot metal ring to a fire hydrant, providing water through four valves on the ring. A photograph of the system with a modified hydrant is shown in Figure 1. The design was developed in collaboration with Montreal's fire department and the city's water services to maintain the operability of the fire hydrants for emergencies and ensure the quality of the water supply. Spouts can be interchanged to serve as drinking fountains or sprays to cool down. The installation angle can be rotated, allowing flexibility for different hydrant heights and providing easy access to water for adults, children, and wheelchair users. An internal tubing system prevents water from becoming heated under the sun and ensures hygiene.

Figure 1. A modified fire hydrant in Montreal.

New York City is looking to implement a similar system to enhance access to drinking water. The city has been recognized for having some of the best tap water in the nation; however, it may not always be accessible. In February 2024, the City introduced a bill to establish a pilot program to install drinking fountains and tap them into existing fire hydrants. The pilot program will inform the city whether the program should be expanded or made permanent. Figure 2 is an example of a modified hydrant being considered for installation in NYC. The program is also contingent on the determination of the fire commissioner to investigate if the drinking fountains would interfere with the fire department's use of fire hydrants and submit a report explaining such determination.

Figure 2. A design option for New York City's pilot project.

NEW ZEALAND, AUSTRALIA, AND THE UNITED STATES

A study completed by MONASH University's Institute of Transportation Studies evaluated the impact of shared mobility programs on low-income riders. The study assessed the discount ridership program for Lime, a shared e-bike and e-scooter operator with facilities in New Zealand, Australia, and the United States. Using responses from a survey method, the study generated ridership characteristics for customers participating in the discounted ridership program (Lime Access) and non-member riders. Members of the subsidized program received discounted rides based on their income. They determined that members of the program compared to non-members are:

- ✓ 90% more likely to have a household income below the area median,
- ✓ over four times more likely to be unemployed or 2.5 times more likely to be employed part-time,
- ✓ locals who use shared micromobility for practical purposes like shopping/errands and commuting,
- ✓ three times more likely to be a student,
- ✓ more likely to report mechanical challenges and
- ✓ more likely to use bikeshare as a first/last-mile mode linked to transit.

Findings from the survey showed that micromobility had the most significant impact on sustainability. 15% of all shared-mobility users opted to use an e-bike or e-scooter instead of requesting a taxi or ride-hailing service. The survey also found that all users replaced 10% of trips that would have been taken by car with a micromobility option.

The high trip substitution with public transport (34% among riders in the discounted program) and very low substitution with taxis (4%) also indirectly suggest that these riders are less likely to have access to car-based mobility. Figure 3 highlights the difference in transit connections and use by members of the Lime Access discount program and non-members.

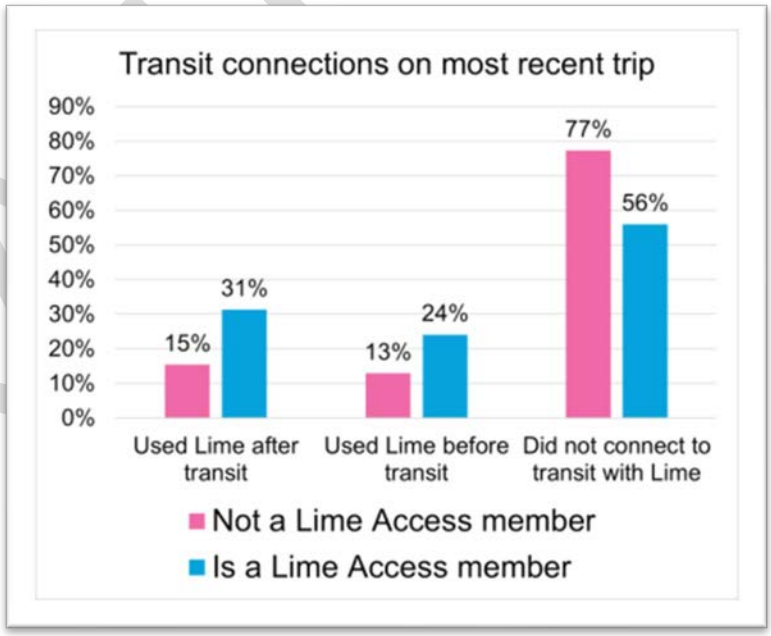


Figure 3. Comparisons of transit connections made by subsidized micromobility users vs. non-subsidized users.

The study also found that the discount program provided riders mobility despite medical conditions or physical disabilities. Many disabilities are 'invisible' and are not likely to be noticed by the casual observer. Yet, using an electric micromobility vehicle can reduce fatigue and strain experienced while walking or riding a standard bike by individuals with disabilities.

As shared scooter companies look to expand the usage of reduced-fare programs by more individuals, the most prevalent obstacle is likely to be a need for greater awareness of the program's existence. According to the survey, only a quarter of existing customers were aware of the discount ridership program before participating. Figure 4 depicts a bike-share user.

The study recommends a broader conversation about the role of governments in supplying financial support for reduced-fare programs. There are precedents from other commercial mobility providers for this approach; for example, in Australia, people with a disability eligible for subsidized taxi trips can use their discount for private-hailing operators if their wheelchair or mobility aid can fit inside the vehicle. A similar approach could be taken with the growing proliferation of e-bike rebates. While most rebate programs aim to offset the cost of purchasing a personal e-bike with more significant rebates for low-income individuals, these funds could also be directed to subsidize membership in a shared e-bike or e-scooter program. This approach addresses barriers experienced with personal ownership around the availability of safe, secure storage and maintenance costs.

Figure 4. Bikeshare user riding within a bicycle lane.

Shared scooter programs often have restricted service areas and limited fleet sizes. Companies typically are interested in expanding to serve larger areas and providing more vehicles to riders, and cities could use this interest as a carrot for achieving equity goals. Simultaneously, expanding fleets and service areas could give low-income riders better access to safe riding facilities. For example, e-scooters and e-bikes are prohibited in Chicago's Lakefront Trail or the Loop. Yet, these two facilities supply some of the best infrastructure for people riding bicycles and scooters. Low-income residents on Chicago's South Side would receive help from these facilities being opened to connect them to more destinations safely.

In New York City, Citi Bike is the official bike-sharing system. Due to complex permit processes for private companies looking to station vehicles in public spaces, other transit alternatives may be more challenging. However, shared micro-mobility is pursuing a new model: putting shareable bikes on private property instead. Bicycles can be stationed on private properties across the city, out of the public right of way, bypassing the permitting and regulations and allowing riders to reserve, pick up, and drop off at private property locations. The initiative aims to show that private and public options can work together to meet the high demand for transport options. An example of this system is proven in Figure 5, where the private rideshare operations are located within the building, and an alternative rideshare docking station on the right of way can be seen in the rear.

Figure 5. Bikeshare docking station located on private property.

TEL AVIV, ISRAEL

According to the 2021 edition of the TomTom Traffic Index report, Tel Aviv ranked 16th on the list of cities with the worst traffic congestion globally. On average, travel times in Tel Aviv were 43% longer than during the baseline non-congested conditions established by the study. Given the high reliance on automobiles, Tel Aviv has been pursuing implementing one of the world's most extensive shared mobility networks by establishing over 215 miles of dedicated bike paths by 2025. An example of the network's bike lanes is provided in Figure 6.

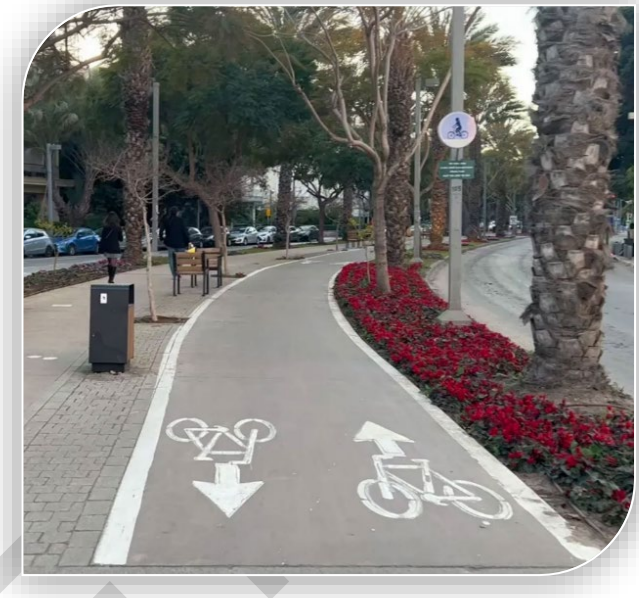


Figure 6. Micromobility lanes in Tel Aviv, Israel.

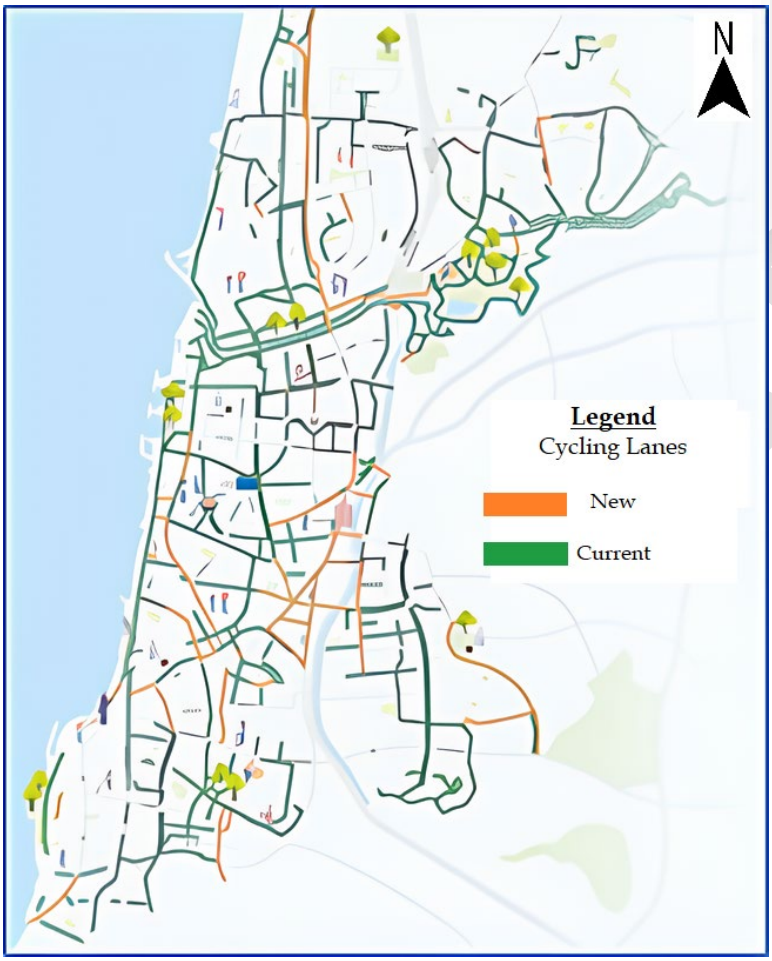


Figure 7. Current and programmed bicycle network lanes in Tel Aviv, Israel.

Tel Aviv has a population of just half a million; however, the greater Tel Aviv metro area has a population of 3.9 million, significantly impacting mobility in the 20-square-mile city. In 2020, the modal share observed was 16% walking, 12% cycling, 17% public and shared transportation, and 55% driving in single-occupancy vehicles. The target for 2030 is 20% walking, 25% cycling, and 25% public and shared transportation, reducing single-occupancy vehicle use to 30%.

Figure 7 highlights the extent to which the 215-mile cycling network is being implemented. The existing network is shown in green, and the new connections are shown in orange. Riders operating bicycles or electric scooters can both use these facilities.

The city's shared mobility network has proven successful, with daily rides totaling around 170,000. Factors like warm weather, a flat topography, and robust infrastructure have contributed to the system's success.

Regulations in Tel Aviv play a pivotal role in shaping a safe micromobility environment. Requirements include a license for electric scooter riders, mandatory helmet usage, adherence to speed limits, and designated parking areas. Local authorities also work with providers of shared e-scooters to identify restricted zones where the equipment automatically shuts down. Finally, while Israeli law allows users to operate vehicles at age 16, e-scooter users are restricted to users 18 and older.

SINGAPORE

Singapore's transportation system is highly regarded for its efficiency and effectiveness. It comprises a well-integrated network of roads, Mass Rapid Transit (MRT), Light Rail Transit (LRT), and comprehensive bus services.

Figure 8. Singapore's MRT and LRT rail networks.

The MRT system boasts a daily ridership of over 3 million on a 200-kilometer network of over 140 stations across six lines spanning the island. Complementing the rail system are two LRT systems that function as feeder services to bring commuters closer to their homes. The LRT system comprises a 28-kilometer network with over 40 stations and a daily ridership of over 200,000 commuters. Figure 8 shows the system map prepared by the Land Transport Authority (LTA), which oversees public transport in Singapore.

Bus service in Singapore is provided in various types, including trunk, feeder, premium, city direct, and shuttle bus services. Trunk Bus Services are the backbone of the public bus network because they provide longer routes that take riders from one neighborhood to another or into the center of town. Feeder Bus Services offer transfers from MRT stations and bus interchanges to surrounding residential and industrial areas. Premium Bus Services, typically providing service between major residential areas and critical industrial/ commercial nodes during peak hours, are designed to ease the rush-hour crowd by charging a premium fare but offering a more direct connection than other public transport options. City Direct Services primarily serves commuters and operates between major residential areas and the Central Business District (CBD) during weekday peak hours. Shuttle Bus Services cater to specific transport needs, such as connecting to places of interest, tourist attractions, commercial or retail centers, and medical institutions. Shuttle service can be a fare collection or a free shuttle service.

The public transportation system is supported by privately operated taxis and ride-hailing, which provide door-to-door transportation. Taxis can be hailed along roads, at designated taxi stands and stops. They are not allowed to pick up or drop off passengers in bus lanes during operating hours, within 9 meters of a bus stop, and in areas with regulatory signs and lines that do not allow vehicles to stop. Users of private hire cars can book their rides through one of the licensed ride-hailing operators. A private hire decal identifies vehicles at the front and back of the car. Ride-hails are not allowed to pick up or drop off riders at taxi stands and are encouraged to use private driveways as pick-up points.

The LTA has looked into Mobility as a Service (MaaS) to facilitate payment and transportation mode changes. MaaS integrates various transport and transport-related services into a single, comprehensive, and on-demand mobility service and offers end-users the added value of accessing mobility through a single application and payment channel (instead of multiple ticketing and payment operations). To meet a customer's request, a MaaS operator hosts a diverse menu of

transport options, like public transport, active modes such as walking and cycling, ride/ car/bike-sharing, taxi, and car rental or lease, or a combination thereof. Mobility as a Service (MaaS) is a comprehensive approach integrating various transportation and related services into a unified, on-demand mobility solution.

In Singapore, MaaS was discontinued after 2-years of launching the application. Factors like Singapore riders do not require as many modes to travel throughout the city, and its well-organized and efficient public transit network makes MaaS unappealing to general riders in Singapore. Users mainly saw it as anything other than a planning app, which Google Maps or other programs can ultimately serve. However, the system's success may have also been hampered by COVID-19.

Walking and cycling are additional mobility options encouraged in Singapore, even though the county's climate makes them challenging for users. Several strategies have been implemented to improve the comfort and convenience of pedestrians, including over 200 kilometers (km) of sheltered walkways island-wide, as shown in Figure 9. The Walk2Ride program guarantees a sheltered walkway within 400 meters of all MRT stations and 200 meters of bus interchanges, LRT stations, and bus stops with high commuter volumes. The LTA is actively improving the accessibility of the pedestrian overhead bridges that are part of the sheltered walkway systems by increasing the number of elevators at overheard bridges.

Figure 9. Sheltered skyway near a transit station in Singapore.

Silver zones, highlighted in Figure 10, are pedestrian schemes built in selected residential areas to enhance road safety for older adults. The zones feature bright fluorescent yellow-green signs and yellow rumble strips to alert motorists that they are entering a Silver Zone. They can include "rest points" along the road median so that the roads can be crossed in two stages, include features like rumble strips, chicanes, and lanes with reduced widths to lower vehicle speeds to 30 or 40 km per hour, roundabouts, and low height median dividers to reduce lane widths and encourage motorists to drive slower. In emergencies, emergency vehicles can still drive over them safely.

Figure 10. Silver Zone in a residential street.

The LTA extensively experiments with road safety technology, especially for areas near schools and neighborhoods. LTA works with schools, representatives from the traffic police, town councils, and the Ministry of Education. Some initiatives include pedestrian crossings with raised zebra patterns painted black and yellow checkered to enhance visibility. Use of bollards to make bus stops more visible and protect riders at bus stops from traffic. Additionally, they have implemented the Green Man+ crossing system, which extends the time it stays on and gives elderly pedestrians and persons with disabilities extra time to cross the road.

Cycling is a popular transportation alternative with over 525 kilometers of cycling paths, with plans to extend the network to 1,300 kilometers by 2030. These cycling paths serve as first and last-mile connections, connecting commuters from their homes to MRT stations, bus interchanges, and nearby shopping malls and schools. Cycling infrastructure is designed to improve safety and convenience. Some unique features implemented include pedestrian priority zones where pedestrians and cyclists need to share the space, such as behind bus stops and road crossings, as demonstrated in Figure 11. Space under the MRT viaduct was converted into a sheltered cycling path with greenery. The LTA, in partnership with the country's National Parks Board, tests new horticultural technology in these spaces while increasing greenery in the area. An example is provided in Figure 12.

Figure 12. Cycling "slow down" markings near a bus stop.

Figure 11. Greenery amenities are also utilized for testing horticultural technology.

Figure 13. Dedicated lane for buses and cyclists operates at reduced hours on Sundays.

In October 2022, LTA introduced the West Camp Road Sunday Cycling Lane, as seen in Figure 13. This lane sets aside dedicated road space along West Camp Road for cyclists to ride during low vehicular traffic hours. The lane is operational every Sunday from 5 a.m. to 11 a.m. During operating hours, only buses and cyclists are allowed in the lane. Cyclists are not subject to the group size limit during operating hours.

Bicycle parking is critical for the system to work correctly. Over 267,000 public bicycle parking lots are provided at public transport nodes, public housing, void decks, and public parks, and most residential areas and transport nodes are within a 5-minute walk to a bicycle parking facility. Bicycle amenities are provided near transit facilities through dedicated bicycle crossings, bicycle wheeling ramps on stairs, and safety marks near bus stops, as highlighted in Figure 14.

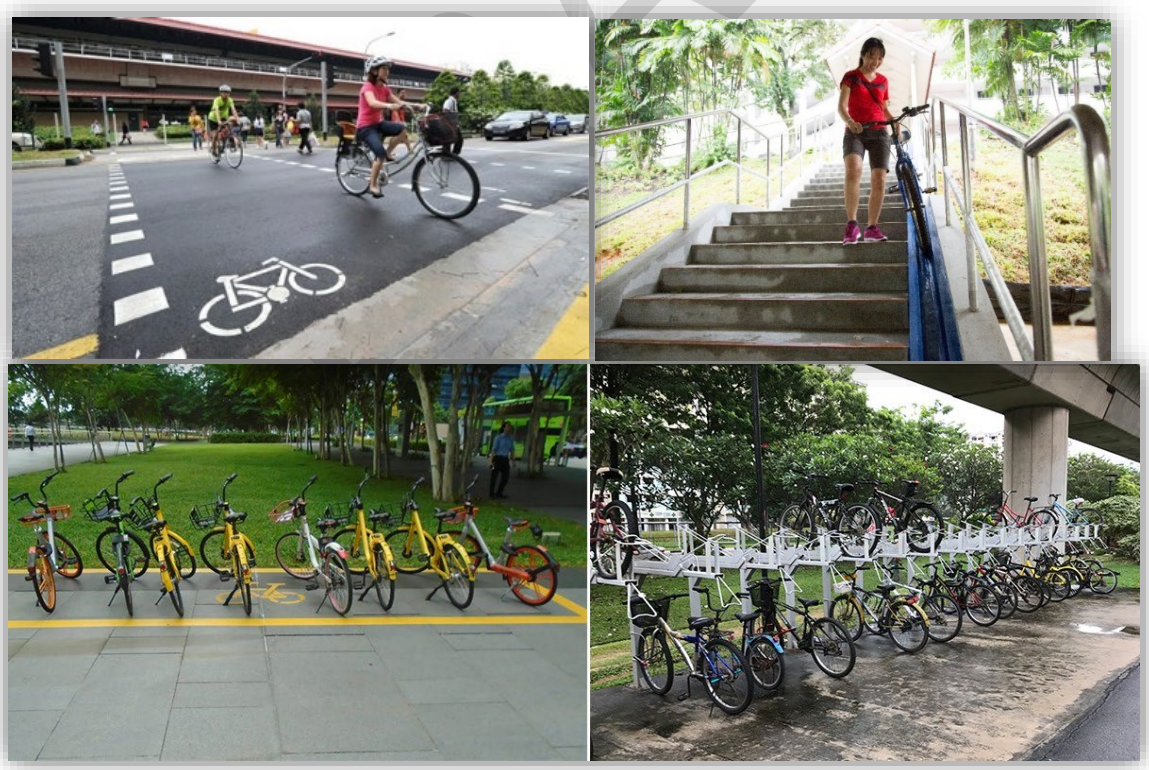


Figure 14. Dedicated crosswalks for cyclists in high pedestrian zones, bicycle wheeling ramps, and bicycle parking.

Strategies aimed to reduce congestion include electronic road pricing (ERP). Recently, the technology was updated to feature onboard units (OBU) on registered vehicles in Singapore. The units alert motorists when approaching an ERP-charging location and display real-time traffic incident alerts so that motorists can make more informed decisions on their travel routes. Through the OBU, motorists can also pay for usage licenses for off-peak cars, tolls, and roadside parking.

The LTA uses data from OBUs, gadgets, sensors, and cameras to gather data on traffic flow, traveling times, and road demand. The technology called Intelligent Transport Systems (ITS) uses the collected data to form a dynamic, real-time picture of the ebb and flow of a population. ITS uses sensors, traffic and control systems, and data analytics to maximize road network efficiency capacity, monitor and manage traffic flow, and make our roads safer. Other systems developed with ITS technology include:

- **The Expressway Monitoring Advisory System (EMAS)** is an intelligent incident management tool that manages traffic along expressways and promptly detects accidents, vehicle breakdowns, and other incidents, ensuring fast response to restore normal traffic flow. It also provides information on travel time on signboards before entering and along the expressways.
- **The Green Link Determining (GLIDE)** system controls all traffic signals in Singapore by adjusting the green time as traffic flow changes. GLIDE also links adjacent traffic signals, allowing vehicles to travel from one junction to another with minimal stops. The system also detects the presence of vehicular and pedestrian traffic at intersections to make traffic signal adjustments and allow motorists to catch the "green wave" and travel from one junction to another without stopping at the red lights as often.
- **Green Man+** allocates a longer green man time for the elderly and Persons with Disabilities (PWD). Elderly pedestrians and PWD can expect up to 13 seconds more Green Man time when they use signalized pedestrian crossings fitted with Green Man+. They need to tap their CEPAS-compliant senior citizen concession card or PWD concession card on the reader mounted above the standard push-button on the traffic light pole to extend green man time by between 3 and 13 seconds, depending on the width of the crossings. Over 1,000 pedestrian crossings have been equipped with Green Man+ function across Singapore. An example is shown in Figure 15.

Figure 15. A pedestrian crossing equipped with Green Man+ function.

- **TrafficScan** collects travel information from many taxis on Singapore's roads. It uses taxi Global Positioning System (GPS) data to calculate the average road traffic speed. The ITS Operations Control Centre then provides motorists with real-time travel information to plan their routes for a smoother journey.
- **The Parking Guidance System (PGS)** de. This real-time information reduces circulating traffic searching for available parking facilities in the central business district and major shopping areas. The data is also available via

various digital platforms, including mobile applications. This technology, highlighted in Figure 16 below, helps motorists make more informed parking decisions and optimizes the use of existing parking facilities.

Figure 16. Digital signs displaying real-time parking data, part of the PGS strategy.

NEW YORK CITY, NEW YORK

In New York City, commercial operations for urban air mobility using Electric Vertical Takeoff and Landing (eVTOL) planes are expected to begin in 2025. Electric vertical takeoff and landing (eVTOL) aircraft, a recent aerospace innovation, ascend vertically like helicopters but use electric motors instead of traditional combustion engines. These electric vehicles employ propellers or rotors for vertical takeoff, stationary hovering, and horizontal flight, featuring large omnidirectional fans for drone-like maneuverability.

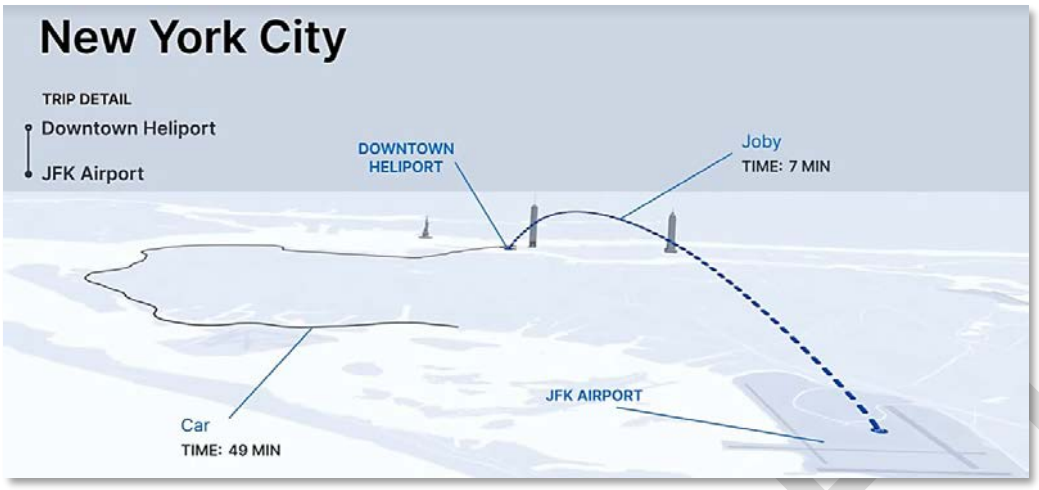


Figure 17. Proposed air route connecting JFK Airport to downtown New York.

Commercial electric air taxi operations typically follow a rideshare app business model, and the NYC operations intend to provide service from downtown Manhattan to John F. Kennedy International Airport. The technology anticipates replacing the almost-hour commute by car with a seven-minute flight. Figure 17 depicts the proposed flight path the new service will take and details the time savings compared to driving.

The eVTOL planes are piloted, accommodate up to four passengers, and have zero operating emissions. They are also designed to have a radically lower acoustic footprint than a helicopter, allowing them to operate in densely populated areas such as New York City without adding to the background noise. The aircraft is optimized for rapid, back-to-back flights and can fly up to 100 miles on a single charge. A prototype of the plane in flight over Manhattan for this new service can be seen in Figure 18. Research into Electric Vertical Takeoff and Landing technology is being expanded to develop vehicles that can transport up to 40 passengers at once and create an aircraft to carry freight with up to a 10,000-pound cargo load.

Figure 18. Prototype of eVTOL taxi in NYC.

The vehicle's mobility in urban settings facilitates the technology in the urban landscape. A notable strategy involves retrofitting parking garage rooftops into vertical lift-off ports and designated landing sites for these electric aircraft. The eVTOL vehicles show promise for passengers and cargo, reducing costs and expediting deliveries.

PORTLAND, OREGON

The Portland Loo, seen in Figure 19, was an idea that originated in response to Portland's growing homeless population. It is used in city parks and is a product that the City of Portland owns and sells to other communities. It was introduced over ten years ago and has grown to 22 installations throughout the city.

Figure 19. A Portland Loo public restroom kiosk.

Without restroom facilities, people experiencing homelessness were left to their own devices. The city realized that public restrooms, open 24 hours a day, would alleviate disturbance to local businesses, help keep sanitation under control, prevent unsightly waste throughout public areas, and hinder the spread of disease. Today, only downtown locations are open 24/7, but they are generally open during park hours, where they are predominately located.

The design of the facilities was developed to prevent potential common problems like vandalism, illegal drug use, or prostitution. The kiosk discourages crime with graffiti-proof wall panels and open grating. Maintenance is limited to cleaning and upgrading standard components when needed.

The system features solar power, no running water to deter any clothing or body washing inside, and exterior handwashing stations. The Portland Loo was designed in cooperation with the city of Portland and earned the city's first patent. The city gets a percent of the profit each time one is sold to another municipality or organization and uses a portion of the sales to support Portland's provision of public restrooms locally.

BEVERLY HILLS, CALIFORNIA

Beverly Hills, California, has a residential population of 35,000 people. Still, its daytime population swells to almost 170,000 due to visitors and employees, mainly concentrated in the city's downtown area, known as the Golden Triangle. Daytime pedestrian activity is notably heavy in this area, leading to numerous conflicts between pedestrians and vehicles at intersections, especially during holidays and tourist seasons.

Large pedestrian flows at crosswalks often obstruct turning traffic throughout the green signal phase, resulting in a backlog of vehicles needing to turn left. A review of collision history revealed several reported vehicle-pedestrian collisions, with data collectors noting numerous close calls. In 1987, the City of Beverly Hills changed traffic signals at eight intersections to include an exclusive pedestrian phase, halting all approaches to allow pedestrians to cross diagonally or conventionally.

The exclusive pedestrian signal phase was perfected based on the diagonal pedestrian path length, with a 20-22-second range for the total pedestrian signal phase. Introducing this pedestrian phase increased the operating cycle of traffic lights from 50 to 60 seconds, efficiently clearing vehicles through the intersections.

Pavement marking indicating that diagonal crossing is allowed was added at each intersection, along with "diagonal crossing OK" signs on each corner. To enhance visibility, pedestrian signal heads were installed facing the diagonals of intersections for a more precise indication of diagonal crossings. The average cost per intersection for these enhancements was under $1000 per signal. This exclusive pedestrian phase proved to be a low-cost, effective tool in improving safety and reducing potential conflicts between automobiles and pedestrians in Beverly Hills' bustling downtown. Figure 20 illustrates the installation at the intersection of N Canon Drive and Brighton Way.

Here are recommendations drawn from the implementation of the pedestrian phasing program:

- Total pedestrian crossing volume should be high, preferably exceeding one thousand pedestrians per hour for at least four hours daily. Efficiency may be compromised if pedestrian volume peaks only during a single hour of peak periods.
- Vehicular volumes should be moderate and consistent for many hours of the day, with a high percentage of left or right turns. Intersections experiencing extreme peak hour conditions may struggle to manage traffic demand and cause delays during the pedestrian phase. Vehicular peak periods must align with pedestrian peaks. The recommended total intersection approach volume should be less than two thousand vehicles per total approach per hour.
- It is advisable for selected intersections to have an existing level of serviceability at level "C" or lower.
- Smaller intersections require less time for an exclusive pedestrian phase, reducing vehicular delays. The recommended area inside crosswalks is forty feet for minor streets and 40 to 60 feet for major roads.
- Caution is advised when selecting intersections for an exclusive pedestrian phase, mainly where both streets are two-way, and left-turn or right-turn phasing is used.
- Selected intersections should be well-illuminated to ensure pedestrian diagonal crossings are visible to motorists during dark hours.

Figure 20. Diagonal pedestrian pathways are used in Beverly Hills, CA as alternative scramble designs.

SAN FRANCISCO, CALIFORNIA

Slow Streets are designed to be safe, comfortable, and low-traffic routes that prioritize active transportation and community connection. They are recommended for residential streets to offer secure alternatives to driving and accommodate all forms of transportation, emphasizing inclusive slow and safe speeds. Conceived initially as a pandemic response, Slow Streets evolved into more than just travel options; they foster community bonds and encourage residents to perceive city streets as shared spaces.

In San Francisco, the city's Municipal Transportation Agency (SFMTA) adopted the program in December 2022 as part of efforts to implement a citywide Active Transportation Network. The program aims to end deaths and severe injuries related to transportation and encourage more people to choose low-carbon ways to travel for their daily trips. Recognizable by distinctive purple signage and road markings, Slow Streets provides spaces for walking, biking, scooting, wheelchair use, and driving. Figure 21 shows a street in San Francisco with improvements in Slow Streets.

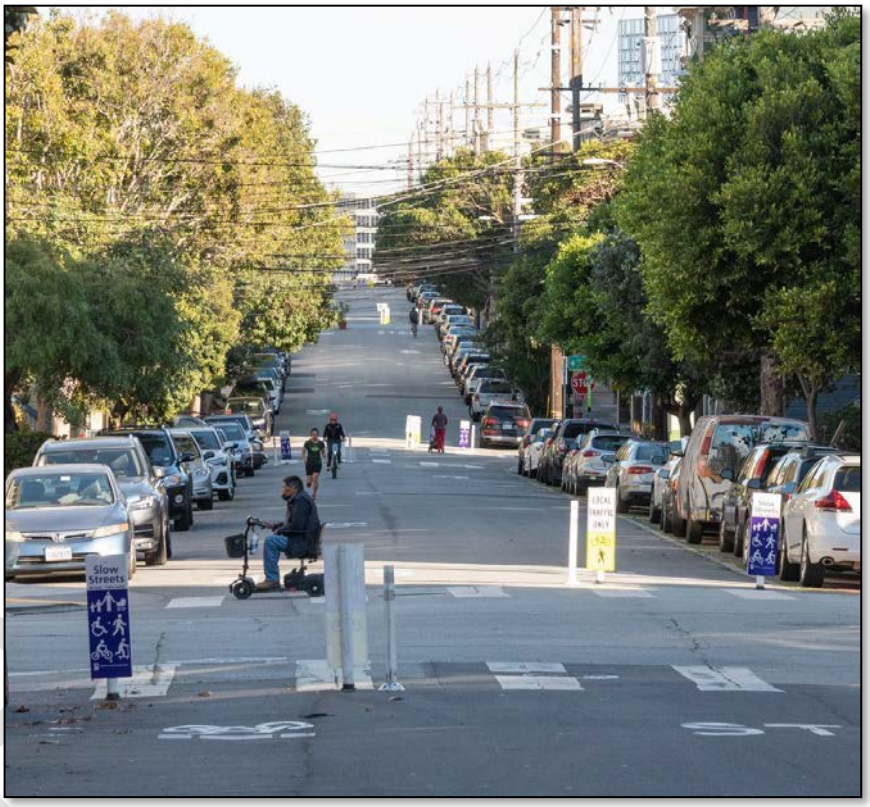


Figure 21. Transformation of a street to San Francisco's Slow Streets.

Funding for these initiatives is provided in part by Proposition K Sales Tax dollars through the San Francisco County Transportation Authority. The Proposition K Sales tax is a general sales tax that increases the effective sales tax in San Francisco by 0.75 percent to 9.25 percent to fund the city's homelessness and transportation programs.

Slow Streets are inclusive and accessible to all, whether walking, rolling, riding a bicycle, or driving. The following are recommendations for Slow Streets:

- Encourage Safe Behaviors
  - Move safely and be considerate of speeds.
- Make space for others – pedestrians must make room for vehicles to pass, and bikes and cars must give plenty of room when passing; under California law, vehicles have the right of way on streets.
- People riding bicycles or using a personal mobility device:
  - Must yield to pedestrians, children, and people with disabilities.
  - Must keep driving on Slow Streets, which are reserved for local trips.
  - Must obey all traffic laws and signs, like speed limits and STOP signs.
  - Must not be hostile toward other Slow Street users or make people feel unwelcome on the designated Street.

The SFMTA has launched the Slow Streets Mural Pilot Program to enhance placemaking along Slow Streets. This pilot program aims to engage community members living on or near Slow Streets by putting mural art on the pavement. Murals will help promote Slow Streets as community spaces and slow vehicle traffic. Implementing a mural involves several steps, including an application to the SFMTA and the San Francisco Arts Commission (SFAC) approval.

Slow Streets can be implemented as quick, low-cost improvements to enhance safety, move people through the city, and pilot new projects. They can be applied in streets with low vehicle volume and low to moderate speeds, where vehicle volumes have dropped, or serve redundant through traffic. Once a street is selected, an installation with traffic barriers and "Local Traffic Only," Slow/Shared, or branded signs (Slow Streets or Stay Healthy Street) should be placed at main vehicle entry points. New technologies and best practices for curb management can also be tested as Slow Streets are implemented to align curb uses with the community's needs.

For neighborhoods, establish a grid of entry points into the local street network where barricades should be installed.

- Identify stewards to take care of and monitor barricades
- Allow local access, deliveries, and emergency vehicles.

Internationally, Slow Streets have been implemented in places like Dunedin, New Zealand, where they are called Safer Streets. The city approved a Safer Streets plan that reduced speeds to 10 km/hr.—and allowed city center businesses to extend into the streets, creating shared spaces for multiple modes. The Safer Streets project aims to improve road safety for all users along the city's busiest streets and make getting to bus stops, local shops, and schools easier. Strategies used included more crossing points, curb cuts, bus super stops that provide better shelter and seating, and potential facilities such as toilets, bike stands, and lockers. Dunedin's Safer Streets design can be seen in Figure 22.

Figure 22. Dunedin's Safer Streets design with downtown speed limits reduced to 6 mph.

SANTA MONICA, CALIFORNIA

The City of Santa Monica, California, designed the Breeze Bike Share pilot program to test technology and best practices for shared electric scooters and bikes operated by private companies on the city's right-of-way. The program was implemented from January 2017 to September 2019 and began with a fleet of 2,000 e-scooters and 500 e-bikes. At peak operations, the fleet had 3,250 devices and generated 2,673,819 rides from October 2018 through September 2019, with ridership peaking during the spring and summer.

The pilot program uncovered that the typical shared mobility device user is male, under 34 years old, and typically earns above $75,000. Only 17% of riders earned less than $30,000. The study suggests that ridership imbalance may be due to the following factors:

1. Trip Cost Barrier.
2. Required access to smartphones and data packages.
3. To pay for these services, Access to banking services and credit cards is required.
4. Access to devices near low-income housing and low-income jobs.
5. Language barriers in marketing and in-app experience.

In terms of use, Santa Monica's shared mobility devices averaged 14-minute trips with a typical distance of 1.3 miles. Figure 23 highlights that most riders used the devices for short work-related trips, recreation, eating out, getting to/from home, and shopping. While people rode all over Santa Monica, the highest concentration was observed in its downtown area (28%), beach areas (13%), and Expo Line Downtown Santa Monica Station (4%).

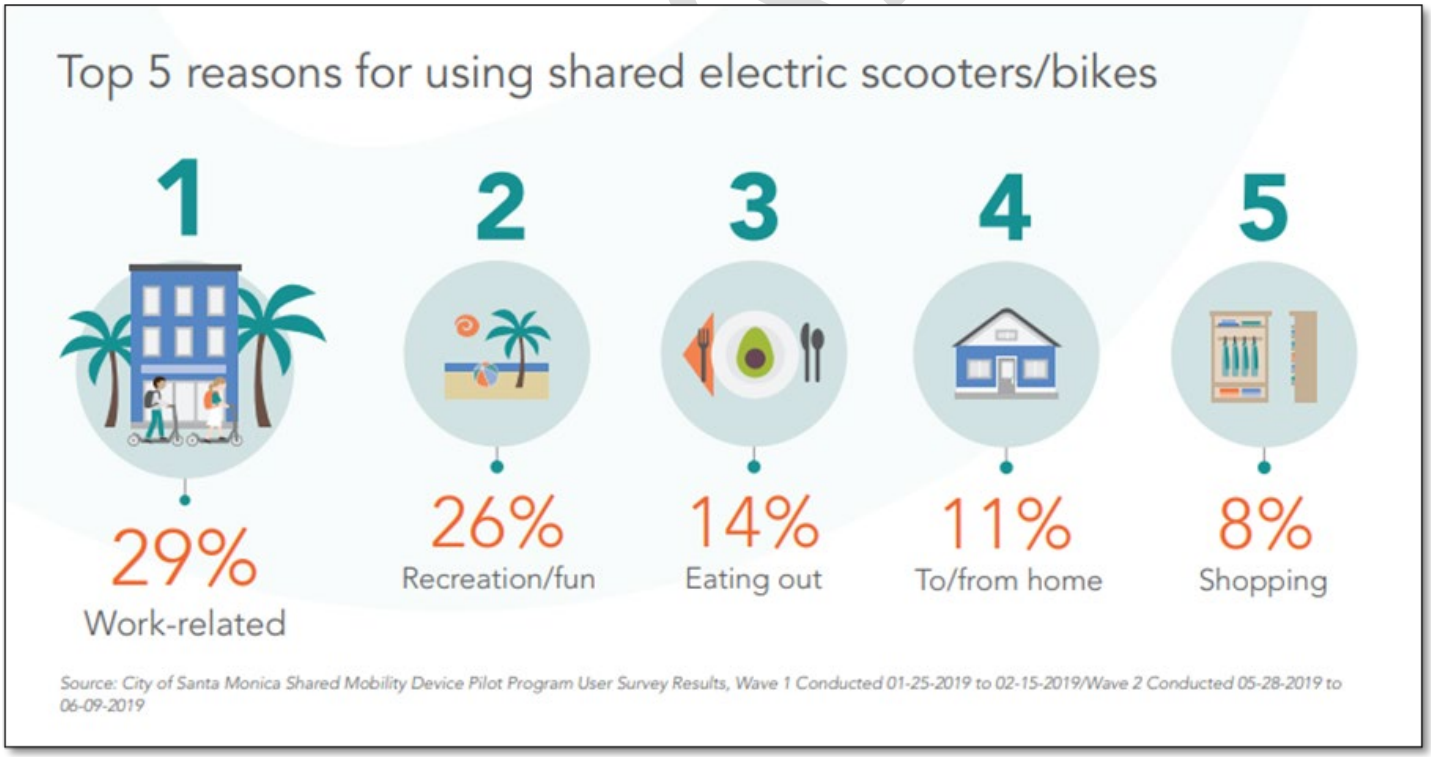


Figure 23. E-Scooter usage rates in Santa Monica, CA.

Nearly half (49%) of shared mobility trips replaced trips that would have otherwise been made by car, either driving alone or ride-hailing. Thirty-nine percent of trips replaced walking trips—in some cases serving as a walking accelerator for those commuting to work or running errands, and in other cases serving tourism or recreational purposes.

The City proactively educated the public and increased public awareness about the program and its rules. City Code Enforcement officers issued 299 citations for 929 violations and impounded over 1,200 devices for blocking access for people with disabilities, parking in the street, slow operator response time, and other violations. Between June 2017 and early September 2019, the Santa Monica Police Department issued 1,006 citations to e-scooters and e-bike riders. Figure 24 depicts an officer issuing a citation to individuals violating this new program. Typically, code officers can only give citations for incidents on sidewalks or public right of way, while police cite on—road users.

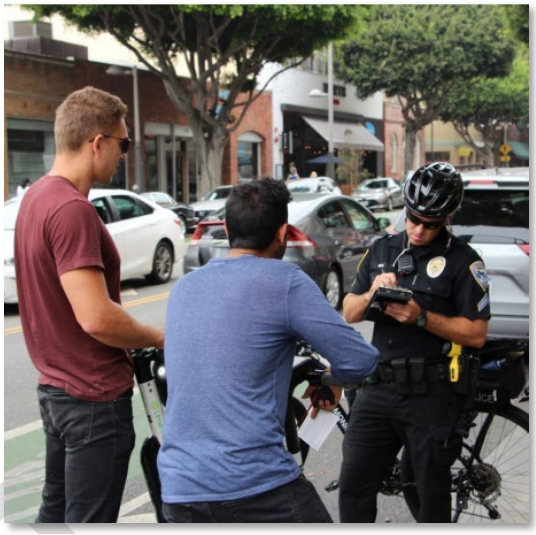


Figure 24. Police officer citing e-scooter users for riding without helmets.

In response, the city installed 107 parking and pick-up zones citywide, helping to organize rider parking and manage service provider fleet deployment using geofencing technology. Santa Monica was one of the first cities to enforce geofencing and digital policy tools to remedy parking, safety, and oversaturation problems. Figure 25 shows a geofenced e-scooter parking area with pavement markings in Santa Monica. Figure 26 shows a geofenced e-scooter parking area adjacent to a bus stop for improved access.

Using geofencing, the City and service providers implemented a deactivation zone around the beach area, which brought devices to a complete stop in these areas, ending conflicts, safety issues, and the number of devices left along the beach path. Companies also introduced e-bikes and other field staff to manage devices, complementing the City's added field oversight staff.

Recommendations from the pilot project include:

- ✓ **Public Right-of-Way Management** – improve fleet management and user parking to reduce clutter and obstructions.
- ✓ **Rider Behavior** – reduce sidewalk riding, tandem, and other unsafe behaviors.
- ✓ **Equity and Access** – increase access and engagement among diverse users, emphasizing income, ability, and disadvantaged communities.
- ✓ **Device Design and Maintenance** – accelerate device improvements to durability to withstand long-term shared use on public streets.

Figure 25. Designated e-scooter parking area with geofencing technology and markings.

- ✓ **Effective Management** – refines tools to manage the dispersed devices, including data and internal systems.
- ✓ **Manage Volatility** –protect the public from industry volatility through partnerships that supply consistent, reliable, fair, and safe shared mobility options.

- ✓ **Dedicated Staff** – the shared mobility program coordinator manages the program's implementation. The code enforcement officer documents non-compliance in the field and enforces Shared Mobility Program regulations and issues.
- ✓ **Enforcement and Public Awareness** – reduce code violations and increase public knowledge about the program and how to ride safely and legally. New rider etiquette and education campaigns.
- ✓ **Adapt** - the city rapidly adapted to device parking challenges by installing 107 drop zones citywide, helping to organize rider parking and manage service provider fleet deployment.
- ✓ **New Technology** - Santa Monica was one of the first cities in the world to enforce geofencing and other digital policy tools to help remedy parking, safety, and oversaturation problems. A geofencing toolkit can be developed for speed zones, drop zones, parking restrictions, and incentivized parking. Active experimentation with new tools like sidewalk riding detection technology is also recommended.
- ✓ **Data** - use Mobility Data Specification to ingest trip and vehicle data from permitted service providers to manage and evaluate services actively.
- ✓ **Partnerships** - The city partnered with third-party contractors for enforcement and analytics support, effectively expanding staff capacity. Joint safety and education campaigns with service providers and community organizations
- ✓ **Price Signals and Incentives** - fare capping removes price volatility and keeps fare structure cheaper than automobile options.
- ✓ **Affordable Access** - expand programs and outreach, provide rider credits and parking incentives.
- ✓ **Fines** - Refined and progressive fee structure for violations to facilitate operational improvements without service disruption.
- ✓ **Wayfinding and Signage** – expand visual tools in the right-of-way, including sidewalk decals and stencils, large education banners, signs, and more.

Scooters and bikes deployed at bus stop making it difficult for transit riders to exit the bus

Figure 26. Combined transit and micromobility stop.

CHICAGO, ILLINOIS

The Chicago Transit Authority (CTA) *System Status & Alerts* program webpage, as shown in Figure 27, provides real-time details of the CTA's bus system and the 'L' Train via the Authority's website.

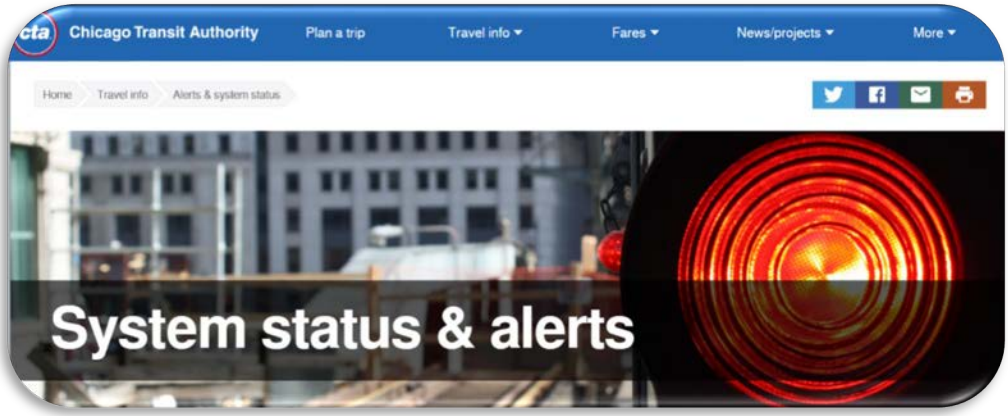


Figure 27. Chicago Transit Alert System.

It also alerts users of any elevator service outages at train stations. Users can access the city website for current elevators and upcoming servicing details. Summaries of planned service changes are supplied weekly, including those for temporary work, construction, and events. Users can opt to receive text or email updates for the accessibility status of elevators, as well as planned and unplanned service changes that affect bus or rail service on routes, via CTA Updates. Details include how the trip is affected, the directions for any route modification needed, and the reason for the service change.

Figure 28. Bus stop with real-time bus route information details.

Bus stop users, without access to the Bus Tracker system, can text the CTABUS location shown at the bus stop and the bus route in question, as seen in Figure 28, to receive details on the expected arrival time of the bus at that location and details of the next bus.

Figure 29. Elevator with QR code.

In the United Nations Headquarters building in New York City, elevators are equipped with a QR code to facilitate reporting an issue with an elevator car. Figure 29 provides an example of the QR code in the elevator. Users can scan the code with any smartphone to open an email to the facilities helpdesk. The code automatically populates the email subject line, indicating which elevator car was causing the problem. All the user needs to do is type in the email what the issue was, like "the car did not stop on my floor," "the elevator made strange noises," or "the door did not fully open," and notify technicians and investigate. If users cannot use the QR code, issues can also be reported via e-mail or by calling the number posted along with the QR code.

NEW YORK CITY, NEW YORK

Since the 1950s, overnight parking has been permitted in New York City, leading to most curb space used for parked cars. However, this benefits only a minority of New Yorkers who own cars and park on the street. New York City has the highest rate of car-free households among major U.S. cities, with only 46% of households owning a vehicle in 2021, compared to the national average of 92%. Approximately 56% of workers in the city commute to work using public transit, while only 27% use private vehicles.

To effectively manage curb space, a Curb Management Action Plan with ten action items has been created to optimize the City's curb space and meet the diverse needs of New Yorkers. These action items are discussed below and illustrated in Figures 30 through 37.

1. Pilot NYC's first "Smart Curbs" neighborhoods to test new and innovative curb uses. High demand for curb spaces requires a comprehensive approach, so working with Business Improvement Districts (BIDs) is recommended to test a blank slate approach to curb programming and activation. New policies and technologies should make curb access easier and adaptive to community needs.

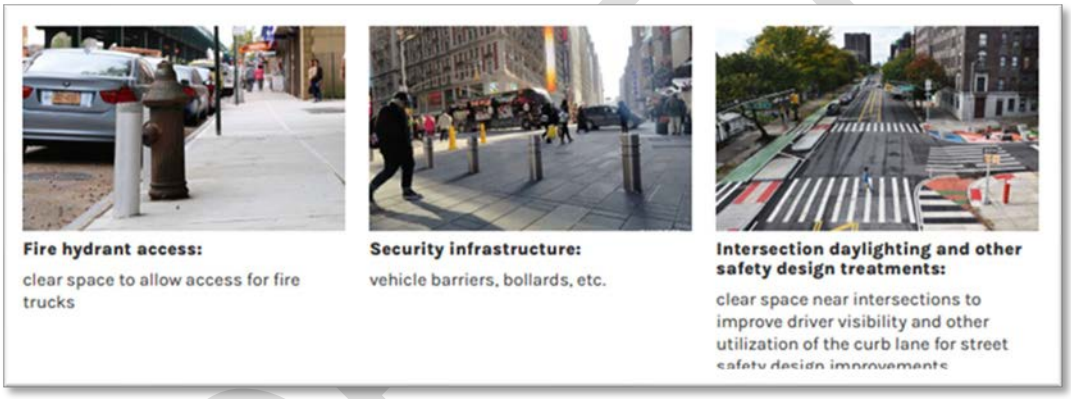


Figure 30. Fire hydrant access, secure infrastructure, and intersection daylighting tested for curb management in NYC.

2. Prioritize curb uses to meet neighborhood needs. A diverse array of curb needs necessitates policies to guide which uses get prioritized. The city published a guide detailing how NYC DOT will prioritize curb uses in a way that is consistent with the city's transportation goals and needs while allowing flexibility to tailor curb management tools to local neighborhood conditions.

Figure 31. Flexible strategies to prioritize curb space for community needs.

3. Make deliveries to businesses and homes safer, sustainable, and more efficient. The rapid growth of e-commerce makes accommodating deliveries at the curb essential. Expanding loading zones, implementing micro hubs, increasing the use of cargo bikes, incentivizing off-hour deliveries, and piloting new types of loading zones (e.g., reservation, restriction of vehicles, time of day management) are all strategies proposed.

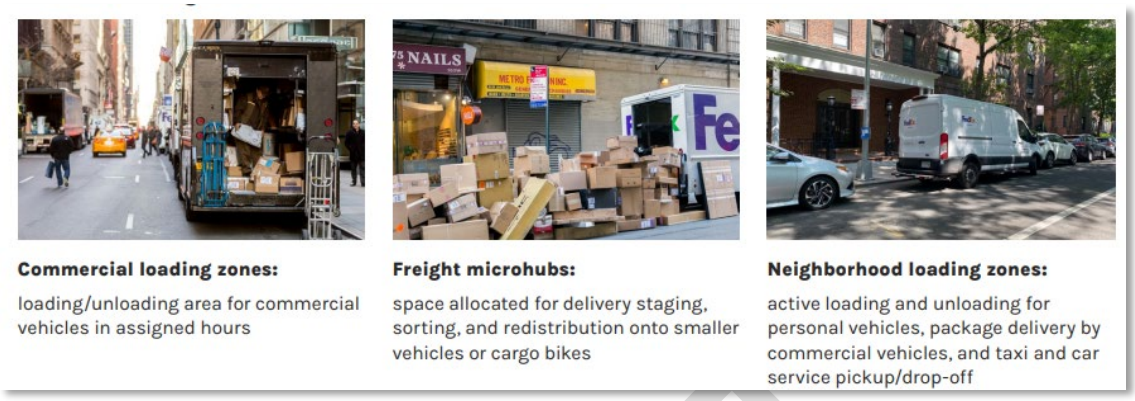


Figure 32. Delivery micro hubs and new loading zones tailored to neighborhood needs.

4. Pilot the East Coast's first low-emission zone. Curb management can play a role in incentivizing or requiring zero—or low-emission vehicles. The city studies pricing, regulatory practices, and incentive options to develop the East Coast's first EV pilot program.

5. Designate curb space to facilitate passenger pickups and drop-offs. The surge in for-hire vehicle trips must be managed with better curb access for passenger loading. Examples include more for-hire vehicle passenger pickup/drop-off zones and paratransit lading zones.

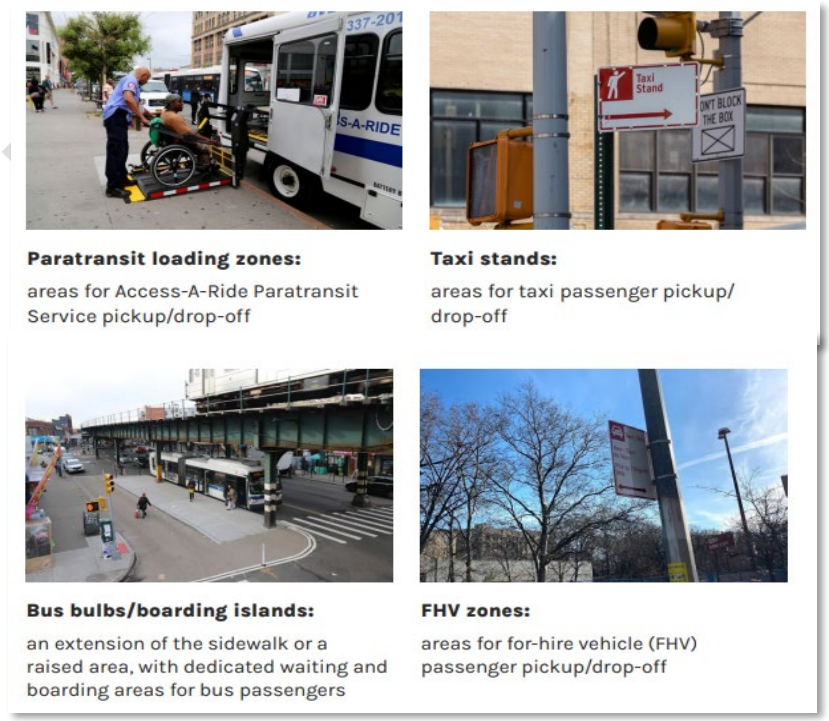


Figure 33. Curb space management to simplify passenger pickups and drop-offs.

6. Expand bike parking to make biking more convenient. NYC's bicycling boom requires additional bike parking without congested sidewalks. Expand on-street and sidewalk short-term bike and micromobility parking, continue and expand bikeshare, and create thousands of secure public bike parking spots.

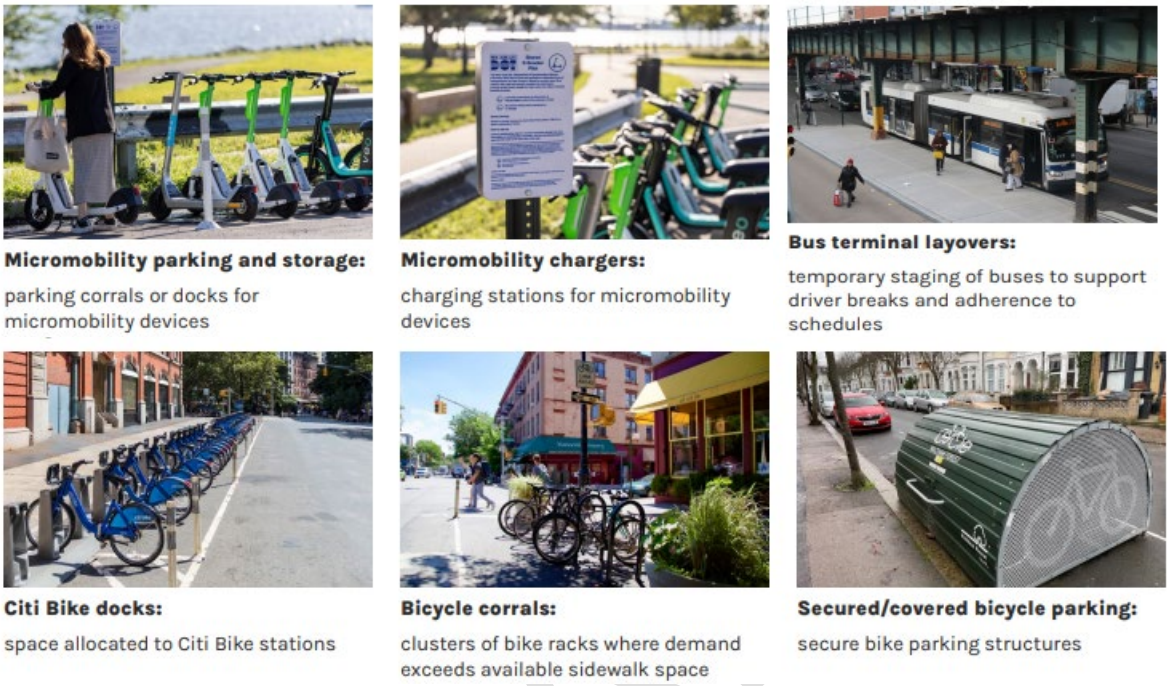


Figure 34. Smart micromobility and transit strategies.

7. Provide space for Dining Out NYC, waste containerization, street furniture, and other public realm improvements. The curb lane provides an opportunity to create a cleaner, safer, and more vibrant public realm. Strategies being pursued include implementing a permanent Dining Out NYC program, providing space for waste containerization, and activating the curb lane with public space improvements like sidewalk widening, street seats, and plantings.

Figure 35. Curb management strategies for outdoor use and public realm enhancement.

8. Test new technologies for remote and flexible curb management and enforcement. Proven and emerging technologies can enable more efficient, data-driven, and user-friendly curb management. Implementing strategies like a more flexible and convenient parking payment system; working with MTA to use new authority to camera enforce bus stops, bike lanes, and double parking; and, in conjunction with Smart Curbs pilot, test technologies to improve data collection and remote curb management to move toward automated enforcement of more violation types; and expand access to curbside charging.

9. Price on-street parking to increase commercial activity. Parking pricing should reflect demand to encourage the most efficient use of limited space. Over the next year, establish a demand-based pricing proof of concept, update meter rates and geographies to reflect the market and increased demand, expand meters (regular and commercial) to improve access in commercial, industrial, and high-demand areas, develop pricing mechanisms to support policy goals, improve fine citation structures, and adjust reserved curb space policies.

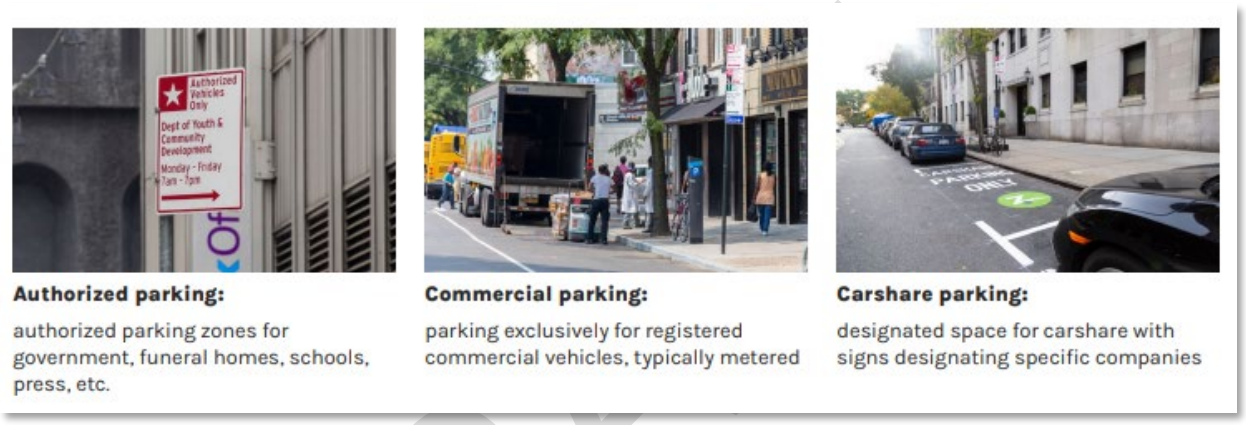


Figure 36. Smart parking: car share, commercial, and authorized parking for government and essential services.

10. Charge non-transportation users of curb space. The curb lane is a valuable resource that should be priced for businesses that benefit from it. To disincentivize excessive use of curb space and minimize community impact, NYC DOT will develop a framework to charge for street occupancy in metered spaces and seek state authorization to charge in non-metered spaces.

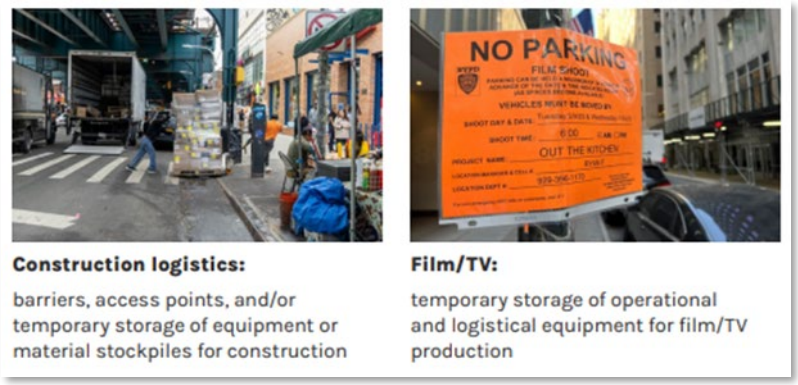


Figure 37. Non-transportation curb uses for construction logistics and media.

SHANGHAI, CHINA

With over 26 million residents, Shanghai has the highest population of any city in China and is the third most populous city in the world. Shanghai is also one of the leading adopters of digital twin technology for city operations and management.

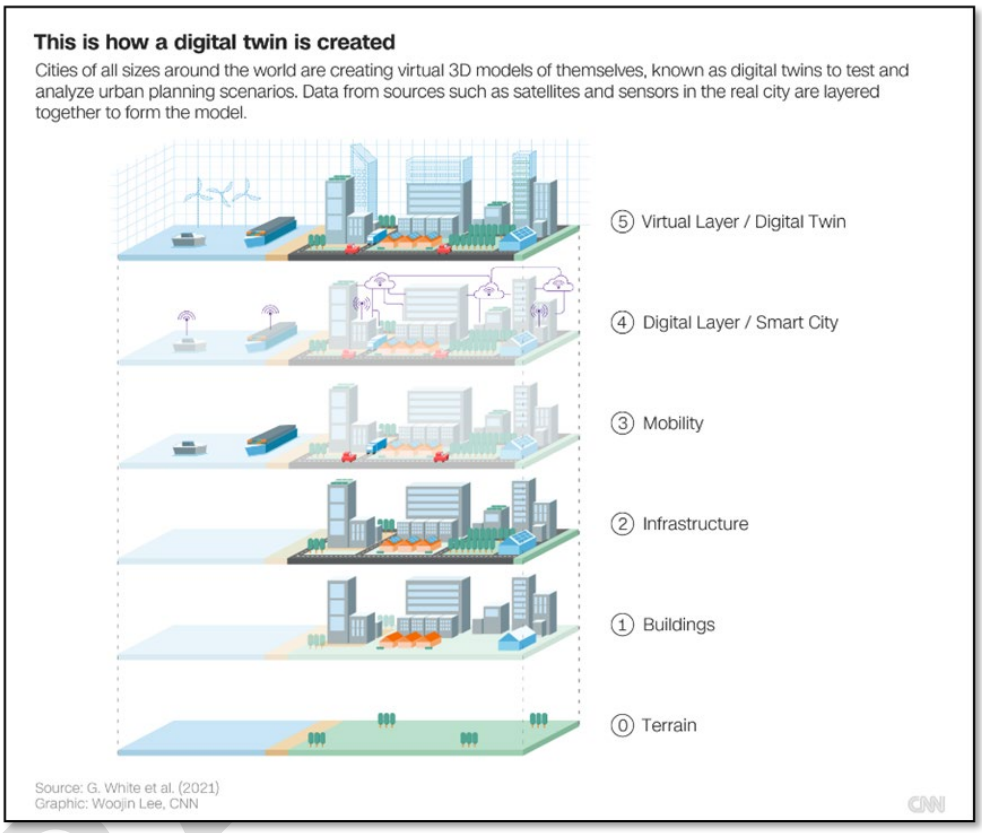


Figure 38. Layers for developing a digital twin city..

Digital twin cities are virtual representations of physical assets (like buildings, roads, waterways, and green spaces) that use connected digital information—from geographic information sensors, satellites, drones, and other sources—to mirror reality and create a digital twin of the current physical conditions. This process is highlighted in Figure 38. In the case of cities, planners and engineers can study digital twins and gain insights for improving services, planning developments, optimizing buildings' systems, and monitoring traffic flow. Designers can simulate ideas in the live city environment before they are constructed and understand in advance the impact of decisions such as where to position a bus stop or the footprint of a new housing development.

While this technology applies to urban planning efforts, during the COVID-19 outbreak, digital twin cities were employed to control and prevent the spread of the virus. The location and details of an infection incident would be recorded, and the digital twin would provide information about the neighborhood residents for epidemiological investigation. An example of the Shanghai digital twin city is shown in Figure 39, and Figure 40 explains how it is applied in urban planning.

Figure 39. Shanghai's digital twin city technology.

In Shanghai, the platform has proven robust and efficient in managing local urban refuse disposal and living safety issues, such as e-bike charging

stations. By 2025, the digital twin will be refined to include poles, boards, trash cans, and other elements observed in the real world and reflected virtually in the Shanghai digital landscape. Meanwhile, other pilot areas in the city will focus on information security, especially privacy protection, during the data collection and development of the digital system.

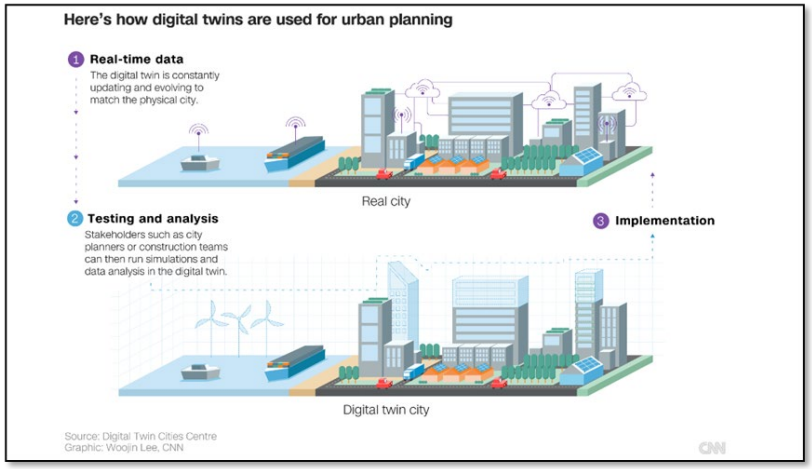


Figure 40. Digital twin city technology in urban planning.

On November 15, 2021, President Biden signed the Bipartisan Infrastructure Law (BIL), which allocates $550 billion from 2022 through 2026 for federal investment in infrastructure, including roads, bridges, mass transit, water infrastructure, resilience, and broadband. Additionally, the BIL established the Strengthening Mobility and Revolutionizing Transportation (SMART) discretionary grant program, with $100 million appropriated annually for the same timeframe.

The SMART program aims to provide grants to eligible public sector agencies for conducting demonstration projects focused on advanced intelligent community technologies and systems to enhance transportation efficiency and safety. The program prioritizes purpose-driven innovation and emphasizes the development of data and technology capacity and experience for government agencies. Eligible projects must demonstrate at least one of eight technology areas, as shown in Figure 41.

The Broward Metropolitan Planning Organization (BMPO) received the grant funding and is developing SMART METRO. This innovative transportation modeling platform will use Artificial Intelligence (AI) technology to create a regional digital twin of the County. BMPO is developing its system so city planners can improve the city's transportation logistics and test improvements before they are physically implemented.

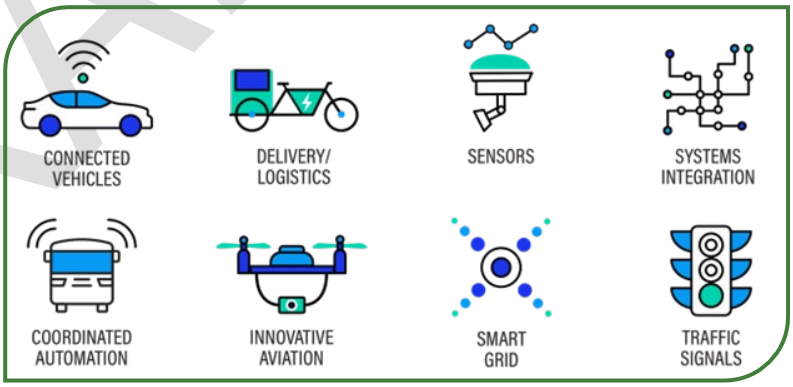


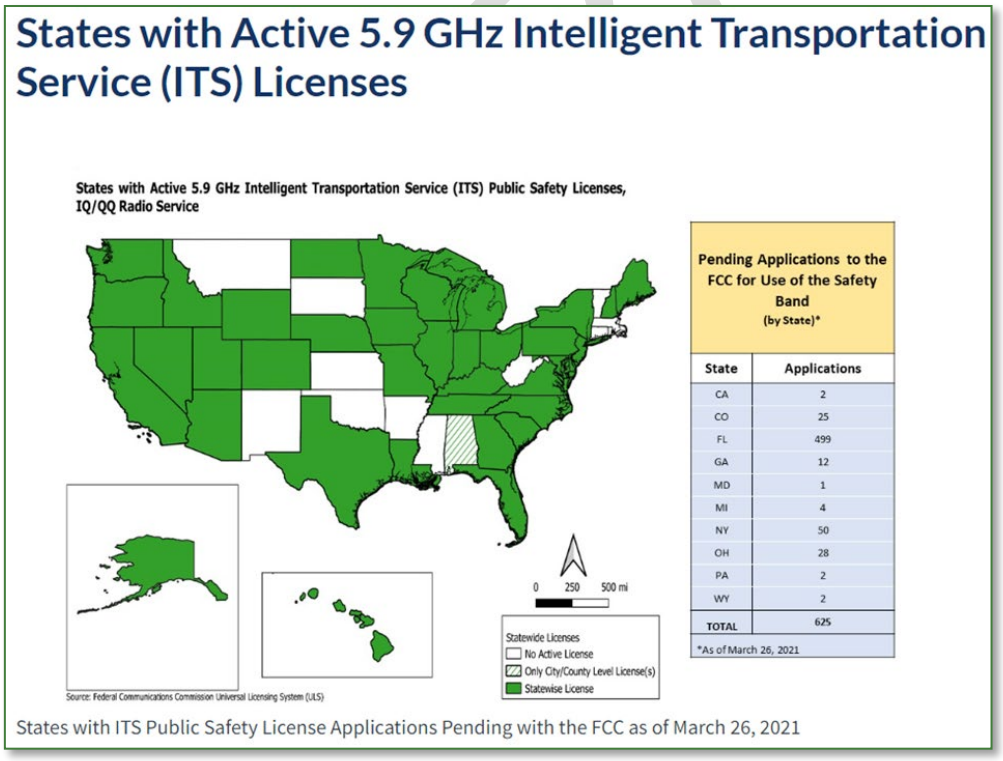
Figure 41. Federal Bipartisan Infrastructure Bill components.

MIAMI, FLORIDA

The Safety Band refers to a wireless spectrum at 5.9 GHz reserved for transportation-related communications among devices that support connected and automated vehicles. The electromagnetic spectrum includes radio waves ranging from as low and long as 30 hertz (Hz) traveling up to 10,000 kilometers to as high and short as 300 gigahertz (GHz) traveling about one millimeter (mm). This range of waves has made various inventions possible, such as long-distance communications, radio and television broadcasts, radio navigation and location, and mobile communications.

In the past, devices that use radio waves required tuning to a specific spectrum. As a result, today, frequencies within the spectrum are distributed for specific uses, such as AM/FM radio stations, defense, air traffic communications, radar, or maritime communications. The Safety Band allocation offers a dedicated set of airwaves for transportation safety. In 1999, the Federal Communications Commission (FCC) allocated 75 MHz of radio spectrum in the 5.9 GHz Safety Band for intelligent transportation systems (ITS) services. Over the past 20 years, the U.S. Department of Transportation has collaborated with industry and the public sector to develop and deploy new technologies, such as connected vehicle technologies, to operate on the dedicated safety band. The technology has been developed in more than half of the United States. It has been designed to support safety-critical applications through continuous, fast, reliable, and secure wireless data communications among vehicles, roadway infrastructure, and mobile devices.

Connected Vehicle (CV) technologies, such as vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), and vehicle-to-everything (V2X) communications, now depend on the Safety Band. These technologies involve devices or connection points between people, vehicles, and transportation environments. No other radio spectrum is currently configured to provide all the critical attributes needed to support V2V and V2I safety applications. Using the interference-free Safety Band, these high-precision devices enable communications between vehicles and traffic lights, generate real-time alerts or warnings, and adjust signals to prioritize emergency vehicles in heavy traffic, significantly improving transportation safety and mobility. Map 1 depicts the U.S. states with active 5.9 GHz intelligent transportation services.



Map 1. States With Active 5.9 GHz Intelligent Transportation Service licenses.

The 5.9 GHz band is used for:

- Traffic light control
- Traffic monitoring
- Travelers' alerts
- Automatic toll collection
- Traffic congestion detection
- Emergency vehicle signal preemption of traffic lights
- Electronic inspection of moving trucks
- Red-light violation warnings
- Reduced speed zone warnings
- Spot weather-impact warnings

In Miami-Dade County, the Automated and Connected Vehicle Technologies for Miami's Perishable Freight Industry Pilot Demonstration Project uses the safety band and technology to improve the Freight Corridors surrounding Miami International Airport (MIA). The research and demonstration project will follow a three-phase approach to measuring, prioritizing, and automating portions of the floral delivery supply chain in Miami-Dade County.

The Florida Department of Transportation (FDOT) proposes improving travel time reliability within the region surrounding MIA by deploying Connected Vehicle/Automated Vehicle technologies on a limited number of operators' fleet vehicles. The three phases for implementation and anticipated findings are summarized below:

- PHASE 1 — CV technologies will allow fleet operators and FDOT to understand better vehicle progression throughout delivery corridors and where bottlenecks occur at traffic signals.
- PHASE 2 — Utilizing the installed CV, devices will connect the freight vehicles to traffic signals through the back-end systems at the Miami-Dade County Traffic Management Center.
- PHASE 3 — During non-peak congestion hours (potentially 12 -5 a.m.), traffic signal priority will be granted to study vehicles' delivery performance improvement.

JACKSONVILLE, FLORIDA

The BayJax Innovation Corridor is a three-mile segment of Bay Street in downtown Jacksonville, Florida, to connect people, places, and information to improve mobility in the city's urban core and surrounding neighborhoods. The project is part of the Jacksonville Transportation Authority's (JTA) plan called the Ultimate Urban Circulator (U2C), which involves replacing the elevated Skyway's monorail cars with autonomous electric vehicles that will be able to operate at street level and connect to the overhead transit system, similar to Miami-Dade's Metromover. The development of this corridor includes various projects, including integrated data exchange through the Internet of Things; autonomous shuttles; smart traffic signals that will provide surveillance and signalization priority; pedestrian sensors including enhanced mid-block pedestrian crossings; flood notification systems for streets; smart LED lighting with sensors to improve efficiency and resources; wayfinding featuring Wi-Fi, emergency services, and event information; solar sidewalks to power traffic signals; converting Bay Street into a two way from a one-way street; public broadband throughout the corridor; safety and surveillance technology that detects gunshots, gases or chemicals to be installed on lighting equipment, and; waste management by increasing trash cans to all intersection and transit stop locations in the corridor.

Figure 42. Representation of the full Urban Circulator System (U2C).

The U2C program aims to comprehensively modernize and expand the existing elevated people mover to fully autonomous transportation systems, as represented in Figure 42. JTA intends to complete the work in three phases to achieve this aim.

Phase I, the Bay Street Innovation Corridor, is currently underway. It extends from the Skyway's Central Station to the Sports/Entertainment District/TIAA Bank Field. The project will introduce Autonomous Vehicles (AVs), initially operating in mixed traffic in curbside lanes along Bay Street for approximately three miles, from Pearl Street (East) to EverBank Stadium, extending west to east through the Jacksonville Urban Core.

Phase II involves converting the Skyway superstructure into an elevated roadway for autonomous vehicles like the Navya model shown in Figure 43, expanding from the Downtown Northbank to the Southbank. Phase 2 is funded through the Local Option Gas Tax and represents the total conversion of the existing Skyway Superstructure and eight stations into an elevated roadway for AVs. The current bi-directional tracks run 2.5 miles in each direction. Launching from the Jacksonville Regional Transportation Center (JRTC), the U2C elevated stations will stretch to four additional stations on the Downtown Northbank and Southbank. Phase 2 also includes the street-level connection to Phase 1, the Bay Street Innovation Corridor, and an operations and maintenance facility for autonomous vehicles in the LaVilla neighborhood near downtown Jacksonville.

Phase III will include neighborhood extensions like the Southwest Corridor, Southbank Corridor, and North Corridor, expanding the system from 2.5 to 10 miles into other neighborhoods adjacent to the urban core.

- Southwest Corridor: This corridor hosts large office towers just over the edge of Downtown Jacksonville and melts into a blend of historic homes and eclectic shops and restaurants. Redevelopment in the northern portion of the corridor is bringing more places to live, work, shop, and dine. Planned autonomous vehicles will help connect future residents to areas within the corridor and nearby neighborhoods.
- Southbank Corridor: This corridor houses medical, office, and residential towers.
- North Corridor: Once served by streetcars, this historic area has undergone a renaissance with new and renovated homes and shops. The area hosts many neighborhood festivals and events.

The JTA's U2C program will serve as a testbed for mobility and transportation strategies and technologies in the North Florida region. The rendering in Figure 43 shows the planned Skyway ramp, which will connect the elevated track with the street level for continuous service.

Figure 43. Rendering of the U2C ramp and autonomous vehicles.

NASHVILLE, TENNESSEE

Downtown Nashville shares many similarities to Downtown Miami. Between 2013 and 2023, the downtown Nashville area experienced a total population growth of 365%. The growth in office space accompanies this. As of 2023, there was a total of 1.7 million square feet of office space under construction. Additionally, the area attracts many tourists, with a record of 14.4 million visitors in 2022 alone, spending over $8 billion in support of the local economy. In 2022, the Downtown Nashville area collected almost 19% of retail taxes generated in the whole of Davidson County, in an area that is less than 0.4% of the county's land area.

People experience similar mobility challenges in Downtown Nashville as well. There is a need for connections within and to Downtown Nashville. All modes of travel slow down to a crawl during peak periods, posing concerns for emergency vehicles, long-term growth, and quality of life. The city has found that while people are stuck in traffic, they may prefer it, as transit travel options do not match desired destinations, and the system is often seen as slow and unreliable.

The city developed the Metro Nashville Transportation Plan with five *Big Moves* to address mobility challenges. The projects highlighted in Figures 45 through 51 will make travel more reliable, comfortable, faster, and safer.

Big Move 1: **Manage Congestion** by upgrading signals, improving traffic operations, and better-managing events to keep people moving. Projects include:

Figure 44. Nashville's traffic signal strategies for congestion management.

Big Move 2: Improve Safety by advancing the implementation of Vision Zero projects. In addition, efforts include:

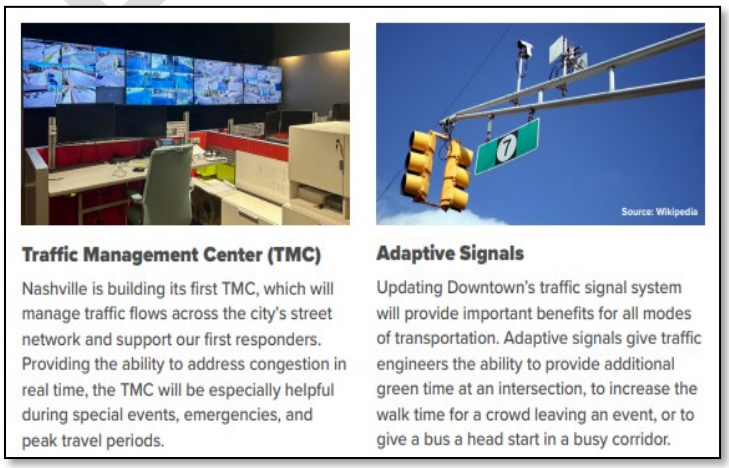


Figure 45. Nashville's safety strategies.

Big Move 3: Move More People by prioritizing buses on critical corridors and improving service through faster and more reliable trips. Transit Priority Corridors make moving people faster and more efficient. Figure 47 shows the strategies that can be implemented.

Figure 46. Transit priority corridors strategy to enhance mobility for all users in Nashville.

Big Move 4: Create Complete Networks to develop equitable, safe, separated, and connected facilities for walking, rolling, biking, and scooting. Examples of projects include:

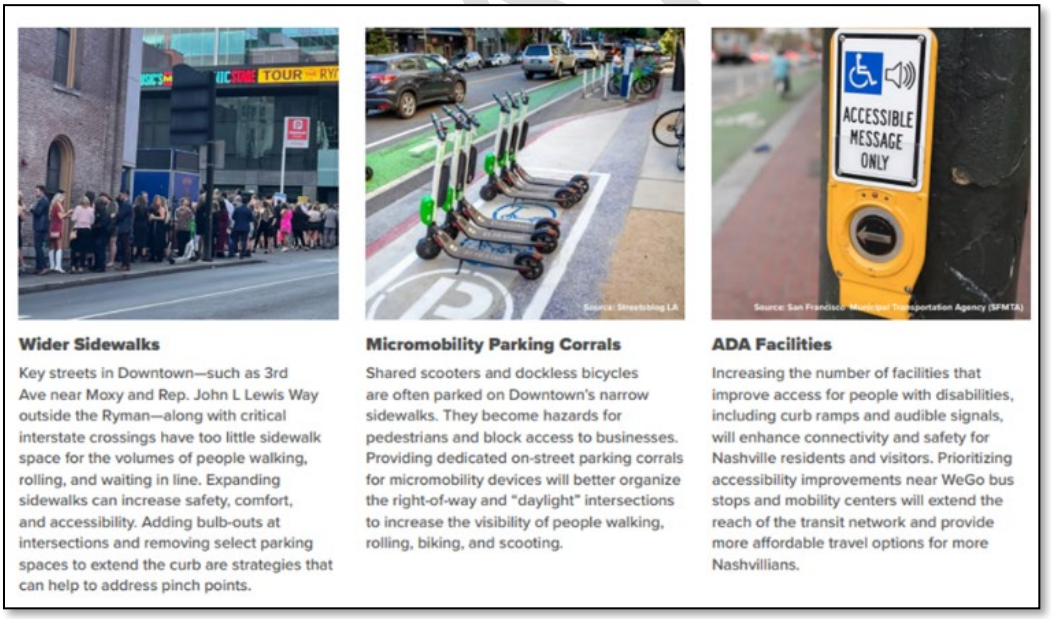


Figure 48. Strategies to improve active mobility and develop complete networks.

Big Move 5: Maximize the Curb by flexing curbs throughout the day, allowing deliveries, service vehicles, and passenger pick-up and drop-off zones, including for charter buses.

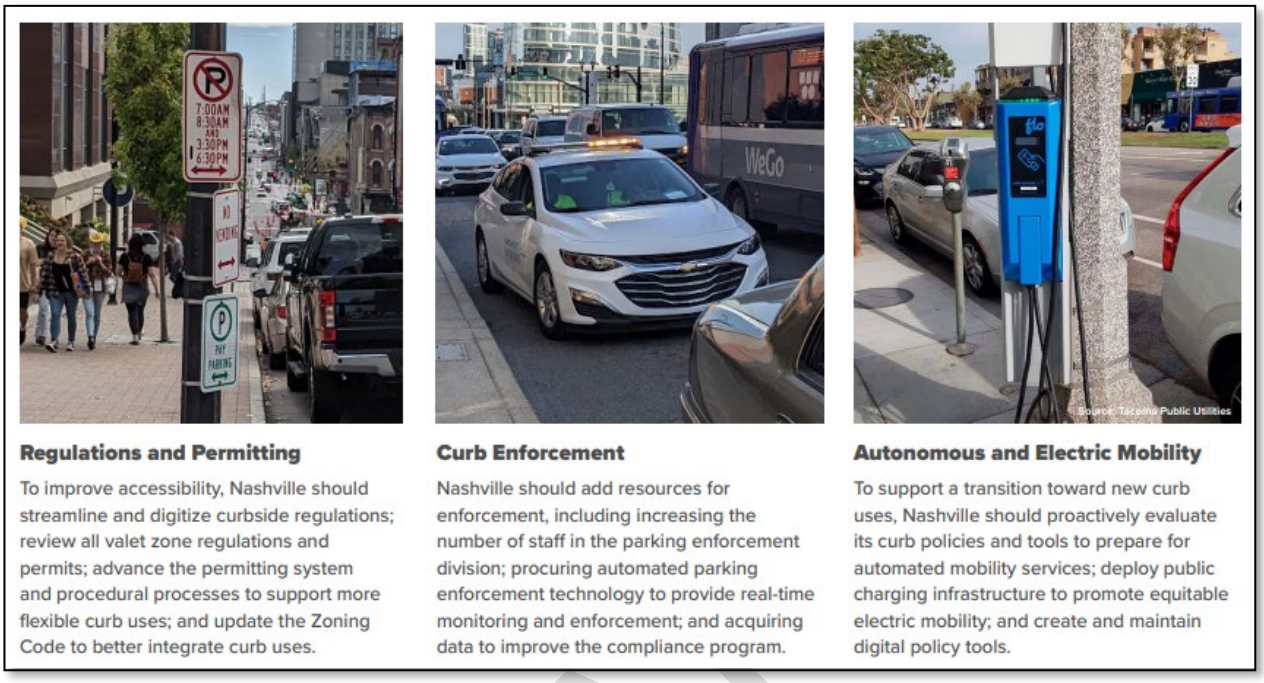


Figure 49. Parking permitting and enforcement for optimal curb management.

FOCUSED IMPROVEMENTS FOR DOWNTOWN NASHVILLE INCLUDE:

1. Develop a **Transportation Demand Management (TDM)** plan and expand the Nashville connector program to include TDM strategies for businesses, residents, and visitors. The TDM Team will guide the program at Nashville's Department of Transportation. It will encourage people to use other modes of travel, especially for short trips Downtown and trips that could be made by bus.
2. Increase **Event Management and Coordination** resources to support more comprehensive planning for multimodal needs and dual-event days. The city hosts hundreds of events a year and will add staff to help plan for and implement detours, manage traffic congestion, and promote alternative modes of travel.
3. Launch a **Construction Hubs Program** to coordinate public and private construction activities in the right-of-way. The program will help contractors coordinate efforts to reduce duplicative work and inform the public of active projects and detours. The program will also help Metro Nashville ensure that private development implements priority infrastructure.

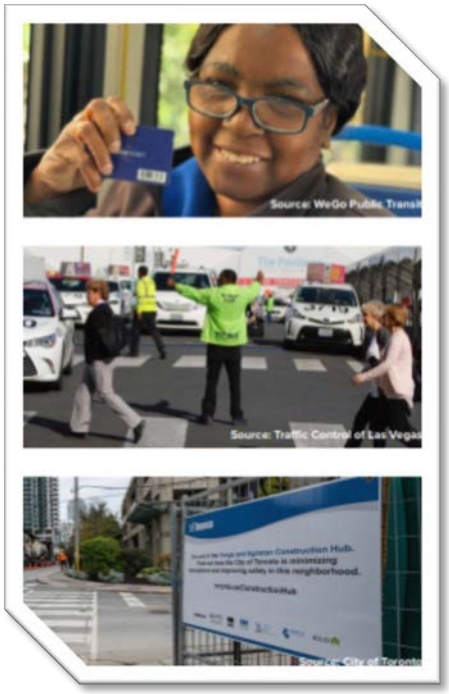


Figure 50. TDM, event management, and construction hubs to keep people moving.

Other notable efforts in the plan include curb management principles and regulations. Figure 52 shows examples of flexible curb regulations.

Curb management principles include:

- **EFFICIENT** and **EFFECTIVE** using data to optimize curb use
- **EQUITABLE ACCESS** for the diverse needs of users
- **USER-FRIENDLY** regulations
- **ADAPTIVE** and **RESILIENT** to be flexible to regulatory change
- **DECISION-MAKING CLARITY** for enforcement and users.

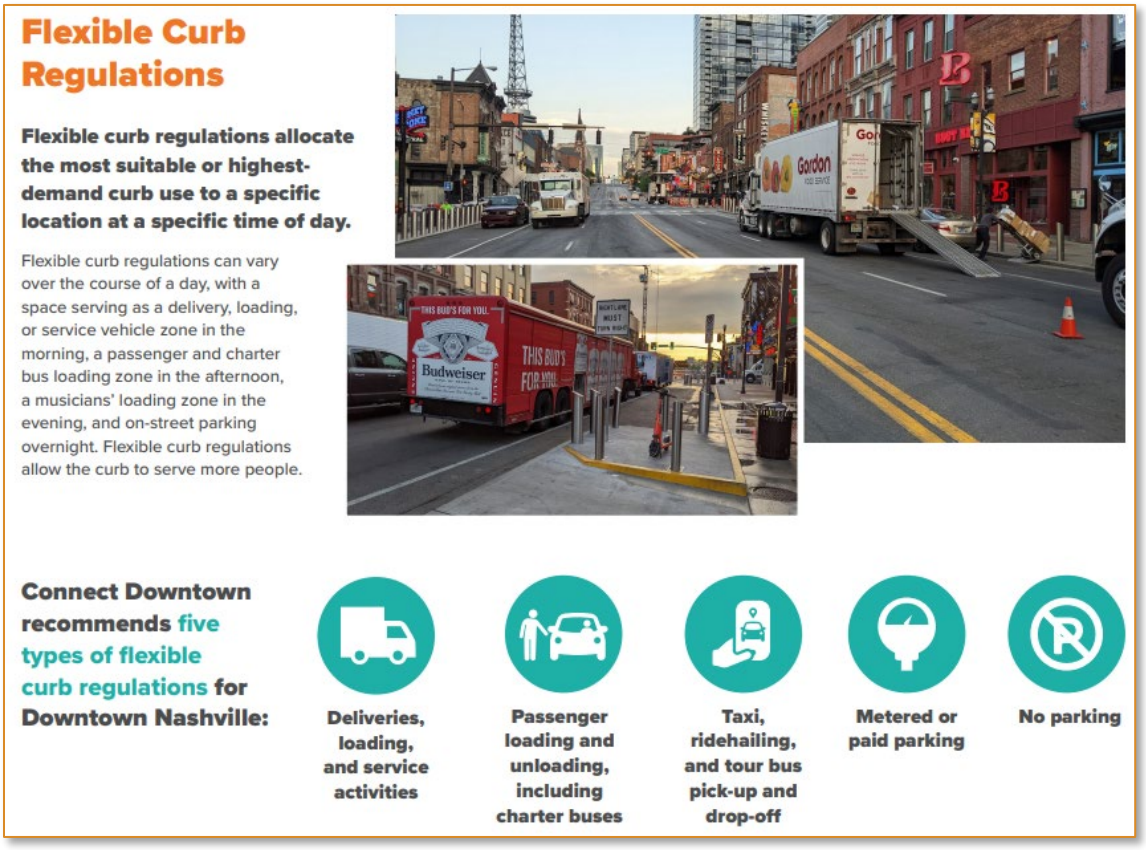


Figure 51. Flexible curb regulation strategies in Nashville.

ATLANTA CURBSIDE MANAGEMENT ACTION PLAN

Commercial centers in Atlanta, Georgia, feature various street and curb uses that must be balanced. Atlanta's approach was to develop action plans for curb space activation based on different types of corridors. Table 1 highlights the components of the Atlanta Curbside Management Plan and the management practices by curb type, land use, and curb use priority.

Table 1. Atlanta's curbside management strategies by curb type.

CURB TYPE	TYPICAL STREET CLASSIFICATION	ADJACENT LAND USE AND CONTEXT	CURB USE PRIORITY
Commercial Centers	Principal Arterials and Collectors	• High density office • High density commercial and ground floor retail • Moderate levels of high rise residential • Access to parking lots/garages and transit • On-street loading and parking is not prioritized on these streets but is provided on cross-streets	1 People/Green Space, 2 Mobility, 3 Passenger Access, 4 Delivery Access, 5 Storage
Entertainment Centers	Principal and Minor Arterial	• High density corridors with mixed land uses including dining, social destinations, and museums or theaters • Accessible through diverse modes of transportation • Requires on-street access as well as access on cross-streets	1 People/Green Space, 2 Passenger Access, 3 Delivery Access, 4 Mobility, 5 Storage
Commercial Mobility Corridors	Principal and Minor Arterials	• Sporadic businesses or entertainment options • Mostly functions as connector into the urban core • Primarily high density commercial and institutional areas • Person throughput-oriented • Storage occurs off-street or on cross-streets	1 Mobility, 2 People/Green Space, 3 Delivery Access, 4 Storage, 5 Passenger Access
Neighborhood Mobility Corridor	Minor Arterials and Collectors	• Predominantly low to mid rise residential • Sporadic ground floor retail • Little delivery demand • Vehicle storage space on-street	1 Mobility, 2 People/Green Space, 3 Storage, 4 Passenger Access, 5 Delivery Access
Neighborhood Avenues	Minor and Collector Arterial	• Moderate intensity retail and entertainment • Low intensity office • Low to mid-rise residential • Accessible through diverse modes of transportation • Limited right of way	1 Passenger Access, 2 People/Green Space, 3 Mobility, 4 Storage, 5 Delivery Access
People Streets	Non-arterials (Local Roads), Minor Arterials	• High intensity commercial • Moderate residential density • Ground floor retail • High walkability • Limited right of way	1 People/Green Space, 2 Delivery Access, 3 Storage, 4 Passenger Access, 5 Mobility

The Atlanta plan provides numerous policies and strategies. Below is a selection of methods appropriate for downtown Miami and can be implemented.

Adopt a curb-type policy to guide curb allocation and provide a framework for decision-making

1. Adopt the curb typology as part of the city street design and curb regulation process to serve as a guiding document,
2. Assign ownership of the curb typology and update it over time. The curb manager is the owner and is encouraged to update the document as conditions change.

Multimodal transportation and curb impact studies are required for significant new developments in parallel with transportation management plan requirements. Require developers to acknowledge the multimodal nature of site access and develop multimodal impact analysis and mitigation plans.

1. Developments adding at least 25,000 square feet of floor area are required to complete a transportation study evaluating impacts on bike transit loading and curb infrastructure, including ride-hailing and delivery.
2. Create templates or other assistance by which developers can estimate trip generation and modal access priorities.

Allocate targeted loading space for loading and pickup drop-off activity.

1. Identify areas where pick-up slash drop-off locations, and commercial loading zones are inadequate or underperforming by coordinating with stakeholders and integrating emerging data streams
2. Create clear protocols within Atlanta dot to install new loading zones and use geofencing to create pick-up slash drop-off locations in critical civic spaces. Enforce the existing loading zone permit program
3. Regularly assess the performance of loading zones and adjust regulations and zone dimensions accordingly.

Maintain curb inventory to facilitate changes to curbside regulations

1. Identify a curb data standard
2. Collect the initial data for the curbside inventory
3. Establish and formalize a process for real-time inventory updates

Monitor curb demand through regular curb utilization studies and use data to adjust policy

1. Formalized procedures for different utilization studies
2. Conduct utilization studies every six months
3. Require vendors to regularly share utilization data and seek partnerships with mobility service providers
4. Monitor loading activity in critical areas and assess off-street loading spaces

Adopt design standards to prevent modal conflict between modes and coordination with the curb typology.

1. Continue to refer to the national guidance, such as the NATCO urban street design guide, when designing roadway improvement to mitigate adverse impacts on non-auto modes
2. Ensure that bus bike and loading facility designs prevent modal conflicts

Allocate multimodal space for non-auto modes on streets to promote mode shift goals and create a more livable environment.

1. Develop a modal prioritization plan that builds off of the work conducted for the curb typology but incorporates specific analysis around modal network needs for buses, bikes, and other non-auto uses in coordination with other regional network plans
2. Use transportation demand management to reduce vehicular demand and free up space for multimodal improvements.
3. Use flexible roadway designs to reduce competition for the right of way and allow multiple uses to function safely in the same space

Allocate people space, providing more space for people using parklets, outdoor dining, and recreational areas through the tactical urbanism permit.

1. Determine appropriate street districts or other areas to establish as shared streets where St. Space and, in particular, curb space can or should be converted to people space about the curb typology
2. Promote the standards and processes for outdoor structures as described in Atlanta's tactical urbanism guide through continued outreach to stakeholders
3. Develop an award program for innovation and design

Curbside use and management pilot and evaluate curbside changes in management tools while gathering public feedback gather a resource pool of flexible materials that can be used to deploy right away pilots rapidly and inexpensively

1. Use outreach and surveys to determine what pilot types are in demand
2. Pilot curb management technologies to better manage the curb and understand curb behavior

STRENGTHENING LINKAGES BETWEEN TRANSPORTATION DEMAND MANAGEMENT AND TRAFFIC MANAGEMENT

Bike Parking/Bike Valet at Sports Areas

Many venues have established bike parking and bike valet services. One example is Nationals Park, seen in Figure 54, in Washington, DC, which offers free, secure bike parking for more than 250 bicycles. The lot opens two hours before game time and remains open until one hour after the game ends. Bikeshare is also available at the stadium. Bike valet parking is also accessible at AT&T Park (San Francisco, CA) and Golden 1 Center (Sacramento, CA). At Kauffman Stadium (Kansas City, MO), parking fees are waived for those who bike to the stadium. Typically, bike valets are manned by paid staff who watch the bicycles, ensuring they remain secure while owners are in the stadium.

Figure 53. Photo of bike valet at Washington Stadium.

Combining Concert and Transit Tickets

The Utah Transit Authority works with the Ogden Twilight concert series every year, as pictured in Figure 55, from June to September to provide public transit to the event. The ticket's purchase price includes a transit fare allowing ticketholders to access Ride UTA FrontRunner, TRAX, and buses with their Ogden Twilight ticket. Guests must show the concert ticket to the bus operator or UTA fare enforcement personnel when asked for proof of payment.

Figure 54. Ogden Twilight Series concert in Utah.

Establishing Ride sourcing Pickup Locations at Event Venues

During the month-long Mardi Gras celebration, many options are available to allow visitors to leave their cars at home. Since 2016, transportation network companies (TNC) have provided special promotions to encourage ride-sharing to get to the festivities. Mardi Gras presents a particular traffic challenge because many roads and entire city sections are closed to vehicle traffic for the dozens of parades over the month. TNCs developed a Mardi Gras guide to direct potential riders to permissible pickup locations, as provided in Figure 56. Similar guides prepared for the Houston Super Bowl and the Louisville Kentucky Derby. Several event venues, including Nationals Park in Washington, DC, have worked with TNCs to designate a formal pickup area and limit curbside pickup.

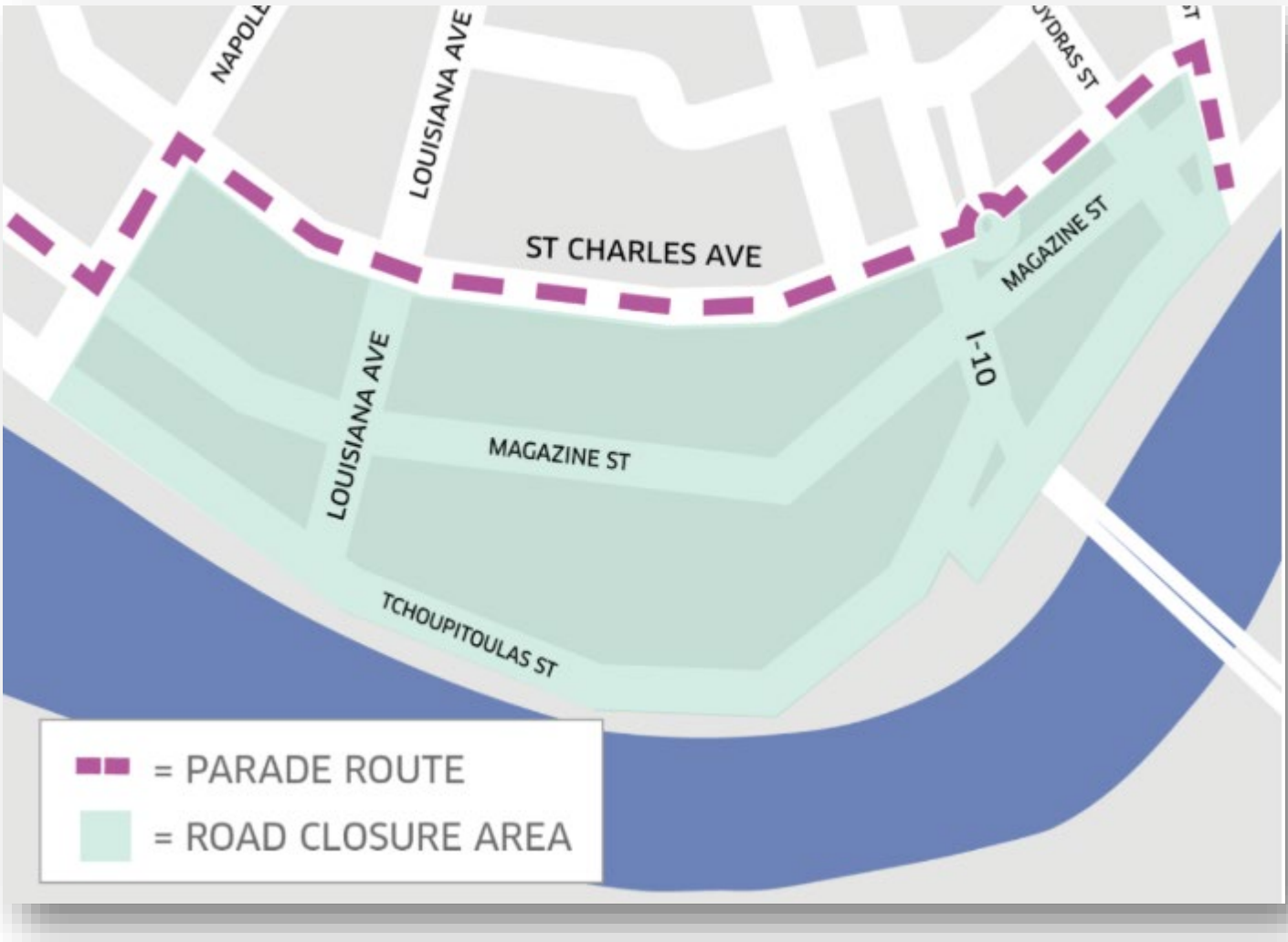


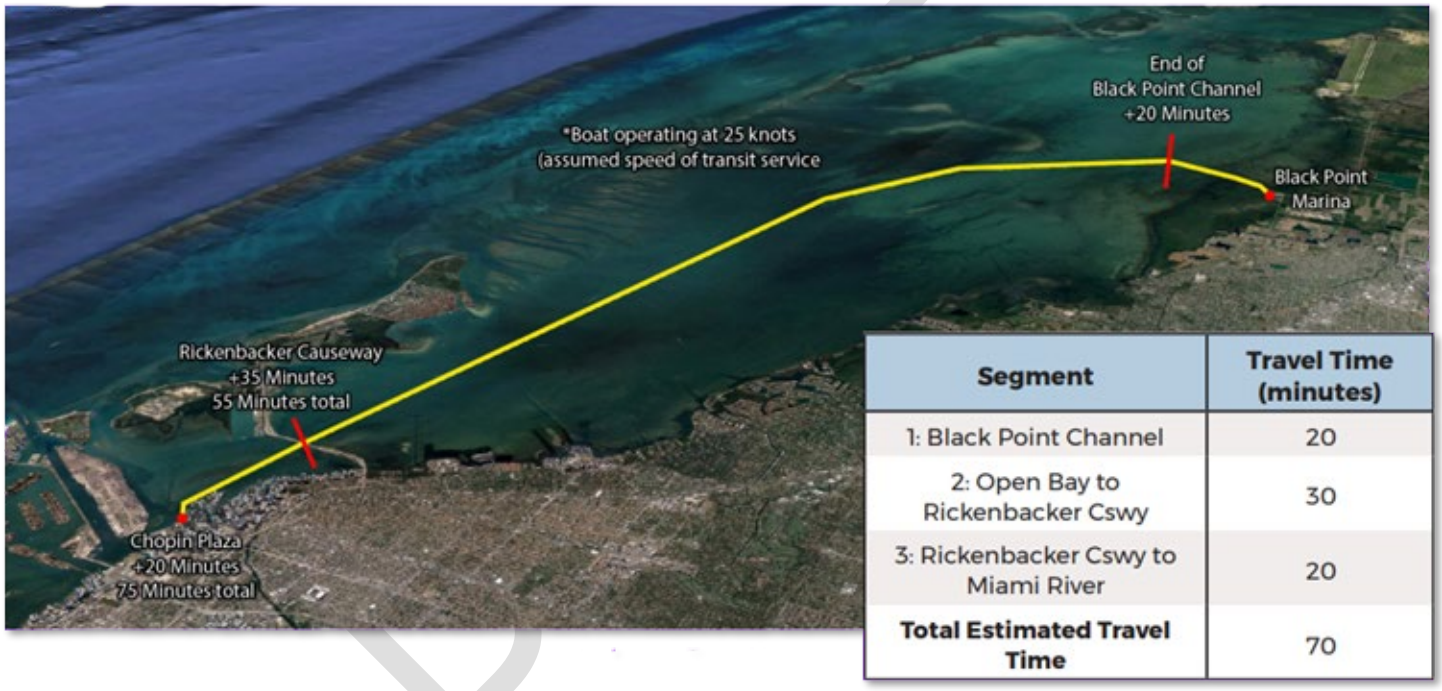
Figure 55. Transportation Network Companies prepare rideshare guides for special events like Mardi Gras.

RESEARCH IN MOBILITY IMPROVEMENTS

WATERBORNE TRANSPORTATION FEASIBILITY STUDY

In 2017, the Miami-Dade Transportation Planning Organization (TPO) conducted a Waterborne Transportation Feasibility Study for travel between Black Point Marina and Downtown Miami. The study assessed the implementation of a ferry as an alternative mode of transportation to improve travel time and accessibility into downtown Miami.

Commute times between southern Miami-Dade County and downtown Miami can take more than two (2) hours during peak travel periods to traverse the 18.5 miles. An alternative travel option is by boat, which results in a total boating trip length of 22.4 miles. Per the study, Black Point Marina would be converted into a multimodal transit location that would include a park-and-ride area, connecting feeder transit and shuttle service, and the waterside area necessary to implement a waterborne commuter service. The travel time with the proposed ferry was estimated at 70 minutes. Figure 57 provides an overview of the route.



Segment	Travel Time (minutes)
1: Black Point Channel	20
2: Open Bay to Rickenbacker Cswy	30
3: Rickenbacker Cswy to Miami River	20
Total Estimated Travel Time	70

Figure 56. Proposed waterborne travel route between Black Point Marina and Downtown Miami.

The recommended catamaran-style vessel for service, seen in Figure 58, can accommodate up to forty-nine passengers and sustain a minimum cruising speed of twenty-five knots. It is designed for improved water stability and a shallower keel depth, and it features a low profile that accounts for bridge height restrictions in Miami-Dade County.

Additional locations for waterborne service were evaluated as part of the study, including Dinner Key Marina in Coconut Grove and three Downtown Miami options connecting waterborne service with transit, including the Riverwalk Metromover station next to the Miami River, Chopin Plaza, and the Sea Isle Marina.

Figure 57. Recommended catamaran-style vessel for Miami water taxi.

Travel to and from downtown is through the Intracoastal Waterway, which allows for full-speed travel; however, the route is often slowed down to various slow-speed buffers along the route, including one near Dinner Key to protect the marina and another near the Rickenbacker Causeway. The three downtown docking stations are within 1,000 feet of a Metromover station and are described below.

Chopin Plaza: This docking location is shown in Figure 59. It was determined to be the fastest downtown stop from Black Point. It is the closest to travel to and has the least speed-restricted zones to pass through.

Sea Isle Marina: As shown in Figure 60, there are two potential docking sites for a water taxi at this location. The northern option aligns with NE 16th Street and provides a more pleasant environment as riders land. The southern option is directly adjacent to NE 15th Street and provides a shorter path to the Metromover station.

Riverwalk Station: Figure 61 shows the Riverwalk Station location, which was determined to be the most helpful for riders. It is only 200 feet from a Metromover station. However, reaching it requires passing beneath the Brickell Avenue Bridge and traveling the Miami River, which is an idle speed zone out to the northeast corner of Brickell Key.

Figure 58. Chopin Plaza docking station and connection to Metromover Station.

Figure 59. Sea Isle and potential docking sites and routes to Metromover and Metrobus.

Figure 60. Riverwalk Station Metromover docking location.

Challenges to the implementation of the ferry service identified in the report include:

- **Marina Location:** Black Point Marina is situated in a relatively remote southeast corner of Miami-Dade County, outside the Urban Development Boundary (UDB), making it difficult to cultivate the desired type of development that could sustain the waterborne trail.
- **Passenger Carrying Capacity:** For waterborne service to be viable, the corridor's passenger carrying capacity may need to be increased. To accomplish this, a new water route must provide sufficient volume with frequent enough service to help alleviate traffic congestion on parallel roadways such as the Florida Turnpike, U.S. 1, and Old Cutler.
- **Regulations**: During stakeholder engagement interviews, it was also noted that Miami-Dade County's Division of Environmental Resources Management (DERM) use of the Manatee Protection Plan (MPP) to regulate water taxis may be outdated and may be restricting the full implementation of this type of travel, especially in Downtown Miami.

The study concluded that the proposed waterborne service between Black Point and Downtown Miami is not feasible at this time, given the service route length and the travel time. Both factors limit passenger carrying capacity, resulting in high operation costs with limited passenger benefits.

EMERGING TECHNOLOGY FOR WATERBORNE TRAVEL

Seagliders: Electric plane-boat hybrids, or seagliders, are being tested in Tampa, Florida, to begin commercial sales in 2025. The battery-powered craft can dock like a boat and float in no-wake zones. After leaving a busy harbor, it can take off into the air and fly above the water at speeds up to 180 mph.

Electric seagliders use hydrofoils—or underwater wings—to hover over waves with speeds between 20 and 40 mph before taking off. While seaplanes are not new in the aviation industry, they have proven impractical for commercial travel due to poor wave tolerance and the need to launch from a dock.

The first seagliders for commercial use will seat about 12 passengers, but the company developing the technology intends to create a larger version with room for about 50 to 100 passengers. Airline companies in Hawaii and Alaska plan to integrate the technology into their coastal airport networks. Figure 62 shows a rendering of the seaglider.

Figure 61. Rendering of a seaglider in flight.

Electric Flying Passenger Ship: Stockholm's public transport system is undergoing a significant transformation with the introduction of the first-ever electric flying passenger ship. This groundbreaking vessel, shown in Figure 63, is designed to revolutionize commuting by reducing a 55-minute journey between Ekerö and Stockholm to just 25 minutes.

Figure 62. Electric passenger ship set to launch in Sweden in 2024.

Measuring 39 feet in length and powered by a 252-kilowatt-hour battery, the ship can comfortably accommodate up to 30 passengers, showcasing its practicality in urban transit scenarios. Capable of gliding at speeds reaching 25 knots (29 mph) and maxing out at 30 knots (35 mph), it can travel up to 50 nautical miles (57.5 miles) on one charge. Hydrofoil technology minimizes water resistance and, consequently, power consumption.

This innovation translates into tangible benefits for commuters, particularly on the route where travel time will be halved. The ship is exempt from speed limits due to its minimized wake disturbance while navigating water. Additionally, advanced technology is harnessed to mitigate the likelihood of passengers experiencing seasickness, ensuring a comfortable journey for all aboard.

DOWNTOWN MIAMI SMART CORRIDOR HUB TRANSPORTATION MOBILITY AND CONNECTIVITY STUDY

This study guides integrated mobility hubs and expanding their use in Miami's urban core and along the SMART corridor hubs to improve mobility in the area. Integrated mobility hubs connect various transport options, allowing users to shift between modes and create new routes according to their preferences.

The following are features identified in the study to promote integrated mobility hubs in downtown Miami:

- Provide infrastructure and incentives for electric vehicles.
- Manage parking dynamically at mobility hubs and urban core areas by using parking inventory technologies to capture, display, and even pay for available parking.
- Use radiofrequency identification (RFID) based technology and biometric devices to efficiently control parking facilities' entrance and exit gates.
- Implement innovative demand-responsive valet parking services to provide low-speed, priority parking stalls for electric vehicles in micro park-and-ride facilities closer to city center entry/exit points.
- Employer-based incentives to cede parking rights, where employers allow workers to trade their parking spaces for the cash equivalent.
- Parking funds and Parking Benefits Districts for community garages (in-lieu fees) will be placed at critical locations (entry points) of city centers, paired with parking-free communities/buildings. They will reduce and ultimately eliminate parking minimum requirements.
- Design and implement a technology-driven, consistent wayfinding system around mobility hubs with supportive features throughout the city.
- Promote data-sharing between stakeholders in the public and private sectors and the general public.
- Implement a centralized, mobile, single-payment fare system platform.
- Allow for flexibility in Curbside Management to adapt to changing urban needs, including providing space for micro transit and transportation network companies, pick-up/drop-off zones, carshare parking, mobile vendors, parklets, and servicing and loading areas that do not interfere with the pedestrian network.
- Consider Congestion Pricing, which works best in areas well-served by high-quality transit services.

The following Mobility Hubs were identified in the Study Area. Map 2 depicts the location of the hubs.

The Underline (1), Brickell Point (5), and Brickell Key (4) Hubs are recommended to focus on active travel for pedestrians and cyclists and access to microtransit, such as community shuttles.

Brickell Station (2), NW 36 Street (14), and the Omni Station (9) Hubs are envisioned as Transit Access hubs with various travel options.

Brickell City Center (3) is proposed as a destination hub with access to popular destinations, including commercial areas, museums, and theatres.

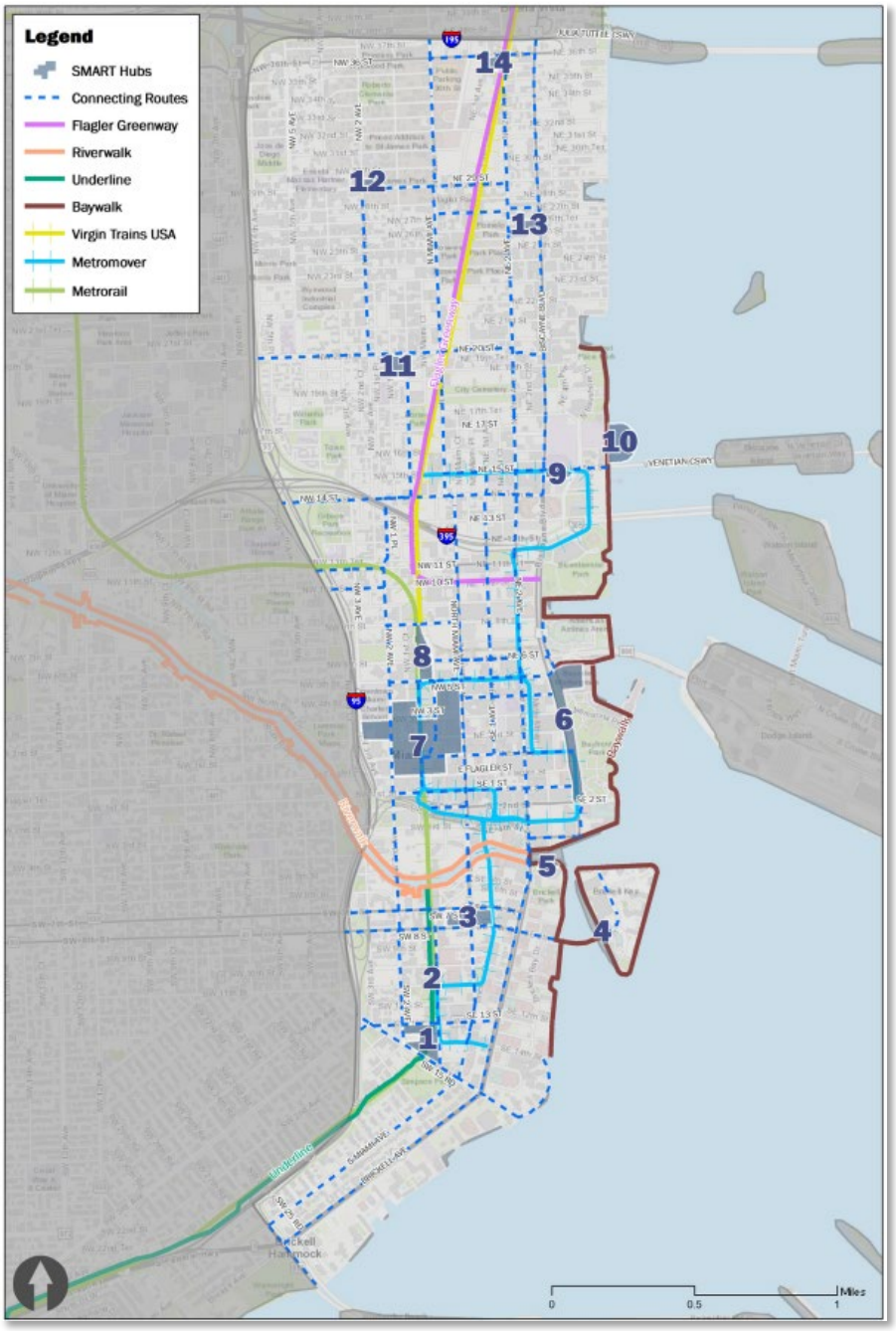
Bayfront Park Hub (6) is proposed with curb space that adapts to changing needs, including space for microtransit, TNCs, carshare parking, mobile vendors, parklets, and loading while providing clear access to pedestrians.

Government Center Hub (7) combines a destination hub with access to housing, employment, and cultural centers and a transit access hub to various mobility modes.

Miami Central Hub (8) is a significant regional mobility hub connecting the tri-county metropolitan area.

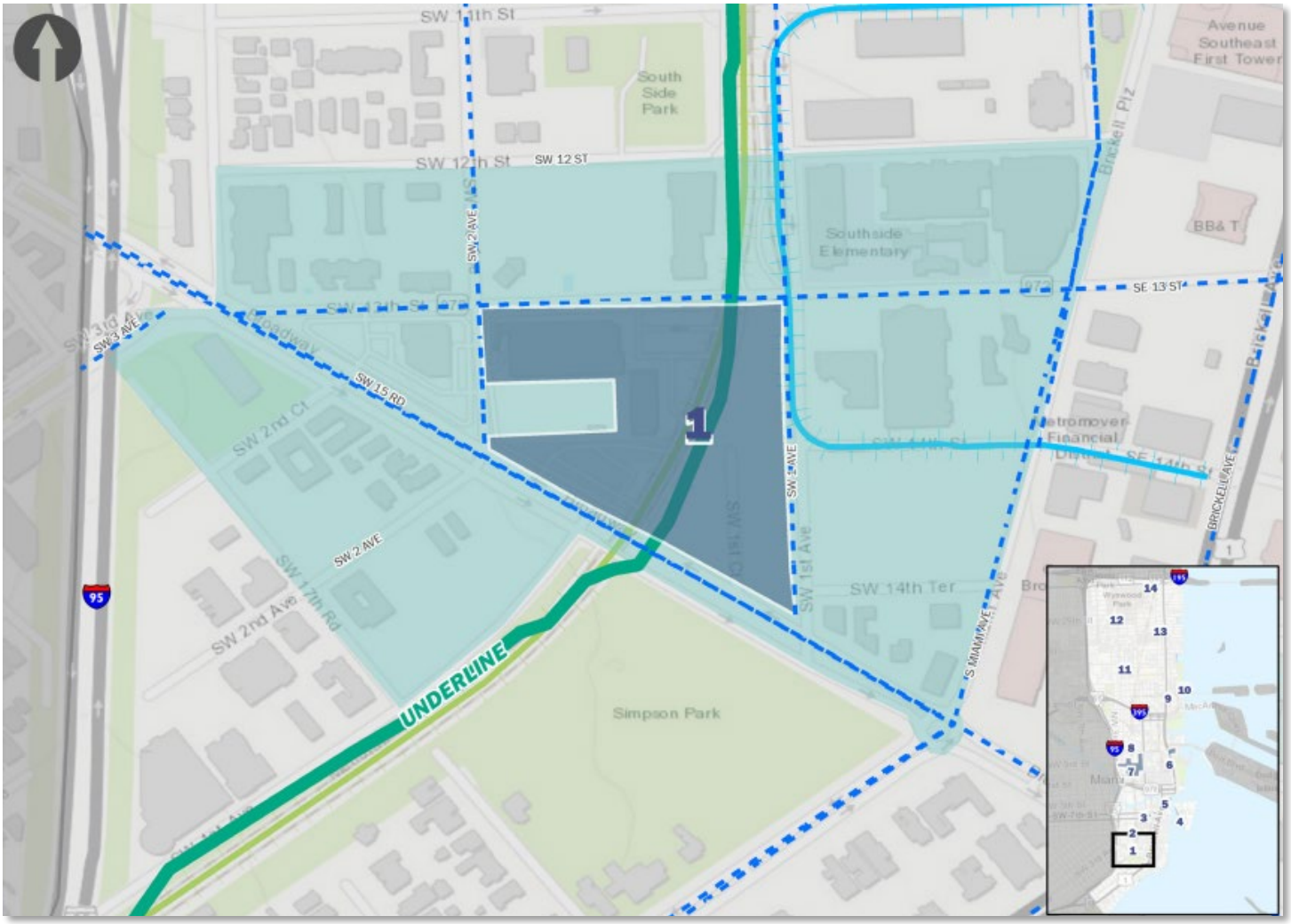
Sea Isle Marina Hub (10) is a water transit hub for a potential connection with waterborne transportation.

NW 20th Street (11), NW 29th Street (12), and Edgewater (13) are envisioned as hubs that provide access to microtransit, such as community shuttles and on-demand TNC services for ride-hailing providers.



Map 2. Map illustrating Smart Hub Networks in the study area.

THE UNDERLINE HUB: This location aims to create a mixed-use hub that functions as a focal point for the community and supports all modes of transportation, focusing on active travel. Despite being close to the urban core, surrounding areas, primarily residential single-family homes, have higher vehicle miles traveled (VMT) rates than other nearby areas. This hub, highlighted in Map 3, caters to active micromobility uses for commuting and recreational trips. This site improves first- and last-mile connections to public transit, including Metrorail.



Map 3. The Underline Hub prioritizes active mobility services.

The hub envisions a multi-story residential community featuring commercial development on the ground floor and improving connectivity with various land uses. Design flexibility along the curbside is a crucial element for this hub. Instead of restricting this space to one or no use, recommendations include using temporary materials to define uses that accommodate the different community needs throughout the day and night. For example, spaces can transform into loading areas during the day and a parklet at night or during special events. Elements of shared mobility, such as carshare parking or a TNC pick-up/drop-off zone, are also recommended for curb use considerations.

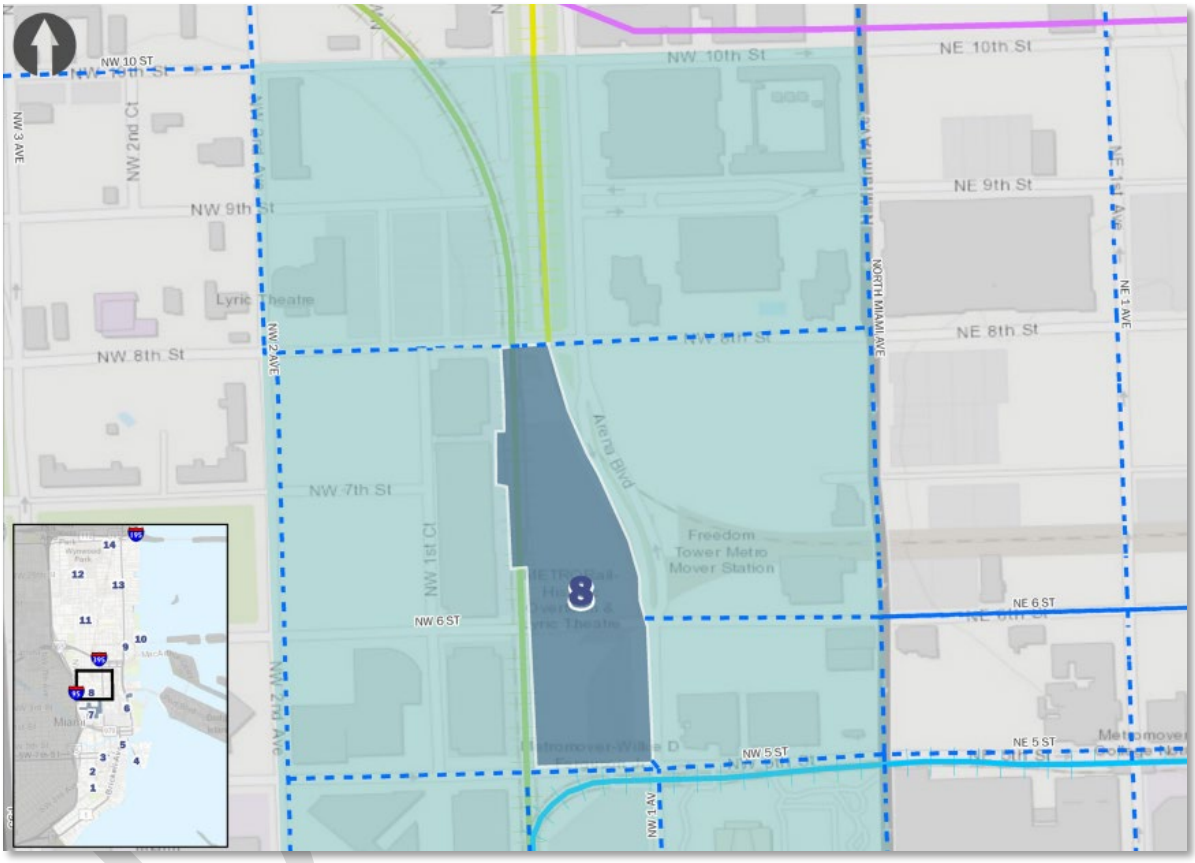
RECOMMENDATIONS

Recommended design elements for an **ACTIVE MOBILITY HUB** include:

- Wayfinding - launching a unique and comprehensive wayfinding system is recommended for the entire study area, including The Underline Hub. This location should feature signs and kiosks displaying real-time travel and destination information.
- Bicycle/Rolling Lanes - active travel will be central to this development; therefore, all supportive facilities to enable users must be provided.
- Micromobility - including micromobility options within the design of the space capitalizes on existing popular trends to further advance nonmotorized mobility in the area.
- Bicycle/E-scooter Parking - end-of-trip facilities are necessary to promote active travel and micromobility as viable mobility options. Providing safe and secure bicycle parking invites residents and visitors to choose this mode for completing nearby trips.
- Carsharing - carsharing coordinated with Curbside Management.
- Enhanced Crosswalks - should be placed at all intersections and mid-block crossings.
- Traffic Control Elements - pedestrian signalization is recommended at significant crossing points.
- Pedestrian-Friendly Designs - close the missing sidewalk gaps within the hub core area to form a continuous pedestrian path network.
- Open Plaza - adequate siting, shade trees, local art, and pedestrian-scale lighting are some of the necessary features to be incorporated.
- Mixed-Use Hub-Oriented Development (HOD) - The Underline Hub must bring together all elements of a TOD to enable urban living where people can live, work, learn, and play while having various mobility options.

MiamiCentral Hub: this hub plays a vital role in regional mobility in South Florida. The station's development aligns with Smart Growth and Transit-Oriented Development (TOD) principles. However, mobility improvements within the core area of the hub are needed to support sustainable growth, encourage active travel as a viable first—and last-mile option, and reduce the risk of injuries and fatalities. Creating a walkable built environment that attracts pedestrians and bicyclists is a priority for this hub. The boundaries of the MiamiCentral hub are shown in Map 4.

Map 4. Map of MiamiCentral Hub, which emphasizes regional mobility.



RECOMMENDATIONS

Recommended design elements for a **REGIONAL MOBILITY HUB** include:

- Wayfinding – a comprehensive wayfinding system is recommended for the entire study area. This hub must orient travelers to destinations and inform them of all the available mobility and transit options. Specific recommendations include signage in highly visible areas and wayfinding kiosks that display real-time travel information for transit services and approximate walking times to prominent destinations.
- Bicycle Lanes - bicyclists were noted as one of the most disadvantaged users at this site, with limited or no facilities providing a direct connection to the station. Designated bicycle lanes are recommended throughout the hub core area.
- Secure Bicycle Parking—Proper end-of-trip supporting facilities for bicyclists, including bike parking and repair services, are also recommended.
- Bicycle Counter—A visible bicycle counter tracking how many bicyclists travel through the designated lanes can encourage cycling, alert drivers of the presence of bicyclists, and provide data to assess needs.

- Micromobility—bike sharing and e-scooter rental are widely available and used throughout the area. Proper facilities ensure that the demand for micromobility is met proactively, reducing conflicts between modes and potential injuries.
- Enhanced Crossings—Raised and textured intersections are recommended at this hub as a traffic calming measure for improved walkability and safety. Considering the multimodal nature of the area, enhanced crossings are recommended at all intersections within the hub core area.
- Curbside Management – areas targeted along NW 6 Street and NW 1 Avenue.
- Ride and Carsharing - shared mobility should be promoted at the hub.
- Autonomous Vehicle Infrastructure - fiber optic cable coverage should be prioritized throughout the hub to enable intelligent transportation system solutions.
- Open Plaza – a plaza is recommended at the vacant governmental lots across Miami Central on NW 1 Avenue to provide a public realm feature that ties together all other pedestrian-friendly design elements.

EMERGING TECHNOLOGIES FOR MOBILITY HUBS

The following emerging technologies identified through the research can be implemented to support mobility hubs.

Figure 63. Universal charge station for e-mobility vehicles.

Battery-as-a-Service (BaaS): Battery-as-a-Service (BaaS) for micromobility electric vehicles is a subscription-based model that separates the cost of the battery from the vehicle. Subscribers can access swap stations where depleted batteries can be exchanged for fully charged ones, improving convenience and reducing downtime. This approach reduces initial costs for micromobility EVs, addresses charging accessibility challenges, promotes battery recycling, and overcomes issues related to the lack of standardization across manufacturers.

Universal Charging Station: Pictured in Figure 64, universal charging stations offer the municipality and e-mobility users a way to help organize public space, lower operation costs, and provide a simple, secure universal charge station. They are installed at locations similar to bike-share docking stations. They are adaptable solutions that can be plugged into advertising boards, bus stations, and street lighting to provide a power source.

Bicycle Lane Rumble Strips: a curb management strategy to reduce conflicts between high pedestrian activity areas and bike lanes. In NYC, the DOT fitted specific bicycle lanes with rumble strips and enhanced markings to improve conflicts at residential buildings and hotel entrances, where a pedestrian would have to walk through a bike lane to access taxis or rideshare services. An example is provided in Figure 65. These areas have resulted in many issues, with damage to property and injuries to cyclists and pedestrians. In addition to these features, hotels post signs alerting guests, and the DOT

Figure 64. NYC bicycle lane equipped with rumble strips, enhanced pavement markings, and signage.

provides an education campaign to cyclists on blocks with hotels to watch out for pedestrian activity.

Smart Parking Meters: Smart parking meters are designed to work with parking apps, street sensors, and mounted cameras. Cameras survey and monitor street parking availability and automate agency parking services operations, making self-parking easier for drivers. The installation cost can be reasonable when installing a single camera for a wide-area parking lot. Each smart meter installed can cost between $250 and $500, depending on the model. A provider is selected to administer innovative parking services, and they may assist in installing infrastructure to enhance their product. Businesses may also wish to contribute.

Geofencing: Geofencing is a location-based technology that creates virtual boundaries, enabling specific actions when a device, such as an e-scooter or e-bike, enters or exits designated areas. In micromobility, geofencing is commonly used to regulate and improve parking practices, restrict usage in certain zones, and contribute to overall urban mobility management. It encourages responsible behavior among riders and can be complemented by physical infrastructure, such as designated parking zones, for more effective and comprehensive micromobility solutions. Figure 66 shows how the City of Boulder, Colorado, uses geofencing to create corralling stations for e-scooters.

Figure 65. Geofencing technology used for e-scooter parking in Boulder, Colorado.

Micromobility Storage At High-Demand Stations: Improved security for bike racks is essential for commuters who park their bikes at the same station daily. As micromobility continues to evolve, storage options must also expand. Storage and parking solutions should not be limited to bike racks alone; they should accommodate all micromobility devices, including adaptive mobile devices, electric scooters, and bicycles. While bicycles remain the primary micromobility device, transportation, and mobility hubs should be equipped with storage lockers, pods, and other multi-device storage options.

In Los Angeles, California, an on-demand electronic locker rental system has been implemented, allowing users to rent lockers daily and pay only for the needed days. These lockers are fully enclosed and large enough to accommodate larger cargo bikes. In Jersey City, New Jersey, micromobility vehicle storage pods are available 24/7 and free of charge. The walk-in pods, seen in Figure 67, cost approximately $80,000, but costs are offset by revenue earned through advertising. Users must register with an online account or download the mobile app. A three-day parking limit during peak times ensures space is available for all regular users.

Figure 66. Micromobility vehicle storage pod in Jersey City.

Scooter Sidewalk Riding Detection Technology: Scooter sidewalk riding is illegal in many parts of the U.S., including Florida, as it poses significant risks to pedestrians, especially older adults and persons with disabilities. Cities can address this problem in the long term by building bike lanes or creating scooter parking bays. However, until these solutions are implemented, operators can use technology to mitigate the issue. One such solution is sidewalk riding detection technology, which uses GPS to detect when a scooter is ridden on a sidewalk in real time. Once detected, the scooter automatically slows to a safer speed. This technology is akin to advanced driver assistance systems (ADAS) found in cars, where radar sensors assist in critical situations to avoid accidents and reduce collisions.

Adaptive Micromobility: Adaptive bike share programs have emerged as a promising solution to address the mobility challenges faced by people with disabilities and older adults, enhancing their independence and participation in physical and social activities. These individuals often lack sufficient transportation options, hindering their desired level of mobility.

Adaptive cycles, including trikes, hand cycles, and recumbents, offer accessible alternatives for those who struggle with standard bicycles or require assistance.

Figure 67. Detroit nonprofit MoGo offers adaptive micromobility devices.

Two models of adaptive bike share programs include a bike/trike library and integration into existing bike share systems. In the bike/trike library model, users pick up and return cycles at specific locations, benefiting from staff assistance and storage. Examples of this model include Portland's BIKETOWN and Detroit's MoGo. Figure 68 shows a sample of vehicles provided by MoGo, including recumbents, trikes, and hand-powered cycles. The other model integrates adaptive bikes into existing docked or dockless bike share systems, providing a familiar and efficient transportation solution. Milwaukee's Bublr Bikes, which incorporated adaptive bikes in 2019, exemplifies this approach.

Challenges such as cost, resource constraints, bicycle types, program implementation, and infrastructure pose obstacles to adopting adaptive bike share programs. Despite these challenges, the potential benefits for individuals with limited mobility make adaptive bike share a valuable area of exploration for creating inclusive and accessible transportation systems.

Interactive Kiosk: Kiosks offer a range of services, including providing information about bus departures, route details, trip planning, and advertising. The software integrated into these kiosks can track individual interactions, such as users' most frequent requests and session durations while collecting data on traffic and pedestrian travel patterns.

Strategic placement of kiosks in heavily trafficked areas, public spaces, and transit stops maximizes effectiveness. Implementing these kiosks requires personalized software support and ongoing maintenance to ensure smooth operation.

In-Ground Parking Sensors: Along with hardware, parking meters, signage, and pricing algorithms, in-ground sensors have helped reduce traffic congestion and improve driver satisfaction. By integrating technology with demand-based pricing, city officials in Los Angeles sought to change driver behavior and balance demand by making 10-30% of the parking spaces on each block available throughout the day. Ensuring availability reduces congestion and pollution, shortens travel times, and encourages the use of alternative forms of transportation.

Figure 68. An in-ground parking sensor installed on a public parking space.

Results from the LA trial of the program from 2016 to 2021 indicate that the use of this technology led to faster circulation of traffic, with a 37% reduction in parking duration, up to a 10% increase in parking availability in some areas, and a 16% increase in parking revenues. However, the installation cost is a drawback, as it is relatively high compared to other Smart Parking

technologies because one sensor is needed per parking space. Figure 69 shows an in-ground parking sensor for a public parking space.

Smart Communications Network: A new communications network has replaced pay phones across New York City, offering fast and free public Wi-Fi within a 750-foot radius of each kiosk. These structures also provide USB charging capabilities and feature a tablet for making phone calls and accessing city services, maps, and directions. An example is provided in Figure 70. Accessibility features such as TalkBack, HearingLoop, and Video Relay Service are available for visually and hearing-impaired individuals. Additionally, the kiosks can display public service announcements, local information, and transit schedules.

Figure 69. Communication networks providing free Wi-Fi, charging, and phone call capabilities.

The installation cost of these Smart Kiosks can exceed $30,000 per unit, but advertising opportunities are utilized to generate revenue and offset expenses. They are strategically placed in areas with high foot traffic, public spaces, and near transit stops.

Micromobility: Micromobility options are affordable, low-emission alternatives to driving and come in various forms, as seen in Figure 71. They are often intended for short trips, such as "first—and last-mile" transportation. They can be individually owned or accessed through shared fleets. According to a report by the National Association of City Transportation Officials (NACTO), users completed 136 million trips in 2019 on shared micromobility systems.

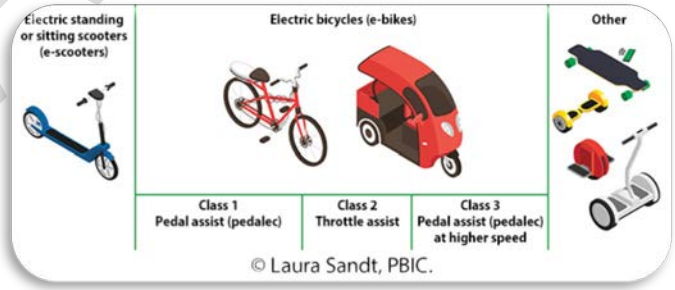


Figure 70. Micromobility devices.

Battery Exchange Stations: As part of the "Charge Safe, Ride Safe" initiative in New York, the city is introducing exchange stations for micromobility batteries to promote the safe charging of electric bicycles and prevent battery fires. This initiative aims to increase the safety of delivery drivers by improving the charging infrastructure. With the rise in e-bike usage among delivery drivers in NYC, the number of battery fires also surged from 40 in 2020 to 220 incidents in 2022. Four battery-swapping stations were installed in New York City to provide e-bike delivery workers and other users

Figure 71. Electric micromobility battery exchange station in NYC.

with safe and reliable charging options. An example of a battery exchange station in NYC is shown in Figure 72.

Wireless Charging for e-Mobility: The wireless inductive charging system for e-bikes simplifies charging by parking the bike. It comprises a weatherproof in-ground "charging tile" connected to the electrical grid and a kickstand hard-wired to the bike's battery. When the bike is parked on the tile, inductive coils transfer electrical current to the battery. The tile is installed like regular pavement tile and requires no specialized equipment. This technology is designed for e-bike rental fleets and ensures that bikes are always charged and ready. Figure 73 shows the technology in work.

Figure 72. E-bikes charging wirelessly

Street Legal Electric Micro Cars: Although resembling cars, they are legally classified as low-speed vehicles (LSVs) by the National Highway Traffic Safety Administration. LSVs have fewer regulatory requirements than traditional cars and can travel up to 25 mph (40 km/h). They are permitted on roads with posted speed limits up to 35 mph (56 km/h) as long as they meet specific safety and manufacturing regulations. These vehicles offer a cost-effective transportation solution, with prices typically around $9,000. A car-sharing scheme can be considered using these vehicles at mobility hubs. An example of a microcar in NYC is shown in Figure 74.

Figure 73. Micro car parked between two conventional cars in NYC.

CONNECTED AUTONOMOUS VEHICLE STRATEGIC PLAN

The Connected Autonomous Vehicle Strategic Plan (2023) explores the impact of Connected and Automated Vehicles (CAVs) on transportation in Miami-Dade County. It outlines the strategic planning efforts of the Miami-Dade Transportation Planning Organization (TPO) and Miami-Dade County for more multimodal transportation systems. CAV technologies are seen as transformative, with potential benefits including improved safety, increased efficiency, and reduced congestion. However, some challenges may be expected, such as data security and increased miles traveled by single-occupancy vehicles. Through the SMART Program, the Miami-Dade TPO is actively planning a multimodal transportation system, focusing on transit and transit-oriented communities (TOCs) along designated corridors. The plan considers various technologies beyond CAVs, such as electric vehicles, telework, and mobility-as-a-service (MaaS). It suggests creating a SMART CAV Concept of Integrated Operations (CIO) to coordinate the planning and operations of the multimodal network.

The study differentiates between connected vehicles (CVs) and automated vehicles (AVs) and highlights the importance of CV connectivity for realizing the full potential of AVs. AVs span a spectrum of automation levels, ranging from no automation, where the driver handles all driving tasks, to full automation, where the vehicle can autonomously perform all driving functions under any condition, with the option for manual control by the driver. In contrast, CVs utilize technology to communicate and connect with other vehicle-to-vehicle networks, eliminating the need for human presence onboard. Figure 75 presents a diagram of the vehicle communications network at work.

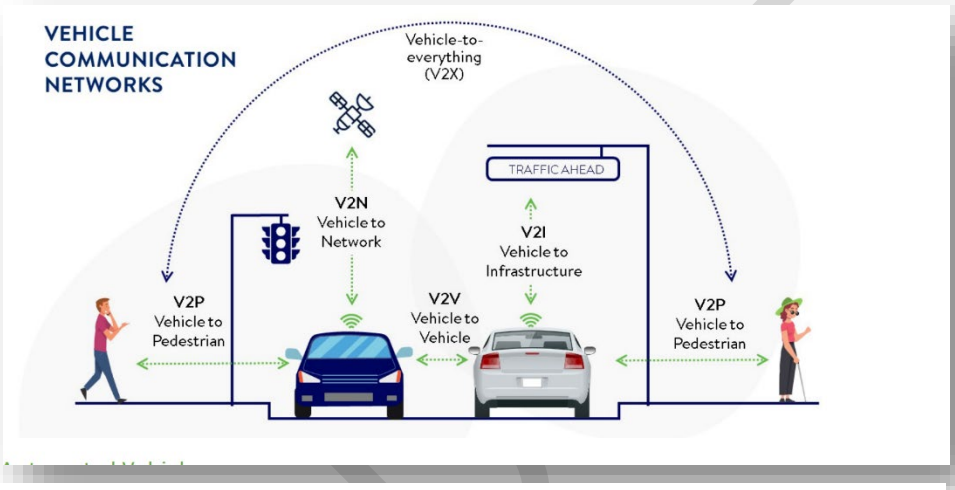


Figure 74. Connected vehicle communication networks.

Emerging technologies such as urban air mobility (UAM) and personal rapid transit (PRT) are recognized for their potential to transform transportation systems significantly. The study delves into four scenarios—Trends, Smart Cars & Roads, Smart Transit, and Smart Infrastructure Networks—with key findings advocating for using technologies to improve multimodal transportation systems. Two critical areas for future focus have been pinpointed: Multimodal Technology and Integrated Management and Operation, derived from insights gleaned from the pilot studies.

The SMART CAV Concept of Integrated Operations (CIO) framework was crafted to integrate and harness CAV technologies alongside other travel technologies, employing short--, mid-, and long-term strategies. The plan advocates for a comprehensive approach to planning for and leveraging CAV and related technologies to optimize multimodal travel and adapt to the changing transportation landscape in Miami-Dade County.

EMERGING TECHNOLOGIES FOR AUTONOMOUS VEHICLES

The following emerging technologies, identified through research, can be implemented to support connected and autonomous vehicle technology within the study area.

Autonomous Shuttle/Taxis/Ride-Hail Network Vehicles: Self-driving electric vehicles promise to address first-mile/last-mile transportation challenges. However, it's crucial to emphasize that expanding robotaxis into mixed traffic should be incremental. In California, where the technology is operational, the vast majority of collisions involving an autonomous vehicle were not the robotaxi's fault, and no human injuries or property damage were reported in 90% of the collisions that occurred while the AV was in self-driving mode.

In Miami-Dade County, efforts to introduce the technology are being led by the Department of Transportation and Public Works (DTPW), which is testing a low-speed, automated vehicle (AV) shuttle within Zoo Miami starting in September 2022. This initiative aims to introduce the public to autonomous vehicle technology in a controlled environment.

Figure 75. Autonomous high-capacity mobility vehicles.

Technology for autonomous vehicles has advanced to provide a fully automated, on-demand ride experience similar to a personal private car at public transportation fare. High-capacity mobility systems utilizing autonomous personal cars moving in dedicated lanes, as depicted in Figure 76, can accommodate up to 10,000 passengers per hour and require significantly less capital expenditure, nearly 95% less than traditional mass transit systems. Operating costs are kept low, averaging $0.025 per passenger mile traveled, with zero greenhouse gas emissions. These systems prioritize inclusivity and are fully ADA-compliant, ensuring comfortable accommodation for passengers, including those using wheelchairs. With Continuous Flow technology, operating autonomously in dedicated lanes, they transport up to four passengers directly to their destinations without stops, resulting in travel times that are, on average, one-third shorter than alternatives.

Since 2023, autonomous taxis have been in commercial operation for driverless passenger transportation in San Francisco, enabling fare charging at any time.

Smart Street Sweepers: Smart Street Sweepers utilize sophisticated technology, including lidars, cameras, mm-wave radars to access CV technology networks, Global Navigation Satellite System, and antennas to achieve a comprehensive 360° coverage of their surrounding environment. With autonomous level 5 certification, these vehicles boast unparalleled capabilities. They operate with minimal noise pollution, enabling 24-hour use without disrupting residents. Moreover, their accurate and efficient recognition algorithms allow them to simultaneously track all objects in sight, ensuring thorough and efficient street cleaning. This advanced technology enhances the effectiveness of street sweeping operations and contributes to increased safety and cleanliness in urban environments.

Road Defect Detection System: The AI-powered road defect detection system utilized by Dubai RTA patrol cars employs laser technology capable of detecting cracks as small as 1 millimeter. This system scans motorways to identify defects and prioritize repairs, promptly alerting maintenance teams to take action. By addressing issues swiftly, the system aims to reduce accident risks and ensure the reliability of the transport network. The device, capable of identifying up to 13 types of defects, is mounted on patrol vehicles and has been used to create a highly accurate virtual map of Dubai's roads. This proactive approach seeks to extend road infrastructure lifespan and decrease maintenance costs, benefiting motorists and enhancing overall road quality.

Advanced Traffic Management (ATM) System: ATM Systems integrate technology to improve vehicle traffic flow and safety. A map of updates for this system within the study area is shown in Figure 77. In Miami-Dade County, the Department of Transportation and Public Works' Traffic Signals & Signs Division is implementing an ATMS to enhance mobility for commuters, transit users, pedestrians, and cyclists. This involves upgrading infrastructure by replacing outdated traffic signal controllers and installing new detection devices at approximately 3,000 signalized intersections. The ATMS will gather high-resolution data on vehicle location, speed, and turning movements to inform maintenance and operations decisions. It aims to optimize traffic signal performance, accommodate various transportation modes, and support innovative city initiatives by enabling two-way communication between vehicles and traffic signals. The project commenced in March 2021 and is expected to be completed within seven years, with an estimated cost of approximately $160 million.

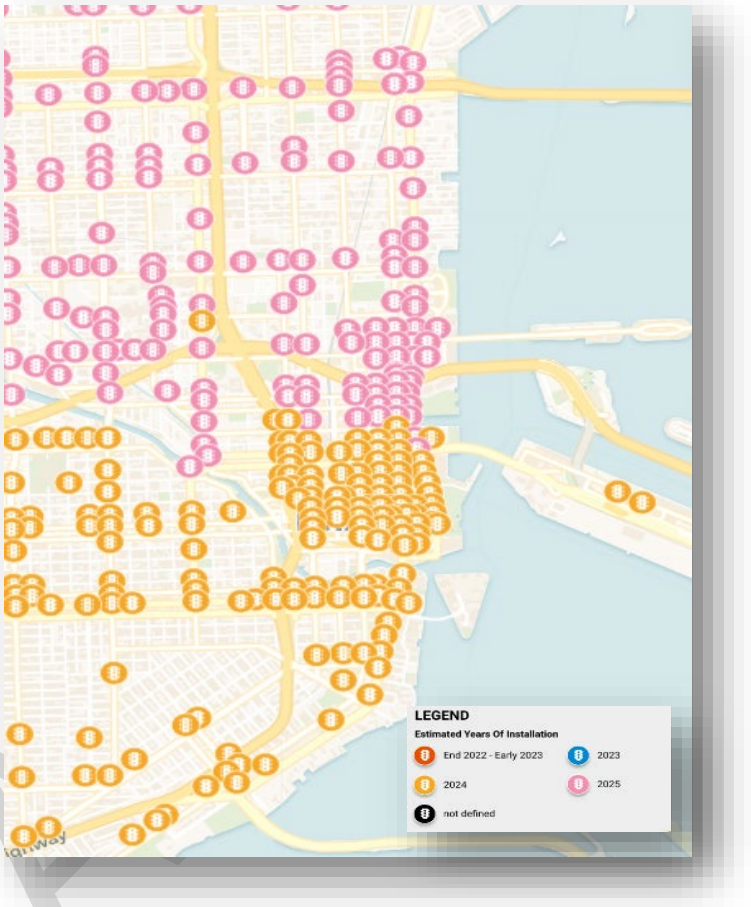


Figure 76. Location of signals with ATMS technoolgy in the study area.

MIAMI-DADE TPO CLIMATE RESILIENCY STUDY

In the summer of 2023, the Miami-Dade Transportation Planning Organization conducted a comprehensive Climate Resiliency Study to address the past, current, and future initiatives in South Florida that plan to combat the shocks and stressors associated with climate change. This study compiled existing resiliency efforts, local, state, and federal government strategies, and best practices from national and international efforts to help aid the resiliency and reliability of the transportation network by evaluating vulnerabilities and critical infrastructure for climate change-induced effects.

Improvements to pedestrian and bicyclist facilities and connectivity are highlighted throughout the study, emphasizing the current lack of safe pedestrian and bicycle systems. The existing conditions report concluded that "the TPO should encourage the alteration of existing roadway infrastructure and future construction projects to provide accommodations for micromobility options such as bicycles and scooters, and pedestrian travel" (Climate Resiliency Study, 2023).

The study included the following recommendations for micromobility and pedestrian improvements:

- Funding should be allocated toward acquiring additional right-of-way (ROW) for future sidewalks, bike lanes, and other mobility infrastructure.
- Initiate projects that improve neighborhood walkability, including changes through land use. Walkable neighborhoods may include quality footpaths, safety barriers, and complete streets that provide pedestrians with safe transportation options.
- Improve multimodal safety through additional bike lanes and other safety buffers to encourage increased usage of alternative forms of transportation.
- Continue to support alternative fuels micromobility services such as electric scooters, electric bikes, and Freebee.

EMERGING TECHNOLOGIES FOR RESILIENCY AND REDUCED CARBON EMISSIONS

The following emerging technologies have been identified as enhancing resiliency and reducing carbon emissions in the study area.

Sustainable Bus Shelters: Today, bus shelter facilities incorporate eco-friendly elements such as recycled plastics, sustainable wood, and energy-efficient lighting systems. Integrating solar panels to power lighting and digital displays reduces the shelters' carbon footprint and energy usage. In NYC, the Mass Transit Authority introduced the city's first Solar-Powered Bus Stop during a pilot program in 2016. The stop, seen in Figure 78, was chosen due to a pedestrian fatality and complaints stemming back to 2009 of poor lighting conditions. Shelters can be designed to include USB charging outlets, motion sensors to conserve battery power, and high-intensity LED lighting.

Figure 77. NYC's first solar powered bus shelter installed in 2016.

Another emerging trend in bus shelter designs is the integration of green spaces and urban vegetation. Living green walls, vertical gardens, and rooftop planters are incorporated into shelter designs to enhance aesthetics, improve air quality, and provide natural shade. These green elements contribute to a healthier and more sustainable urban environment while creating inviting spaces for commuters to rest and relax. Notably, a green roof on a bus shelter in Utrecht, Netherlands, is shown in Figure 79. Over 316 bus stops have been converted to "bee stops" with the adoption of green roofs. This strategy is part of the Dutch nation's economy to be completely circular by 2050. A circular economy practices sustainable, renewable raw materials used repeatedly wherever possible. Products and materials are designed for circularity, reused, repaired, and refurbished, resulting in minimal waste production.

Figure 78. Netherlands' bee stops featuring living plants on the roof of bus shelters.

Figure 79. Bourke Street bioswale and cycling improvements.

Dedicated and Protected Bike Lanes: Creating dedicated bike lanes, separated from vehicular traffic by physical barriers, painted lines, or flexible posts, provides cyclists with safe and marked paths. One notable example of this approach is found in the city of Sydney, Australia. Sydney implemented a comprehensive program of cycling improvements as part of its 2030 master plan. Bourke Street, one of Sydney's pioneering cycleway projects, features a raised curb with a wide bioswale, serving as a protective barrier that separates two-way bike lanes from vehicular traffic. A picture is provided in Figure 80. Despite reducing travel lanes, the city experienced decreased congestion on roads and public transportation systems. This transformation also reduced emissions from fewer vehicles and enhanced particulate matter filtration, alongside carbon dioxide sequestration, facilitated by introducing new greenways.

Solar Umbrella Canopies: Many cities worldwide, such as Coral Gables, Florida, and Lisbon, Portugal, have embraced "umbrella skies" as an artificial shading technique to combat excessive urban heat while enhancing placemaking through art. However, the threat of hurricanes renders traditional umbrella canopies unsuitable for year-round installation.

As an alternative, innovative designs for solar-powered umbrellas are emerging to meet the demand for sustainable power, enhanced pedestrian comfort, and urban beautification. These solar umbrellas, exemplified in Figure 81, offer pedestrians shaded areas to seek relief from the heat while harnessing energy to power nearby streetlights or traffic signals.

Figure 80. Solar umbrella rendering.

Solar Sidewalks: Solar panels can be integrated into existing walkway surfaces, with advancements extending this technology to parking surfaces and roadways. However, the cost is substantial, averaging around $450 per square meter.

In Tampa, Florida, solar sidewalks represent a significant innovation. They can power major traffic signals at intersections, preventing outages during storms. Notably, one such sidewalk is installed at the East Cass Street and North Jefferson Street intersection, shown in Figure 82. Here, the traffic lights are powered by solar energy from the sidewalk. Comprising 84 solar panels, this sidewalk produces about 75% of the power needed to keep the lights on at this intersection. Additionally, with a battery bank, demonstrated in Figure 83, the lights can remain operational for several days during a power outage.

Figure 81. Solar panel technology installed on sidewalk in Tampa, Florida.

Figure 82. Solar sidewalk battery pack to store energy for power outage events.

Digital Technologies for Flood Prediction: Digital technologies play a vital role in flood prediction, prevention, and risk management. Real-time data, advanced predictive models, and early warning systems are essential for authorities and managing entities to anticipate flood events and implement effective solutions. To further protect communities from floods and enhance resiliency, the White House launched a new website and mapping tool in April 2024, shown in Figure 84. This tool allows users to search for an address to determine if it is in a high flood-risk area. The Federal Flood Standard Support Website and Tool assist users in implementing the Federal Flood Risk Management Standard (FFRMS), which applies to projects involving federal funds for new construction, substantial improvements, or repairs to address significant damage. These projects may include critical infrastructure, affordable housing developments, renewable energy initiatives, or broadband internet projects. The tool aids users in determining if their projects will be located within areas at increased risk of flooding, thereby supporting informed decision-making when seeking federal funding.

Figure 83. In April 2024, the White House introduced the Federal Flood Standard Support Tool.

Flood Infrastructure: Flood control infrastructure can take many forms, such as the example depicted in Figure 85, where a skate park facility in a park redirects stormwater to collection areas. Other methods for managing stormwater runoff include bioswales, landscaped extended swales, and utilizing permeable materials for surfaces.

Figure 84. Skate park facility redirects stormwater to collection areas

Figure 85. South Korea's solar-powered bike path.

Solar Infrastructure: In Sejong, South Korea, mobility infrastructure integrates a five-and-a-half-mile bike path within the median of an eight-lane highway. An image is provided in Figure 86. This path is distinct for its integration of solar panels, illuminating the streets below. Designed initially to harness clean energy and offer recreational space, the eco-friendly cycle lane connects Daejeon to Sejong. Featuring 7,502 solar panels installed at intervals, covering three miles of the path, they annually produce 2,200 MWh of eco-friendly electricity. This power source is utilized for streetlights and electronic displays in Sejong, which are equivalent to powering 600 households, according to South Korea's Ministry of Land, Infrastructure, and Transport.

Illuminated Bike Lanes: This technology eliminates the need for traditional lights by using tiny, eco-friendly glow-in-the-dark stones that absorb sunlight during the day and emit a gentle glow at night. Figure 87 shows the technology in effect. A special coating secures the glow stones and ensures durability, creating a sturdy, smooth surface for cyclists. This coating protects the rocks from wear and tear caused by traffic and weather, providing the bike lane's longevity. This approach promotes sustainability by conserving electricity and contributing to a greener environment.

Figure 86. Illuminated bike lanes using eco-friendly technology.

TRAFFIC CALMING FOR PEDESTRIANS AT MIAMI DADE COLLEGE WOLFSON CAMPUS

The Wolfson Campus of Miami Dade College (MDC) is situated in the northern segment of Downtown Miami's Central Business District (CBD) and boasts an enrollment of over 20,000 students. Given its downtown location and sprawling layout across multiple city blocks within the grid street network, many students, faculty, and staff regularly traverse streets to access educational buildings, parking facilities, and transit stations on campus. This study endeavors to formulate recommendations for implementing traffic calming measures to mitigate the negative impacts of motor vehicle usage on pedestrians in and around the Wolfson campus. These recommendations, detailed in Table 2, encompass proposed enhancements to pedestrian connections and safety at critical locations throughout the campus.

Table 2. MDC Wolfson Campus Tiered Recommendations

Issues	Tier 1 Recommendations	Tier 2 Recommendations	Tier 3 Recommendations	Tier 4 Recommendations
Focus Area A: NE 5th Street at Wolfson Garage				
 • Heavy ped volume midblock (500-600 crossing per hour during peak hours) • Significant truck traffic • 5th St is a primary route into the Port • Potential for multiple threat ped crashes with 3-lane section	Advance Yield Line "Yield Here to Pedestrians" Signs Pedestrian Crossing Warning Sign ***($900 - $1,400)***	Tier 1 Improvements, plus the following: Overhead Sign w/ Flashing Beacons Bollards w/ Automatic Detection "Walk Between Posts to Activate Flashing Crosswalk" Signs for Peds ***($17,100 - $51,700)***	Exclusive Pedestrian Signal ***($50,000 - $75,000)***	Pedestrian Bridge ***($500,000 - $3,000,000)***
Focus Area B: NE 5th Street/NE 2nd Avenue				
 • Significant pedestrian activity (450 per hour in west crosswalk during peak hours) • Vehicle view of pedestrians can be obstructed by Metromover column • 3 ped crashes (1996-2003), 1 fatality • Lighting is very poor	"Watch Turning Vehicles" Pavement Legend for Peds "Turning Traffic Must Yield to Peds" Sign Ped-Oriented Street Lighting ***($16,500 - $25,000)***	Tier 1 Improvements, plus the following: Countdown Ped Signal Indicators Curb Extension (SE corner) "Pedestrian in Crosswalk" Internally Illuminated "Smart Sign" ***($31,500 - $71,400)***		
Focus Area C: NE 2nd Avenue/NE 4th Street				
 • Very heavy ped traffic (650-1,000 crossing per hour during peak hours) • Conflicts between WB left turning vehicles & pedestrians crossing in south crosswalk • Low volume of vehicles using 4th St	Curb Extensions (NE/SE corner; W side) Zebra Crosswalk Striping ***($16,500 - $63,000)***	Tier 1 Improvements, plus the following: Countdown Ped Signal Indicators Leading Pedestrian Signal Interval ***($20,500 - $70,300)***	Pedestrian Promenade Extension Textured Pavement (2nd Ave/4th St) Countdown Ped Signal Indicators Wolfson Campus Gateway Feature ***($1,467,000 - $1,669,000)***	
Focus Area D: NE 3rd Street				
 • Heavy pedestrian activity crossing 3rd St midblock (300 per hour during peak hour) • Bldg 1 steps are angled - peds tend to cross 3rd St at this same angle	Advance Yield Line "Yield Here to Pedestrians" Signs Landscaping Planter at Bldg 1 Steps Pedestrian Railing on Bldg 1 Steps "Use Crosswalk" Signs for Peds ***($4,600 - $13,100)***	Tier 1 Improvements, plus the following: Shift MDC Parking Lot driveway west Shift Crosswalk (Curb Ramp, Zebra Crosswalk Striping) Ped-Oriented Lighting on Walkway E. of MDC Parking Lot ***($19,900 - $36,600)***	Tier 2 Improvements, plus: Raised Crosswalk ***($29,900 - $56,600)***	
Focus Area E: NE 1st Avenue				
 • Heavy pedestrian activity crossing 3rd St midblock (400 per hour during peak hour) • Midblock pedestrian crossings occur over the entire block, not at one location • Many pedestrians cut through the MDC parking lot	Pedestrian Railing on E. sidewalk along 1st Ave ***($6,250 - $8,750)***	Tier 1 Improvements, plus the following: Fencing & Landscaping along Borders of MDC Parking Lot Countdown Ped Signal Indicators (2nd & 3rd St intersections on 1st Ave) Zebra Crosswalk Striping (1st Ave/3rd St) ***($35,690 - $83,250)***		

Alternative traffic calming measures include the potential conversion of one-way streets to two-way streets. The Miami Downtown Transportation Master Plan (MDTMP) recommends converting streets in the Downtown area, including NE 1 and 2 Avenues and NE 2 and 3 Streets near the campus, from one-way to two-way. While two-way traffic requires pedestrians to be more vigilant, as they must be aware of vehicles moving in opposite directions, it raises safety concerns. Additionally, two-way traffic travels at slower speeds, enhancing pedestrian safety.

EMERGING TECHNOLOGIES FOR IMPROVED WALKABILITY

The following emerging technologies have been identified to enhance walkability in the study area.

Low-emission zones: Low-emission zones are an option for introducing traffic calming. A low-emission or car-free zone is a contiguous zone that restricts the use of polluting vehicles through priced and non-priced strategies, as shown in Figure 88. Priced LEZs restrict vehicles by charging drivers a fee to enter. Typically, higher-polluting cars pay a higher fee, while hybrid or electric vehicles pay a lower cost or enter free of charge. Non-priced LEZs restrict vehicles by banning the highest-polluting cars from entering the zone. Violators are usually charged a significant fine. Individual corridors are not considered low-emission zones because they are easy for drivers to avoid and will not spur a shift to cleaner vehicles. LEZs can generally have different sizes, pricing structures, operating models, terminology, and restrictions.

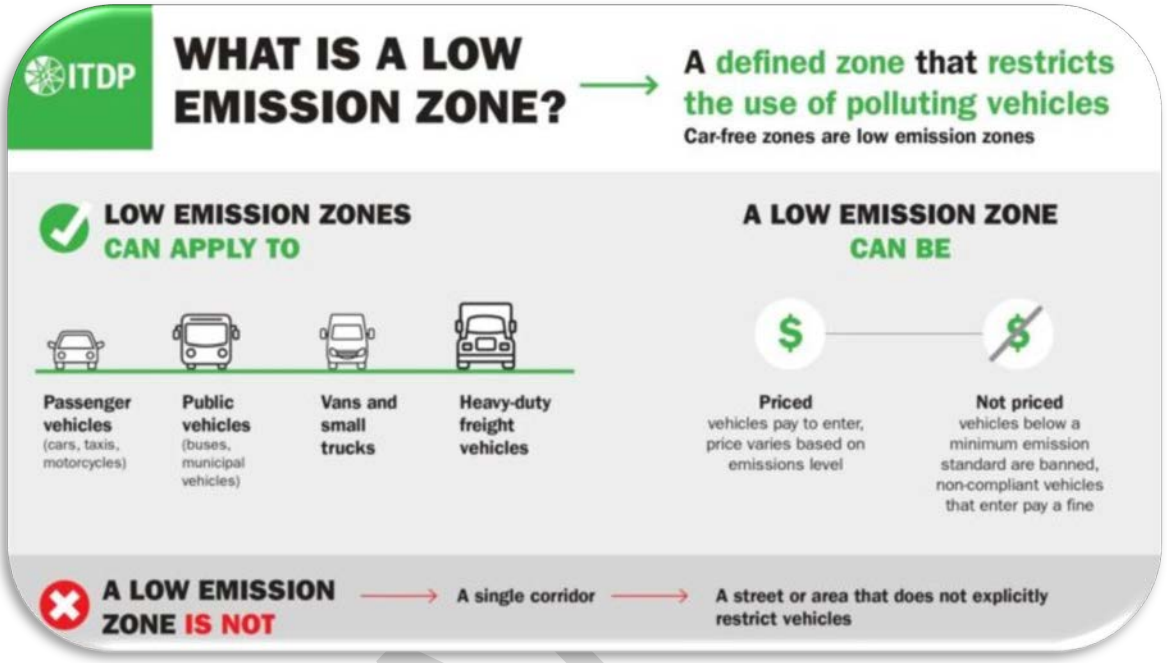


Figure 87. Diagram illustrating Low Emission Zones and their purpose.

Interactive Pedestrian Crossing: This dynamic crossing caters to all users and is tailored for the smartphone era. By utilizing cameras to track objects, the crossing adjusts its orientation, markings, and colors based on the number of people needing to cross. In high-traffic areas, especially where smartphones are prevalent, additional prompts are provided for pedestrians, drivers, and cyclists to enhance road safety.

Figure 88. Interactive pedestrian crossing in South London.

The crossing, shown in Figure 89, employs dynamic road and pavement patterns designed to catch the attention of pedestrians immersed in their phones and encourage them to focus on crossing safely. It features a non-slip, waterproof surface that ensures safety in all weather conditions. An illuminated warning pattern also activates in hazardous situations, such as when a child unexpectedly enters traffic.

Powered by cameras capable of analyzing frames 25 times per second, the system tracks the trajectory of objects or individuals, anticipating their movements. During peak hours, the crossing expands to accommodate increased foot traffic, while during quieter times, such as early hours, it seamlessly blends into the surroundings. This innovative system was trialed in South London in October 2017.

Automated Pedestrian Detection: Automated pedestrian detection devices can sense when a pedestrian is waiting at a crosswalk, triggering an automatic signal switch to initiate the pedestrian WALK phase without requiring pedestrians to press a button. Moreover, advanced devices can assess whether a pedestrian requires additional time to cross the roadway, extending the crossing interval to accommodate slower pedestrians.

Various technologies can be employed for pedestrian detection, including infrared, microwave, thermal sensors, pressure mats, and computer-assisted video. Research conducted in Florida found that the thermal machine vision system performed best, exhibiting the highest detection accuracy and the lowest false detection rate when not required.

The installation of a pedestrian hybrid signal system typically incurs costs ranging from approximately $50,000 to $120,000, depending on site conditions and equipment availability. Operational expenses are estimated to be around $4,000 per year. Integrating automated detectors into an existing pedestrian signal may range from $10,000 to $70,000 per crosswalk.

PedSafe represents an innovative pedestrian and bicycle collision avoidance system currently under development by FDOT. This system, highlighted in Figure 90, aims to enhance road safety by alerting drivers when pedestrians or cyclists are nearby. Additionally, traffic signals will be equipped to detect pedestrians crossing the road.

PedSafe will leverage advanced signal controller technology, Connect Vehicle technologies, and existing communication capabilities to reduce the occurrence of pedestrian and bicycle crashes effectively.

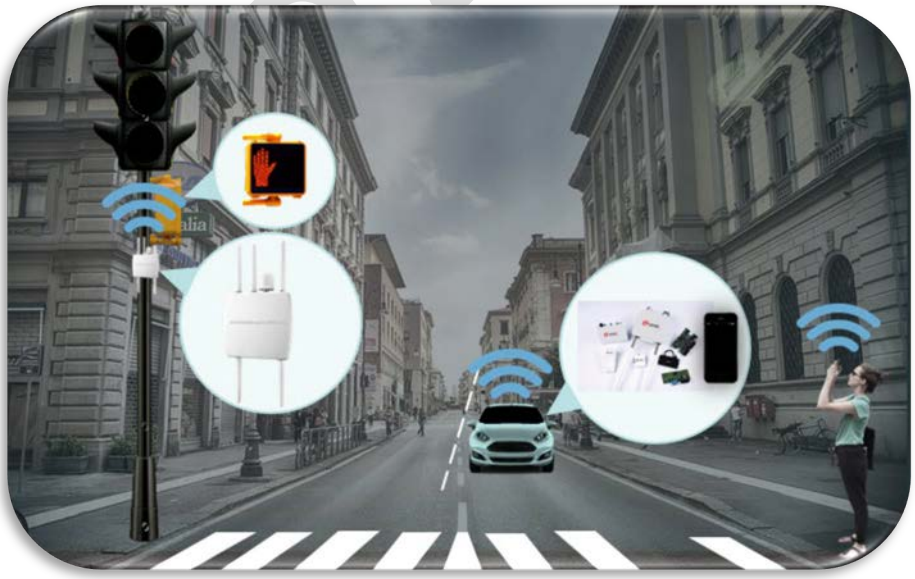


Figure 89. PedSafe: Pedestrian and Bicycle Collision Avoidance System by FDOT utilizing Connected Vehicle technology.

Animated Eye Displays: Animated or "roving" eye displays on pedestrian signals are undergoing evaluation in Las Vegas and San Francisco to assess their effectiveness in prompting pedestrians to watch for vehicles turning into the crosswalk from adjacent streets. An example is provided in Figure 91. These displays feature animated eyes that scan from side to side during the walk indication, reminding pedestrians to check for oncoming traffic. Incorporating animated eye displays into the Manual on Uniform Traffic Control Devices (MUTCD) standards signifies their potential as a standardized safety feature.

Figure 90. Roving eye technology sign.

Moreover, LED animated eyes are considered to warn motorists about crossing pedestrians. Positioned overhead before marked but unsignalized crosswalks, these displays alert drivers to pedestrian presence. Activation of the sign can occur via a pushbutton by pedestrians or automated pedestrian detection. The direction of the animated eye display—left, right, or both—is determined by the pedestrian's crossing direction. Research teams in Las Vegas and Miami are currently evaluating the efficacy of these displays in enhancing motorists' awareness of pedestrians in crosswalks.

Accessible Pedestrian Signals (APS): APS utilizes auditory tones, speech messages, and tactile feedback to assist pedestrians, particularly those with visual impairments, in safely crossing streets.

Introduced in the 1920s and becoming more prevalent by the 1970s, APS initially emitted sounds like "cuckoo/cheep" and was integrated into pedestrian crosswalks. However, their implementation sparked debate within blind communities, with the American Council of the Blind (ACS) advocating for APS installation. At the same time, the National Federation of the Blind (NFB) expressed concerns about independence.

Despite the controversy, cities like San Francisco have mandated APS installation at all new traffic signals and significant signalized intersections undergoing upgrades. Recent legal actions in Chicago and New York, including an important ruling in 2023, have compelled the installation of APS at all light-controlled traffic intersections.

APS devices range from $500 to $10,000 per unit.

Safety Reflectors: Smart reflectors can be wirelessly controlled via a mobile phone application. When a pedestrian approaches a crossing, the reflector at the location can be made to blink and alert drivers. In the future, the reflector can communicate directly with smart traffic lights or cars.

Solar-Powered In-Road Light System: These systems have been demonstrated to have an accident rate of 80 percent less than predicted for uncontrolled, unlit crosswalks. Solar-powered in-road light systems alert motorists to the presence of a pedestrian crossing or preparing to cross the street. Lights are embedded in the pavement on both sides of the crosswalk and oriented to face oncoming traffic. In-road warning lights produce a daytime-visible light focused directly in the driver's line of sight. When the pedestrian activates the system by using a push-button or through detection from an automated device, the lights begin to flash in unison, warning the motorist that a pedestrian is in the vicinity of the crosswalk ahead. The flashing


Figure 91. Solar-powered pedestrian crossing system.

LEDs shut off after a set period, or the time required for pedestrians to cross the street safely. An example is seen in Figure 92.

Video Recording: Security cameras launched in China assist law enforcement agencies in analyzing vehicle and pedestrian traffic with real-time results. Figure 93 provides a sample of the technology in action. Background footage is automatically removed while pedestrians, cars, and bicyclists are extracted and categorized in real time.

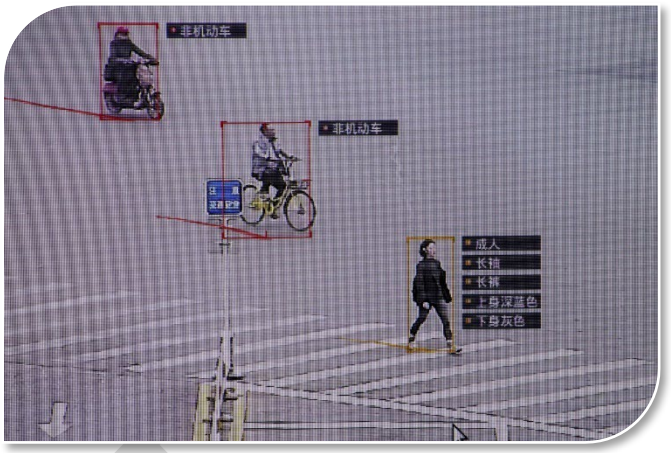


Figure 92. Video recording to enforce pedestrian safety.

RFID technology: Utilized in initiatives like Green Man+, it addresses the needs of elderly pedestrians and persons with disabilities who require more time to cross streets. Through RFID-enabled cards, users tap the card on a reader mounted above the standard push button on traffic light poles. Once verified, the system extends the green time for crossing, varying from 3 to 12 seconds based on the crossing's size.

RFID technology relies on readers detecting designated RFID cards issued to elderly and disabled pedestrians, prompting the crossing light to extend. These sensors are cost-effective to purchase and install, with associated cards incurring minimal costs. Targeted implementation areas prioritize locations with larger aging populations, identified through public input to pinpoint crosswalks most in need of extended crossing times.

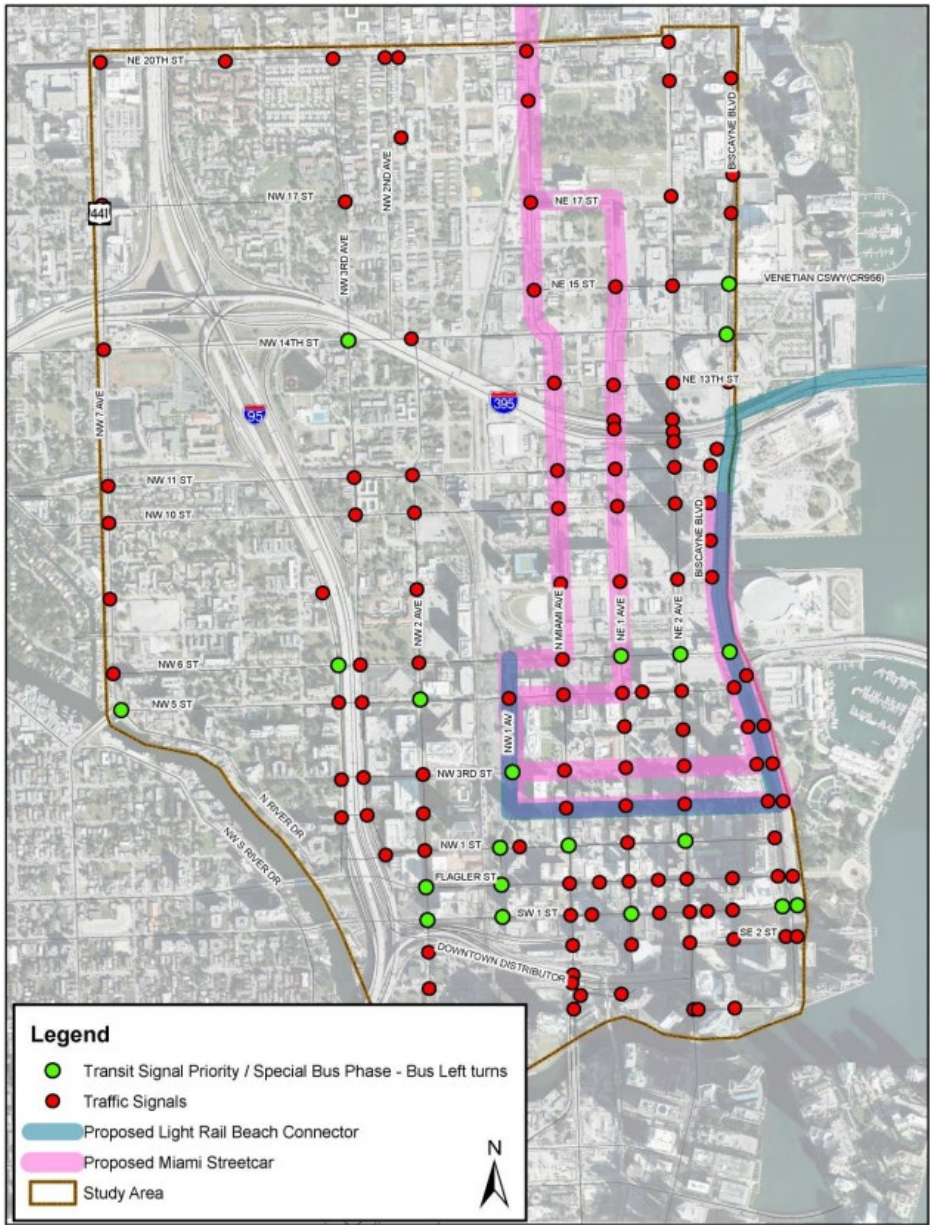
Audible Information Devices (AID): AIDs offers custom messaging with a built-in speaker and microphone, assisting visually impaired pedestrians with up to 60 seconds of pre-recorded instructions when roads and sidewalks are closed. Motion-activated recording and customizable detection range ensure efficiency, while the built-in microphone adjusts decibel levels based on surrounding noise. Compliant with MUTCD Section 6C.03 for providing audible information devices to pedestrians with visual disabilities.

HD Lighting Systems: Integrate projection technology from digital micromirror devices (DMDs) into the vehicle's headlight. A camera system captures street signs and other relevant information, then displays it on the road ahead through the car's headlights. GPS data provides additional details such as speed limits and hazards. The system can project a virtual crosswalk in stopped vehicles for pedestrian safety. Hyundai Mobis developed HD lighting technology for their cars. The technology is highlighted in Figure 94. Further research is recommended for using the technology in public transit vehicles.


Figure 93. HD lighting system technology projects street signs on road.

BUS LANES IN DOWNTOWN MIAMI

The Downtown Miami Bus Lanes Study assesses existing transportation conditions. It provides a framework for identifying and evaluating potential transit priority treatments in downtown Miami and locations where technology or infrastructure should be implemented. This includes roadway segment treatments, exclusive or semi-exclusive bus lanes and stop consolidation, and intersection treatments, such as transit signal priority (TSP), queue jumps/bus bypass lanes, and curb extension. The map below identifies traffic signals in the study area designated for transit signal priority and special phasing for bus left turn lanes. Transit Signal Priority (TSP) technology uses vehicle location and wireless communication technologies to advance or extend the green light of a traffic signal, allowing a bus to continue through an intersection. This helps to reduce travel times and ensure on-time arrivals.



Map 5. Map of downtown Miami: bus transit signal prioritization locations and transit routes.

Routes in the study area were identified based on their ability to facilitate conversion and integrate the necessary infrastructure and equipment to implement the transit signal priority technology.

- **Recommended East-West Bus Lanes -** The most significant congestion experienced by buses in the east-west direction was identified to be along NE/NW SW/SE 1 Street. A lane on SW/SE 1st Street from SW 2 Avenue to SE 1 Avenue is recommended to be designated a business access and transit lane (BAT) or bus rapid transit lane and right-turn vehicle lane during at least weekday peak periods, if not all day. On NE/NW 1st Street, providing a westbound bus rapid transit lane from NE 1st Avenue to I-95 that would mirror an eastbound BAT lane on SW/SE 1st Street is desirable; however, it will require the removal of existing parking lanes. Having BAT lanes on SW/SE and NE/NW 1 Street would facilitate BRT operations in the Flagler Street corridor west of downtown. A BAT lane was also recommended for westbound NE/NW 6 Street, from Biscayne Boulevard to west of I-95. With the construction of the PortMiami Tunnel and the diversion of some truck traffic off this street, NE/NW 6 Street was identified as having excess capacity to convert the right curb lane to a BAT lane and provide two travel lanes. This route also offers direct access to MiamiCentral and Government Center stations. Ideally, an eastbound BAT lane on NW/NE 5 Street is desirable to mirror the westbound lane on NE/NW 6 Street. However, since the study's completion in 2015, these streets are no longer viable routes since they are fitted with protected bike lanes.

- **Recommended North-South Bus Lanes -** Developing bus lanes on the north-south street system is more challenging. A potential reduction of Biscayne Boulevard to four lanes with the Biscayne Green project and the magnitude of traffic on that street suggest the corridor would be adversely impacted if a lane in one or both directions were converted to a BAT lane. This leaves the through north-south streets west of Biscayne Boulevard as potential BAT lane candidates. These include NE/SE 2 Avenue (southbound), SE/NE 1 Avenue (northbound), and Miami Avenue (southbound).

EMERGING TECHNOLOGIES FOR TRANSIT

In addition to the Transit Signal Prioritization technology identified in the study, the following emerging technologies are recommended to enhance bus and public transit use.

Transportation as a Service (TaaS): Leverages on-demand services like ride-sharing and public transit to offer flexible and cost-effective alternatives to traditional car ownership. The core idea is to optimize services using cloud-based technologies, data analytics, and machine learning. TaaS challenges the conventional notion of car ownership, advocating for a model prioritizing renting over owning. This reduces congestion and emissions in urban areas and redefines the need for extensive parking infrastructure. The emergence of self-driving cars adds a layer to TaaS, potentially reshaping the automotive industry. As the shift towards TaaS gains momentum, it's anticipated to impact traditional car sales, significantly changing consumer behavior.

Mobility as a Service (MaaS): MaaS is a comprehensive approach integrating various transportation and related services into a unified, on-demand mobility solution. MaaS simplifies the user experience by providing a single application and payment channel, eliminating the need for multiple ticketing and payment processes. MaaS operators curate a diverse menu of transportation options, including public transit, active modes such as walking and cycling, ride-sharing, car-sharing, bike-sharing, taxis, car rentals, and even combinations of these modes. This means users no longer have to locate, book, and pay for each mode of transportation separately. Instead, MaaS platforms enable individuals to plan and book door-to-door trips through a single app. These platforms consider real-time conditions across the entire transportation

network, considering all available options and the user's preferences, such as time, convenience, and cost. Additionally, MaaS streamlines the payment process, moving us toward a more user-centered and convenient approach to mobility.

Multi-Purpose Bus Posts: The AI-driven multi-purpose bus stop post, powered by solar energy, offers a versatile platform capable of displaying a wide array of information, ranging from transit schedules to advertisements and local crime or advisory alerts. Complemented by IoT sensors and onboard computers for edge computing, this infrastructure extends across the entire transport network. Transport operators and partners can access and archive real-time data collected via the bus post's open data architecture.

Similar posts, like the one in Figure 95, have been deployed in Montreal, Canada, with remarkable results. These installations have increased transit ridership and enhanced customer satisfaction and efficiency in transit operations. Through innovation and technology, these bus stop posts contribute to advancing sustainable and efficient public transportation systems.

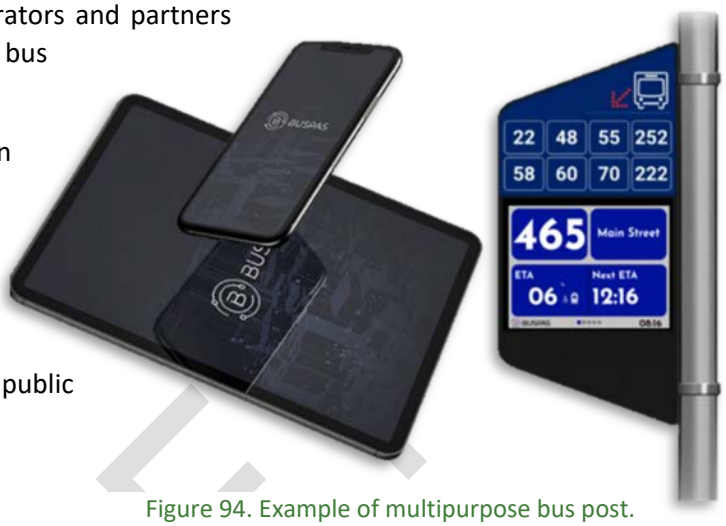


Figure 94. Example of multipurpose bus post.

Real-time Public Transit Vehicle Arrival Information System: GPS technology can provide passengers real-time bus arrival information, including waiting times and essential service messages. This can help increase ridership and hold the service accountable. The capital costs for implementing real-time bus arrival information can vary, ranging from $60,000 for a small deployment to $69.75 million for a more extensive deployment (as seen in London buses). Real-time information can be installed at bus stops and made available on the web and mobile applications, enabling users to plan their trips more effectively.

Air-conditioned bus shelters: These enhance the comfort and appeal of public transportation, particularly in areas with warm climates. For instance, the bus shelter in Hialeah, Florida, was constructed for $65,000. These shelters are typically prioritized for installation at bus stops with the most significant sun exposure and highest passenger usage, making them a valuable investment in improving the overall transit experience.

Figure 95. Air-conditioned Bus Stop at Hialeah Metrorail Station

Figure 96. Automated Bus Enforcement Camera.

Cameras & Artificial Intelligence (AI) Enforcement: Automated camera enforcement laws are becoming more prevalent nationwide following recent enforcement bills in Illinois, California, and New York. In 2019, the New York State Legislature extended authorization to allow camera-based enforcement on all bus lanes within New York City. The initiative combined camera-enforced bus lanes with other bus improvement strategies tailored to specific corridors and yielded significant bus speed improvements, ranging from 15% to 31%, depending on the corridor. Before, the NY DOT only relied on a fixed-location camera system. In the fixed system, two cameras are mounted above the bus lane to capture potential actions in the bus lane and show other activity on the street that might have forced a vehicle to use it. If a vehicle other than a registered bus continues through either of the cameras without turning right, these cameras identify a potential violation. An automated bus enforcement camera can be seen in Figure 97.

The NYC MTA has partnered with HaydenAI to enhance camera enforcement using advanced Artificial Intelligence technology. Since July 2022, the MTA has deployed 300 mobile lane enforcement systems as part of the Automated Bus Lane Enforcement (ABLE) program. An example of the camera system is provided in Figure 65. The goal is to equip 500 buses with this technology by June 2023. ABLE has proven successful in changing driver behavior and keeping bus lanes clear for buses. As of October 2022, 80% of drivers who committed a parking violation in a bus lane did not commit a second violation.

In 2021, California passed Legislation AB 361, allowing towns and cities to install cameras on parking enforcement vehicles to enforce bike lane violations. This new technology, highlighted in Figure 98, uses AI enforcement to keep bike lanes safe and accessible for riders by reducing illegal parking that endangers cyclists' safety. It operates similarly to the technology developed for bus lanes.

Figure 97. AI technology for bike lane enforcement.

NON-MOTORIZED NETWORK CONNECTIVITY PLAN

The Miami-Dade Non-Motorized Network Connectivity Plan aims to identify and fill critical gaps in the County's non-motorized transportation network. These networks primarily focus on walking, wheelchair travel, and bicycling and supply numerous benefits, including environmental sustainability, healthier communities, and increased mobility for young, old, and low-income residents.

The study determined that Miami-Dade County currently provides over 250 miles of bicycle facilities, including on-road bicycle lanes, shared-use paths, paved shoulders, and wide curb lanes. These facilities were often implemented as projects of opportunity in conjunction with other road work like resurfacing streets. As a result, the existing non-motorized network is often fragmented and needs to allow seamless trip-making to common destinations.

Non-motorized transportation improvements should be implemented as a coordinated set of inter-disciplinary methods, including implementing sidewalks, crosswalks, bicycle lanes, shared-use paths, non-motorized shortcut paths, traffic calming, street furniture, safety education programs, law enforcement programs, encouragement activities, end-of-trip facilities (such as bicycle parking and showers/changing rooms at employment centers), automated bicycle rental systems (to improve access to bicycles for trip-making) and developing pedestrian-oriented land use and building design.

The M-path route, highlighted in the Non-Motorized Network Connectivity Plan as a significant route, faces a hurdle with the M-Path Bridge over the Miami River. A pedestrian and bicycle facility would demand substantial capital investment, necessitating either a fixed bridge meeting minimum height clearance for boats to pass under or a movable bridge structure, suboptimal for bicycle-pedestrian use. Instead, enhancing connectivity to the Miami Avenue Bridge via the Miami River Greenway is the preferred solution.

The Commodore Trail Connection to the Rickenbacker Causeway project identifies routes for linking the non-motorized network, extending the Commodore Trail connection to Brickell Avenue and onto the Rickenbacker Causeway. A connection from the Vizcaya Metrorail overpass along SE 32nd Road provides connectivity between the Commodore Trail and the M-Path. Given the high usage of the Commodore Trail and the M-Path, a connection between them would yield significant benefits. Furthermore, these non-motorized transportation network projects emphasize the link to transit in the study area, especially the Vizcaya Metrorail and Brickell Station.

EMERGING TECHNOLOGIES FOR NONMOTORIZED NETWORK IMPROVEMENT

Emerging technologies for nonmotorized network improvements identified from the research include:

Bicycle Detection Systems are essential components of actuated signals, alerting the signal controller to the demand for bicycle crossings on specific approaches. Detection methods include push buttons or automated systems such as in-pavement loops, video cameras, or microwave sensors. In Figure 99, a sign notifying users of a bicycle detection system is installed on a traffic post.

Figure 98. Bicycle Detection System alert sign.

Traditionally, inductive loop vehicle detection is calibrated to detect vehicle size or metallic mass. An example is provided in Figure 100. However, adjustments must account for bicycles' smaller metallic mass to detect them. Otherwise, bicyclists may have to wait for a vehicle to trigger the signal, dismount and use the pedestrian button (if available), or cross unlawfully. In addition to inductive loops, video detection, and miniature microwave radar can also be calibrated to detect bicycles.

Figure 99. Bicycle detection system using loop vehicle detection technology.

Implementing this technology enhances cycling efficiency, improves the convenience and safety of bicycling, and legitimizes bicycling as a mode of transportation. Maintenance involves monitoring and adjusting the sensitivity settings of inductive loop detectors over time. Several cities, including Austin, TX, San Luis Obispo, CA, and Madison, WI, are incorporating these technologies into their transportation systems.

Bicycle Traffic Signals: Implement bicycle-specific traffic signals with dedicated green lights for safer and more efficient intersection crossings. Equipped with bicycle signal heads with sensors, these signals enhance safety and collect valuable rider data, aiding project prioritization and grant applications. An example is shown in Figure 101. Bicycle signals are electrically powered devices used alongside existing traffic signals or hybrid beacons to address safety and operational issues related to cycling. Installed at signalized intersections, these signals indicate bicycle-specific phases and timing strategies, typically using standard three-lens configurations in green, yellow, and red. By incorporating these signals, cities can improve cyclist safety and promote active transportation.

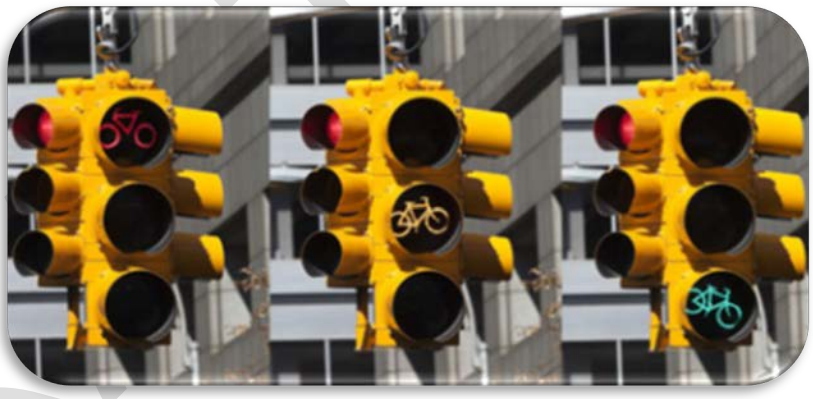


Figure 100. Bicycle traffic signals can be equipped with sensors for data collection .

Automated Bicycle Counters: Utilize sensors embedded in the pavement to gather data on bike traffic, providing valuable insights into ridership patterns. This data aids in prioritizing projects and assessing their impact. By promoting transparency and normalizing biking, these counters encourage increased bicycle usage. However, each counter typically has a price tag of around $60,000. Counters should be installed in areas with high bicycle traffic for optimal effectiveness.

Radio Beams: Utilizing ultra-low power, high-frequency pulses transmitted and reflected off target objects like bicyclists, radar sensors installed in the pavement analyze return pulses to determine object type, distance, and motion. This detection technology enables traffic signals to adjust timing and phasing, significantly enhancing cyclist safety by increasing visibility and ensuring fair passage. While sensor costs can reach upwards of $3,000, economies of scale may reduce per-site expenses with bulk purchases. Identifying streets with high bicycle usage and analyzing crash data guides the deployment of these sensors to problematic areas.

Thermal Imaging Technology: Thermal imaging cameras differentiate between vehicles, pedestrians, and bicyclists, aiding in identifying problematic areas. Pedestrian sensors control traffic signals or warning lights by detecting pedestrians at intersections and transmitting data to the controller for dynamic traffic signal adjustments. The technology also activates warning lights for better visibility. Installation costs for thermal sensors at intersections can amount to up to $16,000 each. Examining streets with high bicycle usage and crash data identifies intersections with high pedestrian and bicycle crash rates, making them prime candidates for thermal sensor installations.

Figure 101. Example of Denver Wedge installation.

The Denver Wedge: The City and County of Denver's Department of Public Works recently implemented a pilot project in downtown intersections, installing rubber curbs and plastic posts to create "corner wedges," an example shown in Figure 102. These wedges slow down left-turn drivers, promoting safer interactions with cyclists and pedestrians. Additionally, cyclists can safely advance at red lights without obstructing pedestrians, addressing concerns about drivers rushing to turn left at green lights. The project encourages cyclists to navigate these intersections cautiously, enhancing the overall interaction between cyclists and pedestrians, particularly during peak periods of pedestrian activity.

Figure 102. Bicycle runnels on stairs.

Bicycle Runnels: Runnels, or bicycle stair channels, run alongside pedestrian stairways, facilitating the movement of bicycles up or down stairs. Although accessible stations may have elevators for bikes, runnels are often faster and can accommodate more bicycles. Additionally, runnels help maintain forward movement and passenger safety by guiding bicycles along designated paths. Ideally, runnels should be incorporated into new stair designs rather than retrofitted later. This approach ensures easier accessibility and smoother integration into station infrastructure. An example is provided in Figure 103.

Portable Propulsion Device: The portable propulsion device in Figure 104 is designed to instantly upgrade any bike, including shared bikes, to an e-bike without needing tools. The unit features optical sensors that detect when the pedals are being pushed and use a lithium-ion battery pack designed for minimal environmental impact. Additionally, it can recapture energy during downhill riding and braking, enhancing efficiency and sustainability.

Figure 103. Portable propulsion devices can convert conventional bikes to e-bikes.

BICYCLE WAYFINDING SYSTEM STUDY

Miami-Dade County's bicycle route numbering and wayfinding system has existed since the early 1980s. Since then, the bicycle network has significantly expanded. While the existing route numbering system has continued to provide route designation to several facilities, a more dynamic and expansive numbering system was recognized as needed.

In 2016, the TPO commandeered a study to develop guidelines for implementing an update to the extensive bicycle wayfinding system in Miami-Dade County. Ideas were gleaned from wayfinding systems used in other cities and practices developed by the National Association of City Transportation Officials (NACTO) and the requirements outlined in the Manual on Uniform Traffic Control Devices (MUTCD). For example, in Berkeley, California, in addition to traditional bicycle wayfinding signs, streets that are part of the bicycle route network have a similar purpose coloring and logo as the bicycle boulevard signs. Figures 105 and 106 highlight these wayfinding signs.

Figure 104. Wayfinding sign in Berkeley, California designed to notify users of the bike/ped routes.

Figure 105. A color-coded scheme is employed to facilitate navigation for both cyclists and pedestrians.

The current bicycle wayfinding system provides even numbers for east-west routes and odd numbers for north-south routes. It also includes some lettered bicycle routes, including the M-Path (Route M) and the Venetian Causeway (Route V).

The study included county-wide recommendations and route-specific recommendations. For county-wide implementation, the study recommended:

- Signage at transit stations to inform potential users of available nearby facilities and improve first/last-mile connections.
- Placing wayfinding signage at major destinations and attractions
- Implementation of three types of signs for bicycle wayfinding:
  - Confirmation Signs, which verify users are on a specific route.

  - Turn Signs lets users know when they need to change directions.

  - Decision Signs provide information when two or more potential trips diverge.

In downtown Miami, the Baywalk shared-use path along Biscayne Bay was identified as a pilot project to implement route-specific wayfinding signage. Being in the urban core, this project provides wayfinding to serve cyclists and pedestrians, which differs from the wayfinding recommended for other county areas. The wayfinding in the Downtown project aims to offer bicyclists and pedestrians directions to nearby attractions, transit stations, parks, routes, and the several disconnected sections of the Baywalk.

Wayfinding in an urban core, particularly for pedestrian use, is best provided through the combined use of maps, information kiosks, and decision signage. It should inform users of their immediate surroundings within a ¼ mile or 5-minute walking distance. Locations for kiosks are recommended in areas with high pedestrian traffic and at crossroads of various strips. Within Downtown Miami, it is recommended that they be on the main path into Bayfront Park, between the arena and Museum Park, and at Brickell Point. Signs for key attractions should be placed where the Baywalk runs near Biscayne Boulevard. This would provide wayfinding to pedestrians on both Baywalk and along Biscayne Boulevard.

Three distance ranges were developed to guide wayfinding sign installations:

1. Less than 2 miles or a less than 15-minute bicycle ride
2. Up to 5 miles, or about a 15 to 30-minute bicycle ride
3. More than 5 miles or a bicycle ride over 30 minutes.

Based on the installation guideline, the study recommended:

- Wayfinding to downtowns may vary depending on the size of the municipality but should typically be signed further out as far as 5 miles or more than 30 minutes.
- Wayfinding to transit stations should be primarily located along bicycle routes. It should be geared towards major transit: Tri-Rail, Metrorail, and Metromover stations and placed as far as 15-30 minutes from the facility.
- Wayfinding to regional and local parks may be placed on- and off-route depending on proximity to the park and placed as far as less than 15 minutes from local parks or 15-30 minutes from regional parks.
- Entertainment venues include sporting arenas, zoos, museums, and other amusement or themed parks. Signage shall be placed at least 15 to 30 minutes from the site.
- Wayfinding to key neighborhoods such as Wynwood, Midtown, and South Beach should be provided both on- and off-route and placed at locations within 15 of the neighborhood.
- End-of-line destinations should be signed along respective routes as needed.

Finally, wayfinding signs should not be limited to bicycle routes only. Bicycle wayfinding should also be placed at major destinations, transit stations, bicycle parking, and bikeshare stations, and pedestrians and bicyclists should be directed to nearby bicycle routes and attractions.

EMERGING TECHNOLOGIES FOR WAYFINDING

Since the study's completion in 2016, wayfinding has emerged with new technology and includes:

Augmented Reality (AR): Wayfinding technology has advanced since the study's completion. Today, Augmented Reality (AR) can enhance wayfinding, allowing users to interact with and navigate spaces using their phones or tablets. An example of this technology is the navigation application commonly included in smartphones. Users can use their phone camera to navigate their surroundings, mimicking the real-world surroundings with visual and auditory cues. The use of the technology is showcased in Figure 107.

Using Internet of Things technology, wayfinding can be enhanced to provide real-time information related to traffic, transit, route obstructions, weather, or emergency events.

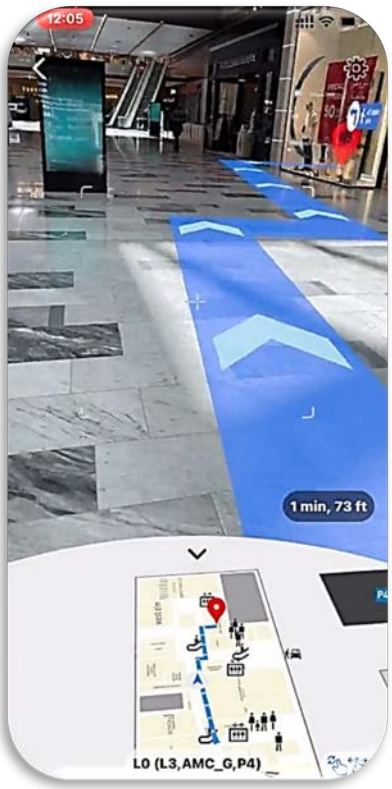


Figure 106. Augmented Reality wayfinding, digitalsignagepulse.com

Automated Pedestrian and Bicycle Counters: Counters can identify where walkers and cyclists are going, and these routes can be prioritized for wayfinding. Counters use sensors embedded in the pavement to collect data that uncovers ridership information and the route frequency of use by a pedestrian, helping prioritize projects and evaluate their effectiveness. This data and transparency normalizes active mobility and encourages more use. Each counter costs around $60,000. Counters are most effective when installed in areas with heavy bicycle and pedestrian use. The Washington DC district Department of Transportation maintains a system of automated counters to measure the number of people walking and biking. DDOT began installing these counters in 2014 and now has 18 in operation. Counters have been installed in both bicycle lanes and trails. DDOT monitors the continuous data stream to analyze trends in walking and biking, assess the value of its facility investments, and apply this data to plan new bike lanes and trails.

Smart Furniture: Smart street furniture includes signs, bus shelters, garbage cans, seats, and kiosks. This furniture serves as an inviting places to relax while offering free Wi-Fi, USB charging, integrated city maps, and real-time city information and alerts. These smart installations can also collect user data and metrics such as temperature and foot traffic counts. A data plan can cost $600 to $2,000 per year for a bench, and the purchase price for each bench unit is $3,800.

Figure 107. Live Touch equipped smart furniture sign in Sydney, Australia.

Smart furniture is best placed at bus stops, commercial areas with high foot traffic, and parks. Maintenance costs can be funded via advertising revenue. For example, New York City is funding its smart kiosks entirely through advertising proceeds, generating $500 million in revenue for the city. In Sydney, Australia, smart street furniture includes "Live Touch," an information resource that provides four apps: photos and information for main Sydney attractions, weather and forecasts, and maps with points of interest, retail directions, and transport links. Figure 67 highlights the technology in Sydney.

EMERGING TUNNELING TECHNOLOGIES FEASIBILITY STUDY

The TPO study evaluated emerging tunnel technologies to assess the implementation of transit tunnel corridors in Miami-Dade County, which would accommodate public transportation via electric vehicles. The type of vehicle, passenger or bus, depends on the tunnel's diameter. A smaller tunnel (12 feet in diameter) can accommodate vehicles with a 6-7 passenger capacity. A large tunnel (24 to 27 feet in diameter) can accommodate a larger electric bus with a carrying capacity of 60 passengers. The overall tunnel characteristics are provided in Table 3.

Table 3. Comparison of tunnel options and their characteristics

Small Diameter Tunnel (Las Vegas Convention Center)	Large Diameter Tunnel
Tunnel size 12-foot inside diameter	Tunnel size 24 to 27-foot inside diameter
Two side-by-side tunnels for two-way operation	Two side-by-side tunnels for two-way operation
Tunnel bottom approximately 40 feet below grade	Tunnel bottom approximately 52-55 feet below grade
Vehicles 6 to 7-passenger capacity	Vehicles 60-passengercapacity
At-grade stations with electric charging stations	Electric charging station at bus maintenance facility
Fire and safety, emergency egress, emergency vehicle access	Ventilation, fire and safety, emergency egress, emergency vehicle access

The preferred excavation method identified is the Tunnel Boring Machine (TBM) for its ability to cause the least amount (if any) of surface disruption. The tunnel system would be accessible via stations at street level approximately one mile apart, with an open underground platform for vehicle distribution and transfer between transit routes. The underground platforms would also be used for fire and life safety emergency vehicles to access the tunnel and for evacuation purposes. Out of the twenty-five evaluated corridors based on cost, land use, mobility, and technology, the identified corridors described below are located within our study area, with a corresponding map in Map 6.

- **Corridor 5:** The Overtown Transit Village/Miami Central to PortMiami route spans 1.4 miles. It includes tunnel stations at Overtown Transit Village, Freedom Tower, and PortMiami Cruise Terminal. The corridor connects to the Overtown Transit Village, Brightline, the SMART Plan NE Corridor, and the Downtown Miami Link at Miami Central. Recognized as a premium transit and bus route terminus, it ranks highest due to its short length, supportive land use, proximity to a community redevelopment area, connection to Miami Central, and minimal utility interference.

- **Corridor 6:** The Brickell Avenue to FTX Arena route spans 1 mile and includes tunnel stations at SW 7th Street and Brickell Avenue, Biscayne Boulevard and Flagler Street, and FTX Arena. Transit connections are available via Metromover at Knight Center, Bayfront Park, Wolfson Campus of MDCC, and Freedom Tower. This corridor will also serve as a premium transit and bus route terminus. Major utilities along Biscayne Boulevard are a concern, and analysis is recommended for future studies.

- **Corridor 8:** Stretching from Miami Central to the Design District, this 2.7-mile route features tunnel stations at Overtown Transit Village/Miami Central, Miami Avenue and 14th Street, NW 2nd Avenue and NW 20th Street,

NW 2nd Avenue and NW 29th Street, and NW 39th Street and NE 1st Avenue. Transit connections are available at Overtown Transit Village/Miami Central Station, with future connections planned for the NE Corridor at N. Miami Avenue and the 14th Street Station. This corridor ranks high due to supportive land uses for transit, proximity to a community redevelopment area, high traffic volume, connections to existing and proposed transit stations, minimal utility interfaces, few water crossings, and limited turns.

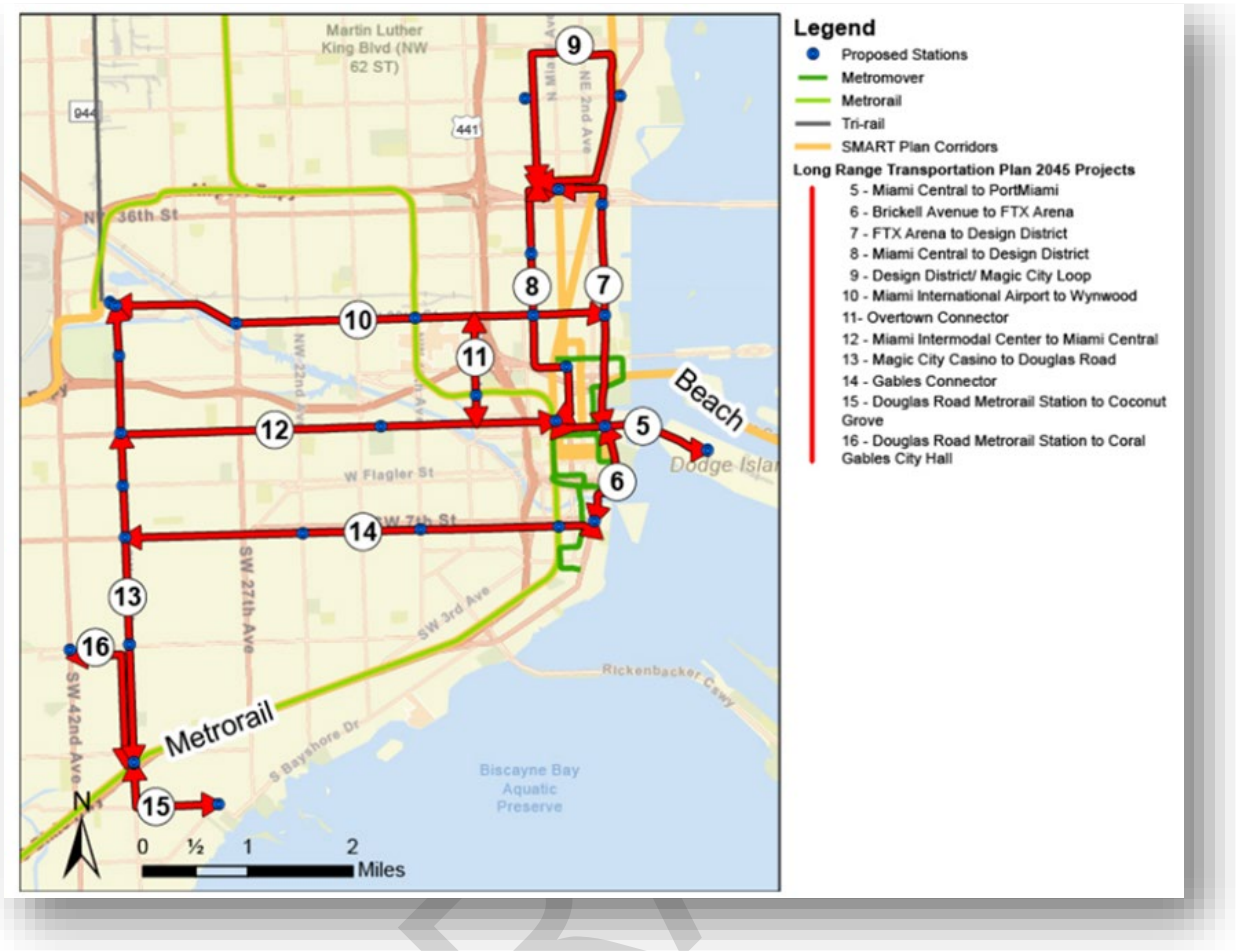
- **Corridor 7:** Spanning 2.6 miles from FTX Arena to the Design District, this route features tunnel stations at FTX Arena, Biscayne Boulevard at 20th Street and 36th Street, and NW 39th Street and NE 1st Avenue. Transit connections are available at the SMART Plan NE Corridor Design District Station. This corridor is highly ranked due to its concise length; supportive land uses for transit, proximity to a community redevelopment area, minimal interface with utilities, few water crossings, and limited turns. Special considerations include obtaining information between FTX Arena and Arsht Center to determine if the tunnel can be installed up to 39th Street, coordinating with Water & Sewer (W&S) for utility information, and possibly consulting the Signature Bridge foundation plans.

- **Corridor 9:** the Design District/Magic City Loop spans 4.2 miles from NE 39th Street and NE 1st Avenue to Biscayne Boulevard and NE 39th Street. Tunnel stations are located at NE 39th Street and NE 1st Avenue, 54th Street and NW 2nd Avenue, 62nd Street and NE 2nd Avenue, and Biscayne Boulevard and 54th Street. Transit connections are expected at the future NE Corridor Design District Station. Major attractions include the Design District, Magic City, and the Biscayne Station entertainment complex at 54th Street.

- **Corridor 10:** Running from Miami International Airport to Wynwood, this tunnel corridor extends from 20th Street and NE 2nd Avenue east to the east side of the South Florida Rail Corridor (SFRC), potentially via the rail spur in Allapattah, then south adjacent to the SFRC to the Miami Intermodal Center. Covering 4.2 miles, it features tunnel stations at MIC, 27th Avenue and 20th Street, 12th Avenue and 20th Street, NW 2nd Avenue and NW 20th Street, and Biscayne Boulevard and NE 20th Street. Transit connections are accessible at MIC and Allapattah Metrorail Station, with major attractions along the route, including MIA, the Miami Intermodal Center, Wynwood, and the Biscayne Corridor.

- **Corridor 12:** Connecting MIA to Miami Central, this 4.9-mile route features tunnel stations at MIC, NW 37th Avenue and Melreese/Soccer Stadium, NW 37th Avenue and NW 7th Street, and approximately 15th Street and NW 7th Street. This corridor option provides access to major attractions like Marlins Park, Melreese Golf Course, and Magic City Casino.

Map 6. East Central Miami-Dade County Corridors



EMERGING TECHNOLOGIES FOR TUNNELS & FREIGHT

As part of exploring emerging tunnel technologies, we also investigated freight technology to enhance freight connections, delivery systems, and truck operations. This strategic approach seeks to alleviate freight traffic congestion on surface roads. The following strategies were identified:

Micro-Delivery-Vehicle: Micro-delivery vehicles, as shown in Figure 109, are reshaping micro-mobility, providing tangible solutions for last-mile delivery needs. These compact vehicles operate in urban environments, swiftly and sustainably transporting goods and services. By seamlessly navigating city streets, they're not just a future vision but a present-day reality, effectively enhancing convenience and mitigating congestion in urban areas.

Figure 108. Micro-delivery vehicles in NYC.

Intelligent Freight Management: The Freight Signal Priority (FSP) service package prioritizes traffic signals for commercial and freight vehicles within a signalized network. This technology can also be utilized by emergency and personal

vehicles. Freight Signal Priority aims to minimize stops and delays, enhance travel time reliability for freight traffic, and bolster safety.

Unmanned Aerial Vehicles: Drones or unmanned aerial vehicles (UAVs) can deliver lightweight packages to homes and businesses, potentially reducing the need for some delivery vehicles on the road and decreasing traffic volume and Vehicle Miles Traveled (VMT). However, implementing this technology would necessitate buildings and streets equipped with sensors, visual cues, and parameters for drones to identify feasible routes, which raises legal, zoning, and land use policy considerations.

Automated Delivery Robots: can carry up to 250 pounds and are connected via a mobile data network. The future of this technology involves establishing a network of autonomous delivery robots to collect data, which can enhance the robots themselves and contribute to the development of other technologies. As seen in other robots, advanced models can transport multiple products in separate compartments, enabling several stops on a delivery route rather than just one-to-one transactions. One potential future application is peer-to-peer deliveries, where individuals can utilize the robot delivery network to send items to friends or colleagues without making a personal trip. An example of this technology is provided in Figure 110.

Figure 109. Automated Delivery Robots with multiple compartments.

Underground Transportation Systems: The Las Vegas Convention Center (LVCC) Loop, highlighted in Figure 111, is an underground transportation system designed for efficient travel, emphasizing direct routes and minimal stops. Its electric vehicles can reach up to 150 mph. The system's passenger capacity varies depending on tunnel and station availability. Its adaptable design allows Loop to integrate stations into various urban settings, reducing congestion. In July 2021, the peak passenger flow was recorded at 1,355 passengers per hour. The LVCC Loop has been commended for its robust security measures, receiving the Gold Standard Award from the U.S. Department of Homeland Security Transportation Security Administration. Additionally, the system has demonstrated resilience to seismic activity, with past events showing no damage to its tunnels, ensuring continued safety for commuters.


Figure 110. Inside the LVCC loop.

Greening Freight Transport: Freight transport accounts for 8% of global emissions, and projections from the Intergovernmental Panel on Climate Change (IPCC) suggest it could become the leading emitting sector by 2030. However, digitalization and big data are crucial in decarbonization efforts. Freight forwarders leverage these technologies to regulate and monitor emissions while implementing environmentally friendly practices such as using modern engines and low-carbon fuels, participating in green supply-chain demand coalitions, and adopting standardized book-and-claim frameworks. These initiatives are vital steps toward reducing the environmental impact of freight transportation.

Autonomous Rail Infrastructure: Self-propelled, electric vehicle platforms, as shown in Figure 112, are being developed on top of existing rail equipment and infrastructure to introduce a new range of AI-powered tools and equipment for railroad users and operators. These innovations aim to enhance competitiveness for modal share with the trucking industry. While rail remains highly effective for transporting large volumes of goods at low costs, customers increasingly value the speed, visibility, precision, and flexibility trucking offers. It's worth noting that every ton-mile moved by rail is 9.5 times more energy-efficient than an equivalent ton-mile moved by truck.

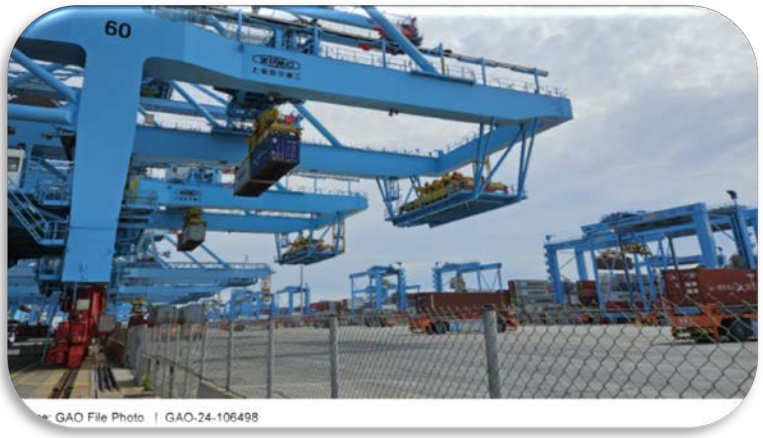


Figure 111. Semi-automated double trolley cranes load containers onto automated guided vehicles

INNOVATION IN FUTURE-READY ZONES

This memo has provided a comprehensive overview of research on emerging technologies, infrastructure, and best practices implemented worldwide in pedestrian and transit-oriented urban downtown areas. The research covered a range of mobility improvements, including micro-mobility enhancements, mobility hub technologies, emerging curb and special event management strategies, transit improvements, and safety measures. Additionally, it examined the previous work by the Miami-Dade Transportation Planning Organization (TPO) and evaluated technological updates to enhance the goals within those TPO studies.

An inventory of technologies assembled from this research has been prepared to provide targeted recommendations for mobility improvements in the study area. These recommendations have been cataloged to identify the type of improvement, the suggested implementation location (future-ready zone), and the actions required for implementation.

The technologies are categorized into the following improvement types:

- Car Lite: Technology that reduces dependency on private transport and increases the use of high-capacity public transportation.
- Curb Management: Technologies to improve the use of public rights of way and curbs.
- Active Mobility Network: Enhancements to infrastructure and systems designed to support and encourage active modes of transportation, such as walking and cycling.
- Integrated Mobility Hub: Transportation hubs that serve as central points for connecting various modes of transportation and facilitating seamless and convenient travel for commuters.
- Event Management for Entertainment Centers: Strategies to facilitate safe travel for pedestrians and vehicles during events.
- Water Taxi: Improvements to waterborne travel.
- Micromobility: Enhanced shared micro-mobility facilities and devices for bicycles, electric bicycles (e-bicycles), and e-scooters.
- Resilience and Adaptability: Strategies to improve infrastructure resilience, adaptability, and reduce carbon emissions.
- Walkability: Improvements to pedestrian mobility.
- Pedestrian and Bicycle Safety: Enhancements for pedestrian and bicycle safety.
- Bicycle Network: Improvements to the bicycle network and facilities.
- Freight Management: Technology that improves delivery services and movements of goods.

The future-ready zones for implementing these technologies were determined through a comprehensive process involving stakeholder engagement, analysis of bicycle ridership and pedestrian activity data, assessment of proximity to transit, coordination with efforts programmed in the Transportation Improvement Program and the 2045 Long Range Transportation Plan, and a bicycle and pedestrian network gap analysis. By pinpointing these locations, the downtown Miami area can prepare for integrating emerging technologies effectively.

Detailed strategies with short-, mid-, and long-term timelines have been provided to facilitate the adoption of these advancements. The implementation timing is identified as either short-term (0 to 3 years), mid-term (3 to 5 years), or long-term (greater than five years), based on the actions required for implementation. These factors include policy development, enforcement, infrastructure construction, and equipment purchase.

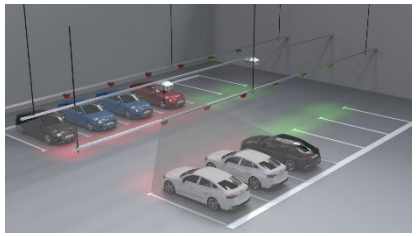
Infrastructure encompasses the physical components that support the technology, such as bike-share stations, and includes digital components like mobile apps. Equipment refers to items like the bike unit, e-scooter, or microcar, and any accessories or components that enhance their functionality or safety, such as GPS trackers. Policy encompasses the rules, regulations, and guidelines that govern the use of technology or products. Enforcement refers to the mechanisms in place to ensure compliance with technology-related policies.

The following table summarizes these findings, including a summary of the recommendation type, the document page where the reader can learn more about the improvement and its application, the future-ready zone or location for the recommendations implemented, and the anticipated time to implement the improvement based on the action items noted.

CAR LITE IMPROVEMENTS		
PHOTO	**STRATEGY**	**IMPLEMENTATION**
	**Low-Emission Zones (pg. 66)** Low emission zones (LEZs) are designated areas where access to vehicles with higher emissions is restricted or prohibited to reduce air pollution and improve urban air quality.	**Action:** Policy, infrastructure, enforcement **Time:** Short-Term **Location:** Downtown core, Brickell urban core, Mary Brickell Village
	**Micro-Delivery-Vehicle (pg. 83)** A micromobility vehicle is a compact, lightweight mode of transportation, typically electric, designed for short-distance travel, such as e-scooters, e-bikes, and electric skateboards.	**Action:** Policy, equipment, enforcement **Time:** Short-Term **Location:** Area-wide
	**Electric Vertical Takeoff and Landing Planes (pg. 16)** These aircraft ascend vertically, like helicopters, using electric motors instead of traditional combustion engines. These electric vehicles employ propellers or rotors for vertical takeoff, stationary hovering, and horizontal flight, featuring large omnidirectional fans for drone-like maneuverability.	**Action:** Policy, equipment, infrastructure, enforcement **Time:** Mid-term **Location:** Brickell, Downtown

	**Automated Delivery Robots (pg. 83)** Advanced models can transport multiple products in separate compartments, enabling several stops on a delivery route.	**Action:** Policy, equipment, infrastructure, enforcement **Time:** Short- to Mid-Term **Location:** Area-wide

CURB MANAGEMENT

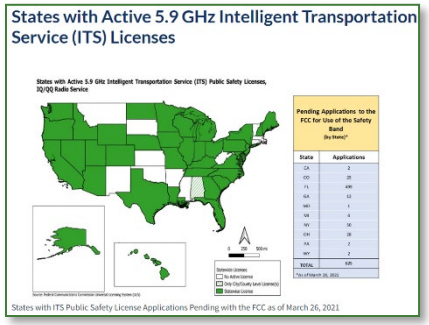
PHOTO	STRATEGY	IMPLEMENTATION
	**Smart Parking (pg. 54)** It utilizes sensors and cameras to monitor and manage street parking availability in real-time, optimize space usage, and enhance urban parking solutions.	**Action:** Policy, infrastructure, enforcement **Time:** Short-Term **Location:** Downtown and Brickell and Wynwood Surface and Parking Garages

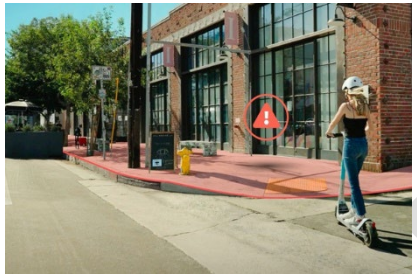
	**Curb Management (pgs. 25-28 and 35-38)** Strategic regulation of curb space to optimize parking, loading zones, and pedestrian access, enhancing urban mobility and public spaces.	**Action:** Policy, infrastructure, enforcement **Time:** Short- to Mid-Term **Location:** Downtown CBD, Brickell, project pilots in other areas.
	**In-ground Parking Sensors (pg. 55)** Real-time parking space availability monitoring enables demand-based pricing and optimizing city parking management.	**Action:** Policy, infrastructure, enforcement **Time:** Short-Term **Location:** Downtown and Brickell and Wynwood Surface and Parking Garages
	**Smart Street Sweeper (pg. 59)** Software-equipped street-sweeping vehicles enhance operational efficiency, route management, and transparency in urban maintenance.	**Action:** Equipment **Time:** Short-Term **Location:** Area-wide

	**Road Defect Detection System (pg. 59)** AI-powered road defect detection system scans motorways to identify defects and prioritize repairs, promptly alerting maintenance teams to take action.	**Action:** Equipment **Time:** Short-Term **Location:** Area-wide
	**Underground Transportation Systems (pg. 84)** **The Transit system allows s**peeds of up to 150 mph. It has demonstrated resilience to seismic activity, with past events showing no tunnel damage.	**Action:** Policy, infrastructure, equipment **Time:** Mid- to Long-Term **Location:** Brickell Avenue to FTX Arena

FREIGHT MANAGEMENT

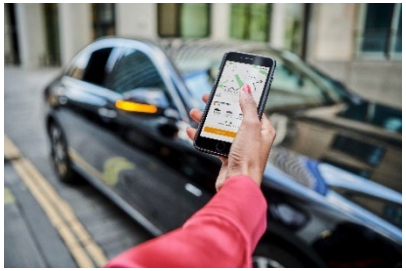
PHOTO	STRATEGY	IMPLEMENTATION
	**Freight Signal Priority (pg. 83)** Freight Signal Priority (FSP) is a traffic management technology that prioritizes traffic signals for freight, commercial, and emergency vehicles traveling within a signalized network.	**Action:** Policy, infrastructure, enforcement **Time:** Short-Term **Location:** Freight routes to Port and Airport.

	**Drones or Uncrewed Aerial Vehicles (pg. 84)** Drones or uncrewed aerial vehicles (UAVs) can deliver lightweight packages to homes and businesses, reducing traffic volume and Vehicle Miles Traveled (VMT) by lessening the need for traditional delivery vehicles.	**Action:** Policy, infrastructure, enforcement, equipment **Time:** Short- to Mid-Term **Location:** Downtown and Brickell pilot project in residential areas in the study area.
	**Intelligent Transportation Services (pg. 30)** The technology uses high-precision devices to enable communications between vehicles and traffic lights, generating real-time alerts or warnings and adjusting signals to prioritize emergency vehicles in heavy traffic, significantly improving transportation safety and mobility.	**Action:** Infrastructure **Time:** Short- to Mid-Term **Location:** Area-wide
	**Autonomous Rail Infrastructure (pg. 85)** Self-propelled electric vehicle platforms are being developed on top of existing rail equipment and infrastructure to introduce a new range of AI-powered tools.	**Action:** Infrastructure **Time:** Short- to Mid-Term **Location:** PortMiami

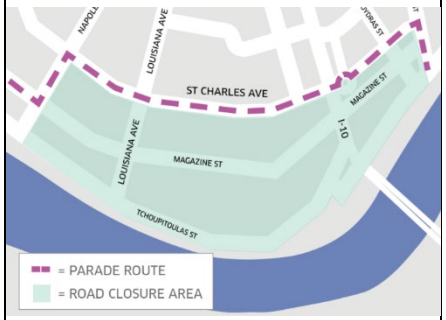
ACTIVE MOBILITY NETWORK IMPROVEMENTS		
PHOTO	**STRATEGY**	**IMPLEMENTATION**
	**Automated Bicycle and Pedestrian Counters (pg. 80)** Pavement-embedded sensors collect data on bicycle ridership and pedestrian use to inform infrastructure projects and promote active mobility.	**Action:** Infrastructure **Time:** Short-Term **Location:** At intersections with major trails.
	**Scooter Sidewalk Riding Detection (pg. 54)** Scooter Sidewalk Riding Detection employs sensor, GPS, and computer vision technologies to discern instances of electric scooter operation on pedestrian sidewalks. Its function involves alerting riders or autonomously modifying scooter behavior to ensure adherence to local regulations.	**Action:** Policy, Enforcement **Time:** Short-Term **Location:** Area-wide
	**Modified Water Hydrants (pg. 6)** Water fountain design that uses fire hydrants to improve access to drinking water.	**Action:** Policy, Infrastructure **Time:** Short-Term **Location:** Near bicycle and pedestrian trails

	**Portland Loo (pg. 17)** Restroom units are patented and sold by the City of Portland for bathrooms that deter illegal activities and provide access to needed resources like restrooms and water.	**Action:** Infrastructure **Time:** Short-Term **Location:** Near bicycle and pedestrian trails
INTEGRATED MOBILITY HUB IMPROVEMENTS		
PHOTO	**STRATEGY**	**IMPLEMENTATION**
	**Sustainable Design Bus Shelters (pg. 61)** Integral urban infrastructure provides shelter and amenities for bus commuters, evolving with innovative designs and sustainable technologies to provide a more comfortable and environmentally friendly commuting experience.	**Action:** Infrastructure **Time:** Short-Term **Location:** Area-wide, prioritize transit stations, major employment centers, and tourist attractions
	**Multi-Purpose Bus Posts (pg. 72)** Systems utilizing GPS to offer commuters up-to-date bus arrival information, enhancing service accountability and trip planning efficiency through various accessible platforms.	**Action:** Infrastructure **Time:** Short-Term **Location:** Area-wide, prioritize transit stations and stops near major employment centers, civic facilities, and tourist attractions

	**Real-time Public Transit Vehicle Arrival Information System (pg. 72)** Systems utilizing GPS to offer commuters up-to-date bus arrival information, enhancing service accountability and trip planning efficiency through various accessible platforms.	**Action:** Infrastructure **Time:** Short-Term **Location:** Area-wide, prioritize transit stations and stops near major employment centers, civic facilities, and tourist attractions
	**Air-Conditioned Bus Shelters (pg. 72)** Comfortable waiting environments at bus stops are strategically placed to offer relief from heat in warm climates, aiming to enhance public transportation experience and ridership.	**Action:** Infrastructure **Time:** Short-Term **Location:** Transit stations at stops near major employment centers and tourist attractions
	**Autonomous Shuttle/Taxis/Ride-Hail Network (pg. 59)** Self-driving electric vehicle networks addressing first mile/last mile challenges, leveraging technology to optimize services and reshape urban transportation.	**Action:** Infrastructure, equipment, policy **Time:** Short-Term **Location:** Area-wide, focusing on first/last mile connections near transit stations, access to major attractions, and residential areas to connect with the urban core.

	**Mobility as a Service- MaaS (pg. 71)** Integrated on-demand mobility solution simplifying transportation access and payment across multiple modes, promoting user-centered trip planning and booking.	**Action:** Infrastructure **Time:** Short-Term **Location:** Area-wide digital access
	**Transportation as a Service-TaaS (pg. 71)** Shift from traditional car ownership to on-demand services, leveraging technology to offer flexible and cost-effective transportation options, aiming to reshape consumer behavior and reduce emissions.	**Action:** Infrastructure **Time:** Short-Term **Location:** Area-wide digital access
	**Street Legal Electric Micro Cars (pg. 57)** These vehicles offer a cost-effective transportation solution, with prices typically around $9,000. A car-sharing scheme using these vehicles at mobility hubs can be considered.	**Action:** Equipment, policy, enforcement **Time:** Short-Term **Location:** MiamiCentral Station, on-street parking near residential developments and major employment centers.

EVENT MANAGEMENT FOR ENTERTAINMENT CENTER IMPROVEMENTS		
PHOTO	**STRATEGY**	**IMPLEMENTATION**
	**Interactive Kiosks (pg. 55)** Information hubs at transit stops provide bus-related information and data collection services for transit agencies, enhancing user experience and infrastructure planning.	**Action:** Equipment **Time:** Short-Term **Location:** Civic centers, transit stations, major attractions
	**SMART Communications Network (pg. 56)** Modern kiosks offer connectivity, device charging, and city services, enhancing accessibility and revenue opportunities while requiring strategic placement and maintenance.	**Action:** Equipment **Time:** Short-Term **Location:** Mobility hubs like MiamiCentral, the Underline, and major attractions
	**Parking Guidance System (pg. 15)** It delivers real-time information through roadside electronic information panels and mobile devices so drivers can view parking availability even while driving.	**Action:** Infrastructure, equipment, policy **Time:** Short-Term **Location:** Near public parking garages and surface lots located in Downtown, Brickell and Wynwood

	**Combining Event and Transit Tickets (pg. 41)** The ticket's purchase price includes a transit fare allowing ticketholders to access public transit.	**Action:** Policy **Time:** Short-Term **Location:** Area-wide to access special events within the study area
	**Ride Sourcing Pickup Locations at Event Venues (pg. 42)** transportation network companies (TNC) develop guides to direct potential riders to permissible pickup locations.	**Action:** Policy **Time:** Short-Term **Location:** Area-wide to access special events within the study area

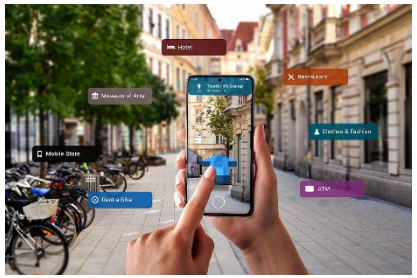
WATER TAXI IMPROVEMENTS

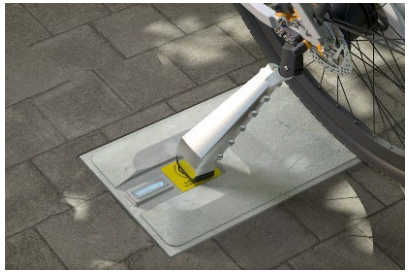
PHOTO	STRATEGY	IMPLEMENTATION
	**Seagliders (pg. 47)** Seagliders Electric-powered vessels revolutionizing water travel with zero emissions, advanced technology, and impressive range are scheduled to transform transportation options by 2025.	**Action:** Equipment, Policy **Time:** Short- to Mid-Term **Location:** Biscayne Bay, Watson Island

	**Electric Flying Passenger Ship (pg. 47)** First-ever electric flying passenger ship. Capable of gliding at speeds reaching 25 knots (29 mph) and maxing out at 30 knots (35 mph), it can travel up to 50 nautical miles (57.5 miles) on one charge. In Sweden, the ship is exempt from speed limits due to its minimized wake disturbance while navigating the water.	**Action:** Equipment, Policy, Infrastructure **Time:** Short- to Mid-Term **Location:** Biscayne Bay, Intracoastal Waterway, Miami River

MICROMOBILITY IMPROVEMENTS

PHOTO	STRATEGY	IMPLEMENTATION
	**Adaptive Micromobility (pg. 54)** Inclusive micro-mobility share programs offer accessible alternatives for older individuals or those with disabilities, promoting mobility and participation in urban activities.	**Action:** Equipment, Policy **Time:** Short-Term **Location:** Area-wide, prioritize mobility hubs, residential zones
	**Electric Scooter Enforcement (pg. 22)** Measures to address scooter misuse through citations and education, aiming to improve safety and compliance among users of shared mobility services.	**Action:** Enforcement, Policy **Time:** Short-Term **Location:** Area-wide, prioritize mobility hubs, Downtown and Brickell cores

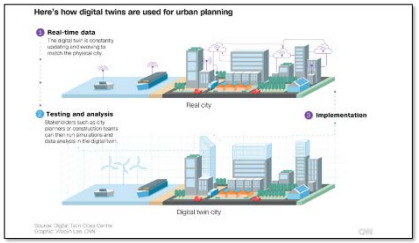
	**Wayfinding/Augmented Reality (pg. 79)** Technologies providing visual navigation aids through mobile applications enhance urban navigation efficiency by superimposing digital information onto the physical environment. This helps users locate points of interest and navigate unfamiliar areas more efficiently.	**Action:** Equipment, Infrastructure **Time:** Short-Term **Location:** Mobility hubs, non-motorized mobility networks, transit stations, major attractions
	**Bicycle Runnels (pg. 76)** Bicycle runnels are ramps alongside pedestrian stairways at transit stations. They facilitate the movement of bicycles up or down stairs, improving accessibility and safety for cyclists, reducing congestion, and ensuring a smoother flow of pedestrian traffic.	**Action:** Infrastructure **Time:** Short-Term **Location:** All transit stations.
	**Micromobility Storage At High-Demand Stations (pg. 54)** Secure parking solutions for micromobility devices at transit hubs, enhancing accessibility and encouraging sustainable transportation use. These solutions, including lockers, pods, and multi-device storage options, aim to improve accessibility and convenience for commuters and support first-mile/last-mile connectivity.	**Action:** Infrastructure **Time:** Short-Term **Location:** Government Center, Vizcaya, Brickell, near major employment centers, MDC Wolfson Campus

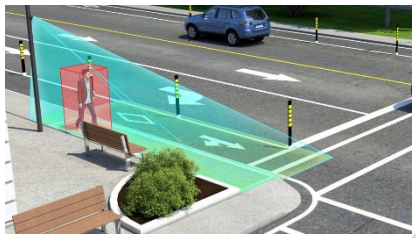
	**Bike Share on Private Property (pg.8)** This micromobility approach places shareable bikes on private properties to bypass regulatory hurdles and provide convenient transportation options for riders.	**Action:** Policy, equipment **Time:** Short-Term **Location:** Area-wide
	**Geofencing (pg. 21, pg. 54)** A location-based technology that sets virtual boundaries is typically used for micromobility to regulate parking, restrict certain zones, enhance urban mobility management, and encourage responsible rider behavior.	**Action:** Infrastructure **Time:** Short-Term **Location:** Area-wide. Geofenced e-mobility parking areas near transit stations and along areas with high pedestrian activity, such as in the core of Brickell and Downtown.
	**Wireless Charging (pg. 57)** A wireless inductive charging system for e-bikes simplifies charging and allows you to park the bike. It comprises a weatherproof in-ground "charging tile" connected to the electrical grid and a kickstand hard-wired to the bike's battery.	**Action:** Infrastructure **Time:** Short-Term **Location:** Area-wide. Geofenced e-mobility parking areas near transit stations and along areas with high pedestrian activity, such as in the core of Brickell and Downtown.

STRATEGIES TO IMPROVE RESILIENCE, ADAPTABLE INFRASTRUCTURE, AND REDUCE CARBON EMISSIONS

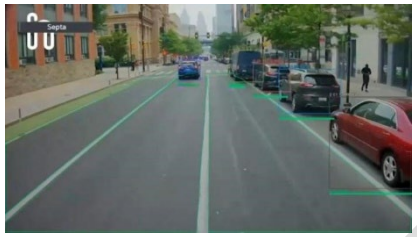
PHOTO	STRATEGY	IMPLEMENTATION
	**Universal Charging Station (pg. 53)** A solution facilitating the organization of public space and providing a universal charge station for e-mobility, adaptable to various urban structures like advertising boards, bus stations, and street lighting, reducing operational costs.	**Action:** Infrastructure **Time:** Short-Term **Location:** Near transit stations (Metrorail and Metromover) and active mobility hubs like the Underline.
	**Battery-as-a-Service (pg. 53)** BaaS for micromobility electric vehicles is a subscription-based model separating battery costs from micromobility electric vehicles, offering access to swap stations for depleted batteries, minimizing upfront costs, enhancing charging accessibility, promoting battery recycling, and addressing standardization challenges across manufacturers.	**Action:** Infrastructure, Policy, Equipment **Time:** Short-Term **Location:** Near transit stations (Metrorail and Metromover) and at mobility hubs
	**Solar Roads and Sidewalks (pg. 63)** Solar panels can be integrated into walkways, parking surfaces, and roadways to generate solar energy. However, they can be costly and potentially less efficient than other solar panel installations like roof panels or solar farms.	**Action:** Equipment, Infrastructure **Time:** Short-Term **Location:** Major intersections with Biscayne Boulevard or Miami Avenue.

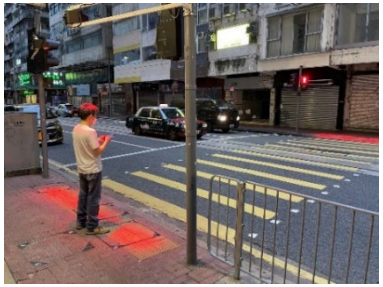
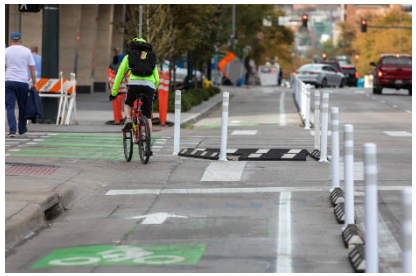
	**Solar Umbrella Canopies (pg. 62)** Innovative solar-powered umbrellas provide shading in urban areas while capturing energy to power nearby infrastructure, such as street lights or traffic signals, addressing sustainability and pedestrian comfort needs.	**Action:** Equipment, Infrastructure **Time:** Short- to Mid-Term **Location:** Along corridors where right-of-way availability limits the growth of large canopy trees.
	**Smart Furniture (pg. 80)** Solar-powered benches with free Wi-Fi and USB charging capabilities can collect user data and metrics while furnishing streets. They are best suited for high-traffic areas like bus stops and parks.	**Action:** Equipment, Infrastructure **Time:** Short-Term **Location:** Area-wide

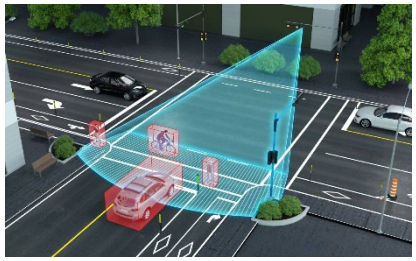
	**Digital Twin Cities (pg. 29)** Virtual representations of physical assets (like buildings, roads, waterways, and green spaces) that use connected digital information to mirror reality and create a digital twin of the current physical conditions, allowing the testing of new technology without physical construction.	**Action:** Infrastructure **Time:** Short-Term **Location:** Area-wide digital access.
	**Bioswale and Cycling Improvements (pg. 62)** Implementation reduced emissions from fewer vehicles and enhanced particulate matter filtration, alongside carbon dioxide sequestration, facilitated by the introduction of the infrastructure.	**Action:** Enforcement **Time:** Short-Term **Location:** Area-wide
	**Digital Technologies for Flood Prediction (pg. 63)** Real-time data, advanced predictive models, and early warning systems are essential tools for authorities and managing entities to anticipate flood events and implement effective solutions	**Action:** Equipment **Time:** Short-Term **Location:** Digitally accessible area-wide

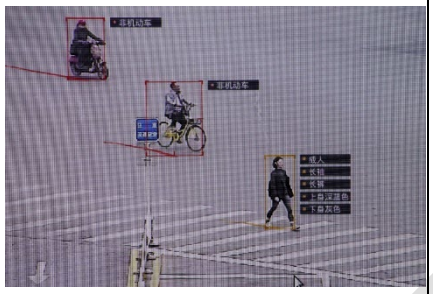
WALKABILITY IMPROVEMENTS		
PHOTO	**STRATEGY**	**IMPLEMENTATION**
	**Interactive Pedestrian Crossing (pg. 66)** A dynamic crossing system utilizing cameras to adjust markings and colors enhances safety by prompting pedestrians, drivers, and cyclists to cross roads more attentively, with adaptable configurations based on traffic flow.	**Action:** Infrastructure **Time:** Short- to Mid-Term **Location:** Area-wide
	**Automated Pedestrian Detection (pg. 67)** Devices sensing pedestrians at crosswalks automatically adjust signals to accommodate crossing times, with installation costs varying depending on site conditions and operational costs.	**Action:** Infrastructure **Time:** Short- to Mid-Term **Location:** Area-wide
	**Extended Time (Tap Cards) for Crosswalk (pgs. 14, 69)** RFID-enabled cards trigger extended crossing times for elderly and disabled pedestrians at designated crosswalks, aiming to improve accessibility in areas with larger aging populations.	**Action:** Infrastructure **Time:** Short-Term **Location:** At intersections of Major corridors like Biscayne Boulevard and South Miami Ave, near civic institutions.

	**Accessible Pedestrian Signals (pg. 68)** Signals are designed to aid visually and mobility-impaired pedestrians with audible tones, speech messages, and vibrating surfaces, enhancing safety at crosswalks at varying costs.	**Action:** Infrastructure **Time:** Short-Term **Location:** Area-wide
	**Sheltered Skyways (pg. 11)** In Singapore, the Walk2Ride program guarantees a sheltered walkway within 400 meters of all MRT stations and 200 meters of bus interchanges, LRT stations, and bus stops with high commuter volumes.	**Action:** Infrastructure, Policy **Time:** Mid-Term **Location:** Area-wide with a focus near transit, employment centers, major attractions, and areas with high pedestrian activity like Brickell and Downtown Core.
	**Pedestrian Scrambles (pg. 18)** Crosswalks allow pedestrians to travel in all directions, reducing traffic-related injuries.	**Action:** Infrastructure **Time:** Short-Term **Location:** High volume intersections on Biscayne Blvd near Arena or Bayfront Park.

	**SLOW STREETS (pg. 19)** They are designed to be safe, comfortable, low-traffic routes prioritizing active transportation and community connection.	**Action:** Infrastructure, Policy **Time:** Short-Term **Location:** Areas with high pedestrian volume, low-speed corridors, or streets within Downtown, Brickell Core, or Wynwood.
PEDESTRIAN AND BICYCLE SAFETY IMPROVEMENTS		
PHOTO	**STRATEGY**	**IMPLEMENTATION**
	**AI Enforcement (pg. 73)** Utilization of artificial intelligence to enforce and cite the illegal encroachment of bicycle and bus lanes by vehicles.	**Action:** Policy, Equipment, Enforcement **Time:** Short-Term **Location:** Area-wide
	**Rumble Strips on Bicycle Lanes (pg. 53)** Install rumble strips in bicycle lanes to alert cyclists to slow down, improving safety in crowded urban areas.	**Action:** Infrastructure **Time:** Short-Term **Location:** Area-wide at high pedestrian and cyclist zones to deter conflicts. At access drive connections with public roadways, particularly for residential and office buildings in the study area.

	**Safety Reflector (pg. 68)** Reflectors can be wirelessly controlled via a mobile phone application. When a pedestrian approaches a crossing, the reflector at the location can blink to alert drivers.	**Action:** Infrastructure **Time:** Short-Term **Location:** At intersections near educational facilities located in the study area.
	**The Denver Wedge (pg. 76)** Wedges are designed to slow down left-turn drivers, promoting safer interactions with cyclists and pedestrians.	**Action:** Infrastructure **Time:** Short-Term **Location:** Area-wide, prioritizing conflict areas in Downtown and Brickell core.
	**Thermal Technology (pg. 76)** Thermal sensors enhance traffic signal control to prioritize pedestrian and cyclist safety at intersections, particularly in high-crash areas.	**Action:** Infrastructure, equipment **Time:** Short to Mid-term **Location:** Intersections with major bicycle and pedestrian trails.

	**Radio Beams (pg. 74)** Radar sensors are installed in the pavement to detect cyclists, adjusting traffic signals for safer passage, particularly in problematic areas.	**Action:** Infrastructure, equipment **Time:** Short to Mid-term **Location:** Intersections with major bicycle and pedestrian trails.
	**HD Lighting Systems (pg. 75)** Integrate projection technology from digital micromirror devices (DMDs) into the vehicle's headlight. It captures street signs and other relevant information using a camera system, then displays it on the road ahead through the car's headlights.	**Action:** Equipment **Time:** Short to Mid-term **Location:** Area-wide to be installed on public transit vehicles.

	**QR Codes (pg. 24)** QR codes enable easy reporting of the elevator, escalator, or other maintenance issues, streamlining maintenance requests for efficient resolution.	**Action:** Equipment **Time:** Short-Term **Location:** Metrorail and Metromover service elevators
	**Video Recording (pg. 69)** Security cameras can assist law enforcement agencies in analyzing vehicle and pedestrian traffic with real-time results.	**Action:** Policy, Enforcement, Infrastructure, Equipment **Time:** Short to Mid-term **Location:** SR 5
	**Silver Zones (pg. 12)** From Singapore, these are pedestrian schemes built in selected residential areas to enhance road safety for older adults.	**Action:** Infrastructure **Time:** Short to Mid-Term **Location:** Residential zones

BICYCLE NETWORK IMPROVEMENTS		
PHOTO	**STRATEGY**	**IMPLEMENTATION**
	**Dedicated and Protected Bike Lanes (pg. 62)** Separated lanes for cyclists, safeguarded from vehicular traffic, fostering safe and efficient cycling infrastructure.	**Action:** Infrastructure, Policy, Enforcement **Time:** Short to Mid-Term **Location:** ➲ Along S. Miami Avenue from the intersection of SW 32nd Road to SE 15th Road. ➲ Along SW 15th Road from the intersection of SW 11th Street to the road end at Brickell Bay Drive. ➲ Along NW 1st Street from the intersection at NW 3rd Avenue to the street's end at Biscayne Blvd. ➲ Along the southbound direction on Biscayne Blvd from the intersection at NE 11th Terrace to the intersection at SE 1st Street.
	**Solar Infrastructure (pg. 64)** Bike path within the median of an eight-lane highway that integrates solar panels, illuminating the streets below.	**Action:** Infrastructure, Equipment, Policy **Time:** Mid-term **Location:** Bicycle and Pedestrian trails with limited shade or canopy coverage.

	**Bicycle Traffic Signals (pg. 75)** Traffic signals are dedicated to cyclists, ensuring safer intersection crossings and smoother traffic flow. Sensors can be installed to capture ridership data at intersections.	**Action:** Infrastructure **Time:** Mid-term **Location:** At intersections with bicycle routes and facilities along major roadways.
	**Bicycle Detection Systems (pg. 74)** Enhancements at intersections to prioritize cyclist safety, including dedicated signals and lanes.	**Action:** Infrastructure **Time:** Short-term **Location:** At intersections with bicycle routes and facilities along major roadways.
	**Illuminated Bike Lanes (pg. 64)** Tiny, eco-friendly glow-in-the-dark stones that absorb sunlight during the day and emit a gentle glow at night, this technology eliminates the need for traditional lights.	**Action:** Infrastructure **Time:** Short-Term **Location:** Non-motorized mobility networks, parks, the Underline.

	**Smart Bicycle Parking (pg. 53)** Affordable, secure parking solutions for bicycles, strategically placed to facilitate commuter needs and promote cycling accessibility.	**Action:** Equipment, Policy **Time:** Short-Term **Location:** MiamiCentral, major transit stations, and adjacent mobility hubs. At major employment centers, attractions, and Wolfson Campus.
	**Green Infrastructure Technology (pg. 12)** In Singapore, Green amenities along the path below the rail are also used to test horticultural technology.	**Action:** Infrastructure **Time:** Short-Term **Location:** Beneath Metrorail and Metromover line, Underline, Underdeck
	**Portable Propulsion Device (pg. 76)** It is designed to instantly upgrade any bike, including shared bikes, to an e-bike without needing tools. Strategies like employee discounts for this type of equipment can encourage users to ride low-cost conventional bikes that can be adapted to electric technology.	**Action:** Equipment **Time:** Short-Term **Location:** Can be provided as a shared service at active mobility hubs, major employment centers, or transit stations

Miami-Dade Transportation Planning Organization

DOWNTOWN MIAMI TRANSPORTATION MASTER PLAN

Technical Memo #3

Evaluating Bicycle and Pedestrian Network Connectivity

THE CORRADINO GROUP

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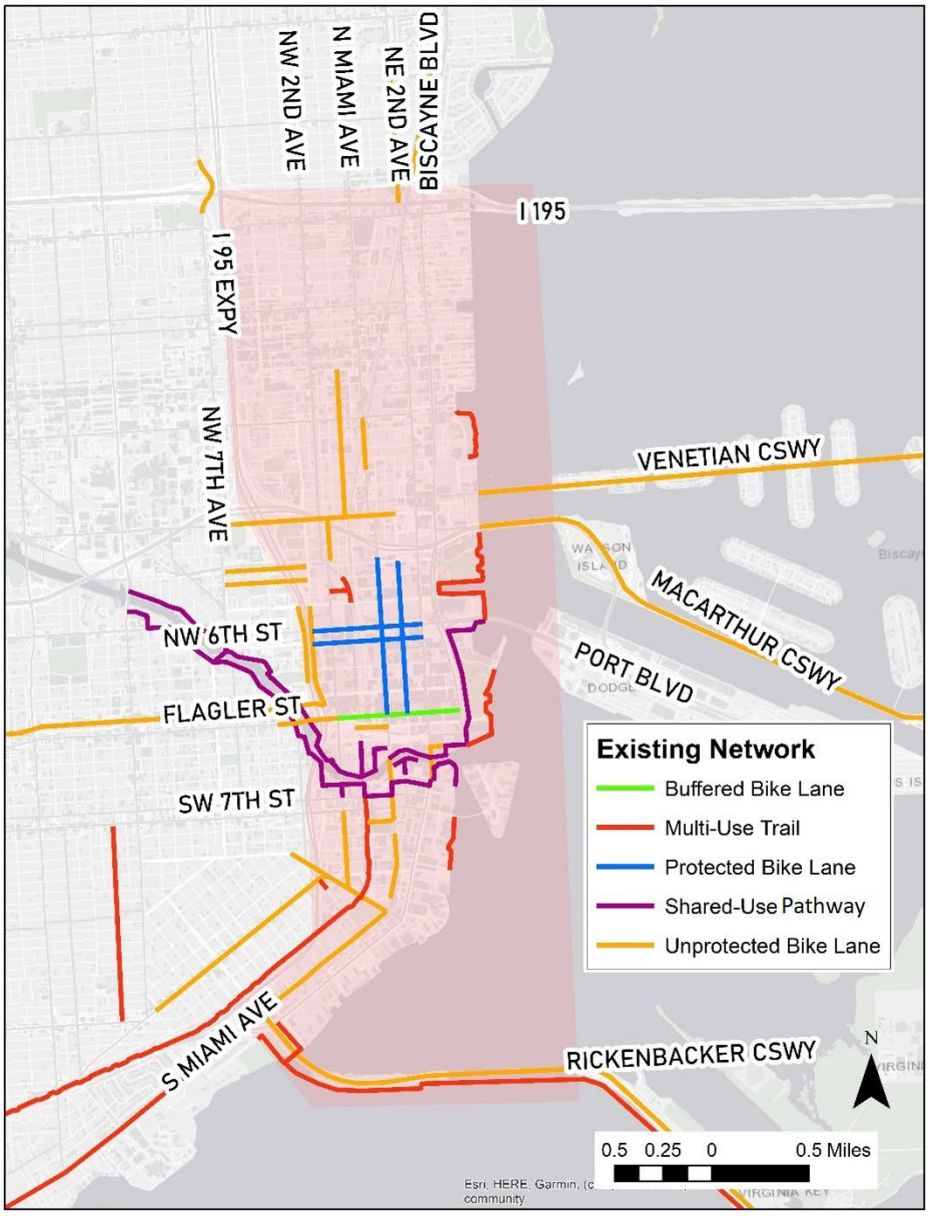
Tech Memo 3: Evaluation of Bicycle and Pedestrian Connectivity to Transit and Major Trails

Introduction

The objective of this assessment is to evaluate the pedestrian and bicycle access to Metrorail Stations, Metromover Stations, and The Underline within the study area boundaries. The evaluation begins with an overview of the existing pedestrian and bicycle network in the study area. Once the framework for the existing conditions is established, the study evaluates the planned cycling connectivity improvements to be programmed in the 2050 Long-Range Transportation Plan (LRTP).

Using a pedestrian shed analysis, an assessment was completed to identify the proximity and the types of facilities connecting to each Metromover and Metrorail station in the study area. The Transit Alliance Miami's 2023 Mobility Scorecard findings supplement the mapping analysis, providing data related to walking scores for Metrorail stations and countywide cycling crash data.



Map 1: Existing Bicycle and Pedestrian Network

A review of the major trails in the study area, including The Underline, Rickenbacker Trail, Commodore Trail, and the Venetian Causeway, is also provided. The connectivity between the trails and the study area was assessed using the data from the existing and planned bicycle and pedestrian network. Strava Heat mapping was also used to supplement recommendations for connectivity.

Existing Conditions

The existing dedicated bicycle facilities located in the study area are highlighted in **Map 1**. In total, there are approximately 22 miles of existing bicycle facilities within the seven-square-mile study area. The most common type of bicycle facility are unprotected bicycle lanes, constituting 41% of the network. Shared pedestrian and bicycle facilities (multiuse trails and shared use pathways) represent 44%, with the remaining 15% being accounted for as buffered bike lanes and protected bike lanes. **Table 1** summarizes the total mileage and percentage for each facility type within the study area.

Table 1 Summary of Existing Bicycle and Pedestrian Facilities

Facility Type	Miles	Percent
Buffered Bike Lane	0.6	3%
Multi-Use Trail	5.9	27%
Protected Bike Lane	2.7	12%
Shared Use Pathway	3.7	17%
Unprotected Bike Lane	9.0	41%

[1]Source

Table 2 catalogs the existing facilities within the study area, followed by an overview of each facility type and application context within the study area. Baseline conditions are then coupled with programmed improvements to be included in the 2050 LRTP to identify gaps and opportunities for infill of the bicycle and pedestrian networks.

Table 2 Existing Bicycle and Pedestrian Facilities within the Study Area

Facility Name	From	To	Total Length (mile)	Length within Study Area (mile)	Facility Type	Roadway Speed
Biscayne Bay	SE 12 Street	SE 10 Street	0.3	0.3	Multi-Use Trail	Not Applicable
Coral Way	SW 12 Avenue	SW 15 Road	1.1	0.1	Unprotected Bike Lane	35
Linear Park	NW 8 Street	NW 10 Street	0.1	0.1	Multi-Use Trail	Not Applicable
Margaret Pace Baywalk	N Bayshore Drive	S of NE 20 Terrace	0.3	0.3	Multi-Use Trail	Not Applicable
Miami Avenue	SW 25 Road	SW 15 Road	0.8	0.8	Unprotected Bike Lane	40
Miami Ave Bridge	South of Miami River	North of Miami River	0.3	0.3	Unprotected Bike Lane	40
Miami River Greenway	MIC	Biscayne Bay	0.5	0.5	Multi-Use Trail	Not Applicable

[1] 2050 TPO Bike/Ped Plan -Needs Assessment

Facility Name	From	To	Total Length (mile)	Length within Study Area (mile)	Facility Type	Roadway Speed
Miami River Greenway	MIC	Biscayne Bay	6.4	3.7	Shared Use Pathway	Not Applicable
M-Path/The Underline	South Dadeland Station	Miami River	10.0	1.4	Multi-Use Trail	Not Applicable
Museum Park Baywalk	NE 6 Street	MacArthur Causeway	0.9	0.9	Multi-Use Trail	Not Applicable
N Miami Avenue	NW 11 Terrace	SE 1 Street	0.8	0.8	Protected Bike Lane	30 mph
N Miami Avenue	NE 17 Street	NW 20 Street	0.3	0.3	Unprotected Bike Lane	30 mph
NE 1 Avenue	NE 11 Street	SE 1 Street	0.8	0.8	Protected Bike Lane	30 mph
NE 2 Avenue	NE 37 Street	NE 42 Street	0.2	0.1	Unprotected Bike Lane	40 mph
NW 1 Avenue	NW 14 Street	NW 23 Street	0.8	0.8	Unprotected Bike Lane	30 mph
NW 1 Place	NW 11 Street	NW 14 Street	0.2	0.2	Unprotected Bike Lane	30 mph
NW 10 Street	NW 7 Avenue	NW 3 Avenue	0.4	0.1	Unprotected Bike Lane	30 mph
NW 11 Street	NW 7 Avenue	NW 3 Avenue	0.4	0.2	Unprotected Bike Lane	30 mph
NW 14 Street	NW 7 Avenue	NW 1 Avenue	0.7	0.5	Unprotected Bike Lane	35 mph
NW 3 Avenue	NW 8 Street	SW 2 Street	0.5	0.5	Unprotected Bike Lane	30 mph
NW 3 Court	NW 8 Street	SW 2 Street	0.4	0.4	Unprotected Bike Lane	30 mph
NW 5 Street	NW 3 Avenue	NE 2 Avenue	0.6	0.6	Protected Bike Lane	30 mph
NW 6 Street	NW 3 Avenue	NE 2 Avenue	0.6	0.6	Protected Bike Lane	30 mph
NW 9 Street Pedestrian Mall	NW 2 Avenue	NW 1 Avenue	0.1	0.1	Multi-Use Trail	Not Applicable
NW/NE 14 Street	NW 1 Avenue	NE 1 Avenue	0.2	0.2	Unprotected Bike Lane	35 mph
Rickenbacker Causeway	Toll Plaza	Crandon Marina	3.4	1.4	Unprotected Bike Lane	45 mph
Rickenbacker Trail	Brickell Avenue	Crandon Park	4.2	2.1	Multi-Use Trail	Not Applicable
SE 1 Street	SW 5 Avenue	SW 2 Avenue	0.3	0.1	Unprotected Bike Lane	40 mph

Facility Name	From	To	Total Length (mile)	Length within Study Area (mile)	Facility Type	Roadway Speed
South Miami Avenue	S. 14 Street	S. 10 Street	0.3	0.3	Unprotected Bike Lane	40 mph
SR 5/Brickell Avenue	SE 5 Street	SE 3 Avenue	0.2	0.2	Unprotected Bike Lane	40 mph
SR 968/W Flagler Street	SW 25 Avenue	SW 5 Avenue	2.1	0.1	Unprotected Bike Lane	45 mph
SR A1A/MacArthur Causeway	N. Bayshore Drive	Watson Island	1.1	0.4	Unprotected Bike Lane	45 mph
SW 15 Road	Coral Way	South Miami Avenue	0.4	0.4	Unprotected Bike Lane	35 mph
SW 15 Road	SW 11 Street	SW 13 Street	0.2	0.1	Unprotected Bike Lane	40 mph
SW 17 Road	SW 2nd Court	SR 972/SW 3 Avenue	0.2	0.1	Multi-Use Trail	30 mph
SW 2 Avenue	SW 15 Road	SW 8 Street	0.4	0.4	Unprotected Bike Lane	35 mph
SW 2 Street	SW 1 Avenue	South Miami Avenue	0.2	0.2	Unprotected Bike Lane	30 mph
SW 26 Road	South Miami Avenue	Rickenbacker Causeway	0.4	0.4	Unprotected Bike Lane	45 mph
SW 9 Street	SW 1 Avenue	South Miami Avenue	0.1	0.1	Unprotected Bike Lane	30 mph
SW-SE 1 Street	SW 2 Avenue	Biscayne Boulevard	0.6	0.6	Buffered Bike Lane	40 mph
Venetian Causeway	Bayshore Dr	17 Street	2.7	0.4	Unprotected Bike Lane	30 mph

[2]Source

Buffered Bicycle Lanes

Buffered bicycle lanes consist of conventional bicycle lanes paired with a designated buffer space that separates the bicycle lane from adjacent vehicular traffic or parking lanes. These lanes offer several advantages, including increased distance between motor vehicles and cyclists, enhancing safety. However, buffered lanes may primarily attract more experienced bicycle users, as studies suggest that only approximately 5-9% of riders feel safe biking in such lanes. A study performed by Portland State University found that 71% of residents in their study area said they would be more likely to travel by bicycle if these buffered lanes exist.[3].

Currently, only one segment within the study area is equipped with buffered bike lanes. Approximately 0.6 miles of buffered lanes are installed along SE 1 Street, stretching from SW 2 Street to Biscayne Boulevard. **Map 2** highlights this

[2] 2050 TPO Bike/Ped Plan -Needs Assessment
[3] The Influence of Bike Lane Buffer Types on Perceived Comfort and Safety of Bicyclists and Potential Bicyclists- Portland State University, 2015

one-way segment, offering eastbound access within the study area. Additionally, **Figure 1** provides a street view of the SE 1 Avenue buffered bike lanes (depicted in green), alongside a dedicated bus lane painted in red.

Map 2. Buffered Bike Lanes within the Study Area

Figure 1: Google Street view of buffered bike lanes along SE 1 Street

Multiuse Trails and Shared Use Pathways

Multiuse trails and shared use pathways are off-street, paved facilities that accommodate two-way travel for pedestrians and cyclists. Within the study area, these facilities represent 44%, or approximately 9.6 miles, of the existing bicycle and pedestrian network. This can be visualized in **Map 3** which depicts the current shared pathways and trails in Downtown. According to the Federal Highway Administration (FHWA), more than half of bicycle riders report feeling safe on shared pathways compared to other bicycle facilities.

Several segments of major trails within the study area are developed with shared use pathways and multiuse trail facilities, providing regional connectivity to and from Downtown Miami. These trails include:

The Underline: Spanning a total of 10 miles from South Dadeland Station to the south bank of the Miami River, approximately 1.4 miles of The Underline are located within the study area. The Brickell Backyard segment of The Underline, situated between the Miami River and SW 13 Street, features hydration stations, a bike repair station, bike racks, and shaded resting areas. **Figure 2** depicts The Underline at SW 8 Street in Downtown.

The Rickenbacker Trail: Beginning on Brickell Avenue and culminating at Crandon Park, this recreational trail covers a total of 4.2 miles and provides access to the city's beaches. Approximately 2.1 miles of this trail are within the study area's boundary. Changing rooms, bathrooms, and bike racks are provided adjacent to the trail within Hobie Beach Park.

The Miami River Greenway: Envisioning a trail circuit on the north and south banks of the Miami River, this facility is planned to extend from Bayfront Park to the Miami Intermodal Center. Approximately 4 miles of the Miami River Greenway have been developed within the study area, consisting of a mix of multiuse trail and shared use pathways facilities. **Figure 3** showcases a shared-use pathway along the Miami River Greenway by Bayfront Park.

Map 3. Multiuse trails and shared-use pathways within the study area

Figure 2: Google Street view of The Underline multiuse trail.

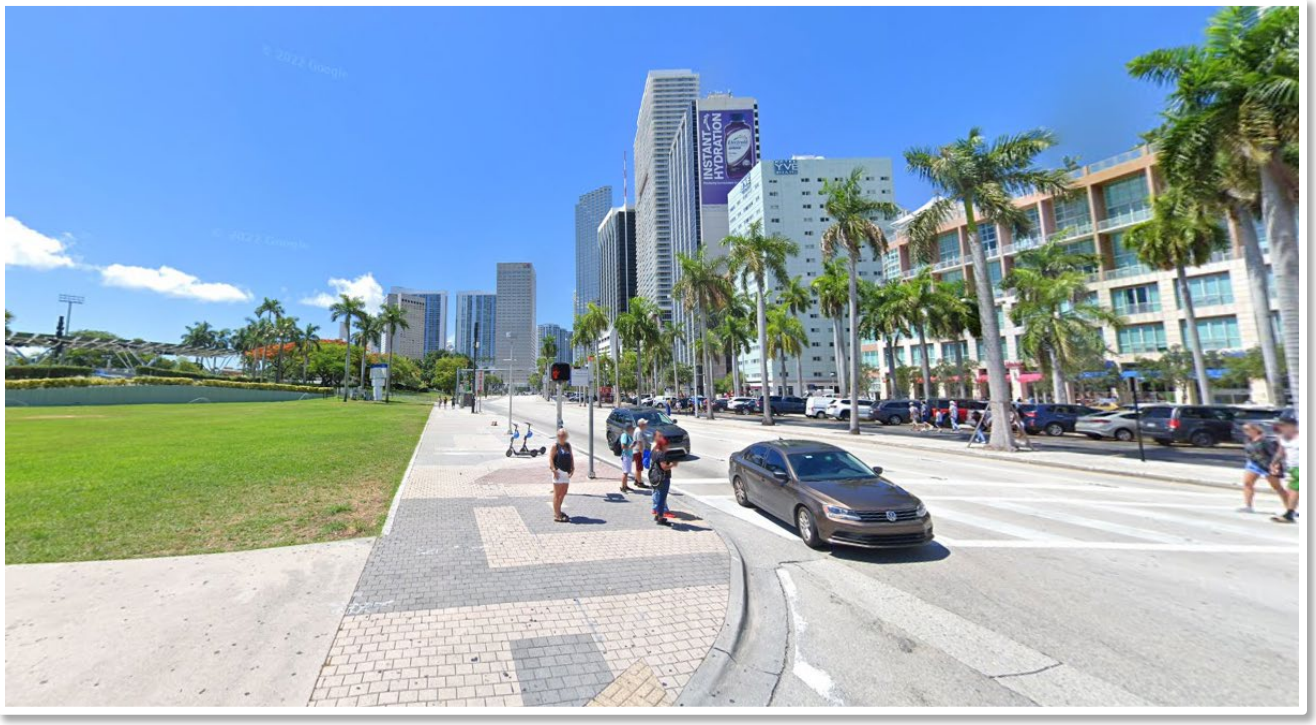


Figure 3: The Miami River Greenway fronting Bayfront Park is an example of a shared use pathway facility within the study area.

PROTECTED BICYCLE LANES

Protected bike lanes are bikeways typically installed at street level that incorporate various methods for physical protection from passing vehicular traffic. Barriers can include raised curbs, flexible posts, bollards, or even designated parking lanes. These types of bicycle facilities are commonly found in urban landscapes, and statistically, more than half of cyclists feel safe riding in them.[4]

Figure 4: Rendering of planters to be installed along the NE 5 Street and NE 6 Street protected bicycle lanes.

As of 2023, there are 2.7 miles of protected bike lanes providing one-way travel within the study area boundary. **Map 4** highlights the existing facilities in the area.

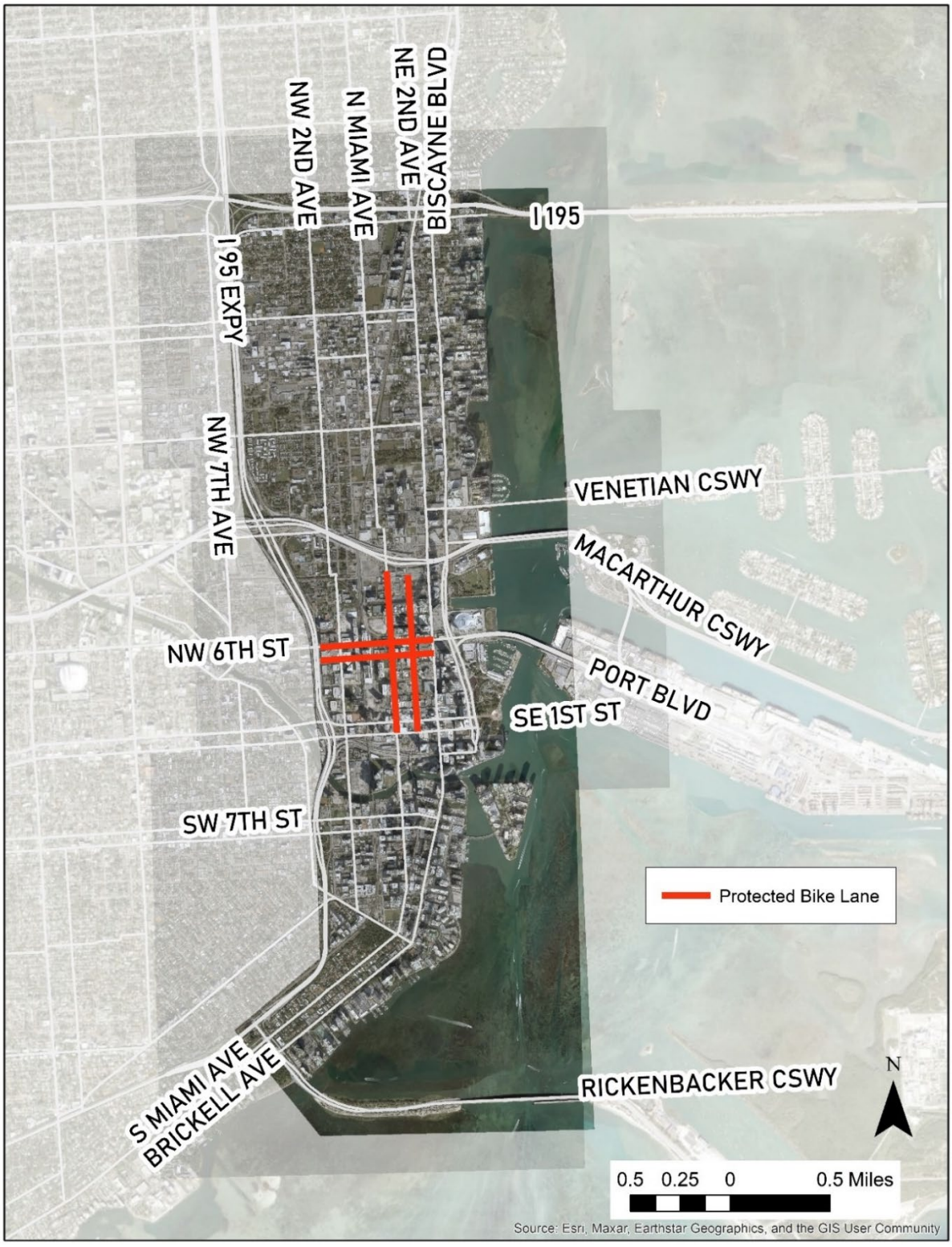
The lanes on NE/NW 5 Street and NE/NW 6 Street offer protected east and west access for cyclists, extending from NW 3 Avenue to NE 2 Avenue. The Downtown Development Authority is leading efforts to enhance the existing flexible posts protecting the bicycle lanes along these corridors with a more effective barrier system. **Figure 4** illustrates the proposed installation of planters to prevent the encroachment of vehicles along these bicycle facilities.

The east and west protected bicycle lanes as seen in **Figure 5**, intersect with the north and south routes along North Miami Avenue and NE 1 Avenue. Protected bike lanes are installed from NW 11 Terrace to SE 1 Street along North Miami Avenue, providing southbound access. On NE 1 Avenue, with traffic heading northbound, protected bicycle lanes are provided in

Figure 5: Google Street view of the bike lanes protected by on-street parking along North Miami Avenue.

[4] The Influence of Bike Lane Buffer Types on Perceived Comfort and Safety of Bicyclists and Potential Bicyclists- Portland State University, 2015

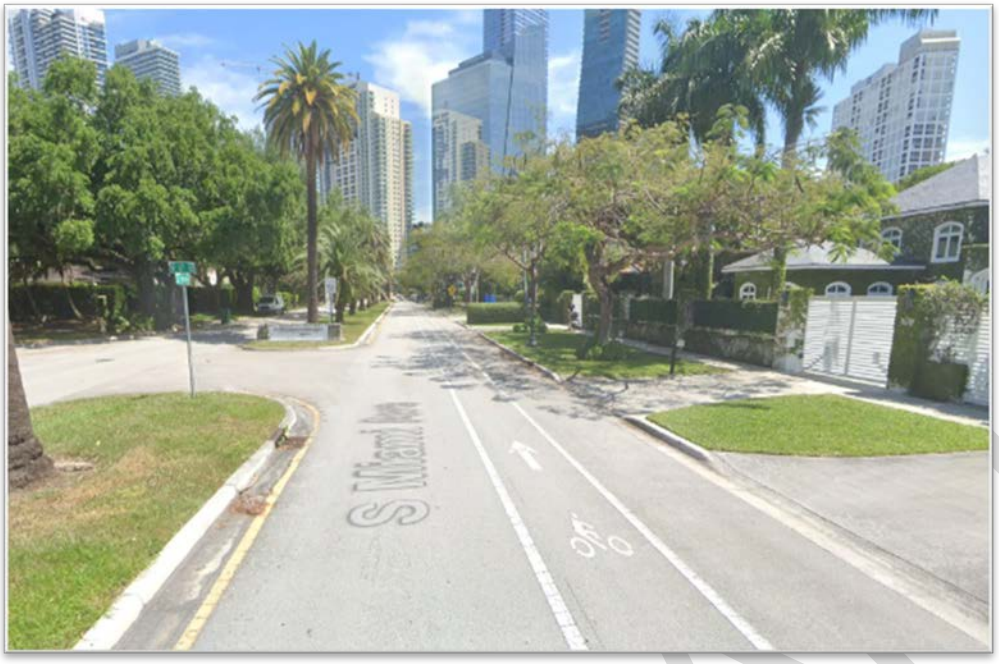
the segment from SE 1 Street to NE 11 Street. Bicycle protection along these corridors is achieved through a combination of flexible posts, raised curbs, and designated parking lanes.



Map 4. Existing protected bicycle lanes within the study area boundary

UNPROTECTED BICYCLE LANES

Unprotected bike lanes constitute the most common type of bicycle facility within the study area, accounting for 41% of the existing bicycle network. According to recent studies documented in Volume 171 of the Accident Prevention and Analysis, people were more likely to allow their kids to travel in bike lanes if they were protected. The same study concluded that higher speeds were seen in protected versus unprotected, painted lanes.[5]



Within the study area, unprotected bike lanes are situated on roadways with speed limits ranging from 30 mph up to 45 mph, as depicted in **Figure 6**. A significant concern with these lanes is the frequent encroachment by delivery trucks, ride-shares, food delivery cars, and even public safety vehicles into the designated bicycle spaces. Consequently, cyclists often need to maneuver onto adjacent roadways or sidewalks to complete their routes. **Map 5** provides a visual representation of existing unprotected bicycle paths within the study area.

[5] Alexandra Knight, Samuel G. Charlton, Protected and unprotected cycle lanes' effects on cyclists' behavior, Accident Analysis & Prevention, Volume 171,2022,

Figure 6

Map 5. Existing Unprotected Bicycle Lanes within the Study Area

COORDINATION WITH 2050 LRTP

Table 3 catalogs bicycle and pedestrian improvements for the study area, which are to be programmed in the 2050 LRTP. These improvements encompass unbuilt needs from the 2045 LRTP, as well as projects programmed in the FY 2020 Transportation Improvement Plan (TIP). The 2050 LRTP is slated for adoption by the TPO Governing Board in summer 2024.

Table 3 Programmed Bicycle and Pedestrian Improvements in the Study Area

Facility Name	From	To	Facility Type	Category	Planning Period	Length (miles)
M-Path Greenlink	SW 67 Avenue	Miami River Greenway	Shared Use Pathway	LRTP 2045 Cost Feasible	4	0.4
SE 32 Road/Brickell Avenue - Route A	The Underline	SR 913/Rickenbacker Causeway	Shared Use Pathway	LRTP 2045 Cost Feasible	3	0.3
SE/SW 26 Road - Route B	SR 913/ Rickenbacker Causeway	The Underline	Shared Use Pathway	LRTP 2045 Cost Feasible	3	0.4
The Underline	Dadeland South	Miami River	Shared Use Pathway	FY 2020 TIP	1	9.6
NW 17 Street	NW 7 Avenue	NW 7 Court	Shared Use Pathway	FY 2020 TIP	1	0.1
City of Miami I-395 Pedestrian Bay Walk Connection	Museum Park Baywalk	NE 15 Street	Shared Use Pathway	FY 2023 TIP		
SR AIA / MacArthur Causeway	East of SR -5/ Biscayne Boulevard	W. SR 907 /Alton Road	Bike Path	FY 2023 TIP		2.717
Intersection at S Miami Avenue and S 10 Street			Traffic Signal	FY 2023 TIP		
Intersection at Brickell Avenue and SE 14 Terrace			Traffic Signal	FY 2023 TIP		
Intersection at NW 1 Avenue and NW 29 Street			Traffic Signal	FY 2023 TIP		
Intersection at Coral Way and SW 2 Avenue			Traffic Signal	FY 2023 TIP		
Intersection at SE 8 Street and Brickell Bay Drive			Traffic Signal	FY 2023 TIP		
Intersection at NW 10 Avenue and NW 39 Street			Traffic Signal	FY 2023 TIP		

Facility Name	From	To	Facility Type	Category	Planning Period	Length (miles)
Intersection of NE 1 Avenue and NE 16 Street			Traffic Signal	FY 2023 TIP		
NW 2 Avenue	NW 38 Street	NW 57 Street	Protected Bicycle Lanes	LRTP 2050	5	1.2
SW 7 Avenue	SW 12 Avenue	SW 11 Street	Sidepath	LRTP 2050	5	0.7
SW 25 Road	SW 1 Avenue	SW 9 Avenue	Buffered Bike Lane	LRTP 2050	5	0.7
SW 6 Street	SW 27 Avenue	SW 5 Avenue	Sidepath	LRTP 2050	5	2.5
NW 6 Avenue	NW 40 Street	NW 47 Street	Protected Bicycle Lanes	LRTP 2050	5	0.4
NE 4 Avenue	NE 42 Street	NE 50 Street	Shared Use Pathway	LRTP 2050	5	0.7
NE 17 Street	North Miami Avenue	NE 2 Avenue	Shared Use Pathway	LRTP 2050	5	0.3
SE 1 Avenue	SE 6 Street	SE 3 Street	Shared Use Pathway	LRTP 2050	5	0.3
SE 1st Avenue	SE 1 Street	NE 1 Street	Protected Bicycle Lanes	LRTP 2050	5	0.3
N Federal Highway	NE 36 Street	NE 54 Street	Shared Use Pathway	LRTP 2050	5	1.1
NW 1 Place	NW 14 Street	NW 21 Street	Shared Use Pathway	LRTP 2050	5	0.7
NW 1 Avenue	NW 25 Street	NW 29 Street	Shared Use Pathway	LRTP 2050	5	0.2
NW 3 Avenue	NW 25 Street	NW 29 Avenue	Shared Use Pathway	LRTP 2050	5	0.2
NE 17 Street	NE 2 Avenue	Biscayne Boulevard	Shared Use Pathway	LRTP 2050	5	0.1
NE 2 Avenue	NE 17 Street	NE 17 Street	Shared Use Pathway	LRTP 2050	5	0.0
Brickell Bay Drive	SE 15 Road	SE 14 Street	Shared Use Pathway	LRTP 2050	5	0.3
Commodore Trail	N Prospect Drive	Rickenbacker Causeway	Shared Use Pathway	LRTP 2050	5	4.4
Plan Z	SE/SW 26 Road	Rickenbacker Causeway	Shared Use Pathway	LRTP 2050	5	2.4
NE 23 Street	Biscayne Boulevard	NE 4 Avenue	Shared Use Pathway	LRTP 2050	5	0.1
NE 4 Avenue	NE 22 Street	NE 24 Street	Shared Use Pathway	LRTP 2050	5	0.2
Ludlam Trail	SW 8 Street	Flagler Street	Pedestrian Bridge	LRTP 2050	2.5	5.6

[6]Source

Pedestrian Shed Analysis

The existing network and planned connectivity segments were evaluated concerning their proximity to Metromover and Metrorail stations within the study area. Additionally, the segment of The Underline within the study boundary was included in the evaluation.

A pedestrian shed analysis was conducted to assess the accessibility of bicycle facilities within walking distance of transit stations in the study area. Originating from the new urbanist movement, the concept of a pedestrian shed defines areas reachable within a five or ten-minute pedestrian catchment radius centered on a specific point. Traditionally, a quarter-mile buffer represents a five-minute walk, while half a mile signifies a ten-minute walk.[7] This analytical approach is effective in Miami due to its gridded street system, facilitating the capture of walking distances and providing users with a predictable street pattern for easier navigation.

A cursory study of the areas reveals several findings. In the study area, blocks are typically platted so that the street-side is a greater distance than the avenue-side. For example, in Brickell, blocks adjacent to the Metrorail line have a street-side ranging from approximately 500 to 650 feet, while avenue-sides are about half that length, typically measuring 320 feet. North of I-395, this grid pattern exhibits more variety, reflecting historical land uses and the presence of at-grade railways that traverse this area.

A preliminary analysis of the 5-minute pedestrian shed around Metromover stations quickly demonstrates that most stations are located within a quarter-mile distance of another Metromover station. **Map 6** illustrates that every Metromover station, except the School Board station, is within a 5-minute walk of another Metromover station.

[6] 2050 TPO Bike/Ped Plan -Needs Assessment
[7] Plater-Zyberk, **The 5-minute neighborhood, 15-minute city, and 20-minute suburb, Congress for the New Urbanism, 2024**

The existing and planned connectivity analysis is complemented by the findings from the Transit Alliance Miami's 2023 Mobility Scorecard, which builds upon its 2018 predecessor by placing a greater emphasis on safety issues and metrics for pedestrians and cyclists in relation to the County's transit network.

Map 6. Metromover stations pedestrian shed analysis of existing and proposed bicycle network improvements in the study area.

As shown in **Table 4**, all Metromover stations have access to a bicycle facility within a 5-minute walk. The table also includes the planned improvements from the TPO's 2050 Needs Assessment for the LRTP. The stations located around the southern terminus (Financial District and Tenth Street Promenade), and the northern terminus (Adrienne Arsht Center, School Board, and Museum Park) of the circulator have fewer bicycle facilities. Most facilities providing north/south and east/west access within the study area are concentrated north of the Miami River and south of NE 11 Street.

The 4.4-mile Metromover system received a B rating with an average delay time of less than 2 minutes and a monthly ridership of 558,396 riders. The Metromover operates free of charge, but the typical cost per rider has been quantified at $2.07. While the system has not been updated since 1994, proposed extensions include a route north to the Design District and east to Miami Beach. Fleet replacement, which is anticipated to deliver more reliable service, is expected to be completed by Summer 2025.

Table 4 Metromover Station Pedestrian Shed Analysis for Bicycle Facilities

Station Name	Facilities within 5-minute Pedestrian Shed	Direction
Adrienne Arsht Center	Margaret Pace Baywalk from N. Bayshore Drive to S. of NE 20 Terrace	North and South
	Museum Park Baywalk from NE 6 Street to MacArthur Causeway	North and South
	Unprotected Bike Lanes on MacArthur Causeway from N. Bayshore Drive to Watson Island	East and West
	Unprotected Bike Lanes on Venetian Causeway from Bayshore Drive to 17 Street	East and West
Bayfront Park	Miami River Greenway Trail: MIC to Biscayne Bay	East and West, then North and South on Biscayne Boulevard and Biscayne Bay
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East
	Unprotected Bike Lanes on Brickell Avenue from SE 5 Street to SE 3 Avenue	North and South, then West on SE 3 Avenue
Brickell	M-Path/The Underline: South Dadeland Station to the Miami River	North and South
	Unprotected Bike Lanes on SW 15 Road from SW 11 Street to South Miami Avenue	East and West
	Unprotected Bike Lanes on Miami Ave Bridge from South of the Miami River to North of the Miami River	North and South
	Unprotected Bike Lanes on Coral Way from SW 12 Avenue to SW 15 Road	North and South
	Unprotected Bike Lanes on SW 2 Avenue from SW 15 Road to SW 8 Street	North and South
	Unprotected Bike Lanes on South Miami Avenue from SW/SE 14 Street to SW/SE 10 Street	North and South up to SW/SE 12 Street, then North
	Unprotected Bike Lanes on SW 9 Street from SW 1 Avenue to South Miami Avenue	West
College/ Bayside Station	Miami River Greenway Trail: MIC to Biscayne Bay	East and West then North and South on Biscayne Boulevard and Biscayne Bay
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North

Station Name	Facilities within 5-minute Pedestrian Shed	Direction
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Protected Bike Lane on NW 6 Street from NW 3 Avenue to NE 2 Avenue	West
College North (Bike Miles: 3.34)	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on N. Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Protected Bike Lane on NW 6 Street from NW 3 Avenue to NE 2 Avenue	West
Brickell City Centre/ Eighth Street	Miami River Greenway Trail: MIC to Biscayne Bay	East and West
	M-Path/The Underline: South Dadeland Station to the Miami River	North and South
	Unprotected Bike Lanes on Miami Avenue Bridge from South of the Miami River to North of the Miami River	North and South
	Unprotected Bike Lanes on SW 9 Street from SW 1 Avenue to South Miami Avenue	West
	Unprotected Bike Lanes on Brickell Avenue from SE 5 Street to SE 3 Avenue	North and South, then West on SE 3 Avenue
	Unprotected Bike Lanes on South Miami Avenue from SW/SE 14 Street to SW/SE 10 Street	North and South up to SW/SE 12 Street, then North
Eleventh Street	Museum Park Baywalk from NE 6 Street to MacArthur Causeway	North and South
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
Fifth Street	Miami River Greenway Trail: MIC to Biscayne Bay	East and West
	M-Path/The Underline: South Dadeland Station to Miami River	North and South
	Unprotected Bike Lanes on Miami Avenue Bridge from South of the Miami River to North of the Miami River	North and South
	Unprotected Bike Lanes on Brickell Avenue from SE 5 Street to SE 3 Avenue	North and South, then West on SE 3 Avenue
	Unprotected Bike Lanes on SW 2 Avenue from SW 1 Avenue to South Miami Avenue	West
Financial District	M-Path/The Underline: South Dadeland Station to the Miami River	North and South
	Unprotected Bike Lanes on SW 15 Road from SW 11 Street to South Miami Avenue	East and West
	Unprotected Bike Lanes on South Miami Avenue from SW/SE 14 Street to SW/SE 10 Street	North and South up to SW/SE 12 Street, then North
	Brickell Bay Drive Shared use pathway from SE 15 Road to SE 14 Street (included in the 2050 LRTP)	North and South
First Street	Miami River Greenway Trail: MIC to Biscayne Bay	North and South
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on N. Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Protected Bike Lane on NW 6 Street from NW 3 Avenue to NE 2 Avenue	West

Station Name	Facilities within 5-minute Pedestrian Shed	Direction
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East
Freedom Tower	Museum Park Baywalk from NE 6 Street to MacArthur Causeway	North and South
	Miami River Greenway Trail: MIC to Biscayne Bay	North and South
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Protected Bike Lane on NW 6 Street from NW 3 Avenue to NE 2 Avenue	West
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East
Government Center	Unprotected Bike Lanes on NW 3 Avenue from NW 8 Street to SW 2 Street	North
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Unprotected Bike Lanes on SE 1 Street from SW 5 Avenue to SW 2 Avenue	East
	Unprotected Bike Lanes on NW 3 Court from NW 8 Street to SW 2 Street	South
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Unprotected Bike Lanes on SW 2 Street from SW 1 Avenue to South Miami Ave	West
	Unprotected Bike Lanes on W Flagler Street from SW 25 Avenue to SW 5 Avenue	West
Knight Center	Miami River Greenway Trail: MIC to Biscayne Bay	East and West
	Unprotected Bike Lanes on Miami Ave Bridge from South of the Miami River to North of the Miami River	North and South
	Unprotected Bike Lanes on Brickell Avenue from SE 5 Street to SE 3 Avenue	North and South, then West on SE 3 Avenue
	Unprotected Bike Lanes on SW 2nd Street from SW 1 Avenue to South Miami Avenue	West
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
Miami Avenue	Miami River Greenway Trail: MIC to Biscayne Bay	East and West
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East
	Unprotected Bike Lanes on SE 1 Street from SW 5 Avenue to SW 2 Avenue	East
	Unprotected Bike Lanes on Miami Avenue Bridge from South of the Miami River to North of the Miami River	North and South
	Unprotected Bike Lanes on SW 2 Street from SW 1 Avenue to South Miami Avenue	West
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South

Station Name	Facilities within 5-minute Pedestrian Shed	Direction
Museum Park	Museum Park Baywalk from NE 6 Street to MacArthur Causeway	North and South
	Unprotected Bike Lanes on MacArthur Causeway from N. Bayshore Drive to Watson Island	East and West
Park West	Museum Park Baywalk from NE 6 Street to MacArthur Causeway	North and South
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on N. Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Protected Bike Lane on NW 6 Street from NW 3 Avenue to NE 2 Avenue	West
Riverwalk	Miami River Greenway Trail: MIC to Biscayne Bay	East and West
	M-Path/The Underline Trail: South Dadeland Station to the Miami River	North and South
	Unprotected Bike Lanes on Miami Avenue Bridge from South of the Miami River to North of the Miami River	North and South
	Unprotected Bike Lanes on Brickell Avenue from SE 5 Street to SE 3 Avenue	North and South, then West on SE 3 Avenue
	Unprotected Bike Lanes on SW 2 Street from SW 1 Avenue to South Miami Avenue	West
	Buffered Bike Lanes on SW/SE 1 Street from SW 2 Avenue to Biscayne Boulevard	East
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
School Board	Unprotected Bike Lane on N 14 Street from NW 7 Avenue to NE 1 Avenue	East and West
	Unprotected Bike Lane on NW 1 Avenue from NW 14 Street to NW 23 Street	North and South
	Unprotected Bike Lane on North Miami Avenue from NE 17 Street to NW 20 Street	North and South
	Protected Bike Lane on NE 17 Street from North Miami Avenue to NE 2 Avenue (included in the 2050 LRTP)	North
	Protected Bike Lane on NE 2 Avenue from NE 17 Street to NE 17 Street (included in the 2050 LRTP)	East
	Shared Use Pathway on NE 17 Street from NE 2 Avenue to Biscayne Boulevard (included in the 2050 LRTP)	East and West
Tenth Street/ Promenade	M-Path/The Underline Trail: South Dadeland Station to the Miami River	North and South
	Shared use Pathway Biscayne Bay from SE 12 Street to SE 10 Street	North and South
	Miami River Greenway Trail: MIC to Biscayne Bay	East and West
	Unprotected Bike Lanes on Miami Avenue Bridge from South of the River to North of the Miami River	North and South
	Unprotected Bike Lanes on South Miami Avenue from SW/SE 14 Street to SW/SE 10 Street	North and South up to SW/SE 12 Street, then North
	Unprotected Bike Lanes on SW 9 Street from SW 1 Avenue to South Miami Avenue	West
Third Street	Miami River Greenway Trail: MIC to Biscayne Bay	East and West
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East

Station Name	Facilities within 5-minute Pedestrian Shed	Direction
	Unprotected Bike Lanes on Miami Avenue Bridge from South of the Miami River to North of the Miami River	North and South
	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Unprotected Bike Lanes on Brickell Avenue from SE 5 Street to SE 3 Avenue	North and South, then West on SE 3 Avenue
	Unprotected Bike Lanes on SW 2 Street from SW 1 Avenue to South Miami Avenue	West
	Protected Bike Lane on SE 1 Avenue from SE 1 Street to NE 1 Street (included in the 2050 LRTP)	North
	Shared-Use Path on SE 1 Avenue from SE 6 Street to SE 3 Street (included in the 2050 LRTP)	North and South
Wilkie D. Ferguson, Jr	Protected Bike Lane on NE 1 Avenue from NE 11 Street to SE 1 Street	North
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Protected Bike Lane on NW 6 Street from NW 3 Avenue to NE 2 Avenue	West
	Linear Pak (between NW 1 Court and Arena Boulevard) from NW 8 Street to NW 10 Street	North & South

A pedestrian shed analysis which can be seen in **Table 5** was completed for Metrorail stations in and adjacent to the study area to evaluate bicycle connectivity, including an analysis of existing and programmed improvements for implementation. Metrorail stations within the study area appear to be adequately served by pedestrian and bicycle facilities, particularly the Brickell and Historic Overtown/ Lyric Theatre Metrorail Stations. As demonstrated in **Map 7**, Metrorail stations northwest of the study area, including Allapattah, Santa Clara, and Civic Center, lack designated bicycle facilities providing east/west connections into the study area.

Pedestrian access to Metrorail stops was ranked by ridership and walking score in the Transit Alliance Mobility scorecard for 2023. There are three Metrorail stations within the study area. These are the Historic Overtown/Lyric Theater, Government Center, and Brickell Metrorail Stations. The Government Center Metrorail Station has the highest ridership of all the Metrorail stops with a walking score of 94, followed by the Brickell Metrorail Station with the second highest ridership and a 99-walking score. In contrast, the Historic Overtown/Lyric Theater station has a comparatively less ridership, ranking 12th in ridership with a 93-walking score.

Regarding mass transit services provided, Metrorail scored a C rating, averaging a 49.2% on-time arrival/departure performance. A Metrorail system's expansion has been proposed as part of the Strategic Miami Area Rapid Transit (SMART) Plan, including the Northeast Corridor, the North Corridor, the Baylink; and the South Corridor Bus Rapid Transit (BRT), which is under construction. Recommendations for system improvements include increasing frequency, upzoning land around stations to encourage development, and improving connectivity from stations to population centers with better bus and trolley connections, additional biking infrastructure, and crossing improvements for pedestrians.

Based on projects to be included in the 2050 LRTP, new bicycle and pedestrian improvements are being considered near the Brickell and Vizcaya Metrorail Stations, within a 5-minute walk of each station. However, the proposed projects have

a significant regional impact, expanding access to The Underline from other facilities and connecting to the regional network. These improvements are further addressed in the report, detailing how they link to The Underline.

Table 5 Metrorail Station Pedestrian Shed Analysis for Bicycle Facilities

Station Name	Facilities within 5-minute Pedestrian Shed	Direction
Culmer	Unprotected Bike Lane on NW/NE 14 Street from NW 7 Avenue to NE 1 Avenue	East and West
	Unprotected Bike Lane on NW 11 Street from NW 7 Avenue to NW 3 Avenue	West
	Unprotected Bike Lane on NW 10 Street from NW 7 Avenue to NW 3 Avenue	East
Historic Overtown/ Lyric Theatre	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Protected Bike Lane on NW 6 Street from NW 3 Avenue to NE 2 Avenue	West
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Unprotected Bike Lanes on NW 3 Avenue from NW 8 Street to SW 2 Street	North
	NW 9 Street Pedestrian Mall from NW 2 Avenue to NW 1 Avenue	East and West
	Linear Pak (between NW 1 Court and Arena Boulevard) from NW 8 Street to NW 10 Street	North and South
Government Center	Unprotected Bike Lanes on NW 3 Avenue from NW 8 Street to SW 2 Street	North
	Buffered Bike Lanes on SE/SW 1 Street from SW 2 Avenue to Biscayne Boulevard	East
	Protected Bike Lane on NW 5 Street from NW 3 Avenue to NE 2 Avenue	East
	Unprotected Bike Lanes on SE 1 Street from SW 5 Avenue to SW 2 Avenue	East
	Protected Bike Lane on North Miami Avenue from NW 11 Terrace to SE 1 Street	South
	Unprotected Bike Lanes on SW 2 Street from SW 1 Avenue to South Miami Avenue	West
	Unprotected Bike Lanes on NW 3 Court from NW 8 Street to SW 2 Street	South
	Unprotected Bike Lanes on W Flagler Street from SW 25 Avenue to SW 5 Avenue	West
Brickell	M-Path/The Underline: South Dadeland Station to the Miami River	North and South
	Unprotected Bike Lanes on SW 9 Street from SW 1 Avenue to South Miami Avenue	West
	Unprotected Bike Lanes on South Miami Avenue from SW/SE 14 Street to SW/SE 10 Street	North and South up to SW/SE 12 Street, then North
	Unprotected Bike Lanes on SW 2 Avenue from SW 15 Road to SW 8 Street	North and South
	Unprotected Bike Lanes on Coral Way from SW 12 Avenue to SW 15 Road	North and South
	Unprotected Bike Lanes on Miami Avenue Bridge from South of the Miami River to N of the Miami River	North and South

Station Name	Facilities within 5-minute Pedestrian Shed	Direction
	Unprotected Bike Lanes on SW 15 Road from SW 11 Street to South Miami Avenue	East and West
Vizcaya	Unprotected Bike Lanes on Coral Way from SW 12 Avenue to SW 15 Road	North and South
	M-Path/The Underline: South Dadeland Station to the Miami River	North and South
	Commodore Trail: Mercy Way to SE 32 Road	North and South

Map 7. Metrorail stations pedestrian shed analysis of existing and proposed bicycle network improvements in the study area

Within the study area, public transit is supported by the County's Metrobus system, City of Miami trolly, and point-to-point services like Freebee and GoConnect. According to the Transit Alliances Mobility Scorecard, the City of Miami's trolley service has the highest ridership rate for any municipality in the County, estimated at over 2.6 million riders, followed by Miami Beach and the Coral Gables trolley service. The Miami trolley has a frequency of fifteen to thirty minutes, and it averages a $4.13 cost per rider. Overall, the municipal trolley system in the County received an F-rating in the 2023 scorecard prepared by the Transit Alliance. Moreover, the County's Metrobus received a D-rating due to being identified as being on time 32.4% of the time, with most delayed trips happening in Downtown Miami and Miami Beach.

Overall, the Transit Alliance rated cycling and bicycle facilities in Miami-Dade County an F, with 919 crashes, 845 serious injuries, and 17 fatalities. As of 2022, the County has a total of 207.77 miles of bicycle lanes. Of these, 95% are unprotected, and only 5% or 11.2 miles are buffered or protected lanes. Paved paths and multiuse trails are also part of the network, accounting for another 178.23 miles countywide.

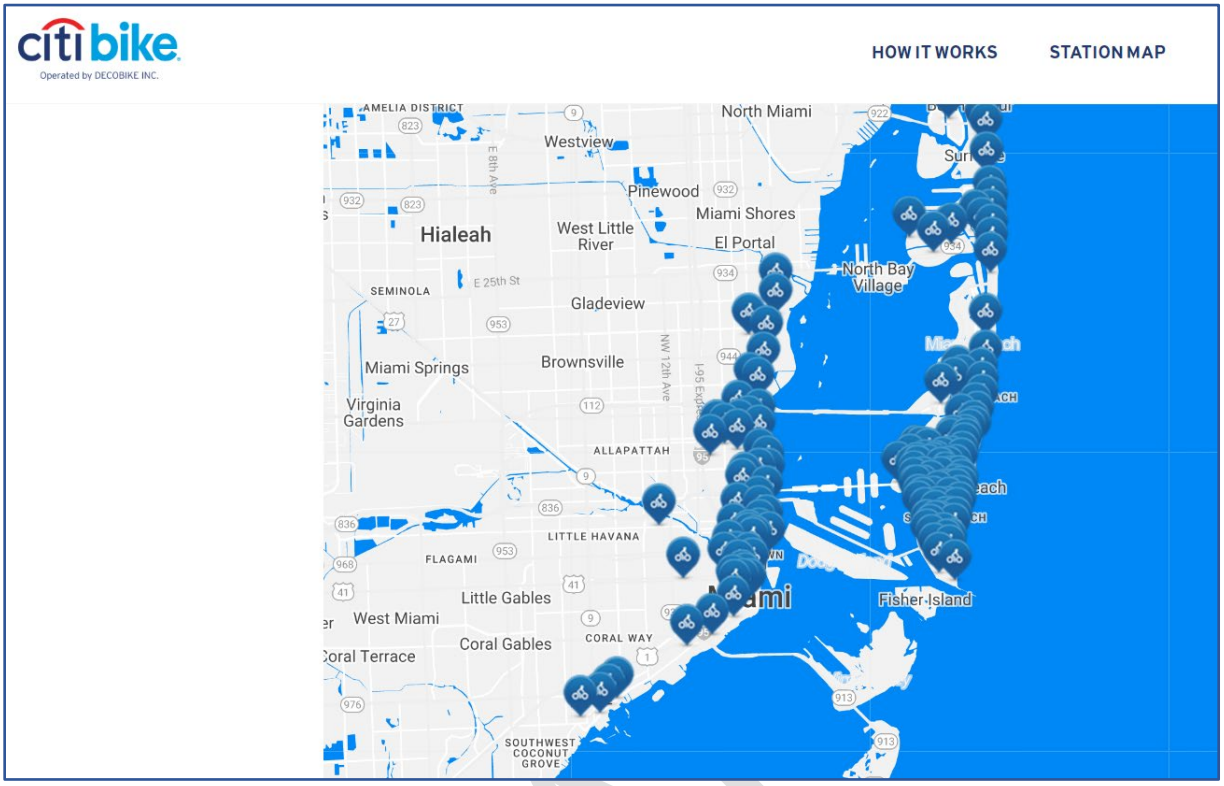
The study reveals a decline in bike and pedestrian facilities in Miami-Dade and Florida in general, while the national trend indicates an increase in incidents. Between 2018 and 2022, a total of 2,943 pedestrian and bike crashes were recorded in Miami-Dade. Among these, 283 resulted in serious injuries, and 112 led to fatalities.

Common characteristics were identified for roadway segments with high fatalities. Over 85% of fatal and severe crashes occurred on "*stroads*". A "*stroad*" is a type of thoroughfare with a mix of street and road characteristics that typically prioritize vehicular traffic. They are often too wide and fast, with speed limits exceeding 40 mph, have multiple intersections to facilitate vehicular traffic flow efficiently, and frequently allow right turns on a red signal. Pedestrian and cycling amenities are minimal, sidewalks lack buffers, crosswalks are poorly marked, and very little shade or tree cover is provided. Typically occurring at intersections and driveways, conflicts noted in the study area include drivers often looking towards oncoming traffic or initiating a turn before looking for pedestrians or cyclists coming from the other direction on the sidewalk. Despite these characteristics, no roadway in the study area was identified as a high bicycle crash segment.

The bicycle network's fragmentation and lack of continuity limit its full potential. Most bicycle pathways or lanes are for leisure, and the system could benefit by connecting to job centers, places of interest, or other regional amenities. With an expanded network, bicycling and walking could potentially replace trips under three miles, which account for over a third of vehicular trips in Miami-Dade County.

The area's access to bicycle amenities is augmented by a bike-sharing program. Bike-sharing programs typically come in two main formats: docking and dockless systems. Docking systems involve renting bikes from designated stations, known as docks, which are equipped with technology-enabled bicycle racks. Users can pick up a bike from one dock and return it to another within the system. Dockless systems, on the other hand, operate without fixed stations, relying instead on smart technology to locate and unlock available bikes.

In Miami, the CitiBike program offers a docking system bike-sharing program that also extends into Miami Beach, adjacent to the study area. There are more than 160 bike station locations that are available year-round. Use of the CitiBike system is through a membership pass or an hourly rental. Individuals registered with the program and nonmembers that have the application on their phones can acquire a bike at any of the stations. **Map 8** showcases the over 160 current station locations where the public can rent bicycles through the CitiBike sharing system.



Map 8. Citi Bike Miami station locations.

Of the 160 stations, thirty-nine stations were identified within the study area, and a total of 75,692 bicycle rentals were documented for the CitiBike stations for the period between January 2023 to July 2023.

The three top performing stations with the greatest use are located at:

1. N. Bayshore Drive between SW 17 Street and SW 18 Street (6,055 rides)
2. NE 1 Street and Herald Plaza (5,610 rides)
3. Biscayne Boulevard and NE 15 Street (4,424 rides)

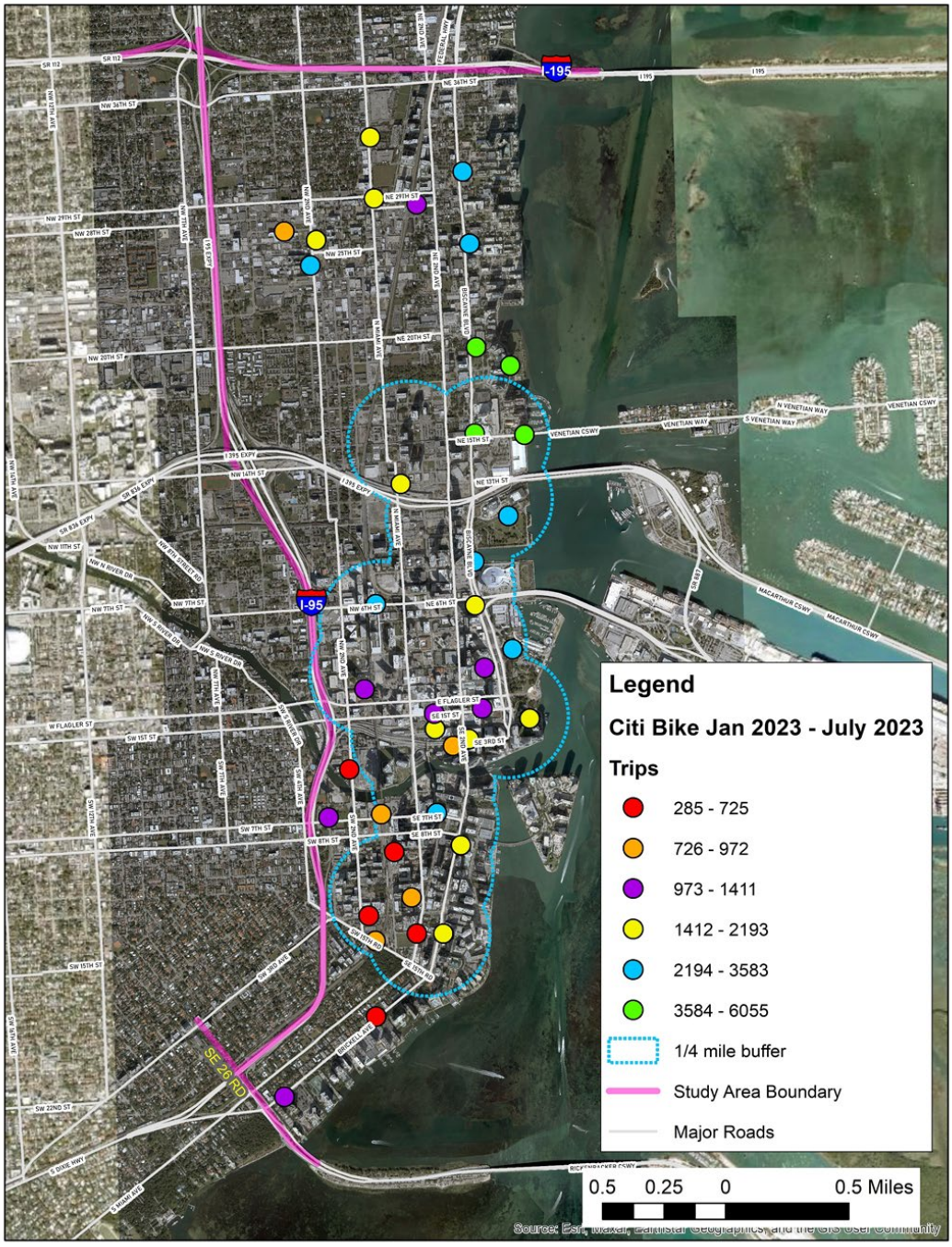
These three stations are located near the Venetian Causeway. This correlates with the findings from Strava pedestrian and cyclist heat maps, highlighting that the causeway is a frequent and preferred path for users.

The three stations with the lowest rentals or rides were located at:

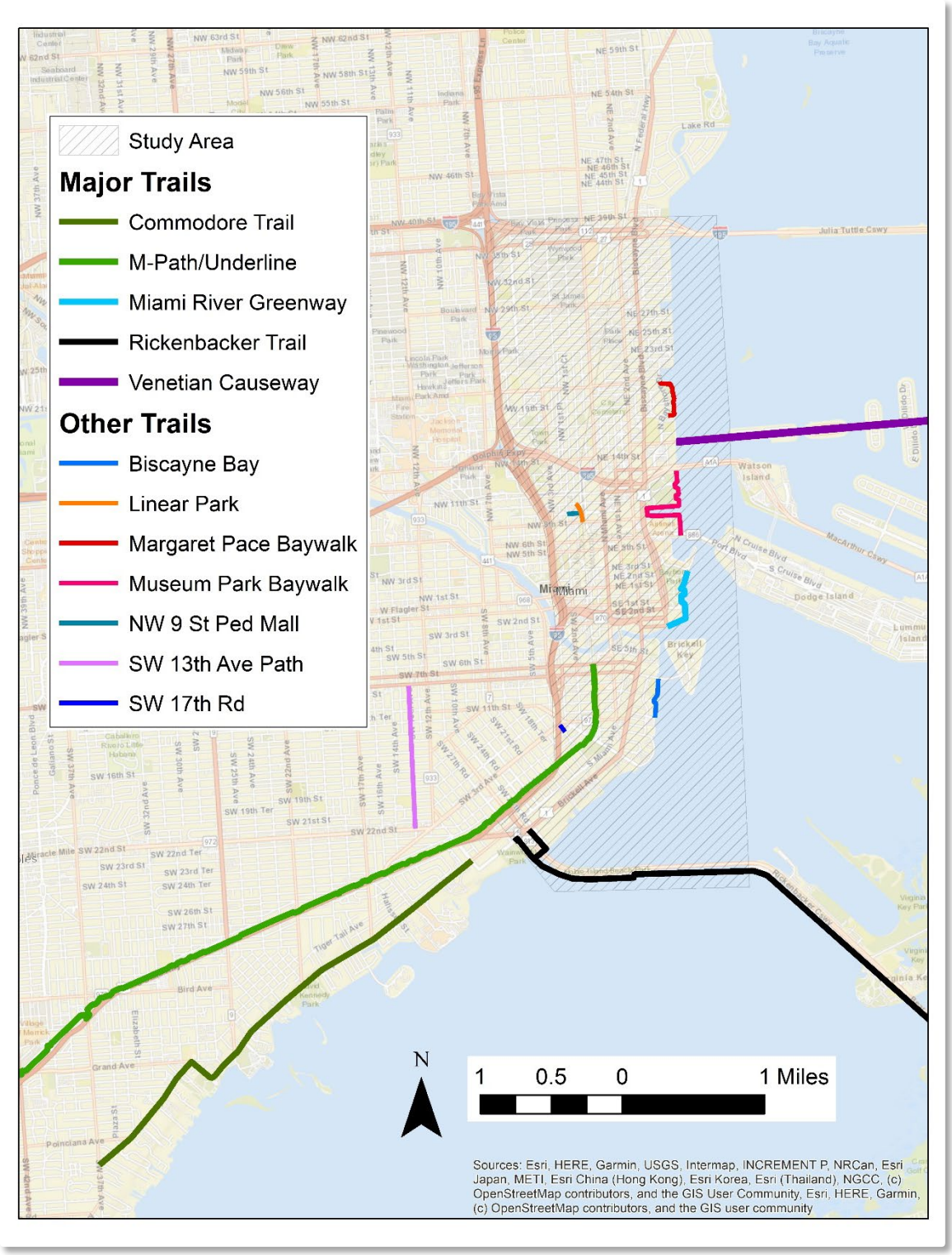
1. Miami River Side Center at 444 SW 2 Avenue (285 rides)
2. SE 14 Street and South Miami Avenue (545 rides)
3. SW 13 Street and SW 2 Avenue (641 rides)

These locations are mostly in the Brickell area.

Of the 39 stations, 25 are located within a ¼ mile of a Metromover station and can be an effective first- and last-mile option. Map 9 shows the bikeshare station locations within study area. It must be noted, CitiBikes are not permitted on the Metrorail or Metromover systems. Miami-Dade Transit Security and local police are authorized to stop anyone who fails to comply and may retain the bike(s).



Map 9. Map of Citi Bike station locations within study area.



Map 10. Major pedestrian and bicycle trails connecting to the study area

CONNECTIVITY TO MAJOR TRAILS

The assessment includes an evaluation of bicycle and pedestrian connectivity to The Underline, and the overall connectivity of the Rickenbacker Trail, the Commodore Trail, and the Venetian Trail to The Underline and the general study area. Map 10 depicts this study's boundaries.

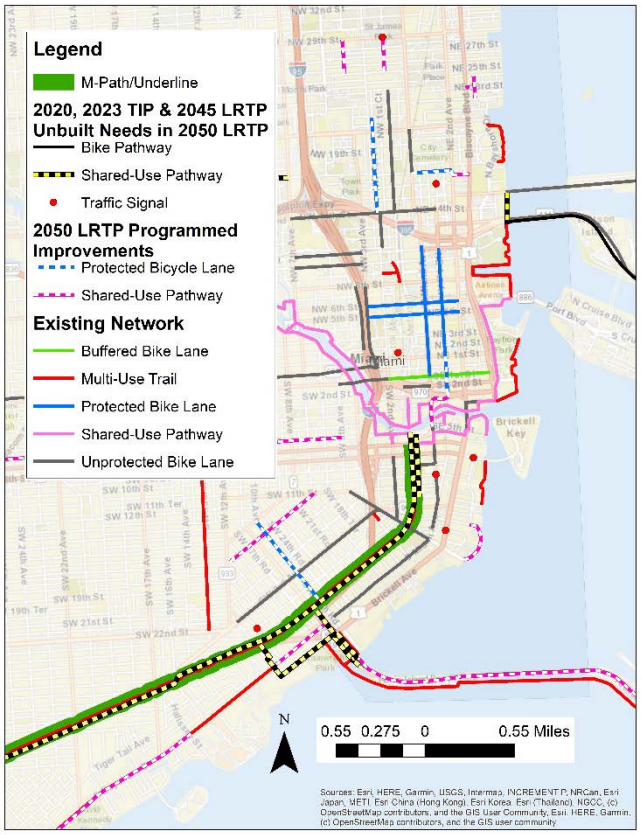
The Underline serves as the vital spine in the intricate network of regional trails. **Map 11** illustrates The Underline's seamless linkages to completed and proposed trail connections. Spanning approximately 10 miles, the trail follows the Metrorail line overhead, functioning as a linear park and a unifying thread for the diverse communities it connects, including Downtown, Brickell, Coconut Grove, and the South Miami-Dade communities.

In addition to its role as a trail, The Underline significantly enhances accessibility by seamlessly integrating with various modes of transportation, including the Metromover, Metrorail, Metrobuses, and municipal trolleys. This connectivity extends to a total of eight of the 23 Metrorail stations.

The Underline also connects with The Commodore Trail along SE 32 Avenue and South Miami Avenue. A shared use pathway is planned to improve that connection in the 2050 LRTP. **Map 10** illustrates the overall existing and programmed bicycle network in relation to The Underline. Based on the network reviewed, adequate connections are provided from The Underline to the Miami River Greenway. However, the Venetian Causeway is limited to a connection between Herald Plaza, NE 15 Street, and MacArthur Causeway.

Overall, only approximately 1.5 miles of The Underline are within the study area. **Map 11** shows the portion of the segment that runs from the south bank of the Miami River to SE 26 Road, or the southern boundary of the study area. Improvements programmed for implementation are needed in the area and will reinforce connections to other regional trails like the Rickenbacker Trail and the Commodore Trail.

In addition to The Underline trial, the Commodore Trail, Rickenbacker Trail, and the Venetian Causeway were evaluated to assess their connectivity and access to Downtown Miami.



Map 11. The Underline and existing bicycle network

The Rickenbacker Trail

Figure 7: Proposed location map for Rickenbacker Causeway Master Plan

The Rickenbacker Trail connects the City of Miami with Bill Baggs Cape Florida State Park and runs a total of 8.5 miles. It is developed through a mix of on-street bicycles lanes, paved multiuse pathways, and sidewalks. It provides access to cultural sites, educational facilities, and plenty of water sports opportunities. **Figure 7** is a map prepared by Miami Dade County highlighting the points of interest along the trail.

The multiuse/shared use pathway portion of the trail runs for an approximate length of 4.2 miles, beginning at Brickell Avenue and SE 26 Road and extending to near the Crandon Park Marina. Users can continue and connect to the Village of Key Biscayne through the portion of the Trail (approximately 2.4 miles) that traverse though Crandon Beach Park and culminates at Rickenbacker Circle on Crandon Boulevard/SR 913 . To access, users must cross Crandon Boulevard/SR 913 at the designated crosswalk near the trails-end at the Marina. The multiuse trail provides off-road access for cyclists and pedestrians for a total of 6.6 miles, which are complemented by on-road, unprotected bicycle lanes that follow the same route of the trail on both directions of the Rickenbacker Causeway and Crandon Boulevard/SR 913.

The Rickenbacker Trail stands as one of the busiest bicycling and running routes in Miami-Dade County. According to the Miami-Dade Department of Transportation and Public Works (DTPW), cyclist and pedestrian counts for Rickenbacker Causeway are estimated at approximately 500,000 cyclists and 250,000 pedestrians per year.

Connections between the Rickenbacker Trail and The Underline are being improved through the following unbuilt LRTP 2045 Cost Feasible Projects to be included in the 2050 LRTP:

- 0.91 mile shared use pathway on SW/SE 26 Road from SW/SE 32 Road, crossing South Miami Avenue and connecting to Brickell Avenue and the Rickenbacker Causeway.

Within the study area, a segment of the Commodore Trail (4.37 miles total) is proposed. The shared-use path segment on South Miami Avenue between SW/SE 32 Road and the Rickenbacker Causeway will connect the three trails: The Underline, the Rickenbacker Trail, and the Commodore Trial.

The 2050 LRTP will also include the following unbuilt LRTP 2045 Needs Plan project improving connections to the Rickenbacker Trail:

- Improvements to the shared use pathway on the Rickenbacker Causeway/SR 913 from South Miami Avenue to Crandon Boulevard for a total length of 3.96 miles.

The TPO has also identified Plan Z, shared use pathway project for inclusion in the 5-year planning period. Plan Z was developed by architect and urban planner Bernard Zyscovich, envisioning turning the Rickenbacker Causeway into a "*scenic road through a park*," by prioritizing bicycle and pedestrian facilities and spaces. The proposed plan was designed to comply with the Miami-Dade Parks, Recreation and Open Space (PROS) Master Plan, and has been approved by the Miami-Dade Metropolitan Planning Organization's Bicycle and Pedestrian Advisory Committee. Renderings of the proposed Plan Z segments with the study area are illustrated in **Figure 8**.

Figure 8: Rendering of Plan Z

Additionally, DTPW is in the process of finalizing a Master Plan that will develop a holistic planning framework for the Rickenbacker Causeway. The study area extends along SW/SE 26 Road and the Rickenbacker Causeway from I-95's northbound on-ramp to the Key Biscayne Village boundary, and includes coordination with the Village of Key Biscayne, the Miami-Dade County Police Department (MDPD), and PROS. **Figure 9** depicts the proposed improvements to the Rickenbacker Causeway pedestrian and toll booth designs.

Key features of the Rickenbacker Causeway Master Plan will include:

- Coastal resiliency, vehicular traffic flow, bicycle and pedestrian safety, and recreation improvements along the Rickenbacker Causeway to preserve the Causeway's beauty, heritage, and function.
- Addressing roadway and bridge storm surge and sea level rise impacts.
- Performing a traffic lanes analysis and redesign to provide improved vehicle access on and off Virginia Key and the Village of Key Biscayne.
- Improving traffic flow and public safety, including creating separated and dedicated bicycle and pedestrian pathways.

- The expansion of parkland and beachfront along the Rickenbacker Causeway.

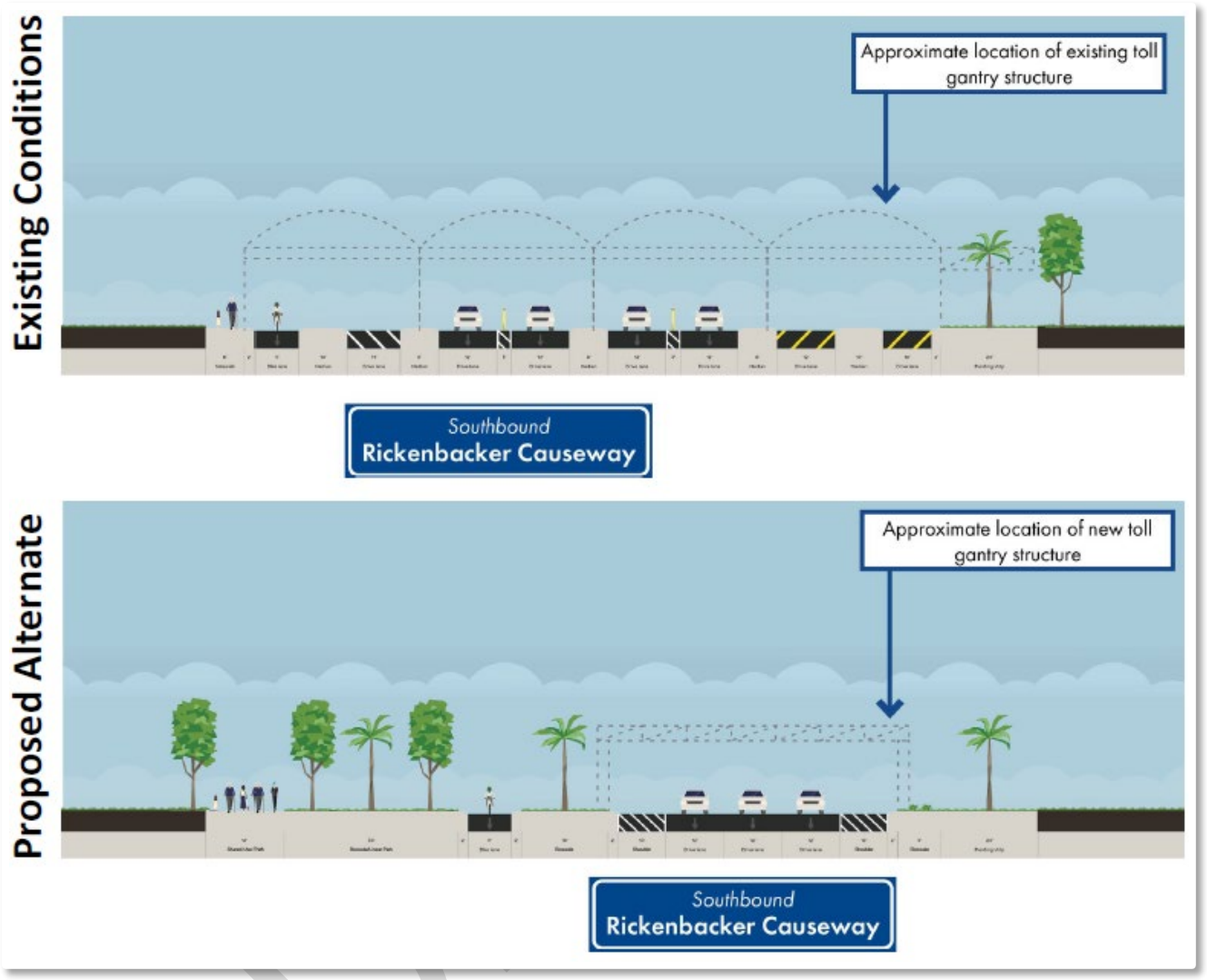


Figure 9: Example of proposed pedestrian and bicycle improvements to toll plaza on Rickenbacker Causeway being analyzed as part of the Master Plan.

Venetian Causeway

East and west access from the study area to Miami Beach is provided through three routes: the MacArthur Causeway, the Julia Tuttle Causeway, and the Venetian Causeway. The MacArthur Causeway is equipped with unprotected bike lanes and has a maximum speed limit of 45 mph. The Julia Tuttle is less bicycle friendly, equipped with paved shoulders for bike access and has a maximum speed limit of 55 mph. Alternatively, the Venetian Causeway cuts through the mostly residential Venetian Islands and has a maximum speed limit of 30 mph, making it a preferred route for pedestrians and cyclists.

The Venetian Causeway begins at the bridge on NE 15 Street, one block east of Herald Plaza, and traverses approximately 3 miles through the Venetian Islands, culminating at Dade Boulevard, near Lincoln Road in Miami Beach. **Figure 10** depicts the Venetian Causeway heading South toward Downtown Miami. Both, the east and west roadways are equipped with unprotected bike lanes. Improvements have been programmed in the TIP to replace the bridges along the Venetian Causeway to address storm surge and sea level rise impacts, improve the safety of pedestrians and cyclists, and ensure the traveling safety of Venetian Island residents and visitors.

Figure 10: Google Street View of Venetian Causeway heading west towards Miami.

The following project will help improve the connectivity of the Venetian Causeway within the study area. The project was identified in the 2050 Bicycle and Pedestrian Master Plan's assessment and are anticipated for inclusion in the 2050 LRTP.

- The Underline/M-Path connection from SW 12 Steet via Miami Avenue up to NE 17 Street. The project is an LRTP 2045 Needs Plan under the SMART Plan Terminal Connector unbuilt facilities.

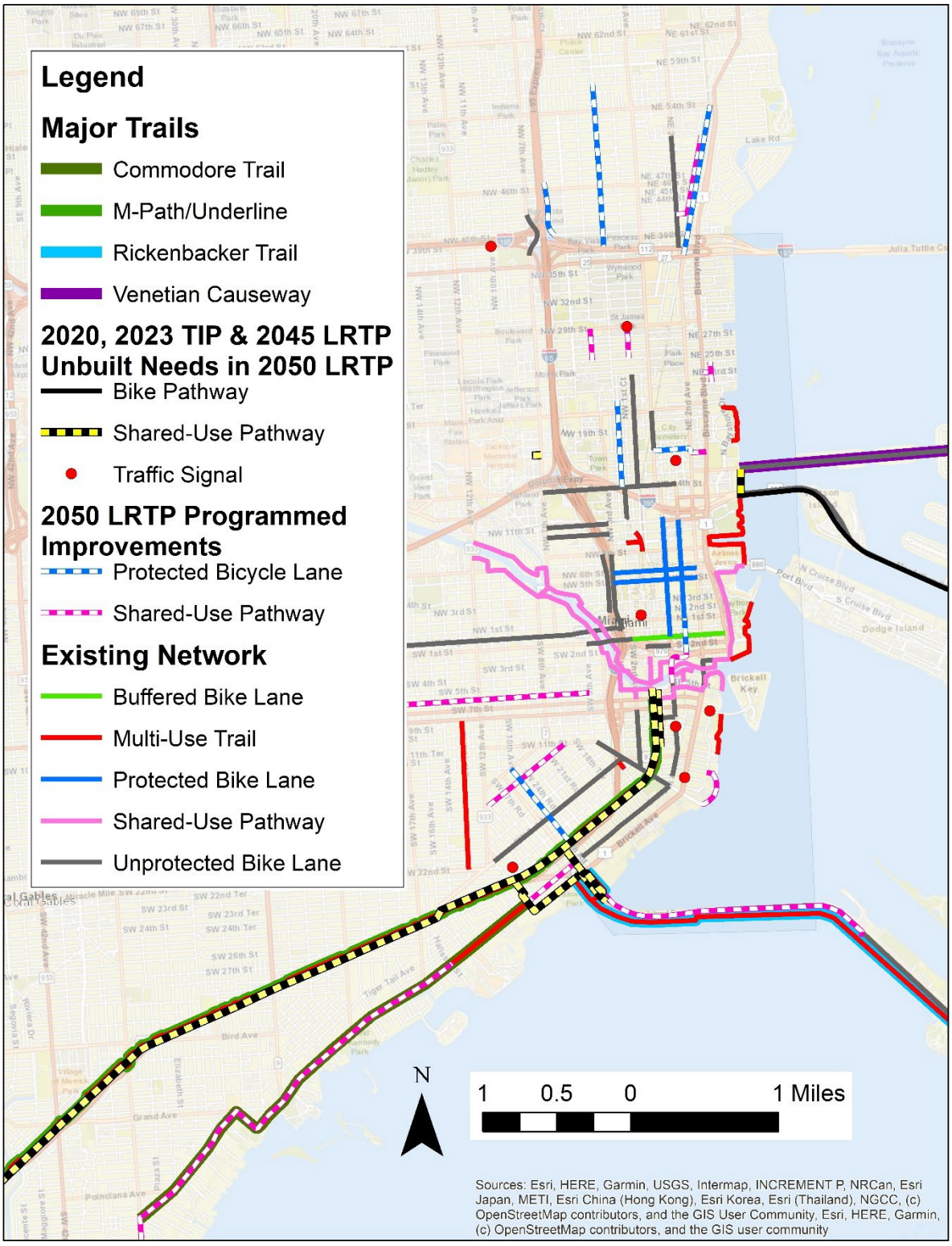
The Commodore Trail

The Commodore Trail is a 5-mile-long pedestrian and bicycle trail connecting Old Cutler Road to the Rickenbacker Causeway as seen in **Figure 11**. The north-south route provides two-way travel along the trail located on the east side of SW 37 Avenue/Main Highway/South Bayshore Drive/South Miami Avenue. The Commodore Trail is a popular route that provides a shaded trail connecting Coconut Grove with Brickell. A master plan to redevelop the trial is in process, where existing concerns identified include repair and maintenance of asphalt, and poor crossing intersection at South Miami Avenue and SE 32 Road. This intersection connects the Commodore Trail to The Underline, and the encroachment of the trail by street vendors and golf carts, particularly around the Mercy Hospital and the Vizcaya Museum and Gardens.

Guiding principles for the redevelopment of the trail include the protection of existing trees and an increase in canopy coverage with more shade trees. Protection of historic elements is critical and shall only be altered if they threaten trail users' safety or limit ADA accessibility. A reduction of lane widths, asphalt, and, in some cases, the excess vehicular capacity, wherever possible, were recommended to improve the corridor for all users.

Figure 11: Map of the Commodore Trail

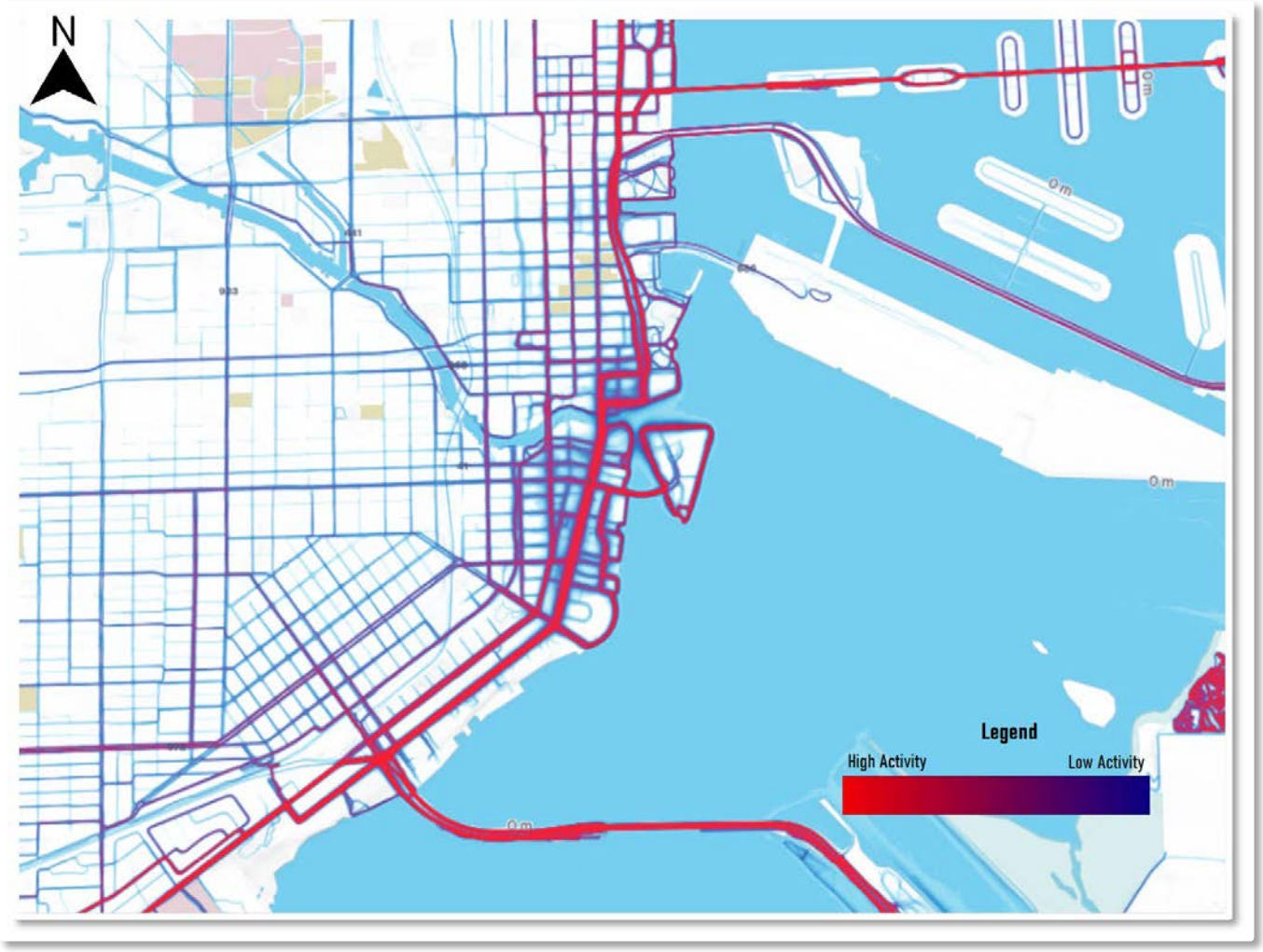
As demonstrated in **Map 12**, The Underline has established connections to major trails but can improve with more dedicated ped/bicycle facilities connecting to it. Improvements outside the study area can also enhance its functionality and connections to major trails by the surrounding neighborhoods. For instance, "*The Roads*" neighborhood has a planned bicycle lane route leading into The Underline. On the other hand, the Venetian Causeway is a heavily used trail but it lacks connectivity once it culminates in the City of Miami, particularly lacking connections directly south of NE 15 Street with continuous dedicated facilities to west of the Omni area.



Map 12. The Underline Project Area with the Other Trails and Programmed Mobility Improvements

Heatmap Analysis

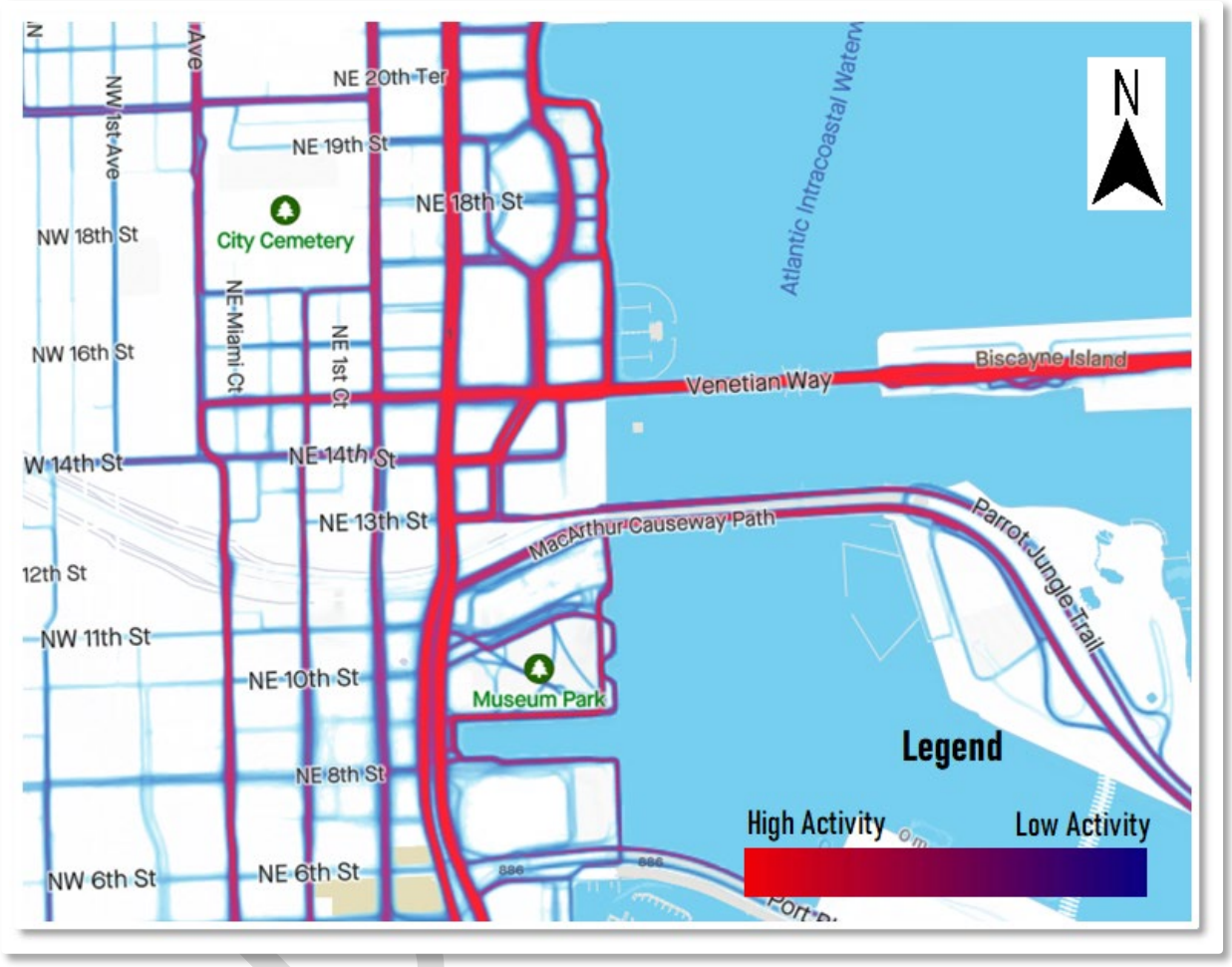
In addition to the connectivity evaluation, a heatmap analysis using Strava METRO data supplements the assessment by highlighting the routes most frequently used by cycling and pedestrian users as seen in **Map 13**. While Strava METRO data is self-reported by users, it provides valuable insights into areas where frequent users feel more encouraged or comfortable walking or cycling.



Map 13. A Strava heatmap showing routes where bicycle and pedestrian use is concentrated

The Rickenbacker and Commodore trails experience heavy usage. Planned improvements in the 2050 LRTP target areas with demonstrated high demand, as indicated on the heat map. For example, a shared use pathway is proposed to connect the Rickenbacker Trail to The Underline at SW 32 Road. Additionally, facilities are required to extend past South Miami Avenue along SW 26 Road. The 2050 LRTP includes provisions for protected bicycle lanes along SW 26 Road from the Rickenbacker Causeway to South Miami Avenue.

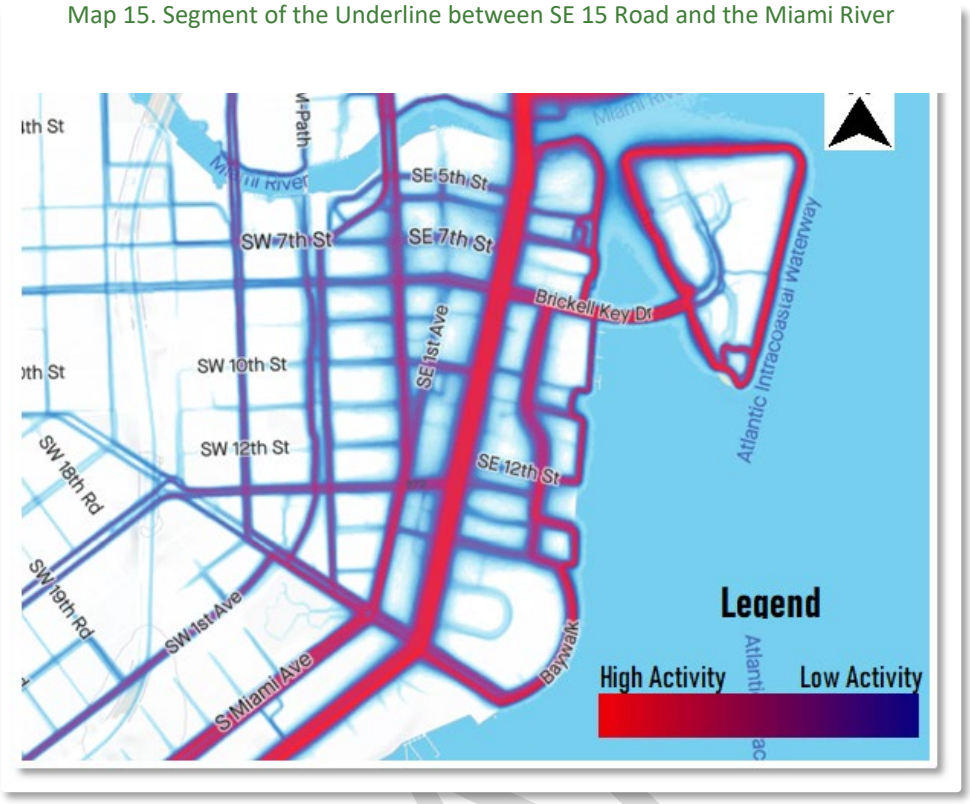
Connections to The Underline within Brickell primarily utilize SW 14 Street, SW 20 Street, SE 7 Street, and SW 8 Street. Currently, there are no existing or planned facilities along these routes. An unprotected bike lane is present on SE 9 Street to South Miami Avenue.



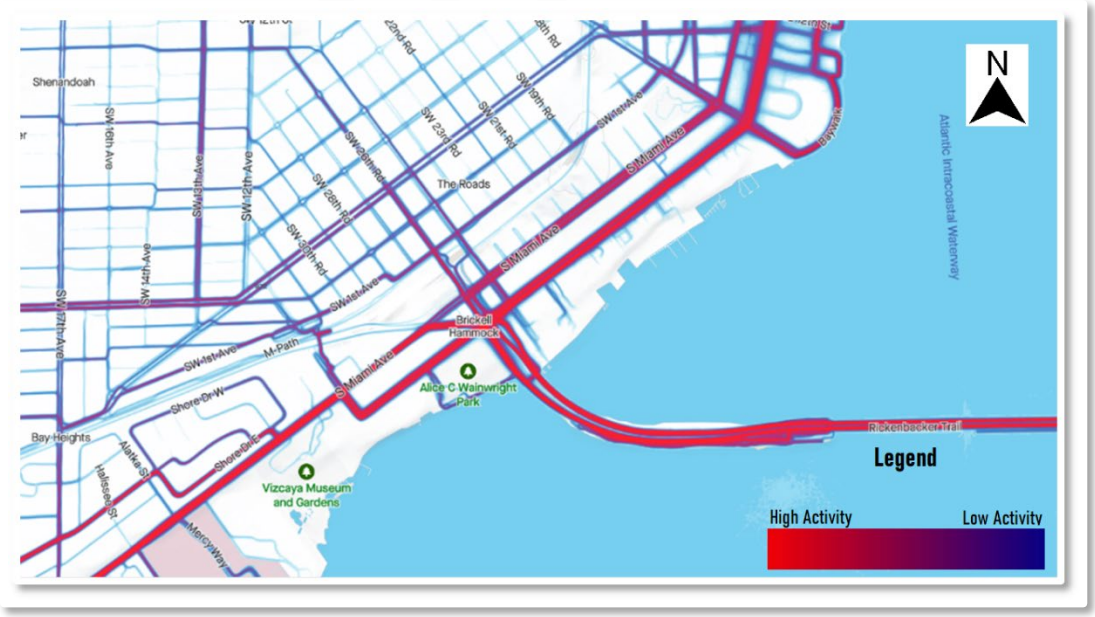
Map 14. Strava Heatmap of northeast quadrant of study area showing of the Venetian Causeway

The Venetian Causeway heat map analysis demonstrates that there is a demand by pedestrians and cyclists as seen in **Maps 13-16**. Needed improvements shall be provided between Biscayne Boulevard and North Miami Avenue. Also, north of the route, there is frequent ridership on east-west roadways taking place on roads without bicycle amenities such as bicycle lanes or shared pathways. **Map 13** also shows the user propensity to go through Herald Plaza and connect to NE 14 Street. There are no bicycle facilities providing connections in these areas.

Map 15. Segment of the Underline between SE 15 Road and the Miami River



Map 15. Segment of the Underline between SE 15 Road and the Miami River



Map 16. Heatmap of the Rickenbacker Causeway

Conclusion

The study assessed the connections between the existing and programmed bicycle and pedestrian improvements to transit and regional trails within the study area. Findings show the core and Metromover facilities are adequately connected to bicycle facilities within a quarter-mile buffer or a 5-minute walk. Metrorail facilities within the study area are also adequately served by facilities within the same distance. However, stations adjacent to the study area can benefit from east-west connections into the study area. Major trails connecting to and within the study area were evaluated and determined that program improvements are in line with user demand. Heatmap analysis compared to the map of programmed improvements corroborated these assumptions. Future connections to trails should consider the replacement of unprotected bicycle lanes with enhanced protection features or separation and look to make access to The Underline more porously. There is a noted lack of bicycle amenities in the north and west areas of the study. Planned improvements mitigate the north-south connections but severely lack east and west accessibility. Improvements should be considered for NE 36 Avenue and NE 29 Street for east/west connections through to Biscayne Boulevard.

When feasible, facilities should also be constructed north and south of I-395 and coordinated with the proposed improvements recommended in The Underdeck Plan. Interstate highways and the Miami River continue to be barriers to the study area. Improvements like the Miami River Greenway and the side path proposed from SW 27 Avenue to SW 5 Avenue along SW 6 Street will encourage access to adjacent communities.

Recommendations:

1. Explore east-west connections toward Biscayne Bay, with pathways facilitating bicycle access south of I-395, and north-south access via the Margaret Pace and Bicentennial Park trails, connecting the School Board to the Venetian Causeway.
2. Utilize the Adrienne Arsht Center as a center point for uniting north and south regions, as well as for facilitating crucial east-west connections between Overtown and Biscayne Bay.
3. Provide the Museum Park area with both east and west connections to enhance its accessibility within the surrounding area.
4. Establish an east-west connection for NW/NE Eleventh Street, as this will become imperative for improving its integration within the transportation network.
5. Streamline transportation services and access to the Park West area, as this will be a precursor to east-west connectivity.
6. Strategize southern access points to and from historic and iconic destinations, e.g. The Freedom Tower, to enhance accessibility and convenience for visitors and occupants alike.
7. Vision, prioritize, and actualize the establishment of regional connections, with particular emphasis on facilitating access to The Underline and other major transit corridors, to enhance transportation efficiency and connectivity within the region.

Florida House of Representatives

Representative Jose Felix Diaz

District 116

District Office:
7901 S.W. 24th Street
Miami, FL 33155
(305) 442-6800

Tallahassee Office:
400 House Office Building
402 South Monroe Street
Tallahassee, FL 32399-1300
(850) 717-5116

Email: Jose.Diaz@myfloridahouse.gov

May 12, 2015

VIA ELECTRONIC CORRESPONDENCE

Secretary Gus Pego
FDOT District 6
1000 NW 111 Ave
Miami, FL 33172

Re: Issues Pertaining to the Brickell Bridge

Dear Secretary Pego:

I hope that this correspondence finds you well. I know that you are very busy, but I also understand that this letter might by timely and can help provide some guidance on some pending issues relating to the Brickell Bridge (the "Bridge"), a vital infrastructure concern in downtown Miami, where I have worked for the past ten years.

I respectfully request that FDOT's project #412473-8 trial "Alternative 4" be replaced with "Alternative 1", which would restore two desperately needed vehicular lanes & still provide the safety improvement on, and adjacent to, the Bridge. See FDOT's attached preferred "Alternative 1: Barrier Wall in Front of Wells Fargo Center, Benefits – No lane changes".

As you are well aware, the Bridge openings have long been an issue for the necessary balance between the river traffic, and downtown vehicular traffic, neither of which should be unreasonably delayed. The new need for drivers to merge from three lanes into only two northbound vehicular lanes while driving on top of the Bridge, makes the vehicular back-up/bottleneck take longer, and takes more time to restore average traffic flow after a Federally regulated Bridge opening.

It is my understanding that FDOT stated at a public meeting of the MPO's Bicycle & Pedestrian Advisory Committee that the FDOT video camera focused on the NE side of the Bridge frequently views cars running the "No Right on Red" traffic light when the pedestrian and bicycle is crossing the intersection incorrectly thinking it's their turn because the vehicular traffic light is red and the flashing beacon is indicating that it is safe to cross. On March 24, 2015 the MPO's Bicycle & Pedestrian Advisory Committee passed a unanimous resolution, "to recommend that FDOT suspend project #412473 pending an area-wide study to see the impacts of the lane reduction".

Please note the problem with this "trial" reduction of a vehicular travel lane directly on the Brickell Bridge has been confirmed by me and multiple other witnesses whom live and work in this immediate area. I have asked the Miami River Commission for, and am attaching, the several letters of support, all respectfully requesting that FDOT restore the removed and desperately needed vehicular lanes on and adjacent to the Brickell Bridge.

Secondly, on a related issue – For the past two years, I have been following the public parking lot which is to be constructed on the right-of-way beneath the Brickell Bridge (to service the Miami Circle Park). It has come to my attention that the archeologist in charge of the work plan has re-submitted his plans, and I ask for your support in expediting the State's approval of this land for an MPA parking lot.

As always, I thank you for your time and your consideration.

Sincerely,

Jose Felix Diaz
State Representative

Miami River Commission

c/o Robert King High
1407 NW 7th Street, Suite D
Miami, Florida 33125
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Fax: (305) 642-1136
email: miamiriver@bellsouth.net
www.miamirivercommission.org

August 12, 2013

FDOT District 6 Secretary Gus Pego
1000 NW 111 Ave
Miami, FL 33172

Re: Recommendation to Restore Previous 3 Northbound Vehicular Lanes on Brickell Bridge

Dear Secretary Pego:

I'm writing to express my opposition to FDOT's current "trial project", which resulted in the unfortunate elimination of a northbound vehicular travel lane on the Brickell Bridge. As you are aware, Brickell Bridge openings have long been an issue for the necessary balance between the Port of Miami River, and downtown traffic, neither of which want to be temporarily delayed. The new need for drivers to merge from three lanes down into only two northbound vehicular lanes while driving on top of the Brickell Bridge, makes the backup longer, and takes more time to restore average traffic flow after a USCG regulated Bridge opening. The 1st traffic light on the north side of the Brickell Bridge still often turns red, when pedestrians frequently push the button at the crosswalk. Please note the problem with this "trial" reduction of a northbound vehicular travel lane directly on top of the Brickell Bridge, has been confirmed by witnesses whom work in this immediate area.

Your time and consideration are appreciated.

Sincerely,

Horacio Stuart Aguirre

Horacio Stuart Aguirre
Chairman,
Miami River Commission

Miami River Commission

c/o Robert King High
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April 29, 2015

FDOT District 6 Secretary Gus Pego
1000 NW 111 Ave
Miami, FL 33172

Re: Recommendation to Restore Previous 3 Northbound Vehicular Lanes on Brickell Bridge.

Dear Secretary Pego:

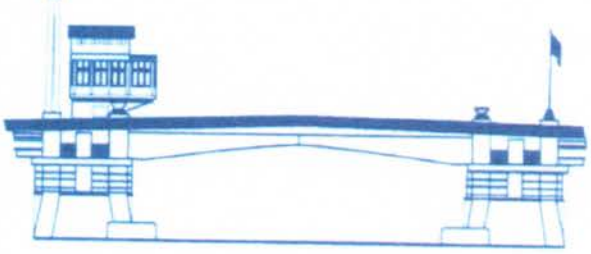
I'm writing to express the Miami River Commission's continued opposition to FDOT's current "trial project", which resulted in the unfortunate elimination of a northbound vehicular travel lane on the Brickell Bridge.

As you are aware, Brickell Bridge openings have long been an issue for the necessary balance between the Port of Miami River, and downtown traffic, neither of which want to be temporarily delayed. The new need for drivers to merge from three lanes down into only two northbound vehicular lanes while driving on top of the Brickell Bridge, clearly makes the vehicular backup longer, and takes more time to restore average traffic flow after a Federally regulated Bridge opening.

FDOT stated at a public meeting of the MPO's Bicycle & Pedestrian Advisory Committee that the FDOT video camera focused on the NE side of the Brickell Bridge frequently views cars running the "No Right on Red" traffic light when the pedestrian and bicycle is crossing the intersection incorrectly thinking it's their turn because the vehicular traffic light is red and the flashing beacon is indicating it's safe to cross. On March 24, 2015 the MPO's Bicycle & Pedestrian Advisory Committee passed a unanimous resolution, "to recommend that FDOT suspend project #412473 pending an area-wide study to see the impacts of the lane reduction".

Please note the problem with this "trial" reduction of a vehicular travel lane directly on the Brickell Bridge has been confirmed by witnesses whom live and work in this immediate area.

Miami River Commission



c/o Robert King High
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www.miamirivercommission.org

I have attached the following letters to FDOT Sec. Gus Pego, all respectfully requesting FDOT restore the removed and desperately needed vehicular lane on the Brickell Bridge:

- Epic Residences May 2, 2014, representing hundreds of resident taxpayers
- James L. Knight Convention Center, March 26, 2015, representing hundreds of jobs and economic revenue
- Miami River Commission, August 12, 2013

In addition, we have the following issues with FDOT's attached "Public Meeting Notification" for this evening's meeting:

1) Although the City, MRC, SFRPC, Hyatt, Epic, and MPO's BPAC have been trying to schedule a meeting with FDOT about restoring this removed vehicular lane on the Brickell Bridge for months, FDOT did not notify the Miami River Commission, nor the MPO BPAC during their public meeting last night.
2) The words "Brickell" and or "Bridge" do not appear anywhere in the title or entire FDOT public notice for this meeting.
3) Although the FDOT public notice for this meeting includes 14 bullet points describing the project under "Project Details", nowhere on the notice does it indicate that this trial project, which FDOT is currently paying for construction engineering documents to permanently install, removes a needed vehicular lane from the Brickell Bridge, which is possibly the busiest intersection in the entire State of Florida.

The community implores you to please restore the removed vehicular lane on the Brickell Bridge, and find a better final solution to maximize safe and efficient vehicular, pedestrian and bicycle use at this critical intersection.

Your time and consideration are appreciated.

Sincerely,

Horacio Stuart Aguirre

Horacio Stuart Aguirre
Chairman,
Miami River Commission

Miami River Commission

c/o Robert King High
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www.miamirivercommission.org

May 12, 2015

City of Miami Commission
City Hall
3500 Pan American Dr
Miami, FL

Re: 1) Request FDOT to Replace Their Project #412473-8 Trial Option 4A with Option 1, Restoring 2 Needed Vehicular Lanes & Still Providing Safety Improvement, On and Adjacent to Brickell Bridge

Dear City Commissioners:

Please join the Miami River Commission, Epic, the James L. Knight Convention, State Representative Jose Felix Diaz, and other affected parties in requesting that FDOT's project #412473-8 replace the trial "Alternative 4" with "Alternative 1", which **would restore two desperately needed vehicular lanes on and adjacent to the Brickell Bridge & still provide the safety improvement.** Please see FDOT's attached preferred "Alternative 1: Barrier Wall in Front of Wells Fargo Center, Benefits – No lane changes".

As you are aware, Brickell Bridge openings have long been an issue for the necessary balance between the Port of Miami River, and downtown traffic, neither of which want to be temporarily delayed. **The new need for drivers to merge from three lanes down into only two northbound vehicular lanes while driving on top of the Brickell Bridge, clearly makes the vehicular backup longer, and takes more time to restore average traffic flow after a Federally regulated Bridge opening.**

FDOT stated at a public meeting of the MPO's Bicycle & Pedestrian Advisory Committee that the FDOT video camera focused on the NE side of the Brickell Bridge frequently views cars running the "No Right on Red" traffic light when the pedestrian and bicycle is crossing the intersection incorrectly thinking it's their turn because the vehicular traffic light is red and the flashing beacon is indicating it's safe to cross. On March 24, 2015 the MPO's Bicycle & Pedestrian Advisory Committee passed a unanimous resolution, "to recommend that FDOT suspend project #412473 pending an area-wide study to see the impacts of the lane reduction".

Miami River Commission

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Please note the problem with this "trial" reduction of a vehicular travel lane directly on the Brickell Bridge has been confirmed by witnesses whom live and work in this immediate area.

I have attached the following letters to you, all respectfully requesting FDOT restore the removed and desperately needed vehicular lanes on and adjacent to the Brickell Bridge:

1. Epic Residences May 2, 2014, representing hundreds of resident taxpayers
2. James L. Knight Convention Center, March 26, 2015, representing hundreds of jobs and economic revenue
3. Representative Jose Felix Diaz, May 12, 2015
4. Miami River Commission, August 12, 2013
5. Miami River Commission, April 29, 2015

The community has been begging FDOT to please restore the two removed vehicular lanes on and adjacent to the Brickell Bridge, and replace it with FDOT's "Alternative 1" which still provides the desired safety improvements (additional traffic calming, sharrows, etc. may also be included) without the unintended and negative consequences of removing two vehicular lanes at this critical and busy intersection.

Your time and consideration are appreciated.

Sincerely,

Horacio Stuart Aguirre

Horacio Stuart Aguirre
Chair,
Miami River Commission

Brickell Bridge Action Items
5/19/17

1) Strictly enforce the existing Federal Bridge Opening Regulations and enforce all submitted unnecessary opening forms.

2) Install pedestrian gates and utilize "white glove" security officers to reduce unnecessarily long openings created by pedestrians who insist on continuing to cross the bridge after the warning signals light up, thus creating longer vehicular traffic delays. Currently the first operational step in opening the bridge for a vessel is closing the vehicular safety gates to stop traffic. After the gates close and before the bridge opens for the vessel, numerous pedestrians and bicycles are knowingly going beneath or over the closed safety gates, and cross the bridge because they don't want to wait a few minutes for an opening, and in doing so put themselves at risk. This happens during the majority of bridge openings, and the Bridge tender whom must remain in the Bridge house tells violators over a loudspeaker not to cross the bridge which is trying to open, but they continue to cross regardless. The actual time needed for the bridge to be open for the vessel to pass could be equivalent to a long red light, but the dangerously crossing pedestrians and bicycles are doubling the time the cars are stopped for a bridge opening, therefore essentially doubling the resulting vehicular traffic. In addition place USCG or Marine Patrol Vessels at Brickell Bridge to assist Bridge tenders avoiding and enforcing unnecessary openings.

3) Restore the vehicular traffic lanes which FDOT recently removed from the Brickell Bridge. Following a bridge opening, having these vehicular lanes returned would improve flushing through the traffic backup generated during the bridge's temporary opening.

4) Do not allow hotels on the north side of Brickell Bridge to illegally block vehicular traffic lanes in the street for "Valet Parking", which eliminates 2 needed vehicular lanes and forces all traffic to merge into only one vehicular lane, which creates traffic jams.

5) Synchronize the signal light timing and synchronization with Bridge operations, so that after the bridge opens and closes, the adjacent traffic lights should be "green" to facilitate clearing out the vehicular backup.

6) Install "Smart Signage," warning drivers of upcoming bridge openings before they are in bumper to bumper traffic, and suggest best alternate routes depending on the direction of vessel on the river. For example, please note the fixed I-95 Bridge ramps ingress and egress is at the same location as the bascule Brickell Bridge.

7) Provide final permit for the "What Up Bridge" software application, which provides Bridge opening notifications (emails and or texts). If drivers are aware of a bridge opening, they may take other appropriate actions. FDOT granted a temporary 1 year permit for a successful pilot program, and now a final permit is needed for its continued operations.

8.	Electronic automation of the bridge tender logs to ensure accuracy as well as posting of bridge logs on web or mobile app for public dissemination. Including partnering with data providers (i.e., Google, Waze, etc.) to specify bridge openings into their data systems similar to current reporting that is provided regarding traffic conditions.
9.	Research the possible placement of marine (river) traffic circulation signals (traffic signal for marine traffic on the river) in advance of the bridge to advise vessels of permitted passage and/or prohibited passage times .
10.	Installation of additional bridge signage outlining hours along the River as well as on the landward side. Two (2) new signs have been placed on the east and west side of bridge, however the Section 117.305 (d) limitation of the hour and half hour opening was not included.
11.	Installation of landward side signage in the vicinity of the bridge to advise vehicles/drivers of bridge openings – more notably during the ½ hour intervals.

12. Support the concept of the Brickell Tunnel

City Hall
3500 Pan American
Drive
Miami, FL 33133
www.miamigov.com

File Number: 15-00655 **Final Action Date:**

A RESOLUTION OF THE MIAMI CITY COMMISSION, WITH ATTACHMENT(S), URGING THE MIAMI-DADE COUNTY BOARD OF COUNTY COMMISSIONERS TO ADOPT A RESOLUTION, IN SUBSTANTIALLY THE ATTACHED FORM, AUTHORIZING AND APPROVING THE ESTABLISHMENT, SOLICITATION AND AWARD OF PUBLIC WATERBORNE TRANSPORTATION AT SPECIFIED LOCATIONS WITHIN THE CITY OF MIAMI; DIRECTING THE CITY CLERK TO TRANSMIT A COPY OF THIS RESOLUTION TO THE ELECTED OFFICIALS STATED HEREIN.

WHEREAS, Miami-Dade County ("County") has the power to provide, operate, regulate, franchise, control and take over public transportation systems in the County; and

WHEREAS, in the past two decades, the County and certain municipalities have entered into Interlocal Agreements whereby certain municipalities have been delegated the authority to provide for certain specialized or local public transportation to enhance, supplement and complement the County Mass Transit System, including, without limitation, the Electro Wave Electric Bus, the Coral Gables Trolley Service and the City of Miami Trolley Service, among others; and

WHEREAS, the City of Miami ("City") has been a supporter of commercial and working waterfronts, and cleanup, restoration and increased usage of navigable bodies of water such as Biscayne Bay and the Miami River which are located within the City; and

WHEREAS, City officials, the City Administration and involved City Departments such as Capital Improvements and Transportation, Procurement and others respectfully request the authorization, cooperation and support of the County to be able to implement regulations and agreements for the establishment of a limited public waterborne transportation system on certain navigable waters within the City in the manner envisioned in the proposed attached County Commssioners' ("Board") Resolution;

NOW, THEREFORE, BE IT RESOLVED BY THE COMMISSION OF THE CITY OF MIAMI, FLORIDA:

Section 1. The recitals and findings contained in the Preamble to this Resolution are adopted by reference and incorporated as if fully set forth in this Section.

Section 2. The Miami City Commission urges the passage by the Board of County Commissioners of a County Resolution, in substantially the attached form, to support the efforts of the City and authorize the City to competitively solicit, procure and award agreements to qualified private sector waterborne transportation providers, in order to utilize providers of water taxis and similar vessels, to drop off and pick up passengers, constituting the general public who are paying a fixed rate, to and from the locations listed or otherwise agreed to by the County and the City, which abut the Miami River and/or Biscayne Bay within the City.

Section 3. The City Clerk is directed to transmit a copy of this resolution to Miami-Dade County Mayor Carlos Gimenez and the Board of the County Commissioners.

Section 4. This Resolution shall become effective immediately upon its adoption and signature of the Mayor {1}.

APPROVED AS TO FORM AND CORRECTNESS:

VICTORIA MÉNDEZ
CITY ATTORNEY

Footnotes:

{1} If the Mayor does not sign this Resolution, it shall become effective at the end of ten (10) calendar days from the date it was passed and adopted. If the Mayor vetoes this Resolution, it shall become effective immediately upon override of the veto by the City.

RESOLUTION NO. 007/2024

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE MIAMI DOWNTOWN DEVELOPMENT AUTHORITY ("MIAMI DDA") OF THE CITY OF MIAMI, FLORIDA, DIRECTING MIAMI DDA STAFF TO: WORK WITH THE CITY OF MIAMI AND MIAMI-DADE COUNTY TO (1) APPLY FOR AND OBTAIN CLASS 1 PERMITS AND/OR MARINE OPERATING PERMITS (MOPS) FOR WATER TAXI STOPS AT PREFERRED SITES (EXHIBIT A); (2) MONITOR MIAMI-DADE COUNTY'S DIVISION OF ENVIRONMENTAL RESOURCE MANAGEMENT (DERM) CHANGES TO THE MANATEE PROTECTION PLAN (MPP) TO ENSURE WATER TAXI STOPS ARE ALLOWED AT CERTAIN IMPORTANT AREAS; AND (3) DRAFT A MODEL ORDINANCE FOR REGULATION/CERTIFICATION OF WATER TAXI OPERATORS.

WHEREAS, one of the 2025 Downtown Miami Master Plan (adopted in 2009) goals is to "Develop Waterborne Transportation Systems linking Downtown to Major Waterfront Destinations"; and

WHEREAS, one of the 2025 Downtown Miami Master Plan (adopted in 2009) goals is to "Support Transit with Car Sharing Service, Bike Rentals, Pedicabs and Other Creative Mobility Solutions"; and

WHEREAS, in February 2003, the Miami-Dade County Metropolitan Planning Organization (MPO) produced a comprehensive study titled *"Feasibility of Utilizing Miami-Dade Waterways for Urban Commuter Travel,"* concluding that there is a potential waterway network on which commuter service could be provided; and

WHEREAS, in December 2004, the Miami-Dade County Metropolitan Planning Organization ("MPO") initiated the *Development of a Service Plan for Waterborne Transit Services in Miami-Dade County* to develop a water transit service plan that would describe a potential system intended to meet mobility goals; and

WHEREAS, on January 19 and February 7 of 2006, Murray A. Greenberg, County Attorney, sent a memo to Chairman Joe A. Martinez and Members of the Board of County Commissioners, outlining a Resolution directing the County Manager to explore the feasibility of introducing various waterborne transit routes; and

WHEREAS, on May 28, 2015, the Miami City Commission passed Resolution No. 15-0231 urging the Miami-Dade County Board of County Commissioners to adopt a Resolution to authorize and approve the Establishment, Solicitation, and Award of Public Waterborne Transportation at Specified Locations within the City of Miami; and

WHEREAS, in 2015, the Miami River Commission passed an Official Statement supporting Resolution No. 15-0231, approved by the City of Miami; and

WHEREAS, in April 2016, the Miami Beach City Commission approved a one-year water taxi pilot program servicing the Purdy Avenue Dock; and

WHEREAS, on June 22, 2016, Lee Hefty, Assistant Director, Miami-Dade County Division of Environmental Resource Management (DERM), sent a memo to Alice Bravo, Director, Miami-Dade County Department of Transportation and Public Works, outlining DERM staff's "Environmental Review of Conceptual Locations to Accommodate Vessels for the Purpose of Providing Waterborne Transportation/Taxi Services Within Miami-Dade County, Florida," and proposed a "North/South and East/West Transit Oriented Routes linking Haulover Park, Miami Beach to Downtown"; proposed "Water Taxi Sites on the Miami River"; and "Proposed Courtesy Slips and a Water Taxi Slip in the Vicinity of Museum Park (FEC Slip, Museum Park Eastern Seawall)" (Exhibit A); and

WHEREAS, in July 2016, the Miami-Dade County Department of Transportation & Public Works (DTPW) presented a feasibility study of two Waterborne Transportation Initiatives (commuter-based service and on-demand service) to complement the existing Miami-Dade Transit Service and activate the Waterfront Public Spaces; and

WHEREAS, in 2016, the Miami DDA created the Waterfront Task Force Committee, which then hired the lobbyist firm of Floridian Partners to meet with DERM staff, City and County Commissioners, Miami River Commission staff, and Bayfront Park Management (BPMT) staff to discuss waterborne transportation, adding water taxi service, and adding transient boat slips throughout the Downtown core; and

WHEREAS, the Waterfront Task Force, Floridian Partners, and Miami DDA staff created a map that proposed twelve (12) possible dock sites along Biscayne Bay and another twelve (12) "DERM Approved Sites" along the Miami River (Exhibit B); and

WHEREAS, on September 15, 2016, the Miami-Dade County Metropolitan Planning Organization ("MPO") passed Resolution #50-16 to develop a scope of work and budget to study the Feasibility of Waterborne Transportation between Black Point Marina and Downton Miami; and

WHEREAS, in late 2016, Miami River Commission staff looked at and photographed the eight (8) potential Water Taxi Stops along the Miami River; and

WHEREAS, on December 8, 2016, the Miami-Dade County Metropolitan Planning Organization ("MPO") passed Resolution #73-16, approving the scope of work and budget to study the feasibility of Waterborne Transportation between Black Point Maria and Downtown Miami; and

WHEREAS, on February 7, 2017, the Board of County Commissioners passed Resolution No. R-149-17 directing the County Mayor to update the previous feasibility study on Waterborne Transportation solutions as part of a comprehensive transportation network throughout Miami-Dade County and prepare an implementation plan for creating on-demand and fixed-route Waterborne Transportation; and

WHEREAS, in November 2017, the Miami DDA Board of Directors passed Resolution No. 044/2017, urging the City of Miami to prioritize rebuilding the docks at Fort Dallas Park, destroyed by Hurricane Irma, as quickly as possible to facilitate waterborne transportation; and

WHEREAS, on March 20, 2018, Carlos A. Gimenez, Mayor of Miami-Dade County, sent a memo to Chairman Esteban L. Bovo, Jr., and Members of the Board of County Commissioners outlining a report on Waterborne Transportation in response to Resolution No. R-149-17, which requested: (1) An update to the previous feasibility study on waterborne transportation solutions as part of a comprehensive transportation network through Miami-Dade County; and (2) Prepare an implementation plan for the creation of on-demand and fixed-route waterborne transportation; and

WHEREAS, on September 4, 2019, the Miami-Dade County Board of County Commissioners approved Resolution No. R-958-19 directing the County Mayor to negotiate agreements as necessary to facilitate or implement fixed route waterborne transit services connecting the Downtown Miami and South Beach areas; authorizing the County Mayor to apply for grant funding related to such services; and requiring status reports to this Board; and

WHEREAS, on March 22, 2024, the Board of Directors of the Miami DDA directed the Executive Director to include the following three (3) sites as additional potential Water Taxi Stops along the Miami River: (1) Brickell Key, (2) River Park (South side), and (3) River Landing;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE MIAMI DOWNTOWN DEVELOPMENT AUTHORITY OF THE CITY OF MIAMI, FLORIDA:

Section 1. The recitals and findings contained in the Preamble of this Resolution are adopted by reference and incorporated as if fully outlined in this Section.

Section 2. The Board of Directors of the Miami DDA approves a resolution of support directing the Miami DDA staff to work with the City of Miami and Miami-Dade County to: (1) Apply for and obtain class 1 Permits and/or Marine Operating Permits (MOPs) for water taxi stops at preferred sites (Exhibit B); (2) Monitor Miami Dade County's Division of Environmental Resource Management (DERM) changes to the Manatee Protection Plan (MPP) to ensure water taxi stops are allowed at certain important areas; and (3) Draft a model ordinance for regulation/certification of water taxi operators.

Section 3. This Resolution shall become effective immediately upon its adoption.

PASSED AND ADOPTED this 22nd day of March, 2024.

Commissioner Manolo Reyes, Chairman

Christina Crespi, CEO & Executive Director

ATTEST:

Ivonne de la Vega
Secretary to the Board of Directors

Memorandum

MIAMI-DADE COUNTY

Date: June 22, 2016

To: Alice Bravo, Director
Department of Transportation and Public Works

From: Lee N. Hefty, Assistant Director - Division of Environmental Resources Management
Department of Regulatory and Economic Resources

Subject: DERM Staff Environmental Review of Conceptual Locations to Accommodate Vessels for the Purpose of Providing Waterborne Transportation/Taxi Services within Miami-Dade County, Florida

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This memo follows our recent meeting regarding the feasibility of promoting waterborne transportation options and the associated environmental permitting of landings in various locations to support waterborne transportation routes. During the meeting we discussed the establishment of transit oriented routes linking Haulover Park with Sea Isle Marina, and linking Miami Beach with the mainland at Sea Isle Marina and downtown Miami at Chopin Plaza. We also discussed the establishment of several water taxi stops in the Miami River, and the establishment of a water taxi or transit landing at Museum Park, including the use of a barge to serve as a dock/landing. In addition, we discussed the establishment of courtesy slips in the FEC slip at Museum Park for general use.

A DERM Class I permit is generally required for the construction or installation of marine structures to create a slip for the mooring of vessels. In addition, a DERM Marine Facilities Operating (MOP) permit is required for the operation of all commercial boat docking facilities. The evaluation of a request for a Class I permit includes, but is not limited to, avoidance and minimization of adverse environmental impacts to benthic resources, compliance with State and County water quality standards, consistency with the County's minimum water depth requirement of 4 feet N.O.A.A. Mean Low Water datum (in addition to having adequate water depth for any individual vessel), and an evaluation of each site with respect to its historic use and the siting criteria recommendations in the Miami-Dade County Manatee Protection Plan (MDCMPP) among other evaluation factors in the Code. Please note that a completed Class I permit application will require authorization from both the upland property owner and evidence of ownership or a lease, and authorization for use of the submerged lands where the work will occur. In addition, State and Federal review and approval may be required for any change in the use of a marine facility, or for mooring a vessel in a location not currently authorized. A request for mooring of vessels over State-owned submerged lands generally includes a requirement to obtain authorization from the State, and early coordination with State regulatory staff is recommended. On the question of using a barge as a docking/landing structure, please note that the installation of a barge for such purposes would be evaluated the same as the installation of a permanent structure (i.e. using the same evaluation criteria as described above including evaluating resource impacts, water depth, and conformance with recommendations of the MDCMPP). As discussed, while a DERM Class I permit is required to create boat slips, existing facilities may be used consistent with existing authorizations. Therefore facilities that currently have approved transitory slips or water taxi slips may continue to use them without the need for further approval from DERM.

As part of evaluating the proposed sites discussed at the meeting, DERM staff reviewed our records including existing MOPs, reviewed historic uses of the proposed water taxi/transit oriented slip locations, and conducted inspections at some sites in order to provide preliminary feedback regarding the proposed use of the sites. For the purposes of this exercise, we focused on three

main fundamental questions: 1) can the proposed slips be created/used without adverse impacts to benthic resources; 2) is the proposed use consistent with recommendations of the MDCMPP; and 3) does the proposed slip contain adequate water depth for the mooring of the proposed vessels.

The following is a brief summary of our initial findings:

Proposed North/South and East/West Transit Oriented Routes linking Haulover Park and Miami Beach to Downtown:

The five (5) transit oriented sites linking Haulover Park and Miami Beach (Miami Beach Marina, Sunset Harbour Marina) with the mainland downtown at Sea Isle Marina and Chopin Plaza Park, as identified on page 7 of the submittal entitled, "WATERBORNE TRANSPORTATION MIAMI-DADE COUNTY" are proposed at existing facilities that currently have authorizations that allow transitory slip use. Therefore, provided there is adequate water depth for the proposed vessels to safely access the facilities, the facilities may be used for water taxi service provided the water taxis utilize existing permitted slips and operate in accordance with each facility's MOP. No further approval from DERM is required to use these facilities for waterborne transportation. Please note that a Class I permit from DERM would be required for any work in, over, or upon tidal waters at these locations if such work is necessary for mooring of subject vessels.

Proposed Water Taxi Sites on the Miami River:

During our meeting, we were provided with a list of seven (7) Miami-Dade County-owned properties on the Miami River as potential sites for private sector waterborne transportation providers to pick-up and drop-off passengers. Following our meeting, DERM received information on additional potential water taxi sites on the Miami River. A total of twelve (12) sites on the Miami River were evaluated and are listed in the spreadsheet (attached). As previously mentioned, DERM staff focused on three main factors during this evaluation. They include conformance with the County approved MDCMPP, potential for resource impacts, and whether the site has adequate water depth. The attachment provides a brief description of our initial findings regarding these three main factors at each site. In general, the use of these sites for water taxi operation is consistent with the MDCMPP as noted in the attached spreadsheet. Furthermore, creating slips in these locations are not expected to result in adverse impacts to benthic resources. Our preliminary assessment indicated that water depth may be a limiting factor in creating slips to access some of these sites. Since many of the sites do not currently have docking facilities or permitted slips, a Class I permit will likely be required in order to implement the proposed uses. Additional information such as the size, type and draft of water taxis proposed to operate at each facility would be needed to fully evaluate individual sites for adequate water depth. A MOP for each facility will also be required prior to operation.

Proposed Courtesy Slips and a Water Taxi Slip in the Vicinity of Museum Park (FEC Slip, Museum Park Eastern Seawall):

During our meeting we discussed the proposed siting of a transit-oriented slip or water taxi slip on the eastern shoreline of Museum Park to provide access to the Museum Park Metromover Station. During this discussion, DTPW staff asked about the feasibility of permitting the installation of a barge to serve as a docking/landing platform at this location. As noted above, the installation of a barge for this purpose would be reviewed the same as with the installation of a fixed structure. In addition, we also discussed the possibility of siting "courtesy" slips in the "FEC" slip area at Museum Park for general public use.

The shoreline along Museum Park including within the "FEC" slip is an area that is recommended for freight terminal and large vessel (>100 ft.) berthing per the MDCMPP. The creation of public general use courtesy slips or water taxi slips at this location is not recommended in the MDCMPP. Any such proposal would require an in depth evaluation of the potential impact to manatees, including a full evaluation of any proposed mitigating factors that serve to reduce or eliminate potential threats to manatees using this area.

Please note that the information provided in this memo and attachment are based on a cursory review of these sites for potential environmental concerns. DERM staff are available to meet to discuss any questions you may have to further assist with planning of waterborne transportation options.

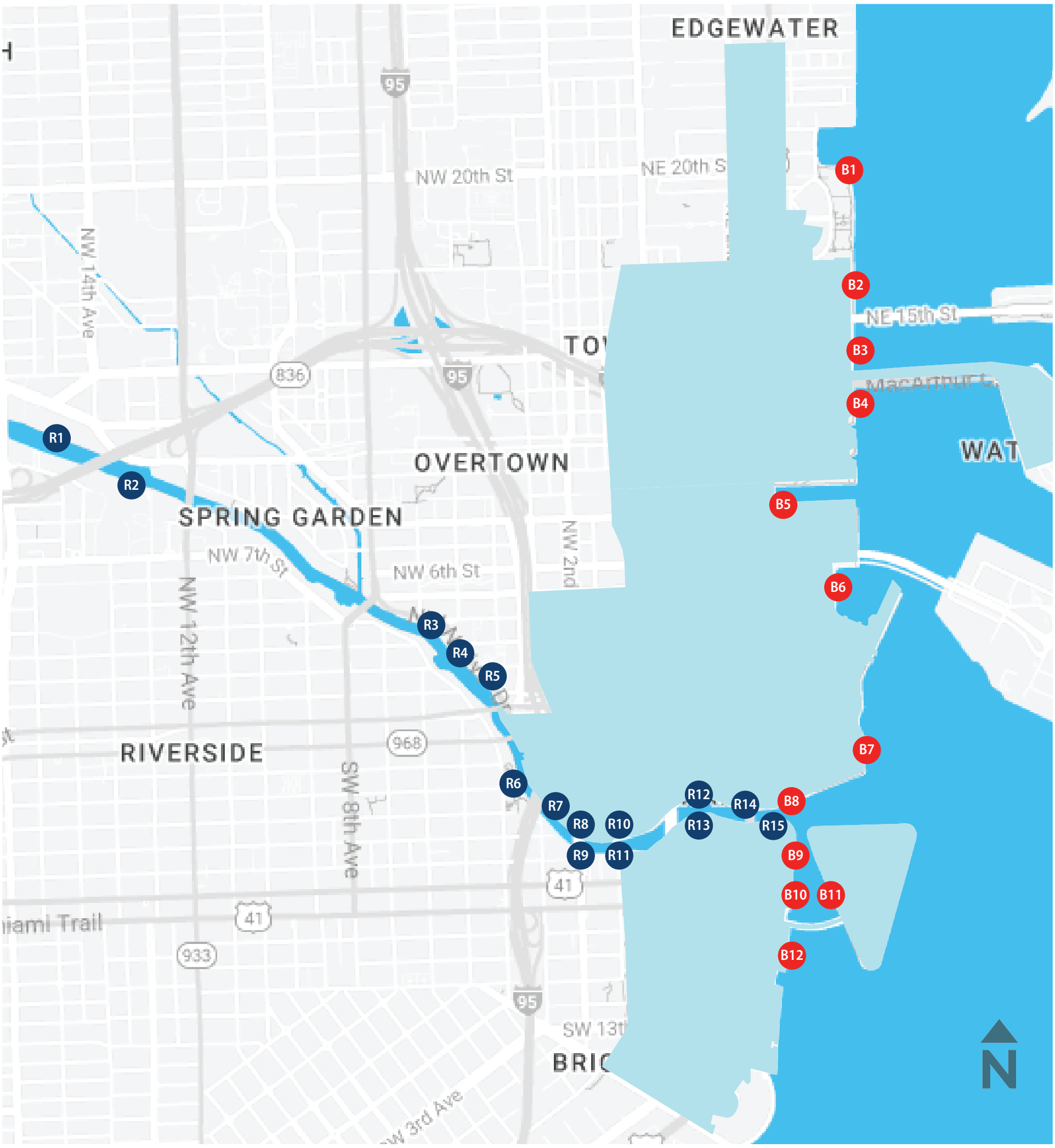
Attachment: Proposed Water Taxi Site Spreadsheet

c: Lourdes M. Gomez, Deputy Director, Department of Regulatory and Economic Resources
Irene Hegedus, Chief, Transportation Enhancements – DTPW
Julian Guevara, Municipal Manager – DTPW
Pamela Sweeney, Manager, Coastal and Wetlands Resources, RER-DERM

Proposed Water Taxi Site Spreadsheet

		Is Water Taxi Use Consistent with the MDCMPP?	Potential Water Depth Issues	Potential Benthic Resource Issues	Action needed for Water Taxi Use
	MIAMI RIVER SITES				
R1	WASD Pump Station No.1	Yes, if limited to 1 transitory slip at the property and no other mooring	TBD	Not Likely	*Obtain a Class I permit for mooring hardware/structures - vessel draft limitations and operational conditions may be implemented *Obtain an MOP
R2	Lummus Park	Yes - 15 historic slips permitted including 1 transitory and 1 law enforcement	3' max draft	Not Likely	Can be Authorized for Water Taxi Use upon MOP Issuance
R3	Jose Marti Park	Yes, if limited to 1 transitory slip at the property and no other mooring	TBD	Not Likely	*Obtain a Class I permit for mooring hardware/structures - vessel draft limitations and operational conditions may be implemented *Obtain an MOP
R4	Miami Riverside Center	Yes, if limited to 1 transitory slip at the property and no other mooring	No	Not Likely	Can be Authorized for Water Taxi Use upon MOP Issuance
R5	Beneath the 2nd Avenue Bridge, North Shore	Yes, if limited to 1 transitory slip at the property and no other mooring	Yes	Not Likely	*Obtain a Class I permit for mooring hardware/structures - vessel draft limitations and operational conditions may be implemented *Obtain an MOP
R6	Beneath the 2nd Avenue Bridge, South Shore	Yes, if limited to 1 transitory slip at the property and no other mooring	Not Likely	Not Likely	*Obtain a Class I permit for mooring hardware/structures - vessel draft limitations and operational conditions may be implemented *Obtain an MOP
R7	Metro-Rail North Shore	Yes, if limited to 1 transitory slip at the property and no other mooring	Yes	Not Likely	*Obtain a Class I permit for mooring hardware/structures - vessel draft limitations and operational conditions may be implemented *Obtain an MOP
R8	Metro-Rail South Shore	Yes, if limited to 1 transitory slip at the property and no other mooring	Not Likely	Not Likely	*Obtain a Class I permit for mooring hardware/structures - vessel draft limitations and operational conditions may be implemented *Obtain an MOP
R9	Riverwalk Metromover Station	Yes, if limited to 1 transitory slip at the property and no other mooring	Yes	Not Likely	*Obtain a Class I permit for mooring hardware/structures - vessel draft limitations and operational conditions may be implemented *Obtain an MOP
R10	5th Street Metromover Station	Yes, if limited to 1 transitory slip at the property and no other mooring	Not Likely	Not Likely	*Obtain a Class I permit for mooring hardware/structures - vessel draft limitations and operational conditions may be implemented *Obtain an MOP
R11	James L Knight Convention Center	Yes, if limited to 1 transitory slip at the property and no other mooring	TBD	Not Likely	*Obtain a Class I permit for mooring hardware/structures - vessel draft limitations and operational conditions may be implemented *MOP application pending response from applicant
R12	Miami Circle Park	Yes, if limited to 1 transitory slip at the property and no other mooring	Yes	TBD	*Obtain a Class I permit for mooring hardware/structures - vessel draft limitations and operational conditions may be implemented *Obtain an MOP

Possible Dockage Sites



Miami River

R1 River Landing
R2 River Park (South Side)
R3 Garcia's Seafood
R4 WASD Pump Station No.1
R5 Lummus Parks
R6 Jose Marti Park
R7 Miami Riverside Center
R8 Beneath the 2nd Ave Bridge – North Shore
R9 Beneath the 2nd Ave Bridge – South Shore
R10 Metrorail North Shore
R11 Metrorail South Shore
R12 Riverwalk Metromover Station
R13 5th Street Metromover Station
R14 James L. Knight Convention Center / Miami River Bridge
R15 Miami Circle Park

Biscayne Bay

B1 Margaret Pace Park
B2 Sea Isle Marina
B3 Genting
B4 PAMM – Maurice Ferre Park
B5 Kaseya Center - FEC Slip
B6 Bayside Marketplace
B7 Chopin Plaza / Bayfront
B8 EPIC Marina
B9 Viceroy / Icon Brickell
B10 Brickell Park
B11 Brickell Key
B12 Four Ambassadors

Miami DDA District

MIAMIDDA
DOWNTOWN DEVELOPMENT AUTHORITY

City Hall
3500 Pan American
Drive
Miami, FL 33133
www.miamigov.com

File Number: 15-00655 **Final Action Date:**

A RESOLUTION OF THE MIAMI CITY COMMISSION, WITH ATTACHMENT(S), URGING THE MIAMI-DADE COUNTY BOARD OF COUNTY COMMISSIONERS TO ADOPT A RESOLUTION, IN SUBSTANTIALLY THE ATTACHED FORM, AUTHORIZING AND APPROVING THE ESTABLISHMENT, SOLICITATION AND AWARD OF PUBLIC WATERBORNE TRANSPORTATION AT SPECIFIED LOCATIONS WITHIN THE CITY OF MIAMI; DIRECTING THE CITY CLERK TO TRANSMIT A COPY OF THIS RESOLUTION TO THE ELECTED OFFICIALS STATED HEREIN.

WHEREAS, Miami-Dade County ("County") has the power to provide, operate, regulate, franchise, control and take over public transportation systems in the County; and

WHEREAS, in the past two decades, the County and certain municipalities have entered into Interlocal Agreements whereby certain municipalities have been delegated the authority to provide for certain specialized or local public transportation to enhance, supplement and complement the County Mass Transit System, including, without limitation, the Electro Wave Electric Bus, the Coral Gables Trolley Service and the City of Miami Trolley Service, among others; and

WHEREAS, the City of Miami ("City") has been a supporter of commercial and working waterfronts, and cleanup, restoration and increased usage of navigable bodies of water such as Biscayne Bay and the Miami River which are located within the City; and

WHEREAS, City officials, the City Administration and involved City Departments such as Capital Improvements and Transportation, Procurement and others respectfully request the authorization, cooperation and support of the County to be able to implement regulations and agreements for the establishment of a limited public waterborne transportation system on certain navigable waters within the City in the manner envisioned in the proposed attached County Commssioners' ("Board") Resolution;

NOW, THEREFORE, BE IT RESOLVED BY THE COMMISSION OF THE CITY OF MIAMI, FLORIDA:

Section 1. The recitals and findings contained in the Preamble to this Resolution are adopted by reference and incorporated as if fully set forth in this Section.

Section 2. The Miami City Commission urges the passage by the Board of County Commissioners of a County Resolution, in substantially the attached form, to support the efforts of the City and authorize the City to competitively solicit, procure and award agreements to qualified private sector waterborne transportation providers, in order to utilize providers of water taxis and similar vessels, to drop off and pick up passengers, constituting the general public who are paying a fixed rate, to and from the locations listed or otherwise agreed to by the County and the City, which abut the Miami River and/or Biscayne Bay within the City.

Section 3. The City Clerk is directed to transmit a copy of this resolution to Miami-Dade County Mayor Carlos Gimenez and the Board of the County Commissioners.

Section 4. This Resolution shall become effective immediately upon its adoption and signature of the Mayor {1}.

APPROVED AS TO FORM AND CORRECTNESS:

VICTORIA MÉNDEZ
CITY ATTORNEY

Footnotes:

{1} If the Mayor does not sign this Resolution, it shall become effective at the end of ten (10) calendar days from the date it was passed and adopted. If the Mayor vetoes this Resolution, it shall become effective immediately upon override of the veto by the City.

ATTACHMENT

RESOLUTION NO.

RESOLUTION SUPPORTING AND AUTHORIZING THE EFFORTS OF THE CITY OF MIAMI TO COMPETIVELY SOLICIT AND AWARD AGREEMENTS TO PRIVATE SECTOR WATERBORNE TRANSPORTATION PROVIDERS TO DROP OFF AND PICK UP PASSENGERS FROM CERTAIN CITY OF MIAMI COUNTY OWNED BISCAYNE BAY AND RIVERWALK SITES IDENTIFIED HEREIN; FURTHER URGING THAT THE CITY AND THE COUNTY ENTER INTO AN INTERLOCAL AGREEMENT TO IMPLEMENT THIS RESOLUTION AND TO PRESENT SUCH AGREEMENT TO THE BOARD OF COUNTY COMMISSIONERS FOR CONSIDERATION AND APPROVAL

WHEREAS, Section 1.01 (A) (2) and (14) of the County Home Rule Charter provides that the Board of County Commissioners has the power to provide, operate, regulate, franchise, control and take over public transportation systems in Miami-Dade County (the "County"); and

WHEREAS, the County has undertaken the role of providing County wide public transportation since 1957; and

WHEREAS, in the past two decades, the County has, from time to time, entered into Interlocal Agreements with municipalities located in the County that have delegated the ability to certain municipalities to provide or cause to be provided public transportation systems which are complementary and supplemental to existing County public transportation systems; and which serve the unique and particular needs of the local community in that municipality such as the Coral Gables and Magic City (Miami) Trolleys, and the Miami Beach Electro wave Buses, among others; and

WHEREAS, a large portion of the Miami River is in the City of Miami (the "City") and the City has a Miami River Element in its adopted Comprehensive Plan and additionally the City has been demonstrably supportive of recreational and commercial working waterfronts as defined by Florida Statutes; and

WHEREAS, a significant portion of Biscayne Bay is within the territorial limits of the City and the City is desirous of fostering waterborne transportation and mobility within Biscayne Bay; and

WHEREAS, certain locations identified in the body of this resolution are within the corporate limits of the City and are ideal for the competitive solicitation and award by the City to private sector waterborne transportation providers to drop off and pick up passengers; and

WHEREAS, the lack of mass transit in the City has hampered mobility for local residents and visitors; and

WHEREAS, various projects to enhance mobility in the County have been approved by the Metropolitan Planning Organization ("MPO"); and

WHEREAS, the City abuts and encompasses the Miami River which is a navigable waterway that connects to Biscayne Bay and other portions of the County; and

WHEREAS, the City is seeking support and approval to facilitate enhanced mobility and is requesting support and approval of this proposed program to take advantage of these portions of Biscayne Bay and the Miami River for mass transit, commercial and recreational working waterfront purposes; and

WHEREAS, this program will enhance such mobility and will benefit the general public by allowing the provision of enhanced waterborne transportation options and facilitate the movement of people to and from certain designated destinations within the City and will benefit the entire County; and

WHEREAS, the Board of County Commissioners is strongly and robustly supportive of the City spearheading these efforts in light of the reasons and factors set forth herein and in view of the fact that furnishing additional means of public transportation utilizing waterborne systems relieves traditional traffic congestion, will promote local trade commerce and tourism and serve the general public;

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF MIAMI-DADE COUNTY, FLORIDA, that:

Section 1. This Board approves and incorporates the foregoing recitals to this Resolution.

Section 2. This Board supports the efforts of, and authorizes, with appropriate delegations of authority, the City of Miami to competitively solicit, procure and award agreements to qualified private sector waterborne transportation providers, utilizing, without limitation, providers of water taxis and similar vessels, to drop off and pick up passengers, constituting the general public who are paying a fixed rate, to and from the following locations abutting the Miami River and Biscayne Bay within the City of Miami:

(a) WASD Pump Station #1, between Lummus Park and 3 River Restaurants;

(b) Lummus Park;

(c) Jose Marti Park;

(d) Miami Riverside Center;

(e) Beneath the 2nd Avenue Bridge, North Shore;

(f) Beneath the 2nd Avenue Bridge, South Shore;

(g) Metro-Rail North Shore;

(h) Metro-Rail South Shore;

(i) "Riverwalk " Metro Mover Station;

(j) "5 ST" (Fifth Street) Metro Mover Station;

(k) James L. Knight Convention Center;

(l) Biscayne Bay sites, including, Peacock Park, City Hall, Kennedy Park, Alice Wainwright Park, Brickell Park, Bayfront Park, American Airlines Arena, Museum Park, Margaret Pace Park, Morningside Park, and American Legion Park; and

(m) Such other accessible waterfront locations within the City limits that the County and City agree as set forth in any Interlocal Agreement regarding the provision of waterborne transportation as contemplated herein.

Section 3. This Board recommends and urges the County Administration to negotiate and present to the Board, for our consideration and approval, an Interlocal Agreement with the City to implement and effectuate this Resolution. The Interlocal Agreement will address, among other terms and conditions, the authorization for the City to enter into Agreements with the qualified public sector providers of waterborne transportation, the permitting, insurance and safety requirements, and approval of their vessels and personnel, for the locations listed in the preceding Section of this Resolution.

Section 4. This Board directs the Clerk of the Board to transmit a certified copy of this Resolution to the MPO; the Miami River Commission; and the Mayor, City Manager, and City Clerk of the City of Miami.

MIAMI-DADE COUNTY, FLORIDA
BY ITS BOARD OF
COUNTY COMMISSIONERS

HARVEY RUVIN, CLERK

By: _____
Deputy Clerk

Approved by the County Attorney as
to form and legal sufficiency_____

OFFICIAL DOCUMENT

Regulatory and Economic Resources
Environmental Resources Management
701 NW 1st Court, 6th Floor
Miami, Florida 33136-3912
T 305-372-6567 F 305-372-6407

miamidade.gov

Permit No: MOP-000480-2020/2021 (B)-GEN
Permit Issued To: LUMMUS LANDING PUBLIC DOCKS
Facility Location: 250 NW NORTH RIVER DR
MIAMI, FL 33128-

Contact Name/Address:
Attn: Daniel Rotenberg
CITY OF MIAMI - DREAM
444 SW 2 AVE - 3RD FLOOR
MIAMI, FL 33130-

MARINE FACILITIES
ANNUAL OPERATING PERMIT

DESCRIPTION OF FACILITY/EQUIPMENT

This document, issued under the provisions of Chapter 24, Miami-Dade County Code (Ordinance Number 89-104), shall be valid from 01-OCT-2020 through 30-SEP-2021. The above named permittee, is hereby authorized to operate the marine facility at the above location which consists of the following:

Recreational Boat Docking Facility.

Total wet slips: 15
Total dry slips: 0
Total dry storage spaces: 0
Total commercial vessels: 0
Total recreational vessels: 15
Number of liveaboards: 0
Days of week in operation: 7

This facility is subject to conditions listed below and in the following pages (if any) of this permit.

SPECIFIC CONDITIONS

1. This facility spans 250 and 176 NW North River Drive (Folios 01-0109-030-2020 and 01-0110-090-1100). This permit shall extend to the two adjacent parcels as one facility.

2. The subject docking facility has been approved to have a maximum of 15 slips. Therefore, no greater than 15 vessels may be moored at the subject facility at any time.

3. Pursuant to the Sovereign Submerged Lands Lease, the permitee shall ensure that 1 slip is used exclusively for water taxi access (e.g. the loading and off-loading of water taxi passengers) and that signage is placed on the waterward edge of the dock, which clearly designates the use of the slip is for "Water Taxi Only." The Water Taxi slip shall be utilized solely for water dependent public transportation.

4. Pursuant to the Sovereign Submerged Lands Lease, the permitee shall ensure that 1 slip is used exclusively for law enforcement vessels and that signage is placed on the waterward edge of the dock, which clearly designates the location and use of the slip is for "Law Enforcement Only."

5. The remaining 13 slips that are not specifically designated for Law Enforcement and Water Taxi use shall be used exclusively by recreational vessels. No commercial activities or operations are authorized in association with the remaining 13 slips.

6. Pursuant to the Sovereign Submerged Lands Lease, only temporary day mooring shall be allowed at the facility. Overnight or permanent mooring is prohibited.

Lee N. Hefty, Assistant Director
Department of Regulatory and Economic Resources,
Environmental Resources Management

7. Due to shallow water depths, vessels shall be restricted from mooring in areas designated as a "Mooring Prohibited Area," as depicted in Attachment A of Class I permit CLI-2015-0299 as MPA #1 and MPA #2. Mooring of vessels anywhere north of the dock (WASD Easement) or along the AT&T easement near the center of the dock, just north of NW 2nd Street, shall be strictly prohibited. Additionally, the installation of fenders, davits, mooring whips, cleats, or any hardware to facilitate the mooring of vessels in a "Mooring Prohibited Area" is prohibited. Signage denoting the mooring prohibited areas shall be posted and maintained along said areas.

8. Covered trash containers shall be provided at convenient locations adjacent to the facility for the disposal of solid waste. Permanent signs shall be posted along the marginal dock advising the users thereof to dispose of solid waste in the trash containers provided rather than throwing it in the adjacent waters.

9. No live-aboard vessels, permanent or transient, shall be permitted to dock at this facility at any time.

10. The fueling of any vessels at this facility, including the use of landside tanker trucks, is strictly prohibited.

11. No marine related repairs of any type are to be performed at this facility.

12. A manatee educational display is required at this docking facility. Said sign(s) shall be posted in a prominent location, in an area clearly visible to users, staff, and guests of the facility. This is in addition to having the required minimum of two (2) manatee awareness (i.e. caution) signs posted. All signs shall conform to Florida Fish and Wildlife Conservation Commission (FWC) guidelines (http://www.myfwc.com) and be maintained for the life of the docking facility in a manner acceptable to FWC and DERM.

13. The maximum number of vessels that may be stored, docked, or moored at this facility may not exceed the number of slips and/or dry storage spaces as referenced above in this Operating Permit. Unless otherwise authorized by DERM, a maximum of one (1) vessel shall be moored in each designated slip. This condition shall not apply to appurtenant vessels such as dinghies and tenders that are associated by ownership, design, and common usage with a primary vessel docked, moored, or stored at the facility, and therefore, are affixed to/carried by and stored on the primary vessel.

14. Adequate clearance shall be maintained at all times between the submerged bottom, and any existing benthic resources, and any vessels moored at the property, such that there are no impacts to either benthic resources or the submerged bottom, including but not limited to bottom scouring or prop dredging.

15. The use of bilge cleaners or degreasers by vessels shall be prohibited while they are docked at or within this facility. In addition, no discharge of bilge wastewater or gray water shall cause iridescence on the water's surface or be contaminated by oil, fuel, or other regulated contaminants.

16. This facility must be operated in accordance with the "Marine Facilities Best Management Practices" (BMPs), which are incorporated by reference as part of this permit. Copies of the BMPs are available upon request.

17. All applicable conditions from previously executed local, state, and federal permits issued for the above-referenced marine facility shall be enforced.

18. All fixed or floating non-water dependent structures in, on, over, or upon tidal waters, unless previously approved by a Class I permit, are prohibited.

19. All permanent sewage pumpout systems and portable pumpout systems required at this facility pursuant to DERM, state, or federal permits shall be maintained on site and in fully operable condition at all times in order to convey sewage to the sanitary sewer system. Designated slips for pumpout stations shall be kept open at all times except while a vessel is discharging sewage to the pumpout system. There shall be no overboard discharge of sewage to tidal waters from vessels at this facility. This prohibition also includes discharges from approved Coast Guard Type 1 or 2 flow-through marine sanitation devices. All vessel occupants shall use shoreside facilities unless the vessel is equipped with a Coast Guard approved holding tank system or is directly connected to the facility's sewage pumpout system.

20. The facility owner/operator is required to maintain a submerged land lease from the State of Florida if any vessels or structures are located over state-owned submerged lands. Use of state-owned submerged lands without a lease or other form of consent from the State of Florida is prohibited.

21. Unless otherwise approved by DERM, fueling of vessels at this facility shall be prohibited. Facilities approved for fueling operations shall maintain on-site spill prevention, containment,

MIAMI-DADE COUNTY
miamidade.gov

OFFICIAL DOCUMENT

Regulatory and Economic Resources
Environmental Resources Management
701 NW 1st Court, 6th Floor
Miami, Florida 33136-3912
T 305-372-6567 F 305-372-6407

Permit No: **MOP-000480-2020/2021 (B)**
Permit Issued To: **LUMMUS LANDING PUBLIC DOCKS**

and recovery equipment and materials including, but not limited to, absorbent pads, booms, and sweeps and shall maintain staff trained in the deployment and operation of said equipment at all times. Fueling at approved facilities shall be conducted only at the designated fueling location in order to contain any spills that may occur. A floating containment boom large enough to enclose the area of the vessel being fueled, but with a minimum length of fifty (50) feet, shall be available at all times during fueling operations. Said equipment shall be deployed and operated in the most effective manner possible when spills occur.

22. Strict compliance with reporting requirements for fuel and oil spills (regardless of the size) shall be required pursuant to local, state, and federal regulations. The use of dispersants, including household detergents, to treat in-water fuel and oil spills is prohibited.

23. The facility shall immediately report to DERM any discharges to surface waters, or to drainage features connected to surface waters, of petroleum or other pollutants including but not limited to fuel, sewage, solvents, paints, or other chemicals. DERM shall be notified by telephone at 305-372-6955 and/or electronic mail at EnvironmentalComplaints@miamidade.gov. The facility shall also report the discharge to the National Response Center (NRC) by calling 1-800-424-8802 so that the US Coast Guard may be notified. Reports of a discharge shall include information concerning the time, source, type, and quantity of the discharge along with actions taken, and to be taken, to remediate the discharge.

24. Any vessel meeting the definition of a derelict vessel as defined in Section 823.11(b) Florida Statutes shall not be left, stored, or abandoned in, on, over, or upon tidal waters and submerged bottom within the facility. This includes any vessel in a wrecked, junked, or substantially dismantled condition, including any sunken vessel. For any derelict vessel that is docked, grounded, or beached upon private property within the facility, the property owner shall remove the vessel after complying with the notice requirements specified in Section 328.17(5) Florida Statutes. As the custodian of any such derelict vessel, the facility shall be responsible for the removal and proper disposition of the vessel if the owner of the vessel fails to do so.

25. Harassment of manatees is prohibited. Harassment includes, but is not limited to, feeding, watering, physical contact, and/or any interference in their normal behavior or movements.

26. All permitted docking facilities shall post a minimum of two (2) manatee awareness (i.e. caution) signs. Facilities with fifty (50) or more boat slips are also required to post a manatee educational display. All signs shall be posted in prominent locations, in areas clearly visible to users, staff, and guests of the facility. All signs shall conform to Florida Fish and Wildlife Conservation Commission (FWC) guidelines (http://www.myfwc.com) and be maintained for the life of the docking facility in a manner acceptable to FWC and DERM. Additional signs may be requested to be posted depending on the size and layout of the facility.

27. Pursuant to Section 24-48.26 of the Code of Miami-Dade County, for all facilities which are subject to a County marine facilities operating permit pursuant to Chapter 24, such permit shall require the removal, replacement, or repair of any unencapsulated polystyrene, as defined in Section 24-5, where such polystyrene shows evidence of degradation, disintegration, shredding, or other damage, as determined in the discretion of the Director.

28. In-water disposal of fish carcasses is prohibited. Facilities with fish cleaning stations shall provide covered trash containers at a convenient location adjacent to each fish cleaning station for the disposal of fish carcasses. Permanent signs shall be posted at each cleaning station advising facility patrons of this disposal requirement.

GENERAL CONDITIONS

29. The Permittee, by acceptance of this document, agrees to operate and maintain the subject operation so as to comply with the requirements of Chapter 24 of the Code of Miami-Dade County.

30. If for any reason, the Permittee does not comply with or will be unable to comply with any condition or limitation specified on this document the Permittee shall immediately notify and

provide the Department with the following information: (a) a description of and cause of non-compliance; and (b) the period of non-compliance including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps taken to reduce, eliminate, and prevent recurrence of the non-compliance. The Permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or revocation of this document.

31. As provided in Section 24-15 of the Code of Miami-Dade County, the prior written approval of the Department shall be obtained for any alteration to this facility.

32. The issuance of this document does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. Nor does it relieve the Permittee from liability for harm or injury to human health or welfare or property.

33. This document is required to be posted in a conspicuous location at the facility site during the entire period of operation.

34. The Permittee must provide written notification to the Department upon ceasing operations at the facility that includes the official date of closure. If the submittal of other information is required by the Department prior to the closure of the facility pursuant to the conditions of this permit, said information must be submitted in accordance with the requirements and applicable timeframes indicated therein.

35. This document is not transferable. A new or modified permit issued by the Department, pursuant to Chapter 24 of the Miami-Dade County Code, is required for any changes or modifications to the name of the Permittee, facility location, or upon sale or legal transfer of the property or facility.

36. The Permittee, by acceptance of this document, specifically agrees to allow access to the named source at reasonable times by Department personnel presenting credentials for the purposes of inspection and testing to determine compliance with this document and Department rules.

37. This document does not constitute an approval by the Department or certification that the Permittee is in compliance with applicable laws, ordinances, rules or regulations. The Permittee acknowledges that separate enforcement actions may be initiated by the Department and that this document does not constitute compliance with orders issued in conjunction with enforcement actions for correction of violations.

38. This document does not indicate a waiver of or approval of any other Department permit that may be required for other aspects of this facility.

39. Failure to comply with any condition of this document, or the requirements of Chapter 24, Code of Miami-Dade County may subject the Permittee to the penalty provisions of said Chapter including civil judicial penalties up to $25,000 per day per offense and/or criminal penalties not to exceed $500 per day or, for violations of Section 24-42.4 Sanitary Sewer Discharge Limitations and Pretreatment Standards not to exceed $2,000 per day and/or sixty (60) days in jail.

MIAMI RIVER CORRIDOR URBAN INFILL PLAN

prepared for

Miami River Commission, City of Miami, and Miami-Dade County

THE MIAMI RIVER COMMISSION ONE VOICE for the river

THE CITY OF MIAMI DADE CO. FLORIDA

MIAMI - DADE

Kimley-Horn and Associates, Inc.

50300056.02

INTRODUCTION

This section of the plan provides specific recommendations for protecting maritime uses along the Miami River as well as encouraging responsible expansion of recreational boating and water based transit. The Miami River is a transportation corridor for both the marine industry and recreational boats. The water-dependent activities along the River support a range of sailing and motor vessels of all types and sizes, contributing to the economy as well as the maritime character of the River. In order to provide continued service to these maritime users, the provision of a sustained and diverse boat slip inventory along the Miami River is necessary. The Miami-Dade Metropolitan Planning Organization has begun a waterways transportation study that will look at opportunities to establish commuter boat and water taxi service to relieve roadway congestion.

The direct economic impact of the mega yachts repair and maintenance at boatyards in the tri-county areas in 1998 was $199 million. The marine shipping industry along the Miami River alone transports over $4 billion of goods annually. There is clear justification to protect and enhance the industrial land uses and docking facilities for these types of crafts along the Miami River. Additionally, during the opportunities and constraints portion of this study, six planned residential and mixed-use development projects in the lower and middle river were identified. These projects will create demand for smaller scale recreational watercraft access and dock facilities. Existing slips may generally be rebuilt or renovated, but due to limitations associated with submerged land use, navigation, or environmental requirements, it is sometimes difficult to expand or build new marinas or docks. Recommendations for watercraft transportation are as follows:

Maintaining Existing Maritime Uses: Zoning regulations and procedures for seeking variances should require that water-dependent and water-related land uses be maintained on parcels with water access. Incentives, such as reduced fees or expedited review of applications, could be offered for development proposals that incorporate existing vessel docks and dry storage. A boat slip inventory should be conducted to determine the number and type of existing boat slips available along the Miami River. The purpose of this inventory would be to establish a target "level of service" for water transportation and vessel support. In the event that existing docking or vessel storage facilities are not retained during redevelopment, the inventory could also be used to track slips that might be available to reallocate to another suitable location.

Water Bus: The initial recommendation is to fund a water bus service to operate in the lower river. Such a vessel could stop to pick up or drop off passengers at existing docks with public access, or at new courtesy docks as permitted. As development expands to the middle river service would expand to serve those areas. The long term vision for water bus service is to provide service for the entire river and link to other local destinations such as Coconut Grove, Miami Beach and the Port of Miami. In the future the water bus could provide service from the Miami Intermodal Center to the Port of Miami, allowing cruise passengers to arrive in Miami and enjoy the Miami River and its destinations on the way to the cruise terminal. The operation of a water bus service should not conflict with marine industrial activities.

A low profile water bus providing tours on River Day.

New Boat Slips: Opportunity for construction of new boats slips on the Miami River may be limited by submerged land ownership, navigation constraints or environmental issues. The state-approved Manatee Protection Plan for Miami-Dade County recommends new or expanded ship terminals or large (>100 feet) vessel facilities, as well as new slips for residential developments or courtesy docks, with limits on the density of motorboats. Currently, there is a general commitment from all parties that the existing baseline number of slips as described in the Manatee Projection Protection Plan shall remain. It may be possible to allow an even greater number of motorboat slips or density at a particular location without increasing overall impact to manatees in the River, if slips that were given up or were no longer used elsewhere could be "transferred" or reallocated. This approach could preserve the maritime character of the Miami River without sacrificing manatee protection or other environmental goals. The feasibility of such a procedure should be assessed, taking into consideration the inventory described above along with legal and regulatory requirements. It is implicit in this recommendation that manatee protection and boat dockage are to be maintained or enhanced.

Miami River Corridor

MULTI-MODAL TRANSPORTATION PLAN
FINAL REPORT

PREPARED FOR

MIAMI-DADE MPO Metropolitan Planning Organization

Miami River Commission

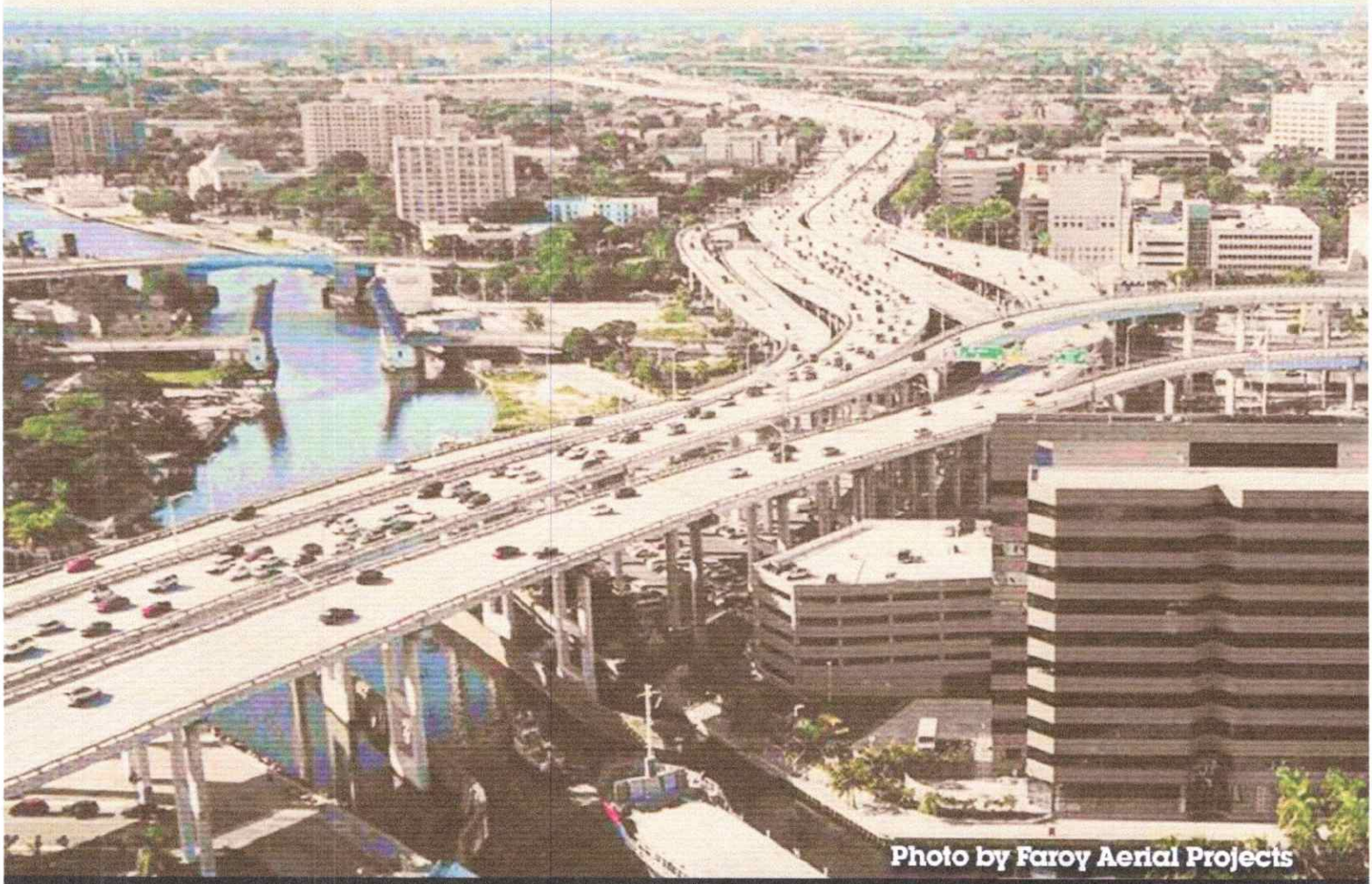


Photo by Faroy Aerial Projects

PREPARED BY

Kimley-Horn and Associates, Inc.

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Waterborne Transit

The Miami River Corridor is not only a functional waterway, but also an attractive focal point unique to Miami. Therefore, it is recommended to use the Corridor as an alternative mode of transportation not only because it would help to alleviate the traffic congestion on the roads, but also serve as a desirable attraction. The Miami River Multi-modal Transportation Plan recommends a waterbus service to be implemented along the Miami River. The waterbus service should connect to the future Miami Intermodal Center (MIC), and provide access to new residential developments as well as existing public transit along the Corridor. Potential waterbus stops include Palmer Lake or the Tamiami Canal, parks, restaurants and feasible Metromover and Metrobus stops. The waterbus service should be operated with vessels ranging in size from 20 to 70 passengers yet be short enough to pass under as many bascule bridges as possible without requiring opening. The most cost feasible and environmentally sound vessels should be explored.

Active WaterBus Service at Annual Miami Riverday Festival

The Miami River waterbus system would connect to a larger proposed waterbus service recommended for Miami-Dade County in the Development of a Service Plan for Waterborne Transit Service. The hub for the waterbus system is proposed near the mouth of the Miami River at Chopin Plaza or Bayfront Park. This location would provide connections from the River to proposed waterbus routes in Biscayne Bay being considered by the County to link to Haulover, Aventura, Coconut Grove, and Miami Beach. Low wake-wash catamaran waterbus are recommended for Biscayne Bay routes with seating capacity for 100 to 149 passengers. An additional advantage for the waterbus transit is the ability to provide transit to the major employment centers including the central business district and civic center.

Consideration should be given to creating waterbus landings where appropriate along the Miami River. For example, the seawall depicted in the picture below of a new residential development on the Fort Lauderdale riverwalk, which has a waterbus service, features a step down area, that makes it easier to board a vessel.

Existing Fort Lauderdale Riverwalk with Acceptable Landing for Waterbus

Figure 13, which is taken from the Development of a Service Plan for Waterborne Transit Service, represents the potential water transit system in Miami-Dade County. The figure shows the potential for a route along the Miami River Corridor, and its connection to the Port of Miami and the surrounding area. This recommendation can be found as line items T1, T9 and T12 in Tables 10-12, as well as on Figures 12 A, 12B and 12C.

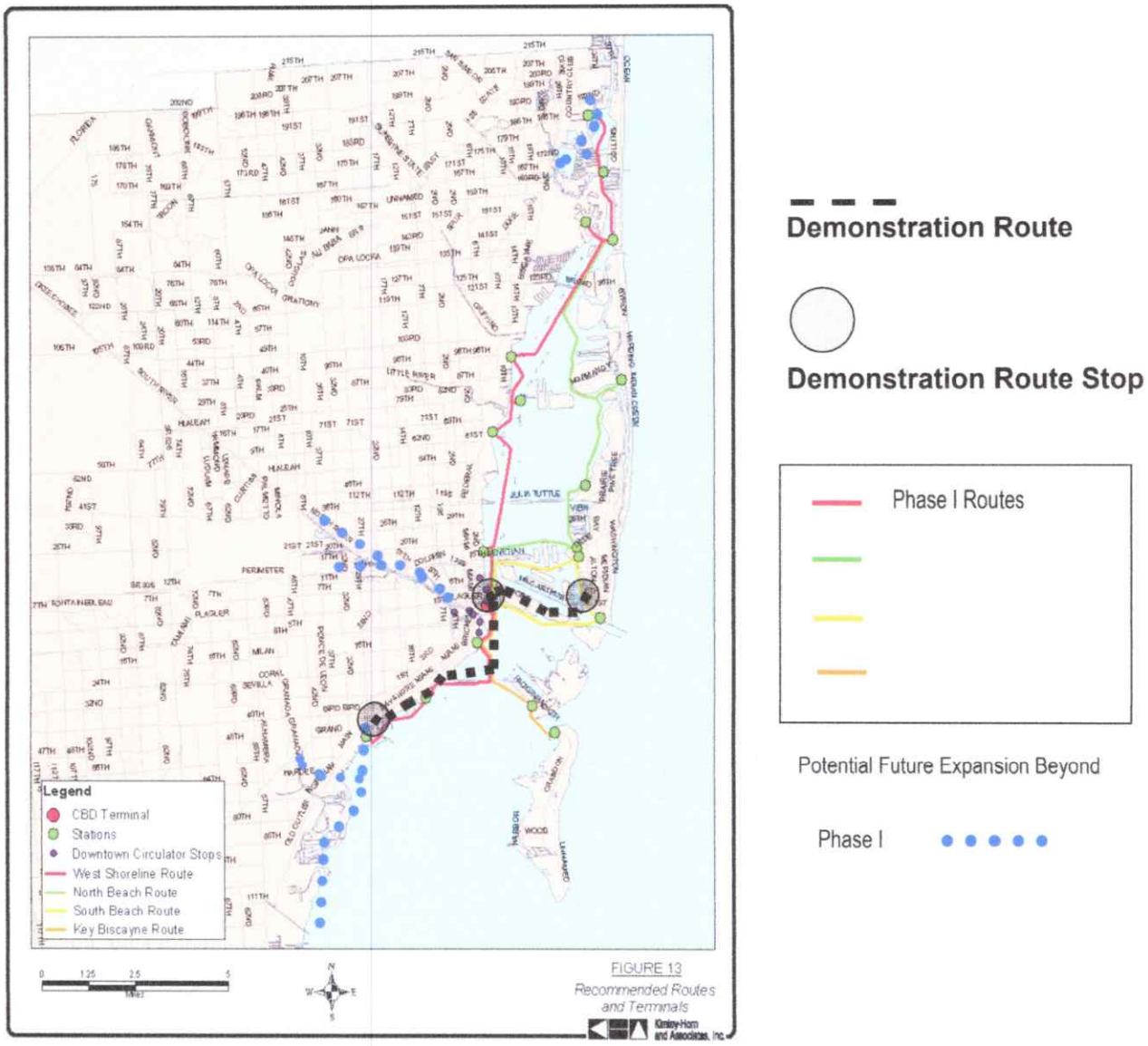

Figure 13: Miami-Dade County Water Transit Recommended Routes and Terminals

ARTICLE XIV. - WATER TAXI REGISTRATION

FOOTNOTE(S):

--- (**9**) ---

Cross reference— Boats, docks and waterways, Ch. 6.

Sec. 17-431. - Title.

This Article shall be titled "The Palm Beach County Water Taxi Registration Ordinance."

(Ord. No. 2014-016, § 1, 5-20-14)

Sec. 17-432. - Definitions.

[The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:]

Designated Docking Facilities shall refer to the publicly-owned or privately owned docks and/or wharves which have been identified by the Provider as the location where a Water Taxi may dock or moor for the purpose of picking-up and dropping-off passengers.

Division or *DCA* shall mean the Palm Beach County Division of Consumer Affairs.

Provider shall refer to the owner and/or operator of a water taxi for hire.

Registration shall refer to the registration of all providers of Water Taxi services required by Palm Beach County pursuant to this Article.

Tour Boat shall refer to any boat that picks up and drops off passengers for a fee in exchange for tour services, including any vessel/amphibious vehicle that may also operate on both land and water in this capacity.

Water Taxi shall refer to any taxi for hire at prearranged rates of fare which is operated between the point of origin and a destination point different from the point of origin. Said term shall include but not be. limited to water taxis and tour boats, but shall not include charter services, dive boats and fishing vessels.

(Ord. No. 2014-016, § 2, 5-20-14)

Sec. 17-433. - Registration.

(a) Providers of Water Taxi services shall register with Palm Beach County before commencing operations; or if currently operating before the adoption of this Article, such Providers shall register within sixty (60) days after the effective date of this Article.

(1) The registration shall be on forms designated by the Palm Beach County Department of Public Safety.

(2) Documentation shall indicate that all persons operating a Water Taxi are licensed and insured in accordance with applicable federal requirements, the Palm Beach County Application for

Water Taxi Business Permit and Vessel Decal, and the requirements set forth herein.

(3) Documentation shall indicate the Provider's Designated Docking Facilities. Subsequent requests to modify Designated Docking Facilities must be submitted to the County in writing and must be approved by the County before the Provider may commence services at a new Designated Docking Facility.

(b) All Providers of Water Taxi services shall renew their registrations and pay all renewal fees with Palm Beach County on or before the date the initial registration is set to expire. If the registration expiration date falls on a weekend or holiday, the renewal registration is due and payable on or before the first business day following the expiration date.

(c) The initial registration fee shall be one hundred fifty dollars ($150.00) and the renewal registration fee shall be one hundred fifty dollars ($150.00). The initial registration shall be valid for a two-year period and a renewal registration shall be valid for a two-year period. Nothing herein prevents Providers from obtaining successive renewals from Palm Beach County so long as the requirements of this Article are met.

(d) All Providers shall comply with the local rules of each Designated Docking Facility and all registration requirements of any municipality.

(e) Once a Provider has completed the registration process, paid all registration fees, and submitted all forms required by Palm Beach County, the County shall issue the Provider a revocable license and a decal to provide Water Taxi services as prescribed in the registration documents and license. A Provider shall also obtain a decal from each municipality where the Provider intends to provide Water Taxi services prior to the commencement of these services. To obtain a municipal decal, the Provider must submit proof to the municipality that it has met all insurance and indemnification requirements under this Article, and that it has paid the municipal fee for such decal. The County decal and all municipal decals must be displayed in a publicly visible area of the Water Taxi at all times.

(Ord. No. 2014-016, § 3, 5-20-14)

Sec. 17-434. - Insurance.

In order to obtain a revocable license from Palm Beach County for the provision of Water Taxi services, all Providers must secure and maintain, at their own expense and keep in effect during the full period of the revocable license agreement, a policy or policies of insurance, which must include the following coverages and minimum limits of liability:

(a) *Commercial General Liability.* Provider shall agree to maintain Commercial General Liability at a limit of liability not less than one million dollars ($1,000,000.00) each Occurrence. Coverage shall not contain any endorsement excluding nor limiting Contractual Liability, Products/Completed Operations Liability, or Cross Liability.

(b) *Marine Protection & Indemnity Insurance.* Provider shall agree to maintain Marine Protection and Indemnity, or similar Watercraft Liability, for owned, hired, or borrowed watercraft. Coverage may be provided either by way of endorsement under the Commercial General Liability (GC 24 12 Boats), or by separate Marine Protection and Indemnity insurance with limits not less than one million dollars ($1,000,000.00) each occurrence.

(c) *Workers Compensation Insurance & Employers Liability.* Provider shall agree to maintain Florida Workers Compensation Insurance & Employers Liability. Provider shall agree to maintain Federal Act endorsements for U.S. Longshoremens & Harbor Workers Act (WC 00 01 06 A) and The Jones Act (WC 00 02 01 A) when activities or operations involve work on or contiguous to navigable bodies of U.S. waterways and ways adjoining, or vessels. The Provider agrees to be responsible for the employment, control and conduct of its employees and for any injuries sustained by such employees in the course of their employment.

(d) *Umbrella or Excess Liability.* Provider may satisfy the minimum limits required above for Commercial General Liability, Marine Protection & Indemnity, or Employers' Liability coverage under Umbrella or Excess Liability. The Umbrella or Excess Liability shall have an Aggregate limit not less than the highest Each Occurrence limit for Commercial General Liability, Marine Protection & Indemnity, or Employers Liability. The County, and each municipality where the Provider provides Water Taxi services, shall be specifically endorsed as an Additional Insured on the Umbrella or Excess Liability, unless the Certificate of Insurance notes the Umbrella or Excess Liability provides coverage on a Follow-Form basis.

(e) *Additional Insured.* Provider shall agree to endorse the County and each municipality where the Provider provides Water Taxi services, as an Additional Insured with a CG 2026 Additional Insured - Designated Person or Organization endorsement, or its equivalent, to the Commercial General Liability, the Marine Protection & Indemnity, and the Employers Liability. The Additional Insured endorsement for Palm Beach County shall read "Palm Beach County Board of County Commissioners." The Additional Insured endorsement for each municipality where the Provider provides Water Taxi services shall be in the form required by each municipality.

(f) *Waiver of Subrogation.* Provider shall agree by entering into a revocable license agreement to a Waiver of Subrogation for each required policy. When required by the insurer, or should a policy condition not permit an Insured to enter into a pre-loss agreement to waive subrogation without an endorsement, then Provider shall agree to notify the insurer and request the policy be endorsed with a Waiver of Transfer of Rights of Recovery Against Others, or its equivalent. This Waiver of Subrogation requirement shall not apply to any policy, which a condition to the policy specifically prohibits such an endorsement, or voids coverage should Provider enter into such an agreement on a pre-loss basis.

(g) *Certificate(s) of Insurance.* Immediately following notification of the award of the revocable license agreement, Provider shall agree to deliver to the County a Certificate(s) of Insurance evidencing that all types and amounts of insurance coverages required by the revocable license agreement have been obtained and are in full force and effect. Such Certificate(s) of Insurance shall contain a provision or endorsement that the coverage afforded shall not be cancelled, materially changed or renewal refused until at least thirty (30) days written notice has been given to the Palm Beach County Board of County Commissioners by certified mail. The Certificate Holder shall read Palm Beach County, Board of County Commissioners, 50 South Military Trail, Suite 201, West Palm Beach, Florida 33415 and each municipality.

(h) *Right to Review.* The County, by and through its Risk Management Department, in cooperation with all applicable County Departments including, but not limited to the Departments of

Public Safety and Parks and Recreation, reserves the right to review, modify, reject or accept any required policies of insurance, including limits, coverages, or endorsements, herein from time to time throughout the life of the revocable license agreement. The County reserves the right, but not the obligation, to review and reject any insurer providing coverage because of its poor financial condition or failure to operate legally.

(Ord. No. 2014-016, § 4, 5-20-14)

Sec. 17-435. - Revocation, suspension and denial of license/administrative appeal/court appeal.

Provider agrees to perform the work under the license agreement as a licensee, and not as a contractor/subcontractor, agent or employee of the County or of any municipality where the Provider provides Water Taxi services. A violation of the terms of the license agreement shall constitute a material breach by the Provider and the County, at its sole discretion, may cancel the license agreement and all rights, title and interest of the Provider shall thereupon cease and terminate.

(a) The Director of the Division of Consumer Affairs is authorized to deny, suspend or revoke licenses/decals, upon written notice. Suspensions shall not be more than six (6) months. Providers not resolving issues related to suspensions within the six-month suspension period will be subject to license/decal revocation. Said notice of license/decal denial, suspension or revocation shall be by personal service (to the Provider by certified mail, return receipt requested, or posting in a conspicuous place at the place of business or home of the Provider).

(b) Upon receipt of the notice of denial, revocation, or suspension of a license/decal, which notice shall specify the grounds for the denial, suspension or revocation, the Provider shall be entitled to an appeal according to the following:

(1) *Administrative appeal.* Any Provider which has had a license/decal denied, revoked, or suspended by the Division, may appeal such decision to the Consumer Affairs Division within twenty (20) days of receipt of the decision. A non-refundable filing fee must accompany the written request for appeal. The Provider or attorney shall file a written notice of appeal signed by the Provider or attorney requesting a hearing and setting forth a brief statement of the reasons thereof. The filing fee shall be one hundred fifty dollars ($150.00). The appeal shall be reviewed at a hearing of the Consumer Affairs Hearing Board or Special Master within sixty (60) days of receipt by the Division of the notice of appeal. The determination of whether the appeal will be heard by the Consumer Affairs Hearing Board or Special Master will be made by the Division of Consumer Affairs in accordance with their policies and procedures. The Operator may be represented by an attorney and shall be entitled to present a defense.

(2) *Court appeal.* Any person may appeal a final determination of the Consumer Affairs Hearing Board/Special Master within thirty (30) days of the rendition of the decision by filing a petition for writ of certiorari in the Circuit Court of the Fifteenth Judicial Circuit in and for the County.

(3) *Suspension of the license/decal.* If, at the conclusion of the hearing, the Consumer Affairs Hearing Board or Special Master decides to suspend the license/decal a time certain shall be set as the period of suspension. Prior to the end of such time certain, those violations for which the suspension was imposed shall be corrected; otherwise, the suspended

license/decal shall be automatically revoked. A fee of fifty (50) percent of the license/decal fee shall be collected to reinstate the suspended license/decal.

(4) *Revocation of license/decal.* If, at the conclusion of the hearing, the Consumer Affairs Hearing Board or Special Master votes to revoke the license/decal, the Provider shall return the license/decal and return same to the Division. A Provider whose license/decal has been revoked, shall not be eligible to reapply as a new applicant for a period of one (1) year from the date of revocation.

(5) If the Consumer Affairs Hearing Board or Special Master reverses the decision of the Director of the Division of Consumer Affairs, the Director of the Division of Consumer Affairs shall issue or restore the license/decal.

(6) When the license/decal of a Provider has been denied, suspended or revoked by the Consumer Affairs Hearing Board or Special Master, all operations of the Water Taxi/Tour Boat shall immediately cease.

(7) In the event a written notice of appeal and accompanying filing fees are not submitted within the time frames outlined in this Article, the decision of the Director of the Division of Consumer Affairs shall be the final administrative action.

(8) *Administrative appeal—Insurance.* When a license/decal has been denied, suspended or revoked for failure of the Provider to obtain or maintain the required insurance pursuant to this Article and the Provider wishes to appeal the denial/suspension/revocation, the Provider may appeal such decision to the Consumer Affairs Hearing Board/Special Master within five (5) days of receipt of the decision. The appeal shall be heard by the Consumer Affairs Hearing Board/Special Master within ten (10) days of receipt of the written appeal. A non-refundable filing fee must accompany the written request for appeal. The filing fee shall be one hundred fifty dollars ($150.00).

(9) *Effect of appeal.* An appeal of the decision of the Director of the Division of Consumer Affairs to deny, suspend or revoke a Provider's license/decal or the renewal of same, shall stay the effective date of the denial, suspension or revocation. A stay does not apply to a denial, revocation or suspension of a Provider's license/decal of a business or renewal thereof, which failed to maintain insurance as required by this Article.

(10) *Hearing procedures.* Notwithstanding Section 4 of Palm Beach County Consumer Affairs Ordinance 2014-7 (as may be amended from time to time), the Consumer Affairs Hearing Board/Special Master shall give due regard to competent, reliable and technical evidence which will aid the Consumer Affairs Hearing Board/Special Master in making a fair determination of the matter, regardless of the existence of any common law or statutory rule which might otherwise make improper the admission of such evidence. All parties shall have an opportunity to present evidence and argument on all issues involved, to conduct cross examination and submit rebuttal evidence, and to be represented by counsel.

When appropriate, the general public may be given an opportunity to present oral or written communications. The Consumer Affairs Hearing Board/Special Master may consider any evidence, including evidence of the general reputation of the petitioner. All testimony shall be under oath and

shall be recorded. Formal rules of evidence shall not apply, but fundamental due process shall be observed and shall govern the proceedings. Irrelevant, immaterial or unduly repetitious evidence may be excluded but all the other evidence of a type commonly relied upon by reasonably prudent persons in the conduct of their affairs shall be admissible, (including hearsay) whether or not such evidence would be admissible in a trial in the courts of the state. Orders of the Consumer Affairs Hearing Board/Special Master shall be based on competent and substantial evidence. The petitioner shall have the burden of proof by a preponderance of the evidence.

(Ord. No. 2014-016, § 5, 5-20-14)

Sec. 17-436. - Indemnification.

In order to obtain a revocable license from Palm Beach County for the provision of Water Taxi services, all Providers must execute an indemnification agreement, which must include the following language:

(a) To the fullest extent permitted by laws and regulations, the Provider shall indemnify, defend, save and hold harmless, Palm Beach County, its officers, agents and employees from any and all claims, damages, losses, liabilities and expenses, direct indirect or consequential arising out of, or in consequence of the services furnished by, or the operations of the Provider, or its subcontractors, agents, officers, employees or independent subcontractors pursuant to the performance of the license agreement and provide written notification of same to Palm Beach County and the affected municipality(s).

(b) To the fullest extent permitted by laws and regulations, the Provider shall indemnify, defend, save and hold harmless, any municipality which has a Designated Docking Facility where Provider intends to dock and operate its Water Taxi services, the municipality's officers, agents and employees from any and all claims, damages, losses, liabilities and expenses, direct indirect or consequential arising out of, or in consequence of the services furnished by, or the operations of the Provider, or its subcontractors, agents, officers, employees or independent subcontractors pursuant to the performance of the License Agreement and provide written notification of same to Palm Beach County and the affected municipality(s).

(c) Provider shall pay all losses, claims, liens, settlements, or judgments of any nature whatsoever in connection with the foregoing indemnification, including but not limited to, reasonable attorney's fees (including appellate attorneys' fees and costs).

(d) Palm Beach County and each affected municipality reserves the right to select its own counsel to conduct any defense in any such proceedings and all costs and fees associated therewith shall be the responsibility of the Provider under the indemnification agreement set forth herein. Nothing contained herein is intended nor shall it be construed to waive Palm Beach County's or an affected municipality's rights and immunities under the common law or F.S. § 768.28, as amended from time to time.

(Ord. No. 2014-016, § 6, 5-20-14)

Sec. 17-437. - Violations.

False statements on applications. It shall be unlawful for any person to knowingly and intentionally make or cause to be made any false statement in writing or omit material information for the purpose

of procuring a license/decal or to knowingly and intentionally make any false statements or entries or material omissions on the records required to be kept by this Article.

Failure to comply with the provisions of this Section may result in the Director of the Division of Consumer Affairs denying a license/decal, revoking or suspending the license/decal, denying the renewal of such license/decal or other such remedies available to the Division herein.

(Ord. No. 2014-016, § 7, 5-20-14)

Sec. 17-438. - Refusal of service.

No Water Taxi Provider shall refuse transportation to any passenger unless the passenger cannot pay the scheduled fare or the taxi is already at capacity as mandated by the U.S. Coast Guard or other authority. Service may be refused to persons who are visibly inebriated.

(Ord. No. 2014-016, § 8, 5-20-14)

Sec. 17-439. - Enforcement; applicability.

This Article is enforceable by all means provided by law. Additionally, the County may choose to enforce this Article by seeking injunctive relief in the Circuit Court of Palm Beach County. These rules shall be enforced by the applicable local government having jurisdiction by means of F.S. Ch. 162, code enforcement process or by any other legal means available. Each day that a violation continues shall constitute a separate and distinct magistrate or in the County Court for Palm Beach County.

These rules and regulations shall apply to all Water Taxi and Tour Boat operations, including those using public or private docks or boat ramps within Palm Beach County.

The provisions of this Article shall be applicable to the incorporated and unincorporated areas of the County. This Article shall be effective in municipalities unless the municipality opts out or shall be effective up to the extent of conflict with the municipal ordinance.

(Ord. No. 2014-016, § 12, 5-20-14)

Sec. 17-440. - Penalty.

Any violation of any portion of this Article shall be punishable as provided by law.

(Ord. No. 2014-016, § 13, 5-20-14)

Checklist for a Water Taxi Business Permit

A completed Water Taxi application from our office must be accompanied by the following documents for issuance of a Permit:

☐ 1. **INITIAL REGISTRATION FEE: $150 -** ***Check, money order, Visa, MasterCard, or Discover payable to the Board of County Commissioners. (CASH WILL NOT BE ACCEPTED.)***

☐ 2. Coast Guard Certification of Vessel

☐ 3. Coast Guard Certification of Captain

☐ 4. Florida Vessel registration(s)

☐ 5. **Palm Beach County Local Business Tax Receipt from the Tax Collector's Office -** available from the following locations:

- 2976 State Road 15, Belle Glade (PBC Glades Office)
- 301 N. Olive Avenue, West Palm Beach (Governmental Center)
- 501 S. Congress Ave, Delray Beach
- 3188 PGA Blvd., Palm Beach Gardens
- 200 Civic Center Way, Royal Palm Beach
- 4215 S. Military Trail, Greenacres (south of Lake Worth Road)

OR

Municipal Occupational License from the municipality where vessel resides
(Address MUST match the physical address of your business)

☐ 6. Articles of Incorporation AND/OR Fictitious Name Registration (whichever is applicable – from the State of Florida), Telephone No. - (850) 488-9000 or www.sunbiz.org

☐ 7. **Certificate(s) of Insurance** –minimum liability requirements:

a) $1,000,000 general liability;
b) $1,000,000 marine protection and indemnity insurance;
(An umbrella policy to expand coverage for limit that your company already has in its existing or underlying, liability policies is acceptable)
c) The Certificate of Insurance shall list the PBC Board of County Commissioners and each municipality where the company provides Water Taxi Services **as** additional insured(s);
d) The Certificate of Insurance **shall also** list PBC Board of County Commissioners as the certificate holder;
e) Worker's compensation and employer's liability as required by statute;
f) The Certificate of Insurance must list the insured vessel(s) and operator(s);
g) Waiver of Subrogation and/or Waiver of Transfer of Rights of Recovery Against Others or its equivalent;
h) The provider shall agree to deliver Certificate(s) of Insurance immediately following the notification of the award of the revocable license agreement.

Note: The Certificate of Insurance must come directly from the Insurance Agent/Company by fax, email or US Mail

☐ 8. Check in the proper amount made payable to Board of County Commissioners of Palm Beach County -
Fees are non-refundable - no cash is accepted

☐ 9. Signed addendum with specific requirements for park(s) serviced and "Designated Docking Facilities"

☐ 10. Color digital or print photograph of vessel(s)

☐ 11. Brochure/flyer advertising rates for water taxi service

☐ 12. Indemnification agreement

PALM BEACH COUNTY, FLORIDA
BOARD OF COUNTY COMMISSIONERS
DIVISION OF CONSUMER AFFAIRS
50 South Military Trail, Suite 201
West Palm Beach, FL 33415
(561)712-6600 (Main Office)
1-888-852-7362 (Boca, Delray, Glades)
www.pbcgov.com/consumer

APPLICATION FOR WATER TAXI BUSINESS PERMIT AND VESSEL DECAL

IN ACCORDANCE WITH THE PROVISIONS OF THE AMERICANS WITH DISABILITIES ACT, THIS APPLICATION MAY BE REQUESTED IN AN ALTERNATIVE FORMAT. PLEASE CONTACT THE DIVISION OF CONSUMER AFFAIRS AT THE ABOVE-REFERENCED TELEPHONE NUMBERS.

INITIAL REGISTRATION FEE: $150

Please pay by check, money order, Visa, MasterCard, or Discover payable to the Board of County Commissioners. (CASH WILL NOT BE ACCEPTED.)

FEES ARE NON- REFUNDABLE

BUSINESS INFORMATION

(1) Please check box below noting present legal status of business.

☐ Sole Proprietorship (Individual or Fictitious Name Ownership)

☐ Partnership

☐ Corporation

NOTE: YOU MUST PROVIDE A STREET ADDRESS. POST OFFICE BOXES OR MAIL DROPS WILL NOT BE ACCEPTED.

NAME OF BUSINESS: _____

D/B/A: _____

If operating under a trade name, please attach a copy of your Fictitious Name Registration with the Florida Department of State.

PHYSICAL ADDRESS: _____

_____

MAILING ADDRESS:_____

_____

BUSINESS TELEPHONE (land line): _____ **FAX NUMBER:** _____

CELL PHONE NUMBER: _____

E-Mail Address:_____

Web Site Address: _____

(1)(A) **ALL OTHER WATER TAXI BUSINESS NAMES:**

Do you the individual, the partnership or corporation currently operate or have you previously operated under any business names other than the name you are presently using?

_____ YES _____ NO

If **YES**, please list such names below:

_____

_____

(1)(B) **BUSINESS INFORMATION** (continued):

If Sole Proprietorship (Individual or Fictitious Name Ownership), please provide the following:

Name: _____

Address: _____

_____

Work Telephone: _____ Fax: _____

Cell Phone: _____ E-Mail Address: _____

_____ State: _____ ____/_____/____ _____/_____/_____
(Driver's license number) (Exp. date) (Date of birth)

PARTNERSHIP: Please list all general and limited partners.

Name: (Last, First, MI)_____

Address: _____

City _____State: _____ Zip_____

Work Telephone: (___)_____ Fax: _____

Cell Phone: _____ E-Mail Address: _____

(1)(B) **BUSINESS INFORMATION** (continued):

CORPORATION: Please list all corporate officers and directors

President: _____

Address: _____

_____

Work Telephone: _____ Cell Phone: _____ Fax: _____

_____ State: _____ ____/____/____ ____/____/____
(Driver's license number) (Exp. date) (Date of birth)

E-Mail Address: _____ Federal Tax ID: _____

Vice President: _____

Address: _____

_____

Work Telephone: _____ Cell Phone: _____ Fax: _____

_____ State: _____ ____/____/____ ____/____/____
(Driver's license number) (Exp. date) (Date of birth)

E-Mail Address: _____

Secretary/Treasurer: _____

Address: _____

_____

Work Telephone: _____ Cell Phone: _____ Fax: _____

_____ State: _____ ____/____/____ ____/____/____
(Driver's license number) (Exp. date) (Date of birth)

E-Mail Address: _____

Director: _____

Address: _____

_____

Work Telephone: _____ Cell Phone: _____ Fax: _____

_____ State: _____ ____/____/____ ____/____/____
(Driver's license number) (Exp. date) (Date of birth)

E-Mail Address: _____

(1) (C) **BUSINESS OPERATIONS (service location(s) and docking):**

Passenger Embarkation: _____

City _____

Service/Other Stop(s): _____

_____

_____

City/Cities: _____

Passenger Debarkation: _____

City _____

(1) (D) **VESSEL(S) providing Water Taxi Services:**

Name(s) of Vessel(s) **and/or** Vessel(s) State Registration:

_____ Reg. _____

_____ Reg. _____

_____ Reg. _____

_____ Reg. _____

_____ Reg. _____

_____ Reg. _____

_____ Reg. _____

*****If any of the above noted vessel(s) weighs five (5) net tons or greater, a Certificate of Documentation must be submitted with the Certificate of Inspection*****

(2) (D) **BUSINESS DISPUTE CONTACT:**

Name: _____

Telephone: _____

E-Mail Address: _____

(2) **PARTNERSHIP OR CORPORATION DOCUMENTATION**:

PLEASE ATTACH A COPY OF THE FIRM'S PARTNERSHIP AGREEMENT; OR, IF A CORPORATION, A COPY OF YOUR FIRM'S CORPORATION REGISTRATION WITH THE FLORIDA DEPARTMENT OF STATE.

State of Florida Corporation Document Number _____

(3) **FICTITIOUS NAME REGISTRATION**

Please attach a copy of the fictitious name affidavit if you are currently doing business under a name other than your true name.

State of Florida Fictitious Name Registration Number:_____

(4) **PALM BEACH COUNTY LOCAL BUSINESS TAX RECEIPT** (formerly Occupational License**)**

OR

MUNICIPAL OCCUPATIONAL LICENSE RECEIPT FROM THE MUNICIPALITY WHERE VESSEL RESIDES

FAILURE TO HAVE A CURRENT PALM BEACH COUNTY BUSINESS TAX RECEIPT OR MUNICIPAL OCCUPATIONAL LICENSE WILL RESULT IN THE DISAPPROVAL OF YOUR LICENSE APPLICATION UNTIL SUCH TIME THAT A PALM BEACH COUNTY LOCAL BUSINESS TAX RECEIPT IS OBTAINED. THE ADDRESS ON YOUR LOCAL BUSINESS TAX RECEIPT MUST MATCH THE PHYSICAL ADDRESS YOU ARE REGISTERING WITH OUR OFIFCE.

(5) **INSURANCE COVERAGE**:

Please have **your insurance agent/company** fax, e-mail or send by U.S. Mail the required insurance certificate for your business **PRIOR TO SUBMISSION OF APPLICATION**.

Insurance certificates **MUST:**

- Provide an endorsement giving 30 days written notice to Palm Beach County Consumer Affairs of any material change, expiration or cancellation of the policy. See Palm Beach County Code, Chapter 17, Article XIV, sec.17-434 – Water Taxi Registration Ordinance
- List each and every vessel's Florida Identification Number and the name of each insured operator of the vessel(s)

- Worker's compensation and employer's liability as required by Statute;
- Waiver of Subrogation and/or Waiver of Transfer of Rights of Recovery Against Others or its equivalent;
- **At least $1,000,000 in liability insurance for injuries per occurrence or accident.**
- **At least $1,000,000 general liability**
- **At least $1,000,000 marine protection and indemnity insurance**

(An umbrella policy to expand coverage for limit that your company already has in its existing, or underlying, liability policies is acceptable)

All insurance policies shall be issued by insurance companies licensed and admitted to write Marine Protection and Indemnity liability insurance in the State of Florida.

Insurance Certificate must show **Palm Beach County Board of County Commissioners, 50 S. Military Trail, Suite 201, West Palm Beach, FL 33415** as the "**certificate holder**" and "**additional insured**"; Additionally, **each** municipality where services will be provided must be listed as "**additional insured**".

(6) (1) **SUSPENSION/REVOCATION:**

Have you ever had a Water Taxi permit/license suspended or revoked by a government agency? (Please include suspension for expiration of insurance coverage.)

_____ **YES** _____ **NO**

If yes, please provide the following information:

Agency/Location: _____

Date(s): _____

Action (license action, judgment, etc.): _____

(6) (2) **CIVIL ACTION OR PENALTY:**

Have you/your business, or any of your directors, officers, owners or general partners have or had any unsatisfied civil penalties, judgments or administrative orders in any action brought by Palm Beach County Consumer Affairs, or any government agency, under the requirements of this or a similar Ordinance?

_____ **YES** _____ **NO**

(7) **COAST GUARD CERTIFICATION OF VESSEL:**
Attach the original Coast Guard Certification for each vessel.

(8) **COAST GUARD CERTIFICATION OF CAPTAIN**

(9) **COPY OF FLORIDA VESSEL REGISTRATION FOR EACH VESSEL**

(10) **COLOR DIGITAL OR PRINT PHOTOGRAPH OF VESSEL(S)**

(11) **SIGNED ADDENDUM WITH SPECIFIC REQUIREMENTS FOR PARK(S) SERVICED**

(12) **COPY OF BROCHURE ADVERTISING RATES FOR WATER TAXI SERVICE**

Division of Consumer Affairs

Agreement for Water Taxi Business Application

As the owner, partner or corporate officer of this Water Taxi company:

1. I agree to abide by the conditions and requirements of the Palm Beach County Code, Chapter 17, Article XIV – Water Taxi Registration Ordinance.

2. I attest that all operators of the Water Vessel have been approved by a commercial automobile liability insurer.

3. I attest that all Vessels registered with the Division have the required liability insurance.

4. I understand my company is required to notify the Division, in writing, immediately but no later than 10 business days from the date of any change in advertised rates.

5. I agree to follow the local rules of each docking facility.

6. This application is true and correct to the best of my knowledge and belief.

I have fully read and completed the application for a Water Vessel business permit through the Palm Beach County Consumer Affairs Division.

I acknowledge that omissions or false statements will be grounds for revocation, suspension or non-issuance of the Water Vessel permit and decals.

Signed: _____**Date:**_____
(owner, partner, or corporate officer)

Print Name: _____ **Title:**_____
(owner, partner, or corporate officer)

Division of Consumer Affairs

Water Taxi
Provider Indemnification Agreement

In order to obtain a revocable license from Palm Beach County for the provision of Water Taxi services, all providers must execute an indemnification agreement that meets Palm Beach County Code, Chapter 17, Article XIV – Water Taxi, Section 17-436—Indemnification.

1. To the fullest extent permitted by laws and regulations, the Provider shall indemnify, defend, save and hold harmless, Palm Beach County, its officers, agents and employees from any and all claims, damages, losses, liabilities and expenses, direct indirect or consequential arising out of, or in consequence of the services furnished by, or the operations of the Provider, or its subcontractors, agents, officers, employees or independent subcontractors pursuant to the performance of the license agreement.
2. To the fullest extent permitted by laws and regulations, the Provider shall indemnify, defend, save and hold harmless, any municipality which has a Designated Docking Facility where Provider intends to dock and operate its Water Taxi services, the municipality's officers, agents and employees from any and all claims, damages, losses, liabilities and expenses, direct indirect or consequential arising out of, or in consequence of the services furnished by, or the operations of the Provider, or its subcontractors, agents, officers, employees or independent subcontractors pursuant to the performance of the License Agreement.
3. Provider shall pay all losses, claims, liens, settlements, or judgments of any nature whatsoever in connection with the foregoing indemnification, including but not limited to, reasonable attorney's fees (including appellate attorneys' fees and costs).
4. Palm Beach County and each affected municipality reserves the right to select its own counsel to conduct any defense in any such proceedings and all costs and fees associated therewith shall be the responsibility of the Provider under the indemnification agreement set forth herein. Nothing contained herein is intended nor shall it be construed to waive Palm Beach County's or an affected municipality's rights and immunities under the common law or F.S. § 768.28, as amended from time to time.

By signing below, I agree to the term and conditions of the Provider Indemnification Agreement**.**

Signed:_____Date:_____

Printed Name:_____Title:_____

Division of Consumer Affairs

50 South Military Trail, Suite 201
West Palm Beach. FL 33415
Phone: (561) 712-6600
Fax: (561) 712-6610

AUTHORIZATION FOR PAYMENT BY CREDIT CARD

If you wish to pay by credit card, complete the "Authorization for payment by Credit Card" in its entirety.

TYPE OF CREDIT CARD: (Please X type of credit card payment)

☐ ***VISA*** ☐ ***MASTERCARD*** ☐ ***DISCOVER***

Issuer of Credit Card (**Example**: Capital One, Wachovia, Bank of America, etc.):

_____

Name on Credit Card: _____
Must match name on credit card

CREDIT CARD #:__ __ __ __ - __ __ __ __ - __ __ __ __ - __ __ __ __

EXPIRATION DATE: __ __ / __ __
Mo. Yr.

Amount: ($) __ __ __ __. __ __

☐ Driver's Permit/I.D.

Signature of Card Holder: _____

Division of Consumer Affairs

Water Taxi
Provider Indemnification Agreement

In order to obtain a revocable license from Palm Beach County for the provision of Water Taxi services, all providers must execute an indemnification agreement that meets Palm Beach County Code, Chapter 17, Article XIV – Water Taxi, Section 17-436—Indemnification.

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2. To the fullest extent permitted by laws and regulations, the Provider shall indemnify, defend, save and hold harmless, any municipality which has a Designated Docking Facility where Provider intends to dock and operate its Water Taxi services, the municipality's officers, agents and employees from any and all claims, damages, losses, liabilities and expenses, direct indirect or consequential arising out of, or in consequence of the services furnished by, or the operations of the Provider, or its subcontractors, agents, officers, employees or independent subcontractors pursuant to the performance of the License Agreement.
3. Provider shall pay all losses, claims, liens, settlements, or judgments of any nature whatsoever in connection with the foregoing indemnification, including but not limited to, reasonable attorney's fees (including appellate attorneys' fees and costs).
4. Palm Beach County and each affected municipality reserves the right to select its own counsel to conduct any defense in any such proceedings and all costs and fees associated therewith shall be the responsibility of the Provider under the indemnification agreement set forth herein. Nothing contained herein is intended nor shall it be construed to waive Palm Beach County's or an affected municipality's rights and immunities under the common law or F.S. § 768.28, as amended from time to time.

By signing below, I agree to the term and conditions of the Provider Indemnification Agreement**.**

Signed:_____Date:_____

Printed Name:_____Title:_____

[Code of Federal Regulations]
[Title 33, Volume 1]
[Revised as of July 1, 2006]
From the U.S. Government Printing Office via GPO Access
[CITE: 33CFR117]

[Page 571]

TITLE 33--NAVIGATION AND NAVIGABLE WATERS

CHAPTER I--COAST GUARD, DEPARTMENT OF HOMELAND SECURITY

PART 117_DRAWBRIDGE OPERATION REGULATIONS--Table of Contents

Subpart B_Specific Requirements

Sec. 117.305 Miami River.

(a) General. Public vessels of the United States, tugs, tugs with tows, and vessels in a situation where a delay would endanger life or property shall, upon proper signal, be passed through the draw of each bridge listed in this section at any time.

(b) The draws of the S.W. First Street Bridge, mile 0.9, up to and including the N.W. 27th Avenue Bridge, mile 3.7 at Miami, shall open on signal; except that, from 7:35 a.m. to 8:59 a.m. and 4:45 p.m. to 5:59 p.m., Monday through Friday, except Federal holidays, the draws need not open for the passage of vessels.

(c) The draws of the Miami Avenue Bridge, mile 0.3, and the S.W. Second Avenue Bridge, mile 0.5, at Miami, shall open on signal; except that, from 7:35 a.m. to 8:59 a.m., 12:05 p.m. to 12:59 p.m. and 4:35 p.m. to 5:59 p.m., Monday through Friday, except Federal holidays, the draws need not open for the passage of vessels.

(d) The draw of the Brickell Avenue Bridge, mile 0.1, at Miami, shall open on signal; except that, from 7 a.m. to 7 p.m., Monday through Friday except Federal holidays, the draw need open only on the hour and half-hour. From 7:35 a.m. to 8:59 a.m., 12:05 p.m. to 12:59 p.m. and 4:35 p.m. to 5:59 p.m., Monday through Friday except Federal holidays, the draw need not open for the passage of vessels.

[CGD07-03-118, 69 FR 7688, Feb. 19, 2004]

Monday-Friday

Brickell Bridge:

Morning Rush Hour lockdown, 7:35 – 8:59

Lunch Hour lockdown, 12:05 – 12:59

Evening Rush Hour lockdown, 4:35 - 5:59

In between three lockdown periods, bridge opens only if needed on the hour and half hour (7am – 7pm)

Least likely openings:	More likely openings:
7:05 – 7:29	7:30
7:35 – 8:59 (Morning Rush Hour lockdown)	9
9:05 – 9:29	9:30
9:35 – 9:59	10
10:05 – 10:29	10:30
10:35 – 10:59	11
11:05 – 11:29	11:30
11:35 – 11:59	noon
12:05 – 12:59 (Lunch Rush Hour lockdown)	1
1:05 – 1:29	1:30
1:35 – 1:59	2
2:05 - 2:29	2:30
2:35 – 2:59	3
3:05 – 3:29	3:30
3:35 – 3:59	4
4:05 – 4:29	4:30
4:35 – 5:59 (Evening Rush Hour lockdown)	6
6:05 – 6:29	6:30
6:35 – 6:59	7

South Miami Ave and SW 2 Ave Bridges:

Morning Rush Hour lockdown, 7:35 – 8:59

Lunch Hour lockdown, 12:05 – 12:59

Evening Rush Hour lockdown, 4:45 - 5:59

SW 1 ST, Flagler, NW 5 ST, NW 12 Ave, NW 17 Ave, NW 22 Ave and NW 27 Ave Bridges:

Morning Rush Hour lockdown, 7:35 – 8:59

Evening Rush Hour lockdown, 4:45 - 5:59

"Public vessels of the U.S., tugs, tugs with tows, and vessels in a situation where a delay would endanger life or property are exempt" (33CFR117.305)

The Miami River's Federal navigable channel is amongst the largest Ports in the State, featuring numerous marine industrial businesses including International shipping, recreational boatyards, marinas, commercial fishing, tug boats, etc., which generate local jobs and international trade.

Fern Isle Park Expansion

Consider expanding the existing public Riverwalk in Fern Isle Park further west all the way to the dead end at 836 (into the area currently not publicly accessible behind a chain link fence). We already secured permission from FDOT and GSX. Doing so would nearly double the linear distance of the Parks existing public Riverwalk. (Please note the current shoreline is a code violation)

Fern Isle Park Expansion

Fern Isle Park Expansion

Fern Isle Park Expansion

Fern Isle Park Expansion

Fern Isle Park Expansion

Fern Isle Park Expansion

Fern Isle Park Expansion

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Fern Isle Park Expansion

Fern Isle Park Expansion June 6, 2024

Fern Isle Park Expansion

Fern Isle Park Expansion

Fern Isle Park Expansion

Fern Isle Park Expansion

Fern Isle Park Expansion

Wagner Creek Linear Park

The City of Miami owns the waterfront along Wagner Creek from NW 20 ST to NW 15. This area includes 2 street dead ends at NW 19 Terrace and NW 15 ST, and suffers from significant illegal dumping. The shoreline is unimproved and is eroding into Wagner Creek. Therefore, please consider improving this public right of way by constructing a public Riverwalk, decorative lighting, landscaping, and a seawall. At a televised "Sunshine Meeting" in City Hall (not a City Commission meeting) Director Santana stated the City has funding to make waterfront street dead ends like these into mini Parks. (Please note the current shoreline is a code violation)

Wagner Creek Linear Park June 6, 2024

Wagner Creek Linear Park June 6, 2024

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Grove Circle Mini Park

The City of Miami owns "Grove Circle Mini Park" which is currently an unimproved riverfront public greenspace located along NW 16 Ave from the Miami River's South Shore to NW South River Drive. This public Park space is part of a historic linear park through the Grove Park residential neighborhood, but the construction of 836 removed a large portion. Today the other remaining portion of this historic site serves as a lovely park with a playground, shade structure, Parks rules sign, etc. On the other hand, today the riverfront portion remains unimproved, and is mowed by the Parks Department. The seawall is very low so this area including 16 Ave often floods. City of Miami Solid Waste has been unable to service a house on this street due to flooding. To the east many years ago the City Commission approved an upzoning with a restrictive covenant where the property owners were going to fund and construct a new seawall and public riverwalk at this City owned "Grove Circle Mini Park" location, but they are not moving forward with the development and the site currently has a posted for sale sign again. Currently the public greenspace is being abused on a regular basis by late night parties which leave behind cases of empty beer cans, liquor bottles, drug paraphernalia, used condoms, someone even shot the River Landing building across the River with a gun from this location. (Please note the current shoreline is a code violation)

2
7
3
South Miami Avenue Bridge
MetroMover
Brickell Bridge
SE 5 Street
SE 6 Street

Grove Circle Mini Park

Grove Circle Mini Park

Grove Circle Mini Park

Grove Circle Mini Park

Grove Circle Mini Park

Grove Circle Mini Park

Grove Circle Mini Park

Grove Circle Mini Park

Grove Circle Mini Park

Grove Circle Mini Park

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Grove Circle Mini Park

Grove Circle Mini Park

Grove Circle Mini Park

CFN 2019R0196809
OR BK 31383 Pgs 2284-2291 (8Pgs)
RECORDED 03/28/2019 12:38:50
HARVEY RUVIN, CLERK OF COURT
MIAMI-DADE COUNTY, FLORIDA

This instrument was prepared by and after recordation return to:
Ben Fernandez, Esq.
Bercow Radell Fernandez & Larkin, PLLC
200 S. Biscayne Boulevard, Suite 850
Miami, Florida 33131

(Space reserved for Clerk)

DECLARATION OF RESTRICTIVE COVENANT

This Declaration of Restrictive Covenants (the "Declaration") made this 20 day of April, 2018, by **1515 Miami River, LLC** (hereinafter referred to as the "Owner"), is in favor of the **CITY OF MIAMI, FLORIDA**, a municipality located within the State of Florida (hereinafter referred to as the "City").

WHEREAS, the undersigned Owner holds fee simple title to certain real property located at 1515, 1529, 1543 NW South River Drive in Miami, Florida, which are identified by Miami-Dade Tax Folio Nos. 01-3135-016-0040, 01-3135-016-0060, 01-3135-016-0070 and legally described as follows:

LEGAL DESCRIPTION:

Lots 4, 5, 6, 7, and 8, Block 1, GROVE PARK, according to the Plat thereof, as recorded in Plat Book 5, Page 66, of the Public Records of Miami-Dade County, Florida.

LESS AND EXCEPT:

A portion of Lot 4, Block 1, GROVE PARK, according to the Plat thereof, as recorded in Plat Book 5, Page 66, of the Public Records of Miami-Dade County, Florida, being more particularly described as follows:

Begin at the Southeast corner of said Lot 4, Block 1, also being a point along the North right-of-way line of N.W. South River Drive; thence N00°00'00"W along the East line of said Lot 4, Block 1 for 112.49 feet; thence N71°11'37"W for 0.35 foot to a line being 0.33 foot West of and parallel to said East line of Lot 4, Block 1; thence S00°00'00"E along said parallel line for 112.50 feet to said North right-of-way line of N.W. South River Drive, also being the south line of said Lot 4, Block 1; thence S73°48'49"E along said North right-of-way line for 0.35 foot to the Point of Beginning.

hereinafter referred to as the "Property."

17-3330/ 3404/PZ6

WITNESSETH

WHEREAS, the Owner sought and obtained a rezoning pursuant to Ordinance No. 13754 for the Property; and

WHEREAS, the Owner is desirous of making a voluntary binding commitment to assure that the Property shall be developed in accordance with the provisions of the Declaration herein; and

NOW THEREFORE, the Owner, for valuable consideration, the receipt and adequacy of which are hereby acknowledged, voluntarily covenants and agrees that the Property shall be subject to the following restrictions that are intended and shall be deemed to be a covenant running with the land and binding upon the Owner of the Property, and its heirs, grantees, successors, and assigns as follows:

Section 1. The recitals and findings set forth in the preamble of this Declaration are hereby adopted by reference thereto and incorporated herein as if fully set forth in this Section.

Section 2. The Owner hereby makes the following voluntary declarations running with the land concerning the use of the Property:

1. The owner shall allow waterfront access to the public from 6:00 AM to 10:00 PM along a river walk to be developed as part of a multi-family residential project on the Property.
2. The proffered river walk will be designed in accordance to Article 3, Section 3.11 and Appendix B of the Miami 21 Code.

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3. The Owner shall replace or refurbish the publically accessible seawall along NW 16th Avenue.
4. The Owner shall improve the segment of NW 16th Avenue abutting the Property to improve drainage.
5. The Owner shall provide landscape and paver or sidewalk improvements to the public median within NW 16th Avenue, if permittable.
6. The Owner shall cooperate with Miami River Commission and the City of Miami to allow water transportation to pick up and drop off passengers at the terminus of NW 16th Avenue, if permittable.
7. The Owner agrees to make vessel dockage available along the Miami River frontage of the Property, as may be permitted by Miami Dade County and the City of Miami.
8. The Owner recognizes that legally permitted existing Working Waterfront 24-hour operations may currently exist proximate to the Property. Therefore, Owner agrees:
    a. not to object or otherwise attempt to impede any legally permitted Working Waterfront 24-hour operations;
    b. to provide all future tenants and prospective owners of the Property notice of the existing Working Waterfront 24-hour operations and will include a provision to agree not to object to legally permitted Working Waterfront 24- hour operations in each lease and or Condominium Sale Documents;
    c. that it is solely the Owner's responsibility to design its structures to accommodate legally permitted Working Waterfront 24-hour operations; and
    d. that it will not pursue any claims for liability, loss or damage, whether through litigation or otherwise, against permittees engaging in Working Waterfront 24-hour operations, related to, noise, smoke, fumes, federally regulated bridge openings, and/or other quality of

life issues that might result from legally permitted Working Waterfront 24-hour operations.

9. The Owner shall contribute $28,674.00 to the Miami 21 Public Benefits Trust Fund payable in full prior to obtaining a Certificate of Occupancy for new construction on the Property.

Section 3. Effective Date. This Declaration is effective at the date of execution hereof. This instrument shall constitute a covenant running with the title to the Property that shall be binding upon Owner, its heirs, grantees, successors, and assigns. These restrictions shall be a limitation upon all present and future Owners of the Property and shall be for the public welfare.

Section 4. Term. This voluntary covenant on the part of the Owner shall remain in full force and effect and shall be binding upon the Owner of the Property, its successors in interest and assigns, for an initial period of thirty (30) years from the date this instrument is recorded in the public records and shall be automatically extended for successive periods of ten (10) years, unless modified, amended or released prior to the expiration thereof.

Section 5. Applicable Law & Venue; Attorney's Fees. Florida law will apply to interpretation of this instrument. Venue in any civil actions arising under this instrument shall be in Miami-Dade County, Florida. Each Party shall bear their own attorney's fees and costs.

Section 6. Amendment and Modification. This instrument may be modified, amended, or released as to any portion of the Property by a written instrument executed by the then Owner(s) of the fee-simple title to the land to be affected by such modification, amendment or release, providing that same has been approved by the City of Miami Planning, Zoning and Appeals Board or City Commission after a public hearing which public hearing shall be applied for at the sole cost and expense of the Owner. Upon

approval of such modification amendment or release as specified herein, the Director of the City of Miami's Planning Department or his successor shall execute a written instrument in recordable form effectuating and acknowledging such modification, amendment or release. Such instruments shall be in a form acceptable to the City Attorney.

Section 7. Inspection and Enforcement. It is understood and agreed that any official inspector of the City of Miami may have the right at any time during normal working hours of the City of Miami's inspector to enter upon the Property for the purpose of investigating the use of the Property and to determine whether the conditions of this Declaration and the requirements of the City's building and zoning regulations are being complied with. After notice and an opportunity to cure, an enforcement action may be brought by the City by action in law or in equity against any party or person violating or attempting to violate any covenants of this Declaration, or provisions of the building and zoning regulations, either to restrain violations or to recover damages. This enforcement provision shall be in addition to any other remedies available under the law. Each party shall bear their own attorney's fees and costs.

Section 8. Severability. Invalidation of any one of these covenants by judgment of Court shall not affect any of the other provisions of the Declaration, which shall remain in full force and effect.

Section 9. Recording. This Declaration shall be filed of record among the Public Records of Miami-Dade County, Florida, by the Owner and at the cost of the Owner, within fifteen (15) days of execution and acceptance by the City of Miami. The Owner shall promptly furnish the City of Miami Planning and Zoning Director with a recorded copy of this Declaration within thirty (30) days of recordation of same.

[Signature Pages to Follow]

Section-Township-Range: 35, 53, 41
Folio Nos.: 01-3135-016-0040, 01-3135-016-0060, 01-3135-0016-0070

ACKNOWLEDGMENT
CORPORATION

Signed, witnessed, executed and acknowledged on this 20th day of April, 2018.

WITNESSES:

Signature

Alex Castillo
Print Name

Signature

Roberto Barrero
Print Name

OWNER:
By: 1515 Miami River, LLC,
a Florida Limited Liability Company

By: 1515 Miami River Holdings, LLC,
a Florida Limited Liability Company,
as Manager of 1515 Miami River, LLC

By: Antonio P. Pardo,
as Manager of 1515 Miami River Holdings, LLC,
Address: 2020 Ponce de Leon Blvd., Suite 1103, Coral Gables, FL 33134

STATE OF FLORIDA
COUNTY OF MIAMI-DADE

The foregoing instrument was acknowledged before me by Antonio P. Pardo, the Manger of 1515 Miami River Holdings, LLC, as Manager of **1515 Miami River, LLC**, on behalf of the limited liability company. He is ☒ personally known to me or ☐ has produced _____, as identification.

Witness my signature and official seal this 20th day of April 2018, in the County and State aforesaid.

Notary Public State of Florida

My Commission Expires:

Christy Corps
Print Name

CHRISTY CORPS
MY COMMISSION #GG130724
EXPIRES: AUG 02, 2021
Bonded through 1st State Insurance

Section-Township-Range: 35, 53, 41
Folio Nos.: 01-3135-016-0040, 01-3135-016-0060, 01-3135-0016-0070

Approved as to Planning and Miami 21 Code:

JEREMY CALLEROS GALLOFRE
ON BEHALF OF

Francisco Garcia, Director
Planning Department

Approved as to Legal Form:

Victoria Méndez
City Attorney
#17-2023

Section-Township-Range: 35, 53, 41
Folio Nos.: 01-3135-016-0040, 01-3135-016-0060, 01-3135-0016-0070

JOINDER BY MORTGAGEE
(Where Applicable)

The undersigned **Terrabank, N.A.,** a national banking association, as Mortgagee under that certain Mortgage, Assignment of Leases and Rents and Fixture Filing (the "Mortgage") dated February 4, 2014, and recorded in Official Records Book 29021, Page 1700, of the Public Records of Miami-Dade County, Florida, covering all/or a portion of the property described in the foregoing Declaration of Restrictive Covenant (the "Covenant") does hereby acknowledge that the terms of the Covenant are and shall be binding upon the undersigned and its successors in title.

IN WITNESS WHEREOF, these presents have been executed this 25 day of April, 2018.

Terrabank, N.A.

By: _____
Name: Jose L. Martinez
Title: Executive Vice President
Address: 3191 Coral Way, PH-1
Miami, FL 33145

STATE OF FLORIDA)
COUNTY OF MIAMI-DADE)

BEFORE ME, the undersigned authority, this day appeared JOSÉ L. MARTINEZ, known by me to be the EXE. V.P. of Terrabank, N.A., a national banking association and he/she acknowledged to and before me that he/she executed the said instrument, acting in his/her said official capacity, for and as to the act and deed of said corporation and in its name, for the uses and purposes therein mentioned, and after being duly authorized and directed. He/She is: [✓] personally known to me, or [ ] produced _____ as identification.

WITNESS my hand and official Seal in the County and State aforesaid, on this, the 25 day of APRIL, 2018.

My Commission Expires:

_____
Notary Public State of FLORIDA
Print Name TERESITA MENENDEZ

TERESITA MENENDEZ
Notary Public – State of Florida
Commission # GG 101702
My Comm. Expires Aug 31, 2021
Bonded through National Notary Assn.

Miami River Commission's Stormwater Subcommittee
Public Meeting Minutes
June 5, 2024

The Miami River Commission (MRC) Stormwater Subcommittee's public meeting convened June 5, 2024, 10 AM, 1407 NW 7 ST. The attendance sheet is attached.

I. "Miami River Basin Water Quality Improvement Plan" Agency Quarterly Implementation Progress Reports – Ms. Juliet Ruggiero, Miami Dade County's Department of Environmental Resource Management's (DERM) provided a report covering October – December 2023. The most alarming water quality violation was detected at Wagner Creek testing station WC04 in November had enterococci Bacteria of 22,400 (cfu/100ml) and Wagner Creek testing station WC03 had 7,270 enterococci bacteria, when the safe water quality standard is only 130 (cfu/100ml). The maximum amount the test is able to detect is 22,400, therefore that result exceeded the maximum amount which the test is able to determine.

MRC Managing Director Brett Bibeau stated in 2023 DERM's monthly water quality samples at 3 locations along Wagner Creek and Seybold Canal failed 33 of 36 tests (93%).

MRC Director Bibeau cited a April 12, 2024 Memo Mayor Cava to the County Commission stating in part, "Addressing Pollution Using Technology Solutions…The main objective of the project is to identify and eliminate pollution…and this work includes characterizing sources of pollution reaching the Miami River…Thanks to the use of smart covers being strategically located where sewage spills have been known to occur, 39 sewage spills have been prevented…currently there are three pilot locations in the Little River Canal…RER-DERM is currently preparing the procurement of an additional five pilot locations for further testing and construction."

Director Bibeau presented two Miami Dade County Domestic Wastewater Discharge / Abnormal Event Notifications and pictures he took:

1. The 2/6/24 notification was in response to Director Bibeau finding and reporting sanitary sewage spilling out the top of a sanitary sewer manhole cover in Little Havana at 10 SW South River Drive resulting in 800 gallons of sanitary sewage entering the Miami River.
2. The 2/27/24 notification was in response to Director Bibeau finding and reporting sanitary sewage spilling out the top of a sanitary sewer manhole cover in Little Havana at SW South River Drive and the 1 ST Bridge (close to the previous location) resulting in an additional 135 gallons of sanitary sewage entering the Miami River.

Considering these repeated sanitary sewer manhole overflows in the same portion of Little Havana directly on the Miami River, Director Bibeau recommended the County install Smart Covers at least in this portion of NW South River Drive, in addition to other areas directly along the Miami River.

MRC Managing Director Bibeau noted in 2022, the Miami River passed 36 of 48 (75% = "C") water quality tests for enterococci bacteria, while in 2023 the Miami River passed 39 of 48 (81% = "B-"), increasing the passed tests by 6%.

II. Discussion Regarding 169 NW South River Drive – Attendees discussed the City of Miami owned crushed stormwater outfall, located beneath the County owned 169 NW South River Drive. The County riverfront parcel is a sanitary sewer easement where a sewer line tunnels beneath the Miami River to the sewage pump station on the opposite side of the River. MRC Director Bibeau stated Billie Jo McCarley, MDC WASD, attended the MRC Stormwater Subcommittee's June 2023 public Meeting regarding this item, and provided her contact info to Elyrosa Estevez, City of Miami. Ms. Estevez reported that a private sector development in the area may be required to conduct the repair of the subject City of Miami owned crushed stormwater outfall beneath this County owned site.

III. Discussion Regarding Collapsing Shoreline Along South River Drive West of 27 Ave MRC Director Bibeau thanked the representatives from the City of Miami Public Works and Parks Departments, Miami-Dade County Public Works and the South Florida Water Management District for participating in a site visit to the subject site. The MRC recommends a public Riverwalk featuring a new seawall in the subject area. Elyrosa Estevez, City of Miami Public Works, stated the City of Miami's Parks Department is going to create a "scope" for this project.

IV. Discussion Regarding Collapsing Shoreline Along Wagner Creek South of NW 20 ST Elyrosa Estevez, City of Miami's Resilience and Public Works Department, stated the City has identified funding and a contractor for this future street improvement project which will include shoreline stabilization, and her Department will work towards creating a design.

V. Discussion Regarding Collapsing Shoreline at NW North River Drive and NW 25 Ave MRC Managing Director Bibeau reported the City owned shoreline at NW North River Drive and NW 25 Ave around a City owned stormwater outfall is collapsing into the Miami River.

VI. Update Regarding FDEP's "Miami River Basin Stormwater Management" Grant Award - MRC Director Bibeau thanked FDEP for awarding the MRC's submitted application for $500,000 in grant funding from the State's FY 23-24's $20 million for improving water quality in the Biscayne Bay Aquatic Preserve, by increasing frequency of vacuum truck services in stormwater manholes along the Miami River, landside garbage pickups, landscaping ie removal invasive plant species along the Miami River. The stormwater system was identified as a source of pollution in the County's recent helpful Miami River Water Quality Assessment, which was reviewed during a previous MRC Stormwater Subcommittee public virtual workshop. In 2023 the MRC removed estimated 4,680 cubic yards of garbage (30 cubic yard dumpster filled three times per week) from the Miami River Basin.

The public meeting adjourned.