DORAL TROLLEY

SMART PLAN COORDINATION STUDY | FEBRUARY 2020

DORAL FLORIDA

TPO Miami-Dade Transportation Planning Organization

BY: GANNETT FLEMING

The preparation of this report has been financed in part by the U.S. Department of Transportation (USDOT), through the Federal Highway Administration (FHWA) and/or Federal Transit Administration (FTA), the state planning and research program (section 505 of Title 23, US Code) and Miami-Dade County, Florida. The contents of this report do not necessarily reflect the official views of the U.S. Department of Transportation.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES

LIST OF ACRONYMS

APTA	American Public Transportation Association
AWS	American Welding Society
APC	Automated Passenger Counter
AVL	Automatic Vehicle Location
AVIS	Automatic Voice Information System
BERT	Bus Express Rapid Transit
BRT	Bus Rapid Transit
BAT	Business Access and Transit
CRT	Commuter Rail Transit
DPF	Diesel Particulate Filter
DTS	Doral Trolley System
FHWA	Federal Highway Administration
FDOT	Florida Department of Transportation
FIU	Florida International University
GEM	Global Electric Motorcars
HRT	Heavy Rail Transit
HEFT	Homestead Extension of Florida's Turnpike
ITPA	Informed Traveler Program App
IQR	Interquartile Range

LRT	Light Rail Transit
LSF	Limousines of South Florida
LPA	Locally Preferred Alternative
LRTP	Long Range Transportation Plan
MIC	Miami Intermodal Center
MIA	Miami International Airport
DTPW	Miami-Dade Department of Transportation and Public Works
PTP	People's Transportation Plan
PRT	Personal Rapid Transit
PD&E	Project Development and Environmental
STIP	State Transportation Improvement Program
SMART Plan	Strategic Miami Area Rapid Transit (SMART) Plan
TIP	Transportation Improvement Program
TPO	Transportation Planning Organization
TSM&O	Transportation Systems Management and Operations
USDOT	United States Department of Transportation
UTMA	University Transit Management Association
UI	User Interface
VMT	Vehicle Miles Traveled

INTRODUCTION

HISTORICAL CONTEXT

STUDY PURPOSE

STUDY NEED

STUDY SCOPE

From golf course to booming urban center, the City of Doral has progressed immensely and rapidly. Incorporated in 2003, Doral is now one of the major employment centers and a leisure destination within Miami-Dade County. With a burgeoning downtown and growing population, the City recognized the need to increase mobility options through more efficient public transportation. In 2008, in response to a growing demand, the City initiated a two-year pilot program to run an intra-city circulator. With a free-of-charge and convenient service, this program soon became popular. The Doral Transit System (DTS) has grown to four circulator routes connecting major destinations such as the Palmetto Metrorail Station, Miami-Dade College West, Dolphin Mall, Miami International Mall, and the Florida International University (FIU) Engineering and Modesto A. Maidique campuses.

HISTORICAL CONTEXT

Hinged around the visionary development of Alfred and Doris Kaskel, the City of Doral transformed from a vacant plain of wetlands and limestone into a modern suburban community. Open in 1962, the Doral Country Club featured three (3) golf courses that imported guests from an accompanying hotel in Miami Beach. Named after a combination of Doris and Alfred, the popularity of the country club became the catalyst for residential growth as the Kaskel family began developing the Doral Estates and Doral Park communities during the 1980s. Confronting environmental and regulatory challenges, growth boomed in 1989 with the formation of the West Dade Federation of Homeowner Associations, which helped create the City's first civil services.

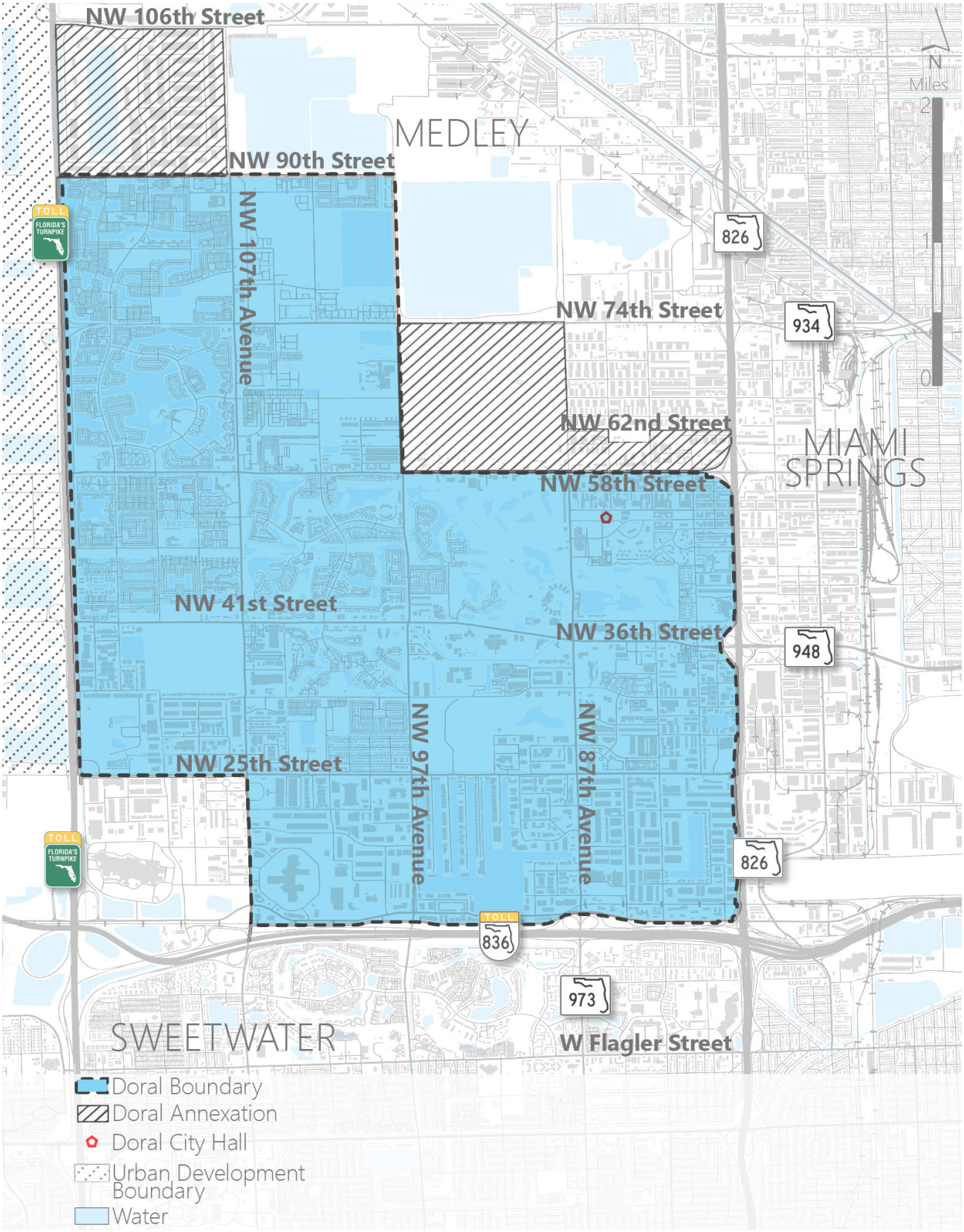
Alfred Kaskel

The City's growth also benefited from surrounding infrastructure such as the Miami International Airport (MIA). With nonstop flight services to the west, beyond St. Louis and New Orleans, and transatlantic flights to Europe, Miami began its transformation into a major hub for the aeronautical industry. With Air Florida establishing the first hub in the early 1980s, followed by American Airlines in the early 1990s, MIA is now one of the country's largest port-of-entry for air freight and international passengers.

In addition to the airport, major roadways developed during the early history of Doral fueled its growth. With the completion of the Palmetto Bypass Expressway (SR 826) in June 1961 and the opening of the Airport Expressway, Doral was accessible from all areas of the County. As the City grew, it soon overwhelmed the Palmetto Expressway, creating the need for a "bypass to the bypass." Hence, on the western boundary of the City, the Homestead Extension of the Florida's Turnpike (HEFT) began development with the 1973 mainline connecting to the Golden Glades Interchange and US 27/Okeechobee Road. The last section of the HEFT was opened in 1974 connecting to Florida City and US 1.

These events placed Doral squarely in central Miami-Dade County with significant international, national, and regional connectivity. Since incorporating in 2003, the City's population has grown from roughly 21,000 residents to 61,000 in 2017. Given its proximity to MIA, the City hosts over 3,000 logistics-related companies, over 250 company headquarters, and 14 business parks. With over 2 million square feet of approved commercial developments, and 9,000 approved residential units, the City is a major business and residential community within the County. Most recently, the City has begun promoting a 120-acre downtown master plan to complete its transformation into a true live, work, and play community.

Figure 1: City of Doral Municipal Boundary



STUDY PURPOSE

With the understanding that sustainable growth requires diverse transportation solutions that are nimble to change, this study aims to analyze and evaluate the existing DTS to recommend modification, enhancement, and/or expansion solutions to better serve the target travel market over the short-, medium-, and long-term. This study also aims to define the target travel market and connect the DTS with other existing and planned municipal, County, and regional transit services. This will be accomplished through meeting the following objectives:

- **Address Title VI of the Civil Rights Act of 1964 regarding nondiscriminatory transportation for all customers and potential customers of the DTS**
- **Integrate the Strategic Miami Area Rapid Transit (SMART) Plan and University Transit Management Association (UTMA) services with the DTS**
- **Develop a comprehensive design guideline for transit stop infrastructure and amenities**

Doral Country Club (1960s)

STUDY NEED

Miami-Dade County approved in 2002 a half penny local surtax with the purpose of constructing the People's Transportation Plan (PTP). This plan intended to bring premium transit services to the County. In 2016, the County's Transportation Planning Organization (TPO) voted unanimously to advance six (6) of the PTP's rapid transit corridors. The new development of the PTP has been labeled the SMART Plan and includes a network of Bus Express Rapid Transit (BERT) service in addition to the rapid transit corridors. A renewed effort to implement mass transit in the County comes at a crucial time when Florida has become the third most populous state, with Miami-Dade being the most populous county and part of the country's fourth largest urbanized metro area.

Miami International Airport (1970s)

The County's growth is exacerbating the need for increased mobility options as congestion becomes more widespread and intense throughout the thirty-four (34) municipalities and unincorporated areas of Miami-Dade. The Federal Highway Administration (FHWA) estimates the annual cost of congestion to motorists in urban areas at approximately $7 billion. Not only does congestion represent a significant cost and economic disadvantage to the citizens of Miami-Dade, it also hinders the County's ability to keep growing and enhancing the well-being of its residents.

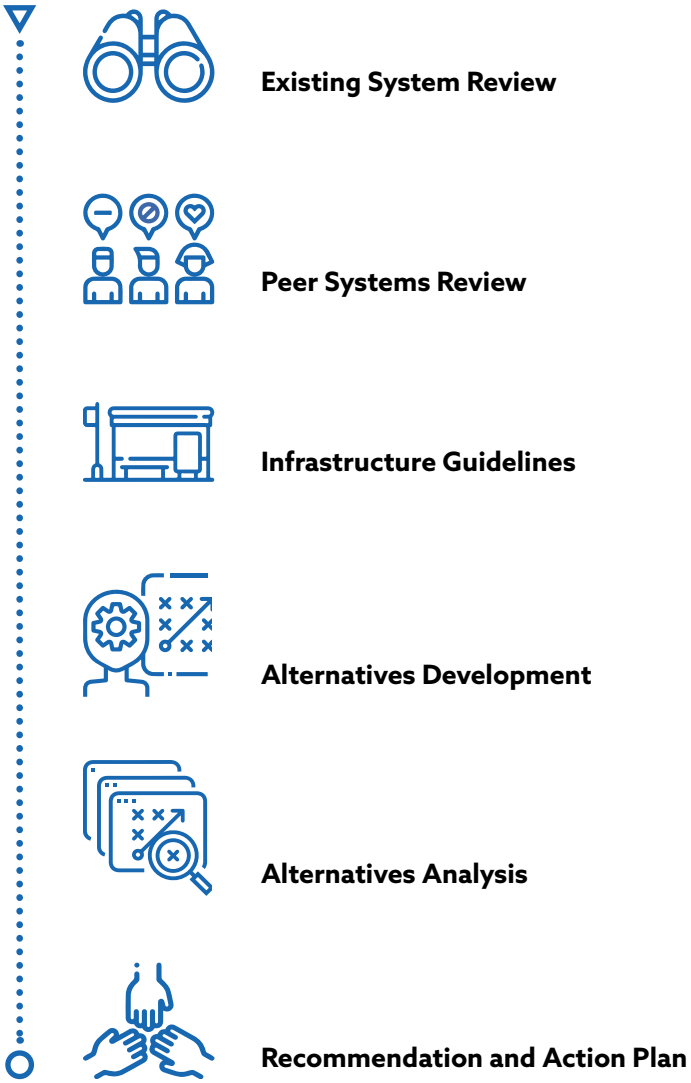
With the BERT and trolley services, the County has devised a strategy around the SMART Plan's six (6) premium transit corridors which are planned to be the main regional transportation mode. This strategy requires local services to provide short-to-medium distance trips to feed riders into the primary corridors and to mobilize customers locally. This is where systems such as the DTS have been established to support the County's Metrobus system. By enhancing the local circulators, services can be connected, coordinated, and synchronized to function as an efficient distribution network.

SR 112/Airport Expressway (1970s)

STUDY SCOPE

This study begins with an analysis of the existing transit system. This analysis looks at current transit services and operations, planned improvements, City demographics, and environmental conditions with the intention of understanding how well the current services performs in meeting the City's needs. This requires an understanding of travel markets within the City and how commuter, student, business, and leisure trips interact.

After analyzing the existing conditions, this study focuses on peer systems to compare conditions, infrastructure, and operations. These insights aid in developing infrastructure guidelines and transit strategy alternatives that improve the existing transit services. These strategies detail supporting pedestrian and bicycle environments, transit infrastructure, and transit operations that are fully integrated with future mobility options and adjacent land uses. Alternatives are then evaluated to determine associated benefits and tradeoffs. An alternative is finally recommended for implementation with an accompanying action plan.



Existing System Review

Peer Systems Review

Infrastructure Guidelines

Alternatives Development

Alternatives Analysis

Recommendation and Action Plan

02

EXISTING CONDITIONS

LITERATURE REVIEW

EXISTING SYSTEM REVIEW

Appendix A includes a separate report documents the full existing conditions analysis completed as part of this study. This section provides a summary of the existing conditions to highlight the facts and needs addressed by the recommendations presented in this report.

LITERATURE REVIEW

A comprehensive literature review was performed to understand the context of ongoing and planned improvements within the City of Doral and its surroundings. The following list identifies the documents reviewed. These documents contain everything from specific corridor recommendations to region-wide work programs and master plans listing current and future projects. Of the documents reviewed, the Miami-Dade TPO SMART Plan and the Better Bus Project are critical complementary plans to this study.

Documents Reviewed

AGENCY
MIAMI-DADE COUNTY TPO

DATE PUBLISHED	DOCUMENT
2019	Miami-Dade TPO SMART Plan
2019	Transportation Improvement Program (TIP)
2017	Protected Bicycle Lanes Demonstration Project
2016	Non-Motorized Network Connectivity Plan
2014	2040 Long Range Transportation Plan (LRTP)
2014	2040 Bicycle/Pedestrian Plan

AGENCY
FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT)

DATE PUBLISHED	DOCUMENT
2019	State Transportation Improvement Program (STIP)
2019	Work Program
2017	Doral Subarea Freight Improvement Plan
2016	Medley Subarea Freight Improvement Plan

AGENCY
MIAMI-DADE DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS (DTPW)

DATE PUBLISHED	DOCUMENT
2019	2028 Transit Development Plan

AGENCY
FLORIDA INTERNATIONAL UNIVERSITY (FIU)

DATE PUBLISHED	DOCUMENT
2019	Modesto A. Maidique Campus and Engineering Center Master Plans
2003	107th Avenue Pedestrian Transit Greenways Corridor at City of Sweetwater

AGENCY
TOWN OF MEDLEY

DATE PUBLISHED	DOCUMENT
2018	Multimodal Mobility Study

AGENCY
CITY OF DORAL

DATE PUBLISHED	DOCUMENT
2017	Doral Boulevard Beautification Master Plan
2017	FIU Trolley Expansion Feasibility Study
2017	Low Impact Development Plan Master Plan
2017	Transportation Master Plan
2016	Housing Master Plan
2016	Trolley On-Board Survey
2015	Bicycle Network Plan
2014	Transit Mobility Plan
2010	Doral Design District Master Plan
2008	Green Master Plan

LITERATURE REVIEW

MIAMI-DADE TPO 2040 LRTP

The Miami-Dade TPO's 2040 LRTP is intended to assist stakeholders, citizens, community leaders, businesses, and elected officials in achieving the County's transportation vision through 2040. The LRTP serves as a tool to identify needed improvements to the transportation network and provides a long-term investment framework to address current and future challenges. **Tables 1 through 3** list the projects documented in the LRTP that fall within the study area.

Table 1: 2040 LRTP Projects

PRIORITY	PROJECT	CORRIDOR	LIMITS	PROJECT DESCRIPTION
1 (2015-2020)	1	NW 74th St.	HEFT to SR 826	Add 2 lanes and reconstruct
	2	NW 97th Ave.	NW 70th St. to NW 74th St.	New 4 lane road reconstruction
	3	NW 97th Ave.	NW 58th St. to NW 70th St.	Add 2 lanes and reconstruct
	4	HEFT	SR 826 to NW 106th St.	Add lanes and reconstruct
	5	SR 826 & SR 836	North of SW 8th St./ NW 87th Ave. to south of NW 25th St./NW 57th Ave.	Interchange improvements
	6	SR 836	NW 107th Ave.	Construction of access ramp
	7	SR 836 Interchange at 87th Ave.	SR 836 west of 82nd Ave. to NW 97th Ave.	Interchange improvements
2 (2021-2025)	8	NW 107th Ave.	NW 41st St. to NW 25th St.	Add 2 lanes and reconstruct
	9	NW 107th Ave.	NW 12th St. to NW 74th St.	Operational and capacity improvements where feasible
	10	NW 117th Ave.	NW 25th St. to NW 41st St.	New 2 lane road to support the flow of truck traffic to HEFT
	11	NW 12th St.	NW 107th Ave. to SR 826	Widening
	12	NW 25th St.	NW 89th Ct. to SR 821	Capacity and operational improvements
	13	NW 79th Ave.	NW 48th Way to NW 36th St.	Merge and reduce access points if possible
3 (2026-2030)	14	NW 36th St./ NW 41st St.	NW 42nd Ave. to HEFT	Operational improvements
	15	NW 58th St.	NW 107th Ave. to NW 82nd Ave.	Corridor traffic operational improvements
	16	SR 836 Managed Lanes	HEFT to SR 826/SR 836 Interchange	2 new managed lanes
4 (2031-2040)	17	NW 97th Ave.	NW 58th St. to NW 52nd St.	Add 2 lanes and reconstruct
	18	HEFT	NW 12th St. to NW 74th St.	Transportation Systems Management and Operations (TSM&O)
	19	SR 826	SR 836 to NW 103rd St.	Add 4 special use lanes
Partially Funded Projects	21	East-West Corridor	Miami Intermodal Center to FIU Modesto A. Maidique campus	Light Rail Transit (LRT) and/or appropriate premium transit technology

Table 2: 2040 LRTP Freight Management & Non-motorized Projects

PROJECT	ROADWAY	LIMITS	PROJECT DESCRIPTION
1	NW 97th Ave.	NW 74th St. to NW 58th St.	Bicycle facility improvements
2	NW 82nd St.	NW 114th Path to NW 109th Ave.	Pedestrian facility improvements
3	NW 58th St.	NW 82nd Ave. to NW 74th Ave.	Freight Management – High number of access points on the south side of NW 58th St. Merge and reduce access points close to busy intersections if possible.
4	NW 82nd Ave.	NW 41st St. to NW 25th St.	Freight management – widen from 2 to 4 lanes

Table 3: 2040 LRTP Private Sector Projects

PROJECT	ROADWAY	LIMITS	PROJECT DESCRIPTION
1	NW 90th St.	NW 107th Ave. to NW 87th Ave.	New 4 lane road construction
2	NW 97th Ave.	NW 74th St. to NW 90th St.	New 4 lane road construction


211

LITERATURE REVIEW

SMART PLAN

On February 2016, the TPO Governing Board unanimously approved a policy to set as "highest priority" the advancement of rapid transit corridors and transit supportive projects for the County. Following this milestone, the Governing Board adopted and endorsed the proposed Strategic Miami Area Rapid Transit (SMART) Plan on April 2016. The SMART Plan intends to advance six rapid transit corridors of the 2002 People's Transportation Plan, along with a network system of Bus Express Rapid Transit (BERT) service, in order to implement mass transit projects in Miami-Dade County. **Table 4** lists the six rapid transit corridors and **Table 5** the BERT network included in the SMART Plan. Of these improvements, the six (6) rapid transit corridors have been amended into the 2040 LRTP as partially funded projects. Furthermore, the Miami-Dade DTPW and TPO, as well as the FDOT, have begun Project Development and Environmental (PD&E) studies for all six (6) rapid transit corridors. These studies aim to select a Locally Preferred Alternative (LAP) for funding, design, and ultimately construction. In addition to the PD&E Studies, the TPO is leading Land Use and Visioning planning studies to examine the interrelationship between transit and surrounding land uses to complement the SMART Plan with policies that promote community integration. The latest SMART Plan map is presented in **Figure 2**.

South Corridor Renderings

Table 4: SMART Plan Rapid Transit Corridors

CORRIDOR	FROM	TO	LOCALLY PREFERRED ALTERNATIVE SELECTION (LAP) DATE
Beach Corridor	Midtown Miami	Miami Beach Convention Center	Fall 2019
East-West Corridor	Miami Intermodal Center (MIC)	Florida International University	Fall 2019
Kendall Corridor	Dadeland Area Metrorail Stations	Krome Avenue	Winter 2019
North Corridor	Martin L. King, Jr. Metrorail Station	NW 215th Street	December 2018
Northeast Corridor	Downtown Miami	City of Aventura	Ongoing negotiations with South Florida Rail Transportation Authority, Florida East Coast Railroad, and Miami-Dade DTPW
South Dade Transitway	Dadeland South Metrorail Station	SW 344th Street Transit Terminal (Florida City)	August 2018

Table 5: SMART Plan BERT Corridors

CORRIDOR	DESCRIPTION
Beach Express	**North** – Miami Beach Convention Center to Golden Glades via I-95 **Central** – Miami Beach Convention Center to Civic Center via Julia Tuttle Causeway **South** – Miami Beach Convention Center to Downtown Miami via MacArthur Causeway
Flagler Corridor	Downtown Miami to West Dade via Flagler Street
Florida's Turnpike Express	**North** – Dolphin Station to I-75/Miami Gardens Park-n-Ride via the HEFT **South** – Dolphin Station to SW 344th Street via the HEFT
Northwest Miami-Dade Express	Palmetto Metrorail Station to Miami Gardens Drive Park-n-Ride via Palmetto Expressway and I-75
South Miami-Dade Express	Dadeland North Metrorail Station to southern Miami-Dade County via SR 878, SR 874, and Florida's Turnpike
Southwest Miami-Dade Express	Dadeland North Metrorail Station to Miami Executive Airport via SR 878 and SR 874

Figure 2: SMART Plan Map

LEGEND

- Terminal
- Existing Metrorail
- Existing Tri-Rail
- Existing Rail

RAPID TRANSIT CORRIDORS:
(In alphabetical order)

1. Beach Corridor
2. East-West Corridor
3. Kendall Corridor
4. North Corridor
5. Northeast Corridor
6. South Dade Transitway

BUS EXPRESS RAPID TRANSIT (BERT) NETWORK

- a Flagler Corridor
- b S. Miami-Dade Express
- c N.W. Miami-Dade Express
- d S.W. Miami-Dade Express
- e1 Florida's Turnpike Express (South)
- e2 Florida's Turnpike Express (North)
- f1 Beach Express North
- f2 Beach Express Central
- f3 Beach Express South

*Map Not Drawn to Scale

Revised April 2019

LITERATURE REVIEW

SMART PLAN (CONTINUED)

The Miami-Dade TPO, along with sister agencies, are conducting studies to analyze the market, travel demand, ridership, service plan, terminal operations, and operating costs estimates of all the proposed BERT routes. These studies are all scheduled to be completed by May 2020 with ongoing community coordination. To date, the market analysis, travel time analysis, ridership estimates, service plan refinement analysis, and vehicle needs have been complete.

East-West Corridor

This rapid transit corridor is envisioned to run along SR 836/Dolphin Expressway from the MIC to the Panther Station in SW 8th Street and SW 109th Avenue, next to the FIU Modesto A. Maidique campus. The ongoing PD&E study is evaluating alignment alternatives as well as the location and design of transit stations and Park-n-Ride transit terminals. The first phase of the evaluation explored Bus Rapid Transit (BRT), Heavy Rail Transit (HRT), and Commuter Rail Transit (CRT) as alternative modes of transportation. From this phase, only the BRT and HRT alternatives advanced for further consideration. Currently, the second phase of the study is ongoing to select the LPA.

Moreover, the first hub for this corridor broke ground in January 2017. This hub is located on NW 12th Street and NW 122nd Avenue, just west of the HEFT, and is called the Dolphin Station Park-n-Ride Transit Terminal Facility. Two (2) other hubs have already been identified and will soon commence construction. These hubs are the Panther Station at FIU and the Tamiami Station to be located in the corner of SW 8th Street and SW 147th Avenue.

Flagler BERT Corridor

FDOT is conducting the Flagler PD&E Study. This BERT corridor covers from approximately the HEFT to the Downtown Multimodal Terminal in NW 1st Avenue. The proposed corridor also includes a segment of SW 8th Street from SW 147th Avenue to SW 107th Avenue, SW 107th Avenue from SW 8th Street to NW 12th Street, and NW 12th Street from approximately NW 122nd Avenue to NW 107th Avenue. The PD&E Study is considering three (3) alternatives: Business Access and Transit (BAT) Lanes, Exclusive Left Lane BRT Separated by Traffic, and an Exclusive Left Lane BRT.

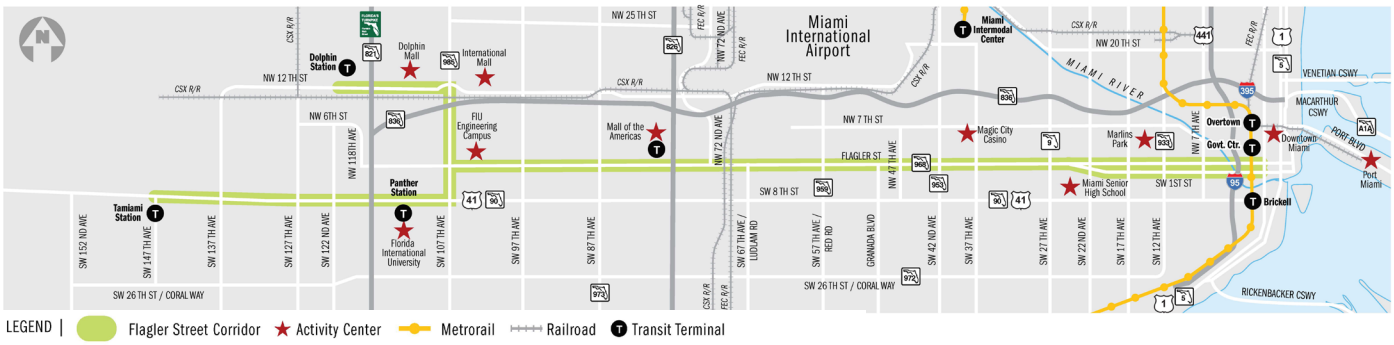
Four (4) corridors are of particular interest due to their potential interface with the DTS. These corridors are:

Rapid Transit
East-West Corridor

BERT
Flagler Corridor
Florida's Turnpike Express
Northwest Miami-Dade Express

Dolphin Station Park-and-Ride Transit Facility

Figure 3: Flagler BERT Corridor Map



LITERATURE REVIEW

SMART PLAN (CONTINUED)

Florida Turnpike North & South BERT Corridors

The Turnpike BERT routes are anticipated to begin operation once the construction of the HEFT Express Lanes has been completed. For the Turnpike South BERT corridor, the anticipated implementation year is 2022 with the completion of the HEFT Express Lanes from SW 216th Street to SR 836/ Dolphin Expressway. On the other hand, the Turnpike North BERT corridor is anticipated to begin operating in 2027 with the completion of the HEFT Express Lanes north of SR 836/Dolphin Expressway. The routes are proposed to have 20 minute peak hour headways and operate in the peak periods only.

Northwest Miami-Dade Express BERT Corridor

This BERT corridor begins in the Palmetto Metrorail Station and ends in the I-7/Miami Gardens Drive park-and-ride. This BERT is anticipated to begin operating in the spring of 2020 and will have a stop at the American Dream Mall once the development is completed. The route is proposed to have 20 minute peak hour headways and operate in the peak periods only.

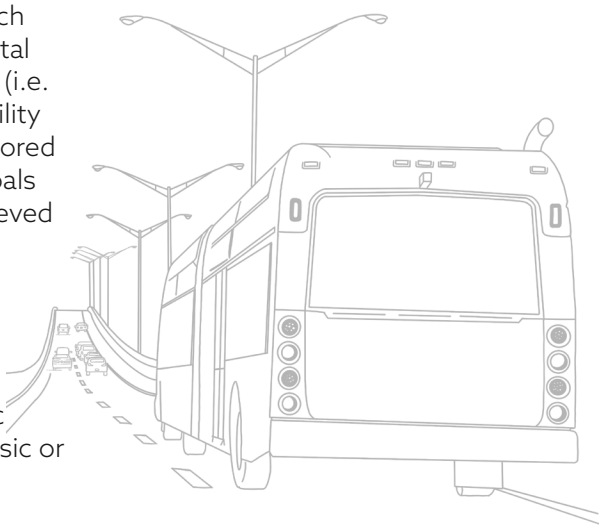
BETTER BUS PROJECT

The Better Bus Project is an advocacy-led and community-driven bus system redesign being conducted by Miami-Dade DTPW and the Transit Alliance Miami. The project intends to redesign the existing Metrobus system through a collaborative planning effort. The project is looking at modifications to the system's routes, frequencies, and schedules. In addition to evaluating the Metrobus system, the project will also assess the trolley systems of the City of Miami, City of Miami Beach, and City of Coral Gables. The network redesign is starting with a clean slate and evaluating choices and concepts through a pragmatic perspective; by retaining existing services which the analysis deems sensible but not limiting or biasing potential changes based on the existing system.

The first phase of this project looked at choices for the system redesign based on existing conditions, outreach, and industry best practices. This step aims to balance competing goals of the transit system such as providing economic mobility, minimizing/mitigating environmental impacts, providing social justice, encouraging active transportation (i.e. walking and biking), and empowering personal liberty through mobility options. Since transit budgets are essentially fixed, if one goal is favored over the other, then the transit system must do less of the other goals to provide a substantial difference. Overall, these goals can be achieved through two (2) systemwide trade-offs:

1. Economic Efficiency versus Social Equity, and
2. Ridership Maximization (Demand Responsive) versus Coverage (Geographic Equity).

Economic Efficiency involves being cost-efficient with limited public funds and resources while Social Equity involves the provision of basic or



enhanced mobility, accessibility (including affordability), and connectivity for non- or minimal drivers. Social Equity, in particular, impacts individuals that may be physically, economically and/or socially disadvantaged (those individuals that have a greater need for transit services). Social equity typically considers the following groups: low income households, minority households, immigrant or low-English proficiency households, zero car households, indigenous, elderly, youth, disabled, and veterans. Economic Efficiency focuses on minimizing costs and maximizing revenues when selecting transit routes and stop locations as well as when establishing fare structures. This differs from Social Equity which focuses on serving specific disadvantaged groups regardless of the cost. Providing Economic Efficiency usually favors high to mid density development areas with more affluent commuters and their places of employment (with higher and/or variable transit fares and parking fees). Providing Social Equity usually favors mid- to low-density development areas with disadvantaged groups and their places of employment or other activity (with discounted or free fares and no parking fees).

Ridership Maximization (Demand Responsive) involves concentrating most transit operations and premium transit services where and when transit travel demand is highest with no or very limited transit service to other areas or communities where transit travel demand is low. Coverage (Geographic Equity) involves spreading transit service out to all areas and communities including those where transit travel demand may be low and with minimal transit service where and when transit travel demand is high. Ridership Maximization is achieved by providing a very high level of transit service (frequency and span of service) in relatively close proximity to high transit travel demand areas, while Coverage (Geographic Equity) is achieved by providing a basic level of transit service in relatively close proximity to the majority of the population (typically within ½ to ¼ mile). Ridership Maximization usually favors high- to mid-density developments in urbanized areas, including areas with high concentrations of employment, while providing Coverage (Geographic Equity) usually favors mid- to low-density developments in rural and suburban areas, including areas with low concentrations of employment or other activities. Preventing conditions of excess travel demand avoids congestion and potential loss of riders, while preventing conditions of excess travel supply avoids inefficiencies and wasted resources. A basic challenge of being fully responsive to travel demand is that it can and does vary in both predictable and unpredictable ways (by time and/or by location) while public transit travel supply is typically fixed and discrete.

Hence, the Better Bus Project determined two (2) concepts, the Coverage and Ridership concepts, in the second phase of the study (see **Figure 6** and **Figure 7**). These concepts illustrate a spectrum of possibilities for how to redesign the bus network in Miami-Dade.

Both concepts show the same contrast with the Existing Network (**Figure 5**) on three (3) key questions:

1 **How Much Change?**
Both the Coverage and Ridership concepts will change the network significantly to increase the freedom and access people have by transit.

2 **Whether and how to change trolley services?**
Both the Coverage and Ridership concepts assume that the City of Miami and Miami Beach would change their trolley.

3 **How far apart should bus stops be?**
Both the Coverage and Ridership concepts assume that bus stops should be about every 1,000 to 1,300 feet apart on most high ridership routes. This allows riders to get where they are going faster.

LITERATURE REVIEW

BETTER BUS PROJECT (CONTINUED)

Both concepts show significant job access benefits, but only because they assume the three (3) questions regarding change are possible and desirable. The concepts are different from each other in how they emphasize Ridership and Coverage objectives, which is represented as the horizontal axis on the triangle in **Figure 4**. These concepts represent a spectrum of possibilities, and they are not intended to be an either/or proposition. With these two (2) concepts at hand the project is now exploring how to balance each objective to come up with a solution between December 2019 and February 2020.

In regards to the City of Doral, the Coverage Concepts keeps DTPW Routes 238 and 87 intact and shortens Route 36B to end in Downtown Doral as opposed to Dolphin Mall. In this concept, the City benefits from improved frequencies on Route 11 and a new proposed Rapid Route 11R (i.e. from 60 minute to 30/15 minute headways). The Ridership Concept eliminates DTPW Route 238 and 87 which connect the Dolphin Mall to the MIC and the Palmetto Metrorail Station to the Dadeland North Metrorail Station, respectively. However, Doral benefits from improved frequencies on Route 36L/36 (i.e. from 60 minute to 30/15 minute headways) on Routes 107 and 11A (i.e. from 60 minute to 15 minute headways). In the Ridership concept, Route 36L/36 still reaches Dolphin Mall albeit through a different route configuration. While the Ridership Concept eliminates two (2) important routes for the City, it provides great improvements in frequencies and opportunities for the DTS to partially cover eliminated connections within the City.

Figure 4: Spectrum of Choices for Miami's Transit Network from the Better Bus Project

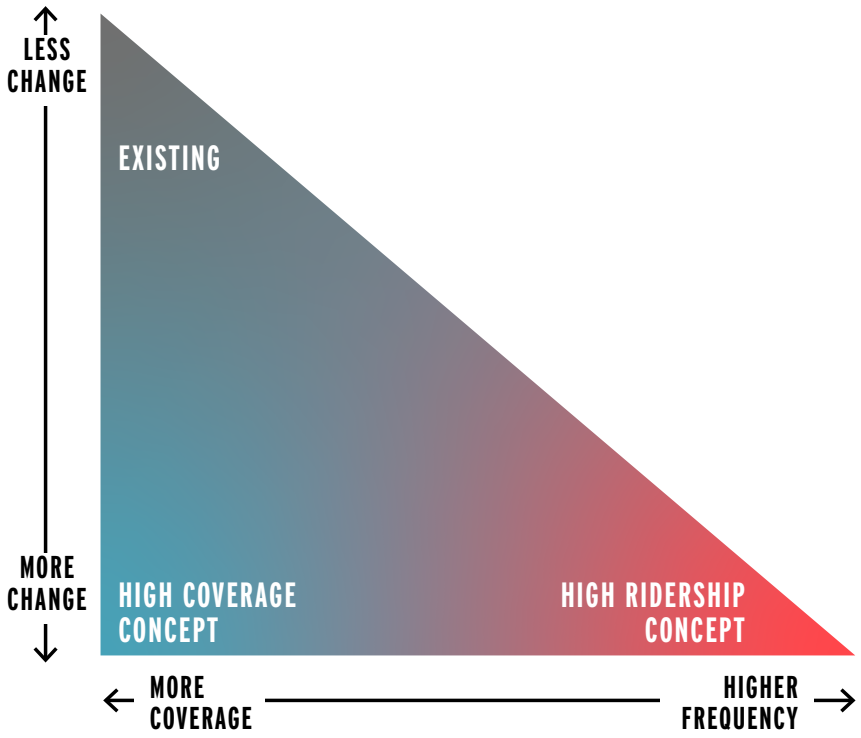


Figure 5: Miami-Dade County Metrobus Existing System

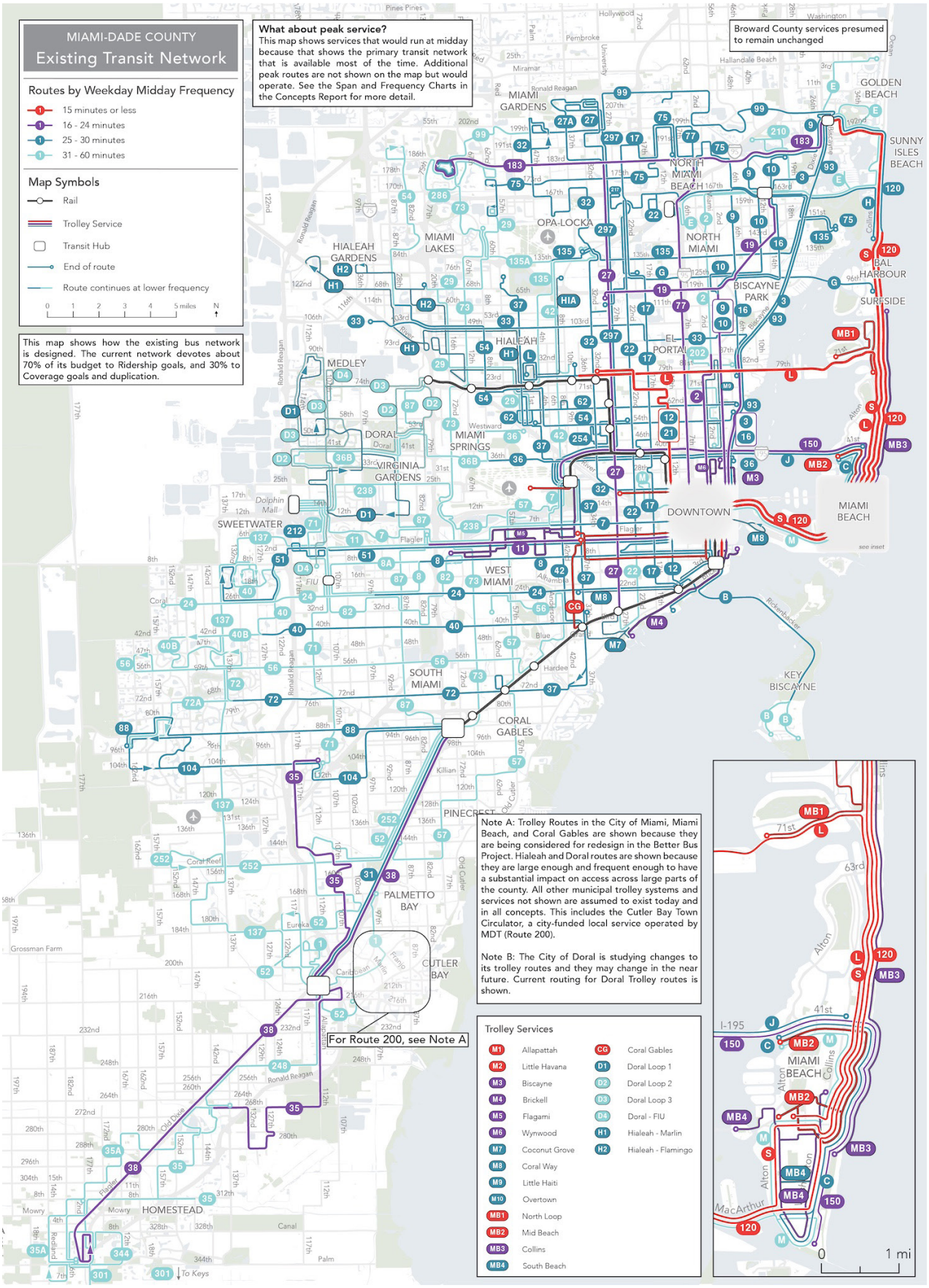


Figure 6: Better Bus Project Coverage Concept

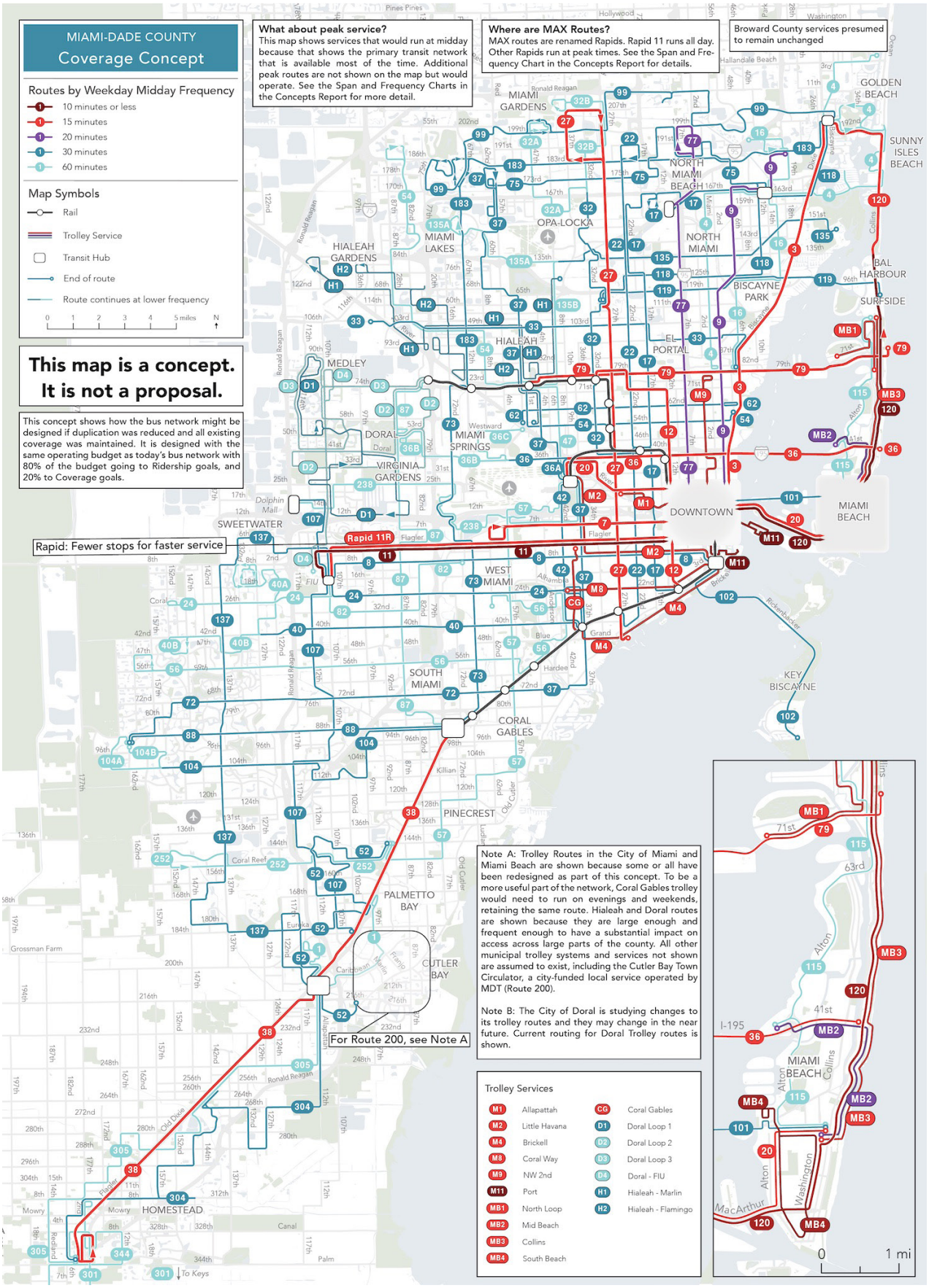
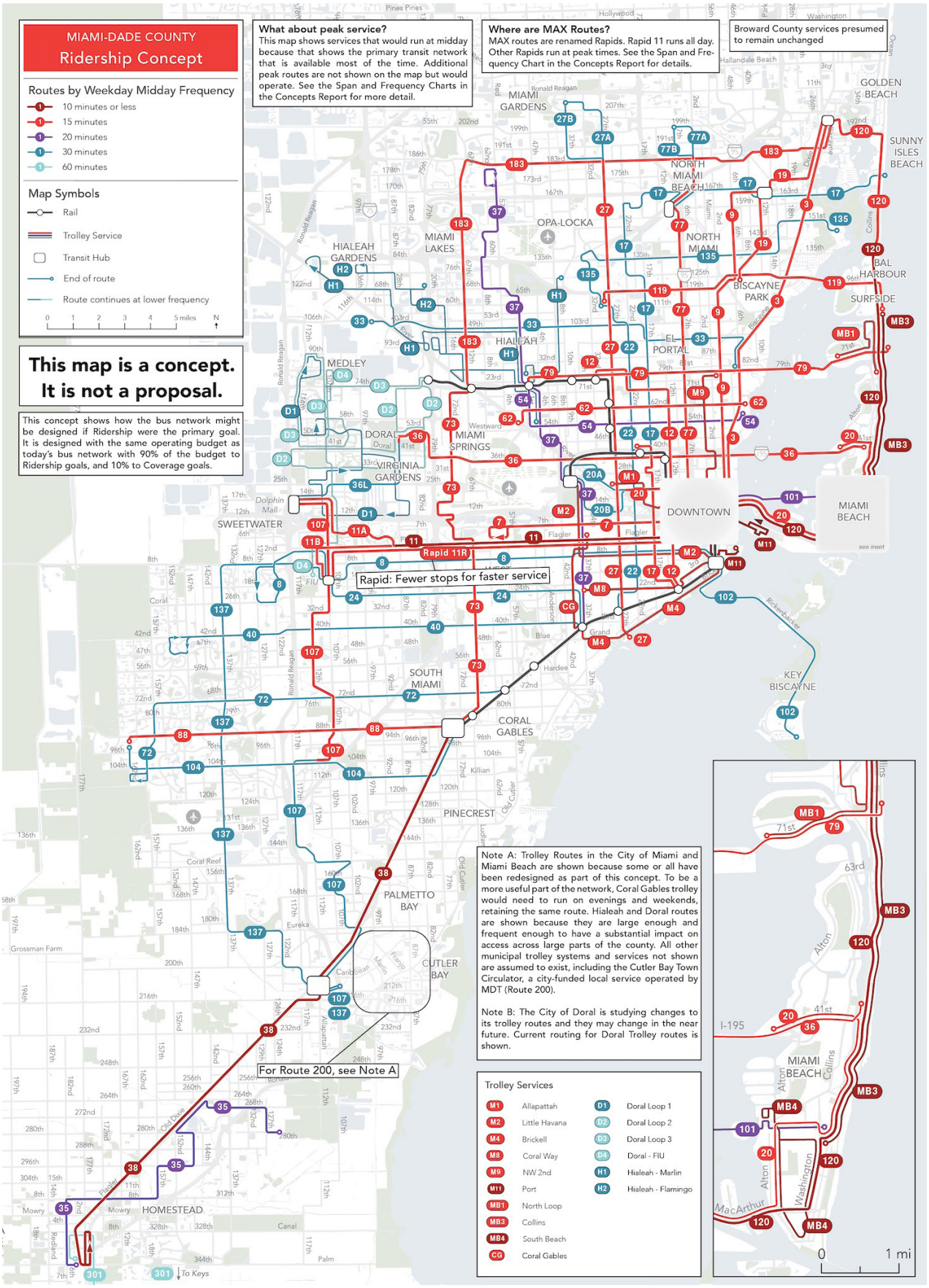


Figure 7: Better Bus Project Ridership Concept



EXISTING SYSTEM REVIEW

DORAL TROLLEY SYSTEM

Management and Organizational Structure

The DTS began service on February 2008 as a pilot project organized between the City of Doral and Miami-Dade County as part of the Municipal Transportation Program. This program is funded through the County's PTP which calls for 20% of surtax proceeds to be distributed directly to municipalities on a pro rata basis for use on local transportation and transit projects. Furthermore, the PTP stipulates that municipalities must invest at least 20% of their surtax share on transit. In 2016, the City and the County approved a second inter-local agreement to continue DTS operations. This agreement, adopted as resolution number R-1164-16 by the Board of County Commissioners and resolution number 16-167 by the City of Doral's Council, is effective for five (2) years and subject to two (2) five-year automatic renewals. The agreement documents the legal structure of the DTS. Key provisions within the agreement are:

- The City is responsible for bus stop passenger amenities such as bus shelters and benches at all bus stops served by the DTS
- The City may charge a fare similar to other County agreements for service, however, the fare structure must accept all Miami-Dade DTPW passes, transfers, or identifications entitling an eligible passenger to ride the service without paying an additional fare (i.e., Miami-Dade County Patriot Passport or Golden Passport) or at half fare for babies, toddlers, children, and teenagers (i.e., kindergarten through 12th grade students)
- The DTS shall operate with fixed or semi-fixed routes where at least 70% of each route is within City boundaries
- Changes to routes, schedules, or fares may only occur after the following steps have been performed by the City:
  - Advertise a notice of public hearing in English and Spanish
  - Conduct a minimum of one (1) public hearing that gives the community an opportunity to voice their opinion concerning any changes
  - Present evidence of advertisement and completion of public hearing to the County

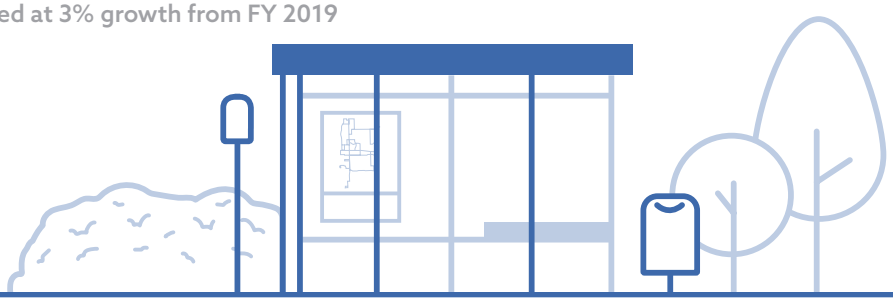
- The City, as well as the County, shall collect and keep on file documentation of insurance of any and all private providers operating the DTS routes including:
  - Worker's Compensation and Employer's Liability per the statutory limits of the state of Florida
  - Commercial General liability of $1,000,000.00 per occurrence of bodily injury and property damage
  - Automobile Liability of $1,000,000.00 for each occurrence of owned/non-owned/hired automobiles
  - Blanket fidelity bond of $10,000.00
- The City may seek federal or state grant funding and provide grant-matching funds at its own discretion – the County may contribute none, part, or all of the grant-matching funds required
- The County agrees to pay the City its attributable share of federal and state formula funds received from United States Department of Transportation (USDOT) and FDOT in the event the DTS statistics result in an increase to the County's transportation funding

Table 6 summarizes the previous five-year funding amounts received by the City of Doral from Miami-Dade County to operate and maintain the DTS as well as the 2019 projections. Since its inception, the County has invested $11,315,963.00 (provided data available presented in **Table 6**) in the DTS.

Table 6: Summary of Miami-Dade County Funding for the DTS

YEAR	POPULATION	FUNDING PER CAPITA	TOTAL FUNDING
2020**	68,244	$43.46	$2,966,042.00
2019*	64,167	$41.87	$2,686,686.00
2018	59,304	$42.30	$2,508,438.00
2017	55,660	$40.11	$2,232,432.00
2016	52,889	$40.10	$2,120,607.00
2015	Data Not Reported		
2014	47,529	$37.19	$1,767,800.00

Note: * 2019 values projected at 3% growth from FY 2018
**2020 values projected at 3% growth from FY 2019



EXISTING SYSTEM REVIEW

DORAL TROLLEY SYSTEM (CONTINUED)

Operations

As depicted in **Figure 8,** the DTS has four (4) routes identified by the colors: Blue, Yellow, Green, and Purple. The Doral Trolley is free to ride and provides a real-time trolley tracker through mobile and web applications. **Table 8** summarizes the calculated headways per route per period (based on published route schedules). **Table 9** summarizes the holidays when the system is not operational.

ROUTE 1
Blue Route

Connects Midtown, Doral, Dolphin Mall, and the Miami International Mall

ROUTE 2
Yellow Route

Connects the Palmetto Metrorail Station, Doral Government Center, Downtown Doral, Miami-Dade College West, and Doral City Place

ROUTE 3
Green Route

Connects Midtown Doral with the Palmetto Metrorail Station

ROUTE 4
Purple Route

Connects Midtown Doral, Miami International Mall, and FIU's Engineering and Modesto A. Maidique campuses

Table 7: DTS Stops and Schedule per Route

ROUTE	LENGTH (MILES)	NO. OF STOPS	SCHEDULE					
			Weekday		Saturday		Sunday	
			AM	PM	AM	PM	AM	PM
Route 1	24.8	86	06:00	10:07	07:00	08:03	07:00	08:03
Route 2	16.7	53	06:00	09:35	06:50	07:53	No Service	
Route 3	15.7	46	05:50	09:28	06:50	06:56	No Service	
Route 4	15.2	48	06:00	11:00	No Service		No Service	

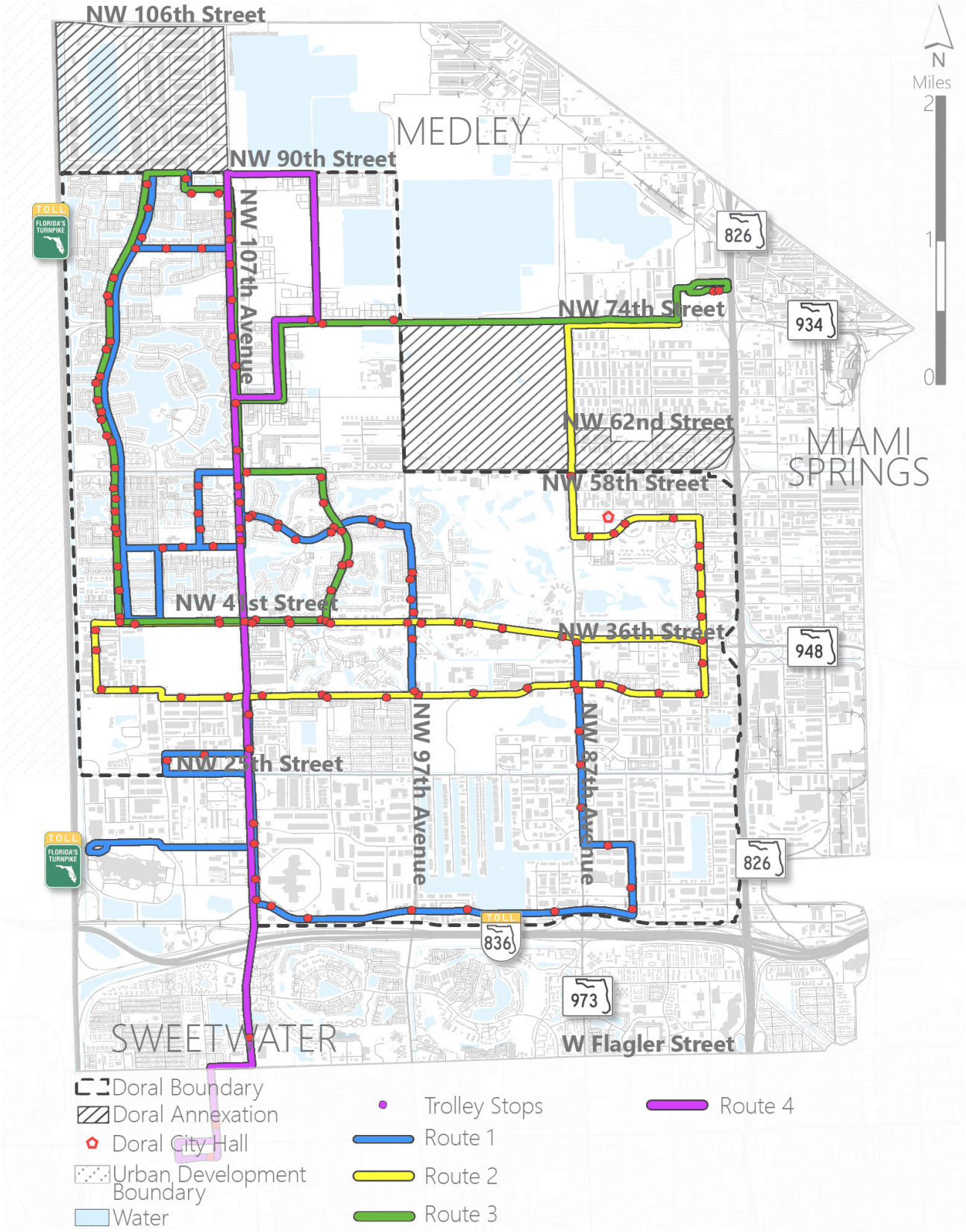
Table 8: DTS Headways per Route and Period

ROUTE	PERIOD	HEADWAYS		
		Weekday	Saturday	Sunday
Route 1	Peak	25	50	100
	Non-Peak	30	50	100
Route 2	Peak	35	80	No Service
	Non-Peak	40	80	
Route 3	Peak	35	60	No Service
	Non-Peak	40	60	
Route 4	Peak	35	No Service	No Service
	Non-Peak	45		

Table 9: DTS Holiday Schedule

HOLIDAY	DTS OPERATIONAL?
New Year's Day | January 1st	No
Martin Luther King Day | Third Monday of January	Yes
President's Day | Third Monday of February	Yes
Memorial Day | Last Monday of May	No
Independence Day | July 4th	No
Labor Day | First Monday of September	No
Columbus Day | Second Monday of October	Yes
Veteran's Day | November 11th	Yes
Thanksgiving Day | Fourth Thursday of November	No
Day After Thanksgiving | Fourth Friday of November	Yes
Christmas Day | December 25th	No

Figure 8: DTS Routes and Stops



EXISTING SYSTEM REVIEW

DORAL TROLLEY SYSTEM (CONTINUED)

Operations (Continued)

The City operates 16 vehicles ranging from 30 to 34 feet in length. These vehicles, depicted in **Figure 9**, resemble old-style streetcars or trams with front pilot/cowcatcher, framed windows, round lights, wooden bench seating, and double roof. Referred to as "trolley-replica buses" by the American Public Transportation Association (APTA), these vehicles have rubber tires, run on biodiesel fuel, and have an estimated service life of 10 years or 350,000 miles. Doral's fleet has an average age of 4.5 years with five of its 16 vehicles having more than five years in operations.

Typical DTS Vehicle Interior

Table 10 and **Table 11** summarize key characteristics of the City's fleet. These vehicles have an average cost of $173,500 (excluding the annual safety and security equipment cost). Additionally, the vehicles are equipped with the following IT amenities:

- Automatic Vehicle Location (AVL) GPS
- Automatic Voice Information System (AVIS)
- Automated Passenger Counter (APC)
- MDVR 4 Channel with 4 Cameras of 500 GB (Cp4 and cables included)
- AVAS (Inner LED and 2 speakers)
- Wi-Fi (Hot spot)

Vehicles also include ETA solar displays and trolley drivers operate an electronic tablet. Six of the 16 vehicles have maximum seating and standing capacity of 41 people while the rest have a capacity of 44 people.

Figure 9: Doral Trolley Vehicle

Table 10: DTS Fleet Inventory and Purchasing Costs

TROLLEY	MAKE	FUEL TYPE	MILES	MODEL YEAR	YEAR TO REPLACE	YEARS IN SERVICE	COST	REIMBURSEMENT	
								AMOUNT	SOURCE
DT01	Freightliner Supreme	Biodiesel	303,241	2009	2019	7.00	$143,000.00		
DT02	Freightliner Hometown	Biodiesel	57,164	2018	2028	1.00	$188,483.75		
DT03	Freightliner Supreme	Biodiesel	329,200	2010	2020	9.00	$152,000.00		
DT04	Freightliner Supreme	Biodiesel	288,474	2011	2021	8.00	$161,500.00		
DT05	Freightliner Supreme	Biodiesel	265,338	2011	2021	8.00	$169,531.00		
DT06	Ford Hometown	Gasoline	261,748	2013	2023	6.00	$152,137.00	$152,137.00	Private development contribution (Park Square)
DT07	Freightliner Hometown	Biodiesel	169,178	2014	2024	5.00	$175,750.00	$127,333.72	FTA Grant $475K
DT08	Freightliner Hometown	Biodiesel	205,997	2014	2024	5.00	$175,750.00	$127,333.72	FTA Grant $475K
DT09	Freightliner Hometown	Biodiesel	196,498	2014	2024	5.00	$175,750.00	$86,740.19	FTA Grant $350K
DT10	Freightliner Hometown	Biodiesel	157,116	2015	2025	4.00	$175,750.00	$127,333.72	FTA Grant $475K
DT11	Freightliner Hometown	Biodiesel	117,133	2015	2025	4.00	$175,750.00	$86,740.19	FTA Grant $350K
DT12	Freightliner Hometown	Biodiesel	115,697	2016	2026	1.00	$175,750.00		
DT13	Freightliner Hometown	Biodiesel	28,020	2018	2028	0.50	$188,483.75		
DT14	Freightliner Hometown	Biodiesel	31,301	2018	2028	0.50	$188,483.75		
DT15	Freightliner Hometown	Biodiesel	22,472	2018	2028	0.33	$188,483.75		
DT16	Freightliner Hometown	Biodiesel	22,823	2018	2028	0.25	$188,483.75		

Table 11: DTS Fleet Capacity

TROLLEY	LENGTH (FT.)	WHEEL BASE (IN.)	AISLE WIDTH (IN.)	SEATING CAPACITY	ADA SEATING	STANDING CAPACITY
DT01	31	208	20	26-30	2	18
DT02	34	208	23	26-30	2	18
DT03	31	208	23	26-30	2	18
DT04	32	208	23	26-30	2	18
DT05	33	208	23	30-34	2	21
DT06	32	208	23	24-28	2	17
DT07	30	208	23	24-28	2	17
DT08	30	208	23	24-28	2	17
DT09	30	208	23	24-28	2	17
DT10	30	208	23	24-28	2	17
DT11	30	208	23	24-28	2	17
DT12	32	208	23	26-30	2	18
DT13	33	208	22	26-30	2	18
DT14	33	208	22	26-30	2	18
DT15	33	208	22	26-30	2	18
DT16	33	208	22	26-30	2	18

EXISTING SYSTEM REVIEW

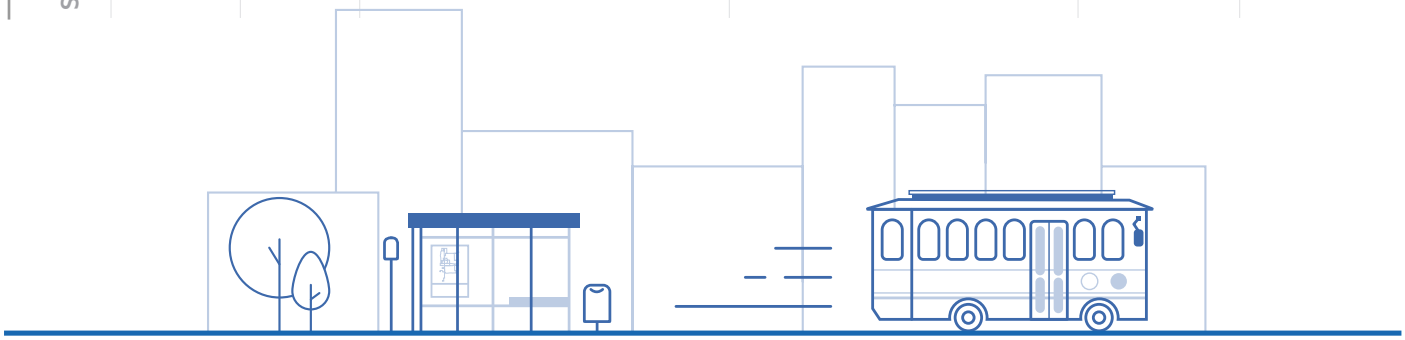
DORAL TROLLEY SYSTEM (CONTINUED)

Operations (Continued)

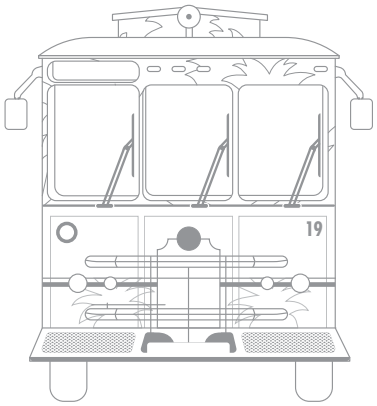
Table 12 summarizes the number of vehicles assigned to each route and where and when they begin and end their daily journeys. Trolley vehicle assignments are scheduled a week in advance through the TSO Mobile website. TSO Mobile is a fleet management contractor retained by the City to provide digital tools for tracking and monitoring the DTS. Of the 16 trolley vehicles available, only 15 are used and one (1) is reserved as a spare.

Table 12: DTS Operating Hours by Vehicles

DAY	ROUTE	BLOCK	START OF ROUTE	END OF ROUTE	START TIME (AM)	END TIME (PM)
WEEKDAY	Route 1	1	NW 109th Ave. & NW 88th St.	Dolphin Mall	06:00	09:35
		2	NW 109th Ave. & NW 88th St.	Dolphin Mall	06:31	10:07
		3	NW 10500 Blk. & NW 12th St.	NW 109th Ave. & NW 88th St.	06:00	09:32
		4	NW 10500 Blk. & NW 12th St.	NW 109th Ave. & NW 88th St.	06:31	10:04
	Route 2	1	Palmetto Metrorail Station	Palmetto Metrorail Station	06:00	09:12
		2	Palmetto Metrorail Station	Palmetto Metrorail Station	06:40	08:35
	Route 3	1	Palmetto Metrorail Station	Palmetto Metrorail Station	05:50	09:28
		2	Palmetto Metrorail Station	Palmetto Metrorail Station	06:30	08:56
	Route 4	1	NW 107th Ave. & NW 58th St.	Doral Academy	06:00	11:00
		2	NW 107th Ave. & NW 58th St.	FIU Main Campus	06:40	10:51
SATURDAY	Route 1	1	NW 10500 Blk. & NW 12th St.	Dolphin Mall	07:00	08:03
		2	NW 10500 Blk. & NW 12th St.	Dolphin Mall	07:49	07:14
	Route 2	1	Palmetto Metrorail Station	Palmetto Metrorail Station	06:50	07:53
	Route 3	1	Palmetto Metrorail Station	Palmetto Metrorail Station	06:50	06:56
SUNDAY	Route 1	1	NW 10500 Blk. & NW 12th St.	Dolphin Mall	07:00	0:03



Operating and Maintenance Costs



The City outsources operations and maintenance of its trolley vehicles through public bids. Currently, the company contracted to provide these services is Limousines of South Florida (LSF). Based on data provided by the City, trolley operating and maintenance cost per service hour is of $59.90. This includes trolley vehicle operation, maintenance, fueling, and storage by LSF. This cost was calculated by dividing LSF's total hours of operations of 31,109.88 by the total payment of $1,862,117.15 for the period from October 2018 to June 2019 and rounding to the nearest tenth.

LSF is located at 3737 NW 43rd St, Miami, FL 33142 where they store, repair, and maintain the City's trolley. Drivers report to this facility and deadhead to their designated route starting point. The City does not own any facilities related to Trolley operations.

Furthermore, the City has contracted TSO Mobile to provide and manage the information technology infrastructure. The City spends $194.89 monthly for IT services including Automatic Vehicle Location (AVL) GPS, Automated Passenger Counter (APC), MDVR 4 Channel with 4 Cameras of 500 GB (Cp4 and cables included), AVAS (Inner LED and 2 speakers), and Wi-Fi (Hot spot). The City has a plan of 45,000 minutes for $2,250 per month for the Automatic Voice Information System (AVIS).

Ridership Analysis

Throughout the course of this study, the trolley vehicle APCs were malfunctioning. City staff and TSO Mobile staff reported double counting and presented in this report are other errors in the data recorded by the APCs. Hence, total ridership used was recorded through tally marks by drivers.

In March 2019, the City and TSO Mobile worked to retrofit the trolley vehicles APCs from side mounted systems to ceiling mounted systems to improve the record keeping accuracy of boarding and alighting. As of March 27, 2019, all trolley vehicles were retrofitted with the exception of DT09. Hence, ridership data presented herein corresponds to the period of March 28, 2019 through April 10, 2019. Trolley assignments during this period are presented in **Table 16**, where assignments of Trolley DT09 are highlighted given in did not have ceiling mounted APCs.

Table 13 summarizes the total boarding and alighting by route for the period studied. This table shows that Route 1 has the highest ridership, followed by Route 3, Route 2, and then Route 4. The FIU route is the newest route in the system, which began service on August 20, 2018, and is the only route not in service during the weekend.

Table 13: Trolley Ridership Summary from 03.28.2019 – 04.10.2019

ROUTE	BOARDING	ALIGHTING	TOTAL
Route 1	11,287	11,259	22,546
Route 2	2,543	2,348	4,891
Route 3	5,339	5,321	10,660
Route 4	1,909	1,820	3,729
TOTAL	**21,703**	**21,333**	**43,036**

EXISTING SYSTEM REVIEW

DORAL TROLLEY SYSTEM (CONTINUED)

Route Efficiency Analysis

Using the route schedules and route lengths, Vehicle Miles Traveled (VMT) were estimated for each route. This calculation was performed by multiplying the estimated daily cycles a trolley vehicle does for a specific route and day multiplied by the route length. The estimate daily VMT was then multiplied by 10 and 2, depending on weekdays and weekends, to obtain the VMTs traveled by each vehicle in each route for a two (2) week period. Each route's VMT in two (2) weeks was aggregate to obtain an estimated total VMT per route. Hence, route efficiency (boarding per VMT) can be calculated to compare each route. **Table 14** shows that Routes 1 and 3 are the most efficient followed by Route 2 and 4 respectively. This proves that even though Route 1 has almost twice the ridership of Route 3, Route 3 is as efficient in moving people as Route 1. Furthermore, if Route 4 achieves the same boarding as Route 2, Route 4 will become slightly more efficient than Route 2.

Table 14: Trolley Route Efficiency from 03.28.2019 – 04.10.2019

ROUTE	BOARDING	TOTAL VMT IN TWO WEEKS	EFFICIENCY (BOARDING PER VMT)
Route 1	11,287	8,580.80	1.32
Route 2	2,543	4,175.00	0.61
Route 3	5,339	4,301.80	1.24
Route 4	1,909	3,800.00	0.50

Table 16: Trolley Assignments from 03.28.2019 – 04.10.2019

ROUTE	BLOCK	THURSDAY 03.28.19	FRIDAY 03.29.19	SATURDAY 03.30.19	SUNDAY 03.31.19	MONDAY 04.01.19	TUESDAY 04.02.19	WEDNESDAY 04.03.19
1	1	DT07	DT07 replaced by DT05	DT16	DT15	DT07 replaced by DT05	DT07 replaced by DT08 replaced by DT07	DT09
	2	DT16	DT16	DT12		DT16	DT16	DT16
	3	DT15	DT15			DT15	DT15	DT15
	4	DT02	DT02			DT02	DT02	DT02
2	1	DT11	DT11	DT14	No Service	DT11	DT11	DT11
	2	DT10	DT10			DT10	DT10	DT10
3	1	DT06	DT06	DT02	No Service	DT06	DT06	DT06
	2	DT12	DT12			DT12	DT12	DT12
4	1	DT04	DT04		No Service	DT04	DT04	DT04
	2	DT14	DT14	DT16		DT14	DT14	DT14

Table 15: Estimated Trolley Vehicle Miles Traveled (VMT)

DAY	ROUTE	BLOCK	APPROXIMATE DAILY CYCLES	ROUTE LENGTH (MILES)	DAILY VMT	VMT IN TWO WEEKS
WEEKDAY	Route 1	1	7.5	24.80	186.00	1,860.00
		2	7.5	24.80	186.00	1,860.00
		3	7.5	24.80	186.00	1,860.00
		4	7.5	24.80	186.00	1,860.00
	Route 2	1	12	16.70	200.40	2,004.00
		2	11	16.70	183.70	1,837.00
	Route 3	1	13	15.70	204.10	2,041.00
		2	12	15.70	188.40	1,884.00
	Route 4	1	13	15.20	197.60	1,976.00
		2	12	15.20	182.40	1,824.00
SATURDAY	Route 1	1	8	24.80	198.40	396.80
		2	7	24.80	173.60	347.20
	Route 2	1	10	16.70	167.00	334.00
	Route 3	1	12	15.70	188.40	376.80
SUNDAY	Route 1	1	8	24.80	198.40	396.80

THURSDAY 04.04.19	FRIDAY 04.05.19	SATURDAY 04.06.19	SUNDAY 04.07.19	MONDAY 04.08.19	TUESDAY 04.09.19	WEDNESDAY 04.10.19
DT05	DT05	DT16	DT01	DT05 replaced by DT08	DT08	DT08
DT16	DT16	DT14		DT16	DT16	DT16
DT15	DT15			DT15	DT15	DT15
DT02	DT02			DT02	DT02	DT02
DT11	DT09	DT13	No Service	DT01 replaced by DT03	DT03 replaced by DT01	DT01
DT10	DT10			DT10	DT10	DT10
DT06	DT06	DT02	No Service	DT06	DT06	DT06
DT12	DT12			DT12	DT12	DT12
DT13	DT13		No Service	DT04	DT13	DT13
DT14	DT14	DT16		DT14	DT14	DT14

EXISTING SYSTEM REVIEW

DORAL TROLLEY SYSTEM (CONTINUED)

Peak Period Analysis

Boarding and alighting data were also obtained per hour for the same two-week period of March 28, 2019 through April 10, 2019. Using this data, average daily boarding and average daily alighting were calculated for each route. The following graphs illustrate the distribution of demand on an average weekday. From these graphs the following conclusions can be made:

ROUTE 1
Blue Route

- Boarding and alighting AM peak hour is between 6:00 and 7:00 AM (commuters)
- Between 9:00 AM and 1:00 PM boardings flatline at around 40 people per hour
- Boarding and Alighting PM peak hour is between 2:00 and 3:00 PM (commuters/students)

ROUTE 2
Yellow Route

- Boarding and alighting AM peak hours are between 6:00 and 9:00 AM (commuters)
- Boarding and alighting PM peak hours are between 4:00 PM and 6:00 PM
- Boarding has a second PM peak between 8:00 and 9:00 PM (commuters)
- Sources of contributing to this second peak is unknown.

ROUTE 3
Green Route

- Boarding and alighting AM peak hour is between 6:00 and 7:00 AM
- Between 9:00 AM and 1:00 PM boardings flatline at around less than 20 people per hour
- Boarding has a second PM peak between 8:00 and 9:00 PM

ROUTE 4
Purple Route

- Boarding and alighting AM peak hour is between 6:00 and 7:00 AM
- Boarding and alighting PM peak hour is between 1:00 PM and 2:00 PM
- Boarding has a second PM peak between 8:00 and 9:00 PM (commuters)
- Sources of contributing to this second peak is unknown.

Other observations made include:

- Routes 1 and 3 are similar in that they demonstrate typical directional flow behavior – imbalanced AM and PM peaks – providing two-way service may balance the AM and PM demands
- Existing headways for Routes 1 and 3 may be insufficient during peak demand
- Routes 2 and 4 have more balanced demand throughout the day but also have low overall ridership demand

Figure 10: Route 1 Average Weekday Boarding and Alighting (03.28.2019 – 04.10.2019)

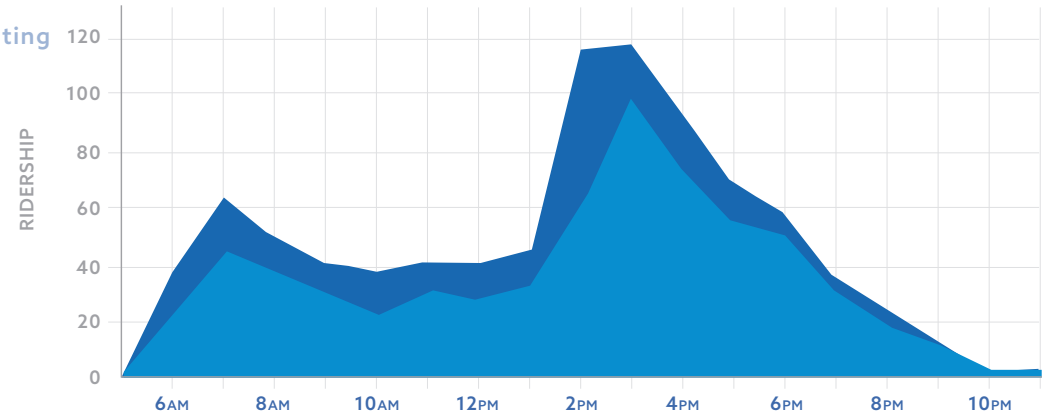


Figure 11: Route 2 Average Weekday Boarding and Alighting (03.28.2019 – 04.10.2019)

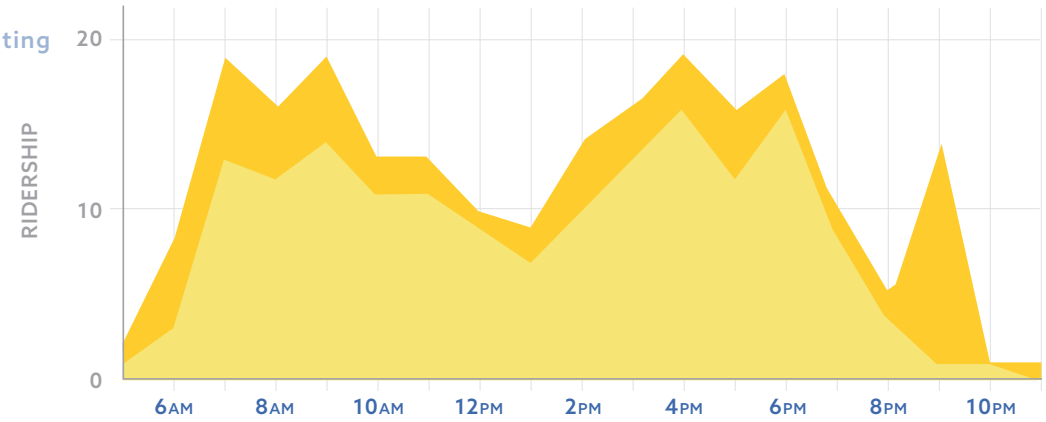


Figure 12: Route 3 Average Weekday Boarding and Alighting (03.28.2019 – 04.10.2019)

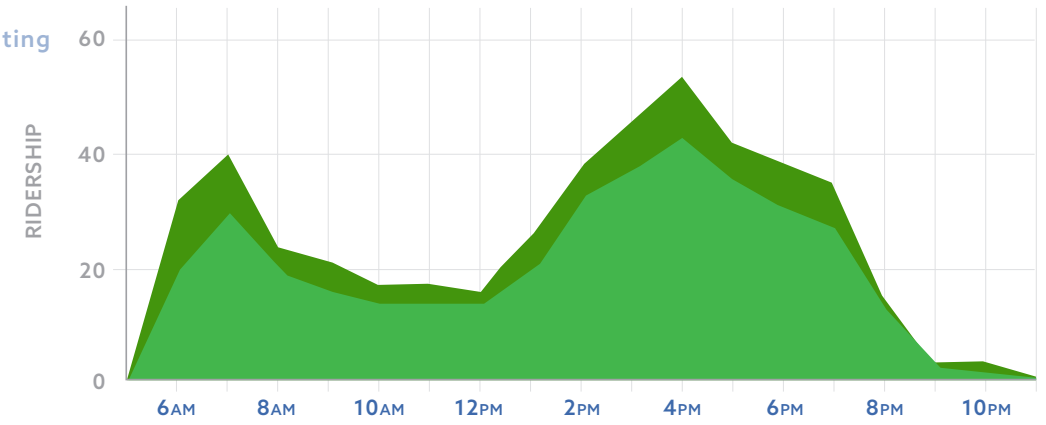
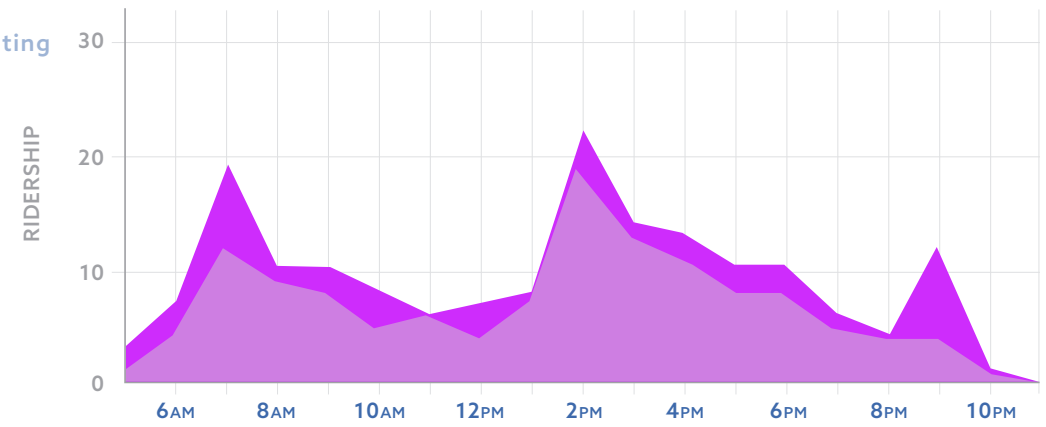


Figure 13: Route 4 Average Weekday Boarding and Alighting (03.28.2019 – 04.10.2019)



EXISTING SYSTEM REVIEW

DORAL TROLLEY SYSTEM (CONTINUED)

Stop Demand Analysis

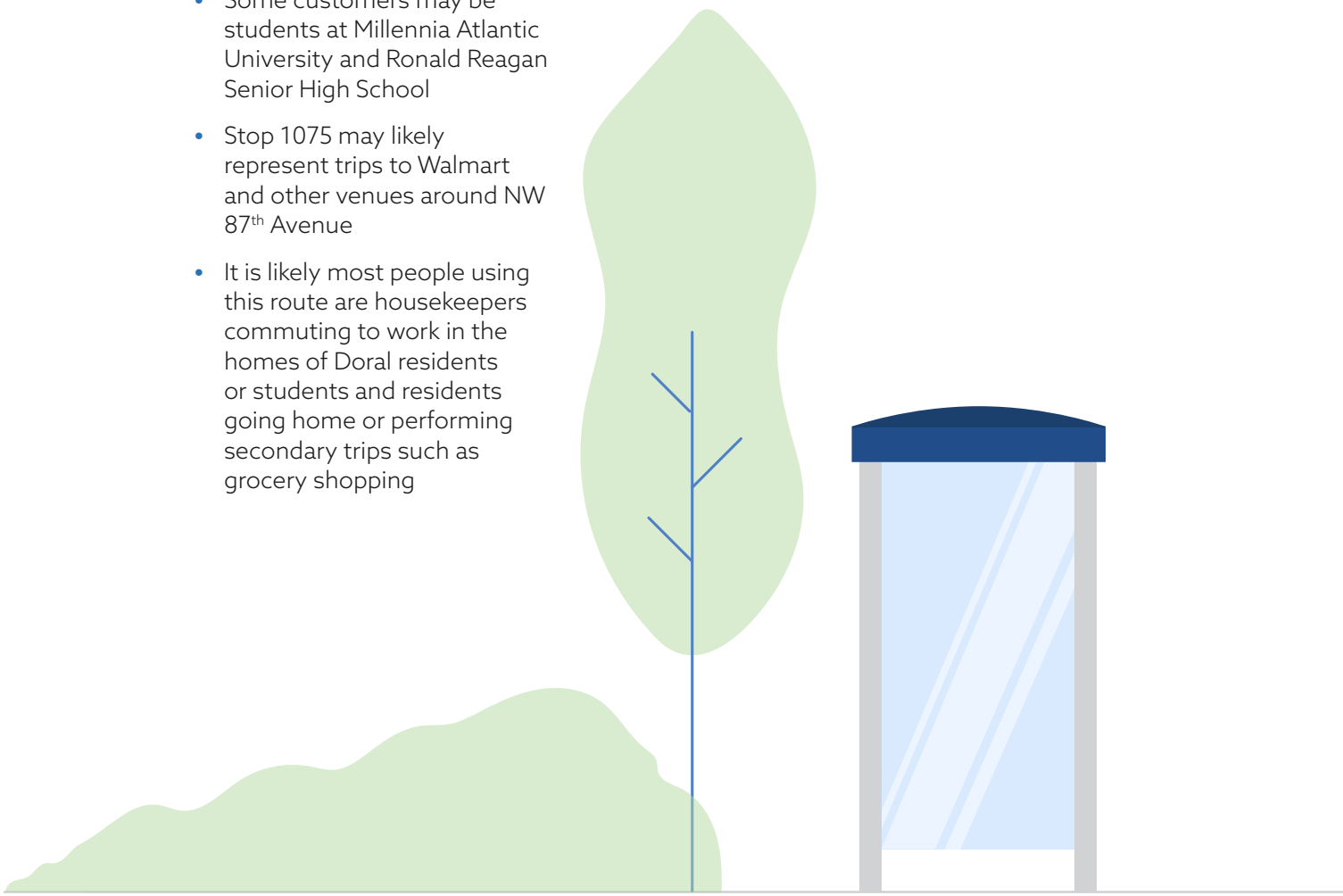
Table 17 through Table 24 list the stops with ten (10) highest and ten (10) lowest total ridership for the period of 03.28.19 through 04.10.19. **Figure 14 through Figure 21** illustrate the average boarding and alighting by stop and by route. These tables and figures lead to the following conclusions:

ROUTE 1
Blue Route

- The main customers of Route 1 are transferring from Metrobus at Dolphin Mall or Miami International Mall
- Most high boarding stops are located in the northern residential area of the City
- Some customers may be students at Millennia Atlantic University and Ronald Reagan Senior High School
- Stop 1075 may likely represent trips to Walmart and other venues around NW 87th Avenue
- It is likely most people using this route are housekeepers commuting to work in the homes of Doral residents or students and residents going home or performing secondary trips such as grocery shopping

ROUTE 2
Yellow Route

- Most trips are focused along NW 41st Street/NW 36th Street and NW 87th Avenue
- Most likely users are workers going from Downtown Doral to the multiple commercial and institutional land uses along Doral Boulevard

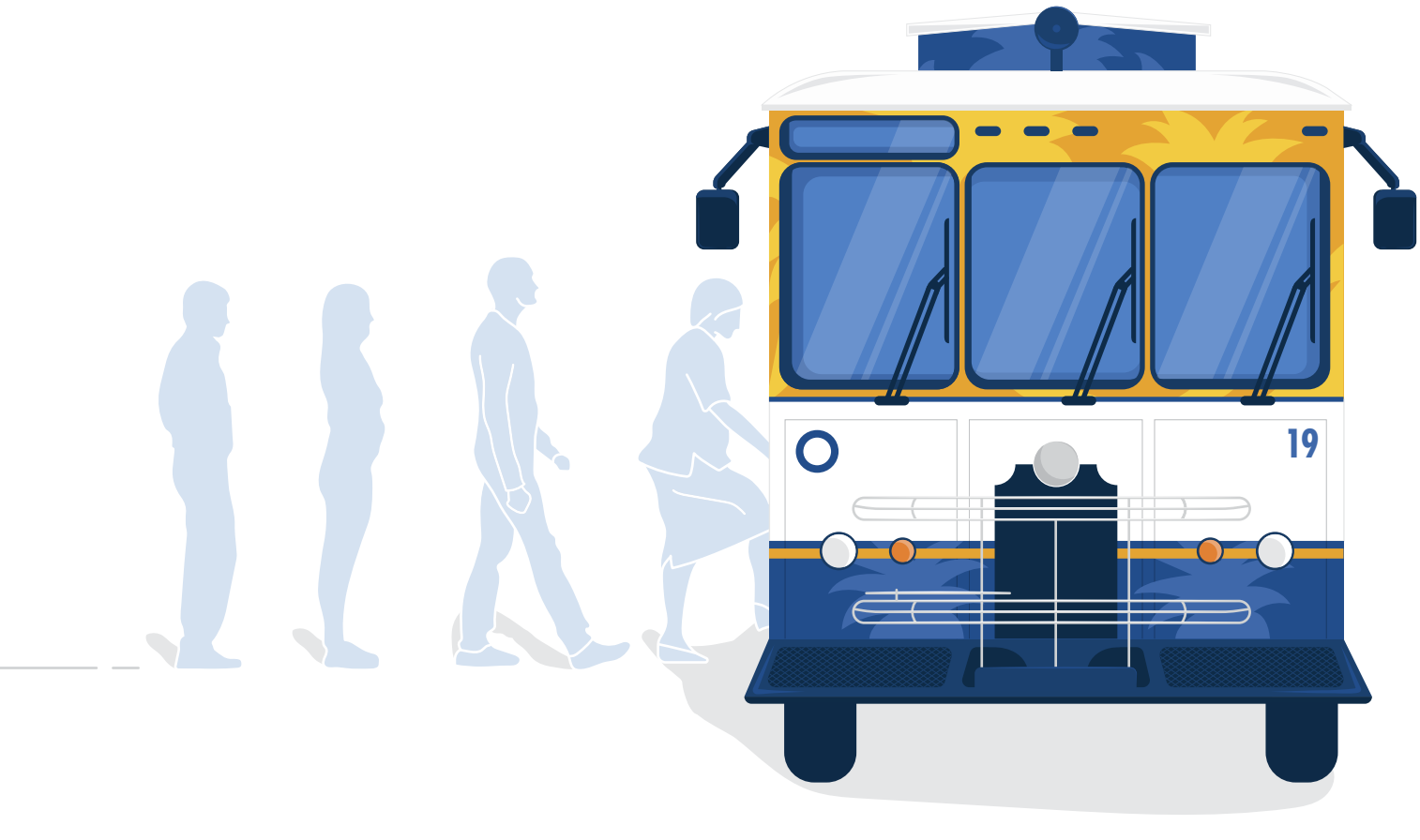


ROUTE 3
Green Route

- Ridership is highly concentrated around schools and residential areas
- Palmetto Metrorail Station is a high demand stop for Route 3, more than it is for Route 2, which confirms field observations of most customers skipping the Route 2 trolley at the station to wait instead for the Route 3 trolley
- Most likely customers are commuters in the morning and students in the afternoon

ROUTE 4
Purple Route

- Most of the ridership demand is concentrated between NW 12th Street and NW 90th Street
- Surprisingly, the FIU Modesto A. Maidique campus and the FIU Engineering Center had between 80-90 boarding and alightning, ranking 15th or less, hence, they do not appear in **Table 24** which only shows the top ten (10) stops by ridership



EXISTING SYSTEM REVIEW

DORAL TROLLEY SYSTEM (CONTINUED)

Table 17: Route 1 Stops with Highest Total Ridership between 03.28.2019 – 04.10.2019

STOP NO.	DESCRIPTION	BOARDING	ALIGHTING	TOTAL
1079	Dolphin Mall	769	678	1,447
1006	Miami Int'l Mall (Mattress Firm)	409	508	917
1017	Millennia Atlantic University	405	429	834
1075	Red Lobster	331	429	760
1058	Bella Plaza (Sedano's) and transfer to Route 3	358	309	667
1042	Islands of Doral II	423	243	666
1081	Camden Doral Villas	214	404	618
1053	Brisas of Doral	395	221	616
1041	Ronald Reagan High School and transfer to Route 3	320	247	567
1038	Ibis Villas	307	207	514

Table 18: Route 1 Stops with Lowest Total Ridership between 03.28.2019 – 04.10.2019

STOP NO.	DESCRIPTION	BOARDING	ALIGHTING	TOTAL
1067	Miami-Dade Fire Rescue	8	11	19
1083	Hawksnest Doral	9	10	19
1057	Costa Linda	12	5	17
1072	Doral Central Park and transfers to DTPW Routes 87 and 95	10	7	17
1008	Bed Bath & Beyond Plaza	7	5	12
1039	NW 109th Ave.	6	6	12
1025	Doral Terrace	2	9	11
1011	Doral Academy High School	9	0	9
1020	Doral Oaks	3	1	4
1022	John I Smith K-8 Center	2	0	2

Table 19: Route 2 Stops with Highest Total Ridership between 03.28.2019 – 04.10.2019

STOP NO.	DESCRIPTION	BOARDING	ALIGHTING	TOTAL
2062	Brinks Doral	559	371	930
2031	San Ignacio College and transfer to Route 3 and DTPW Route 36B	141	78	219
2029	The Imagination Factory and transfer to Route 3 and DTPW Route 36B	132	62	194
2017	Tony Roma's and transfers to Route 1, DTPW Routes 87, and 95	45	90	135
2027	Miami-Dade College West and transfer to DTPW Route 36B	59	71	130
2033	Costa del Sol and transfer to Route 3 and DTPW Route 36B	66	62	128
2035	9690 Plaza (Einstein Bagels) and transfer to Route 1 and DTPW Route 36B	86	40	126
2008	Doral Gardens II and transfers to DTPW Routes 36 and 132	84	38	122
2056	Doral 79 Shoppes	50	72	122
2028	Doral Shops Plaza	66	54	120

Table 20: Route 2 Stops with Lowest Total Ridership between 03.28.2019 – 04.10.2019

STOP NO.	DESCRIPTION	BOARDING	ALIGHTING	TOTAL
2021	Costa del Sol (Opp. Veterans Park) and transfer to Route 1	6	21	27
2050	Holiday Inn / 8484 Commercial Plaza	9	18	27
2002	5680 NW 87th Ave.	2	23	25
2025	11369 - 11373 NW 34th St. and transfer to DTPW Route 36B	9	16	25
2030	10775 NW 41st St. and transfer to Route 3 and DTPW Route 36B	7	14	21
2019	Southern Command	6	11	17
2036	Univision and transfer to Route 1 and DTPW Route 36B	9	7	16
2053	Gran Vista at Doral	5	11	16
2018	Miami Herald	7	6	13
2037	Federal Reserve and transfer to Route 1 and DTPW Route 36B	8	3	11

EXISTING SYSTEM REVIEW

DORAL TROLLEY SYSTEM (CONTINUED)

Table 21: Route 3 Stops with Highest Total Ridership between 03.28.2019 – 04.10.2019

STOP NO.	DESCRIPTION	BOARDING	ALIGHTING	TOTAL
3000	Palmetto Metrorail Station and transfers to Route 2, DTPW Metrorail Green Line and Route 87	1838	995	2833
3016	Palm Springs Mile Shopping Center	222	187	409
3031	Ibis Villas	160	180	340
3033	Ronald Reagan High School	131	202	333
3020	Trails & Tails Park and transfer to Route 1	143	188	331
3037	Antilles	91	236	327
3004	CVS (NW 107th Ave. South of NW 74th St.)	96	150	246
3025	Doral Isles	79	167	246
3041	NW 74th St. West of NW 97th Ave.	22	223	245
3035	Islands of Doral II	163	75	238

Table 22: Route 3 Stops with Lowest Total Ridership between 03.28.2019 – 04.10.2019

STOP NO.	DESCRIPTION	BOARDING	ALIGHTING	TOTAL
3011	Doral Place	12	46	58
3045	NW 66th St. and NW 107th Ave/	42	8	50
3015	Wells Fargo and transfers to Route 2 and DTPW route 36B	41	5	46
3034	Ronald Reagan High School and transfer to Route 1	41	5	46
3032	NW 109th Ave.	24	18	42
3043	Vintage Palace	23	18	41
3047	Neieovita Doral	35	4	39
3003	Doral Commons Commercial	2	34	36
3010	NW 102nd Ave. and NW 52nd St., Doral Cove, and transfer to Route 1	29	7	36
3040	NW 74th St. East of NW 102nd Ave.	15	2	17

Table 23: Route 4 Stops with Highest Total Ridership between 03.28.2019 – 04.10.2019

STOP NO.	DESCRIPTION	BOARDING	ALIGHTING	TOTAL
4024	Antilles Island of Doral	98	77	175
4003	NW 107th Ave. North of NW 12th St.	121	36	157
4026	Coronado at Doral	77	77	154
4048	MBMG Medical Centers / Office Building at NW 14th St.	28	114	142
4047	Dade County Federal Credit Union	31	103	134
4022	NW 107th Ave. North of NW 74th St.	79	51	130
4041	Camden Doral Apartments	59	64	123
4039	Della Plaza	81	41	122
4014	NW 107th Ave. North of NW 41st St.	28	73	101
4001	109 Tower	72	28	100

Table 24: Route 4 Stops with Lowest Total Ridership between 03.28.2019 – 04.10.2019

STOP NO.	DESCRIPTION	BOARDING	ALIGHTING	TOTAL
4006	Bed Bath & Beyond Plaza	12	9	21
4017	NW 107th Ave. South of NW 58th St.	13	6	19
4021	NW 107th Ave. South of NW 74th St	8	10	18
4009	NW 107th Ave. North of NW 25th St.	7	3	10
4019	NW 107th Ave. South of NW 66th St	6	4	10
4044	Regions Bank	2	6	8
4025	NW 107th Ave. South of NW 86th St.	2	5	7
4007	2001 NW 107th Ave. Office Building	2	1	3
4038	NW 107th Ave. North of NW 58th St.	2	1	3
4000	FIU Modesto A. Maidique campus	0	0	0

Figure 14: City of Doral Trolley Route 1 Boarding (03.28.2019 – 04.10.2019)

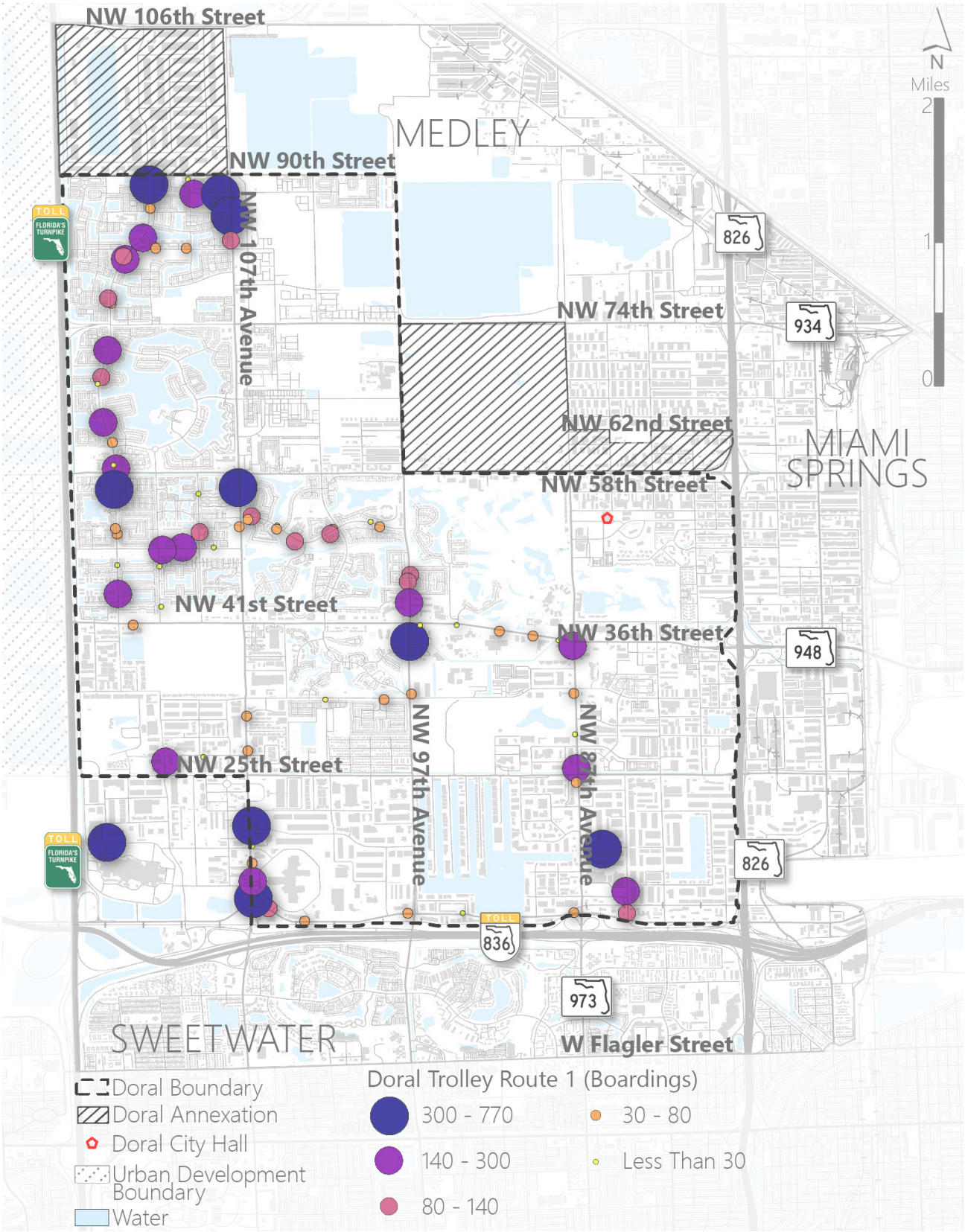


Figure 15: City of Doral Trolley Route 1 Alighting (03.28.2019 – 04.10.2019)

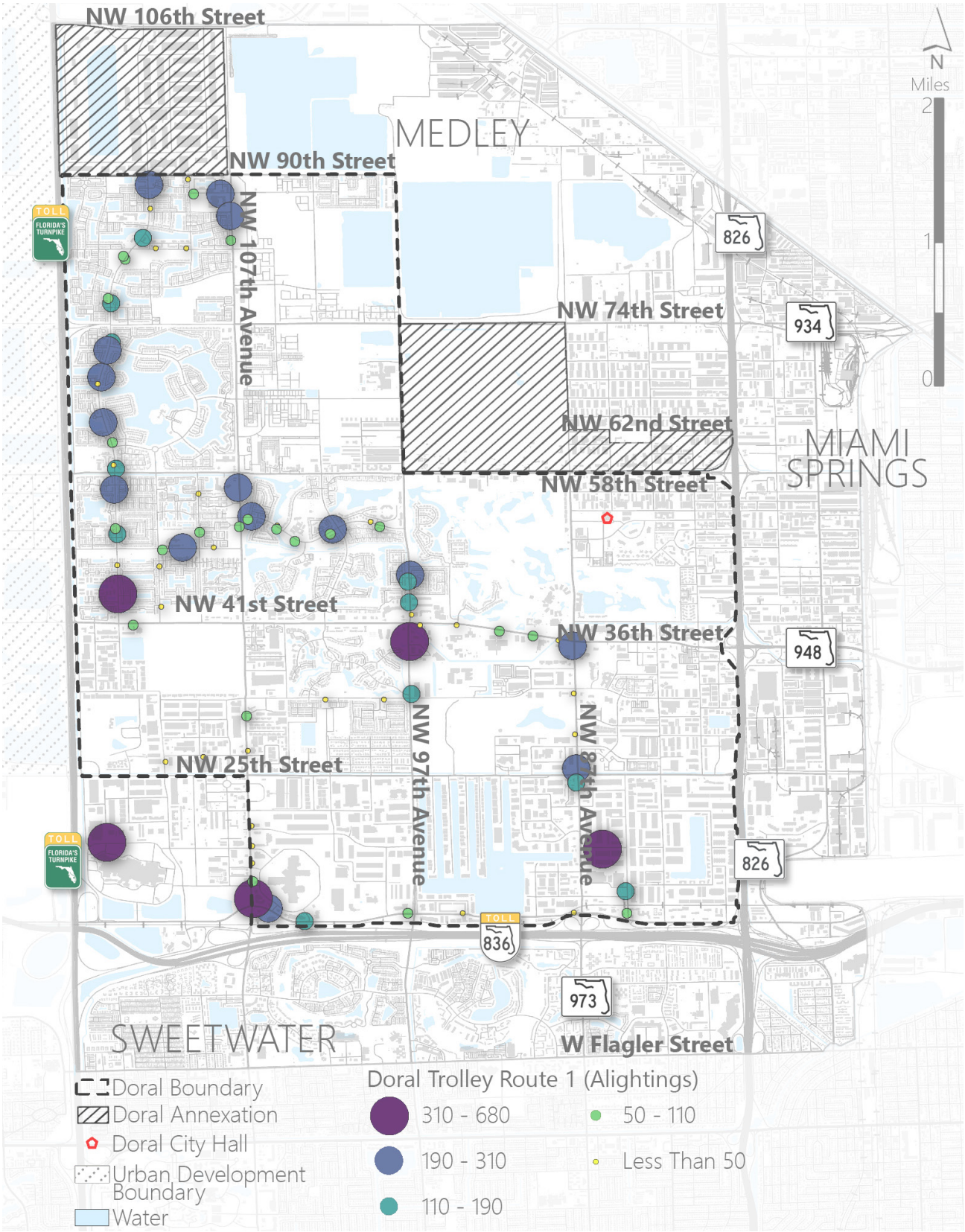


Figure 16: City of Doral Trolley Route 2 Boarding (03.28.2019 – 04.10.2019)

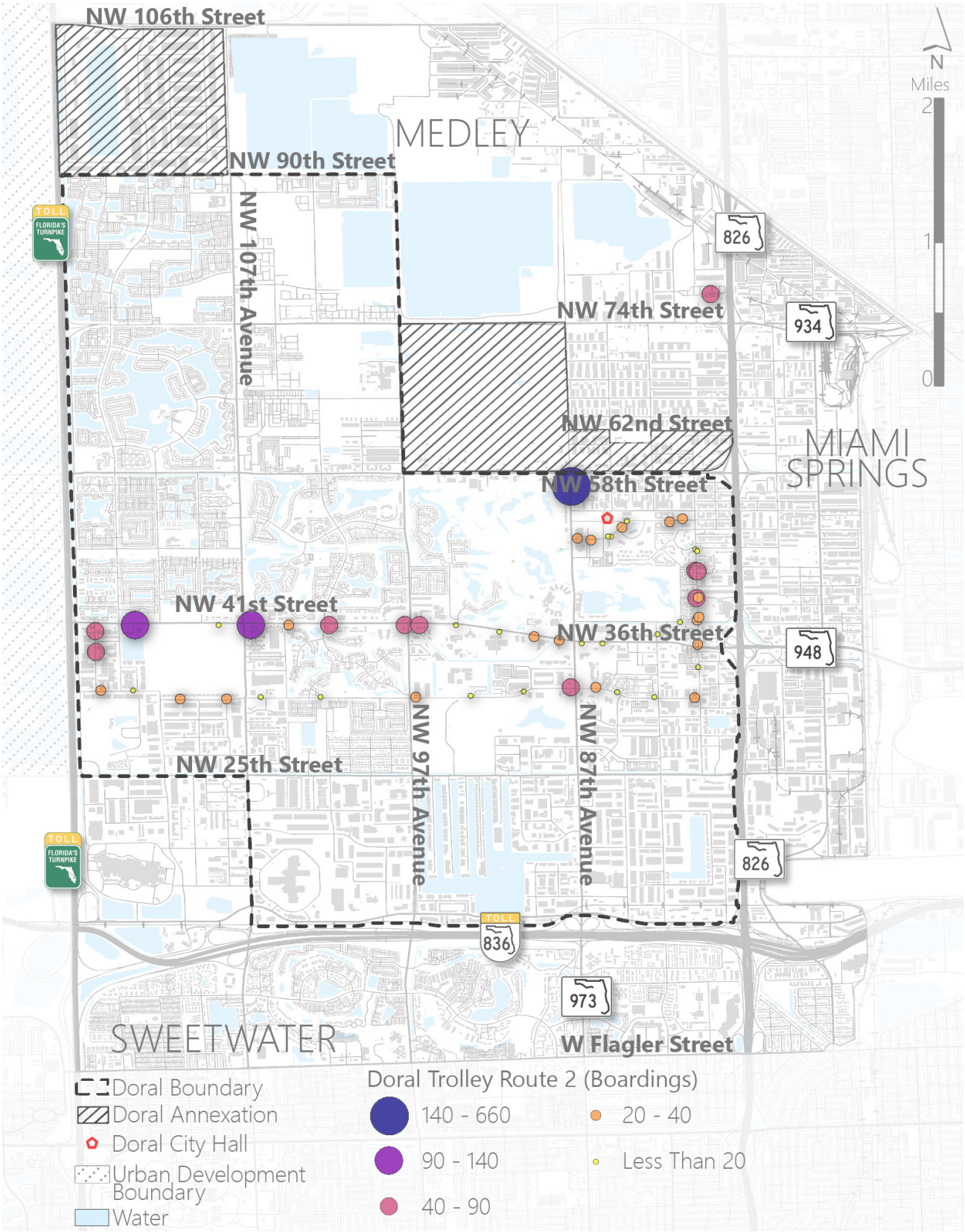


Figure 17: City of Doral Trolley Route 2 Alighting (03.28.2019 – 04.10.2019)

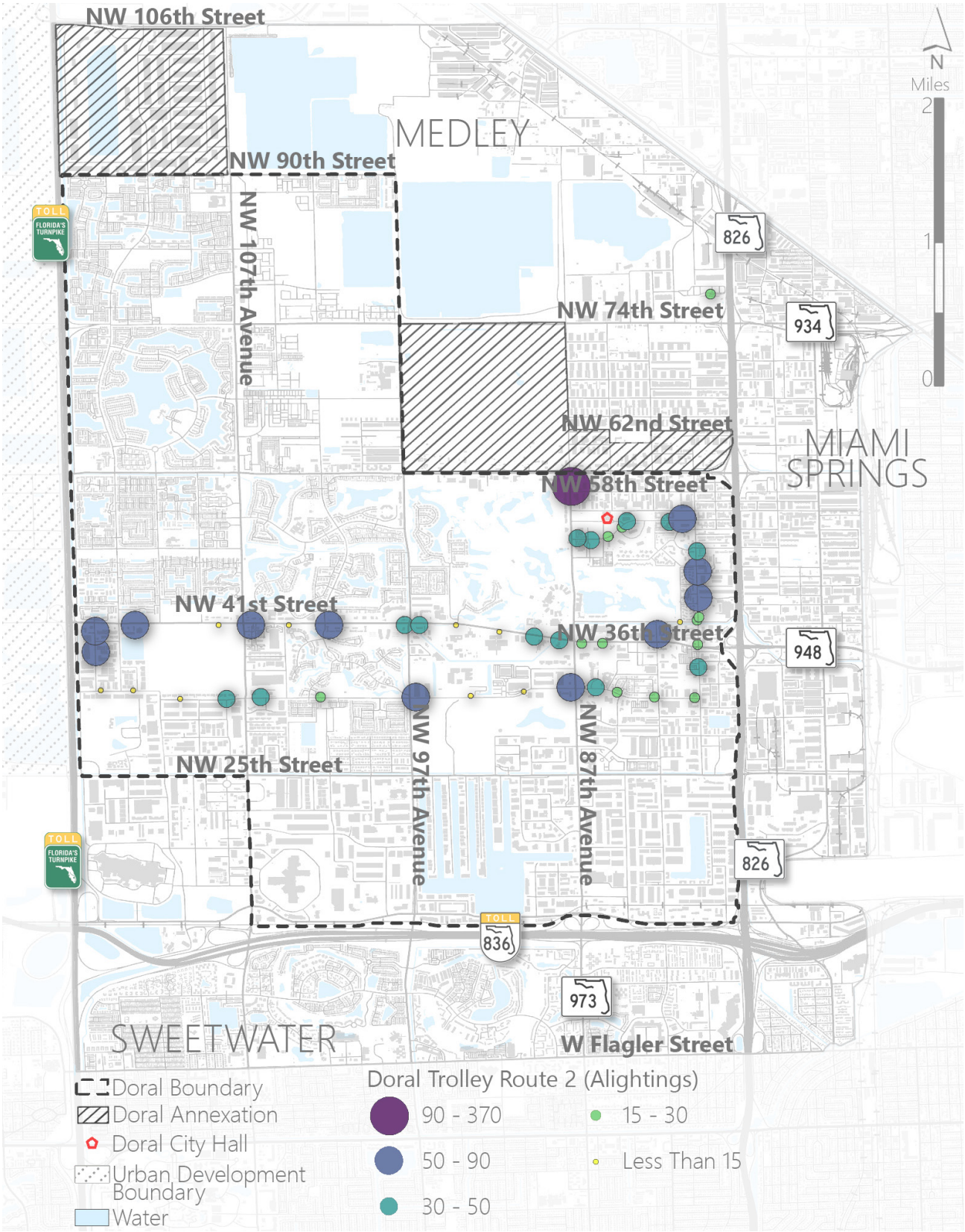


Figure 18: City of Doral Trolley Route 3 Boarding (03.28.2019 – 04.10.2019)

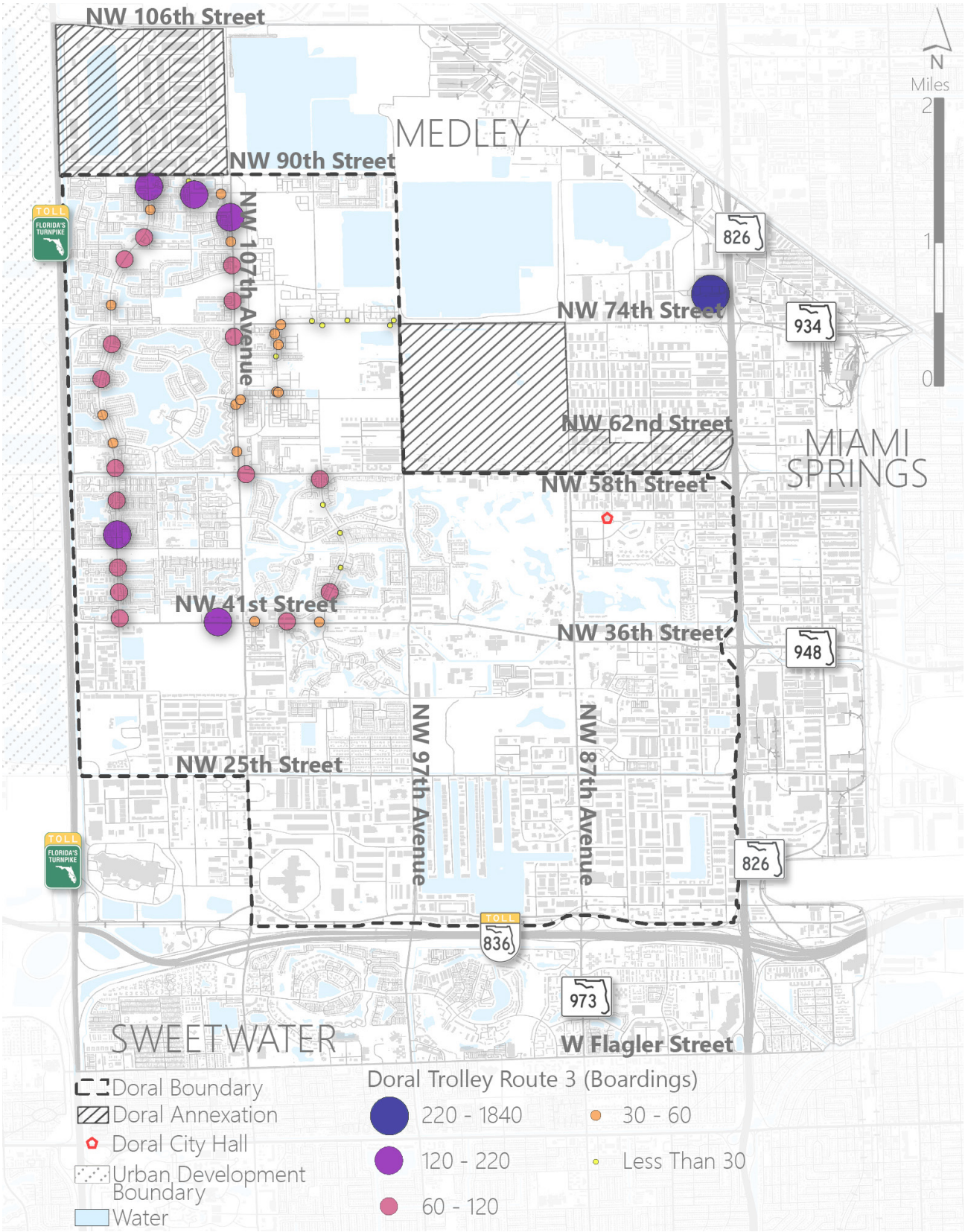


Figure 19: City of Doral Trolley Route 3 Alighting (03.28.2019 – 04.10.2019)

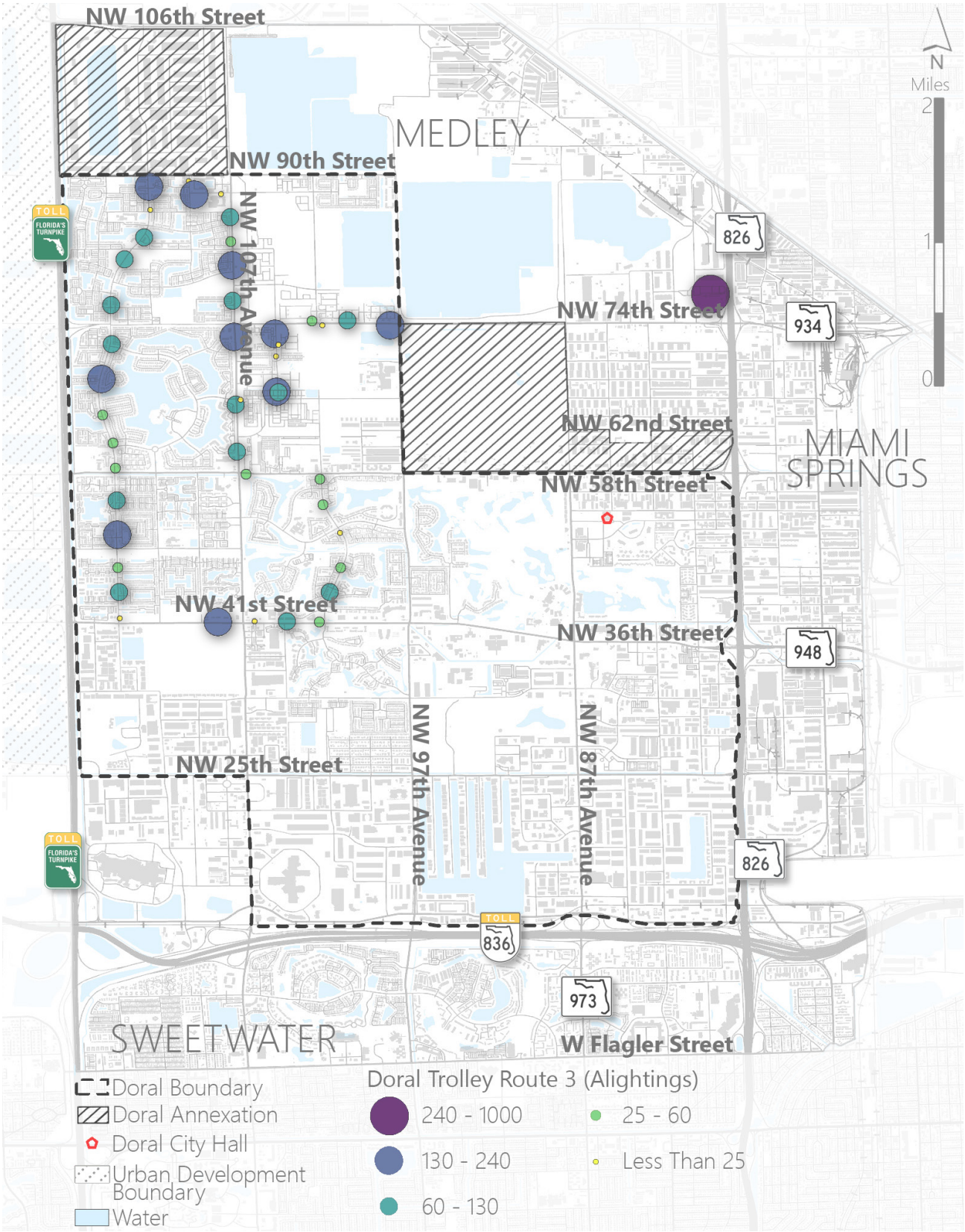


Figure 20: City of Doral Trolley Route 4 Boarding (03.28.2019 – 04.10.2019)

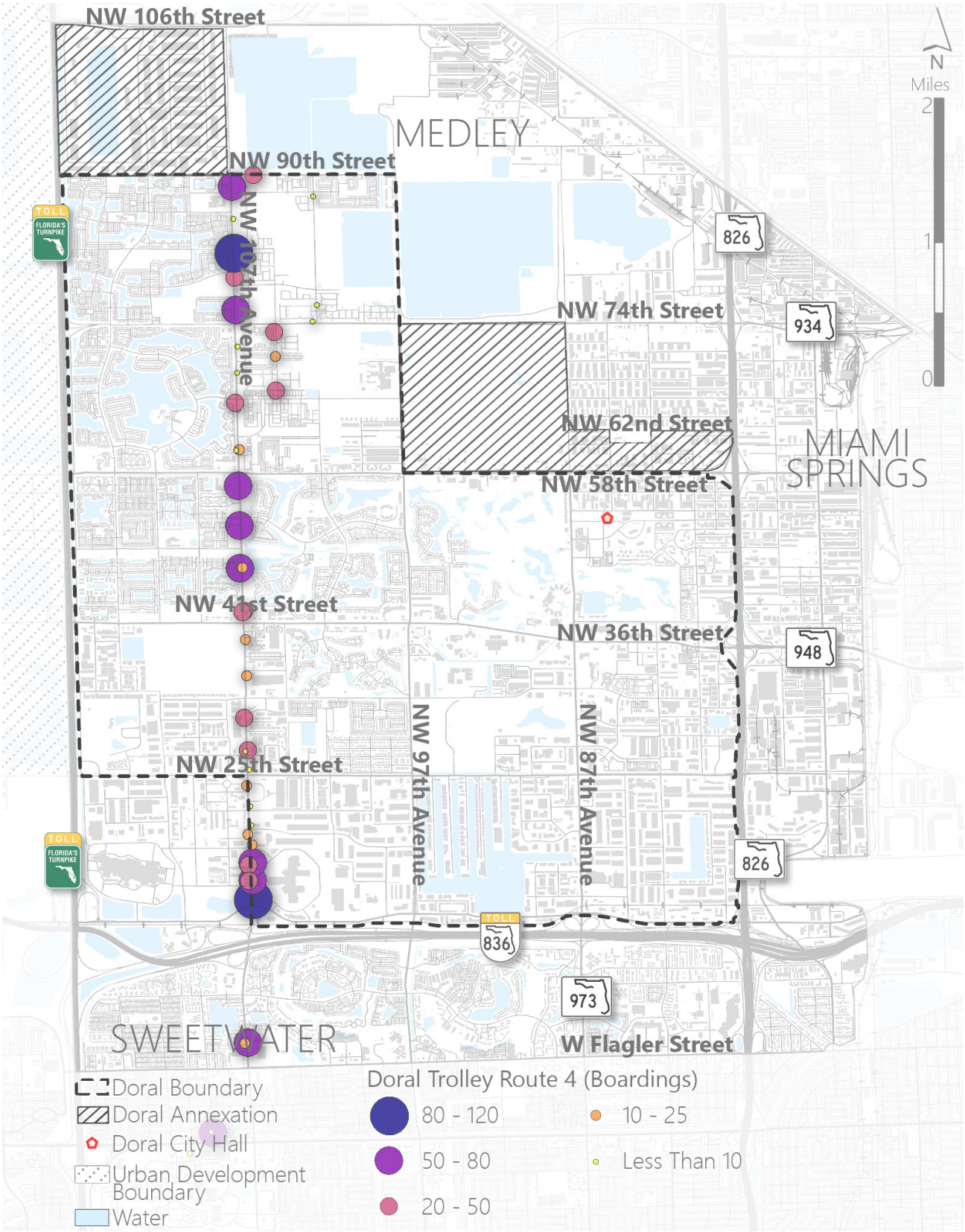
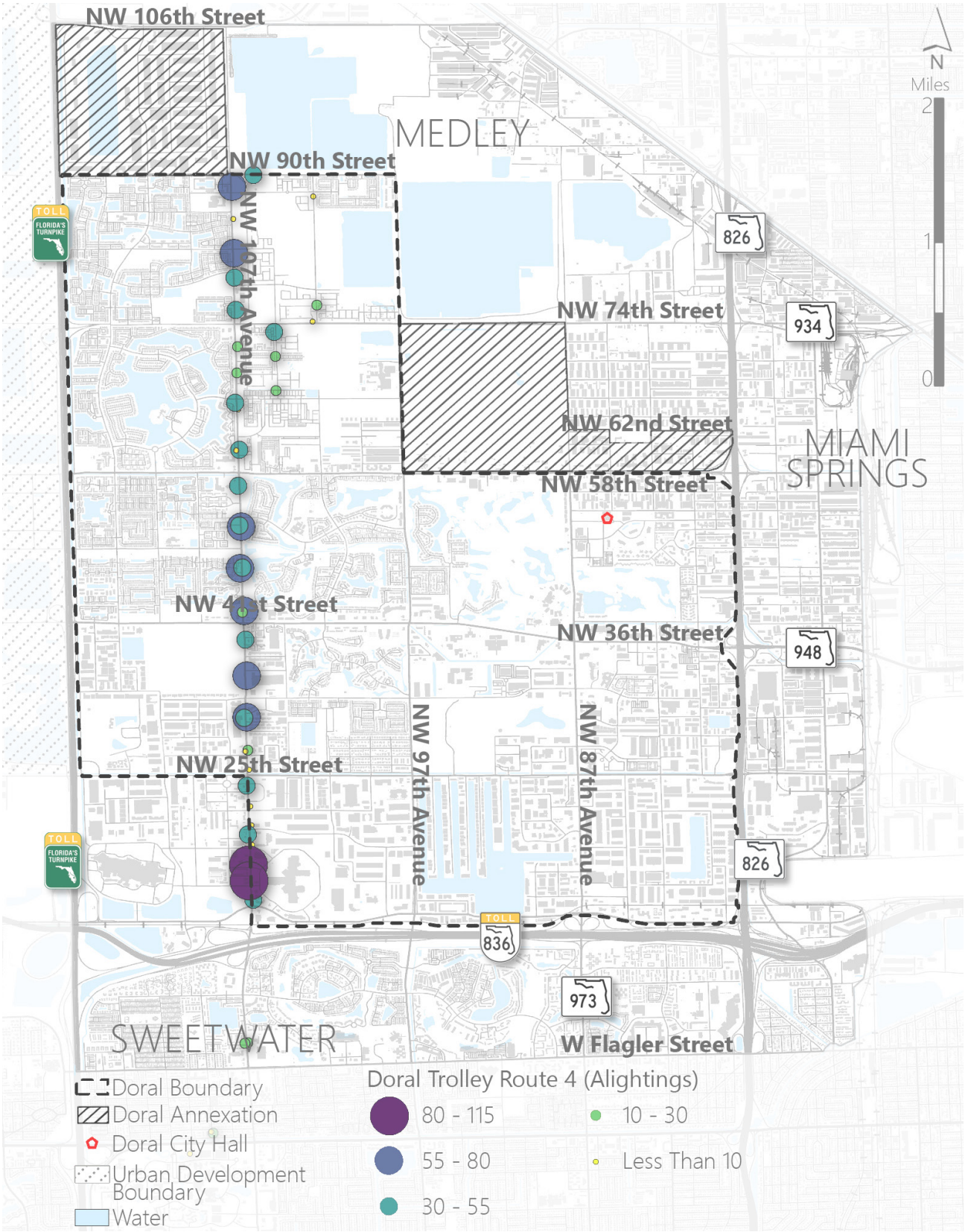


Figure 21: City of Doral Trolley Route 4 Alighting (03.28.2019 – 04.10.2019)



EXISTING SYSTEM REVIEW

EXISTING BUS STOP INVENTORY

The existing DTS has a total of 218 route-specific bus stops, 15 of which are shared between all routes. **Appendix B** includes a table listing different characteristics of each of these bus stops. All stops have a sign demarking the stop location. The standard sign is depicted in **Figure 22**. Most signs are installed using Steel Flanged Channel Posts, as detailed in **Figure 23**. Stops without shelters lack displays of the DTS system map and schedule. Stops with shelters only display the existing DTS routes map (see **Figure 24**).

Figure 22: City of Doral Trolley Stop Sign

Figure 23: Steel Flanged Channel Post Details

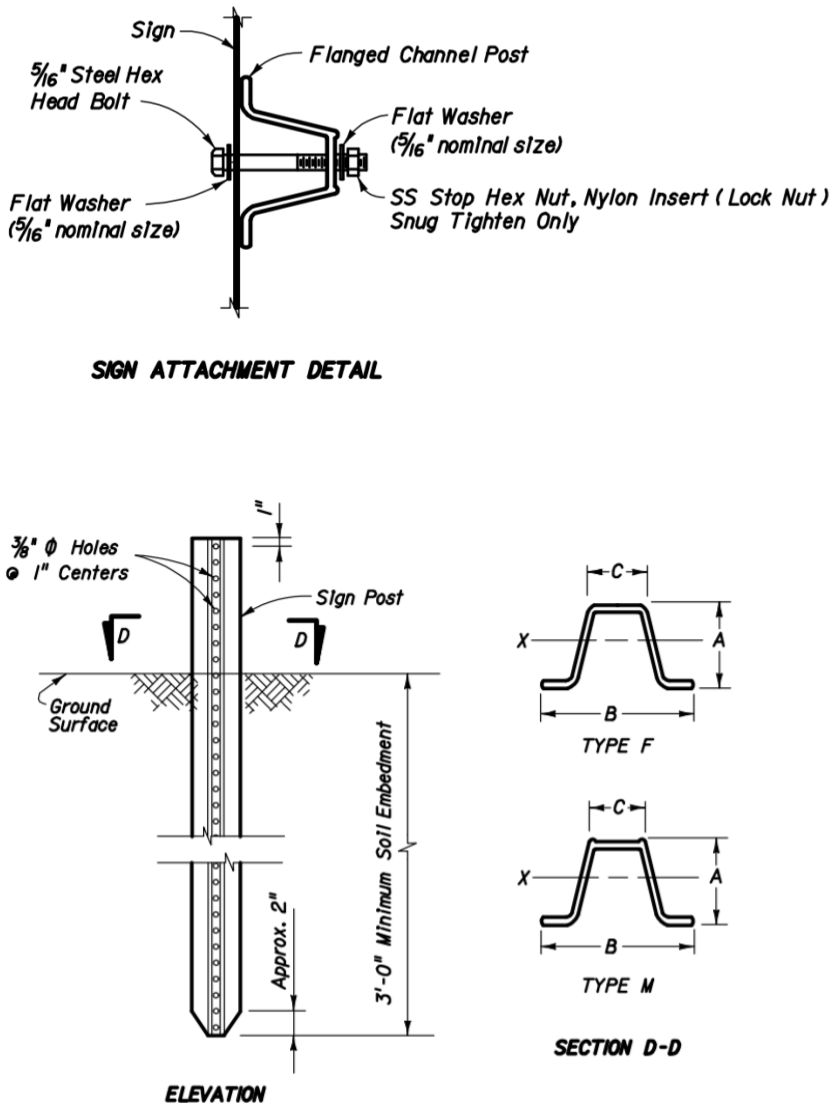
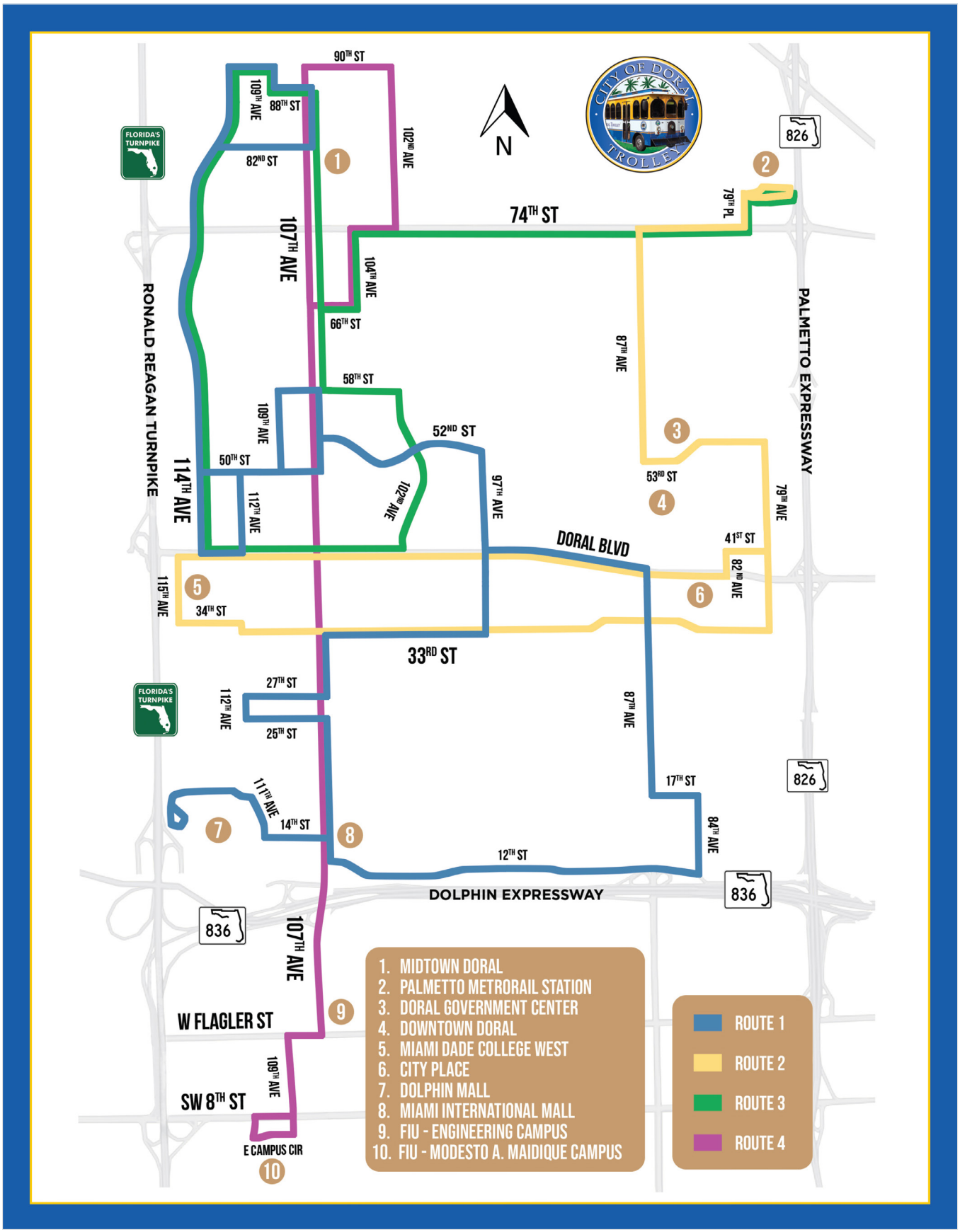


Figure 24: Doral Bus Shelter System Map



EXISTING SYSTEM REVIEW

EXISTING BUS STOP INVENTORY

Direction
Forty-two (42) of the stops are on streets going eastbound, seventy-seven (77) of them are on streets going northbound, fifty-eight (58) of them are on streets going southbound, and forty-one (41) of them are on streets going westbound.

Location
Most of the stops fifty-eight (58) are on the farside of major intersections and on the farside of minor intersections fifty-seven (57). Forty-five (45) of the stops are midblock, nineteen (19) of them are on the nearside of the streets, and thirty-six (36) of them are on the near side of minor intersections. Three (3) of the stops are in parking lots and bus-only lanes.

Number of Lanes
Eighty-two (82) of the bus stops are located on four-lane streets. For two (2) of the stops at the Palmetto Metrorail Station, a minimum of one-lane is present due to the presence of a bus-only lane. Thirty-nine (39) of the stops are on two-lane streets, six (6) are on three-lane streets, thirty-three (33) are on five-lane streets, forty-two (42) are on six-lane streets, twelve (12) on seven-lane streets, and two (2) are on eight-lane streets.

Type of Adjacent Lane
Two hundred and twelve (212) of the stops are adjacent to through lanes. Four (4) are adjacent to right-turn-only lanes and only one (1) is adjacent to a through right-turn lane.

Bicycle Lane
Twenty (20) of the stops are adjacent to bike lanes, one hundred and ninety-eight (198) of them are not. The stops adjacent to bike lanes are in newer, modernized areas of Doral.

Vehicular Parking
Two hundred and eight (208) of the stops are not near any sort of on-street parking. The stop located at the FIU Station is adjacent to the parking garage. While parking is available at this location, visitor parking is limited and metered, as the university garages are for students and faculty. The two (2) stops at the Palmetto Metrorail Station are also near large parking lots. Seven (7) of the stops, mostly in the urban areas of Doral, have on-street parking along the curb.

Curb and Gutter
A grand majority of stops, the two hundred and one (201), have a curb and gutter. Sixteen (16) of the spots without a curb and gutter are on grass curbs where sidewalks are not present or have a landing pad instead. One (1) stop is tentative due to construction in the area, therefore, it is unknown whether there will be both a curb and gutter.

Bus Bay or Curbside
Twelve (12) of the stops are in bus bays, while two hundred and five (205) of them are curbside stops. One (1) of the stops is tentative due to construction in the area, therefore, it is unknown whether the stop will have a bus bay or be curbside.

Adjacent DTPW Bus Stop
Sixty-six (66) of the stops also serve as DTPW bus stops and one hundred and fifty-one (151) of them do not. The sole tentative stop is due to construction in the area, preventing from determining if the stop will also serve as a DTPW stop.

Adjacent Canal/Water Body
Two hundred and two (202) of the stops are not adjacent to any canals or bodies of water, but sixteen (16) of the stops are. Several of these stops are near gated communities with lakes, for example.

Type of Stop
One hundred and sixty-five (165) of the stops are lollipop only stops, while fifty-two (52) of them have shelters. In addition, the tentative stop is undetermined.

Landing Pad
There is an almost even divide between spots with and without landing pads. One hundred and eight (108) stops have landing pads and 109 of them do not. There is one tentative spot that is under construction.

Sidewalk Width
While most of the stops, ninety-five (95) are on sidewalks that are eight-feet wide, the sidewalks range significantly. Three (3) of the stops are on five-foot sidewalks, twelve (12) of them are on six-foot sidewalks, twenty-three (23) of them are on seven-foot sidewalks, two (2) of them are on nine-foot sidewalks, twenty-eight (28) of them are on 10-foot sidewalks, one (1) of them is on an 11-foot sidewalk, eight (8) of them are on a 12-foot sidewalks, two (2) of them are on a 13-foot sidewalks, three (3) of them are on a 14-foot sidewalks, fourteen (14) of them are on a 15-foot sidewalks, five (5) of them are on a 16-foot sidewalks, eight (8) of them are on a 17-foot sidewalks, and three (3) of them are on an 18-foot sidewalks. In addition, the width of the sidewalk is not measurable via Google Earth on three (3) of the stops. Seven (7) of the stops do not have a sidewalk. Additionally, the tentative stop is not currently on a sidewalk.

Detectable Warning Surface
Twenty-one (21) of the stops did have detectable warning surfaces and one hundred and ninety-six (196) of them did not. The one (1) tentative stop does not have a sidewalk yet.

Bench
One hundred and forty-seven (147) of the stops have a bench and seventy (70) of them do not. The tentative stop there is undetermined.

Trash Receptacle
Ninety-five (95) of the stops have trash receptacles and one hundred and twenty-two (122) of them do not. If constructed, the tentative stop is likely to have a trash receptacle.

Bicycle Parking
Five (5) of the stops have bicycle parking and two hundred and twelve (212) of the stops do not. The tentative stop amenities have yet to be determined by the City.

Nearby Lighting
One hundred and thirty-six (136) of the stops do have nearby lighting, however, eighty-two (82) of the stops do not have nearby lighting. The stops without lighting are in areas that are not very busy (e.g., dense residential areas).

EXISTING SYSTEM REVIEW

FIELD VISIT

Three (3) field visits were conducted based on coordination with the City of Doral. The first field visit, on Wednesday, April 10, 2019, occurred from 6:00 AM to 10:00 AM. The second field visit occurred from 3:30 PM to 5:00 PM on Friday, April 13, 2019. The last field visit occurred Monday, April 16, 2019 from 2:20 PM to 4:00 PM. All visits assessed trolley vehicle and stop conditions as well as passenger and driver behaviors. In particular, the following stops were visited due to their recorded high ridership, and because they are located at/near schools (given Trolley drivers commented on issues with student riders) or at major commercial/high activity centers.

Stops 1006/4003 and 1007/4004 at International Mall

- Served by Routes 1 and 4
- Provide transfers to DTPW Routes 7, 36, 71, 137, 238, and 338
- High ridership

Stops 1010 and 1011 at Doral Academy Preparatory

- Served by Route 1
- Reported issues with student behavior

Stops 1040/3033 and 1041/3034 at Ronald Reagan Senior High

- Served by Routes 1 and 3
- Reported issues with student behavior

Stop 2001/3000 at the Palmetto Metrorail Station

- Served by Routes 2 and 3
- Reported issues with trolley drivers not waiting for passengers or coordinating service with the arrival/departure of Metrorail trains
- High ridership

Stops 1076 and 1077 at the Walmart/Sam's Club Commercial Center

- Served by Route 1
- Reported complaints regarding lack of lighting
- Major grocery store destination

Stop 2050 at Doral CityPlace

- Served by Route 2
- Newest large commercial and residential development in the City
- Major leisure activity destination

Stops 2003, 2006, 2058, and 2061 at Downtown Doral

- Served by Route 2
- Major employment and leisure activity destination

WEDNESDAY, APRIL 10, 2019, FROM 6:00 AM TO 10:00 AM
During this field visit the following observations were made:

- Stop 2001/3000 at the Palmetto Metrorail Station
  - Trolley drivers were seen waiting at the station parking lot for the Metrorail train to arrive and the bus stops to saturate with commuters
  - Wait periods lasted approximately 20 minutes
  - 23 passengers were counted at 6:30 AM, with most riders taking Route 3
- Bus benches at all stops are metal with blue epoxy cover
- All stops have trash receptacles in clean and good condition
- Most stops have the ADA required 5 ft. by 8 ft. unobstructed landing pad for wheelchair access to the trolley
- Stops without shelters do not have route maps or schedules on display
- Some students were observed leaving the school early in morning – a potential indication of truancy, of which trolley drivers have no enforcement authority
  - This may represent an opportunity for the City to work with police and appropriate school staff to implement educational and enforcement strategies
- Bus shelters have no interior lighting
- Most stops depended on roadway lighting or surrounding buildings
- Stop 1011 at Doral Academy Preparatory is adjacent to a freight distributor (Carisam-Samiel Meisel) which has limited in-site capacity for loading tractor-trailer trucks, hence, trucks line up on the Double Left-Turn Lane for freight pickup in the mornings and afternoons
  - Five (5) tractor trailer trucks were counted occupying the center lane during this visit with three (3) others existing the facility
  - Truck drivers idle their trucks and dismount to communicate with the operators and gatekeepers of the loading facility
  - Trucks exiting the facility were mounting the raised curbed and damaging the landscaping located on the southside swale of NW 27th Street
- Trolley exit, ADA, and Title VI signs were clearly displayed
- Lighting within the trolley vehicles was poor
- Ceiling air conditioning units within the trolley vehicles had condensation on the bottom surface which lead to water dripping on riders
- Wooden benches within the trolley vehicles are un-comfortable for long rides

EXISTING SYSTEM REVIEW

FIELD VISIT (CONTINUED)

WEDNESDAY, APRIL 10, 2019, FROM 6:00 AM TO 10:00 AM (Continued)

- Hand railings, wheelchair ramps, and wheelchair restrains within the trolley vehicles were observed to be in good condition
- LED display designation signs were operational, but annunciators were not functioning
- TSO Doral mobile application was used but the interface was counter-intuitive and difficult to use for tracking trolley vehicles and planning trips based on ETA

FRIDAY, APRIL 13, 2019, FROM 3:30 PM TO 5:00 PM
During this field visit the following observations were made:

- Stops 1040/3033 and 1041/3034 at Ronald Reagan Senior High
  - 10 students were observed waiting for the trolley with no issues observed
- Stops 1011 at Doral Academy Preparatory
  - Approximately 25 students were observed waiting for the trolley
  - Bus stop was overcrowded
  - Heavy traffic along NW 27th Avenue in the eastbound direction
  - Heavier than normal traffic along NW 112th Avenue in both travel directions
- Stops 1071 and 1076 at Walmart
  - 3 people were observed waiting for the trolley
  - Stop 2011/3000 at Palmetto Metrorail Station
  - 3 people were observed waiting for the trolley
  - Heavy traffic on NW 74th Street
- The City's Trolley Tracker website (**http://publictransportation.tsomobile.com/webtracker/webtracker.htm?labels=false&tkn=582EB861-9C13-4C89-B491-15F0AFBF9F47&lan=en**) was used instead of the TSO Doral mobile application and this website was found to be more reliable and easy to use for trip planning purposes
- CityPlace Doral bus stop 2050 is approximately 1,135 feet away from the main entrance to the shopping center and lacks proper amenities to match existing land use

Trolley Ceiling Air Conditioning Unit

Dim Lighting in Trolley Vehicles

Typical Doral Bus Stop with Shelter

Trucks in Center Lane on NW 27th St.

Palmetto Metrorail Station Seats Lack Coverage from Rain

Typical Doral Bus Stop with Bench

EXISTING SYSTEM REVIEW

FIELD VISIT (CONTINUED)

MONDAY, APRIL 16, 2019 FROM 2:20 PM TO 4:00 PM
During this field visit the following observations were made:

- Stops 1010 and 1011 at Doral Academy
  - 40 students boarded the trolley, exceeding the stated capacity of 30
  - 14 passengers were standing
- Trolley skipped Stop 1012 (2617 NW 107th Avenue) because it was at maximum capacity
- Stop 1029 at Eugenia B. Thomas K-8
  - 6 students and adults boarded Route 1
- Stop 1030 (NW 114th Avenue just north of NW 60th Street)
  - 19 students boarded Route 1
- Stops 1040/3033 and 1041/3034 at Ronald W. Reagan Senior High School
  - 10 students boarded Route 1, and all had to stand
- Stop 1042 (8600 NW 107th Avenue)
  - 6 more students got on Route 1 and had to stand
- Normal student behavior observed during the whole trip
- Other non-student riders boarded and alighted at different locations
- Stop 1079 at the Dolphin Mall
  - 3 people were waiting for Route 1

Doral Academy Students Waiting

Traffic Congestion Along NW 27th St.

Trolley Picking Up Rider on Stop 1077

Trolley Stop 2050 near CityPlace Doral

Trolley Boarding Ronald Reagan High School Students Outside Landing Pad

Ronald Reagan High School Students Waiting

EXISTING SYSTEM REVIEW

MIAMI-DADE COUNTY DTPW

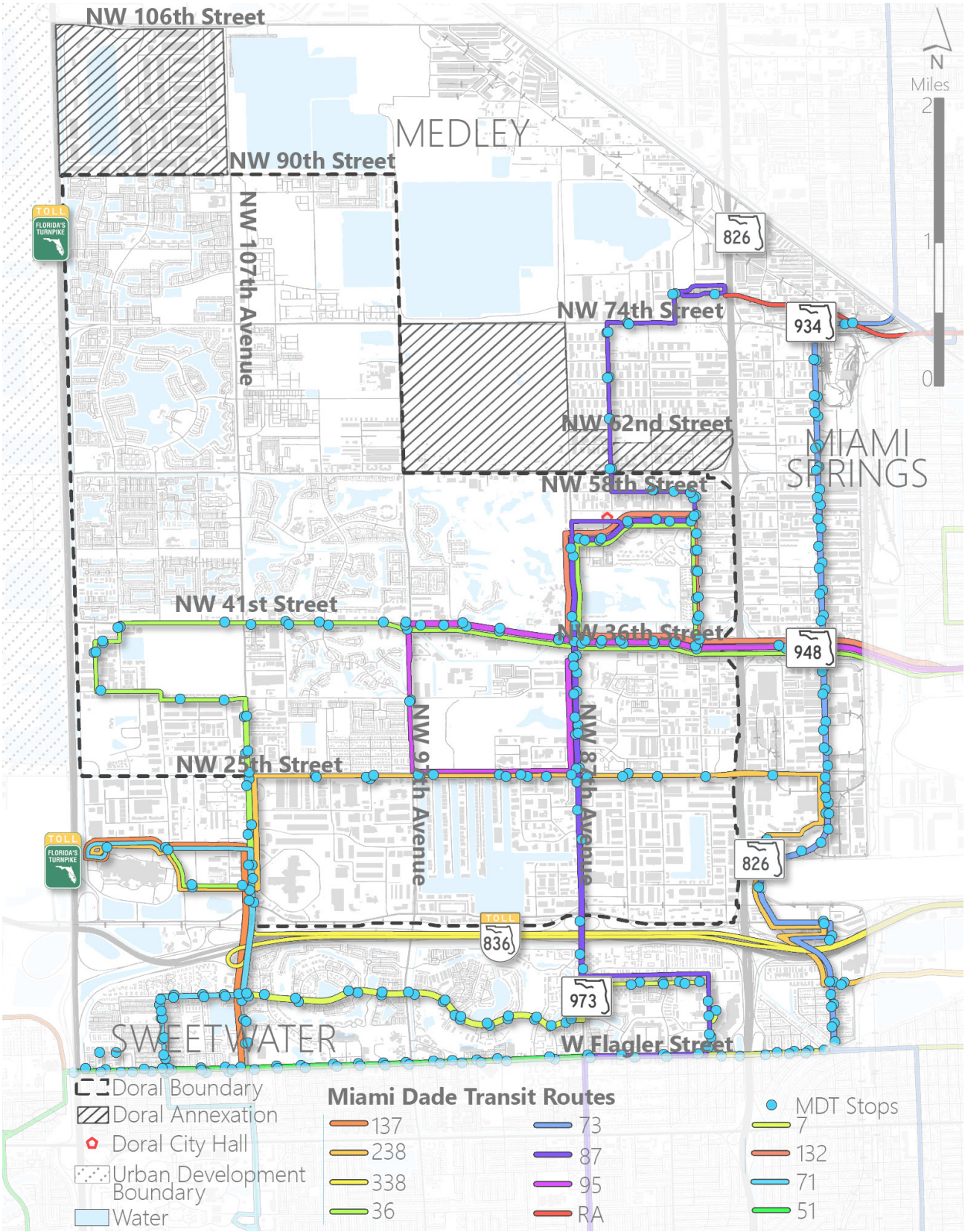
Metrobus

Miami-Dade DTPW operates eleven (11) Metrobus routes servicing the City of Doral. Most routes are concentrated on the southern half of the City, using NW 53rd Street, NW 41st Street/NW 36th Street and NW 25th Street as major east-west corridors; and NW 107th Avenue, NW 97th Avenue, NW 87th Avenue, and NW 79th Avenue as major north-south corridors. Metrobus routes connect Doral Government Center, Downtown Doral, Doral CityPlace, Miami-Dade College West, Dolphin Mall, Miami International Mall, and the FIU Engineering Center and Modesto A. Maidique campuses. **Figure 25** illustrates the eleven (11) Metrobus routes and **Table 25** summarizes the major destinations and characteristics of each route. **Appendix C** has a of detailed Metrobus system map.

Table 25: DTPW Metrobus Routes in Doral

ROUTE	CHARACTERISTICS	MAJOR DESTINATIONS
7		MIA Metrorail station, City of Sweetwater, Dolphin Mall, Miami International Mall, Fontainebleau Blvd., Mall of the Americas, Downtown Bus Terminal, Main Library, Historical Museum of South Florida, Miami Art Museum, MDC Wolfson Campus, and Historic Overtown/ Lyric Theatre Metrorail station
36/36A/36B		36B (no Saturday or Sunday service) – Dolphin Mall, Miami International Mall, Miami Dade College West Campus, Doral Center (36A), City of Miami Springs (36), Miami Springs High School (select trips), NW/NE 36th Street, Allapattah Metrorail station, Biscayne Blvd., NE 36th St. and NE 4th Ave.
51 (Flagler Max)		Weekday service only. SW 137th Ave./Coral Way, West Miami-Dade, West Flagler St., Downtown Bus Terminal, Government Center Metrorail station, Main Library, Historical Museum, and Miami Art Museum
71		SW 107th St. and SW 109th Ct. extended on weekdays during midday hours, Dolphin Mall, Miami International Mall, Florida International University at University Park campus, SW 107th Ave., Concord Shopping Plaza, and Miami Dade College Kendall campus
73		Miami Gardens Dr., NW 73rd Ave. Park-n-Ride Lot, Town of Miami Lakes, Hialeah, Palmetto Metrorail Station, NW 72nd Ave., US Postal Annex, Dadeland Mall, and Dadeland South Metrorail station.
87		NW 80th St./NW 81st Pl., Palmetto Metrorail station, NW 74th St. Connector, Mall of the Americas, SW 87th Ave., Kendall, Dadeland Mall, and Dadeland North Metrorail station
95 (Express Golden Glades)		Weekday rush-hour service only. Golden Glades Park-and-Ride Lot, Civic Center, Veterans Hospital, Jackson Memorial Hospital, Norwood, Earlington Heights Metrorail station, and Downtown Miami, Brickell
132 (Doral/Tri-Rail Shuttle)		Weekday rush-hour service only. Doral Executive Center, Doral Country Club, Atrium Shopping Center, Miami Springs, Hialeah Market, and Tri-Rail Station
137 (West Dade Connection)		Dolphin Mall, Miami International Mall, Sweetwater, Kendale Lakes, Kendall-Tamiami Executive Airport, Tamiami/Pineland Industrial Park, SW 147th Ave./180th St., Serena Lakes, Larry & Penny Thompson Memorial Park, Southland Mall, and South Dade Government Center
238 (East-West Connection)		Weekday service only. Dolphin Mall, Miami International Mall, NW 72nd Ave./25th St., Airport Corporate Center, Airport Cargo City, NW 65th Ave./Blue Lagoon Dr., Airport Hilton Hotel and MIA Metrorail station.
338 (Weekend Express)		Weekend service only. Dolphin Mall and Miami International Airport

Figure 25: Miami-Dade DTPW Metrobus and Metrorail Routes and Stops within Doral



EXISTING SYSTEM REVIEW

MIAMI-DADE COUNTY DTPW (CONTINUED)

Metrobus

Metrobus ridership data for the period of January 1, 2014 through December 31, 2018 was analyzed using GIS tools. **Figure 26**, illustrates the average boarding per stop during the 4-year period studied. This figure illustrates that the following locations have high boarding activity:

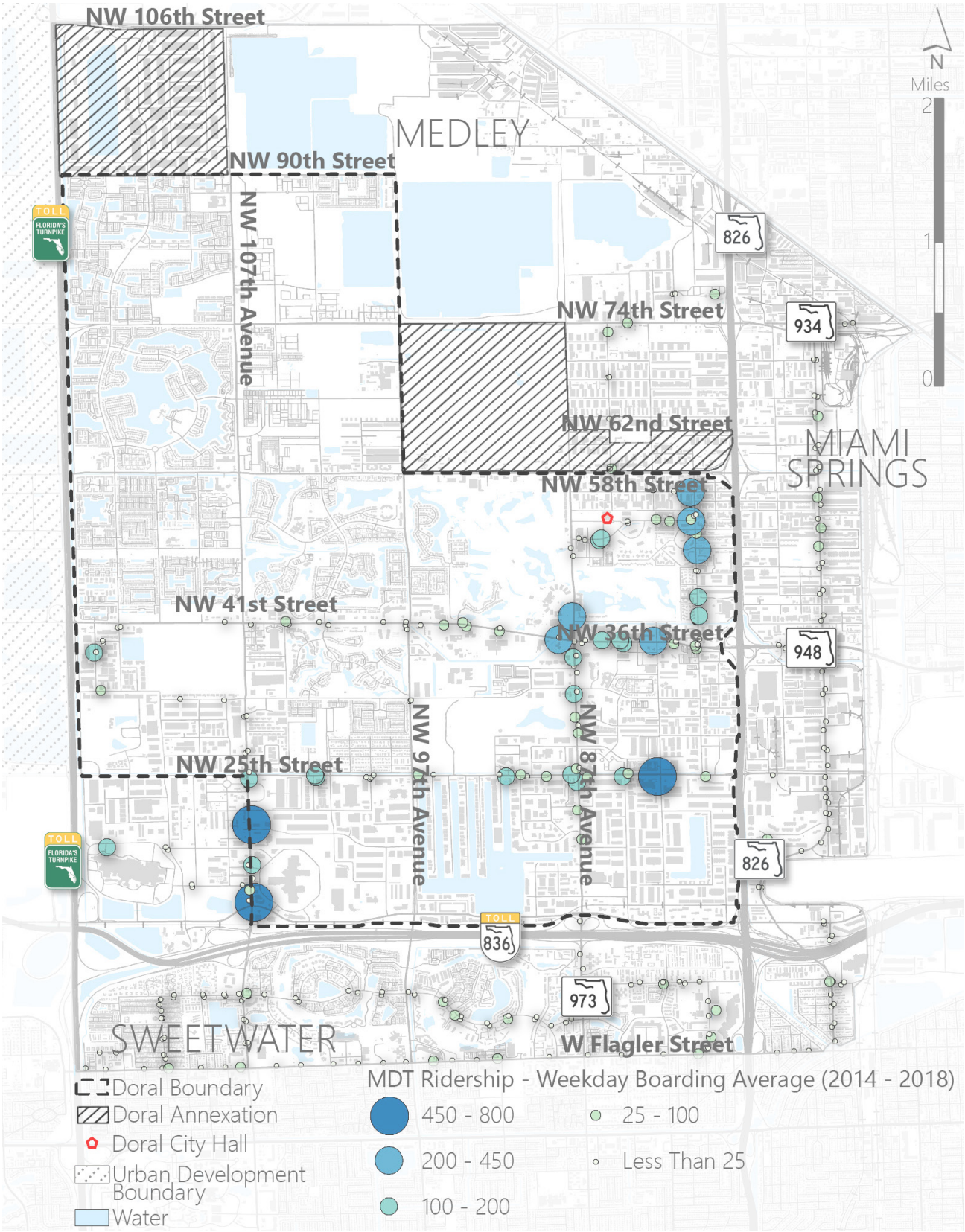
450 – 800 Weekday Average Boarding

- Stop D107#122 adjacent to Miami International Mall on NW 107th Avenue
- Stops D107#192 and D107#194 adjacent to Bed Bath & Beyond Plaza on NW 107th Avenue
- Stops D25S#825 adjacent to a Marathon gas station and the Miami International Commerce Center on NW 25th Street

200 – 450 Weekday Average Boarding

- Stops D36S#875 and 36ST87AS adjacent to Trump National Doral and the Doral Corporate Center on NW 36th Street
- Stops D87V#413 and D87V#411 adjacent to Trump National Doral and the American Welding Society (AWS) building on NW 87th Avenue
- Stops D36S#828 and D36S#825 adjacent to Polytechnic University and near CityPlace Doral on NW 36th Street
- Stops D79V#504, D79V#521, 79AV53SW, 79AV53SE, D79V#532, and D56S79V5 adjacent to Downtown Doral and along NW 79th Avenue

Figure 26: Miami-Dade DTPW Metrobus Average Boarding (2014 – 2018)



EXISTING SYSTEM REVIEW

MIAMI-DADE COUNTY DTPW (CONTINUED)

Figure 27 illustrates the average alighting per stop during the 4-year period studied. Similar to the average boarding, this figure illustrates that the following locations have high alighting activity:

450 – 800 Weekday Average Boarding

- Stop D107#122 adjacent to Miami International Mall on NW 107th Avenue
- Stops D107#192 and D107#194 adjacent to Bed Bath & Beyond Plaza on NW 107th Avenue
- Stops D53S#848, D53S#845, and DORLP218 adjacent to Downtown Doral Charter Elementary School on NW 53rd Street
- Stops 79AV53SW, 79AV53SE, and D79V#532 near Downtown Doral and at the intersection of NW 79th Avenue and NW 53rd Street

200 – 450 Weekday Average Boarding

- Stops D25S#825 adjacent to a Marathon gas station and the Miami International Commerce Center on NW 25th Street
- Stops D36S#875 and 36ST87AS adjacent to Trump National Doral and the Doral Corporate Center on NW 36th Street
- Stops D87V#413 and D87V#411 adjacent to Trump National Doral and the American Welding Society (AWS) building on NW 87th Avenue
- Stops D36S#828 and D36S#825 adjacent to Polytechnic University and near CityPlace Doral on NW 36th Street
- Stops D79V#504, D79V#521, and D56S79V5 adjacent to Downtown Doral and along NW 79th Avenue

Table 26 and **Table 27** summarize the routes serving existing bus stops with high ridership statistics. The boarding and alighting values shown on these tables represent Weekday daily averages.

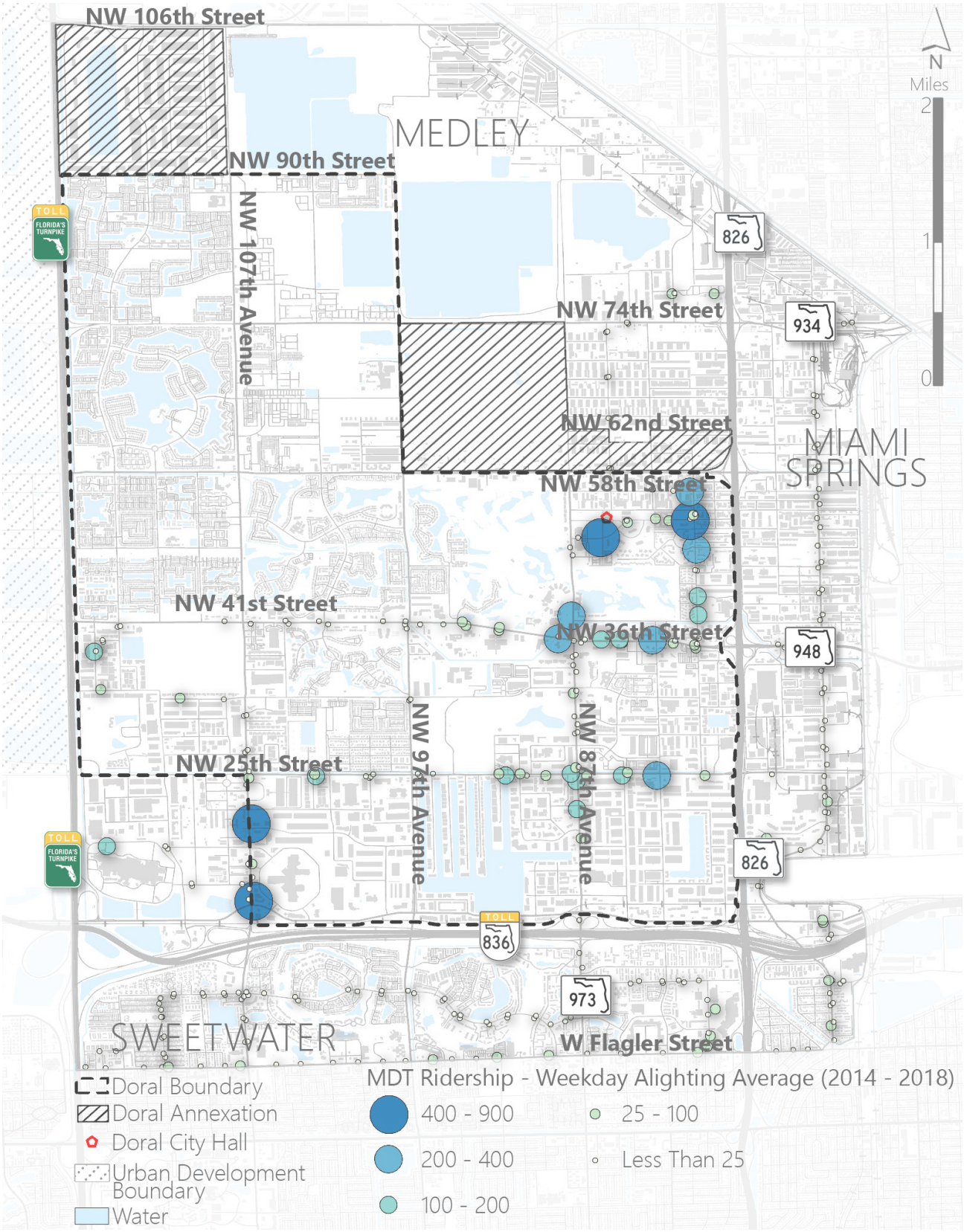
Table 26: Miami-Dade DTPW Top 10 Stops with Highest Boarding within Doral

BUS STOP ID	MAIN STREET	CROSS STREET	BOARDING (4-YR AVERAGE)
1843	NW 25th St.	NW 82nd Ave.	776
1799	NW 107th Ave.	NW 12th St.	754
1800	NW 107th Ave.	NW 19th St.	613
1820	NW 36th St.	NW 82nd Ave.	433
10275	NW 56th St.	#7972	425
1812	NW 36th St.	NW 87th Ave.	257
756	NW 53rd St.	NW 79th Ave.	245
1751	NW 79th Ave.	NW 50th St.	243
1784	NW 87th Ave.	NW 41st St.	240
1842	NW 25th St.	NW 84th Ave.	203

Table 27: Miami-Dade DTPW Top 10 Stops with Highest Alighting within Doral

BUS STOP ID	MAIN STREET	CROSS STREET	BOARDING (4-YR AVERAGE)
1800	NW 107th Ave.	NW 19th St.	907
1799	NW 107th Ave.	NW 12th St.	875
1808	NW 53rd St.	NW 84th Ave.	755
756	NW 53rd St.	NW 79th Ave.	574
1812	NW 36th St.	NW 87th Ave.	401
10275	NW 56th St.	#7972	391
1843	NW 25th St.	NW 82nd Ave.	281
1784	NW 87th Ave.	NW 41st St.	241
1820	NW 36th St.	NW 82nd Ave.	234
1751	NW 79th Ave.	NW 50th St.	221

Figure 27: Miami-Dade DTPW Metrobus Average Alighting (2014 – 2018)



EXISTING SYSTEM REVIEW

MIAMI-DADE COUNTY DTPW (CONTINUED)

Metrorail

Miami-Dade DTPW also operates and maintains Metrorail (see **Figure 29**). Although there are no Metrorail stations within the City, the Palmetto Metrorail Station near NW 74th Street is close enough to serve Doral's residents and visitors and thus is accessed by Trolley Routes 2 and 3. Three (3) years of ridership data were reviewed. **Table 28** provides Weekday, Saturday, and Sunday average daily boarding statistics for the period from October 2015 through September 2018. **Figure 28** shows a line chart illustrating the average daily boarding per month. The ridership data shows less people are using the Palmetto Station since October 2015; however, the change has been minimal. The spread in average daily boarding, as indicated by the Interquartile Range (IQR), is minimal between Weekdays and Saturdays but significant for Sundays. This means Weekday and Saturday daily boarding stay relatively close to the average of 1,540 and 440, respectively.

Table 28: Palmetto Metrorail Station Average Daily Boarding Statistics (10.2015 – 09.2018)

STATISTIC	AVERAGE WEEKDAY RIDERSHIP	AVERAGE SATURDAY RIDERSHIP	AVERAGE SUNDAY RIDERSHIP
Average	1,540	440	275
Standard Deviation	136	58	47
IQR	161	56	56

Figure 28: Miami-Dade DTPW Palmetto Metrorail Station Average Daily Boarding (10.2015 – 09.2018)

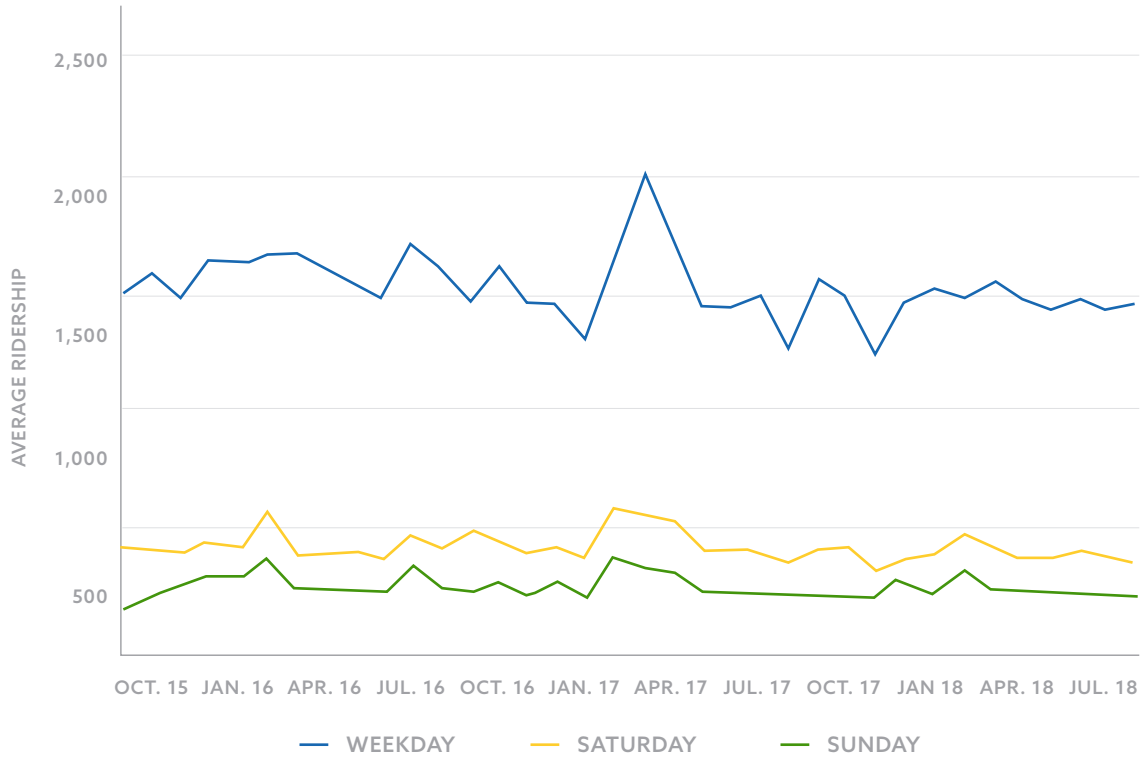


Figure 29: Miami-Dade DTPW Metrorail Routes

03

ISSUES AND OPPORTUNITIES

ISSUES

OPPORTUNITIES

Throughout the existing conditions review, many issues came to light given the multiple changes occurring around Doral; the operations, maintenance, and organization of the DTS; and the City's sociocultural characteristics. From the issues identified by the Study Team, opportunities for improvements were noted. These issues and opportunities form the foundation for the alternative development and evaluation process. **Table 29** includes a comprehensive list of issues and opportunities identified followed by a discussion of key observations.

Table 29 : DTS Issues/Constraints and Opportunities

TOPIC	ISSUES & CONSTRAINTS	OPPORTUNITIES
AREA OF SERVICE	• One (1) constraint imposed by the existing interlocal agreement is that 30% of each route must be within City limits.	• The City is in the process of annexing three (3) sections from unincorporated Miami-Dade County. The trolley must expand to serve these areas but also has opportunities to serve transit-dependent populations within Westchester and Fontainebleau.
OPERATING AND MAINTENANCE COST	• LSF charged the City $2,561,211 for FY 2018 for operating, maintaining, and storing DTS vehicles.	• The City may look into absorbing some services in-house such as providing a maintenance and storage yard within City limits to reduce deadhead (LSF's yard is approximately 5 miles away from the City) or the City may look for a complete turn-key provider.
FUNDING	• CITT currently projects $2,966,042 in County surtax funding distributed to Doral for FY 2020.	• The City may explore charging a fare similar to Metrobus, per the current interlocal agreement, or it may seek other sources of funding such as federal and state grants, advertising, or naming rights. More revenue from population is expected with planned Annexations. • If the DTS replaces existing DTPW Metrobus routes or its services result in a direct increase of Metrobus ridership, then the City may seek an attributable share of federal and state formula funds based on the current interlocal agreement. • The City may propose reevaluating CITT surtax distribution formula to include both population and employment and not just population given that the City is dense in job centers and industrial land uses.

SUBCATEGORY	ISSUES & CONSTRAINTS	OPPORTUNITIES
SCHEDULE	• Routes 2 and 3 currently do not operate on Sundays and Route 4 currently does not operate in the weekends. • Schedule does not allow for bus drivers to break, especially for Route 1. Drivers are using quick service restaurants (QSR) and informal stops which create negative perceptions of drivers.	• The City may look to provide weekend service, especially for high demand locations such as religious and commercial centers. • The City may enter into agreements with QSRs, Miami-Dade County, or other partners to provide rest points for drivers (such as Dolphin Station and Palmetto Station) while making the schedules flexible for driver breaks. The City may also develop its own rest points.
VEHICLES	• Vehicles were observed to have dim lighting during field inspections at early hours of the morning. • Riders have complained of un-comfortable seats specially for long trips. • Vehicles were observed to have faulty air conditioning systems during field inspections. • City staff reported diesel vehi-cles require regeneration during normal operating hours to prevent major damages to the engine. These vehicles require regeneration because their diesel particulate filter (DPF), a device used to remove soot from the exhaust gas of a diesel engine, are designed to burn off the accumulated particulate passively. This, however, does not always work well and the DPI becomes full of soot. When this happens, trolley drives need to stop the vehicle for an average of 20 minutes to activate the fuel burner which heats the filter to soot combustion temperatures.	• The City has four (4) vehicles that will need replacement between 2019 and 2021. • The City may look into replacing the vehicle fleet with more efficient vehicles that have low floors and improved comfortability and aesthetics. • The City has four (4) vehicles that will need replacement between 2019 and 2021. • The City may look into replacing the vehicle fleet with more efficient vehicles that have low floors and improved comfortability and aesthetics.

Table 29 : DTS Issues/Constraints and Opportunities

TOPIC	ISSUES & CONSTRAINTS	OPPORTUNITIES
VEHICLES (CONTINUED)	This maintenance occurs regularly and impacts customer trip times and DTS reliability. • Vehicles have steps to board/alight which may inhibit rider accessibility and are potential tripping hazards. The vehicles do, however, have ramps for wheelchair accessibility. • Vehicles have disabled or malfunctioning annunciators. This is an ADA concern for visually impaired riders.	
METROBUS ROUTES	• Metrobus only has one (1) route connecting the City to the airport (Route 238/338). *Note that Route 338 is the weekend service of Route 238.*	• Metrobus Route 132 may be redirected to serve the Miami Intermodal Center as opposed to the Tri-Rail Hialeah Market station.
TROLLEY ROUTES	• Trolley routes are one-way. Riders have express dissatisfaction with this service because their return trip requires them to travel the entire trolley route to get back to the origin stop. • Trolley riders have complained about routes being circuitous, long, and indirect. This aggravates the complaint against the one-way operation. • Routes 2 and 4 are half as efficient (Boarding per VMT) than Routes 1 and 3, which are the City's highest ridership routes	• The City may provide two-way service. Route 1 and 2 have high PM peaks and imbalance PM and AM peaks. Providing two-way service may help balance ridership demand to provide a consistent service (existing headways are insufficient for high demand PM period). • The City may explore shorter distance routes that connect high ridership locations. This, however, increases the amounts of transfers need to travel long distances.

SUBCATEGORY	ISSUES & CONSTRAINTS	OPPORTUNITIES
TROLLEY ROUTES (CONTINUED)		• Metrobus Route 36 connects Dolphin Mall, MDC West Campus, Doral Center, Miami Springs, and Allapattah Metrorail Station. This duplicates the service provided by Route 2 since it connects MDC West Campus with the Palmetto Station. The DTPW provides longer service periods, including weekends. The City may look at modifying Route 2 to use a more efficient routing. The City may also promote origin/destination points of interests serviced by Route 2 and 4.
TROLLEY STOPS	• City is responsible for furnishing stops and maintaining transit amenities • The DTS currently has a total service length of approximately 72.4 miles/382,272 feet with 218 stops. On average, stops are spaced every 0.33 miles/1,754 feet. Research has identified that the most convenient walking distance to a local transit stop is 0.25 miles/1,320 feet. Ideally, in Urban Areas stops should be spaced every 0.142 miles/750 feet and in Suburban Areas every 0.189 miles/998 feet.	• The City is at liberty to design transit amenities; hence, the City can be innovative in design and concepts. • The City may explore implementing a capital program to consolidate bus stops. • The City is at liberty to design transit amenities; hence, the City can be innovative in design and concepts. • The City may explore implementing a capital program to consolidate bus stops. • The City may request the County to advance the Palmetto Intermodal Station concept and request specific trolley amenities within the station.

Table 29 : DTS Issues/Constraints and Opportunities

TOPIC	ISSUES & CONSTRAINTS	OPPORTUNITIES
TROLLEY STOPS (CONTINUED)	• Doral's roadway grid is of 1-mile blocks. This layout leads to multiple mid-block stops (more than 500 feet away from signalized intersections) which are discouraged over far-side bus stop configuration. The City has 45 mid-block stops, 57stops on the farside, and 36 stops on the nearside of unsignalized intersections (63% of all stops). Multiple existing midblock stops do not have marked crosswalks, traffic signals, warning signs, or other traffic control devices. • 136 stops (62%) do not have nearby lighting. Lack of appropriate lighting was an issue brought up by trolley drivers and citizens. • Some bus stops do not have a route map and schedule display. Shelters only have a route map display. • Palmetto Metrorail Station had several issues including insufficient canopy protection, lack of seating, incorrect pedestrian bollards, lack of cleanliness, and lack of wayfinding. • The City has limited resources to construct new bus shelters and stops.	

SUBCATEGORY	ISSUES & CONSTRAINTS	OPPORTUNITIES
PLANNING CONSISTENCY	• Dolphin Station is not yet operational. • East-West is considering alignments just south of the City limits and does not provide service into the City. • The Better Bus Project Coverage concept increases ridership of some DTPW routes in Doral. • The Better Bus Project Ridership Concept reduces the number of Metrobus routes in the City nut increases frequency.	• Metrobus' highest boarding stops are Miami International Mall, Bed Bath & Beyond Plaza, and the Miami International Commerce Center. These stops are also high ridership stops for the DTS. The City may look into developing Super Stop concepts for these, and other high ridership stops. • The DTS has an opportunity to serve numerous new developments of expected high ridership including mixed-use developments coming to Downtown Doral, Doral Yard, residential projects on the northern sections of the City, new Jackson Health Hospital, redeveloped Miami Free Zone, and new Doral Medical Plaza. • The City may encourage the County to begin Dolphin Station operating which is planned to have premium transit services and is a good transfer point for riders.
TROLLEY FREQUENCY	• Anecdotal information and field inspections revealed that trolley capacity are exceeded during school dismissal hours. • Drivers and citizens complained about general traffic congestion, especially at major intersections of corridors like NW 107th Ave., NW 87th Ave., NW 97th Ave., and NW 114th Ave.	• The City may propose an alignment deviation of the East-West Rapid-Transit Corridor into the City by developing a hub or park-n-ride that generates enough ridership worthy of the investment. • The City should endorse the Coverage Concept if the Better Bus Project.

Table 29 : DTS Issues/Constraints and Opportunities

TOPIC	ISSUES & CONSTRAINTS	OPPORTUNITIES
TROLLEY FREQUENCY (CONTINUED)	• Riders, City staff, and field testing have revealed that the tracking application is unreliable, slow, and sometimes malfunctions.	• The City may explore enforcement options with schools and the Police Department r to ensure student attendance and adequate service during dismissal periods. Through this organization, the City may provide additional vehicles on routes servicing schools during dismissal periods.
CONGESTION		• Doral has an opportunity to build an extensive multimodal transportation network to encourage transit use and potentially decrease congestion. This includes infrastructure such as bus lanes, queue jumps, or TSPs along NW 107th Ave. or adopting lessons learned from the NW 2nd St. Bus Lane pilot project in Downtown Miami. There is also a potential for widening NW 87th Ave. for bus lanes from NW 12th St. to NW 36th St.
TECHNOLOGY		• Doral currently provided Miami-Dade County access to the trolley's tracking application. This will consolidate travel time and tracking information in Miami-Dade County's transit application. Additional opportunities exist to develop one (1) unified application with all transit modes and sleek user interface/intuitive user experience.

ISSUES

OPERATIONS

Issues observed with the existing trolley operations are mostly related to existing routing. Three (3) of the four (4) routes in operation are circuitous/long and all routes operate in a one-way configuration. Travelers, therefore, are subjected to inconveniently ride the entire route to reach a destination that is considerably closer in the opposite direction of the trolley's current path. The overall inconvenience for trolley users is further exacerbated by the mobile trolley tracker application's inaccurate real-time predictions. Lastly, given the few north-south and east-west arterials in the 1-mile street grid of the City, traffic/transit delays and congestion on major roadways are a common occurrences, especially during peak periods where trolleys are known to be at full capacity.

VEHICLES

Comfort has taken a backseat to visual appeal with regard to the trolley. However reminiscent of the 1920s aesthetic, the discomfort passengers experience from sitting on the trolley's wooden benches worsens the experience of long trips or delayed trips due to congestion. Further hindering the passenger experience, there have been complaints about falling droplets due to condensation from the air conditioning units inside the vehicles. Moreover, trolley vehicles are failing to ensure ease of mobility for people of all abilities and ages. For instance, upon boarding and alighting the trolley, many passengers face an increased risk of tripping due to steep steps. The trolley has also been observed to have poor interior lighting and annunciators that are usually disabled or not operational. This amounts to ADA concerns for visually impaired riders that require assistance for transportation services.

Vehicle maintenance records and anecdotal information from City staff also revealed mechanical issues with the trolleys. City staff reported the need for regular vehicle regeneration which causes an average delay of 20 minutes.

INFRASTRUCTURE

Irrespective of the fact that bus stops are still in new condition, certain flaws have been identified. They include: stops with only lollipop signs and benches that do not display route maps and schedules or do not have trash cans; stops whose shelters generally had trash cans but were missing route schedules, bicycle parking, and other amenities; and stops with poor or no lighting.

Without proper lighting, trolley drivers have difficulty identifying customers. Poor lighting conditions also hamper ridership due to skewed perceptions of security on behalf of passengers. Lastly, bus stops are inconveniently located; most stops are mid-block stops far away from signalized intersections with no available crossing opportunities for pedestrians. Mid-block stops are also discouraged over far-side bus stops because, among many reasons, mid-block stops tend to impede traffic flow as the trolley usually stops in a travel lane to pick up/drop-off passengers.

ISSUES

INFRASTRUCTURE (CONTINUED)

Mobility wise, the City also has poor first/last mile connections. Walking and cycling trips are rare within Doral and will likely stay this way until a comprehensive network of bicycle facilities and wide sidewalks is completed. While opposition to this idea may exists, walking and cycling around major transit stops should be prioritized in order to increase the safety and convenience of using the trolley. Fortunately, in 2014 the City completed the Transit Mobility Study which identified missing sidewalks. The City has been awarded two (2) FDOT grants totaling $1M for sidewalk construction.

SOCIOCULTURAL CHARACTERISTICS

In comparison to the County and the nation, most of the residents of the City of Doral have high incomes and are not transit-dependent. Such a demographic contributes to what has become a challenging environment for transit in the City. Incentivizing residents to opt for transit trips (also serving secondary destinations such as restaurants, leisure centers, malls, etc.) depends on emphasizing its convenience versus that of car trips.

The different demands of residents and non-resident commuters, specifically those who utilize transit services, present a challenge in balancing the services provided by the DTS. Non-resident commuters form the bulk of the trolley ridership and they are typically looking for quick trips between major transfer points (i.e. Palmetto Metrorail Station and Miami International Mall) and residential areas (a significant number of riders are housekeepers and nannies). On the other hand, residents need to be swayed to use the trolley by providing convenient trips to low-intensity destinations, such as restaurants and entertainment centers. Balancing the demands of these two (2) demographics creates circuitous routes with few stops of high ridership. This, therefore, discourages residents to use the trolley since they perceive their vehicles as more comfortable and convenient.

Hence, many residents are skeptical of expanding the trolley services since they perceive little to no "direct benefit". What many residents do not realize is that serving the non-resident commuter population benefits them in an indirect way because more services can be provided to resident's homes with less congestion (i.e., less vehicle trips since the trolley accommodates more people per trip).

OPPORTUNITIES

OPERATIONS

Improvements to existing routes can take the shape of shorter routes with two-way service. This allows the DTS to service high demand corridors really well and grow its ridership. With growing ridership, demand pressures will lead to new routes that may expand coverage and better serve all residents. This strategy also leads to a focalized infrastructure plan where bus lanes, queue jumps, and Transit Signal Priorities can be implemented on select arterials. This will further encourage citizens to use the trolley and consequently improve the trolley's reliability. Lastly, integration of tracking applications is key to providing customer service. Not only does the trolley tracker need to be synchronized with DTPW services, but also other trolley systems operating within Greater Miami.

VEHICLES

The "Trolley" can be replaced with more efficient, reliable, and better designed vehicles with potential to attract more riders. This change can also lead to enhanced customer service through innovative designs that make boarding and alighting easy, safe, and convenient for users of all ages and abilities. As the current vehicles do, any new vehicle should strictly conform to ADA guidelines and provide all needed amenities such as annunciators and wheelchair access ramps. The City can also explore using vehicles with alternative fuels or launch a pilot project for automated vehicles in a specialized area.

Lastly, co-branding opportunities exist. With refined routes and discussions with major employers and organizations, the DTS can easily associate with known brands that lead to easy destination recognition and increased customer awareness. A great example of a co-branding opportunity is Route 4 and FIU.

DEVELOPMENT OF ALTERNATIVES

MISSING LINK ALTERNATIVE

ONE SEAT RIDE ALTERNATIVE

HUB & SPOKE ALTERNATIVE

THE GRID ALTERNATIVE

Four (4) preliminary alternatives were developed with the goal of achieving the study purpose of connecting the DTS with other existing and planned municipal, County, and regional transit services. These preliminary alternatives also address study objectives by providing equitable and just transportation for all, integrating the Miami-Dade DTPW SMART Plan, and incorporating design principles/standards from the Trolley Design Guidelines.

Each preliminary alternative was conceived out of specific design philosophies. These philosophies serve as the foundation for routing analysis. Major existing and future origin-destination locations were superimposed on existing ridership and socioeconomic data to begin the analysis. Through adhering to guiding philosophies, such as coverage versus ridership maximization, potential routes were drawn to connect important destinations through a systemwide approach. Each alternative is made of several routes that form a preliminary alternative scenario. Two (2) additional preliminary alternative scenarios were later developed through discussions with City Staff and public and business feedback, for a total of six (6) trolley route alternatives.

Preliminary alternative scenarios were then screened based on criteria developed to compare the benefits and trade-offs of each scenario. These criteria help identify the most appropriate alternative for the City. Since each alternative includes specific assumptions, three (3) operating options were provided when estimating the capital, operating, and maintenance costs as well as when projecting ridership.

MISSING LINK ALTERNATIVE

The first alternative is meant to supplement the existing system by connecting new developments coming to the City of Doral. This alternative will serve the new annexations to be incorporated by the City as well as important destinations planned or under construction such as the Jackson Health, Downtown Doral Charter Upper School, and other mixed-use developments. This alternative scenario keeps all existing routes intact except for Route 3 which extends north to serve the warehouses and offices located between NW 90th Street and NW 106th Street and between NW 117th Avenue and NW 107th Avenue. This alternative also adds a new route, colored orange in **Figure 30**, to serve the new developments in the City. This alternative assumes all routes, including the new orange route, have one-way operation. **Tables 30 through 34** present the headways and fleet assumptions for each operating option as well as the route length given that each route cannot be more than 30% outside of the City of Doral's boundary per the interlocal agreement with Miami-Dade County.

OPERATING OPTIONS

1. Operating the proposed routing alternative with the existing vehicle fleet and determining the feasible headways for each route.
2. Expanding the vehicle fleet to operate the proposed routes with the same, or slightly improved, headways as existing routes.
3. Expanding the vehicle fleet to operate the proposed routes with 15-minute headways, weekdays and weekends.

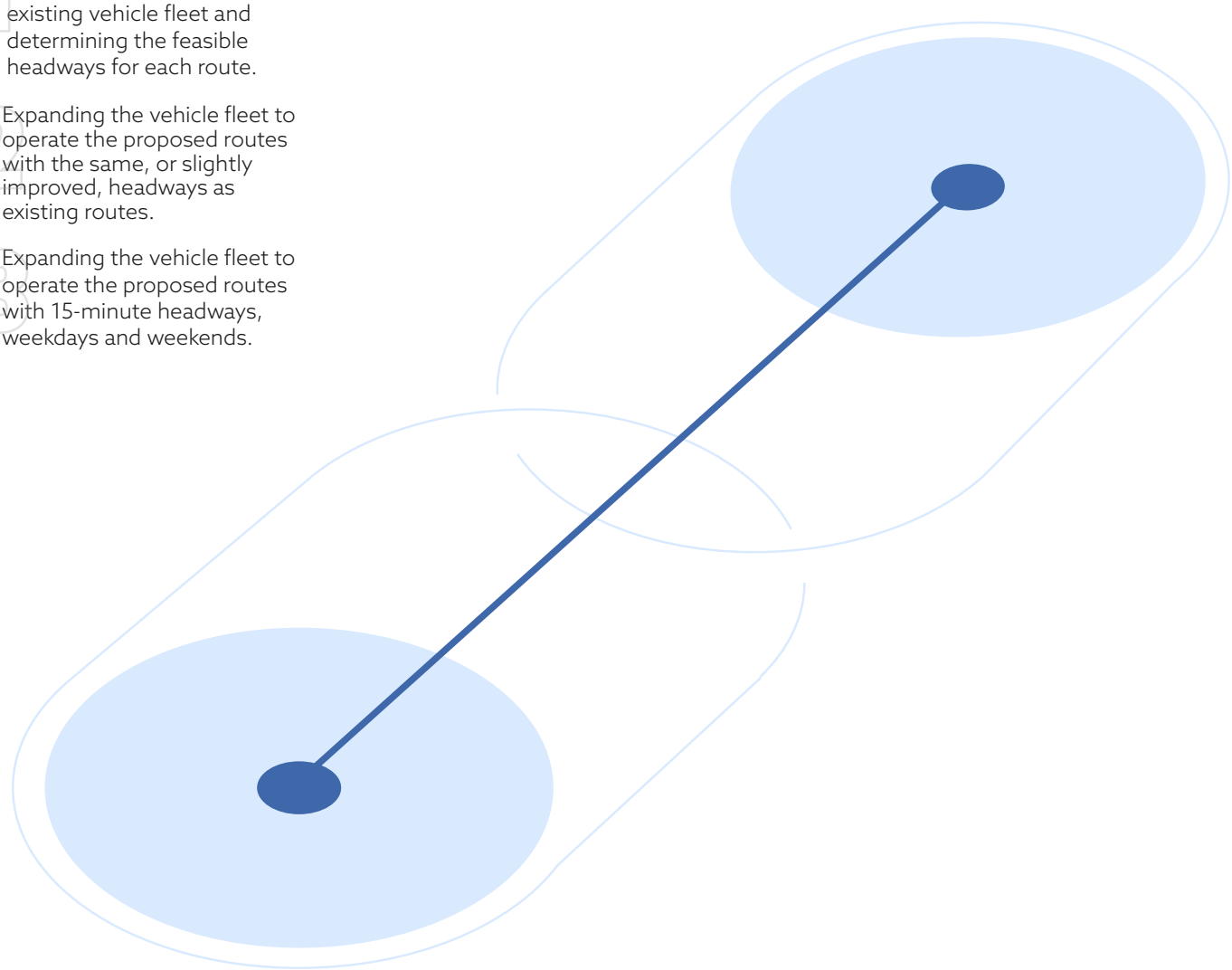
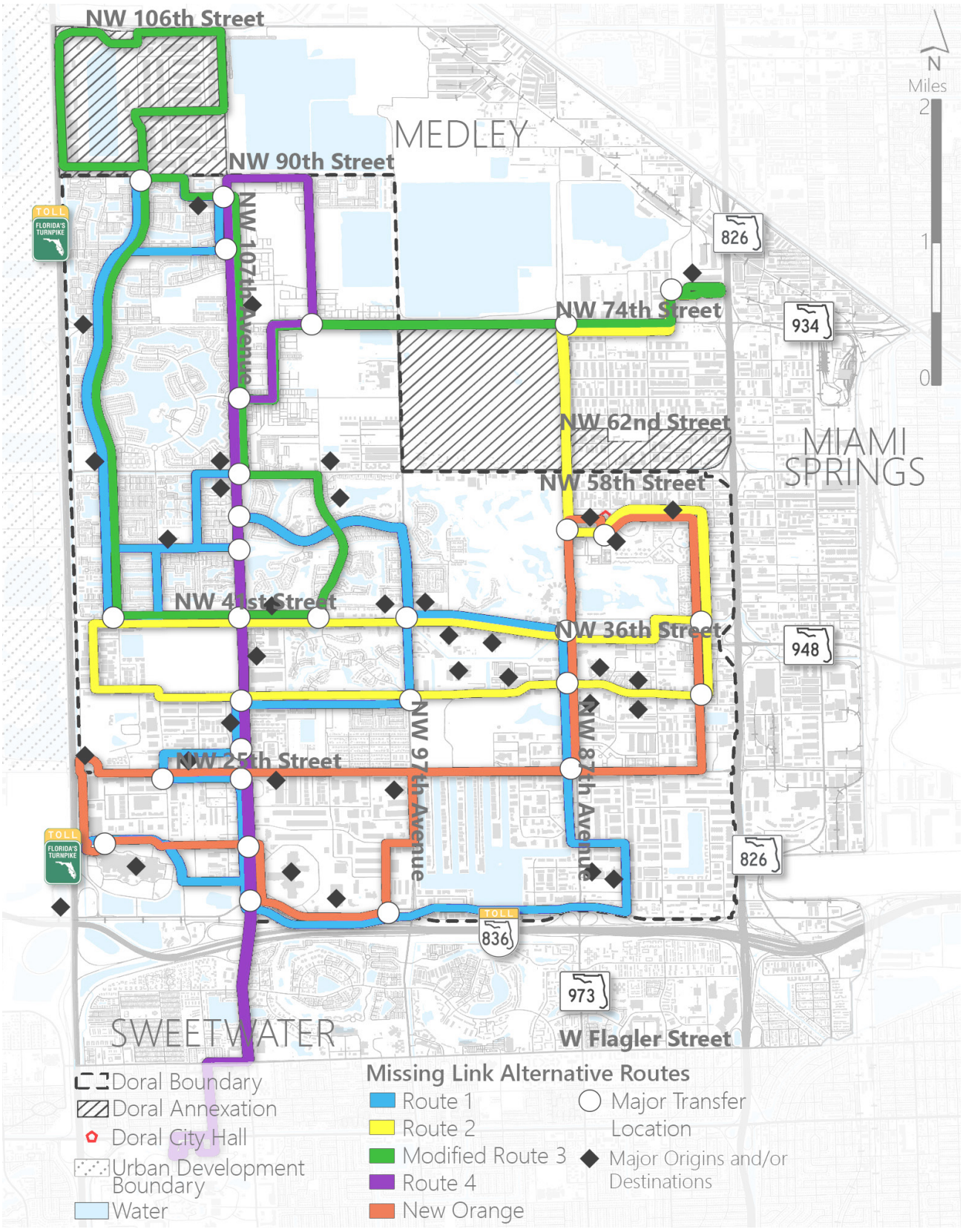


Figure 30 : Missing Link Alternative



MISSING LINK ALTERNATIVE

Table 30: Missing Link Alternative Option 1 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	One-way	35	2	70	1	70	1
Yellow	One-way	25	2	50	1	-	-
Green	One-way	30	2	60	1	-	-
Purple	One-way	25	2	-	-	-	-
Orange	One-way	20	2	40	1	40	1

Required Fleet Size (assuming 20% spares): 12

Table 31: Missing Link Alternative Option 2 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	One-way	35	5	35	4	35	4
Yellow	One-way	25	4	25	4	-	-
Green	One-way	30	4	30	4	-	-
Purple	One-way	25	4	-	-	-	-
Orange	One-way	20	4	20	4	20	4

Required Fleet Size (assuming 20% spares): 26

Table 32: Missing Link Alternative Option 3 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	One-way	35	9	15	9	15	9
Yellow	One-way	25	6	15	6	-	-
Green	One-way	30	7	15	7	-	-
Purple	One-way	25	6	-	-	-	-
Orange	One-way	20	5	15	5	15	5

Required Fleet Size (assuming 20% spares): 40

Table 33: Missing Link Route Length Inside and Outside City of Doral's Boundary (excluding Annexations)

ROUTE	TOTAL LENGTH (MI)	LENGTH INSIDE CITY BOUNDARY (MI)	LENGTH OUTSIDE CITY BOUNDARY (MI)	PERCENT OF ROUTE OUTSIDE CITY BOUNDARY
Blue	22.00	19.94	2.06	9%
Yellow	16.70	12.3	4.40	26%
Green	19.80	11.36	8.44	43%
Purple	15.20	10.81	4.39	29%
Orange	23.70	22.15	1.55	7%
Total	89.70	68.86	20.84	23%

Table 34: Missing Link Route Length Inside and Outside City of Doral's Boundary (including Annexations)

ROUTE	TOTAL LENGTH (MI)	LENGTH INSIDE CITY BOUNDARY (MI)	LENGTH OUTSIDE CITY BOUNDARY (MI)	PERCENT OF ROUTE OUTSIDE CITY BOUNDARY
Blue	22.00	19.94	2.06	9%
Yellow	16.70	14.69	2.01	12%
Green	19.80	17.79	2.01	10%
Purple	15.20	10.81	4.39	29%
Orange	23.70	22.15	1.55	7%
Total	89.70	68.86	20.84	23%

ONE SEAT RIDE ALTERNATIVE

The One Seat Ride alternative (**Figure 31**) consolidates all existing routes, except for Route 4, into two (2) routes that are focused on providing maximum coverage. These two (2) new routes are meant to be convenient by connecting all the major origin-destination locations while also improving trolley operations by concentrating more resources on less routes. This alternative maintains Route 4 intact given it is a new route that functions as an important north-south link on a very transited corridor. The philosophy behind this alternative is to remove or limit the amount of transfers passengers need to make. This increases in-vehicle time and reduces passenger wait time, creating a passenger perception of improved service. Furthermore, passengers have to memorize less routes and are almost guaranteed that any route they take will reach their desired destination. A disadvantage of this alternative scenario is that the new routes, because they provide ample coverage, are long and circuitous. Citizens and stakeholders have expressed concerns with the circuitous characteristic of existing Routes 1 and 3. However, if two-way service and increased frequency with is likely those concerns will go away since passenger will not have excessive wait times or long trips. This alternative assumes the new Blue and Orange routes have two-way operations while the Purple/FIU route remains one-way. **Tables 35 through 39** present the headways and fleet assumptions for each operating option as well as the route length given that each route cannot be more than 30% outside of the City of Doral's boundary per the interlocal agreement with Miami-Dade County.

OPERATING OPTIONS

1. Operating the proposed routing alternative with the existing vehicle fleet and determining the feasible headways for each route.
2. Expanding the vehicle fleet to operate the proposed routes with the same, or slightly improved, headways as existing routes.
3. Expanding the vehicle fleet to operate the proposed routes with 15-minute headways, weekdays and weekends.

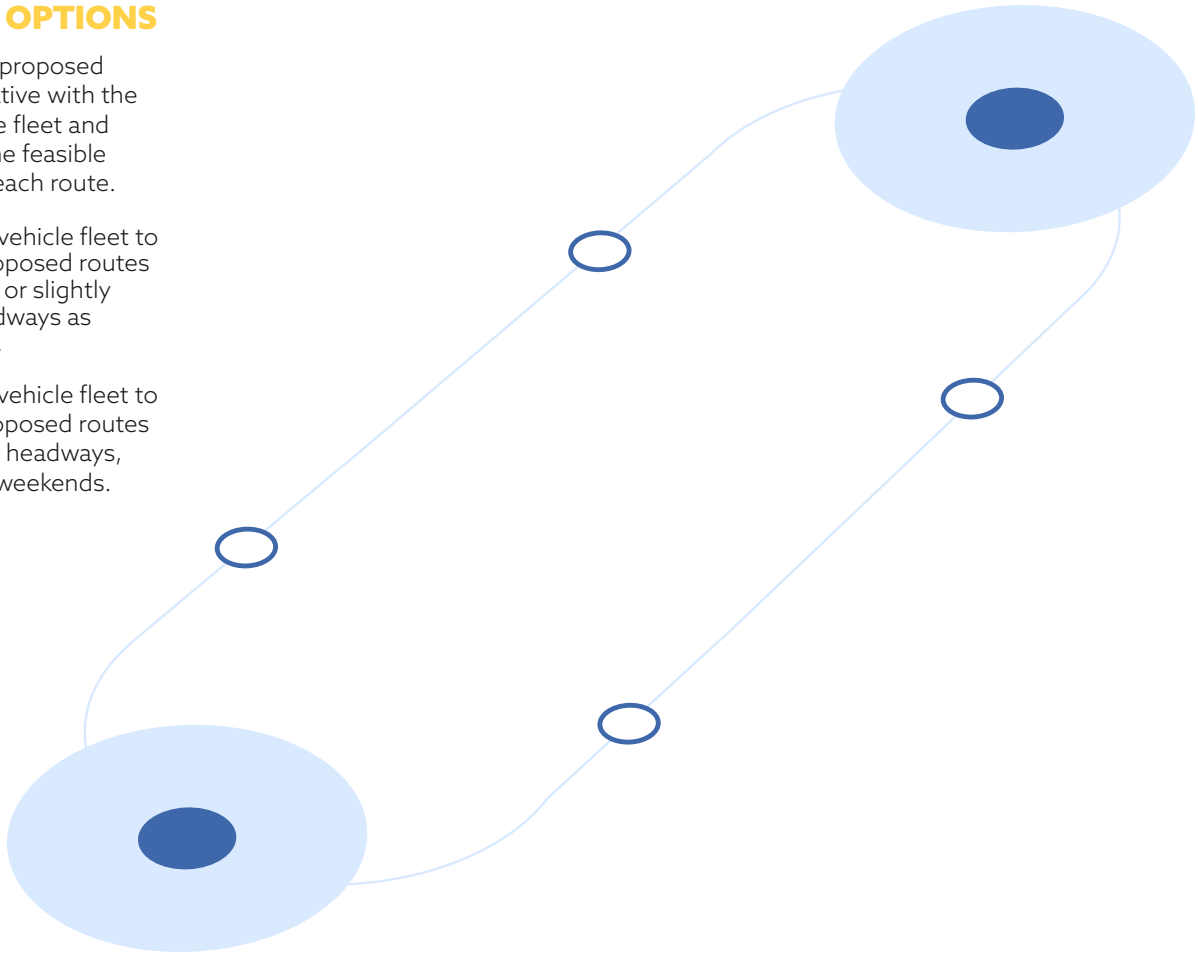
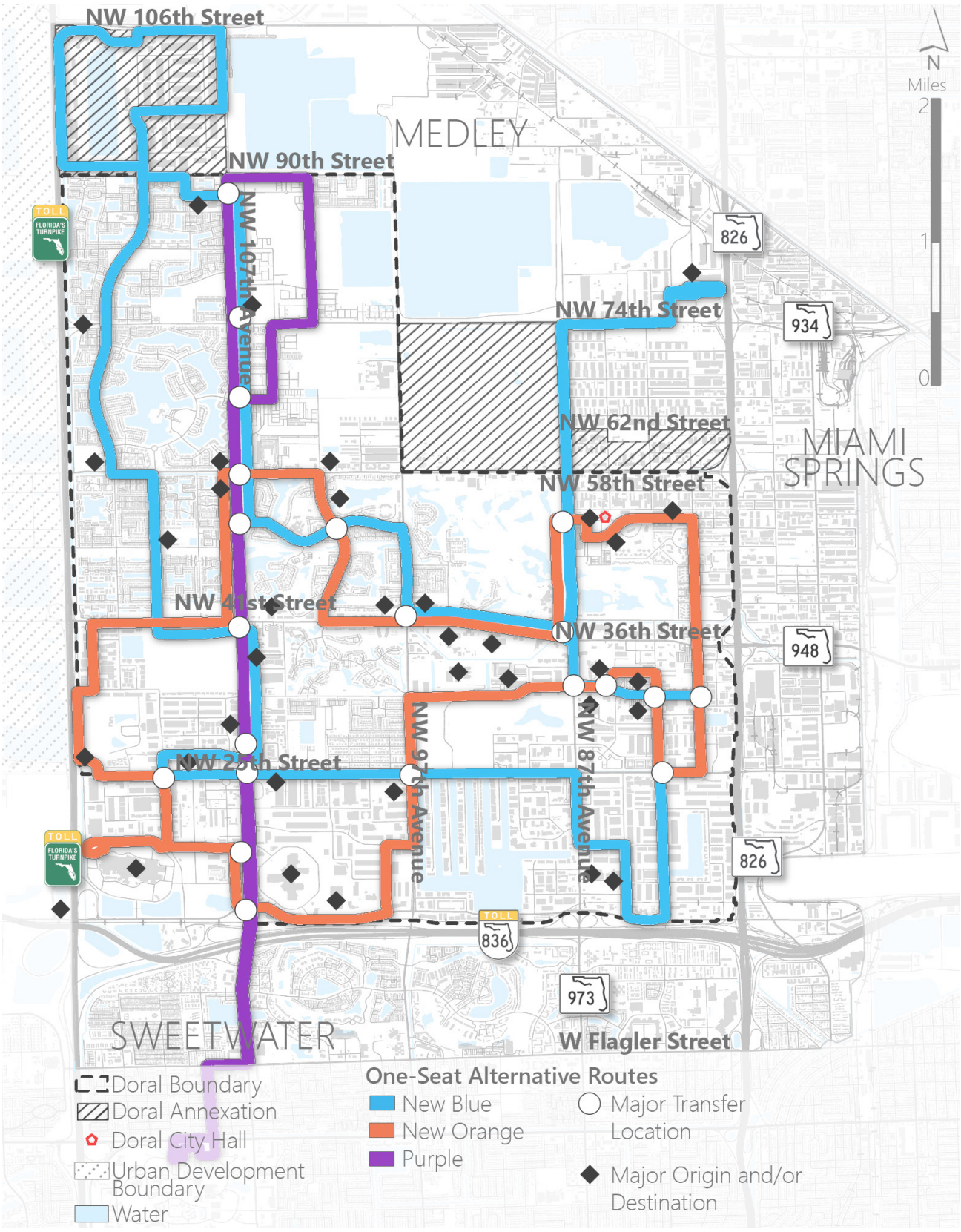


Figure 31 : One Seat Ride Alternative



ONE SEAT RIDE ALTERNATIVE

Table 35: One Seat Alternative Option 1 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	Two-way	40	4	80	2	80	2
Purple	One-way	25	2	-	-	-	-
Orange	Two-way	25	4	50	2	50	2

Required Fleet Size (assuming 20% spares): 12

Table 36: One Seat Alternative Option 2 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	Two-way	20	14	40	8	80	4
Purple	One-way	25	4	-	-	-	-
Orange	Two-way	25	8	25	8	50	4

Required Fleet Size (assuming 20% spares): 32

Table 37: One Seat Alternative Option 3 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	Two-way	15	20	15	20	15	20
Purple	One-way	15	6	-	-	-	-
Orange	Two-way	15	12	15	12	15	12

Required Fleet Size (assuming 20% spares): 46

Table 38: One Seat Ride Route Length Inside and Outside City of Doral's Boundary (excluding Annexations)

ROUTE	TOTAL LENGTH (MI)	LENGTH INSIDE CITY BOUNDARY (MI)	LENGTH OUTSIDE CITY BOUNDARY (MI)	PERCENT OF ROUTE OUTSIDE CITY BOUNDARY
Blue	28.20	19.79	8.41	30%
Purple	15.20	10.82	4.38	29%
Orange	17.40	15.33	2.07	12%
Total	60.80	45.93	14.87	24%

Table 39: One Seat Ride Route Length Inside and Outside City of Doral's Boundary (including Annexations)

ROUTE	TOTAL LENGTH (MI)	LENGTH INSIDE CITY BOUNDARY (MI)	LENGTH OUTSIDE CITY BOUNDARY (MI)	PERCENT OF ROUTE OUTSIDE CITY BOUNDARY
Blue	28.20	26.19	2.01	7%
Purple	15.20	10.81	4.39	29%
Orange	17.40	15.33	2.07	12%
Total	60.80	52.33	8.47	14%

HUB & SPOKE ALTERNATIVE

This alternative scenario draws inspiration from Delta Airlines and its revolutionary hub and spoke model pioneered in 1955. The four (4) new routes were developed to intersect at a centralized hub in the vicinity of Downtown Doral while keeping Route 4/FIU unchanged (see **Figure 32**). From this major transfer point passengers are able to access any location within the City. This simplifies trip planning because riders can be guaranteed most routes lead to the central hub. Passengers also have increased flexibility because the central hub provides a convenient multimodal connection for drop off/pick-up, extended parking times, and enhanced bicycle/pedestrian connectivity. Furthermore, the central hub allows for most transfers to occur in a highly active and functional place as opposed to on intersections and along corridors.

The central hub can also be collocated or integrated with mixed-use development. By creating transit-oriented development within the surroundings of the hub, increased synergies can be achieved by providing more foot traffic to commercial developments and increased ridership to the DTS. Moreover, other modes of transportation can be easily integrated such as Transportation Network Companies (TNCs) like Uber and Lyft, parking garages/lots, and bicycle storage/racks. Having one (1) central hub also creates branding/naming right opportunities for additional revenues and help orient riders through placemaking, public art, wayfinding and monuments. One disadvantage with this alternative is that sometimes, if riders miss the central hub, they will need to backtrack to be able to transfer to other routes.

This alternative assumes the new Blue route has two-way operations while the Green, Yellow, Orange, and Purple/FIU routes have one-way operation. However, the new Orange Route compliments the Green Route by providing service in the opposite direction (i.e..... essentially providing two-way service). **Tables 40 through 44** present the headways and fleet assumptions for each operating option as well as the route length given that each route cannot be more than 30% outside of the City of Doral's boundary per the interlocal agreement with Miami-Dade County.

OPERATING OPTIONS

1. Operating the proposed routing alternative with the existing vehicle fleet and determining the feasible headways for each route.
2. Expanding the vehicle fleet to operate the proposed routes with the same, or slightly improved, headways as existing routes.
3. Expanding the vehicle fleet to operate the proposed routes with 15-minute headways, weekdays and weekends.

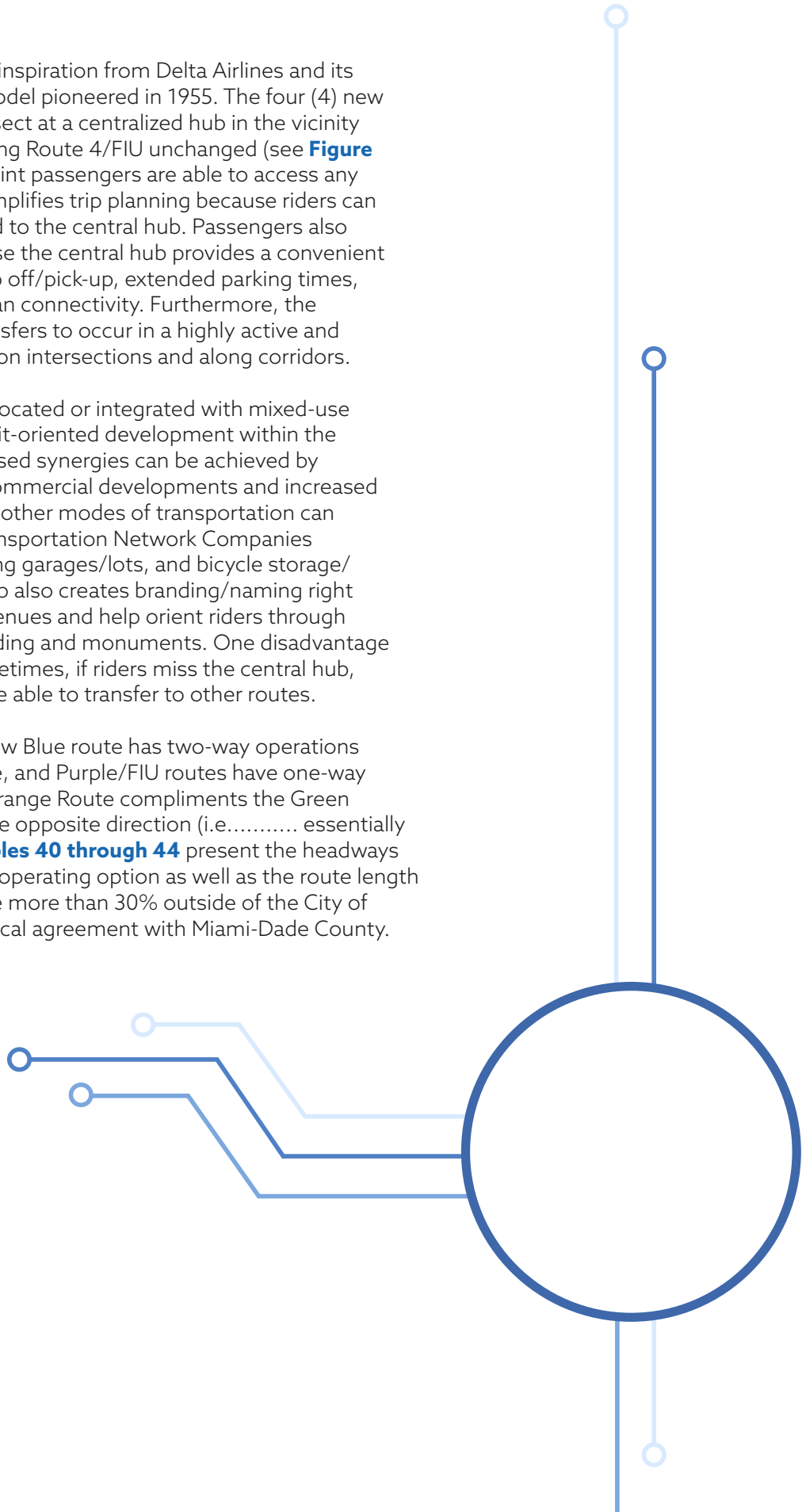
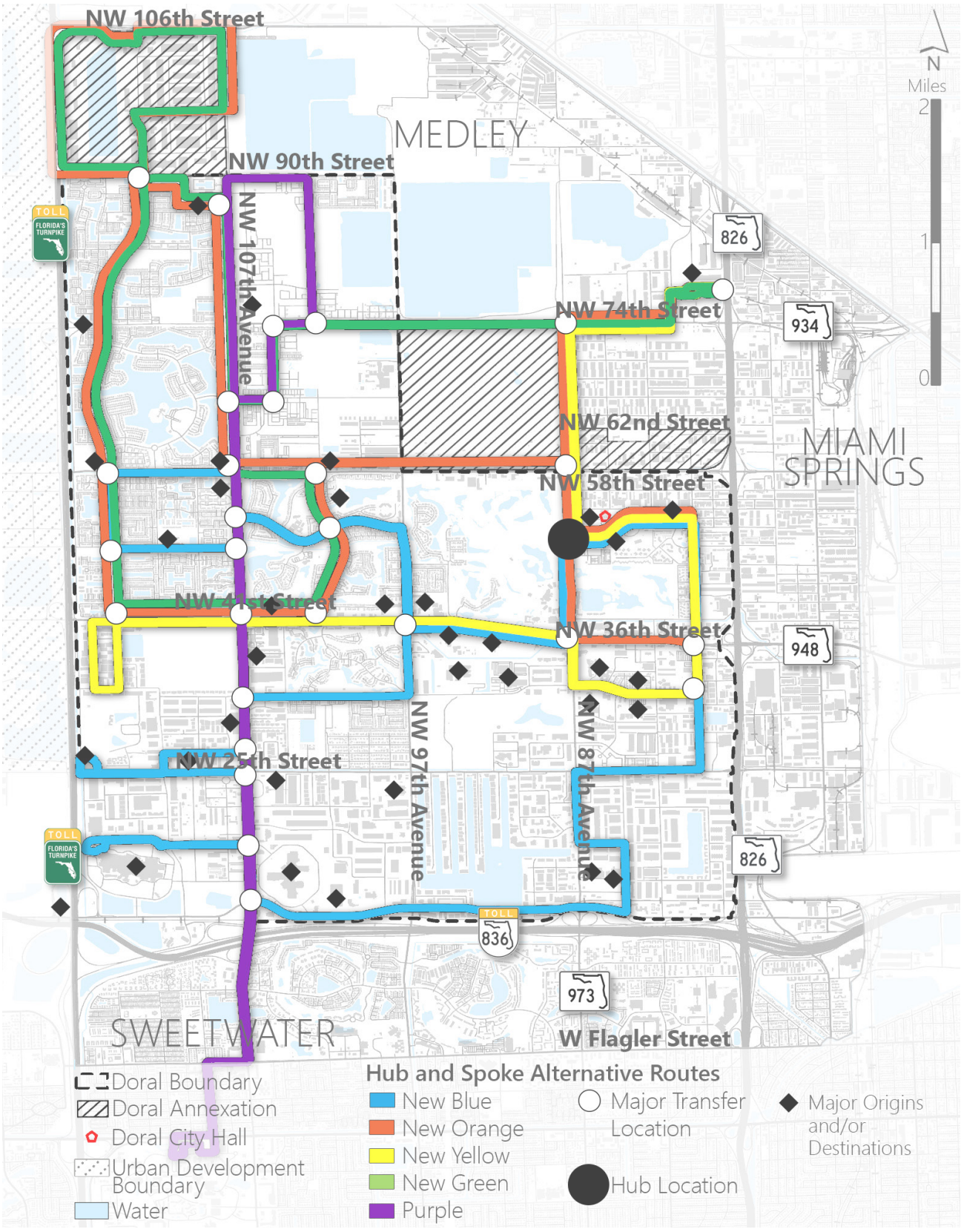


Figure 32 : Hub & Spoke Alternative



HUB & SPOKE ALTERNATIVE

Table 40: Hub & Spoke Alternative Option 1 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	Two-way	60	2	60	2	60	2
Yellow	One-way	25	2	50	1	50	2
Green	One-way	30	2	60	1	-	-
Purple	One-way	25	2	-	-	-	-
Orange	One-way	35	2	70	1	-	-

Required Fleet Size (assuming 20% spares): 12

Table 41: Hub & Spoke Alternative Option 2 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	Two-way	30	8	30	8	60	4
Yellow	One-way	25	4	25	4	50	2
Green	One-way	30	4	30	4	-	-
Purple	One-way	25	4	-	-	-	-
Orange	One-way	35	4	35	4	-	-

Required Fleet Size (assuming 20% spares): 29

Table 42: Hub & Spoke Alternative Option 3 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	Two-way	15	16	15	16	15	16
Yellow	One-way	15	7	15	7	15	7
Green	One-way	15	7	15	7	-	-
Purple	One-way	15	6	-	-	-	-
Orange	One-way	15	8	15	8	-	-

Required Fleet Size (assuming 20% spares): 53

Table 43: Hub & Spoke Route Length Inside and Outside City of Doral's Boundary (excluding Annexations)

ROUTE	TOTAL LENGTH (MI)	LENGTH INSIDE CITY BOUNDARY (MI)	LENGTH OUTSIDE CITY BOUNDARY (MI)	PERCENT OF ROUTE OUTSIDE CITY BOUNDARY
Blue	22.00	19.94	2.06	9%
Yellow	16.70	12.26	4.44	27%
Green	19.80	11.36	8.44	43%
Purple	15.20	10.81	4.39	29%
Orange	23.70	15.29	8.41	35%
Total	98.90	71.2	27.7	28%

Table 44: Hub & Spoke Route Length Inside and Outside City of Doral's Boundary (including Annexations)

ROUTE	TOTAL LENGTH (MI)	LENGTH INSIDE CITY BOUNDARY (MI)	LENGTH OUTSIDE CITY BOUNDARY (MI)	PERCENT OF ROUTE OUTSIDE CITY BOUNDARY
Blue	22.00	19.94	2.06	9%
Yellow	16.70	14.69	2.01	12%
Green	19.80	17.79	2.01	10%
Purple	15.20	10.81	4.39	29%
Orange	23.70	21.69	2.01	8%
Total	98.90	86.42	12.48	13%

THE GRID ALTERNATIVE

More trips and better-quality trips can be performed on a transit network with high-frequency direct routes. These routes are usually linear along a corridor with small turnarounds at each terminal. Choosing major destinations or transfer points as terminals help boost ridership along a route. Forming a network of these efficient routes in Doral creates a grid along the City's major corridors. The Grid Alternative (**Figure 33**) comprises nine (9) new routes plus the existing Route 4. Four (4) of these routes provide north-south mobility along NW 114th/112th Avenue, NW 107th Avenue, NW 97th Avenue, and NW 87th Avenue. Six (6) of these routes provide east-west mobility along NW 12th Street, NW 25th Street, NW 33rd Street, NW 41st/36th Street, NW 58th Street, and NW 74th Street. Transfers occur at major intersections and turn-arounds loop at major destinations/ terminals or around important districts. This alternative only requires one (1) transfer to get almost anywhere in the City.

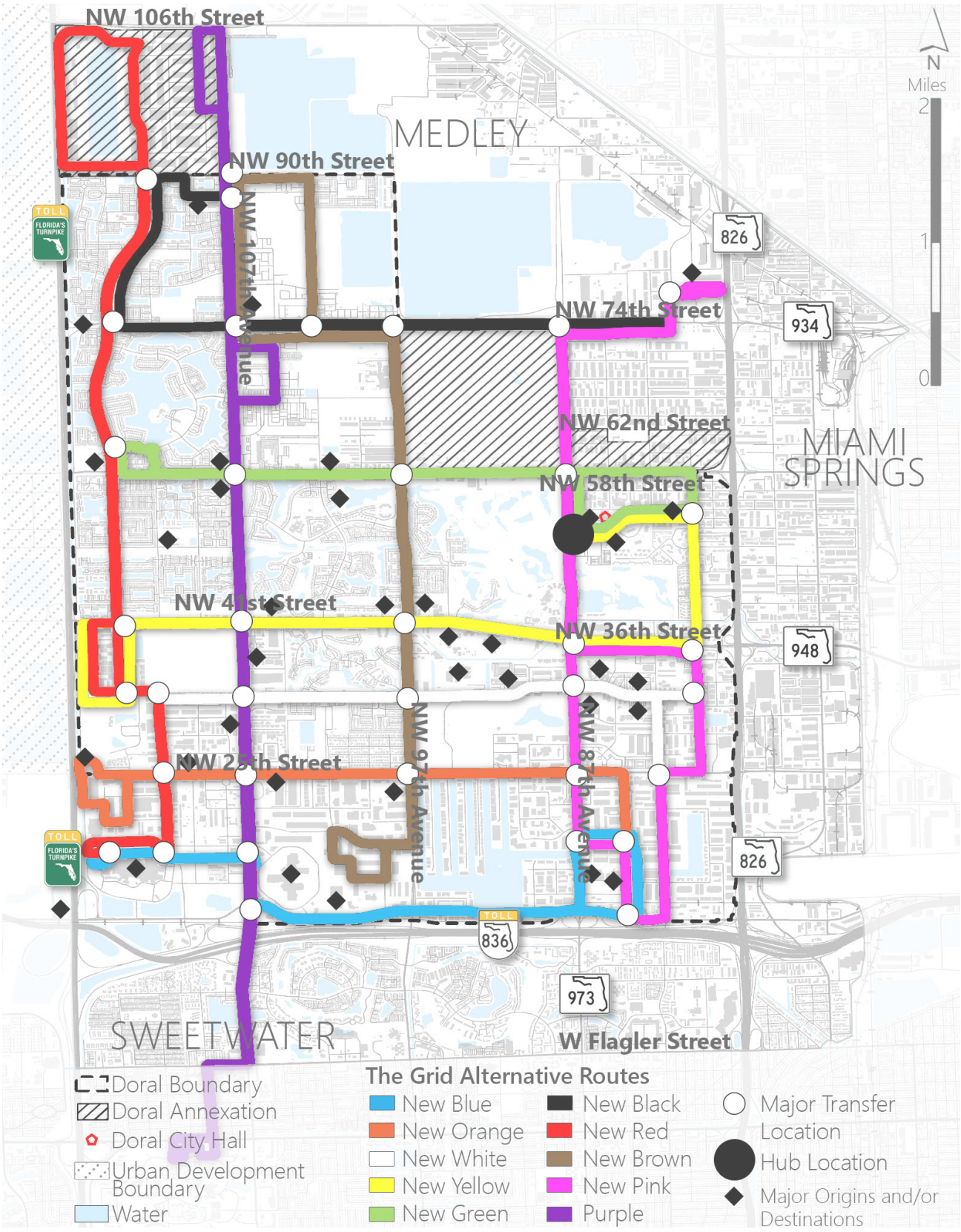
There are several disadvantages with this alternative. First of all, this alternative increases the operating and maintenance costs of the DTS significantly since it expands the system by adding six (6) more routes. Secondly, Doral has a 1-mile block grid which is not ideal for this transit network configuration because of the spacing of transfer points (located far apart from each other) and because locations within the 1-mile block do not receive transit service. The Grid configuration functions well in downtown and urban areas were blocks are small, therefore increasing the coverage of the network while relying on high ridership from heavily transited corridors.

This alternative assumes all routes have one-way operation. **Tables 45 through 49** present the headways and fleet assumptions for each operating option as well as the route length given that each route cannot be more than 30% outside of the City of Doral's boundary per the interlocal agreement with Miami-Dade County.

OPERATING OPTIONS

1. Operating the proposed routing alternative with the existing vehicle fleet and determining the feasible headways for each route.
2. Expanding the vehicle fleet to operate the proposed routes with the same, or slightly improved, headways as existing routes.
3. Expanding the vehicle fleet to operate the proposed routes with 15-minute headways, weekdays and weekends.

Figure 33 : The Grid Alternative



THE GRID ALTERNATIVE

Table 45: The Grid Alternative Option 1 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	One-way	30	1	30	1	30	1
Yellow	One-way	30	1	30	1	30	1
Green	One-way	30	1	30	1	30	1
Purple	One-way	50	1	50	1	50	1
White	One-way	30	1	30	1	30	1
Black	One-way	30	1	30	1	30	1
Red	One-way	40	1	40	1	40	1
Brown	One-way	40	1	40	1	40	1
Pink	One-way	40	1	40	1	40	1
Orange	One-way	30	1	30	1	30	1

Required Fleet Size (assuming 20% spares): 12

Table 46: The Grid Alternative Option 2 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	One-way	30	2	30	2	30	1
Yellow	One-way	30	2	30	2	30	1
Green	One-way	30	2	30	2	30	1
Purple	One-way	25	4	25	4	25	1
White	One-way	30	2	30	2	30	1
Black	One-way	30	2	30	2	30	1
Red	One-way	20	4	20	4	20	2
Brown	One-way	20	4	20	4	20	2
Pink	One-way	20	3	20	3	20	2
Orange	One-way	30	2	30	2	30	1

Required Fleet Size (assuming 20% spares):33

Table 47: The Grid Alternative Option 3 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	One-way	15	4	15	4	15	2
Yellow	One-way	15	4	15	4	15	2
Green	One-way	15	3	15	3	15	2
Purple	One-way	15	6	15	6	15	4
White	One-way	15	4	15	4	15	2
Black	One-way	15	4	15	4	15	2
Red	One-way	15	5	15	5	15	3
Brown	One-way	15	5	15	5	15	3
Pink	One-way	15	4	15	4	15	3
Orange	One-way	15	3	15	3	15	2

Required Fleet Size (assuming 20% spares): 51

Table 48: The Grid Route Length Inside and Outside City of Doral's Boundary (excluding Annexations)

ROUTE	TOTAL LENGTH (MI)	LENGTH INSIDE CITY BOUNDARY (MI)	LENGTH OUTSIDE CITY BOUNDARY (MI)	PERCENT OF ROUTE OUTSIDE CITY BOUNDARY
Blue	8.40	6.34	2.06	25%
Yellow	9.80	9.8	0.00	0%
Green	8.19	8.19	0.00	0%
Purple	17.00	10.38	6.62	39%
White	9.38	9.38	0.00	0%
Black	9.70	5.28	4.42	46%
Red	13.90	8.96	4.94	36%
Brown	12.70	12.7	0.00	0%
Pink	11.90	7.5	4.40	37%
Orange	8.30	7.40	0.90	11%
Total	109.27	77.95	23.34	21%

Table 49: The Grid Route Length Inside and Outside City of Doral's Boundary (including Annexations)

ROUTE	TOTAL LENGTH (MI)	LENGTH INSIDE CITY BOUNDARY (MI)	LENGTH OUTSIDE CITY BOUNDARY (MI)	PERCENT OF ROUTE OUTSIDE CITY BOUNDARY
Blue	8.40	6.34	2.06	25%
Yellow	9.80	9.8	0.00	0%
Green	8.19	8.19	0.00	0%
Purple	17.00	14.77	2.23	13%
White	9.38	9.38	0.00	0%
Black	9.70	7.69	2.01	21%
Red	13.90	11.81	2.09	15%
Brown	12.70	12.7	0.00	0%
Pink	11.90	9.89	2.01	17%
Orange	8.30	7.4	0.90	11%
Total	109.27	97.98	11.29	10%

05

OUTREACH

INITIAL OUTREACH

SECONDARY OUTREACH

The study team performed two sets of outreach meetings. The first set occurred during the development of existing conditions and focused on obtain public and stakeholder feedback regarding existing issues and planning consistency with ongoing Doral initiatives and adjacent municipality. The second set was geared at presenting proposed alternatives to the public and stakeholders in order to obtain their vote of confidence and develop hybrid alternatives if necessary.

INITIAL OUTREACH

FIRST STAKEHOLDER MEETINGS

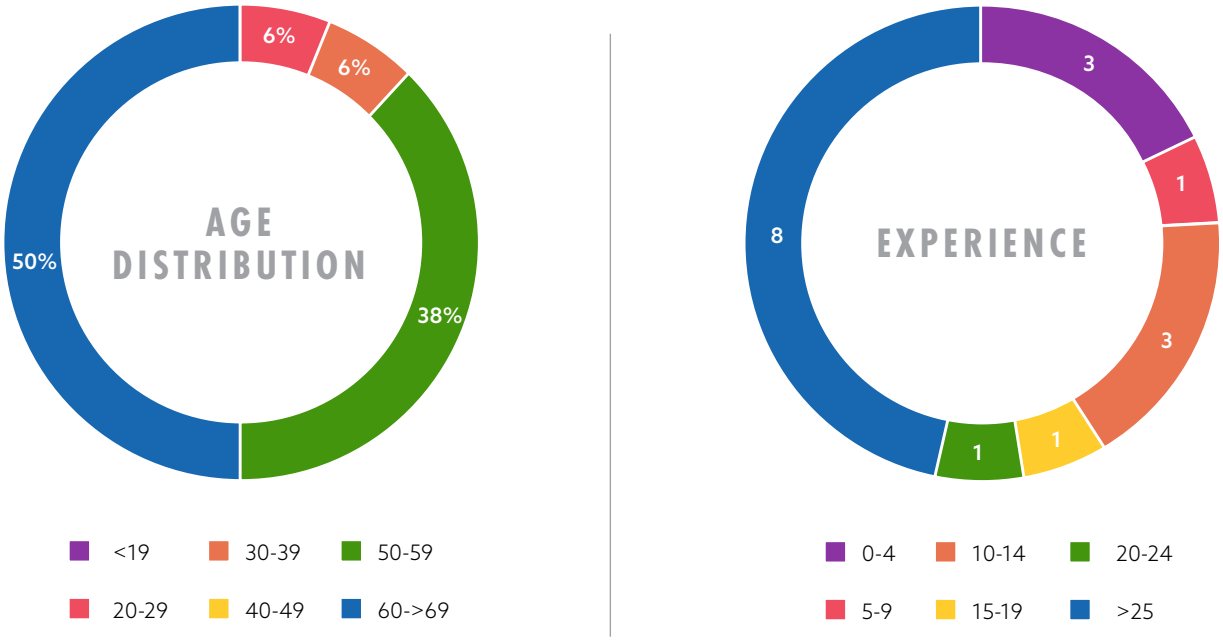
Meeting With Limousines of South Florida (LSF)

On January 23, 2019, the study team met with Limousines of South Florida (LSF), the current trolley operators. During this meeting the study team explained the purpose of the study and encouraged trolley drivers to provide their feedback, opinions, and recommendations on how to improve the DTS. A questionnaire, in English and Spanish, was handed out to the 20 drives employed by LSF. While both the morning and afternoon shift drivers received the questionnaire, the in-person meeting only occurred with the afternoon shift drivers which is 10 employees. 17 questionnaires were received of which six (6) were from drivers in the morning shift, nine (9) from the afternoon shift, one (1) from a stand-by driver, and one (1) undetermined based on the response provided. While most of the drivers had more than 10 years of experience, all drivers had less than or equal to four (4) years working for the DTS. **Appendix D** includes blank samples of the questionnaire provided in both English and Spanish. **Appendix D** also provides a table including answers provided by the trolley drivers. The following bullets, figures, and tables summarize the feedback obtained.

- Poor lighting exists on bus stops at NW 114th Avenue and NW 58th Street (near the Sedano's Supermarket), and NW 52nd Street.
- Drivers complained about poor signal timing at the following intersections:
  - NW 107th Avenue and NW 41st Street
  - NW 107th Avenue and NW 66th Street
  - NW 114th Avenue and NW 41st Street
  - NW 114th Avenue and NW 58th Street
- Queue length exceed the capacity of the eastbound left-turn bay at NW 97th Avenue and NW 33rd Street.
- Passengers have requested the following stops:
  - NW 112th Avenue and NW 41st Street (Potential transfer from Route 1 to Route 2)
  - NW 107th Avenue and NW 14th Street
- Passenger respect for trolley driver and City property is an issue, especially with students on Route 1 since they put themselves and others at risk or disobey trolley policies (such as no drinking/eating, maintaining feet on the ground, etc.).
- Passengers also perform unsafe actions such as standing up and at times descending the doorsteps before the trolley comes to a full stop at a destination. Some passengers also stand almost in front of the trolley as it approaches bus stops.
- Frequently, the trolley is at capacity when it arrives at the Palmetto Metrorail Station between 4:00 PM and 5:00 PM causing some passengers to want to overcrowd the vehicle.

- Due to the expected opening of the Dolphin Station Park-n-Ride, the only route serving the NW 17th Street stop is Route 4 and not Route 1 and 4 as before. This temporary change is expected to be modified once the Park-n-Ride opens but some customers have expressed desire for Route 1 to serve the stop again.
- Drivers suggest using NW 17th Street to connect to the Dolphin Mall as opposed to NW 14th Street due to traffic congestion.
- Some passengers and drivers have noted that the one-way circulator routes are not efficient given the long distance a passenger must ride to go back to a missed stop or return to its trip's origin. Some drivers recommended making routes linear and two-way.
- Drivers noted some blind/visually impaired passengers use the trolley with frequency, however, the drivers were unaware of ADA regulations such as making stop announcements inside transit vehicles at main points along the routes. While the drivers have received training, an automated voice-over gives all the announcements through speakers installed in the vehicles. Some drivers reported trolley vehicles with malfunctioning voice-overs and the maintenance crew noted some vehicles arrived with wires cut to shut-off the system.

Figure 34: LSF Drivers' Age Distribution and Experience



INITIAL OUTREACH

FIRST STAKEHOLDER MEETINGS (CONTINUED)

Meeting With Doral City Staff

On March 5, 2019, the study team met with the City's Trolley Manager. The manager informed the team about the TSO Mobile website and all the data it hosts for the City. Furthermore, the manager informed the team about ongoing issues with the trolley APCs and how the City was in the process of retrofitting the vehicles from lateral to overhead counters. The project team suggested adding bicycle counters to quantify the use of the trolley's bicycle racks. The Trolley Manager oversees weekly vehicle inspections of the trolley vehicles.

In terms of operations, the City staff expressed desire for route simplification, updated branding, and bicycle and pedestrian improvements around existing trolley stops. The staff also said the City would like to evaluate a potential Lunch Route and Sunday Route.

City staff also informed the project team of important developments:

- Doral Boulevard Bus Shelter Concepts between NW 79th Avenue to 87th Avenue
    - As a supplementary effort to the Doral Boulevard Beautification Master Plan, the City commissioned the development of bus shelter design concepts and architectural elements to be located along Doral Boulevard. The proposed concepts are displayed in **Figures 35 through 37**.

Figure 35: Doral Boulevard Bus Shelter Concept 1

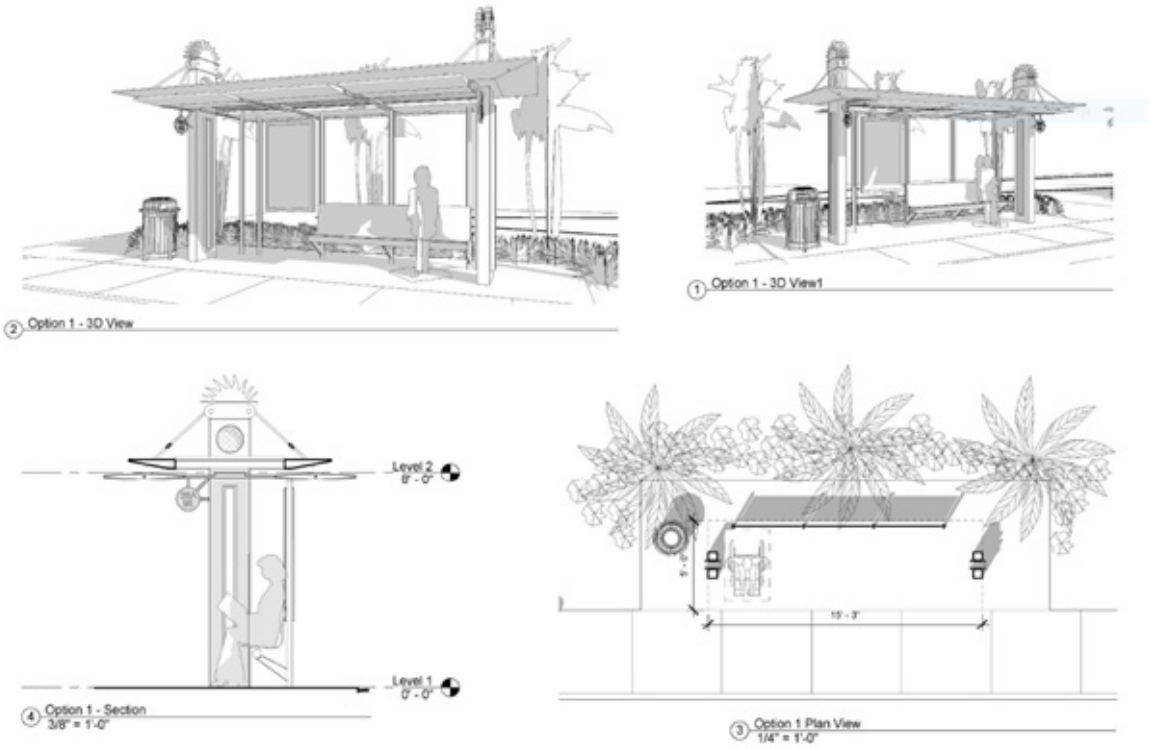


Figure 36: Doral Boulevard Bus Shelter Concept 2

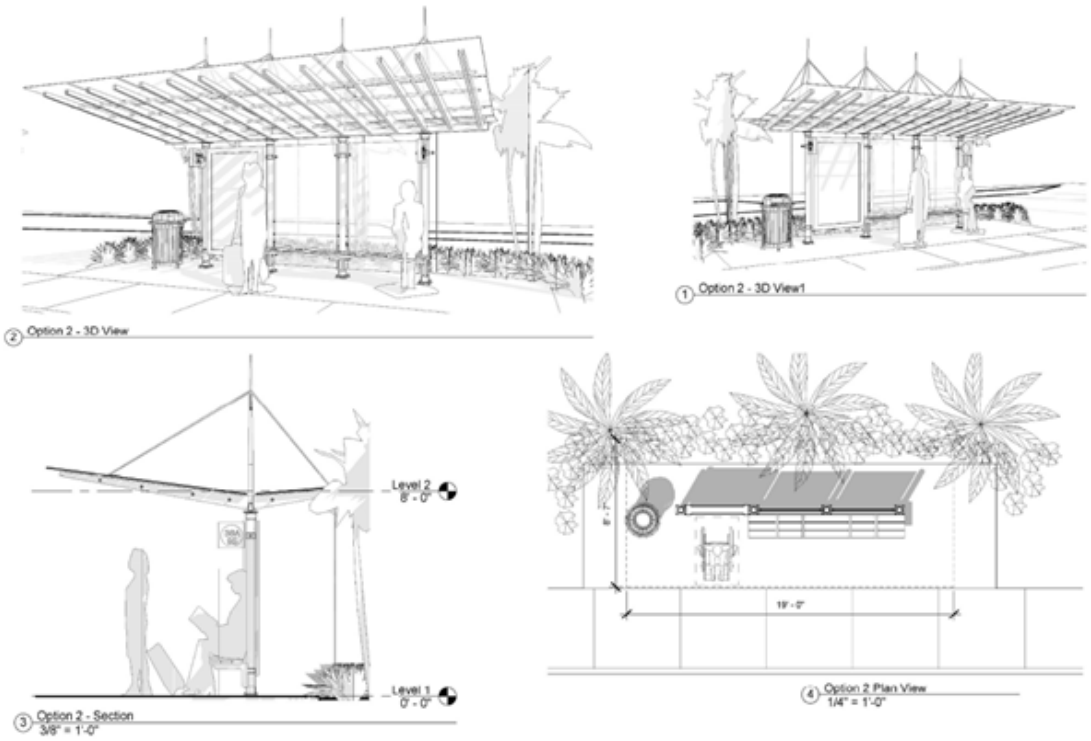
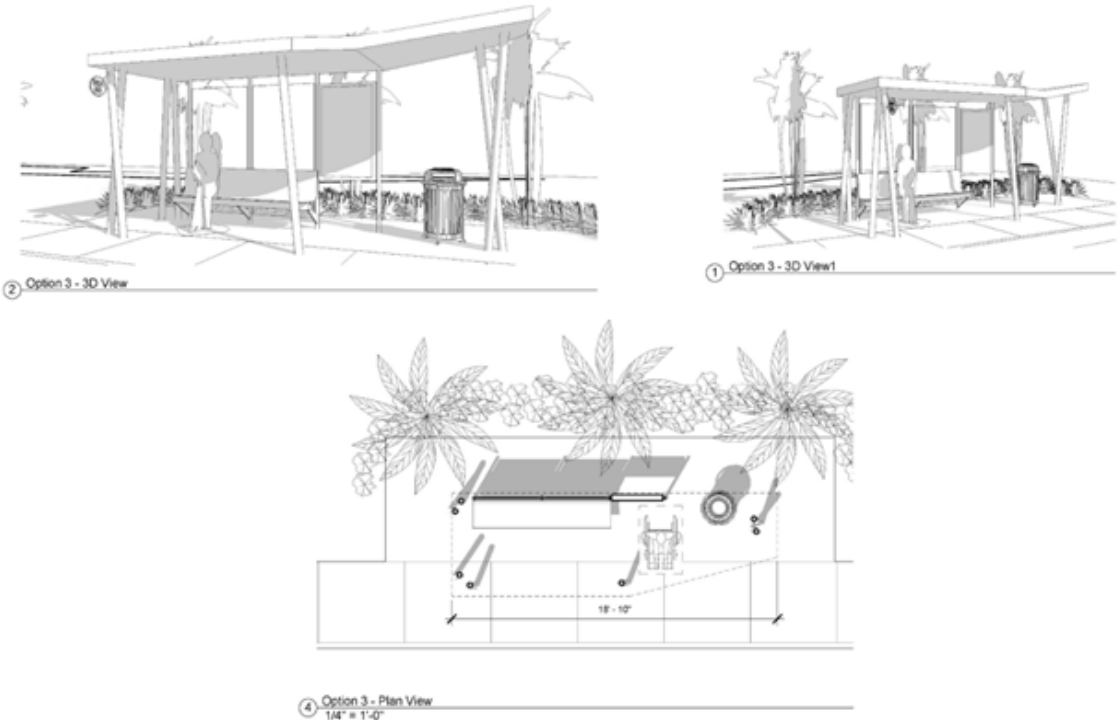


Figure 37: Doral Boulevard Bus Shelter Concept 3



INITIAL OUTREACH

FIRST STAKEHOLDER MEETINGS (CONTINUED)

Meeting With Doral City Staff (Continued)

- Doral Yard at Downtown Doral
  - A staple of Miami's transformative power is moving to Doral. With Wynwood Yard closing and reopening as Doral Yard in Spring 2020, the celebrated bohemian culinary and entertainment open space will now offer live music, food, and drinks in Downtown Doral. This concept has brought the City and developers into talks for unique branding opportunities within the downtown area. Specifically, the City is looking into incorporating public art and distinctive transit infrastructure/amenities to market the area as a new destination experience. This means the DTS should take into consideration potential increased demand from this new attractor and incorporate innovative design elements and aesthetic features.
- Doral Asset Inventory and Management System
  - The City is looking to classify all of its existing infrastructure assets in order to manage useful lives through technology. An asset management system will allow the City to efficiently perform daily operations while improving the and flexibility to perform medium- and long-term projections. With improved data collection, the City is able to schedule important preventive maintenance more efficiently.
- Freebee®
  - The City recently entered into an agreement with Freebee, a South Florida start-up providing micro-transit solutions for Miami-Dade municipalities. Freebee uses Polaris Global Electric Motorcars (GEM), six (6) seater low-speed vehicles, that resemble golf carts. Providing free service, the start-up seeks to amass popularity by functioning as a lunch transportation service in employment-dense areas. Within Doral, Freebee operates between NW 87th Avenue and NW 79th Avenue and between NW 53rd Street and NW 58th Street.
- CitiBike®
  - Similar to Freebee, the CitiBikes provide on-demand bicycle rentals through conveniently located bicycle docking stations. This bike share program is designed for quick trips with convenience and fun in mind. CityBikes in Doral will also be initially located around the Downtown Doral area and may expand throughout the City.

Freebee in Doral

First Meeting with Business Stakeholders

The stakeholder workshop began with a brief presentation of the study's scope and schedule, purpose for the meeting, and snippets of the DTS existing conditions analysis. This presentation followed an open-floor discussion around five (5) points: Land Use, Mode, Technology, Branding, and Policy. Below is a summary of topics discussed for each of these points.

LAND USE:

- Codina is developing most of Downtown Doral and they are supportive of non-motorized transportation and transit.
- Miami-Dade College West is updating its master plan. There is a large section of the West Campus that is an empty shell, and the college is looking to develop more of this campus to be integrated with businesses in the immediate vicinity. The campus does not have student housing and the cost of living in Doral is high for their student population, so the college is always looking for solutions.
- Southern Command is planning to develop 160 acres across their campus for staff housing.

MODE:

- Walking and biking was discussed and a lack of infrastructure was noted. Protected bicycle lanes in Doral are minimal and do not connect to transit stations.
- Freebee was discussed as a convenient mode of connecting short distance trips. The on-demand feature of Freebee was celebrated.
- The trolley is seen as a good mode of transportation because of its free fare and its reach to the City's residential areas.
- Miami-Dade College West is now offering 4-year degrees which may result in an increased demand for transportation options to the campus.

TECHNOLOGY:

- The audience express doubt regarding driverless car completely improving the transportation system. Technology is considered most needed to improve travel and transfer times as well as reliability.
- One attendee recommended improving the User Interface (UI) of mobile and web applications for the Trolley. Increasing the intuitive design can help attract more riders and improve reliability.

BRANDING

- Codina proposed focusing on bus shelters. This infrastructure is a great opportunity for branding and sense of community given they can be practical and aesthetically pleasing. The current bus stops do not protect people from howling rains.
- One (1) attendee had participated in a project to redevelop the bus shelters for the City of Miami Beach. The design included ample shelter coverage, solar panels, and dynamic displays with route maps and games for kids.
- Raising awareness of existing services was also proposed given one (1) audience member did not know the trolley service was free until an opportune conversation with a coworker.

INITIAL OUTREACH

FIRST STAKEHOLDER MEETINGS (CONTINUED)

First Meeting with Business Stakeholders (Continued)

POLICY

- Codina has attempted telecommuting and carpooling but these policies have been unsuccessful. Implementing these policies in Downtown Doral could a be possibility.
- Some attendees are interested in spearheading a Transit Management Area (TMA) if other employers around Downtown Doral are willing to participate.
- Southern Command gets benefits from the federal government which pay for carpooling, Metrorail passes, vanpool opportunities, and other mobility options. Southern Command is unable to participate in TMA due to federal and state regulations.
- Miami-Dade College has some discounted transit service fares for students, but other initiatives have not gelled.

Meeting with the Town of Medley

The purpose of the meeting was to understand the ongoing transit efforts developing in the Town of Medley. Jorge Corzo, Town Engineer, discussed an existing paratransit service to the residents of the Medley Lakeside Retirement Park located in near NW 107th Avenue and NW 116th Way. The service typically takes elderly residents to shopping destinations in Hialeah Gardens. Medley uses all of its CITT funding for this service which is approximately $25,000 annually.

In addition to this service, Medley recently complete a Multimodal Mobility Plan which proposes the implementation of a transit circulator. The route will be operated by Miami-Dade DTPW with 20-minute headways during peak periods and slower headways during off-peak periods. The new route will serve the triangle formed by SR 934/Hialeah Expressway, SR 826/Palmetto Expressway, and NW South River Drive. This route will also connect to the Palmetto Metrorail Station.

Additional points raised during this meeting but not fully discussed include:

- Proposed annexations by the City of Doral, Town of Medley, City of Miami Gardens, and City of Virginia Springs
- New roadway construction on NW 87th Avenue between NW 74th Street and NW 103rd Street in Medley.[1]

[1] Refer to http://www.fdotmiamidade.com/current-projects/north-miami-dade/nw-87-ave-from-nw-74-st-to-nw-103-st-1.html.

Meeting with the City of Sweetwater

The purpose of this meeting was to understand the ongoing transit efforts developing in the City of Sweetwater. Robert Herrada, Sweetwater Assistant City Manager, discussed the existing transit service and expected changes. The City operates its trolley as a flex service with no designated stops. Most residents using the trolley are elderly with principle destinations being Sedano's Supermarket, Walgreens and other pharmacies along Flagler Street as well as Dolphin Mall. The City owns two (2) trolley vehicles and plans to acquire one (1) additional vehicle. LSF operates Sweetwater's trolleys. The City wants to modify the route slightly to serve Ikea and universities north of Dolphin Mall.

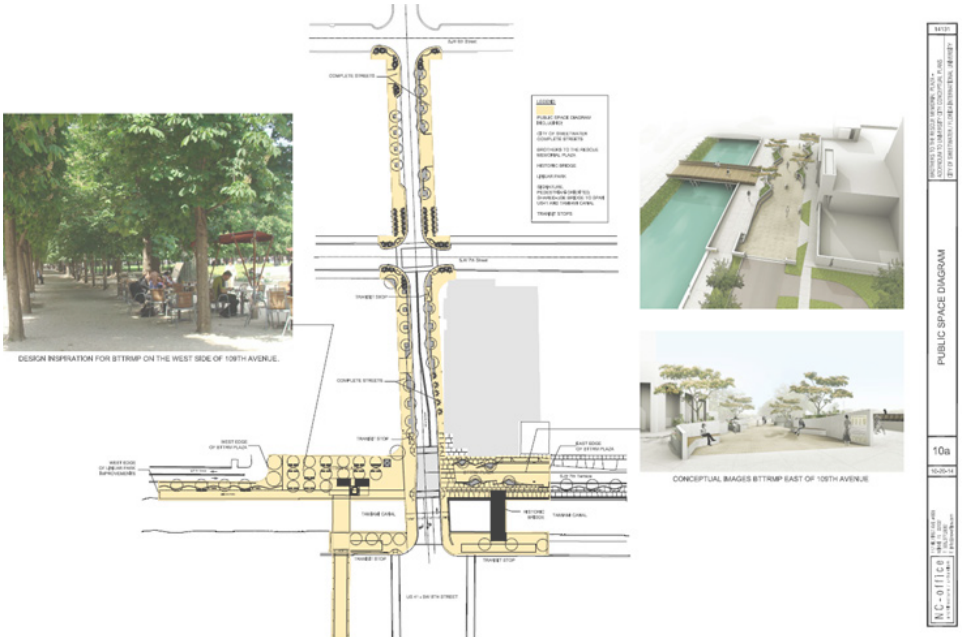
According to Mr. Herrada, 25% of City residents work or go to school in Sweetwater. The City operates its transit system jointly with FIU through a non-profit organization which operates six (6) cutaway vans between the Engineering Center and the Modesto A. Maidique campus. FIU uses Transloc as their GPS provider and an in-house application called Informed Traveler Program App (ITPA)[2] as their main user interface for trip planning and parking occupancy assistance. FIU students riding the trolley have often requested stops in Doral.

Mr. Herrada also discussed land use changes occurring in Sweetwater. As part of the University City vision for Sweetwater, several new developments have been recently completed, are planned, or are underway.

NW 109th Avenue is also intended to be the City's main corridor. The City wants to transform it into a Complete Street with bicycle/pedestrian plaza south of SW 6th Street. Looking at **Figure 38**, NW 109th Avenue will host a Brothers to the Rescue Memorial Plaza, one (1) historic and one (1) signature bicycle/pedestrian bridge, linear park, and transit stops. Other amenities include benches, architectural shading elements, and landscaping. The City recently obtained a $20,000.00 grant for landscaping along NW 109th Avenue.

[2] http://uc.fiu.edu/IA/

Figure 38: NW 109th Avenue Public Space Diagram



INITIAL OUTREACH

FIRST PUBLIC WORKSHOP

The public workshop followed the same structure as the business stakeholder meeting. The highlight of this meeting was the open-floor discussion around five (5) points: Land Use, Mode, Technology, Branding, and Policy. Below is a summary of topics discussed for each of these points.

LAND USE:

- The audience expressed opposition to gated communities and multi-residential developments that prevent the transportation network from having a grid pattern and instead segregate the network by forming clusters of looped roadways.
- The audience expressed skepticism to the idea of land use pattern changing in the future. Most attendees believe development of gated communities will continue and existing gated communities will have legal protection against constructing shared paths or roads within their properties to complete a grid transportation network.

MODE:

- A few members of the audience were in favor of prioritizing non-motorized modes of transportation, such as bicycling, but most attendees were in favor of prioritizing transit services.
- Arguments against bicycle infrastructure investment included comfort and convenience issues due to weather/climate, safety issues due to existing auto-centric roadways, and connectivity issues due to missing gaps in the bicycle network.
- Another argument raised against bicycle investments was a lack of will/culture for using this mode of transportation. This argument was supported by the fact that Spin, a private dockless bicycle/scooter rental company, failed to generate enough ridership to continue operations in the City.
- Most audience members expressed a need for better transit service connecting to Metrorail and future premium transit services destined to Downtown Miami. This need is due to most commuters traveling long to medium distances in an east-west direction. The audience expressed discontent with current travel times and frequencies of the trolley routes to the Palmetto Metrorail Station.
- Similarly, most attendees agreed with a proposition of improving the service for students during peak periods; noting that commuters and students have different schedules and demands.
- Others expressed a need for more on-demand services such as Uber, Lyft, car-sharing (Zipcar) or Personal Rapid Transit (PRT).
- Zip car was brought up as an alternative to owning a personal vehicle. Some audience members rebuked this suggestion as creating more of a problem than a solution – that is, more cars in the City, not less.

- Other modes, such as Freebee, were considered positive supplements to the trolley service but maintaining and improving the trolley was express as the top priority. A possible solution could be to investigate a mixed fleet solution, with small occupancy vehicles used during low demand periods of the day and large occupancy vehicles used during peak periods. Premium transit within Doral was envisioned as a faraway concept that will not be applicable for many years to come.

TECHNOLOGY:

- One attendee suggested partnering with Uber or Lyft to mine origin-destination data. The idea behind this endeavor is to provide reliable public on-demand services or improve trolley service by making routes more flexible and geared towards individual trips.
- One (1) innovative idea offered was to display QR codes on trolley buses that direct mobile phone users to the trolley's website or mobile application.
- Most attendees agreed that the existing mobile application is inaccurate in reporting ETA.
- Automation of vehicles and signal priority were briefly discussed with a positive attitude. These technologies are needed efficiencies in the future.
- Some people expressed a need to focus on the 100,000 plus people that travel daily through the City but do not necessarily live in the City. Aside from providing mobility to citizens and transit-dependent people, an important travel market is the worker commuting into the City.

BRANDING

- The FIU route was brought into question given its specialized service to students and the route going outside of the City boundaries. Attendees claimed FIU should support the trolley route in some manner. This route could incentivize students to rent and live in Doral.
- More advertising of trolley services was recommended given many students or City outsiders do not know the trolley is free and connects important destinations.
- A lunch route using a combination of Freebee and Trolley was recommended. This route should be organized through employers, giving potential for co-branding.
- Co-branding on trolley buses was seen as positive as long as advertisement on the buses are "clean and appropriate".
- Attendees minimally discussed transit infrastructure. While some agreed poor infrastructure is a major impediment to using transit, most agreed the City should focus on the reliability of the trolleys; making sure proper frequencies are provided at peak times.
- East-west connections are important and improvements along NW 25th Street and NW 58th Street are needed to be able to move vehicles. NW 97th Avenue was also discussed as an important north-south connector.

INITIAL OUTREACH

FIRST PUBLIC WORKSHOP (CONTINUED)

POLICY

- Most audience members understood land use policy creates transportation demand.
- While most people disagreed with gated communities, some also expressed dislike for high-rises and mixed-used development. These sentiments are guided by a desire to improve the existing transportation network while maintaining Doral's suburban environment.
- People were very enthusiastic about getting more businesses involved with this study and making businesses aware of their potential benefits from the outcomes of this study.

First Public Workshop Meeting Flyer

SECONDARY OUTREACH

On June 19, 2019 two (2) subsequent stakeholder meetings were conducted to obtain feedback on the alternatives developed from the public and businesses within the City. These meetings took place in the Third Floor Training Room of the City of Doral Government Center. The business stakeholder meeting took place from 10:00 AM to 12:00 PM and the citizens' workshop took place from 6:00 PM to 10:00 PM. **Appendix E** comprises of all presentation materials provided during these meetings as well as meeting packages.

SECOND STAKEHOLDER MEETING

SECOND MEETING WITH BUSINESS STAKEHOLDERS

The stakeholder meeting began with a brief presentation of different proposed alternative routes, service options, and other recommendations. Attendees were also informed of an online survey to cast their votes on their preferred alternative and service options. The following notes/ comments were record as express by representatives of attending businesses and organizations.

- One (1) attendee wanted to ensure a connection is provided to the "Our Lady of Guadalupe" religious center on the recommended alternative. This religious center should be served during the weekends, specifically Sundays.
  - All alternative routes presented provide a connection to the aforementioned religious center. Sunday service will be accommodated for this destination.
- One (1) attendee inquired about the Dolphin Station and whether the trolley will access this terminal in the future.
  - All alternative routes presented, and the existing system, connect to Dolphin Mall as an interim condition until the Dolphin Station begins operating.
- One (1) attendee called attention to the new "Downtown Doral Charter Upper School" currently under development at the corner of NW 79th Avenue and NW 53rd Street.
  - Alternatives proposed do connect to this new development.

- Attendees responded positively to the Hub & Spoke route alternative and fixed service options.
- Attendees had mixed reactions to the idea of a transit terminal in Downtown Doral. Some worried about the terminal's cost due to the high value of real estate in Downtown Doral. Others worried about congestion in this area and the effect on trolley operations. Others viewed the central terminal as a good mobility option for the upcoming area, especially for student mobility given the new middle school and high school do not provide sufficient parking for their student population.

SECOND PUBLIC WORKSHOP

The second public workshop began with a similar presentation as the one presented to the businesses. The audience was also informed and encouraged to participate in the same online survey to select which alternative and service option they preferred. The following notes/comments were recorded as express by individual audience members.

- One (1) attendee expressed his/her issue with the existing Route 1. The attendee voiced that the route is too long, and he/she would like to see shorter routes.
- Attendees complained about poor customer service from trolley drivers.
- Attendees said drives take long layovers at gas stations and fast food restaurants.
- Attendees also complained about inaccurate information provided by the tracking application and how these layovers affect ETA.
- Three (3) attendees expressed concern with the idea of a transit terminal in Downtown Doral. They suggested improving the Palmetto Station or developing a small terminal in the outskirts of Downtown Doral instead of developing a new facility in this location. They claimed developing a terminal in Downtown Doral is cost prohibited and will affect trolley operations due to the areas general traffic congestion.
- One (1) attendee suggested having routes that divide the City into quadrants (NE, NW, SE, and SW) and overlap on major corridors.
    - This attendee also suggested placing transfer stops on side streets and not major corridors.
    - A disadvantage with this proposed alternative route is that the City is very segregated in terms of land use and most of the residential land use is concentrated in the northwestern area of the City. Hence, residents would require several transfers to travel between activity centers/origin-destination pairs. Another disadvantage of this alternative is that the City has one-mile blocks. If the proposed routes only loop around major corridors, potential riders in the center of a block will not be served by the trolley and may have inconvenient first/last mile connections.
- One (1) attendee highlighted the need to connect to outpatient services such as the University of Miami Health System Bariatric Center located on NW 35th Street and NW 82nd Avenue.

INITIAL OUTREACH

SECOND PUBLIC WORKSHOP (CONTINUED)

- One (1) attendee mentioned adding solar panels to the trolley vehicles and trolley stops.
    - Some trolley shelters do have solar panels, however, the attendee pointed out that adding a sticker saying something like "Did you know I am solar?" may be beneficial to highlight the City's investment in sustainable energy.
- One (1) attendee suggested looking into adding a stop at the public library in Miami International Mall.
- One (1) attendee suggested keeping most of the proposed routes within the City boundaries and, when providing connections to terminals outside of the City, keeping those connections as direct as possible (i.e. north-south between the Dolphin Station and NW 25th Street as opposed to traveling on NW 12th Street or within the Dolphin Mall).
- One (1) attendee suggested implementing a text application where you text the stop number and receive a response text with the trolley ETA information.
    - The City has this capability through existing contract with TSO Mobile but is not exercising this option due to operational budget constraints and other service issues with the vendor.
- One (1) attendee commented that the vehicles are unappealing, have poor energy efficiency, and are slow/inefficient
    - This attendee suggested purchasing new vehicles, such as the shuttles used by the City of Miami.
- One (1) attendee mentioned that the trolley vehicles are not being washed before beginning operations.
- One (1) attendee suggested consolidating bus stop locations.
- One (1) attendee suggested creating a new Hybrid Alternative between the "Hub & Spoke" and "The Grid" alternatives.

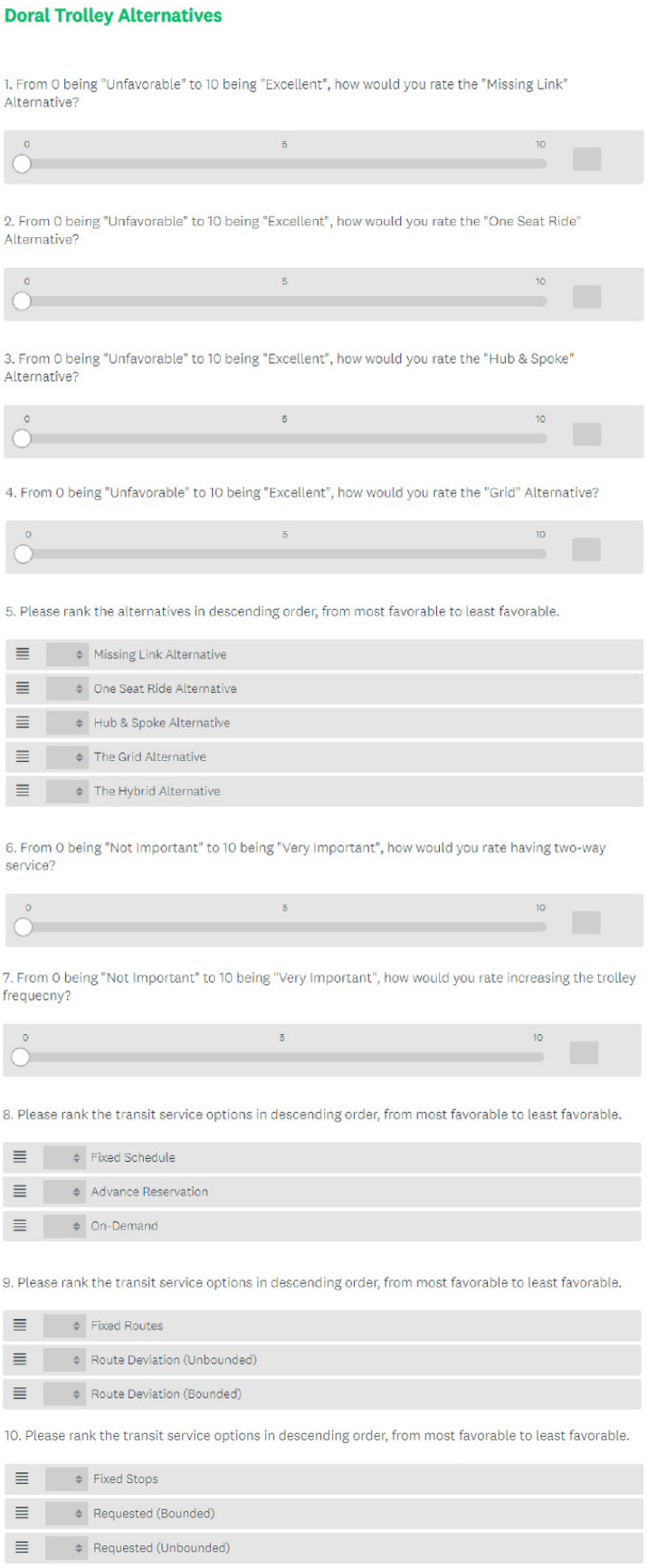
Second Public Workshop Meeting Flyer

INITIAL OUTREACH

SURVEY OF BUSINESSES AND PUBLIC REGARDING PRELIMINARY ALTERNATIVES

The online survey provided to the stakeholders included ten (10) questions. **Figure 39** illustrates the questions and the format presented to the audience. A total of eight (8) individuals attended the June 19, 2019 stakeholder meetings. Of these individuals, seven (7) participated in the online survey but not everyone answered all ten (10) questions. While no hybrid alternatives were presented, participants were allowed to vote for a hybrid alternative if they felt the presented alternatives were inadequate. **Figure 40** summarizes the results for the survey.

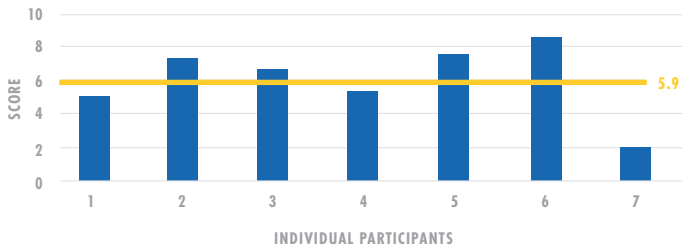
Figure 39: Stakeholder Coordination Survey



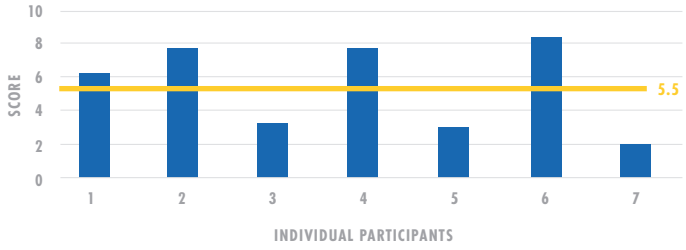
***Note** Questions 8 through 10 sound similar but relate to different topics. Question 8 asked audience members to rank different scheduling options. Transit schedules can be fixed or flexible. Two (2) types of flexible schedules can be implemented: advance reservation where a user schedules a pickup/drop-off, or on-demand such as FreeBee and Uber/Lyft. Question 9 asked audience members to rank different routing options. Routes can be fixed to specific corridors, flexible with route deviations within a specific area (i.e. FreeBee), or flexible and unbounded such as Uber/Lyft. Lastly, Question 10 asked audience members to rank different stop location options. Stops can be fixed to a specific location, flexible through requested within a bounded area (i.e. FreeBee), or flexible and unbounded (i.e. Uber/Lyft).

Figure 40: Stakeholder Coordination Question Results

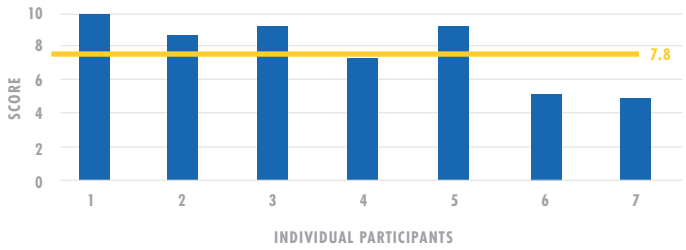
QUESTION 1: MISSING LINK ALTERNATIVE



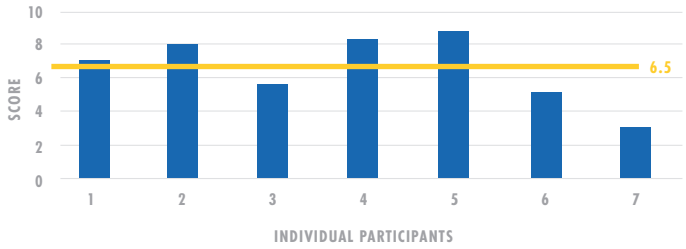
QUESTION 2: ONE SEAT RIDE ALTERNATIVE



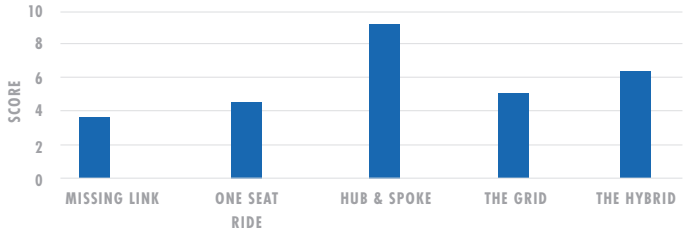
QUESTION 3: HUB & SPOKE ALTERNATIVE



QUESTION 5: THE GRID ALTERNATIVE



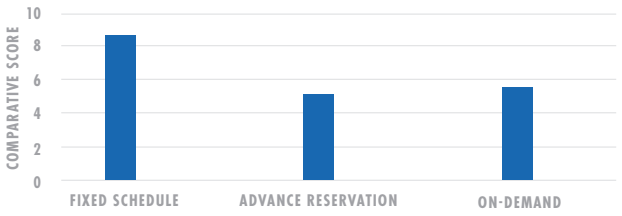
QUESTION 5



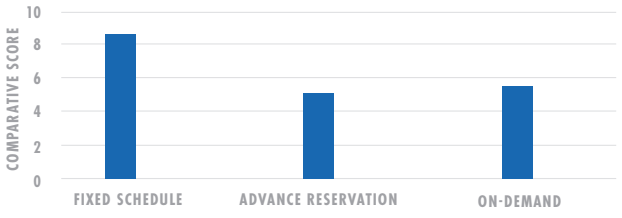
QUESTION 6

QUESTION 7

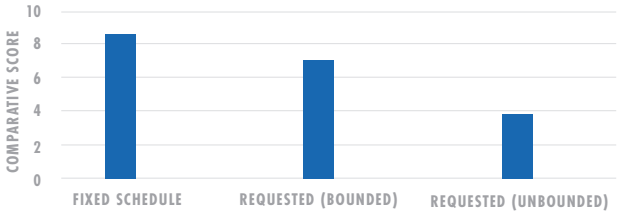
QUESTION 8



QUESTION 9



QUESTION 10



06

HYBRID ALTERNATIVES

GRID HUB HYBRID ALTERNATIVE

QUADRANTS HYBRID ALTERNATIVE

Based on the feedback obtained from the secondary outreach two (2) hybrid alternatives were developed.

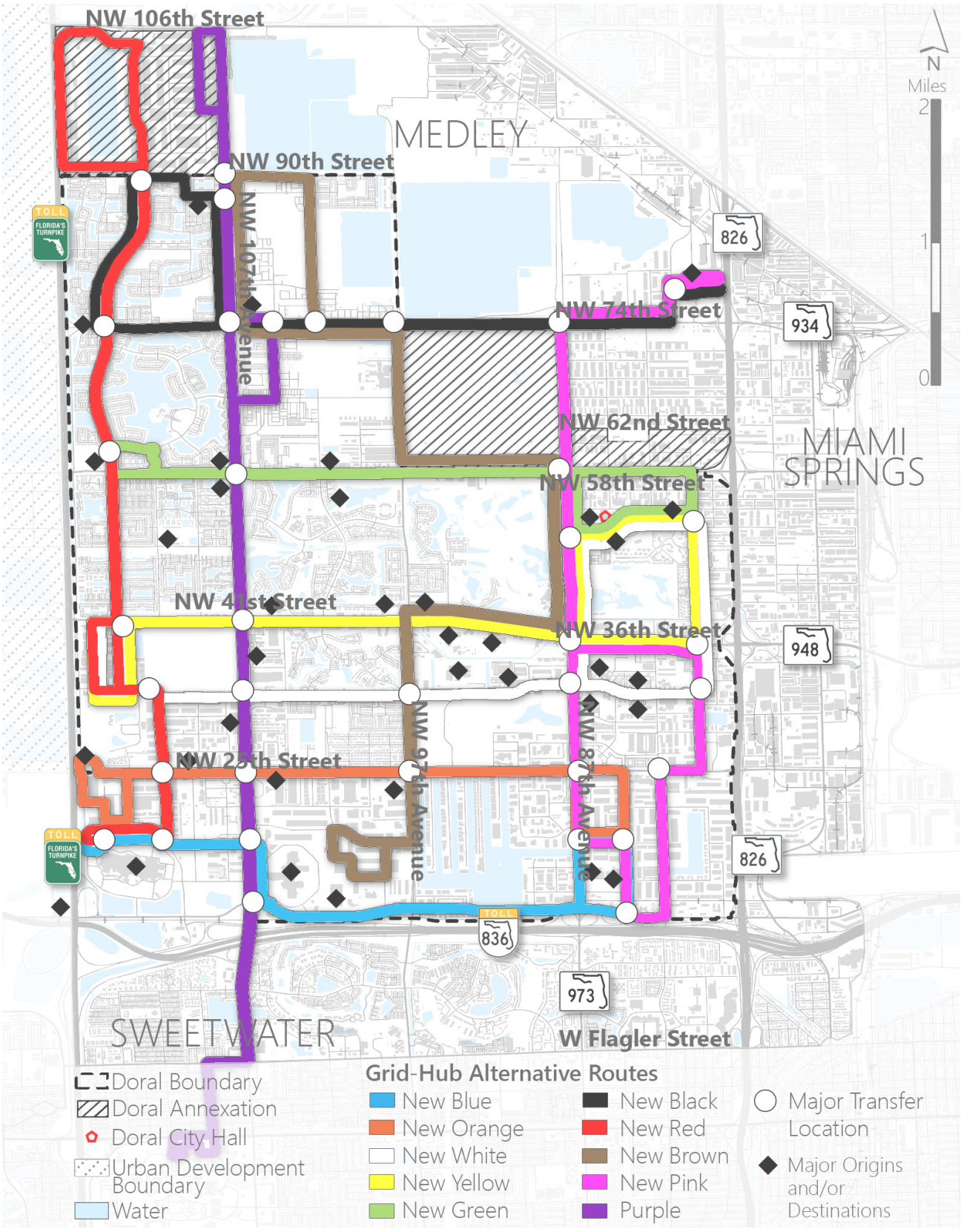
GRID HUB HYBRID ALTERNATIVE

The Grid Hub Alternative (**Figure 41**) modifies The Grid Alternative by creating a hub in Downtown Doral and connecting nearby routes to serve this hub. This alternative keeps Route 4/FIU with minor modifications to serve the anticipated City annexation areas. This alternative incorporates the coverage advantages of a centralized hub with the efficiency advantages of linear routes. The disadvantage of this alternative is that it is more expensive to operate/maintain relative to the existing routes and other alternatives. Furthermore, this alternative is more capital intensive than The Grid Alternative because it requires developing a central hub. This alternative does not acquire all the benefits of the Hub & Spoke Alternative because not all routes can be designed to access the hub due to distance. Hence, corridor routes along NW 114th/112th Avenue, NW 107th Avenue, NW 12th Street, NW 25th Street, and NW 74th Street maintain their linear pattern and do not connect to the central hub. This alternative assumes all routes have one-way operation. **Tables 50 through 54** present the headways and fleet assumptions for each operating option as well as the route length given that each route cannot be more than 30% outside of the City of Doral's boundary per the interlocal agreement with Miami-Dade County.

OPERATING OPTIONS

1. Operating the proposed routing alternative with the existing vehicle fleet and determining the feasible headways for each route.
2. Expanding the vehicle fleet to operate the proposed routes with the same, or slightly improved, headways as existing routes.
3. Expanding the vehicle fleet to operate the proposed routes with 15-minute headways, weekdays and weekends.

Figure 41: Grid Hub Hybrid Alternative



THE GRID HUB HYBRID ALTERNATIVE

Table 50: The Grid Hub Hybrid Alternative Option 1 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	One-way	30	1	30	1	30	1
Yellow	One-way	30	1	30	1	30	1
Green	One-way	30	1	30	1	30	1
Purple	One-way	50	1	50	1	50	1
White	One-way	30	1	30	1	30	1
Black	One-way	30	1	30	1	30	1
Red	One-way	40	1	40	1	40	1
Brown	One-way	40	1	40	1	40	1
Pink	One-way	40	1	40	1	40	1
Orange	One-way	30	1	30	1	30	1

Required Fleet Size (assuming 20% spares): 12

Table 51: The Grid Hub Hybrid Alternative Option 2 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	One-way	30	2	30	2	30	2
Yellow	One-way	30	2	30	2	30	2
Green	One-way	30	2	30	2	30	2
Purple	One-way	25	4	25	4	25	4
White	One-way	30	2	30	2	30	2
Black	One-way	30	2	30	2	30	2
Red	One-way	20	4	20	4	20	4
Brown	One-way	25	4	25	4	25	4
Pink	One-way	20	3	20	3	20	3
Orange	One-way	30	2	30	2	30	2

Required Fleet Size (assuming 20% spares): 33

Table 52: The Grid Hub Hybrid Alternative Option 3 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	One-way	15	4	15	4	15	4
Yellow	One-way	15	4	15	4	15	4
Green	One-way	15	3	15	3	15	3
Purple	One-way	15	6	15	6	15	6
White	One-way	15	4	15	4	15	4
Black	One-way	15	4	15	4	15	4
Red	One-way	15	5	15	5	15	5
Brown	One-way	15	6	15	6	15	6
Pink	One-way	15	4	15	4	15	4
Orange	One-way	15	3	15	3	15	3

Required Fleet Size (assuming 20% spares): 52

Table 53: The Grid Hub Hybrid Route Length Inside and Outside City of Doral's Boundary (excluding Annexations)

ROUTE	TOTAL LENGTH (MI)	LENGTH INSIDE CITY BOUNDARY (MI)	LENGTH OUTSIDE CITY BOUNDARY (MI)	PERCENT OF ROUTE OUTSIDE CITY BOUNDARY
Blue	8.40	6.34	2.06	25%
Yellow	9.80	9.80	0.00	0%
Green	8.19	8.19	0.00	0%
Purple	17.00	10.38	6.62	39%
White	10.60	10.60	0.00	0%
Black	9.70	5.28	4.42	46%
Red	13.90	8.96	4.94	36%
Brown	16.90	16.90	0.00	0%
Pink	11.90	7.50	4.40	37%
Orange	8.30	7.40	0.90	11%
Total	114.69	91.35	23.34	20%

Table 54: The Grid Hub Hybrid Route Length Inside and Outside City of Doral's Boundary (including Annexations)

ROUTE	TOTAL LENGTH (MI)	LENGTH INSIDE CITY BOUNDARY (MI)	LENGTH OUTSIDE CITY BOUNDARY (MI)	PERCENT OF ROUTE OUTSIDE CITY BOUNDARY
Blue	8.40	6.34	2.06	25%
Yellow	9.80	9.80	0.00	0%
Green	8.19	8.19	0.00	0%
Purple	17.00	14.77	2.23	13%
White	10.60	10.60	0.00	0%
Black	9.70	7.69	2.01	21%
Red	13.90	11.81	2.09	15%
Brown	16.90	16.90	0.00	0%
Pink	11.90	9.89	2.01	17%
Orange	8.30	7.40	0.90	11%
Total	114.69	103.40	11.29	10%

QUADRANTS HYBRID ALTERNATIVE

The Quadrants Alternative (**Figure 42**) was developed by dividing the City into four (4) geographic quadrants to provide short routes that circulate within these quadrants. This alternative keeps Route 4/FIU route unchanged. These routes all meet near the geographic center of the City, therefore also creating a hub and spoke mechanism. The routes are designed to pass through all major origin-destination points and have small segments of interaction at the perimeter of their respective quadrants (i.e., NW 41st/36th Street, NW 97th Avenue, and the Palmetto Metrorail Station). A disadvantage of this alternative scenario is that the routes segregate the City by land use. The green route in Figure 42 primarily serves low-density residential communities, the blue route is focuses around malls and warehouses, the orange route mainly serves commercial land uses, and the yellow route concentrates on Downtown Doral and institutional/office complexes. Hence, passengers wanting to go from one land use to another will have to transfer at least once (at the hub) or twice at stops along the quadrant perimeter.

This alternative assumes the blue, orange, and green routes have two-way operations while the yellow and Route 4/FIU routes have one-way operation. **Tables 55** through **59** present the headways and fleet assumptions for each operating option as well as the route length given that each route cannot be more than 30% outside of the City of Doral's boundary per the interlocal agreement with Miami-Dade County.

OPERATING OPTIONS

1. Operating the proposed routing alternative with the existing vehicle fleet and determining the feasible headways for each route.
2. Expanding the vehicle fleet to operate the proposed routes with the same, or slightly improved, headways as existing routes.
3. Expanding the vehicle fleet to operate the proposed routes with 15-minute headways, weekdays and weekends.

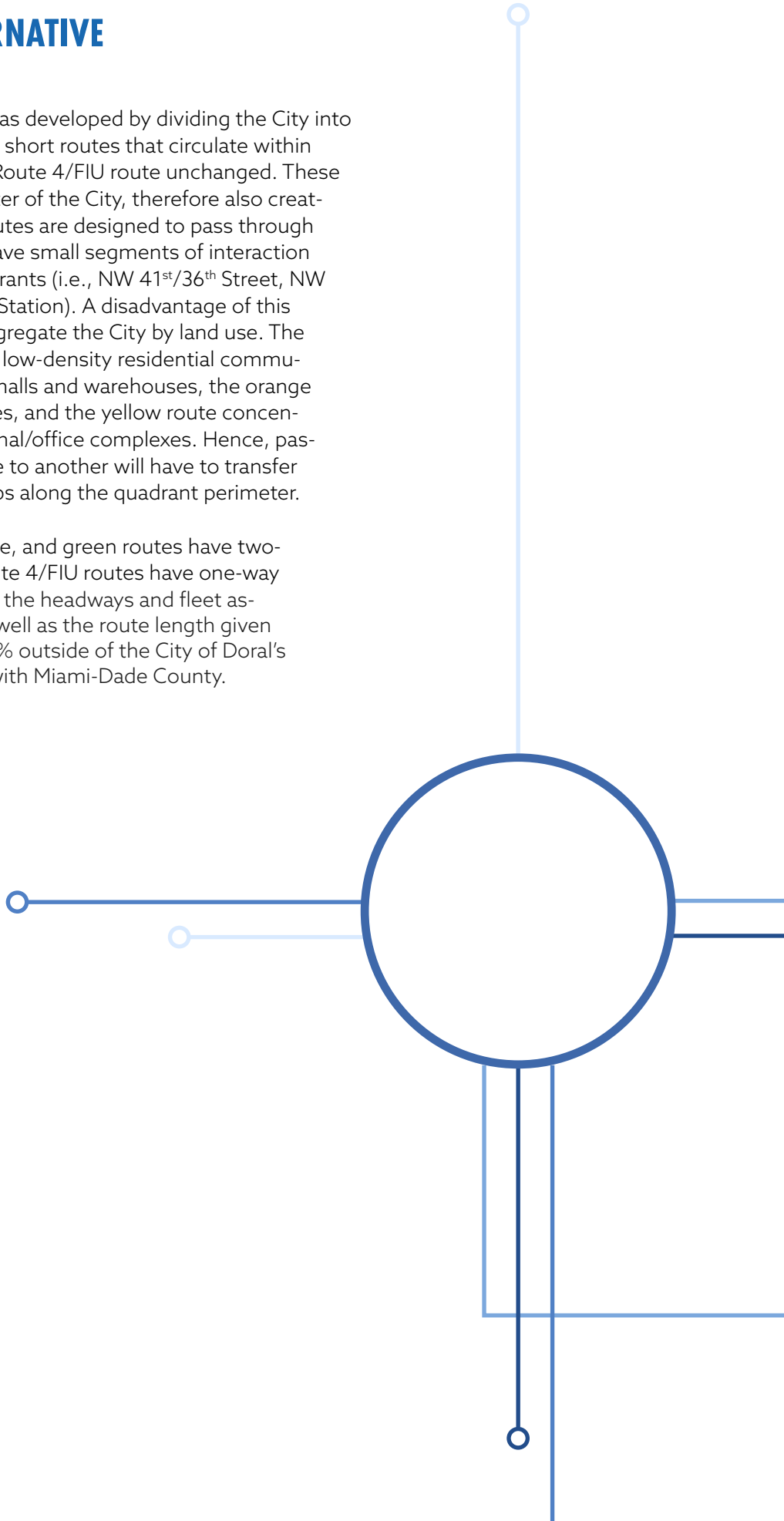
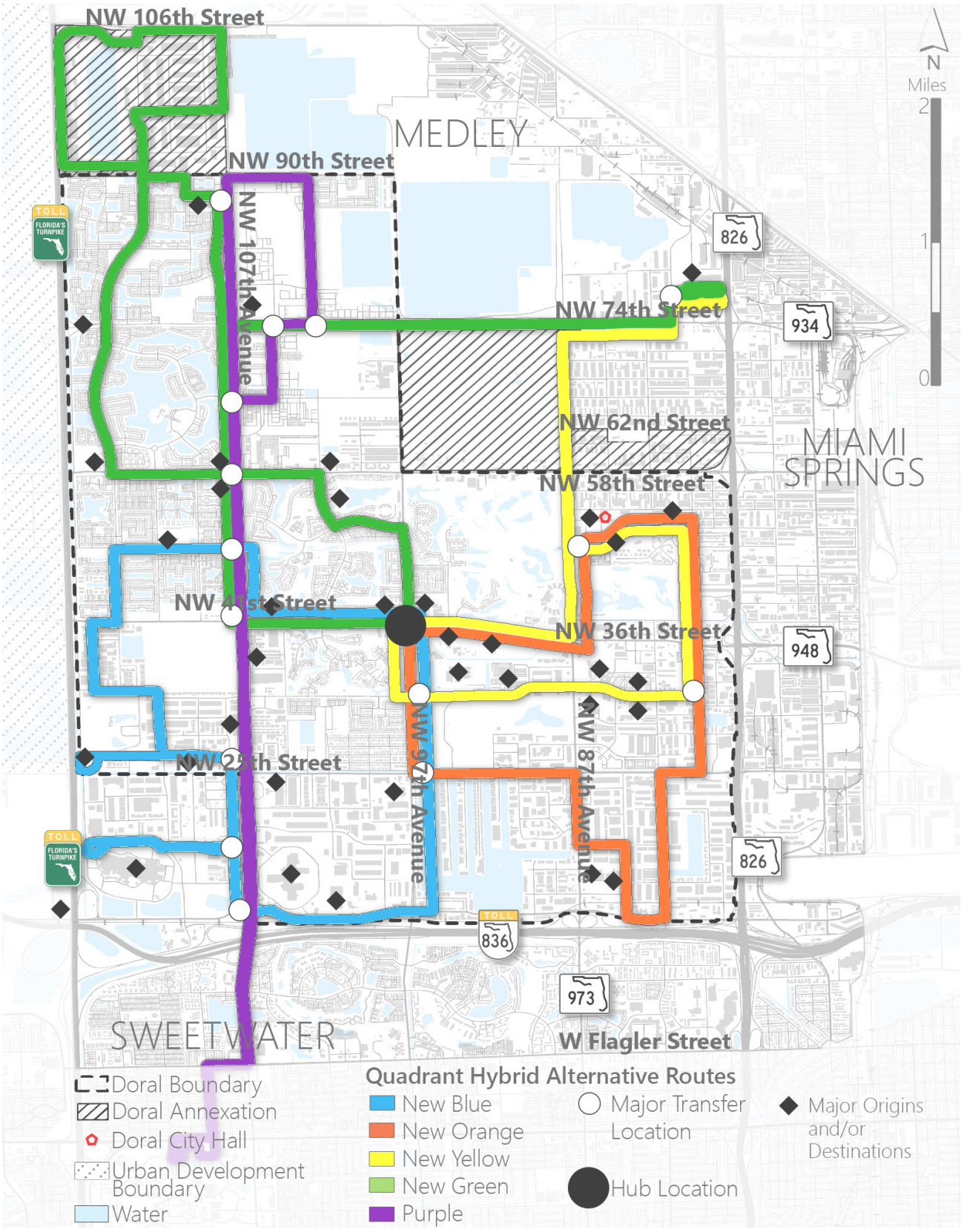


Figure 42 : Quadrants Hybrid Alternative



QUADRANTS HYBRID ALTERNATIVE

Table 55: Quadrants Hybrid Alternative Option 1 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	Two-way	30	2	30	2	30	2
Yellow	One-way	35	1	35	1	-	-
Green	Two-way	30	4	60	2	60	2
Purple	One-way	25	2	-	-	-	-
Orange	Two-way	30	2	30	2	30	2

Required Fleet Size (assuming 20% spares): 14

Table 56: Quadrants Hybrid Alternative Option 2 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	Two-way	30	4	30	4	30	4
Yellow	One-way	35	2	35	2	-	-
Green	Two-way	30	8	30	8	60	4
Purple	One-way	25	4	-	-	-	-
Orange	Two-way	30	4	30	4	30	4

Required Fleet Size (assuming 20% spares): 27

Table 57: Quadrants Hybrid Alternative Option 3 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	Two-way	15	8	15	8	15	8
Yellow	One-way	15	4	15	4	-	-
Green	Two-way	15	14	15	14	15	14
Purple	One-way	15	6	-	-	-	-
Orange	Two-way	15	8	15	8	15	8

Required Fleet Size (assuming 20% spares): 48

Table 58: Quadrants Hybrid Route Length Inside and Outside City of Doral's Boundary (excluding Annexations)

ROUTE	TOTAL LENGTH (MI)	LENGTH INSIDE CITY BOUNDARY (MI)	LENGTH OUTSIDE CITY BOUNDARY (MI)	PERCENT OF ROUTE OUTSIDE CITY BOUNDARY
Blue	10.70	8.64	2.06	19%
Yellow	11.30	6.9	4.40	39%
Green	19.70	11.26	8.44	43%
Purple	15.20	10.81	4.39	29%
Orange	8.93	8.93	0.00	0%
Total	65.83	46.55	19.28	29%

Table 59: Quadrants Hybrid Route Length Inside and Outside City of Doral's Boundary (including Annexations)

ROUTE	TOTAL LENGTH (MI)	LENGTH INSIDE CITY BOUNDARY (MI)	LENGTH OUTSIDE CITY BOUNDARY (MI)	PERCENT OF ROUTE OUTSIDE CITY BOUNDARY
Blue	10.70	8.64	2.06	19%
Yellow	11.30	9.29	2.01	18%
Green	19.70	17.69	2.01	10%
Purple	15.20	10.81	4.39	29%
Orange	8.93	8.93	0.00	0%
Total	65.83	55.36	10.47	16%

07

RIDERSHIP ESTIMATE

RIDERSHIP ESTIMATE

Based on the alternatives developed and the different headway/fleet size options, ridership projections were estimated. The ridership projection was performed using a planning sketch that has been validated through the use in other similar projects such as the development of new routes for the City of Miami Beach trolley. The sketch, performed in a spreadsheet tool, comprises a series of assumptions and calculations that compare proposed routes and services to existing routes. The final worksheets are included in **Appendix F**. The following factors are used in the worksheet to estimate the ridership of each alternative. Explanations below each factor define the assumptions made in order to compare proposed routes with existing routes.

RIDERSHIP ESTIMATE

POPULATION WITHIN ¼-MILE RADIUS OF ROUTE

This factor measures the average population within the walkshed; that is within a ¼-mile radius buffer along a route. Average population was determined by calculating the average population per household in each US Census block that a route passes and then multiply the average population by the number of households within the route's walkshed. For example, Route 4/FIU Route crosses through a US Census block with a total population of 1,604 people. This block also has 154 households. However, within the walkshed of the route there are only 60 households. Hence, the population attributed to this route, for that specific Census block, is 60 * (1,604/154) ≈ 625 people. The average population per block per route walkshed was aggregated per route and per alternative.

PEAK HEADWAY (MINUTES)

FOR EXISTING ROUTES

As presented in **Table 8**.

FOR PROPOSED ROUTES

For Option 1, headways were calculated by dividing the route's Total Cycle Time by the number of vehicles in operation for that route. For two-way operating routes, twice the number of vehicles is needed to maintain the same headway in both directions of travel. For Option 2, headways were selected based on existing routes and calculated Total Cycle Time. For Option 3, 15-minute headways were selected across the board for comparison purposes.

SPAN OF SERVICE (HH:MM)

FOR EXISTING ROUTES

The max span of service for weekdays, Saturdays, and Sundays were obtained from those presented in **Table 12**. Hence, the following weekday Span of Service were selected: 15.6 hours for Route 1, 15.2 hours for Route 2, 15.63 hours for Route 3, and 17 hours for Route 4. For Saturdays, the Span of Service select were 13.05 hours for Route 1, 13.05 for Route 2, and 12.1 hours for Route 3. On Sundays, Route 1 operates for a total of 13.05 hours.

FOR PROPOSED ROUTES

Span of Service for proposed routes were assumed to be similar to existing routes. For proposed routes that mimic two (2) or more existing routes, an average of the Span of Service of those existing routes was used. For brand new routes such as those in The Grid, Span of Service was assumed to be 17 hours for weekdays, and 13.05 hours for Saturdays and Sundays since these are the max Span of Service for existing routes.

ROUTE LENGTH (MILES)

Measured as centerline miles in GIS.

AVERAGE SPEED (MPH)

Based on the most recent City provided data, it takes approximately 120 minutes, or 2 hours, for a trolley to perform one cycle (roundtrip) of Route 1 which is 24.8 miles long. Hence, dividing the length by the time, trolleys have an average speed of 12.4 mph. Given Route 1 is the most circuitous of the existing routes, this speed was assumed for all existing and proposed routes. **Tables 60 and 61** show higher average speeds for all trolleys based on TSO data, however, the more conservative 12.4 mph speed was used.

Table 60: Existing Trolley Speed Distribution from 7.22.2019 through 7.28.2019

SPEED (MPH)	PERCENT OF TOTAL TIME	PRODUCT
5	1.21	6.05
10	13.02	130.20
15	15.44	231.60
20	14.20	284.00
25	18.66	466.50
30	17.71	531.30
35	12.63	442.05
40	5.13	205.20
45	1.46	65.70
50	0.54	27.00
TOTAL	**100**	**2389.60**
Average Speed (mph)		**23.90**

Table 61: Existing Trolley Speed Distribution from 7.29.2019 through 8.1.2019

SPEED (MPH)	PERCENT OF TOTAL TIME	PRODUCT
5	1.11	5.55
10	12.80	128.00
15	15.17	227.55
20	14.72	294.40
25	19.36	484.00
30	19.10	573.00
35	12.06	422.10
40	4.16	166.40
45	1.04	46.80
50	0.48	24.00
TOTAL	**100**	**2371.80**
Average Speed (mph)		**23.72**

RUN TIME (MINUTES)
Run time was calculated based on the Route Length and Average Speed and converted to minutes. This represents the time one vehicle requires to complete one cycle around a route.

LAYOVER TIME (MINUTES)
Existing routes do not have any Layover Time accounted for in their schedule. This is an issue that was noted during the Existing Conditions Analysis. Layover Time of 10 or less minutes was added to each proposed route to bring the Total Cycle Time to a multiple of 5 for ease of determining headways/required vehicles in operation.

NUMBER OF STOPS
FOR EXISTING ROUTES
As presented in **Table 7**: DTS Stops and Schedule per Route.

FOR PROPOSED ROUTES
The number of stops for each proposed route was calculated by dividing the Route Length by the determined Average Stop Spacing.

AVERAGE STOP SPACING (FEET)
For proposed routes that are similar to existing routes, the Average Stop Spacing of the proposed route was assumed to be the same as that of the similar existing route. For proposed routes that mimic two or more existing routes, an average of the stop spacing of those existing routes was used.

AVERAGE WALK DISTANCE (FEET)
Assumed to be ¼-mile (half the walkshed) plus ½ of the Average Stop Spacing.

AVERAGE WALK TIME (MINUTES)
Assumed to be the average walk distance times a walking speed of 3.5 feet per second.

AVERAGE WAIT TIME (MINUTES)
Assumed to be half the headway.

TYPICAL 5-MILE TRIP TIME (MINUTES)
Assumed to be 2 times the Average Walk Time plus the Average Wait Time plus the Average Trolley Travel Time. The latter is calculated using 5 miles and the Average Speed. This calculation assumes one (1) transfer is needed.

DIFFERENCE IN SPAN OF SERVICE FACTOR
This factor adjusts the projected ridership based on the difference in Span of Service of a proposed route and its similar existing route. For routes that mimic two or more existing routes, the average Span of Service of the existing routes was used.

DIFFERENCE IN TYPICAL 5-MILE TRIP TIME FACTOR
This factor adjusts the projected ridership based on the difference in the Typical 5-mile Trip Time of a proposed route and its similar existing route. For routes that mimic two or more existing routes, the average Typical 5-mile Trip Time of the existing routes was used.

RIDERSHIP ESTIMATE

DIFFERENCE IN TOTAL POPULATION FACTOR
This factor adjusts the projected ridership based on the difference in population within a ¼-mile buffer of a proposed route and its similar existing route. For routes that mimic two or more existing routes, the average population of the existing routes was used.

TWO-WAY ROUTE FACTOR
This factor was calculated by applying a transit planning rule of thumb for ridership elasticity that states that a 1% change in frequency leads to a 1.5% change in ridership. Hence, the travel time to and from a typical origin - destination pair for an average trip within existing conditions was used to determine the difference in travel time between offering one-way versus two-way routes. The average trolley trip selected was on Route 1 (highest boarding) from Islands of Doral II (Stop ID 1042) to Dolphin Mall (Stop ID 1079) at 3:00 PM. This southbound trip, from Islands of Doral II to Dolphin Mall, takes approximately 42 minutes and is 13.9 miles long. However, the northbound trip from Dolphin Mall to Islands of Doral II on Route 1 takes approximately 33 minutes and is 10.5 miles long. Hence, providing two-way service cuts the origin-to-destination trip by approximately 23% which represents an increase in ridership by approximately 34.5%. Therefore, for any proposed route with two-way service, the ridership projection was increased by 134.5%.

AVERAGE ANNUAL RIDERSHIP
Ridership projections were calculated by multiplying the Difference in Span of Service, Difference in Typical 5-mile Trip Time Factor, Difference in Total Population Factor, and Two-Way Route Factor times the Annual Ridership of an existing route with similar configuration or the Average Annual Ridership of two or more existing routes. Ridership projections are rounded down to the nearest hundred.

Table 62 through **Table 64** summarize the projected ridership per alternative per headway options.

Note that the different headway options are:

1. Operating the proposed routing alternative with the existing vehicle fleet and determining the feasible headways for each route.
2. Expanding the vehicle fleet to operate the proposed routes with the same, or similar, headways as existing routes.
3. Expanding the vehicle fleet to operate the proposed routes with 15-minute headways.

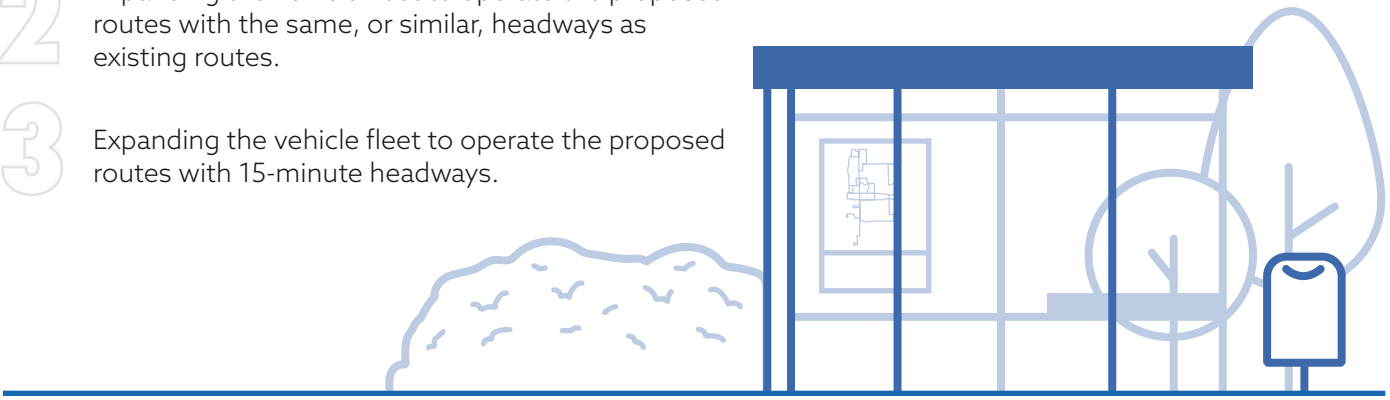


Table 62: Projected Annual Ridership for Option 1 (Existing Fleet Size)

ALTERNATIVE	WEEKDAY RIDERSHIP	SATURDAY RIDERSHIP	SUNDAY RIDERSHIP	TOTAL ANNUAL RIDERSHIP	CHANGE IN RIDERSHIP
Existing	673,358	42,107	12,963	728,428	
Missing Link	592,200	32,800	13,200	638,200	-90,228
One-Seat Ride	533,500	31,000	21,900	586,400	-142,028
Hub & Spoke	593,000	36,100	14,900	644,000	-84,428
The Grid	494,200	42,500	24,900	561,600	-166,828
Grid Hub Hybrid	509,800	44,300	27,100	581,200	-147,228
Quadrant Hybrid	537,900	36,100	19,400	593,400	-135,028

Table 63: Projected Annual Ridership for Option 2 (Expanded Fleet)

ALTERNATIVE	WEEKDAY RIDERSHIP	SATURDAY RIDERSHIP	SUNDAY RIDERSHIP	TOTAL ANNUAL RIDERSHIP	CHANGE IN RIDERSHIP
Existing	673,358	42,107	12,963	728,428	
Missing Link	751,800	58,200	24,300	834,300	105,872
One-Seat Ride	733,300	57,000	30,400	820,700	92,272
Hub & Spoke	936,700	81,400	24,200	1,042,300	313,872
The Grid	688,700	59,400	35,100	783,200	54,772
Grid Hub Hybrid	711,700	62,000	38,300	812,000	83,572
Quadrant Hybrid	649,600	48,900	24,300	722,800	-5,628

Table 64: Projected Annual Ridership for Option 3 (Existing Fleet with 15 min. Headways)

ALTERNATIVE	WEEKDAY RIDERSHIP	SATURDAY RIDERSHIP	SUNDAY RIDERSHIP	TOTAL ANNUAL RIDERSHIP	CHANGE IN RIDERSHIP
Existing	673,358	42,107	12,963	728,428	
Missing Link	849,700	69,300	29,600	948,600	220,172
One-Seat Ride	797,200	70,700	50,100	918,000	189,572
Hub & Spoke	1,103,400	96,800	37,000	1,237,200	508,772
The Grid	772,600	66,600	39,300	878,500	150,072
Grid Hub Hybrid	804,400	69,900	43,200	917,500	189,072
Quadrant Hybrid	761,400	58,100	30,900	850,400	121,972

08

COST ESTIMATE

COST ESTIMATE

A cost estimate was determined for each alternative and each headway option. The cost estimate comprises vehicle operating and maintenance (O&M) cost, information technology (IT) maintenance cost, and capital expenditure for new vehicles. The annual vehicle operating and maintenance cost of $59.90/hour/vehicle was determined as described in **Operating and Maintenance Costs** on **Page 28**. An annual operating and maintenance cost was estimated by calculating the respective proposed route Span of Service times 253 weekdays and the number of vehicles in operations (see **Table 32** through **Table 49**). The system was assumed to operate for 50 Saturdays and Sundays. The total of 353 days of operation considers holidays. On **Page 28**, the IT maintenance cost of $194.89/month/vehicle is also given. This cost was rounded to $195/month/vehicle and used to calculate an annual cost. Lastly, the average vehicle cost of $173,500.00 was assumed for every new vehicle needed to operate the proposed route/options (see **Table 13**). **Table 66** through **Table 68** present the opening year cost assuming a fleet with 20% spare vehicles as stated in **Table 32** through **Table 49**. In total, **Table 65** gives the number of vehicles needed to be purchased by alternative.

COST ESTIMATE

Table 65: Vehicles Required by Alternative and Headway Option

ALTERNATIVE	OPTION 1		OPTION 2		OPTION 3	
	FLEET SIZE	ADDITIONAL VEHICLES	FLEET SIZE	ADDITIONAL VEHICLES	FLEET SIZE	ADDITIONAL VEHICLES
Existing	16		16		16	
Missing Link	16	0	26	10	40	24
One-Seat Ride	16	0	32	16	46	30
Hub & Spoke	16	0	29	13	53	37
The Grid	16	0	33	17	51	35
Grid Hub Hybrid	16	0	33	17	52	36
Quadrant Hybrid	16	0	27	11	48	32

Table 66: Projected Opening Year Cost for Option 1 (Existing Fleet Size)

ALTERNATIVE	TOTAL O&M COST	TOTAL IT MAINTENANCE COST	TOTAL CAPITAL COST	TOTAL OPENING YEAR COST	CHANGE IN OPENING YEAR COST
Existing	$2,588,000.00	$37,440.00	$0.00	$2,625,440.00	
Missing Link	$2,621,000.00	$37,440.00	$0.00	$2,658,440.00	$33,000.00
One-Seat Ride	$4,161,000.00	$37,440.00	$0.00	$4,198,440.00	$1,573,000.00
Hub & Spoke	$3,753,000.00	$37,440.00	$0.00	$3,790,440.00	$1,165,000.00
The Grid	$6,540,000.00	$37,440.00	$0.00	$6,577,440.00	$3,952,000.00
Grid Hub Hybrid	$6,540,000.00	$37,440.00	$0.00	$6,577,440.00	$3,952,000.00
Quadrant Hybrid	$3,133,000.00	$37,440.00	$0.00	$3,170,440.00	$545,000.00

Table 67: Projected Opening Year Cost for Option 2 (Expand Fleet)

ALTERNATIVE	TOTAL O&M COST	TOTAL IT MAINTENANCE COST	TOTAL CAPITAL COST	TOTAL OPENING YEAR COST	CHANGE IN OPENING YEAR COST
Existing	$2,588,000.00	$37,440.00	$0.00	$2,625,440.00	
Missing Link	$5,940,000.00	$49,140.00	$1,735,000.00	$7,724,140.00	$5,098,700.00
One-Seat Ride	$11,445,000.00	$60,840.00	$2,776,000.00	$14,281,840.00	$11,656,400.00
Hub & Spoke	$10,763,000.00	$56,160.00	$2,255,500.00	$13,074,660.00	$10,449,220.00
The Grid	$17,640,000.00	$63,180.00	$2,949,500.00	$20,652,680.00	$18,027,240.00
Grid Hub Hybrid	$17,640,000.00	$63,180.00	$2,949,500.00	$20,652,680.00	$18,027,240.00
Quadrant Hybrid	$6,416,000.00	$51,480.00	$1,908,500.00	$8,375,980.00	$5,750,540.00

Table 68: Projected Opening Year Cost for Option 3 (Expanded Fleet with 15 min. Headways)

ALTERNATIVE	TOTAL O&M COST	TOTAL IT MAINTENANCE COST	TOTAL CAPITAL COST	TOTAL OPENING YEAR COST	CHANGE IN OPENING YEAR COST
Existing	$2,588,000.00	$37,440.00	$0.00	$2,625,440.00	
Missing Link	$9,464,000.00	$77,220.00	$4,164,000.00	$13,705,220.00	$11,079,780.00
One-Seat Ride	$22,447,000.00	$88,920.00	$5,205,000.00	$27,740,920.00	$25,115,480.00
Hub & Spoke	$22,341,000.00	$102,960.00	$6,419,500.00	$28,863,460.00	$26,238,020.00
The Grid	$27,435,000.00	$98,280.00	$6,072,500.00	$33,605,780.00	$30,980,340.00
Grid Hub Hybrid	$17,008,000.00	$100,620.00	$6,246,000.00	$23,354,620.00	$20,729,180.00
Quadrant Hybrid	$11,987,000.00	$93,600.00	$5,552,000.00	$17,632,600.00	$15,007,160.00

COST ESTIMATE

In summary, the following tables provide a cost per rider comparison of each alternative and each option.

Table 69: Cost per Rider for Option 1 (Existing Fleet Size)

ALTERNATIVE	TOTAL OPENING YEAR COST	TOTAL ANNUAL RIDERSHIP	COST PER RIDER
Existing	$2,625,440.00	728,428	$3.60
Missing Link	$2,658,440.00	457,400	$5.81
One-Seat Ride	$4,198,440.00	390,400	$10.75
Hub & Spoke	$3,790,440.00	406,100	$9.33
The Grid	$6,577,440.00	399,800	$16.45
Grid Hub Hybrid	$6,577,440.00	385,700	$17.05
Quadrant Hybrid	$3,170,440.00	407,600	$7.78

Table 70: Cost per Rider for Option 2 (Expanded Fleet)

ALTERNATIVE	TOTAL OPENING YEAR COST	TOTAL ANNUAL RIDERSHIP	COST PER RIDER
Existing	$2,625,440.00	728,428	$3.60
Missing Link	$7,724,140.00	758,500	$10.18
One-Seat Ride	$14,281,840.00	719,400	$19.85
Hub & Spoke	$13,074,660.00	730,400	$17.90
The Grid	$20,652,680.00	743,600	$27.77
Grid Hub Hybrid	$20,652,680.00	715,300	$28.87
Quadrant Hybrid	$8,375,980.00	594,000	$14.10

Table 71: Cost per Rider for Option 3 (Expanded Fleet with 15 min. Headways)

ALTERNATIVE	TOTAL OPENING YEAR COST	TOTAL ANNUAL RIDERSHIP	COST PER RIDER
Existing	$2,625,440.00	728,428	$3.60
Missing Link	$13,705,220.00	1,034,100	$13.25
One-Seat Ride	$27,740,920.00	941,200	$29.47
Hub & Spoke	$28,863,460.00	1,089,700	$26.49
The Grid	$33,605,780.00	973,600	$34.52
Grid Hub Hybrid	$23,354,620.00	952,800	$24.51
Quadrant Hybrid	$17,632,600.00	863,300	$20.42

Note that the existing "alternative" is shown only for comparison purposes.

EVALUATION OF ALTERNATIVES

DTS ALTERNATIVE EVALUATION CRITERIA

Each alternative was evaluated based on six (6) criteria developed from stakeholder feedback and engineering judgment. **Table 72** lists the criteria used to evaluate each of the alternative and explains their importance in relations to quality of transit service. To compare each alternative, the criteria measurements were normalized by dividing each value by the measurements obtained for the existing system. The resulting values were then added. All values have an equal weight of 1 with the exception of the Ridership Estimate which has a weight of 2. Ridership was doubly weighted because the evaluation does not account for two-way service benefits, compounding benefits to other transit services, and potential increase in operating and maintenance funding. The highest scoring alternative, therefore, results in the preferred alternative for the City of Doral. **Appendix H** includes all worksheets used to evaluate all alternatives.

Table 72: DTS Alternative Evaluation Criteria

CRITERION	DESCRIPTION
TOTAL WALKSHED COVERAGE	This criterion measures the area, in square miles, included within a ¼-mile radius buffer along a route. The area measurements of all routes in one alternative are aggregated to give a total area per alternative. This criterion is included to promote alternatives that provide the most coverage and, therefore, are more geographically accessible.
AVERAGE ROUTE LENGTH	This criterion measures, in miles, the sum of total route lengths in one alternative divided by the number of routes proposed. This criterion is included to promote routes with short average route lengths as request by stakeholders (which typically correlates with short trip times).
TOTAL MAJOR ORIGIN/ DESTINATIONS CONNECTED	Total Accessible Major Origin/Destinations (O-D) is computed by counting the number of accessible points of interest by routes within each alternative. These points of interest are universities, high schools, middle schools, major employers, supermarkets, transit terminals, and religious centers. This criterion is included to promote the alternative that connect the most points of interest.
AVERAGE MAJOR ORIGIN/DESTINATIONS CONNECTED PER ROUTE	This criterion takes the Total Major Origin/Destinations Connected in one alternative and divides this number by the total number of routes in that alternative. This criterion is provided to promote alternatives that connect more points of interest with fewer routes, therefore, are more efficient (i.e. less transfers required).
SUMPRODUCT OF INTRASYSTEM MAJOR TRANSFER POINTS AND CONNECTING ROUTES	This criterion counts the number of major transfer points within one alternative and the associated number of routes available at each of these major transfer points. The criterion is calculated by adding the product of connecting routes and major transfer point. For example, within the existing system, Stop ID 1006 at Miami International Mall is a major transfer point which connects Route 1/Blue and Route 4/FIU/Purple. This transfer point has a value of 2 (i.e. 1 transfer point * 2 connecting routes). Similarly, Stop ID 1042 at I Islands of Doral II connects Route 1/Blue, Route 3/Green, and Route 4/FIU/Purple. Hence, Stop ID 1042 has a value of 3 (i.e. 1 transfer point * 3 connecting routes). If the existing system only had these two (2) major transfer points, the total value for this criterion would be 2 + 3 = 5. This criterion is included to promote the alternatives that provide more efficient transfer points (i.e., alternative with most transfer points that connect more than 2 routes).
TOTAL ANNUAL PROJECTED RIDERSHIP FOR OPTION 3	As presented in **Table 64**, this criterion is the estimated annual ridership for Option 3 given this option projected ridership with 15-minute headways for all proposed routes 7 days a week. This criterion is included to promote the alternative with most ridership.
TOTAL ANNUAL OPENING YEAR COST FOR OPTION 3	As presented in **Table 71**, this criterion is the estimated total cost for the opening year of Option 3. This criterion is included to promote the alternative with smallest opening year cost.

Table 73: DTS Alternative Evaluation Matrix

ALTERNATIVE	TOTAL WALKSHED COVERAGE (SQ. MILES)	AVERAGE ROUTE LENGTH (MILES)	TOTAL MAJOR O-D CONNECTED	AVERAGE ACCESSIBLE MAJOR O-D PER ROUTE	SUMPRODUCT OF INTRASYSTEM MAJOR TRANSFER POINTS AND CONNECTING ROUTES	TOTAL ANNUAL PROJECTED RIDERSHIP FOR OPTION 3	TOTAL ANNUAL OPENING YEAR COST FOR OPTION 3
Existing	6.4	18.1	56	14	29	728,428	$2,625,440.00
Missing Link	12.89	17.94	70	14	42	948,600	$13,705,220.00
One-Seat Ride	6.19	20.27	63	21	25	918,000	$27,740,920.00
Hub & Spoke	16	19.78	67	13.4	45	1,237,200	$28,863,460.00
The Grid	12.96	10.93	64	6.4	48	878,500	$33,605,780.00
Grid Hub Hybrid	15.09	11.47	71	7.1	50	917,500	$23,354,620.00
Quadrant Hybrid	7.5	13.17	58	11.6	20	850,400	$17,632,600.00

Table 74: DTS Alternative Scoring Matrix

ALTERNATIVE	TOTAL WALKSHED COVERAGE (SQ. MILES)	AVERAGE ROUTE LENGTH (MILES)	TOTAL MAJOR O-D CONNECTED	AVERAGE ACCESSIBLE MAJOR O-D PER ROUTE	SUMPRODUCT OF INTRASYSTEM MAJOR TRANSFER POINTS AND CONNECTING ROUTES	TOTAL ANNUAL PROJECTED RIDERSHIP FOR OPTION 3	TOTAL ANNUAL OPENING YEAR COST FOR OPTION 3	TOTAL SCORE
Missing Link	2.01	1.01	1.25	1	1.45	1.3	0.19	8.21
One-Seat Ride	0.97	0.89	1.13	1.5	0.86	1.26	0.09	6.7
Hub & Spoke	2.5	0.92	1.2	0.96	1.55	1.7	0.09	8.92
The Grid	2.03	1.66	1.14	0.46	1.66	1.21	0.08	8.24
Grid Hub Hybrid	2.36	1.58	1.27	0.51	1.72	1.26	0.11	8.81
Quadrant Hybrid	1.17	1.37	1.04	0.83	0.69	1.17	0.15	6.42

Based on the results presented in Table 74,

the Hub & Spoke Alternative is the preferred alternative scenario for the City of Doral.

RECOMMENDATIONS

DTS HUB & SPOKE ROUTING ALTERNATIVE

Table 73 and **Table 74** illustrate that the Hub & Spoke Alternative ranks highest out of all the proposed route combinations. From a qualitative perspective, this alternative is superior to the others because it allows the City of Doral to have greater oversight and improved management of the DTS since it conveniently locates a major transfer point near City Hall. This creates opportunities for City staff to host educational and awareness programs at a safe location of high transfer activity. Furthermore, the hub allows City staff to have increased exposure to drivers and passengers, therefore becoming more resilient in tackling daily operational issues that may arise.

DTS HUB & SPOKE ROUTING ALTERNATIVE

The study team recommends implementing the Hub & Spoke routing alternative with Option 2 headway service. In refining the recommended alternative, the study team developed a few changes to the routes presented in **Figure 32**. Given the Blue Route is proposed to have two-way service, the route was split into two (2) complimentary routes - Light Blue and Dark Blue. The Light Blue Route travels counterclockwise while the Dark Blue Route travels clockwise. This operation mimics the Green route and the Orange route, which travel counterclockwise and clockwise respectively. The Yellow Route and Purple Route have one-way linear operation. **Figure 43** presents the refined Hub & Spoke alternative. While this refined alternative still maintains routes that are over 30% outside of the City Boundary, this alternative can be modified to not serve the northern annexation block and, therefore, remain in compliance with the interlocal agreement until that block is annexed (i.e. the Green Route will become 15.75-miles long with 28% outside of the City Boundary and the Orange Route will become 19.65-miles long with 23% outside of the City Boundary). Furthermore, the depicted dashed lines of the Light Blue and Dark Blue routes are proposed to only operate on weekends to serve the Our Lady of Guadalupe Catholic Church. **Table 75** through **Table 79** present the assumptions and characteristics of the refined Hub & Spoke Alternative.

Table 75: Hub & Spoke Recommended Alternative Characteristics

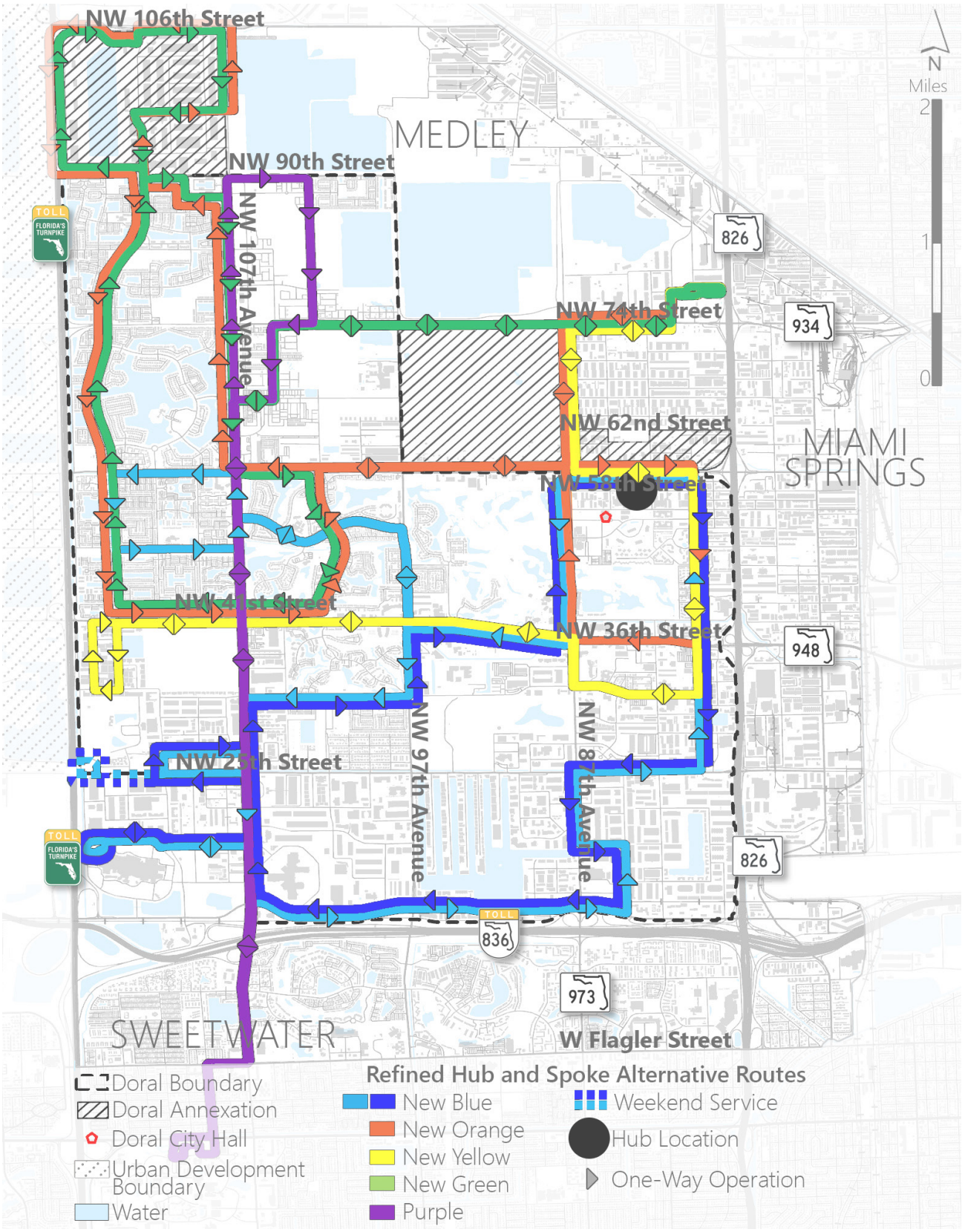
ROUTE	TOTAL LENGTH (MILES)	PERCENT OF ROUTE OUTSIDE CITY BOUNDARY (EXCLUDING ANNEXATIONS)	PERCENT OF ROUTE OUTSIDE CITY BOUNDARY (INCLUDING ANNEXATIONS)	POPULATION WITHIN ¼-MILE WALKSHED
Light Blue	22.00	9%	9%	24,739
Dark Blue	16.13	9%	9%	18,139
Yellow	16.70	0%	0%	5,708
Green	19.80	43%	10%	21,848
Purple	15.20	29%	29%	14,382
Orange	23.70	35%	8%	24,234
TOTAL	**98.90**	**28%**	**13%**	**90.911**

Table 76: Hub & Spoke Alternative Option 2 Fleet Size and Headways

		WEEKDAY		SATURDAY		SUNDAY	
PROPOSED ROUTE	FLOW	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING	HEADWAYS	NO. OF VEHICLES OPERATING
Blue	One-way	30	4	30	4	60	2
Blue	One-way	30	4	30	4	60	2
Yellow	One-way	25	4	25	4	50	2
Green	One-way	30	4	30	4	-	-
Purple	One-way	25	4	-	-	-	-
Orange	One-way	35	4	35	4	-	-

Required Fleet Size (assuming 20% spares): 15

Figure 43 : Hub & Spoke Alternative



DTS HUB & SPOKE ROUTING ALTERNATIVE

Overall, this alternative is expected to provide benefits beyond the small change in ridership estimated. Given the central hub and increased integration with Miami-Dade County transit services, this alternative is likely to have a compounding effect that benefits the entire regional transit system. Furthermore, note that ridership projections and cost estimates were conservatively calculated and true figures may vary given real conditions. With collected travel time data from practice runs, the City will be able to further refine the proposed routes, Hours of Operations and cost estimates.

In addition, the recommended alternative requires the development of a central hub and an expanded vehicle fleet. Hence, two of the following recommendations detail these requirements. The central hub is key to the success of this alternative. However, the City may phase the expansion of its fleet by first providing the new route services. The City can then examine how to best improve headways to the recommended option by adding vehicles to critical routes. Note that the Blue and Red Routes and Green and Orange Routes work as complimentary pairs. Therefore, it is recommended frequencies are improved simultaneously until the desired headways are achieved.

Lastly, the start and end location for each vehicle are proposed based the total cycles a vehicle is able to complete within the proposed timeframe. Most vehicles are recommended to end their operations at either the Palmetto Metrorail Station or the central hub (i.e. Doral Central). These two (2) facilities have sufficient capacity to accommodate the vehicles before they deadhead back to the maintenance facility. Moreover, these facilities are (or will be in the case of the central hub) publicly-owned and are located close to Doral City Hall. This provides increased oversight and coordination potential as well as a safe place for driver relief.

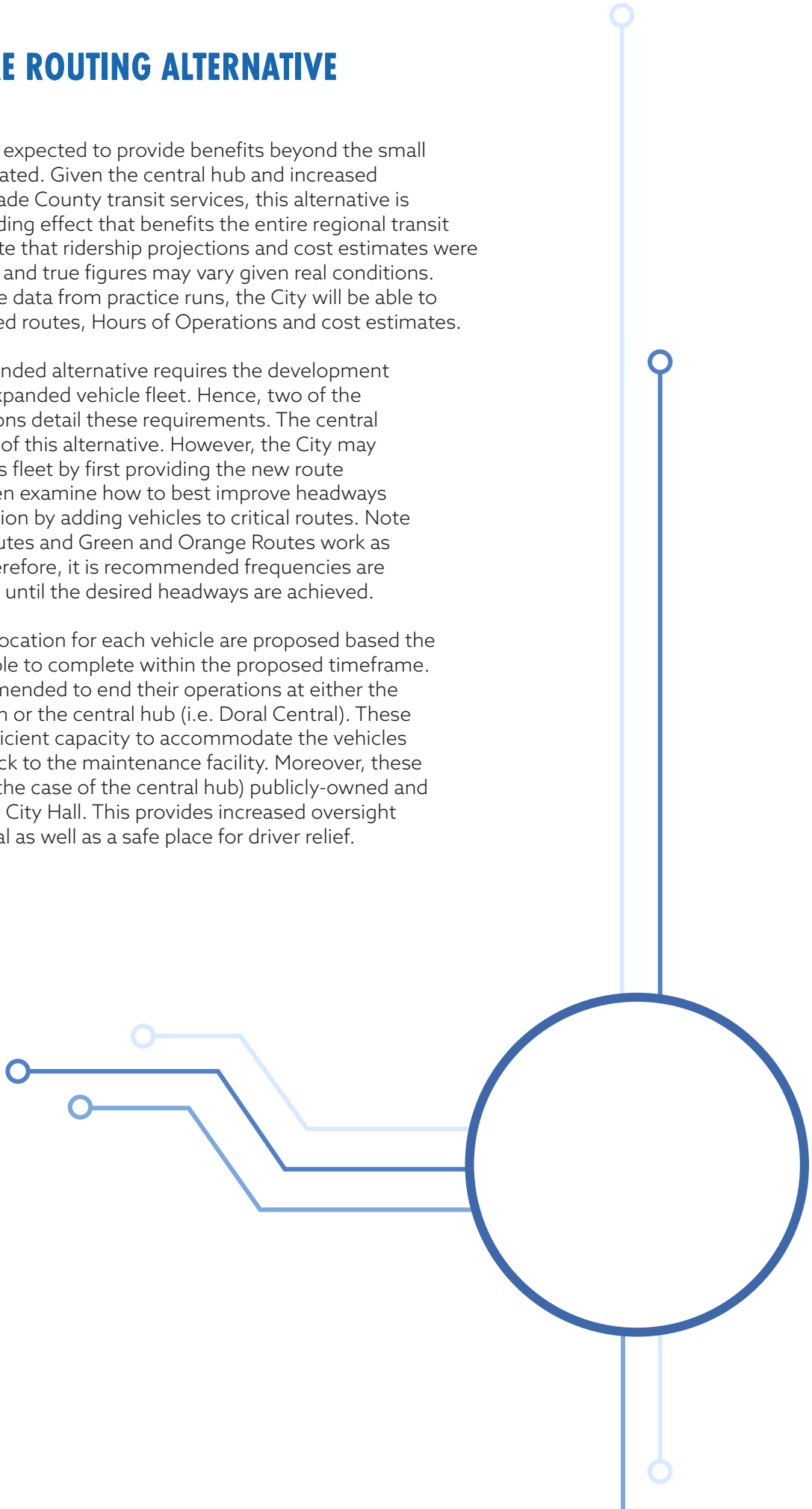


Table 77: Projected Annual Ridership for Option 2

ALTERNATIVE	WEEKDAY RIDERSHIP	SATURDAY RIDERSHIP	SUNDAY RIDERSHIP	TOTAL ANNUAL RIDERSHIP	CHANGE IN ANNUAL RIDERSHIP
Existing	673,358	42,107	12,963	728,428	
Hub & Spoke	647,800	66,000	16,600	730,400	1,972

Table 78: Projected Opening Year Cost for Option 2

ALTERNATIVE	TOTAL O&M COST	TOTAL IT MAINTENANCE COST	TOTAL CAPITAL COST	TOTAL OPENING YEAR COST	CHANGE IN OPENING YEAR COST
Existing	$2,588,000.00	$37,440.00	$0.00	$2,625,440.00	
Hub & Spoke	$10,763,000.00	$56,160.00	$2,255,500.00	$13,074,660.00	$10,449,220.00

Table 79: Hub & Spoke Proposed Hours of Operations by Vehicle

DAY	ROUTE	BLOCK	START LOCATION	END LOCATION	START TIME	END TIME	SPAN OF SERVICE (HOURS)
WEEKDAY	Blue A	1	Dolphin Mall	Doral Central	5:00 AM	9:30 PM	16.5
		2	Dolphin Mall	Doral Central	5:30 AM	10:00 PM	16.5
		3	Dolphin Mall	Doral Central	6:00 AM	10:30 PM	16.5
		4	Dolphin Mall	Doral Central	6:30 AM	11:00 PM	16.5
	Blue B	1	Doral Central	Doral Central	5:00 AM	9:00 PM	16
		2	Doral Central	Doral Central	5:30 AM	9:30 PM	16
		3	Doral Central	Doral Central	6:00 AM	10:00 PM	16
		4	Doral Central	Doral Central	6:30 AM	10:30 PM	16
	Orange	1	Palmetto Metrorail Station	Palmetto Metrorail Station	6:00 AM	9:50 PM	15.83
		2	Palmetto Metrorail Station	Palmetto Metrorail Station	6:30 AM	10:20 PM	15.83
		3	Miami-Dade College West Campus	Palmetto Metrorail Station	6:00 AM	9:05 PM	15.08
		4	Miami-Dade College West Campus	Palmetto Metrorail Station	6:30 AM	9:35 PM	15.08
	Yellow	1	Doral Central	Doral Central	5:30 AM	9:30 PM	16
		2	Doral Central	Doral Central	6:00 AM	10:00 PM	16
		3	Ronald Reagan Senior High	Palmetto Metrorail Station	5:30 AM	8:30 PM	15
		4	Ronald Reagan Senior High	Palmetto Metrorail Station	6:00 AM	9:00 PM	15
	Green	1	Palmetto Metrorail Station	Palmetto Metrorail Station	5:30 AM	10:10 PM	16.67
		2	Palmetto Metrorail Station	Palmetto Metrorail Station	6:00 AM	10:40 PM	16.67
		3	Eugenia B. Thomas K-8 Center	Palmetto Metrorail Station	5:30 AM	9:20 PM	15.83
		4	Eugenia B. Thomas K-8 Center	Palmetto Metrorail Station	6:00 AM	9:50 PM	15.83
	Purple/FIU	1	FIU Modesto A. Maidique campus	FIU Modesto A. Maidique campus	5:00 AM	10:20 PM	17.33
		2	FIU Modesto A. Maidique campus	FIU Modesto A. Maidique campus	5:40 AM	11:00 PM	17.33
		3	Ronald Reagan Senior High	FIU Modesto A. Maidique campus	5:00 AM	9:40 PM	16.67
		4	Ronald Reagan Senior High	FIU Modesto A. Maidique campus	5:40 AM	10:20 PM	16.67

DTS HUB & SPOKE ROUTING ALTERNATIVE

Table 79: Hub & Spoke Proposed Hours of Operations by Vehicle (Continued)

DAY	ROUTE	BLOCK	START LOCATION	END LOCATION	START TIME	END TIME	SPAN OF SERVICE (HOURS)
SATURDAY	Blue	1	Dolphin Mall	Doral Central	5:00 AM	9:30 PM	16.5
		2	Dolphin Mall	Doral Central	5:30 AM	10:00 PM	16.5
		3	Dolphin Mall	Doral Central	6:00 AM	10:30 PM	16.5
		4	Dolphin Mall	Doral Central	6:30 AM	11:00 PM	16.5
		1	Doral Central	Doral Central	5:00 AM	9:00 PM	16
		2	Doral Central	Doral Central	5:30 AM	9:30 PM	16
		3	Doral Central	Doral Central	6:00 AM	10:00 PM	16
		4	Doral Central	Doral Central	6:30 AM	10:30 PM	16
	Orange	1	Palmetto Metrorail Station	Palmetto Metrorail Station	6:00 AM	9:50 PM	15.83
		2	Palmetto Metrorail Station	Palmetto Metrorail Station	6:30 AM	10:20 PM	15.83
		3	Miami-Dade College West Campus	Palmetto Metrorail Station	6:00 AM	9:05 PM	15.08
		4	Miami-Dade College West Campus	Palmetto Metrorail Station	6:30 AM	9:35 PM	15.08
	Yellow	1	Doral Central	Doral Central	5:30 AM	9:30 PM	16
		2	Doral Central	Doral Central	6:00 AM	10:00 PM	16
		3	Ronald Reagan Senior High	Palmetto Metrorail Station	5:30 AM	8:30 PM	15
		4	Ronald Reagan Senior High	Palmetto Metrorail Station	6:00 AM	9:00 PM	15
	Green	1	Palmetto Metrorail Station	Palmetto Metrorail Station	5:30 AM	10:10 PM	16.67
		2	Palmetto Metrorail Station	Palmetto Metrorail Station	6:00 AM	10:40 PM	16.67
		3	Eugenia B. Thomas K-8 Center	Palmetto Metrorail Station	5:30 AM	9:20 PM	15.83
		4	Eugenia B. Thomas K-8 Center	Palmetto Metrorail Station	6:00 AM	9:50 PM	15.83
SUNDAY	Orange	1	Dolphin Mall	Doral Central	5:00 AM	9:30 PM	16.5
		2	Dolphin Mall	Doral Central	5:30 AM	10:00 PM	16.5
	Green	1	Doral Central	Doral Central	5:00 AM	9:00 PM	16
		2	Doral Central	Doral Central	5:30 AM	9:30 PM	16
	Yellow	1	Palmetto Metrorail Station	Palmetto Metrorail Station	6:00 AM	9:50 PM	15.83
		2	Miami-Dade College West Campus	Palmetto Metrorail Station	6:00 AM	9:05 PM	15.08

The Hub & Spoke Alternative connects the following major locations and routes (see colored circles).

- Downtown Doral Central Trolley Hub
- Dolphin Station
- Dolphin Mall
- Miami International Mall
- Gold Coast Beverage Distributors
- Walmart
- Sam's Club
- Jackson West Hospital
- CityPlace Doral
- Renaissance Middle Charter School
- Univision
  - NW 30th Terrace
  - NW 41st Street/NW 36th Street
- Carnival Cruise Line
- Federal Reserve Bank of Atlanta
- West Coast University
- Miami-Dade Fire Rescue Headquarters
- Publix Supermarket
  - NW 41st Street and NW 97th Avenue
  - NW 58th Street and NW 107th Avenue
  - NW 53rd Terrace and NW 84th Avenue
  - NW 74th Street and NW 107th Avenue
- Winn-Dixie Supermarket
  - NW 41st Street and NW 107th Avenue
- Sedano's Supermarket
  - NW 58th Street and NW 107th Avenue
- Nicklaus Children's Doral Outpatient Center
- Perry Ellis International
- Doral Academy Preparatory
- Our Lady of Guadalupe Catholic Church
- Miami-Dade College West
- Shelton Academy
- John I Smith K-8 Center
- John I Smith Middle School
- Eugenia B. K-8 Center
- Divine Savior Academy
- Downtown Doral Charter Elementary and Upper School
- Downtown Doral office complex
- Palmetto Metrorail Station
- Doral International Math & Science Academy
- Dr. Rolando Espinosa K-8 Center
- Ronald W. Reagan Doral Senior High School
- Medley Lakeside Retirement Park
- Ryder Supply Chain Solutions
- FIU Engineering Center
- FIU Modesto A. Maidique campus

DOWNTOWN DORAL CENTRAL TROLLEY HUB

The Hub & Spoke Alternative includes the development of a Downtown Doral trolley hub to serve as the central transfer point and connection to most transit services in the City. This hub may be developed as a standalone facility or may be incorporated into the development of a building. In July 2019, the City concluded a citywide parking study and recommended the development of a parking garage within Downtown Doral. This development presents an excellent opportunity for designing the trolley hub on the first floor of the garage similar to the Dadeland Metrorail stations and the Aventura Mall Metrobus terminal. One proposed concept presented for the recommended parking garage locates the structure in a privately-owned parcel roughly bounded by NW 53rd Street to the south, NW 54th Street to the north, NW 52nd Terrace to the west, and NW 82nd Avenue to the east. The owner of this parcel, Codina Real Estate Management, has conceptualized an office building in this and the adjacent vacant parcels. This presents an opportunity for mixed-use development within these two parcels to accommodate all identified needs within Downtown Doral. The first floor of this development can accommodate street-level retail, the trolley central hub and the first floor of the parking garage. **Figure 44** through **Figure 46** illustrate a concept of the proposed development. **Table 80** lists the parking spaces accommodated per floor by the proposed concept. Additional parking may need to included depending on the need of the office development and retail space.

The central transit hub building shall include the following passenger amenities: climate controlled and exhaust free passenger waiting and seating area with ADA compliant seating, customer service area, ticket vending machines, information kiosks, food and beverage vending machines; automated teller machine (ATM), bus transit information screens, Wi-Fi, refrigerated water fountains, public restrooms, public pay phones, mobile phone charging stations, and clocks. The transit hub may also include the following support facilities: information technology (IT) room, security office, janitor's room with mop and sink, mechanical room/AC closet, and electrical room. Complimentary land uses with the transit hub include transit-related development, public service offices (utilities, police and fire substations, etc.), daycare, concession/retail stores, and quick service restaurants.

Table 80: Hub & Spoke Recommended Alternative Characteristics

LEVEL	PARKING SPACES		TOTAL PARKING SPACES	AREA (SQ. FT)
	STANDARD	ADA		
6	121	0	121	51,730
5	121	0	121	51,730
4	121	0	121	51,730
3	113	4	117	51,730
2	113	4	117	51,730
1	95	4	99	48,658
TOTAL	**563**	**10**	**696**	**307,308**

Parking Efficiency = 441.4 Sq. Ft./Parking Space

The conceptualized parking garage and Downtown Doral Central Trolley Hub were designed using the following standards:

Ramp Grade
5%

Stair Treads
9 @ 11 inches

Ramp Length
210 ft.

Elevator Shaft
7 ft. by 9 ft.

Floor Height
10.5 ft.

Bus Layover
12 ft. wide

Travel Lanes/Aisles
24 ft

Standard Parking Spaces
9 ft. by 20 ft. @ 90°

ADA Parking Spaces
12 ft. by 20 ft. with 6 ft. accessible aisle @ 90°

Stair Intermediate Landing
4 ft. and 9 in. elevation from bottom floor with 1 feet floor depth

Retail Space
Approximately 45,820 sq. ft.

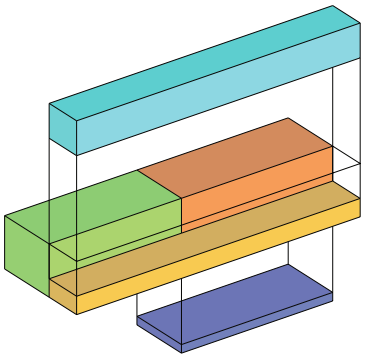
Residential/Office with Garage
Approximately 60,055 sq. ft.

Terminal Platform
30 ft. wide adjacent to retail space and 15 ft. wide on flanks

Drop Off/Pick-up Area
10 ft. wide

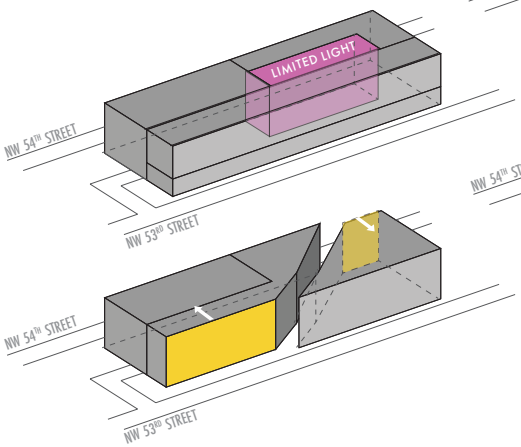
Figure 44: Downtown Doral Central Trolley Hub

PROGRAM SPACE

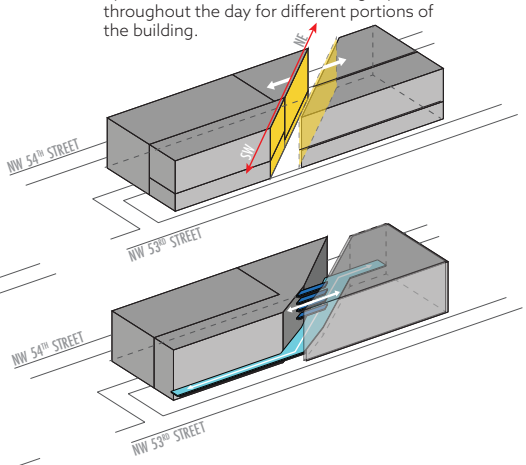


- NW 53rd Street Retail/Frontage Zone
- Residential Units
- Office Units
- Parking Garage
- Transit Hub

1 the conceptualization of the Doral Central's program space resulted in a rectangular mass that occupied the entirety of the two (2) parcels. Due to the nature of a mixed-use Transit- Oriented Development, some program space, primarily in the offices, would recieve no natural light.



2 A central channel travelling from the Southwest to the Northeast through the building was openned to maximize ambitiant light pentration throughout the day for different portions of the building.



3 Portions of the north and south side of the building were recessed to increase sightlines of the openned channel for people passing by and to improve the view out of residnetial and office spaces.

4 A central platform and walkways were added for additional circulation through and across building channel. The first floor of the open channel gives Doral residents and visitors direct access from the south to the Transit Hub located on the NE quadrant of the building. On the second floor, the added platform provides increased space for retail and recreational activity to make the Doral Central a regional destination within Miami-Dade County.

Downtown Doral Central Hub Concept

Figure 45: Doral Central Floor Plan - Ground

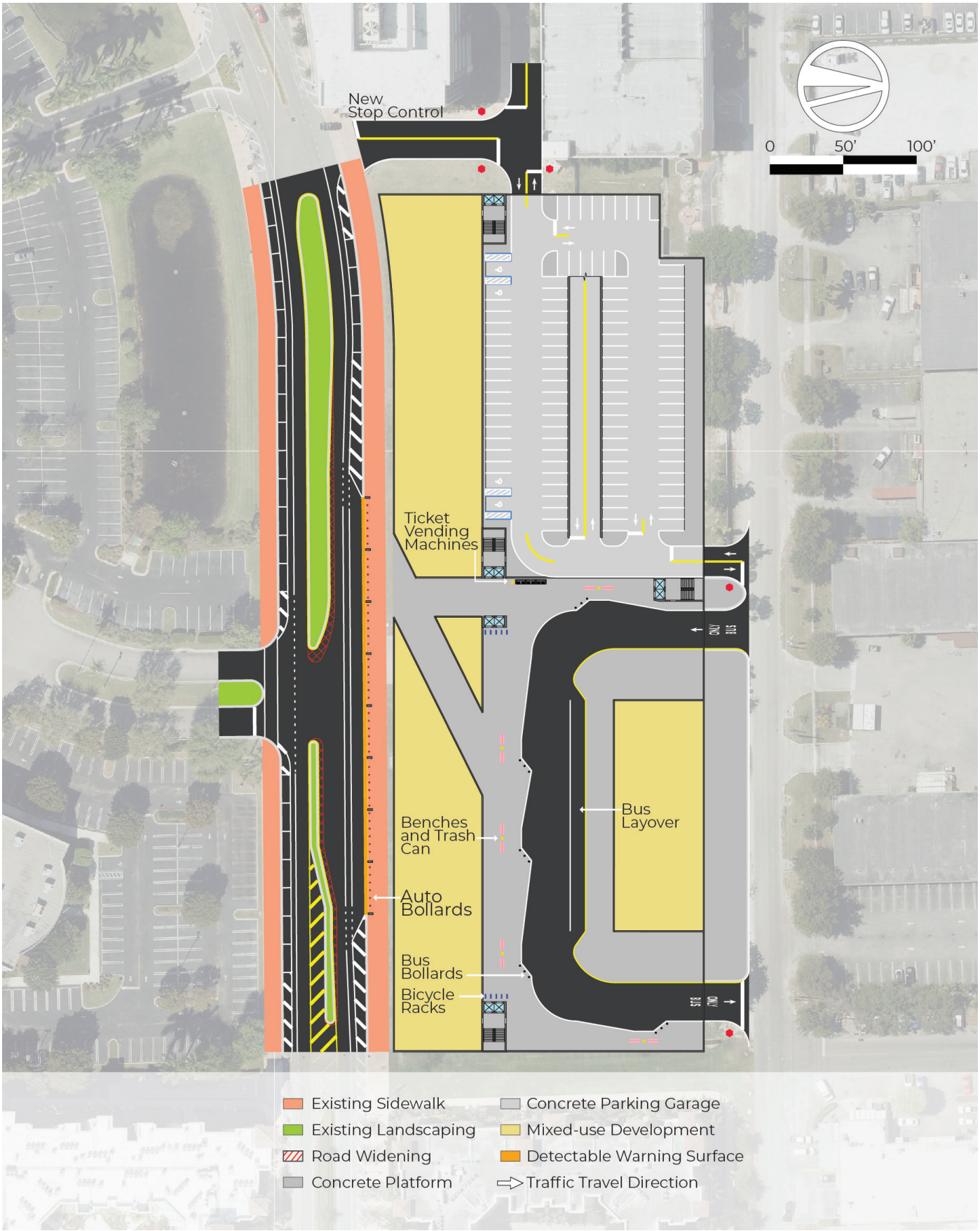


Figure 46: Doral Central Floor Plan - Offices and Residences

Downtown Doral Central Hub Concept - Transit Loop

Downtown Doral Central Hub Concept - Transit Loop Exit

Downtown Doral Central Hub Concept - North View

Downtown Doral Central Hub Concept - South View

COMPREHENSIVE TRANSIT STOP CAPITAL IMPROVEMENT PROGRAM

Numerous trolley stops are lacking essential amenities. **Table 81** lists the amount of bus stops missing amenities such as benches, trash receptacles, wheelchair ramp landings, bicycle racks, and lighting. A bus stop upgrade program is recommended to evaluate and upgrade these bus stops. This program should complete bicycle/pedestrian accessibility study and ROW/engineering feasibility study to accommodate appropriate bicycle and pedestrian amenities.

Regarding bicycle racks, bus stops should have concrete embedded inverted-U racks. This type of bicycle rack is recommended over others because they allow bicyclists to lock their bicycles in the optimal configuration: using multiple locks and either the front wheel or rear triangle as depicted in **Figure 44**.

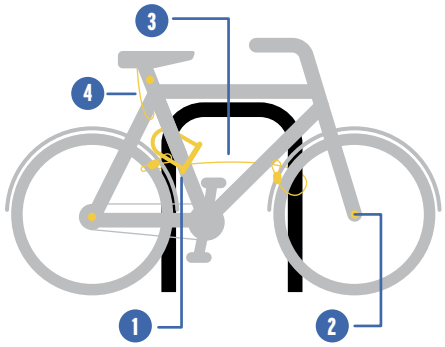
The capital improvement program should also look at developing Super Stops at locations of high ridership. These stops should be iconic, incorporating elements of arts in public spaces and, most importantly, these stops should have enough capacity to handle existing and future demand. Today, stops with high ridership have two (2) offset shelters. Super Stops could be designed with long shelters and wide platforms. These stops will also serve as transfer opportunities outside of the Trolley Hub.

Table 81: Bus Stops Missing Essential Amenities

Bench	70
Trash Receptacle	122
Wheelchair Ramp Landing	109
Bicycle Rack	212
Lighting	136

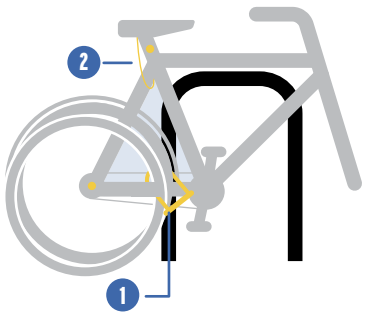
Figure XX : Inverted U-Rack Bicycle Locking Configuration

USING MULTIPLE LOCKS



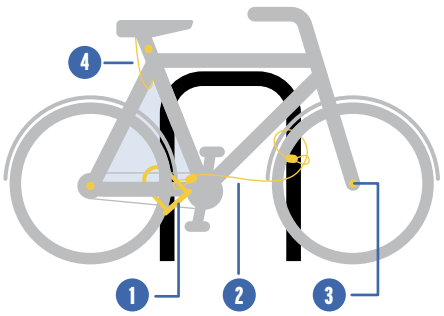
1. **U-Lock** secured to Rack and around Bike Frame
2. **Locking Skewers** replaced Quick Releases for added security
3. **Cable** secured through U-Lock and Wheels
4. **Cable/Chain** and **Locking Skewer** secured to Seat and Bike Frame for added security

REMOVING THE FRONT WHEEL



1. **U-Lock** secured to Rack and around Bike Frame through **Rear Triangle** and Wheels
2. **Cable/Chain** and **Locking Skewer** secured to Seat and Bike Frame for added security

USING THE REAR TRIANGLE



1. **U-Lock** secured to Rack and around **Bike Frame** through **Rear Triangle** and **Wheel Rim**
2. **Cable** secured through U-Lock and around Wheel
3. **Locking Skewers** replaced Quick Releases for added security
4. **Cable** secured to Seat and Bike Frame for added security

TROLLEY FLEET REPLACEMENT

The study team recommends revamping the DTS vehicle fleet. The existing vehicles are inconvenient and inefficient. Diesel vehicles require regeneration during normal operating hours to prevent major damages to the engine. When regenerating the diesel particulate filter (DPF), trolley drives need to stop the vehicle for an average of 20 minutes to activate the fuel burner which heats the filter to soot combustion temperatures. This maintenance occurs regularly and impact customer trip times and DTS' reliability. These constant interruptions to service have negative effects on the trolley operations, passenger's perception of reliability, and operating expenses. Furthermore, updating the aesthetics of the trolley system is consistent with new premium transit services expected around the City. Providing sleeker vehicles attracts more riders to the system and provides a multiplying effect as the riders transfer to other transit services. Vehicle comfort and aesthetics were points of discussion raised by stakeholders.

Through research, the following vehicles were deemed suitable for replacing the existing fleet. These vehicles range from 30 to 35 feet in length, with maximum capacities of 27 to 35 passengers. Vehicle power technology has the most impact on vehicle cost given changes in power technology involve changes in infrastructure, vendors, energy consumption, vehicle useful life, and capital cost. Given that vehicle costs vary widely depending on the vehicle specifications, order size and many other factors, the project team suggests obtaining quotes from vendors to compare accurate prices. From the vehicles listed below, purchase costs range from $200,000 to $800,000 based on preliminary research.

For electric vehicles (EV), the U.S. Department of Energy released a report titled "Costs Associated with Non-Residential Electric Vehicle Supply Equipment" in November 2015. This report compiled cost information from various studies and electric vehicle infrastructure owners and suppliers. It reports that "the cost of a single port electric vehicle supply equipment (EVSE) unit ranges from $300-$1,500 for Level 1, $400-$6,500 for Level 2, and $10,000-$40,000 for DC fast charging. Installation costs vary greatly from site to site with a ballpark cost range of $0-$3,000 for Level 1, $600 - $12,700 for Level 2, and $4,000-$51,000 for DC fast charging." Level 1 and Level 2 refer to two (2) types of alternative current (AC) charging options where the vehicle's on-board charging equipment converts the electricity to the direct current (DC) needed to charge the vehicle batteries. On the other hand, the DC fast charging provides DC electricity directly to the vehicle's battery. Furthermore, this report states that the average electricity rate consumed by EVSE owners ranges from $0.08-$0.15 per kilowatt-hour ($/kWh). While rates for industrial fleets are typically lower, FPL quotes a commercial facility using 40kw, 10,000 kWh a month at an electricity rate of $0.10 per kWh which equals a monthly bill of around $1,000.00 for approximately 4,650 vehicle miles traveled. On average, electric buses have a 2.15 kWh per mile efficiency.

TROLLEY FLEET REPLACEMENT

DIESEL/GAS VEHICLES

Champion® LF Transport® with Flexbus® Technology

Vicinity® 35-ft

Glaval® Titan II®

Karsan® Star®

ENC® E-Z Rider II®

New Flyer® Xcelsior® CNG

MAN® Lion® City

New Flyer® Xcelsior® Charge

ELECTRIC VEHICLES

BYD® K9S®

MAN® Lion® City E

Proterra® Catalyst®

Table 82 lists some specifications of each proposed vehicle.

Table 82: Hub & Spoke Recommended Alternative Characteristics

BRAND	FUEL TYPE	LENGTH (FT.)	WIDTH (FT.)	WHEELBASE (IN.)	SEATING CAPACITY	ADA SEATING	GVWR (LBS.)
Champion® LF Transport® with Flexbus® Technology	Diesel/Gas	27	8.5	208	26	3	14,200
Glaval® Titan II®	Gas	28	8	214	16	2	14,200
ENC® E-Z Rider II®	Diesel/CNG/ LNG/Hybrid	30.5	8.5	160	24	2	35,000
Vicinity® 35-ft	CNG	35	8	224	32	2	37,044
Karsan® Star®	Diesel	27	8	180	27	1	22,046
New Flyer® Xcelsior®	Diesel/CNG/ Hybrid/Electric	35.5	8.5	226	32	2	24,500 - 31,250
MAN® Lion® City	Diesel/Electric	42	8.4	236	37	Not Specified	23,990
BYD® K9S®	Electric	35	8.5	223	32	2	40,784
Proterra® Catalyst®	Electric	35	8.5	243	28	Not Specified	42,000

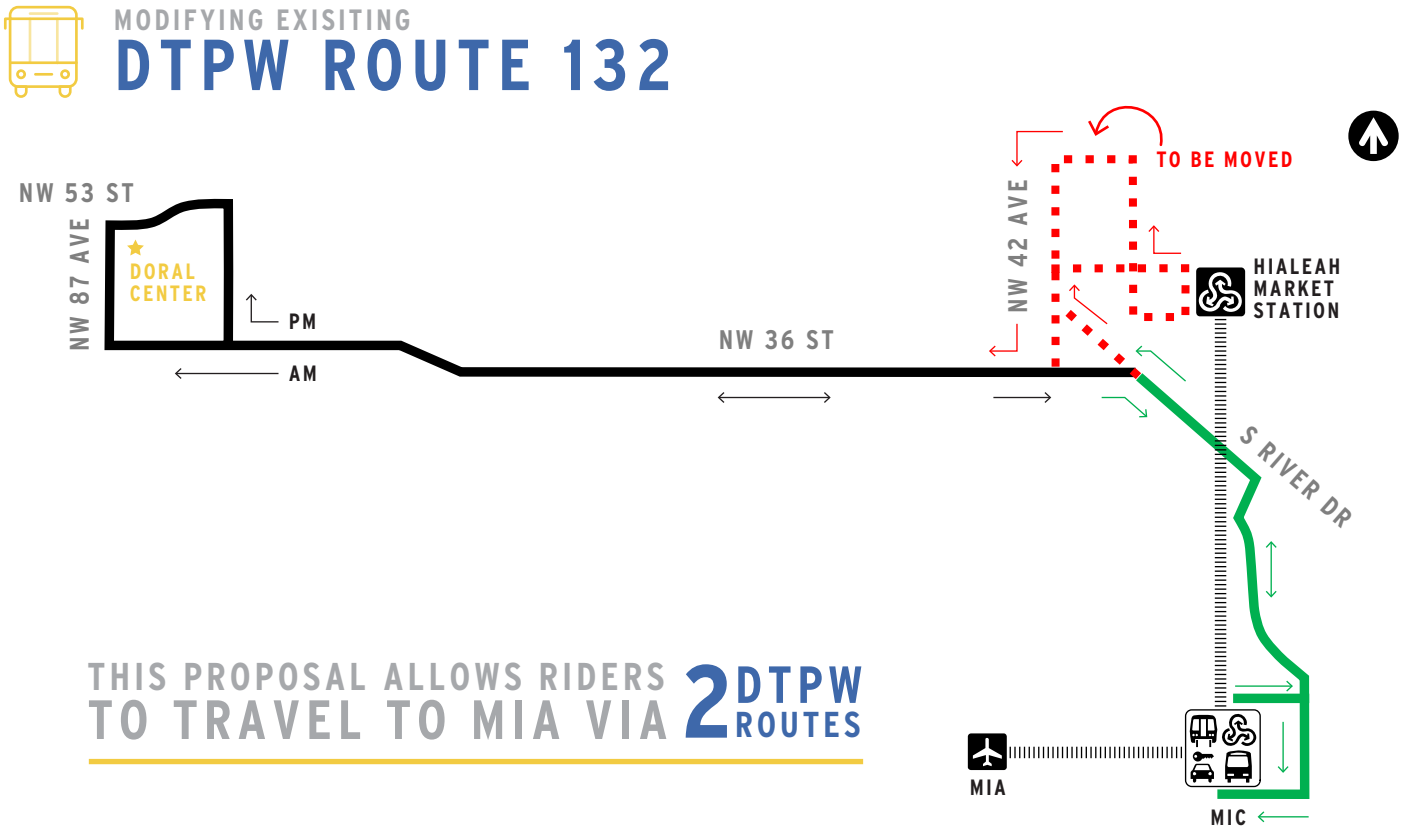
EAST-WEST CORRIDOR INTEGRATION

The Hub & Spoke Alternative works well with the County's SMART Plan, especially the East-West Corridor. Since the East-West Premium Transit Corridor is still in the planning stage, station locations have not yet been determined. This allows an opportunity to designate the trolley hub as a major park-and-ride station. A leg of the East-West could extend north on NW 87th Street and reach Downtown Doral. This recommendation would have a compounding effect since Doral residents will have a multitude of travel options (i.e., trolley, Metrobus, Premium Transit, and Metrorail) to reliably travel to the major economic centers of the County. Hence, the City should coordinate with the East-West SMART Plan Rapid Transit Corridor PD&E Study team to considers a north-south extension on NW 87th Avenue to the proposed Downtown Doral Central Trolley Hub with the proposed modified trolley routes. If the assessment of the proposed Trolley Hub does not generate enough ridership to justify an extension of the East-West Corridor on NW 87th Avenue, then the City could investigate modifying the Hub & Spoke Blue or Yellow routes to tie into the proposed East-West Corridor terminals.

MODIFIED METROBUS ROUTE 132

Of the 11 Miami-Dade DTPW routes operate within Doral, Route 132 can be modified to provide more mobility options. Today, Route 132 serves the Tri-Rail Hialeah Market Station by traveling along NW 36th Street from Downtown Doral. Given the Miami Intermodal Center provides access to Tri-Rail, Metrorail, Miami International Airport People Mover, Metrobus, and intercity bus services such as Greyhound and Megabus, reconfiguring Route 132 to connect to the MIC provides vastly more travel options. Hence, Route 132 is recommended to be reconfigured as illustrated in. This provides a compounding benefits to the City's mobility since now Metrobus Route 238/338 and 132 access the airport, and since Route 132 will benefit from using the Downtown Doral Trolley Central Hub.

Figure 47: Recommended Modifications to Metrobus Route 132



PALMETTO STATION INTERMODAL TERMINAL

Palmetto Metrorail Station lacks certain elements that would improve passenger comfort and safety. As illustrated in **Figure 48** and **Figure 49**, the station does not provide proper coverage from rain, and is lacking wayfinding, lighting, and ADA-specific infrastructure. The City should support for the design and construction of the Palmetto Station Intermodal Terminal and inclusion of three (3) dedicated Doral Trolley bus bays, bus/trolley layover bay, wayfinding, trolley driver break room, wide platform with full cover canopy, sufficient seating and bicycle amenities, and appropriate lighting.

More specifically, the following actions are recommended to improve passenger comfort throughout the Palmetto Station.

- Replace malfunctioning lighting and provide regular maintenance.
- Perform an ADA-compliance evaluation and correct identified deficiencies with pavement markings, drop offs, pedestrian ramps, detectable warning surfaces, cross-slopes and sidewalk grades, and others.
- Perform a lighting intensity analysis to ensure sufficient lighting is provided and correct identified deficiencies.
- Perform a wayfinding analysis of the transportation network surrounding the Palmetto Station. Furthermore, aside from guiding drivers to the station, wayfinding should also be provided to guide passengers and drivers throughout the station. The latter helps passenger understand and locate the multiple transit services available at the station as well as convenience in identify facilities such as restrooms and vending machines.
- Perform a bicycle and pedestrian accessibility study of the station to understand mobility barriers and conceptualize solutions based on the station's surrounding land use and demographic characteristics.

Figure 48 : Palmetto Metrorail Platform

Figure 49 : Palmetto Metrorail Canopy

DOLPHIN STATION OPERATIONS AND ROADWAY CONNECTION

Furthermore, once the Dolphin Station begins operating, the DTS should be modified to access this station. The transportation network around Dolphin Mall, however, is not complete. One long-term recommendation is to complete the grid around this area. Hence, this study recommends evaluating the feasibility of elevating SR 821/HEFT in order to provide a new roadway access to the Dolphin Station. This will provide increase travel reliability and traffic congestion relief to this area. Furthermore, this recommendation is in line with the ongoing developments west of the SR 82/HEFT and between NW 12th Street and NW 25th Street because by providing this new roadway transit services can stop at the Dolphin Station Park-and-Ride, proposed residential and commercial developments, and Dolphin Mall with zero route deviation. Moreover, because NW 17th Street is less traveled than NW 12th Street and NW 25th Street, transit services going to the Dolphin Station will also benefit from reduce delay due to traffic congestion.

Figure 50 : Recommended Modifications to Metrobus Route 132

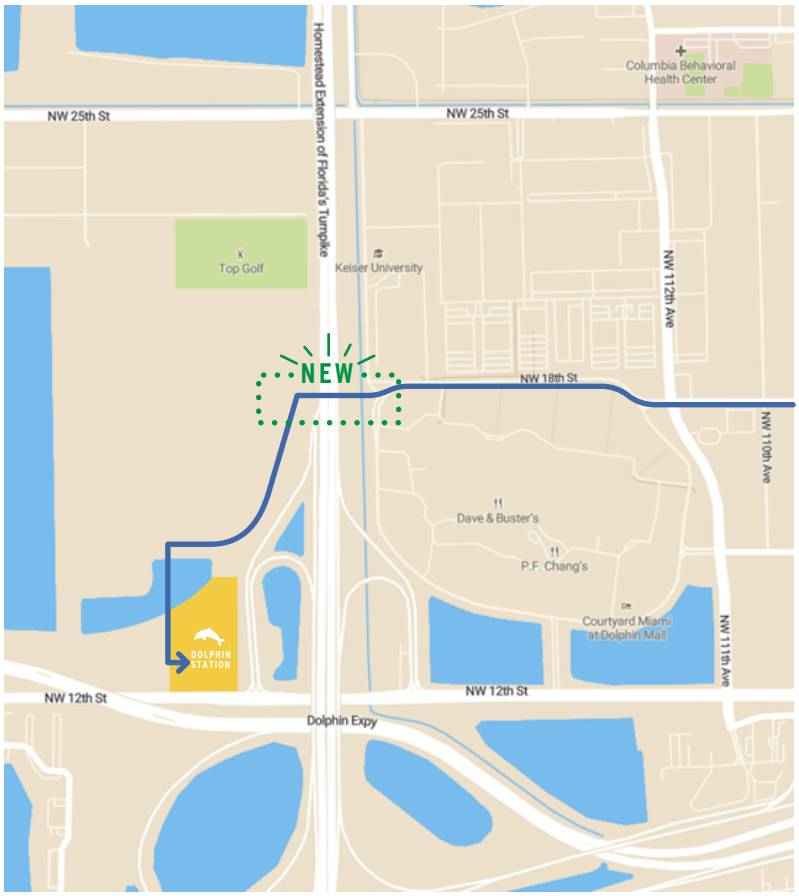
CONNNECTING TO
DOLPHIN STATION
PROVIDES ACCESS TO...

836 EXPRESS

EAST-WEST CORRIDOR
SMART PLAN CORRIDOR

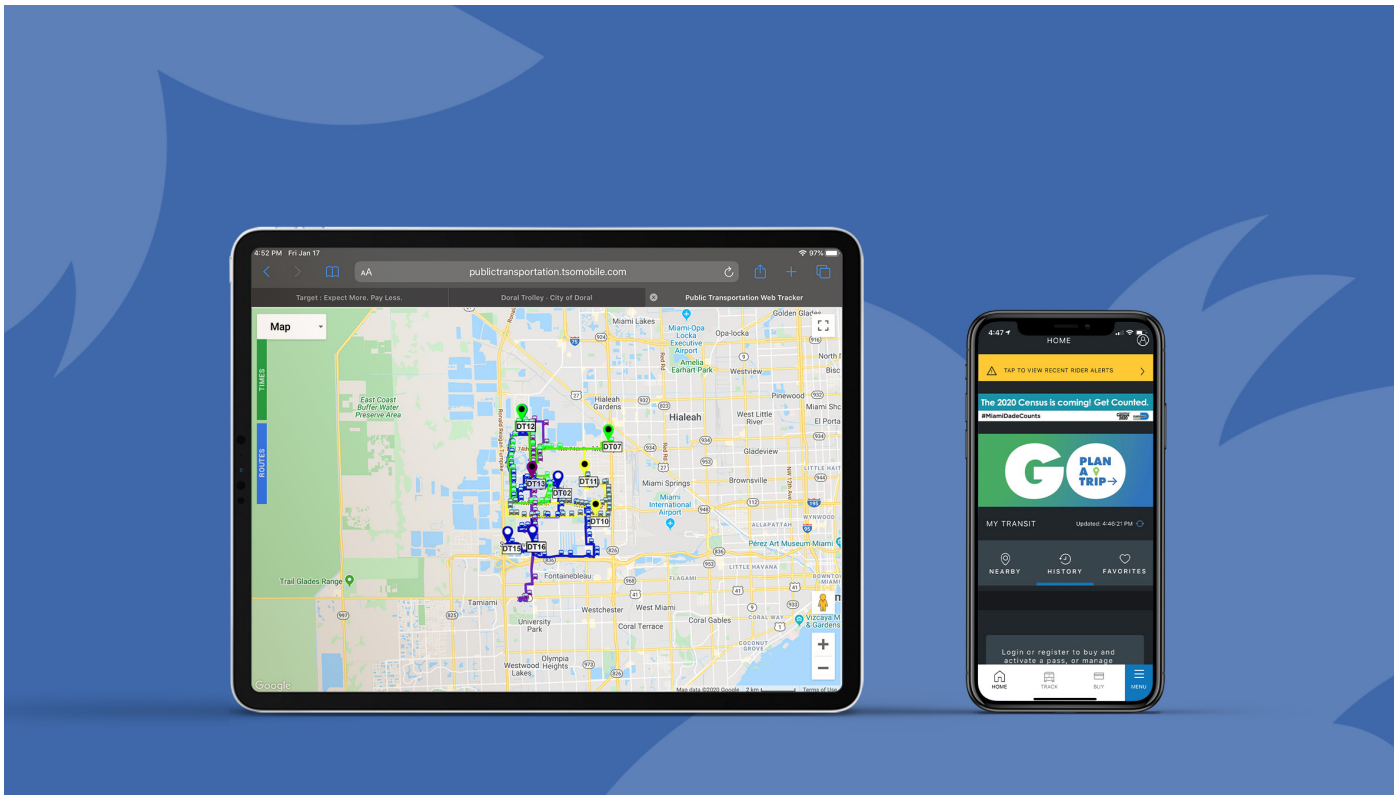
TURNPIKE EXPRESS BERT
SMART PLAN CORRIDOR

DTPW LOCAL ROUTES
7,36,71,137,238, AND 338



UNIFIED TRANSIT TRACKING APPLICATION

The City of Doral has begun sharing trolley tracking data with Miami-Dade County. This action is a positive step in developing a unified tracking application, however, more could be done. The City should coordinate with Miami-Dade County to form a multi-jurisdictional effort so that all transit modes can be tracked via one user-friendly mobile application. The application should provide accurate information and transfers from each municipal trolley system to Metrobus, Metrorail, Tri-Rail, Amtrak, and Brightline. This application can also ease user interaction with the SMART Plan corridors as they come online. Additional, because the County is a larger organization, it benefits from bargaining power for procuring IT services.



11

ACTION PLAN

PRIORITIZED RECOMMENDATIONS

This section outlines a "road map" for implementing the recommendations resulting from this study. The Action Plan lists steps to be accomplished by the City of Doral staff and elected officials. Furthermore, the plan prioritizes the recommendations based on ease of implementation and logical sequencing. For easy of use, the plan also identifies the asset pertaining to a specific recommendation, estimated capital and operation and maintenance costs, the items included in the cost estimates, and potential stakeholders. Overall, the plan outlines needed coordinate, agreements or amendments, project development phases, and actions by elected officials.

DORAL TROLLEY ACTION PLAN

PRIORITY
01

RECOMMENDATION

Propose modifications to Miami-Dade DTPW Route 132 to access the MIC as opposed to the Hialeah Market Tri-Rail Station.

ACTION ITEMS

- Pass a resolution of the Mayor and the City Council urging Miami-Dade DTPW to implement the proposed route change in the short-term to create a new connection to the MIC from Downtown Doral. In the long-term, this route should operate from the proposed central hub and be included in the Better Bus Project
- Coordinate an ongoing dialogue with Miami-Dade DTPW staff

Asset
Metrobus Route

Estimated Capital Cost
$0.00

Estimated O&M Cost
$0.00

Items Included in Estimate
N/A

Stakeholders
① Miami-Dade County DTPW

DORAL TROLLEY ACTION PLAN

PRIORITY
02

RECOMMENDATION

Recommend the Miami-Dade CITT modifies the formula for distributing PTP funds for the Municipal Transportation Program to include population and employment densities as opposed to total population only.

ACTION ITEMS

- Pass a resolution of the Mayor and the City Council urging Miami-Dade CITT to modify the formula for distributing PTP funds for the Municipal Transportation Program to include population and employment densities as opposed to total population only to ensure each municipality within the County obtains a fair share of the available funding in terms of trips served

Asset
Policy

Estimated Capital Cost
$0.00

Estimated O&M Cost
$0.00

Items Included in Estimate
N/A

Stakeholders
① Miami-Dade County CITT

DORAL TROLLEY ACTION PLAN

PRIORITY
03

RECOMMENDATION

Support the prompt implementation of the Florida's Turnpike North and South Bus Express Rapid Transit (BERT) and SR 836 Express Bus services and begin operation of the Dolphin Station transit terminal.

ACTION ITEMS

- Pass a resolution of the Mayor and the City Council urging Miami-Dade TPO, DTPW, and Expressway Authority, as well as Florida Turnpike Enterprise, to begin prompt implementation of the Florida's Turnpike North and South Bus Express Rapid Transit (BERT) and SR 836 Express Bus services and begin operation of the Dolphin Station transit terminal

Asset
BERT Routes

Estimated Capital Cost
$0.00

Estimated O&M Cost
$0.00

Items Included in Estimate
N/A

Stakeholders
1. Miami-Dade County TPO
2. Miami-Dade County DTPW
3. Miami-Dade Expressway Authority
4. FDOT
5. Florida Turnpike Enterprise

DORAL TROLLEY ACTION PLAN

PRIORITY
04

RECOMMENDATION

Modify existing Doral Trolley routes, frequency, and schedule by implementing the Hub & Spoke routing alternative which modifies Routes 1, 2 and 3, adds a new Route 5, and maintains Route 4/FIU.

ACTION ITEMS

- Through this study, the City of Doral held two (2) public and business stakeholder meetings on 3.28.19 and 6.19.19
- Next steps include, organize a Public Outreach Workshop and Public Hearing to inform citizens of route and schedule changes
- Pass a resolution of the Mayor and the City Council approving routing, frequency, and schedule changes as well as changes to the Interlocal Agreement with Miami-Dade County
- Pass a resolution of the Board of County Commissioners of Miami-Dade County approving routing, frequency, schedule, and Interlocal Agreement changes
- Conduct a test drives of the new routes to measure travel times, refine schedules, and determine headways (ideally 15 to 30 minutes)
- Implement the routing and schedule changes

Asset
Doral Trolley Routes

Estimated Capital Cost
$0.00

Estimated O&M Cost
$5,324,000.00

Items Included in Estimate
1. Vendor O&M Fees
2. IT Maintenance Fees
3. Capital Cost of New Vehicle

Stakeholders
1. Miami-Dade County TPO
2. Miami-Dade County DTPW
3. Miami-Dade County CITT

DORAL TROLLEY ACTION PLAN

PRIORITY
05

RECOMMENDATION

Design and construct a Downtown Doral Central Trolley Hub to serve the Doral Trolley, Miami-Dade DTPW metrobus, FreeBee, and potential future transit services.

ACTION ITEMS

- Perform a feasibility analysis to determine preliminary engineering, safety and security, traffic operations, ITS services, parking requirements and financial viability (i.e. available or required funding sources)
- Coordinate with stakeholders to determine political will and preliminary commitments
- Pass a resolution of the Mayor and the City Council approving the procurement and funding for the transit hub
- Depending on funding sources and anticipated services, resolutions from the Mayor and City Council as well as Board of County Commissioners (Miami-Dade) may be required to enter into a new Interlocal Agreements with corresponding stakeholders
- Select the most appropriate procurement and project delivery method (Design-Build, Design-Bid-Build, P3, etc.)
- Complete Preliminary Engineering phase
- Complete Construction phase
- Pass a resolution of the Mayor and the City Council approving the use of the facility and its amenities by Miami-Dade Transit staff
- Pass a resolution of the Board of County Commissioners of Miami-Dade County approving the use of the facility and its amenities by Miami-Dade Transit staff
- Begin facility operations and use by transit providers as well as implement new traffic operation, safety and security, and ITS plans

Asset
Real Estate

Estimated Capital Cost
$300,000.00

Estimated O&M Cost
$0.00

Items Included in Estimate
1. Feasibility Analysis

Stakeholders
1. Miami-Dade County TPO
2. Miami-Dade County DTPW
3. Miami-Dade County CITT
4. Codina Partners

DORAL TROLLEY ACTION PLAN

PRIORITY
06

RECOMMENDATION

Recommend the East-West SMART Plan Rapid Transit Corridor PD&E Study team to consider a north-south extension on NW 87th Avenue to the proposed Downtown Doral Central Trolley Hub.

ACTION ITEMS

- Pass a resolution of the Mayor and the City Council urging Miami-Dade TPO and DTPW to consider a north-south extension of the East-West SMART Plan Rapid Transit Corridor on NW 87th Avenue to the proposed Downtown Doral Central Trolley Hub
- Coordinate with Miami-Dade TPO and DTPW staff to ensure the Central Trolley Hub is modeled appropriately as a park-and-ride (to obtain more accurate results in terms of ridership forecasts), to communicate the exponential multiplier effect provided by connecting multiple transit modes in Downtown Doral and to ensure the engineering and financial feasibility of the project

Asset
East-West SMART Plan Rapid Transit Corridor

Estimated Capital Cost
$0.00

Estimated O&M Cost
$0.00

Items Included in Estimate
N/A

Stakeholders
1. Miami-Dade County TPO
2. Miami-Dade County DTPW
3. Miami-Dade County CITT
4. Codina Partners

DORAL TROLLEY ACTION PLAN

PRIORITY
07

RECOMMENDATION

Endorse a feasibility study to assess the viability of implementing transit priority treatments (i.e., queue jumps, transit approach lanes, transit signal priority) at intersections with high congestion within the City.

ACTION ITEMS

- Conduct a traffic engineering and planning study to analyze high congested intersections within the City and determine the viability of implementing transit priority treatments
- Pass a resolution of the Mayor and the City Council approving recommendations and finding improvements
- Select the most appropriate procurement and project delivery method
- Complete Preliminary Engineering phase
- Complete Construction phase

Asset
Roadway

Estimated Capital Cost
$300,000.00

Estimated O&M Cost
$0.00

Items Included in Estimate
① Traffic Operation and Preliminary Engineering Study Analysis

Stakeholders
① Miami-Dade County TPO
② Miami-Dade County DTPW
③ Miami-Dade County CITT
④ FDOT

DORAL TROLLEY ACTION PLAN

PRIORITY
08

RECOMMENDATION

Support the design and construction of the Palmetto Station Intermodal Terminal and inclusion of three (3) dedicated Doral Trolley bus bays, bus/trolley layover bay, wayfinding, trolley driver break room, wide platform with full cover canopy, sufficient seating and bicycle amenities, and appropriate lighting.

ACTION ITEMS

- Pass a resolution of the Mayor and the City Council urging Miami-Dade TPO and DTPW to proceed with the development of the 2014 proposed Palmetto Station Intermodal Terminal concept (2040 LRTP Priority III, Map ID 2 and 16; 2045 LRTP Table 7.1, Unfunded Projects) and include the City of Doral as an Elevated Stakeholder to ensure specific features accommodating the Doral Trolley are included
- Coordinate an ongoing dialogue with Miami-Dade TPO and DTPW staff

Asset
Palmetto Metrorail Station

Estimated Capital Cost
$0.00

Estimated O&M Cost
$0.00

Items Included in Estimate
N/A

Stakeholders
1. Miami-Dade County TPO
2. Miami-Dade County DTPW

DORAL TROLLEY ACTION PLAN

PRIORITY
09

RECOMMENDATION

Develop a comprehensive transit stop capital program to design and construct Superstops at high activity locations, add bus shelters, and maintain stop amenities and ADA compliance.

ACTION ITEMS

- Perform a feasibility analysis to determine the scope, engineering feasibility, safety and security plan, and financial feasibility (i.e. available or required funding sources) of the program
- Pass a resolution of the Mayor and the City Council approving the development of a Transit Stop capital program with funding collected through bonds, concurrency fees, surtax, or other sources such as advertising/transit branding rights
- Hire a consultant program management team or appoint internal program management team
- Design, construct, and oversee program development
- Monitor existing and constructed assets for life-cycle replacements, financial planning, and customer satisfaction

Asset
Trolley Stops

Estimated Capital Cost
$0.00

Estimated O&M Cost
$0.00

Items Included in Estimate
N/A

Stakeholders
1. Miami-Dade County TPO
2. Miami-Dade County DTPW
3. Miami-Dade County CITT

DORAL TROLLEY ACTION PLAN

PRIORITY 10

RECOMMENDATION

Replace Doral Trolley vehicle fleet with fuel-efficient, attractive, and sustainable vehicles.

ACTION ITEMS

- Coordinate meetings with vendors to obtain accurate quotes and specifications
- Perform a study to select the most appropriate technology and vehicle
- Strategize on procurement method and financial feasibility (i.e. direct City purchase, turn-key vendor, vendor buyback program, RFI, etc.)
- Pass a resolution of the Mayor and the City Council approving recommended vehicle and funding fleet replacement as well as changes to the Interlocal Agreement with Miami-Dade County
- Pass a resolution of the Board of County Commissioners of Miami-Dade County approving vehicle purchase as well as changes to the Interlocal Agreement with Miami-Dade County
- Acquire fleet replacement through the approved procurement process

Asset
Trolley Vehicles

Estimated Capital Cost
Varies

Estimated O&M Cost
Varies

Items Included in Estimate
N/A

Stakeholders
1. Miami-Dade County TPO
2. Miami-Dade County DTPW
3. Miami-Dade County CITT
4. O&M Vendor
5. Vehicle Manufacturer

DORAL TROLLEY ACTION PLAN

PRIORITY 11

RECOMMENDATION

Recommend a new overpass/underpass across SR 821/Homestead Extension of the Florida Turnpike between Telemundo Way and NW 117th Avenue in the City of Sweetwater.

ACTION ITEMS

- Coordinate with all listed stakeholders to gauge engineering need and political will to advance this recommendation
- Perform a feasibility analysis to determine the preliminary engineering, safety, traffic operations, ITS services, and financial feasibility of this recommendation
- Pass a resolution of the Mayor and the City Council in favor of this recommendation (most likely in favor of an amendment to the LRTP/TIP/STIP), in favor of a resolution from the City of Sweetwater, or to enter into an agreement with stakeholders for the financing, design, or construction of this recommendation

Asset
Roadway

Estimated Capital Cost
$0.00

Estimated O&M Cost
$0.00

Items Included in Estimate
N/A

Stakeholders

1. Miami-Dade County TPO
2. Miami-Dade County DTPW
3. Florida Turnpike Enterprise
4. FDOT
5. City of Sweetwater
6. Prologis
7. Taubman Centers

DORAL TROLLEY ACTION PLAN

PRIORITY
12

RECOMMENDATION

Recommend Miami-Dade DTPW implements a unified transit tracking application with user-friendly design to track, plan, and estimate transit trips on all available modes (i.e. trolley, metrobus, Metrorail, Tri-Rail, Brightline, etc.)

ACTION ITEMS

- Coordinate with Miami-Dade TPO and DTPW staff to determine the feasibility of developing one integrated software application and unifying agreement for all available transit tracking softwares in the County
- Pass a resolution of the Mayor and the City Council in favor of a unified transit tracking application

Asset
Smartphone and Web Software Application

Estimated Capital Cost
$0.00

Estimated O&M Cost
$0.00

Items Included in Estimate
N/A

Stakeholders
1. Miami-Dade County TPO
2. Miami-Dade County DTPW
3. Miami-Dade County CITT

DORAL TROLLEY ACTION PLAN

PRIORITY 13

RECOMMENDATION

Develop a trolley storage and maintenance yard within the City of Doral.

ACTION ITEMS

- Coordinate with current trolley O&M vendor to gauge interest in developing a storage and maintenance yard within the City of Doral
- Determine potential parcels for the development of the storage and maintenance yard
- Pass a resolution of the Mayor and the City Council amending the Interlocal Agreement with Miami-Dade County to approve the new location of the trolley storage and maintenance yard, amend the Interlocal Agreement with Miami-Dade County, find the design and construction of the yard, and develop the facility
- Pass a resolution of the Board of County Commissioners of Miami-Dade County approving the amendment to the Interlocal Agreement with the City of Doral
- Procure General Contractor and A/E firm to design-construct yard (this may not be required if the City is able to enter into an agreement with vendor for the development of the yard)

Asset
Trolley Storage and Maintenance Yard

Estimated Capital Cost
$0.00

Estimated O&M Cost
$0.00

Items Included in Estimate
N/A

Stakeholders
1. Miami-Dade County TPO
2. Miami-Dade County CITT
3. O&M Vendor

12

CONCLUSION

The City of Doral is young and experiencing rapid growth. With multiple mixed-use developments under construction and new parks and public spaces underway, the City is truly becoming a place to live, work, and play. This growth, however, brings some pain. Doral is experiencing heavy congestion and is looking to provide sustainable transportation for its residents and visitors. This study evaluated existing conditions and planned and programmed transportation improvements to provide solutions that maintain and evolve the existing Doral Trolley System (DTS). Funded through a partnership with Miami-Dade County, the DTS provides a great mobility service for the City. Residents and visitors are able to travel between large commercial, business, and residential developments at no cost. This study identifies existing issues and constrains and investigates improvement opportunities. In all, recommendations include changes to the existing DTS routes, schedules, and frequencies to better serve existing customer needs and better integrate with planned premium transit services around Doral. The study also looks at other mobility solutions which involve sister transportation agencies and neighboring cities. The transit system of Doral is now set to grow and evolve with the rapid pace of changes occurring around and within the City.


WELCOME TO
DORAL
CENTRAL
DORAL
FLORIDA
TPO
Miami-Dade Transportation
Planning Organization