# FINAL REPORT
# Douglas Road Transit Corridor Study
## General Planning Consultant (GPC) Services
### Work Order #GPC V-8
### Miami-Dade County, Florida

**Prepared for:**

**MIAMI-DADE County Metropolitan Planning Organization**

**Prepared by**

Gannett Fleming

**May 2014**

# Contents

# List of Tables

# List of Figures

## 1. Study Objective

The primary objective of this study is to develop and evaluate feasible premium transit improvement options along the Douglas Road Corridor, extending at a minimum from the Miami Intermodal Center (MIC) on the north to the Metrorail system to the south (in the vicinity of US-1) while connecting various major employment centers and transit generators. The Douglas Road Corridor for purposes of this study extends from SW/NW 42nd Avenue/Le Jeune Road (SR-953) on the west to NW/SW 27th Avenue (SR-9) on the east.

Specific study objectives also include the following:

- Develop a rapid transit strategy that will contain viable short-term, mid-term, and long-term transit plans consistent with existing and future municipal and county goals and policies;
- Develop a cost-effective, incremental premium transit strategy that is financially sustainable and context sensitive;
- Develop a transit plan and strategy that is fully coordinated with existing Miami-Dade Transit (MDT) and local transit services;
- Perform specific analyses and provide documentation that will position and support a short-term premium transit plan discretionary grant application and subsequent National Environmental Policy Act (NEPA) studies.

## 2. Need for Project

An analysis of the current and projected travel conditions along the Douglas Road Corridor was performed and a need for action was developed. The following list of identified deficiencies served in developing a plan of specific improvements:

- Increased north-south travel demand and insufficient roadway capacity
- Projected increases in population and employment growth (more high-density mixed use development) in the study corridor
- Insufficient north-south transit capacity during peak travel periods
- Limited amounts of local bus service provided by MDT
- Limited frequent-stop circulator type trolley service within Coral Gables Central Business District (CBD)
- Lack of high-quality alternatives to auto travel
- Limitations of options for transportation improvements in the study corridor due to constrained right-of-way in a built out urban environment
- Lengthy transit travel times (slow auto and transit speeds) and deteriorating transit reliability due to growing levels of recurring traffic congestion
- Increased transit operating expenses due to recurring and growing traffic delays
- Poor connectivity to major transit hubs and intersecting transit routes
- Indistinguishable and low quality transit facilities and infrastructure with few or no passenger amenities

## 3. Existing Transit Service

The Douglas Road study area is interlaced with 24 separate bus routes operating on headways of between 8 and 60 minutes in the peak periods and 12 to 60 minutes in the off-peak periods (See **Table 3–1** and **Figure 3–1**). Most routes operate on Saturdays and Sundays and the Midnight Owl (Route 500) offers overnight service in place of most individual routes.

Each of the five candidate alignments – Le Jeune Road, Ponce de Leon Boulevard, Douglas Road, 27th Avenue, and 22nd Avenue – are served by a single route with the exception of Le Jeune Road, which is served by four, albeit for only parts of the length of the study area. Peak period headways are between 20 and 60 minutes and off-peak generally 30 to 60 minutes. Such service is typical of non-CBD service and represents a reasonable base level of service.

**Table 3–1 - Existing Miami-Dade Transit Bus Service**

| Line Abbreviation | Line Name | Route Name | Peak | Off-Peak | Evening | Overnight | Saturday | Sunday | Alignment |
|---|---|---|---|---|---|---|---|---|---|
| 6 | Central Plaza-Round Towers Via CBD | 6 | 60 | 60 | n/a | n/a | 60 | 60 | 22nd Ave. |
| 7 | CBD-Dolphin Mall Via NW 7th Street | 7 | 15 | 20 | 30 | n/a | 20 | 20 | |
| 8 | CBD-107th Avenue/Westchester Via SW 8th Street | 8 | 10 | 15 | 20 | n/a | 15 | 20 | |
| 11 | FIU-CBD Via Flagler Street | 11 | 8 | 12 | 20 | 60 | 12 | 15 | |
| 22 | 163rd Street Shopping Center-Coconut Grove Via 22nd Avenue | 22 | 30 | 60 | 60 | n/a | 60 | 60 | |
| 24 | West Dade To CBD - Via Coral Way | 24 | 20 | 20 | 30 | n/a | 30 | 30 | |
| 27 | Coconut Grove-Calder Via NW 27th Avenue | 27 | 30 | 30 | 60 | 60 | 40 | 60 | 27th Ave. |
| 32 | Miami Gardens-Omni Via NW 32nd Avenue-20th Street | 32 | 24 | 30 | 40 | n/a | 40 | 60 | |
| 37 | Hialeah-South Miami Vía Palm/ 37th Avenue | 37 | 15 | 30 | 40 | n/a | 60 | 60 | 37th Ave. |
| 40 | Bird Road/152nd Avenue-Douglas Road Station | 40 | 15 | 30 | 40 | n/a | 60 | 60 | |
| 42 | Douglas Road-Miami Springs/ Opa Locka Tri-Rail | 42 | 20 | 30 | 60 | n/a | 40 | 60 | 42nd Ave. |
| 48 | Brickell-University Station Via South Bayshore | 48 | 60 | 60 | n/a | n/a | n/a | n/a | |

| Line Abbreviation | Line Name | Route Name | Peak | Off-Peak | Evening | Overnight | Saturday | Sunday | Alignment |
|---|---|---|---|---|---|---|---|---|---|
| 51 | Flagler Max: West Dade-CBD | 51 | 15 | 30 | 30 | n/a | n/a | n/a | |
| 56 | Children's Hospital - MDC Kendall/162nd Avenue - Via 56th Street | 56 | 30 | 60 | n/a | n/a | n/a | n/a | 42nd Ave. |
| 57 | Airport-SW 152nd Street Via 57th Ave | 57 | 60 | 60 | n/a | n/a | n/a | n/a | 42nd Ave. |
| 110 | J/Miami Beach-MIA/Tri-Rail Via 36th Street | J | 20 | 30 | 30 | n/a | 30 | 30 | |
| 133 | MIA Tri-Rail Station-Airport Terminal | 133 | 20 | 60 | 30 | n/a | 100 | 100 | 42nd Ave. |
| 136 | Douglas Road-Old Cutler-136th Street –Kendall | 136 | 45 | n/a | n/a | n/a | n/a | n/a | |
| 150 | Airport Flyer | 150 | 30 | 30 | 30 | n/a | 30 | 30 | |
| 207 | Little Havana Connection | 207 | 15 | 20 | 20 | n/a | 20 | 20 | |
| 208 | Little Havana Connection | 208 | 15 | 20 | 20 | n/a | 20 | 20 | |
| 238 | East-West Connection | 238 | 45 | 60 | n/a | n/a | 60 | 60 | |
| 249 | Coconut Grove Circulator | 249 | 18 | 18 | 20 | n/a | 25 | 25 | |
| 500 | Midnight Owl | 500 | n/a | n/a | n/a | 60 | 60 | 60 | |

**Note** – North-south routes shaded in grey.

In addition, the city of Coral Gables operates a local trolley circulator along Ponce de Leon Boulevard. Service operates from 6:30 a.m. to 8 p.m. Monday through Friday. On the first Friday of each month, service is extended until 10 p.m. to support the city's Gallery Night.

The buses stop along a series of closely spaced bus stops offering a short walking distance for bus passengers. With a handful of exceptions, the stops are frequented by no more than 20 passengers per day. Stops at the intersection of east-west arterials show higher boarding activity, presumably from passengers transferring between north-south and east-west service and vice versa.

The closely-spaced stops and low level of activity along the alignments results in frequent stopping and therefore prolonged travel time as compared with less frequent limited stop or express service.

Metrorail runs along the southern perimeter of the study area, continuing to downtown and then to the airport and north and west past Hialeah to the Palmetto Expressway (See **Figure 3–2**). Metrorail operates from 5:00 a.m. to 12:00 midnight seven days a week. Trains arrive approximately every five minutes during rush hours, every 7.5 minutes at midday, and every 15 minutes from about 6:45 p.m. until closing. On weekends, trains arrive every 30 minutes.

Local north-south bus routes connect with the University, Douglas Road, and Coconut Grove Metrorail stations. Ponce de Leon, Douglas, and 27th Avenue routes are reasonably direct while the Le Jeune and 22nd Avenue routes are more circuitous.

Service frequencies are not coordinated between the two modes. Bus passengers arriving at a Metrorail station can expect a relatively short wait for a train while train passengers may wait an appreciable amount of time for a bus, particularly in off-peak and weekend periods.

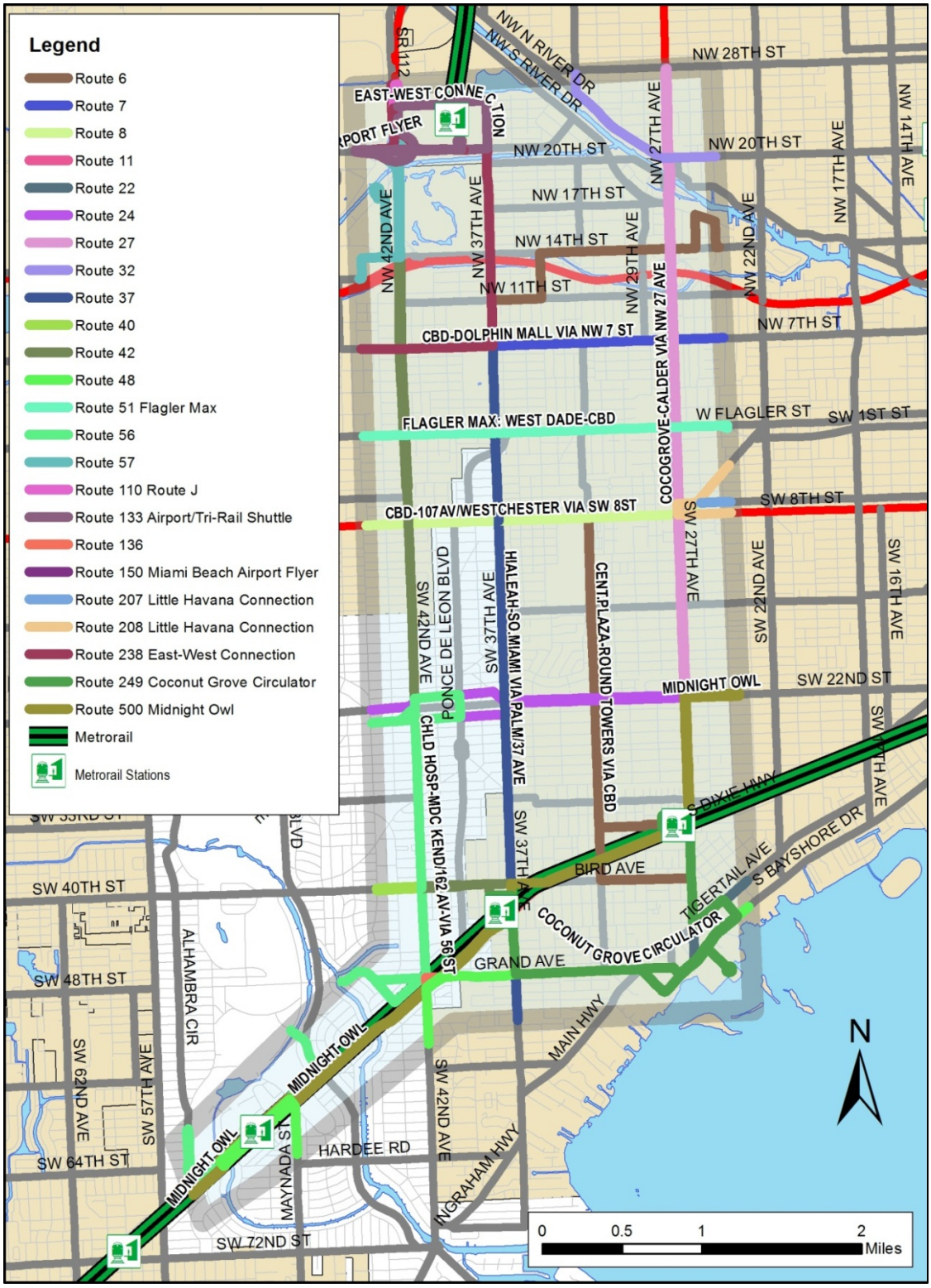



**Figure 3–1 - Existing Miami-Dade Transit Bus Routes in Study Area**


**Figure 3–2 - Existing Metrorail System**

## 4. Transit Level-of-Service

Twenty-four separate MDT routes traverse the city of Coral Gables. Most operate on a 15 to 60-minute headway during peak periods and even during off-peak periods. Evening service is appreciably less and many routes do not operate on Saturdays and Sundays. The Midnight Owl (Route 500), operates during the evening hours on a 60-minute headway.

Transit service is often expressed in terms of a level-of-service, the frequency with which buses serve a particular area. For purposes of local transit service, an area is considered served if a bus passes within one-quarter to one-half mile of a point. For purposes of this study, service was considered only when a bus route passed within one-quarter mile of a location.

Level-of-service (LOS) is evaluated on a scale of A, for more than six buses an hour (10-minute headways), to E, where only one bus serves the area per hour. LOS F indicates less than one bus per hour. **Figure 4–1** shows the resulting peak period transit LOS for north-south transit service through the study area. Service frequency is relatively high along SW 37th Avenue and SW 42nd Avenue/Le Jeune Road, resulting in a high level of service between these two streets. Service along 27th Avenue northwest and southwest, and Ponce de Leon Boulevard along US 1, is poor. East-west service is not shown.

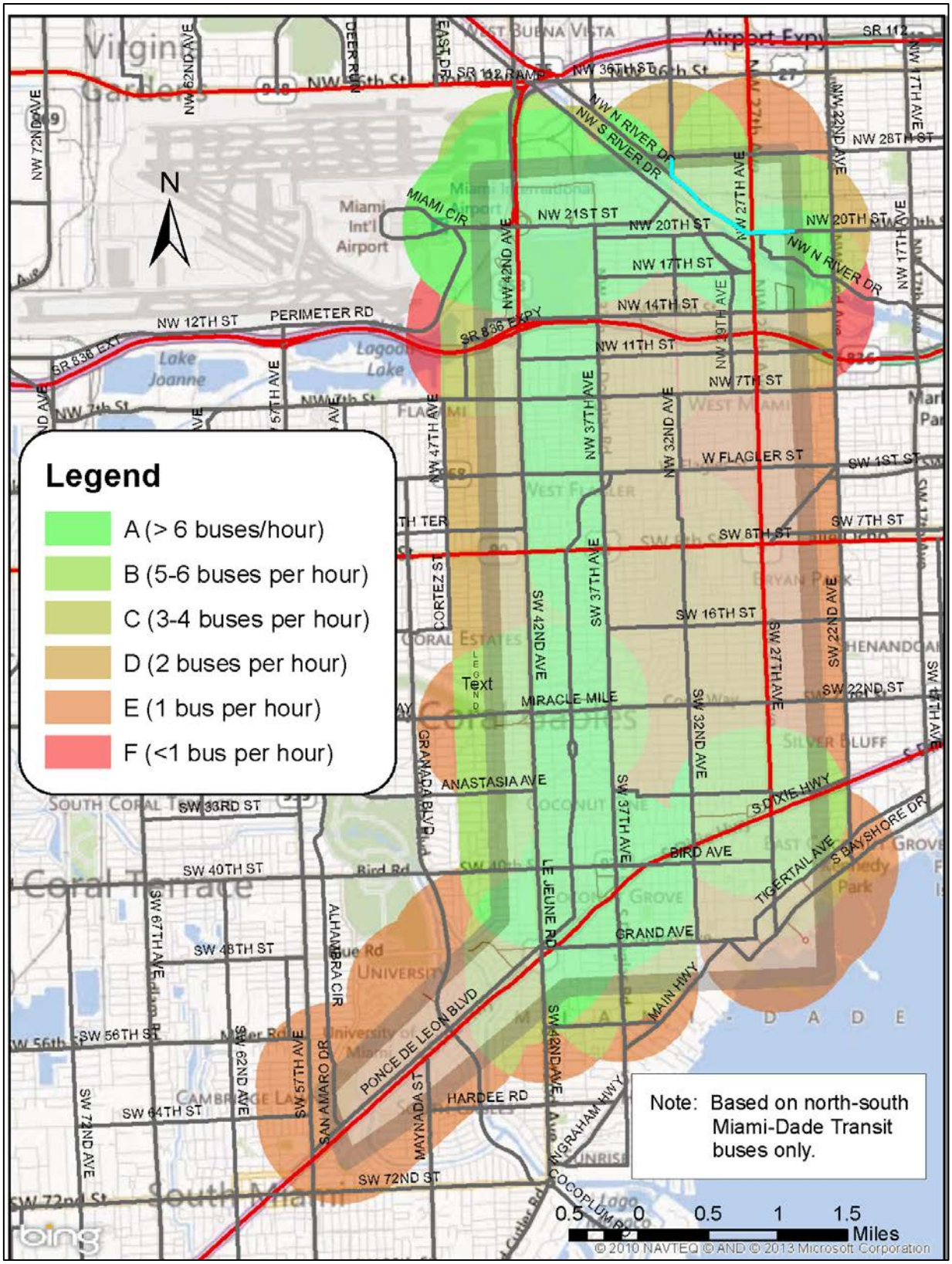



**Figure 4–1 - Miami-Dade Transit Bus Level-of-Service (Frequency)**

## 5. Candidate Modes

Five alternative modal technologies (six including diesel light rail (DLR) transit, a variation of Light Rail Transit (LRT)) are under consideration for this study in each of three time frames. Each modal technology is defined below.

**Metrorail** is the Miami-Dade County brand name for Heavy Rail Transit (HRT). Heavy rail transit is an electrified rail transit system with the capacity to carry a high volume of passengers. HRT typically operates as multiple car trains on fixed rails along exclusive rights-of-way (from which all other vehicular and foot traffic are excluded) at ground level with fencing or substantial barrier, on aerial structures, or in tunnels. Passengers board and alight at level high station platforms. Trains are powered through a single electrified track-level third rail (located parallel to the running rail). HRT is typically implemented in urban areas with high development densities and high transit ridership. Passengers rely on feeder bus, auto and walk access. Stations are usually grade separated (requiring elevators, escalators and stairs for passenger access) and designed to handle long trains of vehicles (4 to 8 cars per train set). Fare collection is done at stations and boarding is from high-level platforms. Additionally, HRT systems have a relatively high absolute operating speed (usually 50 to 70 MPH) with rapid acceleration/deceleration and frequent headways along with sophisticated signaling systems and high levels of automation and central control. Station spacing varies typically between 1 to 3 miles. Heavy rail vehicles are available in lengths of 50 to 75 feet with individual cars often designed as married pairs sharing equipment.

**Table 5–1 - Typical Heavy Rail Characteristics**

| | |
|---|---|
| Mode | Heavy Rail Transit |
| Typical Length | 20 miles |
| Typical Station Spacing | 1 to 5 miles |
| Average Speed | 30 miles per hour |
| Average Headway | 5 to 10 minutes |
| Maximum Speed | 50 to 80 miles per hour |
| Hourly Capacity (passengers) | 15,000 |
| ROW Requirements | Exclusive |
| Fare Payment | Off vehicle |
| Cost/Mile | $150 to 250 million (elevated) |
| Daily Boardings per Stop | 1,400 to 7,600 passengers |
| Vehicle Configuration | 4 to 8 car trains |
| Vehicle Capacity | 166 |
| Function | Longer distance, high volume service |

**Diesel Light Rail (DLR) Transit** is a hybrid rail transit system that is a combination of traditional light rail transit (LRT) and commuter rail transit (CRT). Multiple unit vehicles are typically self-powered by on-board diesel or diesel-electric engines (eliminating the need for overhead electric wiring) within modern streamlined transit vehicles that do not meet Federal Railroad Administration (FRA) car body strength standards (non FRA-compliant in terms of crashworthiness). They often operate on existing railroad ballasted track (within semi-exclusive rights-of-way) but can also travel within streets on embedded track (typically within semi-exclusive rights-of-way). When traveling on shared tracks with freight trains, the service must be separated from freight operations in either space (separate track) or time (freight movements only when the DLR system is not operating). When operating within a street environment, transit stations and the associated infrastructure are similar to traditional light rail transit systems. When operating within railway facilities, transit stations and the associated infrastructure are similar to commuter rail transit systems.

**Table 5–2 - Typical Diesel Light Rail (DLR) Transit Characteristics**

| Mode | Diesel Light Rail (DLR) Transit | | | |
|---|---|---|---|---|
| | **Austin** | **Ottawa (OC Transpo)** | **San Diego - Sprinter** | **Typical DLRT** |
| **Typical Length (miles)** | 32 | 5 | 22 | 20 |
| **Typical Station Spacing (Miles)** | 0.75 | 1.00 | 0.70 | 0.75 |
| **Average Speed (mph)** | 16 | 25 | 25 | 25 |
| **Average Headway (minutes)** | 30 | 15 | 30 | 30 |
| **Maximum Speed (mph)** | 60 | 60 | 55 | 55 |
| **Hourly Capacity (passengers)** | 1,000 | 1,000 | 1,000 | 1,000 |
| **ROW Requirements** | Primarily Exclusive or Priority/Exclusive | | | |
| **Fare Payment** | Pre-pay | Pre-pay | Pre-pay | Pre-Pay |
| **Cost/Mile** | $4 million | $6 | $22 | $5-20 |
| **Daily Boardings per Stop** | 1,000 | 1,000 | 500 | 1,000 |
| **Vehicle Configuration** | 2-car trains | Married pair | Married pair | Married pair |
| **Vehicle Capacity** | 230 + standees | 300 | 218 | 250 |
| **Function** | High capacity, high demand | | | |

**Light Rail Transit** (LRT) is defined as an electrified rail transit system with the capacity to carry a medium to heavy volume of passengers (typically, a lighter volume of passengers compared to heavy rail) that is characterized by its ability to operate single or short (usually one or two car) consists on fixed rails along exclusive rights-of-way at ground level, on aerial structures, or in subways, or along non-exclusive or shared rights-of-way in streets, able to board and discharge passengers at high or low level station platforms or at street, track, or car-floor level, and normally powered by overhead electrical wires. Light rail transit is typically implemented in urban and suburban areas with moderate to high development densities with heavy transit ridership that rely significantly on walk access. LRT includes a broad spectrum of vehicles, running ways and operating environments that range from single unit transit vehicles traveling in mixed traffic within highly urban city streets at speeds as low as 25 MPH and even lower up through multiple car train sets traveling on a totally exclusive guideway at speeds of 60 MPH or faster. In Europe these two extreme forms of rail transit are often called “trams” and “metros”. In the US these two forms of rail transit are typically referred to as “modern streetcars” and “modern or contemporary light rail transit”. In the US, many LRT lines include guideway and track elements of both extreme forms of transit as well as forms in between. A second distinctive feature common to most LRT systems is the drawing of power from overhead wires. The overhead power collection feature allows vehicles, pedestrians and bicyclists to cross tracks safely.

**Table 5–3 - Typical Light Rail Transit (LRT) Characteristics**

| | |
|---|---|
| Mode | Light Rail Transit (LRT) |
| Typical Length | 10 to 15 miles |
| Typical Station Spacing | ½ to 1 miles |
| Average Speed | 20 to 30 miles per hour |
| Average Headway | 5 to 30 minutes |
| Maximum Speed | 55 miles per hour |
| Hourly Capacity (passengers) | 12,000 to 15,000 |
| ROW Requirements | Primarily Exclusive or Priority/Exclusive |
| Fare Payment | On- or Off-vehicle |
| Cost/Mile | $24 to 63 million |
| Daily Boardings per Stop | 300 passengers |
| Vehicle Configuration | 1 to 4 car trains |
| Vehicle Capacity | 125 |
| Function | High Capacity, High Demand |

**Semi-Exclusive Bus Lanes** refers to transit bus operations within an existing street right-of-way in lanes that may be almost exclusively for transit vehicles but may allow entry of right turning vehicles, vehicles accessing properties along the street, high-occupancy vehicles including carpools and taxis, and bicycles. Typically, the curb or outside lane is dedicated to bus operations allowing buses to serve standard bus stops with right-side opening doors. Buses may stop in the semi-exclusive lane to board and deboard passengers; bus operations generally take precedence over other users of the lanes. Semi-exclusive operation may include the use of traffic signal priority to reduce delay at intersections. Bus stops in this case, may be located on the far side of intersections to avoid any stop prior to the intersection and the potential for additional delay from a red traffic signal.


**Table 5–4 - Typical Semi-Exclusive Bus Lanes Characteristics**

| | |
|---|---|
| **Mode** | Semi-Exclusive Bus Lane |
| **Typical Length (miles)** | 5 |
| **Typical Station Spacing (Miles)** | ¼ - ½ |
| **Average Speed** | 15-20 mph |
| **Average Headway (minutes)** | 10 |
| **Maximum Speed** | 45 |
| **Hourly Capacity (passengers)** | 400 |
| **ROW Requirements** | Non-Exclusive |
| **Fare Payment** | Level boarding; On-Board or off-vehicle |
| **Cost/Mile** | $5,000 (vehicles)/$5 million (infrastructure) |
| **Daily Boardings per Stop** | 200 |
| **Vehicle Configuration** | 60-foot articulated bus |
| **Vehicle Capacity** | Seats 57 |
| **Function** | Mid-range trips, limited stop service to complement local service |

**Rapid Bus** is a form of bus service that operates in mixed traffic environments and has fewer stops than typical local service. The route layout is typically simple, operating primarily or solely on a single street. Service is frequent with headways of three to ten minutes during peak commuter periods. Generally, buses come so often that passengers don't need a timetable Stops are spaced about three-quarters of a mile apart, like rail lines, and serve major transfer points.


The vehicles are equipped with low-floor buses to facilitate rapid boarding and alighting and to reduce dwell times. The vehicles are corridors are equipped with equipment for bus priority at traffic signals. This technology reduces traffic delay at intersections by extending the green light or shortening the red light

In most applications, branding is an important feature of rapid bus service. Color-coded buses and stops make it easier for passenger to identify rapid bus stops and buses. The stations are equipped with transit information, lighting, canopies and "Next Bus" displays.

**Table 5–5 - Typical Rapid Bus Characteristics**

| | | |
|---|---|---|
| **Mode** | Rapid Bus | |
| **Typical Length (miles)** | 10 | |
| **Typical Station Spacing (Miles)** | ½ - 2 | |
| **Average Speed** | 20 | |
| **Average Headway (minutes)** | 10 | |
| **Maximum Speed** | 45 | |
| **Hourly Capacity (passengers)** | 500 | |
| **ROW Requirements** | Priority | |
| **Fare Payment** | Level boarding; On-Board or off-vehicle | |
| **Cost/Mile** | $10,000 (vehicles)/$2.5 million per mile (infrastructure) | |
| **Daily Boardings per Stop** | 100 | |
| **Vehicle Configuration** | 40- or 60-foot vehicle | |
| **Vehicle Capacity** | 40’:38 seated, 50 total | 60’: 40 seated, 120 total |
| **Function** | Point-to-point mid- to long-distance service | |

**Trolley Bus** is a rubber-tired bus though generally shorter than the standard 4-foot transit coach, and customized to resemble a late 19th Century/early 20th Century catenary-powered electric trolley. Vehicles are typically equipped with wooden benches to resemble an earlier era. Trolley buses typically operate in circulator service, covered relatively limited geography with frequent stops and short headways.


**Table 5–6 - Typical Trolley Bus Characteristics**

| | |
|---|---|
| **Mode** | Trolley Bus |
| **Typical Length (miles)** | 2 to 3 |
| **Typical Station Spacing (Miles)** | 0.05 – 0.25 |
| **Average Speed** | 5-15 |
| **Average Headway (minutes)** | 5-15 |
| **Maximum Speed** | 35 |
| **Hourly Capacity (passengers)** | 700 |
| **ROW Requirements** | Shared |
| **Fare Payment** | Typically free; on-board |
| **Cost/Mile** | $5000 |
| **Daily Boardings per Stop** | 20-2,000 |
| **Vehicle Configuration** | 35-foot vehicle |
| **Vehicle Capacity** | 35':20 seated, 35 total |
| **Function** | Local circulation |

## 6. Alternative Alignments

The Douglas Road Corridor for purposes of this study would extend about 4.4 miles from the Douglas Road Metrorail station on the south to the Miami Intermodal Center (MIC), on the north. Transit in the corridor could:

- Supplement north-south capacity
- Support projected increases in population and employment
- Increase north-south transit capacity during peak travel periods
- Complement limited MDT local bus service
- Create a frequent-stop circulator type trolley service along the full length of the corridor
- Offer an alternative to auto travel
- Serve as one of very limited options for transportation improvements in the built-out corridor
- Reduce transit travel times, currently affected by recurring traffic congestion
- Reduce transit operating expenses
- Enhance connectivity between major transit hubs and intersecting transit routes
- Upgrade transit with high quality amenities and infrastructure.

Five major roads travel north-south through the corridor (**Figure 6–1**):

- 42nd Avenue/Le Jeune Road/SR 953
- Ponce de Leon Boulevard
- 37th Avenue /Douglas Road
- 32nd Avenue
- 27th Avenue/SR 9

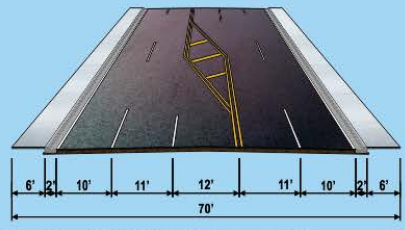
While all of these roads do not connect the two proposed termini, combinations of several streets would permit transit to operate between both.

The basic characteristics of each of the five alignment/ roadways are included in **Figure 6-2** through **Figure 6-6**.

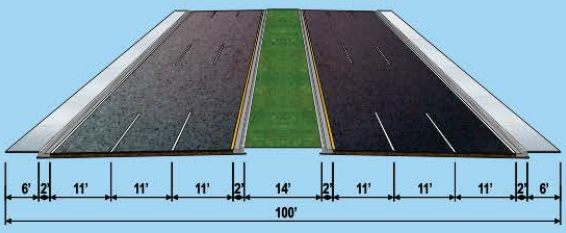

**Figure 6–1 - Alternative Alignments**

## Alignment Summary

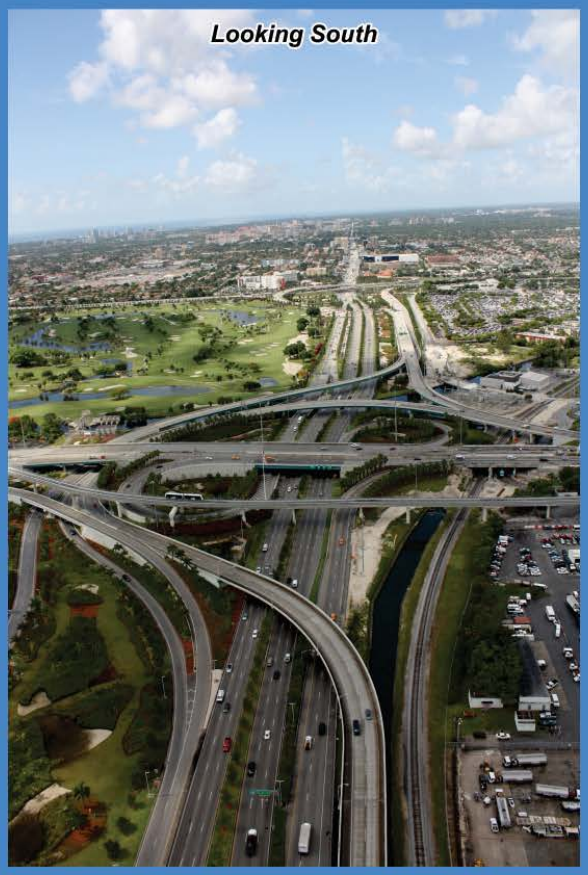
## 42nd Avenue /Le Jeune Road




*North of SW 8th Street - 6 lanes with center left / right turn lane*




*South of SW 8th Street - 6 lanes divided*



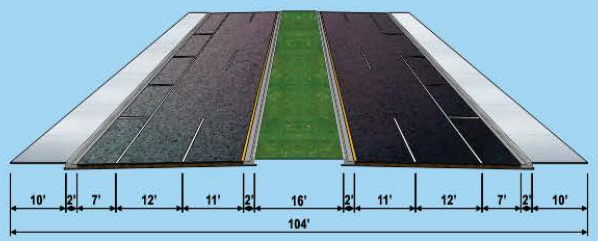

***Corridor Characteristics***

- Direct connection between termini;
- Urban Other Principal Arterial;
- Four-lane and six-lane divided (raised median) arterial with no auxiliary right turn lanes except at SW 8th Street where the roadway section transitions from four to six lanes;
- Right-of-way width typically varies between 70 feet and 90 feet depending upon the number of lanes;
- Posted speed of 40 MPH;
- One reduced speed zone at Coral Gables High School;
- Twenty-two (22) traffic signals between NW 21st Street and US 1 and eleven (11) between NW 8th Street and SW 40th Street;
- Major transit generators: Airport Hotels, CG City Hall, CG CBD, Miracle Mile, Coral Gables Youth Center, Coral Gables Senior High School, Village of Merrick Park;
- Existing bus service: Local service routes 42 and 56 (headways of 20-30, 30-60, and 60 minutes in the morning, midday, and evening periods; 40-minute service on the 42 on Saturdays, 60 minutes on Sundays)

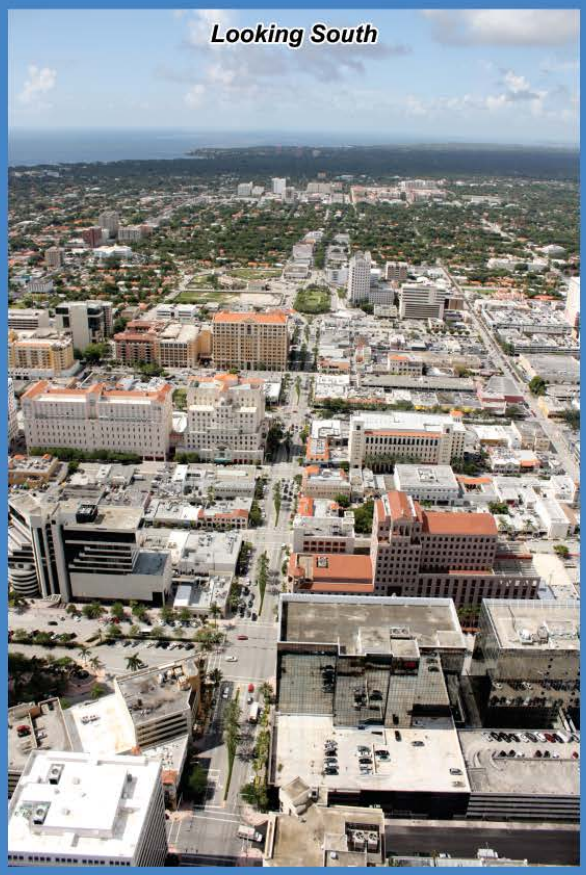
**Figure 6–2 - 42nd Avenue/Le Jeune Road Corridor**

## Alignment Summary

## Ponce de Leon Boulevard




*4 lanes divided with on-street parking*



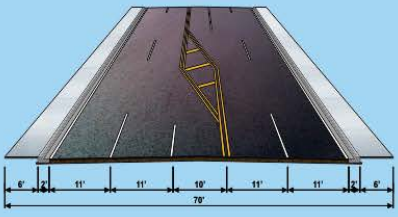

***Corridor Characteristics***

- Extends from Douglas Road Metrorail station/US 1 to Flagler Street;
- Off State Highway System, serves as "main street" for city of Coral Gables;
- Four-lane divided (raised median) arterial with outside on-street parking lanes. Short undivided section with angle parking south of SW 8th Street;
- Right-of-way width varies between 90 and 100 feet;
- Posted speed is 30 MPH or 35 MPH (35 MPH on segment parallel to US-1);
- One reduced speed school zone for Coral Gables Elementary School;
- Thirteen (13) traffic signals between NW 8th Street and US 1;
- Transit generators: Publix, Coral Gables CBD, Miracle Mile, Village of Merrick Park, University of Miami;
- Existing bus service: Coral Gables Trolley (12-minute headways weekdays between 6:30 a.m. and 8:00 p.m.).

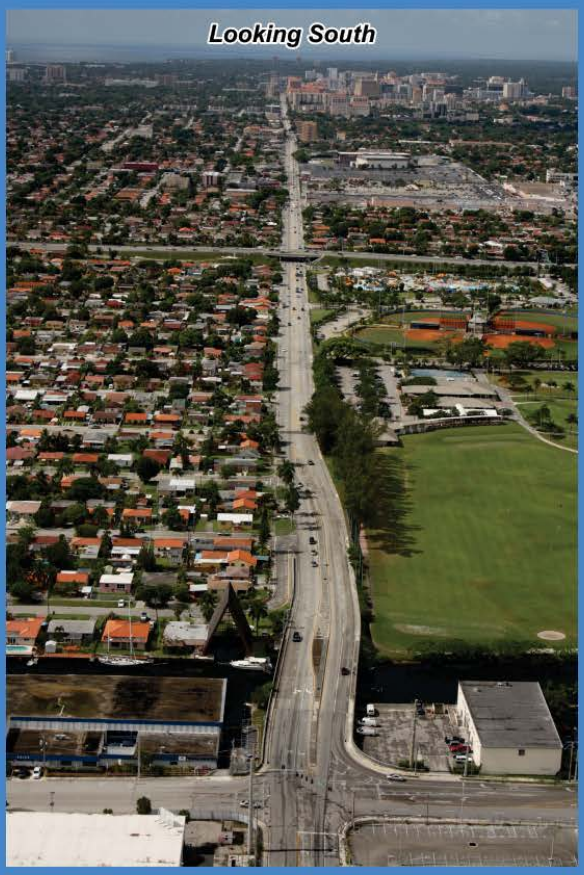
**Figure 6–3 - Ponce de Leon Blvd Corridor**

## Alignment Summary

## 37th Avenue/Douglas Road




*4 lanes with center left / right turn lane*




***Corridor Characteristics***

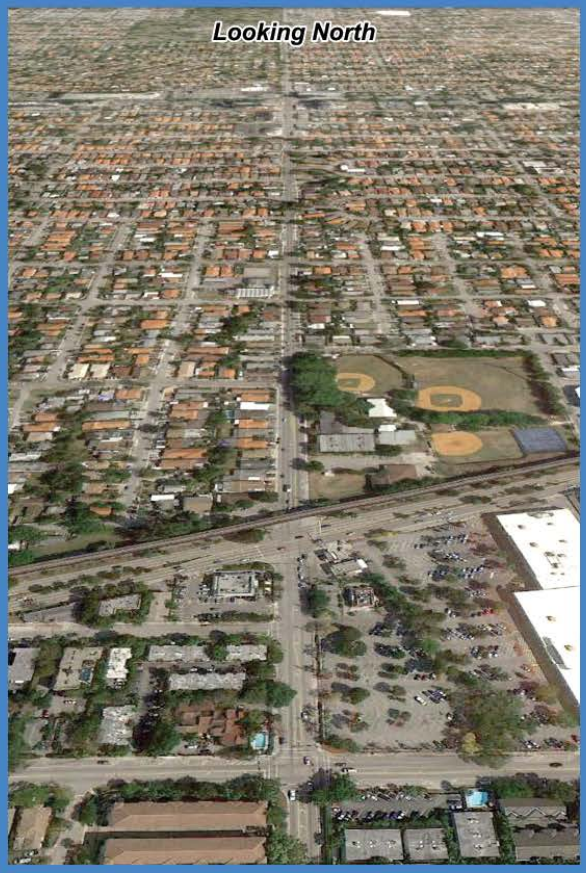
- Extends from Douglas Road Metrorail station/US 1 to Flagler Street;
- Off State Highway System;
- Four-lane divided (flush median) and five-lane (center two-way-left-turn-lane) arterial with no auxiliary right turn lanes;
- Right-of-way width is typically 70 ft;
- Posted speed is 40 MPH;
- One reduced speed zone for Coral Gables Elementary School;
- Nineteen (19) traffic signals between NW 21st Street and US 1 and ten (10) between NW 8th Street and SW 40th Street;
- Transit generators: Grapeland Park, Central Shopping Plaza, Magic City Casino, 2 Publix's, Phillips Park, Hyatt Hotel, Sears, Miracle Mile, CG CBD, CG Hospital, Douglas Park;
- Existing bus service: Local Service Routes 6, 37 and 238 (headways 45 to 60 minutes, 30 to 60 minutes, and 30 to 60 minutes morning, midday, and evening respectively).

**Figure 6–4 – 37th Avenue/Douglas Road Corridor**

## Alignment Summary

## 32nd Avenue


*2-lanes undivided*



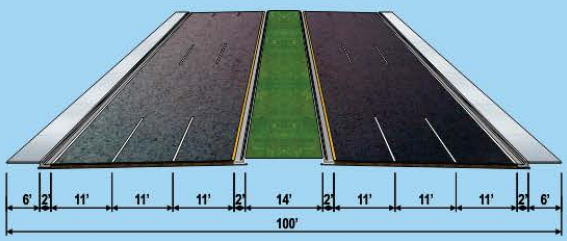

***Corridor Characteristics***

- Off State Highway System;
- Two-lane undivided arterial with some auxiliary right turn lanes;
- Right-of-way width is typically 50 ft;
- Posted speed is 30 MPH;
- Two (2) reduced speed zones at Auburndale Elementary and Brito Miami Schools;
- Six (6) traffic signals between NW 8th Street and SW 40th Street;
- Transit generators: Coral Gate Park, Coral Way, Boys and Girls Club, West Coconut Grove;
- Existing bus service: Local Service Route 6 (60-minute headways morning and midday);
- Unsuitable for premium transit route due to narrow right-of-way, limited number of lanes; and adjacent low-density residential land uses, and absence of significant commercial/retail land uses.

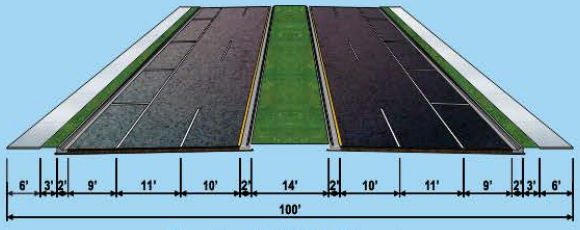
**Figure 6–5 - 32nd Avenue Corridor**

## Alignment Summary

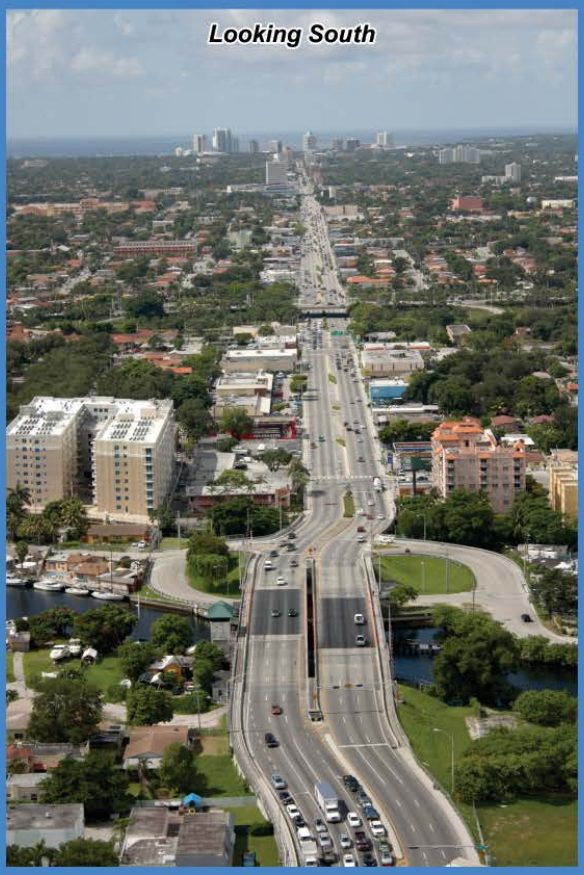
## NW/SW 27th Avenue




*North of SW 8 Street - 6 lanes divided*




*South of SW 8 Street -*
*4 lanes divided with on street parking*




***Corridor Characteristics***

- Connection between termini via Flagler Street and 37th Avenue;
- Urban Other Principal Arterial;
- Four-lane divided (raised median) with outside on-street parking lanes (and bus bays) and six-lane divided arterial with some auxiliary right turn lanes;
- Right-of-way width is typically 100 ft;
- Posted speed is 40 MPH;
- One (1) reduced speed zone at Silver Bluff School;
- Fourteen (14) traffic signals between NW 21st Street and US 1 and six (6) between NW 8th Street and SW 40th Street;
- Transit Generators: Curtis Park, Miami-Dade County Auditorium, Miami Senior High School, Miami Dade College Inter-American Campus, Coral Way commercial area, Publix, Dinner Key Auditorium, Miami City Hall;
- Existing bus service: Local Service Route 27 (15 to 30-minute headways);
- Enhanced bus to be implemented from MIC to NW 215th Street.

**Figure 6–6 - 27th Avenue Corridor**

## 7. Alternatives and Variations

Having established the primary alternative alignments, the range of possible route variations was developed for each. In the case of Le Jeune Road, for example, a route could begin at the Miami Intermodal Center and travel south along Le Jeune Road to US 1 and then to the Douglas Road Metrorail station. Alternatively, the route could deviate from Le Jeune Road and travel partially along Ponce de Leon Boulevard to arrive at the University Metrorail Station or along SW 37th Avenue/Douglas Road to reach the Coconut Grove Metrorail Station. Similar variations for each of the primary alignments would be possible and are described below and summarized on **Table 7–1.**

### 7.1. Alternative 1 - 42nd Avenue/Le Jeune Road

Runs between the Douglas Road Metrorail station and the Miami Intermodal Center (MIC) along Ponce de Leon Boulevard or US 1 to 42nd Avenue/Le Jeune Road over a length of approximately 4.5 miles.

(1.0.1) Ponce de Leon Boulevard variation – extend southwest along Ponce de Leon Boulevard, adjacent to US 1 to the University Metrorail station.

(1.0.2) Coconut Grove variation – extend eastward along SW 40th Street/Bird Road to SW 37th Avenue/Douglas Road to Grand Avenue. Continue along Grand Avenue to South Bayshore Drive.

### 7.2. Alternative 2 - Ponce de Leon Boulevard

Runs between the Douglas Road Metrorail station and the Miami Intermodal Center (MIC) along Ponce de Leon Boulevard to the intersection with 37th Avenue/Douglas Road. Then, along 37th Avenue/Douglas Road to the MIC, a distance of approximately 5.1 miles.

(2.1.1, 2.2.1, 2.3.1) Ponce de Leon Boulevard variation – extend southwest along Ponce de Leon Boulevard, adjacent to US 1 to the University Metrorail station.

(2.1.2, 2.2.2, 2.3.2) Coconut Grove variation – extend eastward along SW 40th Street/Bird Road to SW 37th Avenue/Douglas Road to Grand Avenue. Continue along Grand Avenue to South Bayshore Drive.

### 7.3. Alternative 3 - 32nd Avenue (dropped from further consideration)

Runs between either the Douglas Road or Coconut Grove Metrorail station to the Miami Intermodal Center (MIC). The route would depart from one of the two Metrorail stations and travel along US 1, turning north onto 32nd Avenue. The route would continue along 32nd Avenue, briefly deviating at Flagler Street and then continuing on 32nd Avenue to NW 7th Street. At NW 7th Street the route would deviate onto either 42nd Avenue/Le Jeune Road or 37th Avenue/Douglas road to the MIC, a distance of approximately 5.9 miles.

### 7.4. Alternative 4 - 37th Avenue/Douglas Road

Runs between the Douglas Road Metrorail station and the Miami Intermodal Center along Douglas Road to the MIC, a distance of approximately 4.4 miles.

(4.1.1,4.2.2.1,4.2.3.1) Ponce de Leon Boulevard variation – extend southwest along Ponce de Leon Boulevard, adjacent to US 1 to the University Metrorail station.

(4.1.2, 4.2.2,4.2.3.2) Coconut Grove variation – extend eastward along SW 40th Street/Bird Road to SW 37th Avenue/Douglas Road to Grand Avenue. Continue along Grand Avenue to South Bayshore Drive.

## 7.5. Alternative 5 - 27th Avenue

Runs between the Coconut Grove Metrorail station and the Miami Intermodal Center (MIC). The route would depart from the Metrorail station along 27th Avenue. It would then either turn onto SR 836 (Dolphin Expressway), SR 112 (Airport Expressway), or NW 7th Street to 42nd Avenue/Le Jeune Road to the MIC, a distance of approximately 5.6 miles.

(5.1.1) SW 27th Avenue south variation – extend southward along SW 27th Avenue to South Bayshore Drive then northeast to SW 22nd Avenue.

(5.1.2) Le Jeune Road extension – from the MIC, extend west to 42nd Avenue/Le Jeune Road and then north to SR 112/Airport Expressway. Then continue northward on 27th Avenue.

(5.1.3) 27th Avenue/Douglas Road extension – continue north on 27th Avenue to a future northern terminus.

(5.1.4) Dolphin Expressway connector – connect 27th Avenue/Douglas Road to 37th Avenue/Douglas Road via SR 836/Dolphin Expressway.

(5.1.5) NW 20th Street connector - connect 27th Avenue/Douglas Road to the MIC via NW 20th Street.

(5.1.6) Airport Expressway connector - connect 27th Avenue/Douglas Road to NW 42nd Avenue/Le Jeune Road via SR 112/Airport Expressway. Then, continue on NW 42nd Avenue/Le Jeune Road southward to NW 21st Street. Connect to the MIC via NW 21st Street.

**Table 7–1 - Alternative Alignments and Alignment Variations**

| Alternative | Corridor | Variation | | Alignment | Mode |
|---|---|---|---|---|---|
| **1** | **Le Jeune Road** | 1.0 | 1.0.0 | Primary | Rapid Bus |
| | | | 1.0.1 | Ponce de Leon Boulevard variation | |
| | | | 1.0.2 | Coconut Grove variation | |
| **2** | **Douglas Road/Ponce de Leon Blvd** | 2.1 | 2.1.0 | Primary | Enhanced Trolley |
| | | | 2.1.1 | Ponce de Leon Boulevard variation | |
| | | | 2.1.2 | Coconut Grove variation | |
| | | 2.2 | 2.2.0 | Primary | Semi-Exclusive Bus Lanes |
| | | | 2.2.1 | Ponce de Leon Boulevard variation | |
| | | | 2.2.1 | Coconut Grove variation | |
| | | 2.3 | 2.3.0 | Primary | LRT/Modern Streetcar |
| | | | 2.3.1 | Ponce de Leon Boulevard variation | |
| | | | 2.3.2 | Coconut Grove variation | |
| **4** | **37th Avenue** | 4.1 | 4.1.0 | Primary | Rapid Bus |
| | | | 4.1.1 | Ponce de Leon Boulevard variation | |
| | | | 4.1.2 | Coconut Grove variation | |
| | | 4.2 | 4.2.1 | Ponce de Leon Boulevard variation | Semi-Exclusive Bus Lanes |
| | | | 4.2.2 | Coconut Grove variation | |
| | | 4.3 | 4.3.0 | Primary | Metrorail |
| **5** | **27th & 37th Avenue** | 5.1 | 5.1.0 | Primary | Rapid Bus |
| | | | 5.1.1 | SW 27th Avenue south variation | |
| | | | 5.1.2 | Le Jeune Road extension | |
| | | | 5.1.3 | 27th Avenue/Douglas Road extension | |
| | | | 5.1.4 | Dolphin Expressway connector | |
| | | | 5.1.5 | NW 20th Street connector | |
| | | | 5.1.6 | Airport Expressway connector | |
| | | 5.2 | 5.2.0 | Primary | Metrorail |

## 8. Evaluation Process

Alternative concepts were evaluated as alignment/modal technology combinations. Realistically, different modes are feasible only within the context of a specific location and while all of the candidate modes are feasible in some corridors they may not be feasible in others. Similarly, enhanced transit could be located in almost all of the candidate alignments but the form that enhanced transit would take would be different.

Recognizing the interconnected nature of the alignment and the mode, a series of seven "rules" were established that qualify a particular mode within a particular corridor. By uniformly applying these rules it was possible to determine which corridors would be infeasible for certain modes and therefore, by process of elimination, to determine which modes would be feasible in certain corridors.

Following are the "rules" for the various modes and alignments:

1. Rail technologies (Metrorail/HRT, LRT) would not be feasible for the short- or medium-term horizons due to the complexity of implementation and time for implementation. In addition, land uses within the study area are not yet sufficiently transit-oriented to support an HRT operation. HRT may be feasible in certain corridors for the long-term time frame.
2. Trolley bus is generally intended as a local service, offering frequent service to closely spaced stations. As such, it is not consistent with the characteristics of a premium transit corridor in terms of longer distance travel of higher volumes of passengers. The Coral Gables Trolley is the local circulator through downtown Coral Gables, extending as far north as Flagler Street. Existing MDT service (e.g., 6, 42, 238) offers local circulator service within the corridor. Additional local/circulator service is not warranted.
3. Urban principal arterials are the primary traffic-carrying roadways within the county. Along with limited access freeways, these facilities carry the highest traffic volumes across longer distances. Limiting use of one or more lanes for exclusive use by transit would not be consistent with the purpose of these facilities (i.e., 42nd Avenue/Le Jeune Road and 27th Avenue). Modes that rely on semi-exclusive lanes should not be considered on these roads.
4. Rapid bus operates in mixed traffic and as such, cannot operate efficiently on roadways that are subject to recurring heavy congestion (i.e., 42nd Avenue/Le Jeune Road). While recurring congestion can be addressed through a combination of operational and capital improvements, heavy traffic congestion levels would preclude implementing rapid bus in the short- and medium term along such facilities.
5. Ponce de Leon Boulevard is the main commercial street and serves as the city's "main street." Ponce de Leon is the iconic street through the center of the city and along with the adjacent land uses, establishes the character of the downtown. Elevated Metrorail infrastructure is not compatible with the current image and should not be considered on Ponce de Leon Boulevard.
6. High capacity transit modes like heavy and light rail generally pass through high density corridors comprised of tall commercial and residential buildings. Higher population and employment densities warrant the higher person-carrying capacities that these modes offer and facilitate the movement of people more efficiently than could be accomplished through the auto-centric approach of highways and surface parking. High capacity transit modes should only be proposed in corridors with land uses that are compatible with these transit modes.

7. Street-running high capacity transit is only practical on a roadway with at least four travel lanes. If the road cannot be widened to four lanes the feasibility of the alternative would depend upon the feasibility of acquiring additional right-of-way.

Applying these rules to the various alignment/mode combinations results in the following summarized in **Table 8-1** as viable mode/alignment alternatives:

**Table 8–1 - Basis for Advancement of Viable Short, Medium, and Long-Term Alignment/Modal Combinations**

| Alignment | 42nd Ave | | | Ponce de Leon | | | 37th Ave | | | 32nd Ave | | | 27th Ave | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Term / Mode | Short | Med | Long | Short | Med | Long | Short | Med | Long | Short | Med | Long | Short | Med | Long |
| Metrorail | 1 | 1 | F | 1 | 1 | 5 | 1 | 1 | F | 1 | 1 | 6 | 1 | 1 | 6 |
| DLRT | 1 | 1 | F | 1 | 1 | 6 | 1 | 1 | F | 1 | 1 | 6 | 1 | 1 | 6 |
| LRT/Modern Streetcar | 1 | 1 | 6 | 1 | 1 | F | 1 | 1 | 6 | 1 | 1 | 6 | 1 | 1 | 3 |
| Semi-Exclusive Bus Lanes | 3 | 3 | 3 | F | F | F | F | F | F | 7 | 7 | 7 | 3 | 3 | 3 |
| Rapid Bus | 4 | F | F | 4 | 4 | 4 | F | F | F | 7 | 7 | 7 | F | F | F |
| Trolley Bus | 2 | 2 | 2 | E | E | E | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

Notes: Numbers 1 through 11 indicate basis for determination of "infeasible".

F indicates "feasible"
E indicates "enhancements to existing trolley service"

**Table 8–2** summarizes the short-, medium-, and long-term alternatives for each of the alignments in the study area.

**Table 8–2 - Recommended Alignment/Modal Combinations by Time Frame**

| Alignment | 42nd Ave | Ponce de Leon | 37th Ave | 32nd Ave | 27th Ave |
|---|---|---|---|---|---|
| **Short-Term (less than 5 years)** | None | Semi-Exclusive Bus Lanes<br>Enhanced Trolley | Rapid Bus | None | Rapid Bus |
| **Medium-Term (5 to 15 years)** | Rapid Bus | Semi-Exclusive Bus Lanes<br>Enhanced Trolley | Rapid Bus | None | Rapid Bus |
| **Long-Term (more than 15 years)** | Rapid Bus | LRT/Modern Streetcar<br>Semi-Exclusive Bus Lanes | Semi-Exclusive Bus Lanes | None | Rapid Bus |
| | Metrorail/ DLRT | Enhanced Trolley | Metrorail/ DLRT | | |

## 9. Recommended Alignment Priorities

The two principal indicators for implementing new service in the Douglas Road corridor would be: the size of the market and the cost to serve that market. The following table summarizes the potential market within one-quarter mile of each alignment (residential population and number of jobs). An estimate of the cost to serve the corridor based on a fixed unit cost based on vehicle-hours and vehicle-miles was applied to each route allowing for an estimate of a single run along each alternative. This is not the actual cost of operation but serves as a basis for comparison between alternatives. This number can then be used to determine the cost to serve the potential market.

**Table 9–1** summarizes the preliminary evaluation of the five alternative alignments. The potential market, based upon the population and employment in proximity to each corridor, and the cost to serve each market are summarized.

Using this approach, Alternative 4 – the 37th Avenue alignment would serve the largest market followed by Alternative 1 – Le Jeune Road. Alternative 4 is the shortest route and therefore serves the largest market on a unit length basis. This alternative would also be the least expensive to serve with Alternative 1 – Le Jeune Road following.

Based upon this analysis, these two alignments – Alternative 4 and 1 – should be implemented first with the others following.

**Table 9–1 - Preliminary Evaluation of Candidate Alignments**

| | Employment | Population | Potential Market | Length (Miles) | Market per Mile | Cost per Potential 1,000 Riders Served |
|---|---|---|---|---|---|---|
| **Alternative 1 (Le Jeune Road)** | 109,172 | 54,516 | 163,688 | 6.78 | 24,000 | 1.45 |
| **Alternative 2 (Douglas Road/Ponce de Leon Blvd)** | 78,844 | 47,478 | 126,322 | 7.17 | 18,000 | 1.99 |
| **Alternative 3 (Le Jeune Road/37th Avenue)** | 71,627 | 48,580 | 120,207 | 6.43 | 19,000 | 1.88 |
| **Alternative 4 (37th Avenue)** | 106,774 | 59,261 | 166,035 | 6.01 | 28,000 | 1.27 |
| **Alternative 5 (27th Avenue)** | 34,553 | 59,347 | 93,900 | 6.05 | 16,000 | 2.26 |

## 10. Evaluation of Douglas Road Corridor Transit Alternatives

The alternatives development phase of the project identified short-, medium-, and long-term transit alternatives in four of the five arterials running through the corridor. Through the medium-term, only one alternative has emerged in each alignment with the exception of the Ponce de Leon Boulevard alignment where either enhancements to the existing trolley operation or semi-exclusive bus operations could be implemented. In the long-term however, the analysis performed has identified two or more options in three alignments. **Table 10-1** below shows the candidate alternatives in each of the five alignments. The next task would be to select the best alternative for each alignment based on objective criteria.

**Table 10–1 - Candidate Improvements for Short-, Medium-, and Long-Term**

<table>
<tr><th>Alignment</th><th>42nd Ave</th><th>Ponce de Leon</th><th>37th Ave</th><th>32nd Ave</th><th>27th Ave</th></tr>
<tr><td rowspan="2">Short-Term (less than 5 years)</td><td rowspan="2">None</td><td>Semi-Exclusive Bus Lanes</td><td rowspan="2">Rapid Bus</td><td rowspan="2">None</td><td rowspan="2">Rapid Bus</td></tr>
<tr><td>Enhanced Trolley</td></tr>
<tr><td rowspan="2">Medium-Term (5 to 15 years)</td><td rowspan="2">Rapid Bus</td><td>Semi-Exclusive Bus Lanes</td><td rowspan="2">Rapid Bus</td><td rowspan="2">None</td><td rowspan="2">Rapid Bus</td></tr>
<tr><td>Enhanced Trolley</td></tr>
<tr><td rowspan="3">Long-Term (more than 15 years)</td><td>Rapid Bus</td><td>Semi-Exclusive Bus Lanes</td><td>Semi-Exclusive Bus Lanes</td><td rowspan="3">None</td><td rowspan="3">Rapid Bus</td></tr>
<tr><td rowspan="2">Metrorail/ DLRT</td><td>Enhanced Trolley</td><td rowspan="2">Metrorail/ DLRT</td></tr>
<tr><td>LRT/Modern Streetcar</td></tr>
</table>



## 11. Ridership Estimate

Transit ridership for the Douglas Road corridor was estimated using the population and employment for 2010 and actual Metrorail boardings for February of the same year. Once the relationship between these factors was determined, it was applied to other alignments and other modes using established factors from the Southeast Florida Regional Planning Model (SERPM). The basic steps are as follows:

- Step 1 - Estimate ridership factors based on population and employment for Metrorail.
- Step 2 - Estimate ridership along the Ponce de Leon Blvd. alignment for a hypothetical Metrorail alignment.
- Step 3 - Develop mode bias factors based on the mode choice portion of the SERPM 6.5.2 model.
- Step 4 - Estimate Markets.
- Step 5 - Use mode bias factors to estimate bus ridership for the alignment based on previously estimated Metrorail ridership.
- Step 6 - Compare estimated vs. observed ridership as a check.
- Step 7 - Estimate ridership along all other alignments for all other modes based on the previously used factors for mode bias, population, employment, and station spacing.

Estimate ridership along all other alignments for all other modes based on the previously used factors for mode bias, population, employment, and station spacing.

1. Population and employment within ½ mile of system Metrorail stations was estimated using the existing Traffic Analysis Zone (TAZ) mapping. Metrorail boardings were assembled from the February 2010 boarding reports. Population and employment are based on the 2010 socio-economic data. An all-or-nothing approach was used when determining population and employment of TAZs within ½ mile of the station. A regression equation was developed with population and employment within ½ mile as the independent variables and boardings as the dependent variable, using the coefficients shown in **Table 11–1**.

**Table 11–1 - Linear Regression - Metrorail Boardings**

| | Coefficient | Standard Error | t-stat | P-value | R Square | Observations |
|---|---|---|---|---|---|---|
| Intercept | 0.00 | NA | NA | NA | 0.66 | 22 |
| Population (within 1/2 mile) | 0.056 | 0.049 | 1.157 | 0.262 | | |
| Employment (within 1/2 mile) | 0.100 | 0.038 | 2.661 | 0.015 | | |

2. Metrorail boardings at each station along the alignment were estimated using the above regression. A station spacing factor was applied to account for the difference in station spacing within the hypothetical Ponce de Leon alignment compared to the existing Metrorail system (~1.1 miles existing vs. 0.5 miles on Ponce de Leon Blvd.). The below table (**Table 11–2**) is ordered with the northern most station first.

**Table 11–2 - 2040 Metrorail Ridership Estimate - Hypothetical Ponce de Leon Blvd. Alignment**

| Station | 2040 Population | 2040 Employment | Population Constant | Employment Constant | Station Spacing Factor | Estimated Metrorail Ridership |
|---|---|---|---|---|---|---|
| MIC | 4,215 | 27,624 | 0.056 | 0.100 | 0.450 | 1,355 |
| NW 14 St | 10,882 | 4,889 | 0.056 | 0.100 | 0.450 | 496 |
| NW 7 St | 21,078 | 7,705 | 0.056 | 0.100 | 0.450 | 882 |
| Flagler St | 23,967 | 10,440 | 0.056 | 0.100 | 0.450 | 1,078 |
| SW 8 St | 27,241 | 16,622 | 0.056 | 0.100 | 0.450 | 1,441 |
| SW 16 St | 21,386 | 26,274 | 0.056 | 0.100 | 0.450 | 1,729 |
| SW 22 St | 19,403 | 36,660 | 0.056 | 0.100 | 0.450 | 2,148 |
| SW 27 St | 18,911 | 24,570 | 0.056 | 0.100 | 0.450 | 1,589 |
| Bird Road | 16,068 | 17,149 | 0.056 | 0.100 | 0.450 | 1,182 |
| Douglas Metrorail | 16,921 | 17,193 | 0.056 | 0.100 | 0.450 | 1,205 |
| **Total** | | | | | | **13,104** |

3. Mode bias factors were developed based on the current SERPM 6.5.2 model. These factors are based on the constants currently used in the mode choice portion of the model by purpose and period. SERPM includes mode bias factors for Metrorail, bus rapid transit (BRT), and local bus. Local bus is the reference mode for these factors. The BRT factor was used for semi-exclusive lane operation. The Rapid Bus factor was established as midday between local bus and BRT. The modern streetcar factor was established as midway between Metrorail and BRT. Through a model run with a slight change in these factors, it was found that a reduction of in-vehicle travel time of 6 minutes results in an increase in linked transit trips of 9.4%. The Metrorail ridership derived from the base year model was used to compute a weighted average across period and purpose. The final Mode Bias Factor can be used to factor the Metrorail ridership to BRT or local bus by dividing the Metrorail ridership by the appropriate factor as shown in **Table 11–3**.

**Table 11–3 - SERPM Mode Bias in Minutes**

| Mode | Peak | | | Off-Peak | | |
|---|---|---|---|---|---|---|
| | HBW | HBO | NHB | HBW | HBO | NHB |
| Bus | Reference Mode | | | | | |
| BRT (Bus in semi-exclusive lanes for purposes of this study) | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 | 12.00 |
| Metrorail | 21.83 | 29.36 | 30.23 | 36.40 | 51.48 | 25.56 |
| 2005 Metrorail Ridership (SERPM 6.5.2) | 27,033 | 8,827 | 8,303 | 13,339 | 12,150 | 6,370 |
| Weighted Average Mode Bias - MR to Bus | 31.230 | | | | | |
| Weighted Average Mode Bias - MR to BRT | 19.230 | | | | | |
| Mode Bias Factor - MR to Bus | 1.489 | | | | | |
| Mode Bias Factor - MR to BRT | 1.301 | | | | | |

*In-vehicle travel time

*6 minute IVTT reduction results in an increase of 9.4% in transit linked trips

4. The estimated market within one-half mile and one mile for each alignment can be found in **Table 11–4** and **Table 11–5** below.

**Table 11–4 - Market within 1/2 Mile of Alignment**

| Alignment | | 2010 | | 2040 | |
|---|---|---|---|---|---|
| | Square Miles | Population | Employment | Population | Employment |
| Le Jeune Road | 9.91 | 57,471 | 81,856 | 84,346 | 104,731 |
| Ponce de Leon | 10.06 | 59,185 | 84,582 | 92,302 | 108,141 |
| Douglas Road | 8.53 | 49,539 | 80,664 | 80,586 | 102,928 |
| 27th Avenue | 9.22 | 63,299 | 58,509 | 101,700 | 77,389 |

**Table 11–5 - Market within 1 Mile of Alignment**

| Alignment | | 2010 | | 2040 | |
|---|---|---|---|---|---|
| | Square Miles | Population | Employment | Population | Employment |
| Le Jeune Road | 18.12 | 117,024 | 121,520 | 167,976 | 158,383 |
| Ponce de Leon | 16.15 | 112,624 | 117,789 | 169,616 | 153,319 |
| Douglas Road | 16.43 | 115,699 | 120,718 | 171,613 | 156,839 |
| 27th Avenue | 15.92 | 136,815 | 98,796 | 211,329 | 133,900 |

5. The above factors were used to determine the bus in semi-exclusive lanes and local bus estimated ridership. For the proposed semi-exclusive bus lanes, it is recommended bus in semi-exclusive lanes is used. (See **Table 11–6**).

**Table 11–6 - Ridership Estimation by Mode**

| Station | Estimated Metrorail Ridership | Bus in Semi-Exclusive Lanes Ridership | Bus Ridership |
|---|---|---|---|
| MIC | 1,355 | 1,041 | 910 |
| NW 14 St | 496 | 382 | 333 |
| NW 7 St | 882 | 678 | 592 |
| Flagler St | 1,078 | 829 | 724 |
| SW 8 St | 1,441 | 1,107 | 968 |
| SW 16 St | 1,729 | 1,329 | 1,161 |
| SW 22 St | 2,148 | 1,651 | 1,442 |
| SW 27 St | 1,589 | 1,221 | 1,067 |
| Bird Road | 1,182 | 908 | 794 |
| Douglas Metrorail | 1,205 | 926 | 809 |
| **Total** | **13,104** | **10,072** | **8,801** |

6. Ridership estimates were checked against observed ridership. Observed ridership is from February 2010 to match the 2010 estimated ridership (See **Table 11–7**).

**Table 11–7 - Ridership Check - Observed vs. Estimated**

| | Length (Mile) | Ridership | Ridership / Mile |
|---|---|---|---|
| Observed Metrorail* | 24.4 | 61,532 | 2,522 |
| Estimated Metrorail | 4.5 | 9,543 | 2,121 |
| Coral Gables Trolley* | 3.27 | 4,500 | 1,376 |
| Estimated BRT | 4.5 | 7,335 | 1,630 |

7. Using the population and employment data for each alignment and the mode bias factor for each mode, estimates of potential ridership along each alignment and for all candidate modes was calculated. A mode bias factor for modern streetcar and enhanced trolley is not used in the

SERPM model and so a factor was estimated based on the factors for other modes as shown in **Table 11–8**.

**Table 11–8 - Ridership by Alignment and Mode**

| Mode | Alignment | | | | | |
|---|---|---|---|---|---|---|
| | 42nd Avenue | Ponce de Leon Boulevard | 37th Avenue (Douglas Road) | 27th Avenue | Weighted Average Mode Bias Factor | Mode Bias Factor |
| Bus | 8,368 | 8,801 | 8,153 | 7,397 | 31.23 | 1.489 |
| Rapid Bus | 8,931 | 9,394 | 8,702 | 7,895 | 25.23 | 1.395 |
| Semi-Exclusive Lanes | 9,576 | 10,072 | 9,330 | 8,466 | 19.23 | 1.301 |
| Modern Streetcar | 10,829 | 11,390 | 10,551 | 9,573 | 10.00 | 1.151 |
| Enhanced Trolley | 8,931 | 9,394 | 8,702 | 7,895 | 25.23 | 1.395 |
| Metrorail | 12,459 | 13,104 | 12,139 | 11,014 | 1.00 | 1.000 |
| Corridor Factor | 0.95 | 1.00 | 0.93 | 0.84 | | |

8. Ridership was rounded and included in **Table 11–9**, below. The end-to-end travel time was determined based on typical speeds for the various modes and the levels of traffic interference likely to be experienced in mixed, semi-exclusive, or exclusive lanes. The annual cost was determined based on animalization of typical construction costs, including vehicles, and the operating & maintenance costs from the National Transit Database.

The peak direction capacity was determined from typical person-carrying capacities of the various modes and the typical configuration of the vehicles. Rapid Bus and Semi-Exclusive Lanes for bus operations were assumed to use articulated buses. The enhanced trolley was assumed to make use of the same vehicles in service today.

**Table 11–9 - Characteristics of Alternative Modes**

| Mode | Speed (mph) | Capacity (Seated) | Capacity (standees) | Peak Direction Vehicle Capacity (Total) | Headway (minutes) | Peak Hour Peak Direction Capacity |
|---|---|---|---|---|---|---|
| Enhanced Trolley | 10 | 33 | 10 | 43 | 6 | 430 |
| Metrorail | 31 | Combined | | 664 | 6 | 6,640 |
| Modern Streetcar | 17 | Combined | | 150 | 10 | 900 |
| Rapid Bus | 10 | 60 | 20 | 80 | 10 | 480 |
| Semi-Exclusive Lanes | 17 | 60 | 20 | 80 | 10 | 480 |

For study purposes, the daily demand was factored to a peak hour/peak direction demand equal to 15% of the daily demand. This permitted a comparison of demand and capacity. It also permitted an estimate of an annual cost per passenger. Finally, the potential one-seat market was calculated based on the population and employment within one-quarter mile of the proposed alignments. The results of this analysis are shown in **Table 11–10** on the next page.

The ridership estimate was then used in conjunction with several other factors to determine the preferred alternatives within each alignment. These are identified below.

- **Daily ridership in passengers per day –** the number shown is a placeholder for discussion purposes only.
- **End-to-end travel time in minutes -** is an estimate based on the typical speeds of these modes.
- **Peak hour peak direction capacity in passengers per hour –** is based on the capacity of the various modes with certain assumptions on headway and configuration or vehicle consist.
- **Peak hour ridership in passengers per hour -** is also a placeholder assuming 10% of total trips in the peak hour and 75/25 directional split.
- **Peak hour ridership/capacity ratio –** is a simple division of the preceding two columns.
- **Annual cost per passenger –** is based on an estimate of the annualized capital cost and annual Operations and Maintenance (O&M) cost for each mode divided by the number of daily passengers.
- **One-seat market** - is the total population and employment within either ¼ or ½ mile of the proposed stations plus other Metrorail stations if the Douglas corridor Metrorail interlines with other parts of the system (e.g., North or East-West Corridors).

These measures allow for an objective assessment of the alternatives. For example, those modes that cannot carry the peak period demand would not be viable. Consideration to supplemental peak hour service would be necessary and would also affect the cost. Multiple modes that adequately serve the market but have dramatically different costs would suggest choosing the less expensive mode.

**Table 11–10 - Evaluation of Alternatives**

| Alternative | Corridor | Mode | Total Ridership | End-to-End Travel Time (minutes) | Annual Cost ($millions) | Peak Hour Peak Direction Capacity | Peak Hour Ridership (Assume 15% of Daily) | Peak Hour Ridership / Capacity Ratio | Annual Cost Per Passenger ($s) | One-Seat Market |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Le Jeune | Rapid Bus | 8,900 | 27 | 4.8 | 480 | 670 | 1.40 | 500 | 42,678 |
| 1-M | Le Jeune | Metrorail | 12,500 | 9 | 43.0 | 6,640 | 934 | 0.14 | 3,500 | 160,743 |
| 2.1 | Ponce | Enhanced Trolley | 9,400 | 26 | 2.7 | 430 | 705 | 1.64 | 300 | 80,642 |
| 2.2 | Ponce | Semi-Exclusive Lanes | 10,100 | 16 | 4.8 | 480 | 755 | 1.57 | 500 | 80,642 |
| 2.3 | Ponce | Modern Streetcar | 11,400 | 16 | 6.2 | 900 | 854 | 0.95 | 500 | 80,642 |
| 4.2 | Douglas | Semi-Exclusive Lanes | 9,300 | 16 | 4.8 | 480 | 700 | 1.46 | 500 | 63,771 |
| 4 | Douglas | Metrorail | 12,100 | 9 | 43.0 | 6,640 | 910 | 0.14 | 3,500 | 63,771 |
| 5.1 | 27th | Rapid Bus | 7,900 | 27 | 4.8 | 480 | 592 | 1.23 | 600 | 64,758 |

Demand for all modes, with the exception of Metrorail, would appear to exceed the capacity of the proposed service. Several alternatives would be available for responding to the demand. First, more frequent peak period service could be implemented (e.g., 5-minute rather than 10-minutes headways.) Second, an overlay service of a local bus route could serve local trips while longer-distance trips might use the Rapid Bus or Semi-Exclusive Lanes operations. In general, it was assumed that headways for peak period or overlay service would not be greater than once every 10 minutes resulting in an effective headway of five minutes. **Table 11–11** shows the peak hour ridership to capacity ratio. **Table 11–12** shows the evaluation of the alternatives.

**Table 11–11 - Ridership/Capacity Ratio for Revised Headways**

| Alternative | Alignment | Mode | Peak Hour Ridership/ Capacity Ratio |
|---|---|---|---|
| 1 | Le Jeune | Rapid Bus | 0.70 |
| 1-M | Le Jeune | Metrorail | 0.14 |
| 2.1 | Ponce | Enhanced Trolley | 1.64 |
| 2.2 | Ponce | Semi-Exclusive Lanes | 0.79 |
| 2.3 | Ponce | Modern Streetcar | 0.47 |
| 4.2 | Douglas | Semi-Exclusive Lanes | 0.73 |
| 4 | Douglas | Metrorail | 0.14 |
| 5.1 | 27th | Rapid Bus | 0.62 |

**Table 11–12 - Evaluation Using Reduced (5 rather than 10 minutes) Headways for Bus Modes**

| Alternative | Alignment | Mode | Total Ridership | End-to-End Travel Time (minutes) | Annual Cost ($millionss) | Peak Hour Peak Direction Capacity | Peak Hour Ridership (Assume 15% of Daily) | Peak Hour Ridership/ Capacity Ratio | Annual Cost Per Passenger ($s) | One-Seat Market* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Le Jeune | Rapid Bus | 8,931 | 27 | 9.3 | 960 | 670 | 0.70 | 1,000 | 42,678 |
| 1-M | Le Jeune | Metrorail | 12,459 | 9 | 43.0 | 6,640 | 934 | 0.14 | 3,500 | 160,743 |
| 2.1 | Ponce | Enhanced Trolley | 9,394 | 26 | 2.7 | 430 | 705 | 1.64 | 300 | 80,642 |
| 2.2 | Ponce | Semi-Exclusive Lanes | 10,072 | 16 | 9.3 | 960 | 755 | 0.79 | 900 | 80,642 |
| 2.3 | Ponce | Modern Streetcar | 11,390 | 16 | 12.4 | 1,800 | 854 | 0.47 | 1,100 | 80,642 |
| 4.2 | Douglas | Semi-Exclusive Lanes | 9,330 | 16 | 9.3 | 960 | 700 | 0.73 | 1,000 | 63,771 |
| 4 | Douglas | Metrorail | 12,139 | 9 | 43.0 | 6,640 | 910 | 0.14 | 3,500 | 63,771 |
| 5.1 | 27th | Rapid Bus | 7,895 | 27 | 9.3 | 960 | 592 | 0.62 | 1,200 | 64,758 |

* *Market is calculated as population and employment within one-quarter of the alignment for all modes except Metrorail, which is calculated for one-half mile.*

Greater frequency of service would still preclude the use of enhanced trolley service to carry estimated passenger volumes but all other modes could function. Costs would increase for additional vehicles and O&M costs.

## 12. Recommendations

The short-, medium-, and long-term implementation of enhanced transit in each alignment should logically build upon earlier actions. The 42nd Avenue/Le Jeune Road corridor for example, may not be ready for implementation of any enhanced transit over the next five years but would be an appropriate site for rapid bus in the medium term. Once proceeding with rapid bus, it would be logical to continue with that mode into the long-term.

**Table 12–1** summarizes the recommendations in each alignment over the three future time horizons. Both Le Jeune Road and Ponce de Leon Blvd. would maintain existing transit service – the existing local 42 for Le Jeune Road and the Coral Gables Trolley for Ponce de Leon Blvd. – in the short-term. Le Jeune Road service would advance to rapid bus in the medium- and long-term while service would advance from semi-exclusive bus lanes to LRT/modern streetcar along Ponce de Leon Blvd. In the case of Le Jeune Road, the ultimate, optimal mode would be rapid bus while for Ponce de Leon Blvd., LRT/modern streetcar would be optimal but could not be implemented before the long-term; semi-exclusive bus lanes would be a step toward the ultimate, building ridership and starting the reconfiguration of the street and construction of higher density development during the medium-term.

**Table 12–1 - Modes Recommended for Implementation by Alignment (Short-, Medium-, and Long-Term)**

| Alignment | 42nd Ave | Ponce de Leon | 37th Ave | 32nd Ave | 27th Ave |
|---|---|---|---|---|---|
| Short-Term (less than 5 years) | None | None | Rapid Bus | None | Rapid Bus |
| Medium-Term (5 to 15 years) | Rapid Bus | Semi-Exclusive Bus Lanes | Rapid Bus | None | Rapid Bus |
| Long-Term (more than 15 years) | Rapid Bus | LRT/Modern Streetcar | Semi-Exclusive Bus Lanes | None | Rapid Bus |

Three of the four transit routes, Ponce de Leon Blvd., Douglas Road, and 27th Avenue are shown traveling along Douglas Road from Flagler Street to the MIC as each was developed so as to optimize ridership and serve the greatest need. Ideally, transit through the corridor would travel on both Douglas Road and 27th Avenue and avoid this duplication. A final determination on connections for each alignment between Flagler Street and the MIC would need to be made in the future, depending in part on the sequencing of implementation.

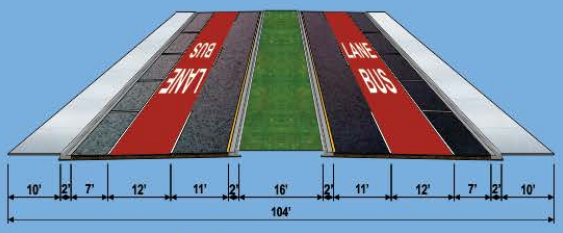
## 13. Detailed Recommendations by Corridor

Recommendations for each of the potential alignments are described in the following sections. For the Le Jeune Road and 27th Avenue alignments, the mode would remain the same from implementation through the long-term horizon of this study. For the Ponce de Leon Blvd. alignment, a mid-term bus in semi-exclusive lanes would pave the way for LRT/Modern Streetcar over the long-term. The 37th Avenue alignment would advance from rapid bus in the mid-term to bus in semi-exclusive lanes in the long-term and likely Metrorail beyond.

### 13.1. Semi-Exclusive Bus Lane – Ponce de Leon Boulevard (mid-term)

Bus operating in semi-exclusive lanes is the recommended mode for the Ponce de Leon Boulevard alignment for the mid-term. Buses would travel from the MIC to the Douglas Road Metrorail station on Douglas Road to Flagler Street and then move into Ponce de Leon Blvd. through downtown Coral Gables. The bus would stop at eight intermediate stations and operate at an average speed of approximately 17 mph. A summary of the recommended characteristics is shown in **Figure 13–1**.

## Ponce de Leon Boulevard - Bus Operating in Semi-Exclusive Lanes (mid-term)




*Off-Set Bus Lanes*

**Route Description**

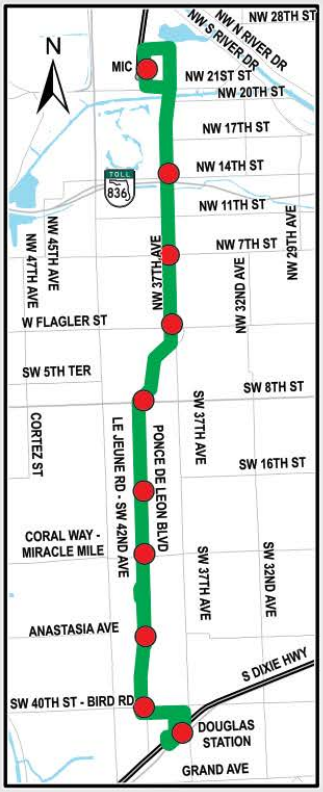
Bus operating in semi-exclusive lanes is the recommended mode for the Ponce de Leon Boulevard alignment for the mid-term. Buses would travel from the Miami Intermodal Center to the Douglas Road Metrorail station on Douglas Road to Flagler Street and then move into Ponce de Leon Boulevard through downtown Coral Gables. The bus would stop at eight intermediate stations and operate at an average speed of approximately 17 mph. Other characteristics of the proposed service are shown in the table below. The alignment and stop locations are shown on the right. The proposed typical section is shown in above.

**System Integration**

- Overlay on Coral Gables Trolley
- Interconnect with Flagler EBS
- Consider North extension beyond MIC
- Consider South extension to Miami City Hall

**Modifications to Existing Service**

- Maintain Trolley as is



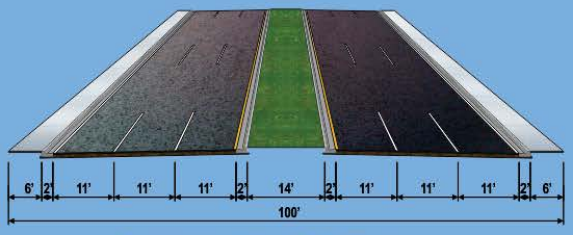

| Category | Metric |
|---|---|
| Mode | Semi-Exclusive Bus Lanes |
| Speed | 17 mph |
| Route Length (miles) | 7.2 |
| Peak Direction Vehicle Capacity | 80 passengers |
| Peak Period Headway | 10 minutes |
| Peak Hour Direction Capacity | 480 passengers |
| End-to-end Travel Time | 16 minutes |
| Annual Cost (O&M) | $4.5 million |
| Capital Cost | $36 million |
| Estimated Daily Ridership | 10,100 |

**Figure 13–1 - Ponce de Leon Boulevard - Bus Operating in Semi-Exclusive Lanes (mid-term)**

## 13.2. Le Jeune Road-NW/SW 42nd Avenue - Rapid Bus Operating in Mixed Traffic Lanes (mid-term)

Rapid Bus is the recommended mode for the Le Jeune Road-NW/SW 42nd Avenue alignment. A rapid bus would travel from the MIC to the Douglas Road Metrorail station in non-exclusive mixed-traffic lanes, operating therefore in mixed traffic. The Rapid Bus would stop at nine intermediate stations and operate at an average speed of approximately 10 mph. A summary of the recommended characteristics is shown in **Figure 13–2**.

## Le Jeune Road-NW/SW 42nd Avenue - Rapid Bus Operating in Mixed Traffic Lanes (mid-term)




*Curbside Mixed Traffic Lanes*

**Route Description**

Rapid Bus is the recommended mode for the LeJeune Road-NW/SW 42nd Avenue alignment. A rapid bus would travel from the Miami Intermodal Center to the Douglas Road Metrorail station in non-exclusive lanes, operating therefore in mixed traffic. The Rapid Bus would stop at nine intermediate stations and operate at an average speed of approximately 10 mph. Other characteristics of the proposed service are shown in the table below. The alignment and stop locations are shown on the right. The proposed typical section is shown above.

**System Integration**

- Overlay on Route 42
- Interconnect with Flagler EBS
- Consider North extension beyond MIC
- Consider South extension to University of Miami

**Modifications to Existing Service**

- Potential reductions on Route 42

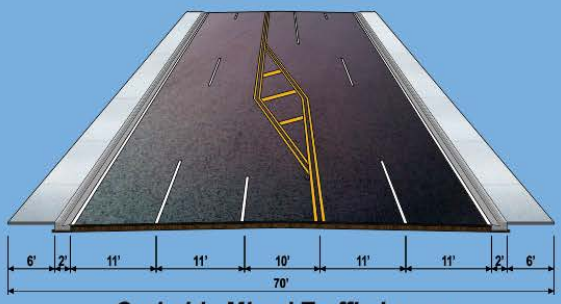
| Category | Metric |
|---|---|
| Route Length (miles) | 6.3 |
| Number of Stations | 11 |
| Speed (miles per hour) | 10 |
| Peak Direction Vehicle Capacity | 80 passengers |
| Peak Period Headway | 10 minutes |
| Peak Hour Direction Capacity | 480 passengers |
| End-to-end Travel Time | 27 minutes |
| Annual Cost (O&M) | $4.5 million |
| Capital Cost | $15.75 million |
| Estimated Daily Ridership | 8,900 |


**Figure 13–2 - Le Jeune Road-NW/SW 42nd Avenue – Rapid Bus Operating in Mixed Traffic Lanes (mid-term)**

### 13.3. Douglas Road-NW/SW 37th Avenue – Bus Operating in Mixed Traffic Lanes (short-term)

Rapid Bus is the recommended mode for the Douglas Road-NW/SW 37th Avenue corridor. A rapid bus would travel from the MIC to the Douglas Road Metrorail station directly south along Douglas Road in non-exclusive mixed-traffic lanes, operating therefore in mixed traffic. The Rapid Bus would stop at eight intermediate stations and operate at an average speed of approximately 10 mph. Other characteristics of the proposed service are shown in **Figure 13–3**.

## Douglas Road-NW/SW 37th Avenue – Rapid Bus Operating in Mixed Traffic Lanes (short-term)


*Curbside Mixed Traffic Lanes*

**Route Description**

Rapid Bus is the recommended mode for the Douglas Road-NW/SW 37th Avenue corridor. A rapid bus would travel from the Miami Intermodal Center to the Douglas Road Metrorail station directly south along Douglas Road in non-exclusive lanes, operating therefore in mixed traffic. The Rapid Bus would stop at eight intermediate stations and operate at an average speed of approximately 10 mph. Other characteristics of the proposed service are shown in the table below. The alignment and stop locations are shown on the right. The proposed typical section is shown above.

**System Integration**

- Overlay on Route 37
- Interconnect with Flagler EBS
- Consider North extension beyond MIC
- Consider South extension to Miami City Hall

**Modifications to Existing Service**

- Potential reductions to Route 37


| Category | Metric |
|---|---|
| Mode | Rapid Bus (EBS) |
| Speed | 10 mph |
| Route Length (miles) | 5.5 |
| Peak Direction Vehicle Capacity | 80 passengers |
| Peak Period Headway | 10 minutes |
| Peak Hour Direction Capacity | 480 passengers |
| End-to-end Travel Time | 16 minutes |
| Annual Cost (O&M) | $4.5 million |
| Capital Cost | $27.5 million |
| Estimated Daily Ridership | 8,700 |

**Figure 13–3 - Douglas Road-NW/SW 37th Avenue – Bus Operating in Mixed Traffic Lanes (short-term)**

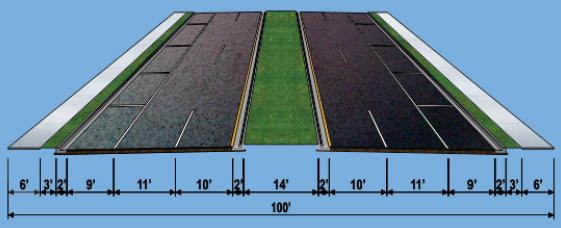
## 13.4. NW/SW 27th Avenue - Rapid Bus Operating in Mixed Traffic (short-term)

Rapid Bus is the recommended mode for the NW/SW 27th Avenue corridor. A rapid bus would travel from the MIC to the Coconut Grove Metrorail station in non-exclusive lanes, operating therefore in mixed traffic. Between Flagler Street and the Miami Intermodal Center lie several alternative alignments that the rapid bus could follow. Service could continue northbound on 27th Avenue as far north as NW 17th Street before diverting to NW 37th Avenue or do so at any of the major east-west streets between Flagler and NW 17th Street.

The particular alignment could be dictated in part by the implementation of service in any of the other alignments listed above. For example, if Douglas Road service is in place prior to the 27th Avenue service, remaining on 27th Avenue would be more logical and avoid duplication of service on Douglas Road north of Flagler Street. The Rapid Bus would stop at between six and eight intermediate stations and operate at an average speed of approximately 10 mph. Other characteristics of the proposed service are shown in **Figure 13–4**.

Although this alignment does not directly serve the Coral Gables Central Business District (CBD), it provides continuity with the NW 27th Avenue Enhanced Bus Service (EBS) proposed as part of incremental premium transit improvements for the PTP North Corridor. At the writing of this document, FDOT and the Miami-Dade MPO, in coordination with MDT, were also evaluating the provision of semi-exclusive bus lanes along NW 27th Avenue between NW 215th Street and SR-112. As the NW 27th Avenue alignment north of the MIC evolves as a priority premium transit corridor, the section between the MIC and Coconut Grove will merit greater attention and possibly corresponding priority.

# NW/SW 27th Avenue - Rapid Bus Operating in Mixed Traffic (short-term)




*Curbside Mixed Traffic Lanes*

**Route Description**

Rapid Bus is the recommended mode for the NW/SW 27th Avenue corridor. A rapid bus would travel from the Miami Intermodal Center to the Coconut Grove Metrorail station in non-exclusive lanes, operating therefore in mixed traffic. Between Flagler Street and the Miami Intermodal Center lie several alternative alignments that the rapid bus could follow. Service could continue northbound on 27th Avenue as far north as NW 17th Street before diverting to NW 37th Avenue or do so at any of the major east-west streets between Flagler and NW 17th Street.

The particular alignment could be dictated in part by the implementation of service in any of the other alignments. For example, if Douglas Road service is in place prior to the 27th Avenue service, remaining on 27th Avenue would be more logical and avoid duplication of service on Douglas Road north of Flagler Street. The Rapid Bus would stop at between six and eight intermediate stations and operate at an average speed of approximately 10 mph. Other characteristics of the proposed service are shown in the table below. The alignment and stop locations are shown on the right. The proposed typical section is shown in above.

**System Integration**

- Overlay in Route 27
- Interconnect with Flagler EBS
- Consider North connection with 27 Ave EBS
- Consider South extension to Miami City Hall

**Modifications to Existing Service**

- Maintain Route 27 as is

| Category | Metric |
|---|---|
| Mode | Rapid Bus (EBS) |
| Speed | 10 mph |
| Route Length (miles) | 6 |
| Peak Direction Vehicle Capacity | 80 passengers |
| Peak Period Headway | 10 minutes |
| Peak Hour Direction Capacity | 480 passengers |
| End-to-end Travel Time | 27 minutes |
| Annual Cost (O&M) | $4.5 million |
| Capital Cost | $15.0 million |
| Estimated Daily Ridership | 7,900 |

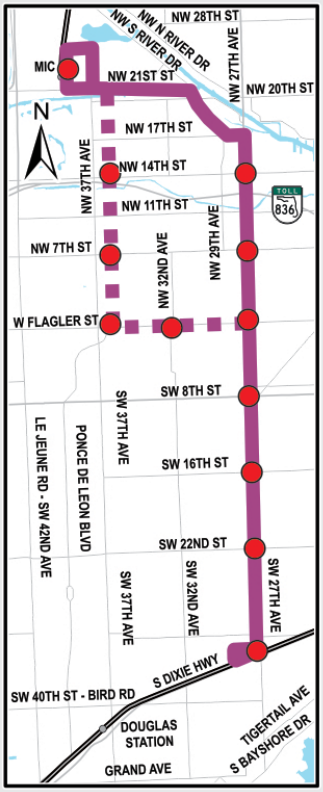
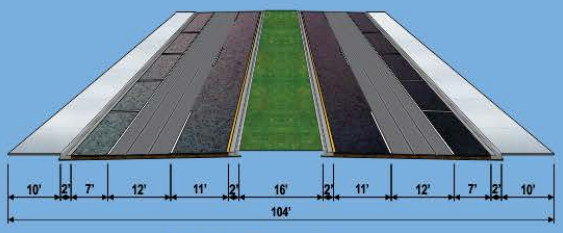



**Figure 13–4 - NW/SW 27th Avenue - Rapid Bus Operating in Mixed Traffic (short-term)**

## 13.5. Ponce de Leon Boulevard – LRT/Modern Streetcar (long-term)

Light Rail Transit (LRT) Modern Streetcar is the recommended mode for the Ponce de Leon Blvd. alignment for the long-term. Vehicles would travel the same route as the bus in semi-exclusive lanes stopping in at similar locations. Other characteristics of the proposed service are shown in **Figure 13–5.**

## Ponce de Leon Boulevard – LRT/Modern Streetcar (long-term)




*Off-Set Transit Lanes*

**Route Description**

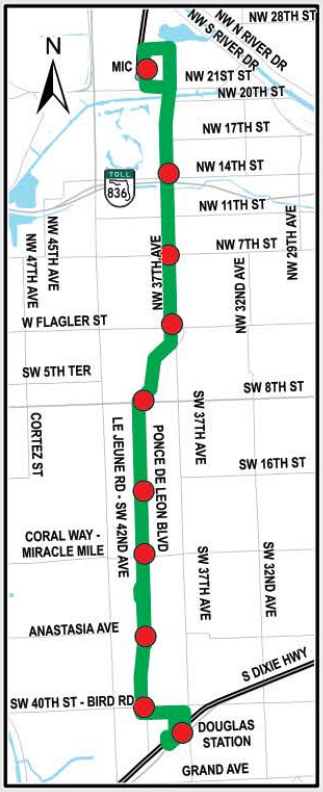
Light Rail Transit (LRT) Modern Streetcar is the recommended mode for the Ponce de Leon Boulevard alignment for the mid-term. Vehicles would travel the same route as the bus in semi-exclusive lanes stopping in at similar locations. Other characteristics of the proposed service are shown in the table below. The alignment and stop locations are shown in on the right. The proposed typical section is shown is shown above.

**System Integration**

- Interconnect with future East/West streetcar possibly along Flagler St. or SW 8th St.

**Modifications to Existing Service**

- Modify trolley route to compliment



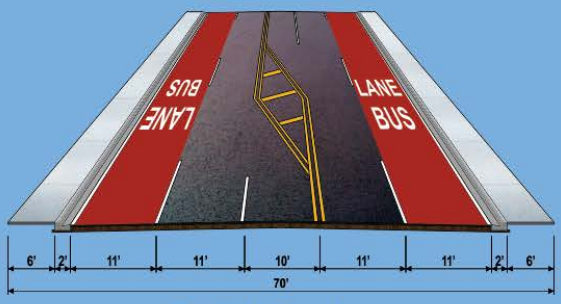

| Category | Metric |
|---|---|
| Mode | LRT/Modern Streetcar |
| Speed | 17 mph |
| Route Length (miles) | 7.2 |
| Peak Direction Vehicle Capacity | 150 passengers |
| Peak Period Headway | 10 minutes |
| Peak Hour Direction Capacity | 900 passengers |
| End-to-end Travel Time | 16 minutes |
| Annual Cost (O&M) | $8.0 million |
| Capital Cost | $310.0 million |
| Estimated Daily Ridership | 11,400 |

**Figure 13–5 - Ponce de Leon Boulevard – LRT/Modern Streetcar (long-term)**

## 13.6. Douglas Road-NW/SW 37th Avenue – Bus Operating in Semi-Exclusive Lanes (long-term)

Bus operating in semi-exclusive lanes is the recommended mode for the long-term for the Douglas Road-NW/SW 37th Avenue corridor. The bus would travel the same alignment as for the mid-term but now in semi-exclusive lanes. It would stop at the same eight intermediate stations and operate at an average speed of approximately 17 mph. A summary of the recommended characteristics is shown in **Figure 13–6.**

## Douglas Road-NW/SW 37th Avenue – Bus Operating in Semi-Exclusive Lanes (long-term)


*Curbside Bus Lanes*

**Route Description**

Bus operating in semi-exclusive lanes is the recommended mode for the long-term for the Douglas Road-NW/SW 37th Avenue corridor. The bus would travel the same alignment as for the mid-term but now in semi-exclusive lanes. It would stop at the same eight intermediate stations and operate at an average speed of approximately 17 mph. Other characteristics of the proposed service are shown in the table below. The alignment and stop locations are shown on the right. The proposed typical section is shown on the right.

**System Integration**

- Overlay on Route 42
- Potential addition limited-stop routes
- North + Southern extensions beyond Metrorail likely

**Modifications to Existing Service**

- TBD in future


| Category | Metric |
|---|---|
| Mode | Semi-Exclusive Bus Lanes |
| Speed | 17 mph |
| Route Length (miles) | 5.5 |
| Peak Direction Vehicle Capacity | 80 passengers |
| Peak Period Headway | 10 minutes |
| Peak Hour Direction Capacity | 480 passengers |
| End-to-end Travel Time | 16 minutes |
| Annual Cost (O&M) | $4.5 million |
| Capital Cost | $27.5 million |
| Estimated Daily Ridership | 9,300 |

**Figure 13–6 - Douglas Road-NW/SW 37th Avenue – Bus Operating in Semi-Exclusive Lanes (long-term)**

## 13.7. Douglas Road-NW/SW 37th Avenue – Metrorail (beyond long-term)

The Douglas Road alignment offers the greatest potential for implementation of Metrorail beyond the time horizon of this study. A direct, elevated Heavy Rail alignment would travel along Douglas Road stopping at stations approximately one-half to one mile apart. Future land development and right-of-way considerations would likely influence the placement of the stations. Other characteristics of the proposed service are shown in **Figure 13–7**

The current Metrorail system is comprised of two lines, an Orange and a Green Line. Both extend from Dadeland South through downtown Miami to the Earlington Heights station. One continues to the Palmetto Station while the other terminates at the MIC Station. Metrorail could be extended through the Douglas Road corridor either as an extension of either of these lines or as a separate line. One key factor in determining the preferred configuration would be the state of the system at such time as Metrorail is extended through the Douglas Road corridor. Another is the selection of the form of heavy rail: either conventional or diesel-powered.

For example, **Figure 13–8** and **Figure 13–9** show six variations for incorporating a Metrorail line through the Douglas Road corridor into the countywide Metrorail system. Under Scenario 1, the Metrorail system is configured as today. Service to Douglas Road would be effected through the continuation of the Orange Line past the MIC to the Douglas Road Metrorail station.

Scenario 2 envisions the North Corridor constructed between Douglas Road Metrorail station and the northern extent of the North Corridor. The Orange Line could also be extended past the MIC to the Douglas Road Metrorail station resulting in increased frequencies in the core of the system but generally consistent service with today elsewhere.

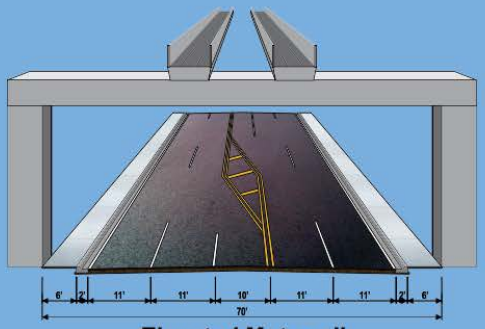
Under Scenario 3A, Metrorail is extended along the East-West Corridor as heavy rail. That service would extend between Earlington Heights and the western extent of the corridor. The Douglas Road corridor would be served by a fourth line running from Dadeland South to Earlington Heights.

Scenario 3B also envisions the East-West Corridor built but as diesel light rail (DLR) transit. It would then be logical to extend the East-West Corridor south through the Douglas Road Corridor were DLR transit selected as the preferred mode for the latter.

In Scenario 4A, where both the North and East-West Corridors had been constructed as conventional Metrorail, the Douglas Road corridor could be served with a new line from Dadeland South to Earlington Heights.

Finally, Scenario 4B again considers the construction of both the North and East-West Corridors but the East-West as DLRT.

# Douglas Road-NW/SW 37th Avenue – Metrorail (beyond long-term)




*Elevated Metrorail*

**Route Description**

The Douglas Road alignment offers the greatest potential for implementation of Metrorail beyond the time horizon of this study. A direct, elevated Heavy Rail alignment would travel along Douglas Road stopping at stations approximately one-half to one mile apart. Future land development and right-of-way considerations would likely influence the placement of the stations. The alignment and stop locations are shown on the right. The proposed typical section is shown on the right.

**System Integration**

- Assume Orange Line extension

**Modifications to Existing Service**

- Potential increased service to better feed rail service
- Replace limited-stop bus service


**Figure 13–7 - Douglas Road-NW/SW 37th Avenue – Metrorail (beyond long-term)**

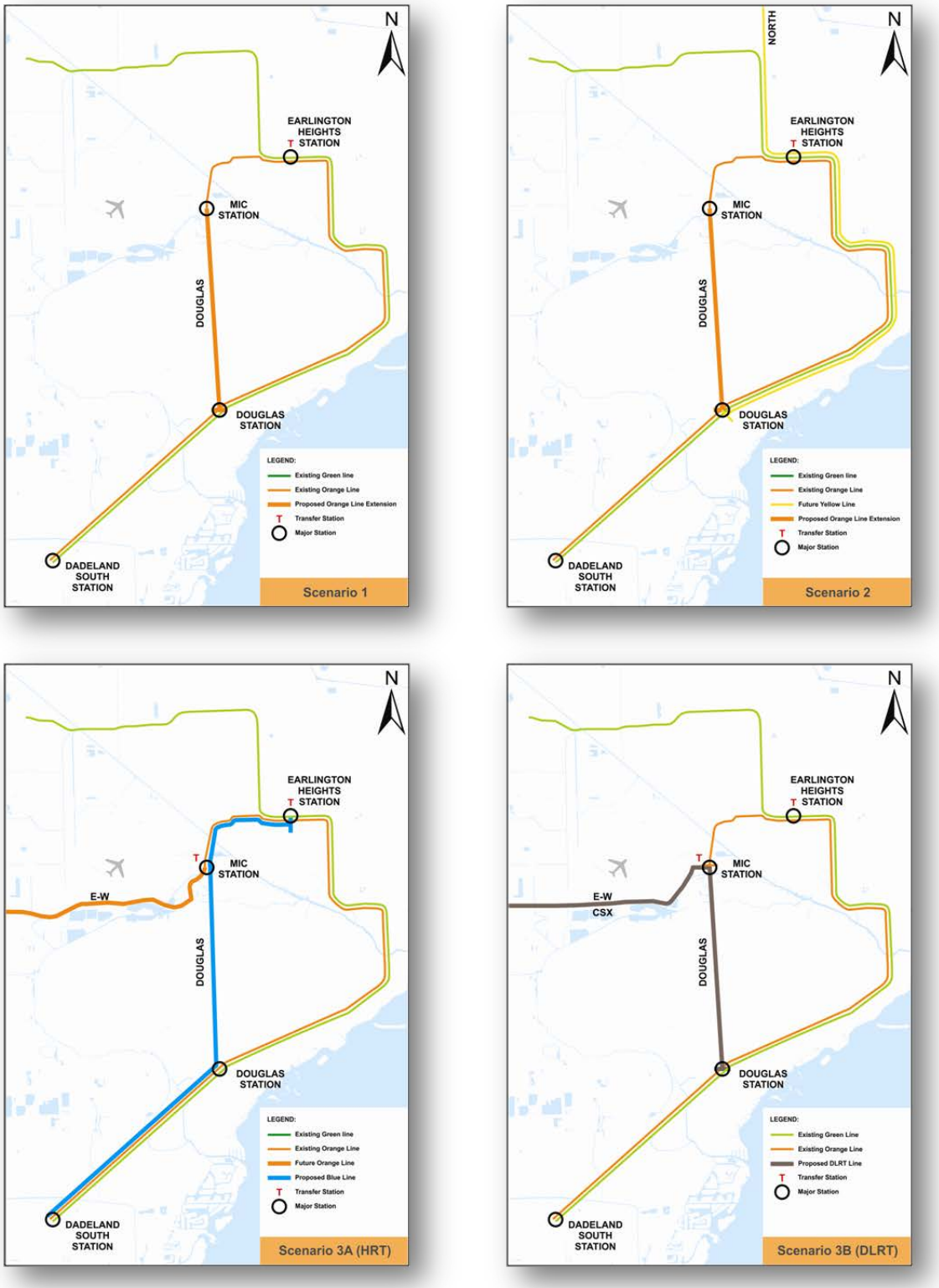



**Figure 13–8 - Future Metrorail System Configurations**

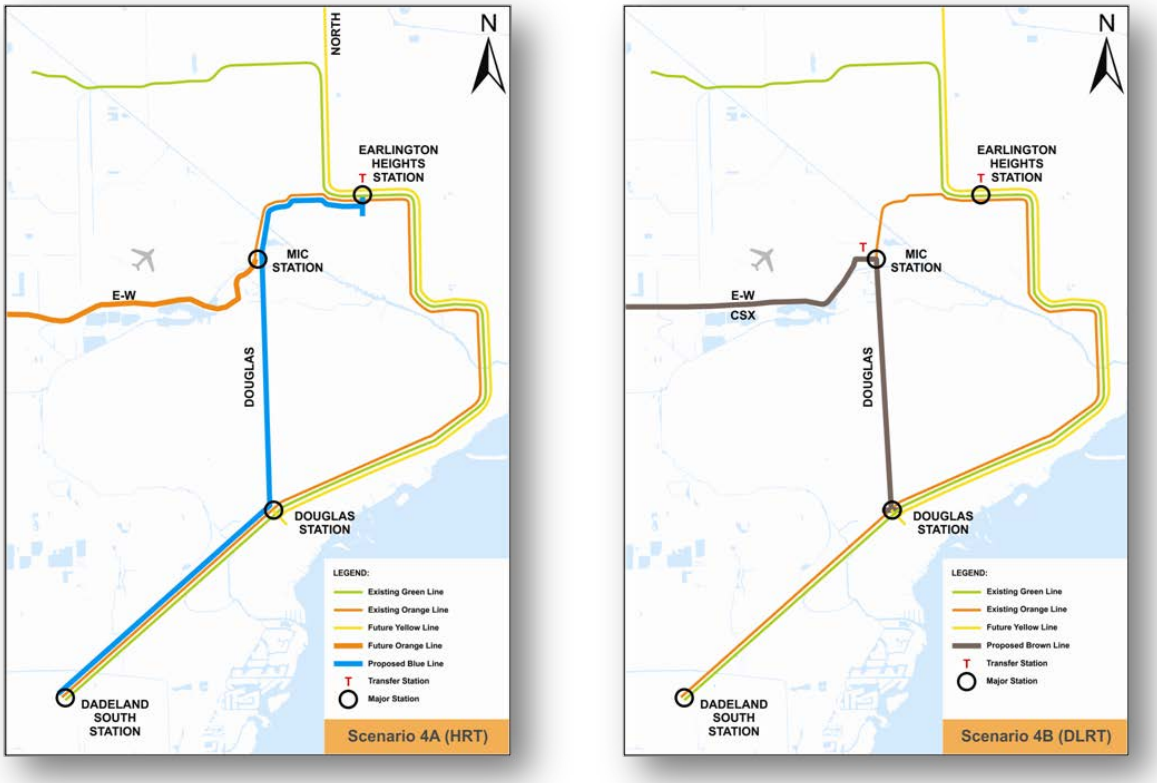



**Figure 13–9 - Future Metrorail System Configurations (continued)**

## 13.8. Timing of Proposed Improvements

From the perspective of a premium Douglas Road Transit Corridor, the Ponce de Leon Blvd. alignment should be advanced as the first of the four alignments considered for future improvements. Connecting the two terminal Metrorail stations, Douglas Road and the MIC, and serving downtown Coral Gables offers the greatest potential market for existing and new riders. A recent survey conducted for the Coral Gables Trolley Master Plan Study and discussions with government and community leaders indicated a strong desire to extend transit service between downtown Coral Gables and Miami International Airport.

Buses operating in semi-exclusive lanes and later LRT/Modern Streetcar would "close the loop" of Metrorail service and connect an important area currently left out of the current Metrorail operation.

Le Jeune Road would be the next corridor advanced, initially as Rapid Bus but ultimately as Metrorail or DLRT. This alignment has the potential for somewhat higher ridership than NW/SW 27th Avenue. The Le Jeune Road alignment offers no redundancy with the Ponce de Leon Blvd. alignment and therefore represents a significant increase in service to the Douglas Road corridor.

Douglas Road would be the next alignment for implementation of higher quality transit service. Over the medium-term, Rapid Bus would be the appropriate technology, connecting the Douglas Road Metrorail station with the MIC. Service could also be extended beyond the MIC along Le Jeune Road, toward Hialeah as is the case for the existing Route 37 Metrobus service.

The study alignment that least services the Coral Gables CBD is NW/SW 27th Avenue. This alignment offers the least new ridership and overlaps with the Ponce de Leon Blvd. and Douglas Road alignments north of Flagler Street. Rapid Bus service could be introduced along this alignment in conjunction with improvements in the other alignments but would need to be integrated with services in the other alignments because of the overlap on the northern end of the route. Service could commence from the Coconut Grove Metrorail station of further south in Coconut Grove and extend to the MIC or continue northward on NW 27th Avenue, following the existing Route 27 and/or the proposed 27th Avenues EBS.

The long-term improvements of Metrorail/DLRT in the Le Jeune Road alignment or LRT/Modern Streetcar in the Ponce de Leon Blvd. alignment would be sequenced based upon available funding. Only one alignment is likely to mature into a rail mode. Metrorail/DLRT along Le Jeune Road would be preferable so as to avoid the introduction of a new mode into the MDT system but cost might preclude construction of such an extension. Conversely, construction of LRT/Modern Streetcar in the Ponce de Leon Blvd. alignment should preclude the introduction of Metrorail/DLRT into the Le Jeune Road alignment; rail modes on both alignments would not be cost-effective and provide far more capacity than would be needed even beyond the long-term analysis.

Converting service in the Douglas Road alignment from Rapid Bus to Bus in Semi-Exclusive lanes could be implemented in the long-term and could be advanced regardless of rail improvements in the Ponce de Leon Blvd. or Le Jeune Road alignments.

## 13.9. Timing for Metrorail

Metrorail would likely be introduced into the Douglas Road corridor after one or more of the alternative alignments had received enhanced bus service and beyond the long-term (2040 design horizon) of this study. Growth in transit demand in the southern portion of the county would likely be the primary determinant in introducing high capacity Metrorail service as the bus and LRT modes recommended within Douglas Road would meet anticipated demand within the corridor.

Metrorail offers substantial passenger-carrying capacity with the potential to carry in excess of 100,000 passengers per day. The existing Metrorail service, operating primarily as a single line, carries in excess of 60,000 passengers per day. Overcrowding is evidenced in selected locations and during limited periods of the day, which could be overcome with longer trains and more frequent service. Metrorail therefore, becomes much needed once the threshold for lower capacity modes occurs. Buses operating on five-minute headways could carry a daily ridership of some 10,000 to 12,000 passengers per day while LRT/Modern Streetcar could carry 15,000 to 18,000 per day. Preliminary projections from the current Long-Range Transportation Plan study suggest a demand of approximately 18,000 passengers by the year 2040. This would fall within the range at which Metrorail is needed and may indeed be more cost-effective than other modes. It is important to note that this estimate includes projects not yet determined to be financially feasible. Nevertheless, Metrorail should be considered at the end of the planning horizon for this study.

An analysis of workers employed in the Coral Gables CBD performed as part of this study indicated that approximately 80% live within Miami-Dade County, 11% live in Broward County and 3% live in Palm Beach County. Only 18% of persons residing within the study area actually work in the Coral Gables CBD. These two statistics indicate that most workers employed within the Coral Gables CBD are traveling relatively long distances which fares well for an expanded Metrorail system.

Metrorail could be precluded or postponed were LRT/Modern Streetcar to be implemented in the Ponce de Leon Blvd. alignment as the anticipated capacity of LRT/Modern Streetcar and Metrorail would likely be excessive as compared with even long-term demand. Since all southern Miami-Dade travel could be accommodated with the existing Metrorail plus enhanced services in the various alignments, the advantages of a direct connection/one-seat ride would be outweighed by the substantial capital and O&M cost of a Metrorail extension.

**Appendix A**

**Characteristics of Existing Miami-Dade Transit Service in the Study Corridor**

# Existing MDT Transit Routes

| Line Name | Route Designation | Route Length | Time | Length | Running Speed | AM | Midday | PM | AM Headway | Midday Headway | PM Headway | First Run | Last Run | Route Length | Route Length within Study Area | Average Weekday Boardings | Average Boardings Saturdays | Average Boardings Sundays | Total Monthly Boardings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CENT.PLAZA-ROUND TOWERS VIA CBD | Route 6 | 111,103 | 81 | 21.04 | 15.59 | 60 | 60 | 0 | 1.00 | 1.00 | - | 7:55 | 18:17 | 21.04 | 7.29 | 900 | 600 | 500 | 23,300 |
| CBD-DOLPHIN MALL VIA NW 7 ST | Route 7 | 113,177 | 84 | 21.44 | 15.31 | 15 | 20 | 30 | 0.25 | 0.33 | 0.50 | 4:50 | 23:00 | 21.44 | 2.05 | 4,700 | 3,400 | 2,400 | 126,300 |
| CBD-107AV/WESTCHESTER VIA SW 8ST | Route 8 | 150,654 | 73 | 28.53 | 23.45 | 10 | 15 | 20 | 0.17 | 0.25 | 0.33 | 4:39 | 0:51 | 28.53 | 2.34 | 8,200 | 5,000 | 3,000 | 212,100 |
| FIU-CBD via Flagler Street | Route 11 | 109,787 | 95 | 20.79 | 13.13 | 8 | 12 | 20 | 0.13 | 0.20 | 0.33 | 4:32 | 4:55 | 20.79 | 2.09 | 12,900 | 9,800 | 7,400 | 353,900 |
| 163ST.SH.CTR-COCOGROVE VIA 22AVE | Route 22 | 201,693 | 99 | 38.20 | 23.15 | 30 | 60 | 60 | 0.50 | 1.00 | 1.00 | 4:53 | 0:38 | 38.20 | 2.17 | 5,400 | 3,000 | 2,200 | 139,300 |
| WEST DADE TO CBD - VIA CORAL WAY | Route 24 | 184,166 | 84 | 34.88 | 24.91 | 20 | 20 | 30 | 0.33 | 0.33 | 0.50 | 5:01 | 0:41 | 34.88 | 4.26 | 3,500 | 2,200 | 1,500 | 93,000 |
| COCOGROVE-CALDER VIA NW 27 AVE | Route 27 | 215,686 | 85 | 40.85 | 28.84 | 30 | 30 | 60 | 0.50 | 0.50 | 1.00 | 4:52 | 5:11 | 40.85 | 8.76 | 3,400 | 2,300 | 1,500 | 90,300 |
| MIAMI GRDNS-OMNI VIA NW 32 AVE-20ST | Route 32 | 144,405 | 97 | 27.35 | 16.92 | 24 | 30 | 40 | 0.40 | 0.50 | 0.67 | 4:55 | 0:26 | 27.35 | 1.02 | 2,600 | - | - | 56,800 |
| HIALEAH-SO.MIAMI VIA PALM/37 AVE | Route 37 | 144,570 | 75 | 27.38 | 21.90 | 30 | 30 | 30 | 0.50 | 0.50 | 0.50 | 4:35 | 23:35 | 27.38 | 8.01 | 3,500 | 2,200 | 1,500 | 93,000 |
| BIRD RD/152 AVE--DOUGLAS RD STAT | Route 40 | 182,658 | 36 | 6.33 | 10.55 | 15 | 30 | 40 | 0.25 | 0.50 | 0.67 | 4:46 | 10:55 | 34.59 | 1.71 | 2,600 | 1,100 | 900 | 65,100 |
| DGLS RD-MIA SPRGS/OPALOCKA TRI-RAIL | Route 42 | 152,310 | 75 | 28.85 | 23.08 | 20 | 30 | 60 | 0.33 | 0.50 | 1.00 | 4:35 | 23:36 | 28.85 | 8.94 | 1,900 | 1,200 | 700 | 48,800 |
| BRICKELL-UNIV. STA. VIA S. BAYSHORE | Route 48 | 71,168 | 46 | 13.48 | 17.58 | 60 | 60 | 0 | 1.00 | 1.00 | - | 6:40 | 19:36 | 13.48 | 5.54 | 300 | - | - | 7,000 |
| FLAGLER MAX: WEST DADE-CBD | Route 51 | 146,350 | 68 | 27.72 | 24.46 | 15 | 30 | 30 | 0.25 | 0.50 | 0.50 | 5:01 | 21:20 | 27.72 | 2.09 | 10,400 | 7,000 | 4,500 | 274,500 |
| CHLD HOSP-MDC KEND/162 AV-VIA 56 ST | Route 56 | 208,524 | 58 | 8.90 | 9.21 | 30 | 60 | 0 | 0.50 | 1.00 | - | 5:17 | 8:01 | 39.49 | 6.26 | 800 | - | - | 16,700 |
| AIRPORT-SW 152 ST VIA 57 AVE | Route 57 | 139,071 | 74 | 26.34 | 21.36 | 60 | 60 | 0 | 1.00 | 1.00 | - | 6:08 | 7:26 | 26.34 | 5.16 | 2,100 | 1,300 | 1,000 | 54,500 |
| J-MIAMI BCH-MIA/TRI-RAIL VIA 36 ST | Route J | 106,389 | 49 | 20.15 | 24.67 | 20 | 30 | 30 | 0.33 | 0.50 | 0.50 | 4:29 | 1:22 | 20.15 | 3.59 | 3,400 | 2,600 | 1,900 | 93,400 |
| MIA TRI-RAIL STA-AIRPORT TERM. | Route 133 | 22,624 | 13 | 4.28 | 19.78 | 20 | 60 | 30 | 0.33 | 1.00 | 0.50 | 4:49 | 10:43 | 4.28 | 2.83 | 800 | 100 | 200 | 19,300 |
| DOUGLAS RD-OLD CUTLER-136ST-KENDALL | Route 136 | 156,688 | 21 | 6.96 | 19.89 | 45 | 0 | 0 | 0.75 | - | - | 4:49 | 0:17 | 29.68 | 1.78 | 400 | - | - | 8,400 |
| AIRPORT FLYER | Route 150 | 128,356 | 42 | 24.31 | 34.73 | 30 | 30 | 30 | 0.50 | 0.50 | 0.50 | 6:25 | 23:40 | 24.31 | 1.35 | 1,200 | 1,200 | 1,100 | 35,200 |
| LITTLE HAVANA CONNECTION | Route 207 | 32,601 | 43 | 6.17 | 8.62 | 15 | 20 | 20 | 0.25 | 0.33 | 0.33 | 5:55 | 20:34 | 6.17 | 0.44 | 1,900 | - | - | 41,000 |
| LITTLE HAVANA CONNECTION | Route 208 | 34,866 | 37 | 6.60 | 10.71 | 15 | 20 | 20 | 0.25 | 0.33 | 0.33 | 6:03 | 20:43 | 6.60 | 0.75 | 2,500 | - | - | 55,500 |
| EAST-WEST CONNECTION | Route 238 | 164,469 | 17 | 5.05 | 17.82 | 45 | 60 | 0 | 0.75 | 1.00 | - | 6:20 | 20:32 | 31.15 | 5.57 | 500 | - | - | 12,100 |
| COCONUT GROVE CIRCULATOR | Route 249 | 25,349 | 20 | 4.80 | 14.40 | 18 | 18 | 20 | 0.30 | 0.30 | 0.33 | 5:27 | 0:23 | 4.80 | 4.80 | 2,600 | 2,100 | 1,600 | 71,600 |
| MIDNIGHT OWL | Route 500 | 109,802 | 28 | 20.80 | 44.56 | 0 | 0 | 0 | - | - | - | 0:32 | 5:32 | 20.80 | 9.07 | 100 | 100 | 100 | 2,100 |


7300 Corporate Center Drive, Suite 701
Miami, FL 33126
Phone: (786) 845-9540
Fax: (786) 845-6802
www.gannettfleming.com