MIAMI-DADE MPO

South Miami-Dade Corridor Alternative Analysis Report (South Link Study)

Prepared by
THE CORRADINO GROUP, INC.
Carter & Burgess, Inc.
Kimley-Horn and Assoc., Inc.
B. Mumford & Company
HR Engineering Services, Inc.
BCC Engineering, Inc.

June 2006

SOUTH MIAMI-DADE CORRIDOR ALTERNATIVE ANALYSIS REPORT (SOUTH LINK STUDY)

MIAMI-DADE COUNTY, FLORIDA

JUNE, 2006

PREPARED FOR:
MIAMI-DADE MPO

This project is a transportation corridor located in the southern-half of Miami-Dade County, FL, connecting the Dadeland South Metrorail station to Florida City. This document examines long-range transit alternatives for future development in the corridor.

SUBMITTED PURSUANT TO:

National Environmental Policy Act (NEPA) of 1969, 41 U.S.C. §4332(2); the regulations of the Council of Environmental Quality (CEQ), 40 CFR 1500-1508; the Federal Transit Laws, Title 49 U.S.C. Chapter 53; National Historic Preservation Act of 1966, 16 USC §470(f); Section 4(f) of the Department of Transportation Act of 1966 as amended; Title 49 U.S.C. §303; the Federal Clean Air Act Amendments of 1990; the Endangered Species Act of 1973 16 U.S.C. § 1531;Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 42 U.S.C. § 4601; Section 402 of the Clean Water Act , 33 U.S.C. § 1342; Executive Order 12898; Federal Actions to Address Environmental Justice in Minority and Low Income Populations; Executive Order 11990, Protection of Wetlands; Executive Order 11988, Floodplain Management; and all relevant laws and procedures of the State of Florida

PREPARED BY:
THE CORRADINO GROUP, INC.
KIMLEY-HORN AND ASSOCIATES, INC.
CARTER & BURGESS, INC.
B. MUMFORD & COMPANY
HR ENGINEERING SERVICES, INC.
BCC ENGINEERING, INC.

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

FIGURES

Executive Summary

Chapter 1

Chapter 2

Figures (continued)

TABLES

Executive Summary

Chapter 1

Chapter 2

Tables (continued)

TABLES (CONTINUED)

EXECUTIVE SUMMARY

Study Area

The Miami-Dade County Metropolitan Planning Organization (MPO) initiated an alternatives analysis study for the South Link Corridor in February 2005. The study limits consisted of a corridor along U.S. 1 (South Dixie Highway) from the Dadeland South Metrorail station south to its intersection with Florida's Turnpike in Florida City. The corridor was defined to be approximately one-half mile in each direction from the centerline of U.S. 1, a multi-lane highway in Miami-Dade County, Florida. The total length of the corridor is approximately 20 miles. The Miami-Dade Transit (MDT) busway right-of-way parallels U.S. 1 for the entire length of the corridor. Figure S-1 shows the study area.

Planning Context

Miami-Dade County's population is projected to grow by 43 percent (from 2,206,500 to 3,149,291) by the year 2030. During this same period the southern portion of the County is projected to grow by 79 percent (from 429,054 to 766,864) and the South Link Corridor, which is already urbanized, is projected to grow by 65 percent by 2030. The South Link Corridor makes up about 27 percent of the residents within South Miami-Dade County and six percent of the entire County total. The 79 percent population growth in South Dade is projected to be accompanied by only a 37 percent increase in employment. Today, South Dade has 28 percent of the County's population and only 20 percent of the jobs. By 2030, South Dade is projected to have 31 percent of the County's population with only 25 percent of the jobs. If the quality of life for the residents of South Dade is to be maintained, a high speed, reliable, transit connection between the residential areas and jobs must be provided. The purpose of this project was to develop a staged program of transit improvements in the corridor that will help to improve mobility between residential areas and employment concentrations.

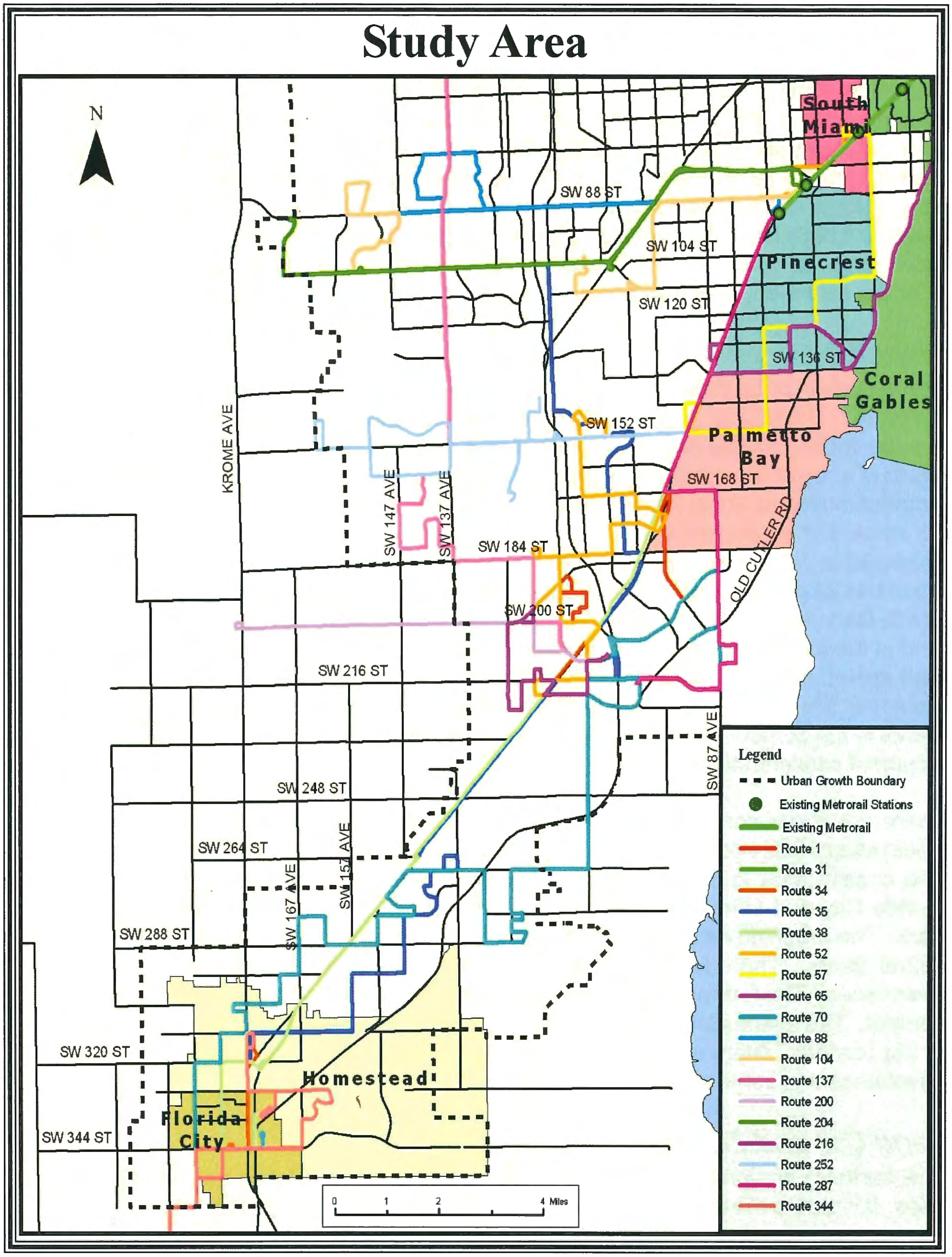
There are major constraints to physical or spatial growth in South Dade even though South Miami-Dade contains the only reasonably sized parcels of land left for urbanization. The coastal area in South Dade is a saltwater mangrove swamp. The area south of Florida City and Homestead is mangrove swamp that extends to Everglades National Park. The urban development boundary lies only about one mile west of U.S. 1 from SW 232nd Street. There is an agricultural preserve between the urban boundary and the Everglades. The former Homestead Air Force Base is also within the general area of the corridor. The eventual, future of the Base property will have a major impact on the future of the corridor. There are natural wetlands near the busway that could constrain future development in some areas of the corridor.

Land Use and Zoning

The northern portion of the corridor is characterized by predominantly residential land uses. It includes the upper middle-class communities of Pinecrest and Palmetto Bay. The

Figure S-1

Study Area



middle portion of the study area is largely agricultural and includes rapidly growing unincorporated villages. The cities of Homestead and Florida City are at the southern end of the corridor. Scattered throughout the neighborhoods are recreational facilities (ball fields, golf courses, etc.) and agricultural areas. Areas zoned for commercial or light industrial use are found only immediately adjacent to U.S. 1. The uses include retail and light industrial facilities, including automotive dealerships, shopping centers, gas stations, restaurants, auto repair centers, marine supplies and maintenance, and building supply facilities.

The South Link Corridor's total area is approximately 29 square miles. The current population of the corridor is about 143,000 people, which equates to 4,900 people per square mile, or only about eight people per acre (Table S-1). By 2030, the corridor is projected to grow to 237,000 people. This equates to 8,200 people per square mile or about 13 people per acre (a density of roughly four dwelling units per acre).

Table S-1 provides information on the corridor based on three segments: North Segment (between Dadeland South and 216th Street), Central Segment (between SW 216th Street and 264th Street), and South Segment (between SW 264th Street and 344th Street).

Table S-1. Growth in South Link Corridor by Segment

	North Segment	Central Segment	South Segment
2000 Population	57,490	38,089	47,830
Population/Sq. Mile	6,114	3,967	4,982
Population /Acre	10	6	8
% Growth	45.5%	78.8%	78.7%
2030 Population	83,613	68,132	85,492
Population/Sq. Mile	8,895	7,097	8,905
Population/Acre	14	11	14

The development pattern described above has already created a strong north-south commuting pattern. Traffic volumes increase steadily from south to north in the South Link corridor. The northern portion of the corridor currently experiences some of the region's worst traffic congestion, constraining economic opportunities and residents' quality of life. The Florida Department of Transportation (FDOT) recorded an average annual daily traffic volume of 94,000 vehicles along U.S. 1 south of Dadeland in 2003. This volume far exceeds the published capacity guidelines for a six-lane urban arterial.

According to FDOT traffic count data along the corridor, U.S. 1 capacity has been saturated for approximately 20 years. Increased travel demand has been met through transportation system management (TSM) improvements such as removing turning movements and signal timing adjustments that heavily favor the flow along U.S. 1 to the detriment of the intersecting roadways. Increases in travel demand strains the capacity of the existing network, causing delays and increased travel times between activity centers within the corridor and the region. Table S-2 shows the growth in traffic over the last ten years in the corridor.

U.S. 1 has reached its limits for widening. Lack of additional right-of-way, and financial, environmental, social, and political constraints have historically limited both the development of new north-south facilities and the substantial expansion of existing facilities. Currently planned roadway improvements are minor in nature and will only provide localized congestion relief.

Table S-2. Average Annual Daily Traffic (AADT) Growth

US 1 Intersection	1994 AADT	2003 AADT	Percent Growth
State Road 826	90,000	94,000	4.44%
SW 152nd Street	61,000	74,000	21.31%
SW 288th Street	28,000	32,500	16.07%
SW 328th Street	11,800	30,000	154.24%

Existing Transit Facilities and Transit Service

Currently, the South Dade Busway operates along the corridor and interfaces with the Stage I Metrorail at Dadeland South, which is the northern most boundary of the study area. The busway is operational as far south as SW 112th Avenue and is under-construction from there to SW 312th Street in Florida City. Miami-Dade Transit (MDT) operates its fixed bus route service in the southern one-third of the county serving the communities of Pinecrest, Palmetto Bay, Florida City and Homestead and all the unincorporated villages. However, the service area and frequency varies in different communities in South Dade.

In the South Dade region of Miami-Dade County, MDT operates 14 public transit routes. These routes offer 15-30 minute peak-period headways, and 30-60 minute off-peak-period and weekend headways. Services are generally offered between 5:30 a.m. and 11:00 p.m. on weekdays with reduced service on the weekends. Service improvements are planned in the People's Transportation Plan (PTP) through 2007. Out of 14 public transit routes in South Dade only six operate on the busway (or will operate on the busway when it is completed). Three of the routes only operate during peak period. Three of the routes that operate on the busway have a scheduled average speed of 13 MPH or less. Two routes operate between the Southland Mall and 168th Street, four routes operate to 152nd Street and seven routes operate north to the Dadeland South Metrorail station. South of the existing busway to Florida City, three routes currently provide service. When the southern extension of the busway is operational, two enhanced busway routes and two new feeder routes in the PTP would supplement service in this area, and provide better coverage for both Goulds and Florida City. In the southern portion of Miami-Dade County, the greatest coverage of transit services exists in the Kendall, Pinecrest, Cutler Ridge, and Homestead neighborhoods. Areas with less service coverage include Richmond Heights, Goulds, Naranja, and Florida City, mainly marked by an absence of service on the west side of South Dixie Highway between 200th Street and 280th Street.

Mobility Constraints

The southern third of Miami-Dade County only has three mobility constraints through north-south facilities: Krome Avenue along the far western urban boundary, the Homestead Extension of the Florida's Turnpike and U.S. 1 (South Dixie Highway). It is unlikely that any additional streets will be developed as through facilities within the next 20 years. South Dixie Highway is the only facility that connects to job rich areas of the County and it cannot be expanded because of adjoining development. Given the anticipated population and employment growth that will occur in South Dade and in the Corridor, natural barriers to expansion, the limited number of roadway options that are operating beyond their capacities and relatively low level of transit service available in the Corridor, the adjacent busway represents the only reasonable solution of improving mobility between South Dade and downtown Miami.

Project Purpose, Goals and Objectives

The general public, with the input of the consultant team, identified the following goals and objectives for the South Link Corridor to solve problems and address issues identified above.

Goal 1 - Improve corridor mobility

- Improve north/south mobility
- Improve transportation options within project area

Goal 2 - Improve citizen access to employment

- Improve economic opportunities
- Provide transit connections to downtown employment
- Improve access for transportation disadvantaged
- Use transit accessibility as a key marketing tool for promoting the economic development /redevelopment in the study area by attracting a broader range of employment categories

Goal 3 - Improve corridor safety and Improve operating efficiencies

- Improve intersection safety
- Provide safety and urban design amenities that make cycling and walking more appealing
- Separate pedestrians, autos and transit
- Provide efficient transit services
- Minimize transit delays in corridor
- Reduce transit/auto conflicts at intersections

Goal 4 - Reduce auto dependency

- Increase transit usage
- Provide environmental benefits through reduced mobile source emissions, green-house gas emissions and energy consumption

Goal 5 - Accommodate future population growth in south Miami-Dade by providing the citizens of south Miami-Dade with high quality and cost-effective transit service

- Provide cost-effective solutions
- Increase speed of transit service
- Provide reliable service
- Minimize transfers
- Develop a staged program of transit improvements in the corridor
- Match capacity of Dadeland South Terminal to busway
- Improve frequency of transit service

Goal 6 - Modify development patterns in the corridor to support transit

- Support transit supportive land use and future patterns. Reorient corridor design to support pedestrianism
- Encourage transit-oriented development (TOD) around stations
- Create opportunities and mechanisms for public/private development partnerships
- Improve access to stations

Goal 7 - Develop plan for incremental increase of transit infrastructure

- Foster the Greenway development and environment of the corridor
- Promote sustainable development
- Preserve existing communities and neighborhoods

Alternatives Development Approach

The development and evaluation of alternatives for the South Link Corridor followed the general approach described in Federal Transit Administration's (FTA) Procedures and Technical Guidance for major investment planning and project development for fixed-guideway transit systems. The build alternatives were evaluated against the No-Build Alternative for potential environmental affects and against the Transportation System Management (TSM) Alternative for transportation-related user benefits or cost-effectiveness. Alternatives in the South Link Corridor were analyzed using a two-tiered process. The analysis began with a fairly large number of broadly defined alternatives that were reduced to a smaller set of alternatives using primarily qualitative evaluation criteria. In the next phase of the project, alternatives were defined in more detail and evaluated using more quantitative data. The following section summarizes this process.

Tier I Alternatives

Alternative 1: No-Build

This alternative consists of existing plus planned and programmed projects (Figure S-2). The No-Build Alternative includes the South Miami-Dade Busway extended to SW 344th Street in Florida City and the completion of the bus expansion program defined in the People's Transportation Plan.

Alternative 2: Transportation Systems Management (TSM)

This alternative would include modification of the existing bus service in the southern half of Miami-Dade County (Figure S-3). Under the Transportation System Management (TSM) alternative, fixed-route service would continue to feed the existing Dadeland South Metrorail station from Florida City. The TSM alternative would provide substantially more park-and-ride facilities. Signal prioritization would be an essential modification to the busway to improve transit travel time on the busway.

Alternative 3: Light Rail Transit (LRT) to Florida City

This alternative would provide light rail transit (LRT) service from SW 104th Street to Florida City (Figure S-4). It includes a one-mile extension of Metrorail from Dadeland South to the vicinity of 104th Street on the existing busway. This alternative consists of approximately 19.5 miles of a light rail facility powered by a catenary with tracks within the original busway right-of-way. The LRT service would be at-grade and a transfer would still be required at the 104th Street station. Stations spacing would be identical to the stops on the busway, approximately at 1/2 mile intervals with easy access for bus riders, pedestrians, and passengers at stations.

Alternative 4: Metro Rail to Southland Mall/Bus Rapid Transit (BRT) from Dadeland South to Florida City

This heavy rail alternative would provide rapid transit service between the existing Dadeland South Metrorail station and the Southland Mall/South Dade Government Center area. The bus service improvements proposed for the TSM alternative would provide transit service improvements in the remainder of the corridor to Florida City. Figure S-5 illustrates this alternative. This alternative would be an eight-mile extension of Miami-Dade Transit's elevated, heavy rail system. The Metrorail vehicles and guideway would be similar to existing services in Miami and operate on an exclusive, elevated guideway. The Busway portion would extend from the proposed Metrorail station in the vicinity of the Southland Mall to Florida City, approximately 11 miles. The Busway would operate on an exclusive, at-grade guideway.

Alternative 5: Metrorail to Florida City

This alternative would provide heavy rail rapid transit service from the existing Dadeland South Metrorail station to Florida City (Figure S-6). This alternative would extend Miami-Dade County's elevated rapid transit system an additional 19 miles. The Metrorail vehicles and guideway would be similar to existing services in Miami.

Figure S-2

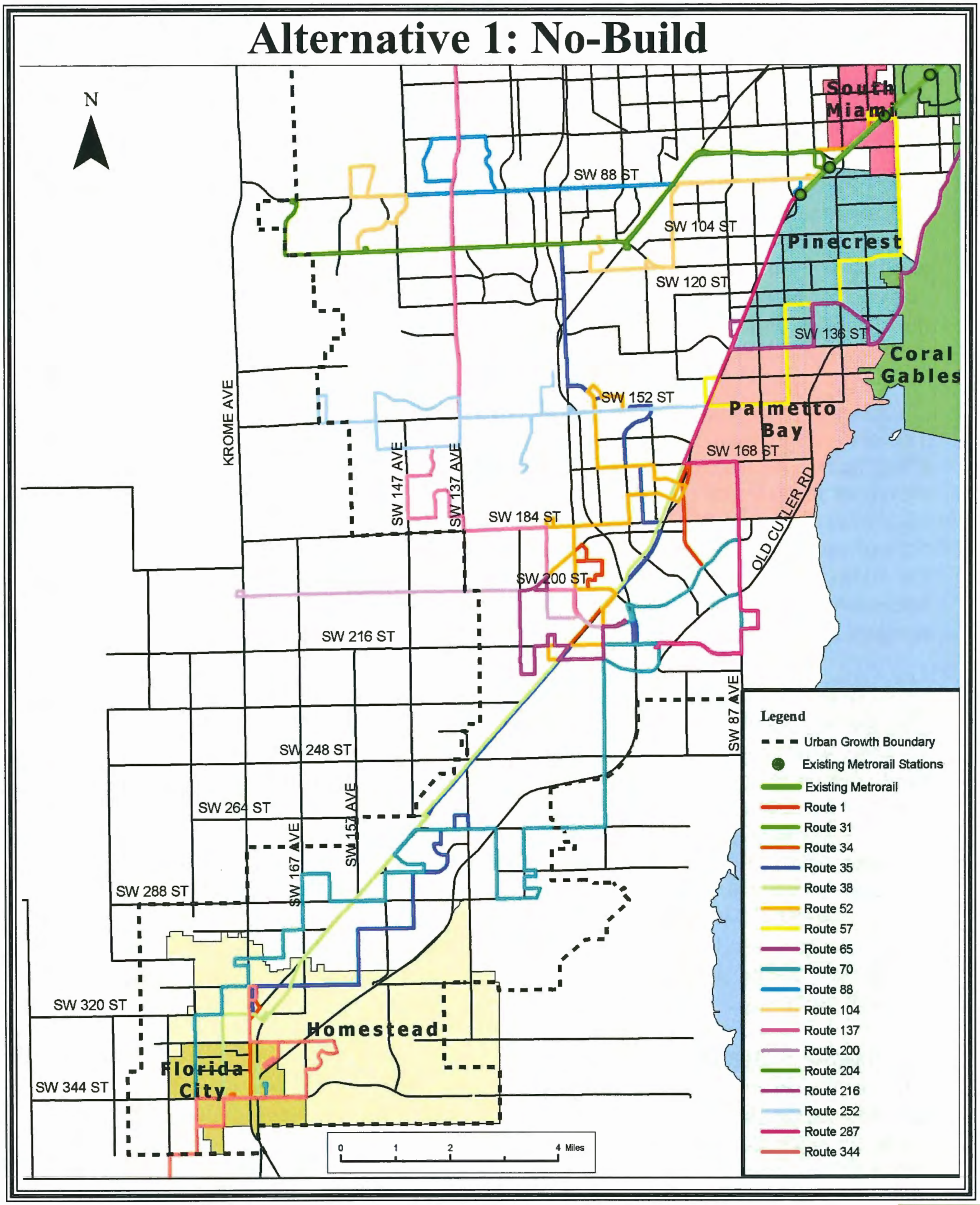

Alternative 1: No-Build
N
South Miami
Pinecrest
Coral Gables
Palmetto Bay
Homestead
Florida City
SW 88 ST
SW 104 ST
SW 120 ST
SW 136 ST
SW 152 ST
SW 168 ST
SW 184 ST
SW 200 ST
SW 216 ST
SW 248 ST
SW 264 ST
SW 288 ST
SW 320 ST
SW 344 ST
KROME AVE
SW 147 AVE
SW 137 AVE
SW 167 AVE
SW 157 AVE
SW 87 AVE
OLD CUTLER RD
0 1 2 4 Miles
Legend
Urban Growth Boundary
Existing Metrorail Stations
Existing Metrorail
Route 1
Route 31
Route 34
Route 35
Route 38
Route 52
Route 57
Route 65
Route 70
Route 88
Route 104
Route 137
Route 200
Route 204
Route 216
Route 252
Route 287
Route 344

Figure S-3

Alternative 2: Transportation Systems Management (TSM)

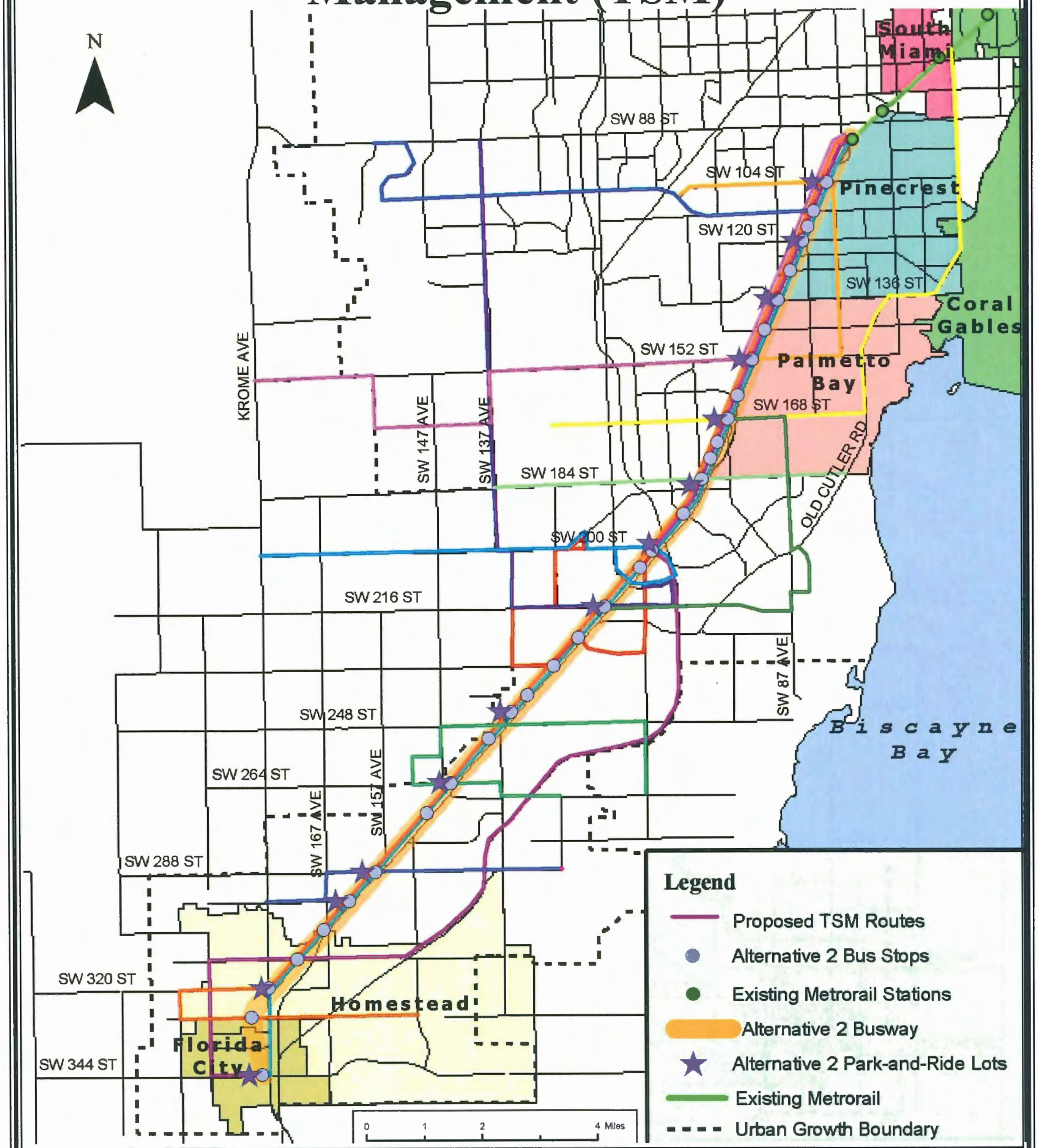


Figure S-4

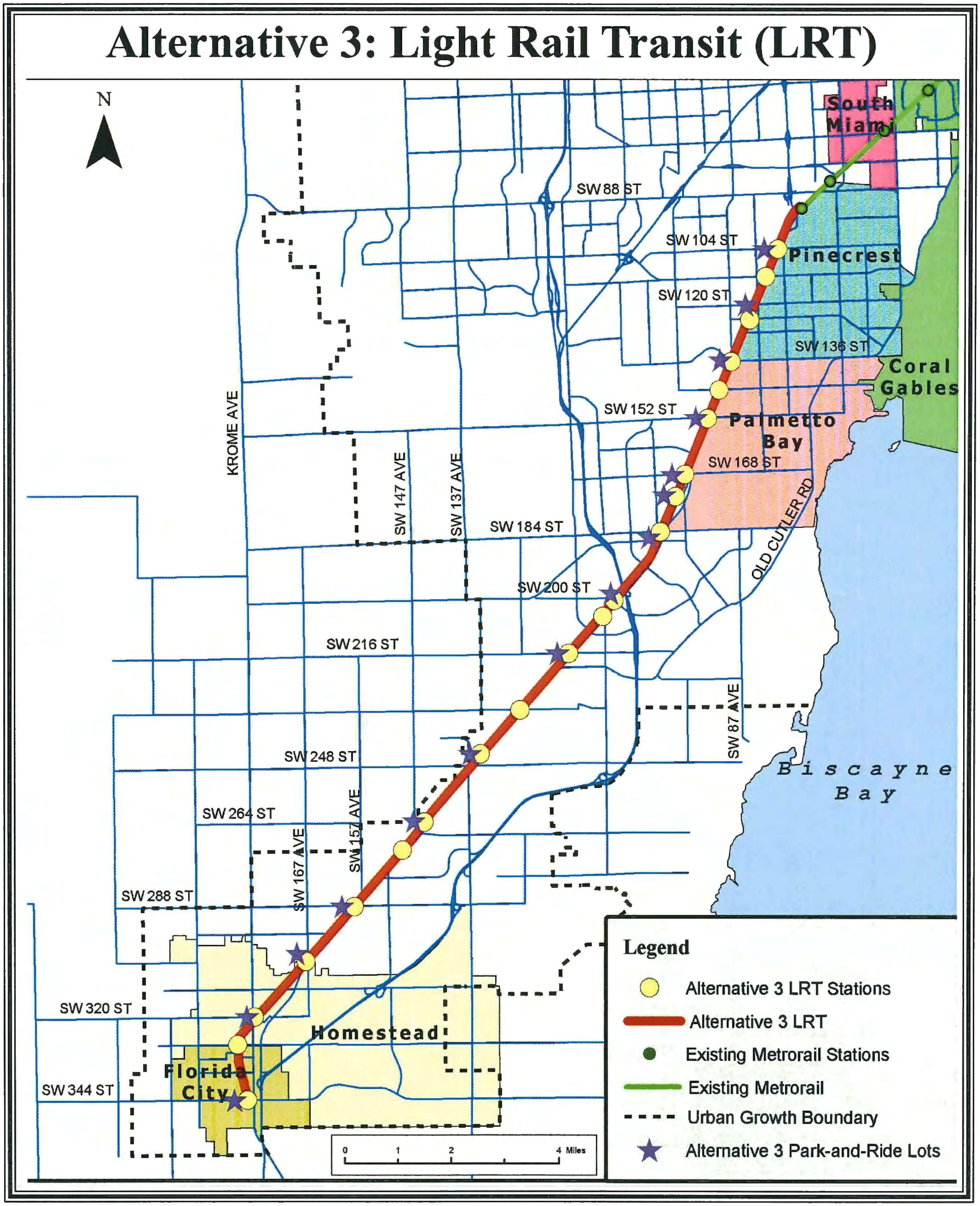

Alternative 3: Light Rail Transit (LRT)
N
South Miami
Pinecrest
Coral Gables
Palmetto Bay
Homestead
Florida City
Biscayne Bay
SW 88 ST
SW 104 ST
SW 120 ST
SW 136 ST
SW 152 ST
SW 168 ST
SW 184 ST
SW 200 ST
SW 216 ST
SW 248 ST
SW 264 ST
SW 288 ST
SW 320 ST
SW 344 ST
KROME AVE
SW 147 AVE
SW 137 AVE
SW 167 AVE
SW 157 AVE
SW 87 AVE
OLD CUTLER RD
0 1 2 4 Miles
Legend
Alternative 3 LRT Stations
Alternative 3 LRT
Existing Metrorail Stations
Existing Metrorail
Urban Growth Boundary
Alternative 3 Park-and-Ride Lots

Figure S-5

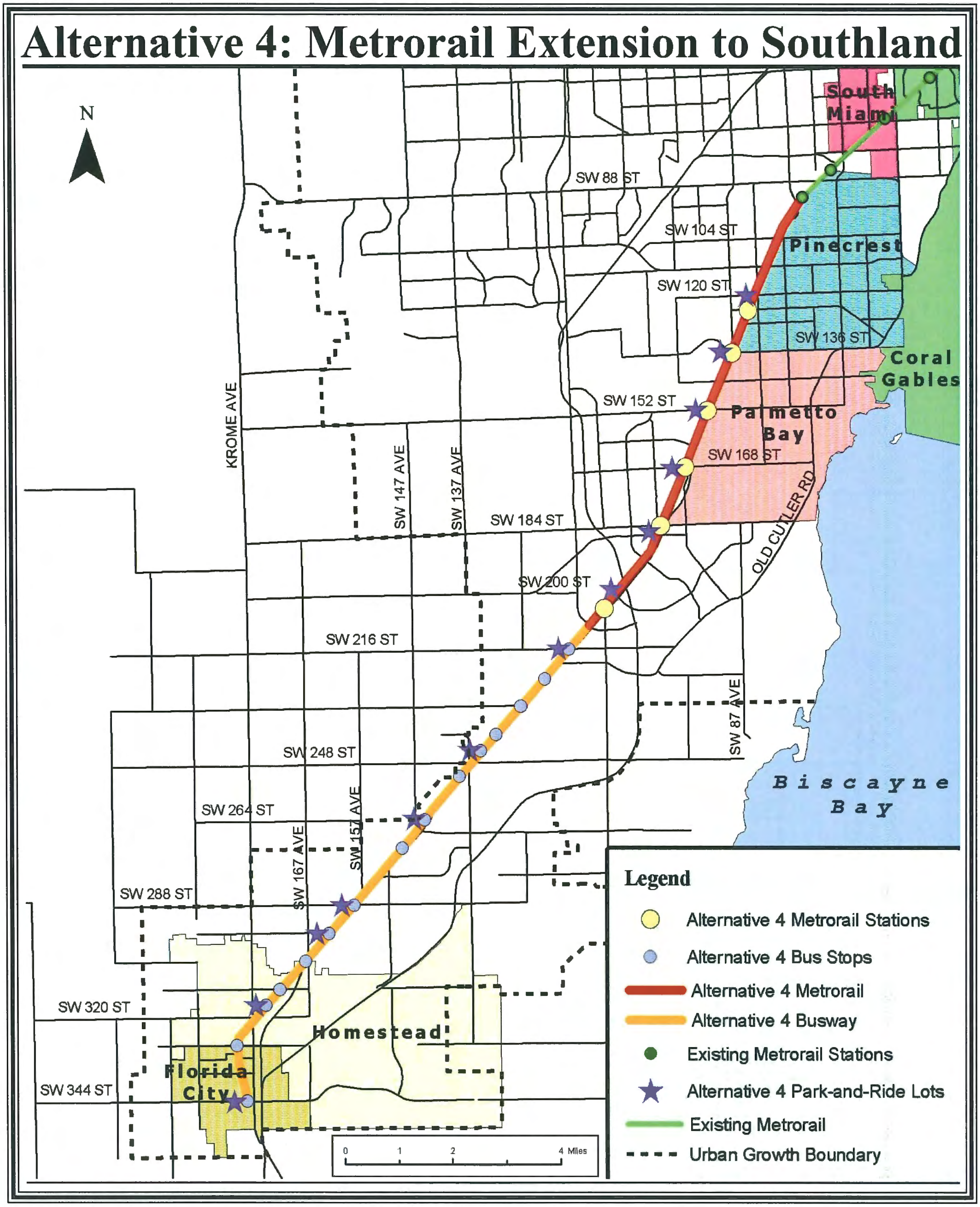
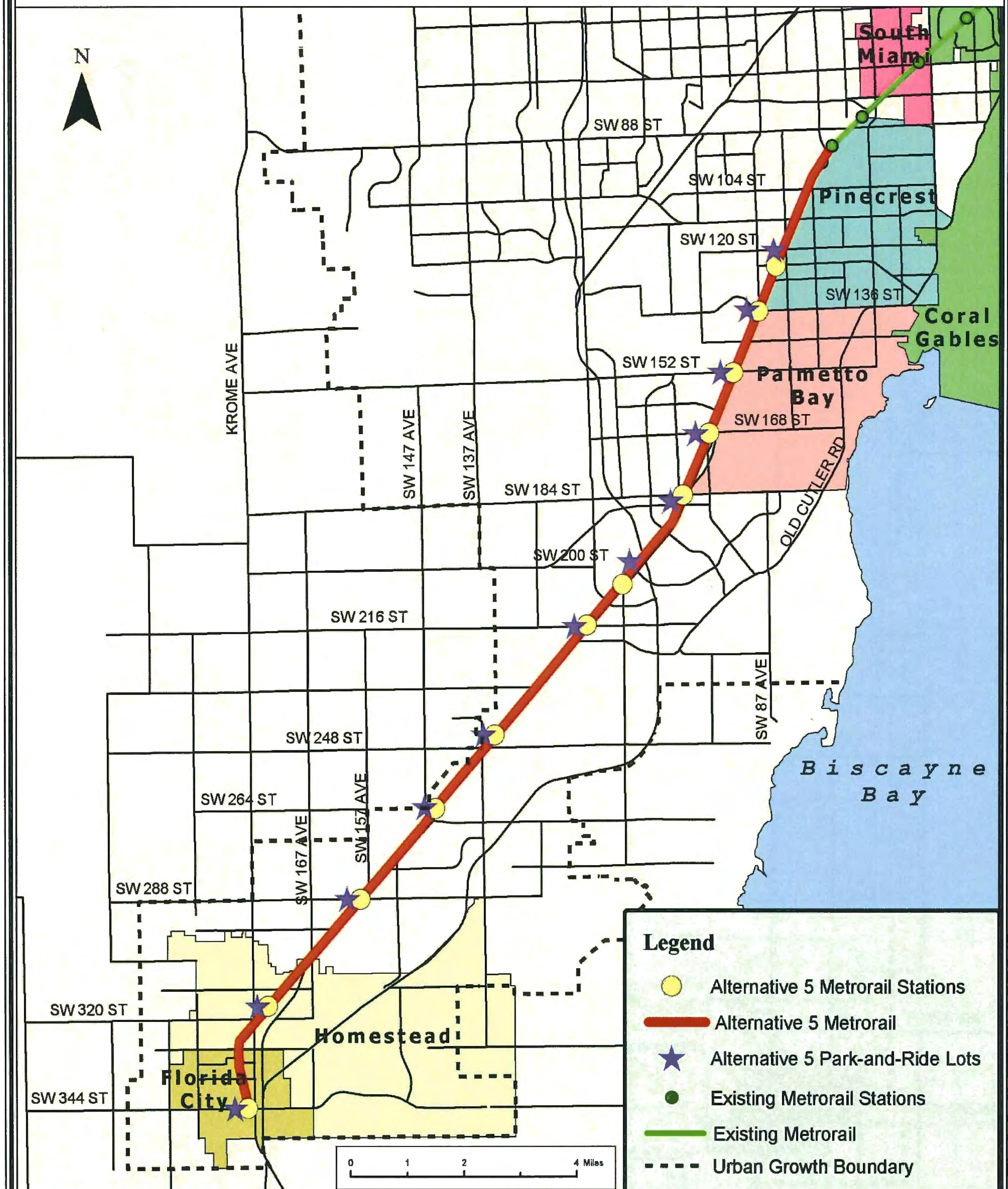

Alternative 4: Metrorail Extension to Southland
N
South Miami
Pinecrest
Coral Gables
Palmetto Bay
Biscayne Bay
Homestead
Florida City
SW 88 ST
SW 104 ST
SW 120 ST
SW 136 ST
SW 152 ST
SW 168 ST
SW 184 ST
SW 200 ST
SW 216 ST
SW 248 ST
SW 264 ST
SW 288 ST
SW 320 ST
SW 344 ST
KROME AVE
SW 147 AVE
SW 137 AVE
SW 157 AVE
SW 167 AVE
SW 87 AVE
OLD CUTLER RD
0 1 2 4 Miles
Legend
Alternative 4 Metrorail Stations
Alternative 4 Bus Stops
Alternative 4 Metrorail
Alternative 4 Busway
Existing Metrorail Stations
Alternative 4 Park-and-Ride Lots
Existing Metrorail
Urban Growth Boundary

Figure S-6

Alternative 5: Metrorail to Florida City



Alternative 6: Metrorail to SW 104th Street/BRT from Dadeland South to Florida City

This alternative would include the construction of a new one-mile extension of Metrorail to the vicinity of SW 104th Street on the existing busway (Figure S-7). South of SW 104th Street, Alternative 6 proposes that the existing busway be converted to a bus rapid transit (BRT) corridor. BRT service would run from SW 104th Street in the north to Florida City in the south, and include grade separation for the BRT corridor at several critical roadway crossings to enhance overall system safety, and to achieve greater travel time and trip reliability benefits for BRT users.

Alternative 7: Diesel Multiple Unit (DMU) on CSX/Kendall Drive and Maintain Operation on Existing Busway

The DMU Alternative for the South Link Corridor consists of diesel multiple unit (DMU) commuter rail service in the CSX corridor between Florida City and Dadeland, combined with the TSM alternative on the busway (Figure S-8). The DMU technology is a general term for a diesel-powered train in which the propulsion and control systems are contained within each vehicle. DMUs can have control cabs at both ends of the vehicle, which simplifies out-and-back, point to point operations. DMUs can also pull up to two standard commuter coaches for increased capacity.

Tier I Evaluation & Comparison of Key Criteria

The evaluation process for Tier 1 was based on 16 evaluation criteria that were developed to address the study goals and objectives. These criteria include:

- Number of north/south travel options;
- Travel time;
- Headways;
- Transit routes serving rail;
- Future employment and population near stations;
- Total capital cost;
- System operating cost;
- Auto/transit conflict points;
- System connectivity;
- Transit ridership or trips; and,
- Community impacts and impacts to the existing Busway and Metrorail.

Once the criteria were established, alternatives were analyzed and evaluated based on a scoring system developed for each criterion. These scores were converted to a qualitative rating or ranking of 'low', 'medium' or 'high' to reduce bias between different evaluation criteria. The impacts of Tier I alternatives on mobility, land use, environment, capital cost and operation and maintenance cost of various transit alternatives within the corridor were compared and assessed against the corridor goals and objectives as shown in Table S-3. Following is a summary of the comparison in key areas.

Figure S-7

Alternative 6: Enhanced Bus Rapid Transit (BRT)

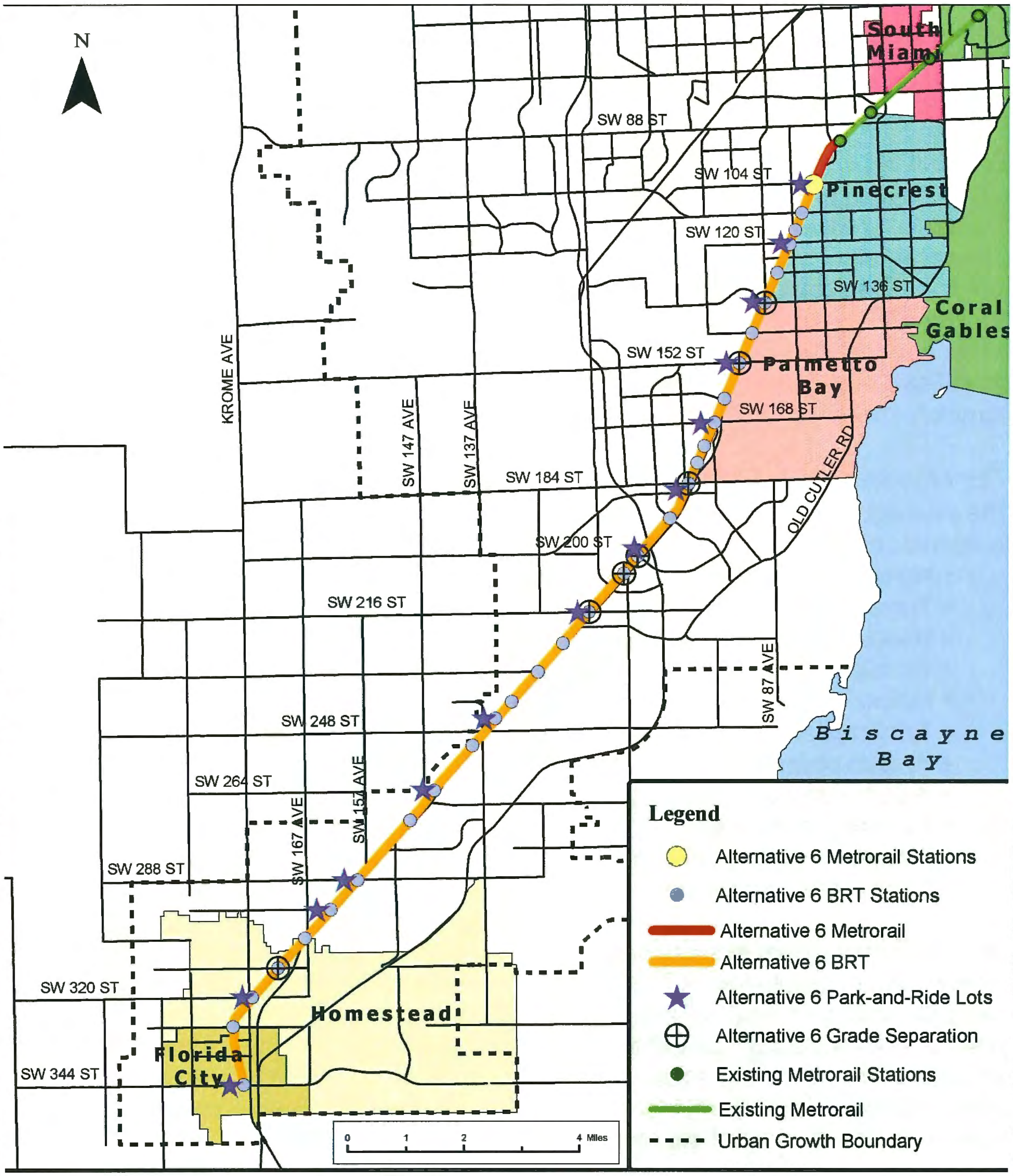


Figure S-8

Alternative 7: Diesel Multiple Unit (DMU)

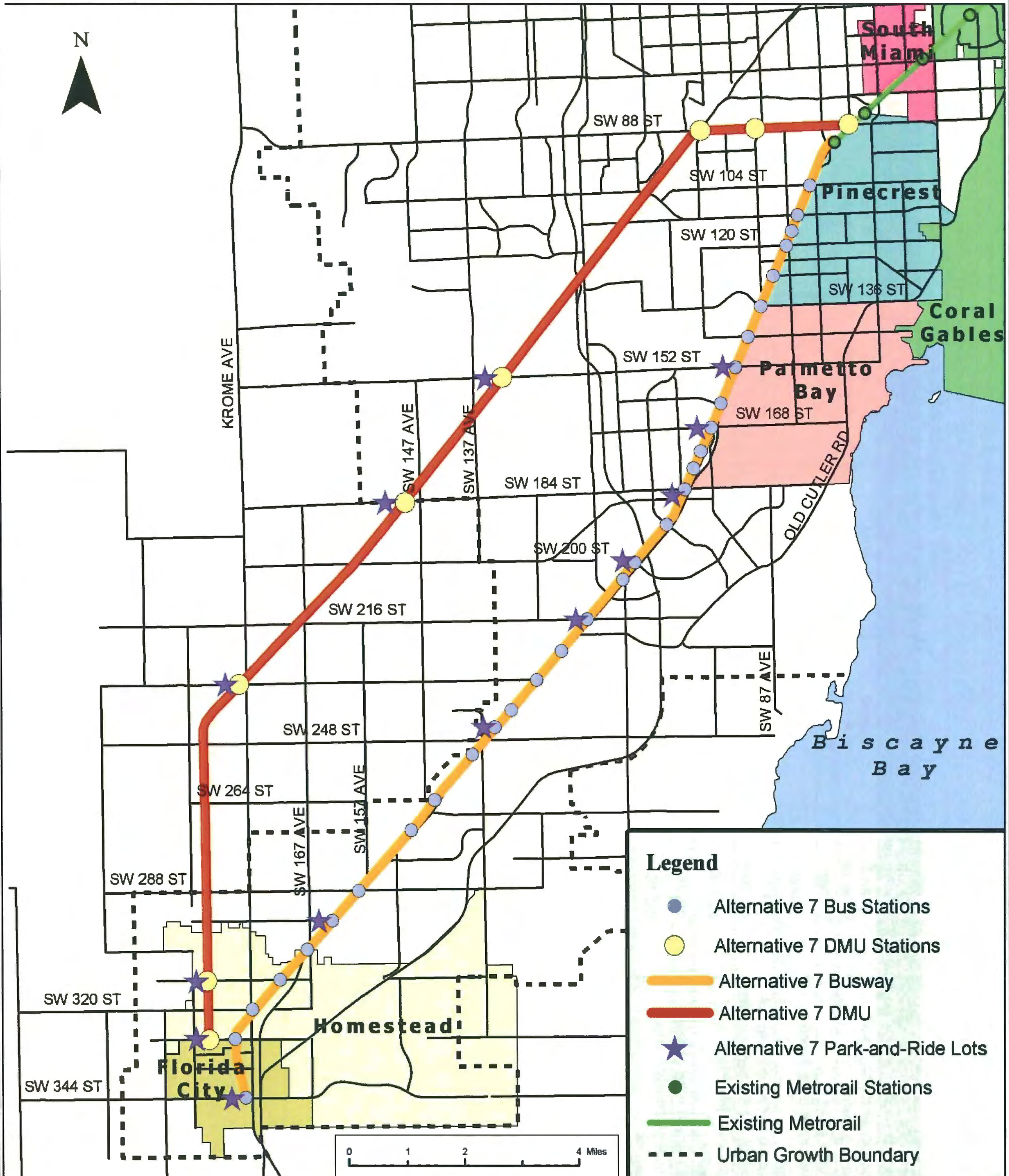


Table S-3
South Link
Tier I Evaluation Matrix

	Alt 1 No-Build	Alt 2 TSM	Alt 3 LRT	Alt 4 Metrorail	Alt 5 Metrorail	Alt 6 BRT	Alt 7 DMU
Number of North/South travel options	3 road 1 transit	3 road 1 transit	3 road 1 transit	3 road 1 transit	3 road 1 transit	3 road 1 transit	3 road 2 transit
Travel Time	58 min.	53 min.	45 min.	35 min.	29 min.	48 min	29 min.
Headways from Florida City	6 min	5 min	3.75 min	5 min	5.5 min	5 min	5.5 min
Transit routes serving rail	10	7	13	13	11	13	12
Employment near stations	40, 943	40,943	40,943	31,724	26,171	40,698	64,083
Future employment near stations	60,896	60,896	60,896	47,893	38,253	60,593	91,990
Population near stations	59,046	59,046	59,046	47,893	30,732	59,046	86,359
Future population near stations	102,909	102,909	102,909	86,929	52,018	102,909	148,370
Low-income households served	3,710	3,710	3,710	2,966	1,549	3,704	4,973
Persons with disabilities served	10,567	10,567	10,567	8,335	5,004	10,560	14,396
Minority population served	23,216	23,216	23,216	18,889	10,854	23,216	29,170
Capital Cost per mile (millions)			$20.6	$81.4	$81.4	$7.2	$15.5
Total Capital Cost Range	None	Low	Medium	High	High	Medium Low	Medium
System operating cost per mile	$6.44	$6.44	$15.94	$6.44/11 mi $8.59/9 mi	$8.59/20 mi	$6.44/19 mi $8.59/1 mi	$6.44/20 mi $11.56/21 m
Auto/transit conflict points	45	45	45	25	0	33	100
Change in VMT	0	-245,500	-351,400		-276,800		-298,500
Change in VHT	0	-65,800	-72,900		-68,800		-65,100
Number of transfers needed to downtown	1	1	1	1	0	1	1
Number of unlinked transit trips	581, 746	582, 213	585, 484		581, 615		565, 805
System capacity (Seated/Crush)	1,400/2,065	1,400/2,065	3,215/7,630	3,280/10,000	3,280/10,000	2,165/4,000	1,804/3,000
Improvements negatively impact Metrorail?	No Impact	No Impact	Modify Dadeland S. for LRT interface	Increases fleet size	Increases fleet size	New southern terminus station	New connection t DMU
Existing land use	No Impact	No Significant Impact	Moderate-Densification	Significant Densification	Significant Densification	Significant access issues	Significant outside UDB
Improvements increase the utility of the busway?	No Impact	No Significant impact	Significant Replaces Busway	Significant Replaces 1/2 of busway	Significant Replaces Busway	Significant Improves operations	No Impact
Impact on existing communities? T	None	Moderate	Moderate	Significant +	Significant +	Significant +	Significant
N	None	Moderate	Moderate	Significant	Significant	Significant	Significant
V	None	Moderate	Moderate	Significant	Significant	Significant	Significant

Travel Time - Transit travel time from Southland Dade Metrorail Station to Florida City decreases from approximately 53 minutes in the TSM Alternative to between 29 to 48 minutes for the Build Alternatives. Of the Build Alternatives, Metrorail Extension 2 has the shortest travel time of approximately 29 minutes, The BRT and LRT Alternatives save approximately eight minutes of total travel time over the TSM Alternative.

Ridership - The LRT and BRT alternatives have higher transit ridership (linked transit trips) than the TSM Alternative. It is estimated that the LRT and the BRT alternatives would have approximately 8,950 and 8,000 new riders respectively. The Metrorail Extension 2 alternative has fewer new riders (7,930 new riders) than LRT and BRT but significantly higher than Metrorail Extension 1 (3,790 new riders) and DMU (3,350 new riders) alternatives.

Cost - Capital cost and Operation and Maintenance (O&M) cost were compared using secondary data in Tier I. The capital cost for Build Alternatives would range from $7.2 million per mile to $81.4 million per mile. In terms of O&M cost, rail-based systems generally would be more expensive than buses.

Three "build" alternatives were recommended by the CAC from the seven Tier I alternatives for more detailed analysis as part of Tier II. Alternatives 4 and 7 were eliminated while Alternatives 3 (LRT), 5 (Metrorail to Florida City) and Alternative 6 (BRT) were recommended for further analysis.

Tier II Alternatives

In the Tier II process, the three Tier 1 build alternatives were advanced with some refinements to the initial definitions of the alternatives. An additional alternative (5A-Hybrid Metrorail to Florida City) was introduced as a less expensive alternative to the conventional metrorail. The alternatives that were analyzed in the Tier II stage of the alternatives analysis are listed below:

Alternative 1. No-Build
Alternative 2. Transportation System Management
Alternative 3. Light Rail Transit to Florida City
Alternative 5. Metrorail to Florida City
Alternative 5A. Hybrid Metrorail to Florida City
Alternative 6. Enhanced Bus Rapid Transit to Florida City

Tier II Evaluation & Comparison of Key Parameters

Key data used in the Tier II includes ridership, capital cost, operation and maintenance cost, and user benefits. The evaluation also includes comparison of potential environmental effects that could result from the construction and implementation of the Tier II Build Alternatives. Environmental factors were considered as a means to identify a potential "fatal flaws" for an alternative. Environmental factors were also used a means to help to differentiate among the alternatives just as costs and ridership were.

Ridership - Systemwide daily transit ridership forecasted (2030) for different Build Alternatives is summarized in Table S-4. All the Build Alternatives improve transit ridership compared to the TSM Alternative. Rail-based alternatives have higher impact on the overall transit ridership when compared to the bus alternative.

Table S-4: Systemwide Transit Ridership Forecasts

Alternative	Total Transit Trips	Total Transit Boardings	% Change in Transit Trips over TSM	% Change in Transit Boardings over TSM
TSM	304,720	606,413	-	-
LRT	310,592	614,054	1.93%	1.26%
Metrorail	309,187	602,673	1.47%	-0.62%
Metrorail Hybrid (Option 5A)	309,187	602,673	1.47%	-0.62%
BRT	307,879	615,945	1.04%	1.47%

The increase in transit boardings for the LRT and BRT Alternatives is due to riders transferring at the existing Southland Dade Metrorail Station. Since the Metrorail Alternative would require no transfers, transit boardings are lower compared with the TSM or LRT or BRT Alternatives.

Traffic Impacts - The Metrorail alternative, which requires replacing the busway with an elevated (grade-separated) Metrorail line, would provide the highest travel time improvements (-6.97 hours) along the U.S. 1 corridor. The Bus Rapid Transit alternative, which would include a mix of grade separations and signal priority at the intersections, is the second best alternative in terms of intersection travel time savings (-5.56 hours). The dual-mode alternative, which also includes a mix of grade separation and signal preemption, has an overall travel time reduction (-2.16 hours). The Light Rail Transit alternative, which would use signal preemption at all intersections, but would have no grade separations, is expected to increase the intersection travel time (+6.21 hours).

Capital Cost - Table S-5 summarizes the total capital cost for all the Build Alternatives and TSM. The Metrorail Alternative is the most expensive because it is completely elevated and has a larger fleet size and more expensive vehicles.

Table S-5. Capital Cost for Tier II Alternatives

Alternative	Total Capital Cost (2005 dollars)
TSM	$126.5 million
LRT	$853.9 million
Metrorail	$1,649.8 million
Metrorail Hybrid (Option 5A)	$1,208.6 million
BRT	$423.3 million

This alternative would cost almost two times the LRT Alternative and four times the BRT Alternative. Metrorail Hybrid option would cost less than Metrorail Alternative because a significant portion of the guideway would be at-grade. It is, however, significantly more costly than the LRT and BRT Alternatives due to grade-separations, elevated stations, and it would need more expensive transit vehicles. The LRT Alternative would be entirely at-grade which significantly reduces the cost of guideway construction. The LRT alternative is almost twice the cost of the BRT Alternative.

Operation and Maintenance Cost - Table S-6 provides a summary of O&M costs for the Tier II alternatives. The implementation of the bus operating plan specified in the TSM alternative would increase the annual operating cost of MDT by approximately $8.2 million. The total additional O&M cost of the LRT when compared to the No-Build Alternative is $28.4 million for the new LRT service, less the $9.3 million cost savings on bus operations realized from replacing bus service with LRT service in the corridor. The estimated additional annual O&M cost of this alternative is $19.1 million. The BRT bus operating system is very similar to the operating plan of the TSM Alternative. The additional O&M cost of the BRT Alternative includes the additional cost of the bus operations - $8.4 million and the additional Metrorail service of $2.4 million dollars for a total increase in O&M costs of $10.8 million.

Table S-6. O&M Cost for Tier II Alternatives

Alternative	Background Bus O&M Cost (2005 dollars)	Build Alternative O&M Cost (2005 dollars)
No-Build	$227.9 million	-
TSM	$236.1 million	-
LRT	$218.6 million	$28.4 million
Metrorail	$218.6 million	$46.7 million
Metrorail Hybrid (Option 5A)	$218.6 million	$46.7 million
BRT	$236.3 million	$2.4 million

Transit User Benefits & Cost-Effectiveness - Table S-7 indicates that the Metrorail Alternative and Metrorail Alternative Hybrid (Option 5A) would provide the highest overall user benefits followed by LRT and BRT Alternatives.

Cost-effectiveness assesses the incremental costs and benefits of Build Alternatives. The costs include both the annualized capital costs and annual operation and maintenance costs. The Metrorail Alternative and the Hybrid option do not offer the most cost-effective solutions for the South Link Corridor.

Table S-7. Cost-Effectiveness of Tier II Alternatives

Alternative	LRT	Metrorail	Metrorail Hybrid (Option)	BRT
Annualized Capital Cost	$66,843,000	$124,570,000	$94,370,000	$33,927,000
Annual O&M Cost	$10,922,910	$29,236,136	$29,236,136	$2,584,102
Total Annualized Cost	$77,765,910	$153,806,136	$123,606,136	$36,511,102
User Benefits Hours (annual)	$1,337,485	$1,399,748	$1,399,748	$1,147,010
Cost-Effectiveness (cost/hour of user benefit)	$58.14	$109.88	$88.31	$31.83

Public Involvement

The involvement of stakeholders in The Public Involvement Participation Program is an integral part of the process and mandated by state and federal laws. The public involvement efforts for the South Link Study provided an open, proactive, participatory process for the public, affected agencies and others to become partners with the Citizens Advisory Committee (CAC). Public and agency involvement activities were an integral component of all tasks and continuous throughout the project. Public involvement activities included the development of public awareness (via newsletters, website, corridor meetings, scoping meetings and public meetings) and coordination of public meetings to identify and rank transportation modes and alternative alignments.

Scoping Meetings - Three scoping meetings were conducted along the corridor at West Perrine Community House-Chamber South, Miami-Dade Community College-Homestead Campus and Coral Reef Senior High School during March and April 2005. The meetings were advertised in two newspapers of general distribution. Postcards were mailed to the initial mailing lists that exist from previous work in the corridor.

CAC Meetings - The CAC was formally appointed and organized and was subject to the Florida Sunshine Law. The CAC consisted of 19 members. The CAC met a total of nine times between March 2005 and March 2006. Meetings will were held to obtain input and concurrence on project issues and update the members on the status of the project.

MPO Committee Meetings - The Project Team met with the various MPO Committees (CTAC, TPTAC, TPC and MPO) at significant milestones of the project. Several meetings were held with the various MPO committees or other agencies. These meetings were initiated on Tuesday, January 25, 2005, at the Stephen Clark Center. A meeting was held to provide coordination between Project Team and the Miami-Dade MPO and Miami Dade Transit.

Corridor Meetings - The Project Team planned for and attended many meetings, including: agency briefings, City Commission meetings, elected official meetings, and group meetings and/or open houses.

Public Meetings - Two sets of public meetings were held. The first set of meetings was held on February 24, 2006. Informal meetings were held in the parking lot of Wal-Mart in Florida City in the morning, in the food court at the Southland Mall during lunch and finally at the Dadeland South Metrorail station during the evening commute period. The project team maintained and used the record of citizens' preferences and comment summary about the alternatives from these meetings. Two advertised public meetings were held along the corridor to obtain recommendations for a selected alternative. These hearings were advertised in the newspaper at least two weeks in advance. These meetings were held on March 22, at the Perinne Cutler building, and the South Dade Government Center. Their purpose was to solicit input on all of the alternatives. Support was expressed for all of the alternatives but the general consensus was that Alternative 5, Metrorail, from Dadeland South to Florida City was preferred.

Newsletters - The Project Team prepared three newsletters about the project. For each, about 2,000 copies were made and distributed throughout the community as project updates and summaries. These newsletters detailed the happenings of the project, from its introduction, selection of a CAC, initial evaluation of Tier 1 alternatives to the evaluation of Tier 2 alternatives.

Project Website Updates - A link was maintained on the MPO Website for the project. It explained the project details, had a variety of downloads, encompassing maps, the purpose and need report, the newsletters and press releases. A history of meeting dates was also kept.

LOCALLY PREFERRED ALTERNATIVE (LPA)

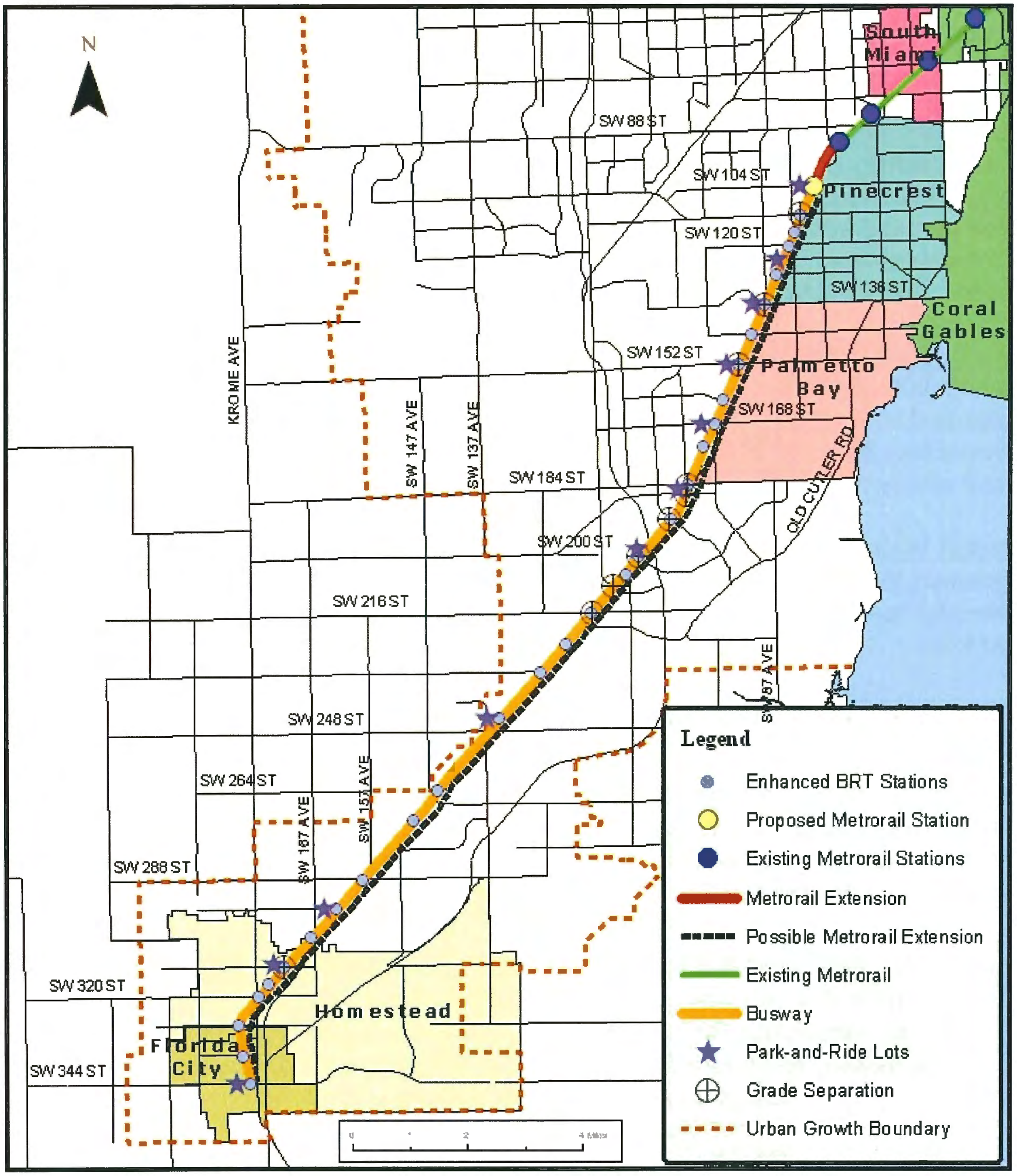
On June 22, 2006, the Miami-Dade Metropolitan Planning Organization voted by simple majority to support the Modified Enhanced Bus Rapid Transit Alternative 6 with a provision of supporting a long-range Metrorail extension south of SW 104th Street as demand warrants, as the Locally Preferred Alternative for the South Link Corridor.

The Modified Enhanced Bus Rapid Transit Alternative for the South Link Corridor, as illustrated in Figure S-9, consists of the two primary components listed below.

- An Enhanced Bus Rapid Transit system from Dadeland South to Florida City within the existing and future South Miami-Dade Busway right-of-way that would include:
    - Enhanced fare collection system;
    - Transit signal priority;
    - Real-time passenger information;

Figure S-9

Locally Preferred Alternative
Modified Enhanced BRT



- Grade separation at selected intersections;
- Feeder buses on surface streets;
- Increased park-and-ride facilities; and
- Low floor stylized buses with a specific branding theme.

- A Metrorail extension (approximately 4,500 feet) from the Dadeland South Metrorail Station to SW 104th Street with a possible future extension as demand warrants.

Bus rapid transit can take many forms, but the common element is a rubber-tired bus operating on a seperated or defined pathway. Essentially the concept is having a bus function and look like a train. BRT vehicles typically include a variety of enhancements over traditional buses that allow faster operating speed, enhance passenger convenience and comfort, and portray a sleek, modern perception of efficiency and distinction from traditional buses.

Advanced technologies are implemented on the BRT vehicle to provide additional travel efficiency. BRT vehicles are often equipped with vehicle tracking systems that allow dispatchers to monitor travel time and schedules for better trip reliability. Information can be relayed to display boards both on-board and at stations that provide travel time information to major destinations and can inform passengers when the next bus is arriving. Perhaps the most recognizable feature of BRT vehicles to the average patron is the distinctive design characteristics that are often employed. The aesthetics of the BRT vehicle, including design, color, and graphics, helps to portray a positive sense with "choice riders" who may be willing to ride BRT vehicles over traditional buses.

The LPA includes the construction of one new Metrorail station in the vicinity of SW 104th Street near the existing busway to relieve congestion in the Dadeland area and to serve latent parking demand experienced in the corridor. It is expected that park-and-ride demand will be significant at the proposed SW 104th Street station due to passenger demand from south of the existing Metrorail line wishing to access popular destinations such as downtown Miami and the Civic Center area. In the absence of adequate park-and-ride facilities, some transit patrons currently use shopping center parking lots near SW 104th Street as de-facto park-and-ride facilities. As the new southern terminus for Metrorail, the SW 104th Street intersection should include approximately 1,500 parking spaces dedicated for Metrorail park-and-ride patrons. An opportunity for a joint development project exists at this station that would ideally include mixed-use retail and office space attached to the Metrorail station.

The Metrorail extension to SW 104th Street should help alleviate congestion and parking deficiencies at the two Dadeland Metrorail stations, thereby increasing efficiency for passengers feeding into the Metrorail system from the proposed BRT system operating within the busway. Currently, the two Dadeland stations are ranked second and third in passenger boarding activity within the Metrorail system, their parking garages are 95 to 100 percent full, and surface streets are severely congested in the Dadeland area.

The northern terminus of the Enhanced BRT system is proposed to be at the Dadeland South Station. Therefore, the Enhanced BRT line would share the 100-foot right-of-way with the proposed Metrorail extension between SW 104th Street and Dadeland South. The purpose of continuing Enhanced BRT service north of the proposed southern terminus of Metrorail is to allow Enhanced BRT passengers to access the Dadeland South employment center without transferring.

The southern terminus of the Enhanced BRT system is proposed to be at SW 344th Street (Palm Avenue). A bus station would be provided within the busway right-of-way north of SW 344th Street. Due to potential high passenger demand within Florida City, some southbound buses may exit the busway at SW 328th Street or SW 336th Street, circulate through Florida City, and re-enter the busway at SW 344th Street for the northbound trip back to Dadeland South. This type of operational arrangement would serve passenger demand and provide a convenient way for buses to turn around at the southern BRT terminus.

Interface with Metrorail

The Metrorail vehicles and guideway would be consistent with the existing Miami-Dade Metrorail service and operate on an exclusive, elevated guideway. Metrorail service would seamlessly extend to the proposed SW 104th Street station. No transfer would be required to travel from the existing Metrorail line to SW 104th Street. The Modified Enhanced BRT Alternative supports a long-range Metrorail extension south of SW 104th Street as future demand warrants.

Feeder bus routes will be designed to circulate through residential neighborhoods, activity centers, and employment areas and connect to the BRT line. Some feeder bus routes will provide limited stop or express service within the BRT corridor and provide direct connections to Metrorail. Feeder buses are proposed to operate on 15-minute headways. The proposed feeder bus routes are presented in Figure S-10.

Bus station spacing along the proposed Enhanced BRT line is recommended to be approximately one-half mile. Station spacing would be similar to the existing busway. A few closely spaced stations may be consolidated to reduce travel time. In addition, stations at intersections that are recommended for grade separation would be located on the elevated section above the cross-street to eliminate the need for pedestrians to walk more than 1,000 feet from the intersection to access the Enhanced BRT station. Table S-8 provides recommended station locations for the Modified Enhanced BRT Alternative along with recommended park-and-ride locations and other enhanced BRT amenities.

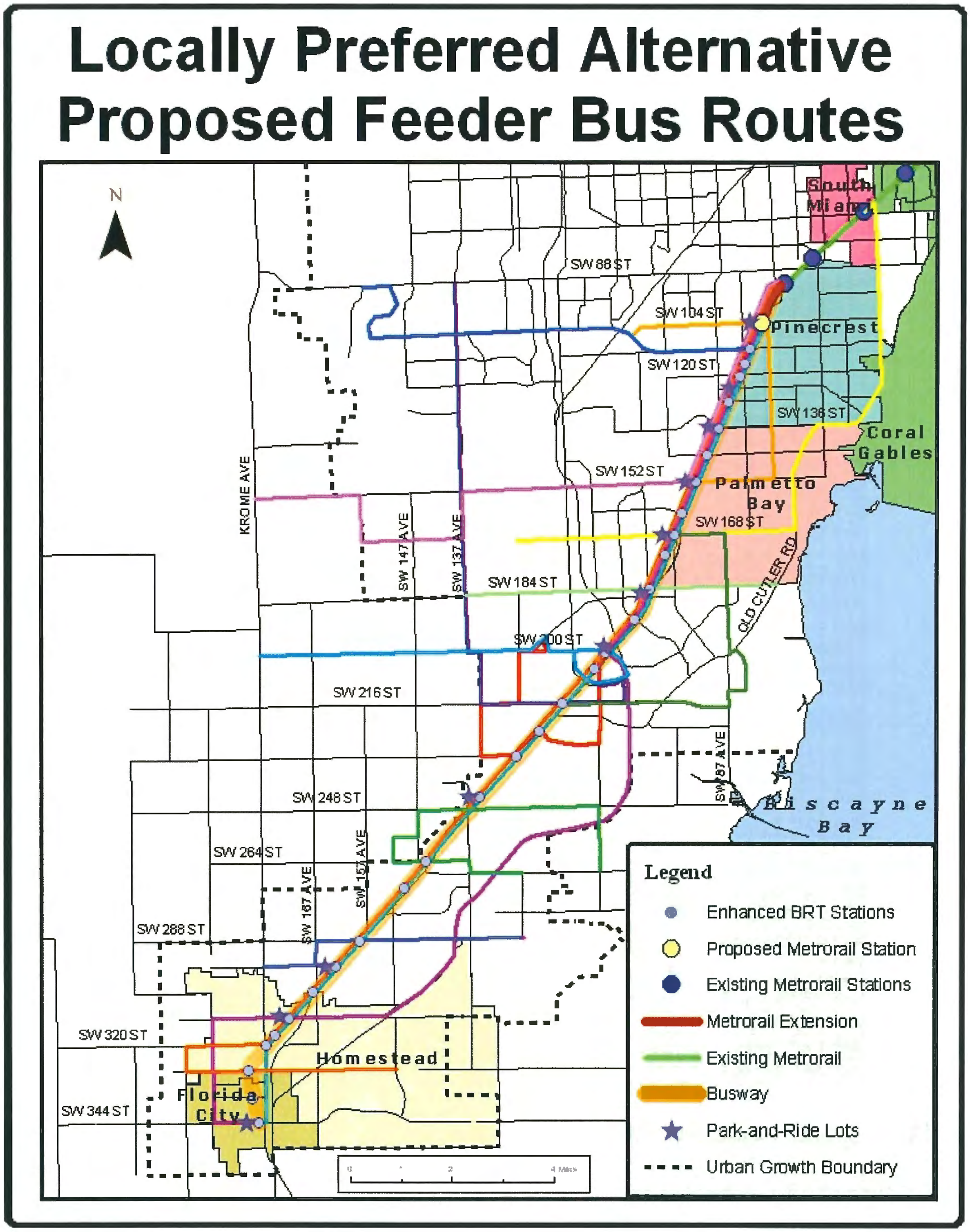
Table S-8. Enhanced BRT Station Locations and Characteristics

Cross-Street	Metrorail Transfer	Intersection Treatment(1)	Park and Ride Facilities	Off-Vehicle Fare Collection	Real-Time Passenger Info
Dadeland South	Yes	Terminus	Existing	Yes	Yes
SW 104th Street	Yes	TSP	Proposed	Yes	Yes
SW 112th Street	No	Elevated	No	Yes	Yes
SW 117th Street	No	TSP	No	Yes	Yes
SW 124th Street	No	TSP	Proposed	Yes	Yes
SW 128th Street	No	TSP	No	Yes	Yes
SW 136th Street	No	Elevated	Proposed	Yes	Yes
SW 144th Street	No	TSP	No	Yes	Yes
SW 152nd Street	No	Elevated	Existing	Yes	Yes
SW 160th Street	No	TSP	No	Yes	Yes
SW 168th Street	No	TSP	Existing	Yes	Yes
Banyan Street	No	TSP	No	Yes	Yes
SW 184th Street	No	Elevated	Proposed	Yes	Yes
Marlin Road	No	Elevated	No	Yes	Yes
SW 200th Street	No	Elevated	Proposed	Yes	Yes
SW 112th Avenue	No	TSP	No	Yes	Yes
SW 216th Street	No	Elevated	No	Yes	Yes
SW 224th Street	No	TSP	No	Yes	Yes
SW 232nd Street	No	TSP	No	Yes	Yes
SW 244th Street	No	TSP	Existing	Yes	Yes
SW 264th Street	No	TSP	No	Yes	Yes
SW 272nd Street	No	TSP	No	Yes	Yes
SW 288th Street	No	TSP	No	Yes	Yes
SW 296th Street	No	TSP	Existing	Yes	Yes
SW 304th Street	No	TSP	No	Yes	Yes
SW 312th Street	No	Elevated	Proposed	Yes	Yes
MDC Homestead	No	N/A	No	Yes	Yes
SW 320th Street	No	TSP	No	Yes	Yes
SW 328th Street	No	TSP	No	Yes	Yes
SW 336th Street	No	TSP	No	Yes	Yes
SW 344th Street	No	Terminus	Proposed	Yes	Yes

(1) TSP – Transit Signal Priority

The LPA requires purchasing thirty-three 45-foot Stylized BRT-type buses and eight buses similar to where MDT currently operates. It was assumed that Miami-Dade Transit's existing storage and maintenance facilities will support the maintenance of these 41 vehicles

Figure S-10. Feeder Bus Routes



as part of typical fleet expansion. Therefore, the LPA does not require a new maintenance or storage facility.

IMPACTS AND BENEFITS OF THE LPA

The implementation of the LPA will include grade separation of the busway at priority east-west streets and transit signal priority (TSP) for the busway at other intersections. Overall, the LPA is expected to decrease the average delay per intersection by approximately 5.6 vehicle hours during the PM peak hour.

Travel demand modeling performed for this study calculates a total of 2,062 hours of travel time savings daily due to faster travel times resulting from grade separation, transit signal priority (TSP), and more efficient passenger boarding. In addition, the Enhanced BRT Alternative is expected to attract 3,200 new riders daily above the Transportation System Management (TSM) Alternative.

The Comprehensive Development Master Plan (CDMP) developed by Miami-Dade County identifies existing and future rapid transit stations as locations to encourage land uses including housing, shopping, and offices paired with compatible entertainment, cultural, and human service uses. Within the South Link Corridor, seven urban centers are identified in the CDMP; five of which coincide with stations on the Enhanced BRT Alternative. Based on CDMP designations, the Modified Enhanced BRT Alternative has high potential for developing stations under the community urban center designation.

The Federal Transit Administration (FTA) requires examination of three different user benefit categories: annual cost per new rider, system operating cost per passenger mile, and cost per hour of user benefit. Annual cost per new rider uses the difference in the annualized cost of the alternative above the annualized cost of the TSM Alternative. System operating cost per passenger mile is calculated by using the increase in annual operating and maintenance cost between the TSM Alternative and the Build Alternative, and dividing it by the increase in passenger miles traveled. Cost per hour of user benefit uses the total of annualized capital cost plus the annual operating cost divided by the hours of user benefit. Table S-9 presents the user benefit results for the Enhanced BRT Alternative.

Table S-9. User Benefits Estimation

Cost per New Rider	Cost per Passenger Mile	Cost per Hour of User Benefit
$25.94	$0.41	$31.83

COSTS

The capital cost of the LPA was estimated at a conceptual level, compatible with the Alternatives Analysis level of planning, and includes required planning and design improvements. As shown in Table S-10, the total cost of the Modified Enhanced BRT Alternative is approximately $398 million.

Table S-10. Capital Cost for Modified Enhanced BRT Alternatives

Components	Cost (2005)
Enhanced BRT	$210,000,000
Metrorail Extension	$101,600,000
Grade Separation	86,000,000
TOTAL	$397,600,000

The Operating and Maintenance (O&M) costs are a recurrent annual cost for transit and for the most part must be budgeted locally. Preventive maintenance is an allowable expenditure of formula funds that transit agencies receive from the federal government. The state also assists with payment for the first three years of up to 50 percent of the costs of new service under their Service Department Block Grants.

O&M costs were developed for the Modified Enhanced BRT Alternative using FTA methodology. The incremental cost of the Modified Enhanced BRT Alternative that would need to be budgeted annually, compared to the No Build Alternative, is $10.8 million as presented in Table S-11.

Table S-11. O&M Costs for Enhanced BRT Alternative (2005 Dollars)

	Background Bus O&M Cost	Build Alternative O&M Cost	Total O&M Cost Above No Build Cost
No Build Alternative	$227.9 million	N/A	N/A
Enhanced BRT Alternative	$236.3 million	$2.4 million	$10.8 million
Additional O&M Costs (Enhanced BRT minus No Build)	$8.4 million	$2.4 million	$10.8 million

IMPLEMENTATION

The following funding strategy and phasing plan were developed for the LPA.

Identified potential funding sources include the Federal Transit Administration's Small Starts program, Miami-Dade County's People's Transportation Plan, and the Federal Highway Administration's Surface Transportation Plan.

The Modified Enhanced BRT Alternative was split into three components as described below.

- A project that meets the Federal Transit Administration's "Small Starts" criteria was identified. In order to meet Small Starts criteria, the total funding requirement for the project should be less than $250 million. The identified Small Starts component entails the BRT component without grade separation. The estimated cost of this component is approximately $210 million.
- The proposed extension of Metrorail from the Dadeland South Station to SW 104th Street and construction of the park-and-ride garage at SW 104th Street were identified for potential funding through FTA and/or the People's Transportation Plan. The estimated cost of this component is approximately $102 million.

- Grade separation of the busway at identified locations was identified for potential funding through the Federal Highway Administration's Surface Transportation Plan (STP). The estimated cost of the FHWA component is approximately $86 million.

It should be noted that the funding plan presented in this section considers fewer park-and-ride facilities than the original Enhanced BRT Alternative. Still, the LPA would provide a total of 11 park-and-ride locations, which is an increase of seven park-and-ride locations in comparison to the No Build Alternative.

An implementation plan was developed for the Modified Enhanced BRT Alternative to determine a timeline for implementation. The three subcomponents of the Modified Enhanced BRT Alternative are expected to be implemented over a 10-year timeframe. The costs presented in Table S-12 are planning level estimates based on 2005 dollar values.

Table S-12. Phasing Plan of Modified Enhanced BRT Alternative

Time Frame	Components	Activities	Cost (2005)
1 – 5 Years	Enhanced BRT	Environmental documentation for BRT component	$3,000,000
		New P&R at SW 124th Street; SW 136th Street	$24,800,000
		Expand P&R at SW 152nd Street, SW 168th Street	$24,800,000
		Order vehicles, spare parts, and reorient feeder bus routes	$44,400,000
		Design BRT elements(A)	$19,300,000
	Metrorail Extension	Environmental documentation for Metrorail extension	$2,000,000
		Design Metrorail Extension/Busway to SW 104th Street	$24,300,000
		Design Metrorail/BRT station at SW 104th Street	$5,900,000
	Grade Separation	Environmental documentation for grade separation	$2,000,000
		Design & construct grade separations at SW 136th Street; SW 152nd Street	$17,700,000
6 – 10 Years	Enhanced BRT	Install TSP for busway	$2,400,000
		Install off-vehicle fare collection system	$6,200,000
		Install communication system	$12,900,000
		Modifications to stations and platforms	$10,200,000
		New P&R at SW 184th Street; SW 344th Street	$24,800,000
		Expand P&R at SW 200th Street	$12,400,000
	Metrorail Extension	Construct Metrorail Extension to SW 104th Street (includes busway modifications)	$39,900,000
		Construct Metrorail/BRT station at SW 104th Street	$9,700,000
		New P&R at SW 104th Street	$19,800,000
	Grade Separation	Design & construct grade separations at SW 112th Street, SW 184th/SW 186th/Marlin Rd; SW 200th Street	$48,600,000
11 – 15 Years	Enhanced BRT	New P&R at SW 312th Street	$12,400,000
		Expand P&R at SW 244th Street	$12,400,000
	Grade Separation	Design & construct grade separations at SW 211th/SW 216th Street; SW 312th Street	$17,700,000
Total Cost			**$398,000,000**

(A) Includes transit signal priority, off-vehicle fare collection, communication system, and modifications to stations and platforms.

CONCLUSION

The objective of the South Link Alternatives Analysis study was to identify transit improvements in the South Link Corridor with the intent to broaden the range of transit options. The need for transit improvements in South Miami-Dade is demonstrated by the lack of adequate north-south mobility corridors, failing levels of service on existing roadways, highest projected population growth in the County (81 percent by 2030), and imbalance between jobs available and housing units in the area.

The recommended Locally Preferred Alternative for the South Link Corridor is the Modified Enhanced Bus Rapid Transit Alternative 6 with a provision of supporting a long-range Metrorail extension south of SW 104th Street as demand warrants. The LPA is expected to attract approximately 3,200 new riders daily more than the Transportation System Management Alternative. The travel time from Florida City to SW 104th Street is expected to be approximately 40 minutes. The total cost of the Modified Enhanced BRT Alternative is approximately $398 million. The additional annual Operations and Maintenance costs of the Modified Enhanced BRT Alternative above programmed service levels is $10.8 million.

The LPA will help alleviate mobility deficiencies by reducing the travel time between South Miami- Dade and major employment centers; increasing park-and-ride capacity; and, increasing transit passenger carrying capacity, service frequency, and system reliability.

CHAPTER 1: PURPOSE AND NEED

1.1 Project Purpose

Miami-Dade County will be providing transit improvements in the South Dade Corridor with the intent to broaden the range of transit options within the corridor. Currently, a busway exists along the corridor that ties into the Stage I Metrorail at Dadeland South, which is the northernmost boundary of the study area. The busway is operational as far south as SW 264th Street, and is being designed from there to SW 344th Street in Florida City. The South Dade Corridor is that area within one-half mile of U.S. 1 between Dadeland South and Florida City. Only 15 bus routes operate in the southern third of the County and nine of them operate on the busway. Three of the routes only operate during peak periods. Seven of the routes only operate at 30-minute headways during peak periods. Three of the routes that operate on the busway have a scheduled average speed of 13 MPH or less. The citizens of south Miami-Dade need a higher quality of transit service.

The southern third of Miami-Dade County (Figure 1-1) only has three through, north-south facilities: Krome Avenue, along the far western urban boundary, the Homestead Extension of the Florida Turnpike and U.S. 1 (South Dixie Highway). It is unlikely that any additional streets will be developed as through facilities within the next 20 years. South Dixie Highway is the only facility that connects to job rich areas of the county and it cannot be expanded because of major adjoining development. The adjacent busway represents the only way of improving mobility between South Dade and downtown Miami. For the purposes of the report South Dade is considered that part of Miami-Dade County south of SW 88th Street (Kendall Drive).

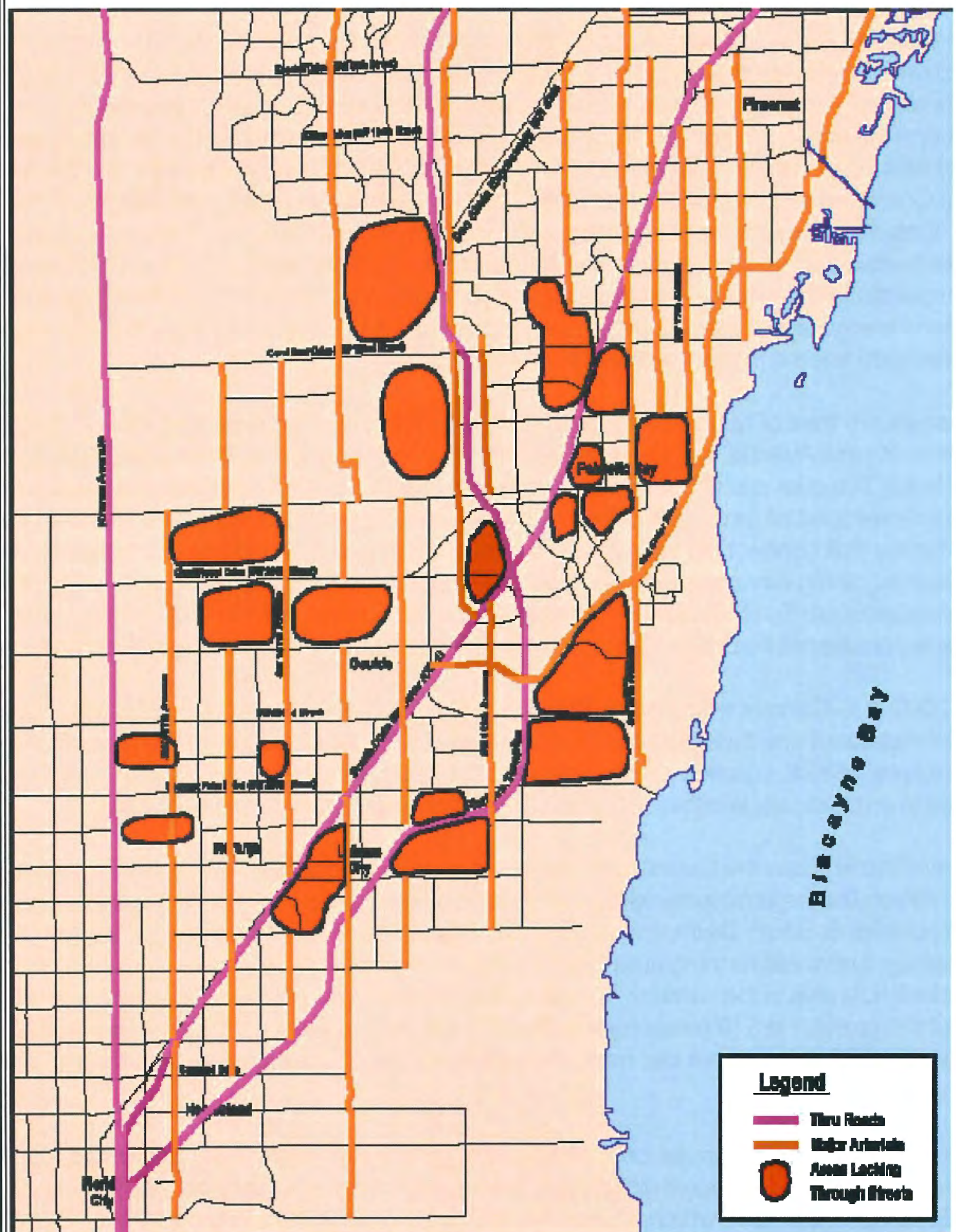
The 2000 U.S. Census indicated that there are 521,000 people living in South Dade. The 15 routes represent one bus route per 34,700 persons. Those 15 routes put 30 buses per hour into service, which equates to one bus per 17,400 persons. Clearly, Miami-Dade County needs to dramatically improve the level of transit service provided in South Dade.

The corridor is below the County average in many of the population indicators of transit ridership. Given the large minority, low income (20% below the poverty level), transit dependent communities in South Dade, transit ridership should be much higher than it is. Improved frequency, improved running times and improved coverage should have a dramatic impact on transit ridership in the corridor. Currently the maximum ridership per hour on the northern half of the corridor is 519 passengers. The maximum load point on the southern half of the busway is 155 passengers per hour. A major purpose of the project is to increase transit ridership in the corridor.

Miami-Dade County's population is projected to grow by 43 percent by the year 2030. During this same period the southern third of the county is projected to grow by 81 percent and the South Link Corridor, which is already urbanized, is projected to grow by 65 percent by 2030.

Figure 1-1

Road Connectivity



Given the lack of north-south arterials and highways in the southern one-third of the County it is critical that transit be prepared to accommodate the growth as it occurs in the corridor.

The 61 percent growth in population in South Dade is projected to be accompanied by only a 37 percent increase in employment. Today, South Dade has 28 percent of the County's population and only 25 percent of the jobs. By 2030, South Dade is projected to have 31 percent of the County's population and only 25 percent of the jobs. If the quality of life for the residents of South Dade is to be maintained or improved, a high-speed, reliable, transit connection between the new residential areas and jobs must be provided. The purpose of this project is to develop a staged program of transit improvements in the corridor that will help bridge the continually widening gap between residential areas and employment concentrations.

This project also focuses upon recommendations for the County to modify development patterns in the corridor to enhance transit productivity and to reduce trip lengths in corridor. The County already has a very advanced ordinance that requires Transit Oriented Development around stations in the Metrorail system. Extending the requirements for design reorientation, densification, and pedestrianism to stations along the busway is a critical aspect of this project.

The overriding purpose of this project is to build transit demand for the timely coordinated development of a high capacity transit facility between southern and central Miami-Dade County.

1.2 Project Need

1.2.1 Zoning Density

A large portion of South Miami-Dade is zoned residential-estate density, which allows up to 2.5 dwelling units per acre. Almost all of the land between Biscayne Bay and the Don Shula Expressway from Kendall Drive (SW 88th Street) to SW 152nd Street has this zoning. It includes the cities of Pinecrest and Palmetto Bay. Immediately adjacent to U.S. 1 are areas zoned for commercial low density residential (up to six units per acre, low-medium density residential (up to 13 units per acre). Around Dadeland South there is a pocket of land zoned medium high density which allows up to 60 units per acre and around the Falls at SW 136 Street there is an area zoned medium density allowing up to 25 units per acre.

South of 152nd Street, the majority of the corridor is low to low-medium density residential to Florida City.

1.2.2 Constraints on Growth

There are major constraints to growth in South Dade even though South Miami-Dade contains the only reasonably sized parcels of land left for urbanization. The coastal area in South Dade is saltwater mangrove swamp. Likewise, the area south of Florida City and Homestead is mangrove swamp giving way to Everglades National Park. The urban development boundary lies only about a mile west of U.S. 1 from SW 232nd Street. There is an agricultural preserve between the urban boundary and the Everglades. Also, within the general area of the corridor is the former Homestead Air Force Base. The eventual future of the base property will have a major impact on the future of the corridor. However, there are natural wetlands near the busway that inhibit any future developments in this corridor.

1.2.3 Change in Density

The corridor is 20 square miles. The current population of the corridor is about 143,000 people, which equates to 7,150 people per square mile, or about 11.17 people per acre. By 2030 the corridor is projected to grow to 237,000 people. This equates to 11,850 people per square mile or about 18.5 people per acres (5 units per acre). Table 1-1 looks more closely at the corridor, which has been divided into three segments: North Segment (between Dadeland South and SW 216th Street), Central Segment (between SW 216th and 264th Streets), and South Segment (between SW 264th and 344th Street). The three segments are illustrated in Figure 1-2.

Table 1-1
Growth By Segment

	North Segment	Central Segment	South Segment
2000 Population	57,490	38,089	47,830
Population/Sq, Mile	5,581	9,522	8,696
Population /Acre	8.7	14.9	13.5
% Growth	45.5%	78.8%	78.7%
2030 Population	83,613	68,132	85,492
Population/Sq. Mile	8,117	17,033	15,544
Population/Acre	12.7	26.6	24.3

The County's Comprehensive Development Master Plan (CDMP) requires Transit Oriented Development (TOD) around mass transit stations. The CDMP requires the development of activity centers around transit stations and requisite increases in densities for all new development within one-quarter mile of a transit station. The density requirements decline as far out as one-half mile radius from the stations. Areas around the transit stations require concentrations of mixed-use developments with one-half mile, increased building densities, adherence to certain parking criteria, and pedestrian orientation in its design. These standards need to be applied around the busway stations in order to control and direct the growth that is projected to occur in the corridor. Exhibit 1-1, is a picture illustrating that some of these standards are already being met around the bus station at SW 200 Street/ Caribbean Boulevard.

Exhibit 1-1

Figure 1-2

Study Area Segments

1.2.4 Transportation Disadvantaged

Several factors are usually evaluated when discussing transportation disadvantaged areas and populations. For purposes of this study and to reflect certain unique aspects of the corridor, characteristics not normally considered as identifiers for the transportation disadvantaged population have been analyzed. Factors such as "non-English speaking," were included because they can affect the likelihood of being employed, and in turn, the trips generated in the corridor. The characteristics that will be used to identify the transportation disadvantaged population for this project are discussed below. They include: minority population, disability status, school-aged and elderly persons, persons without a high school diploma, persons unable to speak English, households living in poverty, and households without a car. The analysis uses 2000 Census Data for the County and census block group information aggregated for block groups in South Dade and block groups within one-half mile of the U.S. 1 corridor.

More than 2.25 million people reside in Miami-Dade County, with over one-half million people in the southern third of Miami-Dade, and 143,000 along the U.S. 1 corridor in South Dade. Approximately 30 percent of the County's population classify themselves as a race other than "white" and over 57 percent classify themselves as Hispanic/Latino. For the U.S. 1 corridor, the percentage of the population that is classified non-white (predominately classified as "black" or African American) jumps to more than 40 percent, while the Hispanic/Latino percentage drops to 41 percent.

Countywide, the percentage of households with incomes below 1999 poverty levels is approximately 18 percent. In the U.S. 1 corridor area, more than 20 percent of the households have incomes below poverty levels; however, in South Dade only 13 percent of households are identified as having incomes below the poverty designation.

Table 1-2 shows that U.S. 1 corridor as compared to Miami-Dade County as a whole has higher or similar levels of transportation disadvantaged persons and households in the majority of criteria evaluated. This corridor has lower percentages than the County of elderly persons and persons not speaking English. Values for the southern third of Miami-Dade occasionally show a lower level of transportation disadvantaged people than the County or the corridor due to the inclusion of more affluent single-family areas such as Pinecrest.

1.2.5 Jobs Housing Balance

One of the challenges facing the South Dade Corridor is that the number of jobs available is disproportionate to the number of housing units and workers in this area. The result of this situation is that persons within the South Dade area have to travel outside of their region to work, creating an increased strain on already overcapacity facilities. Using Traffic Analysis Zone (TAZ) data from the Miami-Dade County Metropolitan Planning Organization (MPO), the ratio of jobs to housing was evaluated for the corridor, the South Dade area, and the remainder of the County.

Table 1-2
Disadvantaged Groups

	Miami-Dade County	South Dade	US 1 Corridor
Total Population (1,000)	2,253	521	167
Black	30.3%	27.8%	41.3%
Hispanic	57.3%	49.8%	41.5%
Disabled	22.8%	18.5%	22.0%
65 and Older	13.3%	8.7%	8.6%
School Aged	22.3%	24.5%	26.7%
Not English Speaking	8.7%	4.7%	5.8%
Not HS Graduate	32.1%	21.4%	32.3%
HH in Poverty	18.3%	13.0%	20.9%
HH without a Car	14.3%	7.9%	13.4%

Source: US Census Bureau, 2000 Census, Summary File 3

The corridor is defined as that area within one-half mile on either side of U.S. 1 from the northern limits of the study area (Dadeland South Metrorail station) to the southern terminus in Florida City. For this study, the South Dade area is defined as that portion of Miami-Dade County located south of Kendall Drive. The remainder of the County consists of those areas north of Kendall Drive. For each of these areas, if the boundary, as defined above, touched a TAZ, the entire TAZ was included in the evaluation. Therefore, the information for the corridor, South Dade, and downtown includes data for land areas that are just outside the defined boundaries.

Table 1-3 shows that in 2000, total employment in the corridor was 72,153 and it is expected to grow by 46.3 percent to 105,546 by 2030. Breaking the corridor into northern, central and southern sectors shows that more significant growth in employment is expected in the southern portion, which is predicted to grow by 79.0 percent. For the entire corridor, the employment sector projected to experience the most growth is the commercial sector, which is predicted to grow by 62.7 percent. The number of workers in the corridor is projected to grow at a rate similar to commercial employment (65.7%), and the number of workers in 2030 will be slightly higher than the number of jobs available (128,626). Both the central and southern sectors of the corridor will experience greater growth in the number of workers than the northern sector.

Housing in the corridor will experience growth similar to commercial employment, with a projected 62.0 percent increase from 47,284 to 76,600 households by 2030. More significant growth in housing is expected in the central and southern portions of the corridor, with projected 80.1 percent and 73.0 percent increases, respectively. Examining the ratios (employment-to-housing; workers-to-housing; and workers-to-employment), one explanation is that workers have to travel outside of the corridor for their jobs, and that this trend will continue and grow in 2030. The numbers indicate that in 2000, there were approximately 9,000 more workers than jobs in the corridor. In 2030, the number of workers will exceed jobs by roughly 10,000.

Table 1-3
Projected Housing, Workers and Employment in the Corridor

	2000	2030	Percent Change
NORTH			
Housing	19,226	27,495	43.0%
Workers	31,513	45,748	45.2%
Employment	40,503	55,519	37.1%
CENTRAL			
Housing	12,543	22,590	80.1%
Workers	20,504	37,663	83.7%
Employment	18,649	26,752	43.5%
SOUTH			
Housing	15,334	26,515	73.0%
Workers	25,323	44,826	77.0%
Employment	13,001	23,275	79.0%
CORRIDOR TOTAL			
Housing	47,248	76,600	62.0%
Workers	77,642	128,626	65.7%
Employment	72,153	105,546	46.3%

South Dade is relatively similar to the corridor in regards to employment, workers and housing. There were 177,157 households in 2000, and this number is expected to grow to 298,779, a 68.7 percent increase, by 2030. The average household size is 3.0 persons per household. The number of workers is expected to increase by 71.3 percent from 292,080 in 2000 to 500,357 in 2030. Employment is projected to grow 42.6 percent from 185,516 to 264,584. As with the corridor, the largest growth is projected to occur in the commercial employment sector. The ratio of employment-to-housing is lower for South Dade, with only one job available for each household. However, similar to the corridor, this ratio will drop slightly in 2030, from 1.1 to 0.9, reflecting the slower growth projected to occur in employment versus housing.

The number of workers available in relation to jobs will increase from 1.6 to 1.9, indicating that by 2030 close to 250,000 people in the South Dade area will have to travel outside of this area for work. Given that U.S. 1 is the major north-south arterial in this area, providing the most direct connection to downtown, it can be expected that a majority of these 250,000 people will travel in the corridor.

The remainder of the County has an employment-to-housing ratio that is slightly higher than the corridor and a worker-to-employment ratio that is roughly half the ratio for the corridor or South Dade. Projected employment growth is approximately 33 percent and projected housing growth is 31.6 percent. The number of workers available is less than the number of jobs, indicating that people will have to travel into the northern part of the County from other areas to fill all the jobs. The average household size is 2.8, the employment to housing ratio is 1.6, and the worker-to-housing ratio is 1.4.

The projected trends for the corridor (Table 1-4), South Dade and downtown, indicate that housing and worker growth will outpace the growth in employment. The opposite is true for the remainder of the County, where employment and worker growth will slightly outpace housing growth. The result is that persons residing in the corridor and South Dade will have to travel outside of the area to find employment.

Table 1-4
Change in Employment

	Corridor			South Dade			Downtown			Remainder of County		
	2000	2030	% Change	2000	2030	% Change	2000	2030	% Change	2000	2030	% Change
Total Employment	72,153	105,546	46.3%	185,516	264,584	42.6%	116,950	152,794	30.7%	997,765	1,325,653	32.9%
Industrial	5,067	4,756	-6.1%	20,029	20,019	-0.1%	3,340	3,059	-8.4%	102,891	100,781	-2.0%
Commercial	33,215	54,056	62.7%	58,543	101,226	73.0%	9,700	15,061	55.3%	255,132	396,944	55.6%
Service	33,873	46,734	37.9%	106,950	143,289	34.0%	103,907	134,624	29.0%	639,742	827,928	29.4%
Number of Workers	77,642	128,626	65.7%	292,080	500,357	71.3%	5,079	24,601	384.4%	806,474	1,081,931	34.2%
Workers/ Employment	1.08	1.22	--	1.57	1.89	--	0.04	0.16	--	0.81	0.82	--
Number of Households	47,284	76,600	62.0%	177,157	298,779	68.7%	4,453	20,349	357.0%	597,182	786,111	31.6%
Persons/ Household	3.03	3.12	--	3.04	3.08	--	2.46	2.52	--	2.80	2.83	--
Workers/ Household	1.64	1.68	--	1.65	1.67	--	1.14	1.21	--	1.35	1.38	--
Employment/H ousehold	1.53	1.38	--	1.05	0.89	--	26.26	7.5	--	1.67	1.69	--

1.2.6 Travel Patterns

According to the 2000 U.S. Census Transportation Planning Package the majority of all of the work trips that originate in the corridor stay in the corridor - 37.2 percent. Since the majority of the area zoned commercial in South Dade is along U.S. 1, it is safe to assume that most of those trips have a destination along U.S. 1.

Considering trips that originate in the corridor, but are destined outside of the corridor, there are three destinations that stand out. The primary external destination for work trips is the Kendall area - attracting 16.3 percent of all the work trips from South Dade. Then both Central Miami and downtown Miami attract more than 13 percent of the work trips from the corridor.

The bottom line for this assessment is that a transit line connecting South Dade along U.S. 1 to Metrorail would serve most of the South Dade internal trips, the downtown Miami trips and the central Miami trips - about 63 percent of the work trips from South Dade.

1.2.7 Traffic

The development pattern that has been described above has already created a strong north-south commuting pattern. Traffic volumes increase steadily from south to north. The northern portion of the corridor currently experiences some of the regions worst traffic congestions, constraining economic opportunities and residents' quality of life. The Florida Department of Transportation (FDOT) recorded an average annual daily traffic volume of 94,000 vehicles along U.S. 1 south of Dadeland in 2003. This volume far exceeds the published capacity guidelines for a six-lane urban arterial.

According to FDOT traffic count data along the corridor, U.S. 1 capacity has been saturated for approximately 20 years. Increased travel demand has been met through transportation system management (TSM) improvements such as removing turning movements and signal timing adjustments that heavily favor the flow along U.S. 1 to the detriment of the intersecting roadways. Increases in travel demand strains the capacity of the existing network, causing delays and increased travel times between activity centers within the corridor and the region. Table 1-5 shows the growth over the last ten years in the corridor.

Table 1-5
Traffic Growth

US 1 Intersection	1994 AADT	2003 AADT	% growth
SR 826	90,000	94,000	4.44%
SW 152nd Street	61,000	74,000	21.31%
SW 288th Street	28,000	32,500	16.07%
SW 328th Street	11,800	30,000	154.24%

The U.S. 1 corridor has reached its limits for widening. Right-of-way, financial, environmental, social, and political constraints have historically limited both the development of new north-south facilities and the substantial expansion of existing facilities. Currently planned roadway improvements are minor in nature and will only provide local congestion relief. Existing levels of service (LOS) in the corridor are generally "F" and are anticipated to further degrade in the future. According to the FDOT District Six "Level of Service Inventory", more than 60 percent of the length of U.S. 1 from Dadeland South to Homestead is currently operating at LOS F. In addition, approximately 90 percent of the corridor currently exhibits a volume-to-service volume (V/SV) ratio of 0.90 or higher, with the entire segment of U.S. 1 north of the Turnpike interchange exhibiting V/SV ratios in excess of 1.50.

Only Krome Avenue and the Florida Turnpike extend all of the way north and south across southern Miami-Dade County. Krome Avenue is a two-lane rural facility along the western urban boundary and is heavily used by trucks to the agricultural uses along Krome Avenue. The Florida Turnpike is a four-lane limited access facility that is heavily used by commuters in the western half of the urban area. Much of the Turnpike is over capacity in the peak directions. The only other street that extends through very much of South Dade is Old Cutler Road, a two-lane road that runs through residential areas between SW 242nd Street and Coconut Grove. The entire stretch of Old Cutler Road is over capacity.

None of the other north-south facilities are continuous. Table 1-6 and Figure 1-3 show the extent and the future level of service for the other arterials in South Dade.

Table 1-6
Projected Level of Service

Roadway	Limits	LOS Limits	LOS
SW 67th Ave.	Sunset to Old Cutler	Sunset to Kendall	F
		Kendall to SW 132 St.	F
		SW 132 St to Old Cutler	C
SW 77th Ave.	SW 104 St. to SW 152 St.	SW 104 to SW 112 St.	F
		SW 112 to SW132 St.	F
		SW 132 to SW 152 St	C
SW 82 Ave.	SW 120 St. to SW 168 St.	SW 120 to SW 124 St.	C
		SW 124 to SW 132 St	F
		SW 132. to SW 152 St	D
		SW 152 to SW 168 St	F
SW 87 Ave	US 1 to SR 874	US 1 to SR 874	F
	SW 140 to SW 162 St.	SW 140 to SW 162 St.	C
	SW 168 to Old Cutler	SW 168 to Old Cutler	C
SW 97 Ave	Kendall to SW 144 St.	Kendall to SW 128 St	F
		SW 128 to SW 144 St	C
	US 1 to Old Cutler	US 1 to Old Cutler	C
SW 117 Ave	Kendall Dr. to US 1	Kendall to SW 152 St	C
		SW 152 to SW 168 St.	F
		SW 168 to US 1	C
SW 137 Ave	Kendall Dr. to SW 152 St.	Kendall to SW 152 St.	C
		SW 152 to SW 168 St	D
		SW 164 to SW 184 St.	F

1.2.8 Quality of Transit Services

In the South Dade region of Miami-Dade County, Miami-Dade Transit (MDT) operates 15 public transit routes. These routes offer 15-30 minute peak-period headways, and 30-60 minute off-peak-period and weekend headways. Services are generally offered between 5:30 a.m. and 11:00 p.m. on weekdays with reduced service on the weekends. Service improvements are planned in the People's Transportation Plan (PTP) through 2007. Figure 1-4 shows that in the southern portion of Miami-Dade County, the greatest coverage of transit services exists in the Kendall, Pinecrest, Cutler Ridge, and Homestead neighborhoods. Areas with less service coverage include Richmond Heights, Goulds, Naranja, and Florida City, mainly marked by an absence of service on the west side of South Dixie Highway between S.W. 200th Street and 280th Street.

On the existing length of the busway, two routes operate between the Southland Mall and 168th Street, four routes operate to 152nd Street and seven routes operate north to the Dade-

Figure 1-3

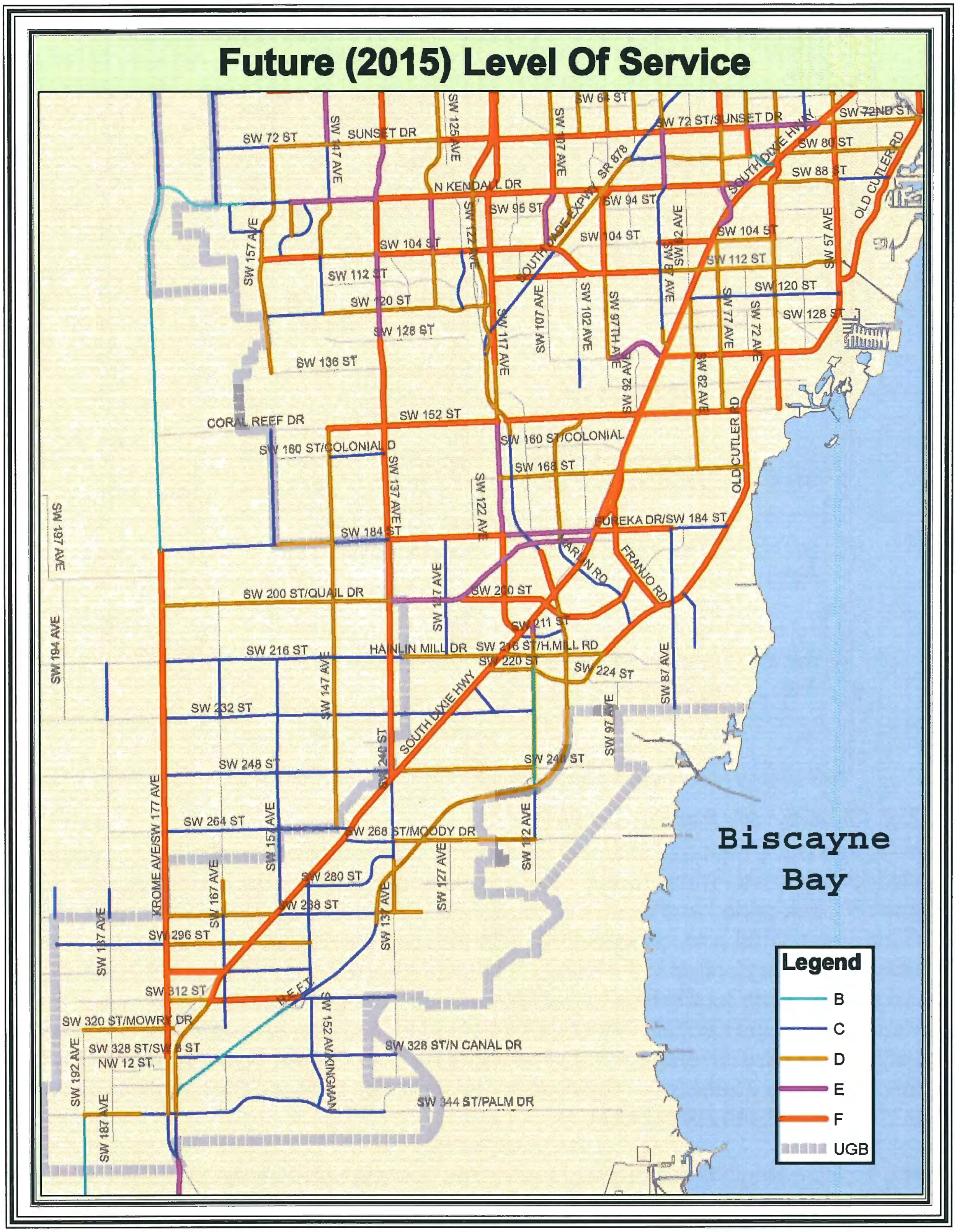
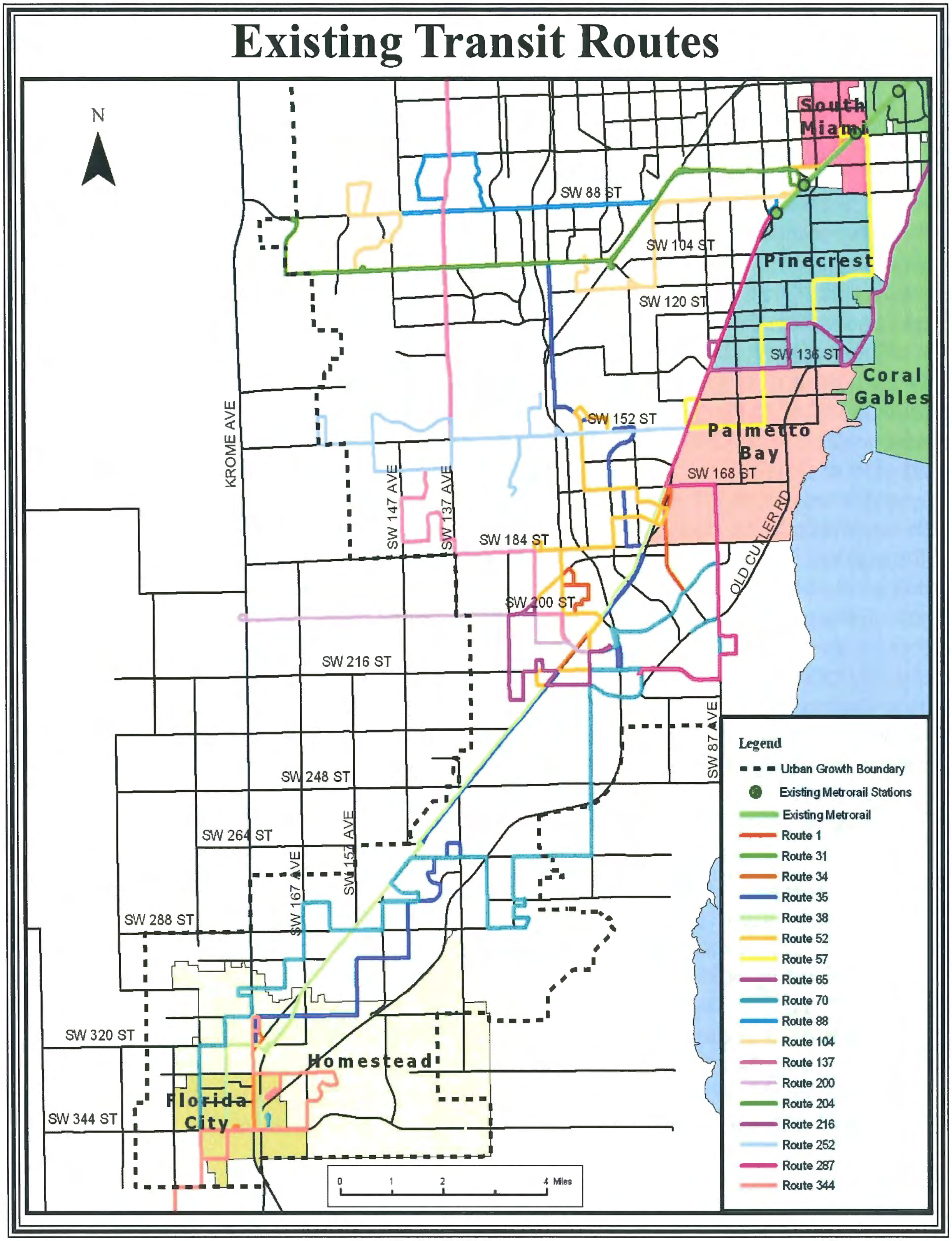


Figure 1-4


Existing Transit Routes
N
South Miami
Pinecrest
Coral Gables
Palmetto Bay
Homestead
Florida City
SW 88 ST
SW 104 ST
SW 120 ST
SW 136 ST
SW 152 ST
SW 168 ST
SW 184 ST
SW 200 ST
SW 216 ST
SW 248 ST
SW 264 ST
SW 288 ST
SW 320 ST
SW 344 ST
KROME AVE
SW 147 AVE
SW 137 AVE
SW 167 AVE
SW 157 AVE
SW 87 AVE
OLD CUTLER RD
0 1 2 4 Miles
Legend
Urban Growth Boundary
Existing Metrorail Stations
Existing Metrorail
Route 1
Route 31
Route 34
Route 35
Route 38
Route 52
Route 57
Route 65
Route 70
Route 88
Route 104
Route 137
Route 200
Route 204
Route 216
Route 252
Route 287
Route 344

land South Metrorail station. South of the existing busway to Florida City, three routes currently provide service. Once the southern extension of the busway is operational, two enhanced busway routes and two new feeder routes in the PTP would supplement service in this area, and provide better coverage for both Goulds and Florida City.

1.2.9 Accessibility of Services

Exhibit 1-2

Pedestrian accessibility on the busway is limited to the west side of the corridor, with crosswalks linking patrons to stops on the east side. Overall access to these pedestrian facilities from the adjacent South Dixie Highway corridor and other cross-streets is limited to major intersections where sidewalks on the east side of South Dixie Highway and cross-streets are linked with sidewalks on the west side of the busway. The area that lies between the busway and South Dixie Highway consists mainly of a low-lying drainage ditch. No pedestrian facilities exist either on the west side of South Dixie Highway or on the east side of the busway, nor are there any mid-block pedestrian crossings to allow for connection between South Dixie Highway to the busway. The LRTP designates the entire length of the South Dade corridor as a Greenway facility, which would include improvements for bicycles and pedestrians adjacent to the transit facility. Exhibit 1-2 (SW 117th Street Station) illustrates accessibility problems to these bus stations. Not only do pedestrians need to jaywalk across U.S. 1, but they also need to cross a drainage ditch within the center median to access this bus station.

1.2.10 Busway Safety

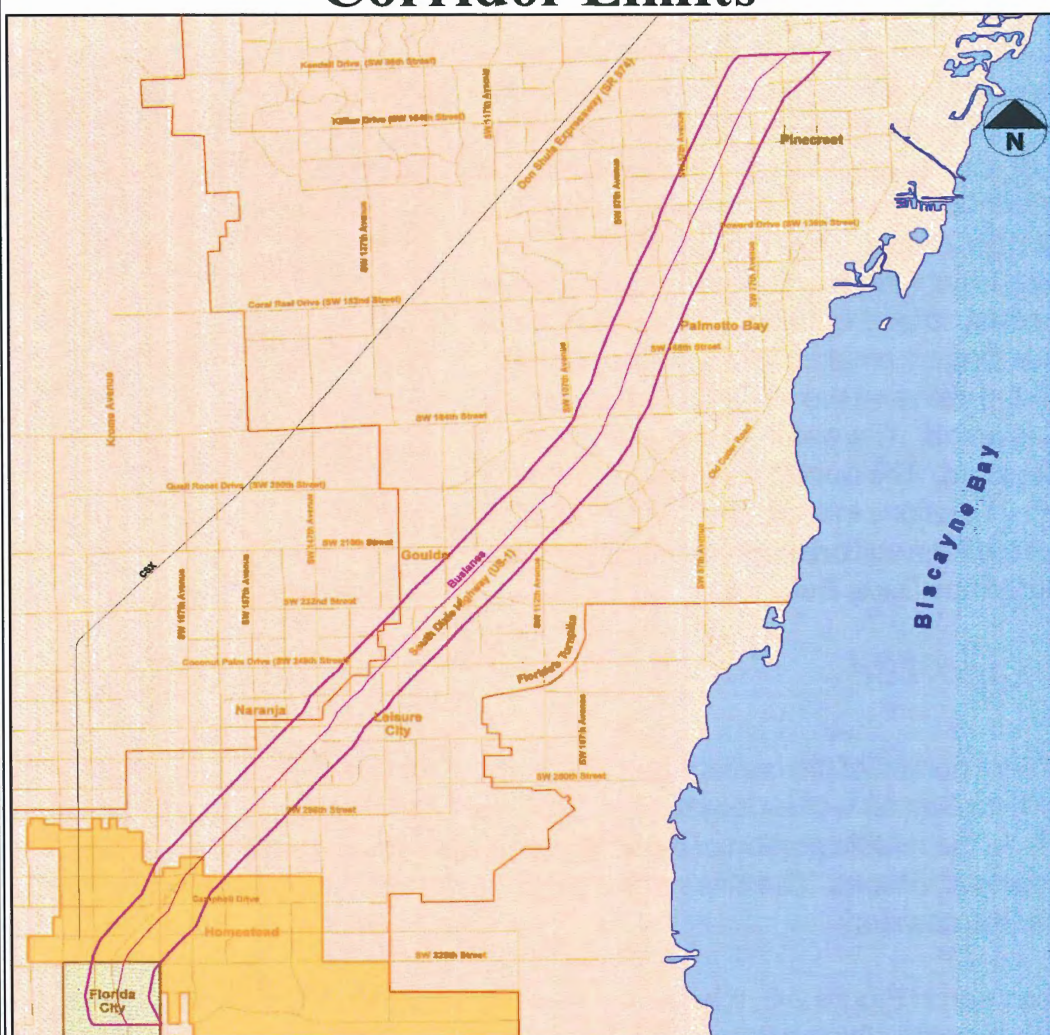
The busway provides a partial solution to automobile travel, but it is hampered by cross traffic and operational and safety constraints. The busway is a two-way, two-lane, bus-only roadway approximately eight miles long that was constructed in a former rail right-of-way adjacent to U.S. 1. The busway's close proximity to U.S. 1 caused operational and safety problems for transit vehicles, automobiles, and pedestrians. Priority preemptive signals for the busway were initially installed, but were eliminated due to safety concerns after several accidents following its opening in 1997. The loss of signal priority preemption has significantly reduced the anticipated travel time savings, especially for the express bus service.

CHAPTER 2: EXISTING CONDITIONS

The study limits consist of a corridor along U.S. 1 (South Dixie Highway) from the Dadeland South Metrorail station south to its intersection with Florida's Turnpike in Florida City. The study limits extend approximately one-half mile in each direction from the centerline of U.S. 1, a multilane highway in Miami-Dade County, Florida. The total length of the corridor is approximately 20 miles. A dedicated Miami-Dade Transit (MDT) busway right-of-way parallels U.S. 1 for the entire length of the corridor. Figure 2-1 depicts the general outline of the corridor.

Figure 2-1

Corridor Limits



2.1 Busway

The South Miami-Dade busway is an exclusive two-lane, two-direction, at-grade transit facility. Operations on the busway started in February 1997. The busway is located within the former Florida East Coast Railroad corridor, connecting the Dadeland South Metrorail station and Florida City, a distance of 20 miles. The first operational portion of the busway was the 8.5 miles from Dadeland South to the Cutler Ridge area at SW 112 Avenue. In April 2005, the second section of the busway opened with a five mile extension to SW 264th Street. US 1/South Dixie highway operates parallel, and mostly adjacent to the rail right-of-way. The busway and US 1 are within 100 feet of each other for most of their length. US 1 is one of the most heavily traveled corridors in Miami-Dade County and is a vital link between downtown Miami and the south.

The busway is designed to be used exclusively by transit buses along with emergency and security vehicles. For the length of the busway, with the exception of the approach to the Dadeland South Metrorail station, the busway is in the center of a 100-foot right-of-way (Refer to Exhibit 2-1). The lanes are 12-feet wide, separated from one another by a four-foot striped median. To the west of the paved bus lanes is an eight-foot wide bicycle path. Between the path and the busway is a deep swale to capture runoff. The swale and the bicycle path are landscaped. The busway crosses 27 intersections with 21 stations in each direction. Figure 2-2 illustrates all of the stations that are presently within the South Miami Dade Busway.

Exhibit 2-1: View of a busway station

2.2 Land Use

The northern portion of the corridor serves the upper middle-class communities of Pinecrest and Palmetto Bay, as well as largely unincorporated residential and commercial areas west of U.S. 1. In the middle portion of the study area are agricultural areas and rapidly growing unincorporated villages. The cities of Homestead and Florida City are located at the southern end of the corridor.

As can be seen in Figure 2-3, a large portion of South Miami-Dade is developed at residential-estate density, which allows up to 2.5 dwelling units per acre. Almost all of the land between Biscayne Bay and the Don Shula Expressway from Kendall Drive (SW 88th Street) to SW 152nd Street has this zoning. South of SW 152nd Street the residential areas are zoned low-density residential (up to six units per acre), low-medium-density residential (up to

Figure 2-2

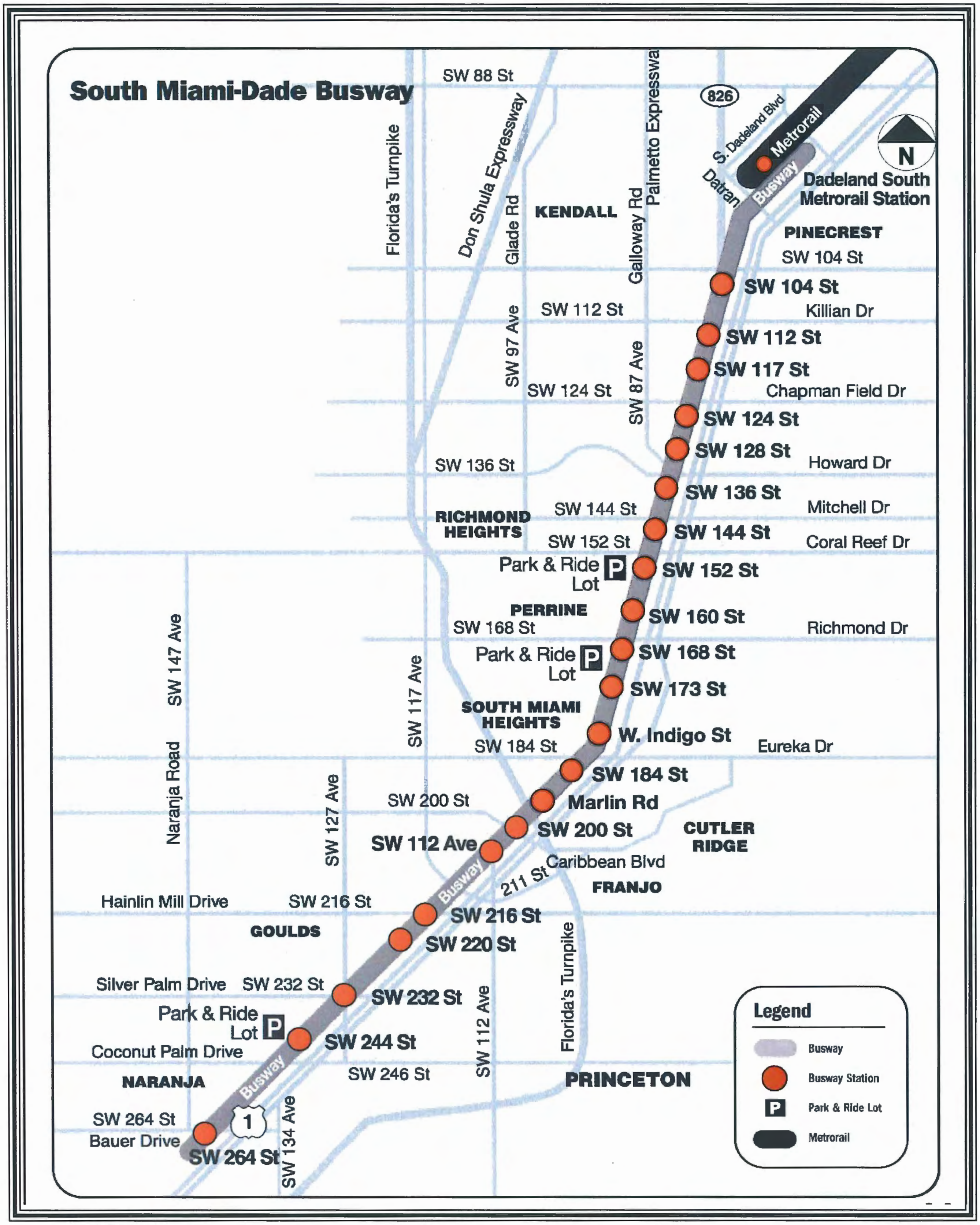
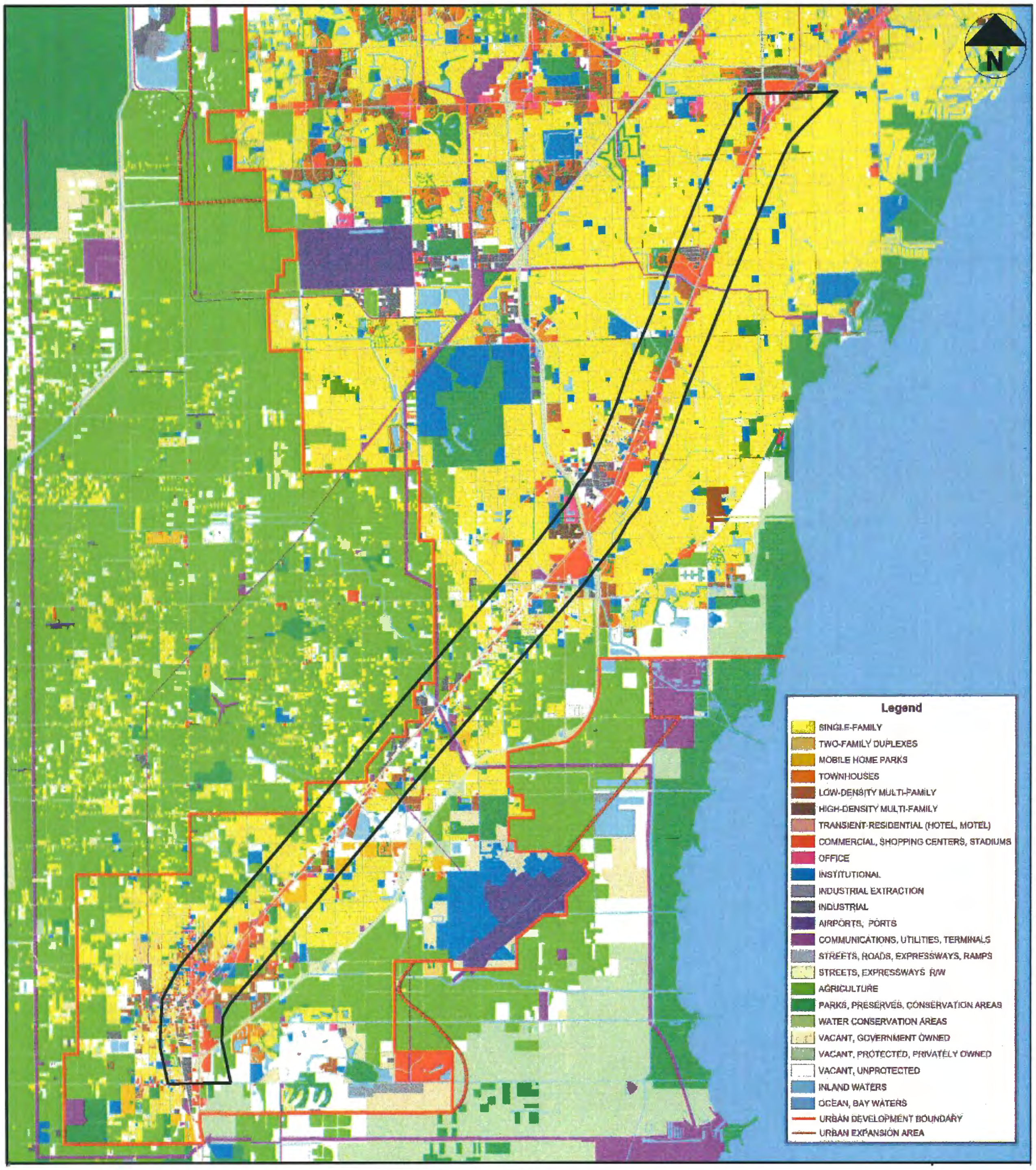

South Miami-Dade Busway
SW 88 St
826
S. Dadeland Blvd
Metrorail
Datran
Busway
Dadeland South Metrorail Station
N
Florida's Turnpike
Don Shula Expressway
Glade Rd
KENDALL
Galloway Rd
Palmetto Expressway
PINECREST
SW 104 St
SW 104 St
Killian Dr
SW 112 St
SW 97 Ave
SW 112 St
SW 117 St
SW 124 St
SW 87 Ave
Chapman Field Dr
SW 124 St
SW 128 St
SW 136 St
Howard Dr
SW 136 St
RICHMOND HEIGHTS
SW 144 St
Mitchell Dr
SW 152 St
SW 144 St
Coral Reef Dr
Park & Ride Lot
SW 152 St
PERRINE
SW 168 St
SW 160 St
Richmond Dr
Park & Ride Lot
SW 168 St
SW 147 Ave
SW 117 Ave
SW 173 St
SOUTH MIAMI HEIGHTS
SW 184 St
W. Indigo St
Eureka Dr
Naranja Road
SW 184 St
SW 127 Ave
SW 200 St
Marlin Rd
SW 200 St
CUTLER RIDGE
SW 112 Ave
Caribbean Blvd
211 St
FRANJO
Hainlin Mill Drive
SW 216 St
GOULDS
SW 216 St
SW 220 St
Silver Palm Drive
SW 232 St
SW 232 St
Park & Ride Lot
SW 244 St
SW 112 Ave
Florida's Turnpike
Coconut Palm Drive
SW 246 St
NARANJA
PRINCETON
SW 264 St
Bauer Drive
1
SW 134 Ave
SW 264 St
Legend
Busway
Busway Station
Park & Ride Lot
Metrorail

Figure 2-3

Land Use



13 units per acre) and medium-density residential (up to 25 units per acre). Scattered throughout the neighborhoods are recreational facilities (ball fields, golf courses, etc.) and agricultural areas (toward the southern end of the corridor). Immediately adjacent to U.S. 1 are areas zoned for commercial or light industrial. The uses include retail and light industrial facilities, including automotive dealerships, shopping centers, gas stations, restaurants, auto repair centers, marine supplies and maintenance, and building supply facilities. Table 2-1 shows the land use classifications within a half-mile of the busway stations broken down into percentages.

2.2.1 Urban Development Boundary

U.S. 1 lies within the existing Urban Development Boundary (UDB) of Miami-Dade County; however, the UDB lies very close to the U.S. 1 corridor (approximately one-half mile northwest of U.S. 1) for approximately two miles between SW 240th Street and SW 264th Street. Figure 2-3 presents the Urban Development Boundary of Miami-Dade County in the vicinity of the study area.

2.2.2 South Dade Communities

Figure 2-4 shows the incorporated cities and identified communities in the vicinity of the corridor. Each community is discussed below.

Village of Pinecrest/East Kendall

The Village of Pinecrest is an upper income community that was incorporated on March 12, 1996, and is one of 32 municipalities in Miami-Dade County. Pinecrest has more than19,000 residents and is located south of downtown Miami and Miami International Airport. Pinecrest encompasses 8.1 square miles. The village boundaries are Snapper Creek Canal (north), Red Road/Old Cutler Road (east), SW 136th Street (south), and U.S. 1 (west). Along the commercial corridor on U.S. 1 there are more than 600 businesses. East of US 1 is Kendall which has a large Hispanic population with 75,226 residents. This area is part of unincorporated Miami-Dade County and covers 16 square miles and is 12 miles south of downtown Miami.

Adjacent to the Village of Pinecrest there are six existing transit stations. Figure 2-5 shows the area around the Dadeland South Metrorail/Busway Transfer station at SW 92nd Street and U.S. 1. Exhibit 2-2 illustrates the immediate area west of U.S. 1, which consists of very high intensity commercial area, while the area immediately west of U.S. 1 is a lower density commercial strip that backs onto low-density residential property. The second station along the busway is at SW 104 Street. Figure 2-6 shows the land use

Exhibit 2-2: Dadeland South

Table 2-1
Percentage of Land Use Classifications

	Shopping Center	Office	Low Density	Medium Density	High Density	Industrial	Instititional	Parks	Agriculture	Inland Water	Vacant
Dadeland South	15%	10%	40%	5%	16%	2%	5%	5%	0%	2%	0%
SW 104th Street	10%	4%	60%	8%	5%	0%	6%	5%	0%	2%	0%
SW 112th Street	15%	3%	70%	0%	2%	0%	7%	0%	0%	3%	0%
SW 117th Street	10%	2%	80%	0%	0%	0%	6%	2%	0%	0%	0%
SW 124th Street	10%	5%	75%	0%	0%	0%	5%	5%	0%	0%	0%
SW 128th Street	13%	12%	63%	0%	3%	0%	4%	5%	0%	0%	0%
SW 136th Street	25%	25%	38%	3%	5%	0%	0%	3%	0%	1%	0%
SW 144th Street	13%	8%	47%	5%	12%	0%	5%	5%	0%	5%	0%
SW 152nd Street	10%	4%	30%	0%	5%	0%	8%	32%	0%	3%	8%
SW 160th Street	17%	4%	50%	3%	6%	0%	3%	12%	0%	3%	2%
SW 168th Street	20%	5%	50%	0%	10%	0%	0%	2%	3%	0%	10%
SW 173rd Street	25%	5%	34%	0%	10%	5%	7%	4%	0%	0%	10%
W. Indigo Street	25%	0%	30%	0%	11%	0%	15%	4%	0%	0%	15%
SW 184th Street	30%	12%	30%	0%	6%	2%	10%	5%	0%	5%	0%
Marlin Road	20%	20%	25%	0%	10%	11%	8%	0%	0%	6%	0%
SW 200th Street	38%	5%	23%	2%	13%	2%	0%	5%	2%	5%	5%
SW 112th Avenue	35%	10%	22%	0%	15%	2%	3%	4%	3%	3%	3%
SW 216th Street	5%	7%	30%	5%	8%	0%	15%	8%	0%	2%	20%
SW 220th Street	10%	5%	30%	2%	5%	0%	0%	18%	10%	0%	20%
SW 232nd Street	10%	0%	19%	0%	0%	0%	8%	10%	30%	3%	20%
SW 244th Street	8%	3%	12%	0%	0%	0%	12%	12%	38%	0%	15%
SW 264th Street	8%	4%	14%	8%	6%	0%	5%	8%	29%	2%	16%

Figure 2-4

South Link Communities

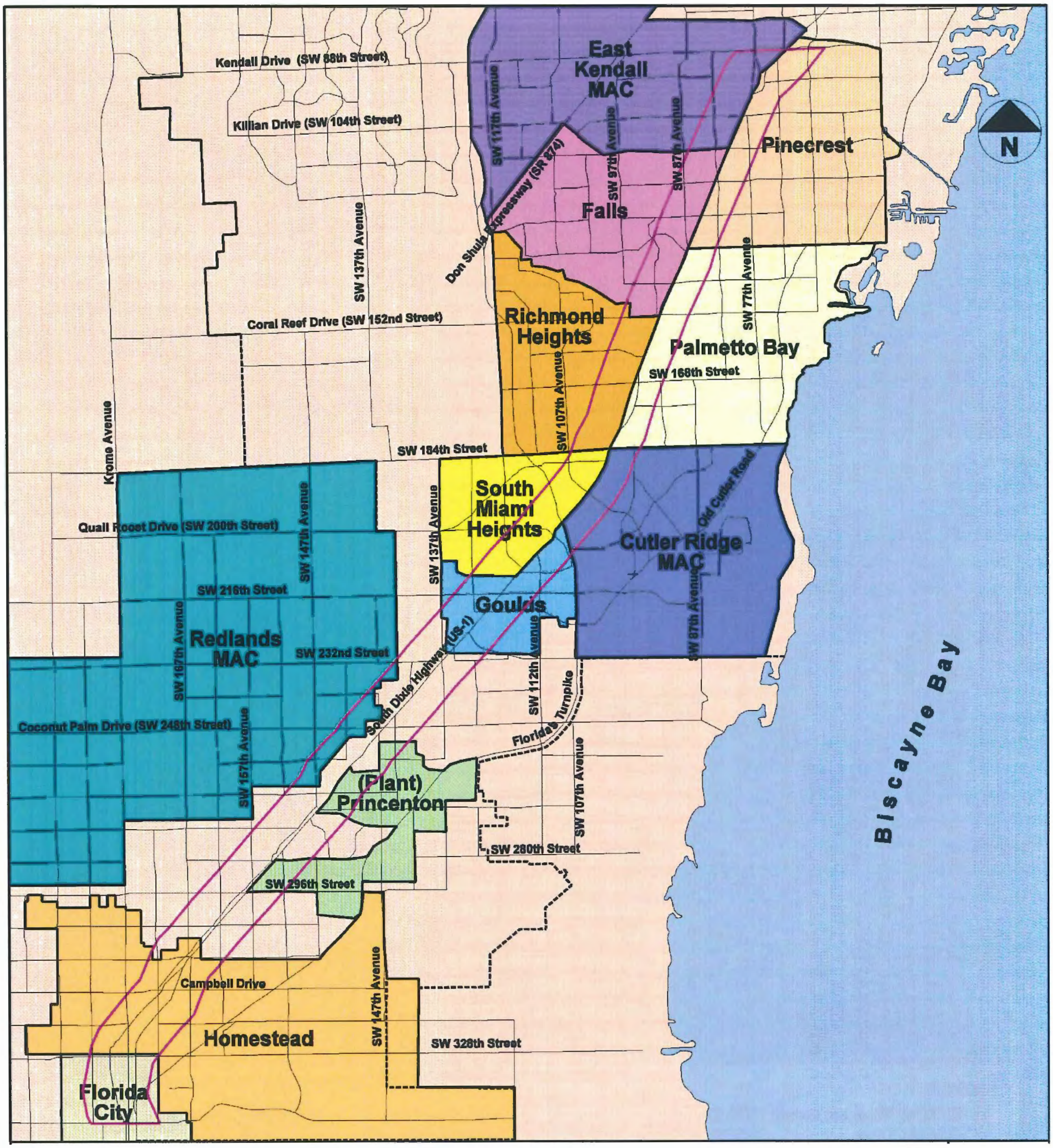


Figure 2-5

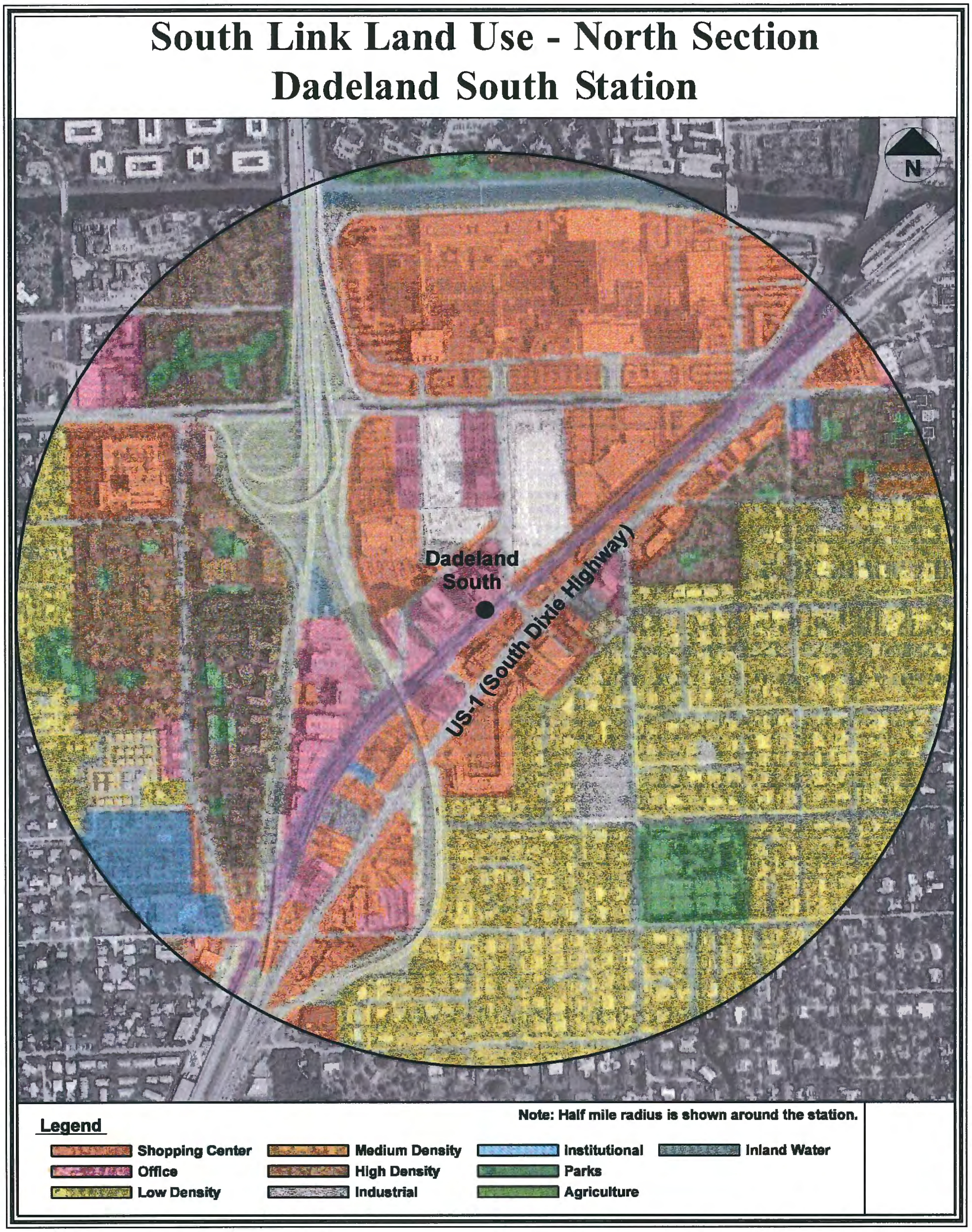

South Link Land Use - North Section
Dadeland South Station
N
Dadeland South
US-1 (South Dixie Highway)
Legend
Note: Half mile radius is shown around the station.
Shopping Center
Office
Low Density
Medium Density
High Density
Industrial
Institutional
Parks
Agriculture
Inland Water

Figure 2-6

South Link Land Use - North Section
SW 104th Street Station

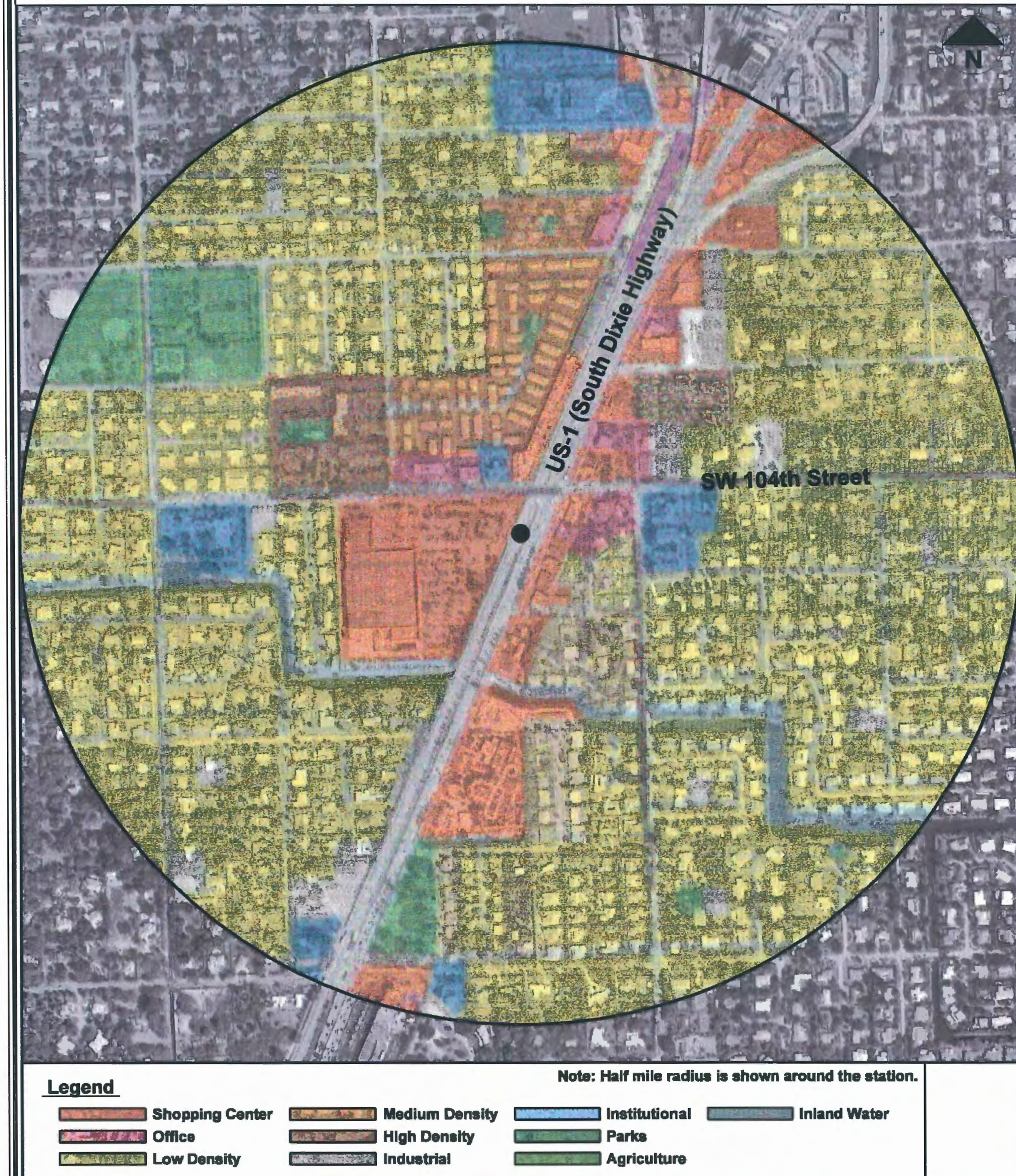


Exhibit 2-3: Pinecrest Residential Area

within a half-mile radius of the busway station. There are two small multi-family developments backing onto the commercial development along U.S. 1. The commercial development consists of big box retail, storage units, low rise offices and strip commercial. Figure 2-7 shows the third busway station, which is located at SW 112 Street or Killian Drive. The east side of U.S. 1 is mostly strip commercial, including Suniland Shopping Center. Most of the rest of the service area of this station is large lot single-family homes as shown in Exhibit 2-3. Figure 2-8 shows the fourth station at SW 117 Street. This station is between two shopping centers. Other than the strip commercial on the east side of U.S. 1, the service area is single-family. These single-family communities contain neighborhood parks and one elementary school.

Figure 2-9 shows the fifth station located at SW 124 Street or Chapman Field Road. To the west of this station is a section of office buildings with single-family residential backing the area. On the east side of the station are single-family residential communities with one neighborhood park. This residential area backs up to a small business area along U.S. 1. Figure 2-10 shows the sixth station at SW 128th Street. On the west side, there is a large residential area called the Howard Community. Within the Howard Community there are mixed land uses of warehousing, industrial, retail, and older single-family housing. There are professional buildings and the U.S. Post Office.

On the east side of the station there is neighborhood strip commercial with the Sunrise Point condominium complex backing up to this shopping center. Around this multi-residential complex there are single-family homes and Suniland Park. Figure 2-11 shows the seventh station located at SW 136th Street. To the west of the station is The Falls regional shopping center with multi-family housing backing up to the mall. Other land uses in this area include additional higher-density housing and industrial businesses. On the east side of the station there is neighborhood strip commercial along US 1. On the backside of this shopping center there is a large area of single-family residential communities.

Palmetto Bay/The Falls/Richmond Heights

The Village of Palmetto Bay was incorporated on September 10, 2002, and is one of 32 municipalities in Miami-Dade County. Palmetto Bay is home to more than 24,000 upper/middle income residents. The village is bounded by SW 136th Street (north), S.W. 184th Street (south), central commercial corridor of U.S. 1 (west), and Biscayne Bay (east). Along U.S. 1 is Palmetto Bay City Hall and Jackson South Hospital. The Falls, just south of Kendall, is part of unincorporated Miami-Dade County. Its main feature, the Falls Shopping Center, is

Figure 2-7

South Link Land Use - North Section
SW 112th Street (Killian Drive) Station

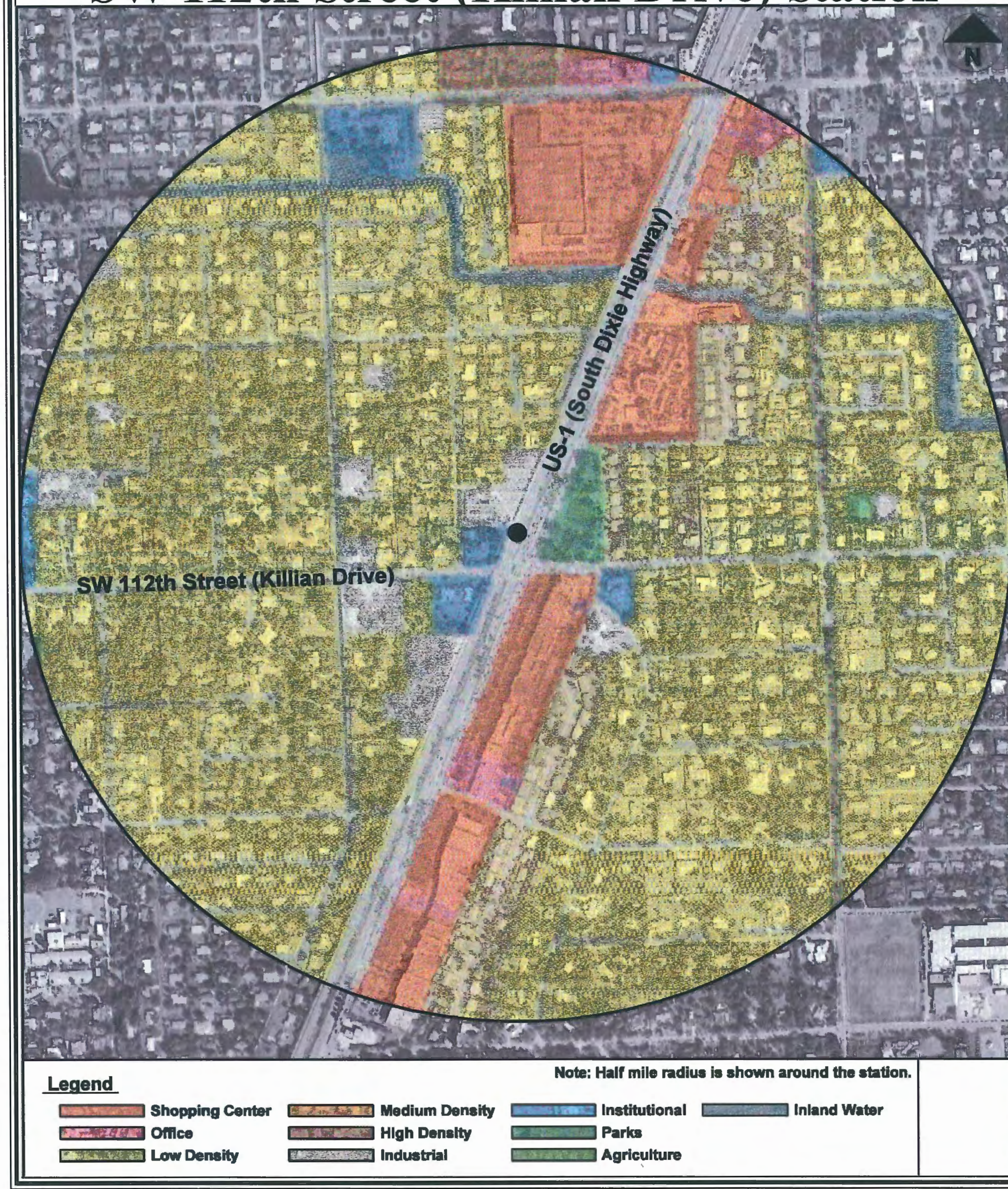


Figure 2-8

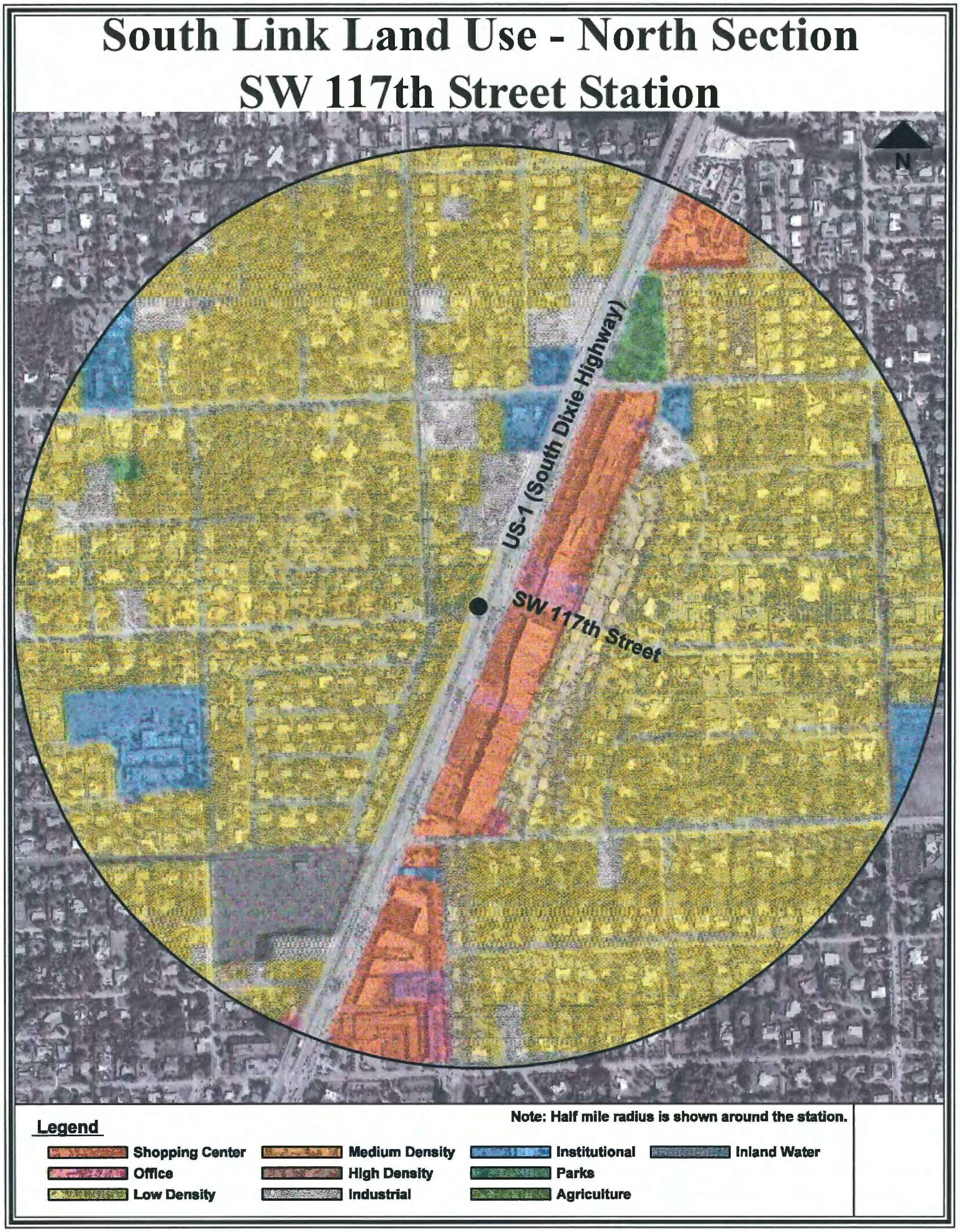

South Link Land Use - North Section
SW 117th Street Station
N
US-1 (South Dixie Highway)
SW 117th Street
Legend
Note: Half mile radius is shown around the station.
Shopping Center
Office
Low Density
Medium Density
High Density
Industrial
Institutional
Parks
Agriculture
Inland Water

Figure 2-9

South Link Land Use - North Section
SW 124th Street (Chapman Field) Station

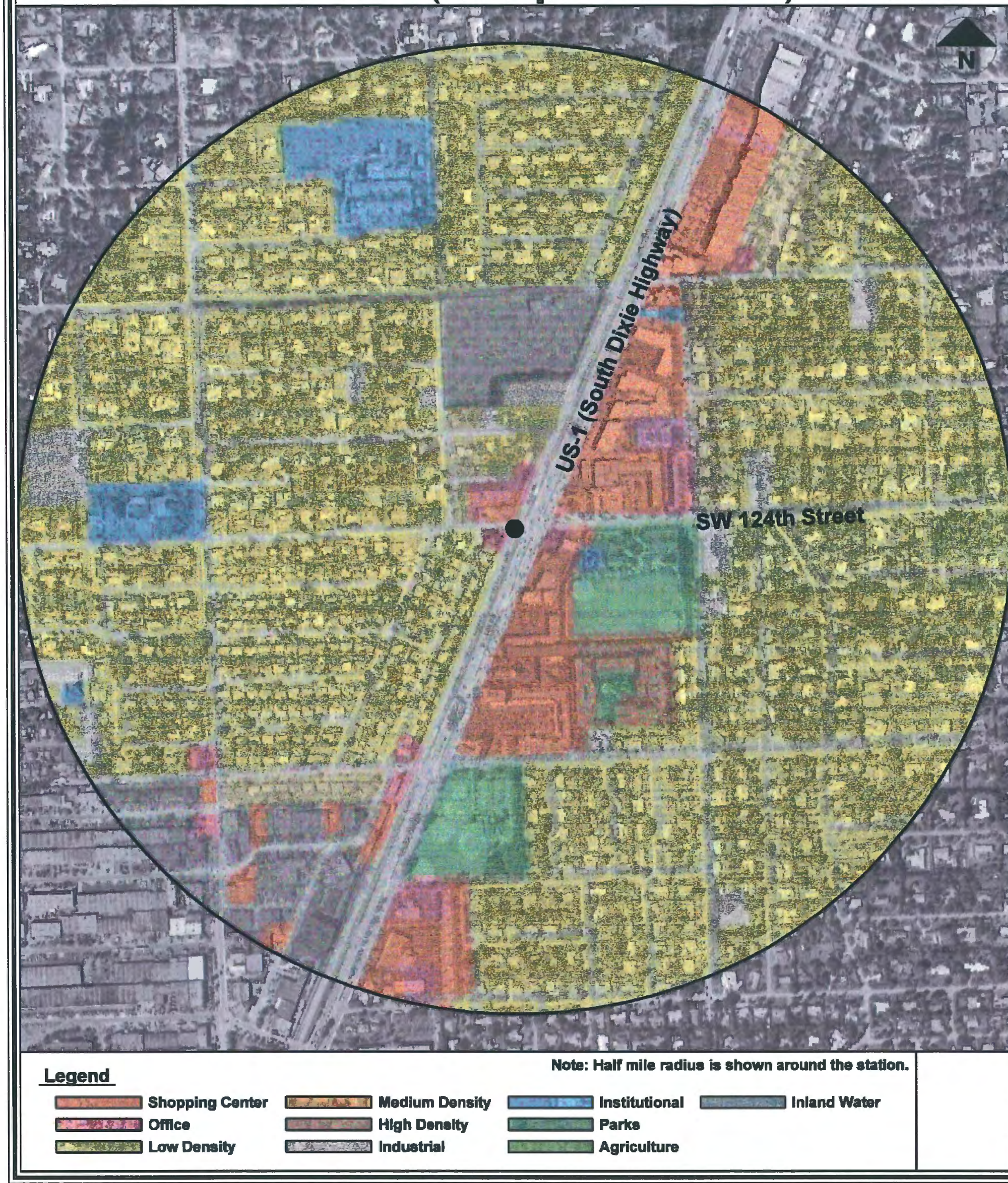


Figure 2-10

South Link Land Use - North Section
SW 128th Street Station

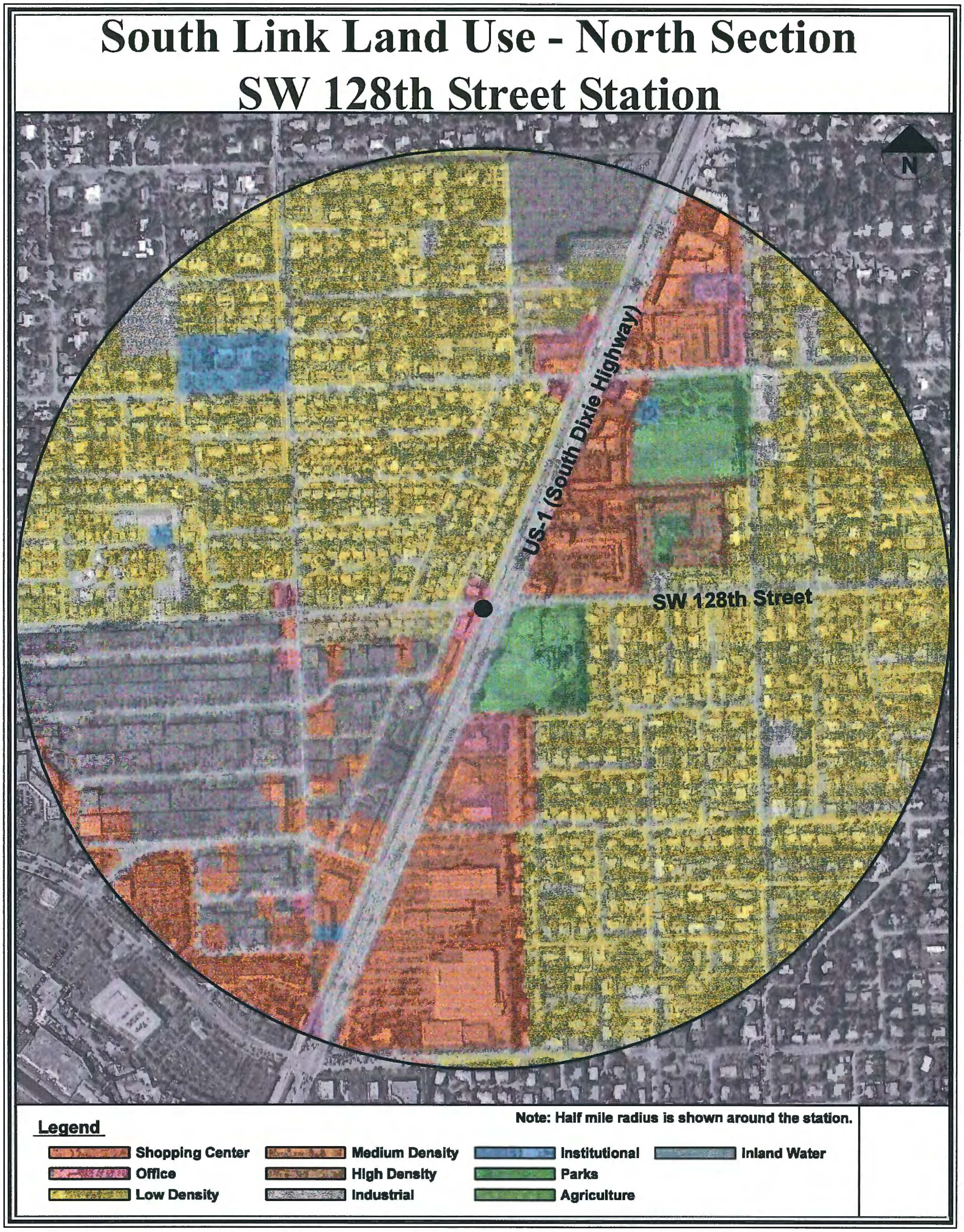
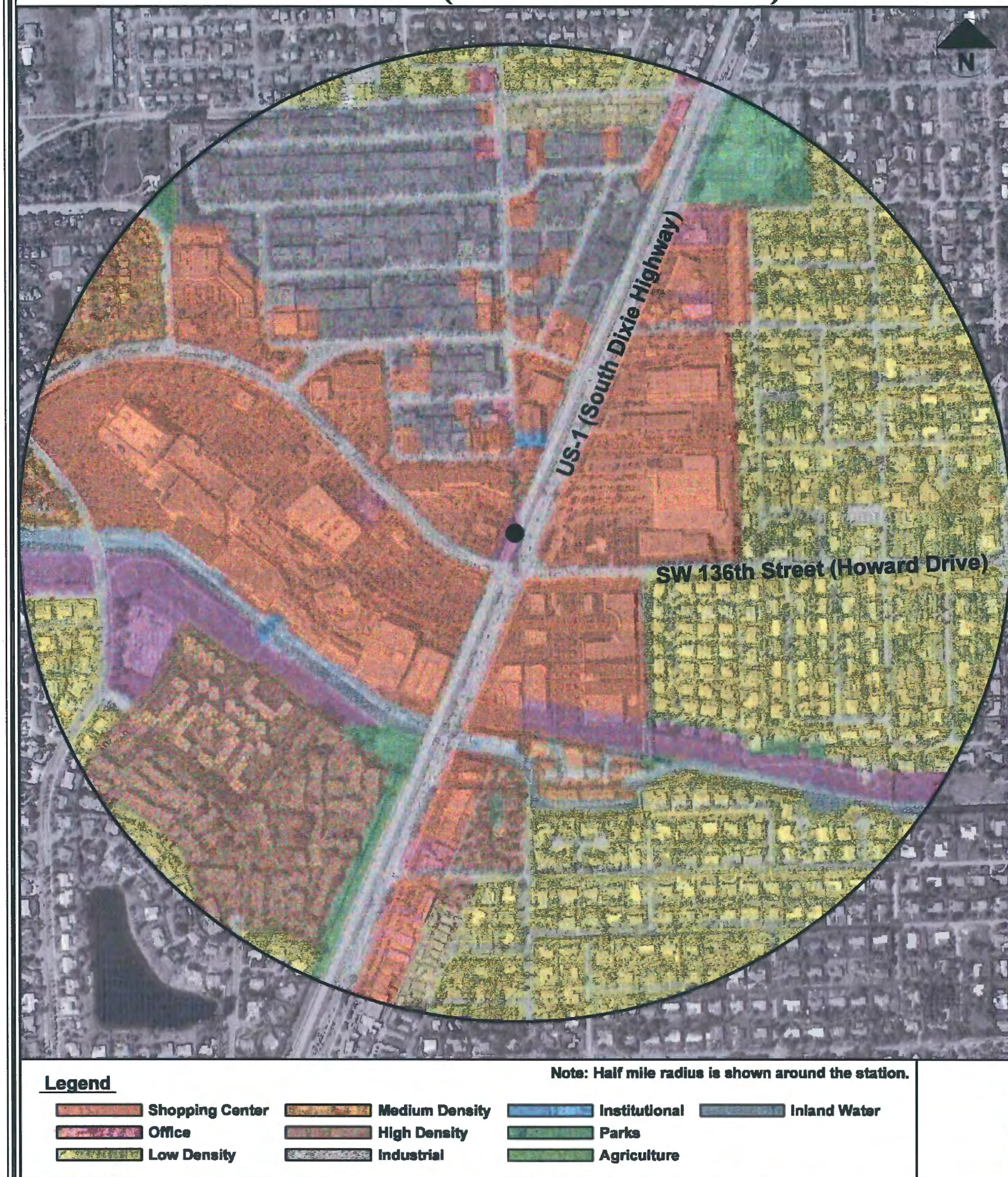


Figure 2-11

South Link Land Use - North Section
SW 136th Street (Howard Drive) Station



located at U.S. 1 and SW 136th Street. It is one of the largest outdoor malls in the United States with more than 100 stores, restaurants, and a movie theater. Richmond Heights has a large African American population with 8,479 residents. This area is part of unincorporated Miami-Dade County. It covers 1.7 square miles and is 15 miles south of downtown Miami.

Adjacent to Palmetto Bay there are seven existing bus stations. Figure 2-12 shows the first station located at SW 144th Street or Mitchell Drive. The area west of the station is wetlands and medium-density housing shown in Exhibit 2-4. Other land uses in this area include single-family homes, lakes, and one neighborhood park. To the east of the station is low-density residential that backs up to a neighborhood strip commercial shopping center. This residential areas includes single-family housing and a few pockets of vacant land. Figure 2-13 shows the second station at SW 152 Street. To the west of the station is the Palmetto Bay City Hall with an adjacent golf course. There is single-family housing backing onto the golf course. Along U.S. 1 there is a large medical center. Other land uses include parks, institutional establishments, and pockets of vacant land. Figure 2-14 shows the third station at SW 160th Street or Colonial Drive. To the west of the station is a large area of low-density housing. There is also neighborhood strip commercial along Colonial Drive. Other land uses include office space and agricultural. The area east of the station along U.S. 1 has car dealerships, a childcare center, and vacant lots. East of the commercial development is a wide area of low-density single-family housing around an elementary school.

Exhibit 2-4: Low-density multi-family development

Figure 2-15 shows the fourth station located at SW 168 Street. The area west of this station has an adjacent park-and-ride lot for busway patrons. Within this area there are duplexes, auto-related and institutional businesses, and neighborhood strip commercial shopping centers. Other land uses include low-density, single-family housing and pockets of office space. The eastside of the station includes low-density residential housing that back up to areas of neighborhood and community commercial shopping centers. East of the station there is also a small amount of agricultural land and an elementary school.

Figure 2-16 shows the fifth station located at SW 173rd at Banyan Street west of U.S. 1. This is the first of four stations approximately half a block west of U.S. 1. As shown in Exhibit 2-5, the businesses around the Banyan station are mostly auto related. There are car dealers, gas stations, and auto repair shops east of the station (Exhibit 2-5). To the west of the station there is affordable housing with a large adjacent vacant lot. Other land uses within this area

Figure 2-12

South Link Land Use - North Section
SW 144th Street (Mitchell Drive) Station

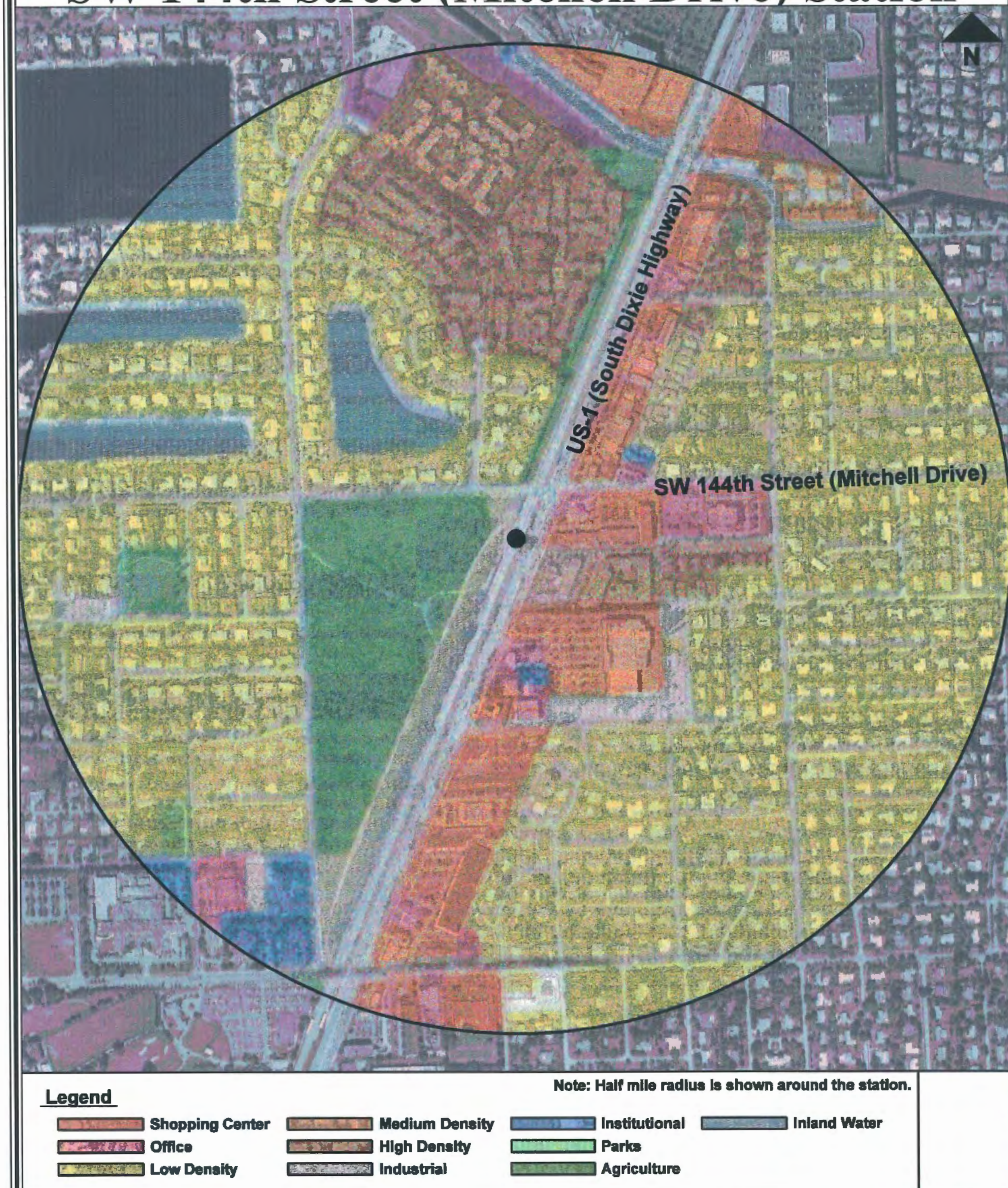


Figure 2-13

South Link Land Use - North Section
SW 152nd Street (Coral Reef Drive) Station

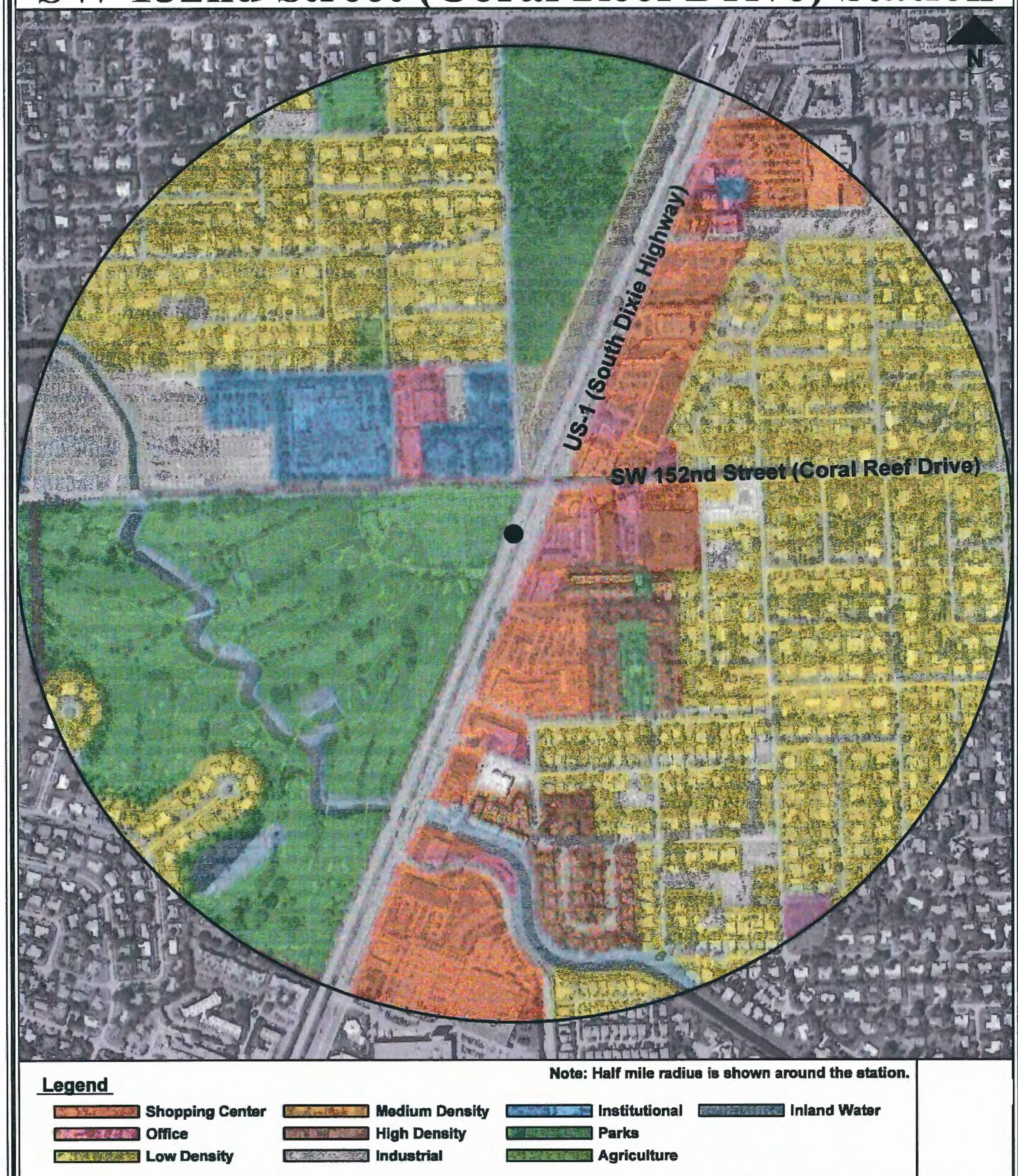
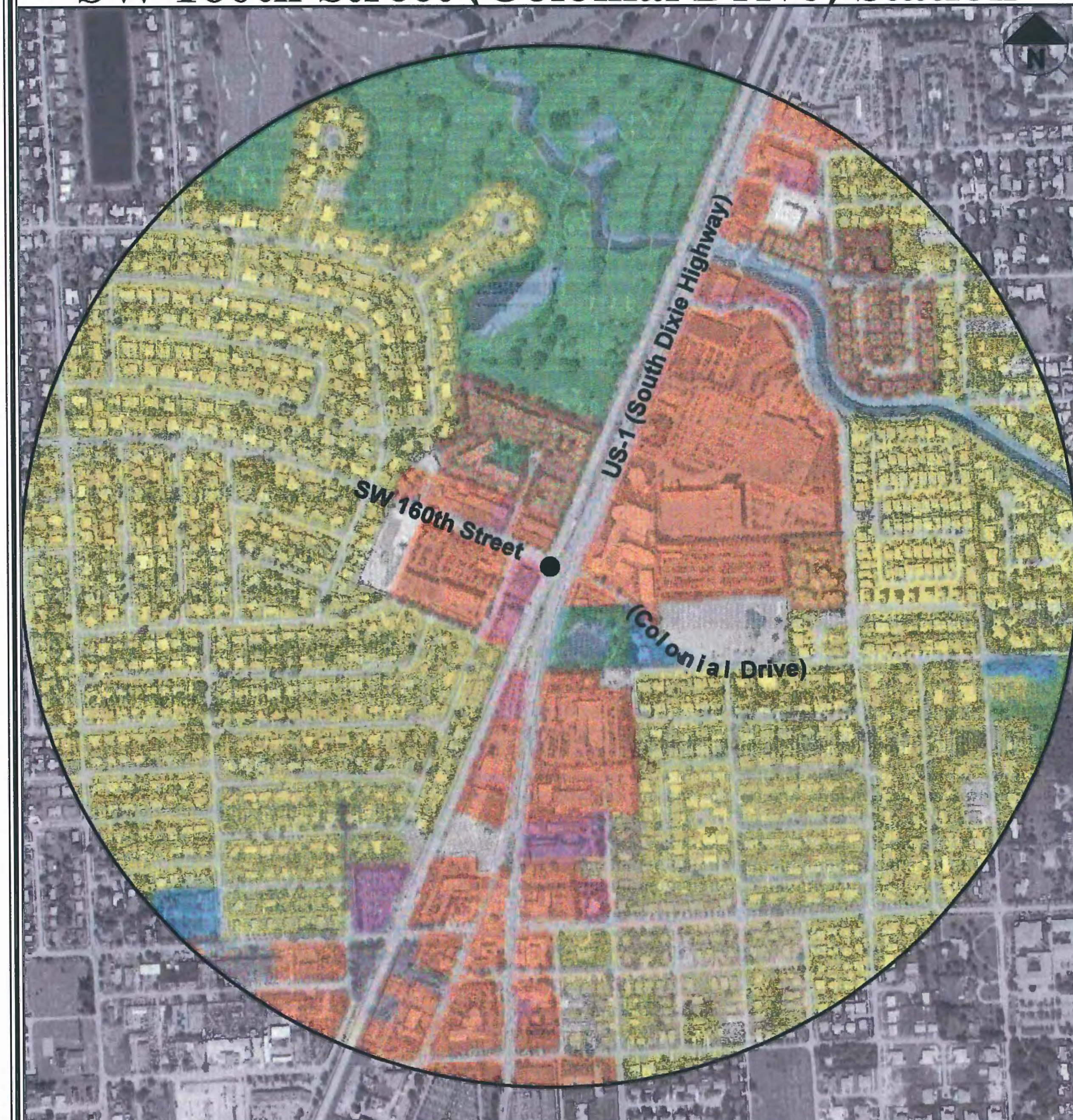


Figure 2-14

South Link Land Use - North Section
SW 160th Street (Colonial Drive) Station



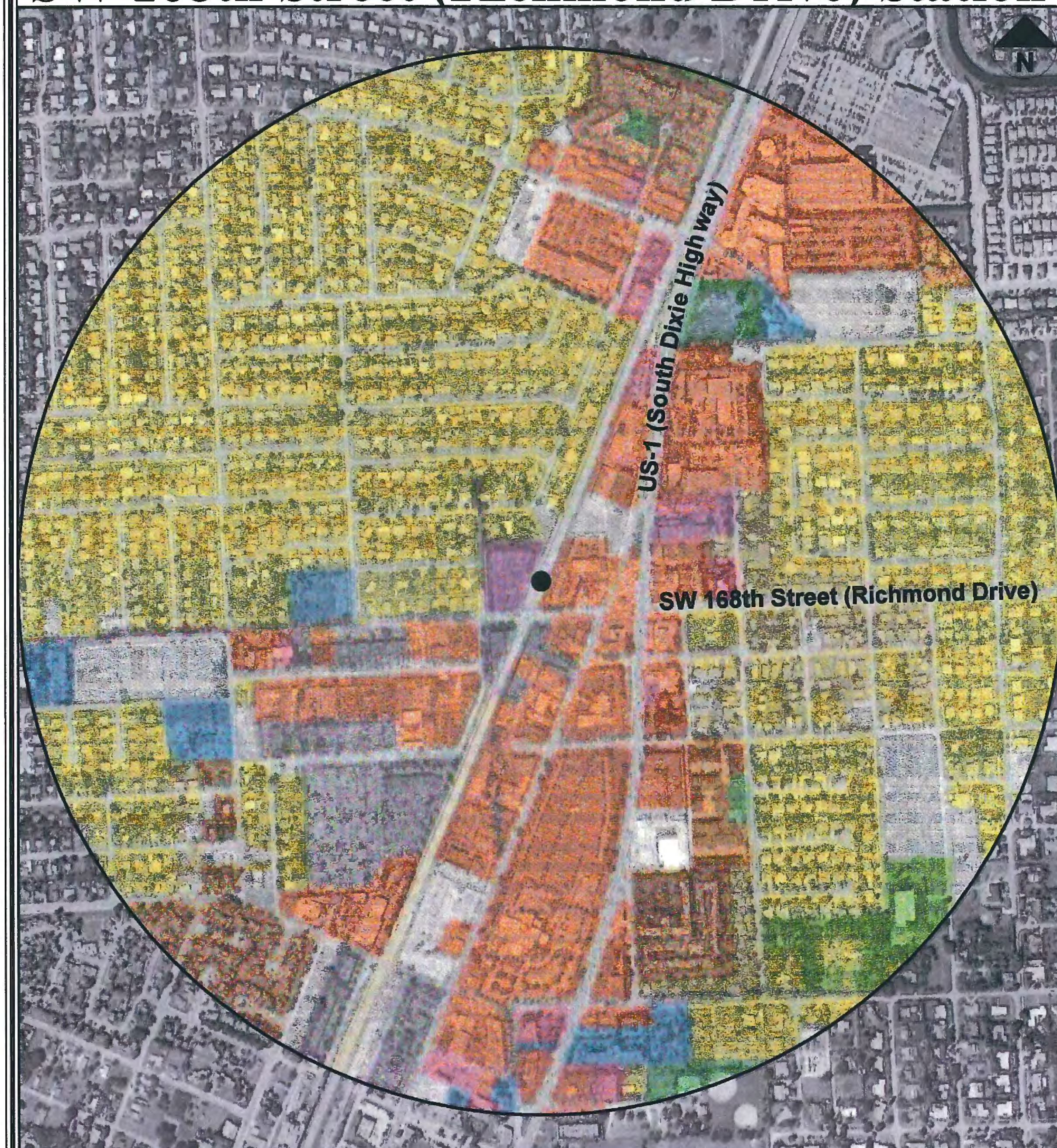
Note: Half mile radius is shown around the station.

Legend

Shopping Center	Medium Density	Institutional	Inland Water
Office	High Density	Parks	
Low Density	Industrial	Agriculture	

Figure 2-15

South Link Land Use - North Section
SW 168th Street (Richmond Drive) Station



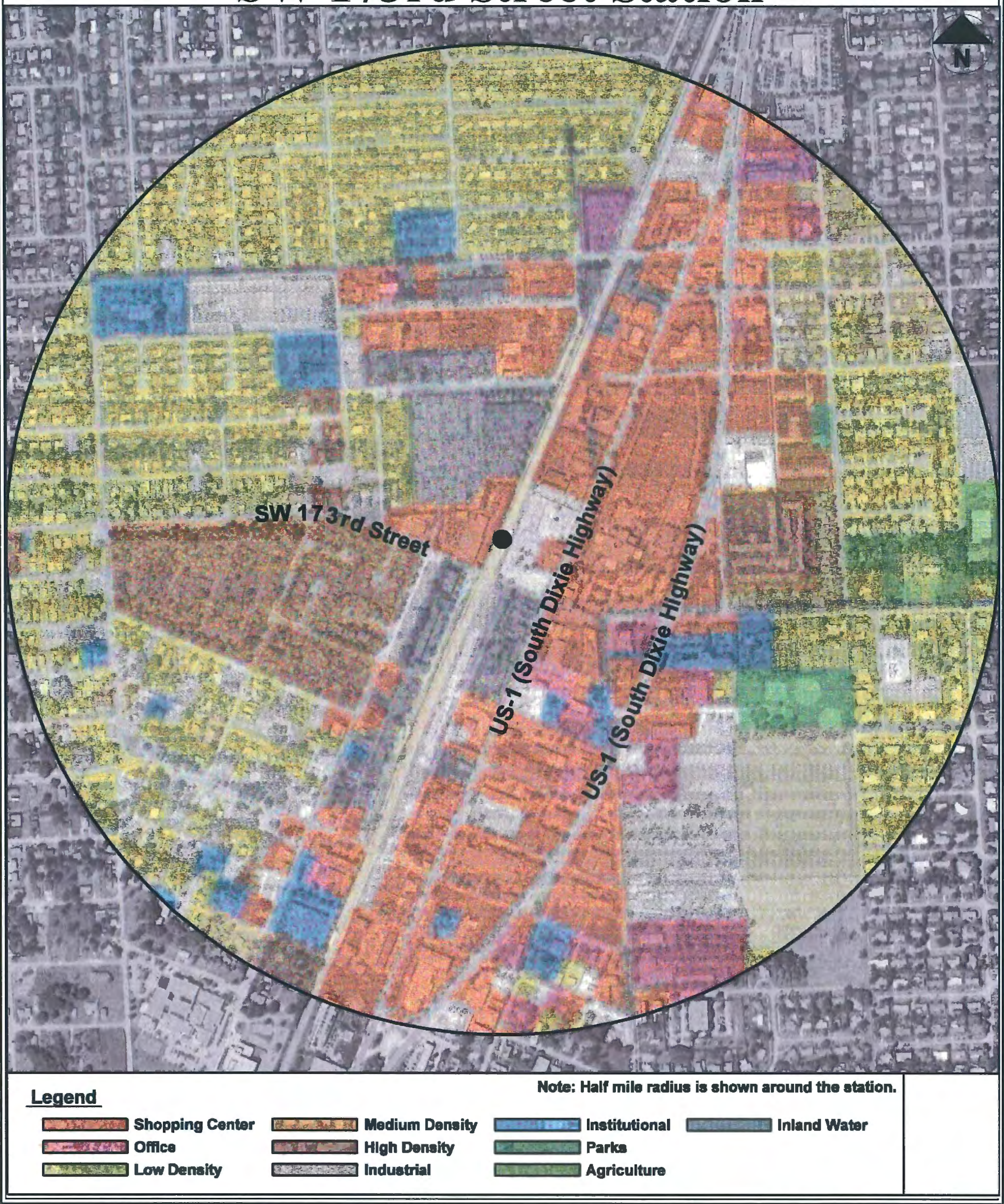
Legend

Note: Half mile radius is shown around the station.

Shopping Center
Office
Low Density
Medium Density
High Density
Industrial
Institutional
Parks
Agriculture
Inland Water

Figure 2-16

South Link Land Use - North Section
SW 173rd Street Station



include industrial, commercial shopping centers, and wide area of low-density, multi-family housing. Figure 2-17 shows the sixth station located at West Indigo Street at Hibiscus Street. The immediate area around the Hibiscus station consists mostly of abandoned lots and vacant land. To the east of the station there are neighborhood strip commercial areas along U.S. 1. To the west of the station is vacant land with clusters of low-density, multi-family housing. Figure 2-18 shows the seventh station that is located along SW 184 Street. This is the third station that lies half a block west of U.S. 1. West of the station are industrial areas, office spaces, institutional businesses, low-density single-family homes, community commercial shopping centers, and vacant land. The major institutional business in this area is the Miami Dade Public Health Facility. East of the station are community commercial shopping, low-density, single-family housing and residential four-plexes.

Exhibit 2-5: Auto-Oriented Land Use

Cutler Ridge-Perrine/South Miami Heights

The Cutler Ridge area has a population of 30,691 and encompasses the area of Perrine. The area covers 9.7 square miles with 10,025 housing units. Cutler Ridge recently voted to incorporate. It is bounded by SW 184 Street (north), SW 226th Street (south), U.S. 1 (west), and Biscayne Bay (east). Cutler Ridge has six parks, five public elementary schools, and two public middle schools. Important uses within the corridor are the South Dade Government Center, South Dade Library, South Miami-Dade Cultural Center, and the Southland Mall and business area. South Miami Heights has a large Hispanic population of 33,522 residents. This area is part of unincorporated Miami-Dade County that covers five square miles and is 18 miles from downtown Miami.

The Cutler Ridge-Perrine area has five stations along the busway. Figure 2-19 shows the first station at Marlin Road - one block west of U.S. 1. The area to the west of the station is industrial and warehousing. The area immediately adjacent to U.S. 1 is comprised of community and neighborhood commercial centers. The community commercial includes car dealerships and big-box retail. The east side of the station includes low-density multi-family residential that backs up to a community level commercial center, institutional establishments and pockets of vacant undeveloped land.

Figure 2-20 shows the second Cutler Ridge station, located along U.S. 1 at SW 200 Street or Caribbean Boulevard. Behind the strip commercial along U.S. 1 are numerous large multi-family apartment complexes. Exhibit 2-6 shows this multifamily residential area that continues about a one half mile west on Caribbean Boulevard before becoming single-family housing. The area east of the station is almost entirely regional commercial with areas of office space. The regional commercial is comprised almost entirely of the Southland Mall with the

Figure 2-17

South Link Land Use - North Section
Indigo Street Station

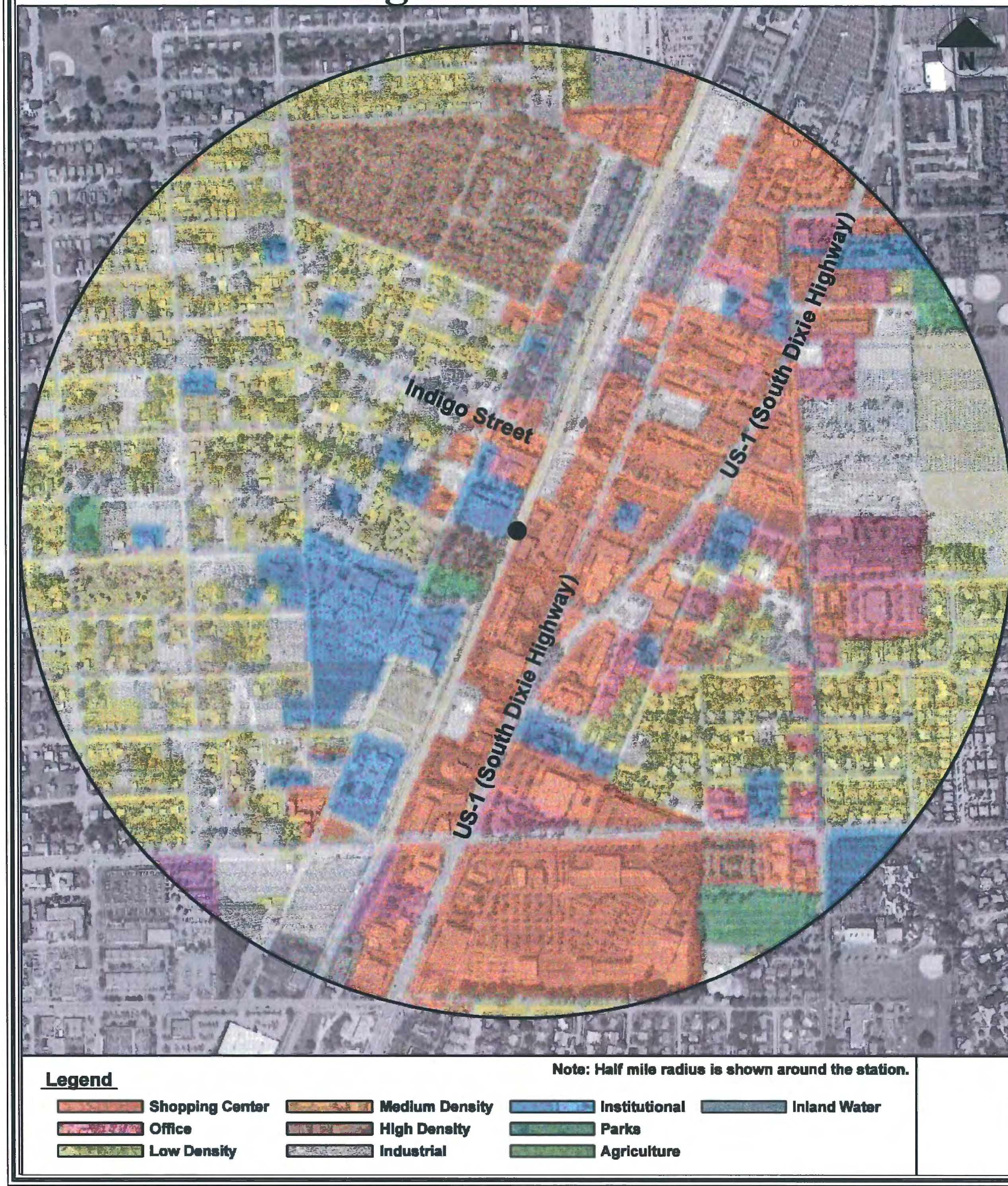


Figure 2-18

South Link Land Use - North Section
SW 184th Street (Eureka Drive) Station

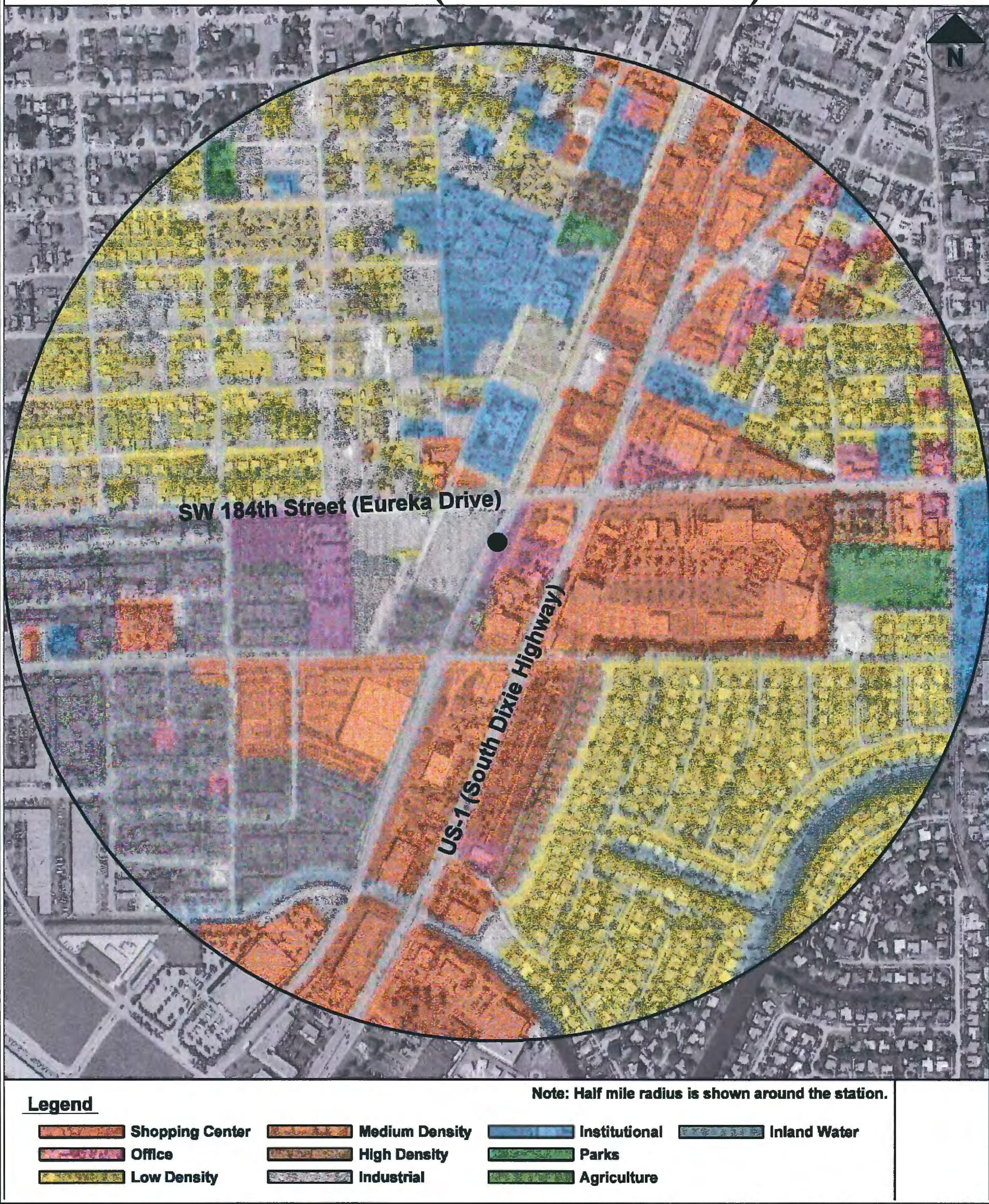


Figure 2-19

South Link Land Use - North Section
Marlin Road Station

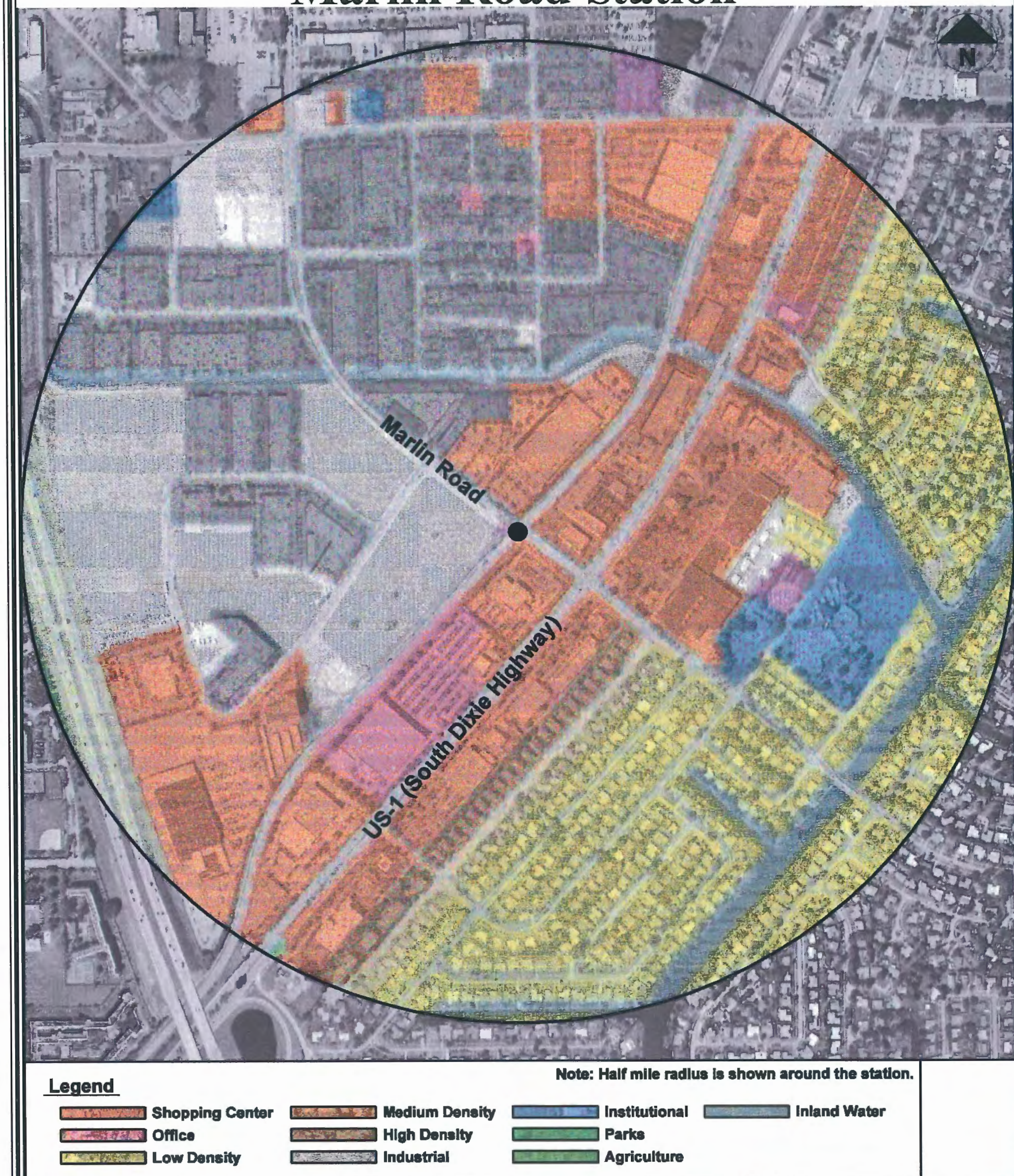


Figure 2-20

South Link Land Use - North Section
SW 200th Street (Caribbean Boulevard)

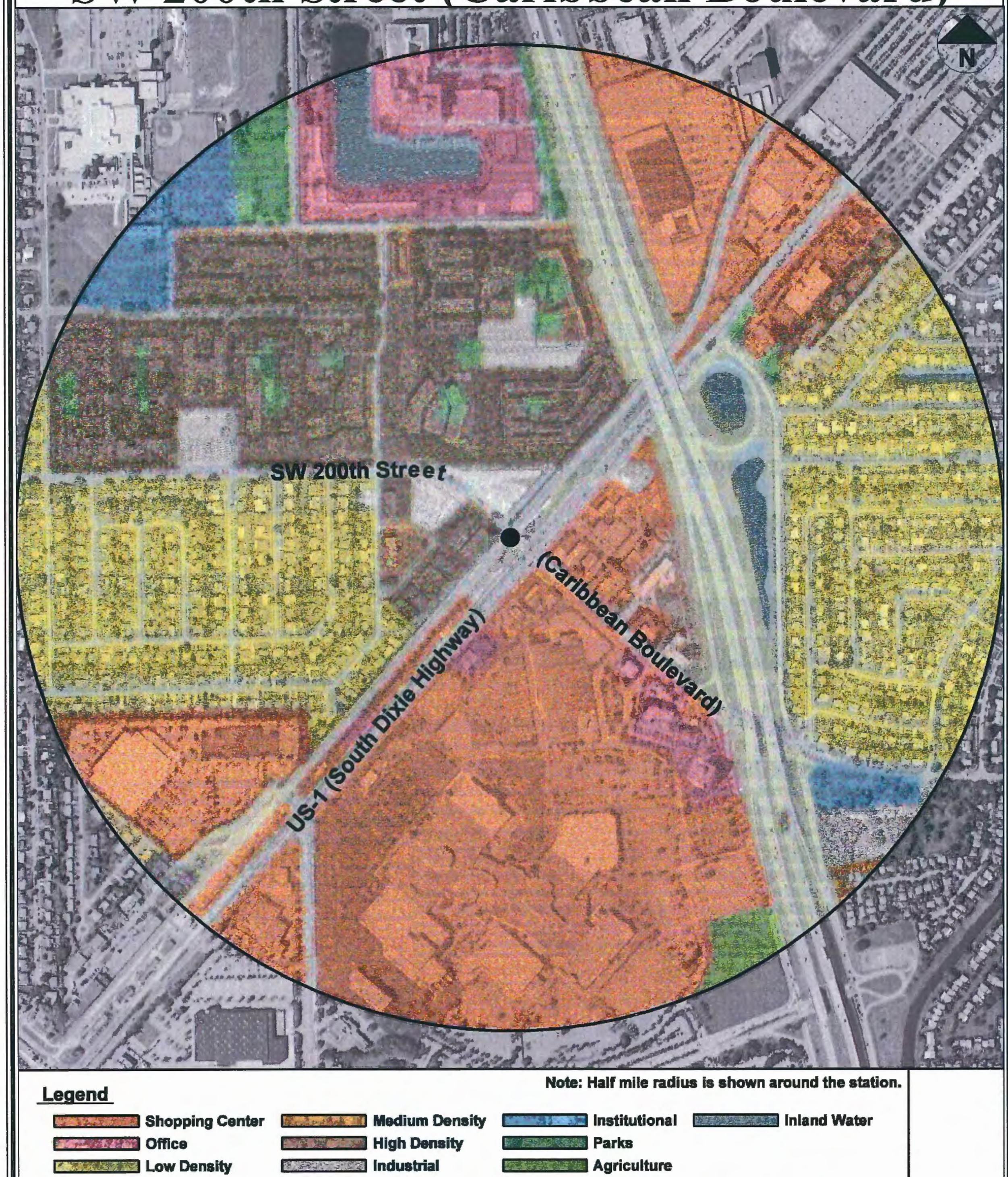


Exhibit 2-6: Multi-story Apartments

adjacent South Dade Government Center. Other land uses include canals and low-density multi-family residential. Figure 2-21 shows the third station along U.S. 1 at SW 112th Avenue or Allapattah Road. The area west of the station is low-density single-family housing that backs community commercial. The community commercial includes big-box retail with an adjacent vacant lot. adjacent South Dade Government Center. Other land uses include canals and low-density multi-family residential. Figure 2-21 shows the third station along U.S. 1 at SW 112th Avenue or Allapattah Road. The area west of the station is low-density single-family housing that backs community commercial. The community commercial includes big-box retail with an adjacent vacant lot.

Figure 2-22 shows the fourth station in Cutler Ridge at U.S. 1 and SW 216th Street. The west side of U.S. 1 is low-density single-family residential, regional commercial, and office space. The regional commercial area includes the southern side of Southland Mall. The industrial areas include the Miami-Dade Water & Sewer facility and a trash and recycling center.

Other land uses include Roberta Hunter Park and pockets of vacant land. To the east of U.S. 1 is a community commercial shopping center with car dealerships, institutional businesses, and low-density residential. The institutional areas include Arthur Middle School with the adjacent Goulds Park. Figure 2-23 shows the fifth station located along U.S. 1 at SW 220th Street. This area consists of community commercial, low-density single-family residential, and pockets of vacant land. The community commercial includes Cauley Square, Goulds Post Office, and Colonial Village.

Goulds

The Goulds area has a population of 7,453. The area covers three square miles and has 2,685 housing units. The Goulds area is part of unincorporated Miami-Dade County and is bounded by SW 232nd Street (north), SW 248th Street (south), SW 127th Avenue (west), and SW 87th Avenue (east). This area has Arthur Middle School, Goulds Park, and the Rinker Plant. Points of interest are Cauley Square (Exhibit 2-7), Goulds Post Office, Colonial Village, and Bargain Town/Farmers Market.

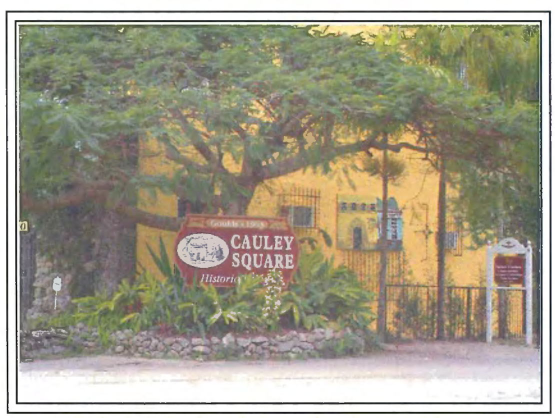


Exhibit 2-7: Historic Retail Area

Figure 2-21

South Link Land Use - North Section
SW 112th Avenue(Allapattah Road) Station

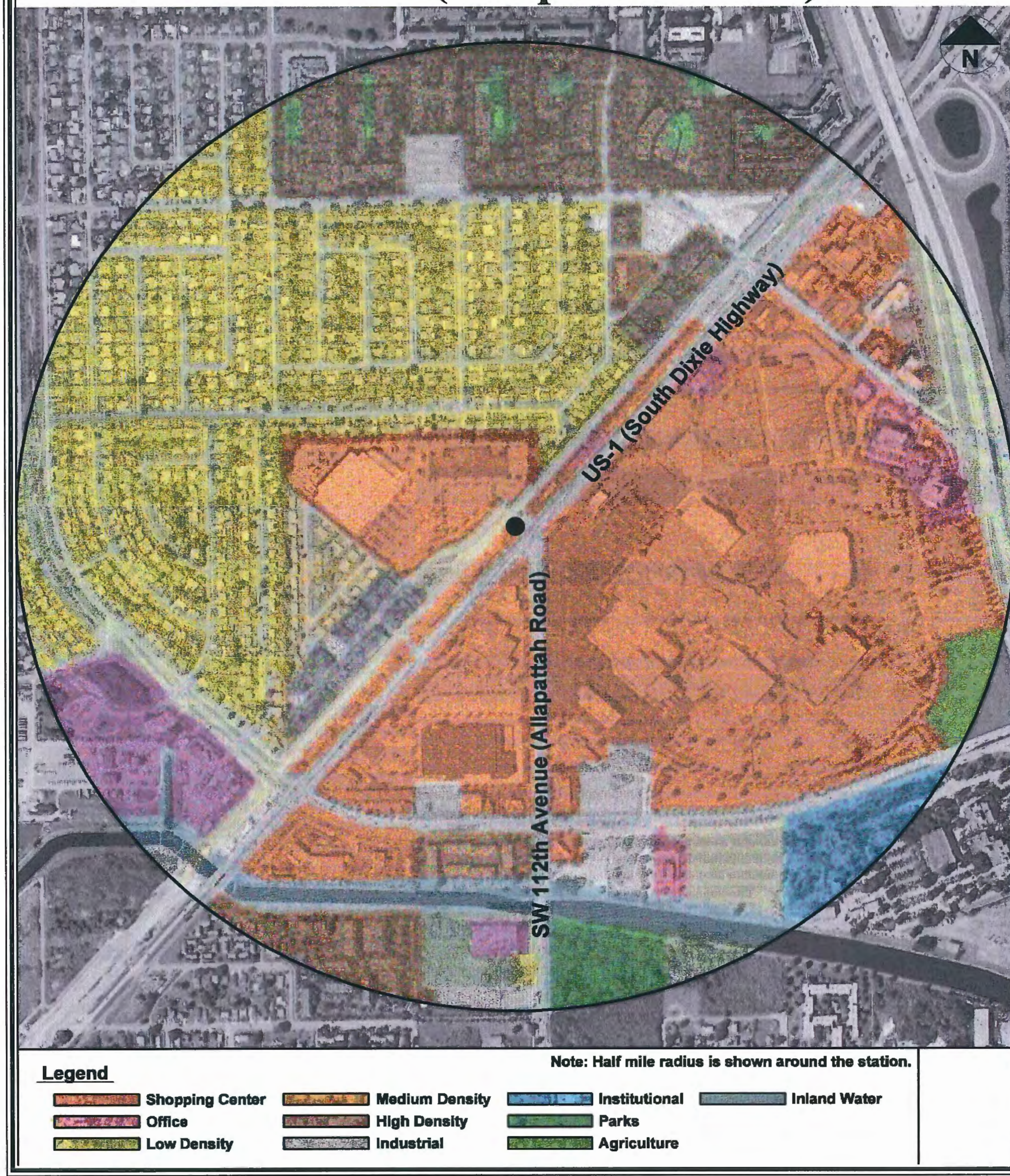


Figure 2-22

South Link Land Use - North Section
SW 216th Street Station

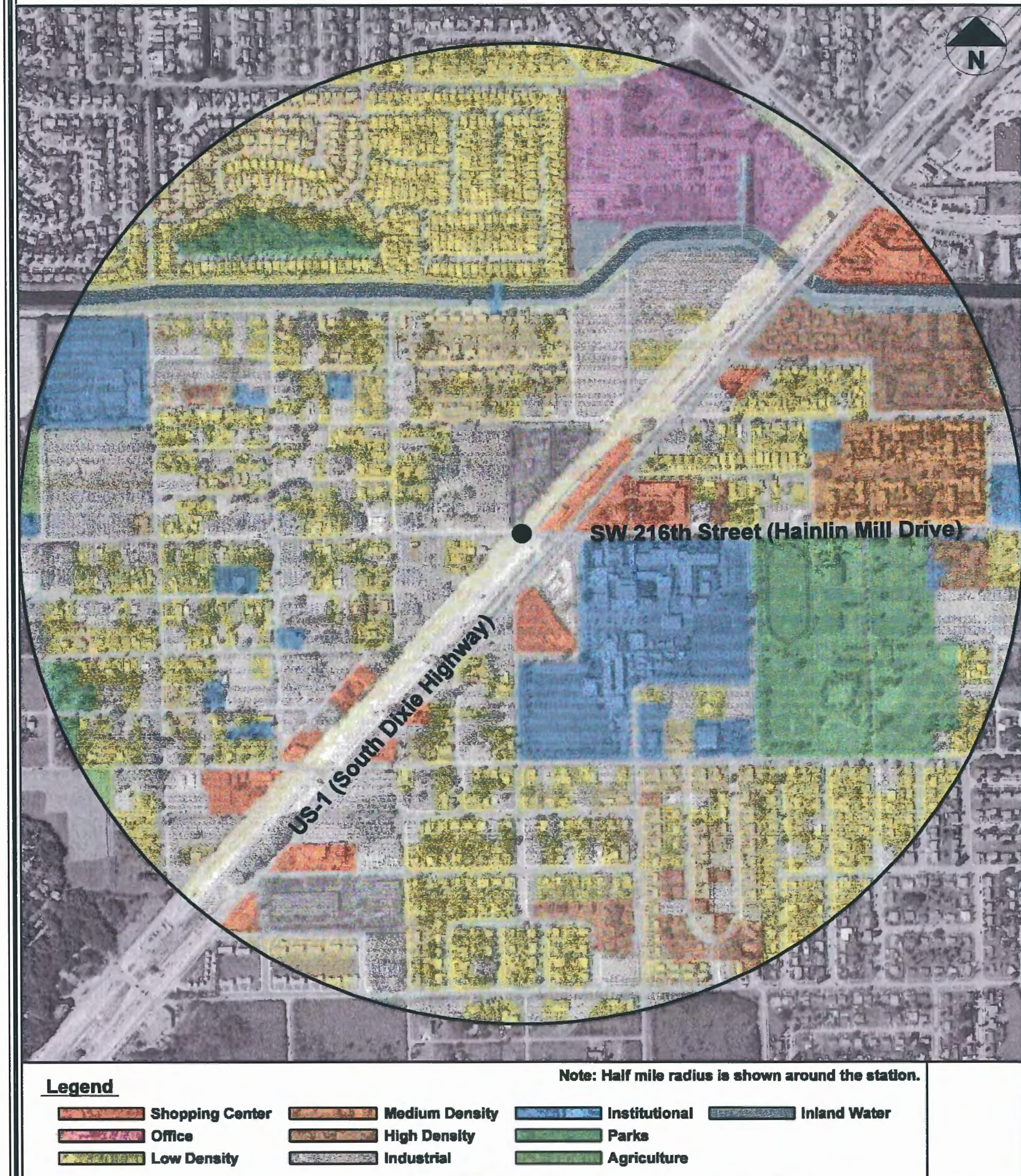
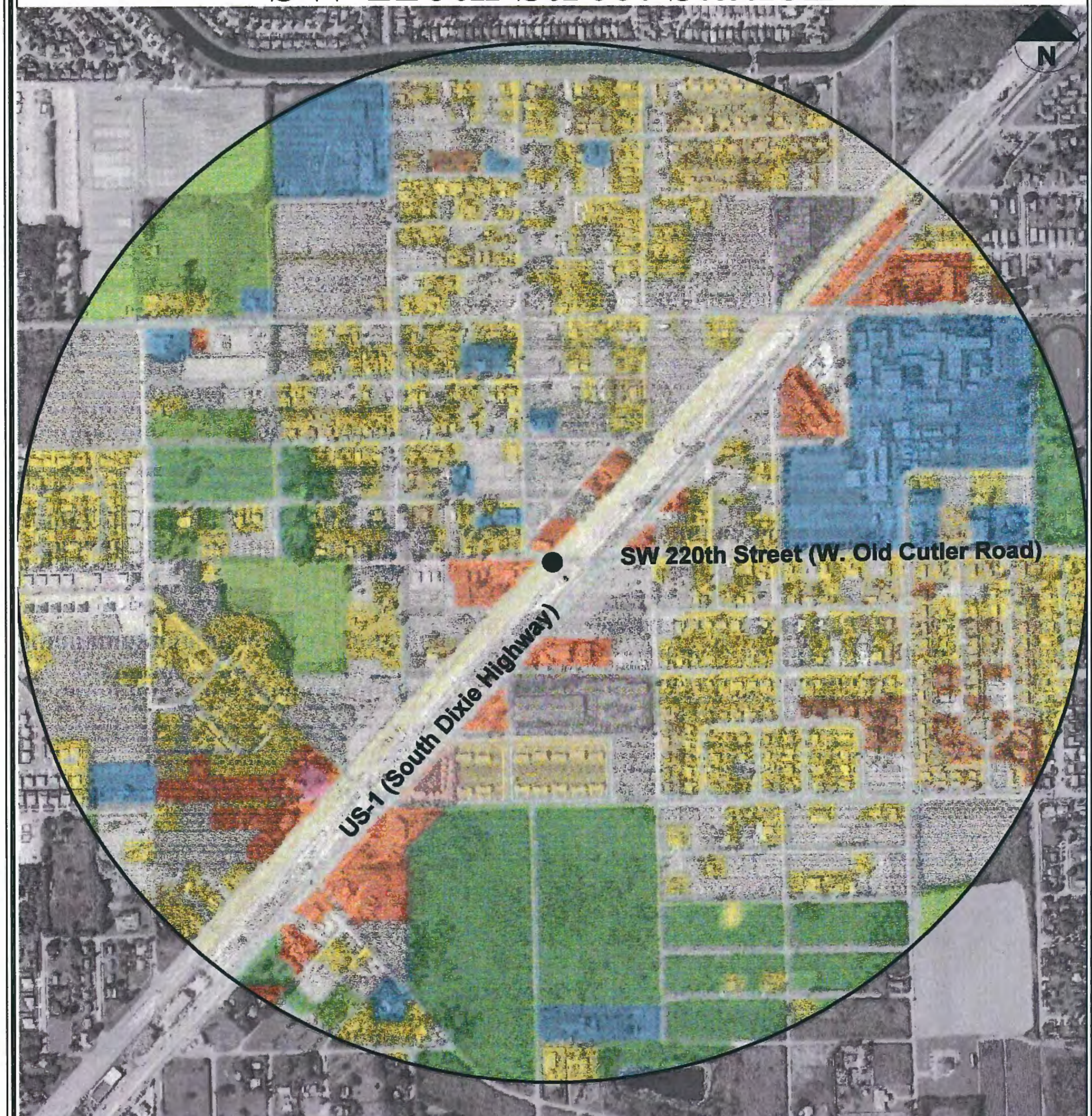


Figure 2-23

South Link Land Use - North Section
SW 220th Street Station



Note: Half mile radius is shown around the station.

Legend

Shopping Center
Office
Low Density
Medium Density
High Density
Industrial
Institutional
Parks
Agriculture
Inland Water

The Goulds area has two busway stations. Figure 2-24 shows the station located between U.S. 1 and Old Dixie Highway at SW 232 Street or Silver Palm Drive. The area around this station is agricultural with orange groves on both sides of the station. Other land uses along U.S. 1 include neighborhood strip commercial, vacant industrial, and pockets of vacant land.

Exhibit 2-8: Agricultural Area

Figure 2-25 shows the station located along U.S. 1 at SW 244th Street. The area around this station is mostly agricultural (Exhibit 2-8) with orange groves, as well as industrial and neighborhood commercial. The industrial area is a Rinker plant. The area west of this station has a park-and-ride lot adjacent to U.S. 1.

NARANJA/PRINCETON

Naranja has a population of 20,716. The area covers 22 square miles and has 6,609 housing units. The Naranja area is part of unincorporated Miami-Dade County and is bound by SW 248th Street (north), Florida Turnpike (east), SW 280th Street (south), and U.S. 1 (west). Naranja consists of single-family homes called, "Mandarin Homes." The main features in this area are a cemetery, a single-family housing development called "Flamingo Homes," and a multi-family residential complex called "Vista Terrace Townhomes."

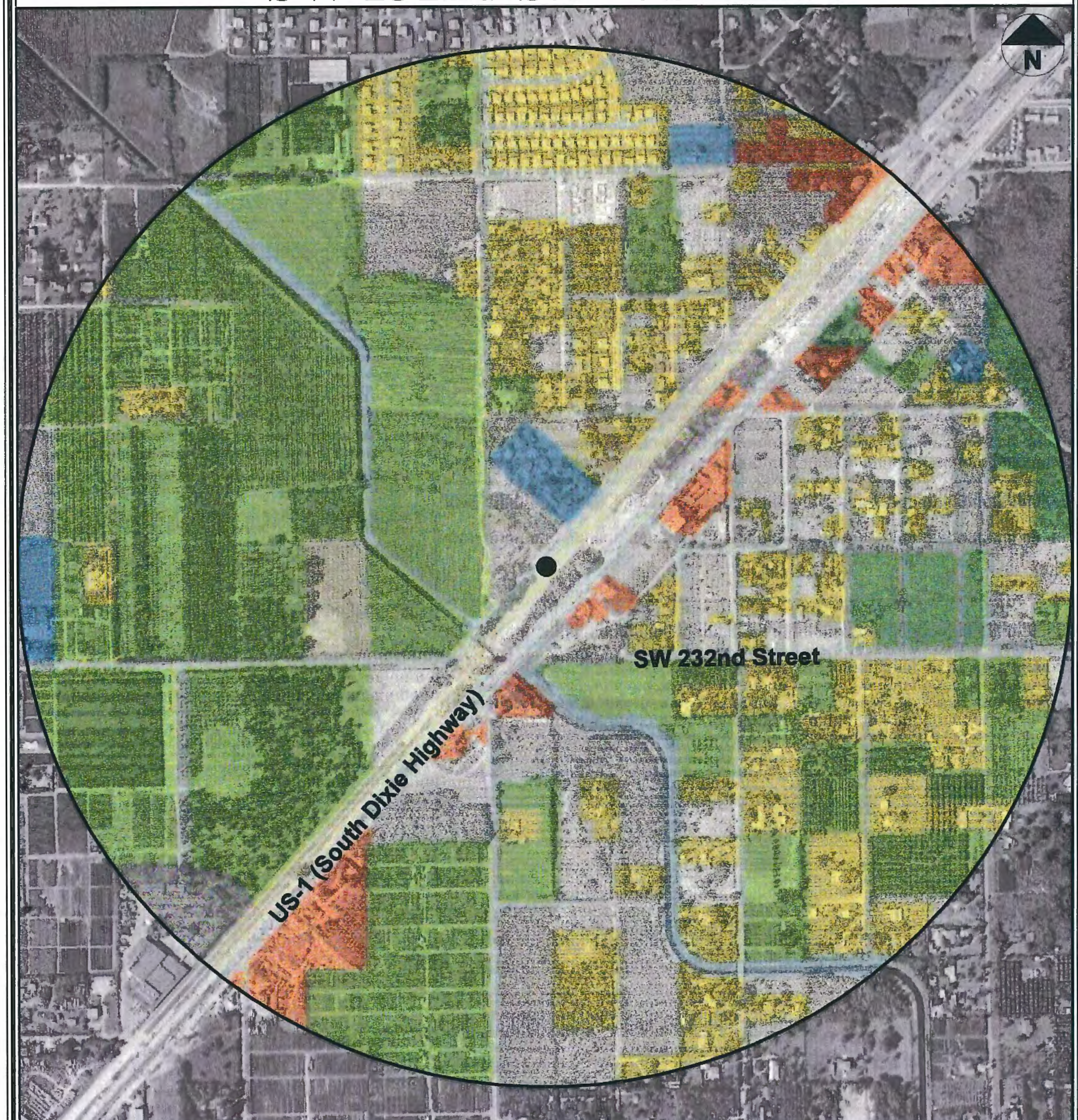
The Naranja area has one busway station. Figure 2-26 shows the Naranja station that is located along U.S. 1 at SW 264th Street. This is the present southern terminus of the busway. To the west of U.S. 1 is low-density residential, vacant industrial. It has some community commercial which includes the Bargain Town/Farmers Market. To the east of U.S. 1 is mostly vacant land with pockets of low-density, multi-family residential. The residential areas include an RV camp, the Naranja apartments, and the Mandarin Homes housing community. The remainder of the land uses in the Naranja area include agricultural and low-density single-/multi-family homes.

REDLANDS

Redlands is outside of the urban development boundary and has a population of 5,514. The area covers 22 square miles and has 1,884 housing units. The Redlands area is part of unincorporated Miami-Dade County and is bounded by SW 184th Street (north), Old Dixie Highway (east), SW 296th Street (south), and SW 197th Avenue (west). The areas around Biscayne Drive have low-density single-family residential and agricultural land. The residential area includes the Farmland Estates that is comprised of 78 single-family home units. To the east of U.S. 1 and Biscayne Drive are single and multi-family residential areas with the adjacent Modello Wayside Park. The community commercial area includes the Community Plaza Shopping Center. The surrounding area around Avocado Drive has single-family residential, neighborhood strip commercial, and vacant land. The vacant land is illustrated in Exhibit 2-9. The neighborhood commercial area includes a Walgreens and a vacant car deal-

Figure 2-24

South Link Land Use - Central Section
SW 232nd Street Station



Note: Half mile radius is shown around the station.

Legend

Figure 2-25

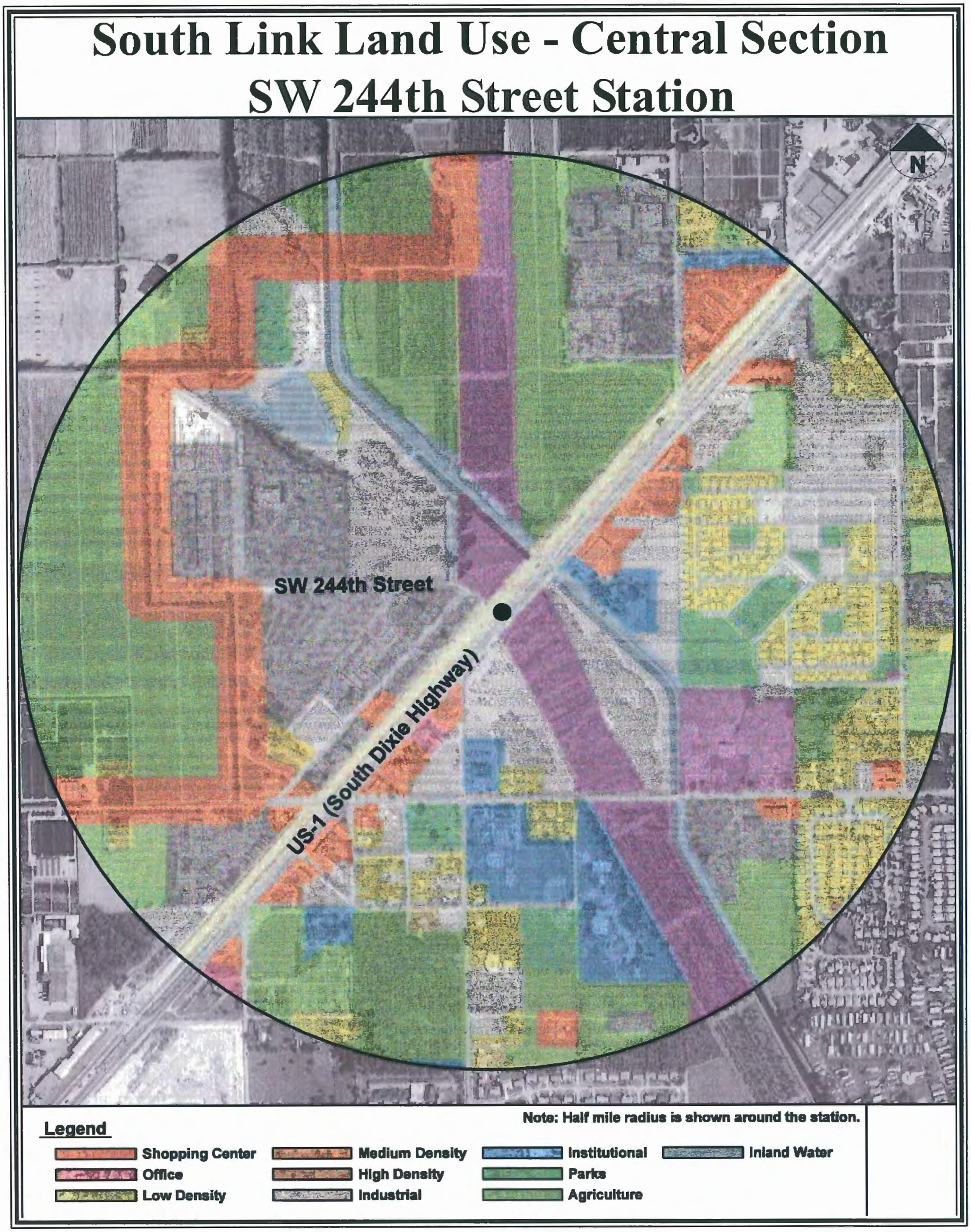
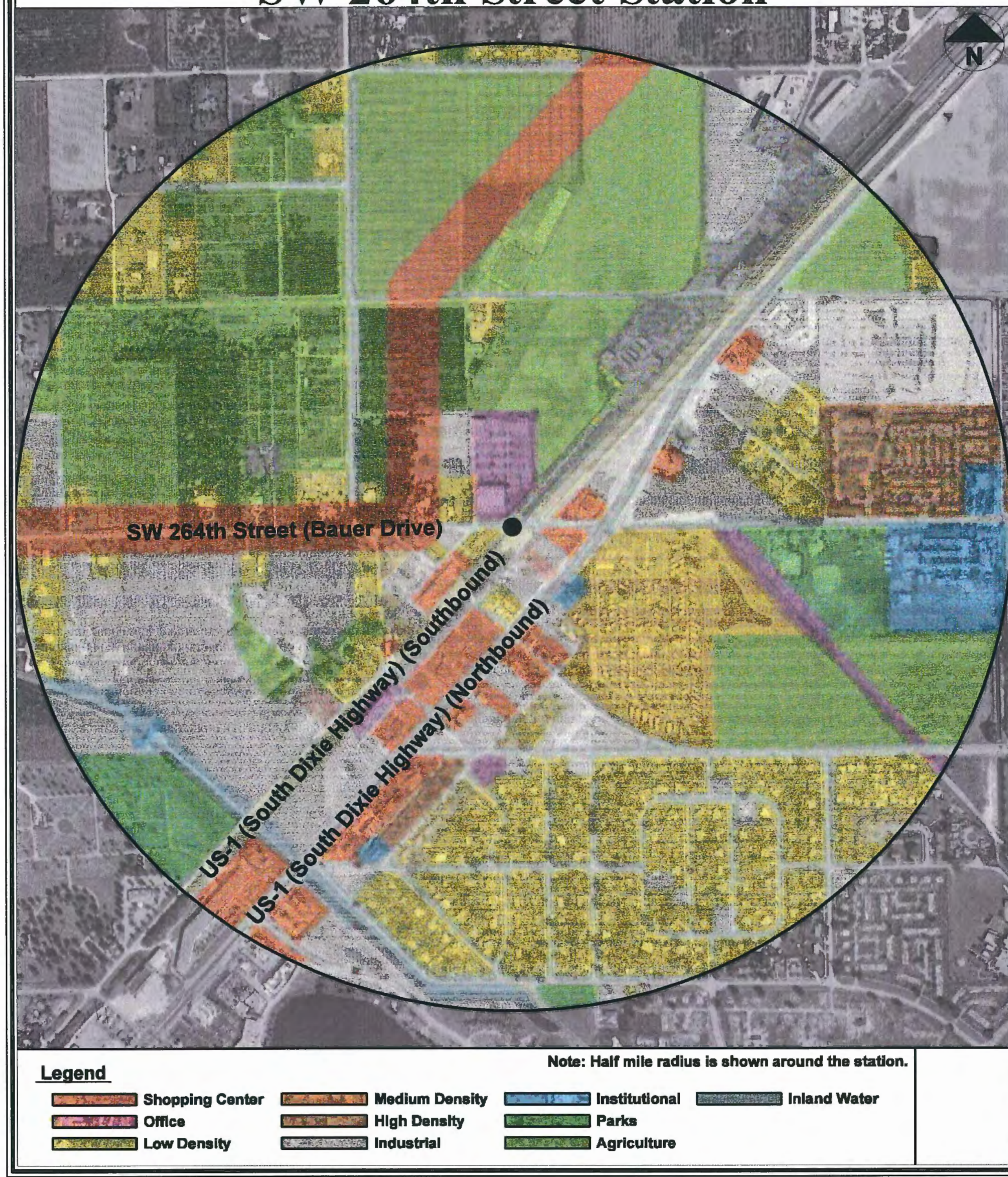

South Link Land Use - Central Section
SW 244th Street Station
N
SW 244th Street
US-1 (South Dixie Highway)
Note: Half mile radius is shown around the station.
Legend
Shopping Center
Office
Low Density
Medium Density
High Density
Industrial
Institutional
Parks
Agriculture
Inland Water

Figure 2-26

South Link Land Use - Central Section
SW 264th Street Station



ership. To the east of U.S. 1 and Avocado Drive are single-family low-density residential and vacant land. Other land uses include institutional and community commercial, which is autorelated retail.


Exhibit 2-9: Avocado Dr. Area

Homestead

The City of Homestead was incorporated in 1913 and has a population of 31,309. The city covers 16 spare miles and has 8,001 housing units. The City of Homestead is bounded by SW 296th Street (north), SW 352nd Street (south), SW 132 Avenue (east), and SW 192nd Avenue (west). Homestead has 12 parks, 10 elementary schools, three middle schools, and two high schools. The agricultural economy in Miami-Dade County is heavily dependent on the fields and groves of Homestead. These produce $900 million worth of fruits, vegetables and tropical foliage each year. The agri-business of Homestead, in which over 83,000 acres of land are set aside, creates a job base of nearly 20,000 at 1,623 farms and nurseries. The main street in Homestead is Krome Avenue which runs through downtown Homestead. It offers antique shops, specialty stores, and restaurants. Large land uses in the city include the Homestead Air Reserve Base, Homestead Hospital, Homestead-Miami Speedway, Homestead Sports Complex, Redland Tropical Gardens, Seminole Theater, and Everglades National Park.

The land uses between Kings Highway and SW 308 Street along U.S. 1 mainly comprise of community commercial, low-density single-family residential, and pockets of vacant land. The community commercial areas include the Dixie Shopping Center and the Homestead Town Square. The area along Campbell Drive includes neighborhood/ community commercial, professional buildings, low-density residential, and institutional land. The institutional land is comprised of the Homestead Air Force Base. The professional buildings and business offices are within the downtown Homestead area.

Florida City

Florida City (Exhibit 2-10) was incorporated in 1914 and has a population of 15,435. The City covers three square miles and has 4,399 housing units. Florida City is bounded by SW 328th Street (north), SW 352nd Street (south), Biscayne National Park (east), and SW 192nd Avenue (west). The city has four city parks, two County parks, and two national parks.


Exhibit 2-10 US 1 in Florida City

The northern portion of Florida City is low-density, single-family residential with agricultural areas. Other land uses include community and neighborhood commercial areas as illustrated in the picture above. The southern portion contains agricultural areas with low-density single-family residential. There are scattered vacant land, parks, and preserves throughout Florida City.

2.2.3 Trip Attractors

Along the corridor there are a number of non-residential trip attractors. These are listed in Table 2-2 .

There is a substantial amount of land use in the corridor classified as either institutional or parks. Following are a series of tables (Table 2-3 through Table 2-8) that list the institutional and park property in the South Dade Corridor.

Table 2-2
Trip Attractors by Location

South Dade Community	Commercial	Major Employers	Tourism/Entertainment	Institutional
Village of Pinecrest	Village Hall Business Offices	Village Hall & Police Station	Wayside Market Parks: Coral Pine, Suniland, Pinecrest, Veterans Wayside	Miami Palmetto Senior High School Miami Killian Senior High School
Palmetto Bay	Retail Business Offices City Hall	The Falls Palmetto Bay City Hall Jackson South Hospital	The Falls Coral Reef Park	Southwood Middle School Coral Reef Elementary
Cutler Ridge-Perrine	Retail Business Offices Entertainment	Southland Mall Precision Response Corp Assurant Group American Bankers Insurance Group South Dade Government Center	Southland Mall Palmetto Golf Course South Miami Dade Cultural Center Black Point Marina	Perrine Elementary Cutler Ridge Middle School Coral Reef Senior High School
Goulds	Retail	Rinker Plant Goulds Post Office	Cauley Square Colonial Village Bargain Town/Farmers Market	Arthur Middle School
Naranja		Shoppes of Naranja Lakes	Naranja Lake Orchard Jungle	
Redlands	Retail	Community Plaza Dixie Center	Modello Wayside Park	
Homestead	Library Retail/Tourism City Hall Business Offices	City of Homestead Miami-Dade College Homestead Air Force Base	Homestead-Miami Speedway Homestead Sports Complex Redland Tropical Gardens Seminole Theater	Homestead & South Dade High Schools Miami-Dade College
Florida City	Retail	Baptist Hospital of Homestead	Coral Castle Robert is Here Everglades Alligator Farm Main Street Cafe	Florida City Elementary School Florida City Headstart

Table 2-3
Churches Located Within One Mile of the Corridor

NAME	ADDRESS
Grace Church of Kendall	8100 SW 104 St. Miami, FL 33156
Kendall United Methodist Church	7600 SW 104 St. Miami, FL 33156
Grace of God Baptist Church	11000 SW 216 St. Miami, FL 33170
Agape Faith Center	21910 SW 120 Ave. Miami, FL 33170
Agape Family Ministries	9731 SW 167 St. Miami, FL 33157
Bay Community Church	9855 SW 184 St. Miami, FL 33157
Beautiful Zion Temple of God	21734 SW 120 Ave. Miami, FL 33170
Berachah Missionary Baptist Church	16436 S Dixie Hwy. Miami, FL 33157
Centro Cristiano Ebenezer	14501 W Dixie Hwy. Miami, FL 33161
Centro Cristiano La Ultima Cosecha	18747 SW 107 Ave. Miami, FL 33157
Christ Congressional Church	14420 SW 67 Ave. Miami, FL 33158
All Saints Greek Orthodox Church	18615 SW 90 Ave. Miami, FL 33157
Center of Hope Church of God of Prophesy Inc	10331 SW 174 St. Miami, FL 33157
Christ The King Catholic Church	16000 SW 112 Ave. Miami, FL 33157
Church of Christ Written in Heaven of Perrine	10230 SW 179 St. Miami, FL 33157
Church of Our Lord	10217 SW 174 Terrace. Miami, FL 33157
Community Tabernacle Church of God in Christ	14150 SW 264 St. Miami, FL 33157
Ekklesia of God	17350 S Dixie Hwy. Palmetto Bay, FL 33157
Emmanuel Apostolic Church	16804 SW 100 Ave. Miami, FL 33157
Our Lady of The Holy Rosary Catholic Church	18455 SW 97 Ave. Miami, FL 33157
Perrine Peters United Methodist Church	18301 SW S Dixie Hwy. Miami, FL 33157
Church of Christ Goulds	22800 SW 112 Ave. Miami, FL 33170
Crusade For Christ Missionary Church	11340 SW 216 St. Miami, FL 33170
Deliverance Lighthouse Church	10701 SW 216 St. Miami, FL 33170
Gould First Church of The Nazarene	118 SW 232 St. Miami, FL 33170
Holiness Church of Florida	12301 SW 216 St. Miami, Fl 33170
Morning Start Baptist Church	22769 SW 120 Ave. Miami, FL 33170
Mt Pleasant Baptist Church	11591 SW 220 St. Miami, FL 33170
New Bethel AME Church	11695 SW 220 St. Miami, FL 33170
Two Stone Church of God	12001 SW 218 St. Miami, FL 33170
Church of The Nazarene Homestead	300 NE 15 St. Homestead, FL 33030
First Baptist Church of Homestead	29050 SW 177 Ave. Homestead, FL 33030
First United Methodist Church	622 N Krome Ave. Homestead, FL 33030
Iglesia Apostólica Del Nombre de Jesús	623 SW 1 Ave. Homestead, FL 33030
Jesús Is The Way Church	312 SW 4 Ave. Homestead, FL 33030
Pentacostal Church of Homestead	736 SW 6 Ave. Homestead, FL 33030
South Dade Baptist Church	17105 SW 291 St. Homestead, FL 33030
St John Episcopal Church	145 NE 10 St. Homestead, FL 33030

Table 2-4
Government Offices Located Within One Mile of the Corridor

NAME	ADDRESS
Pinecrest Village Hall	12645 Pinecrest Parkway
Palmetto Bay Village Hall	8950 SW 152 Street
South Dade Government Center	10710 SW 211 Street
Homestead City Hall	790 N. Homestead Blvd.
Florida City City Hall	404 W Palm Drive

Table 2-5
Fire Stations Located Within One Mile of the Corridor

NAME	ADDRESS
Coral Reef Station # 4	9201 SW 152 St. Miami, FL 33157
Princeton Station # 5	13150 SW 238 St. Redland, FL 33032
Homestead/Florida City Station	325 SW 2 St. Homestead, FL 33030
Suniland/Pinecrest Station # 23	7825 SW 104 St. Miami, FL 33156
Cutler Ridge Station # 34	10850 SW 211 St. Cutler Ridge, FL 33189
Perrine Station # 50	9788 Hibiscus St. Perrine, FL 33157
Modello Station # 6	15890 SW 288 St. Homestead, FL 33157

Table 2-6
Public Schools Located Within One-Half Mile of the Corridor

NAME	ADDRESS
Air Base Elementary School	12829 SW 272 St. Homestead, FL 33032
Caribbean Elementary School	11990 SW 220 St. Miami, FL 33177
Colonial Drive Elementary School	10755 SW 160 St. Miami, FL 33157
Coral Reef Elementary School	7955 SW 152 St. Miami, FL 33157
Florida City Elementary School	364 SW 6 Ave. Florida City, FL 33034
Leisure City Elementary School	14950 SW 288 St. Homestead, FL 33033
Moton RR Elementary School	18050 Homestead Ave. Perrine, FL 33157
Naranja Elementary School	13990 SW 264 St. Naranja, FL 33032
Perrine Elementary School	8851 SW 168 St. Perrine, FL 33157
Pine Lake Elementary School	16700 SW 109 Ave. Miami, FL 33161
Pinevilla Elementary School	21799 SW 117 Court. Miami, FL 33170
Redondo Elementary School	18480 SW 304 Ave. Homestead, FL 33030
Laura C. Saunders Elementary School	505 SW 8 St. Homestead, FL 33030
Vineland Elementary School	8455 SW 119 St. Miami, FL 33156
West Homestead Elementary School	1550 SW 6 St. Homestead, FL 33030
Whispering Pine Elementary School	18927 SW 89 Road. Miami, FL 33157
Campbell Drive Middle School	31110 SW 157 Ave. Homestead, FL 33030
Cutler Ridge Middle School	19400 SW 97 Ave. Miami, FL 33157
Homestead Middle School	650 NW 2 Ave. Homestead, FL 33030
Palmetto Middle School	7351 SW 128 St. Miami, FL 33156
South Wood Middle School	16301 SW 80 Ave. Miami, FL 33157

Table 2-6 (Continued)
Public Schools Located Within One Mile of the Corridor

NAME	ADDRESS
Coral Reef High School	10101 SW 152 St. Miami, FL 33157
Homestead High School	2351 SE 12 Ave. Homestead, FL 33035
Miami Southridge Senior High School	19355 SW 114 Ave. Miami, FL 33157
W. Chapman Elementary School	27190 SW 140 Avenue, Homestead, FL 33032
Mays Junior High School	11700 Hainlin Mill Drive, Goulds, FL 33170
Miami Dade Community College	500 College Terrace, Homestead FL 33030
Neva King Cooper School	151 NW 5 Street, Homestead, FL 33030
South Dade Adult Educational Center	109 NE 8 Street, Homestead, FL 33030
Miami Palmetto Senior High School	7460 SW 118 Street, Miami, FL 33156

Table 2-7
Parks/Recreational Areas Located Within One Mile of the Corridor

NAME	ADDRESS
Bell Aire Park	SW 185 St and 97 Ave. Miami, FL
Ben Shavis Park	SW 179 St and 104 Ave. Miami, FL
Briar Bay Urban Park	SW 128 St and 90 Ave. Miami, FL
Briar Bay Golf Course	9375 SW 134 Ave. Miami, FL 33157
Perrine Wayside Park	South Dixie Hwy and Colonial Dr. Miami, FL
West Perrine Park	SW 104 Ave and 172 Terrace. Miami, FL
Cutler Ridge Park	10100 SW 200 St. Miami, FL
Goulds Park	21840 SW 114 Ave. Miami, FL
Pine Ridge Park	13050 SW 216 St. Miami, FL
Modello Park	SW 152 Ave and 284 St. Miami, FL
Seminole Wayside Park	South Dixie Hwy and 300 St. Miami, FL
Coral Pine Park	SW 70 Ave and 104 St. Miami, FL
Blakey Park	SW 6 St and SW 15 Ave. Homestead, FL
Roby George Park	SW 304 St and 153 Ave. Miami, FL
Palmland Park	SW 304 St and 153 Ave. Miami, FL
Harris Field Park	SW 312 St and South Dixie Hwy. Homestead, FL
Vista Park	NW 115 St and NW 2 Ave. Homestead, FL
Redd Municipal Park	South Dixie Hwy and NE 4th Dr. Miami, FL
Girls Scout Park	Down Town Homestead, FL
Robert Park	NW 6 Ave. and Davis Parkway. Homestead, FL
Tatum Park	SW 7 St and S Flagler Ave. Homestead, FL
Suniland Park	SW 130 St and South Dixie Hwy. Miami, FL
Pinecrest park	SW 124 St and South Dixie Hwy. Miami, FL
Kendall Wayside Park	Killian Dr and South Dixie Hwy. Miami, FL
Goulds Park	21840 SW 114 Ave. Miami, FL
Continental Park	10000 SW 82 Ave. Miami, FL
Southridge Park	SW 192 St and 112 Ave. Miami, FL
Leisure Park	15355 SW Harding Lane, Miami, FL 33157
Everglades National Park	40001 SR 9336, Homestead, FL 33032

Table 2-8
Public Libraries Located One-Half Mile of Corridor

NAME	ADDRESS
Coral Reef Branch	9211 Coral Reef Drive. Miami, FL 33157
South Dade Regional Library	10750 SW 211 St. Miami, FL 33189
Naranja Branch	27060 South Dixie Hwy. Naranja, FL 33032
Homestead Branch Library	700 N Homestead Blvd. Homestead, FL 33030

2.2.4 Projects under Construction

South Dade is growing rapidly. Table 2-9 is a documentation of developments that are ready to begin construction, currently being completed, are under construction, or have recently been completed.

Table 2-9
Residential Development Underway in Corridor

DEVELOPMENT	LOCATION	USE	TIME FRAME	# UNITS
Augusta Green	Fairways/Palm Dr	SF	2003-05	36
Carmel Investment	100 NW 5 St.	SF	2003	9
Casa del Sur	SE 6/Mowry	Townhouse	2004	105
CocoWalk	200 NE 12	Manufacturing	2004	224
Dunwoodie	Fairways/Palm Dr	SF	2004	40
East Lake	2000SE 28 Ave	SF	2004	30
Waterstone I	288 St/137 Ave	SF	2003-2005	1,058
Waterstone II	Campbell Dr/137 Ave	Mixed Res.	2005	1,126
Malibu Bay	288 St/137 Ave	Mixed Res.	2005-2007	1,455
Oasis	328 St/147 Ave	Mixed Res	2005-2012	3,849
Keys Gardens	Canal Dr./152 Ave	Mixed Res	Under Review	929
Silver Palm	232St/Bailes Rd	Mixed Res.	Under Review	1,632
Mandarin Lake	270 St/130 Ave	Mixed Res	Under Review	1,567
Seastone Townhouses		Multi-family	Under review	37
Lakes by the Bay South Commons	87 Ave/216 St.	SF	Under review	692

2.3 Demographics

The 2000 census showed that Miami-Dade County had a population of 2,206,500. By 2030 the population projected to increase by 42.7 percent to 3,149,291. The southern portion Miami-Dade County (south of Kendall Drive) had a 2000 population of 429,054, with growth by 2030 expected to reach 766,864. This represents a 79 percent population growth in the southern third of the County and accounts for 36 percent of the total population growth in the County.

2.3.1 Population

As shown in Figure 2-27, the northern section of the South Miami-Dade Corridor includes the communities of Pinecrest, Palmetto Bay, and Cutler Ridge. These comprise 39 percent of the total population of the corridor. The southern section of the corridor includes Homestead and Florida City and has 34 percent of the total population. The central section of the corridor containing Naranja, Goulds and the Redlands has 27 percent of the population. The South Dade U.S. 1 Corridor makes up about 27 percent of the residents within South Miami-Dade County and 6 percent of the entire County total. Table 2-10 shows the population in the affected areas.

Table 2-10
Population Distribution

	North Section	Central Section	South Section	Corridor Total	South Dade Total	County Total
Population	53,946	38,089	47,830	139,865	521,000	2,253,000

2.3.2 Ethnic Analysis

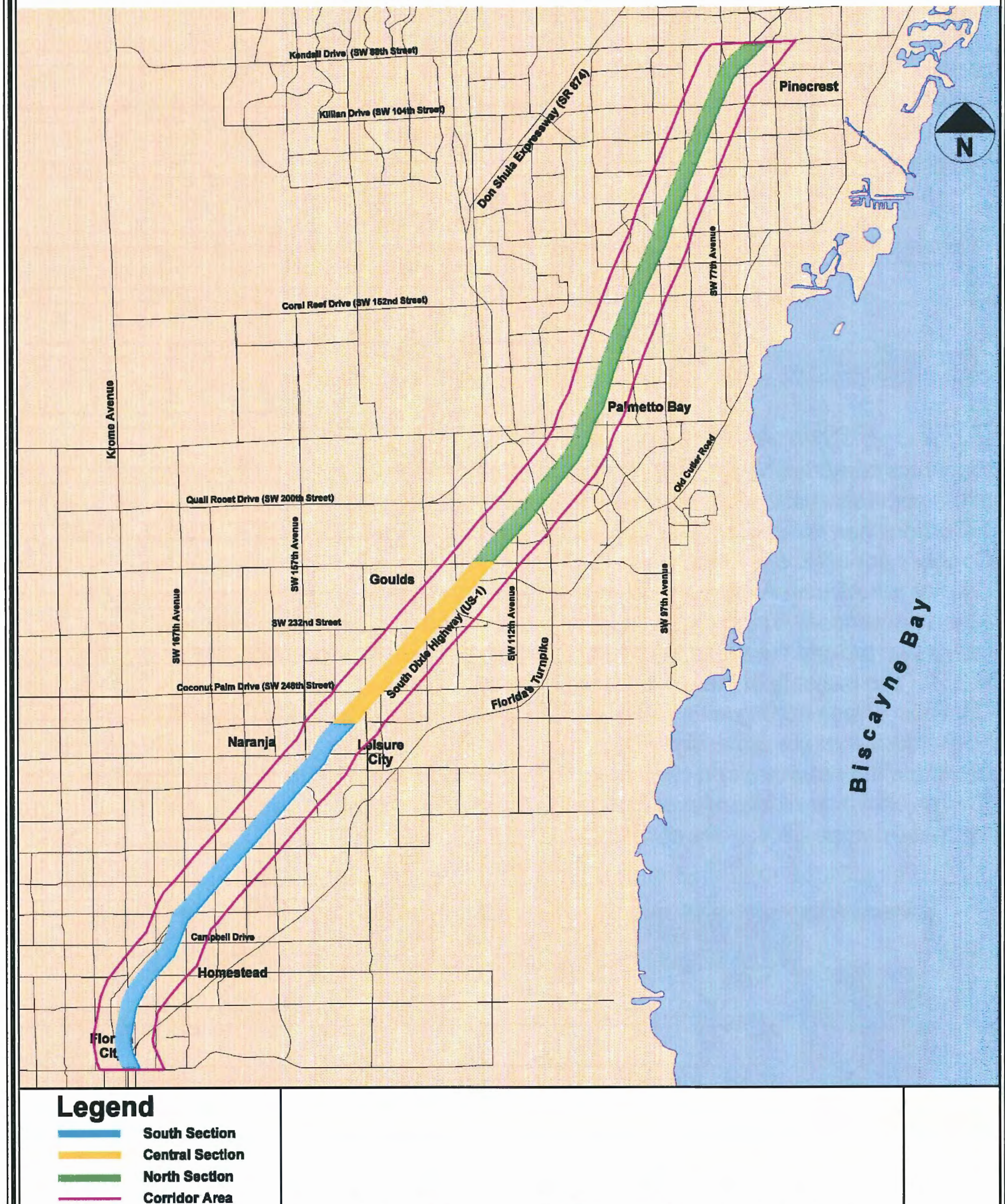
Hispanics comprise 57 percent of the population of Miami-Dade County, but only 38 percent of the population of the County south of Kendall identifies themselves as Hispanic. The U.S. 1 Corridor has even a smaller percentage of Hispanics - 32 percent. Twenty-one of the County's population is African American, and only 10 percent of the population in the south County are African American. Within the U.S. 1 corridor, 22 percent of the population is African American. This reflects the way the suburbanization of South Miami-Dade County has grown around the original African American agricultural communities that existed along U.S. 1. The majority of the white populations live in the northern section of the South Dade Corridor. These communities include Pinecrest, Palmetto Bay, and Cutler Ridge that have households that are generally within the middle to upper classes. The Hispanic populations dominate the southern and central sections and increase north to south within the corridor. The majority of the African American population is within the central section. Table 2-11 shows the racial composition of the corridor.

Table 2-11
Racial Background

	White	Black	Native	Asian	Pacific	Other	Non Hispanic	Hispanic
North Section	34,699	7,488	142	1,652	26	2,755	30,708	16,164
Central Section	15,217	11,680	65	428	50	3,399	18,157	12,682
South Section	18,404	11,427	63	405	0	4,383	18,970	15,712
Corridor Total	68,320	30,595	270	2,485	76	10,537	67,835	44,558
South Miami-Dade	259,564	45,626	1,549	10,407	481	24,592	176,402	165,817
County	1,570,558	457,214	4,365	31,753	799	103,251	961,625	1,291,737

Figure 2-27

South Link Corridor



2.3.3 Employment and Workforce

Table 2-12 shows that the U.S. 1 corridor actually has a large number of jobs and the number of workers and jobs along the corridor is very balanced. However, that does not hold true for South Dade outside of the U.S. 1 Corridor where there is a 30 percent deficit in the number of jobs to support the population. The northern section is the only area in the South Dade Corridor that has more jobs available for the residents that live in this area. The central section is the opposite in that there are fewer jobs available for the workers that live in the area. The southern section is an even split between the jobs that are actually available to the number of workers in the area. Because the central and southern sections have more workers than jobs, this typically forces residents to travel north for employment.

Table 2-12
Employment Distribution

	North Section	Central Section	South Section	South Dade	County
Employment	31,815	20,504	25,795	185,516	997,765
Workers	29,692	21,805	25,350	292,680	806,474

2.3.4 Households

The majority of the white population lives in the northern section of the South Dade Corridor. These communities include Pinecrest, Palmetto Bay, and Cutler Ridge that have households that are generally within the middle- to upper-classes. The Hispanic populations dominate the southern and central sections and increase north to south within the corridor. The majority of the African American population is within the central section. There is almost an even split in the populations of Asians and other races in the central and southern sections.

Table 2-13 shows that the annual average household income and the number of housing units decrease from north to south. However, the number of residents living below the poverty level increases from north to south. There is about a 26 percent increase in the number of people living below the poverty level from the northern to southern sections.

Table 2-13
Household Incomes

	North Section	Central Section	South Section	South Dade	County
Household Income	$58,015	$33,397	$27,756	$32,035	$35,966
Total Housing	19,226	12,543	15,334	177,157	597,182
Households Below Poverty Level	6,333	8,651	14,079	93,780	405,540

2.3.5 Transportation Disadvantaged

Several factors are usually evaluated when discussing transportation disadvantaged areas and populations. For purposes of this study and to reflect certain unique aspects of the corridor, characteristics not normally considered as identifiers for the transportation disadvantaged population have been analyzed. Factors such as "non-English speaking," were included because they can affect the likelihood of being employed, and in turn, the trips generated in the corridor. The characteristics that will be used to identify the transportation disad vantaged population for this project are discussed below. They include: minority population, disability status, school-aged and elderly persons, persons without a high school diploma, persons unable to speak English, households living in poverty, and households without a car. The analysis uses 2000 Census Data for the County and census block group information aggregated for block groups in the South Dade study area and block groups within one-half mile of the U.S. 1 corridor.

- **Minority Population**
  Over 2.25 million people reside in Miami-Dade County, with more one-half million people in the South Dade study area, and 167,372 along the U.S. 1 corridor in South Dade. Approximately 30 percent of the County's population classify themselves as a race other than "white", and more than 57 percent classify themselves as Hispanic/Latino. The percentages are lower for the South Dade study area with approximately 28 percent classified as non-white and just under half of the population classified as Hispanic/Latino. For the U.S. 1 corridor, the percentage of the population that is classified non-white (predominately classified as "black" or African American) jumps to more than 40 percent, while the Hispanic/Latino percentage drops to 41 percent. In general, the Pinecrest and Redlands areas of the South Dade study area have higher percentages of white population and lower percentages of Hispanic/Latino residents.

- **Disabled Population**
  Within Miami-Dade County, approximately 23 percent of the population indicated they have one or more disabilities. The population in the U.S. 1 corridor has about the same percentage of disabled persons at 22 percent, while the percentage of disabled persons in the South Dade study area is slightly lower at 18.5 percent. The Pinecrest area has a low incidence of disabled persons relative to Miami-Dade County.

- **School-Aged and Elderly Population**
  The percentage of elderly persons 65 years and older living within Miami-Dade County is approximately 13 percent of the total population, or one in eight residents. However, the percentages of the population in the South Dade study area and the U.S. 1 Corridor are lower at 8.7 percent and 8.6 percent, respectively, which equates to one in 12 people aged 65 or older.

School-aged children are defined as children three years and older enrolled in preschool/ nursery school through high school. Throughout all three areas, the school-aged population is approximately one-fourth of the total population three years or older. The percentage is the largest for the U.S. 1 Corridor, where almost 27 percent of the total population consists of school-aged children. For the study area, less than 25 percent of the population is school-aged, and for the County as a whole, 22 percent of the population is school-aged.

- **Non-English Speaking Population**
  Given its relatively high proportion of Hispanic/Latino residents, many of Miami-Dade's residents speak Spanish. More than 90 percent of the population five years and older speaks at least some English; however, 8.7 percent of the population is classified as speaking "no English." The percentages in the South Dade study area and along the U.S. 1 corridor are even smaller, with less than five percent of the population in the study area and less than six percent of the U.S. 1 Corridor population identified as not speaking English. In general, the central section of the study area has larger percentages of non-English speaking residents, with Pinecrest having lower percentages.

- **Educational Attainment**
  Almost one-third, or 32 percent, of the populations 25 years and older in Miami-Dade County and in the U.S. 1 Corridor have not attained a high school diploma (or equivalency) or higher education. Only one in five, or 21 percent, of the population in the South Dade study area, has not attained a high school diploma or additional education. The northern part of the study area, particularly Pinecrest, has the lowest levels of populations without a diploma. The percentages increase farther south in the study area. Homestead and Florida City have the highest percentages without a diploma.

- **Poverty Households**
  Countywide, the percentage of households with incomes below 1999 poverty levels is approximately 18 percent. In the U.S. 1 Corridor area, more than 20 percent of the households have incomes below poverty levels; however, in the South Dade study area only 13 percent of households are identified as having incomes below the poverty designation. The difference between the U.S. 1 Corridor and the South Dade study area is due to relatively lower levels of poverty in Pinecrest, the Redlands area, and portions of Kendall.

- **Households Without A Car**
  Approximately one in seven households, or 14.3 percent, in Miami-Dade County do not have access to a vehicle for use by members of the household. A slightly smaller percentage, 13.4 percent, of households in the U.S. 1 Corridor are similarly situated. However, the percentage of "no car" households in the South Dade study area drops to eight percent, primarily due to low numbers of households without vehicles in the Pinecrest and Redlands areas. It should be noted that renter-occupied households are more likely to not have access to a car. Countywide and for the U.S. 1 Corridor, more than one-fourth of renter households do not have access to a vehicle.

Table 2-14 shows that the U.S. 1 Corridor as compared to Miami-Dade County as a whole has higher or similar levels of transportation-disadvantaged persons and households in the majority of criteria evaluated. This corridor has lower percentages than the County of elderly persons and persons not speaking English. Values for the study area occasionally show a lower level of transportation-disadvantaged people than the County or the corridor due to the inclusion of more affluent single-family areas such as Pinecrest.

Table 2-14
Corridor Characteristics

	US 1	South Dade	County
Total Population	167,000	521,000	2,253,000
Non -White	46.6%	27.8%	30.3%
Hispanic	41.6%	49.8%	57.3%
Disabled	22.0%	18.5%	22.8%
65 & Over	8.6%	8.7%	13.3%
School Aged	26.7%	24.5%	22.3%
Do Not Speak English	5.8%	4.7%	8.7%
Not HS Graduate	32.2%	21.4%	32.1%
Households in Poverty	20.9%	13.0%	18.3%
Households without Car	13.4%	7.9%	14.3%

Source: US Census Bureau, 2000 Census, Summary File 3

As the South Dade Corridor continues from north to south, there is an increase in people who don't speak English and don't have a high school diploma. The majority of people within the corridor who don't own a vehicle and/or are disabled reside in the central section. There is almost an even split of elderly and people under the age of 17 within the northern and southern sections with an average of 61.5 percent, whereas the central section has an average of 47 percent. These numbers and percentages don't show the exact numbers of people who actually use public transit, they simply show the categories of people who are more likely to use public transit.

2.4 PHYSICAL ENVIRONMENT

This section of the report summarizes the potential constraints on the development of transportation alternatives relative to an assessment of the vegetative communities, wildlife, wetlands, and potential listed species or listed species habitat on site. This effort did not include formal wetland jurisdictional determinations or specific wildlife and listed species surveys. The vegetative communities were determined through preliminary site evaluation using pedestrian transects and interpretation of aerial photography.

2.4.1 Site Elevation and Topography

Site elevation and topography were reviewed using the South Miami, Perrine, Goulds, and Homestead, Florida, United States Geological Survey (USGS) topographic quadrangle maps. The proposed corridor has limited topographic relief. The approximate elevation ranges from five to 15 feet, National Geodetic Vertical Datum (NGVD).

2.4.2 Drainage

Nine South Florida Water Management District (SFWMD) canals and numerous ponds are located along the corridor. A more detailed description of these features can be found in the following section of this chapter - Floodplains and Wetlands.

2.4.3 Floodplains and Wetlands

The presence or absence of wetlands was determined using the Florida unified methodologies in accordance with Chapter 62-340, Florida Administrative Code (FAC) and the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual. These methods take into account prevalence of wetland vegetation, hydric soil indicators, and wetland hydrology. Surface waters include both natural and man-made bodies of water, such as streams, lakes, ponds, canals, and ditches. Aerial interpretation, ground truthing, and soils information were used to determine if wetlands were present on-site.

Wetlands

No wetlands were identified during site reconnaissance.

Other Surface Waters

There are nine South Florida Water Management District (SFWMD) canals within the project corridor. The nine SFWMD canals are listed below from north to south.

- C-100A
- C-100C
- C-100 (Cutler Drain)
- C-1N
- C-1 (Black Creek Canal)
- C-102N
- C-102 (Princeton Canal)
- C-103N
- C-103 (Mowry Canal)

All of the identified canal banks were stabilized. No wetlands were observed adjacent to these canals.

The waterways of Miami-Dade County connected to Biscayne Bay are considered either Critical Habitat or important habitat for the manatee by the United States Fish and Wildlife Service (USFWS), the Florida Department of Environmental Protection (FDEP), and the Miami-Dade County Department of Environmental Resource Management (DERM).

Constructing infrastructure across these canals may require authorization from one or more of the following agencies: the SFWMD in the form of an Environmental Resource Permit (ERP); U.S. Army Corps of Engineers (ACOE) in the form of a Section 404 (Clean Water Act) or Section 10 (Rivers and Harbors Act) permit; and, Miami-Dade County Department of Environmental Resource Management (DERM) Class IV Permit.

Any activity that is proposed to occur within the right-of-way of these canals will require authorization from the SFWMD right-of-way division. Numerous ponds were observed within the limits of local parks on the east side of U.S. 1.

2.4.4 Wildlife

Site reconnaissance, recent aerial photography and readily available documentation from the Florida Fish and Wildlife Conservation Commission (FWC), U.S. Fish and Wildlife Service (USFWS), Miami-Dade County, and the Florida Natural Areas Inventory (FNAI) pertaining to federal and state listed species were reviewed. Both the University Press Rare and Endangered Biota of Florida (1992) series and the FNAI field guides to rare and endangered biota of Florida were consulted to assess habitat requirements for each protected species known to occur in Miami-Dade County.

2.4.4.1 Endangered, Threatened, and Species of Special Concern

A description of the species with moderate to high potential of occurring within the subject corridor is provided below.

- **American Alligator (Alligator mississippiensis)**
  This species was observed within the subject corridor. One alligator was observed in the SFWMD Canal C-102. These canals are suitable habitat for this species. It is likely that alligators are present in the other SFWMD canals that pass through the study corridor.

- **Wood Stork, Florida Sandhill Crane, and Other Listed Wading Bird Species**
  Data received from FNAI indicates that the subject corridor is near potential habitat for wood storks and Florida sandhill cranes. Wood storks, (a state and federally listed endangered species), Florida sandhill cranes, (a federally listed endangered species and state listed threatened species), and other listed wading bird species, including: snowy egret (Egretta thula), little blue heron (Egretta caerulea), and white ibis (Eudocimus albus) (all state listed Species of Special Concern), may occasionally forage in the corridor. However, habitat observed in the corridor is not likely to be used by wood storks, sandhill cranes, or other wading birds as primary forage habitat, and wood storks, sandhill cranes, or other wading birds are not expected to nest in the corridor. Typically permits are not required to address impacts to wading birds unless nesting occurs in the affected area. Further action regarding these species should not be necessary at this time.

Additionally, the Florida Fish and Wildlife Conservation Commission (FWC) Eagle Nest Locator database (www.wildflorida.org/eagle/eaglenests/Default.asp) was researched to determine if eagle nests were located in the vicinity of the corridor.

The FWC eagle nest databases did not indicate that any eagle nests were located in the vicinity of the corridor.

- **Eastern Indigo Snake (Drymarchon couperi)**
  The eastern indigo snake is a state and federally listed threatened species. Though no eastern indigo snakes were observed in the corridor, habitat for these snakes does exist in the subject corridor. The U.S. Fish and Wildlife Service (USFWS) generally recommends that the Standard Eastern Indigo Snake Protection Measures be included in project design and construction. Thus, no further action is required at this time.

- **Florida Pine Snake (Pituophis melanoleucus mugitus)**
  The Florida pine snake is a state listed Species of Special Concern. It is extremely secretive and fossorial, spending most of its time underground. It is most typically found in the burrows of pocket gophers and, less frequently, gopher tortoises in sandy xeric uplands. Foraging areas include ruderal areas such as old fields or pastures, and the shallow littoral area around ponds. Primary food sources are rodents such as pocket gophers and mice, and ground-dwelling birds and their eggs.

- **Gopher Tortoise (Gopherus polyphemus)**
  Although no gopher tortoise burrows were observed during the initial field reconnaissance, gopher tortoise habitat was observed within the corridor. Gopher tortoises are a state listed Species of Special Concern and are regulated by the FWC. Because of the protected status, it is illegal to take, harm, or harass gopher tortoises according to Florida Law (68A-27.002 FAC). Destruction of gopher tortoise burrows constitutes taking under the law, except as authorized by a specific permit. A gopher tortoise burrow survey may be required prior to construction; however, no further action is recommended at this time.

- **Gopher Frog (Rana capito)**
  Gopher frogs are nearly always found in gopher tortoise burrows. The corridor contains marginal habitat for the gopher tortoises and gopher frogs. No gopher tortoise burrows were observed during the initial field reconnaissance. If gopher tortoise burros exist along the corridor, appropriate measures will be taken to relocate potential commensal species. No further action is needed at this time.

- **Species Observed During Field Reconnaissance**
  During field reconnaissance three manatees (Trichechus manatus) were observed in the C-102 Canal. Manatees are state and federally listed endangered species. There appeared to be one female and two calves or one calf and one yearling. The manatees were located under and adjacent to the existing U.S. 1 bridge over the C-102 canal. The nine SFWMD canals that cross the study corridor are likely manatee habitats.

One alligator was observed in the C-102 Canal. The alligator was west of U.S. 1 on the north bank of the canal.

2.4.4.2 Plant Species

There is a moderate potential that several plant species listed as Endangered or Threatened by the State of Florida and/or by the USFWS exist within the study corridor. During field reconnaissance, no listed plant species were observed. It is recommended that a listed plant survey be completed in the natural areas along the corridor within 12 months of the construction. However, based on the existing conditions of the corridor, and the amount of disturbed lands present, it is likely that the occurrence of listed plant species may be limited to protected areas.

- **Pineland Forest**
  Pine rocklands occur only in southern Miami-Dade County, the Florida Keys, and in some areas of the Bahamas. Pine rocklands grow on the coastal Miami Rock Ridge, a limestone rock outcropping that extends from North Miami Beach to Long Pine Key in Everglades National Park. Two areas of pineland forest were identified within the subject corridor.

- **Rockdale Tract**
  The Rockdale Tract is on the west side of U.S. 1 between SW 144th Street and SW 152nd Street. The Rockdale Tract is a relatively undisturbed Miami rockland pine forest consisting of approximately 40 acres. This area is significant as it is one of the few remaining areas of high quality biological habitat in southern Miami-Dade County. The Rockdale Tract is included in Miami-Dade County's Environmentally Endangered Lands (EEL) program, which identifies and secures endangered lands for preservation. The following endangered or threatened plant species have the potential to occur within the Rockdale Tract:
  - Deltoid Spurge (Euphorbia deltoidea ssp. deltoidea)
  - Small's Milkpea (Galactia smallii)
  - Miami Flax (Linum carteri var. carteri)
  - Florida Keys Noseburn (Tragia saxicola)

- **Old Dixie Pineland Site**
  The remnant pine areas in the Old Dixie Pineland, located between SW 272nd Street and SW 280th Street, and between Old Dixie Highway and U.S. 1, are characterized by a canopy of slash pine (Pinus elliottii var. densa) and a relatively open understory. The ground level varies from rocky to sandy with linear areas of rock outcroppings. Nearby areas of Old Dixie Pineland have been cleared for agricultural purposes.

According to documentation from the U.S. 1 Phase II Exclusive Bus Lanes Corridor Endangered Species Biological Assessment, a Miami-Dade County Department of Environmental Resource Management (DERM) memorandum stated that the design of the proposed bus lane (South Dade Busway extension) should provide for the preservation of the pine rockland habitat to ensure survival of several endangered and threatened plant species. Therefore, it is likely that any further improvements that ultimately occur as a result of this study will also need to provide for the preservation of the Old Dixie Pineland Site.

2.4.5 Potential Contamination Assessment

The primary purpose of the assessment described in this section was to conduct a preliminary limited investigation of the U.S. 1 Corridor and surrounding properties to identify potential recognized environmental conditions (RECs) associated with the past or present uses within the subject corridor and neighboring properties. The findings contained in this document are based on observations of environmental staff and information obtained from readily available federal, state, and county regulatory agencies at the time of the investigation.

2.4.5.1 Methodology

This assessment represents a reasonable attempt to identify potential RECs in association with the subject corridor. The methodology for completing this limited investigation consisted of the following activities:

- A field reconnaissance by environmental professionals to observe and photograph areas of the corridor and surrounding area within a one-mile radius to document existing corridor conditions.

- A review of information generated by Environmental FirstSearch (EFS), which includes a search of state and federal databases, including the National Priority List (NPL), Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), Resource Conservation and Recovery Act (RCRA) Treatment Storage and Disposal facility (RCRA TSD), RCRA Corrective Action List (RCRA COR), RCRA generator list (RCRA GEN), Emergency Response Notification System (ERNS), Delisted NPL Sites, Facility Index System/Facility Identification Initiative Program Summary Report (FINDS), Solid Waste Facilities (SWF), Registered Underground and/or Aboveground Storage Tanks (UST/AST), Leaking Underground Storage Tank Incident Reports (LUST), Florida cattle dip vats, and dry cleaners.

  - **Significant Assumptions**
    Information provided by EFS regarding the regulatory status of facilities located within the minimum search radius and information obtained from the state and county files are assumed to be complete, accurate and current.

  - **Limitations and Exceptions**
    This limited preliminary assessment represents a reasonable attempt to identify potential sources of contamination within the corridor through the implementation of the methodology and the use of resources de-

scribed above. There is always the possibility that potential sources of contamination have escaped detection due to the limitations of this study, the incompleteness or inaccuracy of governmental records, or the presence of undetected and unreported environmental accidents. Conclusions were based on practically reviewable information available within reasonable time and resource constraints.

- **Standard Environmental Record Sources**
  As a part of this assessment, information sources were reviewed to obtain existing information pertaining to the release of hazardous sub stances or petroleum products in the U.S. 1 corridor. An environmental database search of the corridor and surrounding 1.0-mile radius was performed by Environmental FirstSearch (EFS). The FirstSearch re port included a search of state and federal databases, including the National Priority List (NPL), Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), Resource Conservation and Recovery Act (RCRA) Treatment Storage and Dis posal facility (RCRA TSD), RCRA Corrective Action List (RCRA COR), RCRA generator list (RCRA GEN), Emergency Response Notification System (ERNS), Delisted NPL Sites, Facility Index System / Facility Identification Initiative Program Summary Report (FINDS), Solid Waste Facilities (SWF), Registered Underground and/or Aboveground Stor age Tanks (UST/AST), Leaking Underground Storage Tank Incident Re ports (LUST), Florida cattle dip vats, and dry cleaners. Table 2-15 lists the number of potential areas of concern by category, within the study corridor.

Table 2 - 15
EFS Report Summary

CATEGORY OF POTENTIAL CONCERN	AT OR ALONG U.S. 1	WITHIN 1/8 MILE	WITHIN 1/4 MILE	WITHIN 1/2 MILE	> 1/2 MILE	TOTAL
National Priority List	0	1	0	0	0	1
CERCLIS	2	3	0	0	0	5
NFRAP	0	3	0	0	1	4
RCRA TSD	0	0	0	0	0	0
RCRA COR	0	0	0	0	0	0
RCRA GENERATORS	53	98	53	53	47	304
RCRA NLR	-	-	-	-	-	0
ERNS	0	5	2	3	5	15
NPDES	-	-	-	-	-	0
FINDS	-	-	-	-	-	0
TRIS	-	-	-	-	-	0
State Sites	0	3	0	0	0	3
Spills-1990	21	19	11	15	20	86
Spills-1980	-	-	-	-	-	0
SWL	0	1	0	0	8	9
Permits	-	-	-	-	-	0
Other	9	15	6	6	4	40
REG UST/AST	83	147	65	66	107	468
Leaking UST	47	72	27	30	49	225
TOTAL	215	367	164	173	241	1160

Findings

Using a combination of the Environmental FirstSearch documentation and the Miami-Dade County Department of Environmental Resource Management (DERM) contaminated site database, the following potentially contaminated sites were identified within one mile of the centerline of U.S. 1:

- According to the DERM database, there are 1,911 contaminated sites within the one-mile radius of the centerline of U.S. 1. Further research on the nature and extent of contamination is recommended.

- Numerous DERM contaminated sites within 0.25 miles of the centerline of U.S. 1 were verified by field location. The majority of these sites were either gas stations and/or dry cleaners. DERM contaminated database sites within 0.25 miles are considered potential sources of contamination. Further research on the nature and extent of contamination is recommended.

- All five of the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) sites identified by FirstSearch were dry cleaning facilities. Further research on the nature and extent of contamination is recommended.

- The Environmental FirstSearch report identified one National Priority List (NPL) site, the Woodbury Chemical Company. This facility was supposedly located at 13690 SW 248th Street, Princeton, FL, 33032. The facility could not be located in the field. The site that appeared to match the location map and address was gated and had been cleared and construction was occurring. This facility may have been remediated or be in the process of remediation. Further research on the nature and extent of contamination is recommended.

- The EFS Report indicated there are two Solid Waste Landfill (SWL) facilities within the subject corridor as described below.

- An SWL site was identified at 25550 SW 142nd Avenue, Princeton, FL. This facility is owned or operated by Homestead Landfill & Recycling Center. This facility is active. The contact person is Steven Weston (305) 247-0003. This facility is approximately 200 feet from the centerline of U.S. 1.

- An SWL site was identified at 449 NE 7th Street, Florida City, FL. This facility is owned or operated by South Florida Recovery. This facility is inactive. The contact person is Tom Roberts (305) 370-9011. This facility is approximately 0.75 miles from the centerline of U.S. 1.

Environmental staff attempted to field locate these facilities. Staff did not have authorization to enter any properties related to this investigation. Staff did locate the positions of the NPL and CERCLIS sites that were identified by the EFS report. At this time, the exact nature of the potential contamination was not determined nor was it determined how the potentially contaminated sites may affect the subject corridor. Further research on the nature and extent of potential contamination is recommended.

2.5 Transit Facilities

Existing transit operations in the South Link corridor consist of buses operating on the busway west of U.S. 1 from the Dadeland South Metrorail station to the terminus of the routes at SW 264th Street plus various local routes east and west of the busway. The corridor is served by local and limited stop routes. The local feeder routes circulate through surrounding residential neighborhoods, some operating on a portion of the busway or connecting to other busway routes. The Busway Max and the Busway Local operate the length of the busway. The express Busway Max and the Busway Flyer serve the area south of the busway, through the communities of Florida City, and Homestead. The Coral Reef Max and the Saga Bay Max serve the communities west and east of the busway prior to accessing the busway.

Service is offered seven days a week from 5:30 a.m. to 1:00 a.m. The busiest stations receive more service than some of the lesser used stations on the busway. In the peak period up to 24 buses per hour operate in the peak direction. Miami-Dade Transit has established the following fare structure for their system.

Table 2-16 shows the bus routes (1, 31,34, 38, 52, 65, 252, and 287) that operate on the busway and serve the Dadeland South Metrorail station. All of these routes operate on the busway from at least Coral Reef Drive (SW 152 Street) north. The combination of these routes provide a peak hour peak direction headway of one bus every 2.5 minutes. Route 34 and 38 circulate through Florida City and Homestead and operate on the busway for its full length. The busway local - Route 31 originates at the Southland Mall and enters the busway at SW 200th Street. Route 1 circulates through the Perrine area before getting on the busway at 168th Street. Route 287 originates at the CHI Health Center runs through the community of Saga Bay then up SW 87th Avenue and enters the busway SW 168th Street. The Coral Reef Max runs from west of the Country Walk along SW 152nd Street then gets on the Busway. Route 52 circulates between the South Dade Health Center, through the neighborhood known as Goulds, and gets on the Busway at SW 152nd Street.

As shown in Table 2-17 the majority of routes in the southern one-third of the County interface at the Miami-Dade Government Center/Southland Mall area. The north-south routes operating on the busway are fed by the Goulds Connection - Route 216, and Route 200, both of which circulate through the neighborhoods of Cutler Ridge and Goulds immediately to the west of the Southland Mall. Neither of these routes operates on the busway and both require transfers to the buses operating on the busway. The West Dade Connection -Route 137 operates between the Miami International Mall and Miami-Dade Government Center/Southland

Mall. Route 70 connects Florida City with the Miami-Dade Government Center/ Southland Mall winding through Homestead, Naranja, Princeton and Goulds. Route 35 connects Florida City to Miami Dade Community College-Kendall Campus This route is fairly direct and runs through the Miami-Dade Government Center/Southland Mall.

Table 2-16
AM Peak Hour Service (Headways)
Dadeland South

Route	Northbound	Southbound
1	20 minutes	20 minutes
31 Busway Local	15 minutes	15 minutes
34 Busway Flyer	20 minutes	
38 Busway Max	15 minutes	15 minutes
52	30 minutes	30 minutes
65	60 minutes	
287 Saga Bay Max	20 minutes	20 minutes
252 Coral Reef Max	15 minutes	15 minutes

Table 2-17
AM Peak Hour Service (Headways)
South Miami-Dade Government Center/Southland Mall

Route	Northbound	Southbound
1	20 minutes	20 minutes
31 Busway Local	15 minutes	15 minutes
35	30 minutes	30 minutes
38 Busway Max	20 minutes	20 minutes
52	30 minutes	30 minutes
70	30 minutes	30 minutes
137 West Dade Connector	30 minutes	60 minutes
200	30 minutes	30 minutes
216 Goulds Connector	30 minutes	30 minutes

Table 2-18 shows that four of the routes described above originate in Florida City. Two routes the, 34 and the 38, run the entire length of the corridor. Route 35 runs the entire length of South Miami-Dade County terminating in Kendall rather than at the Dadeland South Metrorail station.

Table 2-18
AM Peak Hour Service (Headways)
Krome and Palm Avenue - Florida City

Route	North bound	South bound
34 Busway Flyer	20 minutes	30 minutes
35	30 minutes	30 minutes
38 Busway Max	15 minutes	20 minutes
70	30 minutes	60 minutes

Table 2-19 shows all of the bus stops on the busway with the bus routes that serve the stops.

Table 2-19
Busway Stations

	Bus Routes										
Stop	1	31	34	35	38	52	57	65	252	287	Buses per Peak Hr.
Dadeland So.	X	X	X		X			X	X	X	2.9
SW 104 St	X	X			X	X		X	X	X	3
SW 112 St.	X	X			X	X		X	X	X	3
SW 117 St	X	X			X	X		X	X	X	3
SW 124 St.	X	X			X	X		X	X	X	3
SW 128 St	X	X			X	X		X	X	X	3
SW 136 St	X	X			X	X		X	X	X	3
SW 144 St	X	X			X	X			X	X	3.2
SW 152 St	X	X	X		X		X			X	3.3
SW 160 St	X	X			X					X	4.6
SW 168 St	X	X	X		X					X	3.8
SW 173 St		X			X						8.6
W. Indigo St		X			X						8.6
SW 184 St		X		X	X						6.7
Marlin Rd		X			X						8.6
SW 200 St.		X	X		X						6
SW 112 Ave			X		X						10
SW 220 St			X		X						10
SW 232 St			X		X						10
SW 244 St			X		X						10
SW 264 St			X		X						10

Note: Grey squares indicate that buses only stop in the peak direction during the peak hour.

Table 2-20 shows the operating characteristics of the routes operating in the southern one-third of the County.

Table 2-20
Bus Service in the South Miami-Dade Corridor

Origin	Destination	Via Busway	Headway Peak/Off	1 Way Run Time	Round Trip Miles	Schedule Speed MPH	Ave. Weekday Boarding
Florida City	Dadeland South	Yes	20/0	62 min.	51	26.9	922
Homestead	S. Dade Gov't enter	No	30/30	90 min.	66.3	22.1	1,369
Homestead	MDCC - Kendall	No	30/30	105 min	58.6	16.7	2,025
Florida City	Dadeland South	Yes	15/30	90 min.	51.1	17.0	4,309
Princeton	So. Miami Metrorail	Yes	30/30	105 min.	51.2	14.6	1,555
Quail Roost	Dadeland South	Yes	20/40	60 min	27.2	13.6	1,556
Saga Bay	Dadeland South	Yes	24/0	36 min	19.6	16.3	300
Cutler Ridge	Dadeland South	Yes	15/30	45 min	18.7	12.5	1,969
Country Walk	Dadeland South	Yes	18/60 30	45 min.	28	18.7	1,040
Cutler Ridge	Dolphin Mall	No	30/60	90 min	49.4	16.5	1,150
Perrine	South Miami	No	30/0	45 min	20.1	13.4	243
Douglas Rd station	Dadeland South	No	30/0	45 min	29.0	19.3	286
Kendall	Dadeland North	No	20/30	40 min.	18.9	12.6	2,569
Kendall	Dadeland North	No	30/30	60 min	29.6	14.8	1,587
Redlands	Southland Mall	No	30/30	19 min	16	25.3	151
Caribbean Park	Southland Mall	No	30/30	19 min	13	21.6	111

2.5.1 Ridership

A detailed on-and-off survey was undertaken on all MDT routes in 2004. Table 2-21 shows the daily station activity by direction along the busway.

Table 2-21
South Miami-Dade Busway

	Northbound		Southbound		Total	
	Ons	Offs	Ons	Offs	Ons	Offs
Dadeland South	67	3839	3863	39	3930	3878
SW 104 St.	106	87	66	84	172	171
SW 112 St	28	30	26	73	54	103
SW 117 St	58	43	48	38	106	91
SW 124 St	48	22	36	76	84	98
SW 128 St	53	39	46	60	99	99
SW 136 St	216	167	134	197	350	364
SW 144 St	246	117	98	137	344	254
SW 152 St	423	180	147	218	570	398
SW 160 St	217	84	85	211	302	295
SW 168 St	288	98	114	235	402	333
SW 173 St	124	83	99	87	222	170
W Indigo St	81	64	93	66	174	129
SW 184 St	173	84	87	175	260	259
Marlin Rd.	104	145	130	145	235	291
SW 200 St	550	145	124	348	674	493
SW 112 Ave	125	9	86	91	211	100
Government Ctr	381	198	170	364	550	562

2.5.2 Park-and-Ride Facilities

Currently there are only three small park-and-ride lots along the busway. All three lots get very high use and are usually full early in the morning. Table 2-22 shows the existing, plus proposed, park-and-ride lots in the corridor.

Table 2-22
Existing South Link Park-and-Ride Lots

Location	Facility
SW 152nd St and Busway	Surface Lot 126 spaces
SW 168th St. and Busway	Surface Lot 149 spaces
SW 186th St. and Busway	Proposed*
SW 200th St. and Busway	Surface Lot 362 spaces (Under design)
Cutler Ridge Terminal (Southland Mall)	50 spaces
SW 244th St. and Busway	Surface Lot 93 spaces
SW 296th St and Busway	Surface Lot 117 spaces
SW 344th St and Busway	Surface Lot 250 spaces (Proposed)

** project will include affordable housing and commercial facilities.*

2.5.3 Traffic

The construction of the busway required major changes to the traffic operations on U.S. 1. Traffic signals had to be modified to prohibit movements across the busway that would interfere with bus operations at the east-west cross streets. Turns to the west had to be restricted, including the tight turn on red from south to west. Additionally, the east to south right-turn-on-red had to be restricted. The basic concept for signaling on the busway was to signalize the busway and U.S. 1 as a single intersection. Signals for the busway were originally set to be red unless loop detectors showed an approaching bus. If the approaching bus could clear the intersection while U.S. 1 continued to move, the signal would change to green to allow the bus to move. If the bus could not clear within the U.S. 1 green cycle then the bus would have to wait until the next green cycle. Because drivers initially ignored the busway signal, the loop detectors were disengaged and the traffic signals were timed to be coordinated with those on U.S. 1.

2.5.3.1 Existing Traffic Conditions

Existing traffic conditions were assessed in the study area to establish a starting point for comparison with future transportation needs. Included in the analysis of existing traffic conditions are the identification of the primary transportation network (functional classification and number of lanes), traffic volumes, level of service, and volume-to-capacity ratios. The following intersections along U.S. 1 were examined in detail:

- U.S. 1 at SW 312th Street (Campbell Drive)
- U.S. 1 at SW 117th Avenue/SW 211th Street
- U.S. 1 at SW 200th Street (Caribbean Boulevard)
- U.S. 1 at Marlin Road
- U.S. 1 at SW 186th Street (S.R. 994/Quail Roost Drive)
- U.S. 1 at SW 184th Street (Eureka Drive)
- U.S. 1 at SW 152nd Street (S.R. 992/Coral Reef Drive)
- U.S. 1 at SW 136th Street (Howard Drive)
- U.S. 1 at SW 112th Street (S.R. 990/Killian Drive)
- U.S. 1 at SW 104th Street

Existing traffic data were obtained from the Florida Department of Transportation (FDOT) and Miami-Dade County Public Works. These data included the following:

- Historical traffic volumes
- Crash data

2.5.3.2 Historical Traffic Volumes

Historical traffic volumes were obtained from FDOT. Average annual daily traffic (AADT) volumes were used in the historical traffic assessment. Historical AADTs from 1994 to 2003 were obtained for U.S. 1. Table 2-23 presents the historical AADTs.

Table 2-23
Historical AADT Traffic Approach Counts

LOCATION	2004 Year Forecast	2003 Year Portable Unit	2002 Year Portable Unit	2001 Year Portable Unit	2000 Year Portable Unit	1999 Year Portable Unit	1998 Year Portable Unit	1997 Year Portable Unit	1996 Year Portable Unit	1995 Year Portable Unit	1994 Year Portable Unit
US1/SR 826 (NB)	NA	46,000	44,000	40,500	46,500	44,000	40,500	40,500	41,000	44,000	44,000
US1/SR 826 (SB)	NA	48,000	45,000	43,000	45,000	40,500	43,500	40,000	41,000	45,000	46,000
AADT	94,000	94,000	89,000	83,500	91,500	84,500	84,000	80,500	82,000	89,000	90,000
US1/SW 112 St (NB)	NA	33,500	36,500	33,000	36,500	34,000	38,000	35,000	35,000	37,500	37,000
US1/SW 112 St (SB)	NA	34,500	36,500	33,500	33,000	31,500	38,000	34,500	35,500	39,500	38,500
AADT	79,100	79,100	84,000	77,900	81,100	76,800	88,100	80,800	83,200	88,900	89,000
US1/SW 152 St (NB)	NA	38,000	38,000	37,500	37,000	35,000	35,000	33,500	34,500	36,500	31,500
US1/SW 152 St (SB)	NA	36,000	37,000	35,000	34,000	36,000	32,000	33,000	33,500	44,000	29,500
(NORTH) AADT	74,200	74,000	75,000	72,500	71,000	71,000	67,000	66,500	68,000	80,500	61,000
US1/SW152 St (NB)	NA	37,000	36,500	32,500	34,000	34,000	32,000	31,500	30,500	31,500	33,000
US1/SW152 St (SB)	NA	34,000	34,500	30,000	31,000	30,500	32,000	29,500	29,000	30,500	34,000
(SOUTH) AADT	71,500	71,000	71,000	62,500	65,000	64,500	64,000	61,000	59,500	62,000	67,000
US1/SW 173 St (NB)	NA	NA	32,500	NA	NA	NA	NA	NA	NA	NA	NA
US1/SW 173 St (SB)	NA	29,500	31,000	NA	NA	NA	NA	NA	NA	NA	NA
AADT	NA	29,500	63,500	NA	NA	NA	NA	NA	NA	NA	NA
US1/SW 112 Ave (NB)	NA	25,000	24,000	25,000	21,500	25,500	24,500	24,500	16,000	8,900	22,000
US1/SW 112 Ave (SB)	NA	24,500	22,500	23,500	23,000	19,500	22,000	26,000	11,500	20,000	28,500
AADT	49,900	49,500	46,500	48,500	44,500	45,000	46,500	50,500	27,500	28,900	50,500
US1/SW 232 St (NB)	NA	19,500	20,000	22,000	21,500	22,000	21,500	20,000	16,000	16,500	16,500
US1/SW 232 St (SB)	NA	19,000	18,500	20,500	20,000	21,500	21,500	19,500	18,000	16,000	18,500
AADT	38,500	38,500	38,500	42,500	41,500	43,500	43,000	39,500	34,000	32,500	35,000
US1/SW 288 St (NB)	NA	16,500	20,000	18,500	19,000	18,500	17,500	15,000	14,500	13,000	14,000
US1/SW 288 St (SB)	NA	16,000	20,000	18,000	19,500	18,000	17,500	15,500	15,000	13,500	14,000
AADT	33,700	32,500	40,000	36,500	38,500	36,500	35,000	30,500	29,500	26,500	28,000
US1/SW 308 St (NB)	NA	18,000	18,500	15,500	16,000	15,500	14,000	12,000	12,000	11,500	10,000
US1/SW 308 St (SB)	NA	14,500	14,500	12,500	13,000	12,500	13,500	9,600	12,000	10,000	9,500
AADT	33,100	32,500	33,000	28,000	29,000	28,000	27,500	21,600	24,000	21,500	19,500
US1/SW 328 St (NB)	NA	15,500	14,000	13,000	11,500	11,000	9,700	8,300	10,500	8,100	5,700
US1/SW 328 St (SB)	NA	14,500	13,500	12,000	14,000	11,500	10,000	8,300	10,500	8,100	6,100
AADT	30,900	30,000	27,500	25,000	25,500	22,500	19,700	16,600	21,000	16,200	11,800
US1/SW 344 St (NB)	NA	10,500	11,000	10,500	9,800	11,500	10,500	8,700	9,800	8,500	9,600
US1/SW 344 St (SB)	NA	10,500	12,500	10,000	10,000	11,500	9,500	9,100	10,000	9,800	9,600
AADT	NA	21,000	23,500	20,500	19,800	23,000	20,000	17,800	19,800	18,300	19,200

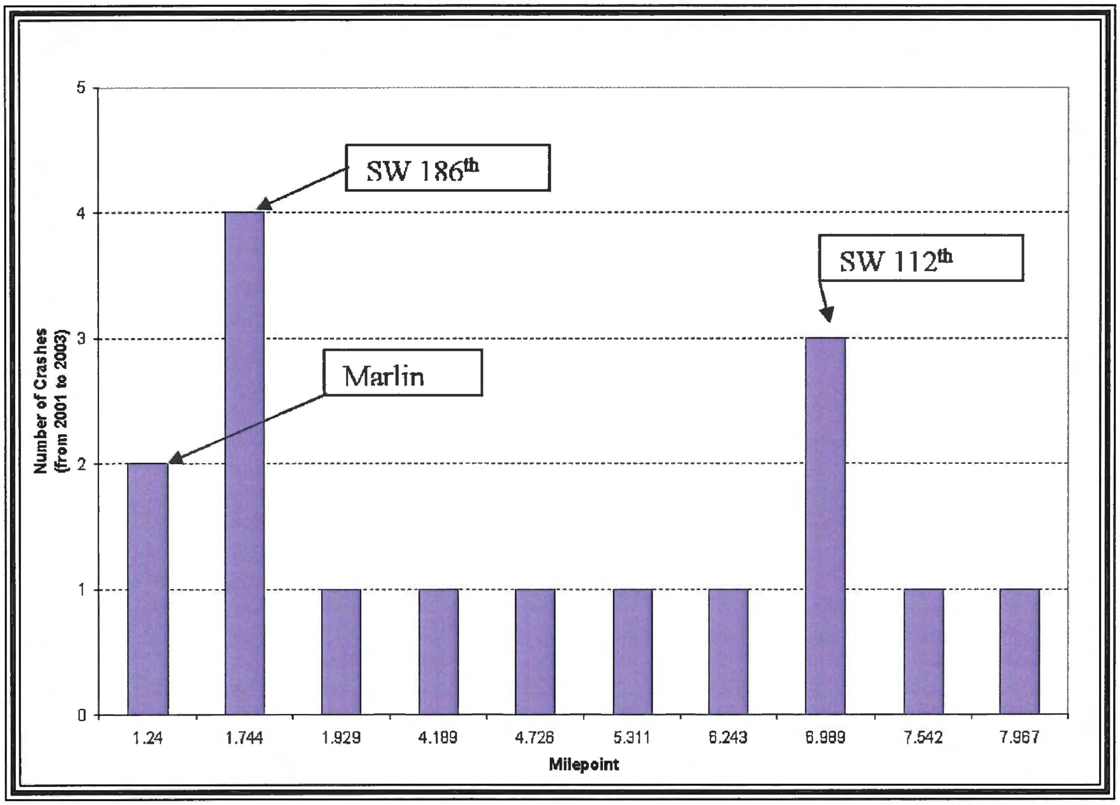
Table 2-23 indicates that traffic volumes along U.S. 1 generally increase from south to north. Existing traffic volumes range from 21,000 vehicles per day near SW 344th Street in Florida City, to 94,000 vehicles per day near the Palmetto Expressway interchange.

In general, traffic volume growth by percentage between 1994 and 2003 was much higher in the southern portion of the corridor than in the northern portion of the corridor. For instance, traffic volumes along U.S. 1 grew 67 percent between 1994 and 2003 at the count location near SW 308th Street. However, traffic volumes along U.S. 1 near S.R. 826 (Palmetto Expressway) only grew four percent over the same time period. Some of the higher growth in the southern portion of the study corridor may be attributed to the returning population over the last ten years following the devastating effects of Hurricane Andrew in 1992. Furthermore, the low percentage traffic growth experienced in the northern portion of the corridor may be a sign that the roadway has reached its practical capacity and travelers are seeking alternate roadways or alternate modes of travel.

2.5.3.3 Crash Data

Crash data from 2001 to 2003 were obtained from FDOT for the existing portion of the busway. According to FDOT's crash data, there were a total of 128 crashes reported from 2001 to 2003 along the busway. These crashes resulted in 121 injuries and no fatalities. However, the crash data indicated that only 16 crashes involved a public transportation vehicle. The location of the crashes involving a bus is illustrated in Figure 2-28.

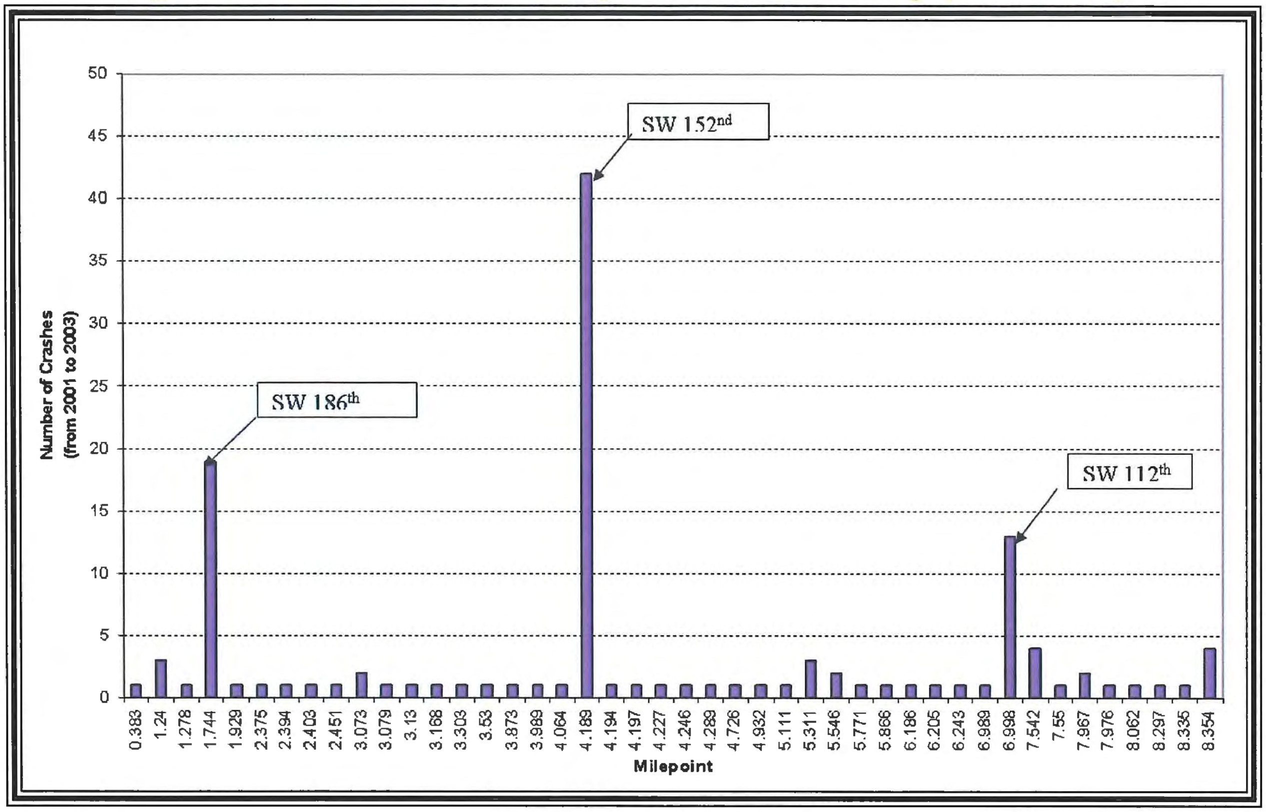
Figure 2-28 Crashes Involving Buses along South Dade Busway (2001-2003)



As shown in Figure 2-29, locations with multiple crashes involving buses include SW 186th Street (S.R. 994/Quail Roost Drive), SW 112th Street (Killian Drive), and Marlin Road. Figure 2-29 shows the total number of crashes, including those not involving buses, along the busway between 2001 and 2003. Figure 2-29 shows that a higher concentration of crashes occurred at three intersections: (1) SW 186th Street (S.R. 994/Quail Roost Drive), (2) SW 152nd Street (S.R. 992/Coral Reef Drive), and (3) SW 112th Street (Killian Drive).

Both the SW 186th Street intersection and the SW 112th Street intersection experienced multiple crashes involving a bus (Figure 2-28) and a high number of overall crashes (Figure 2-29) between 2001 and 2003.

Figure 2-29 Total Crashes along South Dade Busway (2001-2003)



The direction in which the crashes occurred was reviewed at the intersection of the busway and SW 152nd Street (S.R. 992/Coral Reef Drive). The review indicated that approximately 58 percent of the crashes reported at this intersection involved vehicles traveling in the east and west directions. Similarly, the review indicated that 20 percent of the crashes involved a vehicle traveling in the north and south directions at this intersection. This information indicates that a number of crashes involving vehicles traveling in the north-south direction did not involve a bus.

FDOT's "High Crash Roadway Spot" data were obtained for 2000 through 2002, the three latest years for which data were available. A "High Crash Roadway Spot" corresponds to an intersection that presents a crash rate that is significantly higher than the statewide crash rate of an intersection with similar geometry and traffic volumes. Locations appearing in the "High Crash Roadway Spot" list within the study area were identified. Intersections along U.S. 1 in the study area that appeared on the "High Crash Roadway Spot" list all three years include:

- SW 344th Street (SR 9336/Palm Drive)
- SW 328th Street (Lucy Street)
- SW 312th Street (Campbell Drive)
- SW 308th Street
- SW 288th Street
- SW 232nd Street (Silver Palm Drive)
- SW 112th Avenue (S.R. 989/Allapattah Road)

- SW 117th Avenue/SW 211th Street
- SW 200th Street (Caribbean Boulevard)
- Marlin Road
- SW 186th Street (S.R. 994/Quail Roost Drive)
- SW 184th Street (Eureka Drive)
- SW 173rd Street
- SW 152nd Street (S.R. 992/Coral Reef Drive)
- SW 136th Street (Howard Drive)
- SW 112th Street (S.R. 990/Killian Drive)
- SW 104th Street
- SW 88th Street (Kendall Drive)

Additional Data Collection

Based on a preliminary review of the available traffic data and a field review of the study corridor, a list of cross streets to consider for potential grade separation with the South Link Corridor was prepared. Factors considered included traffic volumes, crash experience, width of the cross streets, distance from adjacent cross streets, and nearby land use. The intersections recommended for data collection to further assess grade separation feasibility or additional alternatives include the following:

- U.S. 1 at SW 312th Street (Campbell Drive)
- U.S. 1 at SW 117th Avenue/SW 211th Street
- U.S. 1 at SW 200th Street (Caribbean Boulevard)
- U.S. 1 at Marlin Road
- U.S. 1 at SW 186th Street (S.R. 994/Quail Roost Drive)
- U.S. 1 at SW 184th Street (Eureka Drive)
- U.S. 1 at SW 152nd Street (S.R. 992/Coral Reef Drive)
- U.S. 1 at SW 136th Street (Howard Drive)
- U.S. 1 at SW 112th Street (S.R. 990/Killian Drive)
- U.S. 1 at SW 104th Street

The additional data collection efforts included bi-directional traffic counts collected at the ten intersections on March 18 and 19, 2005. The 48-hour approach counts were used to determine the morning and afternoon peak periods. Based on the traffic data collected, it was determined that the A.M. peak period occurs from 7:00 a.m. to 9:00 a.m., and the P.M. peak period occurs from 4:00 p.m. to 6:00 p.m.

Turning movement counts were collected in the A.M. and P.M. peak periods at these ten intersections. These peak-hour volumes were multiplied by FDOT's Peak Season Factor (1.0) to represent the peak-season peak-hour volumes. These peak-season peak-hour volumes were used in the data analysis to calculate level of service and volume-to-capacity (v/c) ratios for the AM peak and PM peak periods. Table 2-24 presents the peak-season peak-hour volumes.

Table 2 - 24
Peak-Season Peak-Hour Traffic Counts

Intersection	Direction	Lanes	Count [1] A.M. Peak	Count [1] P.M. Peak
U.S. 1 at SW 312th Street	Northbound	3	1,197	1,678
	Southbound	3	1,002	1,605
	Eastbound	2	686	1,028
	Westbound	2	916	1,282
U.S. 1 at SW 117th Avenue/SW 211th Street	Northbound	2	1,839	1,485
	Southbound	2	944	1,990
	Eastbound	2	1,066	732
	Westbound	2	597	815
U.S. 1 at SW 200th Street	Northbound	3	1,620	1,519
	Southbound	3	1,039	2,283
	Eastbound	2	540	612
	Westbound	2	800	1,024
U.S. 1 at Marlin Road	Northbound	3	2,032	1,770
	Southbound	3	1,117	2,116
	Eastbound	2	456	840
	Westbound	2	676	589
U.S. 1 at SW 186th Street	Northbound	3	1,841	1,641
	Southbound	3	1,297	2,349
	Eastbound	2	504	712
	Westbound	2	249	407
U.S. 1 at SW 184th Street	Northbound	3	2,049	1,951
	Southbound	3	1,420	2,445
	Eastbound	2	865	741
	Westbound	2	622	739
U.S. 1 at SW 152nd Street	Northbound	3	2,625	1,825
	Southbound	3	1,472	2,767
	Eastbound	2	1,350	1,096
	Westbound	2	458	849
U.S. 1 at SW 136th Street	Northbound	3	2,987	2,135
	Southbound	3	1,536	2,651
	Eastbound	2	637	810
	Westbound	2	321	655
U.S. 1 at SW 112th Street	Northbound	3	3,091	2,320
	Southbound	3	1,578	2,838
	Eastbound	1	379	442
	Westbound	1	254	322
U.S. 1 at SW 104th Street	Northbound	3	2,949	2,264
	Southbound	4	1,833	3,606
	Eastbound	2	740	555
	Westbound	2	350	494

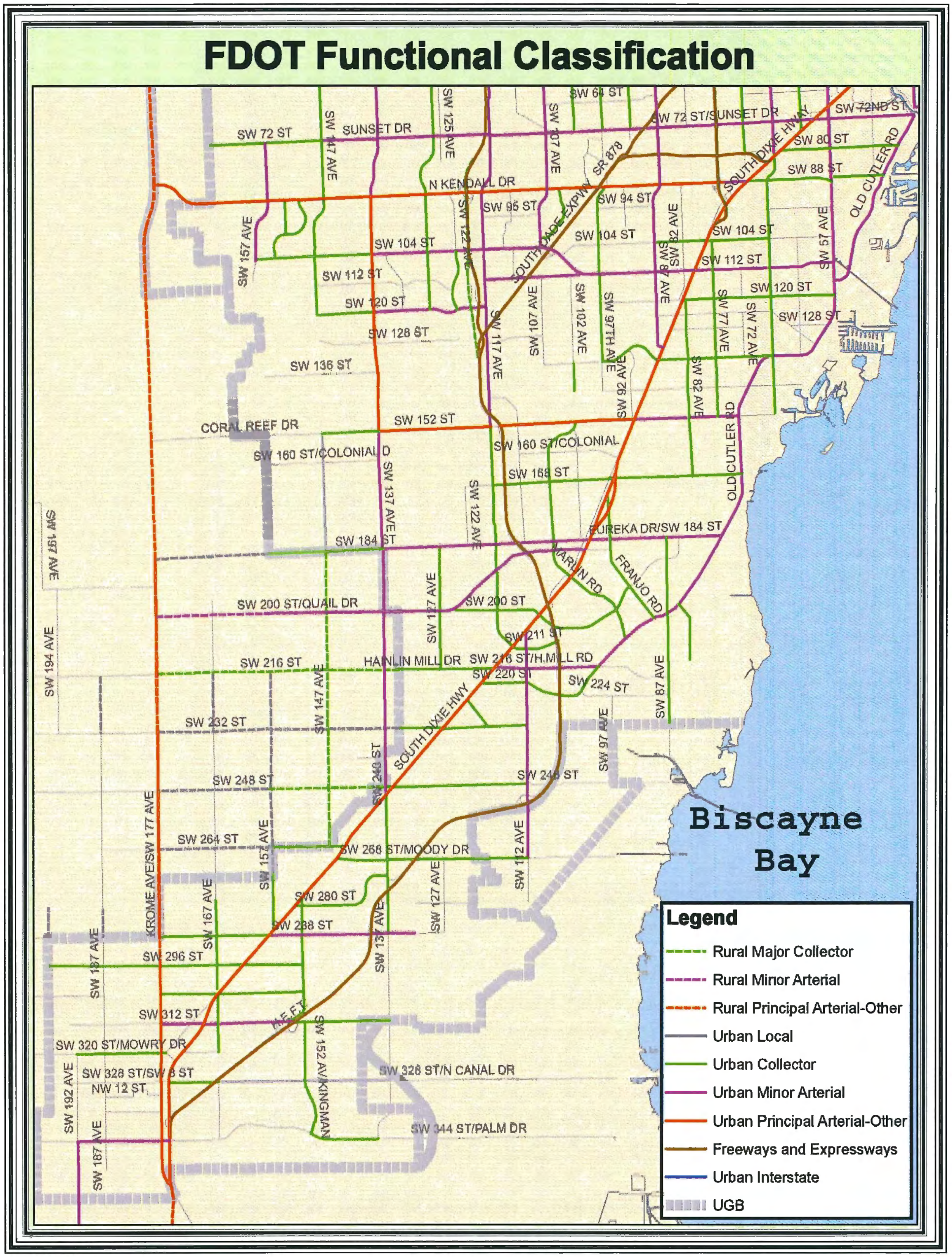
(1) - Count data obtained from Turning Movement Counts (TMCs) collected in March 2005.

2.5.3.4 Transportation Network

For transportation planning purposes, roadway facilities are grouped into functional classifications based upon the character of service they provide. In urban areas the hierarchy of the functional system consists of principal arterials (primarily serve through traffic and carry the highest traffic volume), minor arterials (augment principal arterials at a somewhat lower level of mobility), collectors (distribute trips from the arterials to their ultimate destinations), and local streets (provide access to adjacent land uses).

Figure 2-30 presents the classification of roadway facilities, which generally represent the entity responsible for maintaining the roadway. U.S. 1 is a major state arterial that runs in the

Figure 2-30


FDOT Functional Classification
Legend
Rural Major Collector
Rural Minor Arterial
Rural Principal Arterial-Other
Urban Local
Urban Collector
Urban Minor Arterial
Urban Principal Arterial-Other
Freeways and Expressways
Urban Interstate
UGB
Biscayne Bay
SW 72 ST
SUNSET DR
SW 125 AVE
SW 147 AVE
SW 107 AVE
SW 64 ST
SW 72 ST/SUNSET DR
SW 72ND ST
SOUTH DIXIE HWY
SW 80 ST
SW 88 ST
OLD CUTLER RD
N KENDALL DR
SR 878
SW 94 ST
SW 95 ST
SW 157 AVE
SW 104 ST
SOUTH DADE EXPWY
SW 112 ST
SW 120 ST
SW 128 ST
SW 57 AVE
SW 136 ST
SW 117 AVE
SW 107 AVE
SW 102 AVE
SW 97TH AVE
SW 92 AVE
SW 77 AVE
SW 72 AVE
SW 82 AVE
CORAL REEF DR
SW 152 ST
SW 160 ST/COLONIAL D
SW 160 ST/COLONIAL
SW 168 ST
SW 137 AVE
SW 122 AVE
SW 197 AVE
SW 184 ST
EUREKA DR/SW 184 ST
MARLIN RD
FRANJO RD
SW 200 ST/QUAIL DR
SW 200 ST
SW 127 AVE
SW 211 ST
SW 194 AVE
SW 216 ST
HAINLIN MILL DR
SW 216 ST/H.MILL RD
SW 220 ST
SW 224 ST
SW 87 AVE
SW 232 ST
SW 147 AVE
SW 97 AVE
SW 248 ST
SW 240 ST
SW 177 AVE
SW 264 ST
SW 157 AVE
SW 268 ST/MOODY DR
SW 112 AVE
KROME AVE/SW 177 AVE
SW 167 AVE
SW 280 ST
SW 288 ST
SW 187 AVE
SW 296 ST
SW 312 ST
SW 320 ST/MOWRY DR
SW 192 AVE
SW 328 ST/SW 8 ST
NW 12 ST
SW 328 ST/N CANAL DR
SW 152 AV/KINGMAN
SW 344 ST/PALM DR

northeast-southwest direction. U.S. 1, within the study area, has two access management classifications:

- Access Classification 5 from the U.S. 1/Card Sound Road intersection to the U.S. 1/SW 184th Street intersection, and from the U.S. 1/SW 164th Street intersection to the U.S. 1/SW 98th Street intersection
- Access Classification 6 from the U.S. 1/SW 184th Street intersection to the U.S. 1/SW 164th Street intersection.

A roadway with an access management class 5 requires a minimum spacing of 660 feet and 1,320 feet for directional-median openings and full-median openings, respectively. On the other hand, a roadway with an access management class 6 does not present minimum distances for both directional- and full-median openings.

Other major state arterials are located within the study area. The state designation for these arterials ends on the west side of U.S. 1. The other state arterials are:

- SR 9336 (Palm Drive/SW 344th Street)
- SR 994 (Quail Roost Drive/SW 186th Street)
- SR 992 (Coral Reef Drive/SW 152nd Street)
- SR 990 (Killian Drive/SW 112th Street)
- SR 94 (Kendall Drive/SW 88th Street)

Among the roadways classified as County arterials are: SW 312th Street (Campbell Drive), SW 117th Avenue/SW 211th Street, west leg of the U.S. 1/SW 200th Street (Caribbean Boulevard) intersection, east leg of the U.S. 1 / SW 186th Street (Quail Roost Drive) intersection, SW 184th Street (Eureka Drive), and the east leg of the U.S. 1/SW 112th Street (Killian Drive) intersection.

Among the roadways classified as collectors are: east leg of the U.S. 1/SW 200th Street (Caribbean Boulevard) intersection, Marlin Road, east leg of the U.S. 1/SW 152nd Street (Coral Reef Drive) intersection, SW 136th Street (Howard Drive), and SW 104th Street.

In terms of the number of travel lanes on study roadways, U.S. 1 has three lanes in each direction north of SW 200th Street and two lanes in each direction south of SW 200th Street. The major cross streets have two lanes in each direction, with the exception of SW 112th Street, which contains one lane in each direction.

2.5.3.5 Level of Service and Volume-to-Capacity Ratios

Level of service (LOS) is a quality measure describing operational characteristics within a traffic stream generally in terms of such measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. The level of service is represented by one of the letters A through F, with LOS A representing the best operating conditions and LOS F the worst. Analytical methods specified in the Highway Capacity Manual (HCM 2000) establish methodologies to approximate level of service based upon quantitative measures such as maximum flow rates, volume-to-capacity ratios, and travel speeds. The service flow rate is the maximum hourly rate at which vehicles can be expected to traverse a point. This study defined capacity as the maximum service flow rate for LOS E, which is a widely accepted methodology in traffic engineering. The maximum LOS E is defined as a facility's capacity, because traffic flow becomes unstable at LOS F conditions resulting in lower volumes and speeds than with LOS E conditions.

Volume-to-capacity (v/c) ratios offer an additional comparison of traffic flow on the study segments and provide insight on over-capacity segments and movements, which are indicative of congestion.

2.5.3.6 Approaches to Major Intersections

The existing level of service for the approaches to the ten intersections considered in detail in this study was determined based upon the maximum flow rates provided in FDOT's 2002 Level of Service Handbook, which provides generalized level of service tables. These service volume tables estimate the number of vehicles a facility can carry at various levels of service for a particular classification and number of lanes. The analysis relied upon "Table 4-7" from FDOT's 2002 Level of Service Handbook, which provides peak hour peak-directional volume thresholds.

Operational characteristics of the study intersections were first identified to determine level of service. The approaches to the study intersections fall into two groupings defined in FDOT's 2002 Level of Service Handbook.

- State Two-Way Arterials
  - U.S. 1
  - SW 186th Street (S.R. 994/Quail Roost Drive)
  - SW 152nd Street (S.R. 992/Coral Reef Drive)
  - SW 112th Street (S.R. 990/Killian Drive)
- Major City/County Roadway
  - SW 117th Avenue/SW 211th Street
  - SW 200th Street (Caribbean Boulevard)
  - Marlin Road
  - SW 184th Street (Eureka Drive)
  - SW 136th Street (Howard Drive)
  - SW 104th Street

The number of traffic signals per mile was also determined for the state roadway segments because this impacts the classification in the generalized level of service tables. The number of traffic signals was obtained from FDOT's Straight Line Diagram (SLD) for this section of U.S. 1. The total number of traffic signals along this section of U.S. 1 is 34, which is equivalent to approximately 1.70 traffic signals per mile. A state arterial with less than two signals per mile is considered a class I state roadway. However, the traffic signal spacing is much denser north of SW 117th Avenue/SW 211th Street than it is in the southern portion of the corridor. Between Kendall Drive and SW 117th Avenue/SW 211th Street, signal spacing is approximately 2.90 traffic signals per mile. Therefore, this section of the study corridor is considered a class II state roadway.

Volume-to-capacity (v/c) ratios were calculated for the study intersections according to the LOS E capacities provided in FDOT's 2002 Level of Service Handbook. The calculations used the A.M. and P.M. peak-season peak-hour traffic volumes compiled for this study.

Table 2-25 summarizes both the level of service and v/c ratio for the A.M. and P.M. peak periods for each approach to the study intersections. Figure 2-31 illustrates the study area existing weekday level of service. The approach level of service represents the level of service for each approach to study intersections. For instance, the level of service depicted for the segment of U.S. 1 south of SW 152nd Street is the northbound level of service on the approach to the SW 152nd Street intersection. Likewise, the level of service depicted for the segment of U.S. 1 north of SW 152nd Street is the southbound level of service on the approach to the SW 152nd Street intersection.

Results of the roadway segment level of service analyses clearly demonstrate that northbound traffic conditions on U.S. 1 are generally worse in the A.M. peak period than in the P.M. peak period. Southbound traffic conditions are worse in the P.M. peak period.

Table 2-25 indicates that during the A.M. peak period, the northbound lanes of U.S. 1 operate at LOS E or F conditions from south of SW 152nd Street to the northern limit of the study area. The northbound approaches to the SW 136th Street, SW 112th Street, and SW 104th Street intersections operate at LOS F. In addition, the northbound approach to the SW 117th Avenue/SW 211th Street intersection operates at LOS F during the A.M. peak period. The southbound approaches currently carry volume that is within an acceptable LOS during the A.M. peak period.

During the P.M. peak period, southbound approaches operate at LOS E or F for all intersections studied between the northern study limits and SW 152nd Street. The southbound approach to the SW 117th Avenue/SW 211th Street intersection also operates at LOS F during the P.M. peak period. The directional split between northbound and southbound traffic is not as pronounced during the P.M. peak as it is during the A.M. peak.

A review of the v/c ratios indicates that several approaches on U.S. 1 either exceed or are near the capacity of the roadway. During the A.M. peak period, the northbound approaches to SW 117th Avenue/SW 211th Street (1.02), SW 152nd Street (0.97), SW 136th Street (1.10), SW 112th Street (1.14), and SW 104th Street (1.09) are near or over-capacity. Similarly, in the P.M. peak period, the approaches that are over or near capacity are the southbound approaches to SW 117th Avenue/SW 211th Street (1.11), SW 184th Street (0.90), SW 152nd Street (1.02), SW 136th Street (0.98), SW 112th Street (1.05), and SW 104th Street (1.03).

Table 2-25 Peak Period Level of Service and V/C Ratios on Approaches to Intersections

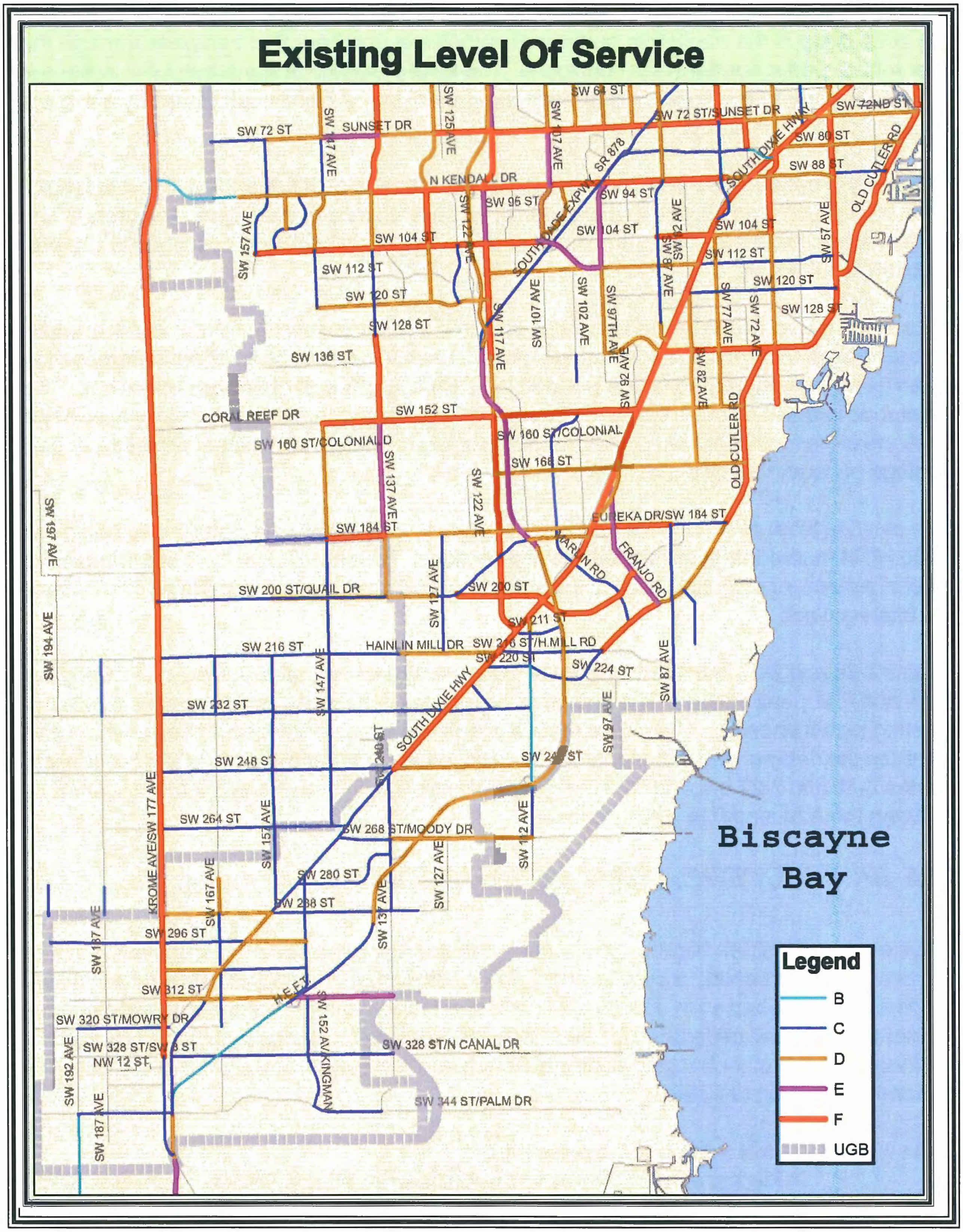
	Intersection	Direction	Classification (1)	Lanes			Capacity (3)		V/C Ratio (4)		Level of Service (5)	
					AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
1	U.S. 1 at SW 312th Street	Northbound	State Two-Way Arterial - Interrupted Flow Class I	3	1,197	1,678	2,790	2,790	0.43	0.60	B	B
		Southbound	State Two-Way Arterial - Interrupted Flow Class I	3	1002	1,605	2790	2,790	0.36	0.58	B	B
		Eastbound	Major City/County Road	2	686	1,028	1720	1,720	0.40	0.60	C	C
		Westbound	Major City/County Road	2	916	1,282	1720	1,720	0.53	0.75	C	D
2	U.S. 1 at	Northbound	State Two-Way Arterial - Interrupted Flow Class II	2	1839	1,485	1800	1,800	1.02	0.83	F	D
	SW 117th Avenue/SW 211th Street	Southbound	State Two-Way Arterial - Interrupted Flow Class II	2	944	1,990	1800	1,800	0.52	1.11	C	F
		Eastbound	Major City/County Road	2	1066	732	1720	1,720	0.62	0.43	C	C
		Westbound	Major City/County Road	2	597	815	1720	1,720	0.35	0.47	C	C
3	U.S. 1 at SW 200th Street	Northbound	State Two-Way Arterial - Interrupted Flow Class II	3	1620	1,519	2710	2,710	0.60	0.56	C	C
		Southbound	State Two-Way Arterial - Interrupted Flow Class II	3	1039	2,283	2710	2,710	0.38	0.84	C	D
		Eastbound	Major City/County Road	2	540	612	1720	1,720	0.31	0.36	C	C
		Westbound	Major City/County Road	2	800	1,024	1720	1,720	0.47	0.60	C	C
4	U.S. 1 at Marlin Road	Northbound	State Two-Way Arterial - Interrupted Flow Class II	3	2032	1,770	2710	2,710	0.75	0.65	C	C
		Southbound	State Two-Way Arterial - Interrupted Flow Class II	3	1117	2,116	2710	2,710	0.41	0.78	C	D
		Eastbound	Major City/County Road	2	456	840	1720	1,720	0.27	0.49	C	C
		Westbound	Major City/County Road	2	676	589	1720	1,720	0.39	0.34	C	C
5	U.S. 1 at SW 186th Street	Northbound	State Two-Way Arterial - Interrupted Flow Class II	3	1841	1,641	2710	2,710	0.68	0.61	C	C
		Southbound	State Two-Way Arterial - Interrupted Flow Class II	3	1297	2,349	2710	2,710	0.48	0.87	C	D
		Eastbound	State Two-Way Arterial - Interrupted Flow Class II	2	504	712	1800	1,800	0.28	0.40	C	C
		Westbound	Major City/County Road	2	249	407	1720	1,720	0.14	0.24	C	C
6	U.S. 1 at SW 184th Street	Northbound	State Two-Way Arterial - Interrupted Flow Class II	3	2049	1,951	2710	2,710	0.76	0.72	C	C
		Southbound	State Two-Way Arterial - Interrupted Flow Class II	3	1420	2,445	2710	2,710	0.52	0.90	C	D
		Eastbound	Major City/County Road	2	865	741	1720	1,720	0.50	0.43	C	C
		Westbound	Major City/County Road	2	622	739	1720	1,720	0.36	0.43	C	C
7	U.S. 1 at SW 152nd Street	Northbound	State Two-Way Arterial - Interrupted Flow Class II	3	2625	1,825	2710	2,710	0.97	0.67	E	C
		Southbound	State Two-Way Arterial - Interrupted Flow Class II	3	1472	2,767	2710	2,710	0.54	1.02	C	F
		Eastbound	State Two-Way Arterial - Interrupted Flow Class II	2	1350	1,096	1800	1,800	0.75	0.61	C	C
		Westbound	Major City/County Road	2	458	849	1720	1,720	0.27	0.49	C	C
8	U.S. 1 at SW 136th Street	Northbound	State Two-Way Arterial - Interrupted Flow Class II	3	2987	2,135	2710	2,710	1.10	0.79	F	D
		Southbound	State Two-Way Arterial - Interrupted Flow Class II	3	1536	2,651	2710	2,710	0.57	0.98	C	E
		Eastbound	Major City/County Road	2	637	810	1720	1,720	0.37	0.47	C	C
		Westbound	Major City/County Road	2	321	655	1720	1,720	0.19	0.38	C	C
9	U.S. 1 at SW 112th Street	Northbound	State Two-Way Arterial - Interrupted Flow Class II	3	3091	2,320	2710	2,710	1.14	0.86	F	D
		Southbound	State Two-Way Arterial - Interrupted Flow Class II	3	1578	2,838	2710	2,710	0.58	1.05	C	F
		Eastbound	State Two-Way Arterial - Interrupted Flow Class II	1	379	442	850	850	0.45	0.52	C	C
		Westbound	Major City/County Road	1	254	322	810	810	0.31	0.40	C	C
10	U.S. 1 at SW 104th Street	Northbound	State Two-Way Arterial - Interrupted Flow Class II	3	2949	2,264	2710	2,710	1.09	0.84	F	D
		Southbound	State Two-Way Arterial - Interrupted Flow Class II	4	1833	3,606	3500	3,500	0.52	1.03	C	F
		Eastbound	Major City/County Road	2	740	555	1720	1,720	0.43	0.32	C	C
		Westbound	Major City/County Road	2	350	494	1,720	1,720	0.20	0.29	C	C

Notes: (1) Classifications were made consistent with guidance provided by FDOT's 2002 Level of Service Handbook
(2) Count data obtained from Turning Movement Counts collected in March 2005.
(3) Peak directional volumes and capacities
(4) "V/C Ratio" is the ratio of peak period count volume to peak hour directiona capacity (LOS E)
(5) Level of Service (LOS) is based upon the Generalized Tables contained in FDOT's 2002 LOS Handbook

Legend:

V/C	LOS
<= 0.80	A, B and C
	D
0.80 - 0.89	E
0.90 - 0.99	F
>= 1.00	

Figure 2-31


Existing Level Of Service
Biscayne Bay
Legend
B
C
D
E
F
UGB
SW 72 ST
SUNSET DR
N KENDALL DR
SW 104 ST
SW 112 ST
SW 120 ST
SW 128 ST
SW 136 ST
SW 152 ST
CORAL REEF DR
SW 160 ST/COLONIAL D
SW 184 ST
SW 200 ST/QUAIL DR
SW 216 ST
HAINLIN MILL DR
SW 232 ST
SW 248 ST
SW 264 ST
SW 268 ST/MOODY DR
SW 280 ST
SW 288 ST
SW 296 ST
SW 312 ST
SW 320 ST/MOWRY DR
SW 328 ST/N CANAL DR
SW 344 ST/PALM DR
SOUTH DIXIE HWY
SOUTH DADE EXPWY
KROME AVE/SW 177 AVE
SW 157 AVE
SW 137 AVE
SW 127 AVE
SW 117 AVE
SW 107 AVE
SW 87 AVE
SW 57 AVE
OLD CUTLER RD
EUREKA DR/SW 184 ST
FRANJO RD
MARLIN RD
SW 72 ST/SUNSET DR
SW 72ND ST
SW 80 ST
SW 88 ST
SW 94 ST
SW 104 ST
SW 112 ST
SW 120 ST
SW 128 ST
SW 152 AV/KINGMAN
SW 197 AVE
SW 194 AVE
SW 192 AVE
SW 187 AVE

2.5.3.7 Intersections

The capacity at a signalized intersection is calculated for each lane group. The capacity of the lane group is the maximum number of vehicles in one hour that can pass through the intersection under normal traffic conditions. The level of service at signalized intersections is defined according to the delay experienced at the signal, which is calculated by using the capacity of the lane group.

The delay is based on several factors such as the laneage of the intersection, cycle length, amount of green time allotted to movements, and the v/c ratio of the critical lane group. The level of service at intersections is calculated by using the methodology described in Chapter 16 of the 2000 HCM.

Note that the level of service and v/c ratios obtained for approaches to an intersection may be different when using traffic engineering software used to perform operational analyses than when using the generalized tables included in FDOT's 2002 Level of Service Handbook. The difference in the level of service and v/c ratios may be due to the fact that at signalized intersections more factors are accounted for such as lane numbers and usage, arrival type, percentage of heavy vehicles, etc.

The existing level of service for each of the study intersections was determined using the 2000 HCM methodology for signalized intersections. Tables 2-26 and 2-27 summarize the level of service for each approach to the study intersections and the overall level of service at the intersections.

Tables 2-26 and 2-27 indicate that most of the cross streets operate at LOS E or F during the A.M. and P.M. peak periods. The poor level of service on the cross streets may be due to the existing signal phasing. The side streets currently operate under a split phase, which can increase the delay on the minor approaches and results in a detriment of the level of service. Tables 2-26 and 2-27 also indicate that overall most of the intersections operate at LOS E or F during the A.M. and P.M. peak periods.

2.6 BICYCLE/PEDESTRIAN CONDITIONS

Bicycle and pedestrian facilities contribute to encouraging the use of alternative modes of travel to the automobile. Bicycling and walking, other than serving as independent travel modes, can also be used to access public transportation systems. Benefits associated with efficient bicycle and pedestrian facilities include easing traffic congestion, minimizing environmental pollution, enhancing personal health and recreation, and reducing the need for automobile parking facilities.

The objectives of this section of the report are:

- To identify existing bicycle and pedestrian facilities within the South Link Corridor study area

Table 2-26 Level of Service at Study Intersections, A.M. Peak Period

		EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL INTERSECTION	
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
US 1 at SW 312th Street	VOLUMES	230	391	65	303	451	162	105	929	163	133	716	153		VOLUMES
	AVG. DELAY, SEC	44.1	37.3	31.8	38.7	35.7	N/A	20.6	29.3	N/A	33.3	24.2	23.5	31.5	AVG. DELAY, SEC
	MOVEMENT LOS	D	D	C	D	D	N/A	C	C	N/A	C	C	C	C	LOS
	MOVEMENT V/C	0.73	0.61	0.04	0.72	0.72	N/A	0.41	0.67	N/A	0.73	0.42	0.29	0.74	V/C RATIO
	APP. DELAY, SEC		39			36.7			28.5			25.3			
	APPROACH LOS		D			D			C			C		130	CYCLE (SEC)
US 1 at SW 117th Avenue	VOLUMES	110	592	364	293	301	3	275	1447	116	29	863	52		VOLUMES
	AVG. DELAY, SEC	44.1	57.6	45.7	195.6	55.8	48.2	30.8	37.3	18.6	27.8	36.9	26.6	51.4	AVG. DELAY, SEC
	MOVEMENT LOS	D	E	D	F	E	D	C	D	B	C	D	C	D	LOS
	MOVEMENT V/C	0.31	0.84	0.43	1.24	0.64	0.00	0.74	0.88	0.11	0.21	0.68	0.09	0.93	V/C RATIO
	APP. DELAY, SEC		52.1			124.3			35.1			36.1			
	APPROACH LOS		D			F			D			D		130	CYCLE (SEC)
US 1 at SW 200th Street	VOLUMES	278	205	57	188	330	282	134	1419	67	220	700	119		VOLUMES
	AVG. DELAY, SEC	N/A	49.1	N/A	43.0	56.6	N/A	55.1	41.5	N/A	56.8	27.7	26.1	43.3	AVG. DELAY, SEC
	MOVEMENT LOS	N/A	D	N/A	D	E	N/A	E	D	N/A	E	C	C	D	LOS
	MOVEMENT V/C	N/A	0.74	N/A	0.30	0.82	N/A	0.49	0.85	N/A	0.64	0.36	0.20	0.82	V/C RATIO
	APP. DELAY, SEC		49.1			53.4			42.6			33.7			
	APPROACH LOS		D			D			D			C		130	CYCLE (SEC)
US 1 at Marlin Road	VOLUMES	79	274	103	82	350	244	337	1583	112	117	806	194		VOLUMES
	AVG. DELAY, SEC	64.6	191.0	68.5	67.7	278.4	N/A	72.4	19.7	N/A	24.9	16.5	N/A	73.0	AVG. DELAY, SEC
	MOVEMENT LOS	E	F	E	E	F	N/A	E	B	N/A	C	B	N/A	E	LOS
	MOVEMENT V/C	0.37	1.19	0.47	0.43	1.43	N/A	1.01	0.57	N/A	0.66	0.35	N/A	1.07	V/C RATIO
	APP. DELAY, SEC		141.5			252.8			28.4			17.4			
	APPROACH LOS		F			F			C			B		160	CYCLE (SEC)
US 1 at SW 186th Street NB LT Lanes	VOLUMES	330	100	72	47	175	27	61	1654	122	25	1097	171		VOLUMES
	AVG. DELAY, SEC	137.7	144.5	64.8	63.9	130.6	N/A	11.5	17.8	N/A	14.7	16.3	N/A	38.1	AVG. DELAY, SEC
	MOVEMENT LOS	F	F	E	E	F	N/A	B	B	N/A	B	B	N/A	D	LOS
	MOVEMENT V/C	1.03	1.06	0.31	0.24	1.00	N/A	0.28	0.59	N/A	0.22	0.43	N/A	0.71	V/C RATIO
	APP. DELAY, SEC		130.3			118.1			17.6			16.2			
	APPROACH LOS		F			F			B			B		160	CYCLE (SEC)

Table 2-26 Level of Service at Study Intersections, A.M. Peak Period (continued)

US 1 at SW 184th Street	VOLUMES	470	370	25	167	421	34	110	1802	137	154	1074	192		VOLUMES
	AVG. DELAY, SEC	73.2	65.6	N/A	59.8	66.3	N/A	28.3	55.7	N/A	64.9	34.4	N/A	53.2	AVG. DELAY, SEC
	MOVEMENT LOS	E	E	N/A	E	E	N/A	C	E	N/A	E	C	N/A	D	LOS
	MOVEMENT V/C	0.85	0.85	N/A	0.57	0.78	N/A	0.57	0.96	N/A	0.82	0.62	N/A	0.92	V/C RATIO
	APP. DELAY, SEC		68			64.5			54.2			37.7			
	APPROACH LOS		E			E			D			D		160	CYCLE (SEC)
US 1 at SW 152nd Street	VOLUMES	543	634	173	132	237	89	258	2213	154	130	1093	249		VOLUMES
	AVG. DELAY, SEC	153.1	145.3	53.8	85.2	77.0	N/A	26.9	53.5	N/A	44.2	30.2	28.8	67.4	AVG. DELAY, SEC
	MOVEMENT LOS	F	F	D	F	E	N/A	C	D	N/A	D	C	C	E	LOS
	MOVEMENT V/C	1.14	1.15	0.45	0.75	0.75	N/A	0.74	0.98	N/A	0.60	0.48	0.35	0.95	V/C RATIO
	APP. DELAY, SEC		135.7			79.6			50.9			31.2			
	APPROACH LOS		F			E			D			C		160	CYCLE (SEC)
US 1 at SW 136th Street	VOLUMES	217	273	147	120	173	28	164	2749	74	190	1238	108		VOLUMES
	AVG. DELAY, SEC	64.6	67.0	63.8	65.0	67.7	N/A	68.1	56.6	N/A	69.8	19.4	15.5	49.8	AVG. DELAY, SEC
	MOVEMENT LOS	E	E	E	E	E	N/A	E	E	N/A	E	B	B	D	LOS
	MOVEMENT V/C	0.54	0.64	0.43	0.36	0.56	N/A	0.54	1.02	N/A	0.61	0.44	0.12	0.87	V/C RATIO
	APP. DELAY, SEC		65.5			66.7			57.3			25.4			
	APPROACH LOS		E			E			E			C		160	CYCLE (SEC)
US 1 at SW 112th Street	VOLUMES	149	179	51	35	154	65	78	2937	76	106	1409	63		VOLUMES
	AVG. DELAY, SEC	65.9	64.4	N/A	64.1	101.9	62.6	70.2	75.3	N/A	77.0	19.3	14.0	59.4	AVG. DELAY, SEC
	MOVEMENT LOS	E	E	N/A	E	F	E	E	E	N/A	E	B	B	E	LOS
	MOVEMENT V/C	0.55	0.55	N/A	0.21	0.87	0.04	0.53	1.08	N/A	0.67	0.50	0.07	0.94	V/C RATIO
	APP. DELAY, SEC		64.9			86.6			75.2			22.9			
	APPROACH LOS		E			F			E			C		160	CYCLE (SEC)
US 1 at SW 104th Street	VOLUMES	540	143	57	19	64	267	74	2865	10	184	1517	132		VOLUMES
	AVG. DELAY, SEC	176.4	82.3	60.6	67.8	70.8	288.9	69.0	61.3	N/A	74.5	19.6	16.2	67.3	AVG. DELAY, SEC
	MOVEMENT LOS	F	F	E	E	E	F	E	E	N/A	E	B	B	E	LOS
	MOVEMENT V/C	1.16	1.12dl	0.25	0.13	0.41	1.40	0.27	1.04	N/A	0.64	0.44	0.16	1.05	V/C RATIO
	APP. DELAY, SEC		114.9			236.7			61.5			24.9			
	APPROACH LOS		F			F			E			C		160	CYCLE (SEC)

N/A= No Applicable
# = 95th percentile volume exceeds capacity, queue may be longer than reported value
m = volume for 95th percentile is metered by upstream signal

Table 2-27 Level of Service at Study Intersections, P.M. Peak Period

		EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			TOTAL INTERSECTION	
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
US 1 at SW 312th Street	VOLUMES	293	635	100	147	821	314	119	1272	287	126	1260	219		VOLUMES
	AVG. DELAY, SEC	45.9	45.2	31.0	31.1	187.8	N/A	32.7	60.4	N/A	38.1	36.5	30.6	74.8	AVG. DELAY, SEC
	MOVEMENT LOS	D	D	C	C	F	N/A	C	E	N/A	D	D	C	E	LOS
	MOVEMENT V/C	0.77	0.84	0.06	0.34	1.32	N/A	0.67	1.01	N/A	0.71	0.81	0.45	1.04	V/C RATIO
	APP. DELAY, SEC		44			169.8			58.4			35.8			
	APPROACH LOS		D			F			E			D		130	CYCLE (SEC)
US 1 at SW 117th Avenue	VOLUMES	90	393	249	378	411	26	190	1145	146	66	1829	95		VOLUMES
	AVG. DELAY, SEC	46.1	52.3	44.5	268.9	57.4	44.3	57.8	27.4	17.9	20.1	172.0	22.9	104.7	AVG. DELAY, SEC
	MOVEMENT LOS	D	D	D	F	E	D	E	C	B	C	F	C	F	LOS
	MOVEMENT V/C	0.32	0.70	0.16	1.44	0.78	0.02	0.67	0.70	0.12	0.31	1.29	0.15	1.11	V/C RATIO
	APP. DELAY, SEC		48.9			155.1			30.4			159.8			
	APPROACH LOS		D			F			C			F		130	CYCLE (SEC)
US 1 at SW 200th Street	VOLUMES	266	247	99	375	432	217	213	1240	66	605	1361	317		VOLUMES
	AVG. DELAY, SEC	N/A	62.9	N/A	54.2	132.1	N/A	59.4	39.5	N/A	230.1	34.7	32.9	74.6	AVG. DELAY, SEC
	MOVEMENT LOS	N/A	E	N/A	D	F	N/A	E	D	N/A	F	C	C	E	LOS
	MOVEMENT V/C	N/A	0.89	N/A	0.69	1.13	N/A	0.63	0.76	N/A	1.36	0.70	0.52	0.95	V/C RATIO
	APP. DELAY, SEC		62.9			103.5			42.3			86.2			
	APPROACH LOS		E			F			D			F		130	CYCLE (SEC)
US 1 at Marlin Road	VOLUMES	171	277	392	137	294	158	301	1383	86	233	1675	208		VOLUMES
	AVG. DELAY, SEC	85.6	187.8	429.2	78.3	145.2	N/A	429.4	18.7	N/A	73.2	21.7	N/A	98.9	AVG. DELAY, SEC
	MOVEMENT LOS	F	F	F	E	F	N/A	F	B	N/A	E	C	N/A	F	LOS
	MOVEMENT V/C	0.80	1.19	1.75	0.69	1.09	N/A	1.82	0.49	N/A	0.99	0.63	N/A	1.72	V/C RATIO
	APP. DELAY, SEC		279.6			129.7			88.5			27.4			
	APPROACH LOS		F			F			F			C		160	CYCLE (SEC)
US 1 at SW 186th Street NB LT Lanes	VOLUMES	491	189	30	136	251	19	149	1408	84	94	2134	121		VOLUMES
	AVG. DELAY, SEC	275.5	287.8	64.6	81.2	268.4	N/A	164.9	20.9	N/A	17.5	30.4	N/A	78.9	AVG. DELAY, SEC
	MOVEMENT LOS	F	F	E	F	F	N/A	F	C	N/A	B	C	N/A	E	LOS
	MOVEMENT V/C	1.41	1.44	0.16	0.73	1.38	N/A	1.13	0.54	N/A	0.51	0.83	N/A	1.19	V/C RATIO
	APP. DELAY, SEC		272.7			205.5			34			29.9			
	APPROACH LOS		F			F			C			C		160	CYCLE (SEC)

Table 2-27 Level of Service at Study Intersections, P.M. Peak Period (continued)

Intersection	Measure														
US 1 at SW 184th Street	**VOLUMES**	287	403	51	277	431	31	223	1557	171	198	1946	301		**VOLUMES**
	AVG. DELAY, SEC	98.7	84.6	N/A	157.4	91.2	N/A	149.3	33.7	N/A	93.6	47.8	N/A	62.9	**AVG. DELAY, SEC**
	MOVEMENT LOS	F	F	N/A	F	F	N/A	F	C	N/A	F	D	N/A	E	**LOS**
	MOVEMENT V/C	0.92	0.92	N/A	1.11	0.93	N/A	1.11	0.71	N/A	0.94	0.94	N/A	1.05	**V/C RATIO**
	APP. DELAY, SEC		89.1			116			47			51.5			
	APPROACH LOS		F			F			D			D		160	**CYCLE (SEC)**
US 1 at SW 152nd Street	**VOLUMES**	551	288	257	322	447	80	340	1366	118	138	2012	617		**VOLUMES**
	AVG. DELAY, SEC	336.3	236.8	111.5	143.2	129.9	N/A	160.8	30.0	N/A	25.1	49.5	74.3	98.1	**AVG. DELAY, SEC**
	MOVEMENT LOS	F	F	F	F	F	N/A	F	C	N/A	C	D	E	F	**LOS**
	MOVEMENT V/C	1.55	1.44dl	0.95	1.06	1.08	N/A	1.17	0.62	N/A	0.56	0.92	0.98	1.21	**V/C RATIO**
	APP. DELAY, SEC		237.9			134.1			53.8			54.3			
	APPROACH LOS		F			F			D			D		160	**CYCLE (SEC)**
US 1 at SW 136th Street (Existing Geometry)	**VOLUMES**	285	342	183	210	354	91	432	1597	106	161	2368	122		**VOLUMES**
	AVG. DELAY, SEC	64.4	66.5	64.0	63.3	93.3	N/A	115.8	30.6	N/A	69.5	65.0	24.1	60.4	**AVG. DELAY, SEC**
	MOVEMENT LOS	E	E	E	E	F	N/A	F	C	N/A	E	E	C	E	**LOS**
	MOVEMENT V/C	0.60	0.67	0.53	0.47	0.94	N/A	1.02	0.69	N/A	0.54	1.02	0.17	0.95	**V/C RATIO**
	APP. DELAY, SEC		65.2			83.7			47.8			63.3			
	APPROACH LOS		E			F			D			E		160	**CYCLE (SEC)**
US 1 at SW 112th Street (Existing Geometry)	**VOLUMES**	258	153	31	58	219	45	239	2034	47	121	2578	139		**VOLUMES**
	AVG. DELAY, SEC	68.1	65.9	N/A	64.9	169.6	62.1	191.9	31.4	N/A	75.9	56.3	19.7	57.5	**AVG. DELAY, SEC**
	MOVEMENT LOS	E	E	N/A	E	F	E	F	C	N/A	E	E	B	E	**LOS**
	MOVEMENT V/C	0.62	0.63	N/A	0.31	1.12	0.03	1.19	0.80	N/A	0.67	1.01	0.18	0.98	**V/C RATIO**
	APP. DELAY, SEC		66.6			135.7			47.9			55.3			
	APPROACH LOS		E			F			D			E		160	**CYCLE (SEC)**
US 1 at SW 104th Street (Existing Geometry)	**VOLUMES**	276	202	77	35	178	281	190	2060	14	341	2870	395		**VOLUMES**
	AVG. DELAY, SEC	72.7	69.2	62.1	65.5	124.9	79.1	69.4	33.7	N/A	76.5	33.0	23.9	43.2	**AVG. DELAY, SEC**
	MOVEMENT LOS	E	E	E	E	F	E	E	C	N/A	E	C	C	D	**LOS**
	MOVEMENT V/C	0.69	0.70	0.35	0.20	0.96	0.68	0.57	0.80	N/A	0.80	0.86	0.49	0.83	**V/C RATIO**
	APP. DELAY, SEC		69.2			94.6			36.7			36.1			
	APPROACH LOS		E			F			D			D		160	**CYCLE (SEC)**

N/A= No Applicable
# = 95th percentile volume exceeds capacity, queue may be longer than reported value
m = volume for 95th percentile is metered by upstream signal

- To identify potential bicycle and pedestrian facilities that may serve public transportation systems recommended by this study.

Existing and planned bicycle facilities within the study area are shown in Figure 2-32. The information in Figure 2-32 was obtained from Miami-Dade County. These bicycle facilities are discussed below.

2.6.1 South Dade Trail

The South Dade Trail is a dedicated bicycle facility that is located on the west side of the existing South Dade Busway. Presently, the bicycle path extends from Dadeland South Metrorail Station to SW 264th Street. When completed, both the South Dade Busway and the South Dade Trail will extend from Dadeland South to SW 344th Street in Florida City. Connections from the South Dade Trail to Metrorail are available at Dadeland South. Both the busway and the bicycle facility have been built along a former railway line previously used by the Florida East Coast Railroad. Dixie Highway (U.S. 1) runs parallel to the busway/bicycle trail on the east side.

2.6.2 Bike Lanes

The only notable bike lanes located in the vicinity of the study area are along SW 137th Avenue (Tallahassee Road) from SW 328th Street to SW 288th Street. This bike facility is about two miles in length and connects to paved paths along SW 312th Street and SW 288th Street, which in turn connect to the South Dade Trail. Eventually, the Tallahassee Road bike lanes are proposed to be extended to the South Dade Trail. Bikeway signs have already been installed at the intersection of U.S. 1 and Tallahassee Road where the South Dade Trail will meet the proposed Tallahassee Road bike lanes (Exhibit 2-12).

Exhibit 2-12
Northern end of Tallahassee Road bike lane at the South Dade Trail

2.6.3 Paved Paths

Paved paths are located outside travel lanes, separated by a buffer zone and meant for walking and bicycling. The primary paved paths on the west side of the study area are along SW 152nd Street and Black Creek Trail. The primary paved paths located on the east side of

Figure 2-32

Bicycle Facilities

Figure No.

2-31

the study area are along Old Cutler Road, SW 288th Street, and SW 312th Street. These paths connect to the South Dade Trail, thus providing potential bicycling/walking access to public transportation systems.

2.6.4 Off-Road Trails

Off-road trails located within the study area include the Princeton Trail, Mowry Trail, Biscayne Trail, Black Creek Trail, and Everglades Trail. Both the Princeton Trail and Black Creek Trail extend from Everglades Trail to Saga Bay and connect to the South Dade Trail. Mowry Trail extends from Everglades Trail to Tallahassee Road and connects to the South Dade Trail. Biscayne Trail extends from Old Cutler Road and connects to Tallahassee Road and Everglades Trail. A spur of Everglades Trail is planned to connect to Biscayne Trail.

2.6.5 South Dade Greenways Master Plan

The Miami-Dade Metropolitan Planning Organization, in its South Dade Greenways Master Plan, has proposed to develop off-road dedicated trails within the County that would cater for bicycling and walking. These trails would follow natural waterways and utility paths. The Draft 2005 Transportation Improvement Program (TIP) of the Miami-Dade MPO so far has not allocated funds for the South Dade Greenways Master Plan for the period from 2003 to 2008 (TIP report accessed online on June 8, 2005).

Exhibit 2-13
South Dade Busway and South Dade Trail - View Looking South

Generally, a network of bicycle facilities exists within the study area that may be improved to serve transit stations along the South Link Corridor (Exhibit 2-13). However, it is conspicuous from Figure 2-18 that very few roads within the study area have bike lanes or even paved shoulders. The absence of bike lanes or paved shoulders on the street network is an obstacle to promoting bicycling to transit facilities. Therefore, to promote bicycling to transit stations, it is important to improve facilities for bicyclists on the streets that connect to transit stations or existing bicycle facilities.

2.6.6 Pedestrian Facilities

To consider walking as a realistic transportation alternative, existing conditions need to be favorable for pedestrian use. The study area is densely developed with residential, commercial, and institutional establishments. Sidewalks are available on most major streets within the study area. However, on some local streets, sidewalks are discontinuous.

The most significant obstacles to pedestrian access exist from the east side, where pedestrians have to cross the heavily-traveled Dixie Highway (U.S. 1) to access the South Dade Busway. Dixie Highway acts as a significant barrier to east-west pedestrian mobility within the study corridor.

Crosswalks are not available at every intersection along Dixie Highway. Although sidewalks exist along Dixie Highway (see Exhibit 2-14), these facilities are frequently interrupted by closely spaced driveways. These driveways create safety concerns for pedestrians.

Well-defined and efficient pedestrian paths are needed to promote walking to and from the existing stations. In the absence of well-defined and efficient walkways, as seen in Exhibit 2-15, pedestrians create illegal access paths to bus stations. High traffic volume on Dixie Highway, developments, closely spaced driveways, and absence of well-defined walkways and efficient make pedestrian access to existing public transportation facilities difficult.

Exhibit 2-14
Sidewalks along South Dixie Highway (U.S. 1)

Exhibit 2-15
Pedestrian Access to a Bus Station Via an Illegal Crossing of the Busway

CHAPTER 3: ALTERNATIVES CONSIDERED

3.1 Introduction

A two-tier alternatives evaluation method was adopted for the South Link Corridor Alternatives Analysis (AA), which evaluates transit improvements within south Miami Dade County generally from the Dadeland South Metrorail Station to Florida City.

Seven alternatives were identified in the Tier I stage and general characteristics of those alternatives were developed. The build alternatives, except the Diesel Multiple Unit Alternative, use the existing right-of-way of the South Miami-Dade Busway Corridor. Two alternatives were eliminated as part of the Tier I screening. Please refer to Chapter four for a detailed description of the Tier I screening process.

3.1.1 TIER I ALTERNATIVES

During the Tier I analysis, the following seven alternatives were identified for the South Link Corridor:

- Alternative 1. No-Build
- Alternative 2. Transportation System Management (TSM)
- Alternative 3. Light Rail Transit (LRT) to Florida City
- Alternative 4. Metrorail to Southland Mall / Bus Rapid Transit (BRT) from Southland Mall to Florida City
- Alternative 5. Metrorail to Florida City
- Alternative 6. Metrorail to SW 104th Street / BRT from Dadeland South to Florida City
- Alternative 7. Diesel Multiple Unit (DMU) on CSX / Kendall Drive and main tain operation on existing Busway

The two alternatives that were eliminated during the Tier I screening process were Metrorail to Southland Mall (Alternative 4) and DMU (Alternative 7). A description of these alternatives follows in section 3.2.

3.1.2 TIER II ALTERNATIVES

Four of the Tier I build alternatives were advanced to the Tier II analysis with some refinements to the initial definitions of the alternatives. A fifth alternative, Dual-Mode Metrorail (Hybrid Metrorail) to Florida City was introduced during Tier II evaluations as a less-expensive alternative to the conventional Metrorail. The five build alternatives that were analyzed in the Tier II stage of the alternatives analysis are listed below:

- Alternative 1 No-Build
- Alternative 2 Transportation System Management (TSM)
- Alternative 3 Light Rail Transit (LRT) to Florida City

- Alternative 5 Metrorail to Florida City
- Alternative 5A Hybrid Metrorail to Florida City
- Alternative 6 Enhanced Bus Rapid Transit (BRT) to Florida City

3.2 Tier I Alternatives

Seven alternatives were identified in the Tier I stage and general characteristics of those alternatives were developed.

3.2.1 Alternative 1 No-Build Alternative

This alternative is required for environmental comparisons of impacts. It measures the impact of growth on the area if nothing beyond what is programmed occurs in the corridor. It provides a benchmark for impacts caused or lessened by building a project. Thus the No-Build Alternative is analyzed against 2030 population and employment projections and the transportation network that is programmed (funded) to be in place by the year 2030. The No-Build Alternative includes the completion of the South Miami-Dade Busway to SW 344th Street in Florida City, the operation of the busway routes on the busway to Florida City, the addition of several park-and-ride lots, implementation of several community circulators, and a minimum of 15-minute peak hour headways on most bus routes.

3.2.2 Alternative 2 Transportation System Management Alternative

This alternative would modify existing bus service in the southern half of Miami-Dade County. The Transportation System Management (TSM) Alternative is required by the Federal Transit Administration (FTA). The TSM Alternative includes all of the non-major capital projects that can be implemented in the corridor. It must provide the same quantity of transit service in the corridor that a major build alternative would provide. Transit ridership on a major capital project is measured only in terms of above and beyond the ridership estimated for the TSM. The TSM Alternative, like all alternatives, must use the 2030 population and employment projections as the basis for estimating total travel demand. The TSM network completely reorganizes the existing bus network in South Miami-Dade and is composed of east-west transit routes that directly access the busway. Every major section-line arterial would have a bus route. Most routes offer a "one-seat" ride from their origin to the Metrorail Station at Dadeland South. The TSM Alternative consists of all of the existing busway stations, more park-and-ride lots than available in the No-Build Alternative, and signal prioritization along the busway to accelerate the trip.

3.2.3 Alternative 3 Light Rail Transit to Florida City

This alternative would provide light rail transit (LRT) service from the existing Dadeland South Metrorail Station to Florida City. LRT vehicles draw their power from an overhead source and operate at-grade. Rail and overhead power lines would be installed for the train. The existing stations, which occur approximately at one-half mile intervals, would serve as the light rail stations. This alternative would use the same feeder bus service; however, none of the routes would use the busway so passengers would have to transfer from the bus to the LRT. A second transfer would be required from the LRT to the Metrorail at Dadeland South. Since the LRT operates at-grade, transit vehicles still interact with automobiles at the intersections. Signal preemption would be an important part of the project so that the LRT can make acceptable time along the corridor. Finally, the same park-and-ride system that is available for the TSM Alternative would be a part of this alternative as well.

3.2.4 Alternative 4 Metrorail to Southland Mall/BRT to Florida City

This alternative consists of two technologies: Metrorail (heavy rail transit) for the northern half of the study corridor, and a BRT for the southern half of the corridor. Metrorail and BRT service would provide a fast, reliable service to downtown Miami and other areas of Miami-Dade County currently served by Metrorail. The key element of this alternative is the extension of Miami-Dade Transit's Metrorail service from the existing southern terminus at the Dadeland South Station to the Southland Mall area. Stations would be located at approximately one-mile intervals. Where feasible park-and-ride facilities would be developed to increase accessibility to the proposed heavy rail service. The BRT portion would extend from the proposed Metrorail station at Southland Mall to Florida City Park-and-ride facilities would also be developed in this portion of the corridor. Bus routes north of Southland Mall would be modified as appropriate to facilitate transfers to Metrorail service. Transit signal priority technology would be deployed on the busway to enhance performance of routes using the busway that would feed the heavy rail service.

3.2.5 Alternative 5 Metrorail to Florida City

The key element of this alternative is the extension of Miami-Dade Transit's Metrorail service from the existing southern terminus at the Dadeland South Station to the City Hall area, Palm Drive, in Florida City. The Metrorail guideway would be elevated along the existing busway alignment to provide sufficient clearance from the surface streets. Heavy rail service would provide a fast, reliable service to downtown Miami and other areas of Miami-Dade County currently served by Metrorail. Stations would be located at approximately one-mile intervals, where feasible park-and-ride facilities would be developed to increase accessibility to the proposed heavy rail service.

3.2.6 Alternative 6 Enhanced BRT to Florida City

This alternative includes the extension of the existing Metrorail service from Dadeland South to SW 104th Street and a bus rapid transit (BRT) system from Dadeland South to Florida City. As the new southern terminus for Metrorail, it is expected that park-and-ride demand will be significant at the SW 104th Street station. Therefore, this station would include a significant parking component (approximately 1,500 parking spaces) dedicated for Metrorail park-and-ride patrons. An opportunity for a joint development exists at this station that would ideally include mixed-use retail and an office attached to the Metrorail station.

South of Dadeland South, the existing busway would be converted to a BRT corridor. BRT service would run from Dadeland South in the north to Florida City in the south. BRT encompasses a variety of approaches designed to improve transit travel speed, trip reliability, and overall quality of transit service over traditional bus service. These enhancements are achieved through unique components of BRT such as transit signal priority at at-grade intersections, pre-boarding fare collection, and low-floor buses with wide doorways and aisles. BRT is generally less expensive to build than heavy rail transit.

Alternative 6 recommends grade separation for the BRT corridor at several critical roadway crossings to enhance overall system safety, and to achieve greater travel time and trip reliability benefits for BRT users. The grade separation at these roadways will increase the busway's vehicular capacity, which may present an opportunity to allow automobiles to use the busway as express toll lanes. Grade separation is expected to be achieved by elevating the BRT lanes and constructing bridges over several major roadways.

Bus station spacing along the BRT corridor is recommended to be approximately every one-half mile, which is about the same as the existing busway. A high level of commuter trips are expected along the BRT corridor; therefore, park-and-ride lots and east-west feeder bus routes are recommended at approximately one-mile spacing. The BRT corridor should be designed such that surface street bus routes should be able to enter the busway and provide connections to the proposed southern terminus of Metrorail at SW 104th Street. This will maintain the bus service frequency within the BRT corridor of at least one bus passing by every 1.8 minutes. Further service improvements could reduce this headway to an even higher service level.

3.2.7 Alternative 7 Diesel Multiple Unit (DMU) on CSX Corridor

Alternative 7 for the South Link corridor consists of diesel multiple unit (DMU) commuter rail service in the CSX corridor between Florida City and Dadeland. The DMU technology is a general term for a diesel-powered train in which the traction system is contained under various cars of the train. DMUs can have driving cabs with passenger seating at both ends of the train, which simplifies out-and-back point to point operations. DMUs can generally pull up to two standard commuter coaches for increased capacity.

Approximately eight passenger stations are anticipated along the DMU corridor between Florida City and Dadeland. It would be necessary for the proposed commuter rail line described in Alternative 7 to leave the CSX corridor in the area of Kendall Drive to make its way east toward one of the Dadeland Metrorail stations, which would become a transfer facility between the DMU commuter rail line and Metrorail. DMU stations are anticipated to be located near the following locations:

- Dadeland South Metrorail Station
- Kendall Drive / SW 87th Avenue (Baptist Hospital)
- Kendall Drive / SW 97th Avenue
- CSX / SW 104th Street (Miami-Dade College Kendall Campus)
- CSX / SW 152nd Street
- CSX / SW 184th Street
- CSX / SW 232nd Street

- CSX / SW 312th Street
- CSX / SW 328th Street

Train headways along the DMU corridor should be no more than 60 minutes. More frequent headways are preferable; however, single-track operations along the CSX corridor may restrict service levels without further improvements. Park-and-ride lots are proposed to serve commuter traffic at the five stops along the CSX Corridor between SW 328th Street and SW 152nd Street and at the stop at Kendall Drive/SW 97th Avenue.

In addition to commuter rail service in the CSX corridor, this alternative proposes that the existing busway corridor retain bus operations similar to what is currently in place. However, feeder routes are proposed for the DMU Alternative similar to the TSM Alternative. In Alternative 7, the busway would extend from the Dadeland South station in the north to SW 344th Street in Florida City. Bus stations would remain in the same location as the No-Build Alternative. In addition to the existing park-and-ride lots at SW 152nd Street, SW 168th Street, and SW 200th Street, new park-and-ride lots would be constructed at the following busway stations to help alleviate overcrowding in existing park-and-ride lots along the busway.

- SW 186th Street
- SW 216th Street
- SW 344th Street

3.3 TIER II ALTERNATIVES

The Tier II alternatives studied for the South Link Corridor include two low cost alternatives and four premium transit alternatives. The remainder of this chapter presents a detailed description of the Tier II alternatives listed below.

The No-Build Alternative is required for analysis by the federal government and its purpose is to examine what would happen in the corridor if no new projects were constructed. In addition, the No-Build Alternative is used as the baseline alternative for evaluating the impacts of the Tier II build alternatives.

The Transportation System Management (TSM) Alternative includes projects in the corridor that would be relatively easy to implement and these projects include modification of local bus routes to better feed the busway, construction of additional park-and-ride facilities, and provision of bus priority signalization along the corridor.

The Light Rail Transit (LRT) Alternative would provide light rail transit service from the Dadeland South Metrorail terminus to Florida City. The LRT service would operate at ground level along the existing busway right-of-way.

The Metrorail Alternative would provide elevated guideway rapid transit service from the existing Dadeland South Metrorail station to Florida City. The Metrorail tracks and stations would be within the existing busway right-of-way.

The Dual Mode Metrorail Alternative would utilize a hybrid Metrorail that could draw power from two different sources. The Metorail vehicles would operate along the existing Metrorail system drawing power from the electrified third rail. In addition, these vehicles would be retrofitted to draw power from an overhead power line, enabling the vehicle to operate at ground level from the Dadeland South Metrorail station to Florida City along the existing busway right-of-way.

The Bus Rapid Transit (BRT) Alternative would provide bus rapid transit service from Dadeland South to Florida City along the existing busway right-of-way. This alternative would also provide flexibility for buses to leave the busway and provide direct service to local neighborhoods.

3.3.1 Alternative 1 No-Build

The No-Build Alternative for the South Link corridor consists of no further improvements to the roadway or transit network beyond those already programmed in the Transportation Improvement Program (TIP). The extension of the South Miami-Dade Busway from SW 264th Street to Florida City and expanded or new park-and-ride facilities identified in the TIP are included in the No-Build Alternative. Therefore, the No-Build Alternative consists of standard Metrobuses operating on the South Miami-Dade Busway from the Dadeland South Metrorail Station to the future southern busway terminus in Florida City. This alternative was used for the purpose of establishing the impacts of the Tier II build alternatives.

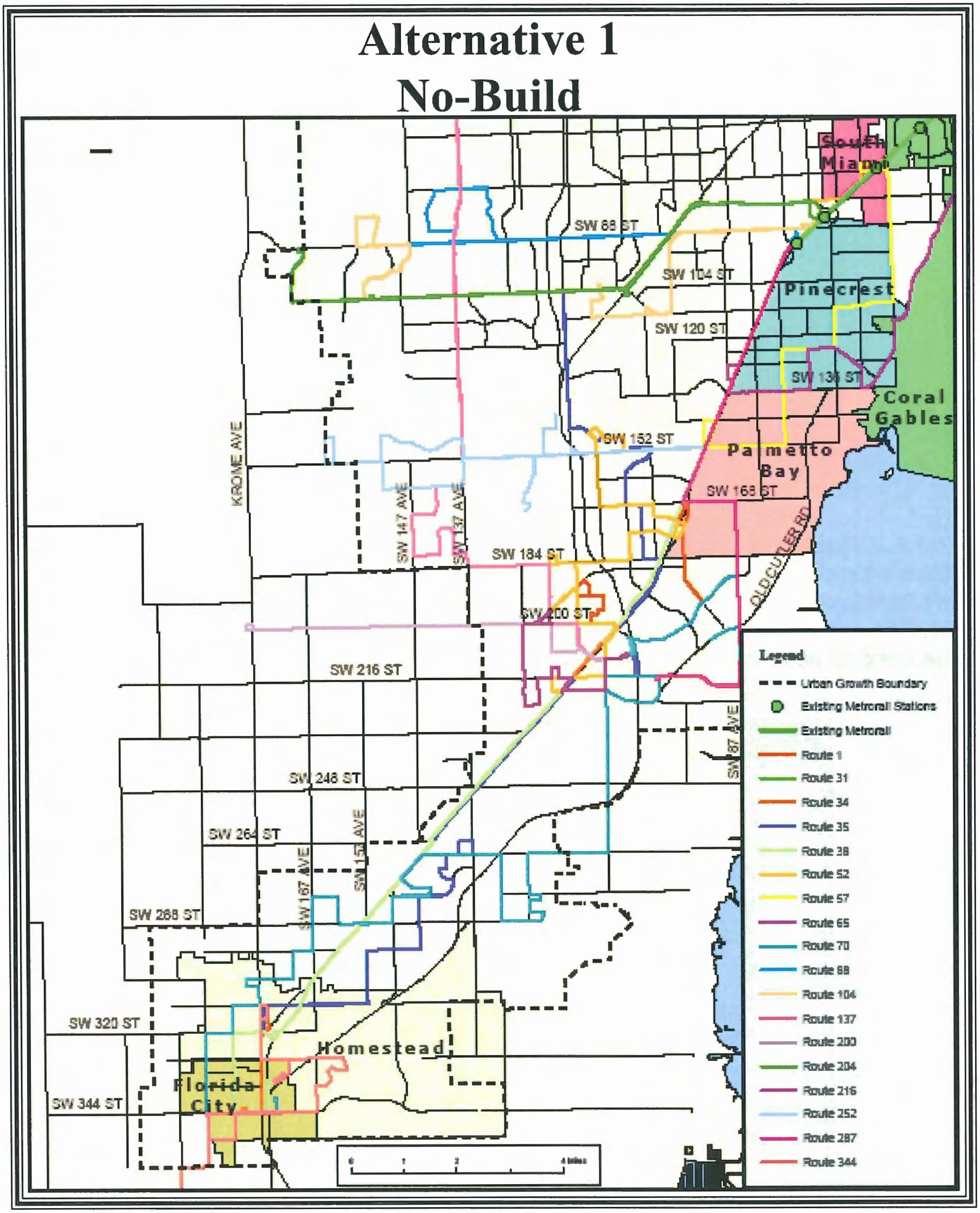
3.3.1.1 Bus Routes

Figure 3-1 depicts the No-Build Alternative bus routes. Metrobus routes 1, 31, 34, 38, 52, 65, 252, and 287 that operate on the South Miami-Dade Busway serve the Dadeland South Metrorail Station. All of these routes operate on the South Miami-Dade Busway from at least Coral Reef Drive (SW 152nd Street) north. The combination of these routes provides peak hour peak direction headway of one bus every 1.8 minutes. Headway of 1.8 minutes would provide approximately 1,400 seating capacity per direction (2,050 crush capacity) during the peak hour.

The majority of the bus routes in the southern third of Miami-Dade County interface at the South Miami-Dade Government Center/Southland Mall area. The north-south routes operating on the South Miami-Dade Busway are fed by the Goulds Connection (Route 216), which circulates through the neighborhoods of Cutler Ridge and Goulds immediately to the west of the Southland Mall. Route 216 does not operate on the South Miami-Dade Busway; therefore, transfers are required to the buses operating on the Busway. The West Dade Connection (Route 137) operates between the South Miami International Mall and Miami-Dade Government Center/Southland Mall.

Routes 34 and 38 that start in Florida City run the entire length of the corridor and provide a combined operating headway of six minutes for the South Miami-Dade Busway south of Southland Mall. Routes 35 and 70 start in Florida City, but those routes do not operate on the

Figure 3-1


Alternative 1
No-Build
South Miami
Pinecrest
Coral Gables
Palmetto Bay
Homestead
Florida City
SW 88 ST
SW 104 ST
SW 120 ST
SW 136 ST
SW 152 ST
SW 168 ST
SW 184 ST
SW 200 ST
SW 216 ST
SW 248 ST
SW 264 ST
SW 288 ST
SW 320 ST
SW 344 ST
KROME AVE
SW 147 AVE
SW 137 AVE
SW 167 AVE
SW 157 AVE
SW 87 AVE
OLD CUTLER RD
Legend
Urban Growth Boundary
Existing Metrorail Stations
Existing Metrorail
Route 1
Route 31
Route 34
Route 35
Route 38
Route 52
Route 57
Route 65
Route 70
Route 88
Route 104
Route 137
Route 200
Route 204
Route 216
Route 252
Route 287
Route 344

busway (Exhibit 3-1 shows the Dadeland South Bus Terminal). Route 70 connects Florida City with the South Miami-Dade Government Center/Southland Mall winding through Homestead, Naranja, Princeton and Goulds. Route 35 connects Florida City to Miami Dade College-Kendall Campus.

Exhibit 3-1. Dadeland South Bus Terminus

3.3.1.2 Operating Characteristics

Table 3-1 shows the operating characteristics of the bus routes operating in the southern third of Miami Dade County. The difference between peak-hour and off-peak headways on routes 31, 216, and 252 is 5 minutes or less. On other routes, the headway difference between peak and off-peak operations is more than 5 minutes.

Table 3-1. Bus Service in the South Miami-Dade Corridor

Route Name/Number	Origin	Destination	Via Busway	Headway Peak/Off	One-Way Run Time	Round Trip (Miles)	Schedule Speed (MPH)
1	Quail Roost	Dadeland South	Yes	20/40	60 min	27.2	13.6
Busway Local (31)	Southland Mall	Dadeland South	Yes	10/15	45 min	18.7	12.5
Busway Flyer (34)	Florida City	Dadeland South	Yes	20/n.a.	62 min.	51	26.9
35	Florida City	MDCC - Kendall	No	15/30	105 min	58.6	16.7
Busway Max (38)	Florida City	Dadeland South	Yes	15/30	90 min.	51.1	17.0
52	Cutler Ridge	South Miami	Yes	15/30	105 min.	51.2	14.6
57	Perrine	South Miami	No	30/n.a.	45 min	20.1	13.4
65	Pinecrest	Coconut Grove	Yes	15/30	45 min	29.0	19.3
70	Florida City	Cutler Ridge	No	15/30	90 min.	66.3	22.1
88	Kendall	Dadeland North	No	20/30	40 min.	18.9	12.6
104	Kendall	Dadeland North	No	30/30	60 min	29.6	14.8
West Dade Connection (137)	Cutler Ridge	Miami International Mall	No	15/30	90 min	49.4	16.5
Goulds Connector (216)	South Miami-Dade Government Center	Goulds	No	30/30	22 min	12.7	17.3
Coral Reef Max (252)	Country Walk	Dadeland South	No	15/18	45 min.	28	18.7
Saga Bay Max (287)	Saga Bay	Dadeland South	Yes	15/24	36 min	19.6	16.3

3.3.1.3 PARK AND RIDE LOCATIONS

Table 3-2 lists the park-and-ride lots that would be available under the No-Build Alternative. Several existing park-and-ride lots presently overflow during the morning peak period. Exhibit 3-2 shows the SW 168th Street park-and-ride lot, where transit riders park vehicles on the grass shoulder due to the inadequacy of available parking spaces.

Table 3-2. Existing and Proposed Park-and-Ride Lots

Location	Capacity
SW 152nd St and Busway	Surface Lot 126 spaces
SW 168th St. and Busway	Surface Lot 149 spaces
SW 184th Street	(1)
SW 200th St. and Busway	(1) Surface Lot 362 spaces
Cutler Ridge Terminal (Southland Mall)	50 spaces
SW 244th St. and Busway	Surface Lot 95 spaces
SW 296th Street and US 1	Surface Lot 117 spaces
SW 344th St and Busway	(1) Surface Lot 250 spaces

Notes: (1) Proposed.

Exhibit 3-2. Park-and-Ride Lot on SW 168th Street

3.3.2 Alternative 2 TSM

3.3.2.1 General Description

Transportation System Management (TSM) strategies seek to increase the capacity of the existing transportation system while minimizing the costs and environmental impacts associated with a significant expansion of the transportation infrastructure. In particular, more efficient use of the existing transportation infrastructure is the goal of the TSM Alternative.

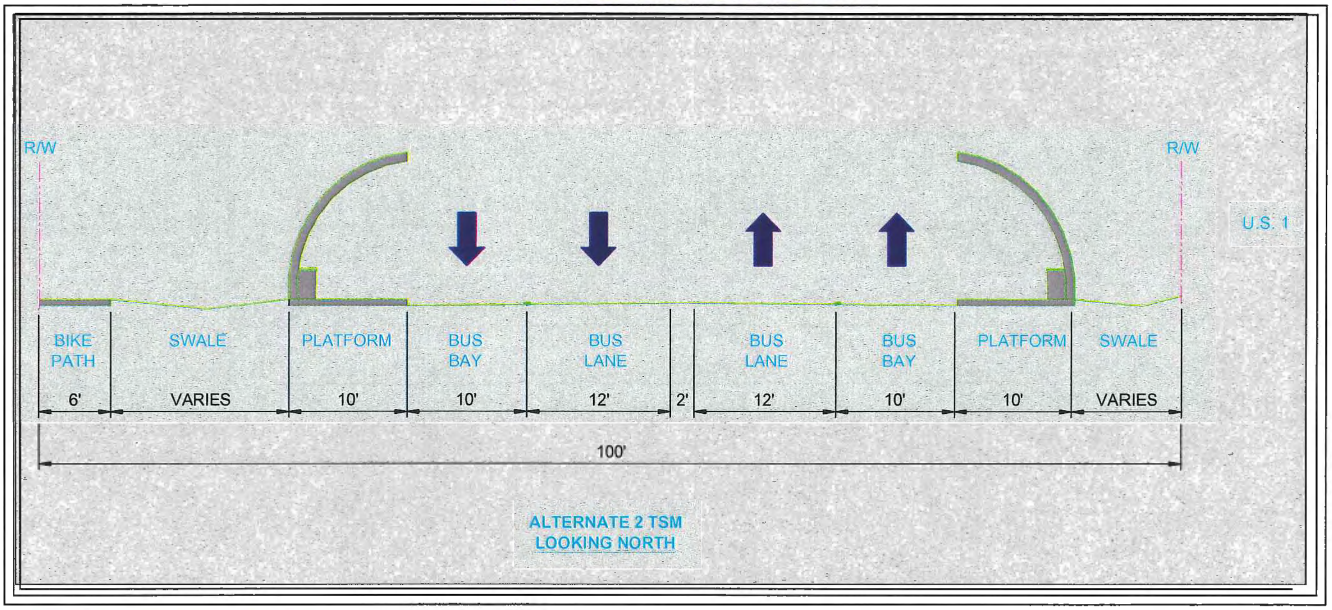
Technology

The TSM Alternative would use buses that are already being operated in the busway. For more details about the characteristics of these buses, please refer to vehicle requirements section.

Typical Cross Section

The TSM Alternative would continue to use the existing infrastructure of the busway. Therefore, no changes to the existing busway design are expected. Figure 3-2 shows a typical cross section of the existing busway at a station.

Figure 3-2. TSM Cross Section



Vertical Alignment

The busway would remain at-grade throughout the corridor. No vertical separations between the busway and other roadways would be constructed. When the South Miami-Dade Busway is completed between Dadeland South and Florida City, there would be approximately 45 at-grade conflict points.

Horizontal Alignment

The TSM Alternative would use the existing alignment of the busway and the alignment of the future extension to Florida City as mentioned in the No-Build Alternative.

3.3.2.2 System Operating Characteristics

This section of the report describes the proposed operating characteristics of the TSM Alternative. The proposed TSM Alternative includes modification of existing bus service in the southern half of Miami-Dade County.

Headways

Bus service from Florida City/Homestead would be operated at five-minute headways during peak periods with two routes running on the South Miami-Dade Busway and one express route running on Florida's Turnpike to Southland Mall where it would use the South Miami-Dade Busway for the remainder of the trip to Dadeland South. A headway of five minutes would provide approximately 500 seating capacity (750 crush capacity) during the peak hour. On the northern portion of the South Miami-Dade Busway, 1.8-minute peak period service would be available. Figure 3-3 shows TSM bus routes.

Travel Time

The estimated peak period one-way travel time between Dadeland South and Florida City is about 59 minutes. Signal prioritization at the intersections would be an essential modification to improve transit travel time on the busway.

Interface with Intersections

As mentioned in the previous section, transit signal priority for the busway at the intersections is recommended to improve transit travel time.

Feeder Buses

The TSM Alternative includes re-orienting bus routes to implement a comprehensive bus feeder network that would interface with the South Miami-Dade Busway at stations and provide connections to local services (Refer to Figure 3-3). Feeder bus service will operate at approximately 15-minute headways.

3.3.2.3 Stations

Type of Station

The TSM Alternative would utilize the existing bus stations and the future stations that would be built when the busway is extended to Florida City.

Fare Collection

The existing on-board fare collection system will be retained in the TSM Alternative.

Station Locations and Parking

Station spacing would remain the same with stops at approximately half-mile intervals with easy access for bus riders, pedestrians, and passengers at stations. Both existing and proposed locations of bus stations along the South Miami-Dade Busway and spacing are presented in Table 3-3.

The TSM Alternative would provide five additional park-and-ride facilities in comparison to the No-Build Alternative. The park-and-ride locations that would be available under the TSM Alternative include:

- SW 124th Street
- SW 136th Street
- SW 152nd Street
- SW 168th Street
- SW 184th Street
- SW 200th Street
- SW 216th Street
- SW 244th Street
- SW 264th Street
- SW 296th Street
- SW 320th Street
- SW 344th Street

Figure 3-3

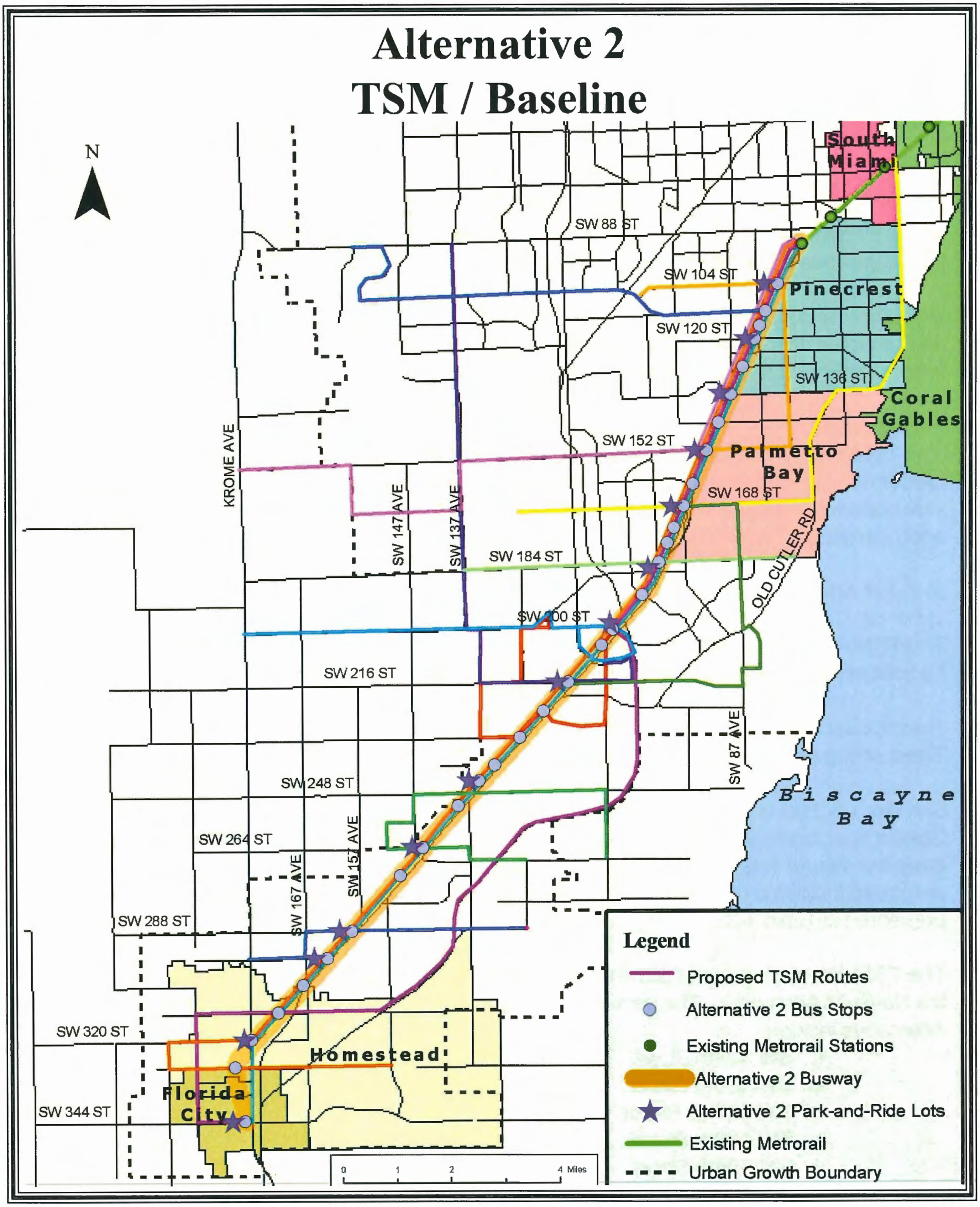

Alternative 2
TSM / Baseline
N
South Miami
Pinecrest
Coral Gables
Palmetto Bay
Biscayne Bay
Homestead
Florida City
SW 88 ST
SW 104 ST
SW 120 ST
SW 136 ST
SW 152 ST
SW 168 ST
SW 184 ST
SW 200 ST
SW 216 ST
SW 248 ST
SW 264 ST
SW 288 ST
SW 320 ST
SW 344 ST
KROME AVE
SW 147 AVE
SW 137 AVE
SW 167 AVE
SW 157 AVE
SW 87 AVE
OLD CUTLER RD
0 1 2 4 Miles
Legend
Proposed TSM Routes
Alternative 2 Bus Stops
Existing Metrorail Stations
Alternative 2 Busway
Alternative 2 Park-and-Ride Lots
Existing Metrorail
Urban Growth Boundary

Table 3-3 Busway Bus Station Locator

Station
Dadeland South to SW 104 Street
SW 104 Street to SW 112 Street
SW 112 Street to SW 117 Street
SW 117 Street to SW 124 Street
SW 124 Street to SW 128 Street
SW 128 Street to SW 136 Street
SW 136 Street to SW 144 Street
SW 144 Street to SW 152 Street
SW 152 Street to SW 160 Street
SW 160 Street to SW 168 Street
SW 168 Street to Banyan
Banyan to Indigo Street
Indigo Street to SW 184 Street
SW 184 Street to Marlin Road
Marlin to SW 200 Street
SW 200 Street to SW 112 Ave
SW 112 Ave to SW 216 Street
SW 216 Street to SW 220 Street
SW 220 Street to SW 232 Street
SW 232 Street to SW 132 Ave
SW 132 Ave to SW 248 Street
SW 248 Street to SW 139 Ave
SW 139 Ave to SW 264 Street
SW 264 Street to SW 272 Street
SW 272 Street to SW 288 Street
SW 288 Street to SW 296 Street
SW 296 Street to SW 304 Street
SW 304 Street to SW 312 Street
SW 312 Street to SW 320 Street
SW 320 Street to SW 328 Street
SW 328 Street to SW 344 Street

Exhibit 3-3 Existing Metrobuses on the South Miami-Dade Busway

3.3.2.4 Vehicle Requirements

Vehicle Description

Currently, Miami-Dade Transit (MDT) primarily operates 40-foot standard buses (Exhibit 3-3) with a seating capacity of 39 (53 maximum "crush" capacity).

Number of Vehicles

Existing Metrobuses would be used to operate the busway and feeder route services for the TSM Alternative. Several existing routes that duplicate proposed feeder routes would be merged into the feeder routes; therefore, existing Metrobuses could be use to operate the feeder routes. Approximately 20 new Metrobuses would be required to operate the proposed Turnpike Flyer route and improve headways to at least 15 minutes on feeder routes.

Operating Characteristics

Several modifications to existing bus service routes are recommended. These modifications intend to facilitate improved access to the busway and to serve key activity centers.

System operating cost per passenger mile for the TSM Alternative is projected to be $0.96, which is comparable with the Metrorail Alternative. However, the TSM Alternative exhibits a lower system capacity than the Metrorail Alternative.

3.3.2.5 Phasing Plan

The phasing plan for the TSM Alternative is not as detailed as the phasing plan for the other build alternatives because the TSM Alternative is not as capital-intensive. It is anticipated that the TSM Alternative could be implemented within a 5-10 year timeframe.

3.3.3 Alternative 3 Light Rail Transit to Florida City

3.3.3.1 General Description

This alternative will provide light rail transit (LRT) service in the South Link Corridor on existing busway right-of-way alongside U.S. 1 from the existing Dadeland South Metrorail station to SW 344th Street in Florida City (See Figure 3-4). The alignment is approximately 20 miles long with the distance between stations generally ranging from one-half mile to one mile. The northern terminus of the LRT alternative would be at the Dadeland South Metrorail Station. Its southern terminus would be in the vicinity of SW 344th Street in Florida City. This alignment would serve the cities of Pinecrest, Palmetto Bay, Homestead and Florida City and the unincorporated areas (Richmond Heights, Perrine, South Miami Heights, Cutler Ridge, Goulds, Princeton, Naranja and Leisure City) of Miami-Dade County. Important activity centers along the corridor that will be served are The Falls Mall, South Dade Government Center, Southland Mall, Homestead Campus of Miami Dade College, and Florida City. During peak hours, trains would be operated at six-minute headways. Fifteen-minute feeder bus service would provide easy access to the LRT stations and connectivity with important activity centers throughout the region.

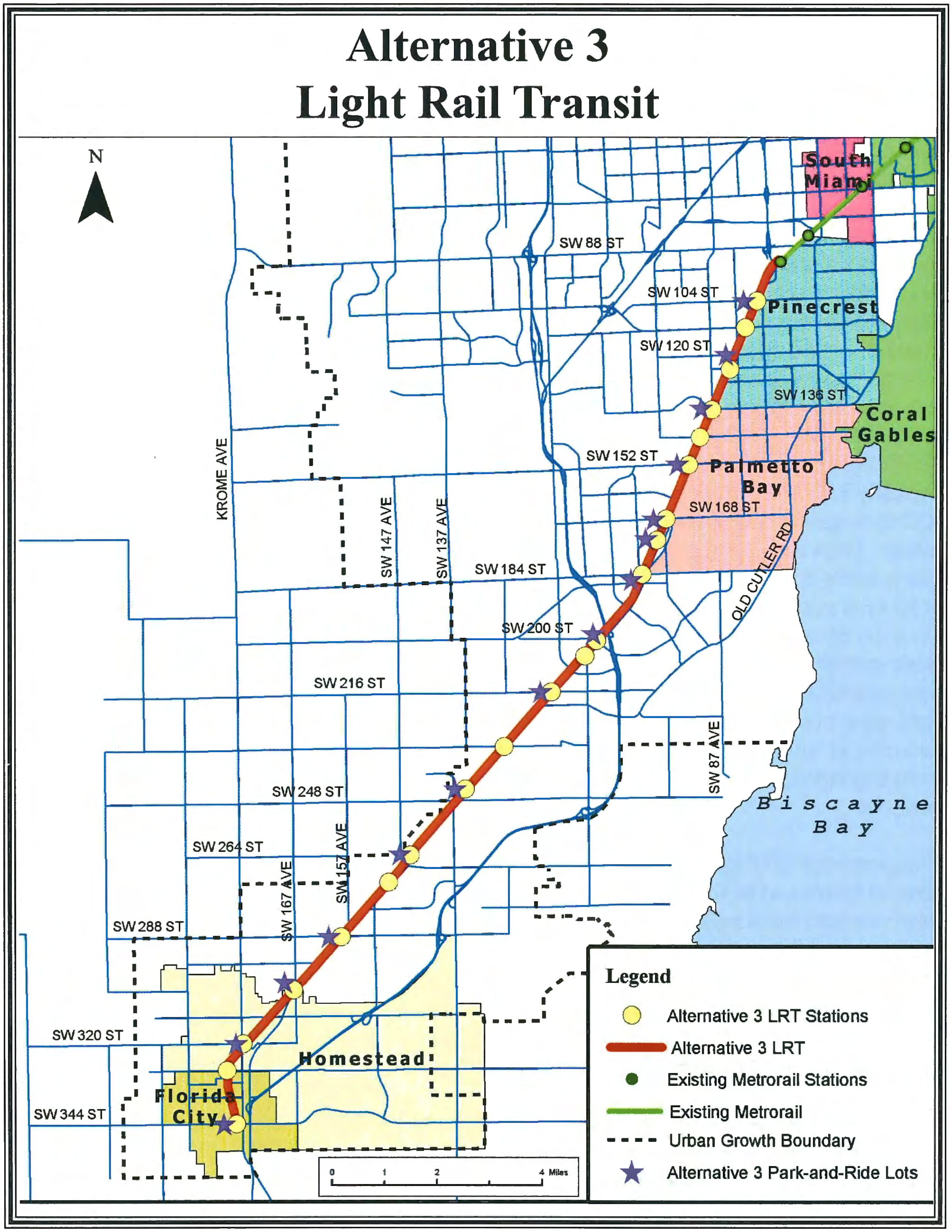
Technology

Typically, LRT technology uses a dedicated track powered by an Overhead Catenary System (OCS) to safely separate automobile and pedestrian traffic from high voltage (750 VDC) power. The trains may operate over exclusive right-of-way, at-grade, or in mixed traffic. LRT can operate up to a maximum safe speed of 70 miles per hour. However, the average speed of light rail systems is significantly lower than the maximum attainable speed since most LRT systems generally operate in downtown mixed traffic, or on the median of major thoroughfares and across major traffic intersections. The close spacing of stations in some areas also contributes to lower average speed of LRT systems. Depending on the travel demand, light rail system could be operated as single-car train or a multiple-car train. The standard two-cab, or articulated LRT vehicle can comfortably accommodate up to 220 passengers including standees. LRT systems with a three-car train can comfortably carry up to 330 passengers.

The proposed LRT system would include all of the basic elements such as fixed infrastructure, all system-wide, fixed equipment and rolling stock. Fixed infrastructure would include all trackway and track switches as well as passenger stations at selected locations along the corridor, and the maintenance and operations facility to support system operations. The maintenance and operations facility, and the layup/storage yard would be constructed at the southern terminus of the alignment in/near Florida City. The system-wide fixed equipment consists of the electrification (OCS), train control/signaling, communications, and fare collection. Rolling stock includes all passenger trainsets and maintenance vehicles.

The trackway proposed for the South Link Corridor LRT Alternative would be ballasted track on concrete ties, use 115-pound RE continuously welded rail (CWR). At roadway-rail at-grade crossings, concrete roadway panels may be utilized to accommodate roadway traffic. Track switches would be provided at the end stations to allow turn-backs and may also be

Figure 3-4


Alternative 3
Light Rail Transit
N
South Miami
Pinecrest
Coral Gables
Palmetto Bay
Biscayne Bay
Homestead
Florida City
SW 88 ST
SW 104 ST
SW 120 ST
SW 136 ST
SW 152 ST
SW 168 ST
SW 184 ST
SW 200 ST
SW 216 ST
SW 248 ST
SW 264 ST
SW 288 ST
SW 320 ST
SW 344 ST
KROME AVE
SW 147 AVE
SW 137 AVE
SW 87 AVE
SW 167 AVE
SW 157 AVE
OLD CUTLER RD
0 1 2 4 Miles
Legend
Alternative 3 LRT Stations
Alternative 3 LRT
Existing Metrorail Stations
Existing Metrorail
Urban Growth Boundary
Alternative 3 Park-and-Ride Lots

placed at other selected locations along the track to accommodate service requirements. Electrification is provided through a network of traction power substations and a distribution system. The traction power substations located approximately every two miles along the length of the corridor and on the right of way would be fed through the local utility power grid. High voltage commercial electrical power, 13kVAC would be converted to 750 VDC for distribution to the individual light rail vehicles through the overhead catenary system (OCS) along the entire length of track.

Train control and signaling would be provided along the length to monitor and protect operation of the trains. The movement of the vehicles would be guided by visual signals (train signal aspect) located alongside the trackway providing an indication to the train operator/ Engineer, of the status of the approaching signal blocks that the train is entering. A signal block is a defined length or section of track under control of the signal system. The length of the signal block is defined primarily by the train/vehicle operational characteristics, such as its maximum design speed, braking distance and other safety critical parameters. All train control/signaling is done using redundant, vital logic communications circuitry. Onboard (cab) signaling and wayside signaling are typically used in combination on most LRT systems. Track signaling is also coordinated with roadway traffic signals on cross-streets and may use full-closure design principles, with four quadrant gates to minimize automobile/pedestrian intrusion into the corridor while the train is crossing the at-grade intersection. Roadway signal pre-emption may be used at critical intersections where traffic congestion may be of concern. Non safety critical communication such as between the maintenance and operations facility and the train operator or station personnel is usually handled via conventional phone line or wireless/radio. Other non-vital communications needs may include a Supervisory Control and Data Acquisitions (SCADA) system for use in monitoring track sensors, monitoring traction power equipment, monitoring of station platforms (CCTV, fire/smoke sensors/alarms), and control of station public address system.

Termini

The north end of the alignment would terminate at the existing Dadeland South Metrorail Station and the south end of the alignment would terminate in the vicinity of SW 344th Street in Florida City.

Interface with Metrorail

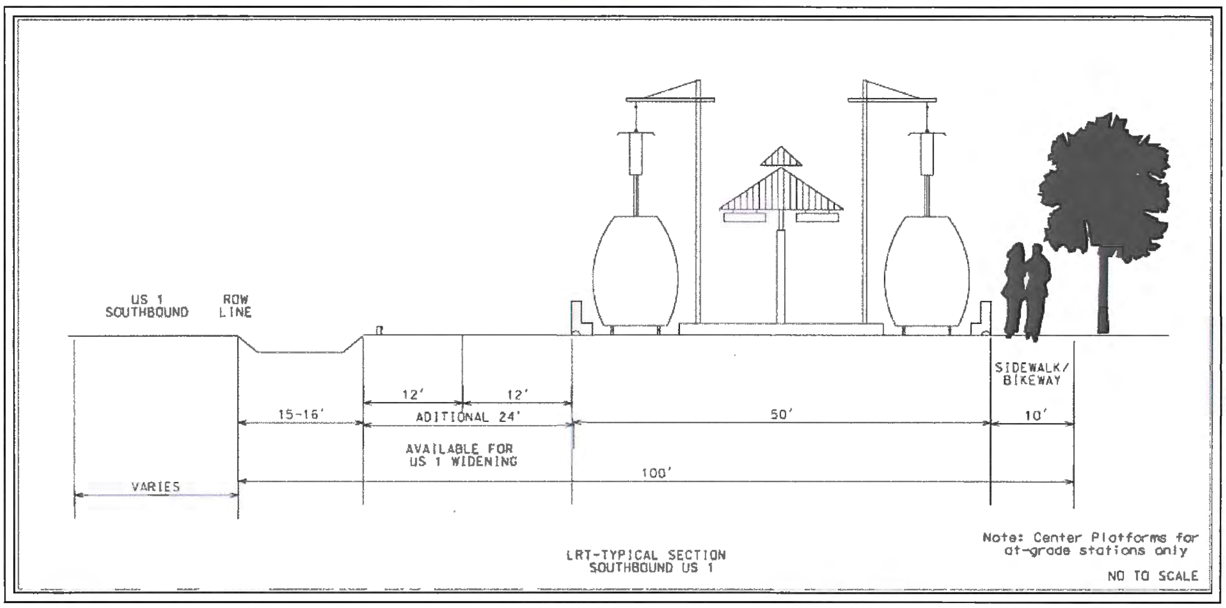
Transfers would be required between LRT and Metrorail at Dadeland South, which would remain the southern terminus of Metrorail. The existing right-of-way between the Dadeland South station and the proposed LRT station at SW 104th Street would be used for both the LRT vehicles and buses to accommodate feeder bus routes from cross-streets in the northern portion of the study corridor. Additional study will have to be conducted to determine the location of the LRT platform relative to the existing busway stops and vertical access to the Metrorail platform at the Dadeland South station.

Vertical Alignment
The alignment would be at-grade for the length of the corridor.

Horizontal Alignment
The LRT vehicles would operate in dedicated right-of-way in the western portion of the existing busway right-of-way. The existing busway has a 100-foot right-of-way including the 16-foot wide drainage ditch, generally along its entire length from the existing Dadeland South station to the southern terminus. The alignment would consist of dual-tracks facilitating travel in northbound and southbound directions. For purposes of this study, it is assumed that the tracks would be installed as ballasted tracks. The right-of-way required to accommodate tracks and platforms at stations would be approximately 50 feet (See Figure 3-5).

A 10-foot wide bike path would be accommodated west of the LRT alignment. Jersey barriers would be used to separate the trackway physically from vehicular and/or pedestrian traffic. This would help in demarcating the LRT right-of-way clearly and provide safety. Therefore, an additional 24 feet would be available from the existing 100-foot busway right-of-way. This additional right-of-way could be used for U.S. 1 expansion or as High Occupancy Vehicle (HOV) lanes or managed lanes.

Figure 3-5 LRT Cross Section



3.3.3.2 System Operating Characteristics
LRT would use two tracks, one track for northbound traffic and one track for southbound traffic. The trains would be articulated and operate as a two-car consist. The trains would be bi-directional for operational flexibility. Service characteristics are very flexible with an LRT system and mostly dependent on equipment and personnel availability.

Mainline Headways

During peak hours weekday service would be operated at five-minute headways. During the midday and evening hours, headways would range from 10 minutes in the midday period to every 30 minutes after 8:00 p.m. until closing. Weekend service would have 15-minute headways until 8:00 p.m., then every 30 minutes until closing. It is anticipated that LRT trains would operate during the same days of the week and hours of the day as Metrorail, which is approximately from 5:00 a.m. to midnight, weekdays and weekends.

Travel Time

The total travel time between Florida City and Dadeland South Metrorail station would be approximately 40 - 45 minutes. To reduce the travel time and increase the reliability of trains (arriving on time as per schedule), low floor LRT vehicles and off-vehicle fare collection would also be implemented.

Interface with Intersections

There are forty-five (45) potential auto/LRT at-grade crossings along the South Link alignment. At intersections with heavy traffic volume and turning movements, LRT vehicles would get a preferential treatment over vehicular traffic. This preferential signal treatment would be provided using Transit Signal Priority (TSP) technology, which would require signal synchronization and coordination with cross-streets and U.S. 1. For at-grade street crossings with low traffic volumes, low cost options like gates with flashers and warning bells would be used.

Feeder Bus

Fifteen-minute feeder bus service would be operated at stations during peak hours; some routes may operate at 30-minute headway. During off peak hours, feeder bus would be operated at 20-minute headways while some routes would operate at 60-minute headways. There would be 13 feeder routes providing connection to LRT service at 11 different stations.

3.3.3.3 Stations

A total of 21 stations are proposed for the LRT alternative. Initially, 30 LRT stations were proposed. However, after reviewing the projected ridership and station spacing, nine stations were not included in the detailed definition of the LRT alternative. Stations that are included in the LRT alternative are:

- SW 104th Street
- SW 112th Street
- SW 124th Street
- SW 136th Street
- SW 144th Street
- SW 152nd Street
- SW 168th Street
- Banyan Street
- SW 184th Street
- SW 200th Street
- SW 344th Street
- SW 112th Avenue
- SW 216th Street
- SW 232nd Street
- SW 244th Street
- SW 264th Street
- SW 272nd Street
- SW 288th Street
- SW 304th Street
- SW 320th Street
- SW 328th Street

The following station locations were considered initially, but were removed from the detailed LRT Alternative:

- SW 117th Street
- SW 128th Street
- SW 160th Street
- SW 186th Street
- Marlin Road
- SW 211th Street
- SW 220th Street
- SW 296th Street
- SW 312th Street

Stations would be spaced ranging generally from one-half mile to one mile. The stations will tend to be closer together in more densely populated areas along the corridor ranging from one-half mile to a few blocks apart, while station spacing increases as the alignment enters more suburban and/or rural areas. In the South Link Corridor, stations north of SW 232nd Street station are more closely spaced in comparison to stations south of SW 232nd Street.

Types of Stations

The LRT Alternative would have at-grade stations. At-grade stations would have single (center) platforms. All the stations would include shelters, real time arrival/departure information, benches and other appropriate passenger amenities. All stations would be fully accessible in compliance with the Americans with Disabilities Act (ADA).

Fare Collection

Off-vehicle fare-collection is proposed for all stations in the LRT Alternative. Stations would be equipped with two to four Ticket Vending Machines (TVM), depending on projected ridership. At each station a secured area for fare collection would be established. Depending on peak hour demand, the number of TVMs could be increased. Required communication infrastructure to support the off-vehicle fare collection would also be installed at the stations.

Platform Location and Other Characteristics

The platforms would be 20 feet wide and 200 feet long and about 18 inches high measured from the top of rail. Height of the platforms is governed by the height of LRT vehicles. It is assumed that the LRT vehicles would be low-floor. Patrons would be able to access the station via walking, biking, bus, or auto. At the Dadeland South Station, the LRT platform would be on the lower level; the Metrorail platform on the upper level would be accessed by existing stairs, escalators, and elevators.

Access

Stations along the proposed alignment would be located at the intersections and/or mid-blocks. Most of the proposed stations are located in areas where bus stops exist along the busway. Pedestrian and auto access were the primary driving forces governing station location. For some stations, the availability of vacant land for park-and-ride lots and street configurations for facilitating feeder bus operations also played an important part in determining station location. These stations locations will be evaluated in more detail during the Preliminary Engineering phase of the study.

Presently, the drainage swale along the east side of the busway presents a physical barrier to pedestrian access. In addition, lack of pedestrian walkways across U.S. 1 poses pedestrian safety issues for and much of the network of sidewalks within a half-mile radius of the proposed LRT stations may require some level of upgrade. All these stations would be designed to meet ADA requirements. Improvements to the sidewalk network need to be completed to improve its quality within a half-mile radius of LRT stations making walking an attractive mode to access the LRT system.

Most LRT stations would have designated passenger drop-off and pick-up areas. These areas would be designed as close as possible to the station platforms. This would reduce the distance transit riders would have to walk to access the LRT system. More detailed site specific information will be used during station area planning to accommodate vehicular access. For Metrobus, turning radius and availability of street right-of-way would govern transit vehicle access issues.

Parking

Park-and-ride lots would be built in the vicinity of the following 15 LRT stations:

- SW 104th Street
- SW 124th Street
- SW 136th Street
- SW 152nd Street
- SW 168th Street
- Banyan Street
- SW 184th Street
- SW 200th Street
- SW 216th Street
- SW 244th Street
- SW 264th Street
- SW 288th Street
- SW 304th Street
- SW 320th Street
- SW 344th Street

On average, there would be a park-and-ride facility available at every 1.5 miles or every fourth station along this corridor. Most park-and-ride lots would be surface lots. Parking garages would be provided initially at 104th, 136th, and 344th Streets. Parking at the other stations would be at-grade (surface lots) until demand warrants construction of a garage. Approximately 17,000 parking spaces would be constructed. In addition, kiss-and-ride/passenger drop-off areas would be provided at all stations.

3.3.3.4 Vehicle Requirements

Vehicle Description

The proposed trains for the South Link LRT Alternative are bi-directional, low floor, and articulated. The cabs would be fully air conditioned accommodating 110 passengers (including standees) comfortably, for a total capacity of 220 passengers per train. The trains could be fitted with a restroom in at least one cab, if so desired. The trains will be fully ADA compliant. The vehicles would allow for various modes of passenger information, including public address and station announcements, electronic destination signs, engineer/operator intercom, and security/surveillance systems. Vehicle would be provided by modern, state-of-the-art electromotive drives, making it efficient and quiet. Vehicle ride quality is matched to track design to provide for a smooth and comfortable ride. Exhibit 3-5 shows a typical LRT vehicle.

Number of Vehicles

The LRT system proposed for the South Link Corridor would use 25 trainsets with a 20 percent spare ratio for a total fleet size of 30. The number of trains was determined using a standard FTA approved formula with recommended spares and is defined by the required peak period headway, train round-trip time, vehicle carrying capacity, average dwell per station, and number of stations served.

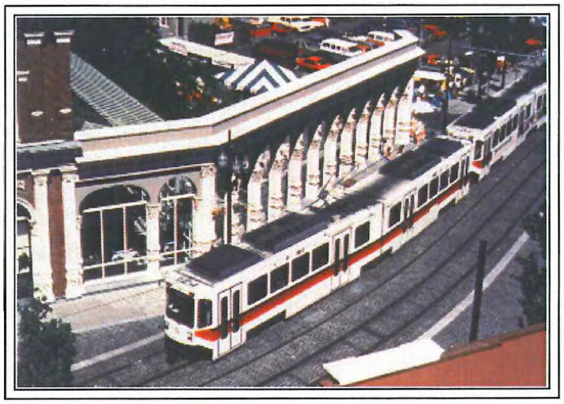


Exhibit 3-5 Typical LRT Vehicle

Vehicle Operating Characteristics

The LRT trains are capable of operating at speeds of 60 to 70 miles per hour, but as noted before, the actual operating speed will be mostly determined by station spacing, location along the alignment, approach to roadway at-grade crossings, and mixed traffic conditions.

3.3.3.5 Maintenance and Operations Facility

The maintenance and operations facility would be located in the southern portion of the alignment, near and accessible to the existing busway right-of-way. The minimum required area determined necessary for both the facility and lay-up/storage yard is estimated to be approximately 15 acres.

The maintenance portion of the facility would contain various shops for both unplanned, planned regular maintenance and major overhaul, with a minimum of one maintenance bay for each of three maintenance types. The typical shops include battery shop, wheel truing shop, motor shop, electronics shop, A/C shop, frame/body shop and parts shop. Offices for supervisory personnel are usually provided close to the shop areas along with locker rooms and restrooms for employees.

The operations portion of the facility would contain the central command/control center of the LRT center and would be the major hub of all train signals and communications. The operations area would also contain offices for administrative and professional staff along with any personnel welfare areas such as locker areas and break-rooms.

For maximum efficiency of operations, the maintenance and operations facility would be located near the southern terminus of the alignment. Such a location would allow for efficient staging and deployment of vehicles at the beginning and end of each day and minimize "deadhead" miles (non-revenue service operations).

The proposed phasing plan for this alternative would have the initial construction of the LRT end in the vicinity of the South Dade Government Center. The initial phase of operation of the LRT alternative would require a maintenance and operations facility. If the operations and maintenance facility constructed for the initial phase of LRT operations were built to meet the needs of the complete project, when the LRT would be extended to SW 344th Street in Florida

City, the maintenance and operations facility would not be located for the most efficient and cost effective operations. A maintenance and operations facility in the vicinity of the South Dade Government Center would result in higher operations and maintenance costs over the total life of the project.

An option to address this issue would be to construct a temporary, interim capacity maintenance and operations facility to support initial operations until the permanent facility is constructed and the full system is implemented. The temporary facility would have to be sized to handle the initial smaller fleet size and reduced personnel service requirements. In implementing the full system, a permanent maintenance and operations facility would be constructed near the southern Terminus at SW 344th Street. The temporary facility would either be dismantled for use as a park and ride facility, or it could continue to be used as a satellite service facility.

During Preliminary Engineering, a detailed analysis would be performed to determine whether it would be more cost effective to have the permanent maintenance and operations facility near the middle of the LRT alignment and incur high operations cost or to construct a temporary maintenance and operations facility to be replaced by a permanent facility at the southern terminus of the alignment.

3.3.3.6 PHASING PLAN

The proposed 20-mile LRT system for the South Link Corridor is estimated to cost approximately $854 million in 2005 dollars, which is an average cost of approximately $41 million per mile. These are conceptual, planning cost estimates. Cost estimates will be refined as more engineering, systems design, and site specific information is developed in subsequent phases of the study (i.e., Preliminary Engineering and Final Engineering phases). Since the funds required for building capital intensive transit projects are not available at one time, transit projects need to phased out over a number of years. Besides funding, phasing of transit projects is required because of wide variations in the travel demand along the corridor. Consequently, construction and operation of short sections in the corridor during the initial years of project implementation is not cost effective. Existing and planned transportation improvements in the corridor need to be coordinated.

Transit improvements for the South Link Corridor would be phased over a period of 25 years. This 25-year period would be consist of five phases - Phase I (Years 1-5), Phase II (Years 6-10), Phase III (Years 11-15), Phase IV (Years 16-20), and Phase V (Years 21-25). The description below explains various transportation improvements proposed for different phases.

Phase I (Years 1-5)

Phase I would involve reorienting existing bus routes. Some of the bus routes may operate as express routes and others as skip-stop routes. Some routes may even mimic LRT service being proposed in the South Link Corridor. In addition, transit service improvements in terms of improved headways would also be implemented. Secured area for facilitating new fare collection would be built. At heavily congested intersections Transit Signal Priority (TSP) system would be installed. Existing parking lots at SW 152nd Street and SW 168th Street that are extensively used and often experience spillover would be expanded. ROW for the proposed parking lots along the corridor would be acquired. A new park-and-ride at SW 200th Street would be built.

Phase II (Years 6-10)

Phase II involves construction of new park-and-ride lots at SW 104th Street, SW 124th Street, and SW 344th Street along the corridor. The park-and-ride lot at SW 244th Street would be expanded. Park-and-ride lots have been phased based on projected demand such that they are generally evenly distributed along the corridor.

Phase III (Years 11-15)

During this phase, EIS for South Link Corridor would be completed including obtaining Record of Decision (ROD) on FEIS/Final Design. ROW required for the maintenance facility at the southern terminus of the LRT alignment would be acquired. Proposed park-and-ride lots at SW 136th Street, SW 184th Street, SW 216th Street, SW 288th Street, and SW 320th Street would be opened. Low-floor LRT vehicles would be ordered. In addition, exiting bus fleet would be augmented as required.

Phase IV (Years 16-20)

All the supporting infrastructure expected for the tracks and stations would be completed and in place by the end of Phase III. During Phase IV tracks and communication infrastructure alongside the tracks will be placed. The stations along this section of the alignment would be built. The alignment would be operational from Dadeland South to Southland Mall in year 20. A maintenance and operations facility would be constructed near the southern terminus of the Phase IV alignment, with sufficient capacity to maintain the fleet and infrastructure.

Phase V (Years 21-25)

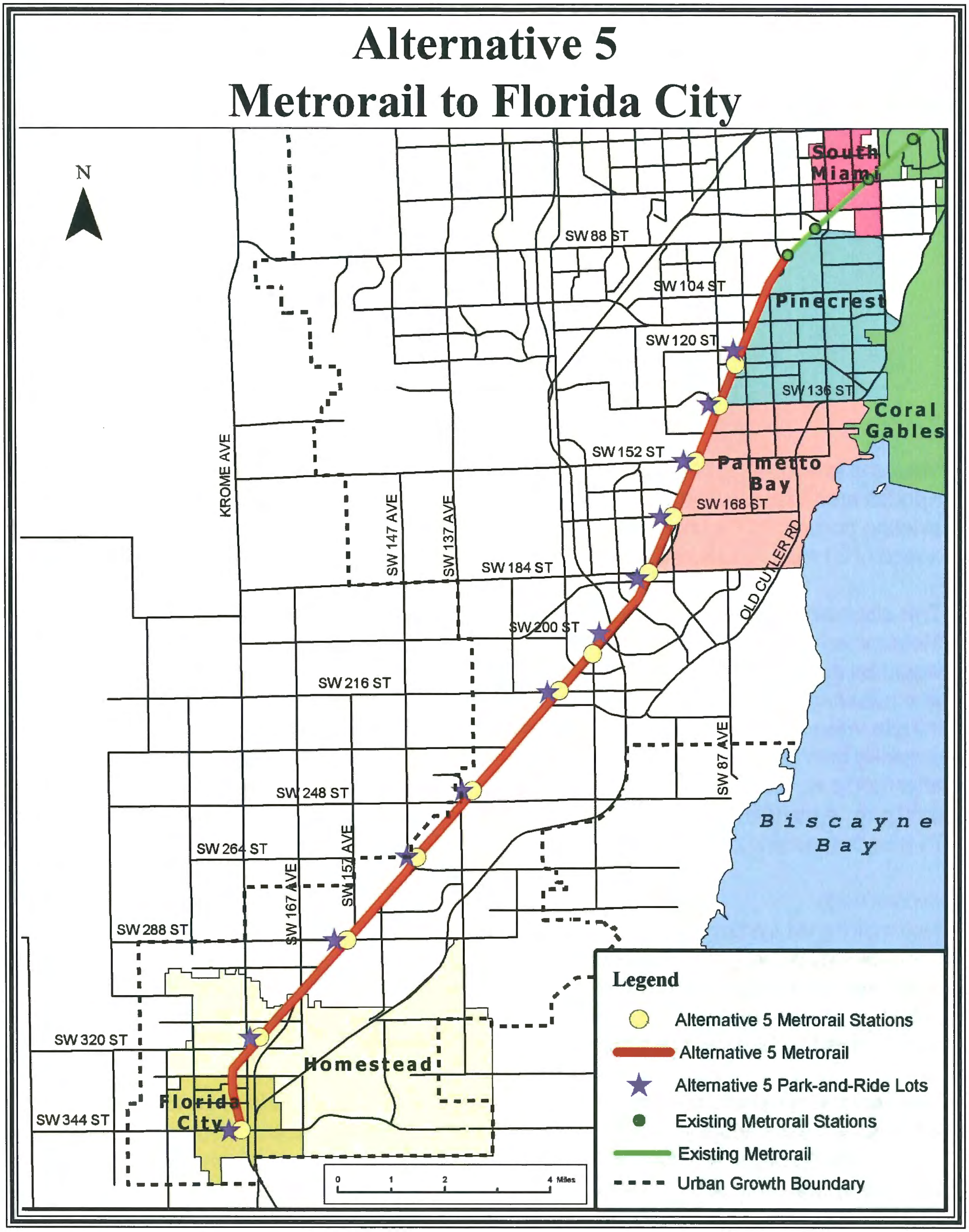
Stations, tracks and other necessary supporting infrastructure from Southland Mall to Florida City would be built and put in place. The LRT system would be fully operational from Dadeland South to SW 344th Street in Florida City in 2030. Surface parking lots would be converted into parking garages at various locations if transit ridership increased enough to justify building a parking structure. The permanent maintenance and operations facility would be constructed in Phase V near the southern terminus of the alignment. The temporary maintenance and operations facility would be either dismantled and converted to a park and ride facility, or continued in use as a satellite service facility.

3.3.4 Alternative 5 Metrorail to Florida City

3.3.4.1 General Description

The Metrorail Alternative, as illustrated in Figure 3-6, would provide elevated fixed guideway rapid transit service from the existing Dadeland South Metrorail station to Florida City. Grade separated heavy rail service would provide fast, reliable service to downtown Miami and

Figure 3-6. Metrorail Alternative



other areas of Miami-Dade County currently served by Metrorail. This line is an extension of the existing Metrorail and a transfer would not be required at Dadeland South for a trip to downtown Miami or to the Civic Center area.

Exhibit 3-6 Miami's Phase I Metrorail

Metrorail is a 22-mile heavy rail system that runs from the Dadeland South station in the Kendall area to the Palmetto station in Medley (Exhibit 3-6). There are 22 stations along the existing corridor. The maximum speed of the system is 58 mph with an average running speed of 31 mph. It takes 42 minutes to run from end to end.

This alternative would extend the elevated rapid transit system approximately 20 miles. The Metrorail vehicles and guideway would be similar to existing services in Miami. Station spacing would be approximately at one-mile intervals with easy access for bus riders, pedestrians, and passengers at stations. Service would be provided by six-car trains operated at six-minute intervals during peak periods to all stations along the alignment. Service would be provided during the midday off-peak period at 15-minute intervals and at 30-minute intervals after 8:00 p.m. Saturday and Sunday service would be provided at 20-minute headways until 8:00 p.m. A complete trip from the Palmetto Station to Florida City would take approximately 71 minutes; a trip from Dadeland South to Florida City would take approximately 29 minutes.

Technology

Metrorail transit systems are high capacity, fixed-guideway systems that operate in exclusive rights-of-way without at-grade crossings. Metrorail systems typically operate below surface (subways) or along elevated structures. Outside of dense urbanized areas, Metrorail systems sometimes operate at-grade in exclusive rights-of-way. Metrorail trains receive power from an electric third rail, usually adjacent to the guideway.

Metrorail trains usually consist of four to six rail cars. Each rail car is approximately 75-feet long with a crush capacity (includes standing room) of 150 to 200 passengers. The length of Metrorail trains often necessitates longer station lengths (loading platforms) and stations are typically spaced one to two miles apart. The ability to provide high service frequency combined with outstanding performance (acceleration and deceleration) and exclusive right-of-way operations allow Metrorail transit systems to achieve extraordinary directional capacities approximating 12,000 passengers per hour. However, Metrorail systems usually require a capital cost of at least twice the level of light rail transit and modern streetcar systems because of their extensive infrastructure requirements.

Termini

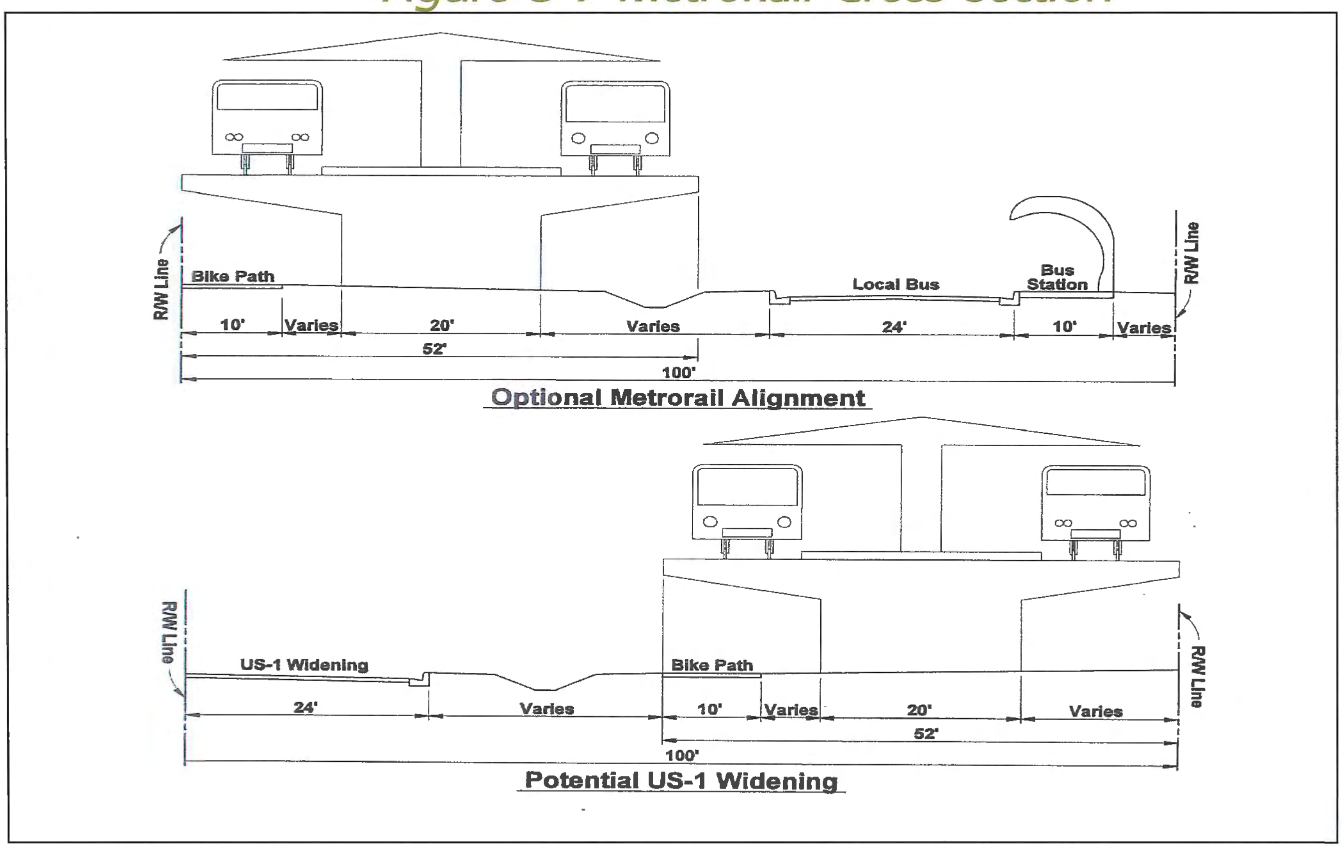
The north end of the alignment would terminate at the existing Dadeland South Metrorail Station and the south end of the alignment would terminate in the vicinity of SW 344th Street in Florida City.

Horizontal and Vertical Alignment

The total alignment would be about 99,000 feet or nearly 20 miles in length starting at SW 94 Street at the existing Dadeland South Metrorail station and terminating at SW 344 Street in Florida City. The alignment use the 100-foot right-of-way currently occupied by the South Miami-Dade Busway.

The structure would be built on the west side of the right-of-way to allow for future improvements such as widening of U.S. 1 or provisions for local bus service in the corridor. Figure 3-7 illustrates where the Metrorail facility might sit within the right-of-way.

Figure 3-7 MetroRail Cross Section



Construction

There are a number of construction techniques for Metrorail Extension including: segmental box, steel girder or beam, and concrete girder or beam. The number of options increases because of the capability with concrete for cast-in-place, or pre-cast, or pre-stressed. The final construction technique will be determined during final design based upon cost, maximum length of span required, staging issues, need to avoid construction impacts, etc.

Column spacing would be between 50 feet and 150 feet depending upon both the structural depth and the method of construction. The height of the structure and the column spacing will dictate the size of the columns. Normally the columns will be located in the center of the structure, except at the stations where the columns will be centered under each track. Depending upon final design the columns would be from 8 to 12 feet in diameter and the depth of the overhead structure would be 6 to 10 feet.

3.3.4.2 System Operating Characteristics

HEADWAYS

During the peak periods, service would be provided at six-minute intervals to all stations along the alignment. Service would be provided during the midday off-peak period at 15-minute intervals and at 30-minute intervals after 8:00 pm. Saturday and Sunday service would be provided at 20-minute headways until 8:00 pm.

TRAVEL TIME

A trip from Dadeland South to Florida City would take about 29 minutes. A complete trip from the Palmetto Station to Florida City would take approximately 71 minutes.

INTERFACE WITH INTERSECTIONS

There are about 45 auto/transit at-grade crossings along the South Link alignment. The majority of the Metrorail alignment would be built at an elevation to provide 16.5 feet clearance over local streets and roads. There are two locations that are exceptions. The alignment would drop to nearly ground level as it leaves the Dadeland South station to go under the Palmetto Expressway southbound off-ramp. The structure would return to the normal Metrorail elevation and would continue at this level until it reached the Homestead Extension of the Florida's Turnpike, where the structure would climb over the Turnpike then return to its normal elevation all of the way to Florida City. None of the grades would exceed three percent.

FEEDER BUS

Feeder bus routes are designed to circulate through residential neighborhoods, activity centers, and employment areas and connect to the Metrorail line. Some feeder bus routes will provide local service within the Metrorail corridor and provide direct connections to Dadeland/ Kendall or Homestead /Florida City. Feeder buses are proposed to operate at 15-minute headways.

Feeder buses are proposed to serve Metrorail stations from the following roadways:

- SW 112th Street (to Dadeland South)
- SW 136th Street
- SW 152nd Street
- SW 168th Street
- SW 184th Street
- SW 200th Street
- SW 112th Avenue (to the SW 200th Street station)
- SW 216th Street
- SW 244th Street
- SW 288th Street
- SW 320th Street
- SW 344th Street

3.3.4.3 Stations

Stage 1 Metrorail stations are 456 feet long to accommodate 6-car trains. The stations along the South Link Corridor would be 580 feet long to accommodate 8-car trains. All of the South Link Corridor stations would consist of a center platform approximately 20 feet in width. The station area would normally be 52 feet wide.

All of the stations would be elevated with a center platform and would be accessible by stairs, elevators and escalators. Fire codes and ADA requirements will dictate the number and location of the vertical circulation elements. Parking would be provided at every stop. Initially, garages would only be constructed at SW 124th Street, SW 136th Street and SW 344th Street. As ridership in the corridor increases park-and-ride lots would be converted to parking garages, as required.

Fare Collection

At each station, off-vehicle payment facilities would be available at ground level prior to being able to access the vertical circulation area. Stations would be equipped with Ticket Vending Machines (TVM). The number of TVMs available would depend on the peak hour demand at each station. Required communication infrastructure to support the off-vehicle fare collection would also be installed at the stations.

Station Locations and Parking

Stations and parking would be provided at the following locations:

- The SW 124th Street station would serve an area surrounded by low density residential and strip commercial development along U.S. 1. The station would be located north of SW 124th Street and a major parking garage would be located immediately west of the station.
- The SW 136th Street station would be immediately east of a major regional shopping center, The Falls. Adjoining the station would be a parking garage developed in conjunction with existing Falls parking. The area is heavily commercial with a substantial amount of nearby multi-family apartments.
- The SW 152nd Street station is adjacent to an existing heavily used park and ride lot. SW 152nd Street is a major east-west thoroughfare in South Dade. The station would be south of SW 152nd Street. The area immediately around the station is very mixed including a golf course, county functions, commercial, multi-family, and single-family residential.

- The SW 168th Street station is also adjacent to a heavily used park and ride lot. The right-of-way is one block east of U.S. 1 and is in a neighborhood with mixed warehousing, commercial, and single family residential uses.
- The next station and park-and-ride lot would be located immediately south of SW 184th Street. The right-of-way is one block west of US 1 in a very mixed use neighborhood with numerous vacant parcels. This station is within the Perrine Charrette area boundaries and will need to be coordinated with their plans.
- The SW 200th Street station is immediately adjacent to a large concentration of mid-rise and high-rise apartments. The location near the Turnpike exit would make the park and ride lot at this location important. The station is just to the north of the out-parcels and mid-rise offices associated with the Southland Mall. This location is on the edge of the Cutler Ridge Charrette Area Plan and should be coordinated with the participants of that plan.
- The station at SW 216th Street is in the center of the Goulds community, which also has a Charrette Area Plan. The station is near several schools and a large community park.
- Both the SW 244th Street station and the SW 264th Street stations are west of most local development. They are surrounded by agricultural and vacant land. They are at the point where U.S. 1 is near the Urban Development Boundary. This area is beginning to experience rapid urbanization.
- The station at SW 288th Street will serve the rapidly growing area north of Homestead.
- The SW 320th Street station would be adjacent to Miami Dade College and within easy walking distance of downtown Homestead
- The terminus station at SW 344th Street serving Florida City will also be a major park and ride facility.

3.3.4.4 Grade Separation

The existing busway intersects with approximately 45 streets, most of which run in an east-west direction. The Metrorail alignment would be built at an elevation to provide 16.5 feet clearance over local streets and roads. Grade separation would be required at locations where the busway intersects with surface streets to ensure safe and efficient functioning of Metrorail.

Grade Separation Options

As previously mentioned, the Metrorail alignment would be mostly built above the local streets. However, the alignment would drop to nearly ground level as it leaves the Dadeland South Station to go under the Palmetto Expressway off-ramp. The structure would return to the normal Metrorail elevation and would continue at this level until it reached the Homestead Extension of the Florida's Turnpike, where the structure would climb over the Turnpike then return to its normal elevation all of the way to Florida City.

Impact

Except at the Palmetto Expressway southbound off-ramp and the Homestead Extension of the Florida's Turnpike, the Metrorail alignment is expected to maintain an elevation of 16.5 feet above the existing busway. Since the Metrorail alignment would be built above the existing surface streets, it will not affect the vehicular movements on local streets. Building the Metrorail structure on the west side of the right-of-way would allow for future improvements such as widening of U.S. 1 or operating a local bus service in the corridor.

Stations

Since the Metrorail structure would be elevated, the stations will also be elevated. Elevated structure and stations would increase visibility and awareness of the station location. Elevated stations could be connected with a pedestrian bridge to parking garages at major park-and-ride locations to enhance safety and connectivity.

Pedestrian Access

Pedestrian access to the elevated stations from streets would be facilitated with escalators, stairs, and elevators. Pedestrian access from parking garages could be made along elevated walkways directly connecting the elevated station and the parking garage. In addition, pedestrian access from the east side of U.S. 1 could be made safer and more convenient through elevated pedestrian walkways across U.S. 1 that directly connect to Metrorail stations.

3.3.4.5 Vehicle Requirements

Vehicle Description

The current Metrorail system operated by Miami-Dade Transit is a heavy rail steel wheel system. The vehicles were manufactured in 1982-1984 by the Budd Company. The fleet is composed of 136 cars with a typical capacity of 164 passengers per car. The vehicles draw 750 volts of direct current from a third rail system. The vehicles operate in "married pairs" of A and B cars. During peak periods the trains are operated with six cars (three sets of married pairs). The existing fleet would be used in the South Link corridor.

Number of Vehicles

To operate trains on six-minute headways from the Palmetto Station to Florida City, the project would be required to procure 74 additional rail cars. This number includes a 20 percent spare ratio.

Operating Characteristics

In the existing Metrorail corridor, the maximum speed of the system is around 58 mph with an average running speed of 31 mph. Higher speeds are possible, but the actual operating speed will be mostly determined by the station spacing and alignment.

3.3.4.6 Storage and Maintenance Facility

The expansion of the fleet would require the development of a storage and maintenance facility. The maintenance facility would be located in the central portion of the alignment, adjacent and accessible to the South Link Corridor. The minimum required area determined necessary for both the facility and lay-up/storage yard is approximately 50 acres.

The maintenance portion of the facility contains the various shops for both unplanned, planned regular maintenance with a minimum of one maintenance bay for each of minor maintenance functions. The typical shops include battery shop, motor shop, electronics shop, A/C shop, and parts shop. Offices for supervisory personnel are usually provided close to the shop areas along with locker rooms and restrooms for craft employees. The maintenance facility would require about 85,000 square feet of structure. It is assumed that no operations area would be needed for this extension.

3.3.4.7 Phasing

The development of Metrorail to Florida City is a long range alternative for the South Link Corridor. However, this alternative can be developed in a staged fashion to improve mobility within the corridor almost immediately.

Phase I (Years 1-5)

During the first five-year time frame (Years 1-5) the county would undertake the following efforts:

- Prepare the environmental documentation and design for the short extension of Metrorail to SW 136th Street including a parking garage at the site.
- Acquire right-of-way for parking.
- Expand the existing park and ride facilities at SW 152nd Street and SW 168th Street.
- Construct a new park and ride facility at SW 200th Street.
- Reorient the MDT bus routes to provide east-west feeder service to the busway.
- Re-implement the transit signal priority system along the busway.
- Implement a new fare collection system to eliminate fare collection on the buses.

Phase II (Years 6-10)

During the second five-year time frame (Years 6-10) the county would undertake the following efforts:

- Extend Metrorail to SW 136th Street and construct new parking garages at 124th and 136th Streets.
- Construct a new park and ride facility at SW 344th Street
- Expand the park and ride facility at SW 244th Street.

Phase III (Years 11-15)

During the third five-year time frame (Years 11-15) the county would undertake the following efforts:

- Complete the environmental documentation and engineering for the Metrorail extension to Southland Mall.
- Acquire land for the maintenance facility

- Open park and ride at SW 184th Street, SW 216th Street, SW 288th Street, and SW 320th Street.
- Order vehicles

Phase IV (Years 16-20)

During the fourth five-year time frame (Years 16-20) the county would undertake the following efforts:

- Open Metrorail to Southland Mall
- Open maintenance facility
- Complete the environmental documentation and engineering for the Metrorail extension from Southland Mall to Florida City.
- Construct parking garages as required by demand.

Phase V (Years 21-25)

During the final five-year time frame (Years 21-25) the county would undertake the following efforts:

- Open Metrorail to Florida City
- Construct parking garages as required by demand.

3.3.5 Alternative 5A Hybrid Metrorail to Florida City

3.3.5.1 General Description

This option is similar in most respects to Alternative 5 (Conventional Metrorail to Florida City) except that the existing Metrorail fleet would be retrofitted to be able to operate in dual mode. Each coupled set of vehicles would be equipped with an overhead contact system capable of drawing power from an overhead source as well as the electrified, third rail power system currently in use on the existing Metrorail system. This would allow the fleet to operate using electrified third rail on the overhead structure. Once the train cleared the Dadeland South Station, the train's overhead contact system would be activated and the train would operate on a non-electrified rail system. The use of the overhead power source would allow the new track to be constructed mainly at-grade, as with the LRT Alternative. Metrorail would primarily be at-grade with surface streets. At selected busy at-grade streets, grade separation is recommended. Signal pre-emption would be provided for Metrorail at at-grade intersections.

Technology

As previously mentioned, the main difference between Alternative 5 and the Dual Mode Metrorail Alternative is that the Metrorail fleet would be retrofitted to draw power using an overhead catenary system as, well as the electrified, third rail power system currently in use on the existing Metrorail system. Other details of the Alternative technology are similar to the Conventional Metrorail technology. Refer to the "Technology" section of Alternative 5 for a description of similar details.

Termini

The north end of the alignment would terminate at the existing Dadeland South Metrorail

Station and the south end of the alignment would terminate in the vicinity of SW 344th Street in Florida City.

Horizontal and Vertical Alignment

The total alignment would be nearly 20 miles in length starting at SW 94th Street at the existing Dadeland South Metrorail station and terminating at SW 344th Street in Florida City. The alignment uses the 100-foot right-of way occupied by the South Miami-Dade Busway. Metrorail would primarily be at-grade with surface streets. At selected busy at-grade streets, grade separation is recommended. The maximum grade of the alignment is expected to be less than three degrees.

The Metrorail structure would be built on the west side of the right-of-way to allow for future improvements such as widening of U.S. 1 or provisions for local bus service in the corridor. Refer to Figure 6 presented in Alternative 5 for an illustration of how the Metrorail facility might sit within the right-of-way.

3.3.5.2 System Operating Characteristics

Headways

During the peak periods, service would be provided at six-minute intervals to all stations along the alignment. Service would be provided at midday off-peak at 15-minute intervals and at 30-minute intervals after 8:00 p.m. Saturday and Sunday service would be provided at 20-minute headways until 8:00 p.m.

Travel Time

A trip from Dadeland South to Florida City would take about 29 minutes.

Interface with Intersections

There are about 45 auto/transit at-grade crossings along the South Link alignment. The majority of the dual mode Metrorail alignment would be built at-grade. Grade separation is recommended for the Metrorail alignment at several high-volume cross-streets. These grade separation locations are described in more detail in the Grade Separation section of this report. At-grade intersections will remain signalized. However, signal pre-emption must be implemented at the at-grade intersections for safety purposes and to provide travel time advantages for the Metrorail line.

Feeder Bus

Feeder bus routes are designed to circulate through residential neighborhoods, activity centers, and employment areas and connect to the Metrorail line. Some feeder bus routes will provide local service within the Metrorail corridor and provide direct connections to Dadeland/ Kendall or Homestead /Florida City. Feeder buses are proposed to operate at 15-minute headways.

Refer to the "Feeder Bus" section of Alternative 5 for a list of proposed feeder bus routes to serve Metrorail stations.

3.3.5.3 STATIONS

The stations along the South Link Corridor would be 580 feet long to accommodate eight-car trains. All of the South Link Corridor stations would consist of a center platform approximately 20 feet in width. The station area would normally be 52-feet wide.

Stations would be provided both elevated and at-grade with a center platform. The elevated stations would be accessible by stairs, elevators, and escalators. Fire codes and ADA requirements will dictate the number and location of the vertical circulation elements.

FARE COLLECTION

At each station, secure, off-vehicle payment facilities would be available prior to the entry to the station platform. If the station is elevated, vertical circulation systems would be provided. Stations would be equipped with Ticket Vending Machines (TVM). The number of TVMs available would depend on the peak-hour demand at each station. Required communication infrastructure to support the off-vehicle fare collection would also be installed at the stations.

STATION LOCATIONS AND PARKING

A total of 12 stations are recommended for this alternative; five stations would be elevated and seven stations would be at-grade. Parking would be provided at each location where a station is recommended. The locations of stations are listed below. Refer to the "Station Locations and Parking" section of Alternative 5 for more details.

- SW 124th Street - at-grade station
- SW 136th Street - elevated station
- SW 152nd Street - elevated station
- SW 168th Street - at-grade station
- SW 184th Street - at-grade station with SW 184th Street elevated
- SW 200th Street - elevated station
- SW 216th Street - elevated station
- SW 244th Street - at-grade station
- SW 264th Street - at-grade station
- SW 288th Street - at-grade station
- SW 320th Street (near Miami Dade College) - elevated station
- SW 344th Street - at-grade station

3.3.5.4 Grade Separation Locations

As previously mentioned, the busway - surface street intersections would be either grade separated or signal preemption provided for the busway. Signal preemption results in excessive delays for the affected vehicular movements. To evaluate the potential ability of grade separation to positively impact traffic congestion, AM and PM peak hour turning movement counts were performed at the busiest intersections along the U.S. 1 corridor. The analysis paid particular attention to vehicular movements and approaches at the selected intersections that could conflict with the future Metrorail facility. In addition, crash history is another indicator of the potential need for grade separation. Therefore, crash data were examined to identify locations along the busway with the highest crash rates. The locations identified for grade separation based on the traffic analysis are presented in the next section.

Grade Separation Options

This alternative would provide two types of grade separations for the South Link corridor - (1)

elevating the rail line over the surface streets; and, (2) elevating the surface streets over the rail line. The majority of the recommended grade separation locations call for elevating the rail line over the surface streets for safety purposes and to minimize traffic impacts from rail crossing. Grade separations are recommended at the following locations:

- SW 104th Street - rail elevated
- SW 112th Street - rail elevated
- SW 136th Street - rail elevated (in conjunction with a station)
- SW 152nd Street - rail elevated (in conjunction with a station)
- SW 184th Street - rail at-grade, SW 184th Street elevated
- SW 200th Street - rail elevated (in conjunction with a station)
- SW 211th Street / SW 117th Avenue - rail elevated
- SW 216th Street - rail elevated (in conjunction with a station)
- SW 312th Street - rail elevated (in conjunction with a station)

These nine grade separations will leave approximately 36 signalized intersections that will have at-grade crossings with the Metrorail. Operation of the Metrorail system at-grade will require that all remaining 36 intersections be equipped with crossing protection.

The Dual-Mode Metrorail Alternative would have the same operating characteristics as Alternative 5, with the same operating frequencies, train lengths, station locations, and platform lengths.

Impact

Each grade separation would be approximately 2,580 feet long. The rise would be at a 1.5 percent to two percent grade and would be approximately 1,000 feet long in order to provide a 16.5 feet clearance over the cross street.

Stations

The design and location of stations will be impacted by grade separation. If the busway is elevated over the cross-streets, the elevated stations would be centered over the cross street. The elevated stations would be at the minimum grade to allow drainage for at least 580 feet. Providing a station on the elevated portion of the grade separation would increase visibility and awareness of the station location.

Where the cross-streets are elevated over the busway, there will only be minor impacts on the placement of the Metrorail station. However, access issues will need to be addressed as patrons coming from the cross-street will need to have access to the station.

Pedestrian Access

For elevated stations located on bridges over cross-streets, pedestrians would need to access the station from street level using escalators, stairs, and elevators. Pedestrian access from parking garages could be made along elevated walkways directly connecting the station and the parking garage. In addition, pedestrian access from the east side of U.S. 1 could be made safer and more convenient through elevated pedestrian walkways across U.S. 1 that directly connect to stations.

Pedestrian access from the street level would also have to be maintained for cases where the intersecting street is elevated over the busway. It is likely that pedestrian paths would be kept at ground level in these cases, which would simplify pedestrian access. However, pedestrian safety and mobility would be hampered by many of the same constraints that exist today including crossing U.S. 1 and at-grade turning movements of intersecting cross-streets.

3.3.5.5 Vehicle Requirements

Vehicle Description

The current Metrorail system operated by Miami-Dade Transit is a heavy rail steel wheel system. The vehicles were manufactured in 1982-1984 by the Budd Company. The fleet is composed of 136 cars with a typical capacity of 164 passengers per car. The vehicles draw 750 volts of direct current from a third rail system. The vehicles operate in "married pairs" of A and B cars. During peak periods the trains are operated with six cars (three sets of married pairs). The existing fleet would be used in the South Link corridor.

Number of Vehicles

There are two alternatives for the fleet in this option. The first alternative would be to procure new vehicles that are especially designed for dual mode operation. Since the South Link Corridor is an extension of the main line, the entire fleet would have to be replaced if the decision were made to procure new dual mode vehicles. This alternative would require the purchase of 210 new dual mode vehicles. The second alternative would be to retrofit the existing fleet to be able to operate in the dual mode. Retrofit of the fleet would require the addition of a retractable pantograph, recabling the car, and accommodating the third rail shoe. The second alternate would require the retrofit of 136 vehicles and the acquisition of 74 new dual mode vehicles.

Operating Characteristics

In the existing Metrorail corridor, the maximum speed of the system is around 58 mph with an average running speed of 31 mph. Higher speeds are possible, but the actual operating speed will be mostly determined by the station spacing and alignment.

Power System

The overhead power system consists of two parts: the electrified overhead wires (catenary wires) and the pantograph (Illustrated in Exhibit 3-6), which is a retractable mechanism that transfers power from the catenary wires to the vehicle power system (shown in the photo below). Rail systems require power substations in order to provide consistent levels of electricity to power the trains. The power substations are small buildings containing electrical equipment that distribute electricity to the overhead wires, which power the rail vehicles. Substations are required at approximately one-mile

Exhibit 3-6 Pantograph on Portland LRT

intervals along the rail line and are generally located where they will have minimal impact on the community, such as parking lots, garages or landscaped areas.

3.3.5.6 Storage and Maintenance Facility

The maintenance and storage facilities would have the same requirements as Metrorail facility described in Alternative 5.

3.3.5.7 Phasing

The development of the dual-mode Metrorail system to Florida City is a long range option for the South Link Corridor. However, this option however can be developed in a staged fashion to improve mobility within the corridor almost immediately.

Phase I (Years 1-5)

During the first five-year time frame (Years 1-5) the county would undertake the following efforts:

- Acquire right-of-way for parking.
- Expand the existing park and ride facilities at SW 152nd Street and SW 168th Street.
- Construct a new park and ride facility at SW 200th Street.
- Reorient the MDT bus routes to provide east-west feeder service to the busway.
- Re-implement the transit signal priority system along the busway.
- Implement a new fare collection system to eliminate fare collection on the buses.

Phase II (Years 6-10)

During the second five-year time frame (Years 6-10) the county would undertake the following efforts:

- Construct a new park and ride facility at SW 344th Street
- Expand the park and ride facility at SW 244th Street.

Phase III (Years 11-15)

During the third five-year time frame (Years 11-15) the county would undertake the following efforts:

- Complete the environmental documentation and engineering for the Metrorail extension to Southland Mall.
- Acquire land for the maintenance facility
- Open park-and-ride at SW 124th Street, SW 136th Street, SW 184th Street, SW 216th Street, SW 288th Street, and SW 320th Street.
- Order/rehab vehicles

Phase IV (Years 16-20)

During the fourth five-year time frame (Years 16-20) the county would undertake the following efforts:

- Open Metrorail plus grade separations to Southland Mall
- Open maintenance facility

- Complete the environmental documentation and engineering for the Metrorail extension from Southland Mall to Florida City.
- Construct parking garages as required by demand.

Phase V (Years 21-25)

During the final five-year time frame (Years 21-25) the county would undertake the following efforts:

- Open Metrorail plus grade separations to Florida City
- Construct parking garages as required by demand.

3.3.6 Alternative 6 Enhanced Bus Rapid Transit to Florida City

This section of the report describes the Tier II Bus Rapid Transit (BRT) Alternative in detail.

3.3.6.1 General Description

The Enhanced Bus Rapid Transit (BRT) Alternative for the South Link Corridor, as illustrated in Figure 3-8, consists of two primary components as described below.

- A Metrorail extension (approximately 4,500 feet) from the Dadeland South Metrorail Station to SW 104th Street
- A Bus Rapid Transit (BRT) system from Dadeland South to Florida City within the existing and future South Miami-Dade Busway right-of-way

Technology

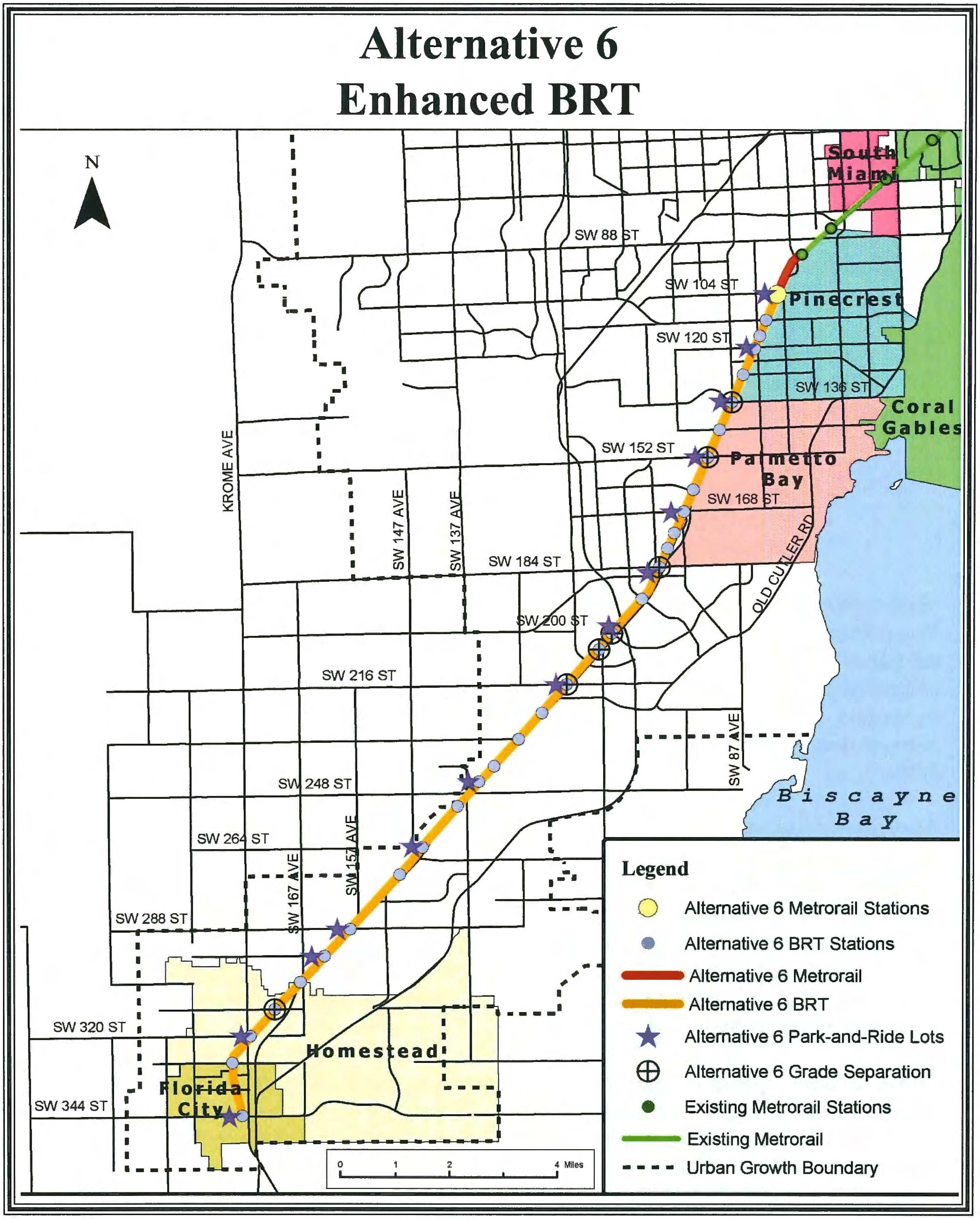
Two primary transit modes would comprise the Enhanced BRT Alternative - Metrorail (heavy rail transit) and Bus Rapid Transit. Feeder buses operating on surface streets would also be utilized as part of the BRT Alternative to provide connections from local neighborhoods, activity centers, and employment areas to the BRT corridor. This section of the report provides a general description of the transit modes in advance of the more detailed descriptions to follow.

Metrorail Component

The Enhanced BRT Alternative proposes an extension of the existing Metrorail line from the Dadeland South Metrorail Station to SW 104th Street along the existing South Miami-Dade Busway corridor. Miami's Metrorail is a heavy rail transit line operating in an exclusive guideway powered by an electric third rail. Heavy rail transit systems are high capacity, fixed-guideway systems that typically operate along elevated structures or below the ground level (subways). Outside of dense urbanized areas, heavy rail systems sometimes operate at-grade in exclusive rights-of-way.

Heavy rail trains typically consist of four to six rail cars. Each rail car is approximately 75 feet long with a crush capacity (includes standing room) of 150 to 200 passengers. The length of heavy rail trains often necessitates longer station lengths (loading platforms) and stations are typically spaced one to two miles apart. Peak period headways are generally five to six minutes. The ability to provide high service frequency combined with outstanding perfor-

Figure 3-8


Alternative 6
Enhanced BRT
N
South Miami
Pinecrest
Coral Gables
Palmetto Bay
Homestead
Florida City
Biscayne Bay
SW 88 ST
SW 104 ST
SW 120 ST
SW 136 ST
SW 152 ST
SW 168 ST
SW 184 ST
SW 200 ST
SW 216 ST
SW 248 ST
SW 264 ST
SW 288 ST
SW 320 ST
SW 344 ST
KROME AVE
SW 147 AVE
SW 137 AVE
SW 167 AVE
SW 157 AVE
SW 87 AVE
OLD CUTLER RD
0 1 2 4 Miles
Legend
Alternative 6 Metrorail Stations
Alternative 6 BRT Stations
Alternative 6 Metrorail
Alternative 6 BRT
Alternative 6 Park-and-Ride Lots
Alternative 6 Grade Separation
Existing Metrorail Stations
Existing Metrorail
Urban Growth Boundary

mance (acceleration and deceleration) and exclusive right-of-way operations allow heavy rail transit systems to achieve extraordinary directional capacities approximating 12,000 passengers per hour per direction. However, heavy rail systems usually require higher per mile capital costs than light rail transit or bus rapid transit because of their extensive infrastructure requirements. Heavy rail systems are found in several North American cities including Miami, Atlanta, San Francisco, New York, Chicago, and Washington, D.C.

Exhibit 3-7 Miami MetroRail

BUS RAPID TRANSIT COMPONENT

The Enhanced BRT Alternative proposes a bus rapid transit system between Dadeland South and Florida City along the existing South Miami-Dade Busway corridor. The goal of BRT systems is to combine the quality of exclusive-guideway transit with the flexibility of buses. BRT improvements typically consist of several elements including signal prioritization at at-grade intersections, enhanced fare collection systems, real-time passenger information systems, automated docking systems, and low-floor buses for level boarding at stations.

The existing South Miami-Dade Busway already contains one primary component of a BRT system - an exclusive guideway. The guideway defines where and how a bus may travel; exclusive guideways allow buses to travel outside of congested arterial streets. Therefore, congestion does not have as much effect on bus travel time for BRT systems as for traditional urban bus systems. BRT systems provide a viable travel time alternative in congested corridors due to their exclusive guideway advantage.

Exclusive guideway BRT systems may include grade separation crossings at major intersections to reduce the damaging effect of cross-street congestion on bus travel time. (The grade separation section of this chapter provides detail regarding grade separation recommendations.) However, it may be too costly to provide grade separation at all intersections. Therefore, signal prioritization is provided along BRT lines at at-grade intersections to provide preferential treatment to transit vehicles. Other electronic control system technologies that can be employed with BRT systems include dispatching systems that relay service instructions to operators at the start of their runs and along the route to ensure greater service reliability.

Enhanced fare collection systems facilitate efficient passenger boarding by allowing fares to be paid prior to boarding the bus (off-vehicle fare collection). This translates to greater bus operating speeds. Fare collection systems also reduce the need for passengers to carry cash, which can enhance safety and security.

Real-time passenger information systems reduce passenger anxiety and allow for greater discretionary travel. Passenger information systems are not only useful during trips, these systems also provide useful marketing tools to attract choice riders. Limited passenger information is often a critical barrier to the use of public transit.

BRT vehicles are low-floor buses with wide doors and aisles that allow efficient passenger access and comply with the Americans with Disabilities Act (ADA) requirements (Exhibit 3-8). Low-floor buses enhance passenger comfort and increase operating speed. BRT vehicles span the range from diesel-powered buses to alternative fuel vehicles, including electric-powered vehicles and fuel cell vehicles. Alternative fuel vehicles often have higher capital costs, but can save in operating costs over the life of the vehicle. Alternative fuel vehicles are cleaner and quieter than diesel-powered buses, which enhances passenger comfort and provides a smoother ride. Alternative fuel vehicles can also serve as a marketing tool to help attract choice riders. In addition, advanced vehicle control systems can permit precision docking and level passenger boarding without causing damage to the vehicle's tires or structure. BRT vehicles are not part of the current Miami-Dade Transit fleet and would represent a fleet expansion.

Exhibit 3-8 Los Angeles Bus Rapid Transit Vehicle at a Station

Termini

Alternative 6 includes the construction of one new proposed Metrorail station in the vicinity of SW 104th Street near the existing busway. As the new southern terminus for Metrorail, it is expected that park-and-ride demand will be significant at the proposed SW 104th Street station due to passenger demand from south of the existing Metrorail line wishing to access popular destinations such as downtown Miami and the Civic Center area. Therefore, this station should include a significant parking component (approximately 1,500 parking spaces) dedicated for Metrorail park-and-ride patrons. An opportunity for a joint development project exists at this station that would ideally include mixed-use retail and office space attached to the Metrorail station.

The purpose of the Metrorail extension to SW 104th Street is to help alleviate congestion and parking availability deficiencies at the two Dadeland stations, thereby increasing efficiency for passengers feeding into the Metrorail system from the proposed BRT system operating within the busway. Currently the two Dadeland stations are ranked second and third in passenger boarding activity within the Metrorail system, parking garages are 95 to 100 percent full, and surface streets are severely congested in the Dadeland area. Parking occupancies greater than 90 percent are considered full to account for turnover. Table 3-4 presents the average weekday boardings and parking occupancy at Dadeland North and Dadeland South Metrorail Stations.

Table 3-4 Parking Deficiencies at Dadeland Metrorail Stations

Station	Average Weekday Boardings / (Ranking) [A]	Parking Capacity	Average Weekday Parking Patronage	Percent Occupancy
Dadeland North	6,700 / (3)	1,900	1,892	100 %
Dadeland South	7,400 / (2)	1,290	1,232	95 %

(A) - Ranking relative to the 21 Metrorail stations.

The northern terminus of the BRT system would be at the Dadeland South Station. Therefore, the BRT line would share the 100-foot right-of-way with the proposed Metrorail extension between SW 104th Street and Dadeland South. The purpose of continuing BRT service north of the proposed southern terminus of Metrorail is to allow BRT passengers to access the Dadeland South employment center without transferring. Bus routes would be designed to operate within the busway to feed Metrorail at SW 104th Street and Dadeland South. A bus station would be provided within the SW 104th Street station to allow passengers a direct transfer to and from Metrorail. Transfers between the BRT line and Metrorail would be provided within the same transfer fare policy as the existing busway. Transferring to Metrorail is free from any northbound bus traveling on the South Miami-Dade Busway.

The southern terminus of the BRT system is proposed to be at SW 344th Street (Palm Avenue). A bus station would be provided within the busway right-of-way north of SW 344th Street. Due to potential high passenger demand within Florida City, southbound BRT buses may exit the busway at SW 328th Street or SW 336th Street, circulate through Florida City, and re-enter the busway at SW 344th Street for the northbound trip back to Dadeland South. This type of operational arrangement would serve passenger demand and provide a convenient way for buses to turnaround at the southern BRT terminus.

Interface with Metrorail

The Metrorail vehicles and guideway would be consistent with the existing Metrorail service in Miami-Dade and operate on an exclusive, elevated guideway. Metrorail service would seamlessly extend to the proposed SW 104th Street station. No transfer would be required to travel from the existing Metrorail line to SW 104th Street.

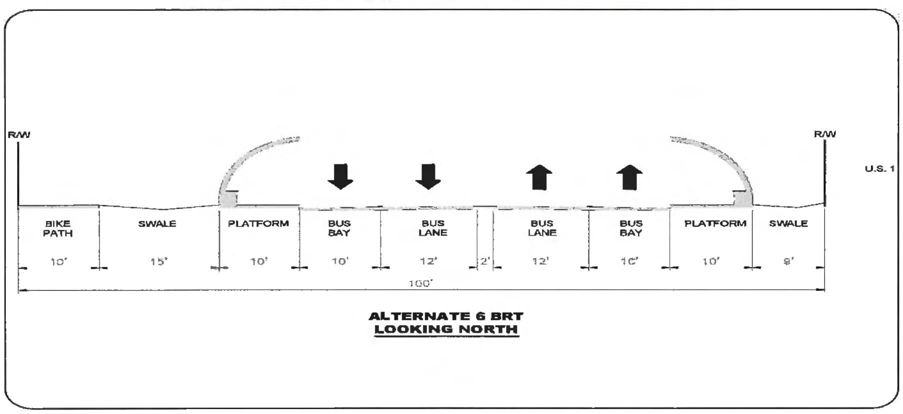
Metrorail headways between SW 104th Street and Dadeland South would be approximately 6 minutes. The proposed SW 104th Street station must include an efficient transfer path for patrons transferring between BRT and Metrorail.

Typical Cross-Section

Components of the typical cross-section for the Metrorail portion of the BRT Alternative between the Dadeland South Metrorail Station and SW 104th Street would be the same as that of the Metrorail Alternative. The western portion of the right-of-way would be used for the elevated Metrorail line and structural support columns. The bicycle path (South Dade Trail) should be expanded to 10 feet in width and would be generally located under the Metrorail alignment in the western portion of the right-of-way. The eastern portion of the right-of-way would contain the BRT travel lanes between Dadeland South and SW 104th Street. South of SW 104th Street, the typical cross-section is similar to the existing busway. Figure 3-9 presents the proposed cross-section for the BRT section of the BRT Alternative at a station. Within the stations, the following elements are included in the typical cross-section.

- Two 12-foot bus lanes, one northbound lane and one southbound lane
- One 2-foot buffer spacing between the bus lanes
- Two 10-foot bus bays serving the station platforms, one northbound and one southbound
- Two 10-foot concrete platforms with station infrastructure
- One 10-foot bicycle path (South Dade Trail)
- One 15-foot swale

Figure 3-9 Typical BRT Cross-Section



The total cross-section width required in station sections is 91 feet, which is within the 100-foot right-of-way of the existing busway. This design allows nine feet of additional swale space and buffer from U.S. 1.

Vertical Alignment

The Metrorail portion of the BRT Alternative between the Dadeland South Metrorail Station and SW 104th Street would consist of an elevated grade-separated guideway within the existing busway corridor. The vertical alignment of the Metrorail extension would tie into the vertical alignment of the Metrorail maintenance tracks south of the Dadeland South station. To provide adequate clearance for the Metrorail extension to pass under the existing southbound Palmetto Expressway overpass (Exhibit 3-9), a sag vertical curve will be necessary. The Metrorail vertical alignment under the Palmetto Expressway will force the closure of SW 98th Street between U.S. 1 and SW 77th Avenue. A tunnel to keep SW 98th Street open is likely not feasible due to the proximity of adjacent roadways such as SW 77th Avenue and U.S. 1.

Exhibit 3-9 Proposed Metrorail Alignment Under Palmetto Expressway

The BRT alignment between SW 104th Street and SW 344th Street would consist primarily of an at-grade dedicated bus roadway. The vertical alignment would be similar to or identical to the existing busway with the exception of recommended grade separation locations where the BRT line crosses intersecting arterial roadways. Recommended grade separation locations are described in more detail in the Grade Separation section of this report.

Horizontal Alignment

The horizontal alignment of the BRT Alternative would primarily follow the alignment of the existing busway.

The typical cross-section of the BRT Alternative was studied to determine if shifting the horizontal alignment to one side of the right-of-way would provide enough space for additional improvements such as high occupancy toll (HOT) lanes or additional through lanes for U.S. 1. However, the width required to accommodate bus bays and platforms at stations, along with the bike trail and the swale, represents 91 feet of the typical 100-foot right-of-way. Bus bays are necessary to accommodate limited stop and express bus service within the corridor. The BRT Alternative provides no space for additional improvements within the busway right-of-way. There is no benefit from shifting the alignment of the BRT line to one side of the right-of-way. Therefore, the BRT alignment should follow the existing busway alignment.

3.3.6.2 System Operating Charcteristics

This section of the report describes the proposed operating characteristics of the Enhanced BRT Alternative. The operating characteristics of the Metrorail extension between the Dadeland South Metrorail Station and SW 104th Street will be similar to those described in the Metrorail Alternative chapter of this report. Therefore, the description of operating charcteristics in this section focuses on the BRT portion of the Alternative.

Headways

One of the primary advantages of BRT is the flexibility offered by buses over fixed-guideway transit vehicles. Planners can design bus routes to "feed" the BRT line in the primary direction of travel. Therefore, headways can become more frequent in the more densely traveled sections of the BRT line.

The BRT Alternative is designed with feeder bus routes that serve residential neighborhoods, activity centers, and employment areas. These feeder routes then enter the BRT guideway and provide connections to Metrorail in the north or Homestead / Florida City in the south. Therefore, headways would fluctuate throughout the BRT corridor. The more densely traveled northern section of the corridor is expected to achieve 90-second peak headways in each direction. Peak headways throughout the corridor are expected to be no worse than 8 minutes. Average headways are projected to be five minutes along the BRT corridor.

Travel Time

Travel time for the BRT Alternative is projected to be faster than the existing busway because of factors such as more efficient passenger boarding, grade separation at major roadways, and signal prioritization at signalized intersections. Travel time aboard limited stop buses between Florida City and SW 104th Street is expected to be 40 to 45 minutes. Shorter trips such as South Dade Government Center to SW 104th Street may be served by feeder bus routes with express service within the busway corridor to Metrorail. Travel time between the South Dade Government Center and the proposed SW 104th Street Metrorail station is expected to be 15 to 20 minutes.

Interface with Intersections

Grade separation is recommended for the BRT Alternative at several high-volume cross-streets. These grade separation locations are described in more detail in the Grade Separation section of this report. At-grade intersections will remain signalized. However, signal prioritization must be implemented at the at-grade intersections to provide travel time advantages for the BRT line. Furthermore, some intersections may remain at-grade to allow bus routes to "feed" into the BRT line.

Feeder Buses

Feeder bus routes are designed to circulate through residential neighborhoods, activity centers, and employment areas and connect to the BRT line. Some feeder bus routes will provide limited stop or express service within the BRT corridor and provide direct connections to Metrorail or Homestead / Florida City. Feeder buses are proposed to operate on 15-minute headways.

Feeder buses are proposed to serve the BRT line from the following roadways.

- SW 112th Street
- SW 136th Street
- SW 152nd Street
- SW 112th Avenue
- SW 216th Street
- SW 244th Street

- SW 168th Street
- SW 184th Street
- SW 200th Street
- SW 288th Street
- SW 320th Street
- SW 344th Street

3.3.6.3 Stations

Bus station spacing along the proposed BRT line is recommended to be approximately ½-mile. Station spacing would be similar to the existing busway. A few closely spaced stations may be consolidated to reduce travel time. In addition, stations at intersections that are recommended for grade separation would be recommended to be situated on the elevated section above the cross-street to eliminate the need for pedestrians to walk over 1,000 feet from the intersection to access the BRT station.

Type of Station

BRT stations would be similar to existing busway stations in length and width. Stations should be designed to protect passengers from weather elements. Low floor buses will facilitate passenger boarding; therefore, bus bay tapers should be designed such that buses can get as close as possible to passenger platforms to allow easy boarding.

Fare Collection

Enhanced fare collection systems are a primary element that separates BRT systems from traditional bus service. Enhanced fare collection systems facilitate efficient passenger boarding by allowing fares to be paid prior to boarding the bus. BRT systems can achieve greater operating speeds through more efficient fare collection. Fare collection systems can also reduce the need for passengers to carry cash, which can enhance safety and security.

Platform Location and Size

Station platforms must be provided on the right side of BRT vehicles relative to the direction of travel. Therefore, one station platform must be provided for each direction of travel. The northbound station platform will be on the east side of the BRT line and the southbound station platform will be on the west side of the BRT line.

The BRT station platforms will be similar in size to the existing busway stations. The width of the BRT station platform would be approximately 10 feet. The length of the concrete platform and bus bay must be extended from 100 feet to 120 feet, enough to accommodate two BRT vehicles in the station simultaneously. The BRT station platforms would be modified by enclosing the platforms to create a secure fare area for off-vehicle fare collection and to provide a refuge for passengers waiting for the bus.

Station Locations and Parking

Table 3-5 provides recommended station locations for the Enhanced BRT Alternative along with recommended park-and-ride locations.

Table 3-5 Alternative 6 Station Locations

Cross-Street	Station Type	Location [1]	Parking
Dadeland South	BRT/Metrorail Transfer	Existing	Existing
SW 104th Street	BRT/Metrorail Transfer	South	SW corner
SW 112th Street	BRT	Elevated	
SW 117th Street	BRT	South	
SW 124th Street	BRT	North	NW corner
SW 128th Street	BRT	South	
SW 136th Street	BRT	Elevated	SW corner
SW 144th Street	BRT	South	
SW 152nd Street	BRT	Elevated	SW corner
SW 160th Street	BRT	South	
SW 168th Street	BRT	North	NW corner
Banyan Street	BRT	North	
SW 184th Street	BRT	Elevated	SW corner
Marlin Road	BRT	Elevated	
SW 200th Street	BRT	Elevated	NW corner
SW 112th Avenue	BRT	South	
SW 216th Street	BRT	Elevated	NW corner
SW 224th Street	BRT	South	
SW 232nd Street	BRT	South	
SW 244th Street	BRT	South	SW corner
SW 264th Street	BRT	North	
SW 272nd Street	BRT	South	
SW 288th Street	BRT	North	
SW 296th Street	BRT	North	
SW 304th Street	BRT	North	NW corner
SW 312th Street	BRT	Elevated	SE corner
MDC Homestead	BRT	Campus	
SW 320th Street	BRT	South	
SW 328th Street	BRT	North	
SW 336th Street	BRT	North	
SW 344th Street	BRT	North	NW corner

South of the Dadeland South station, a total of 30 stations are recommended in the Enhanced BRT Alternative - one new Metrorail station and 29 stations along the BRT line. BRT would serve both the proposed SW 104th Street Metrorail station and the existing Dadeland South station. The purpose of having BRT service continue to Dadeland South is to allow passengers destined to the employment center around Dadeland South to not have to transfer to Metrorail. Dedicated parking facilities are recommended at 12 of the 30 stations, including the SW 104th Street Metrorail terminus.

The Enhanced BRT Alternative recommends 20 BRT stations between SW 104th Street and SW 264th Street, which is the extent of the existing busway. Currently, there are 23 existing busway stations between SW 104th Street and SW 264th Street. Therefore, the BRT Alternative reduces the number of stations along this section of the corridor by three. The three stations that would be closed by the BRT Alternative are:

- West Indigo Street
- SW 132nd Avenue
- SW 252nd Street

The West Indigo Street Station is recommended for closure due to the proximity of stations at Banyan Street and SW 184th Street. Both the SW 132nd Avenue Station and the SW 252nd Street Station are recommended for closure due to sparse development in the area south of SW 244th Street. It is anticipated that the population in this area will be served primarily by connecting bus routes or the park-and-ride lot at SW 244th Street. Consolidating the number of stations along the BRT line will help reduce travel time and enhance the viability of the proposed BRT line.

3.3.6.4 Grade Separation

The existing busway intersects with a number of roadways, most of which run in an east-west direction. To minimize transit-auto conflicts, improve travel time, and enhance safety, opportunities for grade separating the proposed BRT line and/or intersecting roadways were evaluated as part of this study. The approach to evaluating grade separation options for this study followed a two-step procedure.

1. Identify priority locations for grade separation by examining traffic data including volume counts, level of service, and delay.
2. Study grade separation options at the priority intersections including providing a flyover for the busway, elevating the cross-street over the busway and U.S. 1, or providing flyovers for critical turning movements.

Locations

A number of high-volume intersections along U.S. 1 are located close to the existing busway. Therefore, to evaluate the potential ability of grade separation to positively impact traffic congestion, AM and PM peak hour turning movement counts were performed at the busiest intersections along the U.S. 1 corridor. The analysis paid particular attention to vehicular movements and approaches at the selected intersections that could conflict with the future BRT facility. For example, excessive volumes on the eastbound approach of a U.S. 1 intersection could hamper the BRT facility. Similarly, high northbound left turns or southbound right turns from U.S. 1 to an east-west road could negatively impact flow on the BRT corridor. In addition, crash history is another indicator of the potential need for grade separation. Therefore, crash data were examined to identify locations along the busway with the highest crash rates. The following locations were identified as high priority grade separation intersections based on the traffic analysis performed.

- SW 112th Street
- SW 136th Street
- SW 152nd Street
- SW 184th Street
- SW 186th Street
- Marlin Road
- SW 200th Street
- SW 117th Avenue / SW 211th Street
- SW 216th Street
- SW 312th Street

Grade Separation Options

Once the priority intersections were identified, each location was studied individually to determine potential grade separation options to best fit the location. The grade separation options that were studied can be grouped into three general categories as described below.

- Grade separate the busway (BRT Corridor) - the busway would be elevated along with stations (if stations are proposed at the location) and access facili ties would be provided.
- Grade separate east-west roadway - the busway would be kept at ground level.

Instead, the east-west roadway would be elevated and ramps constructed to provide connections to U.S. 1. One of the main drawbacks of this option is difficulties in providing convenient access to adjacent land use from the el evated roadway.

- Grade separate critical movement(s) - instead of elevating the entire roadway, one or more critical movements (e.g. northbound left turns) would be grade separated from the busway. Though less expensive than grade separating an entire roadway, this option would generate similar local access issues.

Options at individual intersections were evaluated based on three primary factors including traffic analysis, adjacent land use, and design considerations.

Impact

Each grade separation location is expected to impact a minimum of 1,100 feet on either side of the roadway being crossed. This is based on guidelines for vertical clearance that must be achieved (16.5 feet according to the Florida Department of Transportation) and acceptable gradients for maintaining desirable bus performance (approximately two to three percent). In addition, smooth gradients of 2 to 3 percent help reduce the roller coaster effect of elevating the roadway and add a more graceful element to the aesthetics of the roadway.

Stations

The design and location of stations will be impacted by grade separation. If the busway is elevated over the cross-streets, stations will have to be placed either on the elevated structure or at ground level at a point where the vertical alignment has tied back into the existing ground level. This second option would place stations approximately 1,100 feet from the nearest intersection, which would negatively impact station accessibility and convenience. In addition, bus operations would be negatively impacted because as buses depart from a station, they would have to accelerate up the incline of the grade separation's vertical alignment. Similarly, buses would have to decelerate coming down the incline of the vertical alignment to stop at a station on the far side of the grade separation. Furthermore, providing a station on the elevated portion of the grade separation would increase visibility and awareness of the station location. Elevated stations could be connected with a pedestrian bridge to parking garages at major park-and-ride locations to enhance safety and connectivity. Therefore, it is recommended placing stations on the elevated portion of the vertical alignment above the intersecting cross-street if the busway is to be elevated over the cross-streets.

If cross-streets are elevated over the busway, this will have only minor impacts on the placement of the BRT station. However, access issues will need to be addressed as transit patrons coming from the cross-street will need to have access to the BRT station.

Pedestrian Access

As mentioned in the previous section, pedestrian access must be maintained following implementation of grade separation improvements.

For elevated BRT stations located on bridges over cross-streets, pedestrians would need to access the station from street level using escalators, stairs, and elevators. Pedestrian access from parking garages could be made along elevated walkways directly connecting the BRT station and the parking garage. In addition, pedestrian access from the east side of U.S. 1 could be made safer and more convenient through elevated pedestrian walkways across U.S. 1 that directly connect to BRT stations.

Pedestrian access from the street level would also have to be maintained for cases where the intersecting street is elevated over the busway. It is likely that pedestrian paths would be kept at ground level in these cases, which would simplify pedestrian access. However, pedestrian safety and mobility would be hampered by many of the same constraints that exist today including crossing U.S. 1 and at-grade turning movements of intersecting cross-streets.

Vehicular Access

Vehicular access to the busway would be impacted by grade separation, which would affect transit buses and emergency vehicles that utilize the busway. These vehicles would still be able to access the busway at at-grade intersections. If the busway is elevated over the cross-street, it should be possible within the 100-foot right-of-way to provide slip ramps to maintain access to certain movements for buses and emergency vehicles.

Priority Grade Separation Locations

The factors described above were evaluated in developing the priority locations for grade separation for the BRT Alternative presented in Table 6. The contributing factors for grade separation and determining the priority rankings are presented under "Notes" in Table 3-6. When ranking locations, an economic analysis was not performed. It should be noted that these locations were identified based on presently available information and should be refined if the BRT Alternative is chosen for the corridor.

Table 3-6 identifies and prioritizes eight potential locations for grade separation for the BRT Alternative. Grade separation of the busway is recommended for the identified locations. The reasons for recommending grade separation of the busway instead of intersecting roadways or critical movements include: local access issues, unavailability of space for grade separating east-west roadways, and the need for complicated design/re-design of intersections and approaches. It should be noted that the busway is an approximately 100-foot wide dedicated facility and hence grade separation of the busway would require fewer impacts to adjacent land use access.

3.3.6.5 Vehicle Requirements

Bus rapid transit involves coordinated improvements in a transit system involving both on-board and off-board aspects. This section of the report describes the on-board vehicle characteristics of BRT and operating characteristics for the South Link corridor.

Table 3-6 Priority List of Potential Grade Separation Locations

Rank	Location	Grade Separation Direction	Notes
1	SW 152nd Street	Busway	Safety concerns; high traffic volume; potential to connect elevated BRT station with proposed park-and-ride garage using elevated walkway
2	SW 117th Avenue / SW 211th Street & SW 216th Street	Busway	High traffic volume; absence of a proposed BRT station at SW 211th Street facilitates grade separation by negating the need for surface pedestrian access; proximity of these streets may facilitate combining the grade separation into one structure
3	SW 184th Street & SW 186th Street & Marlin Road	Busway (1)	Safety concerns; high traffic volume; proximity of these streets may facilitate combining the grade separation into one structure; SW 184th Street and SW 186th Street are only 850 feet apart
4	SW 312th Street	Busway	High existing traffic volume during P.M. Peak; SW 312th Street planned to be widened to 6 lanes; high traffic growth potential
5	SW 136th Street	Busway	High traffic volume; elevated BRT station has the potential to improve pedestrian access to commercial areas by providing bridge over SW 136th Street
6	SW 112th Street	Busway	Safety concerns; relatively low cross-street volumes, but lower intersection capacity because of laneage; SW 112th Street restricted from widening
7	SW 200th Street	Busway	West approach to this intersection not as congested as east approach

(1) – Local concerns regarding congestion on SW 184th Street may warrant grade-separation of SW 184th Street instead.

VEHICLE DESCRIPTION

BRT vehicles typically include a variety of enhancements over traditional buses that allow faster operating speed, enhance passenger convenience and comfort, and portray a sleek, modern perception of efficiency and distinction from traditional buses.

Exhibit 3-9 Sample BRT Vehicle

BRT vehicles are low-floor buses with wide doors and aisles that allow efficient passenger access and comply with the Americans with Disabilities Act (ADA) requirements. Low-floor buses enhance passenger comfort and increase operating speed.

BRT vehicles span the range from diesel-powered buses to alternative fuel vehicles, including electric-powered vehicles and fuel cell vehicles. Alternative fuel vehicles often have higher capital costs, but can save in operating costs over the life of the vehicle. Alternative fuel vehicles are cleaner and quieter than diesel-powered buses, which enhances passenger comfort and provides a smoother ride. Alternative fuel vehicles can also serve as a marketing tool to help attract choice riders.

Advanced technologies can be implemented on the BRT vehicle to provide additional travel efficiency. BRT vehicles are often equipped with vehicle tracking systems that allow dispatchers to monitor travel time and schedules for better trip reliability. Information can be relayed to display boards both on-board and at stations that provide travel time information to major destinations and can inform passengers when the next bus is arriving. In addition, advanced vehicle control systems can facilitate precision docking and level passenger boarding without causing damage to the vehicle's tires or structure.

Perhaps the most recognizable feature of BRT vehicles to the average patron is the distinctive design characteristics that are often employed. The aesthetics of the BRT vehicle, including design, color, and graphics, helps to portray a positive sense with "choice riders" who may be willing to ride BRT vehicles over traditional buses.

Number of Vehicles

The number of vehicles required to operate BRT service within the South Link Corridor depends on the operational plan developed. The number of BRT vehicles required to operate with similar capacities as other transit technologies is much higher, since BRT vehicles are smaller than light rail or heavy rail vehicles. One of the advantages of BRT is being able to run more vehicles at higher frequencies and to operate flexible route alignments. Therefore, BRT is typically considered as a lower-capacity alternative to rail alternatives in corridors that exhibit moderate ridership demand.

Feeder buses may be traditional buses or shuttle buses. It is likely that the true BRT vehicles may be limited to service within the busway including express service, limited stop service, and busway local service that makes all the stops within the busway.

A scheduling analysis was conducted to determine peak vehicle requirements for operating the BRT Alternative at established service goals. It was assumed that the new BRT vehicles will be placed in service on the Busway Flyer, Busway MAX, and Busway Local. The appropriate bus size needed based on travel demand modeling is the 45-foot Stylized Bus (seating capacity = 46; total capacity = 69).

Table 3-7 demonstrates that 26 BRT Stylized vehicles will be required in peak service. The existing Metrobus vehicles that will no longer be in service on Busway Flyer, Busway MAX, and Busway Local will be re-assigned across the proposed feeder routes. This re-assignment of existing vehicles is enough to account for the next service increase required to bring the feeder routes up to the proposed 15-minute headway schedule. Therefore, the only additional standard Metrobus purchases identified in this study are for the proposed Turnpike Flyer route. This route will require 6 vehicles in service during peak periods, based on the calculated one-way travel time of 40 minutes and round trip travel time of 90 minutes (assuming 15-minute headways).

Table 3-7 Fleet Expansion Peak Hour Requirements

Route	Vehicle Type	Headway (minutes)	One-Way Travel Time (minutes)	Round Trip Travel Time (minutes)	Maximum Vehicles
Busway MAX	45-foot Stylized	15	50	120(A)	8
Busway Flyer	45-foot Stylized	12	40	90	9
Busway Local	45-foot Stylized	15	60	135(A)	9
Turnpike Flyer	Standard Metrobus	15	40	90	6

(A) Includes a proposed Florida City loop.

The required MDT spare ratio according to the latest TDP is 38 percent. Assuming a 38 percent spare ratio, the BRT Alternative will require 36 BRT vehicles and nine Metrobuses above what is currently in service within the corridor. The total cost would be $31.5 million as outlined in Table 3-8.

Table 3-8 Proposed New Vehicle Purchases and Costs

Vehicle Type	Service Vehicles	Spares	Total Vehicles	Unit cost	Total Cost
45-foot Stylized	26	10	36	$800,000	$28.8 million
Standard Metrobus	6	3	9	$300,000	$2.7 million

As outlined in Table 3-9, the directional capacity increase in the corridor during the peak hour is 1,109 passengers per hour, assuming that Metrobuses currently operating along the busway would be re-assigned within the study area to enhance feeder route service.

Table 3-9 Transit Capacity Increase

Route	Trips per Hour	Capacity per Trip	Capacity Increase
Busway MAX	4	69	276
Busway Flyer	5	69	345
Busway Local	4	69	276
Turnpike Flyer	4	53	212
Total			1,109

Operating Characteristics

The flexibility of BRT with feeder buses is expected to lead to favorable operating characteristics. The inclusion of feeder buses within the busway allows more frequent service in more densely traveled portions of the corridor, such as the northern section of the corridor that connects to Metrorail. Peak period headways are expected to be approximately 90 seconds per direction in the northern portion of the corridor. Average peak headways along the corri dor are expected to be 5 minutes per direction with no section of the corridor with peak service worse than 8 minutes per direction.

System operating cost per passenger mile for the BRT Alternative is projected to be $0.41, which is lower than light rail transit or heavy rail. However, BRT exhibits a lower system capacity than either of the two rail modes. Travel time for the BRT Alternative between Florida City and SW 104th Street is significantly slower than heavy rail, but is comparable to light rail transit.

3.3.6.6 Phasing Plan

A phasing plan was developed for the BRT Alternative to determine a timeline for implementation. In addition, the proposed BRT Alternative was split into the following three sub-projects to maximize potential funding sources:

- A project that meets the Federal Transit Administration's (FTA) "Small Starts" criteria was identified. This project entails the BRT component without grade separation. In addition, previously identified park-and-ride facilities at SW 216th Street and SW 304th Street were removed from the BRT Alternative.
- The proposed extension of Metrorail from the Dadeland South station to SW 104th Street and construction of the park-and-ride lot at SW 104th Street were identified for potential funding through FTA and/or the People's Transportation Plan (PTP).
- Grade separation of the busway was identified for potential funding through the Federal Highway Administration's (FHWA) Surface Transportation Plan (STP).

The three projects of the BRT Alternative are expected to be implemented over a 10-year timeframe, or approximately 15 years shorter than the Light Rail Alternative or the Metrorail Alternative.

Phase I (Years 1-5)

The activities expected to take place during the first five years under the proposed Small Starts project include an Environmental Impact Statement (EIS) for the BRT component and expansion of the existing park-and-ride facilities at SW 152nd Street and SW 168th Street. Right-of-way acquisition and construction of a park-and-ride facility at SW 200th Street is expected during this timeframe. In addition, the feeder bus service would be re-oriented to better service the busway and transit signal priority for the busway could be initiated. Stylized low-floor buses that were identified for the BRT service may be ordered during this phase.

The activities expected to take place under the proposed extension of Metrorail to SW 104th Street include an environmental impact statement (EIS) and design of the extension, and new station.

The activities expected to take place under the grade separation project include an environmental assessment (EA) and construction of grade separation at SW 152nd Street and SW 200th Street. The grade separation of SW 200th Street could be moved up in priority to coincide with the construction of a park-and-ride facility at SW 200th Street.

Phase II (Years 6-10)

The activities expected to take place during the six to ten year time frame under the proposed Small Starts project include completion of transit signal priority for the busway, installation of an off-vehicle fare collection system, and modifications to stations to provide a secure fare collection area and a platform matching low-floor BRT buses. Additional park-and-ride locations could be opened at SW 124th Street, SW 136th Street, SW 184th Street, and SW 344th Street. The existing park-and-ride facility at SW 244th Street would be expanded. BRT vehicles with the design enhancements discussed in this report could be initiated into service within this timeframe.

The activities expected to take place under the proposed extension of Metrorail to SW 104th Street include the construction of the Metrorail extension to SW 104th Street and the opening of a park-and-ride facility at SW 104th Street.

The activities expected to take place under the STP grade separation project opening grade separations at SW 112th Street, SW 136th Street, SW 184th Street & SW 186th Street & Marlin Road, SW 211th Street & SW 216th Street, and SW 312th Street.

CHAPTER 4. EVALUATION OF ALTERNATIVES

The development and evaluation of alternatives for South Link Corridor followed the general approach as described in Federal Transit Administration's (FTA) Procedures and Technical Guidance for major investment planning and project development for fixed guideway transit systems. This chapter describes the process adopted for identifying the initial set of alternatives; screening and evaluation of alternatives during different phases of alternatives development; and transportation, environmental and financial impacts of the alternatives considered in the South Link Corridor. The build alternatives have been evaluated against the No-Build Alternative for environmental impacts and against the Transportation System Management (TSM) Alternative for transportation related user-benefits or cost-effectiveness throughout the study.

4.1 Screening Process

Alternatives in the South Link Corridor were analyzed using a two-tiered process. The screening process started with the identification of seven alternatives that could potentially solve the problems identified in the Purpose and Need section and meet the goals and objectives established for the corridor. At this early stage of project development, qualitative and generalized quantitative data are used to evaluate alternatives. Evaluation criteria and measures of effectiveness were developed from the goals and objectives established for the corridor. Table 4-1 outlines these goals and objectives, which were used as a guide to establish the evaluation criteria used throughout the South Link Corridor study. It was not feasible to use all the criteria listed in Table 4-1 in Tier I analysis because limited data and information were available for some measures during the initial alternatives definition phase. Generally, detailed cost, ridership, engineering and environmental data are not available during early stages of alternatives development and analysis.

As the study progressed, the number of alternatives decreased and the level of detail of the alternatives increased. In summary, the South Link Corridor Alternatives Analysis Study began with a fairly large number of broadly defined alternatives that were reduced to a smaller set of alternatives using primarily qualitative evaluation criteria. In the next phase of the project, alternatives were defined in more detail and evaluated using more quantitative data.

4.2 Tier I Alternatives

Seven alternatives were analyzed during Tier I analysis. South Link Corridor transportation needs were analyzed using available secondary data on population and employment, land use, travel patterns and growth trends in the study area. On the basis of corridor transportation needs and goals and objectives, the alternatives were identified by the general public with the input from technical committee. The following alternatives were analyzed in the first phase:

- Alternative 1 — No-Build
- Alternative 2 — Transportation Systems Management (TSM)
- Alternative 3 — Light Rail Transit (LRT) to Florida City
- Alternative 4 — Metrorail to Southland Mall/Bus Rapid Transit (BRT) from Southland Mall to Florida City
- Alternative 5 — Metrorail to Florida City
- Alternative 6 — Metrorail to SW 104th Street/BRT Dadeland South to Florida City
- Alternative 7 — Diesel Multiple Unit (DMU) on CSX/Kendall Drive and maintain operation on existing busway

These alternatives are described previously in Chapter 3.

Table 4-1
Goals and Objectives and Evaluation Criteria

Goals	Objectives	Evaluation Criteria
Goal 1 Improve corridor mobility	• Improve North/South mobility • Improve transportation options within project area	• Number of North/South travel options • Travel Time
Goal 2 Improve citizen access to employment	• Improve economic opportunities • Provide transit connections to downtown employment • Improve access for transportation disadvantaged • Use transit accessibility as a key marketing tool for promoting the economic development / redevelopment in the study area by attracting a broader range of employment categories	• Future population near stations (within ½ mile of station) • Number of transit routes to downtown/serving rail • Low-income households served (within ½ mile of station) • Potential future employment near stations (within ½ mile of station)
Goal 3 a) Improve corridor safety b) Improve operating efficiencies	• Improve intersection safety • Provide safety and urban design amenities that make cycling and walking more appealing • Separate pedestrians, autos and transit • Provide efficient transit services • Minimize transit delays in corridor • Reduce transit/auto conflicts at intersections	• Pedestrian amenities • Sidewalks • Bicycle lanes • Pedestrian accessibility to adjacent land uses • Auto/transit conflict points • Auto/pedestrian conflict points • System operating cost per passenger mile • Number of at-grade busway intersections • Change in transit travel times between various points
Goal 4 Reduce auto dependency	• Increase transit usage • Provide environmental benefits through reduced mobile source emissions, greenhouse gas emissions and energy consumption	• Change in mode split • Change in regional pollutant emissions • Change in greenhouse gas emissions • Change in regional energy consumption • Current EPA regional air-quality designation
Goal 5 Accommodate future population growth in south Miami-Dade by providing the citizens of South Miami-Dade with high quality and cost-effective transit service	• Provide cost-effective solutions • Increase speed of transit service • Provide reliable service • Minimize transfers • Develop a staged program of transit improvements in the corridor • Match capacity of Dadeland South Terminal to busway • Improve frequency of transit service	• Change in transit travel time between various points • Number of transfers needed to downtown • Number of unlinked transit trips in corridor • Adequate staged improvements to support future growth? • Incremental cost per hour of transportation system user benefits • Change headways • System capacity • Do improvements negatively impact Metrorail?
Goal 6 Modify development patterns in the corridor to support transit	• Support transit supportive land use and future patterns Reorient corridor design to support pedestrianism • Encourage transit oriented development (TOD) around stations • Create opportunities and mechanisms for public/private development partnerships • Improve access to stations	• Existing land use • Transit supportive plans and policies • Performance and impacts of policies • Plan addresses pedestrianism? • Plan requires TOD? • Existing density around stations • Does plan address public/private partnership?

4.3 TIER I ALTERNATIVES EVALUATION

The evaluation process for Tier 1 generally followed FTA New Starts guidance. Sixteen evaluation criteria, which are defined below, were developed to address the study goals and objectives. The description below explains the measure for each criterion and data source(s) used. Two criteria relate to each of the following goals and objectives: mobility, accessibility, development patterns, incremental increase in transit infrastructure. There are criteria associated with reducing auto dependency, safety and operating efficiency, improving transit quality cost-effectiveness.

Once the criteria were established, each alternative was analyzed and evaluated based on a scoring system developed for each criterion. These scores were converted to a qualitative rating or ranking of 'low', 'medium' or 'high' in order to reduce bias between different evaluation criteria. Table 4-2 shows the results of the Tier 1 evaluation.

4.3.1 EVALUATION CRITERIA

Number of North/South travel options. Using the Miami-Dade County map major roadways and direct transit routes connecting Florida City to downtown Miami, and other areas generally located in the northern part of the corridor were identified. If more options facilitating this north/south movement were available it indicated increased mobility for the citizens. Therefore, it was a positive attribute for an alternative to have more options. Consequently, alternatives adding more options to the existing options scored higher.

Travel time. The travel demand model output was used to estimate the travel time between Florida City and major activity centers in the northern part of the corridor. One of the purposes of the project is to decrease the travel time between Florida City and other major activity centers in the northern part of the corridor. The alternatives having less travel time received the highest score. In this case, the scoring system is reversed and the alternatives with less travel time get higher points and vice versa.

Headways from Florida City. Headways were assumed for each alternative, appropriate for the mode and desired level of service. Lower headways imply higher frequency of premium transit vehicles, which translates into reduced waiting times. Hence, alternatives with shorter headways would receive a higher score. The headways for all the alternatives under consideration were less than 10 minutes. According to Florida Metropolitan Planning Organization (MPO) Transit Quality of Service Evaluation (TQSE) report, headway of less than 10 minutes is defined as level of service (LOS) A. This means more than six vehicles are available per hour and passengers don't need schedules. All of the alternatives were given the highest possible score.

Headways from Dadeland South. Evaluation of this criterion was the same as for headways from Florida City.

Table 4-2 TIER I Evaluation Matrix

Criterion	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
	No-Build	TSM/Baseline	LRT	Metrorail+BRT	Metrorail	BRT	DMU
Number of North/South Travel Options	3 road / 1 transit	3 road / 1 transit	3 road / 1 transit	3 road / 1 transit	3 road / 1 transit	3 road / 1 transit	3 road / 2 transit
Trave Time	58 min.	53 min.	45 min.	35 min.	29 min.	45 min.	29 min.
Headways/Florida City	6 min.	5 min.	5 min.	5 min.	5.5 min.	5 min.	5.5 min.
Headways/Dadeland South	3.5 min.	3.5 min.	5 min.	5 min.	9 min.	3.5 min.	45 min. +3.5 min.
Transit routes serving rail	10	7	13	13	11	13	12
Future employment near stations (2030)	40,943	40,943	40,943	31,724	26,171	40,698	64,083
Future population near stations (2030)	102,909	102,909	102,909	86,929	52,018	102,909	148,370
Capital Cost per mile (millions)			$20.6	$81.4	$81.4	$7.2	$15.5
Total Capital Cost Range			$20.6 X 20	$81.4 X 11	$81.4 X 20	$81.4 X 1 / $14 X 10	$15.5 X 21
System operating cost per mile	$4.32/bus mi	$4.32/bus mi	$4.32/bus mi $13.93/train mi	$4.32/bus mi $8.47/train mi	$4.32/bus mi $8.47/train mi	$4.32/bus mi	$4.32/bus mi $11.56/train mi
Auto/transit conflict points	45	45	45	25	0	33	100
Number of transfers needed to downtown	1	1	1	1	0	1	1
Number of transit trips	224,694	225,975	233,660	228,484	232,624	232,702	228,049
System capacity (seated/crushed)	1,400 / 2,065	1,400 / 2,065	3,215 / 7,630	3,280 / 10,000	3,280 / 10,000	2,165 / 4,000	1,804 / 3,000
Improvements negatively impact Metrorail?	No Impact	No Impact	Modify dadeland S. for LRT interface	Increases fleet size	Increases fleet size	New southern terminus station	New connection to DMU
Existing land use	No Impact	No Significant Impact	Moderate-Densification	Significant Densification	Significant Densification	Significant access issues	Significant outside UDB
Improvments increase the utilitiy of the busway?	No Impact	No Significant Impact	Significant - Replaces Busway	Significant - Relplaces 1/2 of Busway	Significant - Replaces Busway	Significant - Improves operations	No Impact
Impact on existing communities? T	None	Moderate	Moderate	Significant +	Significant +	Significant +	Significant
N	None	Moderate	Moderate	Significant	Significant	Significant	Significant
V	None	Moderate	Moderate	Significant	Significant	Significant	Significant

Transit routes serving rail. Using the Miami-Dade Transit (MDT) system map, bus routes feeding or connecting the transit stations in the corridor were identified. If more bus routes interfaced with the transit stations in the corridor, it meant higher ridership from an increased service area. Therefore, alternatives with more transit routes serving their stations got higher points.

Future employment near stations. Using Geographic Information System (GIS) and travel model demand input data (socio-economic data) employment for the year 2030 within a one-half mile radius of transit stations was calculated. More employment or jobs near transit stations generally results in higher ridership. Therefore, alternatives with higher employment around their stations scored higher.

Future population near stations. Using Geographic Information System (GIS) and travel model demand input data (socio-economic data), population within a one-half mile radius of transit stations was calculated. The more people living near transit stations generally results in higher ridership. Therefore, alternatives with higher population scored more points.

Total capital cost range. Estimating capital costs at this phase of analysis focused on determining the order of magnitude of difference between each alternative, due to differences in mode and operating environment. An estimate (average cost per mile) for each alternative was calculated based on the capital costs of projects that received a Full Funding Grant Agreement (FFGA) under the New Starts program. The alternative with a lower capital cost is desirable. Therefore, the scoring system is reversed and the alternative with low capital cost gets more points.

System operating cost per mile. Based on National Transit Database (NTD) information, an average operating cost per mile was determined for each mode under consideration. The average was based on similar systems currently operating in the United States. Lower operating cost is a favorable attribute. The alternative with lower operating cost per mile receives a higher score.

Auto/transit conflict points. Using a county road map, the number of potential auto/transit conflict points was identified. The lower the number of auto/transit conflict points the better the alternative. Generally, fewer conflict points result in increased transit speed, improved safety and lower initial capital costs. As a result, an alternative with fewer potential auto/transit conflict points receives a higher score.

Number of transfers needed to reach downtown. This attribute measures a rider's convenience. No transfer means a one-seat ride between point A and point B. In this case, only transfers occurring within the corridor were counted. It should be noted that transfers from feeder connections to the corridor are not included. If the number of transfers for an alternative is lower, it is considered more attractive and scores more points.

Number of transit trips (linked). Using output from travel demand model, transit ridership forecast was obtained. Higher transit ridership is desirable. Alternatives with higher ridership score better than those with lower ridership.

System capacity (Seated/Crush). Using typical transit vehicle characteristics, system capacity was calculated for the various modes under consideration. A higher system capacity indicates the potential to carry more passengers per vehicle which can result in more cost-effective operations. Alternatives with higher system capacity get higher points.

Improvements that negatively impact Metrorail. A qualitative assessment was made as to the potential impacts to Metrorail resulting from the implementation of the alternatives. The degree to which Metrorail system needs to be modified to interface with an alternative is considered as an impact. Furthermore, this impact has a cost aspect and therefore it is considered as negative. Consequently, alternatives having significant impacts on Metrorail score lower compared to those having no or moderate impacts.

Improvements that increase the utility of the busway. Evaluation of alternatives under this criterion was based on a qualitative assessment of the positive impact an alternative may have on the existing busway in the corridor in terms of enhancing its capacity or increasing operational efficiency. Therefore, alternatives having significant impacts on the existing busway score higher points compared to those having no or moderate impacts.

Impact on existing communities. This was a qualitative assessment of positive and negative impacts from the implementation of the alternatives on existing communities. This measure was a composite score of traffic, noise and vibration impacts. Each impact was scored individually and then they were averaged together to obtain a score for the evaluation matrix.

4.4 TIER I ALTERNATIVES COMPARISON

The impacts of Tier I alternatives on mobility, land use, environment, capital cost and operation and maintenance cost of various transit alternatives within the corridor were compared and assessed against the corridor goals and objectives.

4.4.1 Mobility & Accessibility

All seven alternatives provide three roadway options and one transit option for traveling in the general north-south direction with the exception of the DMU Alternative. The DMU Alternative would provide an additional transit option since it would use the CSX railroad right-of-way, as well as the existing busway.

Transit travel time from Southland Dade Metrorail Station to Florida City decreases from approximately 53 minutes in the TSM Alternative to between 29 to 48 minutes for the Build Alternatives. The travel savings result from improvements such as transit signal priority, grade separations, low-floor transit vehicles, off-board fare collection, etc. The station spacing is a key factor governing total travel time. Of the build Alternatives, Metrorail Extension 2 has the shortest travel time of approximately 29 minutes, The BRT and LRT Alternatives save approximately eight minutes of total travel time over the TSM Alternative.

Alternative 5 (Metrorail to Florida City) is completely elevated with stations located at one to two mile intervals and therefore has the lowest travel time from one end of the system to the other. The BRT Alternative has grade-separations at major intersections and transit signal priority at some minor intersections. The LRT Alternative is at-grade with transit signal priority at all intersections. The DMU Alternative has significantly more auto-transit conflict points, i.e., at-grade crossings. For the No-Build and TSM Alternatives, buses would operate with traffic before getting on the busway. In addition to travel time savings, safety is another important aspect of separating transit operations from mixed traffic and/or auto-transit conflict points.

Except for Alternative 5 (Metrorail to Florida City), all of the build alternatives would require transit riders to transfer at the existing Southland Dade Metrorail Station to reach downtown Miami.

One of the important factors that determines transit quality of service is headways or frequency of service. All the build alternatives improve the frequency and reliability of transit service over the TSM Alternative.

One of the ways to compare the reduction in auto dependency between different alternatives is to compare the projected transit ridership in the corridor between the TSM and build alternatives. The LRT and BRT alternatives have higher transit ridership (linked transit trips) than the TSM Alternative. It is estimated that the LRT and the BRT alternatives would have approximately 8,950 and 8,000 new riders respectively. The Metrorail Extension to Florida City alternative has fewer new riders (7,930 new riders) than LRT and BRT but significantly higher than Metrorail Extension to Cutler Bay (3,790 new riders) and DMU (3,350 new riders) alternatives.

The total number of jobs and people within one-half mile radius of a transit station is a function of the number of transit stations. The alternative with more stations would have more jobs and people within the walking distance of the transit stops. All the build alternatives except the DMU Alternative have fewer transit stops than the No-Build and TSM Alternatives.

4.4.2 Land Use

All the build alternatives would have varying impact on the existing pattern of development depending on the physical elements or infrastructure associated with the alternatives. Rail based alternatives are perceived to be more permanent public investment when compared to buses and therefore they would be more likely to encourage higher density development around transit stations. Transit stations would serve as catalyst for transit oriented development. The LRT, Metrorail Extension to Southland Mall and Metrorail Extension to Florida City would have a progressively higher impact over the No-Build and TSM Alternatives. The DMU alternative uses CSX rail corridor which is outside the Urban Development Boundary (UDB) and could provide impetus for development in that area.

4.4.3 Environment

All the build alternatives use the existing busway or railroad right-of-way and would have minimurn adverse impact on the physical and natural environment. The exact location of park-and-ride facilities is not determined in the initial planning stages of alternatives development. The location of stations is generally on major intersections and park-and-ride lots would be located as close as possible to station platforms. The location of the fixed facilities would be defined in the next phases of project development. However, traffic, noise and vibration impacts have been addressed at this stage of project development as a means to evaluate alternatives.

At this early stage, it would be safe to consider that the rail-based Build Alternatives would have higher noise and vibration impact than the BRT and TSM Alternatives. In terms of traffic impacts, since the rail-based build alternatives are generally more attractive to people than buses, they would attract more choice riders compared to BRT and TSM Alternatives and have more impact (positive) on traffic.

4.4.4 Capital Cost

The build alternatives would cost between $7.2 million per mile to $81.4 million per mile based on available secondary data. These build alternatives are significantly different in terms of requirement of various physical components that comprise the transit system. That is reflected in the wide range of capital cost between alternatives. Metrorail Extension to Florida City - Alternative 5 is significantly more expensive than the other build alternatives because it is completely grade-separated or elevated, has longer station platforms and includes higher cost vehicles. In addition, it would require demolition, reconstruction and reconfiguration of the existing busway and related infrastructure. It would cost approximately $81.4 million per mile. The DMU and LRT Alternatives are relatively less expensive ($15.5million and $20.6 million per mile respectively) because they use at-grade guideway tracks. The LRT platforms are shorter in length compared to the DMU or Metrorail Alternatives. The LRT Alternative would require demolition of the existing busway and bus stops and reconstruction. The DMU Alternative would not require extensive demolition and reconstruction. The BRT Alternative is the least expensive because it does not need tracks and a power supply system. The shelters and platforms are also less expensive when compared to rail-based systems. In addition, it is the most compatible alternative with the existing transit infrastructure.

4.4.5 Operation and Maintenance (O&M) Cost

Using NTD data, average operation and maintenance cost for the system per mile was calculated for different transit modes. More reliable and accurate O&M for the specific transit system would require a detailed system wide service plan. It is not feasible to develop such service plans for all conceptual alternatives in the initial planning stages. The differences in O&M cost between rail based systems and buses is a result of the additional maintenance required for tracks and guideway, communication and signal control, power supply/fuel, and investment in personnel. Generally, rail based alternatives tend to have a higher O&M cost than buses.

4.5 RESULTS OF TIER I EVALUATION PROCESS

Three "build" alternatives were recommended by the CAC from the seven Tier I alternatives for more detailed analysis as part of Tier II. Alternatives 4 and 7 were eliminated while Alternatives 3 - LRT, 5 - Metrorail Extension to Florida City and Alternative 6 - Enhanced BRT were recommended for further analysis. It was also requested that a Metrorail Hybrid technology be examined in detail as Alternative 5A.

The alternatives in Tier II analysis were defined in detail and were modified slightly from Tier I alternatives to capture the full benefits of a fixed guideway transit system. These modifications included consolidating some stations, eliminating other stations or relocating them. Park-and-ride locations were also modified. The following is a brief description of Tier II Alternatives. More information on the technology, guideway alignment, types of stations, transit vehicles requirements, vehicular and pedestrian access and operating characteristics for each alternative is available in Chapter 3 in Section 3.3. The five build alternatives that were analyzed in the Tier II stage of the alternatives analysis are listed below.

4.6 EVALUATION OF TIER II ALTERNATIVES

The Tier II analysis was based on more quantitative data. Key data used in the Tier II evaluation process was estimated in more detail. Such data includes ridership, capital cost, operation and maintenance cost, and user-benefits.

The evaluation also includes comparison of potential environmental effects that could result from the construction and implementation of the Tier II build alternatives. Environmental factors were considered as a means to identify potential "fatal flaws" for an alternative. In addition to cost and ridership, environmental factors were used as a means to help to differentiate among the alternatives. To a large degree, potential environmental effects are limited since the alternatives would be built and operated within an existing transit right-of-way and/or the potential effect on a particular resource (wetlands or historic resources, for example) would be largely the same for all alternatives. The potential environmental effects were assessed based on readily available information and limited field reviews.

Given that the locations of park-and-ride lots and the maintenance facility for the Build Alternatives were only identified conceptually (that is, the exact location and size of those facilities have not been determined), potential environmental effects were considered only for the transit guideway and stations of the build alternatives.

4.6.1 Mobility

RIDERSHIP

System wide daily transit ridership forecasted (2030) for different build alternatives is summarized in Table 4-3. All the build alternatives improve transit ridership compared to the TSM Alternative. Rail-based alternatives have higher impact on the overall transit ridership when compared to the bus alternative.

Table 4-3
Forecasted System-wide Transit Ridership

Alternative	Total Transit Trips	Total Transit Boardings	Percentage Change in Transit Trips over TSM	Percentage Change in Transit Boardings over TSM
TSM	304,720	606,413		
LRT	310,592	614,054	1.93%	1.26%
Metrorail	309,187	602,673	1.47%	-0.62%
Metrorail Hybrid (Option)	309,187	602,673	1.47%	-0.62%
Enhanced BRT	307,879	615,945	1.04%	1.47%

The increase in transit boardings for the LRT and BRT Alternatives is due to riders transferring at the existing Southland Dade Metrorail Station. Since the Metrorail Alternative would require no transfers, transit boardings are lower compared with the TSM, LRT, or Enhanced BRT Alternatives.

The split between rail boardings and bus boardings is a good indication of the efficiency of the system from a passenger standpoint. Table 4-4 shows the variation between the Tier II alternatives.

Table 4-4
Forecasted Rail versus Bus Boardings

Alternative	Total Transit Trips	Total Rail Boardings	Total Bus Boardings
TSM	304,720	235,712	330,643
LRT	310,592	257,798	315,923
Metrorail	309,187	244,516	317,656
Metrorail Hybrid	309,187	244,516	317,656
Enhanced BRT	307,879	238,100	337,479

Table 4-4 shows that while Metrorail has far fewer rail boardings than the LRT alternative the reality is that most of the trips still require two boardings because of the transfer. However, the fact that the Metrorail has more transit trips indicates that difference between the number of stations with LRT and Metrorail still requires more people to transfer from bus to rail with Metrorail. The LRT has more people walking to stations. The Enhanced BRT alternative compared to the TSM alternative shows the absolute growth in trips stimulated by upgrading the bus system.

Traffic Impacts

With the exception of the Transportation System Management (TSM) alternative, the Tier II alternatives would use some combination of grade separation, signal preemption, or signal priority for the transit corridor at intersections.

A planning level analysis was performed to quantify traffic impacts on major intersections along the U.S. 1 corridor due to proposed changes to the existing busway control methods. The vehicle delay or time savings during the PM peak hour for the major U.S. 1 intersections resulting from grade separation, signal preemption, or signal priority were quantified. Note that positive values indicate an increase in travel time due to the proposed control; negative values indicate a reduction in travel time due to the proposed control methods. Travel time changes were calculated with respect to the 2030 No-Build alternative. A detailed description of methodology, description of impacts of various intersection control strategies, traffic impacts at each intersection alternative wise is available in Chapter 3 of this Report.

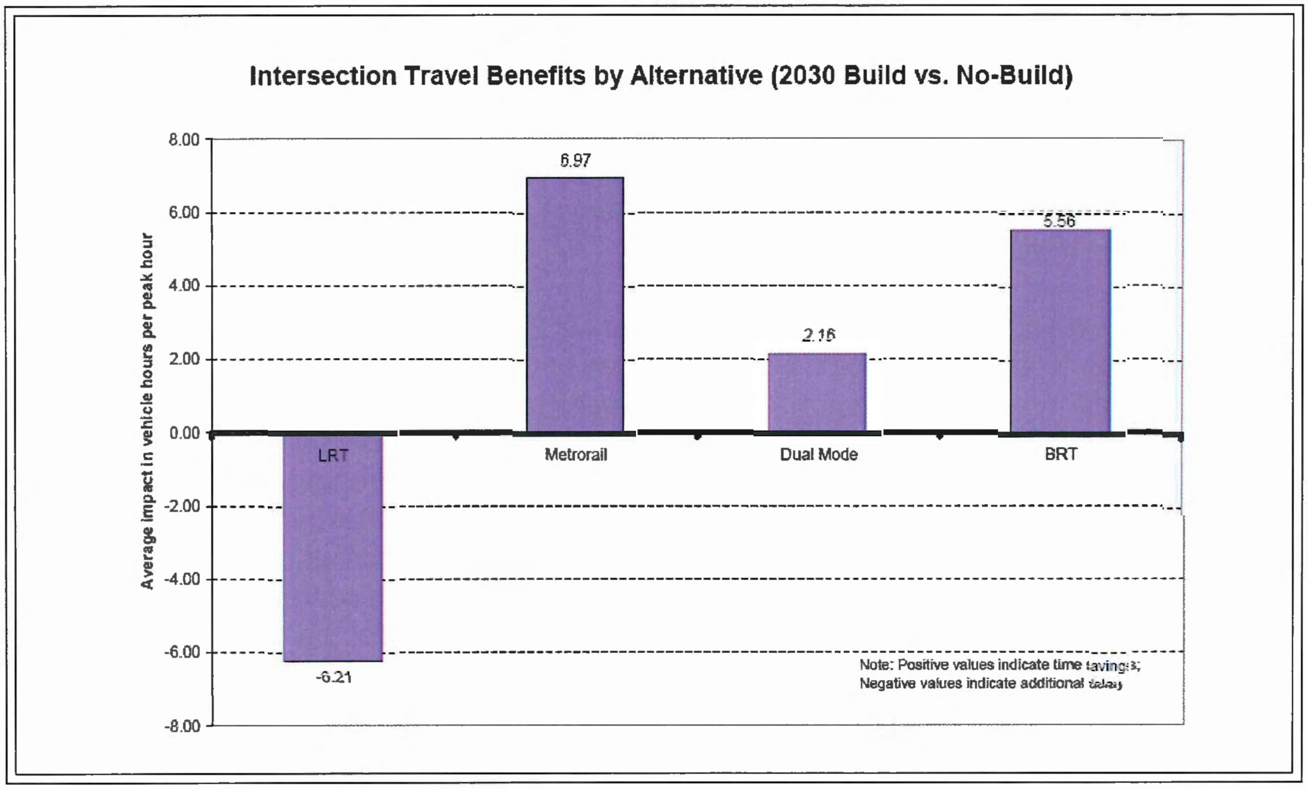
The Metrorail alternative, which requires replacing the busway with an elevated (grade-separated) Metrorail line, would provide the highest travel time improvements for traffic (-6.97 hours) along the U.S. 1 corridor. The Enhanced Bus Rapid Transit (BRT) alternative, which would include a mix of grade separation and signal priority at the intersections, is the second best alternative in terms of intersection travel time savings for traffic (-5.56 hours). The Hybrid alternative, which also includes a mix of grade separation and signal preemption, has an overall travel time reduction (-2.16 hours). The Light Rail Transit (LRT) alternative, which would usee signal preemption at all intersections, but would have no grade separations, is expected to increase the intersection travel time (+6.21 hours).

Of the intersection control strategies considered in this study, signal preemption occurring at at-grade intersections of the rail alternatives, clearly has more impact on traffic. However, signal preemption is necessary to maximize transit mobility and improve the overall safety of the at-grade rail alternatives.

4.6.2 Built Environment

Land Use

The Comprehensive Development Master Plan (CDMP) developed by Miami-Dade County identifies two types of opportunities for development and redevelopment related to transit stations. Existing and future rapid transit stations are identified as locations to encourage land uses including housing, shopping, and offices paired with compatible entertainment, cultural and human service uses. Specific density and walking distance requirements are included in this provision. This general station classification may apply to any of the proposed stations of the Tier II build alternatives, which implies that the greater number of stations an alternative has, the more opportunities that exist for development and redevelopment.



Another designation from the CDMP identifies Urban Centers at the community, metropolitan and regional levels, all with specific requirements for land use, density, parking and public spaces. Within the study corridor, seven community Urban Centers are identified in the CDMP; five of which coincide with stations on the Enhanced BRT alternative, four from the LRT alternative, and three from the Metrorail alternatives. Based on these designations, the Enhanced BRT alternative has the highest potential for developing stations under the community Urban Center designation, followed by LRT and then Metrorail. Two metropolitan Urban Centers are designated within the corridor, which are identified as stations on all of the Tier 2 build alternatives.

Visual Impacts

The visual impacts of the Tier II build alternatives are related to the guideway characteristics, the stations and the vehicle technology.

The Enhanced BRT alternative is primarily an at-grade guideway with grade-separations at 10 intersections. At the northern end of the corridor, the existing Metrorail elevated guideway would be extended by one station to the south. The overall potential visual impact of this guideway in this area is moderate to high. This alternative has the greatest number of stations of the four build alternatives (30 total); one elevated Metrorail station, eight elevated BRT stations, and 21 at-grade BRT stations. While each of these stations has the potential to introduce some degree of visual impact to surrounding communities, elevated stations generally have a greater visual impact. The at-grade station would be located at existing busway stops. In those areas, there would be little or no change from existing conditions. The technology for this alternative consists of single vehicle articulated buses, which tend to have little visual impact.

The LRT guideway has potential for visual impact. The at-grade crossings would require the use of crossing gates, which would introduce new visual elements in the right-of-way. The gates would present a potential impact based on their number. LRT technology also uses an overhead catenary power system. The support poles and wires for the LRT alternative would introduce new visual elements throughout the right-of-way and have potential for a visual impact.

The Metrorail guideway presents the greatest potential visual impact of the guideway alternatives since it is entirely elevated. Even though this alternative has a lower number of stations than other alternatives, the stations are all elevated, which presents a potentially significant visual impact.

The Metrorail-Hybrid alternative contains an at-grade guideway with nine intersections with grade-separations, creating a potentially significant visual impact. Of the 12 total stations, four would be elevated and have the potential for a visual impact. The combination of six-car trainsets and overhead catenary wires indicates that this alternative would have the potential for visual impact.

4.6.3 Natural Environment

During the course of the study, specific features of the natural environment were identified, including floodplains and wetlands, wildlife and habitat, and other environmental conditions. Potential impacts to these natural features are uniform between alternatives given that each alternative would be developed within the previously developed right-of-way of the existing busway corridor.

Air Quality Impacts

Change in regional vehicle miles traveled is the primary determinant used to analyze environmental impacts related to air quality between alternatives. Data generated from the Miami-Dade Urbanized Area FSUTMS model was used to calculate the change in carbon monoxide, oxides of nitrogen (a precursor to ozone formation), volatile organic compounds, energy consumption, and carbon dioxide (a greenhouse gas) emissions of build alternatives with respect to the baseline alternative (i.e., no-build alternative in this analysis). The change in emissions was determined for the TSM, LRT, Metrorail, and Enhanced BRT alternatives.

- Overall, the Metrorail Alternative is shown to have the most beneficial environ mental impacts, followed by the Enhanced BRT and LRT alternatives. (The Metrorail Alternative is projected to exhibit the greatest decrease in emissions, energy consumption, and fuel use.)
- Three build alternatives (LRT, Metrorail, and Enhanced BRT) are shown to re duce vehicle miles (VMT) traveled in comparison to the No-Build Alternative.

However, the TSM Alternative is shown to increase VMT in comparison to the No-Build Alternative.

- Consistent with the results of the VMT analysis, the LRT, Metrorail, and En-
- hanced BRT alternatives show a decrease in fuel use and energy consumption in comparison to the No-Build Alternative, while the TSM Alternative shows an increase in fuel use and energy consumption in comparison to the No-Build Alternative.
- Similar to the above observations, the LRT, Metrorail, and Enhanced BRT al ternatives show a decrease in emissions in comparison to the No-Build Alter native, while the TSM Alternative shows an increase in emission in compari son to the No-Build Alternative.
- Only the TSM Alternative is expected to have negative environmental impacts in comparison to the No-Build Alternative. This may be due to introducing more transit service in the corridor relative to the amount of new riders than the TSM Alternative is projected to generate.

NOISE IMPACTS

Transit noise is generated by several sources including sounds from electric control systems and traction motors that propel transit cars, rolling noise due to continuous rolling contact, impact noise when a wheel encounters a discontinuity, wheel squeal generated by friction on tight curves, exhaust noise, gear noise, air-turbulence noise, and noise from auxiliary sources such as cooling fans, radiator fans, and air-conditioning pumps.

There is no inherent difference in noise between light rail transit (LRT) and heavy rail transit (HRT) vehicles because the suspension systems and axle loads are similar. However, noise level differences arise when considering two additional factors - speed and train length.

In general, transit noise increases with increasing speeds. The sound level dependence on speed is less pronounced for heavier trains. For example, a commuter rail train with a diesel-electric locomotive will be louder at slow speeds than a light-rail train. As speed increases, the sound level produced by the two different types of trains will begin to converge because wheel-rail noise becomes the dominant noise source. Speed dependence is also strong for non-accelerating electric buses (three-axle), because tire/pavement noise dominates these vehicles. At low speeds and while accelerating, diesel exhaust noise is dominant for accelerating buses; but at moderate and high speeds, tire/roadway interaction is dominant. In general, electric buses are much quieter than diesel buses.

In addition, noise increases with train length. A Metrorail train with six cars traveling 30 miles per hour will generate more noise than an articulated two-car light-rail train traveling 20 miles per hour. Light-rail trains traveling in mixed traffic tend to generate less noise than light-rail trains in exclusive guideways because travel speed is naturally slower. For light-rail trains traveling in exclusive rights-of-way, such as the LRT being considered within the South Link Corridor, noise levels tend to be greater than light rail traveling in mixed traffic. However, the noise level for an exclusive-guideway LRT tends to be less than a heavy rail system due to lower speed and shorter train length.

Regardless of vehicle technology, elevated transit systems generate higher noise-level measurements than at-grade transit systems. This is due primarily to the propagation of sound in a 360-degree range for elevated systems. At-grade transit systems do not propagate sound across as wide a range.

There are many different methods to measure noise levels. For example, single point noise levels assess the sound at one instant due to a single event. Average noise levels are also considered that determine an average sound level across a time period such as an hour or a day. Light rail transit may perform better during single event noise assessments, but LRT may lose its advantage when considered across an average time period since shorter headways can generally be achieved with LRT. Shorter headways mean trains pass the noise receptor location more frequently, which will increase the average noise level across a time period.

In summary, the principle noise from urban passenger rail trains is generated by the steel wheel-on-steel rail interaction. The primary types of steel-on-steel noise include continuous rolling noise, impact noise at a discontinuity, and wheel squeal on tight curves. Diesel exhaust noise is the dominant form of noise from accelerating buses; however, at moderate and high speeds, tire/roadway interaction is dominant. When measured as a single point event, transit noise increases with increasing speeds and train lengths. When averaged across a fixed time period, train frequency (headways) also becomes a factor in determining average noise levels.

Vibration levels are also assessed along with noise impacts. Heavy rail and light rail transit systems are often categorized together when vibration levels are assessed; therefore, it may be difficult to assess differences between the two modes. The ground-borne vibration characteristics of heavy and light rail transit vehicles are very similar because they have very similar suspension systems and axle loads. However, elevated guideways have an inherent advantage in reducing ground-borne vibration problems when compared to at-grade or subway systems. Therefore, the elevated Metrorail alternative may produce less vibration impacts than the at-grade LRT alternative. (Vibration can be a problem for elevated guideway systems if support columns are placed within 50 feet of buildings.)

Most problems with bus-related vibration are related to a pothole, bump, or other discontinuity in the road surface. Because rubber tires and suspension systems provide vibration isolation, it is unusual for buses to cause ground-borne vibration problems. When buses cause effects such as rattling of windows, the source is almost always airborne noise. Vibration problems are more likely when buses will be operating inside buildings such as a bus transfer station with commercial office space in the same building.

4.6.4 Costs

The following sections discuss the capital cost and operation and maintenance cost impacts of the build alternatives. The general approach adopted for estimating the capital costs and O&M costs is also described briefly. Detailed cost estimating methodology along with data sources and assumptions for each alternative is available in the Capital Cost and Operation & Maintenance Cost Estimating section of the Methodology Report.

CAPITAL COST

Capital costs were estimated for all the Tier II build alternatives, with all costs expressed in current (2005) dollars. The cost estimate uses parametric unit costs for the major identifiable cost items, including special conditions. The parametric unit costs are based on a conceptual scope appropriately developed for each specific work item. A parametric unit cost is an estimate developed for all elements included in a "cross section" of a work item for a unit of measurement (route feet, linear feet, each, etc.). The parametric unit cost is then multiplied by the total length of the alternative or the number of units as appropriate to calculate the total cost The more complex parametric unit costs, such as passenger stations, have a detailed unit price development backup to substantiate the parametric unit cost Special conditions items include busway (road and station) demolition and reconstruction, pedestrian and bikepath demolition and reconstruction, and utility relocation costs identified as part of the work effort.

Once the unit costs or special condition costs have been determined, they are subject to several allowances and add-on factors. Most unit costs contain "internal" allowances to cover generic costs that have not been quantified. For example, a percentage is included in the unit costs for Agency/Owner Professional/Administration and Agency/Owner Force Account. These allowances are referred to as internal allowances because they are included in the parametric unit costs and found only in the unit price development backup.

The add-on factors include a percentage for Preliminary Engineering, Final Design, Engineering during Construction, Construction Management, Insurance, Permitting/Legal, Professional Staffing Agency Force Account and Design & Construction Contingency. These factors are referred to as add-on factors because they are not added to the unit costs and appear in the cost tables as a separate cost category. Not included in either the standard unit costs or add-ons are additional costs due to environmental remediation, including but not limited to, discovery and relocation of endangered wildlife species. Table 4-5 provides a summary of capital costs for the TSM and Build Alternatives. The TSM Alternative is the least expensive because it includes robust bus service and only low capital cost transit improvements by definition.

The Metrorail Alternative is the most expensive because it is completely elevated and has a larger fleet size and more expensive vehicles. This alternative would cost almost two times the LRT Alternative and four times the Enhanced BRT alternative. Metrorail Hybrid option

Table 4-5
Capital Cost for Tier II Alternatives
($000 2005)

Category	LRT	Metrorail	Hybrid	Enhanced BRT
Guideway	118,342	396,147	146,227	63,031
Stations	38,811	83,400	77,800	37,006
Support Facilities	14,059	39,565	39,565	0
Sitework	47,702	86,015	45,163	19,528
Systems	86,504	60,137	82,287	22,069
Construction Subtotal	$305,418	$665,264	$391,043	$141,634
ROW	137,280	196,768	196,768	89,232
Vehicles	87,999	196,768	196,768	36,450
Professional Services	217,586	420,393	307,963	109,599
Contingency	105,609	204,045	149,475	53,196
Total	$854,391	$1,650,288	$1,217,227	$430,111

would cost less than the Metrorail alternative because a significant portion of the guideway would be at grade. However, it is significantly more costly than the LRT and Enhanced BRT alternatives due to grade-separations at major intersections along the guideway, elevated stations and it would require more expensive transit vehicles. The LRT alternative being completely at-grade saves significantly in terms of guideway construction. It is still twice the cost of the Enhanced BRT alternative. This additional expense can be explained due the cost of demolition of the existing busway infrastructure and laying the guideway and tracks for LRT vehicles. This alternative would require purchasing expensive LRT vehicles compared to articulated or modern BRT vehicles. The LRT alternative would also require an electrical traction power system that the Enhanced BRT alternative does not require. The BRT Alternative makes use of most of the busway infrastructure and does not involve extensive demolition and reconstruction. The significant cost items within the BRT alternative would be fare collection equipment and new BRT vehicles.

Operating and Maintenance Costs

The O&M costs are a recurrent annual cost for transit and for the most part must be budgeted locally. Preventative maintenance is an allowable expenditure of formula funds that go to transit agencies from the federal government that assist in paying for O&M costs. The state also assists with payment for the first three years of up to 50 percent of the costs of new service under their Service Development Block Grants.

To put O&M costs into perspective, existing MDT costs are provided. The most recent figures for Miami- Dade Transit (2003) show a total annual O&M cost of $199,743,000. The breakdown between the various modes are as follows:

- Metrobus - $150,299,000
- Metrorail - $41,964,000
- Metromover - $7,480,000

Operating and maintenance costs were developed for Tier II alternatives using FTA methodology. The O&M budget is normally broken down into three categories for analysis and forecasting: cost for vehicle hours of operations, cost for vehicle miles and cost for number of vehicles. These numbers normally equate to operations, maintenance and administration. In comparing the operating and maintenance costs (O&M) of the Build Alternatives the incremental cost of the increased service above and beyond the No-Build Alternative will be considered. Table 4-6 provides a summary of O&M costs for the Tier II alternatives.

Table 4-6
O&M Cost for Tier II Alternatives

Alternative	Background Bus O&M Cost (2005 dollars)	Build Alternative O&M Cost (2005 dollars)	O&M Cost above No-Build Cost
No-Build	$227.9 million		
TSM	$236.1 million		$8.2 million
LRT	$218.6 million	$28.4 million	$19.1 million
Metrorail	$218.6 million	$46.7 million	$37.4 million
Metrorail Hybrid (Option)	$218.6 million	$46.7 million	$37.4 million
Enhanced BRT	$236.3 million	$2.4 million	$10.8 million

TSM Alternative. The only change between the No-Build Alternative and the TSM Alternative is bus operations within the South Dade Corridor. There is no change in the other modes. The implementation of the bus operating plan specified in the TSM alternative would increase the annual operating cost of MDT by $8.2 million.

LRT Alternative. Implementation of the LRT Alternative in the South Link Corridor would impact the O&M costs of the Metrobus operations and would add the cost of LRT operations within the corridor. There would be no impact on the O&M costs of Metrorail. The total additional O&M cost of the LRT when compared to the No-Build Alternative is $28.4 million for the new LRT service, less the $9.3 million cost savings on bus operations realized from replacing bus service with LRT service in the corridor. The estimated additional annual O&M cost of this alternative is $19.1 million.

Metrorail Alternative. Implementation of Metrorail Alternative in the South Link Corridor would impact the O&M costs of both the Metrobus operations and the Metrorail operations. The bus operating plan supporting both the Metrorail and the LRT Alternatives is exactly the same. The annual additional O&M cost is the cost of Metrorail extension - $46.7 million, less the cost savings of reducing the bus service in the corridor - $9.3 million. The total additional O&M cost is $37.4 million annually.

Metrorail Hybrid Alternative. There are no local or national statistics for operation and maintenance for a hybrid vehicle. The cost would be higher for maintaining the dual electrical system; however, the cost would be significantly lower for not having to maintain the elevated rail structure. For the purpose of this analysis, it was assumed that the O&M cost for the hybrid system is roughly equivalent to the cost of the pure elevated Metrorail system.

Enhanced BRT Alternative. The Enhanced BRT Alternative includes a short extension of

Metrorail and modifications to the bus network. Therefore this alternative will have an impact on both the MDT bus and rail budget. The Enhanced BRT bus operating system is similar to the operating plan of the TSM Alternative. The additional O&M cost of the Enhanced BRT Alternative includes the additional cost of the bus operations - $8.4 million and the additional Metrorail service of $2.4 million dollars for a total increase in O&M costs of $10.8 million.

4.6.5 Transit User Benefits & Cost-Effectiveness

FTA provides two cost-effectiveness ratios for analysis of alternatives.

- Cost per hour of user benefit
- Cost per new rider

Transit user benefits are calculated within the mode choice model of the travel demand forecasting model. Transit user benefits are basically travel time savings experienced throughout the regions between the TSM and build alternatives. These are in-vehicle travel time (IVTT) savings. However, it is well accepted that transit users value out-of-vehicle-time (OVTT) more than IVTT. In other words, transit user-benefits are an estimate of travel time savings transit patrons would realize if a given Build Alternative was implemented. Table 4-7 indicates that highest overall user-benefits would occur if Metrorail Alternative including Hybrid option were implemented followed by LRT and BRT Alternatives.

Table 4-7
User Benefit of Tier II Alternatives

Alternative	LRT	Metrorail	Metrorail Hybrid (Option)	Enhanced BRT
Annualized Capital Cost	$66,843,000	$124,570,000	$94,370,000	$33,927,000
Annual O&M Cost	$10,922,910	$29,236,136	$29,236,136	$2,584,102
Total Annualized Cost	$77,765,910	$153,806,136	$123,606,136	$36,511,102
User Benefits Hours (annual)	$1,337,485	$1,399,748	$1,399,748	$1,147,010
Cost / hour of user benefit)	$58.14	$109.88	$88.31	$31.83

Cost-effectiveness and cost-benefit analysis are the two commonly used methods for evaluating and comparing the benefits of transportation investments relative to their costs. Cost-effectiveness measures the incremental cost and benefits of build alternatives. The costs include both the annualized capital and operation and maintenance costs. Table 4-6 summarizes the cost-effectiveness of Tier II build alternatives. The Metrorail Alternative and the Hybrid option are not the lowest cost-effective solutions for the South Link Corridor. It should be pointed out that the most cost-effective alternatives may not be able to solve the primary problem identified in a corridor and may not be the preferred alternative.

Cost per new rider is a straight forward ratio between annual cost of the system divided by the number of annual new passengers projected to ride the system once the project is implemented. Table 4-8 presents the cost per new passenger.

Table 4-8
Cost per New Rider

	TSM	LRT	Metrorail	Hybrid	Enhanced BRT
Annualized Cost	15,863,400	66,843,000	124,570,000	94,370,000	25,366,000
O&M Cost	8,823,100	17,502,200	37,467,300	37,467,300	10,815,342
Total Annual Cost	24,686,500	84,345,200	162,037,000	126,837,300	36,181,342
New Riders	1360	7,232	5,827	5,827	4,500
Annual New Riders	421,600	2,241,920	1,806,370	1,806,370	1,395,000
Cost per New Rider	$58.55	$37.62	$89.70	$72.98	$25.94

4.7 RESULTS OF TIER II EVALUATION

Table 4-9, on the following page, summarizes the result of the Tier II evaluation process.

Table 4-9

TIER II EVALUATION

Criteria	TSM	Alt. 3 LRT	Alt. 5 Metrorail	Alt. 5A Hybrid	Alt. 6 Enhanced BRT
Total Transit Trips	304,720	310,592	309,187	309,187	307,879
Total Transit Boardings	606,413	614,054	602,673	602,673	615,945
Rail Boardings	235,712	257,798	244,516	244,516	238,100
Bus Boardings	330,643	315,923	317,656	317,656	337,479
Capital Costs	$126.5 million	$853.9 million	$1,649.8 million	$1,208.6 million	$423.3 million
O&M Costs (Change from No-Build)	$8.2 million	$19.2 million	$37.5 million	$37.5 million	$10.8 million
Travel Time Savings/Day over TSM	-	4,314.5 Hours	4,515 Hours	4,515 Hours	2,062 Hours
Current Employment near stations	40,313	34,036	24,478	24,478	39,420
Future Employment near stations	59,869	50,010	35,759	35,759	58,792
Current Pop near stations	57,871	47,746	32,848	32,848	56,515
Future Pop near stations	98,173	79,125	57,318	57,318	95,012
Current Low-income HH	2,766	2,298	1.075	1.075	3,560
Auto/Transit conflicts	45	45	0	32	34
Annual cost /new rider	$23.56	$38.36	$89.70	$72.98	$25.94
System operating cost /passenger mile	$0.96	$0.65	$0.97	$0.97	$0.41
Change in VMT	35,012	-56,488	-67,980	-67980	-63,612
Change in emissions (CO_2 tons/year)	6,094	-9,831	-11,831	-11,831	-11,071
Energy consumption (BTU/year)	79,654	-128,513	-154,658	-154,658	-144,720
Cost/hour of user benefit.	-	$58.14	$109.88	$88.30	$31.83
Transit Supportive Land Use (Existing)	Supportive	Not Supportive	Not Supportive	Not Supportive	Supportive with modifications
Land Use impacts	Minimal changes	Densification along corridor	Densification around stations	Densification around stations	Moderate Corridor densification
Traffic Impacts	0	+6.21 hours	-9.97 hours	-2.16 hours	-5.56 hours
Visual Impacts	None	Moderate	Very High	High	Moderate
Noise Impacts	None	Moderate	High	High	Moderate

CHAPTER 5: PUBLIC INVOLVEMENT

5.1 Introduction

The public involvement efforts for the South Link Corridor Study provided an open, proactive, participatory process for the public, affected agencies and others to become partners with the Citizens Advisory Committee. Public and agency involvement activities were an integral component of all tasks and continuous throughout the project. Early in the process, the project was branded as "South Link", a name which provided identity.

5.2 Public Involvement Plan

Public involvement has been an emphasis in transportation planning since Congress passed the Federal Intermodal Surface Transportation Act of 1991 (ISTEA). This received particular attention in the South Dade Corridor Alternatives Analysis Study. It has been found that the citizens as a whole have definite opinions regarding the type of transportation they desire. A high level of inclusion assists the decision-making process, provides consensus, and streamlines the ability to select a locally preferred alternative.

The involvement of public officials in the Public Involvement Participation Program is an integral part of the process and mandated by state and federal laws and consistent with Miami-Dade MPO's PIP. The process, which involved officials at all levels of government in Miami-Dade County, acquired significant input used in conjunction with the community and business input to formulate a position reflective of the community at large.

Activities included the development of public awareness and coordination of public meetings to identify and rank transportation modes and alternative alignments. The project team was responsible for all logistics for public meetings, including notification; arrangements for the sites; copies of meeting handouts; audio/visual equipment; room setup and breakdown. For each meeting, the team developed and provided the necessary graphics and originals of handouts to the Miami-Dade MPO Project Manager.

A Public Involvement Program was developed. That detailed the approach explained the purpose of the Citizens Advisory Committee, the public outreach in the corridor, which consisted of nearly 40 meetings and interviews with hundreds of people.

A full slate of meetings were scheduled for February 2005, and continued throughout the 14 month process. District 8 & 9 Commissioners briefings were held in February, 2005. Citizens Advisory Committee meetings began in late February, and continued monthly through March, 2006.

Initial one-on-one meetings, City Council and Community Council briefings were in March and April. Rolling Tours/Corridor meetings were held in February 2006. Four agency briefings to CTAC, TPTAC, TPC, were held mid-course of the project. A presentation was prepared for the MPO Board following the Tier I Evaluation process. City Council Briefings with Florida City, Homestead, Pinecrest, and Palmetto early in the project. Public workshops were held after the CAC recommendations. The public meetings were held in March 2006. MPO Board approvals were held in April 2006.

5.3 Citizens Advisory Committee (CAC)

A crucial component of the South Dade Corridor Alternatives Analysis public involvement process was the Citizens Advisory Committee. The mission of the CAC was to articulate community concerns and for committee members to share project milestones with their respective constituencies. As an advisory board, the CAC was to offer recommendations to the Study Team and ensure that the key issues, as they pertained to the study area, were addressed and responded to in a timely and efficient manner. Further, the CAC monitored the alternatives analysis process to ensure that it remains open and fair.

The CAC was formally appointed and organized and was subject to the Florida Sunshine Law. The Citizens Advisory Committee consisted of 19 members. With input from Miami Dade-County District Commissioners 8 and 9, the project team was responsible for developing the CAC membership list for submission to Miami-Dade County for review and approval. Miami-Dade MPO staff was provided with a database of "interested citizens" in the corridor. Meetings were held to obtain input and concurrence on project issues and update the members on the status of the project.

Appointments to the CAC were made by elected bodies representing diverse interest along the South Miami-Dade corridor.

The committee held nine CAC meetings, during the study period. All meetings were held at the South Dade Government Center, 2nd Floor Conference Room, #203. The committee consisted of: (please see following page)

PALMETTO BAY
Ron Williams
Paul Niedhart
CITY OF FLORIDA CITY
Eugene Leon
Bennett Lovitt
CITY OF HOMESTEAD
Jeff Porter
Julio Brea
CITY OF PINECREST
Alan Rosenthal
Ben Gilbert
DISTRICT 8 APPOINTEES
Dee Dee Heacock
Rene Infante
Charley McGarey
Dr. Barry Materson
DISTRICT 9 APPOINTEES
Marlene K. Porter
Benjamin Sparks
Curtis Lawrence
Rev. Ernest Andrews
COMMUNITY COUNCIL REPRESENTATIVES
Robert Wilcosky (12)
Dr. Pat Wade (14)
Ernesto Martinez (15)

Through the CAC, the Study Team was able to increase its ability to notify and meet with all groups who had an interest or were to be directly impacted.

The CAC met a total of nine times between March 2005 and March 2006. At the first meeting introductions were made and a chair and vice-chair were elected. Members of the consultant team, including the project manager met to report on progress of the project and provide draft documents and products for review and comment. Each meeting went into detail relative to the project's progress. At several points, committee members were asked to make recommendations about the alternatives to the MPO Board. The committee selected the alternatives to move forward for second tier analysis in August 2005. The CAC unanimously selected their recommendation for the locally preferred alternative, Alternative 5- Metrorail in March 2006.

5.4 MPO Committee Meetings

The Project Team met with the various MPO Committees (CTAC, TPTAC, TPC and MPO) at significant milestones of the project. Several meetings were held with the various MPO committees or other agencies. These meetings were initiated on Tuesday, January 25, 2005, at the Stephen P. Clark Center, where a meeting was held to provide coordination between the Project Team, Miami-Dade MPO, and Miami Dade Transit.

The following is a list of other county meetings that were used to coordinate, update, and inform various groups as to the South Link project:

Thursday April 7, 2005 @ 9:30AM
Miami-Dade County Transit Corridors Coordination Meeting

Monday May 9, 2005 @ 9:30AM
Miami-Dade County Transit Corridors Coordination Meeting

Wednesday May 18, 2005 @ 10:00 AM
Miami-Dade MPO TPTAC Presentation

Monday June 6, 2005 @ 2:00PM
Miami-Dade MPO TPC

Wednesday June 8, 2005 @ 3:30PM
Miami-Dade MPO TARC

Friday July 8, 2005 @ 9:30AM
PTP Corridor Meeting Briefing on Tier I analysis results.

Wednesday, July 20, 2005 @ 10:00AM
SFRTA Public Transit Coordinating Committee @ Tri-Rail

Wednesday August 3, 2005 @ 10:00AM
Miami-Dade MPO TPTAC

Monday August 8, 2005 @ 2:00PM
Miami- Dade MPO TPC

Monday August 22, 2005 @ 2:00PM
Brief Dr. Bonzon, Asst. County Manager

Wednesday August 24, 2005 @ 10:00AM
Miami-Dade MPO Transportation Sub-Committee

Wednesday August 24, 2005 @ 5:30PM
Miami-Dade MPO CTAC

Thursday August 25, 2005 @ 2:00PM
Miami-Dade MPO Governing Board.

Friday September 9, 2005 @ 9:30AM
PTP Corridor Meeting Briefing

Monday November 21, 2005 @ 2:00PM
Miami- Dade MPO TPC

Thursday December 8, 2005 @ 2:00PM
Miami-Dade MPO Governing Board.

Thursday January 26, 2006 @ 2:00PM
Miami-Dade MPO Governing Board.

January 30, 2006
PTP Corridor Meeting Briefing

Monday February 27, 2006
PTP Corridor Meeting Briefing

In addition, after the CAC's selection of a locally preferred alternative, and two workshops in the corridor, additional meetings were held with the TPC, TPTAC, CTAC and MPO Governing Board to present the findings.

5.5 Scoping Meetings

The Consultant conducted three scoping meetings along the corridor at the locations listed below. The meetings were advertised in two newspapers for general distribution. Postcards were mailed to the initial mailing lists that exist from previous work in the corridor.

Monday, March 21, 2005, 7PM
West Perrine Community House-Chamber South

Wednesday, March 23, 2005, 7PM
Miami-Dade Community College-Homestead Campus

Tuesday, April 5, 2005, 7PM
Coral Reef Senior High School

General scoping comments included:

- Encourage high density/transit oriented development along US1
- Additional east/west feeder buses
- Additional transit service between busway and Pinecrest, Palmetto Bay, Home stead, and Florida City
- Utilize the CSX from MIA to Florida City

- Additional Park-and-Ride Lots next to bus stations
- Transit improvements, park-and-ride lots, and connections in downtown Home stead along the "Main Street" area
- Regional connections with Tri-Rail/Metrorail to Florida City
- Grade separations along busway.
- Other forms of transit such as hover craft and water taxis
- Keep UDB where it is and high density within the UDB
- Regional connections to counties north of Miami-Dade

5.6 Corridor Meetings

The Project Team planned for and attended many meetings, including: agency briefings, City Commission meetings, elected official meetings, and group meetings and/or open houses. The following is a list of the meetings held.

Wednesday, March 16, 2005, 7PM
Kendall Community Council

Thursday, March 31, 2005, 10AM
Village of Pinecrest Mayor and City Man ager

Thursday April 21 @ 5PM
Industry Committee of the Homestead

Tuesday May 24, 2005 @ 7:30AM
Perrine/Cutler Ridge Council presentation
Chamber of Commerce

Wednesday June 1, 2005 @ 12:00PM
Homestead/Florida City Kiwanis.

Wednesday June 8, 2005 @ 12:00PM
Florida City Rotary Club

Wednesday June 15, 2005 @ 12:00PM
Second Florida City Rotary Club
Dadeland

Monday June 20, 2005 @ 7:30AM
Dadeland -Pinecrest Rotary at the Marriot t

Monday June 20, 2005 @ 10:30AM
Commissioner Katy Sorenson Briefing

Thursday, June 23, 2005 @ 11:45AM
The Greater Homestead/Florida City Cham ber of Commerce, membership luncheon

Monday June 27, 2005 @ 1:30PM
Briefing for Commissioner Moss and staff

Friday, July 8, 2005 @ 7:30PM
South Dade Chamber of Commerce.

Monday, July 11, 2005 @ 6:30PM
Commissioner Moss' Citizens Forum

Wednesday, July 13, 2005 @ 7PM
Goulds OCED/Community Action Agency (CAA) Advisory Board

Thursday, July 14, 2005 @ 7PM
Perrine OCED/CAA Advisory Board Meeting (Princeton and Modello)

Tuesday, July 19, 2005 @ 7PM
Naranja OCED/CAA Advisory Board

Tuesday, July 19, 2005 @ 4:00PM
Perrine-Cutler Ridge Infrastructure Committee

Monday, August 8, 2005 @ 7PM
Leisure City OCED/CAA Advisory Board

Friday, August 12, 2005 @ 7:30AM
Chamber South Transportation and Governmental Affairs Committees

Tuesday August 23, 2005 @ 7PM
Florida City City Commission

Thursday August 25, 2005 @ 8:00PM
Kendall Rotary Meeting

August 2005
Palmetto Bay Council COW (Comittee of the Whole) Meeting

February 16, 2006
Homestead/Florida City Economic Development Council

Public Meetings

Two sets of public meetings were held. The first set of meetings was held on February 24, 2006. Informal meetings were held in the parking lot of Walmart in Florida City in the morning, in the food court at the Southland Mall during lunch and finally at the Dadeland South Metrorail station during the evening commute period. Displays for all of the Tier II Alternatives were set up and interested individuals were briefed on the project then polled as to their opinions and preferences. The following is a tally of the expressed alternative preferences and comment summary about the alternatives.

Two advertised public meetings were held along the corridor to obtain recommendations to support the selection of the LPA. These meetings were advertised in the newspaper at least two weeks in advance. These meetings were held on March 22 at the Perrine Cutler building, and the South Dade Government Center. Their purpose was to solicit input on all of the alternatives. Support was expressed for all of the alternatives but the general consensus was that Alternative 5, Metrorail, from Dadeland South to Florida City was preferred.

Newsletters

The Project Team prepared three newsletters about the project. For each distribution, approximately 2,000 copies were made and distributed throughout the community as project updates and summaries. These newsletters detailed the happenings of the project, from its introduction, selection of a CAC, initial evaluation of Tier 1 alternatives to the evaluation of Tier 2 alternatives. They explained the project and process in a clear, concise and easily understood manner.

Project Website Updates

A link was maintained on the MPO website for the project. It explained the project details, had a variety of downloads, encompassing maps, the purpose and need report, the newsletters and press releases. A history of meeting dates was also maintained.

Results of Community Meetings
February 24, 2006

	Florida City	Southland Mall	Dadeland South	Total
TSM	2	1	9	12
LRT	3	1	8	12
Metrorail	19	9	28	56
Hybrid	21	18	32	71
BRT	12	31	29	72
Total	57	60	106	223

Comments

TSM

- Likes system need better bus service
- Better way to pay for ride
- Try to solve current problems
- Need more express service on busway
- Better on-time service
- Expand peak hour service
- The current system is good this is all we need
- Please keep buses – afraid of trains
- Too much money spent on transportation
- Need a lot more feeder service

LRT

- Metrorail is too expensive
- Easier to ride so it would attract more people
- Best system for the handicapped

Metrorail

- No transfers
- No impact on traffic
- Train doesn't have to stop for traffic
- Fastest alternative
- Best ridership because it is visible
- Needs to be elevated
- Most convenient because it is fastest
- Homestead/Florida City is the City of the future and we need the fastest connection
- No body wants to ride a bus
- Safer than Hybrid
- No overhead wires -hurricanes

Comments

Hybrid

- No need for transfers and cheaper than Metrorail
- Better chance for future system expansion
- Provides fast service
- Likes rail at grade with faster speed
- Cheaper than Metrorail
- Less disruptive too community
- Busway is stupid
- Good way to put rail in now.
- Best deal to balance cost and speed
- Likes the travel time advantage
- Don't want to transfer
- Use the same technology to go to Joe Robbie Stadium

BRT

- Frequency of stops-more stops than rail
- Better parking and faster than current busway
- Metrorail is too expensive
- Will provide better bus service to the poor areas to the South
- Gets me where I need to go
- Likes bigger better buses
- Likes grade separations
- Best compromise – ridership, cost, speed
- Makes the most of existing system
- Seems stupid to tear out busway to put in tracks
- Cost is the most important factor
- Better than TSM but not as expensive as other options
- Seems like the best deal
- Need different levels of express and local service – only alternative that can accommodate.
- Current buses take too long
- Doesn't waste current investment
- More practical
- No overhead wires
- Can still operate after a storm
- Likes speed of implementation
- Most stops give best job accessibility
- This could be even faster with fewer stops
- Rail is a failure in Buffalo so stick to buses
- Expand the park and ride is the most critical thing
- More flexible than rail

CHAPTER 6: LOCALLY PREFERRED ALTERNATIVE MODIFIED ENHANCED BUS RAPID TRANSIT

6.1 Locally Preferred Alternative (LPA)

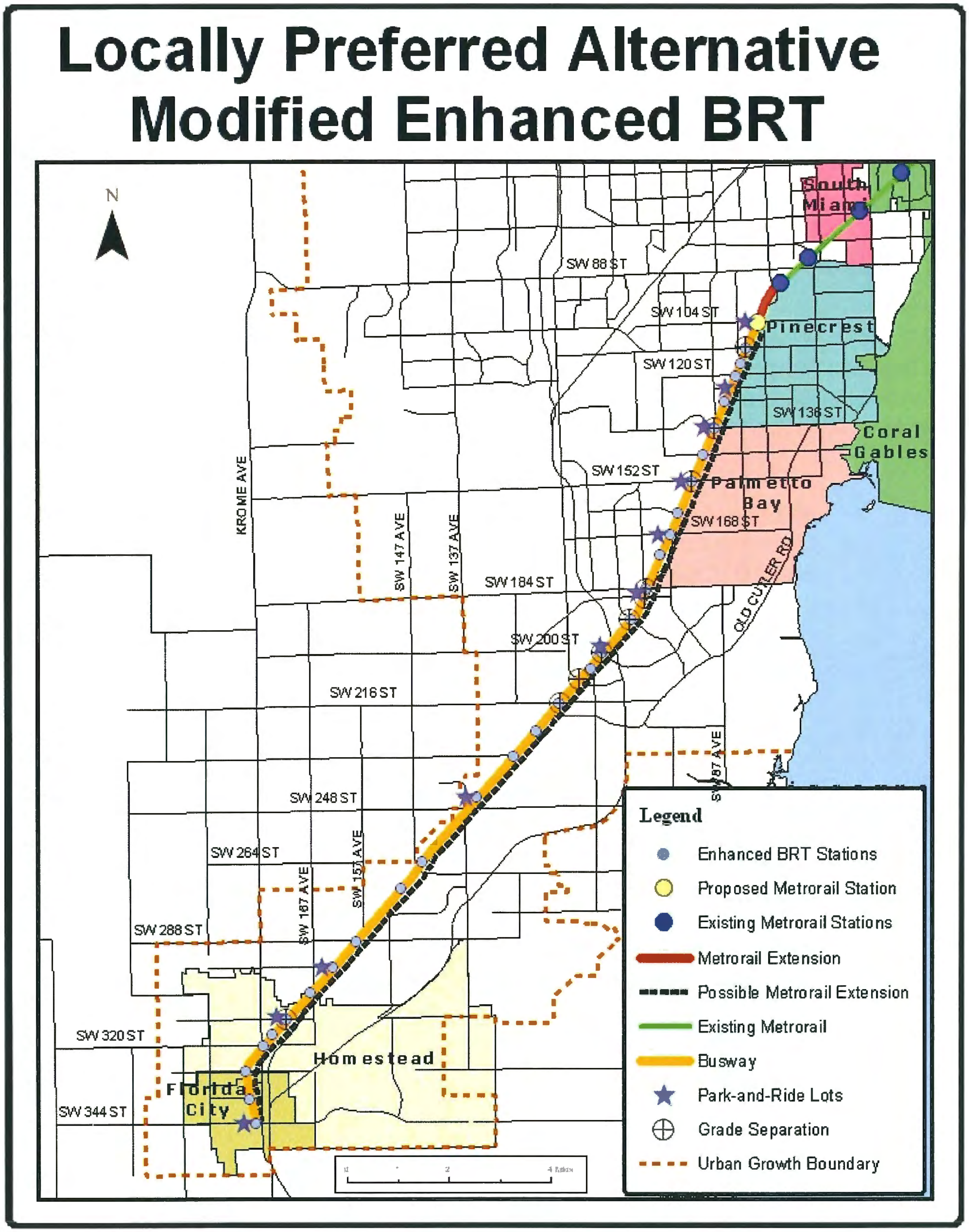
On June 22, 2006, the Miami-Dade Metropolitan Planning Organization (MPO) voted by simple majority to support the Modified Enhanced Bus Rapid Transit (BRT) Alternative 6 with a provision of supporting a long-range Metrorail extension south of SW 104th Street as demand warrants, as the Locally Preferred Alternative (LPA) for the South Miami-Dade Corridor. A copy of the MPO resolution is presented in Appendix A.

6.1.1 LPA DEFINED

The Modified Enhanced Bus Rapid Transit Alternative for the South Miami-Dade Corridor is illustrated in Figure 6-1. In order to facilitate phased implementation, the LPA was broken down to three primary components as listed below.

- An Enhanced Bus Rapid Transit (BRT) system from Dadeland South to Florida City within the existing and future South Miami-Dade Busway right-of-way that would in clude:
    - Enhanced fare collection system
    - Transit signal priority
    - Real-time passenger information
    - Feeder buses on surface streets (route restructure)
    - Increased park-and-ride facilities
    - Low-floor stylized buses with a specific branding theme
- A Metrorail extension (approximately 4,500 feet) from the Dadeland South Metrorail Station to SW 104th Street with a possible future extension as demand warrants.
- Grade Separation of the South Miami-Dade Busway at selected intersections was defined as the third primary component.

Figure 6-1
Modified Enhanced BRT Alternative



6.2 Impacts and Benefits

6.2.1 Transportation Impacts

The following transportation benefits are anticipated with the implementation of the LPA:

- Decrease in the average delay per intersection along U.S. 1 by approximately 5.6 vehicle hours during the PM peak hour.
- Approximately 2,062 hours of travel time savings daily due to faster travel times resulting from grade separation, transit signal priority (TSP), and more efficient passenger boarding.
- Attract approximately 3,200 new riders daily above the Transportation System Management (TSM) Alternative.

6.2.2 Land Use

The Comprehensive Development Master Plan developed by Miami-Dade County identifies existing and future rapid transit stations as locations to encourage land uses including housing, shopping, and offices paired with compatible entertainment, cultural, and human service uses. Within the South Miami-Dade Corridor, seven urban centers are identified in the CDMP. Five of these urban centers coincide with stations on the Enhanced BRT Alternative. Based on CDMP designations, the Modified Enhanced BRT Alternative has high potential for developing stations under the community urban center designation.

6.2.3 User Benefits

The Federal Transit Administration (FTA) requires examination of three different user benefit categories: annual cost per new rider, system operating cost per passenger mile, and cost per hour of user benefit. Annual cost per new rider uses the difference in the annualized cost of the alternative above the annualized cost of the TSM Alternative. System operating cost per passenger mile is calculated by using the increase in annual operating and maintenance cost between the TSM Alternative and the build alternative, and dividing it by the increase in passenger miles traveled. Cost per hour of user benefit uses the total of annualized capital cost plus the annual operating cost divided by the hours of user benefit. Table 6-1 presents the user benefit results for the Enhanced BRT Alternative.

Table 6-1
User Benefits Estimation

Cost per New Rider	Cost per Passenger Mile	Cost per Hour of User Benefit
$25.94	$0.41	$31.83

6.3 Enhanced BRT Component

6.3.1 Enhanced BRT Vehicle

BRT vehicles typically include a variety of enhancements over traditional buses that allow faster operating speed, enhance passenger convenience and comfort, and portray a sleek, modern perception of efficiency and distinction from traditional buses (Exhibit 6-1).

Exhibit 6-1

BRT vehicles are low-floor buses with wide doors and aisles that allow efficient passenger access and comply with the Americans with Disabilities Act (ADA) requirements. BRT vehicles span the range from diesel-powered buses to alternative fuel vehicles, including electric-powered vehicles and fuel cell vehicles.

Advanced technologies are implemented on the BRT vehicle to provide additional travel efficiency. BRT vehicles are often equipped with vehicle tracking systems that allow dispatchers to monitor travel time and schedules for better trip reliability. Information can be relayed to display boards both on-board and at stations that provide travel time information to major destinations and can inform passengers when the next bus is arriving. Perhaps the most recognizable feature of BRT vehicles to the average patron is the distinctive design characteristics that are often employed. The aesthetics of the BRT vehicle, including design, color, and graphics, helps to portray a positive sense with "choice riders" who may be willing to ride BRT vehicles over traditional buses.

6.3.2 Northern BRT Terminus at Dadeland South

The northern terminus of the Enhanced BRT system is proposed to be at the Dadeland South Station. Therefore, the Enhanced BRT line would share the 100-foot right-of-way with the proposed Metrorail extension between SW 104th Street and Dadeland South. The purpose of continuing Enhanced BRT service north of the proposed southern terminus of Metrorail is to allow Enhanced BRT passengers to access the Dadeland South activity center without transferring.

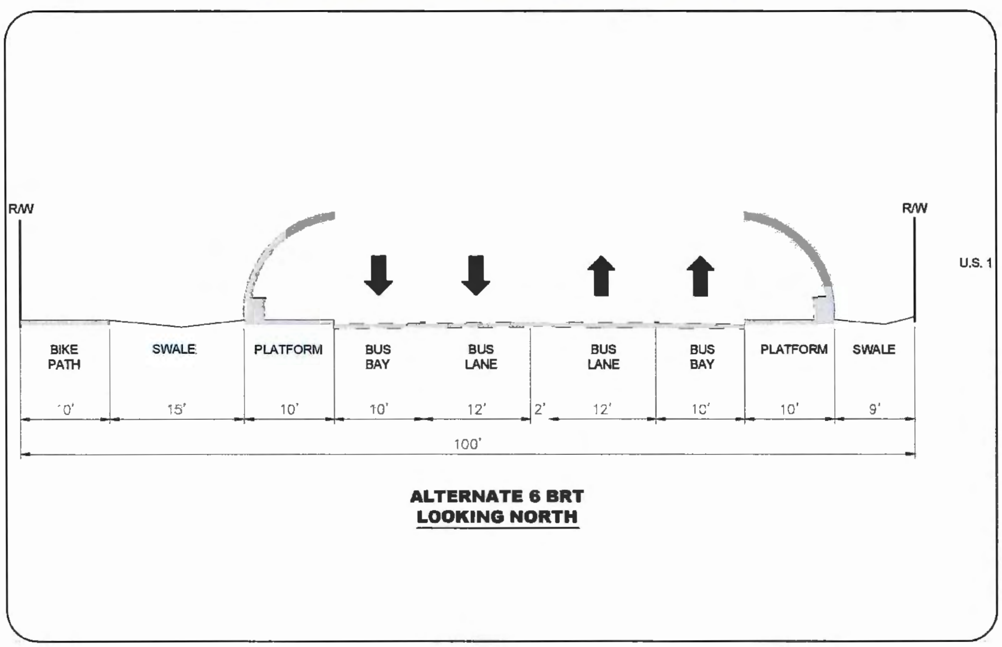
6.3.3 Southern BRT Terminus at SW 344th Street

The southern terminus of the Enhanced BRT system would be at SW 344th Street (Palm Avenue). A bus station would be provided within the busway right-of-way north of SW 344th Street. Due to potential high passenger demand within Florida City, some southbound buses may exit the busway at SW 328th Street or SW 336th Street, circulate through Florida City, and re-enter the busway at SW 344th Street for the northbound trip back to Dadeland South. This type of operational arrangement would serve passenger demand and provide a convenient way for buses to turn around at the southern BRT terminus.

6.3.4 Typical Enhanced BRT Cross-Section

South of SW 104th Street, the typical cross-section is similar to the existing busway. Figure 6-2 presents the proposed station cross-section for the Enhanced BRT section of the Modified Enhanced BRT Alternative. The total cross-section width required in station sections is 91 feet, which is within the 100-foot right-of-way of the existing busway. This design allows nine feet of additional swale space and buffer from U.S. 1.

Figure 6-2
Typical Enhanced BRT Cross-Section
(View Looking North)



6.3.5 Vertical Alignment

The BRT alignment between SW 104th Street and SW 344th Street would consist primarily of an at-grade dedicated bus roadway. The vertical alignment would be similar to or identical to the existing busway with the exception of recommended grade separations where the BRT line crosses intersecting high-volume arterial roadways. Recommended grade separation locations are described in more detail in the Grade Separation section of this report.

6.3.6 Enhanced BRT Headways

One of the primary advantages of BRT is the flexibility to design bus routes to "feed" the BRT line in the primary direction of travel. Therefore, headways would fluctuate throughout the BRT corridor and can become more frequent in the more densely traveled sections of the BRT line. The more densely traveled northern section of the corridor is expected to achieve 90-second peak headways in each direction. Peak headways throughout the corridor are expected to be no worse than eight minutes. Average headways are projected to be five minutes along the BRT corridor.

6.3.7 Enhanced BRT Travel Time

Travel time for the Modified Enhanced BRT Alternative is projected to be faster than the existing busway because of factors such as more efficient passenger boarding, grade separation at major intersecting roadways, and signal prioritization at signalized intersections. Travel time aboard limited stop buses between Florida City and SW 104th Street is expected to be 40 minutes. Travel time between the South Dade Government Center and the proposed SW 104th Street Metrorail Station is expected to be 15 to 20 minutes.

6.3.8 Transit Signal Priority

At-grade intersections will remain signalized. However, signal prioritization must be implemented at the at-grade intersections to provide travel time advantages for the BRT line. Upon detection of a BRT vehicle upstream of an at-grade intersection, signal priority for the BRT Corridor would be provided by either extending the green time provided to north-south through movements of U.S. 1 or by reducing the green time provided to east-west or northbound left-turn movements.

6.3.9 Enhanced Fare Collection

Enhanced fare collection systems are a primary element that separate BRT systems from traditional bus service. Enhanced fare collection systems facilitate efficient passenger boarding by allowing fares to be paid prior to boarding the bus, which allows BRT systems to achieve faster operating speeds. Fare collection systems can also reduce the need for passengers to carry cash, which can enhance safety and security.

6.3.10 Real-Time Passenger Information

Real-time passenger information systems reduce passenger anxiety and allow for greater discretionary travel. Passenger information systems are not only useful during trips, these systems also provide useful marketing tools to attract choice riders. Limited passenger information is often a critical barrier to the use of public transit.

6.3.11 Feeder Bus Routes

Feeder bus routes are designed to circulate through residential neighborhoods, activity centers, and employment areas and connect to the BRT line. Some feeder bus routes will provide limited stop or express service within the BRT corridor and provide direct connections to Metrorail. Feeder buses are proposed to operate on 15-minute headways. The proposed feeder bus routes are presented in Figure 6- 3.

6.3.12 Enhanced BRT Stations

Bus station spacing along the proposed Enhanced BRT line is recommended to be approximately one-half mile. Station spacing would be similar to the existing busway. A few closely-spaced stations may be consolidated to reduce travel time. In addition, stations at intersections that are recommended for grade separation would be located on the elevated section above the cross-street to eliminate the need for pedestrians to walk over 1,000 feet from the intersection to access the Enhanced BRT station.

6.3.13 Platform Location and Size

The Enhanced BRT station platforms will be similar in size to the existing busway stations. One station platform must be provided for each direction of travel. The width of the Enhanced BRT station platform would be approximately 10 feet. The length of the concrete platform and bus bay must be extended from 100 feet to 120 feet, enough to accommodate two BRT vehicles in the station simultaneously. The existing BRT station platforms would be modified by enclosing the platforms to create a secure fare area for off-vehicle fare collection and to provide a refuge for the waiting passengers.

6.3.14 Station Locations and Parking

Table 6-2 provides recommended station locations for the Modified Enhanced BRT Alternative along with recommended park-and-ride locations and other enhanced BRT amenities.

6.3.15 Number of Vehicles

A scheduling analysis was conducted to determine peak vehicle requirements for operating the Modified Enhanced BRT Alternative at established service goals. The analysis indicates that 26 BRT Stylized vehicles will be required in peak service. The existing Metrobus vehicles that will no longer be in service on Busway Flyer, Busway MAX, and Busway Local will be re-assigned across the proposed feeder routes. Therefore, the only additional standard Metrobus purchases identified in this study are for the proposed Turnpike Flyer route.

Figure 6-3
Feeder Bus Routes

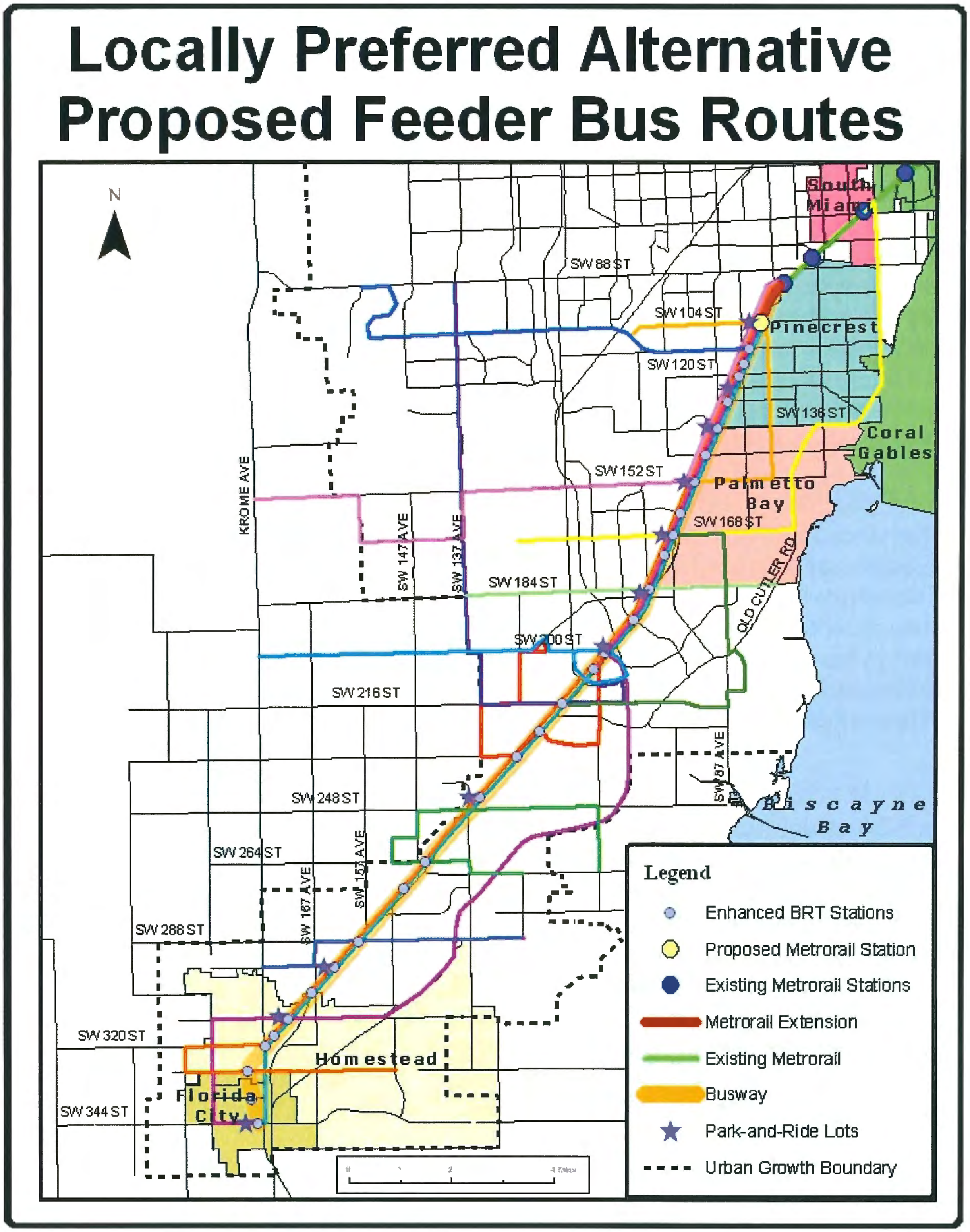


Table 6-2. Enhanced BRT Station Locations and Characteristics

Cross-Street	Metrorail Transfer	Intersection Treatment(1)	Park and Ride Facilities	Off-Vehicle Fare Collection	Real-Time Passenger Info
Dadeland South	Yes	Terminus	Existing	Yes	Yes
SW 104th Street	Yes	TSP	Proposed	Yes	Yes
SW 112th Street	No	Elevated	No	Yes	Yes
SW 117th Street	No	TSP	No	Yes	Yes
SW 124th Street	No	TSP	Proposed	Yes	Yes
SW 128th Street	No	TSP	No	Yes	Yes
SW 136th Street	No	Elevated	Proposed	Yes	Yes
SW 144th Street	No	TSP	No	Yes	Yes
SW 152nd Street	No	Elevated	Existing	Yes	Yes
SW 160th Street	No	TSP	No	Yes	Yes
SW 168th Street	No	TSP	Existing	Yes	Yes
Banyan Street	No	TSP	No	Yes	Yes
SW 184th Street	No	Elevated	Proposed	Yes	Yes
Marlin Road	No	Elevated	No	Yes	Yes
SW 200th Street	No	Elevated	Proposed	Yes	Yes
SW 112th Avenue	No	TSP	No	Yes	Yes
SW 216th Street	No	Elevated	No	Yes	Yes
SW 224th Street	No	TSP	No	Yes	Yes
SW 232nd Street	No	TSP	No	Yes	Yes
SW 244th Street	No	TSP	Existing	Yes	Yes
SW 264th Street	No	TSP	No	Yes	Yes
SW 272nd Street	No	TSP	No	Yes	Yes
SW 288th Street	No	TSP	No	Yes	Yes
SW 296th Street	No	TSP	Existing	Yes	Yes
SW 304th Street	No	TSP	No	Yes	Yes
SW 312th Street	No	Elevated	Proposed	Yes	Yes
MDC Homestead	No	N/A	No	Yes	Yes
SW 320th Street	No	TSP	No	Yes	Yes
SW 328th Street	No	TSP	No	Yes	Yes
SW 336th Street	No	TSP	No	Yes	Yes
SW 344th Street	No	Terminus	Proposed	Yes	Yes

(1) TSP – Transit Signal Priority

The minimum required spare ratio according to the Federal Transit Administration (FTA) is 25 percent. Assuming a 25-percent spare ratio, the Modified Enhanced BRT Alternative will require 33 BRT vehicles and eight Metrobuses above what is currently in service within the corridor. The total cost would be $28.8 million as outlined in Table 6- 3.

Table 6-3 Proposed New Vehicle Purchases and Costs

Vehicle Type	Service Vehicles	Spares	Total Vehicles	Unit cost	Total Cost
45-foot Stylized	26	7	33	$800,000	$26.4 million
Standard Metrobus	6	2	8	$300,000	$2.4 million

The directional passenger capacity increase in the corridor during the peak hour is 1,109 passengers per hour, assuming that Metrobuses currently operating along the busway would be re-assigned within the study area to enhance feeder route service.

6.3.16 Storage and Maintenance Facility

The LPA requires purchasing thirty-three 45-foot Stylized buses and eight Metrobuses. It was assumed that Miami-Dade Transit's (MDTs) existing storage and maintenance facilities will support the maintenance of these 41 vehicles as part of typical fleet expansion. Therefore, the LPA does not require a new maintenance or storage facility.

6.4 Metrorail Component

6.4.1 New SW 104th Street Metrorail Terminus

The LPA includes the construction of one new Metrorail station in the vicinity of SW 104th Street near the existing busway to relieve congestion in the Dadeland area and to serve latent parking demand experienced in the corridor. It is expected that park-and-ride demand will be significant at the proposed SW 104th Street station due to passenger demand from south of the existing Metrorail line wishing to access popular destinations such as downtown Miami and the Civic Center area. In the absence of adequate park-and-ride facilities, some transit patrons currently use shopping center parking lots near SW 104th Street as de-facto park-and-ride facilities. As the new southern terminus for Metrorail, the SW 104th Street intersection should include approximately 1,500 parking spaces dedicated for Metrorail park-and-ride patrons. An opportunity for a joint development project exists at this station that would ideally include mixed-use retail and office space attached to the Metrorail station.

The Metrorail extension to SW 104th Street should help alleviate congestion and parking deficiencies at the two Dadeland Metrorail stations, thereby increasing efficiency for passengers feeding into the Metrorail system from the proposed BRT system operating within the busway. Currently, the two Dadeland stations are ranked second and third in passenger boarding activity within the Metrorail system, their parking garages are 95 to 100 percent full, and surface streets are severely congested in the Dadeland area. Table 6-4 presents the average weekday boardings and parking occupancy at Dadeland North and Dadeland South Metrorail Stations.

Table 6-4
Parking Deficiencies at Dadeland Metrorail Stations

Station	Average Weekday Boardings / (Ranking) (A)	Parking Capacity	Average Weekday Parking Patronage	Percent Occupancy(B)
Dadeland North	6,700 / (3)	1,900	1,892	100 %
Dadeland South	7,400 / (2)	1,290	1,232	95 %

(A) – Ranking relative to the 21 existing Metrorail stations.
(B) – Parking occupancies greater than 90 percent are considered full to account for turnover.

6.4.2 Interface with Metrorail

The Metrorail vehicles and guideway would be consistent with the existing Miami-Dade Metrorail service and operate on an exclusive, elevated guideway. Metrorail service would seamlessly extend to the proposed SW 104th Street station. No transfer would be required to travel from the existing Metrorail line to SW 104th Street. The design of the new Enhanced BRT Station at SW 104th Street should include a fare-free transfer zone for passengers transferring to Metrorail. Future Metrorail headways between SW 104th Street and Dadeland South would be approximately six minutes, assuming a bifurcation of the Metrorail line at Kendall Drive.

The Modified Enhanced BRT Alternative supports a long-range Metrorail extension south of SW 104th Street as future demand warrants. A similar fare-free transfer zone should be provided at the southern terminus of a future Metrorail extension south of SW 104th Street.

6.4.3 Vertical Alignment

The Metrorail portion of the Modified Enhanced BRT Alternative between the Dadeland South Metrorail Station and SW 104th Street would consist of an elevated grade-separated guideway within the existing busway corridor. The vertical alignment of the Metrorail extension would tie into the vertical alignment of the Metrorail maintenance tracks south of the Dadeland South Station. To provide adequate clearance for the Metrorail extension to pass under the existing southbound Palmetto Expressway overpass, a sag vertical curve will be necessary (Exhibit 6-2). The Metrorail vertical alignment under the Palmetto Expressway will likely necessitate the closure of SW 98th Street between U.S. 1 and SW 77th Avenue. In addition, structural support modifications to the Palmetto Expressway overpass may also be required. An Environmental Impact Statement (EIS) needs to be performed to further evaluate these recommendations.

6.4.4 Operating Characteristics

The operating characteristics of the Metrorail extension between the Dadeland South Metrorail Station and SW 104th Street will be similar to those of the existing Metrorail.

Exhibit 6-2. Proposed Metrorail Alignment Under Palmetto Expressway

6.5 Grade Separation Component

The existing busway intersects with a number of roadways, most of which run in an east-west direction. To minimize transit-auto conflicts, improve travel time, and enhance safety, grade separation of the proposed BRT line is recommended at priority locations.

6.5.1 Impact

Each grade separation location is expected to impact a minimum of 1,100 feet on either side of the roadway being crossed. This is based on guidelines for vertical clearance that must be achieved (16.5 feet according to the Florida Department of Transportation), acceptable gradients for maintaining desirable bus performance (approximately 2 to 3 percent), and possible Metrorail extension.

6.5.2 Stations

The design and location of stations will be impacted by grade separation. Providing a station on the elevated portion of the grade separation would increase visibility and awareness of the station. Elevated stations could be connected with a pedestrian bridge to parking garages at major park-and-ride locations to enhance safety and connectivity. Therefore, it is recommended to place stations on the elevated portion of the vertical alignment above the cross-street at grade separation locations. The possibility of a future extension of Metrorail should be considered when designing and locating elevated stations and walkways.

6.5.3 Pedestrian Access

For elevated Enhanced BRT stations located on bridges over cross-streets, pedestrians would need to access the station from street level using escalators, stairs, and elevators. Pedestrian access from parking garages could be made along elevated walkways directly connecting the Enhanced BRT station and the parking garage. In addition, pedestrian access from the east side of U.S. 1 could be made safer and more convenient through elevated pedestrian walkways across U.S. 1 that directly connect to elevated Enhanced BRT stations.

6.5.4 Vehicular Access

Vehicular access to the busway would be impacted by grade separation, which would affect transit buses and emergency vehicles that utilize the busway. These vehicles would still be able to access the busway at at-grade intersections. If the busway is elevated over the cross-street, it should be possible within the 100-foot right-of-way to provide slip ramps to maintain access to certain movements for buses and emergency vehicles.

6.5.5 Priority Grade Separation Locations

Table 6-5 identifies and prioritizes potential locations for grade separation for the Modified Enhanced BRT Alternative.

Table 6-5
Priority List of Potential Grade Separation Locations

Rank	Location	Grade Separation Direction	Notes
1	SW 152nd Street	Busway	Safety concerns; high traffic volume; potential to connect elevated BRT station with proposed park-and-ride garage using elevated walkway
2	SW 117th Avenue / SW 211th Street & SW 216th Street	Busway	High traffic volume; absence of a proposed BRT station at SW 211th Street facilitates grade separation by negating the need for surface pedestrian access; proximity of these streets may facilitate combining the grade separation into one structure
3	SW 184th Street & SW 186th Street & Marlin Road	Busway	Safety concerns; high traffic volume; proximity of these streets may facilitate combining the grade separation into one structure; SW 184th Street and SW 186th Street are only 850 feet apart
4	SW 312th Street	Busway	High existing traffic volume during P.M. Peak; SW 312th Street planned to be widened to 6 lanes; high traffic growth potential
5	SW 136th Street	Busway	High traffic volume; elevated BRT station has the potential to improve pedestrian access to commercial areas by providing bridge over SW 136th Street
6	SW 112th Street	Busway	Safety concerns; relatively low cross-street volumes, but lower intersection capacity because of laneage; SW 112th Street restricted from widening
7	SW 200th Street	Busway	West approach to this intersection not as congested as east approach

6.6 Costs

6.6.1 Capital Cost

The capital cost of the LPA was estimated at a conceptual level, compatible with the Alternatives Analysis level of planning. The Federal Transit Administration (FTA) methodologies were used to estimate the capital cost. The estimated total cost of the Modified Enhanced BRT Alternative is approximately $398 million. (Please refer to Table 6-6).

Table 6-6
Capital Cost for Modified Enhanced BRT Alternatives

Components	Cost (2005)
Enhanced BRT	$210,000,000
Metrorail Extension	$101,600,000
Grade Separation	86,000,000
TOTAL	$397,600,000

6.6.2 Operating and Maintenance Cost

O&M costs were developed for the Modified Enhanced BRT Alternative using FTA methodology. The incremental cost of the Modified Enhanced BRT Alternative that would need to be budgeted annually, compared to the No Build Alternative, is $10.8 million as presented in Table 6-7.

Table 6-7
O&M Costs for Enhanced BRT Alternative (2005 Dollars)

	Background Bus O&M Cost	Build Alternative O&M Cost	Total O&M Cost Above No Build Cost
No Build Alternative	$227.9 million	N/A	N/A
Enhanced BRT Alternative	$236.3 million	$2.4 million	$10.8 million
Additional O&M Costs (Enhanced BRT minus No Build)	$8.4 million	$2.4 million	$10.8 million

6.7 Implementation

The following funding strategy and phasing plan were developed for the LPA.

6.7.1 Funding

Identified potential funding sources include the Federal Transit Administration's Small Starts program, Miami-Dade County's People's Transportation Plan, and the Federal Highway Administration's Surface Transportation Plan.

The funding requirements and potential sources for the three primary components of the Modified Enhanced BRT Alternative are described below.

- The estimated cost of Enhanced Bus Rapid Transit system component is approximately $210 million. Since the total funding requirement is less than $250 million, this component of the LPA could potentially be funded through the Federal Transit Administration's "Small Starts" program.
- The estimated cost of the Metrorail extension component is approximately $102 million. The potential funding sources for the proposed extension of Metrorail from the Dadeland South Station to SW 104th Street and construction of the park-and-ride garage at SW 104th Street include FTA and/or the People's Transportation Plan.
- The estimated cost of the grade separation component is approximately $86 million. This component could potentially be funded through the Federal Highway Administration's Surface Transportation Plan.

It should be noted that the funding plan presented in this section considers fewer park-and-ride facilities than the original Enhanced BRT Alternative. Still, the LPA would provide a total of 11 park-and-ride locations, which is an increase of seven park-and-ride locations in comparison to the No Build Alternative.

6.8 Implementation Plan

An implementation plan was developed for the Modified Enhanced BRT Alternative to determine a timeline for implementation. The three primary components of the Modified Enhanced BRT Alternative could to be implemented over a 15-year timeframe. It should be noted that the implementation order of grade separation locations may differ from the priority locations established in Table 6-8 based on efficiencies gained from grouping adjacent construction projects. Furthermore, the costs presented in Table 6-8 are planning level estimates based on 2005 dollar values.

Table 6-8
Phasing Plan of Modified Enhanced BRT Alternative

Time Frame	Components	Activities	Cost (2005)
1 – 5 Years	Enhanced BRT	Environmental documentation for BRT component	$3,000,000
		New P&R at SW 124th Street; SW 136th Street	$24,800,000
		Expand P&R at SW 152nd Street, SW 168th Street	$24,800,000
		Order vehicles, spare parts, and reorient feeder bus routes	$44,400,000
		Design BRT elements(A)	$19,300,000
	Metrorail Extension	Environmental documentation for Metrorail extension	$2,000,000
		Design Metrorail Extension/Busway to SW 104th Street	$24,300,000
		Design Metrorail/BRT station at SW 104th Street	$5,900,000
	Grade Separation	Environmental documentation for grade separation	$2,000,000
		Design & construct grade separations at SW 136th Street; SW 152nd Street	$17,700,000
6 – 10 Years	Enhanced BRT	Install TSP for busway	$2,400,000
		Install off-vehicle fare collection system	$6,200,000
		Install communication system	$12,900,000
		Modifications to stations and platforms	$10,200,000
		New P&R at SW 184th Street; SW 344th Street	$24,800,000
		Expand P&R at SW 200th Street	$12,400,000
	Metrorail Extension	Construct Metrorail Extension to SW 104th Street (includes busway modifications)	$39,900,000
		Construct Metrorail/BRT station at SW 104th Street	$9,700,000
		New P&R at SW 104th Street	$19,800,000
	Grade Separation	Design & construct grade separations at SW 112th Street, SW 184th/SW 186th/Marlin Rd; SW 200th Street	$48,600,000
11 – 15 Years	Enhanced BRT	New P&R at SW 312th Street	$12,400,000
		Expand P&R at SW 244th Street	$12,400,000
	Grade Separation	Design & construct grade separations at SW 211th/SW 216th Street; SW 312th Street	$17,700,000
Total Cost			**$398,000,000**

APPENDIX A
MPO RESOLUTION FOR LOCALLY PREFERRED ALTERNATIVES

Agenda Item 4.B.1
(Substitute)

MPO RESOLUTION # 30-06

RESOLUTION SELECTING MODIFIED ENHANCED BUS RAPID TRANSIT (BRT) ALTERNATIVE #6 WITH A PROVISION OF SUPPORTING A LONG-RANGE METRORAIL EXTENSION SOUTH OF SW 104TH STREET AS DEMAND WARRANTS AS THE LOCALLY PREFERRED ALTERNATIVE FOR THE SOUTH MIAMI-DADE TRANSIT CORRIDOR

WHEREAS, the Interlocal Agreement creating and establishing the Metropolitan Planning Organization (MPO) for the Miami Urbanized Area requires that the MPO provide a structure to evaluate the adequacy of the transportation planning and programming process; and

WHEREAS, the Transportation Planning Council (TPC) has been established and charged with the responsibility and duty of fulfilling the aforementioned functions; and

WHEREAS, the TPC has reviewed Modified Enhanced BRT Alternative #6 as the locally preferred alternative for the South Miami-Dade Transit Corridor, made a part hereof, and finds it consistent with the goals and objectives of the Transportation Plan for the Miami Urbanized Area.

NOW, THEREFORE, BE IT RESOLVED BY THE GOVERNING BOARD OF THE METROPOLITAN PLANNING ORGANIZATION FOR THE MIAMI URBANIZED AREA:

SECTION 1. That the Modified Enhanced Bus Rapid Transit (BRT) Alternative #6 with a provision of supporting a long-range Metrorail extension south of SW 104th Street as demand warrants is hereby selected as the locally preferred alternative for the South Miami-Dade Transit Corridor.

The foregoing resolution was offered by Board Member Carlos A. Gimenez who moved its adoption. The motion was seconded by Board Member Perla T. Hantman, and upon being put to a vote, the vote was as follows:

Chairman Joe A. Martinez-Aye
Vice Chairman Dennis C. Moss-Nay

Board Member Ruben D. Almaguer	-Aye	Board Member William H. Kerdyk	-Absent
Board Member Bruno A. Barreiro	-Nay	Board Member Julio Robaina	-Absent
Board Member Kevin A. Burns	-Absent	Board Member Dorrin D. Rolle	-Aye
Board Member Jose "Pepe" Diaz	-Aye	Board Member Natacha Seijas	-Absent
Board Member Audrey M. Edmonson	-Nay	Board Member Darryl K. Sharpton	-Nay
Board Member Shirley M. Gibson	-Absent	Board Member Katy Sorenson	-Nay
Board Member Carlos A. Gimenez	-Aye	Board Member Rebeca Sosa	-Absent
Board Member Perla T. Hantman	-Aye	Board Member Javier D. Souto	-Nay
Board Member Sally A. Heyman	-Aye	Board Member Richard L. Steinberg	-Aye
Board Member Barbara J. Jordan	-Absent		

The Chairperson thereupon declared the resolution duly passed and approved this 22nd day of June, 2006.

METROPOLITAN PLANNING ORGANIZATION
M.P.O.

By ____________________
Jose-Luis Mesa
MPO Secretariat

METROPOLITAN PLANNING ORGANIZATION DADE COUNTY FLORIDA MPO

THE CORRADINO GROUP