FINAL REPORT

Final Report

SEPTEMBER 2007

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1 Purpose, Need, Goals and Objectives

Introduction

The Miami-Dade County Metropolitan Planning Organization (MPO) initiated the Kendall Corridor Alternatives Analysis in November 2005. The purpose of this study is to develop short, medium, and long range rapid transit recommendations within the Kendall area in Miami-Dade County. The study area stretches from SR 836 / Dolphin Expressway in the north, SW 152nd Street in the south, US 1 to the east, and Krome Avenue to the west.

The goal is to identify cost-effective, productive and affordable means to use major transit capital investments and service improvements to strengthen mobility connections between the Kendall area and other key regional activity centers in Miami-Dade County and beyond. These mobility improvements are necessary to support existing travel demand as well as the rapid population, employment and commercial growth occurring in the Kendall area and throughout Miami-Dade County.

This study is a reevaluation and update of the findings that lead to the selected of the Locally Preferred Alternative recommended in the *Kendall-SR 826 Major Investment Study* (June 2001). This study will identify a major transit investment strategy for the study area with short, medium and long term improvements.

The problems and needs statements listed below are based upon the detailed analysis of the study area that is described in following sections of this report. They illustrate the opportunities and deficiencies that exist now or in the future and demonstrate why transportation improvements are necessary in the Kendall area.

Problem Statement

Based on the existing conditions and trends in the Kendall study area, the following is a statement of the problems, or challenges, in the study corridor:

- Natural barriers (coast, Everglades) limit space available for development to continue in the same manner and at the current pace. Future development patterns will be higher density in-fill, which will require and support expanded transit service in order to be sustainable.
- The Kendall area makes up 23 percent of the population in Miami-Dade County, the largest County in Florida and the eighth largest County in the U.S. The area is experiencing dramatic change – Kendall grew 43 percent from 1900 to 2000, while Miami-Dade County as a whole only grew 16 percent. Population projections indicate that the Kendall area will continue to grow in the future, reaching approximately 650,000 residents by 2020. Continued population growth will create additional vehicles traveling on study area roadways, exacerbating already congested conditions, particularly in the peak periods.
- The Kendall area is a major employment center. The area two miles either side of SR 836/Dolphin Expressway has more than 50 percent of the total employment in the County. Over 230,000 jobs are projected in the study area by 2020, almost four times more than in the downtown Miami Central Business District. Traffic congestion is impacting the ability to access the major employment centers in the study area, which affects the economic health of the region as a whole.
- The Kendall area generates 28 percent of all work trips in Miami-Dade County – more than any other area of the County. Seventy percent of the workforce leaves the Kendall area for employment elsewhere in the County, higher than the average for any other area. The largest destinations for work

trips are the Central area (20 percent), Airport/Doral (17 percent) and the Central Business District (16 percent). These large volumes of workers from the Kendall area to these work destinations have limited travel choices other than the single occupant automobile.

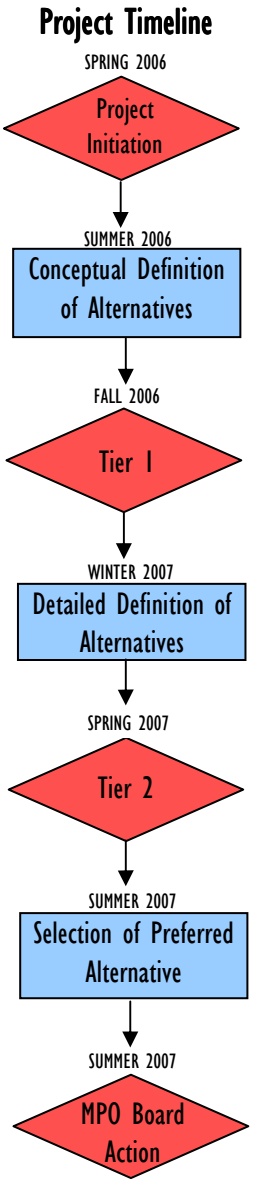
- Average travel time to work is 32.8 minutes, higher than the average for Miami Dade County (30.1 minutes) or the State of Florida (26.2 minutes). Commuters from the western part o the study area commute an average of 42 minutes. The largest growth period is in commuters travel more than 90 minutes to work, up 355 percent from 1990 to 2000.
- The Kendall area has a narrowly focused commuting period – 31 percent of Kendall workers leave between 7:00 a.m. and 8:00 a.m. This creates congestion on roadways during these periods.
- Average daily traffic on Kendall Drive is on the rise, increasing between eight and 10 percent on all segments between 2001 and 2004. Kendall drivers experience significant congestion and delay, taking 32 minutes to travel the 8.6 miles from 157th Avenue to U.S. 1 (an average of 16 miles per hour) Population projections indicate that continued growth in the future will continue to exacerbate already-high levels of traffic congestion.
- A smaller proportion of people take transit to work in the Kendall area (three percent) as compared to Miami Dade County as a whole (five percent). This is because there are fewer transit choices available in the Kendall study area.
- Although 23 percent of Miami-Dade County's population resides in the study area and 28 percent of all work trips originate in the study area, only 16 of the 107 bus routes (15 percent) serve the area and only ten percent of Metrobus boardings are on study area routes. Traffic issues have made it difficult to operate transit services in the corridor and attract and maintain riders.
- Although Metrorail continues to experience modest increases - three percent (Dadeland North) and 11 percent (Dadeland South), future growth potential is restricted because both parking garages are at capacity.
- Although there are indicators of strong transit demand in the corridor, for example, ridership on the Route 288 Kendall KAT increased 55 percent from 2005 to 2006; future ridership growth on these routes may be limited by non-competitive bus travel times due to roadway traffic congestion, as there are no HOV or bus-only facilities in the study area.
- There are many community facilities in the study area which are primarily used by special needs groups such as the elderly, population under 17 and those without a car. These groups have a need for transit services due to their dependency on others for their mobility. Examples of desirable destinations in the study corridor for these groups includes Miami-Dade College (MDC) Kendall Campus which is attended by over 55,000 students, and Baptist Hospital, which serves over 95,000 patients per year.

Transportation Needs in the study Area

The following transportation needs have been identified in the study corridor based on the statement of the problems:

- Expand transit services in order to support more sustainable future development in the study area at higher densities and in-fill locations and address growth management initiatives;
- Meet unmet demand for transit services for work trips due to the recent and anticipated population growth in the area;

- Direct transit services to major employment destinations from the study area including the Central area, Airport/Doral and the Central Business District;
- Improve mobility to the major activity/employment centers in the Kendall area, which are some of the most important facilities in the regional economy and are critical to the economic health of the study area and the region;
- Improve transit services to address the higher than the average travel time to work for the study area;
- Provide a greater variety of travel choices other than single occupant automobile on congested study area roadways;
- Expand solutions to attract and maintain new transit riders;
- Expand person-carrying capacity of existing transportation infrastructure;
- Create new facilities/services that avoid congested conditions, such as dedicated HOV lanes or exclusive transit ways; and
- Increase travel options for special needs groups.



Alternatives Development Approach

The development and evaluation of alternatives for the Kendal Corridor Alternatives Analysis followed the general guidance described in the Federal Transit Administration's (FTA) *Procedures and Technical Guidance* for major investment planning and project development for fixed-guideway transit systems. A two-tiered evaluation process was utilized to assess the various Kendall Corridor alignment options. The analysis began with a large number of broadly defined alternatives in the Tier I evaluation phase which were reduced to a smaller set of alternatives using cursory screening criteria. Alternatives which warranted further study were advanced through to a Tier II screening phase

Goals, Objectives and Evaluation Criteria

Goals and objectives were developed based on identified study area problems and needs. The goals and objectives were used to develop the evaluation criteria for use in screening the alternatives of this study. These goals, objectives and criteria are listed in the following table, along with criteria for measuring how well an alternative met the objectives (Table 1-1).

Table 1-1: Study Goals, Objectives and Criteria

GOAL	OBJECTIVES	CRITERIA
Enhance Regional Mobility	• Create additional transportation choices and new travel options • Improve links between population and activity centers • Improve multimodal connections by linking Metrobus and Metrorail services • Provide effective pedestrian and bicycle access • Meet demand for public transportation • Improve transit travel times • Increase transit ridership • Reduce automobile dependency • Improve services for socially, economically, and physically disadvantaged groups who are frequently transit dependent.	• Service travel times • User time savings • Linkages • Number of total riders • Serves transit-dependent communities
Improve Accessibility to Work Destinations	• Compete with the automobile • Serve major workplace destinations: Central area, Airport/Doral and the Central Business District; • Serve work destinations in the Kendall area • Promote the use of public transportation for work trips • Provide competitive travel times • Serve peak period demand	• Service travel times • User time savings • Number of peak riders • Number of destination businesses accessible to the service • Number of Kendall area businesses accessible to the service • Transit's mode share of work trips
Enhance Existing Infrastructure	• Maximize existing transportation investments • Provide for additional and improved transportation capacity on existing transit lines and roadways • Build on previous and ongoing infrastructure investments	• Use of existing transportation rights-of-way and facilities • Increased ridership on transit services
Promote Communities and the Environment	• Encourage and support transit-friendly development • Provide consistency with local or regional plans and growth management initiatives • Avoid community disruption • Promote improved air quality	• Stations/stops servicing existing/planned transit friendly developments • Consistency with local or regional plans • Ability to meet demands of Clean Air Act and State Implementation Plan
Enhance Existing Transportation Services	• Provide complementary services • Increase public transportation ridership • Support coordinated transportation network • Improve transit reliability • Improve the people-moving capability of the transportation system • Develop time and or financial incentives for the use of alternative modes • Develop alternatives to single occupant vehicles • Develop alternatives to influence when travel occurs during a day • Eliminate existing and anticipated gaps in the rail and bus networks.	• Expanded transit operations (hours/days) • Increased ridership on transit services • Transit's mode share of trips • Decrease average travel time to work

GOAL	OBJECTIVES	CRITERIA
Promote Regional Development	• Create opportunities to increase federal and state investments • Create opportunities for creating public-private partnerships • Create opportunities for economic development	• Type of federal and state funding for which service is eligible • Economic incentives for private investment • Increase in jobs, tax revenues, private investment • Access to planned developments
Develop a Cost-Effective Solution	• Ensure that project benefits outweigh project impacts • Ensure that project investments are consistent with financial resources • Improve overall transit cost-effectiveness and efficiency	• Service goals adequately met • Cost per passenger • Cost per passenger mile • Capital and operating costs not greater than projected funding resources

2 General Study Area Characteristics

Land use

Historically, the Kendall area had predominantly been agricultural land on the fringe of Miami. Beginning in the 1970's and continuing to the present day, the area has developed in to a major residential community in Miami-Dade County and is one of the fastest growing, most densely populated regions in all of Florida. The study area is roughly bounded by U.S. 1 and SW 67th Avenue on the east, SR 836 / Dolphin Expressway on the north, SW 177th Avenue / Krome Avenue to the west and SW 152nd Street Coral Reef Drive to the south. Downtown Miami lies to the east of the study area, with the airport and industrial areas to the north. South of the study area lie the suburban communities of Richmond West, South Miami and Cutler Ridge. Land uses are changing along the western edge of the study area. Areas that had previously been comprised of everglades have been transformed by agricultural uses and rock mining operations. These lands are now suburbanizing as development pushes further westwards from downtown Miami.

There are many community facilities in the study area which derive a significant amount of their trips from special needs groups such as the elderly, population under 17 and those without access to an automobile. These age groups tend to require transit services as they typically depend upon others for mobility. Examples of major destinations within the study area include Miami-Dade Community College (MDCC) Kendall Campus, which is attended by over 55,000 students, Florida International University with over 37,000 students, Baptist Hospital of Miami, which servers over 95,000 patients per year and the Dadeland Mall with over 185 retailers.

Kendall Drive

With the western spread of suburban development into the area, Kendall Drive has evolved from a predominantly rural roadway in to a principal urban arterial that carries large volumes of traffic. The low to medium-density residential and strip commercial patterns of development rely upon automobile use, and have therefore increased vehicular traffic volumes in the study area. At between four and eight lanes in width, Kendall Drive is a significant barrier for pedestrians traversing between communities on the north and south sides of the road.

Residential uses in the western portion of the study area are typically within mixed use developments. Townhouse and apartment complexes tend to be located along Kendall Drive, while single family homes can be found further within the interior of block and away from the major roadways. Developments are typically separated from adjacent roadways and neighborhoods by gates, walls or other physical barriers. Residential development in the Kendall corridor between SR 874 and SR 826 is typically in smaller developments set closer to the road with areas of single family residential frontage with driveway curb cuts.

Commercial development in the western part of the study area typically includes office parks, shopping centers, big box retailers, fast food restaurants and sit-down chain restaurants. These uses tend to be set back from the roadway with large road-fronting parking areas. Commercial development is much lighter between SR 874 and SR 826 and it tends to be located primarily adjacent to highway interchanges. The eastern end of study corridor is characterized by higher density commercial development, including the Dadeland Mall and surrounding office and residential developments of the downtown Kendall area.

The Palmetto Expressway / SR 826 and the Don Shula Expressway / SR 874 Corridor

SR 826 and SR 874 are limited-access urban arterials with Interstate-standard high-speed ramps and interchanges. The highways range in width from approximately twelve lanes near the northern edge of the study area to four lanes near the middle of the corridor to six-lanes at the southern edge of the corridor.

There are no commercial or residential developments directly fronting on the highways and many portions of the corridor are lined with sound walls. Along the corridor, the expressway passes by residential neighborhoods, suburban style commercial and industrial districts, Dade County Tropical Park and the Miami-Dade Community College. The CSX rail line parallels SR 874 for its entire length and the two pass by and cross over several canals.

The CSX Right-of-Way

The CSX railroad right-of-way generally runs from the Miami Intermodal Center near the Miami International Airport and travels westwards skirting the southern boundary of the airport. The line then turns south and passes through several parks, single family residential neighborhoods and light industrial districts. The line meets the SR 874 right-of-way and parallels it in a southwesterly direction passing by light residential, commercial and industrial properties. SR 874 terminates at the HEFT, but the rail line continues southwesterly into suburbanizing areas near the Miami Metro Zoo and the Kendall-Tamiami Executive Airport.

The Homestead Extension of Florida's Turnpike (HEFT) / SR 821

The HEFT is a limited access tolled highway that runs north – south through the western end of the Kendall area. It passes by single-family residential neighborhoods and light commercial developments along with several major institutions including Kendall Regional Medical Center and the Florida International University. The most intensive development along the corridor occurs near Coral Way / SW 24th Street and Kendall Drive / SW 88th Street. Development patterns to the west of the highway tend to be at a much lower density than those to the east. Many ponds and canals lie directly within the right-of-way ear the interchange with SR 836 at the northern boundary of the study area and a canal parallels the highway to the east as it travels southwards. A service area is located within the medians just north of the interchange with SR 874, in an area that is crossed by a major canal and several small ponds.

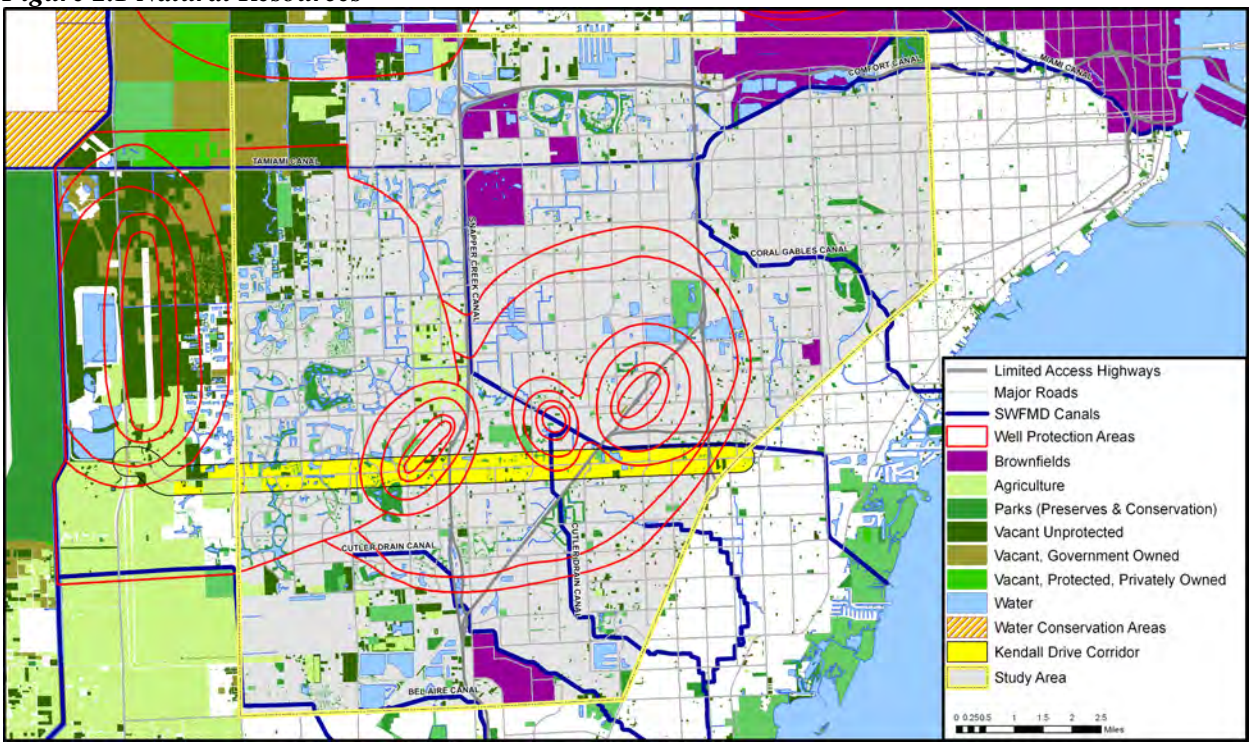
Natural Environment

The western portion of the Kendall area was most likely comprised of the subtropical marshlands that make up the Florida Everglades, while the eastern end of the study area could have more closely resembled the natural characteristics of the Atlantic Coastal Ridge. Slightly elevated points in this extremely flat area were covered with trees, usually cypress and red mangrove. Although much modified by agricultural development. The Everglades is the southern half of a large watershed arising in the vicinity of Orlando known as the Kissimmee River system. The Kissimmee discharges into Lake Okeechobee, a very large, shallow fresh water lake. Water leaving Lake Okeechobee in the wet season forms the Everglades, a shallow, slow-moving flood at one time 40 miles wide and over 100 miles long moving southward across a nearly flat, limestone shelf to Florida Bay at the southern end of the state. It has been called the River of Grass because of the slow the predominance of a sedge known as sawgrass.

While Kendall is now an urbanized area, many unique species of flora and fauna once lived here including alligators, bobcats, hawks, manatees, panthers, and pelicans. As urbanization and habitat encroachment continues throughout Florida, this wildlife is increasingly becoming threatened. Additionally, sightings and even fatal encounters with alligators have been increasing as urbanization moves ever westward. The natural everglades flora has also given way to the lawn grasses and palm trees that are a desirable part of residential development in Miami.

Development in the South Florida has spread from the eastern coastal areas westwards to the Everglades. Draining canals and adding fill material made it possible to expand the urban area. Efforts to preserve agricultural areas and natural wetland areas of the Everglades have succeeded in slowing western expansion to a large degree, but westward development pressures continue. These efforts have encouraged in-fill development and resulted in the higher density, transit friendly patterns located within the already developed areas. Several canals and utility corridors crisscross this portion of Miami-Dade County and the study area is dotted with small lakes and ponds.

Figure 2.1 Natural Resources



Significant Landscape Features

The study area is comprised of landscape features typical to both the everglades drainage plains and the coast plains of Florida. These flat geological formations range in elevation from 5 feet to 15 feet above sea level. The Kendall area is made up of a mix of urban, suburban and urbanizing/suburbanizing rural/agriculture land. Several ponds, canals and creeks pass through the area, but there are no federally designated wetlands as defined by the National Wetlands Inventory.

Seven major South Florida Water Management District (SFWMD) canals pass through the study area on their way to the ocean. Numerous smaller, minor canals can also be found in Kendall. 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.

The waterways of Miami-Dade County that drain into Biscayne Bay are considered either critical habitat or important habitat for the manatee by the U.S. Fish and Wildlife Service, the Florida Department of Environmental Protection (FDEP) and the Miami-Dade County Department of Environmental Resource Management (DERM). Constructing infrastructure across any of these canals may require one or more of the following authorizations. An Environmental Resource Permit (ERP) may be required from the SFWMD or a Class IV permit may be required from DERM to certify that canals and waterways will not be negatively impacted. The U.S. Army Corps of Engineers may also require a Clean Water Act Section 404 permit or a Rivers and Harbors Act Section 10 permit if any waterways are significantly impacted.

Table 2.1: South Florida Water Management District Canals

TYPE	CLASS	NAME	DESCRIPTION
Primary Canal	Major	C-1W	
Primary Canal	Major	C-1N	Bel-Aire Canal
Primary Canal	Major	C-5	Comfort Canal
Primary Canal	Major	C-3	Coral Gables Canal
Primary Canal	Major	C-100	Cutler Drain Canal
Primary Canal	Major	C-2	Snapper Creek Canal
Primary Canal	Major	C-4	Tamiami Canal

Source: South Florida Water Management District

Demographics

Population

According to the 2000 U.S. Census, Miami-Dade County continues to be the most populous County in the State of Florida, making up 14 percent of the population of the entire state (Figure 2.2). The County has been Florida's most populous since 1910. Miami-Dade County is the eighth largest county in the United States and its population exceeds that of seventeen states and the District of Columbia.[1] The population of the Kendall study area is 518,874, representing a significant proportion of Miami-Dade County.

Table 2.2 - 2000 Population

	2000 POPULATION
Kendall Areaa	518,874
Miami-Dade County	2,253,362
State of Florida	15,982,378

Source: 2000 U.S. Census.

The Kendall study area is the second largest of the seven major areas that make up Miami-Dade County (Table 2.3). Twenty-three percent of the population of the County resides in the Kendall area; the only area larger is the Northwest area, where 27 percent of the population lives.

Table 2.3: Major Areas of Miami-Dade County, Percent of Total County Population

	2000 POPULATION	PERCENT OF MIAMI-DADE COUNTY
Kendall	519,000	23%
Central Business District	105,000	5%
South	266,000	12%
Central	329,000	15%
Northwest	609,000	27%
Northeast/Beaches	373,000	16%
Airport/Doral	60,000	3%
Total	2,263,000	

Source: Miami-Dade County MPO

[1] The largest counties were as follows: Los Angeles, CA; Cook, IL; Harris, TX; Maricopa, AZ; Orange, CA; San Diego, CA; and Kings, NY. The states that have a smaller population than Miami-Dade County are Alaska, Delaware, Hawaii, Idaho, Maine, Montana, Nebraska, Nevada, New Hampshire, New Mexico, North Dakota, Rhode Island, South Dakota, Utah, Vermont, West Virginia, and Wyoming.

Figure 2.2: Miami-Dade County and State of Florida Populations

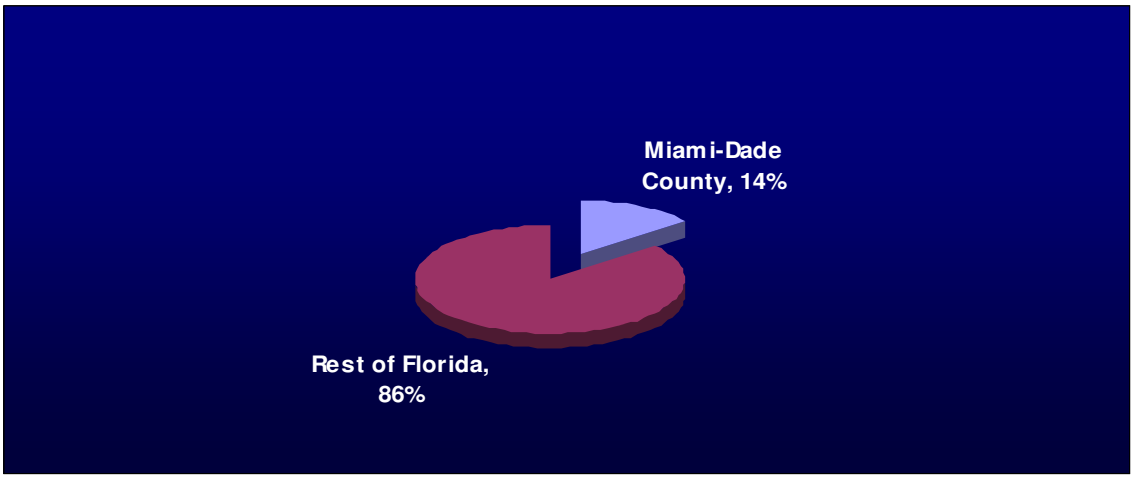
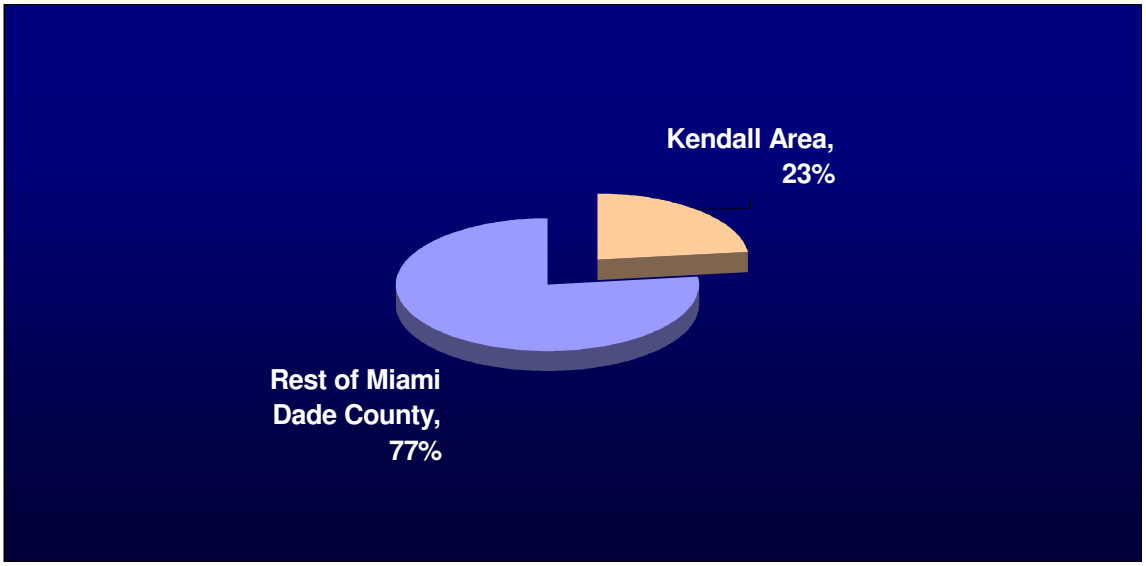


Figure 2.3: Miami-Dade County and Kendall Area Populations



The Kendall area has experienced dramatic change during the last decade. The population of the Kendall area grew by 43.2 percent from 1990 to 2000 (Table 2.4) and now represents 23% of the County's total population, compared with 19% in 1990. This increase is dramatic compared with Miami-Dade County as a whole, which experienced 16.3 percent growth, and the State of Florida, which experienced 23.5 percent growth. Population projections indicate that the Kendall area will continue to experience growth in the future, reaching approximately 650,000 residents by 2020 (Figure 2.5). The Kendall area also experienced increases in both the number of households (39 percent) and workers (23.5 percent) (Tables 2.5 and 2.6).

Table 2.4 - Population, 1990 to 2000

	1990 POPULATION	2000 POPULATION	1990 TO 2000 CHANGE
Kendall	362,371	518,874	43.2%
Miami-Dade County	1,937,094	2,253,362	16.3%
State of Florida	12,937,926	15,982,378	23.5%

Source: 1990 U.S. Census, 2000 U.S. Census.

Table 2.5: Miami-Dade County Population Estimates

	TOTAL POPULATION	CHANGE FROM 2000 CENSUS
July 1, 2005	2,376,014	5.44%
July 1, 2004	2,358,714	4.68%
July 1, 2003	2,335,739	3.66%
July 1, 2002	2,314,547	2.72%
July 1, 2001	2,286,731	1.48%
April 1, 2000 (Census 2000)	2,253,362	0.00%

Source: US Census Bureau, Population Estimates Program

Figure 2.4: Miami-Dade County District Population and Share of Total Population

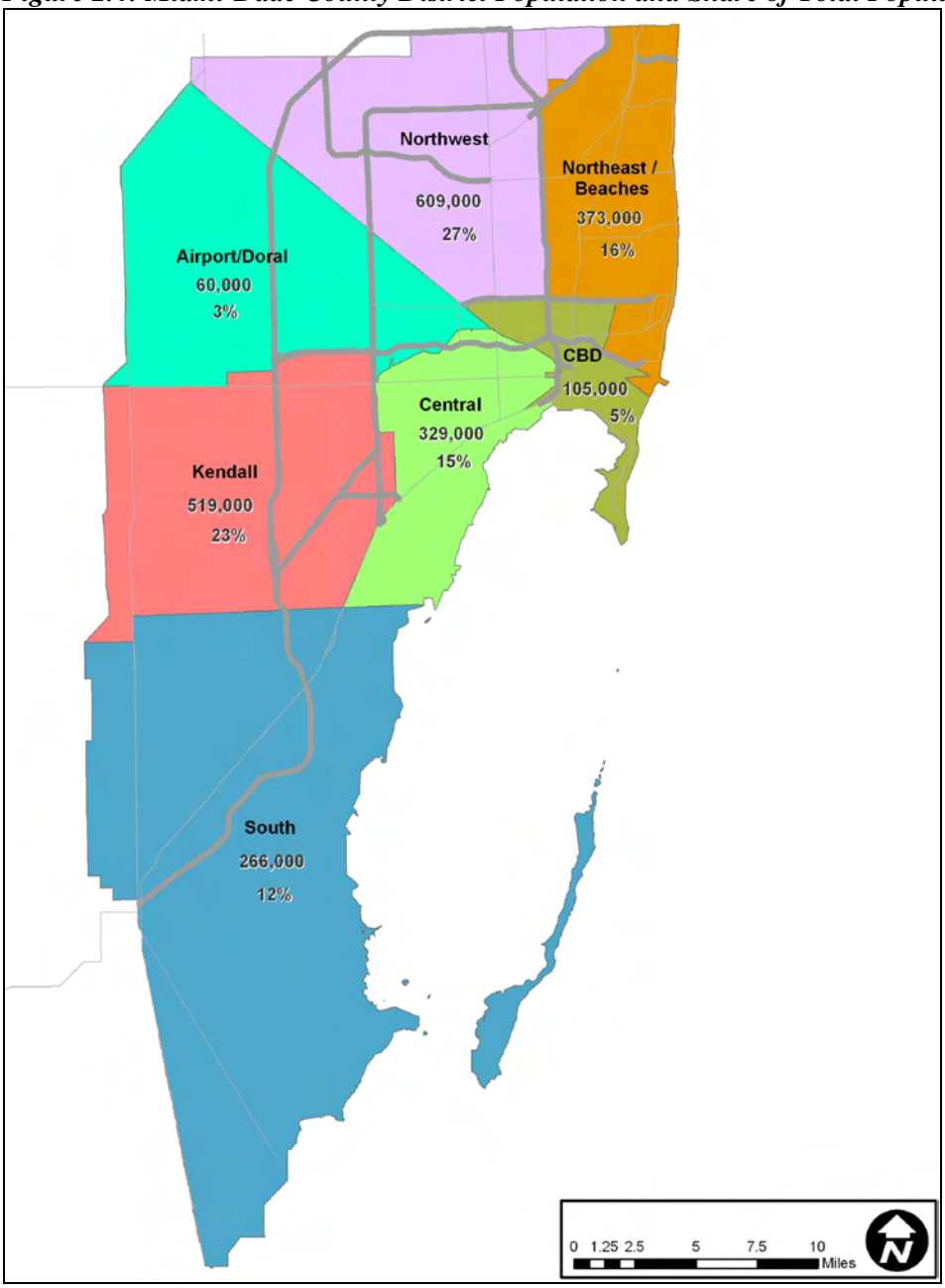
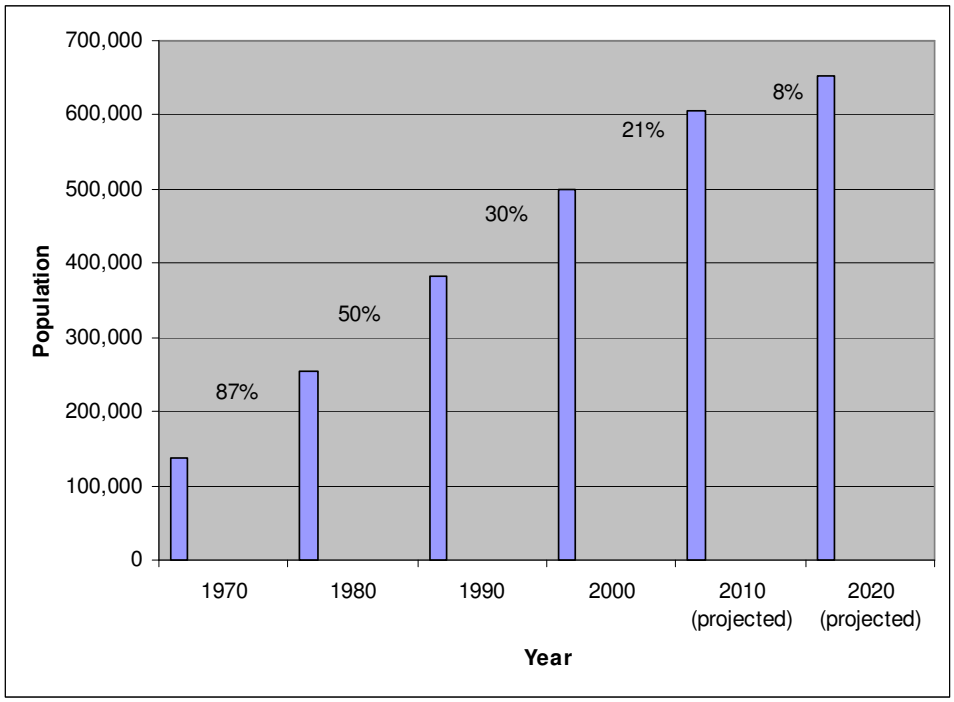


Figure 2.5: Kendall Area Population Trends and Projections



Source: Miami-Dade County Department of Planning and Zoning, 2001

Table 2.6: Households, 1990 to 2000

	1990	2000	1990 TO 2000 CHANGE
Kendall	123,171	171,207	39.0%
Miami-Dade County	692,237	777,378	12.3%
State of Florida	5,138,360	6,337,929	23.3%

Source: 1990 U.S. Census, 2000 U.S. Census

Table 2.7: Workers over Age 16, 1990 to 2000

	1990	2000	1990 to 2000 Change
Kendall	188,716	233,023	23.5%
Miami-Dade County	887,996	899,323	1.3%
State of Florida	5,794,452	6,910,168	19.3%

Source: 1990 U.S. Census, 2000 U.S. Census.

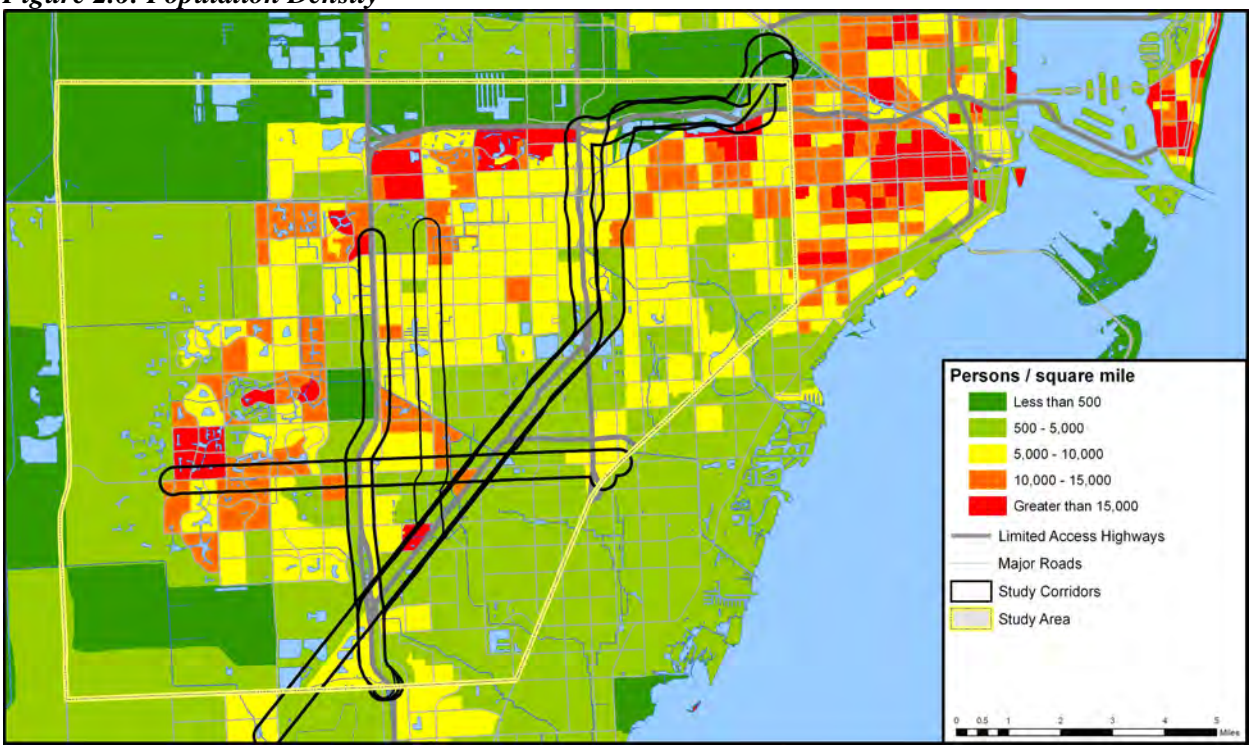
Average household size in the Kendall study area is 3.0 persons, similar to the average household size for Miami-Dade County as a whole (2.9 persons) and higher than the average for the State of Florida (2.5 persons) (Table 2.7). Average household size in the Kendall area, County and State remained relatively constant from 1990 to2000. While estimates are not available for the Kendall area itself, U.S. Census Bureau estimates for the year 2005 show that Miami-Dade County continues to enjoy a respectable rate of growth.

Table 2.8: Average Household Size, 1990 to 2000

	1990	2000	1990 TO 2000 CHANGE
Kendall	2.9	3.0	1%
Miami-Dade County	2.8	2.8	0%
State of Florida	2.5	2.5	0%

Source: 1990 U.S. Census, 2000 U.S. Census

Figure 2.6: Population Density



Auto Availability

The general availability of automobiles and the number of households without access to an automobile is a simple measure with which to understand the need for and potential ridership of improved transit services. Table 2.9 illustrates that the automobile availability of the Kendall Area is much like that for the state of Florida as a whole. The number of single and multiple vehicle households in Miami-Dade County as a whole closely reflects the patterns seen within the state and the study area. The percent of zero vehicle households, however, is twice the rate experienced in the study are or the state. This can be interpreted to mean

Table 2.9: Auto Availability by Household

	FLORIDA	% OF TOTAL	MIAMI-DADE COUNTY	% OF TOTAL	KENDALL AREA	% OF TOTAL
No vehicle available	515,455	8%	111,323	14%	1,964	7%
1 vehicle available	2,626,233	41%	301,500	39%	10,628	37%
2 vehicles available	2,419,707	38%	263,256	34%	11,544	41%
3 vehicles available	596,885	9%	73,233	9%	3,231	11%
4 vehicles available	135,834	2%	20,610	3%	806	3%
5 or more vehicles available	43,815	1%	6,852	1%	294	1%
Total	6,337,929	100%	776,774	100%	28,467	100%

Source: 2000 US Census

Employment

Several large employers are located in the Kendall area. According to a countywide employment analysis, the area two miles on each side of SR 836/Dolphin Expressway, the northern boundary of the Kendall study area, has more than 50 percent of the total employment in the County.[2] These employers include Florida International University, Dolphin Mall/International Mall, the Airport west industrial area, and the Miami International Airport.

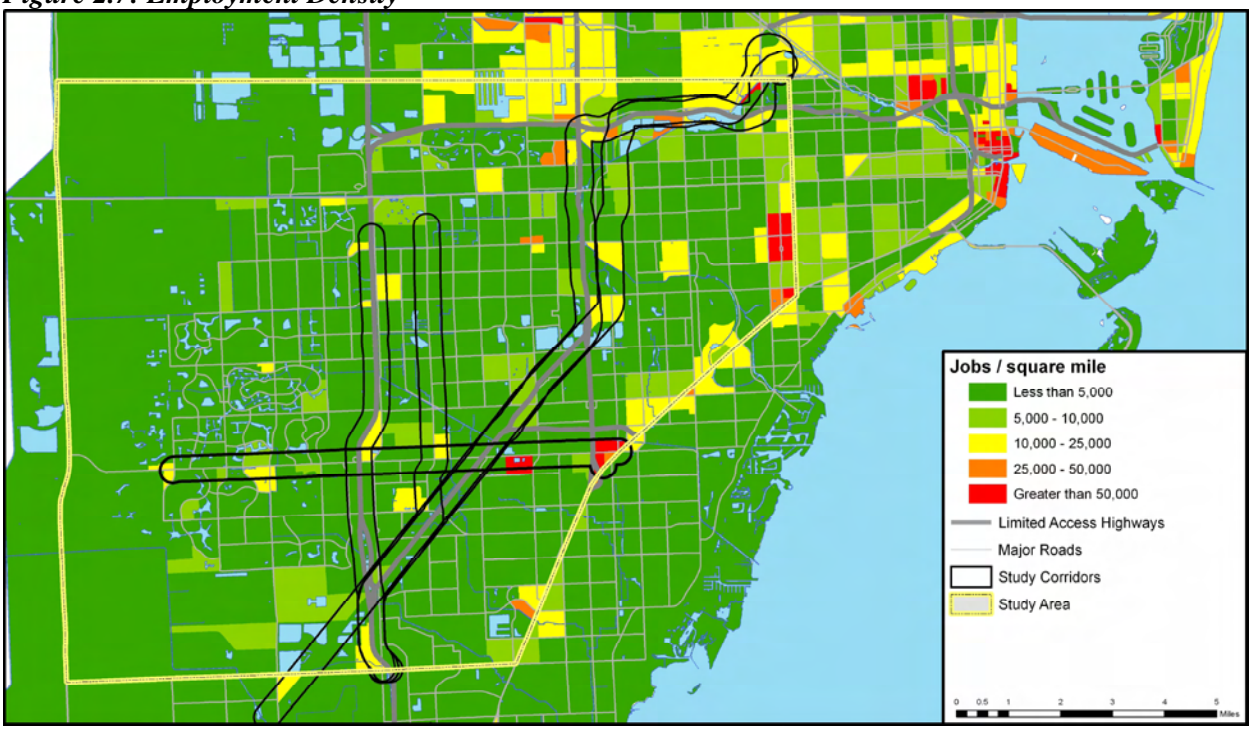
The Baptist Hospital of Miami is one of the largest private employers in Miami-Dade County and is located along the Kendall Drive corridor. The Dadeland/Downtown Kendall area, at the eastern end of the study area, is home to many major retail, hotel and business employers. There are many other new and established small and medium sized commercial and retail developments along the length of Kendall Drive. Over 230,000 jobs are projected for the study area by 2020 (Table 2.10). This is almost four times more than the forecast total in the downtown Miami Central Business District.

Table 2.10: Kendall Area Employment

	1990	1995	2005	2015	2020
Industrial	12,214	14,021	14,162	14,286	14,838
Commercial	32,607	44,638	48,908	53,578	55,708
Service	92,066	115,950	138,030	154,394	160,831
Total	136,887	174,609	201,100	222,258	231,377
Percent Change	--	21.6%	15.2%	10.5%	4.1%

Source: Miami-Dade MPO, Kendall-SR 826 Major Investment Study, June 2001

Figure 2.7: Employment Density



[2] Miami-Dade County MPO, Kendall Drive Mobility Study, September 2002.

Transportation

Roadway Infrastructure

The major east-west roadway corridors in the study area include:

- SR 836 / Dolphin Expressway
- Tamiami Trail / SW 8th Street
- Coral Way / SW 24th Street
- Bird Road / SW 40th Street
- Miller Road / SW 56th Street
- Sunset Drive / SW 72nd Street
- Snapper Creek Expressway / SR 878
- Kendall Drive / SW 88th Street / SR 94
- Killian Drive / SW 104th Street
- SW 152 Street

Major north-south roadways in the study area that intersect with Kendall Drive include:

- Homestead Extension of the Florida Turnpike (HEFT) / SR 821
- Don Shula Expressway / SR 874
- Palmetto Expressway / SR 826
- Dixie Highway / US 1

Kendall Drive / SW 88th Street / SR 94 within the study area is primarily a six-lane divided (raised / restrictive median) state principal arterial. An eight-lane divided section is located from the Turnpike west to SW 127th Avenue. Kendall Drive is identified as a corridor of regional significance in the Miami-Dade MPO 2030 LRTP and is listed as a minor regional arterial. There are only two minor regional arterials in southwest Miami-Dade, the other being Bird Road / SW 40th Street.

Florida Department of Transportation (FDOT) arterial access management classification standards range from "Access Class 2" to "Access Class 7". Kendall Drive from SW 142nd Avenue to US 1 is classified by FDOT as arterial "Access Class 5". From SW 142 Avenue to Krome Avenue, Kendall Drive is classified as arterial "Access Class 3". The lower the access class, the more stringent the standards for driveway connections, medians and median openings, and traffic signals. The speed limit along Kendall Drive is currently posted at 45 miles per hour. There are no HOV or bus-only facilities along Kendall Drive or along key connecting roadways.Roadway Usage

Kendall Drive / SW 88th Street / SR 94 is one of the most highly utilized east-west roadway corridors in Miami-Dade County. With the western spread of suburban development into the Kendall area, Kendall Drive has changed from a predominantly rural roadway to an urban principal arterial carrying large volumes of traffic. The severity and duration of traffic congestion continues to multiply as development increases in the corridor. Average daily traffic on Kendall Drive is on the rise, increasing between eight and 10 percent on all segments between 2001 and 2004 (Table 2.11).

Table 2.11: Kendall Drive, Average Annual Daily Traffic

BETWEEN	2001	2004	PERCENT CHANGE
SW 157th Avenue and SW 137th Avenue	43,000	46,500	8%
SW 137th Avenue and SW 127th Avenue	76,000	82,000	8%
SW 127th Avenue and SR 874	65,000	71,500	10%
SR 874 and US 1	50,000	55,000	10%

Source: Florida Department of Transportation, Transportation Statistics Office

Congestion Delay

Users of Kendall Drive during the peak periods experience congestion delays throughout the corridor. During the morning peak, it would take an average of 32 minutes for a Kendall Drive user to travel from 157th Avenue to US 1, a distance of 8.6 miles. This works out to an average speed of 16 miles per hour. Drivers average approximately 60 miles per hour within the portion of the corridor between 147th and 137th Avenue, while average speeds in the remainder of the corridor tend to be below 20 miles per hour. The area with the greatest delays is between 107th Avenue and SR 874, where speeds average only ten miles per hour.

During the evening peak period, it typically will take 28 minutes for a Kendall Drive user to travel from US 1 to 157th Avenue, a distance of 8.6 miles. This is equate able to an average speed of 16 miles per hour. Similar to the morning peak, in the area between 147th and 137th Avenue drivers are averaging 60 miles per hour, however much of the remainder of the corridor averages below 20 miles per hour. The area with the greatest delay in the evening peak period is also near the Don Shula Expressway, between SR 874 to 127th Avenue, where speeds average ten to 15 miles per hour.

The Kendall area has very diverse travel patterns. Data from the U.S Census Transportation Planning Package (CTPP) illustrates that 30% of workers living here commute to jobs within the study area. This is significantly lower than the rates experienced within other Miami-Dade County areas which tend to see closer to 40% of resident-workers commuting to jobs within their home district.

Table 2.12: Year 2000 Work Trip Flows Between Miami-Dade County Areas

	KENDALL	CBD	SOUTH	CENTRAL	NORTHWEST	NORTHEAST /BEACHES	AIRPORT /DORAL	TOTAL WORKERS
Kendall	66,959	36,465	9,396	44,008	16,461	9,811	37,910	221,010
CBD	1,846	13,366	507	5,871	3,238	3,448	3,752	32,028
South	15,325	12,622	34,944	13,092	5,071	3,503	9,283	93,840
Central	12,575	27,392	2,500	48,014	10,491	7,933	16,195	125,100
Northwest	10,135	32,731	3,088	15,713	78,002	22,295	29,461	191,425
Northeast/Beaches	4,799	28,456	1,591	11,044	15,609	57,455	10,869	129,823
Airport/Doral	2,443	3,438	257	3,092	3,056	1,257	9,062	22,605
	114,082	154,470	52,283	140,834	131,928	105,702	116,532	815,831

Table 2.13: Percentage of Work Trip Flows Between Miami-Dade County Areas

	KENDALL	CBD	SOUTH	CENTRAL	NORTHWEST	NORTHEAST /BEACHES	AIRPORT /DORAL
Kendall	30.30%	16.50%	4.25%	19.91%	7.45%	4.44%	17.15%
CBD	5.76%	41.73%	1.58%	18.33%	10.11%	10.77%	11.71%
South	16.33%	13.45%	37.24%	13.95%	5.40%	3.73%	9.89%
Central	10.05%	21.90%	2.00%	38.38%	8.39%	6.34%	12.95%
Northwest	5.29%	17.10%	1.61%	8.21%	40.75%	11.65%	15.39%
Northeast/Beaches	3.70%	21.92%	1.23%	8.51%	12.02%	44.26%	8.37%
Airport/Doral	10.81%	15.21%	1.14%	13.68%	13.52%	5.56%	40.09%
Percent of Total Travel	13.98%	18.93%	6.41%	17.26%	16.17%	12.96%	14.28%

Table 2.14: Average Travel Time to Work of Miami-Dade County Areas

DISTRICT	AVERAGE TRAVEL TIME
Kendall	35.1
CBD	38.1
South	38.4
Central	33.0
Northwest	36.0
Northeast/Beaches	39.4
Airport/Doral	28.5
Miami-Dade County	35.3

Railroad Infrastructure

Several rail companies provide both passenger and freight service throughout Florida and within Miami-Dade County. CSX Transportation (CSX) operates 56 percent of the statewide rail system, or about 1,616 miles while the Florida East Coast Railway accounts for 386 statewide route miles, or about 13.5 percent of the state rail system[3]. These two railroads also operate the greatest number of route miles in the county. Portions of the CSX and FEC rights-of-way are now owned or used for operations by the South Florida Rail Corridor (SFRC), Miami-Dade Transit (MDT) and the Port of Miami. The following paragraphs describe the various rail lines within the study area.

Through the study area, the FEC line is known as the Ludlum Branch and runs from the north and loops around the south-western portion of Miami International Airport. The line runs parallel for approximately one-half mile and then turns south to cross underneath SR 836 / The Dolphin Expressway and through an at-grade crossing with NW 12th Street. The line then passes through the Oleander Junction where the east-west CSX lines turn south towards Homestead. South of the Oleander Junction the abandoned rail line runs due south to the east of the CSX tracks with trackage terminating approximately .25 mile due north of the Dadeland North Metrorail station. This corridor runs through many residential neighborhoods and parks, and has been identified as a priority bicycle / pedestrian trail.

The South Florida Rail Corridor (SFRC) supports Tri-Rail services run by the South Florida Regional Transportation Authority (SFRTA) and CSX freight traffic. The rail line extends from the Broward County line for 14 miles to the future site of the Miami Intermodal Center (MIC) just east of Miami International Airport (MIA). A second SFRC line runs for four miles west from the MIC to the Oleander Junction within a fifty foot right-of-way. This single track line currently has an at-grade crossing with North Le June Road / NW 42 Ave / SR 953 and the Airport Expressway which may be mitigated or eliminated completely through roadway improvements as part of the MIC project. The line then runs around the southeast edge of MIA along Perimeter Road with at-grade crossings at NW 15th Street and N Red Rd / NW57 Ave / SR959. The SFRC corridor ends at NW 12th Street, just to the north of the Oleander Junction. This portion of track has a direct connection to the CSX track running south to Kendall but no direct connection to the CSX extending due west toward the Florida turnpike. All CSX trains must traverse this section of track. The final SFRC line runs from the MIC to downtown Miami through a fifty foot right-of-way. This single track line runs for five miles, first paralleling North River Drive then turning east at NW 23rd Street and terminating at NW 22nd Street and NW 7th Avenue.

CSX Transportation currently operates three active sections of track. The first segment is an eight-mile length of track known as the Lehigh Spur that runs within a one-hundred foot right-of-way from the Oleander Junction to the quarry operations west of NW 137th Avenue. This single line track parallels SR 836 / Dolphin Expressway and is an active freight line. At-grade crossings exist with NW 78th Ave, NW

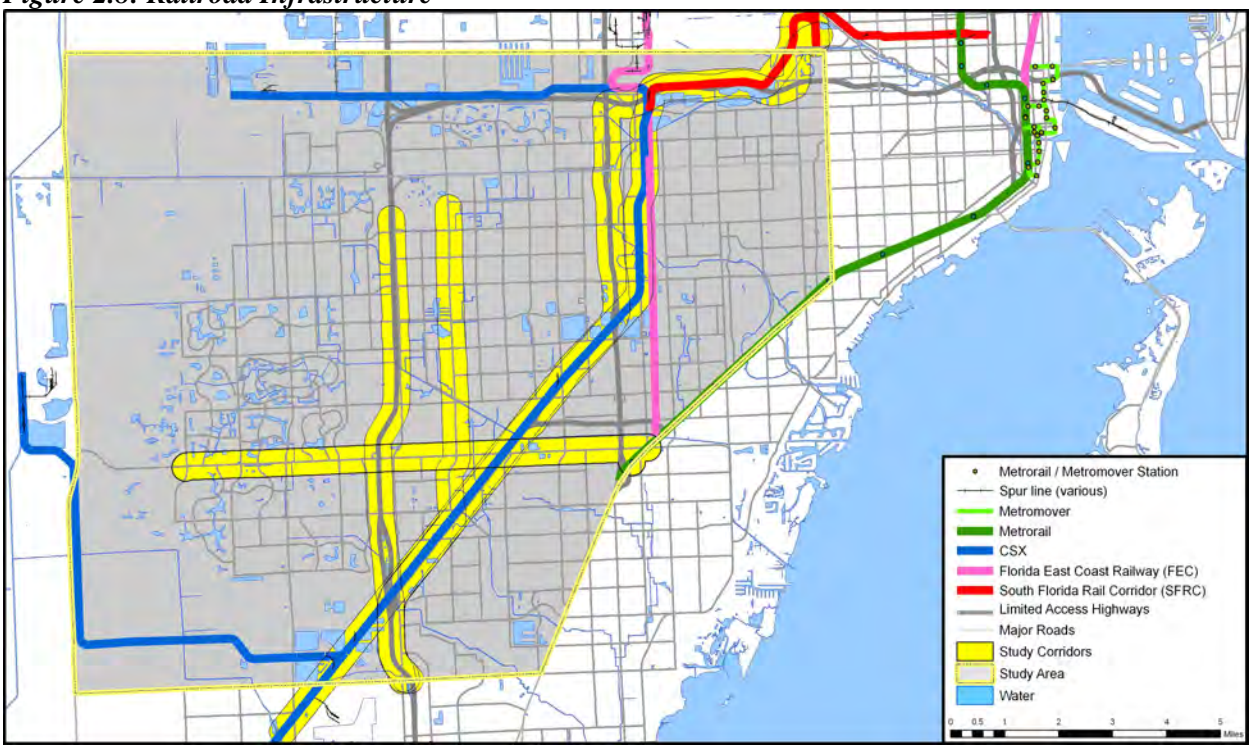
[3] 2002 Florida Rail System Plan, Florida Department of Transportation, Wilbur Smith Associates; 2002

82nd Ave, NW 84th Ave, and the major intersection that includes NW 87th Ave, NW 12th Street and SR 836 on/off-ramps. Near the western terminus of the line, tracks cross at-grade across NW 12th Street and NW 129th and 130th Avenues. Traffic from this line cannot connect directly to the SFRC without maneuvering through the Oleander Junction. There is a study underway known as "the direct connect" that would result in construction of new track between the CSX line and the SFRC, thus by-passing the Oleander Junction.

The second section of CSX track known as the Homestead Subdivision runs 26 miles south from the Oleander Junction towards the City of Homestead. The line runs west of the FEC line and parallel to the Palmetto Expressway to SW 44th Street where it turns southwest and runs on the south side of SR 874. There are many at-grade crossings along the segment of track between the Oleander Junction and SR 874. The line crosses under and runs along the north side of SR 874 at SW 87th Avenue where it extends past the turnpike to SW 182nd Avenue where the line turns due south and runs into Homestead. Active freight service exists along most of the route and traffic can connect directly to both the Lehigh Spur and SFRC at the signal controlled crossing with the FEC line within the Oleander Junction.

The Portland Spur is the final 11-mile section of CSX track that extends westerly from the Homestead Subdivision via a wye located at SW 144th Street. A single track runs to Krome Avenue where it turns north and terminates at SW 58th Street providing access for two rock trains a day to serve the Rinker Plant at the terminus of the line.

Figure 2.8: Railroad Infrastructure



Airport Infrastructure

Air passenger and freight service to Miami-Dade County are provided at Miami International Airport (MIA). The 3,230 acre airport annual impact on local tourism, cruise, international banking, trade and commerce is $19.1 billion and contribute 242,387 jobs directly and indirectly to the South Florida economy. MIA is 1st among U.S. Airports for international freight, 3rd for international passengers and 15th for total passengers. During 2005, this equated to 381,610 flight operations carrying 31 million

passengers and 1,894,241 tons of freight. Four smaller airports also serve the county, ranging from the large general aviation facilities of Opa Locka Airport (OPF) to the smaller Kendall-Tamiami Executive Airport (TMB), Homestead General Aviation Airport (X51) and the small landing strip at Opa Locka West Airport (X46).

Kendall-Tamiami Executive Airport (TMB) is located on 1,280 acres in the southwest sector of the study area at 12800 S.W. 145 Avenue. It is one of the busiest general aviation airports in Florida, serving corporate, recreational, flight training, and governmental agency activities. The airport enjoys an FAA-staffed control tower and has spent approximately $16 million since 1995 on improvements to runways, airfield signage and a new customs clearance facility. More than 160 T-hangar bays are available with private development projects currently under construction expected to add another 500,000 square feet of aviation facilities.

Journey to Work

The Kendall study area generates a significant proportion of all the work trips in Miami-Dade County – 28 percent (Table 2.15). With 221,000 work trips per day, this area creates the greatest number of work trips compared to the other areas of the region. Thirty percent of workers who live within the study area remain in the Kendall area for employment (Table 2.16). This is a smaller percentage than any other region in Miami-Dade County; with other areas ranging between 37 percent and 44 percent of workers remaining in the same area for employment. This means that 70 percent of the Kendall area workforce (154,000) is commuting to another area for employment. The largest destination for Kendall work trips is the Central area (20%) followed by the Airport/Doral (17%) and the Central Business District (16%).

Table 2.15: Work Trip Flows between Miami-Dade County Areas

	KENDALL	CBD	CENTRAL	NORTHWEST	NORTHEAST/ BEACHES	AIRPORT/ DORAL	SOUTH	TOTAL	% OF COUNTY WORK TRIPS
Kendall	66,959	36,097	44,008	16,461	10,179	37,910	9,406	221,020	27.75%
CBD	1,846	13,366	5,871	3,238	3,448	3,752	507	32,028	4.02%
Central	12,575	27,392	48,014	10,491	7,933	16,195	2,500	125,100	15.71%
Northwest	10,135	15,713	15,713	78,002	22,295	29,461	3,088	174,407	21.90%
Northeast / Beaches	4,799	28,456	11,044	15,609	57,455	10,869	1,591	129,823	16.30%
Airport / Doral	2,443	3,438	3,092	3,056	1,257	9,062	257	22,605	2.84%
South	15,325	12,622	13,092	5,071	3,503	9,283	32,466	91,362	11.47%
Total	114,082	137,084	140,834	131,928	106,070	116,532	49,815	796,345	100.00%

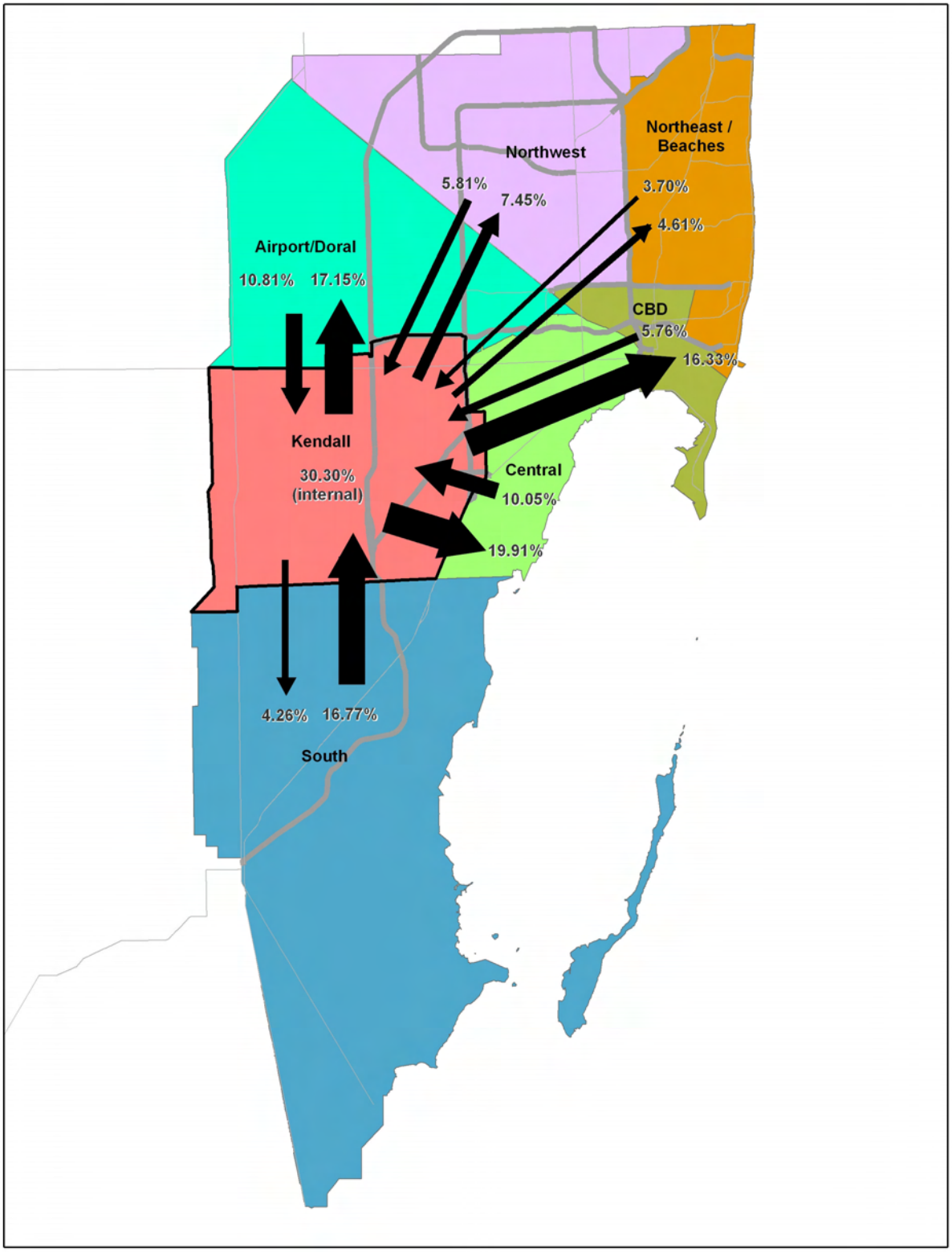
Source: Miami-Dade County MPO; 2000 U.S. Census

Table 2.16: Percentage of Work Trip Flows Between Miami-Dade County Areas

	KENDALL	CBD	CENTRAL	NORTHWEST	NORTHEAST/ BEACHES	AIRPORT/ DORAL	SOUTH
Kendall	30.30%	16.33%	19.91%	7.45%	4.61%	17.15%	4.26%
CBD	5.76%	41.73%	18.33%	10.11%	10.77%	11.71%	1.58%
Central	10.05%	21.90%	38.38%	8.39%	6.34%	12.95%	2.00%
Northwest	5.81%	9.01%	9.01%	44.72%	12.78%	16.89%	1.77%
Northeast / Beaches	3.70%	21.92%	8.51%	12.02%	44.26%	8.37%	1.23%
Airport / Doral	10.81%	15.21%	13.68%	13.52%	5.56%	40.09%	1.14%
South	16.77%	13.82%	14.33%	5.55%	3.83%	10.16%	35.54%
% of County Work Trips to Destination	14.33%	17.21%	17.69%	16.57%	13.32%	14.63%	6.26%

Source: Miami-Dade County MPO; 2000 U.S. Census

Figure 2.9: Percentage of Work Trip Flows Between Miami-Dade County Areas



Means of Travel to Work

A smaller proportion of Kendall area residents take transit to work (3 percent) as compared to Miami-Dade County as a whole (5 percent) (Table 2.17). The inverse percentage of residents commute in single occupant vehicles (79 percent) compared with Miami-Dade County as a whole (74 percent). This can be attributed to the fact that the Kendall study area has fewer transit options such as Tri-Rail (commuter rail) and Metrorail that are found in the other areas of the County. While population and employment densities within the study area are much higher than average for Florida, commuting patterns for the Kendall area correspond almost exactly with those of the State as a whole. This highlights an opportunity to increase transit use by providing new services that can take advantage of the already existing transit-supportive land use in the area.

Table 2.17: Means of Transportation to Work

	KENDALL	PERCENT	MIAMI-DADE COUNTY	PERCENT	STATE OF FLORIDA	PERCENT
Car; truck; or van; Drove alone	184,326	79%	663,902	74%	5,445,527	79%
Car; truck; or van; Carpooled	30,699	13%	131,302	15%	893,766	13%
Bus or trolley bus	3,755	2%	38,249	4%	108,340	2%
Streetcar or trolley car	16	0%	335	0%	945	0%
Subway or elevated	2,274	1%	5,701	1%	6,815	0%
Railroad	324	0%	1,385	0%	3,638	0%
Ferryboat	0	0%	65	0%	629	0%
Taxicab	147	0%	1,352	0%	8,708	0%
Motorcycle	201	0%	890	0%	14,967	0%
Bicycle	439	0%	4,079	0%	39,294	1%
Walked	2,309	1%	19,367	2%	118,386	2%
Other means	1,684	1%	8,547	1%	62,064	1%
Worked at home	6,849	3%	24,149	3%	207,089	3%
Total	233,023	100%	899,323	100%	6,910,168	100%

Source: 2000 U.S. Census

Travel Time to Work

The average travel time to work for Kendall area commuters is 32.8 minutes, higher than the average for Miami-Dade County (30.1 minutes) and the State of Florida (26.2 minutes) (Table 2.18). In fact, commuters from the western part of the study area are commuting an average of up to 41 minutes. Travel time to work is growing. The largest growth is in the 60 to 81 minutes travel time period (Table 2.19). All time periods from 45 minutes and up are seeing growth, while the number of people traveling less than 45 minutes to work is declining. The number of people traveling 90 minutes or more to work in the study area increase 355 percent from 1990 to 2000.

Table 2.18: Average Travel Time to Work, 1990 to 2000

	1990	2000	1990 TO 2000 CHANGE
Kendall	28.7	32.8	14.3%
Miami-Dade County	24.8	30.1	21.5%
State of Florida	21.8	26.2	19.9%

Source: 1990 U.S. Census, 2000 U.S. Census.

Time Leaving for Work

Forty-thousand Kendall area commuters (17.6 percent) leave for work between 7:00 am and 7:30 am, making it the busiest half-hour of the day for commuting (Table 2.20). The peak half hour in the Kendall Corridor is more heavily "peaked" than in Miami-Dade County as whole (15.5 percent) or for the State of Florida (15.9 percent). Thirty-one percent of all Kendall area workers leave home in the hour between

7:00 am and 8:00 am. Travel habits that are focused on a narrow commuting period such as this can be used as an indicator that the Kendall area may be a good candidate for increased transit service. Transit services in heavily "peaked" commuter markets typically perform well, attracting significant numbers of riders, assuming other conditions necessary for transit service are also present. This peaking trend has increased in the Kendall area. From 1990 to 2000, the percent of Kendall area commuters leaving for work for each half hour period from 6:30 am to 8:30 am increased by two percent.

Table 2.19: Travel Time to Work

	KENDALL	PERCENT	MIAMI-DADE COUNTY	PERCENT	STATE OF FLORIDA	PERCENT
Less than 5 minutes	2,041	0.9%	11,481	1.3%	155,487	2.3%
5 to 9 minutes	10,043	4.3%	49,971	5.6%	595,769	8.6%
10 to 14 minutes	18,625	8.0%	90,487	10.1%	922,343	13.3%
15 to 19 minutes	27,344	11.7%	123,790	13.8%	1,085,636	15.7%
20 to 24 minutes	29,380	12.6%	126,890	14.1%	1,040,084	15.1%
25 to 29 minutes	12,233	5.2%	48,772	5.4%	404,902	5.9%
30 to 34 minutes	44,497	19.1%	173,451	19.3%	1,078,082	15.6%
35 to 39 minutes	7,071	3.0%	25,342	2.8%	182,138	2.6%
40 to 44 minutes	11,808	5.1%	39,425	4.4%	237,660	3.4%
45 to 59 minutes	33,904	14.5%	95,732	10.6%	534,237	7.7%
60 to 89 minutes	22,779	9.8%	63,477	7.1%	303,002	4.4%
90 or more minutes	6,449	2.8%	26,356	2.9%	163,739	2.4%
Worked at home	6,849	2.9%	24,149	2.7%	207,089	3.0%
Total	233,023	100.0%	899,323	100.0%	6,910,168	100.0%

Source: 1990 U.S. Census, 2000 U.S. Census

Table 1.20: Time Leaving Home to Go to Work

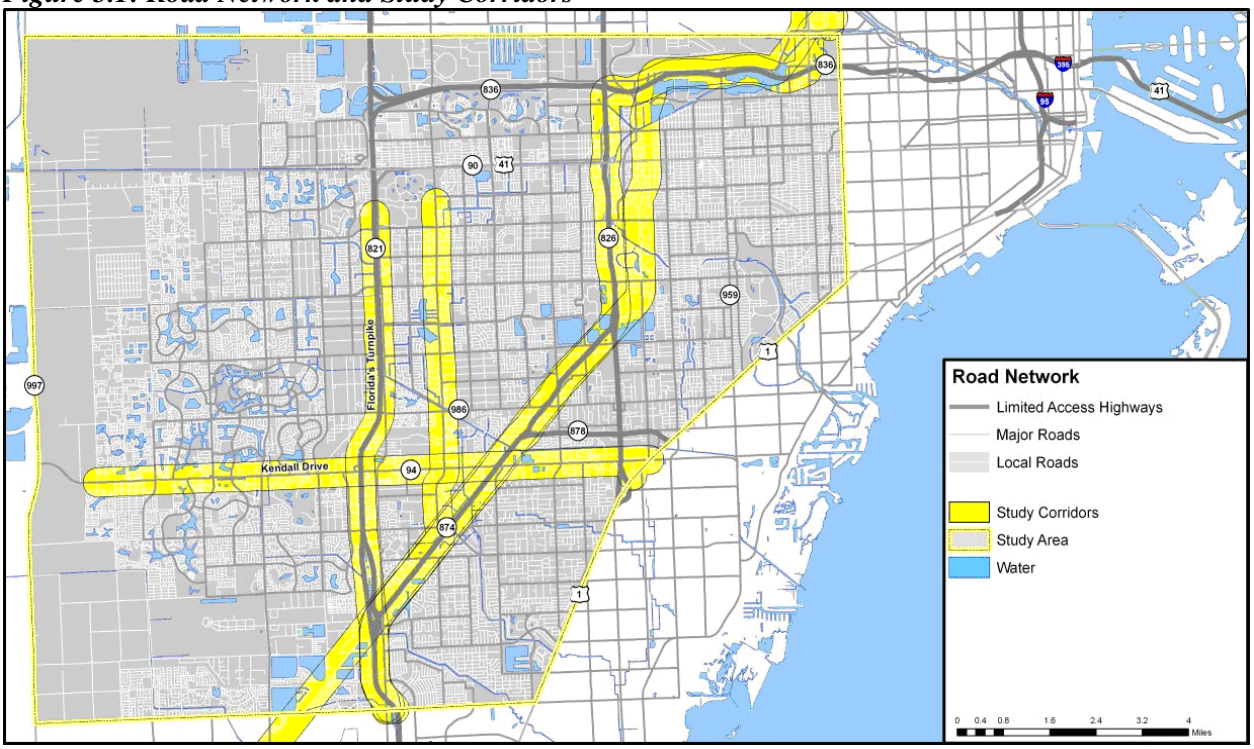
	Kendall	PERCENT	Miami-Dade County	PERCENT	State of Florida	PERCENT
12:00 a.m. to 4:59 a.m.	5,250	2.3%	23,078	2.6%	195,491	2.9%
5:00 a.m. to 5:29 a.m.	4,157	1.8%	20,377	2.3%	162,873	2.4%
5:30 a.m. to 5:59 a.m.	5,467	2.4%	26,301	3.0%	247,678	3.7%
6:00 a.m. to 6:29 a.m.	16,129	7.1%	73,828	8.4%	569,201	8.5%
6:30 a.m. to 6:59 a.m.	22,481	9.9%	85,142	9.7%	720,998	10.8%
7:00 a.m. to 7:29 a.m.	39,885	17.6%	135,810	15.5%	1,063,673	15.9%
7:30 a.m. to 7:59 a.m.	31,221	13.8%	118,740	13.6%	1,046,414	15.6%
8:00 a.m. to 8:29 a.m.	33,212	14.7%	121,865	13.9%	812,057	12.1%
8:30 a.m. to 8:59 a.m.	13,991	6.2%	57,395	6.6%	388,700	5.8%
9:00 a.m. to 9:59 a.m.	19,165	8.5%	68,497	7.8%	419,450	6.3%
10:00 a.m. to 10:59 a.m.	7,834	3.5%	27,324	3.1%	167,860	2.5%
11:00 a.m. to 11:59 a.m.	2,831	1.3%	10,859	1.2%	77,065	1.1%
12:00 p.m. to 3:59 p.m.	12,899	5.7%	54,664	6.2%	413,569	6.2%
4:00 p.m. to 11:59 p.m.	11,652	5.2%	51,294	5.9%	418,050	6.2%
Total (Working Outside the Home)	226,174	100.0%	875,174	100.0%	6,703,079	100.0%

Source: 1990 U.S. Census, 2000 U.S. Census

3 General Right-of-Way Characteristics

This section will describe the study corridors in more detail. These are Kendall Drive, the CSX Corridor, the SR 826 / SR 874 Corridor and the Homestead Extension of Florida's Turnpike (HEFT) Corridor.The Kendall Drive corridor as defined in this study runs westwards from Dixie Highway / U.S. 1 to Krome Avenue / SW 177th Avenue for approximately 11 miles. The single track CSX corridor under consideration in this study runs in a southwesterly direction from the South Florida Rail Corridor (SFRC) main line tracks near the future Miami Intermodal Center (MIC), along the southern boundary of Miami International Airport (MIA), and then south through the Oleander Junction along the Homestead Subdivision towards the MetroZoo roughly near the intersection of SW 152nd Street and SW 137th Avenue. The SR 826 / SR 874 corridor as defined in this study runs southward on the Palmetto Expressway / SR 826 from the Dolphin Expressway / SR 836 and then turns southwestwards along the Don Shula Expressway / SR 874 to the interchange with the Turnpike. The HEFT corridor is defined as the portion of the Florida's Turnpike that extends southward from the Dolphin Expressway / SR 836 to SW 152nd Street.

Figure 3.1: Road Network and Study Corridors



Functional Classification of Roads

The hierarchy of roads organizes the functions of different types of roads. At the top of the hierarchy are limited access roads expressways or toll roads. These roads provide largely uninterrupted travel, often using partial or full access control, and are designed for high speeds. The next level are arterials. In general, arterials are major through roads that are expected to carry large volumes of traffic. Arterials are often divided into major and minor arterials, and rural and urban arterials. These are followed by collectors, which act to collect traffic from local roads and distribute it to arterials. At the bottom of the hierarchy are local streets and roads. The functional classification of roads within the study area is depicted in Figure 3.2.

The HEFT, SR 874 and SR 826 are the only limited access roads within the study area. Major arterials include the East - West Kendall Drive, Killian Drive and Sunset Drive (east of SW 117th Avenue) and the North – South U.S. Route 1, SW 87th Avenue (north of Kendall Drive), SW 107th Avenue and SW 117th Avenue. Sunset Drive (west of SW 117th Avenue) and SW 112th Street (east of SW 97th Avenue) are the only East – West minor arterials in the study area. North – South minor arterials include SW 127th Avenue, SW 137th Avenue, SW 147th Avenue and SW 157th Avenue (north of Kendall Drive). SW 117th, SW 107th and SW 87th Avenues are classified as minor arterials south of Kendall Drive only.

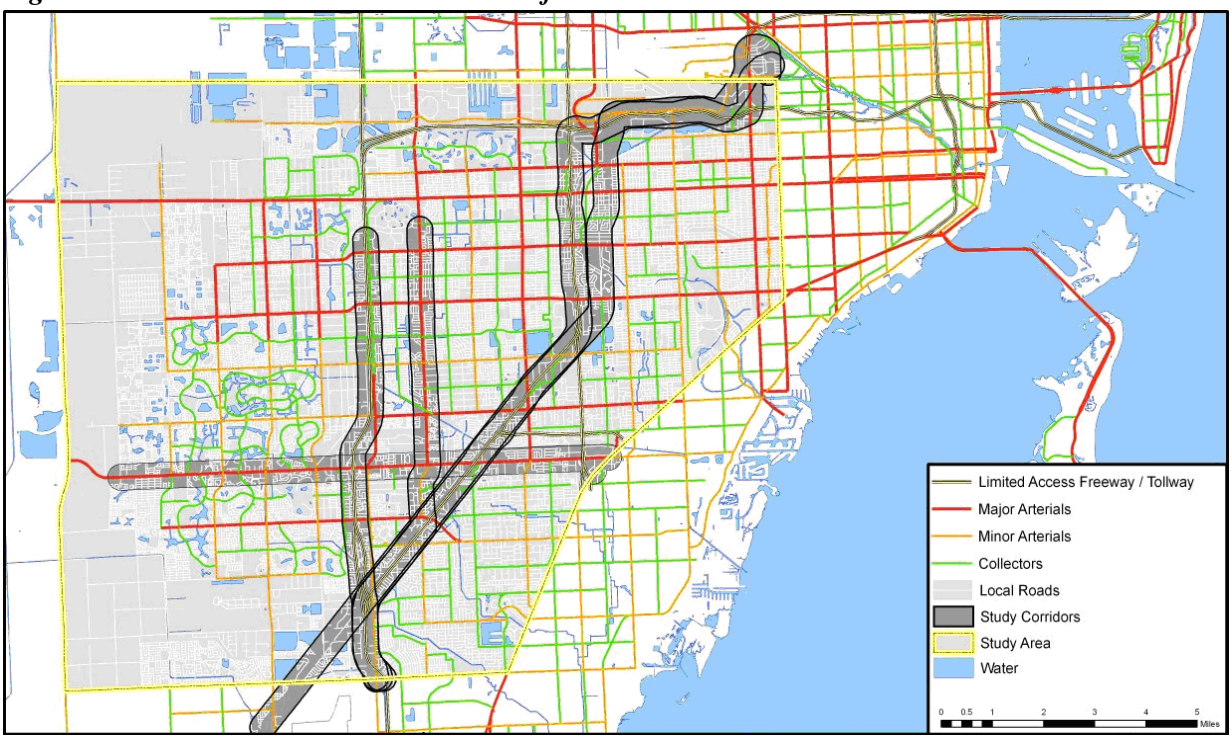
The FDOT classifies the arterial access restrictions on Kendall Drive at class 5 from U.S. 1 west to SW 142nd Avenue and class 3 west of SW 142nd Avenue to Krome Avenue. Arterial access management classification standards range from class 2 to class 7 and define the nature in which curb cuts, driveway connections, medians and traffic signals are controlled. Kendall Drive is less restrictive in the older sections of the corridor, east of SW 142nd Avenue as shown in Table 3.1. West of SW 142nd Avenue, minimum allowable distances for connections, openings and signals increase with the more restrictive set of access management standards.

Table 3.1: FDOT Access Management Classifications

ACCESS CLASS	FACILITY DESIGN FEATURES (MEDIAN TREATMENT AND ACCESS ROADS)	MINIMUM CONNECTION SPACING (FEET)	MINIMUM MEDIAN OPENING SPACING (DIRECTIONAL) (FEET)	MINIMUM MEDIAN OPENING SPACING (FULL) (MILE)	MINIMUM SIGNAL SPACING (MILE)
2	Restrictive with Service Roads	1320/660	1320'	0.5	0.5
3	Restrictive	660/440	1320'	0.5	0.5
4	Non-Restrictive	660/440	N/A	N/A	0.5
5	Restrictive	440/245	660'	0.5/0.25	0.5/0.25
6	Non-Restrictive	440/245	N/A	N/A	0.25
7	Both	125	330'	0.125	0.25

Source: Florida Department of Transportation, 14-97.003: Access Management Classification System and Standards

Figure 3.2: Road Network Functional Classification

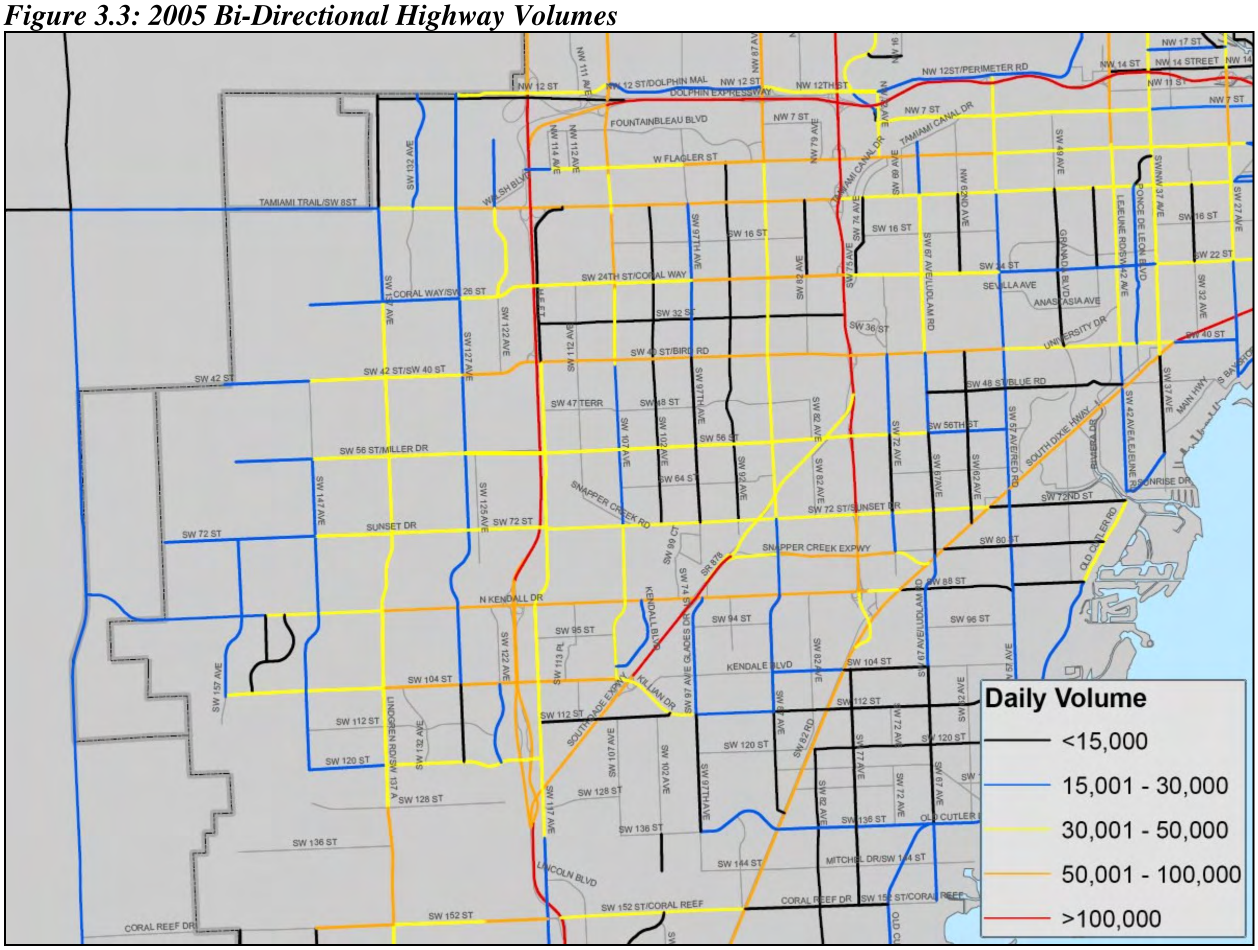


Within these major corridors, many smaller streets provide local access. A limited number of these roadways act as collectors and provide access across major corridors, while the remainder serve a strictly local purpose. This results in very high volumes on the major corridors, as local traffic attempts to make longer distance trips. For inter-zonal trips, almost 60% (40.8% of total Kendall area trips) head eastwards towards central and downtown Miami along with the northeast coastal and beach areas. Almost 70% of the remaining inter-zonal trips (17.15% of total Kendall area trips) are bound for the Airport / Doral area.

Vehicular Circulation

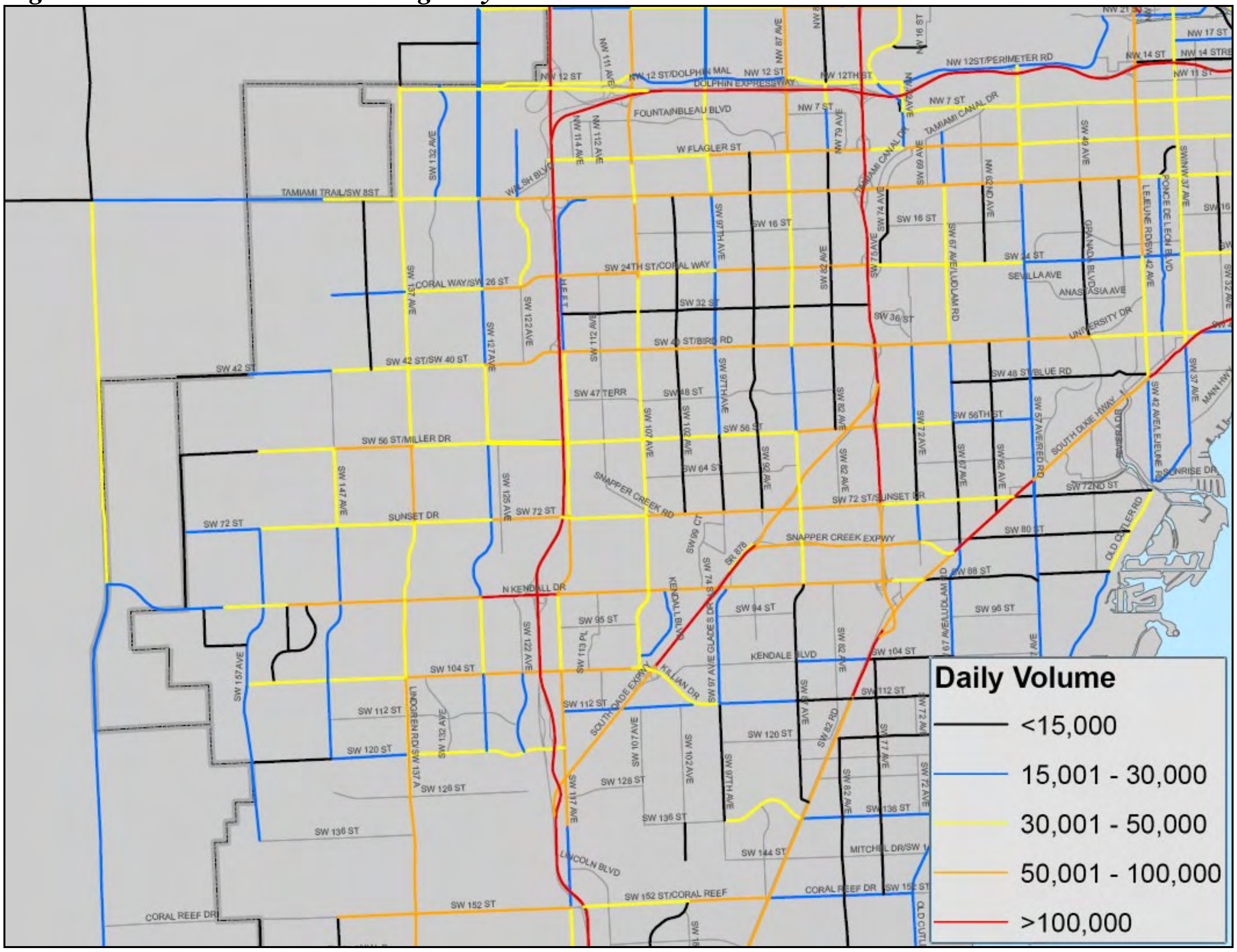
Kendall Drive carries the highest volume of east-west traffic through the study area according to the 2007 Miami-Dade MPO Arterial Grid Analysis Study. The 2005 Bi-Directional Highway Volumes map (Figure 3.3) shows that Kendall Drive generally carries between 50,000 and 100,000 vehicles per day. Much of the SR 826 and HEFT corridors carry over 100,000 vehicles per day. The SR 874 corridor is busiest between the Snapper Creek Expressway / SR 878 and Killian Parkway / SW 104th Street. It carries slightly fewer vehicles between Killian Parkway and the Turnpike and fewer than 50,000 vehicles between SR 878 and SR 826. The 2015 Bi-Directional Highway Volume map (Figure 3.4), shows that volumes are anticipated to increase in the future, with the portion of Kendall Drive near the HEFT exceeding 100,000 vehicles per day.

Figure 3.3: 2005 Bi-Directional Highway Volumes



Source: 2007 Miami-Dade MPO Arterial Grid Analysis Study

Figure 3.4: 2015 Bi-Directional Highway Volumes



Source: 2007 Miami-Dade MPO Arterial Grid Analysis Study

Travel patterns along Kendall Drive are heaviest eastbound during the AM peak period and westbound during the PM peak period. High volumes of traffic are consistently observed traveling in both directions throughout the day, however, due to the linear nature of employment and retail uses along the length of the corridor. The grid pattern of major roads allows for drivers to select many distinct routes to reach their destinations.

The average annual daily traffic (AADT) in 2005 along selected road segments within the study area is shown in Table 3.2. Kendall Drive along with the parallel Sunset Drive / SW 72nd Street / SR 986 and Killian Parkway / SW 104th Street carry the majority of east-west traffic through the study area. The H.E.F.T / SR 821, SR 874 / Don Shula Expressway and SR 826 / Palmetto Expressway carry the majority of north-south travel through the study while SW 147th Avenue, SW 137th Avenue, SW 127th Avenue, SW 87th Avenue and Dixie Highway / U.S. 1 carry much of the intra-zonal north-south flows.

Table 3.2: 2005 Average Annual Daily Traffic (AADT) Counts

FACILITY	LOCATION	AADT
BIRD RD (SW 42 ST)	WEST OF SW 127 AV	45,540
BIRD RD (SW 42 ST)	WEST OF SW 137 AV	34,510
BIRD RD (SW 42 ST)	WEST OF SW 147 AV	20,380
CORAL WAY (SW 24 ST)	WEST OF SEGOVIA ST	19,930
CORAL WAY (SW 24 ST)	WEST OF PALMETTO EXPWY	52,380
CORAL WAY (SW 24 ST)	WEST OF SW 107 AV	47,450
CORAL WAY (SW 24 ST)	WEST OF SW 87 AV	51,430
CORAL WAY (SW 24 ST)	WEST OF SW 97 AV	41,250
CORAL WAY (SW 24 ST)	EAST OF SW 67 AV	39,170
CORAL WAY (SW 26 ST)	WEST OF HEFT	48,910
CORAL WAY (SW 26 ST)	WEST OF SW 127 AV	30,720
CORAL WAY (SW 26 ST)	WEST OF SW 137 AV	27,330
GALLOWAY RD (SW 87 AV)	SOUTH OF KENDALL DR	23,100
GALLOWAY RD (SW 87 AV)	SOUTH OF SW 184 ST	8,100
HAMMOCKS BLVD	SOUTH OF KENDALL DR	9,960
KENDALL DR (SW 88 ST)	WEST OF HEFT	86,370
KENDALL DR (SW 88 ST)	WEST OF SW 137 AV	75,110
MILLER DR (SW 56 ST)	WEST OF HEFT	44,720
MILLER DR (SW 56 ST)	WEST OF PALMETTO EXPWY	46,870
MILLER DR (SW 56 ST)	WEST OF SW 107 AV	38,830
MILLER DR (SW 56 ST)	WEST OF SW 127 AV	41,570
MILLER DR (SW 56 ST)	WEST OF SW 137 AV	37,540
MILLER DR (SW 56 ST)	WEST OF SW 147 AV	27,680
MILLER DR (SW 56 ST)	WEST OF SW 69 AV	33,100
MILLER DR (SW 56 ST)	WEST OF SW 87 AV	41,780
MILLER DR (SW 56 ST)	WEST OF SW 97 AV	40,350
SUNSET DR (SW 72 ST)	WEST OF SW 137 AV	31,510
SUNSET DR (SW 72 ST)	WEST OF SW 147 AV	30,010
SUNSET DR (SW 72 ST)	WEST OF SW 157 AV	15,270
SW 104 ST	WEST OF SW 127 AV	57,720
SW 104 ST	WEST OF SW 137 AV	42,370
SW 104 ST	WEST OF SW 147 AV	40,010
SW 107 AV	SOUTH OF KENDALL DR	32,480
SW 117 AV	SOUTH OF MILLER DR	32,800
SW 117 AV	SOUTH OF KENDALL DR	32,810
SW 117 AV	SOUTH OF SW 112 ST	44,760
SW 117 AV	SOUTH OF SW 136 ST	24,400
SW 117 AV	SOUTH OF SW 152 ST	22,290
SW 120 ST	WEST OF SW 122 AV	31,350
SW 122 AV	SOUTH OF TAMIAMI TRAIL	33,010
SW 122 AV	SOUTH OF SW 104 ST	16,720
SW 127 AV	NORTH OF TAMIAMI TRAIL	18,530
SW 127 AV	SOUTH OF TAMIAMI TRAIL	24,270
SW 127 AV	SOUTH OF CORAL WAY	16,490
SW 127 AV	SOUTH OF BIRD DR	28,770
SW 127 AV	SOUTH OF MILLER DR	25,540

FACILITY	LOCATION	AADT
SW 127 AV	SOUTH OF SUNSET DR	26,360
SW 127 AV	SOUTH OF KENDALL DR	21,340
SW 127 AV	SOUTH OF SW 104 ST	11,310
SW 132 AV	NORTH OF TAMIAMI TRAIL	17,000
SW 137 AV	SOUTH OF TAMIAMI TRAIL	28,330
SW 137 AV	SOUTH OF CORAL WAY	40,590
SW 137 AV	SOUTH OF BIRD DR	38,730
SW 137 AV	SOUTH OF MILLER DR 4	2,370
SW 137 AV	SOUTH OF KENDALL DR	46,470
SW 137 AV	SOUTH OF SW 104 ST	45,020
SW 137 AV	SOUTH OF SW 152 ST	49,700
SW 147 AV	SOUTH OF BIRD RD	27,660
SW 147 AV	SOUTH OF MILLER DR	28,190
SW 147 AV	SOUTH OF KENDALL DR	27,200
SW 147 AV	SOUTH OF SW 104 ST	18,510
SW 152 AV	SOUTH OF KENDALL DR	11,010
SW 152 ST	WEST OF SW 137 AV	50,460
SW 157 AV	NORTH OF KENDALL DR	19,760
SW 72 AV	SOUTH OF BIRD DR	21,180
SW 72 AV	SOUTH OF MILLER DR	11,140
SW 74 AV	SOUTH OF TAMIAMI TRAIL	10,600
SW 82 AV	SOUTH OF TAMIAMI TRAIL	12,230
SW 97 AV	SOUTH OF TAMIAMI TRAIL	22,450
SW 97 AV	SOUTH OF CORAL WAY	17,180
SW 97 AV	SOUTH OF BIRD DR	13,760
SW 97 AV	SOUTH OF MILLER DR	11,310
SW 97 AV	SOUTH OF KENDALL DR	15,360
SW 97 AV	NORTH OF SW 136 ST	11,930

Source: Miami-Dade Public Works Department / Traffic Engineering Division

Kendall Drive operates at or near capacity for large stretches of the corridor between U.S. 1 and SW 127th Avenue. Level of service (LOS) is a measure of ratio of traffic volume to traffic capacity and provides a measure of the nature of traffic flow during peak periods. Volume to Capacity (V/C) ratios in the study area tend to be much higher on the east-west roadways with peak period flows at or near capacity. The level of service characterizes the operating conditions on the facility in terms of traffic performance measures related to speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. The LOS system uses the letters A through F as a range of traffic conditions from free flowing to congested.

LOS A - conditions where traffic flows at or above the posted speed limit and all motorists have complete mobility within and between lanes.
LOS B – additional volume begins to impact maneuverability but does not impact travel speeds.
LOS C – most experienced drivers are comfortable and posted speed is maintained; roads remain safely below but efficiently close to capacity but the ability to pass or change lanes is not always assured.
LOS D – represents high-density but stable flow; speed and freedom to maneuver are severely restricted; conflicts due to turning, passing or lane changing degrade driver comfort and convenience.
LOS E – operating conditions are at or near capacity. Flow becomes irregular and speed varies rapidly, as minor disturbances within the traffic stream will cause breakdowns in flow.
LOS F – describes forced or breakdown flow, where the amount of traffic approaching a point exceeds the amount which can traverse the point, often causing vehicles to move in ‘stop and go’ conditions.

Travelers on area roadways experience significant delay, particularly during the peak periods, with many roadways experiencing level of service LOS E or F conditions. Figure 3.5 shows that Kendall Drive currently operates at failing LOS F conditions from SR 826 to SW 137th Avenue. The parallel Miller Drive, Sunset Drive and Killian Parkway are also operating above capacity. As development continues to occur throughout the study area, drivers can expect extremely congested traffic conditions, with more roadway sections anticipated to deteriorate to LOS F. Figure 3.6 shows that highway levels of service is the study area volumes are anticipated to degrade significantly by 2015.

Figure 3.5: 2005 Highway Level of Service

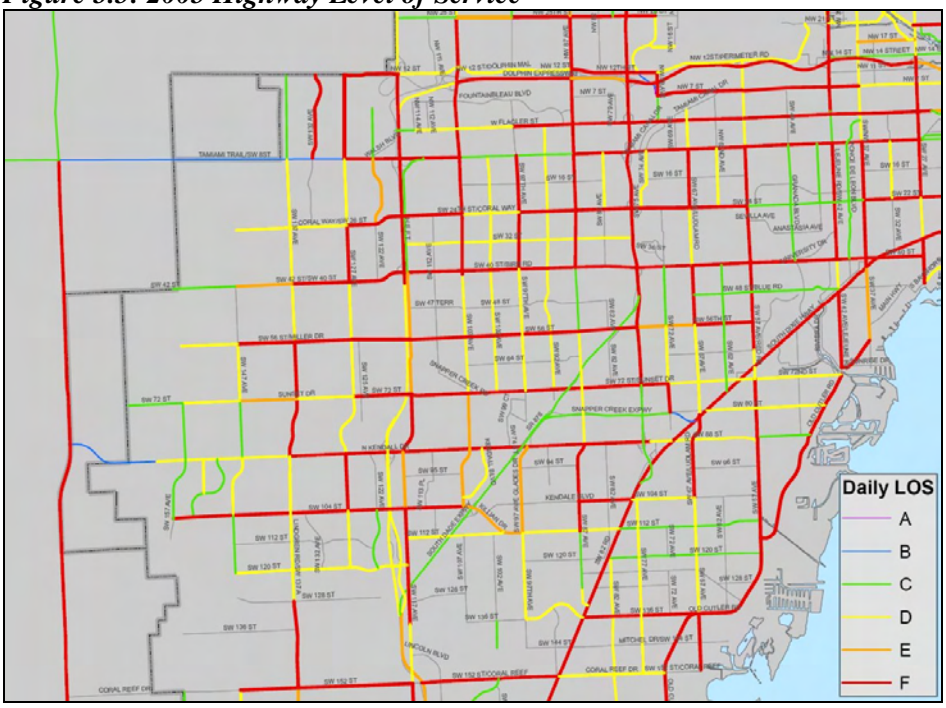
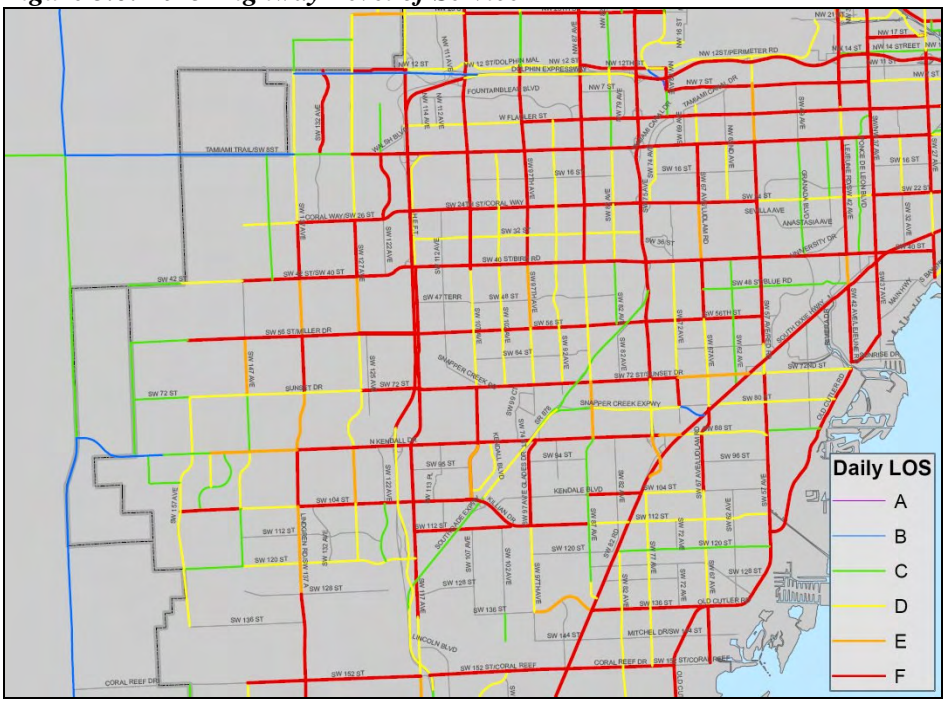


Figure 3.6: 2015 Highway Level of Service



The Kendall Drive Corridor

Kendall Drive / SW 88th Street / SR 94 is a state principal arterial that is one of the most important and highly utilized east-west transportation corridors in southern Miami-Dade County. The Kendall Drive corridor as defined in this study runs westwards from Dixie Highway / U.S. 1 to Krome Avenue / SW 177th Avenue for approximately 11 miles. The current posted speed limit along Kendall Drive is 45 miles per hour. Kendall Drive has evolved from a predominantly rural roadway to an urban arterial that carries large volumes of traffic. The severity and duration of traffic congestion along the corridor continues to increase as development, and now redevelopment, occurs. The study corridor is defined as the portion of Kendall Drive that runs westward from Dixie Highway / U.S. 1 to SW 157th Avenue.

The eastern extent of the Kendall Drive / SW 88th St / SR 94 corridor is located in the Dadeland / Downtown Kendall area. Land use is dominated by retail and office properties. The Dadeland Mall occupies the large parcel of land north of Kendall Drive that extends west from Dixie Highway / U.S. 1 to SR 826. The parcels south of Kendall Drive and north of Dixie Highway contain a mix of high-density office, hotels and new mixed-use high density housing developments. Strip commercial development is slowly turning over to higher intensity uses and the new high-rise residential developments invoke a decidedly urban feeling. The landscape along Kendall Drive, however, is still dominated by a multi-lane arterial road network, surface parking lots, narrow sidewalks and scant green spaces.

A recent planning process aimed to create a more cohesive and pedestrian friendly environment within this classic "Edge-City". The Downtown Kendall Master Plan and Development code was adopted in December 1999 by the Miami-Dade Board of County Commissioners. The plan envisions the redevelopment of existing low-density structures and surface parking lots into high-density, mixed-use development. The Dadeland Mall is re-envisioned with liner buildings that face the street and hide parking structures from plain view while encouraging pedestrian plazas fronting existing mall entrances. The plan also calls for the redevelopment of residential parcels north of Snapper Creek Canal and south of the Snapper Creek Expressway / SR 878 into a more pedestrian friendly neighborhood.

The portion of Kendall Drive between S.R. 826 and the Don Shula Expressway / S.R. 874 transitions from high-density commercial and residential uses into a medium-density single-family residential neighborhood. Many of these homes front upon Kendall Drive, with auto access provided by a private driveway curb-cut or service roads. Kenwood K-8 Center School is located just south of Kendall Drive at SW 97th Avenue and SW 90th Street. The largest trip generator within this portion of the corridor - and one of the largest in the corridor as a whole – is the Baptist Hospital of Miami. The hospital is the largest employer and largest land owner within the study area. The hospital and related commercial buildings are located south of Kendall Drive, north of SW 94th Street, west of SW 87th Avenue and east of SW 92nd Avenue. The parcels immediately to the east of the Don Shula Expressway / SR 874 contain a mix of low to medium density residential, low-density commercial, a parochial school and the K-Land Park.

Land uses west of the Don Shula Expressway / SR 874 are extremely varied, from low density, single-family houses to high-density, multi-family dwellings and strip commercial developments. Retail uses particularly predominate near the Homestead Extension of Florida's Turnpike (H.E.F.T) / SR 821 with a large shopping plaza north of Kendall Drive and west of SW 117th Avenue. Parks within this portion of the corridor include the large Kendall Indian Hammocks Park which lies approximately one-half mile north of Kendall Drive along with Snapper Creek and Kendale parks. Schools include Miami-Douglas High School, Sunset Park Elementary, Kendale Elementary, McGlannon School, Bougainville School and Haven School. A large trip generator within this portion of the corridor is the Miami-Dade Community College – Kendall Campus. The commuter school is located on a large campus generally bounded by SW 96th Street, SW 108th Avenue, Killian Parkway / SW 104th Street and SW 113th Avenue. Access to the site is primarily from Killian Parkway SW 104th Street and its nearby interchange with the Don Shula Expressway / SR 874.

Another large and expanding retail development sits north of Kendall Drive just to the west of the H.E.F.T / SR 821. A large parcel of land, designated in the county land use documentation file as Communications, Utilities, Terminals and Plants, lies north and west of the commercial development and is bounded by SW 127th Avenue on the west and roughly by SW 79th Street and SW 76th Street to the north. This under-developed parcel near a major highway interchange and along a major commercial and dense residential corridor is ripe for redevelopment. As with much of the Kendall area, the land here is located within a well protection zone. This issue has been largely addressed through the agreements that comprise the many Planned Unit Developments here. The Calusa Country Club golf community and surrounding single-family houses encompass the large block bounded by Kendall Drive on the north, SW 127th Avenue on the east, SW 104th Street on the south and SW 137th Avenue on the west. Medium-density commercial and multi-family residential uses make up the parcels immediately south of Kendall Drive.

The portion of Kendall Drive between SW 137th Avenue and SW 149th Avenue contains additional strip retail plazas and multi-family residential developments. West of SW 152nd Avenue, the corridor is composed of more contemporary single-family residential neighborhoods and big-box retail projects. Two large agricultural parcels are slated for mixed-use retail and residential development with a "town-center" orientation. Schools within the corridor west of the H.E.F.T / SR 821 include Hammocks Junior High School, Calusa, Winston Park, Kendale Lakes and Oliver Hoover Elementary Schools and Temple Samu-El Or Olom School. There are many small parks in this portion of the corridor including Winston Park, Calusa Club Estates, Kings Meadow, Kendale Lakes, Water Oaks, Hammocks and Olympic.

Right of Way Width

The right-of-way (ROW) generally averages around 100 feet wide and is generally comprised of three lanes in each direction. The low-density residential portion of Kendall Drive between SW 87th Avenue and SW 97th Avenue is approximately 90 feet wide. A segment from the HEFT to SW 127th Avenue has an eight-lane divided section with a ROW that is approximately 125 feet wide. The road cross-section currently narrows to two lanes in each direction west of SW 152nd Avenue. This portion of the corridor is slated for widening in the near future and adequate ROW is available.

The right-of-way is constrained for its entire length by residential community walls, bridge structures and properties with narrow setbacks. The road is generally divided by a raised planted median with frequent protected left-turn pockets. Plantings typically range from simple lawn grasses to shrubberies, deciduous trees and palm trees. The median is broken at intersections and bridge underpasses to provide additional room for left and right turn lanes.

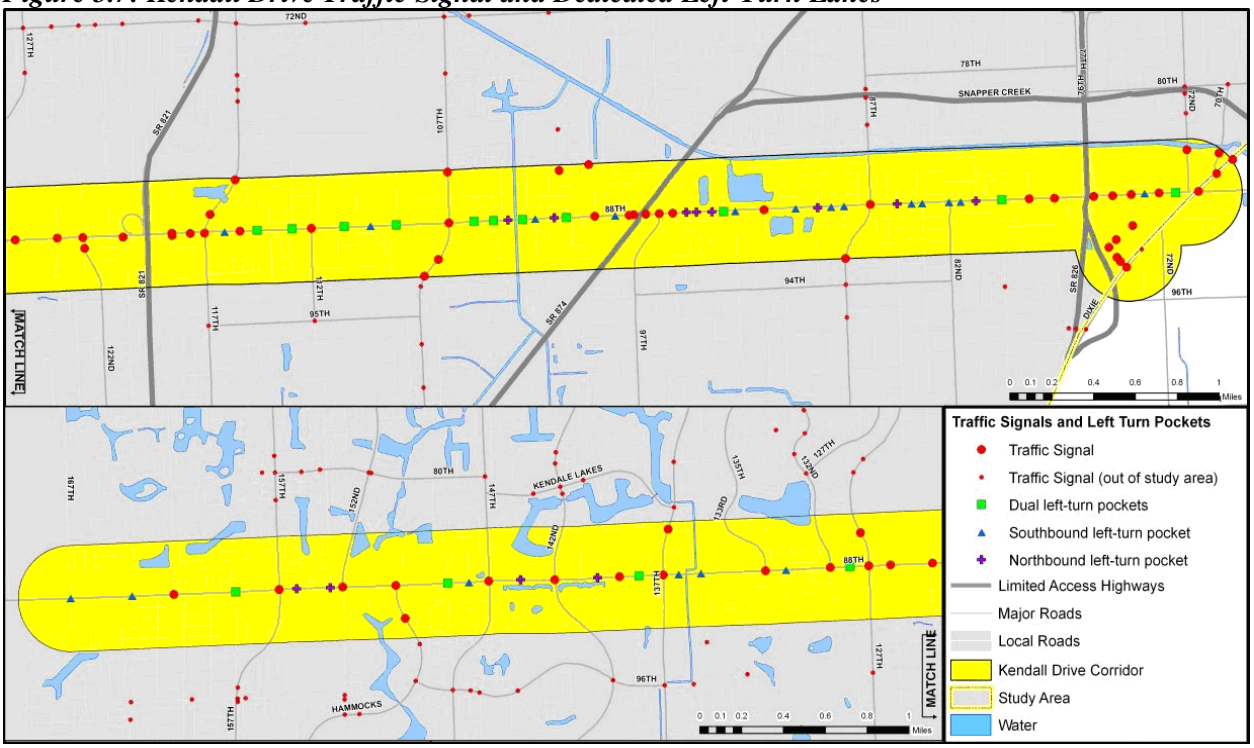
Signalized Intersections and Rail Crossings

As a principal urban arterial, Kendall Drive is heavily signalized, as shown in Table 3.3 and Figure 3.7. Most signalized intersections have at least one eastbound and west left-turn lanes. Many unsignalized left-turn pockets pass through breaks in the planted median to provide access to side streets and both residential and commercial driveways. There is one at-grade railroad crossing with the CSX railroad located immediately west of the Don Shula Expressway / SR 874 overpass. The crossing is fully signalized with both a uniform traffic signal and standard barrier lift gates. A limited amount of freight rail traffic does exist along this stretch of track and while proposals have been discussed, no passenger traffic is currently scheduled for the line.

Table 3.3: Kendall Drive Signalized Intersections

• Dadeland Mall access drives (2)	• Mills Drive
• South Dadeland Boulevard	• HEFT on/off-ramps
• Northbound SR 826 off-ramp	• SW 122nd Avenue
• SW 77th Avenue	• SW 125th Avenue
• SW 79th Avenue	• SW 127th Avenue
• SW 87th Avenue,	• SW 132nd Avenue
• SW 89th Avenue	• SW 133rd Avenue
• SW 90th Avenue	• SW 137th Avenue
• SW 97th Avenue	• SW 142nd Avenue
• SR 874 on- and off-ramps	• SW 147th Avenue
• SW 99th Court	• SW 151st Avenue
• SW 107th Avenue	• SW 152nd Avenue
• SW 112th Avenue	• SW 157th Avenue
• SW 117th Road	• SW 162nd Avenue
• SW 117th Avenue	• SW 177th Avenue / Krome Avenue

Figure 3.7: Kendall Drive Traffic Signal and Dedicated Left-Turn Lanes



Bridges / Culverts

There are several significant bridge structures within the study corridor. The Metrorail track bridge crosses over Kendall Drive immediately to the west of the intersection with Dixie Highway / U.S. 1. Single bridge supports exist on both the north and south sides of Kendall Drive, in addition to a support placed within the median. Moving west, the Palmetto Expressway / SR 826 overpass constrains the right-of-way with bridge supports that are placed within the median of Kendall Drive and with earthen and concrete bridge abutments. The bridge abutments do provide enough right-of-way for additional vehicle lanes, but property line constraints on either side of the overpass limit the usefulness of any road widening.

Kendall Drive then meets the overpass of the Don Shula Expressway / SR 874 approximately two miles to the west. The configuration of the earthen and concrete bridge abutments strictly limits the right-of-way to its current configuration of six-lanes plus two left-turn pockets that access the southbound SR 874 on-ramp. Bridge support columns also exist within the median. Two-thirds of a mile west of the expressway near SW 103rd Avenue, Kendall Drive crosses over the South Florida Water Management District's C-110C Cutler Drain Canal on a continuous culvert with a planted median. This structure does not present any major constraints to changes in road configuration.

Kendall Drive passes underneath the HEFT / SR 821 overpass 1.75 miles west of the canal culvert. The right-of-way is again strictly constrained by the earthen and concrete bridge abutments, lane configuration and bridge supports in the median. The existing lane configuration includes three westbound through lanes, one southbound HEFT on-ramp approach lane, three eastbound through lanes and two northbound HEFT on-ramp approach lanes. A final culvert allows Kendall Drive to cross over a drainage canal approximately 1.6 miles to the west near SW 137th Avenue. There are no additional bridges, culverts or retaining structures within the Kendall Drive study corridor.

The CSX Corridor

The single track CSX corridor under consideration in this study runs in a southwesterly direction from the South Florida Rail Corridor (SFRC) main line tracks near the future Miami Intermodal Center (MIC), along the southern boundary of Miami International Airport (MIA), and then south through the Oleander Junction along the Homestead Subdivision towards the MetroZoo roughly near the intersection of SW 152nd Street and SW 137th Avenue.

Moving westward from the MIC, the track switches off the SFRC main line and loops around a light industrial area. A double at-grade crossing exists across both Le Juene Road / NW 42nd Avenue / SR 953 and the Airport Expressway / SR 112 in the vicinity of NW 29th Street. Both crossings are currently signaled, with grade crossing protection in place. There is no short term plan to improve or grade-separate this busy crossing as part of the roadway improvement program included within the MIC construction project. An additional potential conflict that could arise should the crossings remain in the future is that the Airport Expressway runs in a contra-flow orientation in this area, with southbound traffic running on the east side of the divided road, while northbound traffic runs along the western side of the road. This could potentially be confusing to both motorists and transit operators and could increase the incidence of conflicts.

The rail line then passes over a drainage canal and runs southwards next to an MIA freight handling facility to the west and a drainage canal and the elevated Airport Expressway to the east. The track then passes underneath the main Airport Expressway / NW 21st Street corridor and appears to have a drainage canal running under and along the corridor in a culvert. An unsignalized grade crossing exists at NW 20th Street near an electrical substation, airport fuel tanks and other airport support buildings. The track parallels the fuel tank farm to the west and the South Florida Water Management District (SFWMD) C-4 Tamiami Canal to the east.

After crossing a bridge over a small inlet, the tracks cross over NW 14th Street with a signalized, at-grade crossing with grade grossing protection. The rail line turns westwards and parallels the airport's Perimeter Road to the north and the Dolphin Expressway / SR 836 and the Blue Lagoon to the south. An at-grade, signalized crossing with grade grossing protection exists at Red Road / NW 57th Avenue / SR 959 near access ramps for SR 836. The line passes through two switches, one that provides access to the Florida East Coast railway (FEC) Ludlam Branch and the other heads westward on to a short tail track. This tail track has been proposed to extend westward and connect to the CSX Leigh Spur that heads towards the rock quarry operations west of 137th Avenue.

Turning south, the CSX Homestead Subdivision passes through the Oleander Junction. After passing underneath the Dolphin Expressway / SR 836, the CSX line turns slightly towards the southwest. The FEC tracks approach from the northwest and head due south under SR 836 and meet the CSX line just north of the NW 7th Street overpass. Connections within the signal controlled Oleander Junction allow CSX trains to access the CSX Lehigh Spur, FEC Ludlam Branch and CSX connections through the SFRC in addition to the Homestead Subdivision. The FEC line continues due south on the west side of Lake Mahar and east of Robert King High Park. The CSX tracks run to the west of Robert King High Park and east of a drainage canal and high-density residential neighborhood.

The tracks once again cross the SFWMD C-4 Tamiami Canal and a signalized, at-grade crossing with grade grossing protection at West Flagler Street before passing several light commercial and low-density residential properties where they enter a light-industrial district. Running due south, the line passes through at-grade crossings with SW 4th Street, SW 9th Street, SW 12th Street, SW 13th Street, SW 13th Terrace. The tracks turn towards the southwest and pass through a single-family residential neighborhood with at-grade crossings at SW 16th Street, SW 21st Street, SW 22nd Street and SW 23rd Street. The line veers slightly towards the southeast to run in the median of SW 72nd Avenue before crossing through the intersection with Coral Way / SW 24th Street to the east side of SW 72nd Avenue. The signalized intersection must contend with not only north-south and east-west vehicular traffic, but also with railroad tracks that pass across lanes of traffic.

On the south side of Coral Way, the tracks pass east of Coral Way Park and parallel SW 72nd Avenue through a light industrial district. Continuing due south, SW 72nd Avenue crosses from the west side of the tracks through a signalized at-grade crossing and turns south the parallel the tracks again before both pass over the SFWMD C-3 Coral Gables Canal. The tracks then pass west of a single-family residential neighborhood and east of Ad Barnes Park and cross SW 39th Street at an at-grade crossing. After passing through the intersection of SW 72nd Avenue and Bird Road / SW 40th Street, the line once again turns southwest and passes through another light industrial district with at-grade crossings at SW 41st Street, SW 42nd Street and SW 75th Avenue.

At this location, the CSX tracks pass under the Palmetto Expressway / SR 826 and run adjacent to the Don Shula Expressway / SR 874 right-of-way. The underpass is constrained by access ramps, bridge supports and earthen and concrete bridge abutments. Running along the southern side of SR 874, the tracks pass multi-family residential properties before passing over SW 56th Street at a signalized, at-grade crossing with grade grossing protection. Both the tracks and the Don Shula Expressway pass through a low-density residential area and Sunkist Estates Park for about one mile before reaching SW 87th Street. The rail line crosses the street at-grade, while SR 874 flies over both the tracks and the street, touching down south of the tracks. It then runs north of the expressway and to the south a public water supply facility before meeting SW 72nd Street at a signalized, at-grade crossing with grade crossing protection. The corridor passes through a single-family residential neighborhood and crosses over the SFWMD C-2 Snapper Creek Canal before meeting Kendall Drive / SW 88th Street.

After passing through the signalized, at-grade crossing with Kendall Drive, the tracks pass several multi-family residential properties and then returns to a predominantly single-family residential district. The corridor passes just to the north of the Kendall Golf Course, crosses an electrical utility corridor and then over the SFWMD C-100 Cutler Drain Canal. A smaller drainage canal parallels the corridor to the

northwest, before both the tracks and SR 874 pass under the Killian Parkway / SW 104th Street interchange. A multi-family residential neighborhood lies to the northwest of the corridor and a low-density single family neighborhood lies to the southeast. The tracks then cross SW 112th Street at-grade and pass adjacent to a single family residential neighborhood. A toll plaza for Florida's Turnpike controls access here for SR 874 traffic traveling to and from the HEFT just three-quarters of a mile down the road.

Approaching the HEFT, the CSX rail tracks pass by several light industrial properties and then over the SFWMD C-100 Cutler Drain Canal. The Don Shula Expressway/ SR 874 terminates at the HEFT, while the tracks continue under the turnpike overpasses and to the west of a small light industrial district. The line runs past several vacant, but developing parcels and into the new residential neighborhood of Three Lakes. The lakes in this area appear to be former rock mining pits that have become new waterfront residential areas. The tracks pass an electrical substation and a utility right-of-way as it passes between former quarries and new subdivisions.

Just west of SW 144th Street, the Homestead Subdivision tracks meet the 11-mile Portland Spur segment of CSX track in a wye. From here, a single track runs to Krome Avenue where it turns north and terminates at SW 58th Street. Two rock trains a day serve the Rinker Plant at the terminus of this spur. Further south on the main line, the tracks cross the SFWMD C-1N Bel-Aire Canal and then SW 152nd Street in an at-grade crossing near the northwestern boundary of the Miami MetroZoo. The tracks of the Homestead Subdivision continue out of the study corridor in a southwesterly direction for approximately 7.5 miles, before turning due south in the vicinity of SW 240th Street. The tracks continue for another five miles before terminating in the City of Homestead.

CSX Corridor Right-of-Way Width

Right-of-way width dictates how a corridor may be used and what types of uses may share the corridor at one time. CSX typically required a twenty-five foot center of track to center of track separation between different uses. According to the Miami-Dade MPO Rail Convertibity Study, the SFRC rail corridor from the MIC to the Oleander Junction is fifty feet wide. Continuing southwards down the CSX Homestead Subdivision, the right-of-way continues to be fifty feet wide until crossing Tamiami Trail / SW 8th Street. The right-of-way then transitions to a very tight sixteen feet before returning back to a fifty foot wide corridor at SW 11th Street. At SW 40th Street, the right-of-way again narrows to a width of twenty-five feet as it passes through a light industrial district before transitioning to a one-hundred foot wide right-of-way as it parallels the SR 874 corridor.

At-Grade Railroad Crossings

At-grade crossings are potential conflict points where the paths rail traffic, motorists and pedestrians meet. At-grade crossings with significant rail and vehicular traffic can negatively impact the levels of service for both modes. The potential for conflicts between rail vehicles and other modes is greatest at these at-grade crossings. Crossings may be signed, signaled and protected with grade grossing protection, but conflicts still occur with high regularity due to driver error, trespassing and other incursions within active rail rights-of-way. Attempting to remove these conflicts through grade separation can significantly increase project costs. The at-grade crossings along the CSX / SFRC rail corridor from the MIC to the Miami MetroZoo are listed in Table 3.4 below and shown in Figure 3.8.

Bridges / Culverts

There are nine bridges / culverts over canals and 17 underpasses or road bridges that cross over the Homestead Subdivision railroad corridor. All of the rail bridges are single-track, wooden structures that require major rehabilitation and many will need to be replaced before any passenger services could proceed. The available right-of-way may vary from structure to structure with some constrained by earthen and concrete bridge abutments, others restricted by narrow bridge structures. Table 3.5 lists the characteristics of and Figure 3.8 displays the location of bridges along the CSX railroad study corridor.

Table 3.4: CSX Corridor At-Grade Railroad Crossings

• Le Juene Road / NW 42nd Avenue / SR 953	• SW 23rd Street
• Airport Expressway / SR 112	• Coral Way / SW 24th Street
• NW 20th Street	• SW 72nd Avenue
• NW 15th Street	• SW 39th Street
• Red Road / NW 57th Avenue / SR 959	• Bird Road / SW 40th Street
• West Flagler Street	• SW 41st Street
• SW 4th Street	• SW 42nd Street
• SW 8th Street	• SW 75th Avenue.
• SW 9th Street	• Miller Road / SW 56th Street
• SW 12th Street	• SW 87th Avenue
• SW 13th Street	• Sunset Drive / SW 72nd Street
• SW 13th Terrace	• Kendall Drive / SW 88th Street.
• SW 16th Street	• Killian Drive / SW 112th Street
• SW 21st Street	• Coral Reef Drive / SW 152nd Street
• SW 22nd Street	• SW 137th Avenue

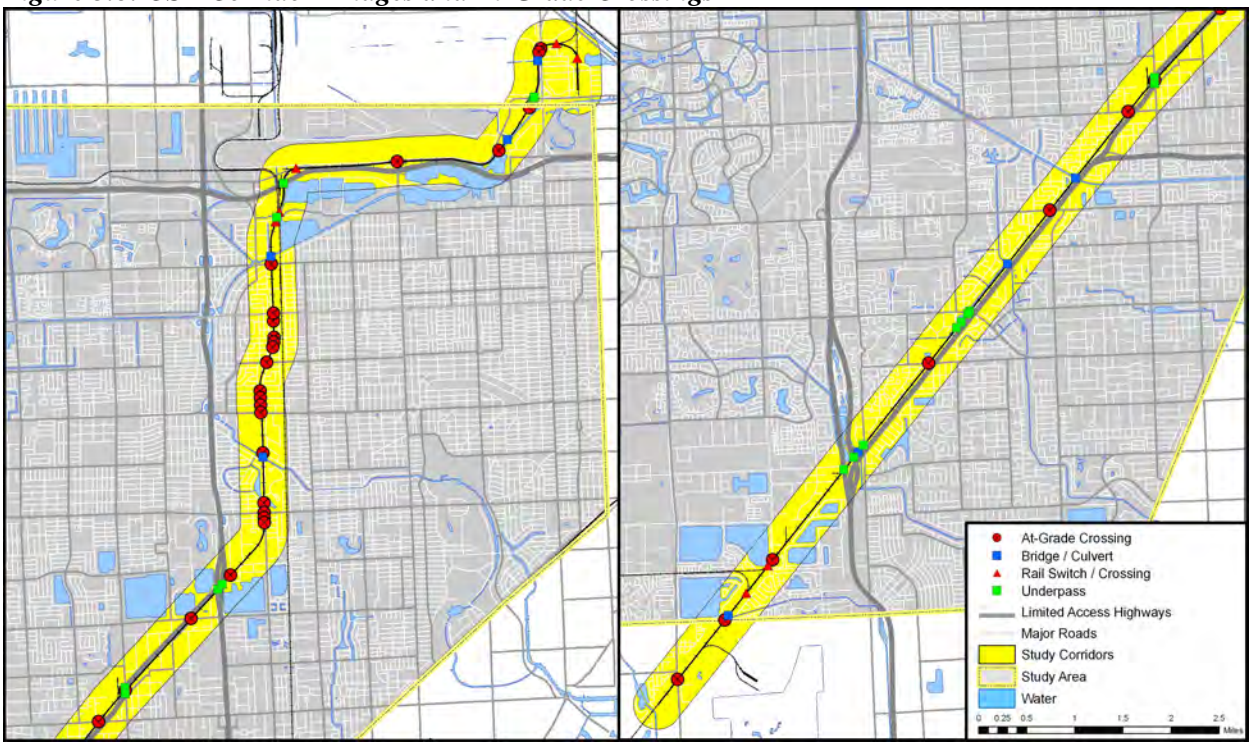
Table 3.5: CSX Corridor Bridge Characteristics

LOCATION	ORIENTATION	BRIDGE TYPE	SPAN TYPE	SUPPORTS IN ROW	SPACE AVAILABLE ON / UNDER EXISTING STRUCTURE	ROW AVAILABLE
Canal near NW 27th Street / Airport Expressway	Over	Wood support canal crossing	Single	No	No	Yes
EB/WB Airport Expressway / NW 21st Street	Under	8-lane highway overpass	Tandem	Yes	Yes	Constrained
EB Airport Expressway to SB Le Jeune Road	Under	2-lane highway ramp	Single	Yes	Yes	Constrained
Near EB Airport Expressway to SB Le Jeune Road	Over	Concrete canal culvert/abutment	Culvert	No	Yes	Yes
Near NW 45th Avenue and Perimeter Road	Over	Wood support canal crossing	Single	No	No	Yes
SR 836 near Oleander Junction	Under	6-lane highway overpass	Tandem	Yes	Yes	Constrained
NW 7th Street near NW 70th Aveneue	Under	6-lane road overpass	Single	Yes	Yes	Yes
Tamimi Canal near West Flagler Street / NW 71st Avenue	Over	Wood support canal crossing	Single	No	No	Yes
Coral Gables Canal near SW 72nd Avenue / N. Waterway Drive	Over	Wood support canal crossing	Single	No	No	Yes
SR 826 at SR 874	Under	5-lane highway overpass	Tandem	Yes	Yes	Yes
SR 874 at SW 87th Avenue	Under	6-lane highway overpass	Tandem	Yes	Yes	Yes
Snapper Creek Canal near SR 874 / SW 83rd Street	Over	Wood support canal crossing	Single	No	No	Yes
Cutler Drain Canal near SR 874 / SW 96th Street	Over	Wood support canal crossing	Single	No	No	Yes
SB SR 874 to WB Killian Parkway Interchange	Under	Single-lane highway ramp	Single	Yes	Yes	Yes

Table 3.5: CSX Corridor Bridge Characteristics (cont'd)

LOCATION	ORIENTATION	BRIDGE TYPE	SPAN TYPE	SUPPORTS IN ROW	SPACE AVAILABLE ON / UNDER EXISTING STRUCTURE	ROW AVAILABLE
Killian Parkway / SW 104th Street	Under	5-lane highway overpass	Tandem	Yes	Yes	Yes
EB Killian Parkway Interchange to SB SR 874	Under	Single-lane highway ramp	Single	Yes	Yes	Yes
SW 117th Avenue	Under	4-lane road overpass	Single	Yes	Yes	Yes
Cutler Drain Canal near SW 117th Avenue	Over	Wood support canal crossing	Single	No	No	Yes
NB H.E.F.T / SR 821	Under	3-lane highway overpass	Single	No	No	Yes
SB H.E.F.T / SR 821	Under	2-lane highway overpass	Single	No	No	Yes
Bel-Aire Canal near SW 152nd Street	Over	Wood support canal crossing	Single	No	No	Yes

Figure 3.8: CSX Corridor Bridges and At-Grade Crossings



The SR 874 / SR 826 Corridor

The Palmetto Expressway / SR 826 is a limited access expressway that wraps around Miami, extending westward from the Golden Glades interchange with Interstate 95, turning south to parallel 77th Avenue west of MIA, crossing the Dolphin Expressway / SR 836 and terminating in Downtown Kendall at Dixie Highway / U.S. 1. The Don Shula Expressway / SR 874 is a short, limited access expressway that extends in a southwesterly direction from SR 826 in the vicinity of SW 48th Street where the CSX Homestead Subdivision crosses the Palmetto Expressway towards the HEFT / SR 821 in the vicinity of SW 128th

Street. The SR 826 / SR 874 corridor as defined in this study runs southward on SR 826 from the Dolphin Expressway / SR 836 and then turns southwestwards along SR 874 to the interchange with the HEFT.

As it passes under the SR 836 / Dolphin Expressway, SR 826 is configured with four southbound-lanes and four northbound-lanes. There is a one-lane flyover ramp from eastbound SR 836 to southbound SR 826 that touches down in the center of the expressway and extends as a divided lane for approximately one-half mile to the half cloverleaf interchange with West Flagler Street. Along this portion of the corridor, the Palmetto Expressway passes a mix of uses including commercial / light industrial properties, high-density residential buildings, a retail plaza and a single family residential neighborhood. The eight-lane, barrier divided cross section generally continues southwards with additional acceleration and deceleration lanes present at on- and off-ramps.

South of West Flagler Street, SR 826 continues through single-family residential neighborhoods with light commercial uses present near the interchanges. One-half mile south of West Flagler Street, the Palmetto Expressway passes through a cloverleaf interchange with SW 8th Street / US 41. The SFWMD C-4 Tamiami Canal also passes east-west underneath the expressway within the interchange. SR 826 runs tightly adjacent to single-family residential neighborhoods to the west and the SFWMD C-3 Coral Gables Canal to the east for approximately one mile to the partial cloverleaf interchange with Coral Way / SW 24th Street. The canal turns eastwards at the interchange, but the eight-lane, barrier divided expressway continues southwards with single family residential neighborhoods on both sides to the interchange with Bird Road / SW 40th Street one mile further down the road. A pedestrian overpass exists in the vicinity of SW 37th Street that connects the residential communities on either side of the highway.

South of the Bird Road interchange, the expressway passes Tropical Park on the west and a light industrial district on the east. The lane configuration also changes as the road approaches the interchange with SR 874. Two southbound SR 826 lanes branch off slightly to the west while two continue due south to access SR 874. Two northbound SR 874 lanes merge in from the southwest to meet the two northbound SR 826 lanes. Two dedicated one-lane ramps that bypass the interchange also exist from northbound SR 874 to the Bird Road off-ramp and from the Bird Road on-ramp to the southbound SR 874.

The Don Shula Expressway / SR 874 continues in a southwesterly direction paralleling the CSX Homestead Subdivision tracks with Dade County Tropical Park located to the north and multi-family residential development to the south. The four-lane, barrier divided expressway passes over SW 56th Street and through a low-density single-family residential neighborhood. It then transitions to a four-lane, grass median expressway and crosses over SW 87th Avenue to the east of a water treatment facility and to the west of several light commercial properties. The CSX tracks also pass under SR 874 at this point and continue to run in a southwesterly direction along the north of the expressway. Continuing in a four-lane divided cross section, the Don Shula Expressway passes by an off-line commercial truck inspection station and crosses over Sunset Drive / SW 72nd Street.

At this point, SR 874 transitions back to a four-lane, barrier divided roadway and meets the Snapper Creek Expressway / SR 878 in a simple flyover interchange. A one-lane southbound ramp to Kendall Drive splits off from the main road before the interchange and is joined by the two westbound lanes of SR 878. Two of the four northbound lanes of SR 874 within the interchange split off to head eastbound along SR 878, with the remaining two continuing north. South of the interchange, the expressway crosses over the SFWMD C-2 Snapper Creek Canal with three westbound/southbound SR 878 lanes, two southbound SR 874 lanes, four northbound SR 874 lanes and one northbound/eastbound SR 878 on-ramp from Kendall Drive. The three westbound SR 878 lanes diverge so that two exit to Kendall Drive and two continue southbound to merge with SR 874. At Kendall Drive, two off-ramps provide access to Kendall Drive from northbound and southbound SR 874, one on-ramp provides access to southbound SR 874 and one provides access to northbound/eastbound SR 878. There is no northbound SR 874 access provided at Kendall Drive.

South of Kendall Drive, SR 874 transitions to a six-lane with grass median cross-section before crossing the SFWMD C-110C Cutler Drain Canal. Passing through a single-family residential neighborhood and

north of the Kendall Golf Course, the Don Shula Expressway meets Killian Parkway / SW 104th Street at a partial cloverleaf interchange. South of the interchange, the roadway transitions to a four-lane, grass median cross section as it passes by a multi-family residential neighborhood to the north and a single-family residential neighborhood to the south.

Shortly after crossing over Killian Drive / SW 112th Street, the SR 874 cross-section expands to encompass approximately twelve lanes as it approaches the Florida's Turnpike toll plaza. The right-of-way becomes very constrained with the addition of toll collection and administration structure and parking areas for employees and service vehicles. The toll facility controls access for southbound SR 874 vehicles heading to southbound HEFT and northbound HEFT vehicles exiting the roadway to northbound SR 874. Single-family residential uses lie to the east and west of the toll plaza with a small light-industrial district to the southwest and the Woodlawn Park Cemetery just beyond. The Don Shula Expressway returns to a six-lane, grass median cross-section south of the toll facility and passes underneath SW 116th Court. It then crosses over the SFWMD C-110 Cutler Drain Canal before turning southwards to merge with the HEFT / SR 821 mainline in a partial flyover interchange. No access is provided from southbound SR 874 to northbound SR 821 or from southbound SR 821 to northbound SR 874.

Expressway Upgrades

The Florida Department of Transportation's (FDOT) Palmetto Expressway Expansion Project including the Coral Way (SW 24th St) and Tamiami Trail (SW 8th St) interchanges began construction on June 6, 2005 and is scheduled to be completed in early 2008. This project included the reconstruction and widening of the Palmetto Expressway / SR 826, including the addition of one general use lane and one (northbound and southbound) lane. All interchanges, ramps and bridges were reconstructed and noise walls were installed along the length of the corridor. The pedestrian overpass over the southbound Coral Way exit ramp was reconstructed and a portion of SW 8th Street was widened and lowered where it passes under the Palmetto Expressway.

The Miami-Dade Expressway Authority (MDX) is also planning to construct a new elevated on-ramp from Kendall Drive to SR 874 / the Don Shula Expressway. This new ramp will provide commuters from Kendall Drive with access to northbound SR 874 where none previously existed. An existing ground level ramp from Kendall Drive to eastbound SR 878, Snapper Creek Expressway, will be reconstructed. The project includes the construction of noise walls that will minimize expressway noise for homeowners adjacent to the expressways. Construction began in March 2007 and is anticipated to be complete in 22 months.

SR 826 / SR 874 Right-of-Way Width

Right-of-way width dictates how a corridor may be used and what types of uses may share the corridor at one time. The SR 826 right-of-way is generally more hemmed in by development than that of SR 874. The right-of-way width varies between roughly 150 feet for constrained sections that accommodate travel lanes and sometimes sound barriers to 300 feet for sections containing travel lanes and access ramps. The existence of adjacent properties and bridge abutments limit the viability of adding additional capacity without major cost and, construction and property impacts.

Bridges / Culverts

There are nine overpasses, six underpasses and three culvert/canal bridges along the SR 826 / SR 874 study corridor. The available right-of-way varies from structure to structure with some extremely constrained by earthen and concrete bridge abutments, others restricted by narrow bridge structures. The available right-of-way is generally most restricted in the northern portion of the corridor as SR 826 approaches the Dolphin Expressway / SR 836, and less restrictive near the southern portion of the corridor as SR 874 approaches the HEFT / SR 821. Table 3.6 lists the characteristics of bridges along the SR 826 / SR 874 study corridor.

Table 3.6: SR 826 / SR 874 Corridor Bridge Characteristics

LOCATION	ORIENTATION	SPAN TYPE	WIDTH	LANES	SOUTHBOUND LANE CONFIGURATION	NORTHBOUND LANE CONFIGURATION	SUPPORTS IN MEDIAN
SR 836	Under	Tandem	125	9	3 + 1 acceleration + 1 shoulder	3 + 1 acceleration	Yes
W Flagler St.	Over	Single	165	11	5 + 1 acceleration	4 +1 deceleration	No
SW 8th St.	Over	Single	152	10	4 +1 acceleration / deceleration	4 +1 acceleration / deceleration	No
SW 24th St.	Over	Single	152	10	4 +1 acceleration / deceleration	4 +1 acceleration / deceleration	No
SW 37th St.	Under / Ped Brdige	Single	175	10	4 + 1 acceleration	4 +1 deceleration	Yes
SW 40th St.	Over	Single	156	12	4 +1 breakdown +1 shoulder	4 + 1 acceleration + 1 breakdown	No
SR 826 / SR 874	Under	Single	280	8	2 +1 breakdown +1 shoulder	2 +1 breakdown +1 shoulder	Yes
SW 56th St.	Over	Single	95	8	2 +1 breakdown +1 shoulder	2 +1 breakdown +1 shoulder	No
SW 87th Ave.	Over	Tandem	2x43	8	2 + 1 deceleration +1 breakdown	2 + 1 acceleration +1 breakdown	No
SW 72nd St.	Over	Tandem	2x43	6	2 + 1 acceleration	2 + 1 deceleration	No
SR 874 / SR 878	Under	Single	100	7	2 +1 breakdown +1 shoulder	2 +1 breakdown	Yes
Snapper Creek Canal	Over	Single	207	15	5 + 1 breakdown + 2 shoulder	4 + 2 breakdown + 1 shoulder	No
Kendall Dr. / SW 88th St	Over	Single	146	12	4 + 1 deceleration +1 breakdown	4 + 1 acceleration +1 breakdown	No
Cutler Drain Canal	Over	Tandem	2X70	8	3 +1 breakdown + 1 shoulder	3 +1 breakdown + 1 shoulder	No
SW 104th St.	Under	Single	275	11	2 + 1 deceleration + 1 breakdown + 1 shoulder	2 + 2 deceleration + 1 breakdown + 1 shoulder	Yes
SW 112th St.	Over	Tandem	60	10	2 + 2 breakdown + 1 shoulder	2 + 2 breakdown + 1 shoulder	No
SW 117th Ave.	Under	Single	210	10	2 + 1 breakdown + 1 shoulder	2 + 1 breakdown + 1 shoulder	Yes
Cutler Drain Canal	Over	Tandem	2x70	12	2 + 1 breakdown + 2 shoulder	2 + 1 breakdown + 2 shoulder	No
H.E.F.T	Under	Single	210	10	2 + 1 breakdown + 1 shoulder	2 + 1 breakdown + 1 shoulder	Yes

Other Structures

A single-lane flyover ramp from the westbound Dolphin Expressway / SR 836 to southbound SR 826 touches down within the median of the Palmetto Expressway. The median widens to allow for approximately two-lanes worth of space for the one-lane of traffic plus a breakdown lane to transition into the SR 826 right-of-way. The highway continues south in a barrier-divided configuration for approximately one-half mile where it merges with the general southbound SR 826 through lanes. The Florida's Turnpike toll plaza located near SW 120th Street introduces a significant barrier within the SR 872 right-of-way. The plaza provides twelve covered lanes for collecting tolls plus two small outbuildings for administration purposes. Parking facilities for service vehicles and Turnpike employees exist on both the northbound and southbound sides of the expressway. There is a very limited amount of right-of way remaining for additional uses within the corridor.

The HEFT Corridor

The HEFT corridor is defined as the portion of the Florida's Turnpike that extends southward from the Dolphin Expressway / SR 836 to SW 152nd Street. The HEFT runs as a four-lane, median divided cross-section through a nearly complete cloverleaf interchange and merges with the westbound and eastbound SR 836 ramps in an extremely wide right-of-way that approaches 500 feet. The SFWMD C-100 Snapper Creek Canal runs parallel to the east of the highway with SW 117th Avenue and a multi-family residential property just on the other side. The roadway transitions to a grass median divided right-of-way with three southbound lanes and four northbound lanes. As SR 821 passes over West Flagler Street, it is comprised one main highway bridge and a one-lane exit ramp from SR 836 to SW 8th Street located just to the west of the mainline roadway.

South of West Flagler Street, the four southbound-lanes and five northbound-lanes of the mainline highway pass to the east of a three lane covered toll collection facility. A single-family residential neighborhood lies to the west of the roadway and a mixed single- and multi-family residential neighborhood lies to the east. At the partial cloverleaf interchange with SW 8th Street / SR 90 / U.S. 41, the HEFT passes over the SFWMD C-4 Tamiami Canal with single-family residential properties to the west and Florida International University to the east. The landuse on the west side of SR 821 south of SW 18th Street changes to a more multi-family residential nature with a large, strip retail plaza at SW 26th Street. Moving southwards, the corridor becomes more constrained while the highway configuration continues as a six-lane, grass-median toll road with the SFWMD C-100 Snapper Creek Canal and SW 117th Avenue still running parallel to the east. Passing through single-family residential neighborhoods, the HEFT roadway widens as it approaches the SW 40th Street interchange.

A three-lane toll collection facility for northbound HEFT traffic is located east of the mainline roadway and west of the Snapper Creek Canal. Access to the northbound Turnpike from surface streets is via a short bridge over the canal from the intersection of SW 117th Avenue and SW 37th Street. A wide two- to three-lane shoulder separates the general northbound through lanes from the toll facility while a two-lane off-ramp routes southbound traffic towards and off-line, three-lane toll collection station. The HEFT passes over SW 40th Street and passes the Kendall Regional Medical Center located tightly against the corridor to the west before crossing over a small drainage canal.

Moving southwards, the landuse to the west of SR 821 transitions to a decidedly low-density, single-family residential neighborhood, with a medium-density single-family residential neighborhood located to the east. A northbound off-ramp exits HEFT and crosses over the Snapper Creek Canal and meets SW 117th Avenue in the vicinity of SW 41st Terrace. At this point, there are three general purpose southbound lanes, one southbound Sun Pass lane and three northbound lanes. The roadway alignment then shifts to provide room for a southbound toll facility with eight general purpose lanes and two Sun Pass lanes. The toll plaza provides service and employee parking on the far western edge of the alignment while the four northbound lanes hug the Snapper Creek Canal. Further to the south, the alignment shifts again so that an identical toll facility can fit within the right-of way, while still providing a wide grassy median between the northbound and southbound lanes.

South of the two toll plazas, SR 821 returns to its general configuration and passes over SW 56th Street. Landuse to the east generally continues to be a single-family residential neighborhood. The previously low-density residential properties to the west continue to spread out to an almost rural landscape of small farms and large estate homes. The HEFT crosses another small drainage canal near SW 59th Terrace as the SFWMD C-100 Snapper Creek Canal turns southeastwards away from the highway right-of-way. The roadway transitions to a barrier-divided highway as it approached SW 72nd Street, with landuses to the east shifting to a more commercial nature with a small drainage canal located immediately west of the right-of-way. South of the overpass, single-family houses lie to the west with a mix of dense residential and retail strip plazas lie to the east. The roadway curves slightly to the west and passes over a utility corridor as it approaches Kendall Drive.

At the Kendall Drive / SW 88th Street / SR 94 partial cloverleaf interchange large retail plazas are located east and west of the HEFT and both north and south of Kendall Drive. A large utility property lies immediately to the northwest of the interchange. The right-of-way returns to a six-lane, grass-median cross-section as it passes by dense single-family residential neighborhoods on both sides of the highway. Approximately one mile south of Kendall Drive, the roadway narrows slightly and is barrier divided for one-tenth of a mile as it passes over a small drainage canal on a culvert and then under SW 104th Street. A small four-diamond baseball park lies immediately southwest SW 104th Street, a small drainage canal parallels the right-of-way to the west and the roadway begins to widen as it approaches the Snapper Creek Service Plaza.

The service plaza complex is located within the median of the roadway and has a mix of multi-family and dense single-family residential properties to its east and west, with the SFWMD C-100 Cutler Drainage Canal running parallel to the west of the right-of-way. The plaza lies immediately to the north of the complex interchange with SW 120th Street. HEFT ramps to and from the service plaza fly over the southbound ramp to and northbound ramp from SW 120th Street. The northbound and southbound SR 821 general travel lanes then cross over SW 120th Street on bridges that are separated by more than 650 feet. South of 120th Street, two three-lane toll plazas provide surface road access to the southbound and from the northbound HEFT. The roadway then passes over the Cutler Drainage Canal still running in a very widely separated cross-section. Heading almost due south, the southbound lanes pass over the CSX railroad corridor while the northbound lanes swing to the east and pass over the Don Shula Expressway / SR 874. The HEFT meets the terminus of SR 874 in a simple flyover interchange with several vacant parcels, light-industrial properties to the west and a mix of low and medium density single family residential neighborhoods surrounding the roadways. No access is provided from southbound SR 874 to northbound SR 821 or from southbound SR 821 to northbound SR 874.

Expressway Upgrades

Florida's Turnpike Enterprise (FTE) is very early in to the Planning, Design and Engineering evaluation of the section of the HEFT between SR 874 / Don Shula Expressway and SR 836 / Dolphin Expressway. This evaluation is considering the addition of lanes to the roadway in a range of possible configurations. The existing six-lane cross-section would be widened to allow for ten general-travel lanes, six general-travel lanes and four managed lanes, or some other combination that best addresses capacity requirements and right-of-way constraints. The current schedule aims to complete initial scoping during the spring of 2008 and design by winter of 2011. Construction could potentially begin during the spring of 2012.

Right-of-Way Width

Right-of-way width dictates how a corridor may be used and what types of uses may share the corridor at one time. The HEFT width runs through a tight section of approximately 275 to 300 feet between Coral Way / SW 24th Street and Miller Road / SW 56th Street. The remainder of right-of-way through the study area is generally less constrained with widths varying between 300 and 600 feet. The right-of-way is at its widest between Killian Parkway / SW 104th Street and SW 130th Street, reaching just over 1,100 feet where the north and south turnpike lanes diverge to pass along either side of the traveler service center and then returning to a 300 foot configuration south of the one-way interchange with SR 874.

Bridges / Culverts

There are nine overpasses, three underpasses and three culvert/canal bridges along the HEFT / SR 821 study corridor. The right-of-way generally provides available space for additional services within the corridor. There are several locations constrained by earthen and concrete bridge abutments or restricted by narrow bridge structures. Available right-of-way generally exists through most of the corridor due in part to the wide grass median in separating the southbound and northbound lanes through the majority of the study area. Table 3.8 lists the characteristics of bridges along the HEFT / SR 821 study corridor.

Table 3.7: HEFT Corridor Bridge Characteristics

LOCATION	ORIENTATION	SPAN TYPE	ROW AVAILABLE	LANES	SOUTHBOUND LANE CONFIGURATION	NORTHBOUND LANE CONFIGURATION	SUPPORTS IN MEDIAN
SR 836	Over	Tandem	Minimal	8	3 +1 breakdown + 1 shoulder	3 +1 breakdown + 1 shoulder	No
SR 836	Under	Single	Minimal	8	3 +1 breakdown + 1 shoulder	3 +1 breakdown + 1 shoulder	Yes
West Flagler St.	Over	Tandem	Minimal	14	3 +2 acceleration +1 breakdown +1 shoulder	5 +1 breakdown +1 shoulder	No
SW 8th St.	Over	Tandem	Minimal	13	4 +1 breakdown +1 shoulder	5 +1 breakdown +1 shoulder	No
SW 24th Street	Under	Single	Yes	8	3 +1 breakdown + 1 shoulder	3 +1 breakdown + 1 shoulder	Yes
SW 40th St.	Over	Tandem	Minimal	10	4 +1 breakdown	3 + 1 acceleration + 1 breakdown	No
Drainage Canal	Over	Tandem	Yes	10	4 +1 breakdown	3 + 1 acceleration + 1 breakdown	No
SW 56th St.	Over	Tandem	Yes	8	3 +1 breakdown + 1 shoulder	3 +1 breakdown + 1 shoulder	No
Drainage Canal	Over	Tandem	Yes	8	3 +1 breakdown + 1 shoulder	3 +1 breakdown + 1 shoulder	No
SW 72nd St.	Over	Tandem	Yes	8	3 +1 breakdown + 1 shoulder	3 +1 breakdown + 1 shoulder	No
Kendall Dr.	Over	Tandem	Yes	13	3 +1 deceleration +1 breakdown	3 +2 acceleration +1 breakdown +1 shoulder	No
SW 104th St.	Under	Single	Yes	8	3 +1 breakdown + 1 shoulder	3 +1 breakdown + 1 shoulder	Yes
Snapper Creek Service Plaza	Over	Single	No	2	1	1	No
SW 120th St.	Over	Tandem	Yes	12	3 +2 acceleration + 1 shoulder	3 +2 acceleration + 1 shoulder	No
Cutler Drainage Canal	Over	Tandem	Yes	10	4 + 1 breakdown	4 + 1 shoulder	No

Other Structures

Toll plazas exist in several locations along the corridor and may constrain potential new transit services. A southbound three-lane exiting toll plaza lies within the corridor just north of SW 8th Street. While setback away from the general travel lanes, it may lie as an obstruction along the western side of the right-of-way. Additional toll facilities at the SW 8th Street interchange lie outside of the general travel lane corridor. A northbound three-lane entering toll plaza lies tightly within the right-of-way directly adjacent to the Snapper Creek Canal in the general vicinity of SW 34th Street and is separated from the general travel lanes by a wide breakdown lane to the west. The dual ten-lane lane toll plazas that lie between SW 40th Street and SW 56th Street sit immediately within the roadway right-of-way. The plazas do not severely limit the potential for additional transit services within the corridor, however, due to their offset configuration.

Two small toll facilities provide access for northbound HEFT traffic to, and for southbound HEFT traffic from, Kendall Drive. The southbound HEFT facility lies just south of Kendall Drive and adjacent to the general travel lanes, while the northbound HEFT plaza lies on the exit ramp out of the mainline corridor. The Snapper Creek Service plaza lies within the median between SW 104th Street and SW 120th Street.

There appear to be two large service buildings, one gas station and one small out-building. South of 120th Street, two small toll facilities lie within the corridor. Access is provided to southbound HEFT, and from northbound HEFT at 120th Street. Due to the configuration of the roadway, the toll plazas are located within the median and directly adjacent to the general travel lanes that rise in this location to fly-over SW 120th Street. Small ponds also lie within the median.

Public Transportation Infrastructure

Public transportation services in the study area are provided by Miami-Dade Transit (MDT), the county-wide transit operator. MDT is the 14th largest public transit system in the United States and the largest transit agency in the State of Florida, providing more than 50 percent of the trips taken on public transit in the State. They operate a system of over 100 Metrobus routes; the elevated 22-mile Metrorail; Metromover, an automated downtown people mover; and the Paratransit division's Special Transportation Service. In 2004, MDT's Metrobus, Metrorail, and Metromover transported more than 96 million passengers, as compared to 85 million during the previous year. The population density within one-quarter mile of Kendall Drive is almost 14,000 persons per square mile, illustrating that improved transit service may perform well within the Kendall area. Approximately thirty percent of current MDT riders do not own a vehicle and 44% have annual HH incomes less than $15,000 per year

Metrorail is an electrically-powered, elevated, heavy rail rapid-transit system. Metrorail is 22.4 miles in length, from Kendall in South Miami-Dade to Medley in Northwest Miami-Dade. Metrorail connects a major portion of Miami-Dade County to business, cultural, and shopping centers and offers connections to Broward and Palm Beach counties via Tri-Rail, South Florida's tri-county commuter train. Travel time from one end of the system to the other is approximately 42 minutes. Metrorail operates from 5 a.m. to midnight, seven days a week, including holidays. On weekdays, trains arrive every six minutes during morning and afternoon peak hours, every 8-10 minutes during weekday midday hours, and every 15-30 minutes after 6 p.m. Metrorail service is accessible at the eastern end of the Kendall study corridor at the Dadeland North and Dadeland South stations. Each of these Metrorail stations has parking garages with over 1,200 spaces.

Metrobus offers countywide bus service throughout Miami-Dade County. All buses are wheelchair accessible. In addition, Metrobus connects with Metrorail and Metromover. With over 1,031 buses, 107 Metrobus routes travel over 41 million miles per year. Presently, there are 16 bus routes that operate primarily in the Kendall study area (Table 3.8 and Figure 3.9). Hours of operation are generally from 5 a.m. to 12 a.m. seven days per week, while some routes are only operated during weekday peak periods. Peak period headways vary from every 10 minutes to every 30 minutes.

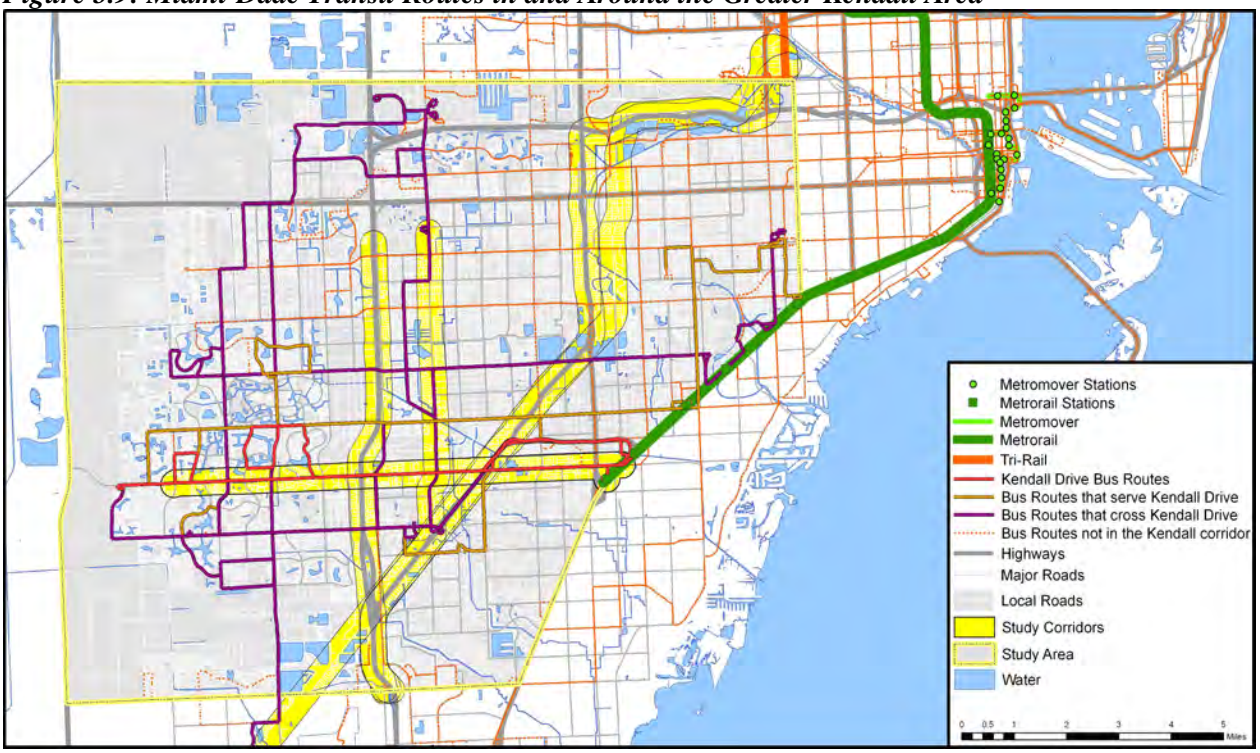
Table 3.8: Metrobus Routes in the Kendall Area

NUMBER	ROUTE
24	SW 137 Court / Coral Way, FIU Bus Terminal, Florida International University South Campus, West Dade Regional Library, Westchester Shopping Center, City of Coral Gables, Vizcaya Metrorail Station, Downtown Miami, Government Center Metrorail Station
40	SW 147 Avenue / 47 Street (40B), SW 132 Avenue / 18 Street (40), Bird Road, City of Coral Gables (40), Douglas Road Metrorail Station
56	John A. Ferguson High School, SW 162 Avenue / 47 Street (56A), Miller Road, Town & Country Mall (56), Miami-Dade College Kendall Campus (56), University Metrorail Station, City of Coral Gables via Ponce de Leon and LeJeune Road, University of Miami Campus, Doctors Hospital
71	Dolphin Mall, Miami International Mall, Florida International University South Campus, SW 107 Avenue, Concord Shopping Center, Miami-Dade College Kendall Campus
72	SW 157 Avenue / 88 Street (72A), Westlakes Plaza (72A), Sunset Drive (SW 72 Street), SW 140 Avenue / 47 Street (72), South Miami Metrorail Station
87	NW 80 Street / 81 Place, Palmetto Metrorail Station, NW 74 Street Connector, Miami-Dade Police HQ (weekdays only), Mall of the Americas, SW 87 Avenue, Kendall, Dadeland Mall, Dadeland North Metrorail Station
88	SW 157 Avenue / Kendall Drive (88A), SW 142 Avenue / 84 Street (88), Dadeland Mall, Dadeland South Metrorail Station (eastbound trips midnight to 5 a.m. only), Dadeland North Metrorail Station

104	SW 80 Street / 157 Avenue, Hammocks Town Center, Miami-Dade College Kendall Campus, Baptist Hospital, Dadeland Mall, Dadeland North Metrorail Station
136	SW 142 Ave., SW 120 St., SW 117 Ave., SW 107 Ave., SW 136 St., The Falls, SW 128 St., The Busway, Dadeland South Metrorail Station
137 West Dade Connection	Miami International Mall, Sweetwater, Kendale Lakes, Kendall-Tamiami Executive Airport, Tamiami / Pineland Industrial Park, SW 147 Avenue, Serena Lakes, Larry & Penny Thompson Memorial Park, SW 211 Street, South Miami-Dade Government Center, Southland Mall Park & Ride
147 Kendall Connection	Kendall-Tamiami Executive Airport, Beckman-Coulter, SW 147 Avenue, Kendale Lakes, Lakes of the Meadow, Dolphin Mall
204 Killian KAT	Shoppes at Paradise Lake, SW 167 Avenue / Kendall Drive, Hammocks Town Center Park & Ride, SW 104 Street, SW 113 Place Park & Ride, MDC Kendall Campus, SR 874, SR 878, Dadeland North Metrorail Station
224 Coral Way MAX	Coral Way, Las Americas Shopping Center, Miami-Dade Permit Inspection Office, West Dade Regional Library, City of Coral Gables City Hall, Coral Gables Hospital, English Center, Douglas Road Metrorail Station
240 Bird Road MAX	West Miami-Dade, SW 152 Avenue / 42 Street, Bird Road, Tropical Park, Kendall Drive, Dadeland Mall, Dadeland North Metrorail Station
272 Sunset KAT	West Lakes Shopping Center, SW 80 Street / 157 Avenue, Shoppes at Lago Mar, Sunset Drive (SW 72 Street), Sunset Strip Shopping Center Park & Ride, SR 878, Dadeland North Metrorail Station
288 Kendall KAT	Shoppes at Paradise Lakes, SW 157 Avenue, Hammocks Park & Ride, Kendall Drive (SW 88 Street), SR 874, SR 878, Dadeland North Metrorail Station

Source: Miami-Dade Transit

Figure 3.9: Miami-Dade Transit Routes in and Around the Greater Kendall Area



Public Transportation Usage

Kendall Drive bus routes 88 104, 288 (Kendall KAT) experience approximately 4,850 average daily boardings. The most heavily utilized Metrobus routes in the study area, Routes 24 and 40, traverse the northern edge of the study area, closest to the City of Miami (Table 3.9). These routes also provide all day service, unlike many of the other study area bus routes which operate only during the peak periods. The KAT routes experienced the greatest increases in ridership from 2005 to 2006, with the Route 288 Kendall KAT increasing 55 percent, the Route 272 Sunset KAT increasing 42 percent and the Route 204 Killian KAT increasing 36 percent. Metrobus routes in the study area on average experienced an eight percent increase in usage over a one year period.

Metrorail use in the study area is also increasing (Table 3.10). The Dadeland South station had an 11 percent increase in boardings and Dadeland North three percent in the period between 2005 and 2006. Overall, both bus and rail usage in the corridor is increasing, by eight percent over the period from 2005 to 2006. The Dadeland South and Dadeland North Metrorail station parking garages experience occupancy rates over 98%. An average of 1,205 vehicles parked at the Dadeland South garage and an average of 1,858 vehicles parked at the Dadeland North garage on the typical weekday.

Table 3.9: Metrobus Ridership in the Study Area

METROBUS ROUTE	AVERAGE WEEKDAY BOARDINGS		PERCENT CHANGE
	JANUARY 2005	JANUARY 2006	
24	4,019	4,324	8%
40	2,877	3,203	11%
56	827	886	7%
71	1,848	1,468	-21%
72	1,241	955	-23%
87	2,211	2,213	0%
88	3,092	2,978	-4%
104	1,582	1,774	12%
136	N/A	150	N/A
137 West Dade Connection	1,522	1,876	23%
147 Kendall Connection	427	397	-7%
204 Killian KAT	1,412	1,926	36%
224 Coral Way MAX	345	364	6%
240 Bird Road MAX	535	649	21%
272 Sunset KAT	1,046	1,482	42%
288 Kendall KAT	595	923	55%
Subtotal – Metrobus (Kendall Study Area)	*23,579*	*25,568*	*8%*
Metrobus - Systemwide	*242,100*	*265,400*	*10%*

Source: Miami-Dade Transit

Table 3.10: Metrorail Ridership in the Study Area

METRORAIL	AVERAGE WEEKDAY BOARDINGS		PERCENT CHANGE
	JANUARY 2005	JANUARY 2006	
Dadeland North	6,326	7,004	11%
Dadeland South	6,713	6,925	3%
Subtotal – Metrorail (Kendall Study Area)	*13,039*	*13,929*	*7%*
Metrorail – Systemwide	*60,200*	*60,900*	*1%*

Source: Miami-Dade Transit

Planned Transportation Improvements

A number of roadway and transit improvements are planned for the Kendall Drive corridor according to the Miami-Dade MPO Transportation Improvement Program for fiscal years 2006/2007 to 2010/2011. The plan calls for the resurfacing of the far western portion of Kendall Drive, along with a program to widen the four-lane section between SW 150th Avenue and SW 162nd Avenue to a six-lane cross-section. Two transit facilities are planned along Kendall Drive at SW 157th Avenue and SW 127th Avenue. An improvement that has potential implications for transit improvements along the corridor is the addition of more left-turn pockets on Kendall between Mills Drive near the HEFT and SW 102nd Avenue approximately 1.6 miles to the east. Intersection improvements are called for at SW 112th Avenue and SW 99th Court and pedestrian safety improvements are slated for the stretch of Kendall Drive between SW 117th Avenue and SW 77th Avenue.

Table 3.11: Kendall Drive Planned Transportation Improvements

FACILITY	FROM	TO	IMPROVEMENT	EXPENDITURE	FISCAL YEAR
Kendall Drive	Krome Avenue / SW 177th Ave	SW 162nd Avenue	Resurfacing	$60,000	2006-2007
Kendall Drive	SW 162nd Avenue	SW 157th Avenue	Widening: to 6 lanes	$700,000	n/a
Kendall Drive	Kendall Drive	SW 157th Avenue	Kendall Town Center transit center	n/a	n/a
Kendall Drive	SW 157th Avenue	SW 150th Avenue	Widening: to 6 lanes	$650,000	n/a
Kendall Drive	Kendall Drive	SW 127th Avenue	Construct park and ride facility	$2.5 million	2006-2008
Kendall Drive	Mills Drive	SW 102nd Avenue	Add Turn Lane(s)	$60,000	2006-2007
Kendall Drive	SW 117th Avenue	SW 77th Avenue	Pedestrian Safety	$16,000	2006-2007
Kendall Drive	Kendall Drive	SW 112th Avenue	Add NB right-turn lane	$50,000	Complete
Kendall Drive	Kendall Drive	SW 99th Court	Intersection Improvements	n/a	2009-2011

Source: Miami-Dade MPO Transportation Improvement Program 2006/2007 to 2010/2011

Table 3.12: Study Area Planned Expressway Improvements

FACILITY	LOCATION / FROM	LOCATION / TO	WORK PROGRAM
SR 826/PALMETTO EXPY	SW 45TH ST	SW 32ND ST	Interchange (modify)
SR 826/PALMETTO EXPY	SW 32ND ST	SW 16TH ST	Add lanes & reconstruct
SR 826/PALMETTO EXPY	S.W. 32 ST	S.W. 16 ST	Landscaping
SR 826/PALMETTO EXPY	SW 16TH ST	SW 2ND ST	Add lanes & reconstruct
SR 826/PALMETTO EXPY	S.W. 16 ST	S.W. 2 ST	Landscaping
HEFT WIDEN FROM	S OF SW 117TH ST	S OF KENDALL	Add lanes & reconstruct
HEFT (SR 821)	KENDALL	SR836	WIDEN 6 TO 10 LANES
HEFT (SR821)	HOMESTEAD TOLL PLAZA	EXPRESS LANES (MP10)	Toll plaza
BIRD ROAD TOLL PLAZA "ORT" LANES	OPEN ROAD TOLLING (ORT)	HEFT MP 22	Six new lanes, three ort lanes in each direction
HOMESTEAD TOLL PLAZA "ORT" LANES	OPEN ROAD TOLLING (ORT)	HEFT MP 10	Four new lanes, two ort lanes in each direction
SR 874/SR 878 Communications and Incident Mgmt.	SR 874	U.S. 1	Installation: communication equipment
SR 878 Toll System Conversion	US-1	SR 874	Toll System Conversion
SR 874 Toll System Conversion	SR 826	HEFT	Toll System Conversion
SR 836 Extension	NW 137th Avenue	NW 107th Avenue	New Construction: 4-lane expressway extension
SR 826 / SR 836 Interchange Improvements	SR 826 Interchange	SR 836	New Construction: 4-lane divided express lanes
SR 836 Landscaping	NW 137 Avenue	NW 87th Avenue	Landscaping
SR 836 Extension from	NW 137th Avenue	SW 136th Street	Project development
SR 836 EB Auxiliary Lane	SR 826/SR 836 Interchange	NW 42th Avenue	Construction of an additional auxiliary lane on SR 836
SR 836 Eastbound Peak Hour Shoulder Usage	SR 826/836 Interchange	NW 42nd Avenue	Enhancements to SR 836 EB shoulder at SR 826 interchange
SR 874 / Killian Parkway Interchange	HEFT	Kendall Drive	Modifications: interchange / New construction: toll plaza, ramp
SR 874 NB On-Ramp from Kendall Drive	Kendall Drive	SW 72nd Avenue	New construction: ramp / Installation: electronic tolling
SR 874 Mainline Reconstruction	Kendall Drive	SR 826	Modification of SR 874 mainline roadway/Noise analysis report
SR 874 Extension to SW 136th Street	SW 136th Street	SR 874	Project development
SR 874 / SR 826 Interchange Improvements	N of SR 874 / 826 Intc	S of SR 874 / 826 Int	Interchange improvements

Source: Miami-Dade MPO Transportation Improvement Program 2006/2007 to 2010/2011

Table 3.13: Study Area Planned Arterial Improvements

FACILITY	LOCATION / FROM	LOCATION / TO	WORK PROGRAM
Kendale Blvd & Killian Parkway	Intersection		Realignment: intersection
Kendall Drive	SW 162 Avenue	SW 157 Avenue	Widening: to 6 lanes
Kendall Drive	SW 157 Avenue	SW 150 Avenue	Widening: to 6 lanes
S/W 56TH ST	AT R/R CROSSING	SW 82ND AVE	RAIL SAFETY PROJECT
SR 90/SW 8 ST	AT SW 87 AVE		PD&E/EMO STUDY
SR 90/SW 8TH ST	11MI W OF KROME AVE	1. MI W OF KROME AVE	PD&E/EMO STUDY
SR 90/US-41/TAMIAMI TRAIL	MP 0 TO 5.00	MP 24.7 TO 25.7	RESURFACING
SR 90/US-41/TAMIAMI TRAIL	MP 10	MP 13.8	RESURFACING
SR 968/W FLAGLER ST	SR 973/GALLOWAY RD	SW 76TH CT	RESURFACING - RIDE ONLY
SR 968/W. FLAGLER ST	TAMIAMI CANAL DR	N.W. 69TH AVE	RESURFACING
SR 972/CORAL WAY	S.W. 37 AVE	S.W. 12 AVE	LANDSCAPING
SR 973/SW 87 AVE	S.W. 96TH ST	S.W. 41ST ST	RESURFACING
SR 973/SW 87TH AVE	SW 8TH ST	WEST FLAGLER ST	RESURFACING
SR 976/SW 40 ST	SW 57TH AVE	W OF SW 38 AVE	RESURFACING
SR 985/SW 107 AVE	SR 976/SW 40 ST.	SR 972/SW 24 ST.	MISCELLANEOUS CONSTRUCTION
SR 985/SW 107 AVE	SR 90/SW 8 ST	SR 968/FLAGLER ST	PD&E/EMO STUDY
SR 985/SW 107 AVE	S.W. 56TH ST	S.W. 40TH ST	RESURFACING
SR 986/SW 72 ST	W OF SW 117 AVE	SW 107 AVE	RESURFACING
SR 986/SW 72 ST	SW 84 PLACE	SW 69TH AVE.	RESURFACING
SR 990/KILLIAN DR	AT SW 82 AVE	(TRAFFIC SIGNAL)	SAFETY PROJECT
SR 997/KROME AVE	SR 94/KENDALL DR	SR 90/SW 8 ST	ADD LANES & RECONSTRUCT
SR 997/KROME AVE	SW 296 ST	SW 136 ST	PD&E/EMO STUDY
SR 997/KROME AVE	S.W. 136TH ST	SR 94/KENDALL DR	ADD LANES & RECONSTRUCT
SR 997/KROME AVE	350' N OF SW 8 ST.	MP 3.478	ADD LANES & RECONSTRUCT
SR 997/KROME AVE	MP 3.478	MP 10.984	ADD LANES & RECONSTRUCT
SW 1 Avenue	SW 8 Street	SW 1 Street	Feasibility Study, 4 Lane Tunnel Under Miami River
SW 102 Avenue and Tamiami Canal			Bridge
SW 104 Street	SW 147 Avenue	SW 137 Avenue	Widening: 4 to 6 lanes
SW 104 Street	Hammocks Blvd	SW 147 Avenue	Widening: 4 to 6 lanes
SW 107 Avenue & SW 160 Street	Intersection		Redesign: intersection
SW 107 Avenue & SW 184 Street	Intersection		Widening: for left turns
SW 107 Avenue Bridge over C -102 Canal			Sonovoid Bridge renovation
SW 107 Avenue Bridge	SW 140 Street		Feasibility Study
SW 109 Court & SW 104 Street	Intersection		New Construction: left turn lane
SW 112 Avenue & Kendall Drive	Intersection		New Construction: right turn lane
SW 112 Avenue (East side)	SW 232 Street	SW 236 Street	1/2 of R4.4 (R4.4: 4 lane divided) (Coordinate with FDOT)
SW 112 Avenue over Westwood Lakes Canal	Approx SW 50 Ter		Feasibility Study
SW 117 Avenue	SW 40 Street	SW 8 Street	Widening: 2 to 4 lanes
SW 117 Avenue	SW 184 Street	SW 152 Street	Widening: 2 to 4 lanes
SW 120 Street (North side)	SW 152 Avenue	SW 157 Avenue	2 lanes of 4 lanes divided
SW 120 Street Bridge over Black Creek Canal			New 4 lane bridge
SW 120 Street	SW 150 Avenue	SW 157 Avenue	New construction: 2 lanes
SW 120 Street	SW 157 Avenue	SW 137 Avenue	Traffic Study
SW 120 Street	SW 137 Avenue	SW 117 Avenue	Widening: 4 to 6 lanes
SW 127 Avenue (East side)	SW 121 Street	SW 124 Street	1/2 of R4.4 (R4.4: 4 lane divided)
SW 127 Avenue	SW 128/124 Street	SW 136/132 Street	New construction: 2 of future 4 lanes
SW 127 Avenue	SW 128 Street	SW 132 Street	New construction: 2 of future 4 lanes

SW 127 Avenue	SW 88 Street	SW 120 Street	Widen to 4 lanes with median, swales, frontage road
SW 127 Avenue	SW 120 Street	SW 88 Street	Widening: to 4 lanes with median, swales and frontage road
SW 136 Street (South side)	SW 162 Avenue	SW 157 Avenue	1/2 of R4.4 (R4.4: 4 lane divided)
SW 136 Street	SW 127 Avenue	FL Turnpike	Widening: 2 to 4 lanes
SW 136 Street	SW 149 Avenue	SW 139 Court	Widening: 2 to 4 lanes
SW 137 Avenue	Sunset Drive	Kendall Drive	Widening: to 6 lanes
SW 137 Avenue	US - 1	SW 200 Street	Completion as two (2) continuous lanes
SW 137 Avenue	HEFT	US - 1	Widening: 2 to 4 lanes
SW 137 Avenue	SW 88 Street	SW 84 Street	Reconstruction, drainage, intersection improvements, curb and gutter, lighting
SW 142 Avenue	SW 42 Street	SW 8 Street	Re-aligning roadway, intersection improvements, milling and resurfacing, construct missing sidewalk and install remedial drainage as necessary
SW 143 Terrace	SW 145 Place	SW 144 Avenue	Extension of SW 143 Terrace (New 2 lanes)
SW 147 Avenue (East side)	N of SW 16 Street	S of SW 16 Street	2 lanes of 4 lanes divided
SW 147 Avenue	SW 15 Street	SW 22 Street	2 lanes
SW 147 Avenue	SW 8 Street	SW 10 Street	2 lanes
SW 147 Avenue	SW 15 Street	SW 22 Street	New construction: 2 west lanes
SW 147 Avenue	SW 8 Street	600 ft south	Widening: 2 to 4 lanes
SW 152 Avenue (East side)	SW 92 Street	SW 88 Street	1/2 of R4.5 (R4.5: 4 lane divided)
SW 152 Street	SW 157 Avenue	SW 147 Avenue	Widening: 2 to 4 lanes
SW 157 Avenue	SW 94 Street	SW 96 Street	New construction: SB lane
SW 157 Avenue	SW 176 Terrace	SW 178 Lane	2 lanes of 4 lanes divided
SW 157 Avenue	at SW 152 Street		Intersection Improvements
SW 157 Avenue	SW 42 Street	SW 8 Street	Additional 2 lanes
SW 157 Avenue	SW 54 Terrace	SW 52 Street	Widening: 2 to 4 lanes
SW 157 Avenue	SW 72 Street	SW 70 Street	New Construction: 4 lanes
SW 157 Avenue	SW 136 Street	SW 120 Street	New 4 lanes
SW 157 Avenue	SW 120 Street	SW 112 Street	New 4 lanes
SW 157 Avenue	SW 184 Street	SW 152 Street	New 4 lane road
SW 162 Avenue (East side)	SW 136 Street	R/R Right-of-Way	1/2 of R3.3 (R3.3: 2 lanes)
SW 162 Avenue	Kendall Drive	SW 96 Street	New construction: 4 lanes
SW 167 Avenue (West side)	N of SW 96 Street		Matching existing to the North
SW 167 Avenue	SW 43 Street	SW 44 Street	2 lanes of 4 lanes divided
SW 167 Avenue	SW 42 Street	SW 43 Street	2 lanes of 4 lanes divided
SW 172 Avenue (East side)	SW 88 Street	SW 96 Street	2 lanes and 1/2 of turn lane
SW 42 Street (Bird Road)	SW 149 Avenue	SW 150 Avenue	Widening: 2 to 4 lanes
SW 42 Street	SW 157 Avenue	SW 162 Avenue	New construction: 2 lanes
SW 42 Street	SW 157 Avenue	SW 162 Avenue	2 lanes of 4 lanes divided
SW 42 Street	SW 157 Avenue	SW 162 Avenue	New Construction: 2 lane road
SW 56 Street	SW 158 Avenue	SW 152 Avenue	Widening: 2 to 4 lanes
SW 62 Avenue	SW 24 Street	NW 7 Street	Street Improvements
SW 62 Avenue	SW 70 Street	SW 64 Street	5 to 2 lanes
SW 72 Avenue	SW 40 Street	SW 20 Street	Street and Traffic Operational Improvements
SW 82 Avenue and Tamiami Canal			Bridge
SW 87 Avenue & SW 128 Street	Intersection		New Construction: 2 lanes
SW 87 Avenue & SW 48 Street	Intersection		Extension: left turn lane
SW 87 Avenue & SW 96 Street	Intersection		New Construction: left turn lanes
SW 87 Avenue	SW 216 Street	SW 168 Street	Widening: 2 to 4 lanes
SW 88 Street (South Side)	SW 154 Avenue	SW 152 Avenue	Coordinate with FDOT
SW 92 Avenue & SW 64 Street	Intersection		New Construction: left turn lanes
SW 96 Street (South side)	SW 167 Avenue	SW 172 Avenue	2 lanes and 1/2 of turn lane

SW 96 Street	SW 162 Avenue	SW 157 Avenue	New construction: 4 lanes
SW 97 Avenue & SW 48 Street	Intersection		Signal modification / Extension: left turn lane
SW 97 Avenue Bridge over Black Creek Canal			Sonovoid Bridge renovation
SW 97 Avenue	SW 72 Street	SW 56 Street	Widening: 2 to 3 lanes
SW 97 Avenue	SW 56 Street	SW 40 Street	Widening: 2 to 3 lanes

Source: Miami-Dade MPO Transportation Improvement Program 2006/2007 to 2010/2011

Table 3.14: Study Area Planned Transit, Bicycle and Pedestrian Improvements

FACILITY	LOCATION / FROM	LOCATION / TO	WORK PROGRAM
Fare Collection System	Bus, Rail and Mover		Acquisition of fare collection equipment
Buses	Countywide		Purchase / Replacement: buses
AVL / AVM Radio System	Countywide		Purchase / Replacement: radio systems
Bus Pull Out Bays	Countywide		Construction
ADA Improvements	Countywide		ADA Accessibility
MDTA/SR94/KENDALL DR	DADELAND NO METRORAIL STA	SW 167TH AVE	TRANSIT SERVICE DEMONSTRATION
Dadeland South Surface Parking Lot	Dadeland South Metrorail Station		Construct extension
East West Corridor	Miami Intermodal Center	Florida International University	Metrorail Extension
MIAMI INTERMODAL CTR (MIC)	MIC CENTRAL	STATION (PHASE 1)	INTERMODAL HUB CAPACITY
Transit Hub	At NW 7 Avenue/NW 62 Street		Construct Passenger Activity Centers
Replace Elevators	Rail, Mover and Bus Facilities		Capital Equipment
Pedestrian Overpass at Dadeland North	Spanning US - 1	Dadeland North Metrorail Station	Design and construct
Special Use Lanes (SUL)	SR 821/HEFT	SR 836/Dolphin Expressway	Premium Bus Service
Park and Ride	At SW 127 Avenue		construction
Metrorail Station Refurbishment	Systemwide		Capital Maintenance
Bus Stop Signage	Various Locations		Installation of new bus stop signage.
Park and Ride	At SW 97 Avenue		
SNAPPER CRK/BIKE-PED	DADELAND S. STATION	DADELND N STATION	BIKE PATH/TRAIL
LUDLAM TRAIL			BIKE PATH/TRAIL
SR 94/KENDALL DR	FROM SW 117TH AVE	TO SW 77TH AVE	PEDESTRIAN SAFETY IMPROV.

Source: Miami-Dade MPO Transportation Improvement Program 2006/2007 to 2010/2011

4 Public Transportation Technology Review

The following review of transit technologies is provided as a means to inventory potential transit applications for the Kendall area and to provide an educational overview of the various transit modes and technologies. Each technology is defined and the relevant strengths and weaknesses of each technology are described. The potential for application of each technology in the Kendall area and within each corridor is also presented.

The following section of this memorandum provides a review of transit modes. They are presented in two sections: ground transit and rail, fixed guideway and waterborne transit. Within these two groupings are a large number of transit technologies and service alternatives.

Based on the preliminary review of travel patterns and regional activity centers and a cursory review of existing transportation infrastructure in the Kendall area, there are three primary markets that require focused examination. The three primary markets under study in the Kendall area are:

- **Kendall Drive Corridor** – this corridor is defined as the area from SW 175th Avenue to the west east to US 1/Dixie Highway and bounded to the north by SW 72nd Street and to the south by SW 104th Street. The east-west corridor is centered on Kendall Drive.
- **HEFT Corridor** – this corridor is defined by the area along the Homestead Extension of the Florida Turnpike (HEFT) from SW 152nd Street to the south and north to SR 836. Improvements proposed in this corridor then would connect to transit services proposed to run east west along the SR 836 corridor between Florida International University (FIU) and the Miami Intermodal Center (MIC) east of the Miami International Airport.
- **SR 874/ SR 826/CSX Corridor** – this corridor is defined by the area along the CSX tracks and SR 874 from SW 152nd Street to SR 826 and north along the CSX tracks (Seaboard Coast Line) and/or SR 826 to SR 836/ Miami International Airport terminating at the Miami Intermodal Center (MIC), which is currently under construction.

The Alternatives Analysis will examine potential transportation technologies and services in each of these corridors and will develop a series of potential transportation strategies to improve mobility in the Kendall area based on specific recommendations addressing improvements in one or all of the corridors above.

Conventional Bus (Fixed-Route)

Fixed route or conventional bus involves a system of vehicles operated along prescribed routes according to a fixed schedule. Fixed route bus services can be operated as local, limited stop or express services. Local bus service stops to allow passengers to board or alight at all stops along the route. Limited stop service is typically operated in peak periods or along long corridors with high demand. Express bus service is a more restrictive form of limited stop service in which case the bus serves one to a few stops at the beginning of the route then operates directly to its destination. Traditionally, fixed-route systems are very effective in dense areas where there is nearly constant demand for services on the route corridor. Miami-Dade Transit operates fixed route bus services.

A variety of existing fixed route bus services are operated within the Kendall area and will continue to have application in the Kendall area for local trips. Additional potential fixed route applications in the study area could involve coordination with feeder services, park and ride lots and connecting bus services.

- **Kendall Drive Corridor** – current and future application potential to increase carrying capacity in the corridor. Add park and ride lots in key locations.
- **HEFT Corridor** – current and future application potential to increase carrying capacity in the corridor. Add park and ride lots in key locations. Express and limited stop bus services have a strong potential application for direct service along the HEFT to FIU or on to the MIC via SR 836. This type of bus service would also fit well in combination with development of managed lane concepts in the HEFT corridor.
- **SR 874/ SR 826/ CSX Corridor** – current and future application potential to increase carrying capacity in the corridor. Add park and ride lots in key locations. Express and limited stop bus services have a strong potential application for direct service along SR 874 to SR 826 and to the MIC. This type of bus service would also fit well in combination with development of managed lane concepts in the SR 874/SR 826/ CSX corridor.

System Characteristics

- 35- to 60 foot vehicles with seating for 35-55 passengers
- Operational Speed: 5-25 mph
- Kneeling or low-floor design
- Short-range service area

Commuter Bus (Express Bus)

A commuter bus service is a fixed-route bus service characterized by operating service predominantly in one direction during peak periods and with limited stops and routes of extended length, usually between the central business district and outlying suburbs. Commuter bus service typically includes the use of multi-ride tickets for its passengers, and operates larger, long-haul coaches rather than traditional transit buses. Most transit operators in larger metropolitan areas operate commuter bus services into the regional central business district.

The commuter bus service concept may have application in the Kendall area for the longer haul trips. Commuter bus service is less applicable for short haul trips. Service is designed to coordinate with feeder services, park and ride lots and connecting bus services.

- **Kendall Drive Corridor** – no potential application in corridor.
- **HEFT Corridor** – potential application for direct service via the HEFT to the MIC, particularly in combination with HOV/HOT applications.
- **SR 874/ SR 826/ CSX Corridor** – potential application for direct service via SR 874/ SR 826/ CSX Corridor to the MIC, particularly in combination with HOV/HOT applications.

System Characteristics

- 40- to 60-foot vehicles with seating for 40-55 passengers
- Operational Speed: 30-45 mph
- Long-range, limited stop service

Circulator Bus (Dial-a-Ride, Flex-routes, Feeder Buses)

A bus or shuttle-bus serving an area confined to a specific locale, such as a downtown area or suburban neighborhood, with connections to major traffic corridors, regional bus routes and BRT or rail systems. Circulator bus service is used to provide short localized trips such as from home to the shopping center or home to a nearby activity center. When providing connections to regional bus routes, BRT or rail services, circulator buses are supporting these services as a feeder and distributor service. Circulator bus services generally employ smaller vehicles that are better able to penetrate neighborhoods, office complexes and shopping centers. Additionally, circulator bus services may also be operated as general public demand responsive service (also called "dial-a-ride") or as deviated fixed-route service (also known as flex-routes). Successful circulator bus programs of varying sizes and organization have been implemented in Prince William County, VA, Madison, WI, and Middlesex County, NJ.

The circulator bus services are applicable in the Kendall area and will be considered a part of other transport investments recommended for the area as follows.

- **Kendall Drive Corridor** – potential for use of circulator bus services to increase mobility in the Kendall Drive corridor and to augment existing regional and shuttle bus services (such as the Kendall KAT).
- **HEFT Corridor** – potential for use of circulator bus services to increase mobility in the area and to provide connections to higher capacity transport services developed in the HEFT corridor.
- **SR 874/ SR 826/ CSX Corridor**– potential for use of circulator bus services to increase mobility in the area and to provide connections to higher capacity transport services developed in the SR 874/ SR 826/ CSX corridor.

System Characteristics

- 30- to 40-foot length vehicles with seating for 25-40 passengers
- Operational Speed: 10-35 mph
- Short-range service area
- Operated in conjunction with Automatic Vehicle Locator (AVL) and Geographic Information Systems (GIS) technologies

Jitneys

Passenger vans or smaller buses operating with fixed routes but no fixed schedules. Jitneys are a privately owned and operated mass transit service which is market-oriented and free of government assistance, but is regulated through a public service commission, state or local government. Jitneys generally are operated under franchise agreements, fares are regulated by route and there are special insurance requirements. Vehicle capacity varies from eight people to 30 people or more, and the vehicles may be owned or leased by the operator. Jitneys are also known in some locations as a publico service.

The jitney does not provide an adequate transit service solution for the Kendall area.

- **Kendall Drive Corridor** – no potential application in corridor.
- **HEFT Corridor** – no potential application in corridor.
- **SR 874/ SR 826/ CSX Corridor** – no potential application in corridor.

System Characteristics

- 25-35 foot length vehicles with seating for 19-28 passengers
- Operational Speed: 5-25 mph
- Kneeling or low-floor design
- Short-range service area

Bus Rapid Transit (BRT) / Exclusive Busway

Bus Rapid Transit / Busway facilities, vehicles, and related systems are intended to accommodate higher capacity, improve speed, provide greater passenger convenience and comfort, and improve reliability and predictability of service. BRT routing may occur in exclusive right-of-ways, reserved lanes in streets, or lanes shared with other traffic. The Miami area is home to one of the nation's longest busway systems since 1997, the South Miami-Dade Busway. Currently operating for 13.5 miles along US Route 1, the South Miami-Dade Busway provides a fast, reliable and convenient travel alternative that links the communities and commercial centers located between SW 264th Street and the Dadeland South Metrorail Station in downtown Kendall.

Busways have been proven successful or are anticipated to begin operations shortly outside of southeast Florida, in the San Fernando Valley, CA; Cleveland, OH; Boston, MA; Ottawa, ON and Eugene, OR. Collectively, BRT treatments are designed to approach the service quality of rail transit while still benefiting from the cost savings associated with bus transit. Within Florida, BRT treatments, such as signal prioritization and a separate travel lane have proven successful with the Lymmo Service of the Central Florida Regional Transit Authority, serving the Orlando area. Other successful BRT treatments have been administered in Los Angeles, Las Vegas, Denver, and Pittsburgh.

System Characteristics

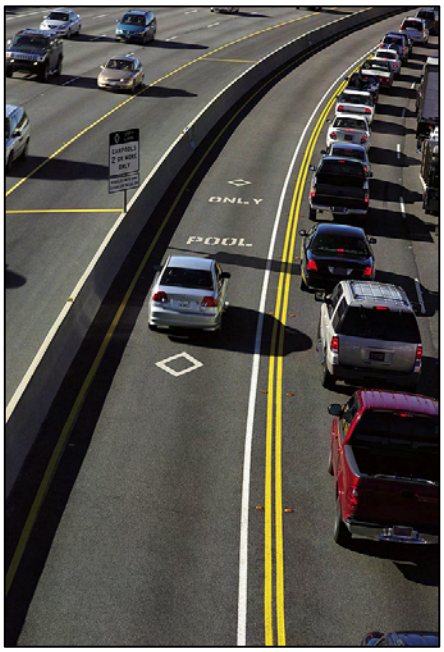
- Exclusive/limited mixed-use lane
- Operational Speed: 25-40 mph
- Lane width is the same or wider than traditional roadways to accommodate buses
- Signal prioritization for bus lane is not required but increases system efficiency
- Uses existing traditional bus vehicles and/or private buses, van and automobiles

Bus lanes have potential in the Kendall area particularly when paired with the concept of managed lanes. Bus lane concepts have potential in the following corridors:

- **Kendall Drive Corridor**– potential application for access to Dadeland South station but limited right-of-way is problematic. Potential application to combine with managed lane concept to expand capacity and provide a source of funding.
- **HEFT Corridor** – potential application to connect with proposed east-west transit service in the SR 836 corridor.
- **SR 874/ SR 826/CSX Corridor** – potential application to access the MIC. Potential application to combine with a managed lane concept to expand capacity and provide a source of funding.

Managed Lanes (HOV Lanes, HOT Lanes, Carpool Lanes)

Managed lanes are exclusive road or travel lanes limited to buses, vanpools, and/or vehicles with two or more individuals. Conventionally, HOV lanes are denoted with diamond markings, and are separated from their corresponding general use lanes typically with the use of roadway stripping. However, it is not uncommon to see HOV lanes separated by concrete barrier or even grade-separations. In recent years, an alternative use for HOV lanes called high-occupancy toll or HOT lanes have been implemented. HOT lanes is an HOV lane that charge an increased toll on vehicles which have less than the specified number of required passengers or are charged higher tolls during periods of increased congestion. Examples of successful HOV lanes can be observed in Miami, Houston, Los Angeles, Washington, DC, and Seattle. Examples of successful integration of HOT lanes can be seen in San Diego, Houston, Minneapolis, and Orange County, California.



HOT lane concepts, combined with BRT or LRT applications, have potential in the Kendall area. Through this combination, HOT concepts would create additional capacity while BRT or LRT would provide high volume transport. In this configuration, HOT would fill remaining capacity plus add a revenue stream to assure optimal facility utilization.

System Characteristics

- Dedicated road eight-of-way
- Can be used by public or private vehicles, including buses, van and automobiles
- Can be used for short-or long-range trips

- **Kendall Drive Corridor** – there is limited right-of-way along the Kendall Drive corridor for at grade HOT lanes. However, the concept of integrating a HOT lane with a BRT application has potential.
- **HEFT Corridor** – application of HOT lanes on the HEFT has potential. This would provide a fast connection to activity centers north and east. The combination of HOT and LRT to FIU along the HEFT has potential
- **SR 874/ SR 826/ CSX Corridor** – application of HOT lanes and express bus service along SR 874/ SR 826/ CSX corridor has potential especially combined with DMU service on the CSX line. This would provide fast connections to the MIC.

Commuter Rail (includes Diesel Multiple Units)

Commuter rail utilizes passenger trains which operate between a central city, its suburbs and/or another central city. It may be locomotive-hauled like Tri-Rail or operate with self-propelled diesel multiple units (DMUs). Commuter rail tends to operate with conventional railroad employment practices, and usually serves only one or two stations in the central business district.

Conventional commuter rail trains are built to Federal Railroad Administration (FRA) standards, allowing them to share track or right-of-way with intercity or freight trains. The newer DMU trains operate with smaller, quieter vehicles, but are also FRA compliant and can safely operate on existing freight corridors. Non-compliant rail transit vehicles tend to be characterized by the light and heavy rail transit systems described on following pages.

The ability to connect suburban communities with the central business districts of metropolitan areas has solidified commuter rail service as a popular transportation alternative. Within southeastern Florida, the South Florida Regional Transportation Authority operates the 72-mile, 18 stations commuter rail service known as Tri-Rail, which links Miami, Fort Lauderdale and West Palm Beach along the Southeast Florida coastline.

The commuter rail concept (including use of DMUs) has potential applicability in the Kendall area, particularly for longer haul trips. Commuter rail could be coordinated with feeder services, park and ride lots and connecting bus services.

- **Kendall Drive Corridor** – no potential application in corridor.
- **HEFT Corridor** – no potential application in corridor.
- **SR 874/ SR 826/ CSX Corridor**– potential application for direct service along SR 874/ SR 826/ CSX Corridor to the MIC.

System Characteristics

- Capacity: 80 – 110 passengers for single-level cars and 145-170 for double-level cars
- Operational Speed: 30-100 mph
- Service Frequency: 15-60 minute headways
- Operate on standard gauge track which can be shared with freight and/or other passenger trains
- Power Supply : diesel or electric

High-Speed Rail

High speed rail is the application of rail technologies on specially design tracks for high speed operation greater than 110 mph. This type of rail transport operates at an interregional level, with stops at large rail stations located in major metropolitan areas. An example of high speed rail in the United States is the Amtrak Acela service between Washington DC, New York and Boston. Magnetic levitation (Maglev) is a type of high speed rail with exclusive right-of-way, which is propelled along a fixed guideway system by the attraction or repulsion of magnets on the rails and under the rail cars. The world's first commercial maglev line is in Shanghai, China. The route from downtown to the airport travels the 18.6 mile distance in just 7 minutes 20 seconds with a top speed of 268 mph.

The application of high speed rail is not suited for implementation in the Kendall area.

- **Kendall Drive Corridor** – no potential application in corridor.
- **HEFT Corridor** – no potential application in corridor.
- **SR 874/ SR 826/ CSX Corridor** – no potential application in corridor.

System Characteristics

- Capacity: 145-170 passengers per car, 4-10 cars per train
- Operational Speed: 110+ mph
- Exclusive or shared right-of-way

Light Rail Transit (LRT)

Light rail transit systems utilize electric passenger rail cars to provide service at higher speeds and capacities than is typical with conventional buses. Light rail may use shared or exclusive rights-of-way, high or low platform loading and multi-car trains or single cars. This is also known as streetcar, trolley or tramway. Because of their light weight, light rail vehicles cannot operate on the same railroad tracks at the same time as freight or commuter rail trains, for safety reasons.

Light rail vehicles may be either electrically powered from an overhead electric line via a trolley or pantograph or utilize diesel fuel. LRT systems typically connect activity centers within an urbanized area. Though technically descended from the streetcars and interurban railways of an earlier era, modern LRT vehicles offer high levels of performance (acceleration, braking, speed) and passenger comfort. Passenger capacity is about 75 persons seated, with room for as many standees for vehicles in the typical vehicle. Examples are currently in operation in Boston, Portland, and Dallas.

Light rail vehicles tend to operate on dedicated rights-of-way and most have not been certified as FRA compliant. A new breed of diesel light rail train has been gaining popularity in the United States that has the flexibility to operate within urban environments and along freight rail corridors. A new DLRT system can be found operating in Southern New Jersey and another line has proposed for Austin, Texas.

LRT has potential as transit service option for the Kendall area.

- **Kendall Drive Corridor** – potential application along the Kendall.
- **HEFT Corridor** – potential application along the HEFT corridor to FIU and in combination with a HOT facility.
- **SR 874/ SR 826/ CSX Corridor** – no potential application in corridor.

System Characteristics

- Capacity: 130-170 passengers per car, 2-6 cars per train
- Operational Speed: 20-65 mph
- Service Frequency: 5-15 minutes during peak and 10-30 minutes during other periods
- Operates on tracks that run along the streets and share space with road traffic, or along exclusive right-of-way and separated from road traffic, or a combination of

Heavy Rail Transit (Metrorail)

Heavy rail transit is an electric railway with the capacity for a heavy volume of traffic and characterized by exclusive rights-of-way, multi-car trains, high speed and rapid acceleration, sophisticated signaling and high-platform loading. Also, high-speed, passenger rail cars operating singly or in trains of two or more cars on fixed rails in separate rights-of-way from which all other vehicular and pedestrian traffic is excluded.

Heavy rail transit service uses rail cars powered by electricity which is drawn from a third rail. It generally uses longer trains and has longer spacing between stations than light rail. It can be operated on an elevated railway is a form or heavy rail commuter service that travels on tracks which are elevated or bridged through an urban area (such as in Chicago). Examples of heavy or rapid rail include the Metro in Washington, DC; MARTA in Atlanta, GA; New York City Transit and Metrorail in Miami. Currently, Metrorail operates on a 22.4 mile elevated rail and services 22 stops between the Dadeland South and Palmetto stations.

Heavy rail already serves the eastern Kendall area in the form of Metrorail at the Dadeland South station. Extension of Metrorail at grade or elevated and either as heavy rail or light rail has potential applicability in the Kendall area.

- **Kendall Drive Corridor** – potential for extension of metrorail service west from Dadeland area.
- **HEFT Corridor** – application of heavy or rapid rail along the HEFT has potential especially if the east-west connection to FIU is built.
- **SR 874/ SR 826/ CSX Corridor** – application of heavy rail is not likely along the SR 874/ SR 826/ CSX corridor.

System Characteristics

- Capacity: 145-170 passengers per car, 4-10 cars per train
- Operational Speed: 25-60 mph
- Service Frequency: 3-10 minutes during peak and 10-20 minutes during other periods
- Exclusive grade-separated right-of-way, that is typically not shared with other freight or passenger trains
- Power Supply: typically electrified third rail

Automated Guideway Transit (AGT or People-mover)

Automated Guideway Transit is a system of guided transit vehicles operating singly or in multi-car trains that are fully-automated and travel on a grade-separated rail network. Service may be on a fixed schedule or in response to a passenger-activated call button. Automated guideway transit includes personal rapid transit, group rapid transit and people-mover systems. These systems provide short-haul collection and distribution services for passengers, usually in a major activity center. AGT is typically found in airports and have been successfully integrated as a form of urban transit in cities such as Detroit, Jacksonville and Miami.

The AGT concept has applicability in support of higher capacity alternatives (such as Metrorail) to serve as a constant feeder from/to densely populated developments. The potential applicability of AGT in the Kendall area is limited to a possible connection to the Dadeland South Metrorail station.

- **Kendall Drive Corridor** – possible application to connect Dadeland Mall and the new development complex at Dadeland with the Dadeland Metrorail station.
- **HEFT Corridor** – limited potential application in corridor.
- **SR 874/ SR 826/ CSX Corridor**– limited potential application in corridor.

System Characteristics

- Capacity: 80 passengers per car and up to 6 cars per train
- Operational Speed: 20-35 mph
- Elevated separate guideway
- Control System: automatic
- Power Supply: electric rail

Monorail

An electrical railway in which a car or train of cars is suspended from or straddles a fixed guideway formed by a single beam or rail (or tube). Most monorails are either heavy rail systems or automated guideway systems. Monorails being used as public transport systems can be observed in Seattle, WA and Las Vegas, NV.

Monorail is not a recommended application for the Kendall area due to the longstanding elevated Metrorail system. Construction of a separate and incompatible elevated rail system would be neither cost effective nor efficient for passengers.

- **Kendall Drive Corridor** – no potential application in corridor.
- **HEFT Corridor** – no potential application in corridor.
- **SR 874/ SR 826/ CSX Corridor**– no potential application in corridor.

System Characteristics

- Capacity: 45 -65 passengers per car, 4-6 cars per train
- Operational Speed: 30-65 mph
- Service Frequency: 5-10 during peak and 10-20 minutes during other periods
- Elevated separate guideway
- Power Supply: electric rail

Ferryboat

A fixed-route service across a body of water using a ferryboat or small watercraft that provides service between several points or docks located along the waterfront. Ferries form a part of the public transport systems for commuter and leisure passengers alike. Additionally, ferryboats provide connections between points at a capital cost much lower than bridges or tunnels. The Staten Island Ferry and NY Waterways, both serving New York City, are examples of successfully operated ferryboat services.

Several canal-based routes were proposed in the MPO's 2004 report, *Development of a Service Plan for Waterborne Transit Services in Miami-Dade County*. The Kendall Area, however, is located a significant distance inland and potential right-of-way conflicts from bridges and other obstructions limit the applicability of ferry service here.

- **Kendall Drive Corridor** – no potential application in corridor.
- **HEFT Corridor** – no potential application in corridor.
- **SR 874/ SR 826/ CSX Corridor**– no potential application in corridor.

Cable Drawn Systems

An electric railway operating in mixed street traffic or along separate tracks or guideways with unpowered, individually controlled transit vehicles propelled by moving cables located below the street surface and powered by engines or motors not on board the vehicle. San Francisco maintains the most notable and extensive cable car system. Cable drawn applications exist in other forms as well however all are characterized by similar operating and infrastructural requirements. Other examples of cable drawn systems include San Francisco's Powell-Mason, Powell-Hyde, and California Street lines, ski lifts, funiculars and overhead cable cars.

The cable drawn systems are not well suited to the Kendall area due to operating limitations and low carrying capacity.

- **Kendall Drive Corridor** – no potential application in corridor.
- **HEFT Corridor** – no potential application in corridor.
- **SR 874/ SR 826/ CSX Corridor**– no potential application in corridor.

System Characteristics

- Capacity: 25-40 passengers per car
- Operational Speed: 7-10 mph
- Street-level rails with a slot between the tracks where an underground cable runs
- Power Supply : centralized powerhouse pull the cables around the entire system at a constant speed

Evaluation of Transit Technologies

The following tables present the long list of potential public transportation applications examined for each corridor in the Kendall area, the Kendall Drive Corridor, the HEFT Corridor and the SR 874/ SR 826/ CSX Corridor. Each of the three corridors has different travel, origin and destination, right-of-way and land use characteristics. The individual characteristic of each corridor influence which transit applications would be most appropriate. For each of the three corridors, the potential service applications were compared against the goals of the project established in the *Kendall Alternatives Analysis Goals, Objective and Purpose and Need Report.* Each technology was given a rating as an opportunity, neutral issue, or challenge/constraint for the corridor. The results of this analysis for each corridor are presented in Tables 4.1, 4.2 and 4.3.

Table 4.1: Evaluation of Transit Technologies in the Kendall Drive Corridor

		GOAL						
		ENHANCE REGIONAL MOBILITY	IMPROVE ACCESSIBILITY TO WORK DESTINATIONS	ENHANCE EXISTING INFRASTRUCTURE	PROMOTE COMMUNITIES AND THE ENVIRONMENT	ENHANCE EXISTING TRANSPORTATION SERVICES	PROMOTE REGIONAL DEVELOPMENT	DEVELOP A COST-EFFECTIVE SOLUTION
Ground Transit	Bus Lanes/ Busways	●	●	●	◑	●	◑	◑
	Managed Lanes	●	●	●	◑	●	◑	●
	Fixed Route/ Conventional Bus	◑	●	◑	◑	●	◑	●
	Commuter Bus	●	●	◑	◑	◑	◑	●
	Circulator Bus	◑	◑	◑	◑	●	◑	●
	Jitney	○	◑	○	◑	●	○	●
	Bus Rapid Transit	●	●	◑	●	●	●	●
Rail, Fixed Guideway & Waterborne Transit	Commuter Rail/ DMU	●	◑	○	◑	◑	●	○
	High Speed Rail	●	◑	○	◑	○	○	○
	Heavy Rail Transit	●	●	●	◑	●	●	◑
	Light Rail Transit	●	●	●	●	●	●	◑
	Cable Drawn Systems	●	◑	○	◑	◑	●	○
	Automated Guideway Transit	●	◑	○	◑	◑	●	○
	Monorail	●	◑	○	◑	◑	●	○
	Ferryboat	●	◑	○	◑	○	○	○

Table Key:
Opportunity ●
Neutral Issue ◑
Challenge/Constraint ○

Table 4.2: Evaluation of Transit Technologies in the HEFT Corridor

		GOAL						
		ENHANCE REGIONAL MOBILITY	IMPROVE ACCESSIBILITY TO WORK DESTINATIONS	ENHANCE EXISTING INFRASTRUCTURE	PROMOTE COMMUNITIES AND THE ENVIRONMENT	ENHANCE EXISTING TRANSPORTATION SERVICES	PROMOTE REGIONAL DEVELOPMENT	DEVELOP A COST-EFFECTIVE SOLUTION
Ground Transit	Bus Lanes/ Busways	●	●	●	◑	●	◑	◑
	Managed Lanes	●	●	●	◑	●	◑	●
	Fixed Route/ Conventional Bus	◑	●	◑	◑	●	◑	●
	Commuter Bus	●	●	◑	◑	◑	◑	●
	Circulator Bus	◑	◑	◑	◑	●	◑	●
	Jitney	○	◑	○	◑	●	○	●
	Bus Rapid Transit	●	●	◑	●	●	●	●
Rail, Fixed Guideway & Waterborne Transit	Commuter Rail/ DMU	●	◑	○	◑	◑	●	○
	High Speed Rail	●	◑	○	◑	○	○	○
	Heavy Rail Transit	●	●	●	◑	●	●	◑
	Light Rail Transit	●	●	●	●	●	●	◑
	Cable Drawn Systems	●	◑	○	◑	◑	●	○
	Automated Guideway Transit	●	◑	○	◑	◑	●	○
	Monorail	●	◑	○	◑	◑	●	○
	Ferryboat	●	◑	○	◑	○	○	○

Table Key:
Opportunity ●
Neutral Issue ◑
Challenge/Constraint ○

Table 4.3: Evaluation of Transit Technologies in the SR 874/ SR 826/ CSX Corridor

		GOAL						
		ENHANCE REGIONAL MOBILITY	IMPROVE ACCESSIBILITY TO WORK DESTINATIONS	ENHANCE EXISTING INFRASTRUCTURE	PROMOTE COMMUNITIES AND THE ENVIRONMENT	ENHANCE EXISTING TRANSPORTATION SERVICES	PROMOTE REGIONAL DEVELOPMENT	DEVELOP A COST-EFFECTIVE SOLUTION
Ground Transit	Bus Lanes/ Busways	●	●	●	◑	●	◑	◑
	Managed Lanes	●	●	●	◑	●	◑	●
	Fixed Route/ Conventional Bus	◑	●	◑	◑	●	◑	●
	Commuter Bus	●	●	◑	◑	◑	◑	●
	Circulator Bus	◑	◑	◑	◑	●	◑	●
	Jitney	○	◑	○	◑	●	○	●
	Bus Rapid Transit	●	●	◑	●	●	●	●
Rail, Fixed Guideway & Waterborne Transit	Commuter Rail/ DMU	●	◑	●	◑	●	●	●
	High Speed Rail	●	◑	○	◑	○	○	○
	Heavy Rail Transit	●	●	●	◑	●	●	◑
	Light Rail Transit	●	●	●	●	●	●	◑
	Cable Drawn Systems	●	◑	○	◑	◑	●	○
	Automated Guideway Transit	●	◑	○	◑	◑	●	○
	Monorail	●	◑	○	◑	◑	●	○
	Ferryboat	●	◑	○	◑	○	○	○

Table Key:
Opportunity ●
Neutral Issue ◑
Challenge/Constraint ○

Recommendations

Based on the transit technology and service application review for each study corridor, technologies that have no significant challenges or constraints, and were found to have five or more opportunities based on the project goals, were identified in the previous section. The following transit applications are recommended to be further examined in more detail in the Tier 1 screening process:

Kendall Drive Corridor

- Bus rapid transit (with managed lanes)
- Heavy rail (extension of Metrorail)
- Light rail

HEFT Corridor

- Bus rapid transit (with managed lanes)
- Heavy rail (extension of Metrorail)
- Light rail

SR 874/SR 826/CSX Corridor

- Bus rapid transit (with managed lanes)
- Commuter rail/(DMU)
- Light rail

5 Tier I Alignment Options

A two-tier evaluation methodology is being applied to the various Kendall Corridor alignment options. Eleven alternatives with a total of 25 different concepts were identified in the Tier I stage. In addition to the area-wide No Build and Transportation Systems Management alternatives, improvements are proposed along Kendall Drive, the SR 826 / SR 874 / CSX corridor, the Homestead Extension of Florida's Turnpike (HEFT), and SW 107th Avenue. On Kendall Drive, there are three Bus Rapid Transit (BRT), two Light Rail Transit (LRT) and one Metrorail alternatives. There are two BRT, one LRT, one Diesel Multiple Unit (DMU) and one commuter rail alternatives along the SR 826 / SR 874 / CSX corridor. Three BRT, two LRT and one Metrorail alternatives will be evaluated on each the HEFT and SW 107th Avenue corridors. These alternatives will be developed in a manner suitable for comparison amongst each other as well as against the agreed upon goals and objectives of the project. This Tier I screening will rely heavily on the work developed in the previous MIS supplemented as necessary with updated analysis.

Subsequent to the review and approval of the Tier I screening by the client and the MPO Board and respective Sub-committees the consultant team will advance the surviving alternatives through the more rigorous Tier 2 screening process. The second tier screening will include all of the technical analysis necessary to progress the options through the detail definition of alternatives.

No Build Alternative

A "No Build" alternative must be evaluated in order to better understand environmental impacts of proposed improvements. It is meant to help gauge the impact of population, employment and traffic growth within the study area if no additional transportation capacity is built above that which is currently programmed. This alternative will serve to compare the magnitude of impacts using this alternative as a baseline comparison. The No Build Alternative includes the 2030 population and employment projection and the funded 2030 transportation network. This includes the expressway improvements to the HEFT, SR 826 and SR 874, the HOV/HOT lanes on the HEFT; arterial improvements to Kendall Drive, Sunset Drive / SW 72nd Street and SW 132nd Avenue; the premium transit improvements programmed for the HEFT and the South Miami-Dade Busway; and improvements to existing transit systems such as neighborhood circulators and a minimum of 15-minute headways on most bus routes during the peak period.

Miami-Dade Transit has planned to implement a program of bus improvements on three major corridors similar in scope to the MetroRapid bus services operated by the Los Angles Metropolitan Transportation Authority. These "rapid bus" routes would operate along Biscayne Boulevard, Flagler Street and Kendall Drive. Each route would utilize transit signal priority, distinctive stations and real-time bus arrival information. The Kendall Drive service would replace the existing Route 288 Kendall KAT and operate between Dadeland North Metrorail station and SW 167th Avenue along Kendall Drive, as opposed to Route 288 that utilizes SR 878. The service would operate at peak period headways of 10 minutes and off-peak headways of 15 minutes. A queue jump at SW 137th Avenue would allow buses to bypass traffic at that intersection and could serve potential park-and-ride facilities at SW 97th Avenue and SW 167th Avenue. The service is projected to provide travel time savings of 15% to 20% over the existing Route 88.

Specific improvements and funding categories were called for in the Miami-Dade 2030 Long Range Transportation Plan include (LRTP) (Table 5.1). Those improvements classified as Priority I can reasonably be expected to be in place within 10 years. Priority II through IV are longer term projects, with expected completion in a 10 to 25 year time frame. Priority I projects on Kendall Drive include capacity improvements to intersections and side streets, signal timing/phasing and interconnection improvements and the installation of new ITS technologies such as closed circuit television cameras, roadway sensors or

arterial dynamic message signs. The People's Transportation Plan proposes a number of new grade separated arterial interchanges, with one proposed at Kendall Drive and SW 127th Avenue.

Several transit improvements planned for completion within the next decade fall outside of the study area but will effect travel patterns throughout the county. These include the Metrorail connection between the Earlington Heights Station and the Miami Intermodal Center, the East-West Metrorail extension from the MIC to Florida International University and the South Miami-Dade Busway extension to Florida City. Funding for additional transit operational improvements was included in the LRTP. These may include the installation of additional queue jumpers and signal priority for buses, increases to the number of bus routes and vehicles and improvements to the frequency and accessibility of the overall bus system. It also calls for enhancements to Metrorail service through additional vehicles and increased frequency. Advanced bus stops and stations may be installed at key locations along major corridor routes, along with bus shelters, bus signage and a park-ride facility. Improved signalization along Kendall Drive, and on parallel arterials, will also be assumed in the No Build scenario.

Table 5.1: Study Area Improvements from the 2030 Long Range Transportation Plan

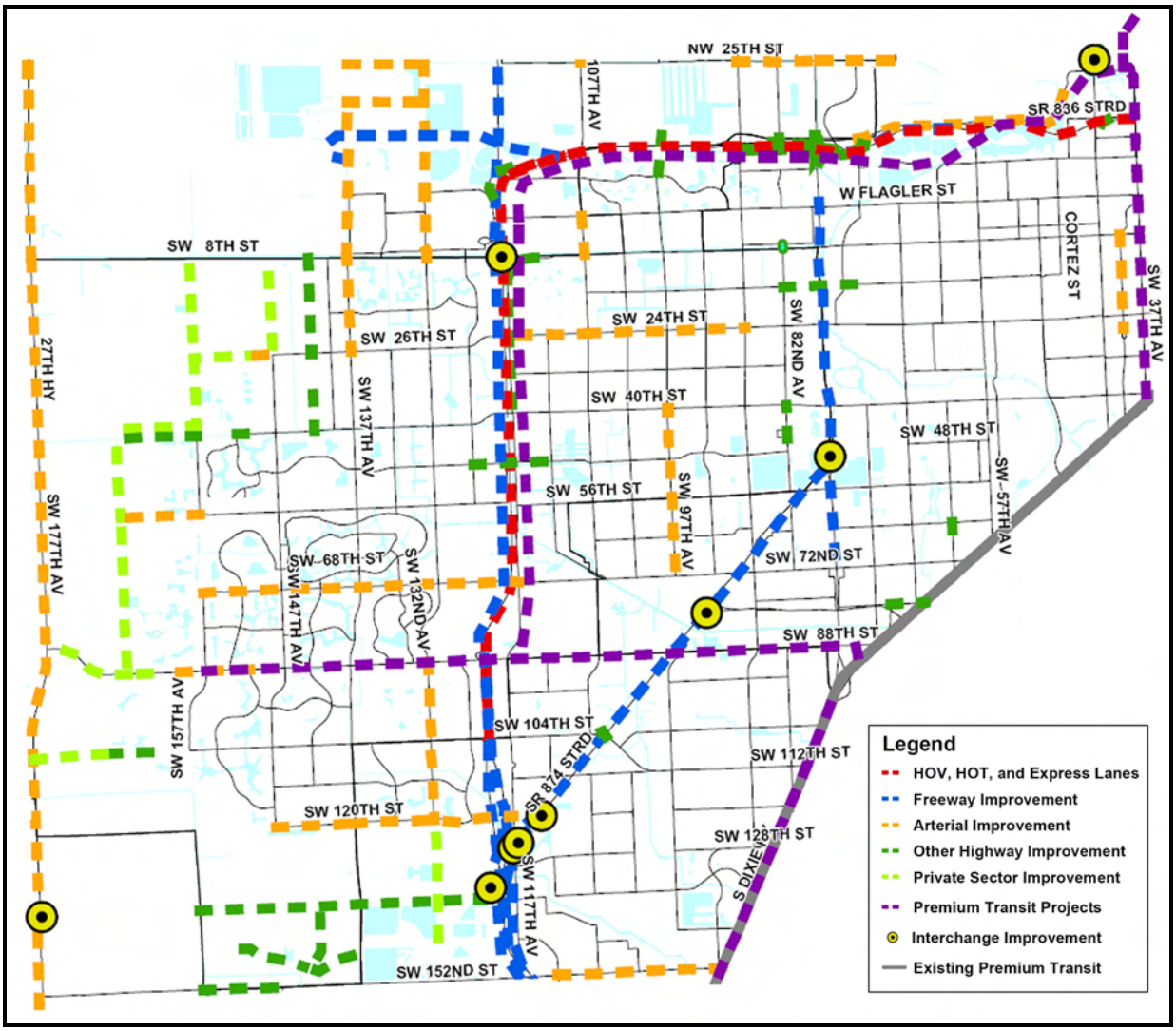
FUNDING PRIORITY	PLANNING AREAS	PROJECT OR FACILITY	FROM	TO	PROJECT DESCRIPTION
1	South	SR 874 NB Ramp	Kendall Drive	SW 72nd Drive	Provide NB ramp from Kendall Drive to SR 874 and install electronic tolling for connection to SR 874
1	South	SR 874	HEFT	Kendall Drive	New NB and SB mainline toll plazas, NB ramp plaza to Killian Parkway
1	South, West	SR 874	SW 117th Ave / SR 874	SR 874 / Kendall Drive	12 lanes + 3 lane CD / 8 lanes
1	West	HEFT	Mills Drive	SW 102nd Ave	Add turn lanes
1	West	Kendall Drive	SW 162nd Ave	SW 157th Ave	Widen to 6 lanes
1	West	Kendall Drive	SW 157th Ave	SW 150th Ave	Widen to 6 lanes
1	South, West	HEFT	SW 117th Ave / SR 874	SR 874 / Kendall Drive	12 lanes + 3 lane CD / 8 lanes
1	West, Northwest	HEFT	At SW 8th Street		Interchange modification
2	Central, South, West	Kendall Drive, Sunset Drive, Killian Parkway	SW 132nd Ave	SW 57th Ave	ITS (Includes CCTV, roadway sensors, arterial dynamic message signs, wireless communication)
2	South	HEFT	N of Eureka Drive	N of SW 117th Ave	Widen to 12 lanes
2	West	Krome Ave	SW 136th Street	SW 8th Street	Add 2 lanes to 2 lane roadway
*2	West	SW 167th Ave	SW 56th Street	Kendall Drive	New 2 lane
*2	West	Sunset Drive	SW 117th Ave	SW 157th Ave	4 to 6 lanes
2	West	Kendall Drive	Krome Ave	SW 167th Ave	4 to 6 lanes
2	West	Kendall Corridor	Dadeland North	West Flagler	Premium transit
2	South, West, Central	Kendall Drive, Sunset Drive, Killian Parkway	SW 132nd Ave	SW 57th Ave	ITS (Includes CCTV, roadway sensors, arterial dynamic message signs, wireless communication)
*3	South	SR 874	SW 102nd Ave	SW 117th Ave	Provide SB off ramp, NB on ramp and install noise attenuation walls
3	South	SE 152nd St	HEFT	US 1	4 to 6 lanes
3	South, Central	SR 874	Kendall Drive	SR 826	Interchange improvements including new bridge over SR 874 from SR 878 and SB CD road to Kendall Drive
3	West	HEFT	SW 104th Street	NW 107th Ave / SR 836	Express lanes
3	West	HEFT	Kendall Drive	SW 8th Street	Widen to 8 lanes

Table 5.1: Study Area Improvements from the 2030 Long Range Transportation Plan (cont'd)

FUNDING PRIORITY	PLANNING AREAS	PROJECT OR FACILITY	FROM	TO	PROJECT DESCRIPTION
4	South	SR 874	SW 1328th Street	SR 874 / Kendall Drive	Provide access ramp to SR 874 from SW 138th Street
4*	West, Northwest	Palmetto Corridor	Dadeland South	Palmetto Station	Premium transit
*Developer	West	West Kendal Transit Hub			Private development as part of Kendall Town Center
*Developer	West	Kendall Drive	SW 162nd Ave	SW 167th Ave	4 to 6 lanes
*Developer	West	SW 147th Ave	SW 8th Street	SW 26th Street	Add 2 lanes to 2 lane roadway

Source: Miami-Dade MPO, 2030 Long Range Transportation Plan
*Projects included in the Miami-Dade 2025 Long Range Transportation Plan

Figure 5.1: Miami-Dade MPO 2030 Long Range Transportation Plan Improvements within the Kendall Corridor Study Area



Transportation Systems Management (TSM)

The TSM alternative is defined as providing the highest level of mobility improvements without the major capital costs that would be required to construct a new fixed-route transit service. An acceptable TSM alternative emphasizes transportation system upgrades such as intersection improvements, minor road widening, traffic engineering actions, bus route restructuring, shortened bus headways, expanded use of articulated buses, dedicated bus lanes, High Occupancy Vehicle / Toll (HOV/HOT) lanes on expressways, special bus ramps on expressways, expanded park and ride facilities, express and limited-stop service, signalization improvements, and timed-transfer operations. The TSM alternative would assume that the entire South Miami-Dade bus network is reconfigured to minimize transfers and to prioritize direct access to line-haul services such as Metrorail.

Previous studies have included proposals for TSM improvements such as the reconfiguration of Kendall Drive to enhance access management and support exclusive bus or HOV lanes along the curb or within the median. Contraflow or reversible flow bus or HOV lanes could provide significant travel time and mobility benefits without requiring the development of a new fixed-route service. Additional Intelligent Transportation System (ITS) improvements could ease the flow of traffic through intersections at peak times and provide information to travelers on incidents, construction activities, detours or recommended alternate routes

The TSM alternative described in the Kendall-SR 826 Corridor Major Investment Study called for an express bus service from the Kendall area to Miami International Airport / Miami Intermodal Center (MIC) using planned HOV or shoulder lanes on SR 826 and SR 836. The Locally Preferred Alternative (LPA) from the same study proposed two transit improvements above the TSM alternative. A reversible bus-only lane would be implemented within the median of Kendall Drive from the Dadeland South Metrorail station to SW 157th Avenue. It also called for both local and express bus service on the HEFT and SR 836 from Kendall Drive to the MIC. The local service would make stops at transit centers located near interchanges, while the express service would run from terminal to terminal. Both services were proposed to operate at 10 minute headways during the peak period and 30 minute headways in the off-peak.

The TSM alternative will be composed of upgraded bus service along Kendall Drive. A single lane reversible busway would be incorporated in to the median of Kendall Drive and serve park-and-ride facilities at SW 157th Ave and SW 122nd Ave with direct access ramps to the HEFT. Bus service would continue along the HEFT to serve FIU and a park-and-ride facility at SW 8th Street with direct access ramps from the HEFT. Local service would continue along Kendall Drive to Dadeland North Metrorail Station, serving stations that will provide a high degree of passenger amenities. An additional route to the Miami Intermodal Center would take advantage of a planned ramp from eastbound Kendall Drive to northbound SR 874 and then utilize the HOV lanes along SR 826 and SR 836. Intersection improvements along Kendall Drive would allow for additional turning lane capability and/or queue storage. New bus routes would provide service between the MetroZoo and the planned West Dade Terminal at the Miami International Mall along SW 147th Avenue; between SW 120th Street and West Dade Terminal primarily along SW 122nd and SW 127th Avenues. The third route would provide a limited-stop express service along Kendall Drive to Dadeland Metrorail stations, then north via the SR 826 HOV lanes to MIA and Tri-Rail Airport station. Additionally, many area Metrobus routes would be adjusted to provide an expanded level of service.

Kendall Drive Corridor

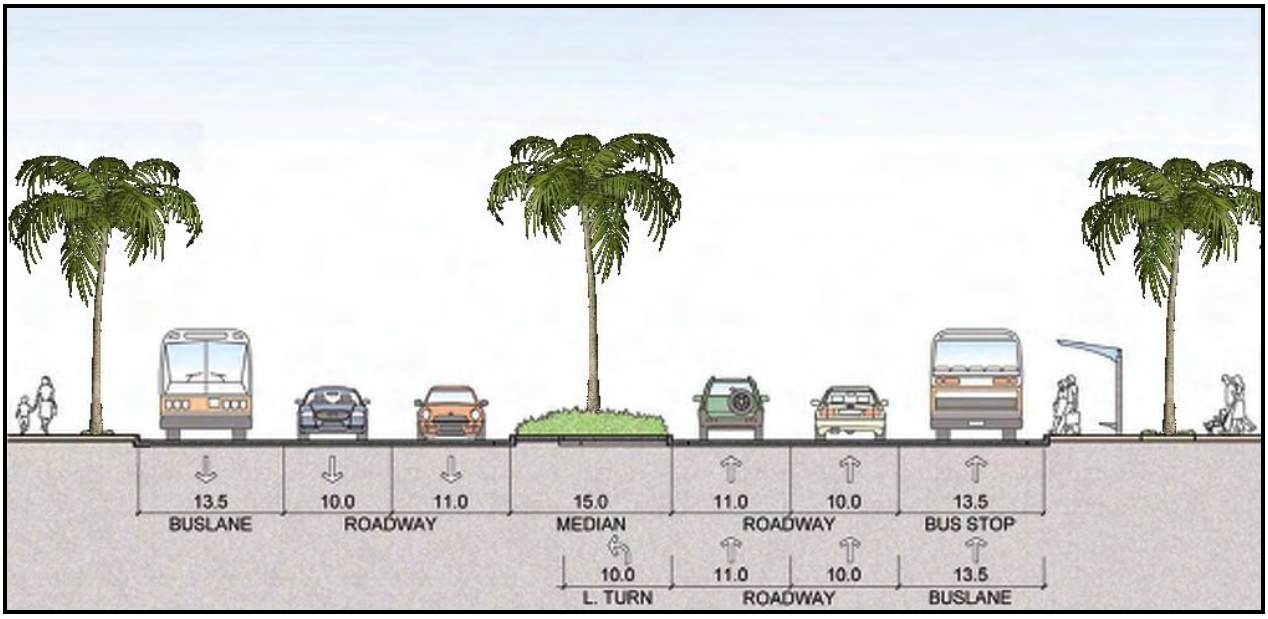
Bus Rapid Transit

The three Bus Rapid Transit alternatives being considered for Kendall Drive are mixed-traffic or curb-lane BRT, exclusive-lane or median BRT and an elevated BRT/HOT concept. Each alternative would begin at the current South Miami-Dade Busway terminal station located underneath the Dadeland South Metrorail Station. BRT Vehicles would then travel northwards on Dadeland Boulevard towards the Dadeland Mall and turn westwards on Kendall Drive to a terminal station at SW 167th Avenue. An existing bus transit transfer facility at SW 157th Avenue is planned to be improved into a park and ride transit center as part of a private development project and could act as a terminal for a slightly shorter route.

Each of the alternatives would ideally enjoy some degree of lanes, transitways or guideways generally free from mixed-flow traffic. Signal priority or preemption systems will speed buses through signalized intersections for the at-grade alternatives. Distinctive stops, stations, and terminals should provide weather-protected facilities with raised boarding platforms, ticket vending machines and real time vehicle arrival information message signs. Low floor BRT vehicles with multiple door boarding could also take advantage of proof-of-payment fare collection to speed boarding. Finally, a distinctive system identity should be created through marketing efforts to clearly brand the BRT service.

The mixed-traffic BRT service option would operate at-grade and would generally run along the curbside lane. Stations would be located on and adjacent to the sidewalks and could potentially provide bus pull-out zones if adequate right-of-way was available. Stations would consist of right-side boarding platforms located on the far side of intersections and should provide adequate space for two articulated buses to dwell simultaneously. Far-side stations allow buses to maximize the utility of the signal priority/preemption system, ensuring that riders move through intersections as quickly as possible. Dedicated curb-lane bus service operation is the lowest cost BRT option being considered for Kendall Drive. The running-way may be delineated with a mountable curb, colored pavement or through the use of distinctive road stripping. This concept would also provide the lowest level of BRT service benefits due to bus-lane incursions by cars or trucks making right-turns to or from cross streets or driveways. A large number of unsignalized intersections and driveway curb cuts currently exist along the corridor. Any

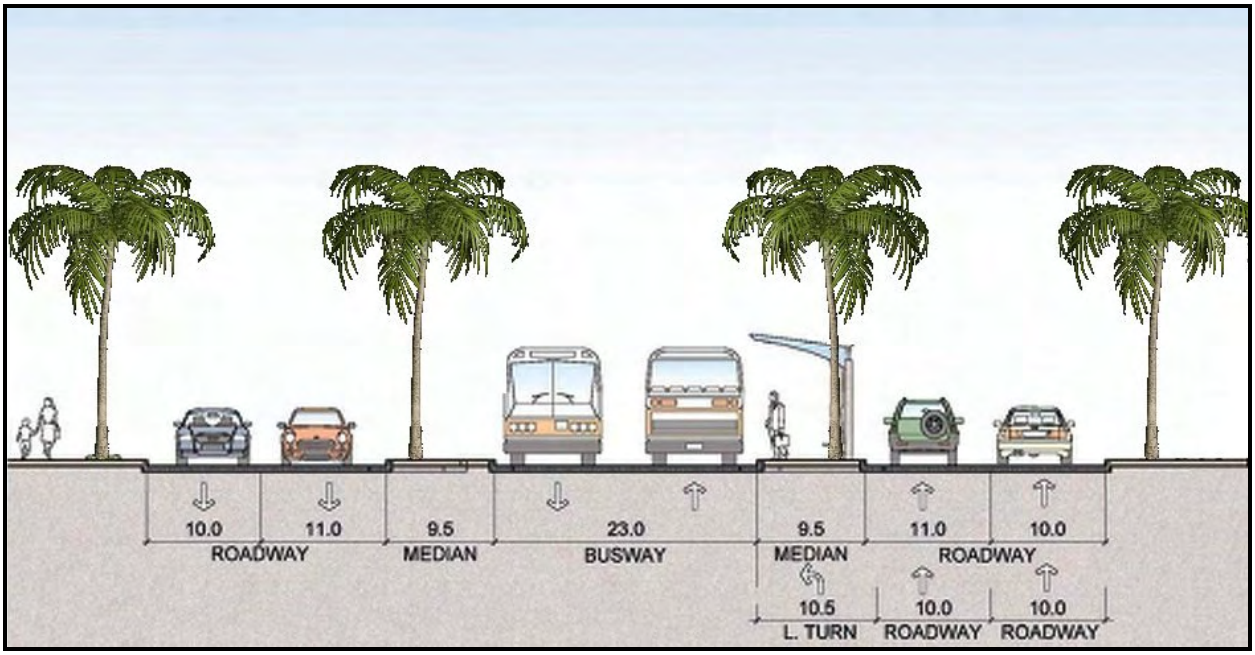
Figure 5.2: Exclusive Bus Lane and Side-Platform Station within Existing Road Median



at-grade, curb-running alternative would be negatively impacted by each of these potential conflict points. The removal and consolidation of a number of these curb cuts and minor intersections would be advisable and could perhaps be accomplished by expanding the limited network of frontage roads that currently exist along the corridor.

The second service options would operate in an at-grade exclusive-lane and would generally run down the middle of the right-of-way within existing median space. Some degree of signal preemption / priority or queue jumping would be an important part of this solution as buses would directly interact with cross traffic at all at-grade intersections. A large number of unsignalized left-turn lanes currently exist along the corridor. Any at-grade, median alternative would necessitate the reconfiguration of these lanes to provide adequate right-of-way for the BRT and to eliminate conflicts caused by traffic crossing the busway. Stations would consist of right-side boarding platforms located on the far side of intersections and should provide adequate space for two articulated buses to dwell at the same time. Utilizing a center-platform for boarding would require the acquisition of new transit vehicles that could accommodate left-door boarding. An alternative to this would be to utilize existing right-door buses in contra-flow operation within an exclusive right-of-way from Dadeland Boulevard to SW 167th Avenue. Loading right-door buses from a center platform can be accomplished by running against traffic within a special lane. Contra-flow bus operations have generally been found to be unacceptable as they introduce operational challenges and confusion to pedestrians and motorists.

Figure 5.3: Exclusive Bus Lane and Side-Platform Station within Existing Road Median



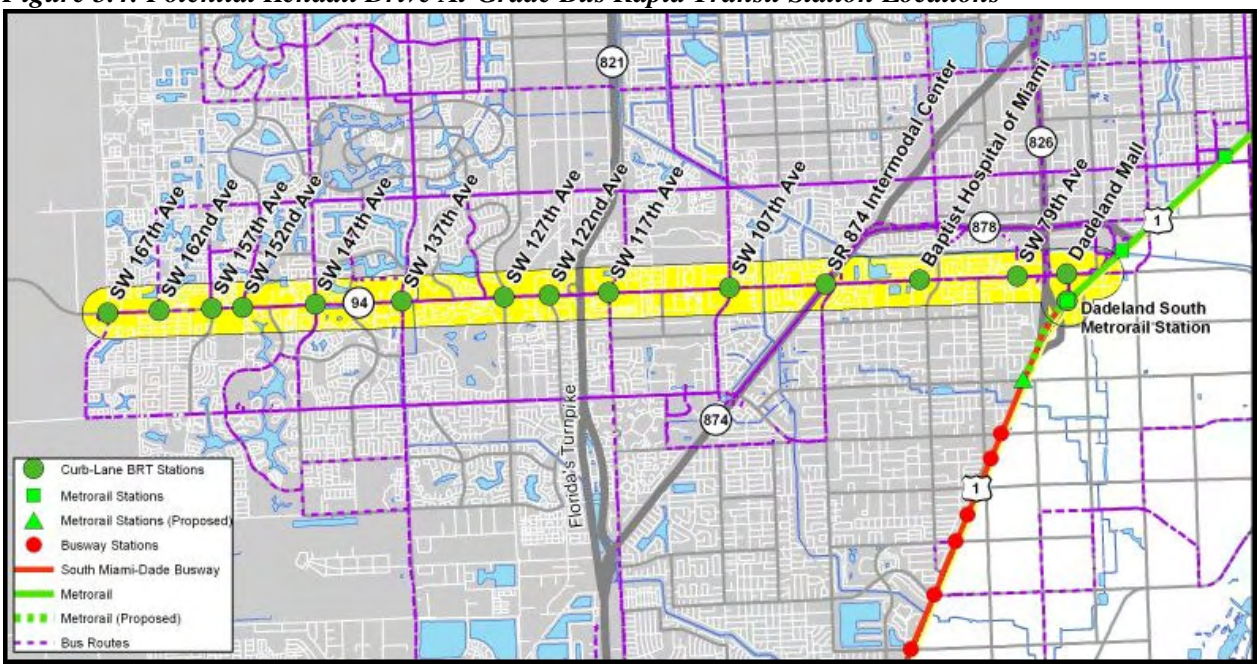
Each of the alternatives would have a different type and number of stations. For the eastern terminal at Dadeland South Metrorail station, each of the alternatives would utilize the existing South Miami-Dade Busway and local bus bays located underneath the station platform. The western terminus at SW 167th Avenue is envisioned to be an at-grade transit center with signalized access to Kendall Drive. The mixed-traffic BRT concept would most closely resemble the existing bus service along the corridor. A simple method that may be employed to decrease travel times along a bus route is to consolidate stops based on operational and ridership studies. Bus stops on Kendall Drive are currently spaced anywhere from one-tenth of a mile to two-thirds of a mile apart with an average distance of about one-quarter of a mile. It is possible that a local bus service would continue to serve every existing bus stop, while the BRT service

would only serve the more major ones. An exclusive-lane BRT service would most likely serve stations near these same major stops.

Potential At-Grade BRT Stations

- Eastern Terminal at Dadeland South Metrorail Station
- Dadeland Mall
- SW 79th Avenue (transfer to Route 87)
- Baptist Hospital of Miami
- SR 874 Intermodal Station (transfer to Route 104)
- SW 107th Avenue (transfer to Route 71)
- SW 117th Avenue (transfer to Route 56)
- SW 122nd Avenue
- SW 127th Avenue
- SW 137th Avenue (transfer to Route West Dade Connection 137)
- SW 147th Avenue (transfer to Routes 104 and 147)
- SW 152nd Avenue (transfer to Routes 72 and 104)
- SW 157th Avenue Transit Center (transfer to Routes 72 and 104)
- SW 162nd Avenue (transfer to Route Sunset KAT 272)
- Western Terminal at SW 167th Avenue (transfer to Routes Killian KAT 204 and Sunset KAT 272)

Figure 5.4: Potential Kendall Drive At-Grade Bus Rapid Transit Station Locations



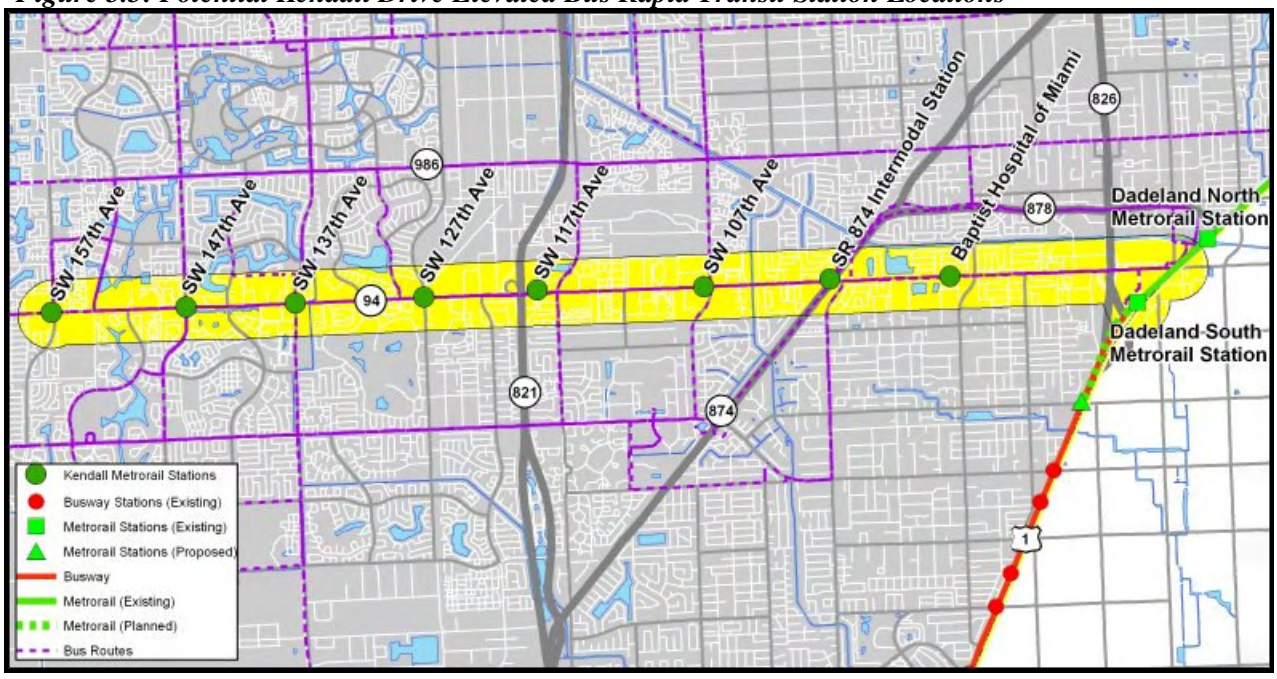
The elevated BRT/HOT concept is proposed to run along an elevated guideway that would be supported on columns placed within the roadway median. This elevated roadway could also potentially act as a tolled High Occupancy Vehicle (HOT) facility that would help to offset project costs and speed through-traffic along Kendall Drive. A very limited number of on/off ramps would be possible under this scenario due to limited right-of-way and adjacent properties. Auto access to the elevated lanes would be provided

at either end of the guideway with potential access points at SR 826, SR 874, the Turnpike (HEFT) and SW 127th Avenue. Additional construction and operational constraints would arise where the elevated guideway crossed over or under the SR 826, SR 874, and HEFT overpasses. The cost and complexity involved in building elevated station platforms would limit the viable number of stations to only the most major locations or to those spaced approximately one mile apart. Off-line stations would be located within right-hand bus pull-out zones so as to not conflict with through-traffic and should provide adequate space for two articulated buses to dwell at the same time. This elevated concept would provide the greatest mobility benefits of the three Kendall Drive BRT options since the transit vehicles and through HOV/HOT autos would run free of at-grade cross-traffic conflicts. Very few of the existing left-turn lanes would have to be removed under this concept and the BRT/HOT operation would cause little impact to surface traffic.

Potential Elevated BRT Stations

- Eastern Terminal at Dadeland South Metrorail Station
- SR 874 Intermodal Station (transfer to Route 104)
- SW 107th Avenue (transfer to Route 71)
- SW 117th Avenue (transfer to Route 56)
- SW 127th Avenue
- SW 137th Avenue (transfer to Route West Dade Connection 137)
- SW 147th Avenue (transfer to Routes 104 and 147)
- Western Terminal at SW 157th Avenue Transit Center (transfer to Routes 72 and 104)

Figure 5.5: Potential Kendall Drive Elevated Bus Rapid Transit Station Locations



An additional alignment alternative that could be implemented under any of the above three service options would be to provide access to the Dadeland South Metrorail Station via a dedicated access roadway. The dedicated busway / bus lanes would meet Kendall Drive near the existing northbound SR 826 / U.S. 1 off-ramp. This alternative would require the ramp to be realigned slightly towards the west so that it would meet Kendall Drive at a T-intersection. It does appear that this small change would provide adequate right-of-way for a two-lane busway to run parallel and just east of the ramp and just to the west of the Publix grocery store and the Datran office buildings. The access road would then cross under the Metrorail tracks where it would turn northeastwards on the existing South Miami-Dade Busway and continue on several hundred feet to the Dadeland South Metrorail Station. This alternative would avoid Dadeland Boulevard and its intersection with Kendall Drive but would not provide direct service to the Dadeland Mall.

Figure 5.6: Prototypical Exclusive-Lane BRT Route

Light Rail

Operationally, a light rail service option would function similarly to an exclusive-lane BRT system. It is unlikely and perhaps inadvisable that a light rail system would operate in a curb lane configuration along a multi-lane arterial right-of-way due to safety concerns, construction costs and other infrastructure requirements. Two LRT service options are considered from the Dadeland South Metrorail Station to the SW 157th Avenue transit center; at-grade median- running and an elevated guideway. An at-grade LRT concept would potentially serve the same stations that are proposed for at-grade BRT and an elevated LRT option would most likely stop at the most major station locations similarly to the elevated BRT concept.

At-grade arterial LRT systems in America tend to operate within the middle of the right-of-way. There are instances where the tracks may run along the side of the road or even within the road for portions of their routes. The signal preemption / priority system and left-turn pocket removal that were recommended for the exclusive-lane BRT concept would require a more intensive implementation for LRT. Dedicated transit signals, left-turn limitations and perhaps even pedestrian crossing barrier gates would need to be considered to ensure safety along the route. Stations could consist of right-side boarding platforms located on the far side of intersections with adequate space provided for two articulated rail vehicles. Numerous left-door boarding LRT vehicles are currently in operation in the United States and a center-platform operation could improve transfers, pedestrian safety and system legibility. Capital construction costs could be significantly higher for LRT than for BRT. Extensive utility relocation, track bed and rail installation, and overhead power system construction would be required along with the provision of a new maintenance and storage yard.

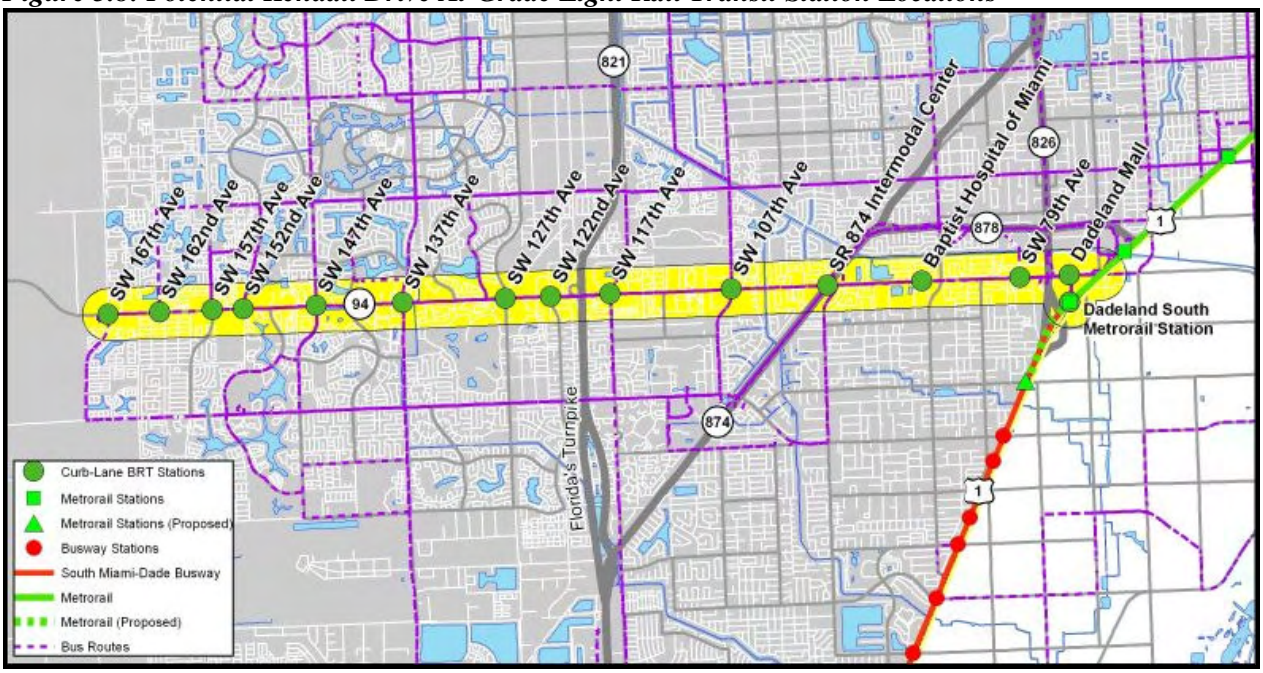
The LRT route could also potentially access the Dadeland South Metrorail Station via a dedicated right-of-way running parallel and just east of SR 826 and west of the Publix grocery store and the Datran office buildings. The route within the existing South Miami-Dade Busway right-of-way and continue to a special platform under the Dadeland South Metrorail Station. This alternative would avoid Dadeland Boulevard and its intersection with Kendall Drive but would not provide direct service to the Dadeland Mall.

Figure 5.7: Typical LRT Vehicle and Station

Potential At-Grade LRT Stations

- Eastern Terminal at Dadeland South Metrorail Station
- Dadeland Mall
- SW 79th Avenue (transfer to Route 87)
- Baptist Hospital of Miami
- SR 874 Intermodal Station (transfer to Route 104)
- SW 107th Avenue (transfer to Route 71)
- HEFT Intermodal Center located at SW 122nd Avenue or SW 117th Avenue (transfer to Route 56)
- SW 127th Avenue
- SW 137th Avenue (transfer to Route West Dade Connection 137)
- SW 147th Avenue (transfer to Routes 104 and 147)
- SW 152nd Avenue (transfer to Routes 72 and 104)
- SW 157th Avenue Transit Center (transfer to Routes 72 and 104)
- SW 162nd Avenue (transfer to Route Sunset KAT 272)
- Western Terminal at SW 167th Avenue (transfer to Routes Killian KAT 204 and Sunset KAT 272)

Figure 5.8: Potential Kendall Drive At-Grade Light Rail Transit Station Locations



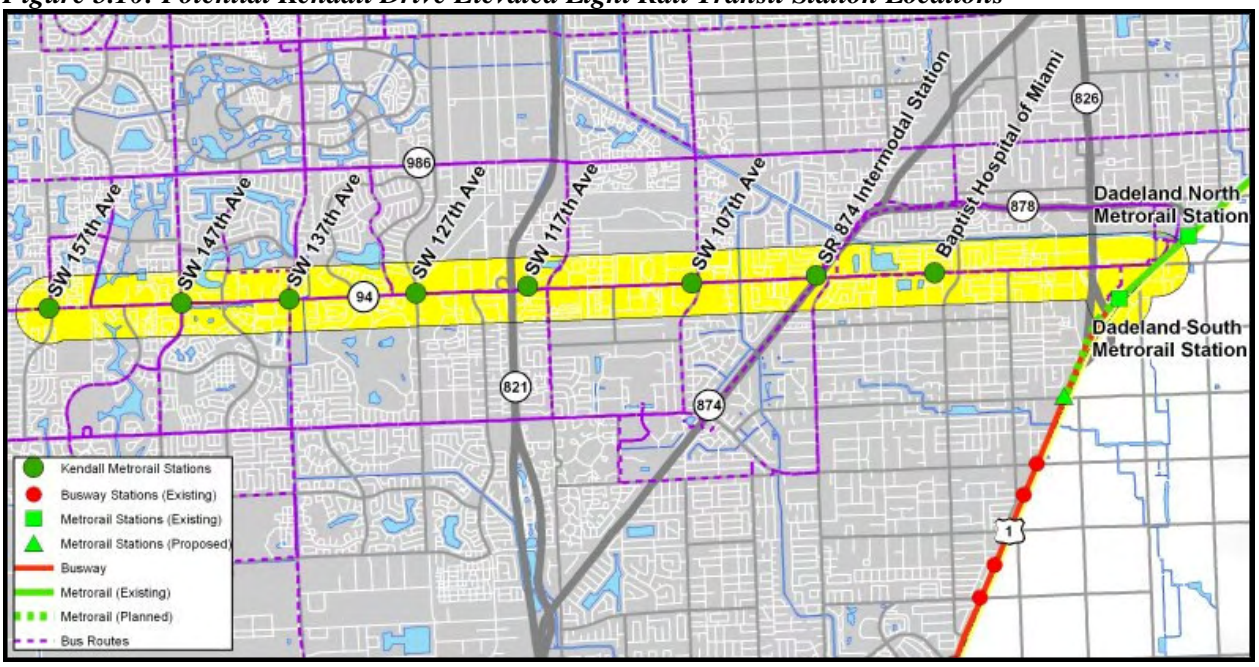
An elevated-guideway LRT service alternative is also considered due to its operational benefits. Elevating the tracks above the road would eliminate the potential for traffic conflicts and ease the scheduling and safety concerns inherent with at-grade service. Unlike the elevated BRT option, the addition of HOT lanes would not be possible under this scenario since auto traffic would be incompatible with the elevated track system. The guideway requirements would therefore be much narrower than with the BRT/HOT alternative, would not require off-line stations or mid-point access ramps and the station platforms would be smaller than existing Metrorail stations due to shorter train lengths. Station structures would still cast shadows on the properties adjacent to and below the guideway and construction and operational constraints occur where elevated guideway must cross over SR 836, SR 874, the HEFT overpasses. While this option would provide travel time and safety benefits, the environmental impacts and increased costs may reduce its overall desirability. Furthermore, while the construction costs would likely be similar to an elevated heavy rail system, the lower capacity and forced transfer at Dadeland South station will most likely cause this option to perform poorly against the Metrorail alternative.

Figure 5.9: Typical Light Rail Vehicle

Potential Elevated LRT Station Locations

- Eastern Terminal at Dadeland South Metrorail Station
- SR 874 Intermodal Station (transfer to Route 104)
- SW 107th Avenue (transfer to Route 71)
- SW 117th Avenue (transfer to Route 56)
- SW 127th Avenue
- SW 137th Avenue (transfer to Route West Dade Connection 137)
- SW 147th Avenue (transfer to Routes 104 and 147)
- Western Terminal at SW 157th Avenue Transit Center (transfer to Routes 72 and 104)

Figure 5.10: Potential Kendall Drive Elevated Light Rail Transit Station Locations



Heavy Rail – Extension of Metrorail

The Miami-Dade Metrorail system currently serves 22 stations along an elevated 22-mile guideway. The tracks run northeastwards along the U.S. 1 right-of-way towards downtown Miami from Dadeland South Station. Only one heavy rail service option is considered along the Kendall Drive corridor. Elevated guideways are the only available option for building heavy rail transit in the densely developed Miami-Dade County. Many urban heavy rail transit systems are constructed in tunnels. The area's geology and high water table, however, negate the possibility of building any transportation system underground or even within a trench. The entire right-of-way of the existing Metrorail system is supported upon concrete piers and support structures.

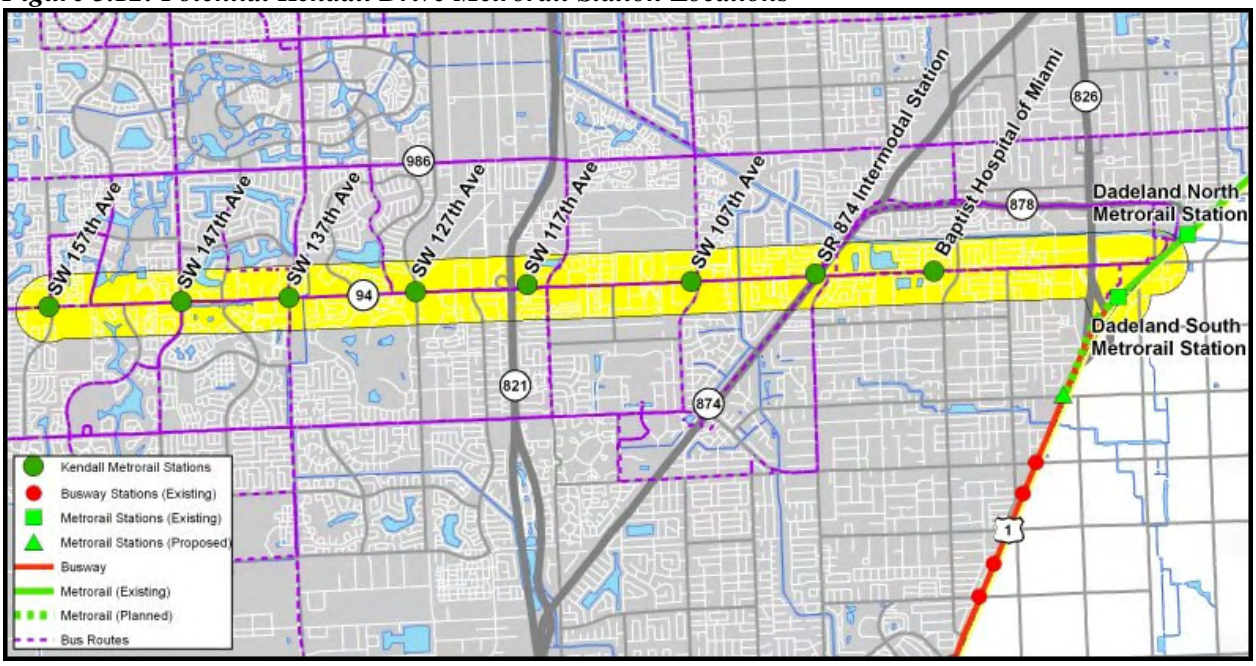
The proposed extension would depart from the Metrorail mainline just south of the Dadeland North Metrorail station and turn westwards along Kendall Drive. The elevated guideway piers would be placed within the median of the existing roadway. The tracks would need to rise as they approach and then descend slightly when passing over the SR 826, SR 874 and HEFT expressway interchanges. This option will provide the highest level of travel time and ridership benefits of any of the Kendall Drive alternatives. The capital costs will also likely be among the greatest of any of the proposed alternatives.

Figure 5.11: Miami-Dade Metrorail

Potential Station Locations

- Eastern Terminal at Dadeland North Metrorail Station
- SW 79th Avenue (transfer to Route 87)
- Baptist Hospital of Miami
- SR 874 Intermodal Station (transfer to Route 104)
- SW 107th Avenue (transfer to Route 71)
- SW 117th Avenue (transfer to Route 56)
- SW 127th Avenue
- SW 137th Avenue (transfer to Route West Dade Connection 137)
- SW 147th Avenue (transfer to Routes 104 and 147)
- Western Terminal at SW 157th Avenue Transit Center (transfer to Routes 72 and 104)

Figure 5.12: Potential Kendall Drive Metrorail Station Locations



The SR 826 / SR 874 / CSX Corridor

SR 826 / SR 874 Bus Rapid Transit

A Bus Rapid Transit concept has been proposed for the Palmetto Expressway / SR 826 and Don Shula Expressway / SR 874 corridor. Miami-Dade County has close to ten years of experience operating a dedicated transitway in the form of the South Miami-Dade Busway. The proposed SR 826 / SR 874 service would be quite different, however, with operations running within general travel lanes, dedicated side-lanes or center-running BRT/ High Occupancy Toll (HOT) lanes. There are very few examples of true expressway-running BRT operations in North America. The Denver to Boulder, Colorado express bus provides service between the two cities via the general travel lanes of the U.S. 36 expressway. Several of the station stops are built into simple four-leg interchanges so that buses may exit the freeway right-of-way to meet the park and ride lot and then return to the freeway without the need to travel on surface roads. Several transit providers operate freeway express service along the I-395 corridor in Arlington, VA using the HOV lane network that has been built with dedicated access ramps. The proposed SR 826 / SR 874 service does not have the benefit of either an existing HOV lane network or interchange ramps that would facilitate easy off/on station stops. Due to these constraints, it is likely that BRT service along this corridor would require a large capital outlay in order to provide significant time savings and ridership benefits.

The Miami-Dade 2030 Long Range Transportation Plan calls for improvements to the SR 836 / SR 826 interchange and for SR 826 to be widened from 8 to 10 lanes between SW 2nd Street and SW 32nd Street. It also calls for the toll plaza on SR 874 near SW 120th Street to be reconstructed. ITS improvements are planned for the entire freeway network. The People's Transportation plan also calls for direct flyover access ramps to improve the Turnpike interchange at SW 117th Avenue and SW 152nd Avenue. These and related roadway construction projects should consider their impact on, or the inclusion of accommodations for, any potential future BRT services.

Figure 5.13: Prototypical Expressway HOV BRT Systems

Five concepts of expressway bus rapid transit will be evaluated in this analysis. An expressway bus operation running within general travel lanes could serve stations located on surface streets at strategic interchanges for relatively low costs but with limited mobility benefits. A side-running BRT option running within a dedicated lane and serving stations on surface streets could provide operational benefits at low cost, but may impact vehicular traffic flow and safety. A more expensive implementation of side-running BRT would utilize a dedicated lane, offline stations built along the expressway right-of-way and could potentially provide grade-separated ramp access to limit vehicular conflicts. A median BRT / HOT lane concept would provide operational and mobility benefits for both transit and automobile users. This scenario could be configured as a terminal to terminal express service or with off-line stations at much higher cost.

All buses would operate with a SunPass toll transponder to quickly pass through the HEFT tollbooths at SW 152nd Street and on SR 874 near SW 120th Street. The toll plaza on SR 874 near SW 120th Street is a direct obstruction to both side and center running BRT service.While "open-road-tolling" has been implemented at this toll plaza, some manner of reconstruction or dedicated flyover ramps may be required to cross from one side of the facility to the other in this constrained portion of the corridor.

The proposed northern terminal station is at the Miami Intermodal Center (MIC). The BRT service would utilize the station's bus bays and would access the Le Jeune Road / NW 42nd Avenue / SR 953 corridor via dedicated access ramps. The buses would then use travel westbound on the Dolphin Expressway / SR 836 within either the general travel lanes, a dedicated side BRT lane or median BRT/HOT lanes. Side-running BRT service would access southbound SR 826 via the right-hand exit loop ramp, while median BRT would be required to weave across four lanes of traffic to access the left-exit southbound SR 826 flyover ramp. Each service option would continue southbound on SR 826, then southwestwards on SR 874 and then HEFT / SR 821.

The proposed southern terminal station would be located at the HEFT park and ride lot at the SW 117th Avenue and SW 152nd Street interchange. Expressway bus and side-running BRT alternatives would approach the station and return to the highway right-of-way via the existing on and off-ramps. The median alternative would require the construction of dedicated flyover ramps to access the station. A potential extension could take the bus service further down the HEFT to U.S. 1 and provide a transfer to bus routes running on the South Miami-Dade Busway at the SW 200th Street station.

Station locations should provide an easily accessible area for boarding and alighting, transfer facilities for intersection bus service and ideally include space for a park and ride lot. Distinctive stops, stations, and terminals should provide weather-protected facilities with raised boarding platforms, ticket vending machines and real time vehicle arrival information message signs. Low floor BRT vehicles with multiple door boarding could also take advantage of proof-of-payment fare collection to speed boarding. Finally, a

distinctive system identity should be created through marketing efforts to clearly brand the BRT service. For the expressway-station alternatives, both the side and center running BRT service would require elevated station platforms to be built above the highway, interchange ramps and cross streets at very high costs.

Surface stations would require a suitable site close to the highway that would provide easy on/off access for both northbound and southbound bus service. The first station south of the MIC would be located off of SR 836 near the Waterford district on Red Road / NW 57th Avenue and would be accessed via the existing highway ramp system. A parcel located immediately southwest of the interchange could provide space for bus transfers and park and ride facilities.

Buses would then return to SR 836 and continue west and then south on SR 826 to a station located just east of the interchange with Tamiami Trail / SW 8th Street. A potential surface street location that would provide easy access for both northbound and southbound service is a site on the north side of SW 8th Street between NW 74th Court and NW 75th Avenue. The bus would then return to SR 826 and exit one mile to the south at Coral Way / SW 24th. This surface street station could be located on a parcel on the south side of SW 24th Street between SW 77th Court and SW 78th Avenue directly opposite of the southbound on and off ramps. A parcel at the southwest corner of intersection with SW 74th Court could accommodate boarding/alighting and transfer facilities for the Bird Road / SW 40th Street station one mile further to the south along SR 826.

The bus would then return to SR 826 southbound and then merge on to SR 874 southbound. Using existing ramps, it would then access the Kendall Drive station which could be located on a site currently housing a Navarro Drugs retail outlet. This parcel is on the southwest side of the CSX tracks and across from SW 98th Court and had been identified in previous studies as a potential location for a commuter rail station. The area around the Killian Parkway / SW 104th Street interchange is densely developed with residential uses. Vacant land at the Miami-Dade Community College entrance on SW 109th Court would provide easy on/off access to SR 874 and ample room for a station near an attractive transit travel destination. The SW 117th Avenue and SW 152nd Street park and ride lot in northeast quadrant of the intersection provides an ideal station and or service terminal location.

An additional potential BRT service option would run southwards from the MIC along SR 826 directly to the Dadeland South Metrorail station. This concept would eliminate the duplication of services along the existing South Miami-Dade Busway that an SR 874 BRT service would introduce. A bus-only ramp could be provided at the southern terminus of SR 826 providing direct access to the existing busway and bus bays under the Metrorail station.

Potential SR 826 / SR 874 Stations with Surface Street Location Options

- Northern Terminal at Miami Intermodal Center (MIC) bus bays
- Waterford / Red Road / NW 57th Avenue: southwest of the interchange (transfer to Routes 57 and Flagami Connection 278
- Tamiami Trail / SW 8th Street: north side between NW 74th Court and NW 75th Avenue (transfer to Routes 8 and Flagami Connection 278)
- Coral Way / SW 24th Street: south side between SW 77th Court and SW 78th Avenue (transfer to Routes 24 and Coral Way MAX 224)
- Bird Road / SW 40th Street: southwest corner of intersection with SW 74th Court (transfer to Routes 40 and Bird Road MAX 240)
- Kendall Drive: south side west of CSX tracks and across from SW 98th Court (transfer to Routes 88, Kendall KAT 288 and Killian KAT 204)
- Killian Parkway / SW 104th Street: Miami-Dade Community College entrance on SW 109th Court (transfer to Routes 35, 56, 71, 104 and Killian KAT 204)
- Southern Terminal at SW 117th Avenue and SW 152nd Street: park and ride lot at northeast quadrant of the intersection (transfer to Route Coral Reef MAX 252)

Figure 5.14: Potential SR 826 / SR 874 BRT Station Locations

CSX Corridor Commuter Rail / DMU / LRT

Three north-south rail options have been proposed for the CSX Homestead Subdivision rail line. The railroad currently runs through single-family residential neighborhoods and light industrial districts and carries approximately two to four rock trains per day. Two previously proposed projects could ease the flow of freight traffic and open greater opportunities for passenger rail in the study area. The 2004 Miami-Dade MPO Rail Convertibility Study recommended that a planning study be completed to assess the feasibility of consolidating all of the rock trains from the quarries west of Krome Avenue by constructing new tracks from the current western terminus of the CSX Lehigh Spur at NW 12th Street and NW 137th Avenue. The new tracks would turn southwards to connect with the existing northern terminus of the Portland Spur which is located north of Kendall Drive and SW 184th Avenue.

These new tracks would shift the rock trains off of the Homestead Subdivision tracks from the Oleander Junction to the Miami Metrozoo and free up the corridor for more non-freight uses. The half-dozen on-line consignees would still require a local operator to switch their freight cars. An additional project known as the direct connection would allow trains to run east-west along the CSX Lehigh Spur line, running along the southern boundary of Miami International Airport, without the diversion through the Oleander Junction that is currently required. This would ease the flow of trains through the junction and make it more accommodating to non-freight services.

Many of station locations proposed below were also identified in the Southwest Corridor report and other earlier planning efforts. Station layout will vary depending upon the vehicle and alignment concept, but the typical Tri-Rail station is comprised of 400 foot long and 12 foot wide low-level platforms. Light rail and DMU stations could utilize shorter platforms that would be more on the order of 160 to 200 feet depending on vehicle consist. The identified station locations could be used by any of the three rail concepts, although service planning, route sharing and ridership constraints may eliminate one or more from implementation.

The Homestead Subdivision has been studied as a direct extension of the Tri-Rail commuter service, using the current bi-level coaches and push/pull diesel engines. A second option would be to operate diesel multiple unit (DMU) service that would use self propelled, diesel powered passenger rail vehicles that are rugged enough to operate within freight corridors. There would be no need to install overhead electric lines or electrified track for DMU service which would result in construction costs that are lower than for conventional light rail systems. DMU cabs may have better acceleration, be more fuel efficient, and may seat more customers than the current diesel engine cab and double-deck rail cars that are currently in use since they can also pull up to three unpowered passenger coaches.

Commuter rail and DMU service options would also be able to use the Hialeah Yard for maintenance and storage of vehicles. The third CSX corridor concept is a light rail transit (LRT) system which would require much of the right-of-way to be reconstructed, a new maintenance and storage facility and the addition of overhead catenary wires. LRT service would also require that freight and passenger tracks be separated either by a certain distance or be operated at different times of day. These limitations however would be offset by the very high level of service that could be provided with very low air and noise pollution impacts.

The northern terminus of rail service within the corridor would be at the Miami International Airport / Miami Intermodal Center. The existing Tri-Rail station is undergoing a major upgrade to a regional intermodal transportation center serving commuter rail, Metrorail, buses and the airport. The Southwest Corridor report states that commuter rail and possibly DMU service could provide 70 minute headway service using the existing station facilities and recommends that one additional track and station platform would be required to provide 20-30 minute headway passenger service.

A light rail transit concept would require the construction of new tracks to approach and enter the MIC station area. This would open the potential for LRT tracks to deviate from the existing right-of-way and perhaps approach the station from the west and south as opposed to the existing rail alignment that must loop around and enter the station from the north. This could also eliminate the major at-grade crossing that currently exists at the Airport Freeway / SR 112 and Le Jeune Road / NW 42nd Avenue near NW 29th Street.

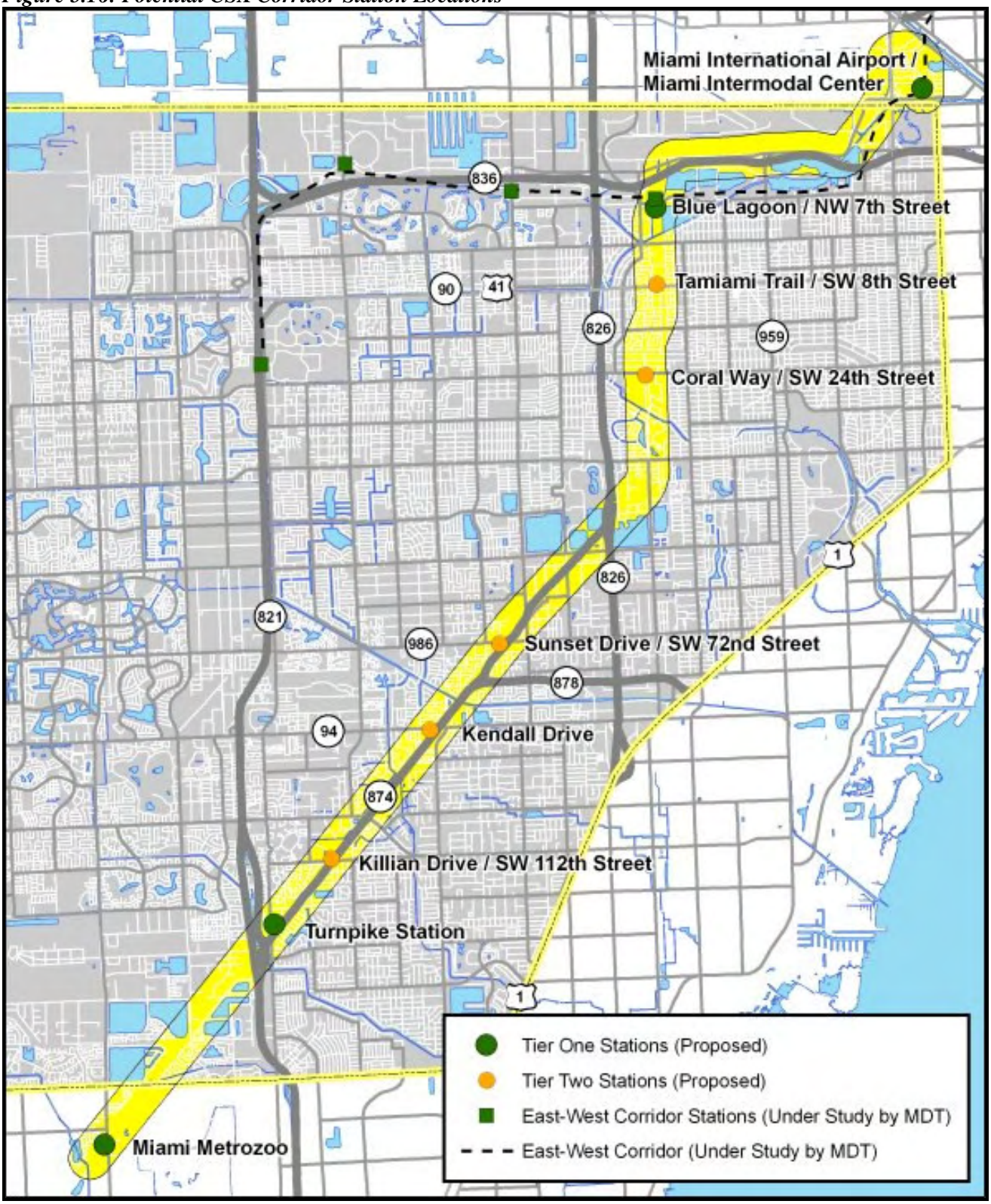
The likely southern terminus of the service would be near the Miami Metrozoo. Station facilities could potentially be constructed on a parcel within a utility corridor on the southwest quadrant of the SW 137th Avenue and SW 160th Street intersection. An alternative terminal station could be constructed near SW 157th Avenue to the southwest of the Kendall-Tamiami Executive Airport. That service would utilize the Portland Spur via the wye track west of the intersection of SW 127th Avenue and SW 144th Street.

Figure 5.15: Typical DMU Vehicle at Grade Crossing

The Blue Lagoon / NW 7th Street station would be located on the west side of the track, just to the south of the NW 7th Street overpass and adjacent to existing parking facilities. This site has also been identified as a potential station in the East-West Transit Corridor DEIS. The Tamiami Trail / SW 8th Street station would require property acquisition for station platforms and bus transfer facilities within the constrained corridor in the surrounding light industrial district.

The previously identified Bird Road / SW 40th Street station location does not appear to provide adequate space for both a platform and a parking facility due to limited right-of-way, multiple at-grade crossings and adjacent property constraints. A nearby location at Coral Way / SW 24th Street appears to provide adequate space for a station. Bus frequencies are also higher along Coral Way than on Bird Road, implying a potential for higher ridership at this location.

Figure 5.16: Potential CSX Corridor Station Locations



Further south, the Tri-Rail Master Plan previously identified the Miami-Dade Water and Sewer Authority property in the southwest quadrant of the at-grade intersection as a potential Sunset Drive / SW 72nd Street station location. A Kendall Drive station would most likely be located on property that is currently occupied by a Navarro Drugs retail outlet located in the southwest quadrant of the at-grade intersection.

An additional station could also be located just to the north of Killian Drive / SW 112th Street and to the west of SR 874. A station here would serve Miami-Dade Community College and the adjacent residential neighborhoods with 10,000 residents living within 0.5 mile of the proposed location. A potential station location known as Turnpike Station could be located on the northwest side of the tracks and to the east of SW 117th Avenue in an area that is currently occupied by warehouses.

Three alternative service options may be considered based upon ridership potential, funding availability or phasing implementation. Option one would serve stations located at Turnpike Station and Blue Lagoon / NW 7th Street in addition to the two terminals. One mid-point passing track would be provided to allow 30 minute peak and 60 minute off-peak service with freight operations during mid-day or night. No signal system would be required. Option two would serve additional stations at Killian Drive / SW 112th Street, Kendall Drive, Sunset Drive / SW 72nd Street, Coral Way / SW 24th Street and Tamiami Trail / SW 8th Street.

Single track service with three passing sidings and a wayside signal system would allow for 20 minute peak and 40 minute off-peak service with freight operations largely taking place at night. Option three represents the highest level of passenger rail service. The line would be largely double-tracked and service would be provided with cab-based signaling and automatic train control that would allow 15 minute peak and 30 minute off-peak headways with freight operations occurring at night. Service would be provided to the same set of stations that were listed in option two.

Potential Station Locations

- Northern Terminal at Miami International Airport / Miami Intermodal Center
- Blue Lagoon / NW 7th Street (transfer to Route East-West Connection 238)
- Tamiami Trail / SW 8th Street (transfer to Route 8)
- Coral Way / SW 24th Street (transfer to Routes 24 and Coral Way MAX 224)
- Sunset Drive / SW 72nd Street (transfer to Routes 72 and Sunset KAT 272)
- Kendall Drive (transfer to Route 88 and Kendall KAT 288)
- Killian Drive / SW 112th Street (transfer to Route 104)
- Turnpike Station (transfer to Routes 35 and 136)
- Southern Terminal at Miami Metrozoo (transfer to Routes West Dade Connection 137 and Coral Reef MAX 252 or SW 157th Avenue along Portland Spur track

The HEFT Corridor

The Homestead Extension of Florida's Turnpike is a relatively new highway facility running along the western edge of the Miami-Dade urbanized area. The land west of the highway is relatively undeveloped north of the Dolphin Expressway / SR 836 and is dotted with active quarry operations. The proposed transit service is to be located south of the SR 836 corridor, where the land west of the HEFT is becoming densely suburbanized. The East-West Corridor project is currently undergoing preliminary engineering and is proposed to travel west along the SR 836 corridor from the Miami Intermodal Center before turning south to the Florida International University. Each of the transit concepts detailed below is proposed to terminate at this location.

The East-West corridor concept currently undergoing design places both the guideway and the station within the HEFT right-of-way, on land east of the highway and west of the Snapper Creek Canal. The Florida International University station would be located on vacant and underused parcels just north of the Coral Way / SW 24th Street overpass. Pedestrian access, bus bays and parking facilities are proposed for the for the east side of SW 117th Avenue. Improvements to the HEFT will include widening the tollway from SW 117th Street north to Kendall Drive to 12 lanes plus 3 collector/distributor lanes, the reconfiguration of the Tamiami Trail / SW 8th Street interchange and enhancements to the SunPass electronic toll collection system. These and related roadway construction projects should consider their impact on, or the inclusion of accommodations for, any potential future premium transit services.

Bus Rapid Transit

The HEFT is a tolled highway facility with very limited on/off ramp access. For this reason, it would be difficult to place stations on surface streets that would be easily accessible from highway ramps. A Bus Rapid Transit concept along the HEFT would most likely be configured as one of the following three alternatives. An expressway bus operation running within general travel lanes serving expressway stations located within the HEFT right-of-way would provide limited operational and ridership benefits but at relatively low costs. The second alternative would be a side-running BRT option operating within a dedicated lane and serving expressway stations located within the HEFT right-of-way. This concept would provide greater operational and ridership benefits than the expressway bus option, but would introduce the potential for conflicts at interchange ramps along with the added costs of mitigating those issues.

A center/side-running dedicated guideway BRT / HOT lane concept with off-line stations could provide both operational and ridership benefits, but at much higher cost. The costs could be offset to some degree by revenues from the HOT lane, but the additional infrastructure required to accommodate automobiles within the transitway may offset this. Each scenario could also be configured as a terminal to terminal express service. This would reduce the cost and engineering complexity required to provide offline stations within the HEFT right-of-way but would negatively impact the level of overall mobility and ridership improvements.

There are several alternatives for the northern terminus at the Florida International University station of the planned East-West Metrorail extension. Flyover ramps could provide dedicated access to the Metrorail station's bus bays from the HEFT right-of-way. Two at-grade BRT facility options could provide pedestrian access to the rail platforms and parking facility via the mezzanine level. The first would be located under the Metrorail tail tracks and the other would be located west of the HEFT alignment with a pedestrian overpass providing access to Metrorail station. Finally, an elevated BRT facility located within the HEFT median could provide an offline station facility for a BRT/HOT lane option, but at very high costs and engineering complexity.

The likely southern terminal station would be located at the SW 117th Avenue / SW 152nd Street park and ride lot that is also identified as a potential terminal station for the SR 826 / SR 874 BRT service. The new flyover access ramp proposed at this location in People's Transportation Plan could provide improved access for BRT service entering and exiting the terminal station.

Station locations would vary by concept and available space for at-grade station facilities is very limited. The first station south from the FIU station would be located at Bird Road / SW 40th Street providing service to the Kendall Regional Medical Center. Station facilities could be located on the north or south side of the HEFT overpass, with the potential for a park and ride lot in the northwest quadrant of the interchange. The Sunset Drive / SW 72nd Street station could be located about 1,200 feet north of the HEFT overpass, with station facilities, park and ride lots and bus bays located on property on the west side of SW 117th Avenue.

Kendall Drive station facilities would be located within the partial cloverleaf interchange on either the north or south side of the overpass. An offline expressway station with park and ride and bus transfer facilities could be located on land between the interchange ramps. A Killian Parkway / SW 104th Street station could be located south of the underpass within the wide right-of-way north of the Turnpike service facility. A station at SW 120th Street could be located on the grounds of the nearby Turnpike service facility.

Potential BRT Station Locations

- Northern terminal at Florida International University Metrorail Station
- Bird Road / SW 40th Street (transfer to Routes 40 and Bird Road MAX 240)
- Sunset Drive / SW 72nd Street (transfer to Routes 56, 72 and Sunset KAT 272)
- Kendall Drive (transfers to Routes 57, 88 and Kendall KAT 288)
- Killian Parkway / SW 104th Street (transfer to Routes 35, 56, 104 and Killian KAT 204)
- SW 120th Street (transfer to Routes 35 and 136)
- Southern terminal at SW 117th Avenue and SW 152nd Street: park and ride lot at northeast quadrant of the intersection (transfer to Route Coral Reef MAX 252)

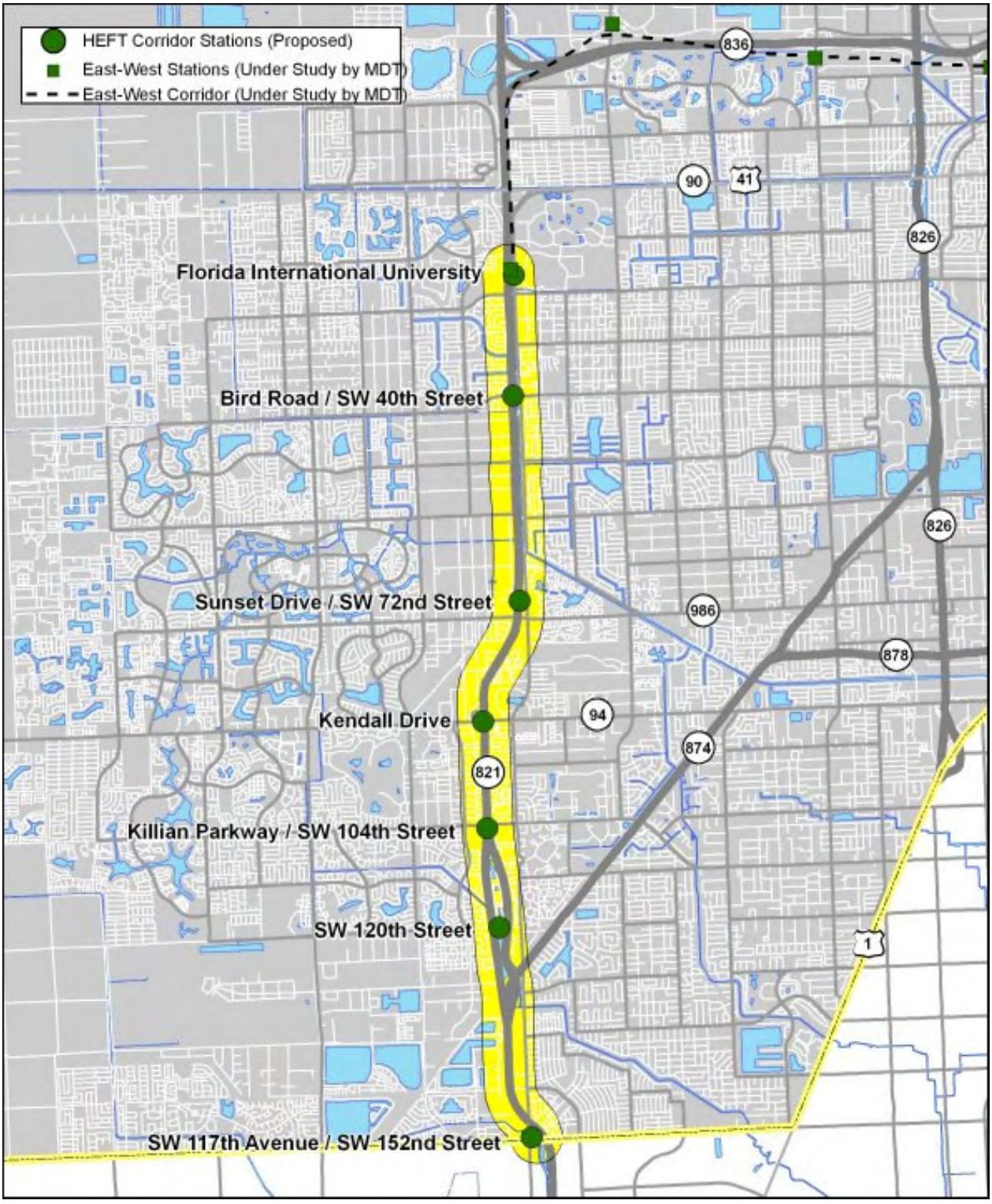
Light Rail / DMU

Operating a light rail service within the HEFT right-of-way introduces several challenges. An operating or abandoned rail right-of-way does not exist along the alignment and the corridor is constrained by the Snapper Creek Canal, residential and commercial development and the Turnpike service toll and service facilities. The LRT/DMU line will have to cross over/under several overpass bridges and flyover ramps will be required to cross over the on- and off-ramps to eliminate at-grade conflicts between trains and highway traffic. A light rail concept running within a constrained highway right-of-way will experience limited operational benefits over a BRT service but at much higher costs. LRT would also provide fewer operational and ridership benefits than a Metrorail extension with comparable costs.

A conventional LRT service would also require new maintenance and storage facilities and overhead electrical systems along with the construction of new rail guideways that Metrorail would require. A light rail maintenance and storage facility could be located within the utility right-of-way and properties on the west side of the HEFT alignment near SW 76th Street. Potential ridership of light rail would be lower than a Metrorail extension due to the use of smaller vehicles and a forced transfer at the FIU station. Extending light rail tracks south of Killian Parkway would also introduce a high level of engineering complexity due to the constrained right-of-way and existing bridges.

Light rail service along the HEFT alignment could operate within the highway median using an elevated guideway or as an at-grade service. Trains would travel south from the FIU Station and cross in to the highway median after flying over the Coral Way / SW 24th Street overpass. The Bird Road / SW 40th Street station would be located either on an at-grade or elevated platform above the highway. Potential station parking and transfer facilities could be located on property within the radius of the southbound HEFT on-ramp. Continuing southwards, the LRT guideway could touchdown at-grade in the median and run between the HEFT toll plazas near SW 47th Street.

Figure 5.17: Potential HEFT Corridor BRT / LRT Station Locations



As with the proposed BRT and Metrorail configuration, the Sunset Drive / SW 72nd Street station could be located about 1,200 feet north of the HEFT overpass. Station facilities, park and ride lots and bus bays would be located on property on the west side of SW 117th Avenue. The Kendall Drive station concept for LRT would be similar to the previously describe options with station facilities, park and ride spaces and bus bays located within the partial cloverleaf interchange on either the north or south side of the overpass. The LRT tracks would then continue south and cross underneath the SW 104th Street overpass.

A Killian Parkway / SW 104th Street station could again be located south of the overpass and within the wide right-of-way just to the north of the Turnpike service facility. The tracks would then launch on to an elevated guideway and would cross to the west side of the HEFT alignment and the Turnpike service facility. The tracks could touch down within the median south of the SR 874 interchange and continue to the southern terminal.

Stations would likely be configured similarly to those of a Metrorail system due to guideway, boarding and alighting characteristics and limited available space for at-grade station facilities. There are three likely alternatives for the northern terminus at the planned Florida International University station. Two at-grade LRT facility options could provide pedestrian access to the rail platforms and parking facility via the mezzanine level. The first would be located under the Metrorail tail tracks and the other would be located west of the HEFT alignment with a pedestrian overpass providing access to Metrorail station. Finally, an elevated station facility located within the HEFT median could provide LRT platforms, but at high costs and engineering complexity. Stations for an LRT option would most likely correspond with those detailed for the Bus Rapid Transit alternative.

Potential Station Locations

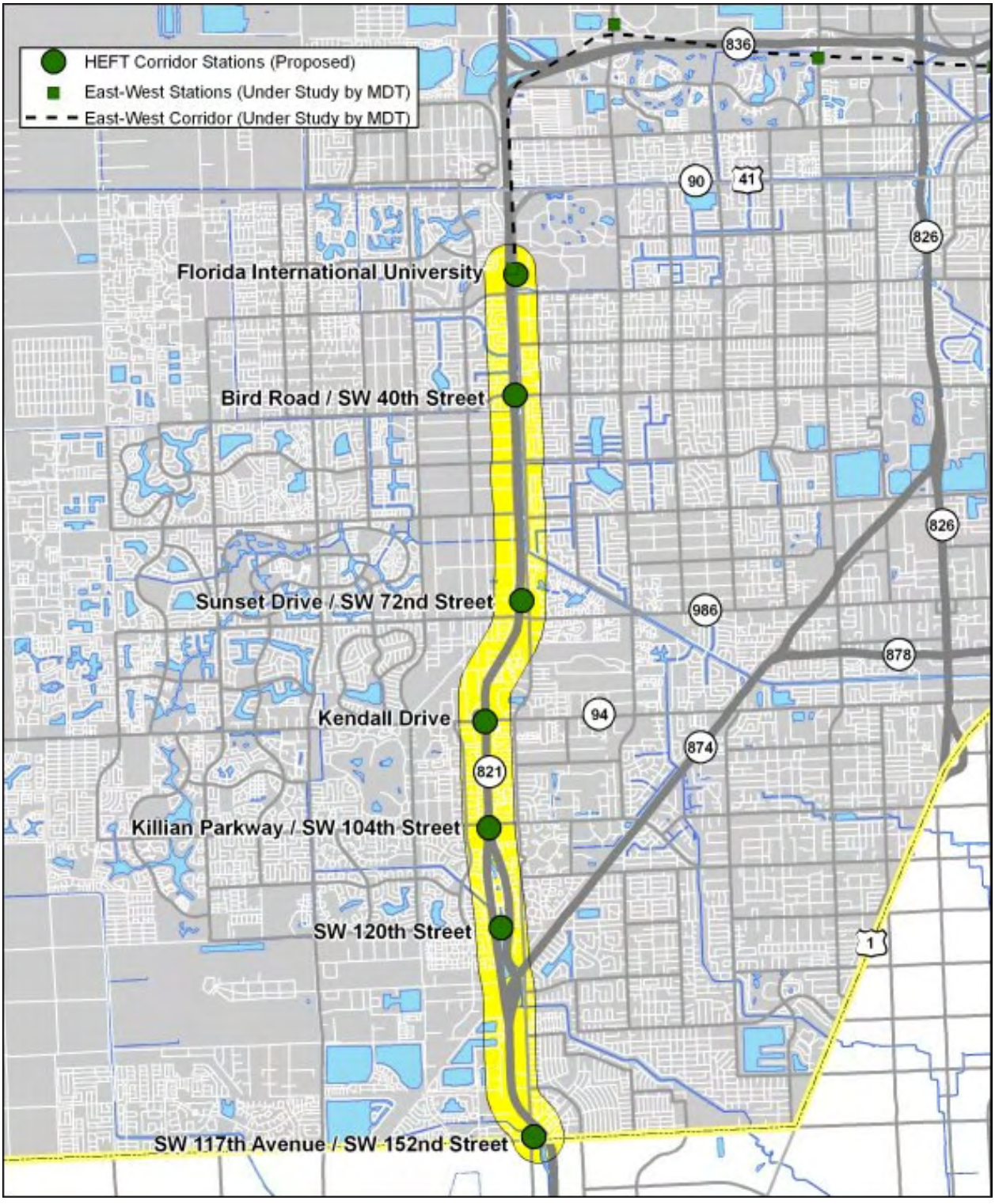
- Northern terminal at Florida International University Metrorail Station
- Bird Road / SW 40th Street (transfer to Routes 40 and Bird Road MAX 240)
- Sunset Drive / SW 72nd Street (transfer to Routes 56, 72 and Sunset KAT 272)
- Kendall Drive (transfer to Routes 57, 88 and Kendall KAT 288)
- Killian Parkway / SW 104th Street (transfer to Routes 35, 56, 104 and Killian KAT 204)
- SW 120th Street (transfer to Routes 35 and 136)
- Southern terminal at SW 117th Avenue and SW 152nd Street: park and ride lot at northeast quadrant of the intersection (transfer to Route Coral Reef MAX 252)

Heavy Rail / Extension of Metrorail

The East-West Corridor is moving forward through the environmental and design stage for a Metrorail extension from the MIC to Florida International University. A proposed extension of this service south to Kendall Drive was included as part of the People's Transportation Plan. Metrorail would provide high level operational and ridership benefits, but would do so at high capital, operations and maintenance costs. Since the extension to Kendall Drive would be a continuation of the East-West Corridor service, it is assumed that the two services would utilize the same maintenance and storage facilities. The land use and land value impacts would also be highest with this option due to the direct high-speed service to the airport and transfer opportunities to Tri-Rail and downtown Miami. An extension of Metrorail south to SW 117th Avenue and SW 152nd Street will be evaluated for the purposes of this study.

Metrorail service along the HEFT would likely continue south from the Florida International University Station along the east side of the highway alignment. After crossing over Coral Way / SW 24th Street, the elevated guideway could potentially transition westwards into the median of the highway. The Bird Road / SW 40th Street station would be located on an elevated platform above highway. Potential station parking and transfer facilities could be located on property within the radius of the southbound HEFT on-ramp.

Figure 5.18: Potential HEFT Corridor Metrorail Station Locations



Continuing southwards, the elevated Metrorail guideway would pass between the north and south toll plazas near SW 47th Street. The Sunset Drive / SW 72nd Street station could be located approximately 1,200 feet north of the HEFT overpass. With a similar configuration to the proposed BRT concept, station facilities, park and ride lots and bus bays would be located on property on the west side of SW 117th Avenue. The Kendall Drive station could also be configured in a similar manner to the proposed BRT station at this location. Station facilities, park and ride spaces and bus bays could be located within the partial cloverleaf interchange on either the north or south side of the overpass.

A Killian Parkway / SW 104th Street station could be located south of the underpass and within the wide right-of-way just to the north of the Turnpike service facility. The land area at the SW 120th Street station site is somewhat constrained for the construction of surface facilities due to adjacent canals and ponds. An elevated station here could take advantage of the nearby Turnpike service facility for surface operations. South of this location, the elevated guideway may cross to the west side of the HEFT alignment and travel south along the western edge of the Turnpike service facility and on to the southern terminal station.

Potential Station Locations

- Northern Terminal at Florida International University Metrorail Station
- Bird Road / SW 40th Street (transfer to Routes 40 and Bird Road MAX 240)
- Sunset Drive / SW 72nd Street (transfer to Routes 56, 72 and Sunset KAT 272)
- Kendall Drive (transfer to Routes 57, 88 and Kendall KAT 288)
- Killian Parkway / SW 104th Street (transfer to Routes 35, 56, 104 and Killian KAT 204)
- SW 120th Street (transfer to Routes 35 and 136)
- Southern terminal at SW 117th Avenue and SW 152nd Street: park and ride lot at northeast quadrant of the intersection (transfer to Route Coral Reef MAX 252)

The SW 107th Avenue Alignment

An alternative service option has been proposed for the East-West Corridor Metrorail service that would turn south from SR 836 on to SW 107th Avenue. A terminal station would be located in the vicinity of Florida International University between Tamiami Trail / SW 8th Street and Coral Way / SW 24th Street. A planned grade separation of the SW 107th Avenue and Tamiami Trail / SW 8th Street intersection would ease the flow of vehicular traffic in the general vicinity, but may add to the cost and complexity of running Metrorail service within the corridor.

Bus Rapid Transit, at-grade and elevated Light Rail Transit and Metrorail alternatives will be evaluated in this section. Operating services along SW 107th Avenue would likely cost less than the parallel HEFT right-of-way route due to the lack of bridge structures that must be crossed by the guideway and the difficulty of building station facilities within the HEFT corridor. Ridership numbers may be lower along the SW 107th Avenue corridor due to access limitations, fewer existing trip generators and existing low-density development patterns.

Land use along SW 107th Avenue heading south from Coral Way / SW 24th Street tends to be comprised of medium density, single family residential properties, with several small commercial buildings. Several larger commercial buildings and multi-family residential developments lie at the intersection with Bird Road / SW 40th Street. Continuing south, SW 107th Avenue is paralleled by a utility corridor to the east and single family residential properties to the west. The low to medium-density residential pattern continues along both sides of SW 107th Avenue south of Miller Road / SW 56th Street. A small collection of commercial buildings sits at Sunset Drive / SW 72nd Avenue and the road passes by multi-family residential buildings to the

east and a park to the west as it approaches Kendall Drive. High density multi-family developments and commercial buildings surround the intersection of with Kendall Drive. SW 107th Avenue passes through a single family residential neighborhood as it approaches Killian Parkway / SW 104th Street where the road meets the on and off ramps to the Don Shula Expressway / SR 874. The SW 107th Avenue corridor does not cross the SR 874 right-of-way, and the road south of the highway is of a low volume local residential nature.

Bus Rapid Transit

A bus rapid transit service along SW 107th Avenue would operate in a dedicated curb-lane or within a dedicated median transitway. Stations would be located at Bird Road / SW 40th Street, Miller Road / SW 56th Street , Sunset Drive / SW 72nd Street, Kendall Drive and Killian Parkway / SW 104th Street. These curb-lane or Median stations would be configured similar to those described for the Kendall Drive BRT alternatives. Service would continue southwards on SR 874 to the HEFT and access a terminal station at the SW 117th Avenue / SW 152nd Street park and ride facility. This concept would follow the south terminal alternatives described for SR 826 / SR 874 BRT service above.

Light Rail Transit

An LRT service could travel southwards from a Florida International University Station located on SW 107th Avenue in an at-grade or elevated configuration. As with the BRT and Metrorail concepts described above and below, at-grade or elevated LRT service traveling south on SW 107th Avenue would likely run within the median. An at-grade LRT service would cost much more than BRT service and would provide marginal ridership and mobility benefits. An elevated LRT service along SW 107th Avenue would require a forced transfer at FIU and may provide lower ridership and mobility benefits than Metrorail, but at comparable costs.

Stations would be located at Bird Road / SW 40th Street, Miller Road / SW 56th Street , Sunset Drive / SW 72nd Street, Kendall Drive and Killian Parkway / SW 104th Street. The tracks would then touchdown within the median of SR 874 lanes and travel south towards the HEFT and continue within the median to the park and ride facility at SW 117th Avenue / SW 152nd Street. An alternative service option would extend LRT service south along the existing CSX tracks to access a terminal station at the Miami Metrozoo.

Potential BRT/LRT Station Locations

- Northern terminal at Florida International University Metrorail Station
- Bird Road / SW 40th Street (transfer to Routes 40 and Bird Road MAX 240)
- Miller Road / SW 56th Street (transfer to Route 56)
- Sunset Drive / SW 72nd Street (transfer to Routes 56, 71, 72 and Sunset KAT 272)
- Kendall Drive (transfer to Routes 71, 88 and Kendall KAT 288)
- Killian Parkway / SW 104th Street with transfers to Routes 35, 56, 71, 104 and Killian KAT 204
- Southern terminal at SW 117th Avenue and SW 152nd Street (transfer to Route Coral Reef MAX 252)

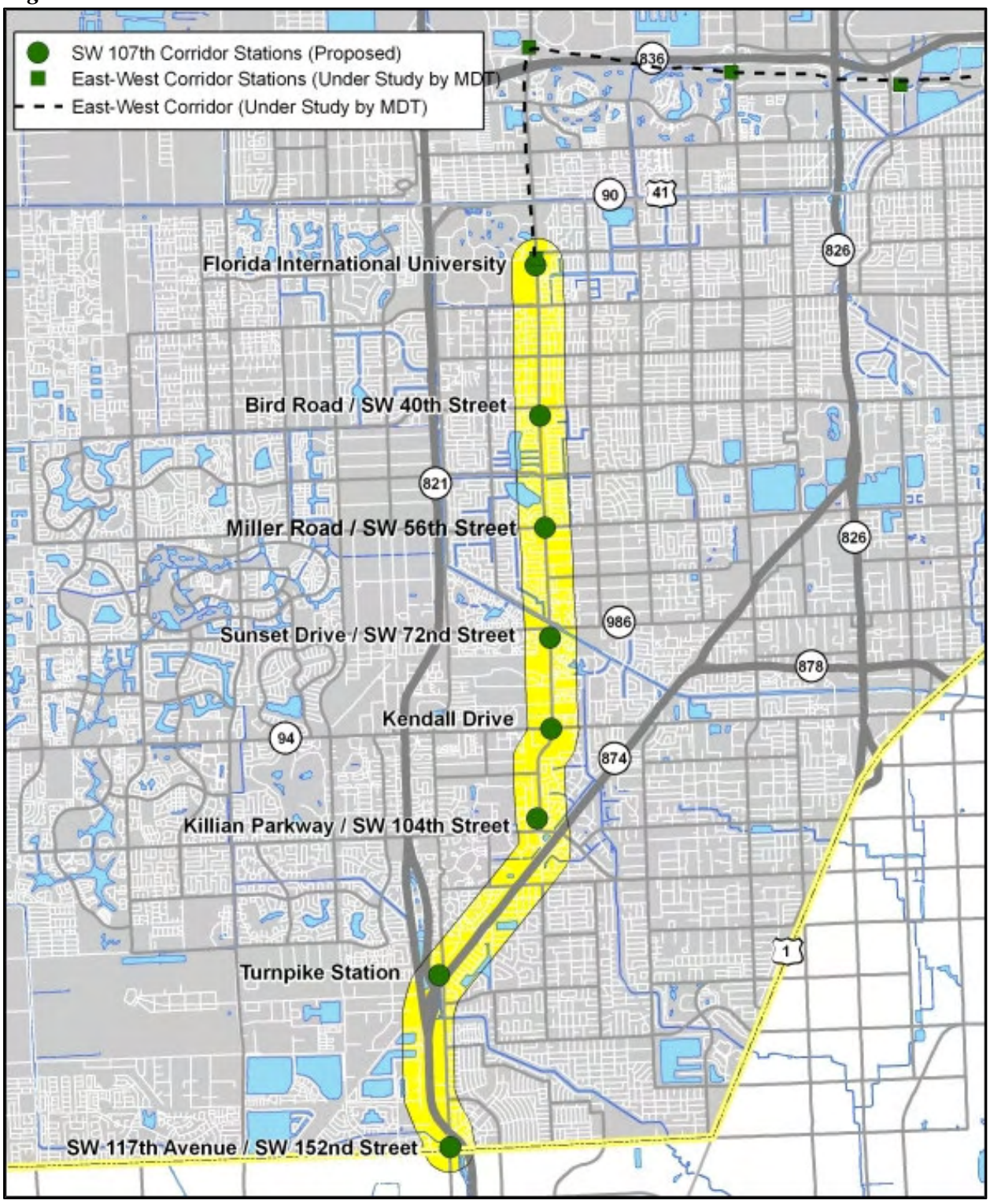
Heavy Rail / Extension of Metrorail

Extending Metrorail south of an East-West Metrorail terminal at Florida International University could travel south along SW 107th Avenue with elevated guideway supports placed within the median. Stations could be located at Bird Road / SW 40th Street, Miller Road / SW 56th Street , Sunset Drive / SW 72nd Street, Kendall Drive and Killian Parkway / SW 104th Street. A terminal facility could be located west of SW 107th Avenue and north of SW 104th Street on property adjacent to the Miami-Dade Community College. It would be possible, but very expensive to extend Metrorail service further south to access the park and ride facility at SW 117th Avenue / SW 152nd Street. The elevated guideway could travel within the medians of SR 874 and the HEFT for the remainder of this route. A potential Turnpike station could be located on property northwest of SR 874 that is currently occupied by warehouses near the SW 117th Avenue overpass.

Potential Metrorail Station Locations

- Northern terminal at Florida International University Metrorail Station
- Bird Road / SW 40th Street (transfer to Routes 40 and Bird Road MAX 240
- Miller Road / SW 56th Street (transfer to Route 56
- Sunset Drive / SW 72nd Street (transfer to Routes 56, 71, 72 and Sunset KAT 272
- Kendall Drive (transfer to Routes 71, 88 and Kendall KAT 288
- Killian Parkway / SW 104th Street (transfer to Routes 35, 56, 71, 104 and Killian KAT 204
- Turnpike Station / SW 117th Avenue (transfer to Routes 35 and 136
- Southern terminal at SW 117th Avenue and SW 152nd Street (transfer to Route Coral Reef MAX 252

Figure 5.19: Potential SW 107th Avenue Corridor Station Locations



6 Tier I Preliminary Operating Plans

The Kendall Drive Corridor

Bus Rapid Transit

The three Bus Rapid Transit alternatives being considered for Kendall Drive are curb-lane BRT, center-lane BRT and an elevated BRT/HOT concept. Each alternative would begin at the current South Miami-Dade Busway terminal station located underneath the Dadeland South Metrorail Station. BRT Vehicles would then travel northwards on Dadeland Boulevard towards the Dadeland Mall and turn westwards on Kendall Drive to a terminal station at SW 157th Avenue. An existing bus transit transfer facility at this location is planned to be improved into a park and ride transit center as part of a private development project. A potential extension of service to SW 167th Avenue could also be considered.

The operating profile for each of these alternatives will vary significantly due to differences in station location, station configuration, and the extent of interaction with parallel and cross-flow general vehicle travel. The elevated BRT scenario would not have to negotiate signalized intersections, but would face potential delays when pulling back in to the free flowing high-occupancy-tolled automobile traffic lane. The center-lane BRT would not be impacted by traffic running within the transit right-of-way, but would have to deal with cross traffic at signalized intersections. Finally, the curb-lane BRT concept would have potential conflicts not only at signalized intersections, but also due to automobiles that travel in, through or across the bus lane at minor intersections and driveways. Conflicts with automobiles may be mitigated to varying degrees through the use of signal priority or queue jumping lanes at intersections, or with raised or mountable curbs and colored pavements used to delineate the transit way. Aggressive ticketing or bus-mounted enforcement cameras could also discourage motorists from driving within exclusive transit lanes.

The manner in which buses are able to approach and depart from stations, along with the speed of passenger loading and unloading can also significantly impact overall travel times. The station structures required for the elevated BRT concept could provide an ideal environment for pre-paid fare collection and high-level platforms. Pre-paid fare collection in the center-lane and curb-lane BRT alternatives would likely require some form of proof-of-payment since it would be difficult, and perhaps inadvisable, to control pedestrian access to the stations. Collecting fares prior to the boarding process and allowing passengers to enter and exit the transit vehicle on a level surface can reduce station dwell times significantly from the conventional average of 3.5 to 4 seconds per passenger. Low-floor and multi-door vehicle configurations and computer assisted precision docking can also help to reduce dwell times and increase travel speeds along the route.

The alignment options laid out in Chapter 4 detailed a proposed set of stations that varied with each of the three BRT concepts. The potential exists for local bus routes to access either the center or curb-lane BRT right-of-way, but only the three BRT services were evaluated in this tier one analysis. The station locations were classified as either premium or intermediate level BRT stations. Premium stations represent the major transfer locations with the potential to serve the greatest number of passengers. An elevated BRT/HOT guideway would stop at only the premium stations, while a center-lane BRT concept could serve the more major intermediate locations. A curb-lane BRT service would serve stations at both the premium and intermediate station locations and could serve a more local purpose due to the lower costs of both the running-way and station infrastructure.

Note that the HEFT Intermodal Center may be located at SW 117th Avenue, SW 122nd Avenue or a location within the HEFT right-of-way and the three locations are shown only to determine travel distance and time. Only one HEFT station will be used in the final alignment. Several factors such as the guideway design speed, signal priority and safety considerations will effect planned travel times and operating

speeds for each alternative. Weekday services for premium bus service would span 18 hours a day from 5:00am to 11:00pm with 6 hours of peak period operations and 12 hours of off-peak operations. Peak period operations were evaluated between 6:00am and 9:00am and between 4:00pm to 7:00pm. Peak period headways of 5 minutes, 7.5 minutes and 10 minutes and off-peak headways of 10 minutes, 15 minutes and 20 minutes were evaluated for each service option.

The travel time characteristics for the curb-lane BRT alternative are detailed in Table 6.1. The proposed service would make twelve station stops on its way from Dadeland South. Station spacing varies from one-quarter of a mile to exactly one mile. The route would make one roundtrip of 19.06 miles in approximately 50 – 60 minutes depending upon average operating speeds and time spent stopped or turning vehicles around at the terminal stations. The proposed center-lane service would make eight station stops on its way from Dadeland South to the SW 157th Avenue Transit Center (Table 6.2.). Assuming an average dwell time, or duration of station stop, of 30 seconds, the route would make one roundtrip of 17.06 miles in approximately 45 – 50 minutes depending again upon average operating speeds and time spent at the terminal stations.

Table 6.3 details the travel time characteristics for the elevated BRT/HOT guideway alternative. The proposed service would make six station stops including the Dadeland South and SW 157th Avenue stations. Assuming an average dwell time of 30 seconds, the route would make one roundtrip of 17.06 miles in approximately 30 – 35 minutes depending upon operating speed and time spent stopped at the terminal stations.

Tables 6.1, 6.2 and 6.3 illustrate that significant time savings can be experienced as the level of bus priority is increased, the number of station stops is reduced and the operating speed is increased. The approximate roundtrip travel time for the option with the least priority is almost 40% more than the highest priority option. The curb-lane alternative running at 35 mph is modeled to make one roundtrip in almost 50 minutes, while the elevated BRT/HOT guideway concept was modeled to make one roundtrip in almost 30 minutes.

Table 6.1: Kendall Drive Curb-Lane BRT Travel Time Characteristics

STATION/STOP LOCATION	FEET TO NEXT STATION	CUMULATIVE MILEAGE	SIGNALIZED INTERSECTIONS	INTERSECTION DELAY	DWELL TIME	CUMULATIVE TRAVEL TIME	AVERAGE SPEED
Dadeland South Metrorail Station	1531.2	0.00	2	0:01:00		0:00:00	10.2
Dadeland Mall	2481.6	0.29	3	0:01:30	0:00:30	0:01:28	11.6
SW 79th Avenue	4699.2	0.76	2	0:01:00	0:00:30	0:03:19	21.3
Baptist Hospital of Miami - SW 89th Ave	5649.6	1.65	3	0:01:30	0:00:30	0:05:36	19.8
SR 874 Intermodal Station	4276.8	2.72	2	0:01:00	0:00:30	0:08:15	20.3
SW 107th Avenue	3537.6	3.53	1	0:00:30	0:00:30	0:10:25	23.5
SW 112th Avenue	2640.0	4.20	2	0:01:00	0:00:30	0:12:16	16.4
* SW 117th Avenue	1478.4	4.70	3	0:01:30	--	--	--
HEFT Intermodal Center	1584.0	4.98	1	0:00:30	0:00:30	0:14:48	16.9
* SW 122nd Avenue	3220.8	5.28	3	0:01:30	--	--	--
SW 132nd Avenue	4224.0	5.89	2	0:01:00	0:00:30	0:17:22	20.2
SW 137th Avenue	4435.2	6.69	1	0:00:30	0:00:30	0:19:31	26.1
SW 147th Avenue	5280.0	7.53	3	0:01:30	0:00:30	0:21:36	19.1
SW 157th Avenue Transit Center	5280.0	8.53	1	0:00:30	0:00:30	0:24:09	27.9
SW 167th Avenue		9.53				0:25:56	
Total		9.53	*29*	*0:14:30*	*0:04:00*	*0:21:13*	*20.7*

* Stations were noted at SW 117th Avenue and SW 122nd Avenue as placeholders where stations could be located should a direct transfer not be provided to a north-south transit service at the HEFT Intermodal Center.

Table 6.2: Kendall Drive Center-Lane BRT Travel Time Characteristics

STATION/STOP LOCATION	FEET TO NEXT STATION	CUMULATIVE MILEAGE	SIGNALIZED INTERSECTIONS	INTERSECTION DELAY	DWELL TIME	CUMULATIVE TRAVEL TIME	AVERAGE SPEED
Dadeland South Metrorail Station	8712.0	0.00	7	0:03:30		0:00:00	17.6
Baptist Hospital of Miami - SW 89th Ave	5649.6	1.65	3	0:01:30	0:00:30	0:03:59	21.0
SR 874 Intermodal Station	4276.8	2.72	2	0:01:00	0:00:30	0:06:38	21.2
SW 107th Avenue	6177.6	3.53	3	0:01:30	0:00:30	0:08:48	23.7
* SW 117th Avenue	1478.4	4.70	3	0:01:30	--	--	--
HEFT Intermodal Center	1584.0	4.98	1	0:00:30	0:00:30	0:12:22	17.0
* SW 122nd Avenue	3220.8	5.28	3	0:01:30	--	--	--
SW 132nd Avenue	4224.0	5.89	2	0:01:00	0:00:30	0:14:56	21.0
SW 137th Avenue	4435.2	6.69	1	0:00:30	0:00:30	0:17:05	27.6
SW 147th Avenue	5280.0	7.53	3	0:01:30	0:00:30	0:19:09	20.1
SW 157th Avenue Transit Center		8.53	1	0:00:30	0:00:30	0:21:13	
Total		*8.53*	*29*	*0:14:30*	*0:04:00*	*0:21:13*	*22.8*

* Stations were noted at SW 117th Avenue and SW 122nd Avenue as placeholders where stations could be located should a direct transfer not be provided to a north-south transit service at the HEFT Intermodal Center.

Table 6.3: Kendall Drive Elevated BRT/HOT Guideway Travel Time Characteristics

STATION/STOP LOCATION	FEET TO NEXT STATION	CUMULATIVE MILEAGE	SIGNALIZED INTERSECTIONS	INTERSECTION DELAY	DWELL TIME	CUMULATIVE TRAVEL TIME	AVERAGE SPEED
Dadeland South Metrorail Station	8712.0	0.00	0	0:00:00		0:00:00	46.3
Baptist Hospital of Miami - SW 89th Ave	5649.6	1.65	0	0:00:00	0:00:30	0:02:36	41.2
SR 874 Intermodal Station	4472.3	2.72	0	0:00:00	0:00:30	0:04:40	52.3
SW 107th Avenue	6270.6	3.53	0	0:00:00	0:00:30	0:06:28	35.0
* SW 117th Avenue	1478.4	4.70	0	0:00:00	--	--	
HEFT Intermodal Center	1584.0	4.98	0	0:00:00	0:00:30	0:08:54	47.8
* SW 122nd Avenue	7444.8	5.28	0	0:00:00	--	--	
SW 137th Avenue	9715.2	6.69	0	0:00:00	0:00:30	0:11:34	47.4
SW 157th Avenue Transit Center		8.53	0	0:00:00	0:00:30	0:13:54	46.8
Total		*8.53*	*0*	*0:00:00*	*0:03:00*	*0:13:54*	*36.0*

* Stations were noted at SW 117th Avenue and SW 122nd Avenue as placeholders where stations could be located should a direct transfer not be provided to a north-south transit service at the HEFT Intermodal Center.

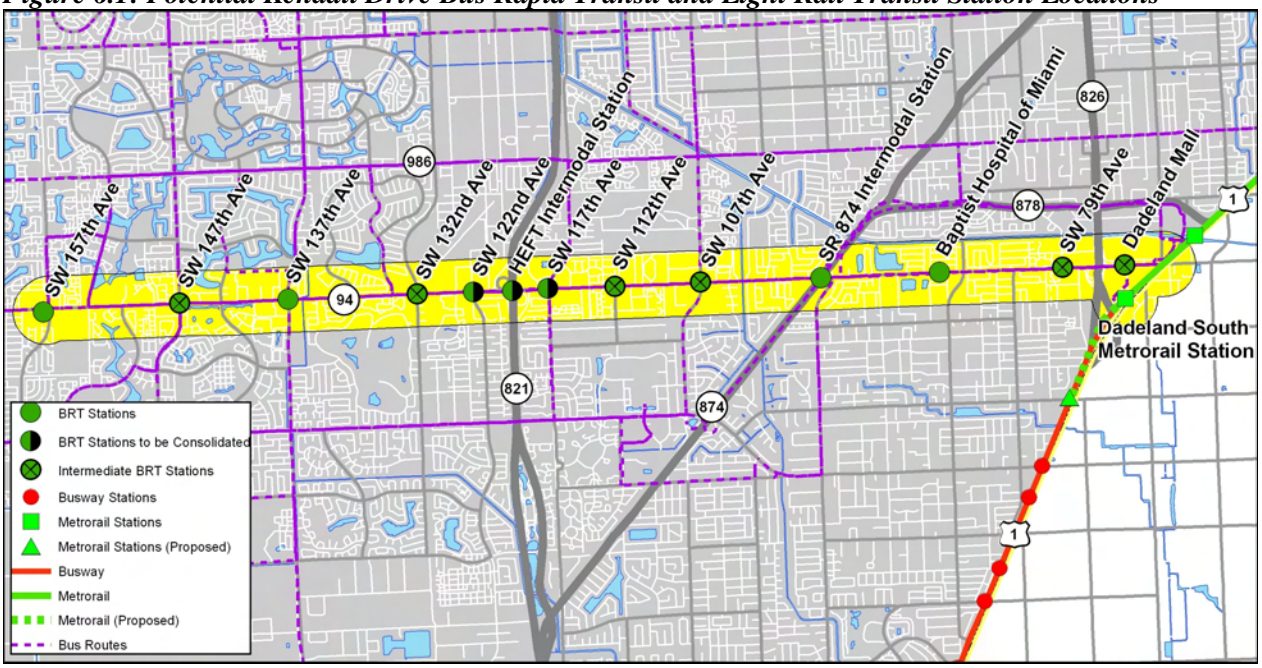
Based upon preliminary results of the travel demand model, net new ridership for the curb-lane BRT service would be on the order of 1,200 passengers. This number is in addition to the roughly 3,500 daily bus riders currently traveling along Kendall Drive. The center-lane BRT and elevated BRT/HOT alternatives are projected to attract on the order of 3,500 to 4,000 additional transit trips per day respectively. Standard 40 foot buses can seat 45 people and carry over 100 passengers in crush-load conditions. Articulated 60 foot buses can seat 64 and carry almost 160 passengers. Specially branded 60 foot articulated BRT vehicles would be used for each of the alternatives.

Light Rail Transit

The three Light Rail Transit alternatives being considered for Kendall Drive are similar to the Bus Rapid Transit options; curb-lane LRT, center-lane LRT and an elevated LRT concept. A dual LRT/HOT guideway would not be possible due to the conflicting road and rail modes. Each alternative would begin at the Dadeland South Metrorail Station. LRT Vehicles would then travel northwards along Dadeland Boulevard towards the Dadeland Mall and turn westwards on Kendall Drive to a terminal station at SW

157th Avenue. An existing bus transit transfer facility at this location is planned to be improved into a park and ride transit center as part of a private development project.

Figure 6.1: Potential Kendall Drive Bus Rapid Transit and Light Rail Transit Station Locations



The operating profile for each of these alternatives will also be very similar to the BRT options, and would provide similar levels of service. Interaction with parallel and cross-flow general vehicle traffic will impact the reliability of the curb-lane and center-lane options, but not the elevated option. The curb-lane LRT concept would have potential conflicts not only at signalized intersections, but also due to automobiles that travel in, through or across the transit tracks at minor intersections and driveways. Conflicts with automobiles may again be mitigated with signal priority, queue jump lanes, raised or mountable curbs or colored pavement used to delineate the transit way. Aggressive ticketing or LRT vehicle mounted enforcement cameras could also discourage motorists from driving within exclusive transit lanes.

Light Rail Transit vehicles are valued for their comfortable ride and operational reliability. Stations could provide pre-paid fare collection through proof-of-payment and precise docking with high-level platforms. Collecting fares prior to the boarding process and allowing passengers to enter and exit the transit vehicle on a level surface can reduce station dwell times significantly from the conventional average of 3.5 to 4 seconds per passenger. Without high-level platforms, low-floor, multi-door vehicles could also help to reduce dwell times and increase travel speeds along the route.

The station locations described in Chapter 4 were classified as either premium or intermediate level LRT stations. Premium stations represent the major transfer locations with the potential to serve the greatest number of passengers. The elevated LRT would stop at only the premium stations, while a center-lane LRT concept could serve the more major intermediate locations. A curb-lane LRT service would serve stations at both the premium and intermediate station locations and could serve a more local purpose.

Several factors such as the guideway design speed, signal priority and safety considerations will effect planned travel times and operating speeds for each alternative. Weekday services would span 18 hours a day from 5:00am to 11:00pm with 6 hours of peak period operations and 12 hours of off-peak operations. Peak period operations were evaluated between 6:00am and 9:00am and between 4:00pm to 7:00pm.

It was shown for the BRT alternatives that significant time savings can be seen when the level of transit priority is increased, the number of station stops is reduced and the operating speed is increased. Tables 6.4, 6.5 and 6.6 detail the travel time characteristics of the three Kendall Drive LRT alternatives.

Table 6.4: Kendall Drive Curb-Lane LRT Travel Time Characteristics

STATION/STOP LOCATION	FEET TO NEXT STATION	CUMULATIVE MILEAGE	SIGNALIZED INTERSECTIONS	INTERSECTION DELAY	DWELL TIME	CUMULATIVE TRAVEL TIME	AVERAGE SPEED
Dadeland South Metrorail Station	1531.2	0.00	2	0:01:00		0:00:00	10.2
Dadeland Mall	2481.6	0.29	3	0:01:30	0:00:30	0:01:28	11.6
SW 79th Avenue	4699.2	0.76	2	0:01:00	0:00:30	0:03:19	21.3
Baptist Hospital of Miami - SW 89th Ave	5649.6	1.65	3	0:01:30	0:00:30	0:05:36	19.8
SR 874 Intermodal Station	4276.8	2.72	2	0:01:00	0:00:30	0:08:15	20.3
SW 107th Avenue	3537.6	3.53	1	0:00:30	0:00:30	0:10:25	23.5
SW 112th Avenue	2640.0	4.20	2	0:01:00	0:00:30	0:12:16	16.4
* SW 117th Avenue	1478.4	4.70	3	0:01:30	--	--	--
HEFT Intermodal Center	1584.0	4.98	1	0:00:30	0:00:30	0:14:48	16.9
* SW 122nd Avenue	3220.8	5.28	3	0:01:30	--	--	--
SW 132nd Avenue	4224.0	5.89	2	0:01:00	0:00:30	0:17:22	20.2
SW 137th Avenue	4435.2	6.69	1	0:00:30	0:00:30	0:19:31	26.1
SW 147th Avenue	5280.0	7.53	3	0:01:30	0:00:30	0:21:36	19.1
SW 157th Avenue Transit Center	5280.0	8.53	1	0:00:30	0:00:30	0:24:09	27.9
Total		*8.53*	*29*	*0:14:30*	*0:04:00*	*0:25:56*	*20.7*

* Stations were noted at SW 117th Avenue and SW 122nd Avenue as placeholders where stations could be located should a direct transfer not be provided to a north-south transit service at the HEFT Intermodal Center.

Table 6.5: Kendall Drive Center-Lane LRT Travel Time Characteristics

STATION/STOP LOCATION	FEET TO NEXT STATION	CUMULATIVE MILEAGE	SIGNALIZED INTERSECTIONS	INTERSECTION DELAY	DWELL TIME	CUMULATIVE TRAVEL TIME	AVERAGE SPEED
Dadeland South Metrorail Station	8712.0	0.00	7	0:03:30		0:00:00	17.6
Baptist Hospital of Miami - SW 89th Ave	5649.6	1.65	3	0:01:30	0:00:30	0:03:59	21.0
SR 874 Intermodal Station	4276.8	2.72	2	0:01:00	0:00:30	0:06:38	21.2
SW 107th Avenue	6177.6	3.53	3	0:01:30	0:00:30	0:08:48	23.7
* SW 117th Avenue	1478.4	4.70	3	0:01:30	--	--	--
HEFT Intermodal Center	1584.0	4.98	1	0:00:30	0:00:30	0:12:22	17.0
* SW 122nd Avenue	3220.8	5.28	3	0:01:30	--	--	--
SW 132nd Avenue	4224.0	5.89	2	0:01:00	0:00:30	0:14:56	21.0
SW 137th Avenue	4435.2	6.69	1	0:00:30	0:00:30	0:17:05	27.6
SW 147th Avenue	5280.0	7.53	3	0:01:30	0:00:30	0:19:09	20.1
SW 157th Avenue Transit Center		8.53	1	0:00:30	0:00:30	0:21:13	
Total		*8.53*	*29*	*0:14:30*	*0:04:00*	*0:21:13*	*22.8*

* Stations were noted at SW 117th Avenue and SW 122nd Avenue as placeholders where stations could be located should a direct transfer not be provided to a north-south transit service at the HEFT Intermodal Center.

Preliminary analysis from the travel demand model projected that net new ridership for the LRT alternatives was at about the same levels projected for the BRT alternatives. Curb-Lane service was shows to draw roughly 1,300 passengers per day in addition to existing level of Kendall Drive transit ridership. The center-lane and elevated LRT alternatives are projected to attract approximately 3,500 to 4,000 additional transit trips per day respectively.

Table 6.6: Kendall Drive Elevated LRT Guideway Travel Time Characteristics

STATION/STOP LOCATION	FEET TO NEXT STATION	CUMULATIVE MILEAGE	SIGNALIZED INTERSECTIONS	INTERSECTION DELAY	DWELL TIME	CUMULATIVE TRAVEL TIME	AVERAGE SPEED
Dadeland South Metrorail Station	8712.0	0.00	0	0:00:00		0:00:00	46.3
Baptist Hospital of Miami - SW 89th Ave	5649.6	1.65	0	0:00:00	0:00:30	0:02:36	41.2
SR 874 Intermodal Station	4472.3	2.72	0	0:00:00	0:00:30	0:04:40	52.3
SW 107th Avenue	6270.6	3.53	0	0:00:00	0:00:30	0:06:28	35.0
* SW 117th Avenue	1478.4	4.70	0	0:00:00	--	--	
HEFT Intermodal Center	1584.0	4.98	0	0:00:00	0:00:30	0:08:54	47.8
* SW 122nd Avenue	7444.8	5.28	0	0:00:00	--	--	
SW 137th Avenue	9715.2	6.69	0	0:00:00	0:00:30	0:11:34	47.4
SW 157th Avenue Transit Center		8.53	0	0:00:00	0:00:30	0:13:54	46.8
Total		*8.53*	*0*	*0:00:00*	*0:03:00*	*0:13:54*	*36.0*

* Stations were noted at SW 117th Avenue and SW 122nd Avenue as placeholders where stations could be located should a direct transfer not be provided to a north-south transit service at the HEFT Intermodal Center.

Heavy Rail (Extension of Metrorail)

The Kendall Drive Metrorail alternative enjoys several benefits over the BRT and LRT alternatives. Metrorail trains do not have conflicts with automobiles, as the surface-running alternatives do. This allows a high sustained speed along with a high degree of schedule and operationally reliability. Finally, the Metrorail alternative was modeled as providing a one-seat ride to the central business district and the Miami Intermodal Center. Regardless of the level of transit priority that may be provided to the BRT and LRT alternatives, they still suffer from a "forced transfer" at Dadeland South. Any passengers wishing to continue towards downtown would be required to exit the BRT or LRT vehicle to make the transfer to Metrorail. The one-seat ride provided by the Metrorail alternative increases the desirability of transit along Kendall Drive.

The Kendall Drive Metrorail would begin at the Dadeland North Metrorail Station and turn westwards towards the Dadeland Mall and continue to a terminal station at SW 157th Avenue. An existing bus transit transfer facility at this location is planned to be improved into a park and ride transit center as part of a private development project.

Metrorail provides a premium level of transit, with high capacity vehicles, the shortest travel time of the various proposed technologies, and it provides a comfortable ride. Stations provide pre-paid fare collection through the use of fare-gates. Vehicles are able to dwell in the station for a short period of time due to the many available doors that allow for prompt boarding and alighting.

The station locations described in Chapter 4 represent the major transit transfer locations with the potential to serve the greatest number of passengers. Weekday services would span 18 hours a day from 5:00am to 11:00pm with 6 hours of peak period operations and 12 hours of off-peak operations. Peak period operations were evaluated between 6:00am and 9:00am and between 4:00pm to 7:00pm. Peak period headways of 12 minutes and off-peak headways of 20 minutes were evaluated. Table 5.7 details the travel time characteristics of the Kendall Drive Metrorail alternative.

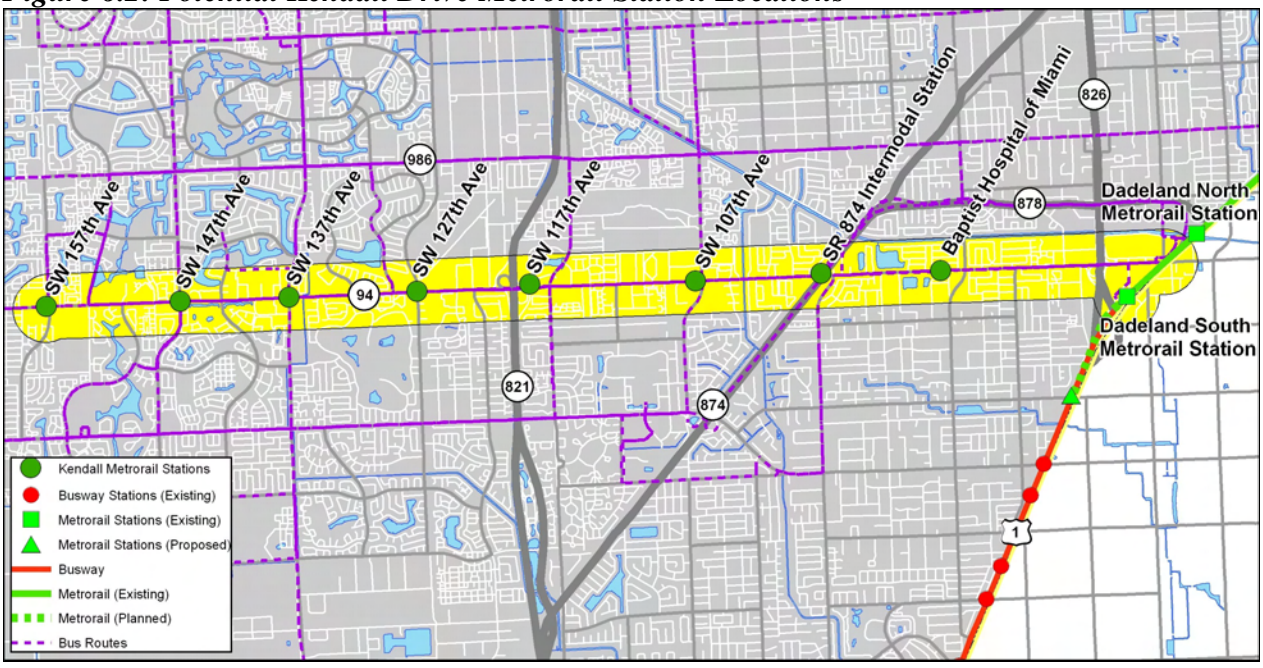
Preliminary analysis from the travel demand model projected that net new transit ridership would be approximately 11,500 passengers per day in addition to existing 3,500 daily transit riders on Kendall Drive.

Table 6.7: Kendall Drive Metrorail Travel Time Characteristics

STATION/STOP LOCATION	FEET TO NEXT STATION	CUMULATIVE MILEAGE	SIGNALIZED INTERSECTIONS	INTERSECTION DELAY	DWELL TIME	CUMULATIVE TRAVEL TIME	AVERAGE SPEED
Dadeland North Metrorail Station	10296.2	0.00	0	0:00:00		0:00:00	46.3
Baptist Hospital of Miami - SW 89th Ave	5649.6	1.95	0	0:00:00	0:00:30	0:02:27	41.2
SR 874 Intermodal Station	4472.3	3.02	0	0:00:00	0:00:30	0:04:30	52.3
SW 107th Avenue	6270.6	3.87	0	0:00:00	0:00:30	0:06:18	35.0
* SW 117th Avenue	1478.4	5.05	0	0:00:00	--	--	
HEFT Intermodal Center	1584	5.33	0	0:00:00	0:00:30	0:08:40	47.8
* SW 122nd Avenue	7444.8	5.63	0	0:00:00	--	--	
SW 137th Avenue	9715.2	7.04	0	0:00:00	0:00:30	0:11:10	47.4
SW 157th Avenue Transit Center		8.88	0	0:00:00	0:00:30	0:13:23	46.8
Total		*8.88*	*0*	*0:00:00*	*0:03:00*	*13:23*	*36.0*

* Stations were noted at SW 117th Avenue and SW 122nd Avenue as placeholders where stations could be located should a direct transfer not be provided to a north-south transit service at the HEFT Intermodal Center.

Figure 6.2: Potential Kendall Drive Metrorail Station Locations



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The CSX Corridor

Three rail transit alternatives were considered for the CSX corridor. This underutilized rail corridor is well suited to a relatively new technology for North American transit – the Diesel Multiple Unit (DMU). DMU vehicles perform in a very similar fashion to LRT vehicles, but are self-propelled instead of fed with electricity from overhead wires.. Each alternative would begin at the Miami Intermodal Center and follow the existing Florida East Coast rail line to the Oleander Junction near NW 12th Street and NW 72nd Avenue. From here, the line would merge on to the CSX Homestead Branch tracks, travel south for almost four miles and then travel southwest for approximately ten miles to the vicinity of the Miami MetroZoo.

The first operating plan calls for DMU vehicles to serve the four primary (tier one) stations operating at thirty minute peak period headways. The second alternative provides service at twenty minute peak period headways to seven stations. The highest level of service is provided by the third alternative, which operates at fifteen minute peak period headways and stops at nine stations.

Varying levels of maintenance and upgrades to the rail and track bed would be required in order to operate passenger service along the CSX corridor. DMU vehicles operate on the same rails as freight trains, and are governed by federal regulations that dictate spatial and/or temporal separation of conflicting services. Since the rail line is lightly used, it is assumed that all freight operations will be confined to the hours outside of passenger service, or during the off-peak periods. Because of these requirements, the three DMU services would be required to adhere to a strict schedule, thus providing a high degree of operational reliability.

The trains would cross many at-grade road crossings with the potential for conflict with trucks and autos. Standard railroad signals and crossing gates provide a high-degree of safety at these crossings, but it has been assumed that the service would slow to a maximum of 30 miles per hour while passing through all at-grade crossings.

Stations could potentially provide high-level boarding platforms and pre-paid fare collection through a proof-of-payment system. Collecting fares prior to the boarding process and allowing passengers to enter and exit the transit vehicle on a level surface can reduce station dwell times significantly from the conventional average of 3.5 to 4 seconds per passenger. Without high-level platforms, low-floor, multi-door vehicles could also help to reduce dwell times and increase travel speeds along the route.

Weekday services for premium bus service would span 18 hours a day from 5:00am to 11:00pm with 6 hours of peak period operations and 12 hours of off-peak operations. Peak period operations were evaluated between 6:00am and 9:00am and between 4:00pm to 7:00pm.

Tables 6.8, 6.9 and 6.10 display the travel time characteristics of the three CSX corridor DMU alternatives. Preliminary analysis from the travel demand model has projected ridership for the three DMU alternatives. The first alternative is projected to attract approximately 900 riders per day, the second would draw close to 1,800 and the high degree of service provided by the third alternative would carry just over 3,000 riders per day. Since there is no existing transit service along the corridor, it is difficult to tell at this early stage of analysis whether any existing transit riders within the general area would switch to the new services.

Table 6.8: Running Times for CSX Corridor Alternative 1

STATION/STOP LOCATION	FEET TO NEXT STATION	CUMULATIVE MILEAGE	SIGNALIZED INTERSECTIONS	INTERSECTION DELAY	DWELL TIME	CUMULATIVE TRAVEL TIME	AVERAGE SPEED
Miami Intermodal Center	63,360	0	25	0:00:00	0:00:00	0:00:00	42.7
Kendall Drive	15,840	12	0	0:00:00	0:00:45	0:16:51	46.2
Turnpike Station	17,952	15	1	0:00:00	0:00:45	0:20:48	60.9
Miami Metrozoo	-	18.4	2	0:00:00	0:00:45	0:24:06	60.9
Total		*18.4*	*28*	*0:00:00*	*0:02:15*	*0:24:06*	

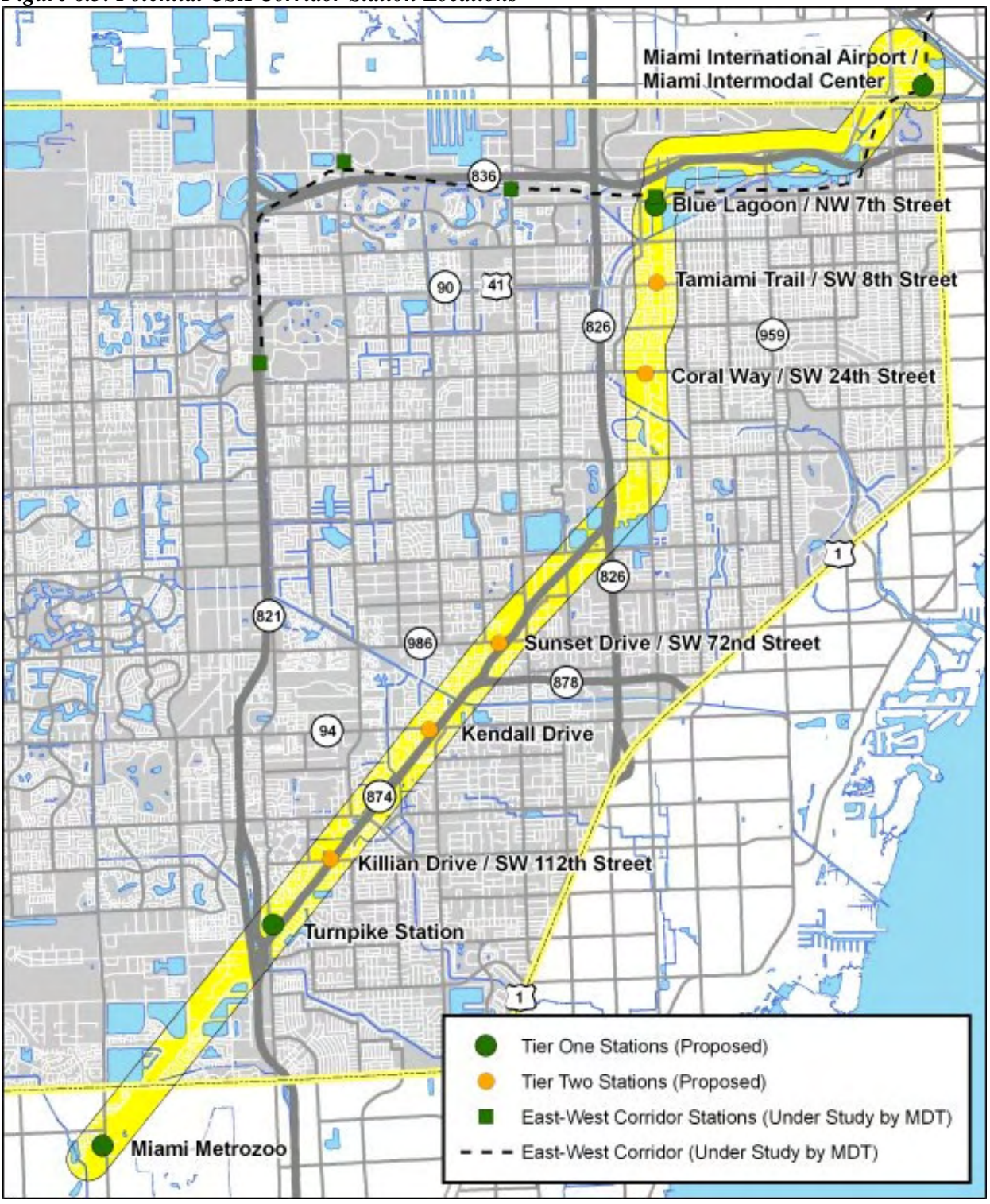
Table 6.9: Running Times for CSX Corridor Alternative 2

STATION/STOP LOCATION	FEET TO NEXT STATION	CUMULATIVE MILEAGE	SIGNALIZED INTERSECTIONS	INTERSECTION DELAY	DWELL TIME	CUMULATIVE TRAVEL TIME	AVERAGE SPEED
Miami Intermodal Center	25,344	0	0	0:00:00	0:00:00	0:00:00	37.8
Blue Lagoon / NW 7th Street	4,752	4.8	5	0:00:00	0:00:45	0:07:37	26.6
Tamiami Trail / SW 8th Street	26,400	5.7	11	0:00:00	0:00:45	0:09:39	37.0
Sunset Drive / SW 72nd Street	6,864	10.7	9	0:00:00	0:00:45	0:17:46	29.6
Kendall Drive	15,840	12	0	0:00:00	0:00:45	0:20:24	45.6
Turnpike Station	17,952	15	1	0:00:00	0:00:45	0:24:21	61.8
Miami Metrozoo	-	18.4	0	0:00:00	0:00:45	0:27:39	61.8
Total		*18.4*	*26*	*0:00:00*	*0:04:30*	*0:27:39*	

Table 6.10: Running Times for CSX Corridor Alternative 3

STATION/STOP LOCATION	FEET TO NEXT STATION	CUMULATIVE MILEAGE	SIGNALIZED INTERSECTIONS	INTERSECTION DELAY	DWELL TIME	CUMULATIVE TRAVEL TIME	AVERAGE SPEED
Miami Intermodal Center	25,344	0	0	0:00:00	0:00:00	0:00:00	37.8
Blue Lagoon / NW 7th Street	4,752	4.8	5	0:00:00	0:00:45	0:07:37	26.6
Tamiami Trail / SW 8th Street	5,280	5.7	2	0:00:00	0:00:45	0:09:39	23.5
Coral Way / SW 24th Street	21,120	6.7	9	0:00:00	0:00:45	0:12:12	36.3
Sunset Drive / SW 72nd Street	6,864	10.7	9	0:00:00	0:00:45	0:18:49	29.4
Kendall Drive	7,392	12	0	0:00:00	0:00:45	0:21:28	30.7
Killian Drive / SW 112th Street	8,448	13.4	0	0:00:00	0:00:45	0:24:10	33.7
Turnpike Station	17,952	15	1	0:00:00	0:00:45	0:27:03	61.5
Miami Metrozoo	-	18.4	2	0:00:00	0:00:45	0:30:22	61.5
Total		*18.4*	*28*	*0:00:00*	*0:05:15*	*0:30:22*	

Figure 6.3: Potential CSX Corridor Station Locations



The SR826 / SR 874 Corridor

Five separate Bus Rapid Transit alternatives were considered for the SR 826 / SR 874 corridor. The first option is to travel within general traffic lanes and serve off-line stations on surface streets. The second option would also serve stations located on surface streets, but would operate within a dedicated curb-lane. The third option would also operate within a dedicated curb-lane, but would stop at stations located within the expressway right-of-way. A terminal to terminal service operating within a dedicated / HOV center-lane is the fourth alternative and the final would also use a dedicated / HOV center-lane, but would make stops at stations located within the expressway right-of-way.

Service for each of the alternatives would begin at the Miami Intermodal Center and access SR 836 via the MIC dedicated access ramps. Buses would travel westwards for approximately 3.75 miles before turning south along SR 826 for almost 4 miles before merging on to SR 874. Service would continue in a southwesterly direction for approximately 6.5 miles before turning south on the HEFT for about 1.5 miles to the terminus at SW 152nd Street.

The operating profile for each of these alternatives will vary significantly due to differences in station location, station configuration, and the extent of interaction with parallel, merging, and surface street general vehicle travel. The center-lane / HOV scenario would not experience conflicts due to traffic crossing the travel lane, but would have to interact with free flowing high-occupancy-vehicle automobile traffic. The curb-lane BRT would not have to exit the expressway right-of-way and would only have to contend with traffic crossing over the dedicated transit lane at on and off ramps.

Colored pavement, aggressive ticketing and perhaps even bus-mounted cameras could also act to discourage motorists from driving within exclusive transit lanes Each of the alternatives that access stations located on surface streets would experience potential conflicts and travel delay at signalized intersections. Conflicts with automobile traffic may be mitigated to varying degrees through the use of signal priority or queue jumping lanes at intersections.

The manner in which buses are able to approach and depart from stations, along with the speed of passenger loading and unloading can also significantly impact overall travel times. The station structures required for the expressway BRT station concepts could provide an ideal environment for pre-paid fare collection and perhaps even high-level boarding platforms. Collecting fares prior to the boarding process and allowing passengers to enter and exit the transit vehicle on a level surface can reduce station dwell times significantly from the conventional average of 3.5 to 4 seconds per passenger. Low-floor and multi-door vehicle configurations and computer assisted precision docking can also help to reduce dwell times and increase the speeds along the route.

Several factors such as the guideway design speed, signal priority and safety considerations will effect planned travel times and operating speeds for each alternative. It was shown for the BRT alternatives that significant time savings can be seen when the level of transit priority is increased, the number of station stops is reduced and the operating speed is increased. Weekday services would span 18 hours a day from 5:00am to 11:00pm with 6 hours of peak period operations and 12 hours of off-peak operations. Peak period operations were evaluated between 6:00am and 9:00am and between 4:00pm to 7:00pm.

Table 6.11 lists the travel time characteristics of the five SR 826 / SR 874 BRT alternatives. Preliminary analysis from the travel demand model projected ridership to range between 1,200 daily riders and 5,500 riders in the year 2030. As was the case with the CSX corridor alternatives, it is difficult to project whether any existing transit riders within the general area would switch to the new services since there is no existing transit service that closely matches the proposed BRT services.

Figure 6.4: Potential SR826 / SR 874 Bus Rapid Transit Station Locations

Table 6.11: Running Times for SR 826 / SR 874 Alternatives

STATION/STOP LOCATION	GENERAL TRAFFIC WITH SURFACE STREET STATIONS	CURB-LANE BRT WITH SURFACE STREET STATIONS	CURB-LANE BRT WITH EXPRESSWAY STATIONS	TERMINAL TO TERMINAL CENTER-LANE BRT/HOT LANE	CENTER-LANE BRT/HOT LANE WITH EXPRESSWAY STATIONS
Miami Intermodal Center	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
Waterford / Red Road / NW 57th Avenue	0:11:36	0:07:33	0:03:34	--	0:03:34
Tamiami Trail / SW 8th Street	0:21:45	0:16:01	0:07:42	--	0:07:42
Coral Way / SW 24th Street	0:27:28	0:21:36	0:09:41	--	0:09:41
Bird Road / SW 40th Street	0:33:18	0:27:18	0:11:34	--	0:11:34
Kendall Drive	0:42:50	0:36:20	0:15:47	--	0:15:47
Killian Parkway / SW 104th Street	0:48:40	0:42:02	0:17:53	--	0:17:53
SW 117th Avenue and SW 152nd Street	0:59:06	0:51:22	0:22:09	0:16:53	0:22:09
Quail Roost Drive	1:07:02	--	--	--	--
SW 200th Street Busway Station	1:12:23	--	--	--	--

The HEFT Corridor

Bus Rapid Transit

Six express bus and Bus Rapid Transit alternatives were considered for the HEFT corridor. The first alternative would operate an express bus in general travel lanes that would serve only the north and south terminal stations. Alternative two would also operate as an express bus within general travel lanes. The third and forth options would serve only the north and south terminal stations with one running in a dedicated curb-lane and the other within a dedicated center-lane / HOV. The last two alternatives would both serve stations located within the expressway right-of-way, with one running in a dedicated curb-lane and the other within a dedicated center-lane / HOV.

Service for each of the alternatives would begin at the Florida International University station, which is to be the terminal of the future East-West corridor Metrorail line. Buses would travel south on the HEFT for approximately 8.5 miles to the southern terminus at SW 152nd Street. The potential also exists to extend service further southwards to the SW 200th Street South Miami-Dade Busway Station.

The operating profile for each of these alternatives will vary significantly due to differences in station location, station configuration, and the extent of interaction with parallel and merging general vehicle travel. The center-lane / HOV options would not experience conflicts due to traffic crossing the travel lane, but would have to interact with free flowing high-occupancy-vehicle automobile traffic. The curb-lane BRT would have to contend with traffic crossing over the dedicated transit lane at on and off ramps. The general travel lane express bus services would also be impacted by travel delays due to automobile congestion. Colored pavement, aggressive ticketing and perhaps even bus-mounted cameras could also act to discourage motorists from driving within exclusive transit lanes

The manner in which buses are able to approach and depart from stations, along with the speed of passenger loading and unloading can also significantly impact overall travel times. The station structures required for the expressway BRT station concepts could provide an ideal environment for pre-paid fare collection and perhaps even high-level boarding platforms. Collecting fares prior to the boarding process and allowing passengers to enter and exit the transit vehicle on a level surface can reduce station dwell times significantly from the conventional average of 3.5 to 4 seconds per passenger. Low-floor and multi-door vehicle configurations and computer assisted precision docking can also help to reduce dwell times and increase the speeds along the route.

Figure 6.5: Potential HEFT Transit Station Locations

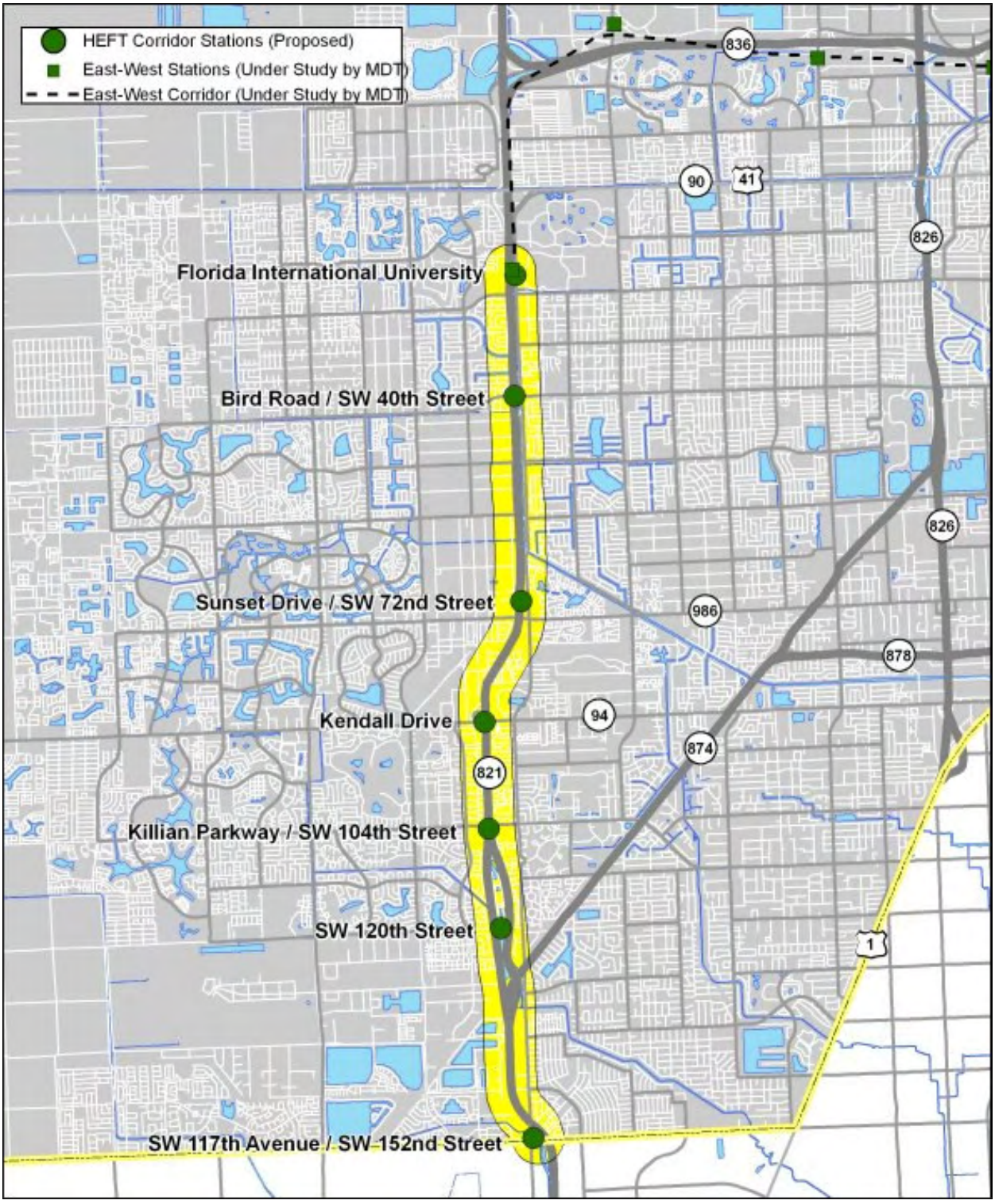


Table 6.12 lists the travel time characteristics of the five SR 826 / SR 874 BRT alternatives. Preliminary analysis from the travel demand model projected ridership to be approximately 750 daily riders in the year 2030. Several factors such as the guideway design speed, signal priority and safety considerations will effect planned travel times and operating speeds for each alternative.

It was observed for the BRT alternatives that significant time savings can be seen when the level of transit priority is increased, the number of station stops is reduced and the operating speed is increased. Weekday services would span 18 hours a day from 5:00am to 11:00pm with 6 hours of peak period operations and 12 hours of off-peak operations. Peak period operations were evaluated between 6:00am and 9:00am and between 4:00pm to 7:00pm.

Table 6.12: Running Times for HEFT Corridor Bus and BRT Station Locations

STATION/STOP LOCATION	TERMINAL TO TERMINAL EXPRESSWAY BUS	EXPRESSWAY BUS WITH EXPRESSWAY STATIONS	TERMINAL TO TERMINAL CURB-LANE BRT	TERMINAL TO TERMINAL CENTER-LANE BRT	SIDE BRT WITH EXPRESSWAY STATIONS	CENTER-LANE BRT/HOT WITH EXPRESSWAY STATIONS
Florida International University Station	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
Bird Road / SW 40th Street	--	0:02:53	--	--	0:02:59	0:02:59
Sunset Drive / SW 72nd Street	--	0:05:47	--	--	0:06:07	0:06:07
Kendall Drive	--	0:07:30	--	--	0:08:12	0:08:12
Killian Parkway / SW 104th Street	--	0:09:14	--	--	0:09:41	0:10:11
SR 874 / SW 117th Avenue	--	--	--	--	--	--
SW 117th Avenue and SW 152nd Street	0:13:37	0:15:37	0:10:02	0:10:02	--	0:14:00
SW 200th Street Busway Station	0:16:58	--	--	--	--	--

Light Rail Transit / Diesel Multiple Units / Metrorail

Three rail alternatives were tested along the HEFT corridor. Each would operate from the East-West Corridor terminal station at Florida International University. Vehicles would travel south within the HEFT right-of-way for approximately 8.5 miles to the southern terminus at SW 152nd Street. Each alternative would operate in a very similar fashion, with the vehicle technology and passenger capacity being the major differences. The entire corridor would be require the construction of new rail that could be placed at-grade along the side of the toll road, or on an elevated guideway. This entirely new track would not have the same issues with at-grade crossings that impact the LRT and DMU alternatives on Kendall Drive and the CSX corridor.

Stations for the LRT and DMU alternatives could potentially provide high-level boarding platforms and pre-paid fare collection through a proof-of-payment system. Collecting fares prior to the boarding process and allowing passengers to enter and exit the transit vehicle on a level surface can reduce station dwell times significantly from the conventional average of 3.5 to 4 seconds per passenger. Without high-level platforms, low-floor, multi-door vehicles could also help to reduce dwell times and increase travel speeds along the route. Metrorail provides a premium level of transit, with high capacity vehicles. Stations provide pre-paid fare collection through the use of fare-gates. Vehicles are able to dwell in the station for a short period of time due to the many available doors that allow for prompt boarding and alighting.

The Metrorail alternative would have one distinct benefit over the LRT and DMU alternatives as it would provide a one-seat ride to the Miami Intermodal Center and downtown Miami. The “forced transfer” at FIU station is considered to be a disincentive to LRT or DMU passengers wishing to continue towards downtown. This one-seat ride provided by the Metrorail alternative increases the desirability of transit along the HEFT.

Weekday services would span 18 hours a day from 5:00am to 11:00pm with 6 hours of peak period operations and 12 hours of off-peak operations. Peak period operations were evaluated between 6:00am and 9:00am and between 4:00pm to 7:00pm. Table 6.13 details the travel time characteristics of the HEFT rail alternatives. Preliminary analysis from the travel demand model projected that rail transit ridership along the HEFT would range from 1,000 to 4,250 passengers per day.

Table 6.13: Running Times for HEFT Corridor Light and Heavy Rail Station Locations

STATION/STOP LOCATION	LRT	DMU	METRORAIL
Florida International University Station	0:00:00	0:00:00	0:00:00
Bird Road / SW 40th Street	0:02:59	0:03:06	0:02:59
Sunset Drive / SW 72nd Street	0:06:07	0:06:22	0:06:07
Kendall Drive	0:08:12	0:08:35	0:08:19
Killian Parkway / SW 104th Street	0:10:11	0:10:42	0:10:26
SR 874 / SW 117th Avenue	--	--	0:12:34
SW 117th Avenue and SW 152nd Street	0:14:00	0:14:38	0:15:19

The SW 107th Avenue Corridor

Two BRT, two LRT, two DMU and one Metrorail alternative are proposed for service along the SW 107th Avenue corridor. These concepts were developed to account for the potential that the East-West corridor Metrorail line may turn south from SR 836 on to SW 107th Avenue instead of along the HEFT. Each of the alternatives would begin service at a SW 107th Avenue Florida International University terminal station.

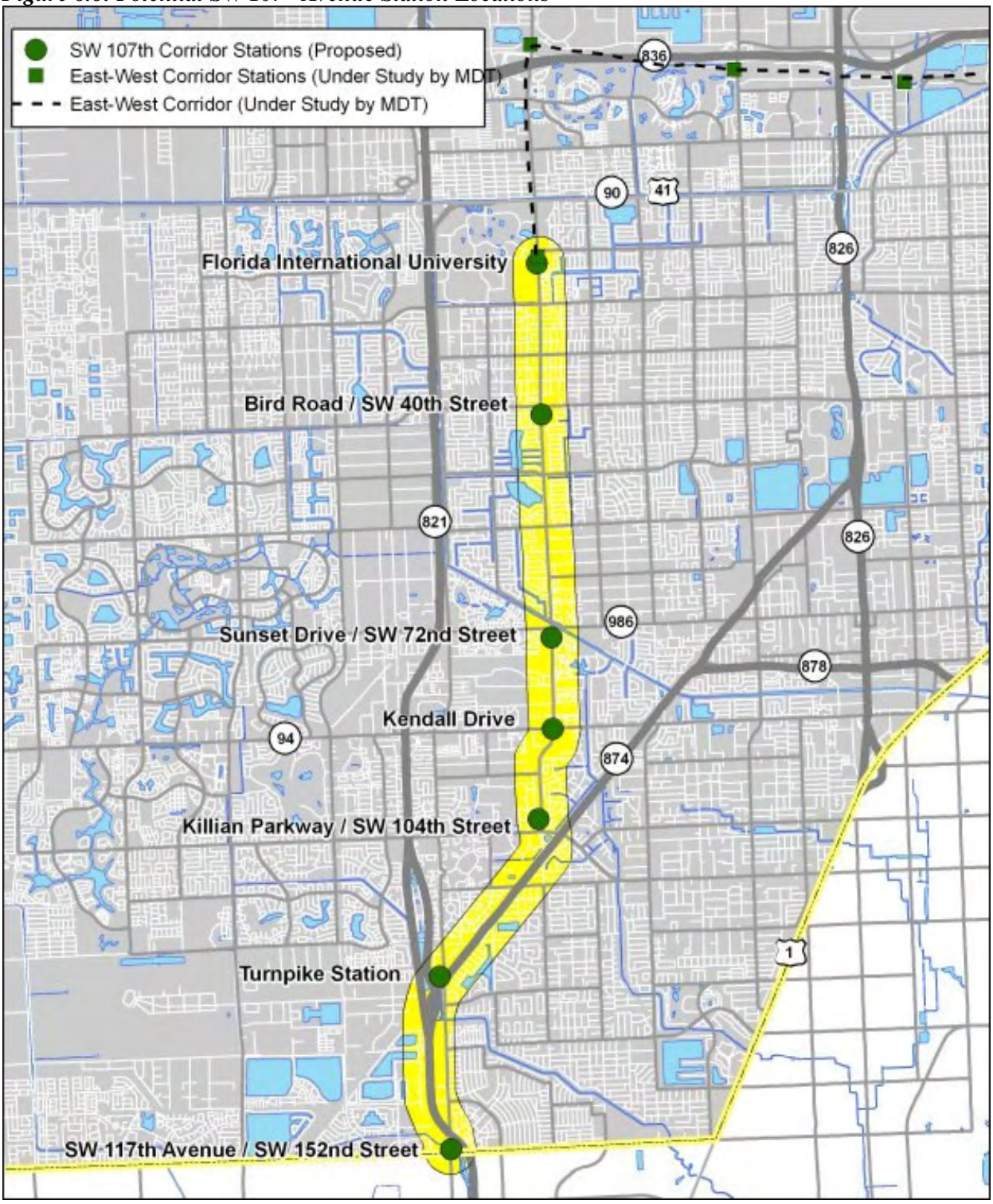
Service would travel south on SW 107th Avenue for approximately 5.75 miles to SR 874, where it would turn southwestwards and travel within the right-of-way of SR 874 for 1.75 miles. The vehicles would then turn south along the HEFT and travel 1.5 miles to the southern terminus at SW 152nd Street. Due to limited right-of-way and engineering complexity, only the elevated LRT, DMU and Metrorail alternatives would stop at the Turnpike Station.

The operating profile for each of these alternatives will vary significantly due to differences in station location, station configuration, and the extent of interaction with parallel and merging general vehicle travel. The operating profile for each of these alternatives will vary significantly due to differences in station location, station configuration, and the extent of interaction with parallel and cross-flow general vehicle travel.

The curb-lane BRT concept would have potential conflicts not only at signalized intersections, but also due to automobiles that travel in, through or across the bus lane at minor intersections and driveways The center-lane BRT, LRT and DMU options would not be impacted by traffic running within the transit right-of-way, but would have to deal with cross traffic at signalized intersections. Conflicts with automobiles may be mitigated to varying degrees through the use of signal priority or queue jumping lanes at intersections, or with raised or mountable curbs and colored pavements used to delineate the transit way. Aggressive ticketing or bus-mounted enforcement cameras could also discourage motorists from driving within exclusive transit lanes. The elevated LRT, DMU and Metrorail scenarios would enjoy the highest level of transit priority and would face no impacts due to automobile traffic.

The manner in which vehicles are able to approach and depart from stations, along with the speed of passenger loading and unloading can also significantly impact overall travel times. The station structures required for the curb-lane and center-lane BRT, LRT and DMU station concepts could provide an ideal environment for pre-paid fare collection and perhaps even high-level boarding platforms. Collecting fares prior to the boarding process and allowing passengers to enter and exit the transit vehicle on a level surface can reduce station dwell times significantly from the conventional average of 3.5 to 4 seconds per

Figure 6.6: Potential SW 107th Avenue Station Locations



passenger. Low-floor and multi-door vehicle configurations and computer assisted precision docking can also help to reduce dwell times and increase the speeds along the route.

Metrorail provides a premium level of transit, with high capacity vehicles. Stations provide pre-paid fare collection through the use of fare-gates. Vehicles are able to dwell in the station for a short period of time due to the many available doors that allow for prompt boarding and alighting. The Metrorail alternative would have one distinct benefit over the elevated LRT and DMU alternatives as it would provide a one-seat ride to the Miami Intermodal Center and downtown Miami. The "forced transfer" at FIU station is considered to be a disincentive to LRT or DMU passengers wishing to continue towards downtown. This one-seat ride provided by the Metrorail alternative increases the desirability of transit along SW 107th Avenue.

Table 6.14 lists the travel time characteristics of the seven SW 107th Avenue alternatives. Preliminary analysis from the travel demand model projected ridership to be approximately 2,000 daily riders in the year 2030 for the lowest cost and transit priority option of curb-lane BRT. At the high end of transit service, the model projected a daily ridership of only 2,500 for Metrorail along SW 107th Avenue Weekday services would span 18 hours a day from 5:00am to 11:00pm with 6 hours of peak period operations and 12 hours of off-peak operations. Peak period operations were evaluated between 6:00am and 9:00am and between 4:00pm to 7:00pm.

Table 6.14: Running Times for SW 107th Avenue Corridor Station Locations

STATION/STOP LOCATION	CURB-LANE BRT	CENTER-LANE BRT	CENTER-LANE LRT	ELEVATED LRT	CENTER-LANE DMU	ELEVATED DMU	ELEVATED METRORAIL
Florida International University Station	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00	0:00:00
Bird Road / SW 40th Street	0:03:05	0:03:05	0:03:05	0:02:29	0:03:11	0:02:34	0:02:28
Miller Road / SW 56th Street	0:06:11	0:06:11	0:06:11	0:04:41	0:06:23	0:04:52	0:04:39
Sunset Drive / SW 72nd Street	0:08:44	0:08:44	0:08:44	0:06:40	0:09:03	0:06:59	0:06:38
Kendall Drive	0:11:18	0:11:18	0:11:18	0:08:39	0:11:43	0:09:06	0:08:38
Killian Parkway / SW 104th Street	0:13:43	0:13:43	0:13:43	0:10:39	0:14:14	0:11:13	0:10:37
Turnpike Station	--	--	--	0:12:07	--	0:12:48	0:12:05
SW 117th Avenue and SW 152nd Street	0:17:31	0:17:31	0:17:31	0:14:18	0:18:08	0:15:02	0:14:13

7 Tier I Ridership Forecasting

This section describes the methodology used to develop ridership forecasts for the proposed transit service alternatives. The Kendall area is at the western edge of the Miami-Dade County. While traditional commuting patterns to the CBD do exist, a more distributed pattern of travel occurs within the region. The Greater South Florida region is a major tourist destination, and these visitors generally utilize the same transportation system as residents. Recreational travel has not been well accounted for in traditional travel demand models and was not a factor considered in this Tier I analysis.

The estimation of the travel demand relies on assumptions regarding future travel. There are significant variables regarding the future that make it difficult to project future demand. These variables include projected socioeconomic conditions and planned development patterns for the build year of 2030.

The main input to the modeling process is the 2030 transportation network. The network is based upon the links and nodes that sit within and connect the traffic analysis zones. The model transit network is based upon the system of transit lines approved and adopted in to the 2030 Long Range Transportation Plan. Three new Miami-Dade Transit lines are planned for in the LRTP (Figure 6.1). The Earlington Heights-MIC Connection is a 2.4-mile expansion will be an extension from Earlington Heights Metrorail Station to the Miami Intermodal Center. The East-West Corridor is a 10.6 mile expansion that runs along the SR 836 / Dolphin Expressway corridor from the MIC to a station near Florida International University near the HEFT. The North Corridor is a 9.5-mile northward extension from the Dr. Martin Luther King, Jr. Metrorail Station, along NW 27th Avenue to NW 215th Street at the Miami-Dade/Broward County line.

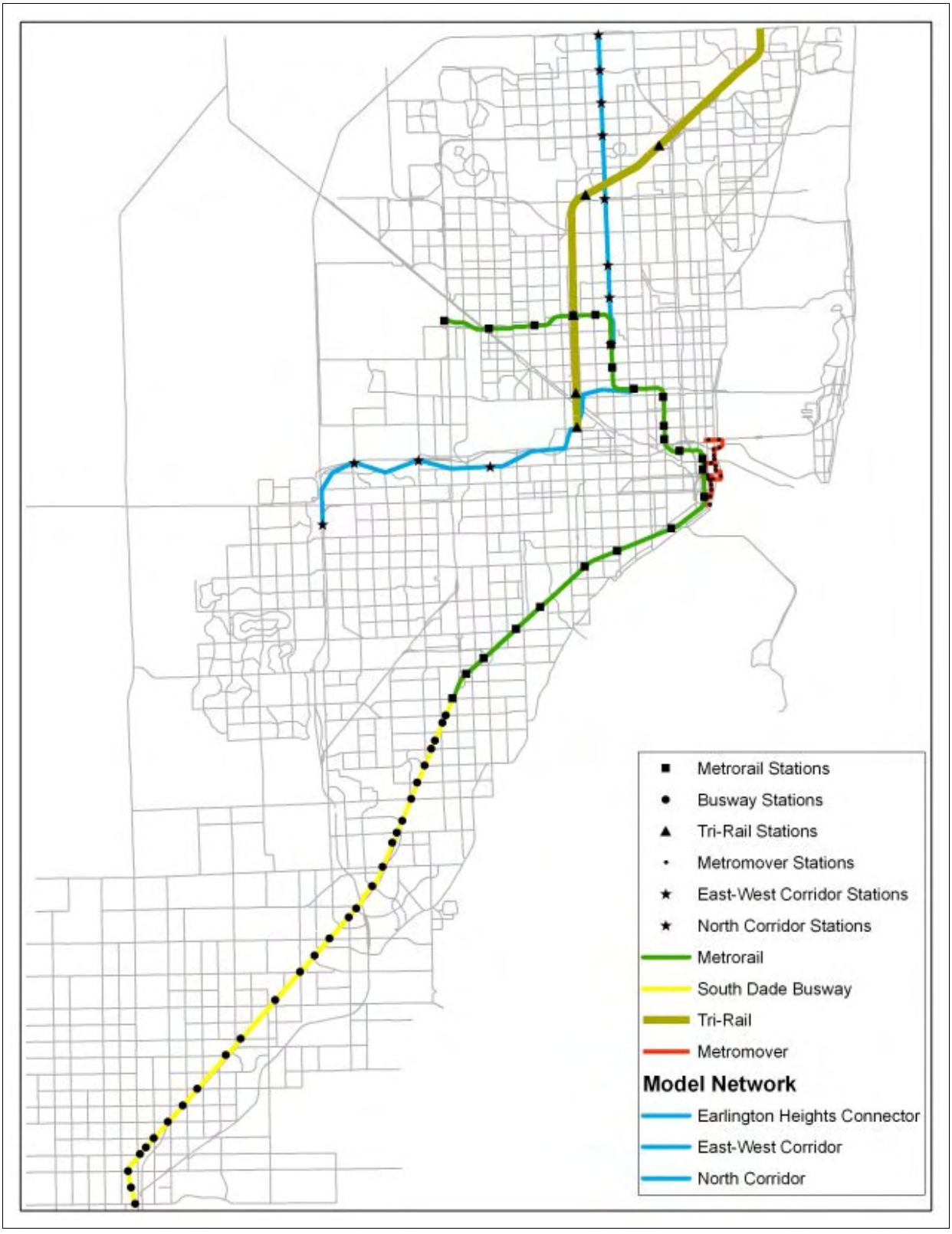
Several revisions to the base transportation network were completed over the course of the modeling process. This involved removing three proposed, but unfunded transit projects; the East-West corridor segment two, which would connect the MIC to downtown Miami along the Miami River, the Baylink connection from downtown Miami to the City of Miami Beach and the Douglas Road Corridor connecting the existing Douglas Road Metrorail station to the MIC. The results of these changes can be seen in Figure 7.1.

A key factor in estimating transit ridership is the accessibility of the potential travel market. Accessibility is the measure of how difficult it will be for potential trip makers to reach the proposed transit stations. In general, trip-makers near a station are much more likely to use transit services than trip-makers that are some distance from the station. Because accessibility is an important issue, it is important to establish the distribution of potential trip makers throughout the study area.

Travel Demand models typically record geographical location using Transportation Analysis Zones (TAZ). This is primarily done to simplify input to the modeling process. Rather than carry individual addresses for each trip, they are grouped together by zone. The mode share model used to predict the potential diversion of trips to the proposed transit services is based on the origins and the destinations of trips. The Miami-Dade County TAZ network was used to complete this analysis.

The mode share model used in this study uses four variable attributes to describe trip characteristics. They are: 1) in-vehicle time, 2) access time, 3) wait time, 4) cost. To test a given scenario, the model finds the minimum path from each origin to each destination using the transit service being tested. These minimum path trips were run to measure zone to zone impedances for each zone pair in the trip table. Impedance is a measure of accessibility. The impedance value is segmented to quantify the various components of the path; total travel time, in-vehicle time, cost, access time, and wait time. Transit impedance values are based on the transit network paths from origin zones in the Kendall Area to destination zones radiating toward the CBD and the MIC.

Figure 7.1: Revised 2030 Base Transportation Network



The assumptions regarding impedances are a significant factor in estimating the mode split for a particular services. Transit mode-splits (bus or rail) can vary from 0.0% - 12% depending on these impedances, indicating that the automobile is the dominant travel mode (88-100% of total trips.) Costs per mile vary depending on the cost of the service and the amounts of ridership it is projected to attract. These impedance values for auto and transit travel are inputs to the Miami-Dade model for each zone origin destination pair. Mode shares were then calculated for each origin destination pair. The model estimate of rail transit share was then applied to the 2030 total person trip tables.

To develop projected ridership numbers the Florida Standard Urban Transportation Model Structure (FSUTMS) data set was acquired and applied to both the 'Bi-County' and 'Miami-Dade' models. The Bi-County model included revisions to the geographical area covered by the model to include Broward County and revisions to the original trip generation, distribution and mode choice model components. Data was provided for several model application years including 1999, 2010, 2025 and 2030.

Preliminary Tier I Results

Running transportation models is a time consuming and data intensive process. A representative set of model runs was completed in an effort to evaluate the Tier I alternatives (Table 7.1). It was assumed that since the BRT and LRT alternatives would likely draw a similar level of patronage due to their similar operating profiles. Curb-Lane BRT was not modeled along Kendall Drive, since it can be assumed to attract a lower number of riders than the Center-Lane BRT due to slower travel times.

The elevated BRT, LRT and DMU options were also not modeled because it was assumed that they would not attract the same level of riders as a Metrorail alternative, but would do so at a similar level of costs. Their ridership levels would most likely be lower than for Metrorail since passengers destined for downtown would be required to transfer at Dadeland South.

Table 7.1: 2030 Projected Daily Transit Riders

ALTERNATIVE	OLD 2030 BASE	REVISED BASE
CSX Alt 1 – 30/60 minute headways	205	612
CSX Alt 2 – 20/40 minute headways	1,075	1,370
CSX Alt 3 – 15/30 minute headways	2,112	2,546
Kendall Drive – Center-Lane BRT	1,229	4,214
Kendall Drive – Metrorail	3,884	10,509
SR 826 - Curb-Lane BRT w/Expressway Stations	3,093	5,487
HEFT – Curb-Lane BRT w/Expressway Stations	483	
HEFT – Center-Lane BRT/HOT w/Expressway Stations	989	2,241
HEFT – Metrorail	1,049	4,223
SW 107th – Curb-Lane BRT	2,033	
SW 107th – Metrorail	2,555	

A more rigorous evaluation of CSX Alternative 3 was completed to analyze the boarding (on's) and alighting (off's) profile for the proposed transit line (Table 7.2). This CSX Alternative 3 is the DMU option with 15 minute peak and 30 minute off-peak headways making nine station stops. The preliminary results were sufficiently attractive to warrant a more detailed analysis during the Tier II evaluation phase. This level of testing will be completed on all of the alternatives that are advanced to Tier II.

Table 7.2: 2030 Projected Daily Boardings and Alightings for CSX Alternative 3

STATION	PEAK ONS/OFFS	OFF-PEAK ONS/OFFS	TOTAL ONS/OFFS
Intermodal	1,093	229	1,322
Blue Lagoon	432	193	625
Tamiami	320	55	375
Coral Way	468	97	565
Sunset Drive	170	65	235
Kendall Drive	128	33	161
Killian Drive	46	88	134
Turnpike	277	77	354
Zoo	332	171	503
Total Boardings			3,266
Total Riders			1,633

8 Tier I Generalized Operations and Maintenance Costs

Introduction

Operating and Maintenance Costs (O&M) costs are a recurrent annual cost for transit and for the most part must be budgeted for at the local level. The O&M tables found in this section present the representative unit costs as related to preliminary operating assumptions. Development of the numbers involves identifying costs that vary with service levels, and then attributing each variable cost to the service characteristics to which it is most closely tied. The O&M costs are displayed here in a preliminary nature. As project alternatives are further refined and developed during the Tier II screening process, a more rigorous exercise of total cost generation will be undertaken. These cost also do not account for any operating credit that may be passed on to the proposed alternatives by existing services that will be replaced or supplanted.

Methodology

FTA provides a very simple methodology for projecting the O&M costs for projects. O&M costs are generally forecast in current dollars. The O&M budget is normally broken down into three categories for analysis and forecasting: cost per vehicle hours of operations, cost per vehicle service miles and a cost for number of vehicles. These numbers normally equate to operations, maintenance and administration. FTA recommends using the following formula for forecasting O&M costs.

$$\text{O\&M Cost} = \text{Cost}_{\text{vehicle mile}} (\text{vehicle miles}) + \text{Cost}_{\text{vehicle hour}} (\text{vehicle hours}) + \text{cost}_{\text{peak vehicle}} (\#\text{ of peak vehicles})$$

Budgets are maintained and reported to the FTA for the categories of vehicle operations, vehicle maintenance, general administration and non-vehicle maintenance. Within each budget are the cost categories of labor, service, materials, utilities, insurance, taxes and other expenses. These figures are available for all transit properties, by mode in the United States within the National Transit Database.

Development of Operating Cost Estimates

Operating cost estimates were developed for four different modes: Bus and Bus Rapid Transit, Light Rail Transit, Diesel Multiple Units, and Metrorail. Cost estimates for BRT/Bus and Metrorail were developed based on MDT's existing cost structure for existing services. Cost estimates for DMU were developed using Tri-Rail's existing cost structure for diesel-hauled commuter rail service, with adjustments for DMU operation. Cost estimates for light rail were developed using average costs for existing LRT services in other areas, with adjustments to reflect MDT's cost structure compared to those of LRT operators.

All operating cost estimates were developed on an incremental cost basis, and are intended to reflect the additional costs that would be incurred to operate the new services. The methodology used for all modes was similar to that used for bus service for the Miami-Dade MPO's *2005 People's Transportation Plan, Financial Capacity Analysis*

The document analyzes the $150 million budget and applies $92,389,500 to cost of vehicle hours of operation. That amount divided by the base number of revenue hours per year (2,520,822) yields the cost per vehicle hour - $36.65. The budget allocates $50,781,355 to cost of vehicle miles (maintenance). That amount is divided by the base bus revenue miles (32,117,032) to yield the cost per vehicle mile - $1.58. Finally MDT allocates $8,906,179 to the cost per peak vehicle day. This figure when divided by 209,406 yields a cost per peak vehicle day of $42.53. The incremental cost factors can be updated to 2005 dollars by applying an inflation factor. They will then be multiplied by the forecast vehicles hours, vehicle miles and number of peak vehicles to produce the O&M costs of the various alternatives.

Table 8.1: Miami-Dade Transit and National Operating Costs Per Revenue Hour

	NATIONAL AVERAGE	NATIONAL MEDIAN	MIAMI-DADE TRANSIT
Motor Bus	$4.70	$4.32	$6.25
LRT	$15.48	$13.93	NA
Heavy Rail	$8.46	$8.47	$8.34

Source: National Transit Database 2002 Data

BRT/Bus Service

In December 2003 Miami-Dade Transit forecast the cost of operating the bus fleet in the People's Transportation Plan using the FTA recommended methodology. These figures are available from FTA and uses a base bus revenue miles of 30,926, 515/year forecast to grow to 43,450,963 miles/year. The base revenue hours per year is 2,520,822, which is forecast to grow to 3,482,761 revenue hours per year. MDT translates the peak fleet of 573 vehicles to peak vehicle days and gets 209,406 days. The plan grows the bus fleet by 347 vehicles, growing to 335,800 vehicle days.

BRT/Bus operating cost estimates were developed using MDT 2004 actual operating costs. These costs were allocated to vehicle service hours and vehicle service miles in a similar manner as for the PTP Financial Capacity Analysis, with two differences. First, costs that were not related to hours or miles were allocated to peak vehicles instead of "peak vehicle days." This was done to provide for consistency with LRT and DMU estimates, where peak vehicle day figures are not available. Second, a greater proportion of non-vehicle maintenance costs (72%) were considered to be variable costs to reflect that BRT systems have more elaborate passenger facilities that need ongoing maintenance. As detailed in Table 8.2, resulting unit costs are:

Table 8.2: Incremental BRT/Bus Operating Costs

	VEHICLE SERVICE HOURS	VEHICLE SERVICE MILES	PEAK VEHICLES	TOTAL
MDT Service Statistics				
Vehicle Service Hours	2,535,807			
Vehicle Service Miles		31,100,472		
Peak Vehicles			663	
MDT Incremental Costs (2004)				
Labor & Fringe	$110,225,470	$28,848,065	$910,403	$139,983,938
Services	$6,616,130	$4,298,072	$1,445,970	$12,360,173
Materials	$0	$5,322,179	$13,607,587	$18,929,766
Utilities & Fuel	$0	$9,969,453	$1,333,822	$11,303,275
Insurance	$0	$0	$220,000	$220,000
Taxes	$0	$0	$20,575	$20,575
Other	$0	$0	$765,814	$765,814
Total	$116,841,600	$48,437,769	$18,304,171	$183,583,540
MDT Incremental Costs (2004)				
Cost/VSH	$46.08			
Cost/VSM		$1.56		
Cost/Peak Vehicle			$27,608	
MDT Incremental Costs (2006)				
Cost/VSH	$51.43			
Cost/VSM		$1.74		
Cost/Peak Vehicle			$30,816	

DMU Service

DMU operating cost estimates were developed using Tri-Rail's actual 2004 operating costs, with adjustments for expected DMU savings. As estimated by Colorado Railcar for service in Danbury, Connecticut,[1] these savings would be 50% for fuel and 33% for vehicle maintenance. With these adjustments, and with costs inflated to 2006, resulting unit costs shown in Table 8.3 are:

- Cost per vehicle service hour:$151.34
- Cost per vehicle service mile: $2.43
- Cost per peak vehicle: $266.207

Table 8.3: Incremental DMU Operating Costs

	VEHICLE SERVICE HOURS	VEHICLE SERVICE MILES	PEAK VEHICLES	TOTAL
Tri-Rail Service Statistics (2004)				
Vehicle Service Hours	56,523			
Vehicle Service Miles		2,048,688		
Peak Vehicles			20	
Tri-Rail Incremental Commuter Rail Costs (2004)				
Labor & Fringe	$484,376	$0	$0	$484,376
Services	$1,127,479	$390,311	$3,771,350	$5,289,140
Materials	$0	$205,981	$0	$205,981
Utilities & Fuel	$0	$2,036,595	$265,370	$2,301,965
Insurance	$0	$0	$0	$0
Taxes	$0	$0	$0	$0
Other	$6,051,745	$4,244,119	$733,208	$11,029,072
Total	$7,663,599	$6,877,007	$4,769,928	$19,310,534
Tri-Rail Incremental Commuter Rail Costs (2004)				
Cost/VSH	$135.58			$3
Cost/VSM		$3.36		
Cost/Peak Vehicle			$238,496	
DMU Adjustments				
Fuel		-$1,018,298		-50%
Vehicle Maintenance		-$1,400,559		-33%
Estimated DMU Incremental Costs (2004)				
Cost/VSH	$135.58			
Cost/VSM		$2.18		
Cost/Peak Vehicle			$238,496	
Estimated DMU Incremental Costs (2006)				
Cost/VSH	$151.34			
Cost/VSM		$2.43		
Cost/Peak Vehicle			$266,207	

[1] CRM DMU Modeling for Danbury Branch, Prepared by Colorado Railcar Manufacturing, March 2004.

Light Rail Transit

Since there are no LRT operations in Miami, actual local O&M costs could not be used. The average of O&M budgets for LRT properties in the United States was used as a surrogate. The 2003 National Transit Data base supplied the operations and maintenance budgets for the properties and the FTA formula presented above was used to develop the unit costs which were then adjusted to reflect cost differences in the Miami area. These adjustments were based on the differences in bus operating costs between MDT and the systems that operate light rail. Using this process, unit LRT operating costs were estimated at:

- Cost per vehicle service hour:$60.16
- Cost per vehicle service mile: $3.00
- Cost per peak vehicle: $34,105

Table 8.4: Incremental LRT Operating Costs

	VEHICLE SERVICE HOURS	VEHICLE SERVICE MILES	PEAK VEHICLES	TOTAL
LRT Service Statistics (for Systems that Operate LRT and Bus Service)				
Vehicle Service Hours	3,793,077			
Vehicle Service Miles		57,930,878		
Peak Vehicles			1,118	
LRT Incremental Costs (for Systems that Operate LRT and Bus Service)				
Labor & Fringe	$212,098,656	$221,359,136	$14,559,961	$448,017,753
Services	$28,258,544	$11,831,607	$10,876,781	$50,966,932
Materials	$0	$12,381,278	$36,323,961	$48,705,239
Utilities & Fuel	$0	$40,578,500	$7,239,816	$47,818,316
Insurance	$0	$0	$5,908,729	$5,908,729
Taxes	$0	$0	$58,892	$58,892
Other	$0	$0	-$7,625,991	-$7,625,991
Total	$240,357,200	$286,150,521	$67,342,148	$593,849,869
LRT Incremental Costs (for Systems that Operate LRT and Bus Service) (2004)				
Cost/LRV Service Hours	$63.37			
Cost/LRV Service Mile		$4.94		
Cost/Peak Vehicle			$60,234	
MDT Bus Operating Costs Relative to Bus Costs for LRT Operators (2004)				
MDT Incremental/Other Systems	90.7%	68.9%	110.4%	
Estimated MDT Incremental LRT Costs (2004)				
Cost/VSH	$53.90			
Cost/VSM		$2.68		
Cost/Peak Vehicle			$30,555	
Estimated MDT Incremental LRT Costs (2006)				
Cost/VSH	$60.16			
Cost/VSM		$3.00		
Cost/Peak Vehicle			$34,105	

Metrorail

FTA recommends that if detailed figures are available that the more detailed the incremental cost figures are the better the estimate will be. MDT keeps a detailed cost model that uses eight cost factors, which are derived by disaggregating the Metrorail budget to these areas and developing the cost per unit. The cost per unit in 2005 dollars is presented in Table 8.5 below.

- Platform hours - $38.81
- Total Train hours - $18.14
- Rail Vehicles - $97,231
- Vehicle Miles - $2.77
- Passenger Boardings - $.06
- Stations - $522,258
- Yards - $738,924
- Track miles - $93,589

Metrorail operating costs were estimated in the same manner as BRT operating costs, with resulting costs estimated at:

- Cost per vehicle service hour: $82.83
- Cost per vehicle service mile: $5.74
- Cost per peak vehicle: $111,030

Table 8.5: Incremental Metrorail Operating Costs

	VEHICLE SERVICE HOURS	VEHICLE SERVICE MILES	PEAK VEHICLE REQUIREMENT	TOTAL
Metrorail Service Statistics (2004)				
Vehicle Service Hours	182,749			
Vehicle Service Miles		4,535,427		
Peak Vehicles			103	
Metrorail Incremental Costs (2004)				
Labor & Fringe	$8,159,313	$14,227,294	$910,403	$23,297,010
Services	$5,401,945	$1,039,646	$279,150	$6,720,741
Materials	$0	$1,109,063	$7,981,452	$9,090,515
Utilities & Fuel	$0	$6,965,941	$688,843	$7,654,784
Insurance	$0	$0	$220,000	$220,000
Taxes	$0	$0	$0	$0
Other	$0	$0	$165,759	$165,759
Total	$13,561,258	$23,341,944	$10,245,607	$47,148,808
Incrementally Allocated Costs (2004)				
Cost/Vehicle Service Hour	$74.21			
Cost/Vehicle Service Mile		$5.15		
Cost/Peak Vehicle			$99,472	
Metrorail Incremental Costs (2006)				
Cost/VSH	$82.83			
Cost/VSM		$5.74		
Cost/Peak Vehicle			$111,030	

Operating Profile Calculations

Table 8.6 provides an example of the operating profile that was calculated for each of the alternatives evaluated in this study. This table details the three Kendall Drive BRT concepts at three different operating speeds at peak period headways of 5 minutes and 10 minutes in the off-peak. The costs listed at the bottom of each table are for service operations only and do not reflect the upfront outlays or debt service payments on the capital construction costs. While the costs for running the elevated BRT/HOT guideway service at 65mph are half of those for a curb-lane BRT running at 45mph, the construction and related capital costs for the elevated guideway would be several orders of magnitude higher than a surface operation.

Three costs are computed at the bottom of each table. The O&M Costs (Daily) represent the total cost to maintain the vehicles and operate each particular service option. These costs are then annualized for each of the concepts, headway and operating speed options. Finally, the final row lists the total expenditure required to purchase the number of vehicles that would be needed to maintain each of the headway and service options. In this regard, the initial year costs for the curb-lane BRT operating a 5 minute peak period service with an operating speed of 35mph would be $7,074,345. First year O&M costs for the elevated BRT/HOT guideway operating a 10 minute peak period headway service and running at 65mph would be $1,375,320.

Table 8.6: Kendall Drive BRT Operating Profile for 5 Minute Peak / 10 Minute Off-Peak Frequency

	CURB-LANE BRT			CENTER-LANE BRT			ELEVATED BRT/HOT GUIDEWAY		
OPERATING SPEED	35 MPH	40 MPH	45 MPH	35 MPH	40 MPH	45 MPH	45 MPH	55 MPH	65 MPH
Peak Trips/Hour	12	12	12	12	12	12	12	12	12
Off-Peak Trips/Hour	6	6	6	6	6	6	6	6	6
Vehicle Cycle Factor	0.78	0.70	0.62	0.66	0.58	0.51	0.50	0.42	0.34
Peak Vehicles Required	9.4	8.4	7.4	7.9	7.0	6.1	6.0	5.0	4.1
Off-Peak Vehicles Required	4.7	4.2	3.7	4.0	3.5	3.0	3.0	2.5	2.0
Fleet Required (1.2 spare)	11.3	10.1	8.9	9.5	8.4	7.3	7.2	6.0	4.9
Vehicle Revenue Hours	112.88	100.87	88.88	95.05	84.07	72.88	72.26	60.12	48.88
Vehicle Revenue Miles	2,689	2,403	2,118	2,027	1,793	1,554	1,541	1,282	1,042
Peak Vehicle Days @ $45.12	$424	$379	$334	$357	$316	$274	$272	$226	$184
O&M Cost / Hour @ $38.88	$4,389	$3,922	$3,456	$3,696	$3,269	$2,834	$2,809	$2,338	$1,901
Vehicle Mile Costs@ $1.87	$5,029	$4,494	$3,960	$3,791	$3,353	$2,906	$2,881	$2,398	$1,949
O&M Costs (Daily)	$9,843	$8,795	$7,750	$7,844	$6,937	$6,014	$5,962	$4,961	$4,034
Annual O&M Costs	$2,559,054	$2,286,780	$2,014,920	$2,039,341	$1,803,732	$1,563,612	$1,550,225	$1,289,898	$1,048,754
Vehicle Capital Costs	$4,515,291	$4,034,880	$3,555,200	$3,802,149	$3,362,880	$2,915,200	$2,890,240	$2,404,887	$1,955,298

The operations cost for each alternative is based upon the operating assumptions detailed in the Preliminary Operating Plans section of this report. All services are assumed to operate from 5:00 am to 12:00 am and weekend headways are assumed to be the same as weekday off-peak headways. Annual operating costs along Kendall Drive range from $3.9 million for the elevated BRT/HOT option to $18.5 million for the Metrorail alternative.

Table 8.7 - Unit Operating Costs: 2006 Estimated

	BRT	LRT	DMU	METRORAIL
Vehicle Service Hour	$51.43	$64.14	$151.34	$82.83
Vehicle Service Mile	$1.74	$3.80	$2.43	$5.74
Peak Vehicle	$30,816	$74,204	$266,207	$111,030

Source: Estimates developed using MDT and NTD data.

Operation & Maintenance Cost Calculations

The total estimated operating costs for each alternative are a function of the unit operating costs described in the previous sections and the level of service that would be provided. With respect to service levels, the following assumptions were used:

- Span of service: All alternatives were assumed to operate from 5:00 am to 11:00 pm seven days a week.
- Train sizes: LRT and DMU service was assumed to be provided with two car trains (this assumption may need to be revised based upon projected ridership). Metrorail service would operate with existing consist sizes, which average 4.7 cars.
- Headways: For all corridors except the CSX corridor during peak periods, BRT was assumed to operate every 5 minutes, LRT and DMU every 10 minutes, and Metrorail every 12 minutes. The longer headways for LRT, DMU, and Metrorail reflect the higher capacities of those modes. In addition, the 12 minute Metrorail headway was set so that every other train would operate along the extension. With the exception of Metrorail, weekday off-peak and weekend headways were set at twice the weekday peak headway. For Metrorail, the weekday off-peak headway was set at 20 minutes, which as with peak period service, would mean that every other train would operate along the extension.
- In the CSX corridor, three different headways scenarios were used: (1) 30 minute peak; 60 minute off peak, (2) 20 peak; 60 minute off-peak, and (3) 15 minutes peak; 30 minutes off-peak.

Using these service parameters and the unit costs described above, operating costs would be as described in the following sections.

Kendall Drive Alternatives

The Kendall Drive alternatives would cost $3.9 to $18.5 million per year to operate (Table 8.8). The BRT alternatives would be the least expensive to operate ($3.9 to $5.0 million), followed by LRT ($5.9 to $8.4 million), DMU ($9.2 million), and Metrorail ($18.5 million). As with all corridors with Metrorail alternatives, Metrorail extensions would be the most expensive to operate because of the much longer train lengths that would be operated.

Table 8.8: Operating Costs for Kendall Drive Alternatives

	CURBSIDE BRT	CENTER LANE BRT	ELEVATED BRT	CURBSIDE LRT	CENTER LANE LRT	ELEVATED LRT	ELEVATED DMU	METRORAIL
Weekday Headways (mins)								
Peak	5	5	5	10	10	10	10	12
Off-Peak	10	10	10	20	20	20	20	20
Round Trip Running Time (mins)	57	44	39	57	44	28	28	33.0
Cycle Time (mins)	70	60	50	70	60	40	40	40
Round Trip Distance (miles)	19.1	17.1	17.1	19.1	17.1	17.1	17.1	17.1
Consist Length	1.0	1.0	1.0	2.0	2.0	2.0	2.0	4.7
Peak Vehicle Requirement	14	12	10	14	12	8	8	16
Annual Operating Costs (millions)	$5.0	$4.3	$3.9	$8.4	$7.3	$5.9	$9.2	$18.5

SR 826/SR 874 Alternatives

SR 826/SR 874 BRT alternatives would cost $5.2 to $11.1 million per year to operate (Table 8.9). Terminal-to-Terminal BRT/HOT Lane service would be the least expensive because it would have the faster running times and would thus require fewer vehicle service hours and vehicles. BRT service in general traffic would be the most expensive to operate because it would be the slowest and require the highest number of vehicle service hours and vehicles.

Table 8.9: Operating Costs for SR 826/SR 874 Alternatives

	GENERAL TRAFFIC BRT WITH SURFACE STREET STATIONS	SIDE LANE BRT WITH SURFACE STREET STATIONS	SIDE LANE BRT WITH EXPRESSWAY STATIONS	TERMINAL TO TERMINAL CENTER LANE BRT/HOT LANE	CENTER LANE BRT/HOT LANE WITH EXPRESSWAY STATIONS
Weekday Headways (mins)					
Peak	5	5	5	5	5
Off-Peak	10	10	10	10	10
Round Trip Running Time (mins)	145	103	44	34	44
Cycle Time (mins)	160	120	60	50	60
Round Trip Distance (miles)	39.4	32.8	32.8	32.8	32.8
Consist Length	1.0	1.0	1.0	1.0	1.0
Peak Vehicle Requirement	32	24	12	10	12
Annual Operating Costs (millions)	$11.1	$8.6	$5.7	$5.2	$5.7

CSX Corridor Alternatives

Operating costs for DMU service in the CSX corridor would be $5.4 million for 30 minute peak period service with four stations, $7.9 million for 20 minute peak period service and seven stations, and $11.7 million with 15 minute peak period service and nine stations (Table 8.10).

Table 8.10: Operating Costs for CSX Corridor Alternatives

	DMU ALT 1 @ 30 MINS	DMU ALT 2 @ 20 MINS	DMU ALT 3 @ 15 MINS
Weekday Headways (mins)			
Peak	30	20	15
Off-Peak	60	60	30
Round Trip Running Time (mins)	49	57	62
Cycle Time (mins)	60	80	75
Round Trip Distance (miles)	39.4	32.8	32.8
Consist Length	2.0	2.0	2.0
Peak Vehicle Requirement	4	8	10
Annual Operating Costs (millions)	$5.4	$7.9	$11.7

HEFT Corridor Alternatives

Operating costs for HEFT Corridor alternatives would range from $2.5 million to $19.7 million. BRT alternatives would cost the least to operate ($2.5 to $3.5 million), followed by expressway bus ($4.0 to $4.2 million), LRT ($6.3 million), DMU ($9.4 million), and Metrorail ($19.7 million) (Table 8.11). For BRT and expressway bus, operating cost differences are due to the length of the alternatives and the number of stations, both of which would impact travel times. Shorter alternatives with fewer station

would be faster and less expensive, and longer alternatives with more stations would have longer running times and thus be more expensive to operate.

LRT, DMU, and Metrorail alternatives would all operate along the same alignment and to the same number of stations and would have similar running times. As a result, cost differences would be attributable to differences in the cost structures for the different modes and train lengths.

Table 8.11: Operating Costs for HEFT Alternatives

	TERMINAL TO TERMINAL EXPRESSWAY BUS	EXPRESSWAY BUS WITH EXPRESSWAY STATIONS	TERMINAL TO TERMINAL SIDE LANE BRT	TERMINAL TO TERMINAL CENTER LANE BRT	SIDE BRT WITH EXPRESSWAY STATIONS	CENTER LANE BRT/HOT WITH EXPRESSWAY STATIONS	LRT WITH EXPRESSWAY STATIONS	DMU WITH EXPRESSWAY STATIONS	METRORAIL
Weekday Headways									
Peak	5	5	5	5	5	5	10	10	12
Off-Peak	10	10	10	10	10	10	20	20	20
Round Trip Run Time	34	34	20	20	19	30	30	30	29
Cycle Time (mins)	50	50	30	30	30	40	40	40	40
Round Trip Distance	21.1	18.9	18.9	18.9	12.5	18.9	18.9	18.9	18.9
Consist Length	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	4.7
Peak Vehicles	10	10	6	6	6	8	8	8	16
Annual Operating Costs	$4.2	$4.0	$3.1	$3.1	$2.5	$3.5	$6.3	$9.4	$19.7

SW 107th Avenue Corridor Alternatives

Operating costs for SW 107th Avenue Corridor Alternatives would range from $3.3 million to $17.0 million (Table 8.12). BRT would be the least expensive to operate ($3.3 million), followed by LRT ($5.7 million), DMU ($9.0 million), and Metrorail ($17.0 million). Operating cost differences would be attributable to differences in the cost structures for the different modes, and for rail alternatives, train lengths.

Table 8.12: Operating Costs for SW 107th Avenue Alternatives

STATION/STOP LOCATION	CURB LANE BRT	CENTER LANE BRT	CENTER LANE LRT	ELEVATED LRT	MEDIAN DMU	ELEVATED DMU	METRORAIL
Weekday Headways (mins)							
Peak	5	5	10	10	10	10	12
Off-Peak	10	10	20	20	20	20	20
Round Trip Running Time (mins)	35	35	35	29	36	30	28
Cycle Time (mins)	40	40	40	40	40	40	36
Round Trip Distance (miles)	15.8	15.8	15.8	15.8	15.8	15.8	15.8
Consist Length	1.0	1.0	2.0	2.0	2.0	2.0	4.7
Peak Vehicle Requirement	8	8	8	8	8	8	14.1
Annual Operating Costs (millions)	$3.3	$3.3	$5.7	$5.7	$9.0	$9.0	$17.0

Summary

Operating costs would vary significantly by mode and alternative. Based on initial operating assumptions, BRT would generally provide the lowest operating costs, and Metrorail the highest costs (Table 8.13). Metrorail costs would be highest because the Metrorail alternatives would operate as extensions of existing service, meaning that train lengths would need to be the same as for existing service. As a result, more capacity would be provided than would likely be necessary. With other modes, the amount of service could be tailored more closely to actual demand, which would result in lower

operating costs. LRT and DMU operating costs would be between those for BRT and Metrorail. They would be higher than for BRT because the basic cost structures for these modes are higher, and lower than Metrorail largely due to shorter train lengths.

Table 8.13: Estimated Operating Cost Summary

	KENDALL DRIVE	SR 826 / SR 874	CSX CORRIDOR	HEFT	SW 107TH AVENUE
Expressway Bus					
General Traffic with Surface Street Stations		$11.1			
Terminal to Terminal Expressway Bus				$4.2	
Expressway Bus with Expressway Stations				$4.0	
BRT					
Curbside BRT	$5.0				$3.3
Center Lane BRT	$4.3				$3.3
Elevated BRT	$3.9				
Side Lane BRT with Surface Street Stations		$8.6			
Side Lane BRT with Expressway Stations		$5.7		$2.5	
Center Lane BRT with Expressway Stations		$5.7		$3.5	
Terminal to Terminal Center Lane BRT		$5.2		$3.1	
Terminal to Terminal Side Lane BRT				$3.1	
Light Rail					
Curbside LRT	$8.4				$5.7
Center Lane LRT	$7.3				
Elevated LRT	$5.9				$5.7
LRT with Expressway Stations				$6.3	
DMU					
Elevated DMU	$9.2				$9.0
DMU @ 30 Mins			$5.4		
DMU @ 20 Mins			$7.9		
DMU @ 15 Mins			$11.7		
DMU with Expressway Stations				$9.4	
Median DMU					$9.0
Metrorail					
Elevated Metrorail	$18.5				$17.0
Metrorail with Expressway Stations				$19.7	

9 Tier I Generalized Capital Costs

This chapter presents conceptual capital costs for each of the five study corridors including the five proposed transit technologies in described in the preceding sections. Conceptual capital costs have been prepared based upon the findings of the estimated operating and maintenance cost and revenues outlined in Section 1.7.

Methodology

Guidance contained in *Procedures and Technical Method for Transit Project Planning*, Section II.3, Estimation of Capital Costs, Federal Transit Administration, September 1990, as revised, was used in preparing this estimate. The following report presents the unit cost assumptions, and generalized capital cost spreadsheets used for estimating capital costs of each alternative. As such, the capital cost model presented herein has been developed to a level of detail appropriate for the concept-level work performed in this study.

The capital cost model is limited by the level of design detail that was available at this stage of project development. Similarly, cost estimates are also limited in their accuracy to a conceptual level of detail. The level of detail is appropriate for comparative evaluation of the kind to be performed in the study. Should the study advance to the next phase, conceptual engineering would need to be performed and capital costs refined with the more detailed information developed.

A contingency cost factor was included to anticipate potential variances in assumptions made in the order-of-magnitude costs and actual implementation cost. If any of the alternatives is further advanced and more detailed design work is prepared and available for use in capital cost estimating, the contingency factor, or risk, will decrease. More detailed information on environmental mitigation, right-of-way changes, and property acquisition for stations, maintenance facilities and storage yards would need to be quantified in the next phase of design.

Unit costs have been based on historical project experience with the design and costing of capital elements. Numbers were compared and adapted to respect recently completed planning and engineering level unit cost estimation for related projects within Miami-Dade County and across the United States. This model cannot predict unforeseen future fluctuations that cannot be anticipated based on historic experience. The model has been prepared in 2006 dollars.

The capital cost model for the Diesel Multiple Unit (DMU), Light Rail Transit (LRT) and Metrorail alternatives is made up of three elements. Transit systems and infrastructure comprise the hard costs based upon individual units (vehicle, station, etc.) or on a per mile, per intersection or per linear foot basis. Each cost category includes an add-on cost, which is a place holder meant to account for potential cost escalation due to design changes, special jurisdictional or operator requirements or market-based construction or manufacturing cost increases. A project contingency cost is also included to cover potential cost escalation due to inflation or related soft costs. These elements were then evaluated on the following cost category line items:

- Systems
  - Vehicles
  - Transit Centers / Stations
  - Park and Ride Lots
- Infrastructure
  - Guideway / Trackwork / Bridges
  - Signals and Communications
  - Structures / Power Substations
  - Maintenance and Yard Facilities
- Project Contingency

Systems

Vehicles

The conceptual service plans for each alternative assume that a certain number of vehicles will be required to operate at the proposed headway or frequency. These assumptions are based upon roundtrip travel distances and projected travel times. For instance, more vehicles are required for the curb-lane BRT alternatives than the center-lane BRT due to slower roundtrip travel times. This Tier I capital cost analysis has not factored the potential cost savings that could be realized should it be possible to divert existing bus, BRT, DMU or Metrorail vehicles. Use of existing equipment in this manner is a capital cost savings.

Table 9.1: Vehicle Unit Costs

	UNIT COST	UNIT
Commuter Coach	$500,000	Vehicle
BRT Bus	$500,000	Vehicle
DMU (Single Level Powered)	$2,900,000	Vehicle
DMU (Single Level Trailer Car)	$2,100,000	Vehicle
LRT	$3,000,000	Vehicle
Metrorail	$1,300,000	Vehicle
Add-On Costs	15%	%

Transit Centers / Stations

Stations costs were estimated on a non-site specific basis. Station cost estimates were based on conceptual estimates for platform costs, station amenities and per space costs for parking. Platform costs range from an improved sidewalk for the curb-lane BRT options to the high level platforms with guard rails/handrails and tactile platform edging that is typical of existing Metrorail stations. Property acquisition costs were assumed to be minimal due in part to the fact that the majority of the alternatives operate within existing public rights-of-way. Further evaluation of one or more high-performing alternatives should explore the possibility of property acquisitions for station facilities.

Table 9.2: Transit Center / Station Unit Costs

	UNIT COST	UNIT
At-Grade	$995,400	Station
At-Grade with Pedestrian Overpass	$2,255,400	Station
Elevated	$4,321,800	Station
Metrorail	$14,000,000	Station
Add-On Costs	56%	%

Park and Ride Lots

Park and ride lots are an important part of transit station development. The lots improve station accessibility by allowing commuters to leave their personal vehicles and transfer to a bus, rail system or carpool for the rest of their trip. Costs include accommodation for both vehicular and pedestrian circulation, drainage and landscaping based upon national and local averages. Property acquisition costs were not calculated at this time due to the conceptual level of alternative development

Table 9.3: Park and Ride Lot Unit Capital Costs

	UNIT COST	UNIT
Surface	$5,040	Space
Structured	$21,000	Space
Add-On Costs	56%	%

Infrastructure

Guideway / Trackwork

Guideway / Trackwork costs encompass the rehabilitiation of existing facilities or the construction of new at-grade or elevated busways, transitways or railroads. Trackwork costs for the CSX corridor assume the upgrade or replacement of mainline tracks, yard tracks, timber ties, special trackwork and turnouts.

Signals and Communications

This category includes signals, communications and grade crossing controls. These elements are not unique to a specific segment, but are attributes of each concept under study. Grade crossing control costs include warning and protection devices, and do not include crossing materials within the road, which are included under structures. Grade crossing control costs were estimated based on the number of crossings. A number of the alternatives also propose a system of signal priority. While some degree of signal coordination is being tested along Kendall Drive, these costs were included in the analysis to account for potential upgrades or troubleshooting that would be required to operate any of the alternatives at their highest level of efficiency.

Structures / Power Substations

Structures costs unique to each alignment were evaluated as non-recurrent items. These items include grade crossing improvements, bridge rehabilitation and new structures. Assumptions were made regarding typical structures since detailed design was not included in this phase of the study.

Table 9.4: Infrastructure Unit Costs

	UNIT COST	UNIT
Bus Rapid Transit		
Side-Lane (2 lanes)	$13,860,000	Mile
Center-Lane (2 lanes)	$13,860,000	Mile
Elevated (2L)	$30,379,860	Mile
Signal Priority	$150,000	Intersection
Diesel Multiple Units / Light Rail Transit		
At-Grade (2T) w/o Retaining Wall	$7,333,200	Mile
Elevated (2T)	$33,755,400	Mile
Grade Crossing Protection (4 quadrant)	$264,600	Intersection
Curb-Lane (both sides)	$21,735,000	Mile
Center-Median (2 tracks)	$15,107,400	Mile
Elevated	$40,496,400	Mile
Ballasted Bridge (1T)	$16,380	Linear Foot
Ballasted Bridge (2T)	$22,680	Linear Foot
Signal Priority	$150,000	Intersection
	Unit Cost	Unit
Metrorail		
2 Track Viaduct	$11,600	Linear Foot
Direct Fixation Track	$425	Linear Foot
Underground	$57,166,200	Mile
Traction Power Substations	$6,000,000	Each
Third Rail Electrification	$100	Linear Foot
Signals	$1,600,000	Mile
Add-On Costs	56%	%

Signals and Communications

This category includes signals, communications and grade crossing controls. These elements are not unique to a specific segment, but are attributes of each concept under study. Grade crossing control costs include warning and protection devices, and do not include crossing materials within the road, which are included under structures. Grade crossing control costs were estimated based on the number of crossings. A number of the alternatives also propose a system of signal priority. While some degree of signal coordination is being tested along Kendall Drive, these costs were included in the analysis to account for potential upgrades or troubleshooting that would be required to operate any of the alternatives at their highest level of efficiency.

Maintenance and Yard Facilities

Maintenance and yard costs are dependant upon the technology being evaluated. While Miami-Dade Transit currently operates buses, Metrorail trains and soon BRT vehicles, existing yards and maintenance facilities may not be able to accommodate all of the new equipment. Layover facility costs were generated on a per-vehicles basis to account for the added cost of storing or repairing vehicles at existing facilities or for the cost for the cost to build new or expanded facilities.

Table 9.5: Maintenance and Yard Facility Unit Costs

	UNIT COST	UNIT
BRT/Express Bus	$116,667	Vehicle
Diesel Multiple Units	$630,000	Vehicle
Light Rail Transit	$718,200	Vehicle
Metrorail		
Yard Track	$16,200,000	Each
Third Rail Electrification	$5,300,000	Each
Traction Power Substation	$6,000,000	Each
Running Repair Facilities	$5,000,000	Each
Add-On Costs	56%	%

Project Contingency

Add-on items are included in the cost model to cover the non-physical elements of capital investment calculations. These items include engineering and construction management, administrative, construction insurance, and right-of-way acquisition. At the conceptual engineering level of analysis, contingencies are relatively high. As the project progresses into more detailed engineering, the level of uncertainty in the estimated cost decreases and the amount reserved for contingency decreases. Contingency has been included in the model as 25 percent of the capital cost subtotal.

Engineering and Construction Management

The capital cost model includes an estimate of the additional work required to implement the alternative, i.e., preliminary engineering, final design, and construction management. These costs include both contract costs and costs that would be incurred by the operator. Based on national experience implementing transit projects of this nature, a percentage of subtotaled segment and system-wide costs are used for this estimate. Engineering and construction management have been included in the model as 20 percent of capital cost subtotal.

Administrative Cost

The cost model includes the cost to the operator to administer the construction of the alternative. This cost is assumed to be five percent of the capital cost subtotal.

Construction Insurance

Construction insurance covers liabilities associated with the construction of a capital improvement and is estimated as five percent of the capital cost subtotal.

Kendall Drive

Three BRT concepts were developed for the Kendall Drive corridor. The least intensive of these options was projected to cost approximately $283 million. Capital costs for the center-lane BRT would be slightly higher to account for additional guideway costs. Costs for the rail transit options ranged from approximately $375 million for the center-lane LRT up to $1.65 billion for a Metrorail extension.

Table 9.6: Kendall Drive Corridor Conceptual Capital Costs (millions)

	CURBSIDE BRT	CENTER-LANE BRT	ELEVATED BRT	CENTER-LANE LRT	ELEVATED LRT	ELEVATED DMU	METRORAIL
Vehicles	$9.0	$10.0	$7.0	$52.0	$34.5	$33.5	$67.5
Transit Centers/Station	$11.0	$23.5	$47.5	$11.0	$47.5	$47.5	$175.0
Guideway	$192.0	$214.5	$404.5	$208.5	$539.0	$449.5	$950.0
Maintenance Facilities	$3.0	$3.5	$2.5	$17.0	$11.5	$10.0	$51.0
Park and Ride Lots	$12.5	$12.5	$39.5	$12.5	$39.5	$39.5	$81.5
Right-of-Way	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Contingencies	$57.0	$66.0	$125.0	$75.5	$168.0	$145.0	$331.0
Total	$283.0	$329.0	$625.0	$375.5	$839.0	$724.0	$1,655.0

SR 826 / SR 874 Corridor

Vehicle costs for the five bus options along the SR 826 / SR 874 corridor reflect the priority over auto traffic that transit is provided along the route. Vehicle costs decrease as guideway costs increase because fewer vehicles are required to provide the same level of service within the exclusive lanes. No accommodation for guideway costs were included for the general traffic BRT option and vehicles comprise almost one-third of the projects $70 million. While vehicle costs for the curb and center-lane BRT with expressway station options were calculated at only $9 million, the large outlay required for guideway construction pushes the total cost of these options up to $525 million.

Table 9.7: SR 826 / SR 874 Corridor Conceptual Capital Costs (millions)

	GENERAL TRAFFIC BRT WITH SURFACE STREET STATIONS	CURB-LANE BRT WITH SURFACE STREET STATIONS	CURB-LANE BRT WITH EXPRESSWAY STATIONS	TERMINAL TO TERMINAL CENTER-LANE BRT/HOT LANE	CENTER-LANE BRT/HOT LANE WITH EXPRESSWAY STATIONS
Vehicles	$22.5	$17.0	$9.0	$7.0	$9.0
Transit Centers/Station	$16.0	$12.5	$24.5	$3.5	$24.5
Guideway	$0.0	$363.5	$363.5	$363.5	$363.5
Maintenance Facilities	$7.5	$5.5	$3.0	$2.5	$3.0
Park and Ride Lots	$11.0	$11.0	$21.5	$11.0	$21.5
Right-of-Way	$0.0	$0.0	$0.0	$0.0	$0.0
Contingencies	$14.0	$102.5	$105.5	$97.0	$105.5
Total	$70.0	$510.5	$525.5	$483.0	$525.5

The CSX Corridor

Three DMU concepts with increasing headways were developed for the CSX corridor. The 30 minute headway option would require fewer vehicles and a smaller maintenance facility than the 15 minute headway option. Station costs varied in that each option would require different station storage and passing accommodations. Capital costs for the three alternatives ranged from $173 million to almost $230 million.

Table 9.8: CSX Corridor Conceptual Capital Costs (millions)

	DMU ALT 1@ 30 MINS	DMU ALT 2 @ 20 MINS	DMU ALT 3 @ 15 MINS
Vehicles	$13.5	$27.0	$33.5
Transit Centers/Station	$23.5	$11.0	$47.5
Guideway	$108.5	$108.5	$108.5
Maintenance Facilities	$4.0	$8.0	$10.0
Park and Ride Lots	$6.0	$6.0	$11.5
Right-of-Way	$0.0	$0.0	$0.0
Contingencies	$39.0	$40.0	$52.5
Total	$180.0	$173.0	$229.0

The HEFT Corridor

Two bus, four BRT and three rail transit options were evaluated along the HEFT corridor. Exclusive guideway construction costs increase the BRT options by $131 million over the expressway bus alternatives. The rail options were projected to require capital outlays that would be several orders of magnitude higher, with Metrorail costs approaching $1.7 billion.

Table 9.9: HEFT Corridor Conceptual Capital Costs (millions)

	TERMINAL TO TERMINAL EXPRESSWAY BUS	EXPRESSWAY BUS WITH EXPRESSWAY STATIONS	TERMINAL TO TERMINAL CURB-LANE BRT	TERMINAL TO TERMINAL CENTER-LANE BRT	CUB-LANE BRT WITH EXPRESSWAY STATIONS	CENTER-LANE BRT/HOT WITH EXPRESSWAY STATIONS	LRT WITH EXPRESSWAY STATIONS	DMU WITH EXPRESSWAY STATIONS	METRORAIL
Vehicles	$7.0	$7.0	$5.0	$5.0	$5.0	$6.0	$34.5	$33.5	$30.0
Transit Centers/Station	$5.0	$21.0	$3.5	$3.5	$14.0	$21.0	$21.0	$21.0	$153.0
Guideway	$0.0	$0.0	$131.0	$131.0	$131.0	$131.0	$302.0	$191.0	$1,111.5
Maintenance Facilities	$2.5	$2.5	$1.5	$1.5	$1.5	$2.0	$11.5	$10.0	$51.0
Park and Ride Lots	$3.5	$3.5	$3.5	$3.5	$3.5	$7.5	$7.5	$7.5	$7.5
Right-of-Way	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Contingencies	$4.5	$8.5	$36.0	$36.0	$39.0	$42.0	$94.0	$65.5	$338.5
Total	$21.5	$41.5	$179.5	$179.5	$193.0	$208.5	$469.5	$327.5	$1,690.5

SW 107th Avenue

Costs for the two BRT, one LRT, and one DMU curb and center-lane options were projected to range between $212 million and $335 million. The three elevated rail options would require the construction of much more intensive infrastructure, with costs several order of magnitude higher than related surface options. Again, a Metrorail extension would have come at extremely high costs of over $1.5 billion.

Table 9.10: SW 107th Avenue Corridor Conceptual Capital Costs (millions)

	CURB-LANE BRT	CENTER-LANE BRT	CENTER-LANE LRT	ELEVATED LRT	MEDIAN DMU	ELEVATED DMU	METRORAIL
Vehicles	$6.0	$6.0	$34.5	$34.5	$33.5	$33.5	$27.0
Transit Centers/Station	$11.0	$28.5	$11.0	$54.0	$11.0	$54.0	$175.0
Guideway	$175.5	$175.5	$191.0	$499.5	$98.5	$416.5	$927.0
Maintenance Facilities	$2.0	$2.0	$11.5	$11.5	$10.0	$10.0	$51.0
Park and Ride Lots	$14.0	$14.0	$21.0	$18.0	$18.0	$18.0	$55.5
Right-of-Way	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Contingencies	$52.0	$56.5	$67.5	$154.5	$42.5	$133.0	$309.0
Total	$260.0	$282.0	$335.5	$770.5	$212.5	$663.5	$1,543.0

Table 9.11: Capital Cost Summary Matrix

	CAPITAL COSTS				
	KENDALL DRIVE	SR 826 / SR 874	CSX CORRIDOR	HEFT	SW 107TH AVENUE
Expressway Bus					
General Traffic with Surface Street Stations		$69,613,177			
Terminal to Terminal Expressway Bus				$21,331,649	
Expressway Bus with Expressway Stations				$41,380,769	
BRT					
Curbside BRT	$328,608,051				$259,603,294
Center-Lane BRT	$282,990,311				$281,593,444
Elevated BRT	$624,925,631				
Curb-Lane BRT with Surface Street Stations		$510,322,217			
Curb-Lane BRT with Expressway Stations		$525,115,844		$192,520,959	
Center-Lane BRT with Expressway Stations		$525,115,844		$208,076,836	
Terminal to Terminal Center-Lane BRT		$482,589,787		$179,326,869	
Terminal to Terminal Curb-Lane BRT				$179,326,869	
Light Rail					
Center-Lane LRT	$375,240,038				
Elevated LRT	$838,973,999				$770,368,745
LRT with Expressway Stations				$469,431,699	
DMU					
Elevated DMU	$723,690,176				$212,311,408
DMU @ 30 Mins			$179,801,654		
DMU @ 20 Mins			$172,522,414		
DMU @ 15 Mins			$228,931,874		
DMU with Expressway Stations				$327,044,709	
Median DMU					$663,366,240
Metrorail					
Elevated Metrorail	$1,654,789,500				$1,542,791,250
Metrorail with Expressway Stations				$1,690,119,126	

Table 9.12: Capital Cost per Mile Summary Matrix

	CAPITAL COSTS PER MILE				
	KENDALL DRIVE	SR 826 / SR 874	CSX CORRIDOR	HEFT	SW 107TH AVENUE
Expressway Bus					
General Traffic with Surface Street Stations		$4,143,641.47			
Terminal to Terminal Expressway Bus				$2,257,317.30	
Expressway Bus with Expressway Stations				$4,378,917.30	
BRT					
Curbside BRT	$34,481,432.37				$32,861,176.39
Center-Lane BRT	$33,175,886.34				$35,644,739.68
Elevated BRT	$73,262,090.42				
Curb-Lane BRT with Surface Street Stations		$30,376,322.43			
Curb-Lane BRT with Expressway Stations		$31,256,895.45		$18,976,388.20	
Center-Lane BRT with Expressway Stations		$28,725,582.54		$18,976,388.20	
Terminal to Terminal Center-Lane BRT		$31,256,895.45		$20,372,588.20	
Terminal to Terminal Curb-Lane BRT				$22,018,712.75	
Light Rail					
Center-Lane LRT	$43,990,625.84				
Elevated LRT	$98,355,685.74				$97,515,030.95
LRT with Expressway Stations				$49,675,312.06	
DMU					
Elevated DMU	$84,840,583.34				$26,874,861.77
DMU @ 30 Mins			$10,963,515.49		
DMU @ 20 Mins			$10,519,659.39		
DMU @ 15 Mins			$13,959,260.61		
DMU with Expressway Stations				$34,607,905.66	
Median DMU					$83,970,410.06
Metrorail					
Elevated Metrorail	$193,996,424.38				$195,290,031.65
Metrorail with Expressway Stations				$178,848,584.71	

10 Tier I Evaluation and Screening

Introduction

A two-tier evaluation methodology has been applied to the various Kendall Corridor alignment options. Nine alternatives with over fifteen concepts were identified in the tier-one phase. These alternatives were developed in a manner suitable for comparison amongst each other as well as against the defined set of project goals and objectives. The Tier 1 screening process collected information, performed various analyses and incorporated the work of previous studies such as the *Kendall – SR 826 Corridor Major Investment Study*.

Project materials were presented to the public and the Miami-Dade MPO Board for comment and feedback. These discussions lead to the completion of the Tier I screening process. Several alternatives were dropped from further consideration while new permutations of existing alternatives were developed for a more focused review during Tier II screening. The next steps of the study will include the refined and more detailed technical analysis necessary to progress the options through to the selection of a locally preferred alternative.

November 2006 Outreach

Public outreach meetings were held on November 2, 2006 at the Wayside Baptist Church and November 8, 2006 at the West Kendall Regional Library to provide area residents and business owners with the opportunity to learn more about the study, express their views and address any questions the attendees might have about the project. Approximately one hundred people attended the two meetings that were held near the eastern and western ends of the Kendall Drive Study Corridor.

Attendees expressed concerns about project costs and impacts to traffic, parking, station locations, noise, vibration, and property values. The study team will be evaluating these issues amongst others in more detail during the Tier II screening process. Participants also provided comments and suggestions warranting further study such as the potential for grade-separated rail crossings, terminal-to-terminal rail service along the CSX corridor, and a transit corridor running along Krome Avenue that would meet the planned East-West Metrorail line at the Turnpike and SR 836 interchange.

Analysis

The following pages contain the Tier I evaluation tables for each of the preliminary alternatives. The evaluation criteria is made up of twenty interrelated measures that are grouped as objectives, costs/benefits, mobility, operating efficiencies and land use and economic development (Table 10.1). The following tables provide a means of comparing the positive or negative attributes of each of the alternatives. These attributes were used as a means of identifying those alternatives that would be evaluated in the Tier II screening phase. The analyses were completed using the Miami-Dade transportation model, transit operations planning software, standard engineering costing procedures and U.S. census data.

Table 10.1: Evaluation Criteria

PLANNING OBJECTIVES	
1. Percent of proposed route within Urbanized Development Boundary	This figure relates to the stated MPO policy to not expand transit capacity to areas near or outside of the Urbanized Development Boundary.
2. Total existing transit ridership in market area (2000 Census)	This provides an order of magnitude reference to compare the benefit of project ridership figures.
3. Future population density in market area served by line (per square mile)	New transit services are best suited to areas of higher than average population density.
COSTS / BENEFITS	
1. Annual passenger miles per route mile	This figure describes how intense the service and ridership will be along the new transit line.
2. Total riders (average daily)	Projected ridership is one of the main figures used to consider the benefit of the new transit service.
4. Total capital cost (millions) 2006 Dollars	All transportation projects vie for a limited amount of funding. Projects with a better cost/benefit ratio will perform well against competing projects.
5. Capital cost per annual passenger miles	This figure provides a measure of how much it will cost to build the new transit system as compared to the amount of service that will be provided.
MOBILITY	
1. Ability to link Urban Centers with reverse service to jobs	Linking workers who live in urban centers with the jobs located in outlying areas is an important function of transit and a measure that will be used to compare benefits with competing projects.
2. Travel Time to MIC (minutes)	Provides a means of comparing the mobility benefits provided by each of the alternatives.
3. Travel Time to CBD (minutes)	Provides a means of comparing the mobility benefits provided by each of the alternatives.
4. Travel Time to downtown Kendall (minutes)	Provides a means of comparing the mobility benefits provided by each of the alternatives.
5. Number of transfers to MIC	Forced transfers act in a way that discourages potential riders from choosing transit. Fewer transfers make tend to make a transit service more attractive.
6. Number of transfers to CBD	Forced transfers act in a way that discourages potential riders from choosing transit. Fewer transfers make tend to make a transit service more attractive.
7. Number of transfers to downtown Kendall	Forced transfers act in a way that discourages potential riders from choosing transit. Fewer transfers make tend to make a transit service more attractive.
OPERATING EFFICIENCIES	
1. Annual operating costs (millions)	Operating costs are on-going charges that must be considered before implementing a new transit service. This measure acts as a way to compare the attractiveness of the various alternatives.
2. Annual operating revenue (millions)	Projected operating revenue is based on ridership and will act as a means to offset the operating costs.
3. Annual net operating subsidy (millions)	The projected annual operating subsidy is the amount of money that the transit provider will need to fund through means other than through proceeds of the farebox of the new service.
LAND USE AND ECONOMIC DEVELOPMENT	
1. Employment within 1/2 mile of stations	New transit services best serve areas of higher than average employment density.
2. Future growth in employment along the line	Areas with low existing employment density, but high projected employment densities are also idea locations for new transit service.
3. Future growth in employment along the line (percent)	The percent growth in employment along the transit line is a measure that will be used to compare the various alternatives.

The Kendall Drive Corridor

Table 10.2 illustrates the wide range of costs and benefits that were found for the alternatives running along Kendall Drive during the Tier I evaluation process. Three at-grade (two BRT and one LRT) alternatives and one elevated (Metrorail) alternative were analyzed. The mixed-traffic BRT alternative was projected to perform at an average speed and carry a number riders that would be similar to what is currently experienced by the existing local bus routes along Kendall Drive. Route 88 carried approximately 2,900 passengers a day during 2006.

The mixed-traffic BRT alternative is projected to carry only several hundred more per day, but at a capital cost of almost $330 million. This alternative would also require a slightly higher capital cost outlay than even the exclusive-lane BRT option. The additional costs come from the additional buses required to serve the route due to lower average speeds from traffic congestion. The LRT alternative seems to perform similarly to the exclusive-lane BRT from a speed and ridership perspective, but at higher capital and operating costs. Capital and annual operating costs for the Metrorail alternative are projected to be several times higher than other concepts, but it is predicted to carry more than twice the daily riders.

Table 10.2: Kendall Corridor Evaluation Matrix

MEASUREMENT INDICATOR	KENDALL CORRIDOR BRT MIXED	KENDALL CORRIDOR BRT EXCLUSIVE	KENDALL CORRIDOR LRT EXCLUSIVE	KENDALL CORRIDOR METRORAIL
PLANNING OBJECTIVES				
1. Percent of proposed route within Urbanized Development Boundary	100	100	100	100
2. Total existing transit ridership in market area (2000 Census)	6,400	6,400	6400	6400
3. Future population density in market area served by line (per	4,922	4,922	4,922	4,922
COSTS / BENEFITS				
1. Annual passenger miles per route mile	935,000	840,000	850,000	1,870,000
2. Total riders (average daily)	3,300	4,200	4,300	10,500
4. Total capital cost (millions) 2006 Dollars	$330,000,000	$325,000,000	$375,000,000	$1,655,000,000
5. Capital cost per annual passenger miles	$350.00	$390.00	$450.00	$900.00
MOBILITY				
1. Ability to link Urban Centers with reverse service to jobs	Y	Y	Y	Y
2. Travel Time to MIC (minutes)	65-73	55-63	55-63	44
3. Travel Time to CBD (minutes)	47-53	43-51	43-51	32
4. Travel Time to downtown Kendall (minutes)	30-35	25-33	25-33	16
5. Number of transfers to MIC	1	1	1	0
6. Number of transfers to CBD	1	1	1	0
7. Number of transfers to downtown Kendall	0	0	0	0
OPERATING EFFICIENCIES				
1. Annual operating costs (millions)	$5,000,000	$4,350,000	$7,300,000	$18,525,000
2. Annual operating revenue (millions)	$1,800,000	$1,800,000	$1,800,000	$4,450,000
3. Annual net operating subsidy (millions)	$3,200,000	$2,550,000	$5,500,000	$14,075,000
LAND USE AND ECONOMIC DEVELOPMENT				
1. Employment within 1/2 mile of stations	59,760	59,760	59,760	59,760
2. Future growth in employment along the line	24,767	24,767	24,767	24,767
3. Future growth in employment along the line (percent)	41.4%	41.4%	41.4%	41.4%
EVALUATION STATUS	Eliminated	Advanced	Eliminated	Advanced

The Exclusive-Lane BRT appears to provide the best cost/benefit results of the three Kendall Drive at-grade alternatives and therefore warrants further analysis in the Tier II screening. The high number of riders attracted to the proposed Metrorail system, the mobility benefits and the positive impact to roadway congestion also make this alternative attractive enough for further evaluation.

The SR 826 / SR 874 Corridor

The SR 826 / SR 874 / CSX Corridor traverses the study area in a northeast / southwest orientation. Two BRT and three rail alternatives were evaluated. The two BRT alternatives evaluated on the SR 826 / SR 874 Corridor performed well from a ridership perspective, but were identified as potential TSM projects and were therefore eliminated from further evaluation in this study. As was the case with the HEFT Corridor BRT alternatives, these highway-BRT options will be assessed by the MPO during a future regional express bus network planning effort. Additional improvements to local bus services along major corridors are expected to provide bus priority and amenities to existing buses, eliminating the need for further evaluation of a mixed-traffic BRT service along Kendall Drive. These three BRT alternatives will be considered as a Transportation Systems Management (TSM) option that will be assumed to be in place before any of the Kendall-Link alternatives would be implemented.

Table 10.3: SR 826 / SR 874 Evaluation Matrix

MEASUREMENT INDICATOR	SR 826/ SR 874 BRT MIXED TRAFFIC	SR 826/ SR 874 BRT EXCLUSIVE OPERATION
PLANNING OBJECTIVES		
1. Percent of proposed route within Urbanized Development Boundary	100	100
2. Total existing transit ridership in market area (2000 Census)	6,369	6,369
3. Future population density in market area served by line (per square mile)	4,922	4,922
COSTS / BENEFITS		
1. Annual passenger miles per route mile	1,600,000	1,600,000
2. Total riders (average daily)	2,600	5,500
4. Total capital cost (millions) 2006 Dollars	$510,000,000	$525,000,000
5. Capital cost per annual passenger miles	$325.00	$325.00
MOBILITY		
1. Ability to link Urban Centers with reverse service to jobs	Y	Y
2. Travel Time to MIC (minutes)	25-33	25-33
3. Travel Time to CBD (minutes)	39-45	39-45
4. Travel Time to downtown Kendall (minutes)	N/A	N/A
5. Number of transfers to MIC	1	1
6. Number of transfers to CBD	1	1
7. Number of transfers to downtown Kendall	1	1
OPERATING EFFICIENCIES		
1. Annual operating costs (millions)	$8,500,000	$5,750,000
2. Annual operating revenue (millions)	$1,100,000	$2,250,000
3. Annual net operating subsidy (millions)	$7,400,000	$3,500,000
LAND USE AND ECONOMIC DEVELOPMENT		
1. Employment within 1/2 mile of stations	131,305	131,305
2. Future growth in employment along the line	47,065	47,065
3. Future growth in employment along the line (percent)	35.8%	35.8%
EVALUATION STATUS	Eliminated	Eliminated

The CSX Corridor

There is sufficient interest in evaluating options for rail service along the underutilized CSX Homestead Corridor to advance the three DMU options to Tier II. Capital costs for the three preliminary alternatives are projected to be relatively low, suggesting that one could be implemented in a fairly short time frame. Projected ridership numbers were lower than was found on most of the other alternatives. The Tier II analysis will provide a more detailed assessment of the trip patterns of potential riders and will aid in the determination of costs vs. benefits. Stakeholder concerns relating to potential traffic noise, vibration, and property value impacts will be evaluated. A more comprehensive investigation of proposed station and parking locations will also help to establish a more thorough understanding of possible land acquisition needs.

Table 10.4: CSX Corridor Evaluation Matrix

MEASUREMENT INDICATOR	CSX DMU SINGLE TRACK / 30 MIN PEAK HEADWAY	CSX DMU SINGLE TRACK / 20 MIN PEAK HEADWAY	CSX DMU DOUBLE TRACK / 15 MIN PEAK
PLANNING OBJECTIVES			
1. Percent of proposed route within Urbanized Development Boundary	100	100	100
2. Total existing transit ridership in market area (2000 Census)	6,369	6,369	6,369
3. Future population density in market area served by line (per square mile)	4,922	4,922	4,922
COSTS / BENEFITS			
1. Annual passenger miles per route mile	700,000	700,00	1,100,000
2. Total riders (average daily)	650	1,400	2,600
4. Total capital cost (millions) 2006 Dollars	$180,000,000	$175,000,000	$225,000,000
5. Capital cost per annual passenger miles	$275.00	$250.00	$200.00
MOBILITY			
1. Ability to link Urban Centers with reverse service to jobs	Y	Y	Y
2. Travel Time to MIC (minutes)	25	28	31
3. Travel Time to CBD (minutes)	42	45	48
4. Travel Time to downtown Kendall (minutes)	N/A	N/A	N/A
5. Number of transfers to MIC	0	0	0
6. Number of transfers to CBD	1	1	1
7. Number of transfers to downtown Kendall	1	1	1
OPERATING EFFICIENCIES			
1. Annual operating costs (millions)	$5,500,000	$8,000,000	$12,000,000
2. Annual operating revenue (millions)	$250,000	$600,000	$1,100,000
3. Annual net operating subsidy (millions)	$5,250,000	$7,400,000	$10,900,000
LAND USE AND ECONOMIC DEVELOPMENT			
1. Employment within 1/2 mile of stations	142,642	142,642	142,642
2. Future growth in employment along the line	31,635	31,635	31,635
3. Future growth in employment along the line (percent)	22.2%	22.2%	22.2%
EVALUATION STATUS	Advanced	Advanced	Advanced

The HEFT Corridor

Mixed-traffic BRT, exclusive-lane BRT and Metrorail alternatives were evaluated the Homestead Extension of Florida's Turnpike corridor. The exclusive-lane BRT concept was eliminated due to a lack of available right-of-way for the dedicated lanes. The mixed-traffic BRT concept was also eliminated due to the low number of riders that were projected to use the system. Finally, the MPO has separate plans to improve regional express bus services throughout the County.

The HEFT Metrorail alternative was advanced forward for further evaluation during the Tier II screening process despite the very high capital costs that are projected to be over $1.5 billion. From an overall transit network perspective, it makes sense to consider how an additional southwards extension of the planned East-West Metrorail system would perform. The initial ridership projection of just over 4,000 trips per day could be revised upwards with the more thorough analysis that is possible during Tier II screening.

Table 10.5: HEFT Evaluation Matrix

MEASUREMENT INDICATOR	HEFT BRT MIXED TRAFFIC	HEFT BRT EXCLUSIVE OPERATION	HEFT METRORAIL
PLANNING OBJECTIVES			
1. Percent of proposed route within Urbanized Development Boundary	100	100	100
2. Total existing transit ridership in market area (2000 Census)	6,369	6,369	6,369
3. Future population density in market area served by line (per square mile)	4,922	4,922	4,922
COSTS / BENEFITS			
1. Annual passenger miles per route mile	610,000	925,000	2,100,000
2. Total riders (average daily)	1,050	2,300	4,225
4. Total capital cost (millions) 2006 Dollars	$195,000,000	$210,000,000	$1,700,000,000
5. Capital cost per annual passenger miles	$325.00	$225.00	$825.00
MOBILITY			
1. Ability to link Urban Centers with reverse service to jobs	Y	Y	Y
2. Travel Time to MIC (minutes)	30-38	30-38	30
3. Travel Time to CBD (minutes)	42-50	42-50	42
4. Travel Time to downtown Kendall (minutes)	N/A	N/A	N/A
5. Number of transfers to MIC	1	1	0
6. Number of transfers to CBD	1	1	0
7. Number of transfers to downtown Kendall	1	1	0
OPERATING EFFICIENCIES			
1. Annual operating costs (millions)	$2,500,000	$3,550,000	$20,000,000
2. Annual operating revenue (millions)	$450,000	$1,250,000	$1,800,000
3. Annual net operating subsidy (millions)	$2,050,000	$2,300,000	$18,200,000
LAND USE AND ECONOMIC DEVELOPMENT			
1. Employment within 1/2 mile of stations	32,681	32,681	32,681
2. Future growth in employment along the line	11,179	11,179	11,179
3. Future growth in employment along the line (percent)	34.2%	34.2%	34.2%
EVALUATION STATUS	Eliminated	Eliminated	Advanced

The SW 107th Avenue Corridor

Two BRT concepts and one Metrorail alternative were also evaluated on SW 107th Avenue. This corridor was initially selected due to early speculation of the location for the East-West Corridor Metrorail terminal station at Florida International University. A possible terminal station location for the East-West Metrorail extension on SW 107th Avenue has been eliminated from that study. Therefore, this corridor has been eliminated from further consideration in this study, even though the mixed-traffic BRT alternative appears to perform relatively well from a cost and benefit perspective. While it will not be considered as part of this study, it is conceivable that it may benefit in the future from planned county-wide bus system upgrades.

Table 10.6: The SW 107th Avenue Evaluation Matrix

MEASUREMENT INDICATOR	SW 107TH AVE BRT MIXED TRAFFIC	SW 107TH AVE BRT EXCLUSIVE OPERATION	SW 107TH AVE METRORAIL
PLANNING OBJECTIVES			
1. Percent of proposed route within Urbanized Development Boundary	100	100	100
2. Total existing transit ridership in market area (2000 Census)	6,369	6,369	6,369
3. Future population density in market area served by line (per square mile)	4,922	4,922	4,922
COSTS / BENEFITS			
1. Annual passenger miles per route mile	775,000	775,000	1,750,000
2. Total riders (average daily)	4,225	1,500	2,000
4. Total capital cost (millions) 2006 Dollars	$260,000,000	$280,000,000	$1,550,000,000
5. Capital cost per annual passenger miles	$325.00	$375.00	$990.00
MOBILITY			
1. Ability to link Urban Centers with reverse service to jobs	Y	Y	Y
2. Travel Time to MIC (minutes)	30-38	30-38	30
3. Travel Time to CBD (minutes)	42-50	42-50	42
4. Travel Time to downtown Kendall (minutes)	N/A	N/A	N/A
5. Number of transfers to MIC	1	1	0
6. Number of transfers to CBD	1	1	0
7. Number of transfers to downtown Kendall	1	1	0
OPERATING EFFICIENCIES			
1. Annual operating costs (millions)	$3,275,000	$3,275,000	$17,000,000
2. Annual operating revenue (millions)	$1,800,000	$630,000	$850,000
3. Annual net operating subsidy (millions)	$1,475,000	$2,645,000	$16,150,000
LAND USE AND ECONOMIC DEVELOPMENT			
1. Employment within 1/2 mile of stations	38,913	38,913	38,913
2. Future growth in employment along the line	7,890	7,890	7,890
3. Future growth in employment along the line (percent)	20.3%	20.3%	20.3%
EVALUATION STATUS	Eliminated	Eliminated	Eliminated

Summary

The evaluation summary shown in Table 9.5 illustrates the positive and negative attributes of each alternative in more general terms. A positive value for capital and operations costs reflects a lower level of funds required to build or maintain the project with respect to the other alternatives. Likewise, a negative rating describes that a high capital or operating cost is projected relative to other alternatives. A positive transit ridership benefit means that many people would be attracted to use the proposed service, while a negative rating reflects low projected usage. A congestion mitigation benefit that is positively or negatively rated describes how the alternative is assumed to affect traffic congestion on the existing roadway network. While the Kendall Drive Metrorail alternative is rated with a negative value for capital and operations costs, it is rated highly in ridership and congestion mitigation benefits.

The Tier I screening process considered the ridership potential along with the capital and operations costs for each of the fifteen concepts. Feedback from policy makers and the public also factored heavily in the screening process. Each of the highway Bus Rapid Transit (BRT) services were eliminated from further evaluation. The MPO has pledged to improve regional express bus services throughout Miami-Dade County and decided that the SR 874 / 826 BRT and HEFT BRT options would be addressed in that separate effort.

Additional improvements to local bus services along major corridors are expected to provide bus priority and amenities to existing buses, eliminating the need for further evaluation of a mixed-traffic BRT service along Kendall Drive. These three BRT alternatives will be considered as a Transportation Systems Management (TSM) option that will be assumed to be in place before any of the Kendall-Link alternatives would be implemented.

Each of the Light Rail Transit (LRT) alternatives was eliminated from further consideration. The at-grade and elevated LRT alternatives on the Kendall Drive corridor was screened out since it was projected to carry a similar number of riders as the BRT alternatives, but at significantly higher costs. Capital costs for the elevated LRT alternatives were so high that they approached those of a Metrorail extension, while attracting a ridership not much higher than the BRT alternatives.

The SW 107th Avenue corridor was initially considered due to a potential routing of the East-West Metrorail corridor to a terminal station and Florida International University along that road. The East-West Corridor Study is currently evaluating terminal and routing options that would run along the SR 836 / Dolphin Corridor or along the HEFT / SR 821 corridors and not SW 107th Avenue. For this reason, the SW 107th Avenue corridor has been eliminated from further consideration. Two BRT alternatives and one Metrorail concept were screened during Tier I and will not move forward into Tier II. Furthermore, with the elimination of the highway BRT alternatives, the SR 826 / SR 874 corridor will also not be considered during the Tier II evaluation.

The elevated BRT/HOT concept along Kendall Drive was eliminated due to high capital costs, low ridership potential, a lack of available right-of-way and poor public support. The elevated BRT/HOT concept was proposed to run along an elevated guideway supported on columns placed within the roadway median. This elevated roadway could also potentially act as a tolled High Occupancy Vehicle (HOT) facility that would help to offset project costs and speed through-traffic along Kendall Drive. This elevated concept would provide the greatest mobility benefits of the three Kendall Drive BRT options since the transit vehicles and through HOV/HOT autos would run free of at-grade cross-traffic conflicts and few of the existing left-turn lanes would have to be removed. This alternative also results in greater environmental impacts and does so at much greater costs than the at-grade BRT options. The cost to build the BRT/HOT elevated guideway would likely be comparable to a typical elevated Metrorail structure. Furthermore, this alternative performed poorly on ridership and mobility benefits when compared to Metrorail, due in part to lower capacity vehicles and the forced transfer to Metrorail at Dadeland South Station.

Table 10.5: Summary Evaluation Matrix

	SYSTEM CHARACTERISTICS			COMMUNITY INDICATORS		
	CAPITAL COST	OPERATIONS COST	POTENTIAL RIDERSHIP	INTERACTION WITH AUTO TRAFFIC	NOISE AND VIBRATION	POTENTIAL LAND REQUIREMENT
KENDALL DRIVE CORRIDOR						
BRT MIXED TRAFFIC	◑	○	◑	◑	○	○
BRT EXCLUSIVE OPERATION	◑	○	◑	●	○	◑
LRT EXCLUSIVE OPERATION	◑	◑	◑	●	◑	◑
METRORAIL	●	●	●	○	●	●
SR 826 / SR 874 CORRIDOR						
BRT MIXED TRAFFIC	◑	◑	○	◑	○	○
BRT EXCLUSIVE OPERATION	◑	◑	◑	○	○	◑
CSX CORRIDOR						
DMU SINGLE TRACK / 30 MIN PEAK HEADWAY OPERATION	○	◑	○	◑	◑	○
DMU SINGLE TRACK / 20 MIN PEAK HEADWAY OPERATION	○	◑	○	◑	◑	◑
DMU DOUBLE TRACK / 15 MIN PEAK HEADWAY OPERATION	○	●	○	◑	◑	◑
HEFT CORRIDOR						
BRT MIXED TRAFFIC	○	○	○	◑	○	○
BRT EXCLUSIVE OPERATION	○	○	○	○	○	◑
METRORAIL	●	●	◑	○	●	●
SW 107TH AVENUE CORRIDOR						
BRT MIXED TRAFFIC	◑	○	◑	◑	○	○
BRT EXCLUSIVE OPERATION	◑	○	○	●	○	◑
METRORAIL	●	●	○	○	●	●

Table Key:

- ● High
- ◑ Medium
- ○ Low

11 Tier II Alternative Definition

Introduction

A two-tier evaluation methodology has been applied to the various Kendall Corridor alignment options. Four alternatives with over twenty-one concepts were identified in the Tier I evaluation phase. These alternatives were developed in a manner suitable for comparison amongst each other as well as against the defined set of project goals and objectives. The Tier I screening process collected information, performed various analyses and incorporated the work of previous studies such as the *Kendall – SR 826 Corridor Major Investment Study*.

Project materials were presented to the public and the Miami-Dade MPO Board for comment and feedback. These discussions lead to the completion of the Tier I screening process. Several alternatives were dropped from further consideration while new permutations of existing alternatives were developed for a more focused review during Tier II screening. This second phase includes the refined and more detailed technical analysis necessary to progress the options through to the selection of a locally preferred alternative.

Tier II Alternatives

The Tier II screening process is evaluating the remaining alternatives in much more detail. Several additional transit concepts were suggested by the public and the MPO Board. A terminal-to-terminal DMU service option on the CSX corridor was evaluated and eliminated as it was projected to perform poorly. The evaluation also added an option that routes the DMU service to a station at SW 157th Avenue along the south side of the Kendall-Tamiami Airport on Portland Spur instead of to the Miami Metrozoo.

A proposed transit corridor running along Krome Avenue was not included as a Tier II alternative due to an MPO policy prohibiting transit capacity expansion outside the Urbanized Development Boundary (UDB). The majority of this corridor is currently undeveloped land that is along or outside to the UDB and would provide limited ridership and mobility benefits. An alternative corridor several miles to the east is being evaluated along SW 137th Avenue. This BRT concept would travel west from the SW 152nd Avenue / SW 117th Avenue Park-and-Ride lot at the HEFT, turn north on SW 137th Avenue, then east on Coral Way and terminate at the FIU Station of the planned East-West Metrorail extension.

The Tier II screening process evaluated five alternatives with a total of eleven concepts. Three BRT concepts were evaluated on Kendall Drive in addition to a Metrorail extension. The Metrorail alternative on the HEFT was advanced for detailed study. Five DMU concepts, were evaluated along the CSX corridor and one BRT alternative was modeled along SW 137th Avenue.

The in-depth study of each alternative addressed potential ridership and projected capital, operating and maintenance costs. Community integration indicators still under detailed include interaction with automobile traffic circulation, potential noise and vibration issues and possible land requirements for stations and related parking. The Tier II alternatives are as follows:

A: Kendall Drive Corridor

A1 - Kendall Drive Center-Lane BRT between SW 167th Ave and Dadeland South

A2 - Kendall Drive Center-Lane BRT between SW 167th Ave and SR 874. Side-Lane BRT to Dadeland North via Snapper Creek Expressway and to Dadeland South via Kendall Drive

A3 - Kendall Drive Center-Lane BRT between SW 167th Ave and SR 874. Side-Lane BRT to Dadeland North via Snapper Creek Expressway

A4 - Kendall Drive Metrorail within median between SW 157th Avenue and Dadeland North Metrorail Station

B: Homestead Extension of the Florida's Turnpike

B1 - HEFT Metrorail between FIU Metrorail Station and SW 152nd Street

C: CSX Corridor

~~C1 - DMU Service between Miami Intermodal Center and Miami Metrozoo with 2 Stations and 60 Minute Peak Headways / No Off-Peak Service~~ [eliminated]

C2 - DMU Service between Miami Intermodal Center and Miami Metrozoo with 5 Stations and 30 Minute Peak Headways / 60 Minute Off-Peak Headways

C3 - DMU Service between Miami Intermodal Center and Miami Metrozoo with 9 Stations and 20 Minute Peak Headways / 40 Minute Off-Peak Headways

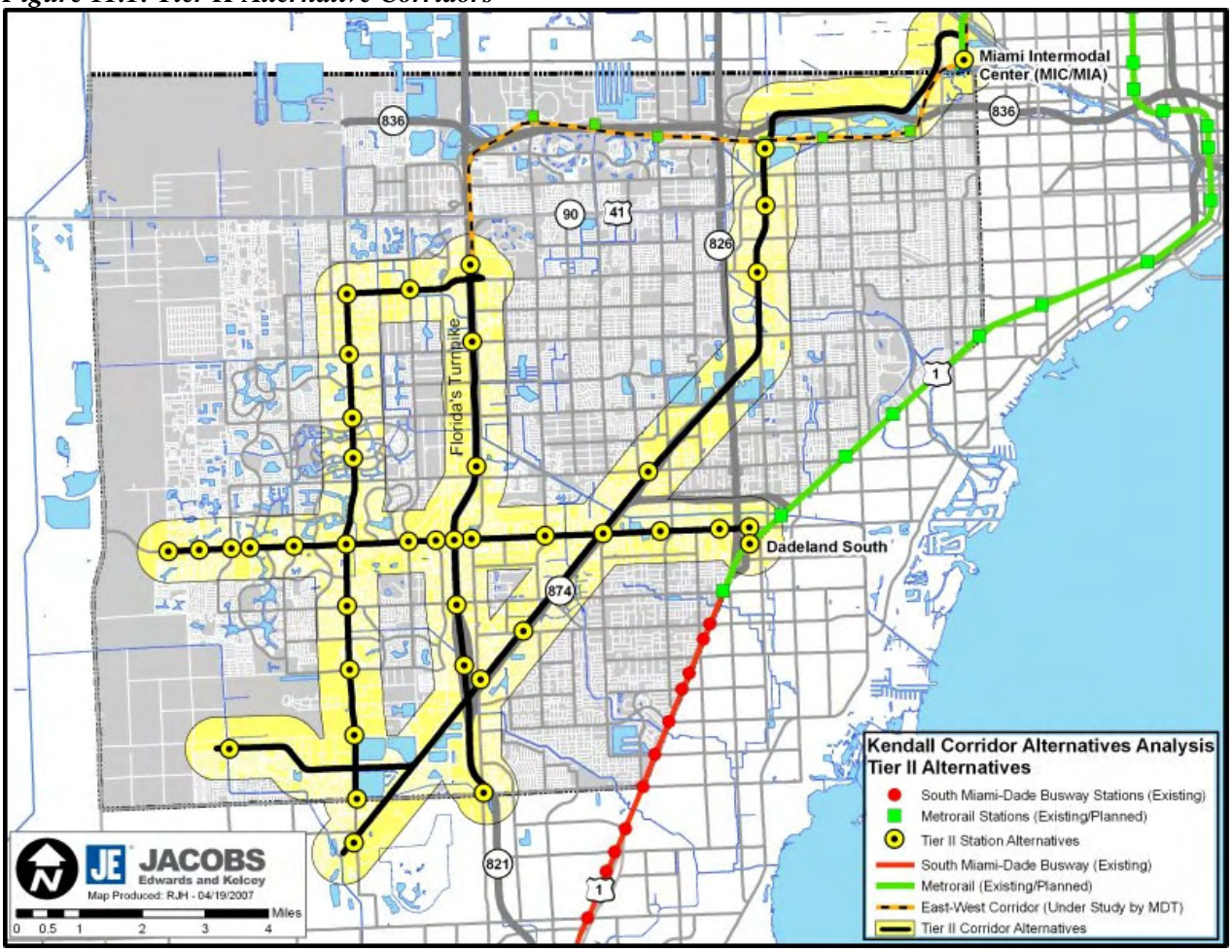
C4 - DMU Service between Miami Intermodal Center and Miami Metrozoo with 9 Stations and 15 Minute Peak Headways / 30 Minute Off-Peak Headways

C5 - DMU Service between Miami Intermodal Center and SW 157th Avenue with 9 Stations and 15 Minute Peak Headways / 30 Minute Off-Peak Headways

D: SW 137th Avenue

D1 – SW 137th Avenue Center-Lane BRT between the SW 152nd Avenue / SW 117th Avenue Park-and-Ride and FIU Metrorail Station

Figure 11.1: Tier II Alternative Corridors



A1 – Kendall Drive Center-Lane BRT between SW 167th Ave and Dadeland South

Alternative A1 provides BRT service within exclusive center-lanes from SW 167th Avenue Dadeland South Metrorail Station. Placing exclusive lanes within the median will cause impacts to the existing pattern of vehicular traffic operations along Kendall Drive. Lane widths or the number of through lanes may need to be reduced in some areas and many existing left-turn lanes would need to be eliminated to provide space within the road right-of-way for the exclusive lane and stations. Removing left-turn lanes would also minimize potential conflicts from cars and trucks turning across the path of BRT vehicles.

Fares for the service would be the same as the base fare for Metrobus and Metrorail (currently $1.50) and customer parking would be free of charge should space be available. Service could operate throughout the day, with frequent service during peak periods. Inbound service would travel east within the exclusive center-lane on Kendall Drive from 167th Street to Dadeland Boulevard.

The BRT vehicles would then turn south on Dadeland Boulevard and approach the Dadeland South Metrorail Station in general travel lanes. Outbound from Dadeland South Metrorail Station, vehicles would travel north on Dadeland Boulevard and turn west in to the exclusive center-lane on Kendall Drive. The BRT service would then continue westwards and make all stops to SW 167th Avenue.

Table 11.1: Alternative A1 Weekday Headways (minutes)

EARLY AM	AM PEAK	MID-DAY	PM PEAK	EVENING	OVERNIGHT
20	6	10	6	10	60

Table 11.2: Alternative A1 Running Times:

STATION	CUM. MILEAGE	ARRIVE	DWELL TIME	DEPART
Dadeland South Metrorail	0.00	-	-	0:00:00
Dadeland Mall	0.29	0:00:58	0:00:30	0:01:28
SW 79th Avenue	0.76	0:02:49	0:00:30	0:03:19
Baptist Hospital	1.65	0:05:06	0:00:30	0:05:36
SR 874 Intermodal Station	2.72	0:07:45	0:00:30	0:08:15
SW 107th Avenue	3.53	0:09:55	0:00:30	0:10:25
SW 117th Avenue	4.70	0:12:42	0:00:30	0:13:12
SW 122nd Avenue	5.28	0:15:09	0:00:30	0:15:39
SW 127th Avenue	5.70	0:16:48	0:00:30	0:17:18
SW 137th Avenue	6.69	0:19:29	0:00:30	0:19:59
SW 147th Avenue	7.53	0:21:42	0:00:30	0:22:12
SW 152nd Avenue	8.23	0:23:43	0:00:30	0:24:13
SW 157th Avenue	8.53	0:25:12	0:00:30	0:25:42
SW 162nd Avenue	9.03	0:26:57	0:00:30	0:27:27
SW 167th Avenue	9.53	0:28:43	-	-

Figure 11.2: Alternative A1 and Connecting Bus Service

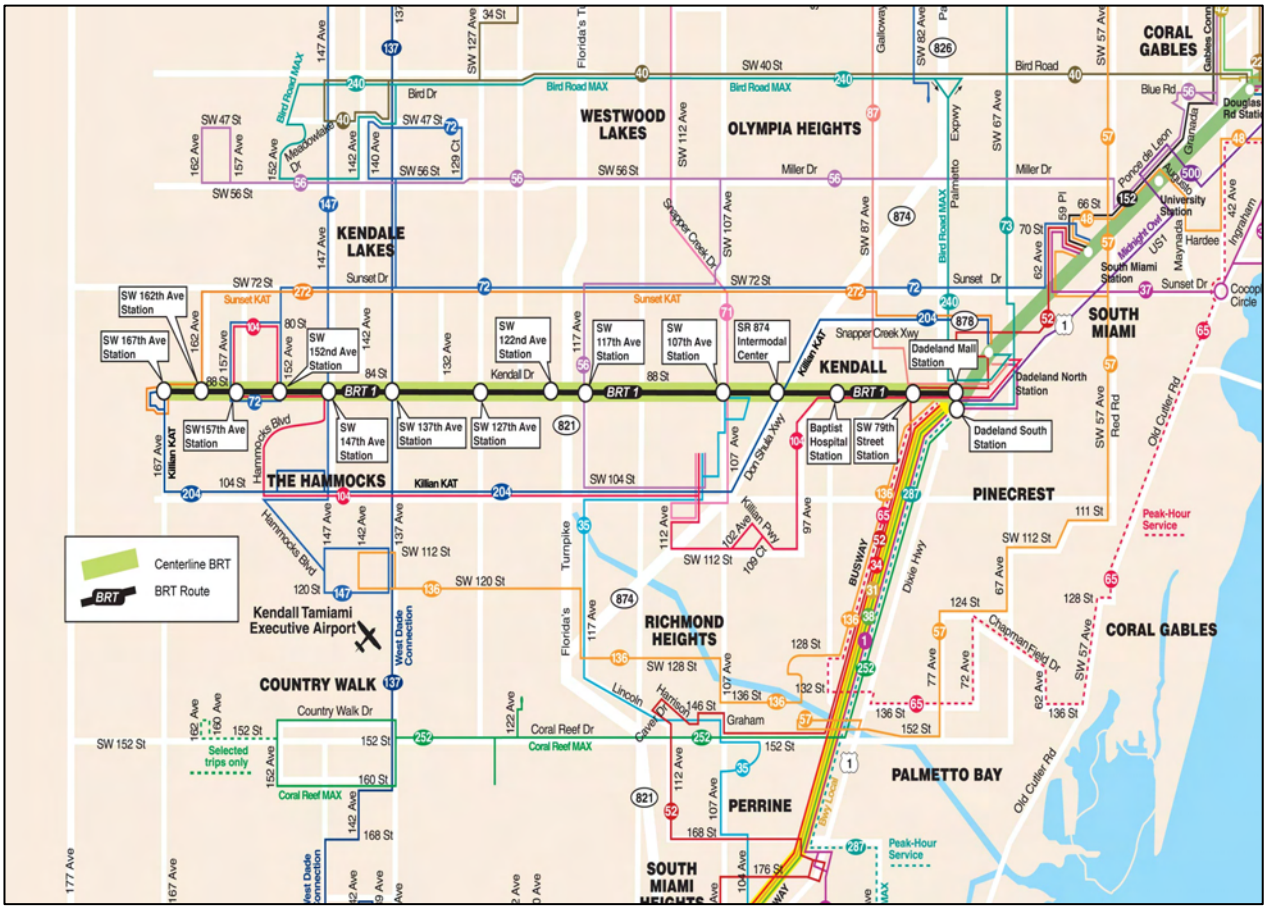
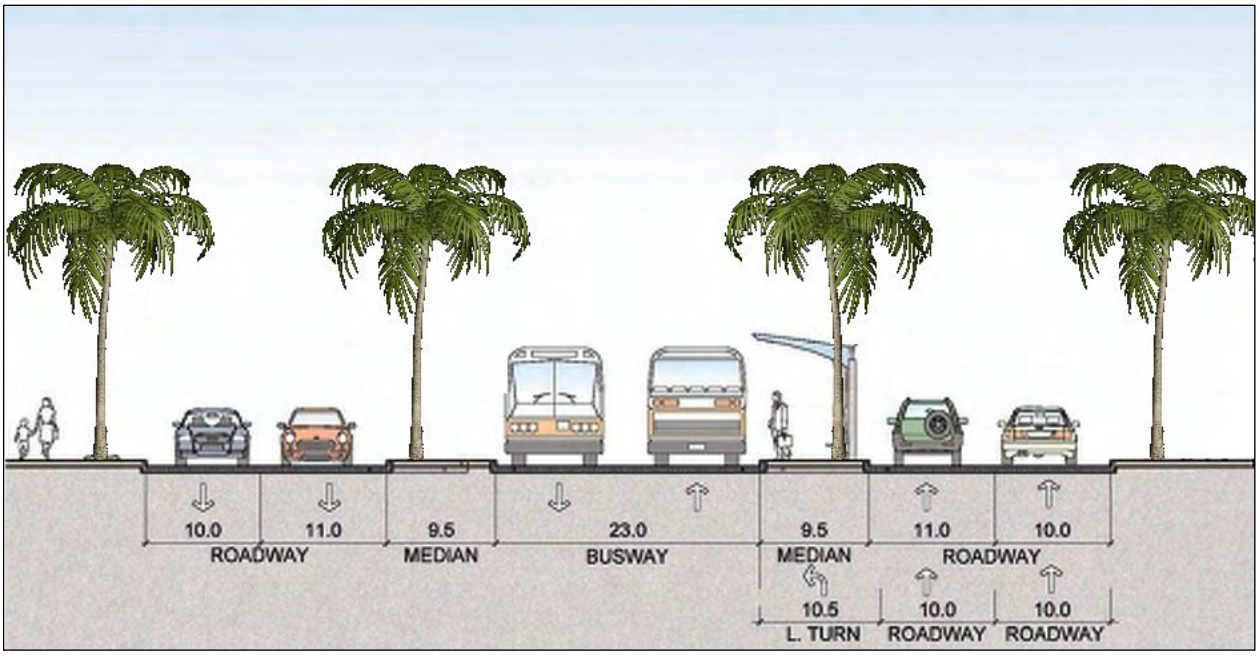


Figure 11.3: Exclusive Bus Lane and Side-Platform Station within Existing Road Median



A2 – Kendall Drive Center-Lane BRT between SW 167th Ave and SR 874. Side-Lane BRT to Dadeland North via Snapper Creek Expressway and to Dadeland South via Kendall Drive

Alternative A2 comprises two alignments and provides service from SW 167th Avenue to both Dadeland North and Dadeland South Metrorail Stations. As with the other BRT alternatives, there will be impacts to vehicular traffic on Kendall Drive due to a reduction in the width of travel lanes, the number of through lanes and the number and frequency of dedicated left-turn lanes. Left-turn lanes would be preserved on the portion of Kendall Drive that is east of SR 874 / Don Shula Expressway where the A2b service would operate in general travel-lanes. Fares for the service would be the same as the base fare for Metrobus and Metrorail (currently $1.50) and customer parking would be free of charge should space be available. Service could operate throughout the day, with frequent service during peak periods.

The inbound service for Alternative A2a utilizes an exclusive center-lane from 167th Street Station and travels east on Kendall Drive to SR 874 / Don Shula Expressway. The service then travels north on SR 874 within the shoulder and merges on to eastbound SR 878 / Snapper Creek Expressway. The BRT vehicle will then exit to SW 70th Avenue and continue east on SW 85th Street to the Dadeland North Metrorail Station. The inbound Alternative A2b follows the same alignment as A2a until it reaches SR 874 / Don Shula Expressway where the exclusive lane will terminate. The BRT service continues eastwards along Kendall Drive, making local stops within general travel lanes and turns south on Dadeland Boulevard towards the Dadeland South Metrorail Station.

Outbound from Dadeland North Metrorail Station, the A2a service will travel west on SW 85th Street, north on SW 72nd Avenue and west on SW 80th Street to the SR 878 / Snapper Creek Expressway on-ramp. BRT vehicles traveling within the shoulder will then merge on to SR 874 / Don Shula Expressway south, exit at Kendall Drive and continue west to SW 167th Avenue within the exclusive center-lane. Alternative A2b service would travel north from Dadeland South Metrorail Station on Dadeland Boulevard and turn west to the general travel lanes on Kendall Drive. The BRT service would then enter the exclusive center-lane west of SR 874 / Don Shula Expressway and make all stops to SW 167th Avenue. Tables 11.3 and 11.4 depict the headways and running times for Alternative A2a; times for A2b would be the same as Alternative A1.

Table 11.3: Alternative A2 Weekday Headways (minutes)

EARLY AM	AM PEAK	MID-DAY	PM PEAK	EVENING	OVERNIGHT
20	12	20	12	20	60

Table 11.4: Alternative A2a Running Times:

STATION	CUM. MILEAGE	ARRIVE	DWELL TIME	DEPART
Dadeland North Metrorail	0.0	-	-	0:00:00
SR 874 Intermodal Station	3.5	0:06:29	0:00:30	0:06:59
SW 107th Avenue	4.3	0:08:39	0:00:30	0:09:09
SW 117th Avenue	5.5	0:11:26	0:00:30	0:11:56
SW 122nd Avenue	6.1	0:13:53	0:00:30	0:14:23
SW 127th Avenue	6.5	0:15:32	0:00:30	0:16:02
SW 137th Avenue	7.5	0:18:13	0:00:30	0:18:43
SW 147th Avenue	8.3	0:20:25	0:00:30	0:20:55
SW 152nd Avenue	9.0	0:22:26	0:00:30	0:22:56
SW 157th Avenue Transit Center	9.3	0:23:56	0:00:30	0:24:26
SW 162nd Avenue	9.8	0:25:41	0:00:30	0:26:11
SW 167th Avenue	10.3	0:27:26	-	-

Figure 11.4: Alternative A2 and Connecting Bus Service

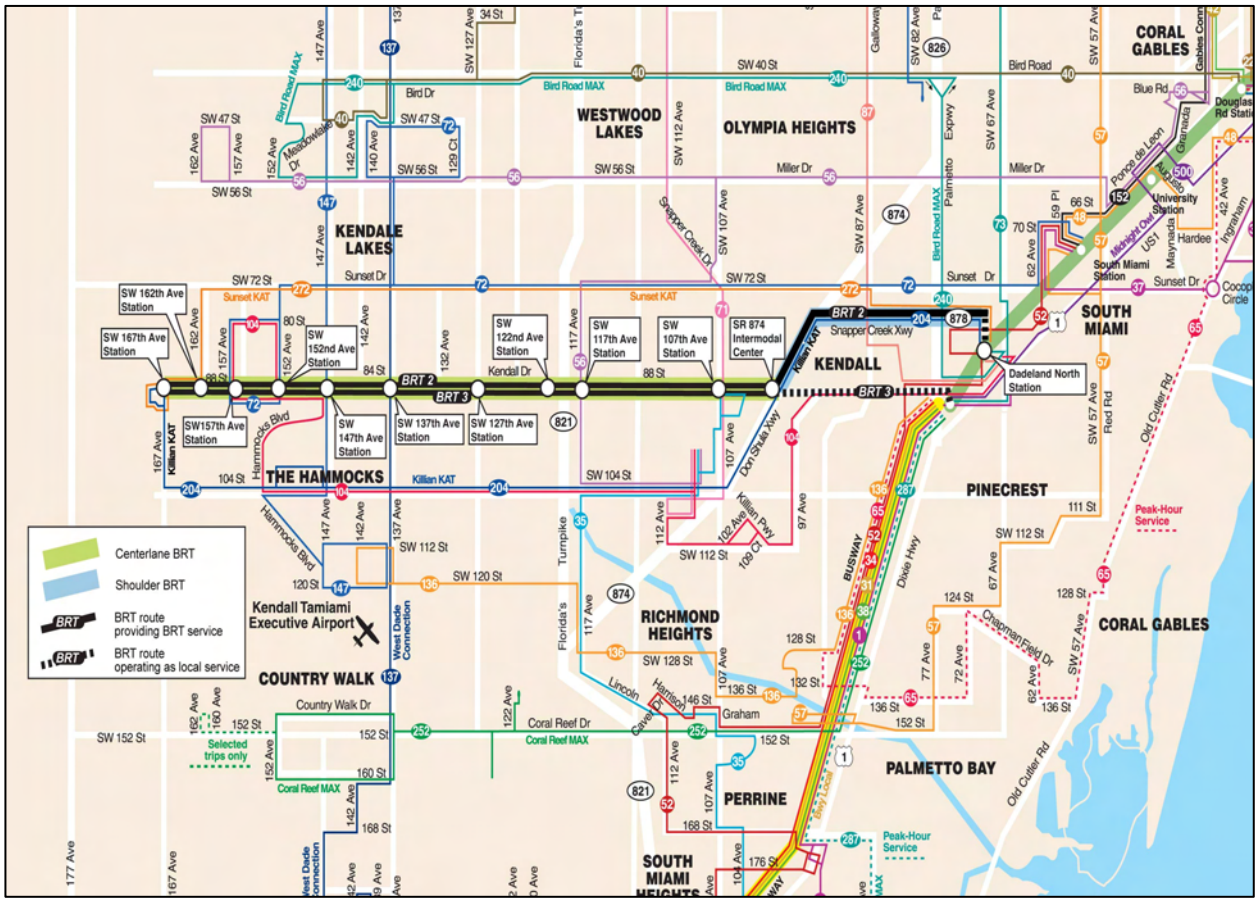
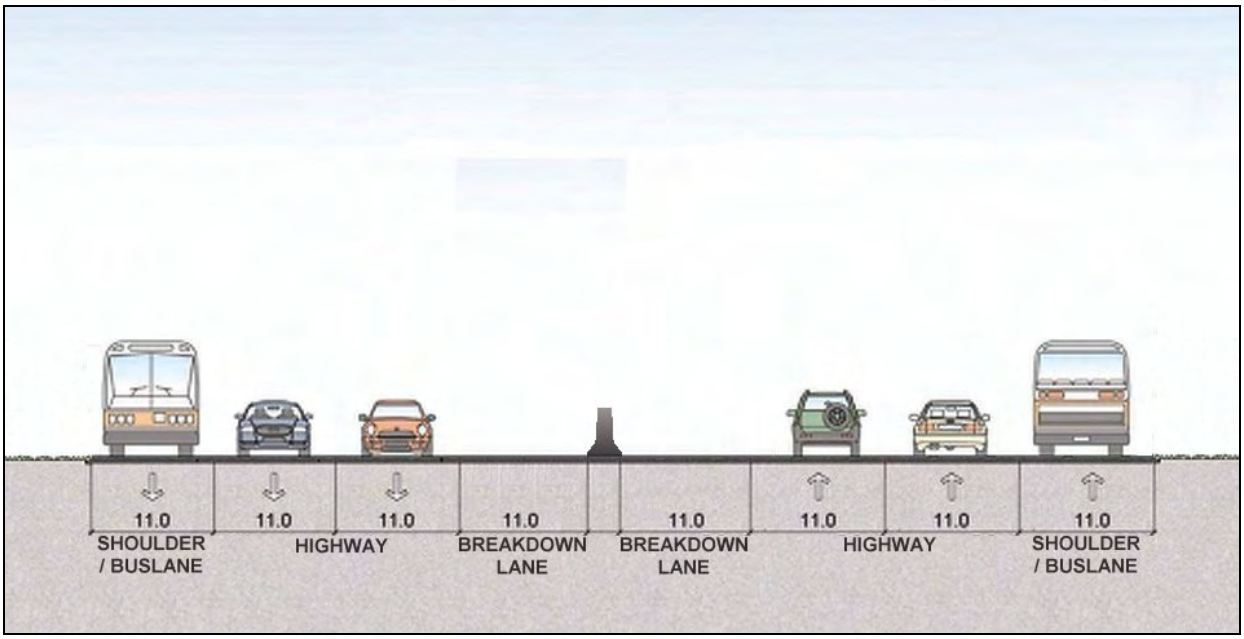


Figure 11.5: Cross Section of BRT Operating within the Shoulder of the Snapper Creek Expressway



A3 – Kendall Drive Center-Lane BRT between SW 167th Ave and SR 874. Side-Lane BRT to Dadeland North via Snapper Creek Expressway

Alternative A3 includes only the portion of the A2 service that provides service from SW 167th Avenue to Dadeland North Metrorail Stations along the SR 878 / Snapper Creek Expressway. Again, reducing the number and width of lanes and eliminating left-turn lanes will impact vehicular traffic on Kendall Drive. Both alternatives A2 and A3 would preserve the existing left-turn lanes east of SR 874 / Don Shula Expressway. Fares for the service would be the same as the base fare for Metrobus and Metrorail (currently $1.50) and customer parking would be free of charge should space be available. Service could operate on a 24 hour schedule with frequent service during peak periods.

Inbound service would travel east within an exclusive center-lane from 167th Street Station on Kendall Drive to SR 874 / Don Shula Expressway. The BRT vehicle would then travel north on SR 874 within the shoulder and merge on to eastbound SR 878 / Snapper Creek Expressway. Miami-Dade County has already implemented new express bus services that operate within the shoulders of selected expressways and incremental guideway costs would be relatively low.

The BRT vehicle will then exit to SW 70th Avenue and continue east on SW 85th Street to the Dadeland North Metrorail Station. Outbound from Dadeland North Metrorail Station, the service will travel west on SW 85th Street, north on SW 72nd Avenue and west on SW 80th Street to the SR 878 / Snapper Creek Expressway on-ramp. Vehicles traveling within the shoulder will then merge on to SR 874 / Don Shula Expressway south, exit at Kendall Drive and continue west to SW 167th Avenue within the exclusive center-lane.

Table 11.5: Alternative A3 Weekday Headways (minutes)

EARLY AM	AM PEAK	MID-DAY	PM PEAK	EVENING	OVERNIGHT
20	12	20	12	20	60

Table 11.6: Alternative A3 Running Times:

STATION	CUM. MILEAGE	ARRIVE	DWELL TIME	DEPART
Dadeland North Metrorail	0.0	-	-	0:00:00
SR 874 Intermodal Station	3.5	0:06:29	0:00:30	0:06:59
SW 107th Avenue	4.3	0:08:39	0:00:30	0:09:09
SW 117th Avenue	5.5	0:11:26	0:00:30	0:11:56
SW 122nd Avenue	6.1	0:13:53	0:00:30	0:14:23
SW 127th Avenue	6.5	0:15:32	0:00:30	0:16:02
SW 137th Avenue	7.5	0:18:13	0:00:30	0:18:43
SW 147th Avenue	8.3	0:20:25	0:00:30	0:20:55
SW 152nd Avenue	9.0	0:22:26	0:00:30	0:22:56
SW 157th Avenue Transit Center	9.3	0:23:56	0:00:30	0:24:26
SW 162nd Avenue	9.8	0:25:41	0:00:30	0:26:11
SW 167th Avenue	10.3	0:27:26	-	-

Figure 11.6: Alternative A3 and Connecting Bus Service

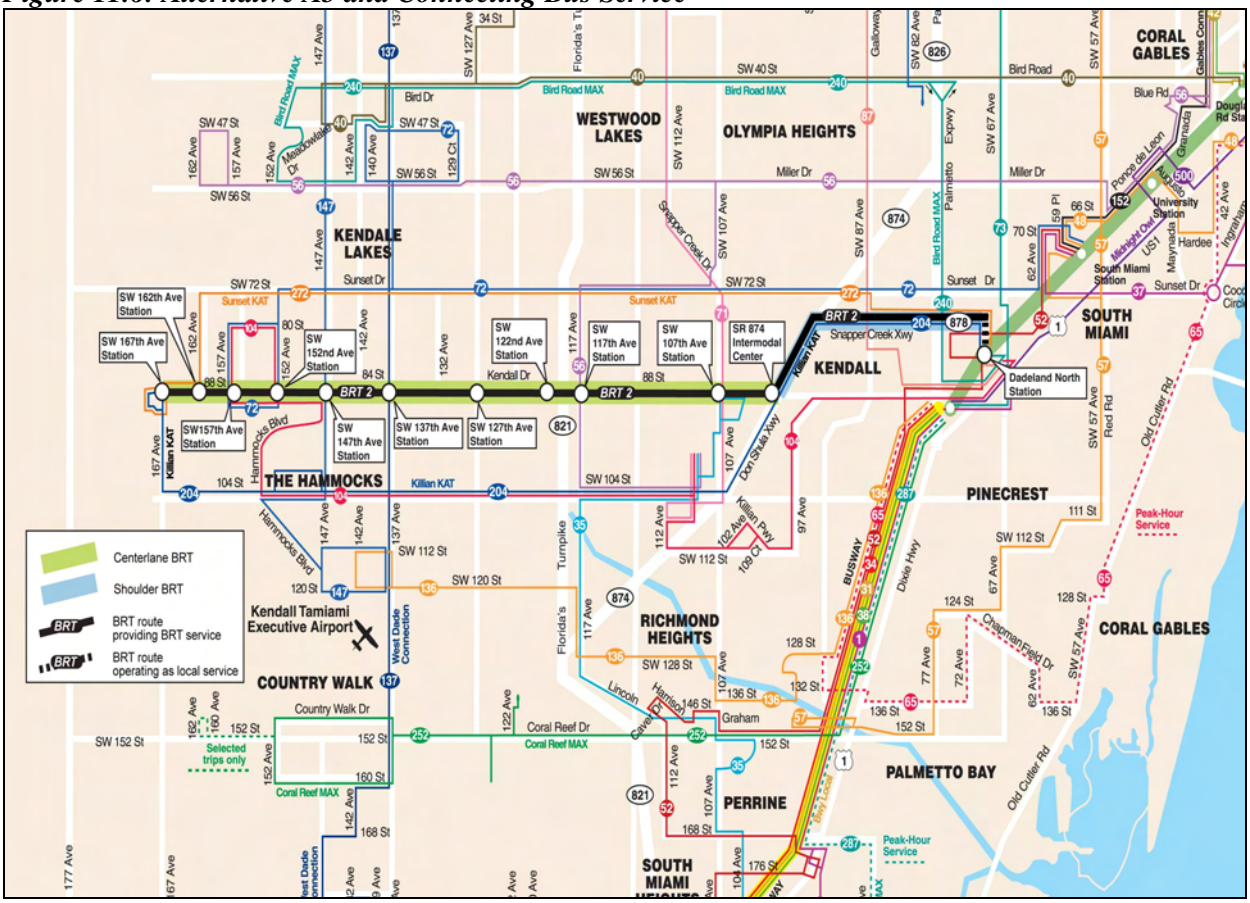


Figure 11.7: Prototypical Exclusive-Operation BRT Route

A4– Kendall Drive Metrorail within median between SW 157th Avenue and Dadeland North Metrorail Station

Alternative A4 proposes extending Metrorail service along Kendall Drive to SW 157th Avenue. New tracks would turn west from the existing Metrorail line just south of Dadeland North Metrorail Station and travel west along Kendall Drive. The tracks would be supported on a single pillar placed within the median of the road, as opposed to the double pillar used for much of the existing Metrorail system along the U.S. 1 corridor. The tracks would need to rise as they approach, and then descend slightly, to pass over the SR 826 / Palmetto Expressway, SR 874 / Don Shula Expressway and SR 821 / HEFT highway overpasses. The terminal station near SW 157th Avenue will also require tail track with room to switch and store trains.

While the tracks would be elevated above the roadway, there would still be some degree of impact to vehicular traffic on Kendall Drive. A number of the existing left-turn lanes may need to be eliminated in order to facilitate the placement of concrete pillars and traffic safety barriers. Many others could be preserved in their current configuration. Fares for the service would be the same as the base fare for Metrobus and Metrorail system (currently $1.50). Customer parking would cost $4.00 per day, as is the case with parking at existing Metrorail stations. Service would operate from 5:00am to 12:00am on weekdays with frequent service during peak periods.

Table 11.7: Alternative A4 Weekday Headways (minutes)

EARLY AM	AM PEAK	MID-DAY	PM PEAK	EVENING	OVERNIGHT
10	6	10	6	15	No Service

Table 11.8: Alternative A4 Running Times:

STATION	CUM. MILEAGE	ARRIVE	DWELL TIME	DEPART
Dadeland North Metrorail	0.00	-	-	0:00:00
SW 79th Avenue	1.00	0:01:27	0:00:30	0:01:57
Baptist Hospital	1.89	0:03:20	0:00:30	0:03:50
SR 874 Intermodal Station	2.96	0:05:23	0:00:30	0:05:53
SW 107th Avenue	3.77	0:07:11	0:00:30	0:07:41
SW 117th Avenue	5.22	0:09:33	0:00:30	0:10:03
SW 127th Avenue	5.94	0:11:26	0:00:30	0:11:56
SW 137th Avenue	6.93	0:13:12	0:00:30	0:13:42
SW 147th Avenue	7.77	0:15:02	0:00:30	0:15:32
SW 157th Avenue	8.77	0:16:47	-	-

Figure 11.8: Alternative A4 Kendall Drive Metrorail and Connecting Bus Service

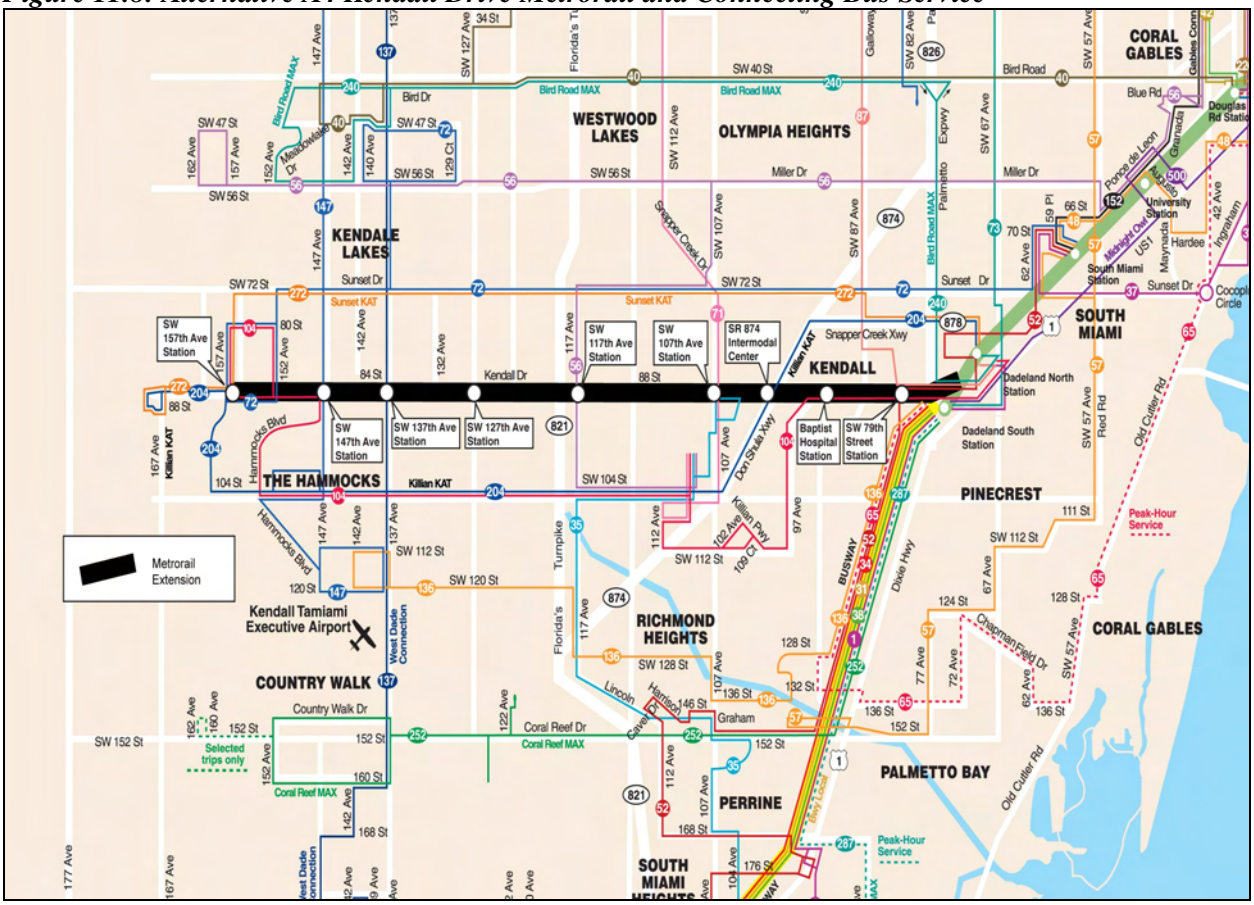


Figure 11.9: Miami-Dade Metrorail with Single Pillar Construction

B1 - HEFT Metrorail between FIU Metrorail Station and SW 152nd Street

Alternative B1 is composed of a Metrorail extension between the planned East-West Corridor Florida International University Metrorail Station and the existing park and ride facility at SW 152nd Street and SW 117th Avenue. The East-West Corridor Project is moving forward through the environmental and design stage for a Metrorail extension from the Miami Intermodal Center to FIU. Metrorail service along the HEFT would continue south from the FIU Station along the east side of the highway alignment.

The elevated guideway could potentially run along the SW 117th Avenue corridor or transition across the Snapper Creek Canal and continue south along the eastern edge of the highway right-of-way. The tracks would need to rise as they approach, and then descend slightly, when passing over the SW 24th Street / Coral Way and SW 104th Street / Killian Parkway overpasses. The terminal station at SW 152nd Street will also require an elevated tail track of several hundred feet with room to switch and store trains.

With the tracks elevated within the Turnpike right-of-way, this alternative would cause very few impacts to vehicular traffic. Space for concrete support columns and traffic safety barriers would still be very limited due to the proximity of active, high-speed travel lanes and the adjacent Snapper Creek canal. Fares for the service would be the same as for the existing Metrorail system (currently $1.50). Customer parking would cost $4.00 per day, as is the case with parking at existing Metrorail stations. Service would operate from 5:00am to 12:00am on weekdays with frequent service during peak periods.

Table 11.9: Alternative B1 Weekday Headways (minutes)

EARLY AM	AM PEAK	MID-DAY	PM PEAK	EVENING	OVERNIGHT
10	8.5	10	8.5	15	No Service

Table 11.10: Alternative B1 Running Times:

STATION	CUM. MILEAGE	ARRIVE	DWELL TIME	DEPART
FIU Station	0.0	-	-	0:00:00
Bird Road / SW 40th St	1.99	0:02:22	0:00:30	0:02:52
Sunset Drive / SW 72nd St	4.14	0:05:23	0:00:30	0:05:53
Kendall Drive	5.24	0:07:29	0:00:30	0:07:59
Killian Parkway / SW 104th St	6.23	0:09:29	0:00:30	0:09:59
SW 120th Street	7.25	0:11:31	0:00:30	0:12:01
SW 117th Ave/SW 152nd St	9.45	0:14:34	-	-

Figure 11.10: Alternative B1 HEFT Corridor Metrorail and Connecting Bus Service

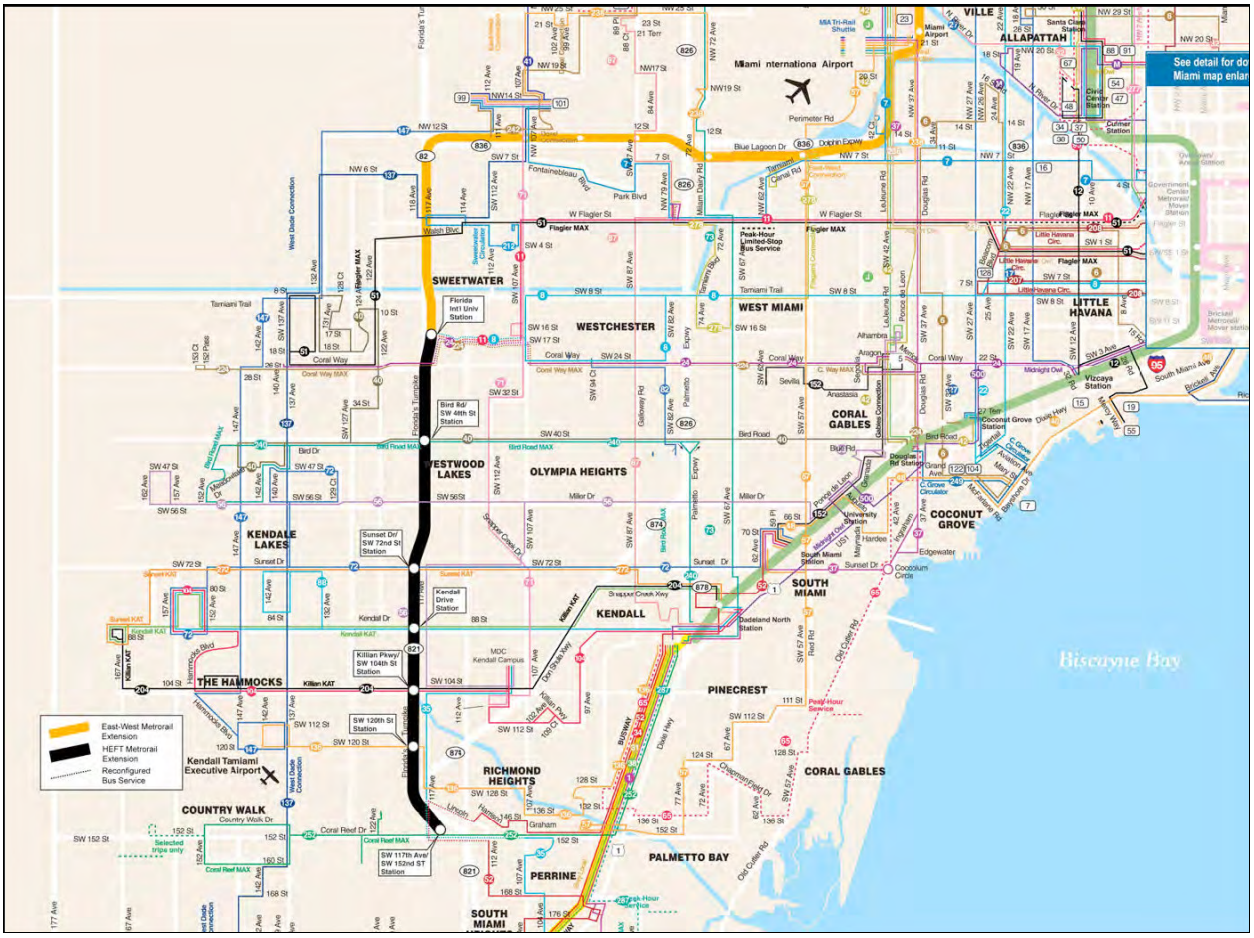


Figure 11.11: Miami-Dade Metrorail

C2 - DMU Service between Miami Intermodal Center and Miami Metrozoo with 5 Stations and 30 Minute Peak Headways / 60 Minute Off-Peak Headways

Alternative C2 would implement rail transit service to five stations along the existing CSX Homestead Subdivision between the Miami Intermodal Center the Miami Metrozoo. In order to provide frequent, all-day service along the corridor, the existing Class II and excepted track would need to be upgraded to Class IV status. Upgrading bridges, curves and signals to Class IV status would allow passenger operations at a maximum speed of 60 miles per hour. The addition of one passing siding would be required to operate trains at 30 minute headways.

Diesel multiple units (DMU) are also proposed for service in Alternative C2. Freight service would be scheduled to operate concurrently with the compliant DMU passenger service. Service for alternative C2 would operate every 30 minutes during peak periods and every 60 minutes during off-peak periods from 5:00am to 12:00am.

Figure 11.12: Alternative C2 and Connecting Bus Service

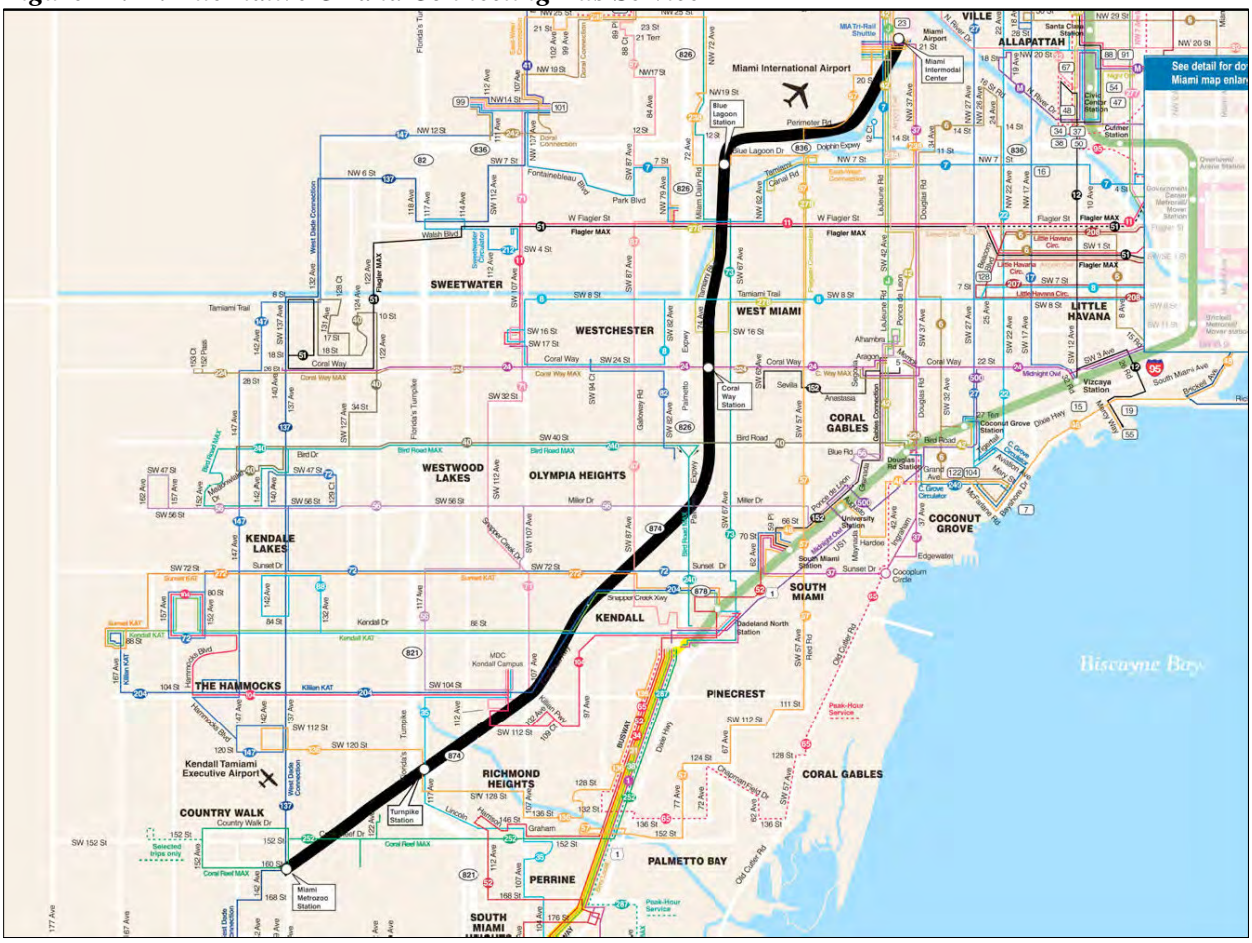


Table 11.11: Alternative C2 Weekday Headways (minutes)

EARLY AM	AM PEAK	MID-DAY	PM PEAK	EVENING	OVERNIGHT
60	30	60	30	60	No Service

Table 11.12: Alternative C2 Running Times:

STATION	CUM. MILEAGE	ARRIVE	DWELL TIME	DEPART
Miami Intermodal Center	18.4	-	-	0:00:00
Blue Lagoon	13.6	0:07:05	0:00:45	0:07:50
Coral Way	11.7	0:10:45	0:00:45	0:11:30
Turnpike Station	3.4	0:20:50	0:00:45	0:21:35
Miami Metrozoo	0.0	0:25:13	-	-

Note: Running times assume max allowable track speed through grade crossings.

C3 - DMU Service between Miami Intermodal Center and Miami Metrozoo with 9 Stations and 20 Minute Peak Headways / 40 Minute Off-Peak Headways

Alternative C3 proposes additional incremental improvements within the CSX corridor beyond those outlined in alternative C2. The DMU transit service would stop at nine stations between the Miami Intermodal Center the Miami Metrozoo. Track, bridges, curves and signals would all be upgraded to a Class IV status railroad. Three passing sidings would allow for the operation of 20 minute peak period headway service with a maximum speed of 60 miles per hour.

Service for alternative C2 would operate every 20 minutes during peak periods and every 40 minutes during off-peak periods from 5:00am to 12:00am.

Table 11.13: Alternative C3 Weekday Headways (minutes)

EARLY AM	AM PEAK	MID-DAY	PM PEAK	EVENING	OVERNIGHT
40	20	40	20	40	No Service

Table 11.14: Alternative C3 Running Times:

STATION	CUM. MILEAGE	ARRIVE	DWELL TIME	DEPART
Miami Intermodal Center	18.4	-	-	0:00:00
Blue Lagoon	13.6	0:07:05	0:00:45	0:07:50
Tamiami Trail	12.7	0:09:21	0:00:45	0:10:06
Coral Way	11.7	0:11:54	0:00:45	0:12:39
Sunset Drive	7.7	0:18:31	0:00:45	0:19:16
Kendall Drive	6.4	0:21:10	0:00:45	0:21:55
Killian Drive	5.0	0:23:52	0:00:45	0:24:37
Turnpike Station	3.4	0:26:45	0:00:45	0:27:30
Miami Metrozoo	0.0	0:31:09	-	-

Note: Running times assume max allowable track speed through grade crossings.

Figure 11.13: Alternative C3 and Connecting Bus Service

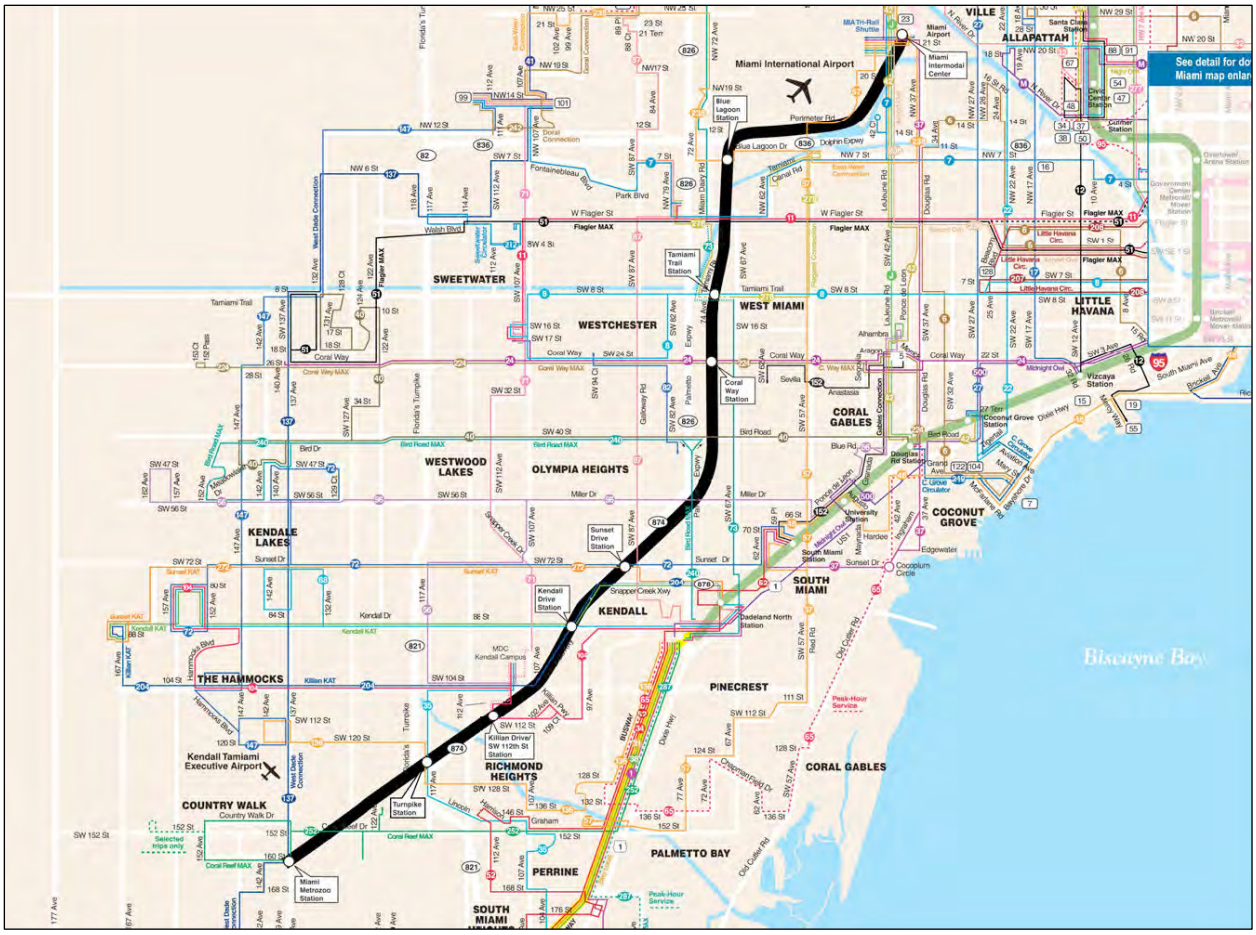


Figure 11.14: Typical DMU Vehicle

C4 - DMU Service between Miami Intermodal Center and Miami Metrozoo with 9 Stations and 15 Minute Peak Headways / 30 Minute Off-Peak Headways

Alternative C4 outlines a more capital intensive DMU rail service option. In order to provide 15 minute peak-period headways on the CSX Homestead Branch, the alignment would be reconstructed with two parallel tracks running along a large portion of the corridor. Trains would serve nine stations between the Miami Intermodal Center and the Miami Metrozoo. Track, bridges, curves and signals would all be upgraded to a Class IV status railroad. Service for alternative C2 would operate every 20 minutes during peak periods and every 40 minutes during off-peak periods from 5:00am to 12:00am.

Table 11.15: Alternative C4 Weekday Headways (minutes)

EARLY AM	AM PEAK	MID-DAY	PM PEAK	EVENING	OVERNIGHT
30	15	30	15	30	No Service

Table 11.16: Alternative C4 Running Times:

STATION	CUM. MILEAGE	ARRIVE	DWELL TIME	DEPART
Miami Intermodal Center	18.4	-	-	0:00:00
Blue Lagoon	13.6	0:07:05	0:00:45	0:07:50
Tamiami Trail	12.7	0:09:21	0:00:45	0:10:06
Coral Way	11.7	0:11:54	0:00:45	0:12:39
Sunset Drive	7.7	0:18:31	0:00:45	0:19:16
Kendall Drive	6.4	0:21:10	0:00:45	0:21:55
Killian Drive	5.0	0:23:52	0:00:45	0:24:37
Turnpike Station	3.4	0:26:45	0:00:45	0:27:30
Miami Metrozoo	0.0	0:31:09	-	-

Note: Running times assume max allowable track speed through grade crossings.

Figure 11.15: Alternative C4 and Connecting Bus Service

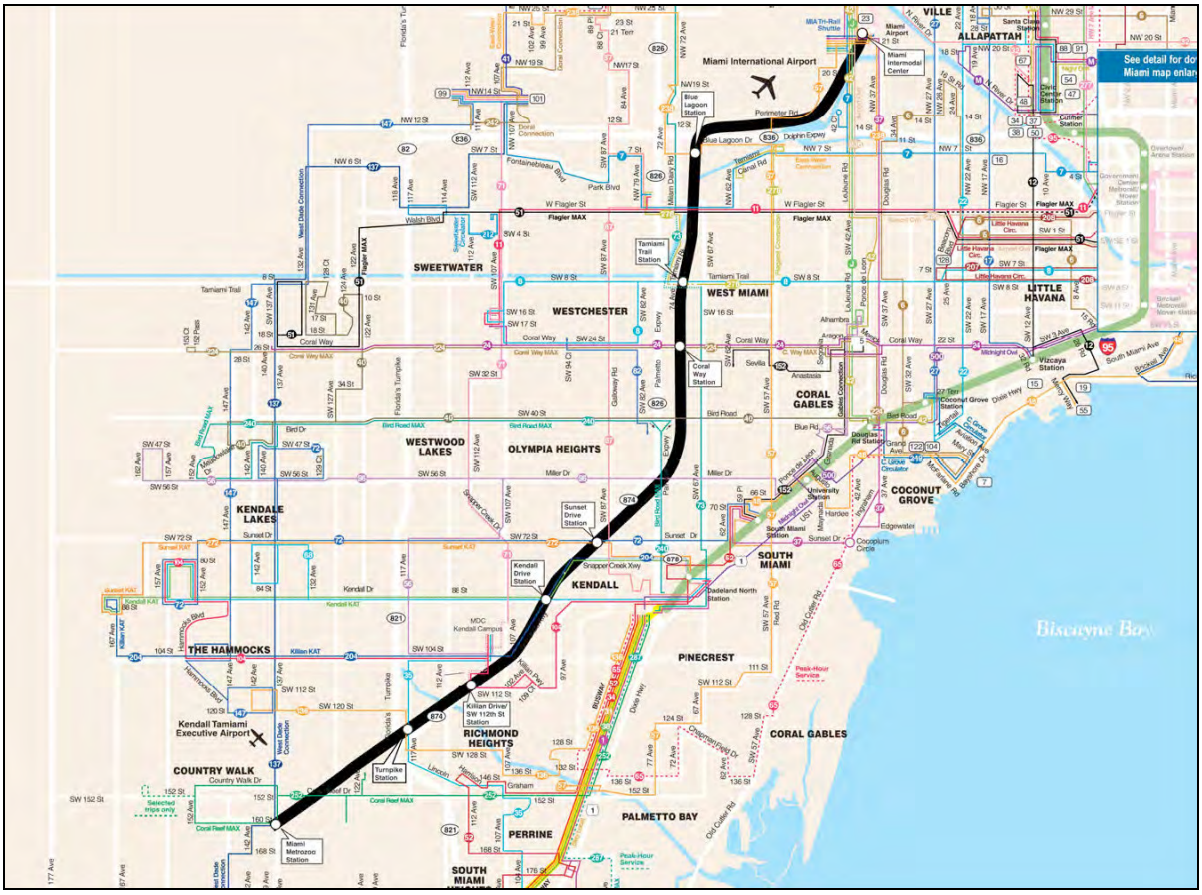


Figure 11.16: Prototype DMU Vehicle

C5 - DMU Service between Miami Intermodal Center and SW 157th Avenue with 10 Stations and 15 Minute Peak Headways / 30 Minute Off-Peak Headways

Alternative C5 mirrors Alternative C4 with DMU service operating every 15 minutes during peak periods along a two-track right-of-way. The difference is that the service would not terminate at the Miami Metrozoo, but rather would turn westwards on to the Portland Spur and run along the south side of the Kendall-Tamiami Airport to a terminal station near SW 157th. Trains would serve ten stations between the Miami Intermodal Center and SW 157th Avenue. Track, bridges, curves and signals would all be upgraded to a Class IV status railroad. Service for alternative C2 would operate every 20 minutes during peak periods and every 40 minutes during off-peak periods from 5:00am to 12:00am.

Table 11.17: Alternative C5 Weekday Headways (minutes)

EARLY AM	AM PEAK	MID-DAY	PM PEAK	EVENING	OVERNIGHT
30	15	30	15	30	No Service

Table 11.18: Alternative C5 Running Times:

STATION	CUM. MILEAGE	ARRIVE	DWELL TIME	DEPART
Miami Intermodal Center	19.7	-	-	0:00:00
Blue Lagoon	14.9	0:07:05	0:00:45	0:07:50
Tamiami Trail	14.0	0:09:21	0:00:45	0:10:06
Coral Way	13.0	0:11:54	0:00:45	0:12:39
Sunset Drive	9.0	0:18:31	0:00:45	0:19:16
Kendall Drive	7.7	0:21:10	0:00:45	0:21:55
Killian Drive	6.4	0:23:52	0:00:45	0:24:37
Turnpike Station	4.8	0:26:45	0:00:45	0:27:30
SW 137th Ave	2.2	0:31:03	0:00:45	0:31:48
SW 157th Ave	0.0	0:36:07	-	-

Note: Running times assume max allowable track speed through grade crossings.

Figure 11.17: Alternative C5 and Connecting Bus Service

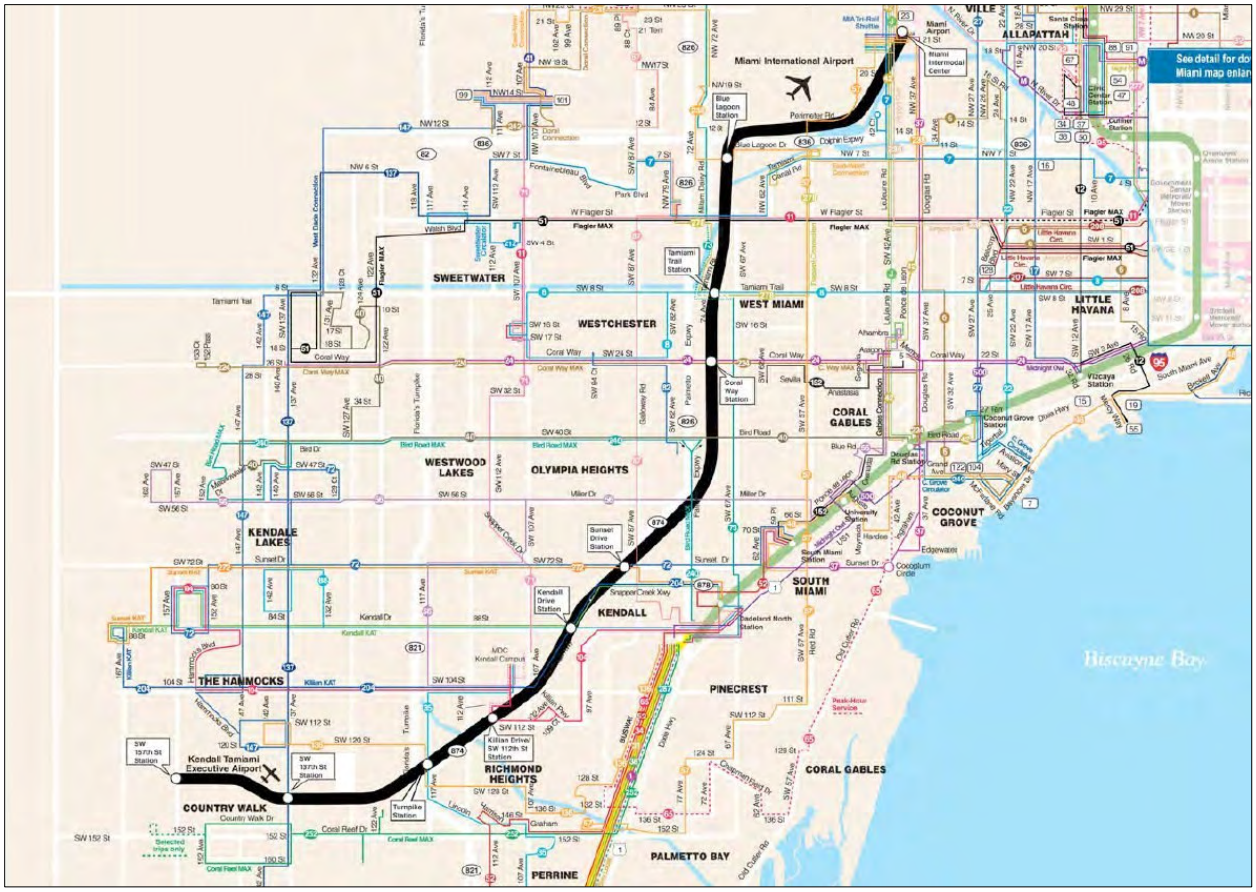


Figure 11.18: Prototype Tri-Rail DMU Vehicle

D1 – SW 137th Avenue Center-Lane BRT between the SW 152nd Avenue / SW 117th Avenue Park-and-Ride and FIU Metrorail Station

Alternative D1 provides BRT service within an exclusive center-lane from the SW 152nd Street / SW 117th Avenue Park-and-Ride to the planned FIU Metrorail Station. Placing exclusive lanes within the median would significantly impact vehicular traffic operations along SW 137th Avenue. Most of the existing left-turn lanes would need to be eliminated to provide space within the road right-of-way for the exclusive lane and stations. Removing left-turn lanes would also minimize potential conflicts from cars and trucks turning across the path of BRT vehicles.

Fares for the service would be the same as Metrorail (currently $1.50) and customer parking would be free of charge should space be available. Service could operate throughout the day, with frequent service during peak periods. Inbound service would travel west within the exclusive center-lane on SW 152nd Street from the SW 152nd Street / SW 117th Avenue Park-and-Ride to SW 137th Avenue. The BRT vehicles would then turn north within the exclusive center-lane on SW 137th Avenue. The route would then turn east on Coral Way, cross over the HEFT, turn north on SW 115th Avenue, west on SW 24th Street and then north on SW 117th Avenue to the terminal at the FIU Metrorail Station. Outbound service would follow the same route in reverse, making all twelve stops along the way to the SW 152nd Avenue / SW 117th Avenue Park-and-Ride.

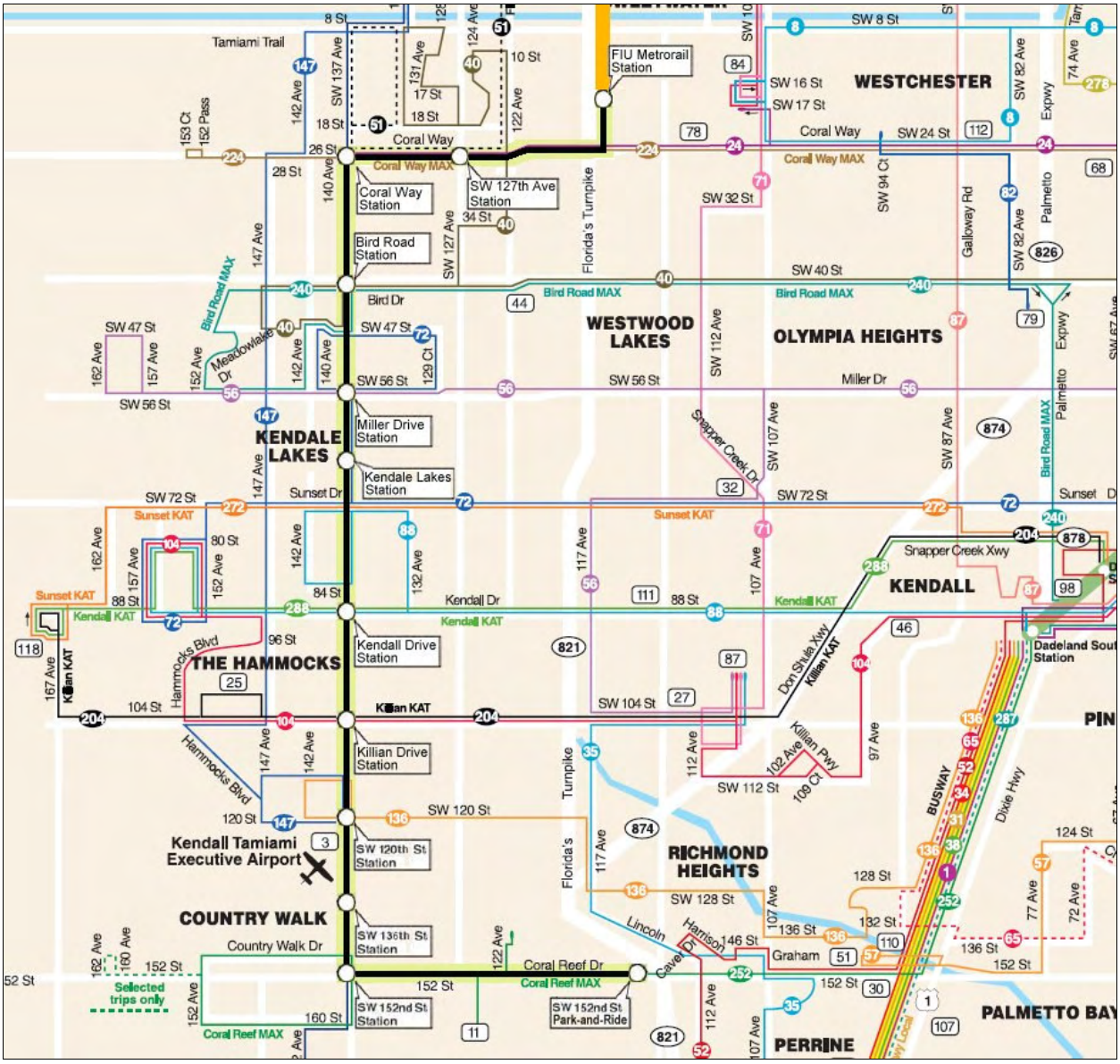
Table 11.19: Alternative D1 Weekday Headways (minutes)

EARLY AM	AM PEAK	MID-DAY	PM PEAK	EVENING	OVERNIGHT
20	6	10	6	10	60

Table 11.20: Alternative D1 Running Times:

STATION	CUM. MILEAGE	ARRIVE	DWELL TIME	DEPART
FIU Metrorail	0.00	-	-	0:00:00
SW 127th Avenue	1.43	0:04:55	0:00:30	0:05:25
Coral Way	2.43	0:08:04	0:00:30	0:08:34
Bird Road	3.42	0:10:42	0:00:30	0:11:12
Miller Road	4.43	0:13:51	0:00:30	0:14:21
Kendale Lakes / SW 66th Street	5.06	0:17:01	0:00:30	0:17:31
Kendall Drive	6.45	0:21:41	0:00:30	0:22:11
Killian Drive	7.45	0:24:50	0:00:30	0:25:20
SW 120th Street	8.45	0:27:59	0:00:30	0:28:29
SW 136th Street	9.49	0:31:11	0:00:30	0:31:41
SW 152nd Street	10.51	0:34:22	0:00:30	0:34:52
SW 152nd Street Park and Ride	12.63	0:40:29	-	-

Figure 11.19: Alternative D1 and Connecting Bus Service



12 Tier II Ridership Forecasting

Each of the Tier II alternatives were evaluated using the Bi-County Travel Demand Model. This model was recently revised and is being used to prepare ridership projections for the East-West and North Metrorail Corridor Studies and has been reviewed by the Federal Transit Administration (FTA). The 2030 planning horizon is consistent with the adopted Miami-Dade County MPO Long Range Transportation Plan (LRTP). Additions were made to the 2030 transportation network to represent the various model alternatives.

This section describes the results of the ridership forecasts for the proposed transit service alternatives. The travel demand forecasting methodology was described in Section 1.6. The model was developed to a much higher level of detail. Walk-access links were added to all station locations to account for bicycle and pedestrian trips. Bus routes were realigned so as to better serve the proposed stations in each of the alternatives. Finally, Ridership projections recalculated with $2 parking at Metrorail stations and free parking at all other stations

The following summary table lists the projected daily riders and the maximum transit line loads. The Bi-County model generates figures for travel throughout the region on various modes such as by auto, bus, and rail. The model provides a value for the number of riders who board and alight at each of the proposed stations during both the peak and off-peak periods. These figures are calculated as the number of people who drive, use a connecting transit service or walk to the station. As passengers board or exit the transit vehicle, a running total number of riders can be generated. This allows for the calculation of the total daily riders projected who would utilize the proposed services in 2030. The maximum load represents the point along the transit line where the greatest numbers of riders are projected to pass through. For instance, the peak inbound maximum load for alternative A1 is 3,627 riders which occurs at the proposed SW 79th Avenue station.

Table 12.1: Projected Daily Riders and Maximum Transit Line Loads

	A1 KENDALL BRT	A2 KENDALL BRT	A3 KENDALL BRT	A4 KENDALL METRORAIL	B1 HEFT METRORAIL	C2 CSX DMU	C3 CSX DMU	C4 CSX DMU	C5 CSX DMU	D1 SW 137 BRT
Peak Inbound										
Total Riders	4,449	2,829	2,534	9,968	7,890	463	1,144	1,663	1,555	3,120
Maximum Load	3,627	2,135	2,227	8,708	6,317	413	838	1,210	1,142	2,626
Peak Outbound										
Total Riders	1,033	369	240	231	168	53	168	268	259	562
Maximum Load	760	186	170	899	650	44	119	160	157	230
Off-Peak Inbound										
Total Riders	3,921	2,567	950	4,714	3,708	69	444	850	847	2,721
Maximum Load	2,373	1,029	487	3,277	2,306	61	286	489	489	1,441
Off-Peak Outbound										
Total Riders	645	1,276	2,110	652	499	15	156	302	356	1,382
Maximum Load	1,147	340	1,237	1,198	1,014	12	90	168	211	600
Daily Trips	10,048	7,041	5,834	15,565	12,265	600	1,912	3,083	3,017	7,785

The proposed fare structure is also an important factor in ridership forecasting, as it effects how people make travel choices. Fares for BRT Alternatives (A1- A3 and D1) were modeled at the current Metrobus fare of $1.50 and customer parking was free of charge. Service would operate on a 19 hour schedule with frequent service during peak periods. Fares for Metrorail Alternatives (A4 and B1) were set to the existing $1.50 fare. Customer parking fees were set to the $4.00 per day currently charged at Metrorail stations. Service would operate from 5:00am to 12:00am on weekdays with frequent service during peak periods. The DMU Alternatives (C2-C5) were also set to the existing $1.50 Metrorail fare, but free customer parking was provided at the Killian Drive, Turnpike and MetroZoo stations.

Alternative A4, the Kendall Drive Metrorail and Alternative B1, the HEFT Metrorail are projected to have the highest ridership with 15,565 and 12,265 daily trips respectively. A1 the Kendall Drive BRT and D1 the SW 137th Avenue BRT are projected also projected to carry a significant number of riders with daily ridership of 10,048 for A1 and 7,785 on D1. The five DMU alternatives along the CSX corridor are projected to carry the least riders. To make additional judgments on the merit of each alternative, it is instructive to compare the estimated capital costs with the projected user benefits of each alternative.

The following tables detail the results of the Tier II ridership forecasting for each of the alternatives. Both the outbound and inbound boarding and alighting values are listed for each station in the tables. Three formatting notations highlight points of information within the tables.

- Alignment Continued Outside of Project Extent
- Max On/Off
- Maximum Load Point

Grey shading denotes stations that are along the transit line's alignment, but outside of the proposed project extent. For instance, the Kendall Metrorail is proposed to operate as an extension of the existing Metrorail line and would therefore operate from SW 157th Avenue, through Dadeland North and on to Government Center and beyond. The stations beyond Dadeland North are along the transit line's alignment, but outside of the study area. The Max On/Off points are denoted by a yellow highlight. These are the station locations that experience the highest boarding or alighting activity along the transit line and/or within the study area extents. The maximum load point along the transit corridor that is projected to carry the greatest number of passengers.

Table 12.2: Alternative A1 Peak Period Transit Line Loads

			DADELAND SOUTH TO SW 167TH			SW 167TH TO DADELAND SOUTH		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	6103	Dadeland South	305	0	0	0	90	90
2	6101	Dadeland Mall	433	3	305	1	3415	3504
3	6097	SW 79th Ave	28	3	735	2	125	3627
4	6090	Baptist Hospital	66	87	760	263	118	3482
5	6084	874 Intermodal	18	265	739	131	191	3542
6	6078	SW 107th Ave	17	62	492	113	83	3512
7	6071	SW 117th Ave	54	115	447	630	114	2996
8	8200	HEFT Intermodal	22	133	386	227	112	2881
9	6065	SW 122nd Ave	29	71	275	447	70	2504
10	6067	SW 127th Ave	12	16	233	182	16	2338
11	6057	SW 137th Ave	15	117	229	803	87	1622
12	6051	SW 147th Ave	19	42	127	511	17	1128
13	6047	SW 152nd Ave	1	14	104	319	3	812
14	6046	SW 157th Ave	13	46	91	524	4	292
15	6042	SW 162nd Ave	1	23	58	37	4	259
16	6041	SW 167th Ave	0	36	36	259	0	0

Table 12.3: Alternative A1 Off- Peak Period Transit Line Loads

			DADELAND SOUTH TO SW 167TH			SW 167TH TO DADELAND SOUTH		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	6103	Dadeland South	509	0	0	0	331	331
2	6101	Dadeland Mall	645	7	509	12	1655	1974
3	6097	SW 79th Ave	134	180	1147	42	433	2365
4	6090	Baptist Hospital	123	118	1101	196	204	2373
5	6084	874 Intermodal	87	269	1106	311	171	2233
6	6078	SW 107th Ave	41	74	924	142	68	2159
7	6071	SW 117th Ave	188	305	891	670	319	1808
8	8200	HEFT Intermodal	70	229	774	282	195	1721
9	6065	SW 122nd Ave	79	154	615	345	150	1526
10	6067	SW 127th Ave	45	48	540	107	49	1468
11	6057	SW 137th Ave	107	294	537	647	218	1039
12	6051	SW 147th Ave	73	95	350	364	66	741
13	6047	SW 152nd Ave	22	93	328	222	27	546
14	6046	SW 157th Ave	27	99	257	277	21	290
15	6042	SW 162nd Ave	9	68	185	69	14	235
16	6041	SW 167th Ave	0	126	126	235	0	0

Table 12.4: Alternative A2a Peak Period Transit Line Loads

			DADELAND NORTH TO SW 167TH			SW 167TH TO DADELAND NORTH		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	6110	Dadeland North	0	0	0	0	2012	2012
2	6084	874 Intermodal	26	0	0	0	123	2135
3	6078	SW 107th Ave	38	3	26	324	82	1893
4	6071	SW 117th Ave	18	23	61	149	88	1832
5	6065	SW 122nd Ave	23	12	56	298	26	1560
6	6067	SW 127th Ave	9	5	67	136	16	1440
7	6057	SW 137th Ave	13	34	71	493	60	1007
8	6051	SW 147th Ave	14	13	50	267	12	752
9	6047	SW 152nd Ave	3	11	51	221	2	533
10	6046	SW 157th Ave	5	17	43	355	1	179
11	6042	SW 162nd Ave	0	19	31	28	4	155
12	6041	SW 167th Ave	0	12	12	155	0	0

Table 12.5: Alternative A2a Off-Peak Period Transit Line Loads

			DADELAND NORTH TO SW 167TH			SW 167TH TO DADELAND NORTH		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	6110	Dadeland North	277	0	0	0	1008	1008
2	6084	874 Intermodal	58	18	277	48	69	1029
3	6078	SW 107th Ave	127	104	317	323	192	898
4	6071	SW 117th Ave	43	108	340	143	124	879
5	6065	SW 122nd Ave	52	58	275	169	88	798
6	6067	SW 127th Ave	31	29	269	61	39	776
7	6057	SW 137th Ave	74	154	271	315	132	593
8	6051	SW 147th Ave	44	44	191	187	36	442
9	6047	SW 152nd Ave	10	56	191	130	14	326
10	6046	SW 157th Ave	19	62	145	176	12	162
11	6042	SW 162nd Ave	8	38	102	39	12	135
12	6041	SW 167th Ave	0	72	72	135	0	0

Table 12.6: Alternative A2b Peak Period Transit Line Loads

			DADELAND SOUTH TO SW 167TH			SW 167TH TO DADELAND SOUTH		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	6103	Dadeland South	175	0	0	0	161	161
2	6084	874 Intermodal	7	0	175	2	77	236
3	6078	SW 107th Ave	17	13	182	36	43	243
4	6071	SW 117th Ave	4	76	186	23	48	268
5	6065	SW 122nd Ave	8	33	114	36	14	246
6	6067	SW 127th Ave	2	6	89	18	5	233
7	6057	SW 137th Ave	1	54	85	86	44	191
8	6051	SW 147th Ave	4	8	32	71	7	127
9	6047	SW 152nd Ave	0	4	28	34	2	95
10	6046	SW 157th Ave	2	14	24	64	0	31
11	6042	SW 162nd Ave	0	8	12	3	2	30
12	6041	SW 167th Ave	0	4	4	30	0	0

Table 12.7: Alternative A2b Off-Peak Period Transit Line Loads

			DADELAND SOUTH TO SW 167TH			SW 167TH TO DADELAND SOUTH		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	6103	Dadeland South	276	0	0	0	361	361
2	6084	874 Intermodal	21	15	276	14	39	386
3	6078	SW 107th Ave	82	71	282	89	141	438
4	6071	SW 117th Ave	24	106	293	85	76	429
5	6065	SW 122nd Ave	29	46	211	97	52	384
6	6067	SW 127th Ave	16	22	194	31	12	365
7	6057	SW 137th Ave	45	119	188	175	106	296
8	6051	SW 147th Ave	20	30	114	98	29	227
9	6047	SW 152nd Ave	8	26	104	74	11	164
10	6046	SW 157th Ave	9	36	86	80	7	91
11	6042	SW 162nd Ave	3	18	59	17	7	81
12	6041	SW 167th Ave	0	44	44	81	0	0

Table 12.8: Alternative A3 Peak Period Transit Line Loads

			DADELAND NORTH TO SW 167TH			SW 167TH TO DADELAND NORTH		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	6110	Dadeland North	111	0	0	0	2125	2125
2	6084	874 Intermodal	21	0	111	0	102	2227
3	6078	SW 107th Ave	41	3	132	339	71	1959
4	6071	SW 117th Ave	18	60	170	156	98	1901
6	6065	SW 122nd Ave	22	34	128	313	41	1629
7	6067	SW 127th Ave	6	9	116	140	8	1497
8	6057	SW 137th Ave	10	61	113	507	65	1055
9	6051	SW 147th Ave	6	13	62	274	15	796
10	6047	SW 152nd Ave	1	8	55	238	0	558
11	6046	SW 157th Ave	4	20	48	378	4	184
12	6042	SW 162nd Ave	0	18	32	28	5	161
13	6041	SW 167th Ave	0	14	14	161	0	0

Table 12.9: Alternative A3 Off-Peak Period Transit Line Loads

			DADELAND NORTH TO SW 167TH			SW 167TH TO DADELAND NORTH		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	6110	Dadeland North	168	0	0	0	69	69
2	6084	874 Intermodal	48	14	168	7	46	108
3	6078	SW 107th Ave	205	19	202	20	84	172
4	6071	SW 117th Ave	168	8	388	8	61	225
6	6065	SW 122nd Ave	226	53	548	49	55	231
7	6067	SW 127th Ave	387	177	721	80	199	350
8	6057	SW 137th Ave	79	43	931	26	37	361
9	6051	SW 147th Ave	216	102	967	61	77	377
10	6047	SW 152nd Ave	192	187	1081	62	172	487
11	6046	SW 157th Ave	365	215	1086	147	131	471
12	6042	SW 162nd Ave	56	55	1236	45	19	445
13	6041	SW 167th Ave	0	1237	1237	445	0	0

Table 12.10: Alternative A4 Peak Period Transit Line Loads

			FIU TO SW 157TH			SW 157TH TO FIU		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	4238	FIU	945	0	0	0	97	97
2	4909	NW 107th Ave	1660	20	945	3	712	806
3	4912	NW 97th Ave	1992	19	2585	11	376	1171
4	22321	NW 87th Ave	814	327	4558	36	904	2039
5	8071	NW 7th St	697	248	5045	64	1226	3201
6	7300	Blue Lagoon	143	64	5494	15	223	3409
7	22303	NW 57th Ave	336	231	5573	60	788	4137
8	4940	NW 42nd Ave	340	264	5678	141	400	4396
9	3684	MIC	1077	607	5754	258	2522	6660
10	4693	Earlington Heights	413	875	6224	2305	717	5072
11	4716	Allapattah	1392	813	5762	1133	725	4664
12	4856	Santa Clara	119	180	6341	127	223	4760
13	4977	Civic Center	161	1072	6280	110	1419	6069
14	4993	Culmer	172	128	5369	140	12	
15	5248	Overtown/Arena	169	248	5413	395	189	6015
16	5259	Govt' Ctr	775	2731	5334	641	4952	10326
17	5696	Brickell	773	1222	3378	779	1603	11150
18	5681	Vizcaya	203	270	2929	478	386	11058
19	5809	Coconut Grove	137	489	2862	668	437	10827
20	5939	Douglas Road	119	1153	2510	919	1046	10954
21	6027	University	19	327	1476	154	284	11084
22	6009	South Miami	38	400	1168	478	435	11041
23	6110	Dadeland North	264	171	806	1974	200	9267
24	6097	SW 79th Ave	49	152	899	683	124	8708
25	6090	Baptist Hospital	27	242	796	350	187	8545
26	6084	874 Intermodal	10	85	581	287	21	8279
27	6078	SW 107th Ave	72	145	506	1298	130	7111
28		SW 117th Ave	25	158	433	656	127	6582
29	6067	SW 127th Ave	18	41	300	971	31	5642
30	6057	SW 137th Ave	23	154	277	2360	76	3358
31	6051	SW 147th Ave	7	56	146	1318	5	2045
32	6046	SW 157th Ave	0	97	97	2045	0	0

Table 12.11: Alternative A4 Off-Peak Period Transit Line Loads

			FIU TO SW 157TH			SW 157TH TO FIU		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	4238	FIU	285	0	0	0	412	412
2	4909	NW 107th Ave	1466	25	285	63	718	1067
3	4912	NW 97th Ave	840	27	1726	29	249	1287
4	22321	NW 87th Ave	975	428	2539	175	806	1918
5	8071	NW 7th St	1157	446	3086	185	1159	2892
6	7300	Blue Lagoon	286	99	3797	69	167	2990
7	22303	NW 57th Ave	1242	213	3984	387	454	3057
8	4940	NW 42nd Ave	244	200	5013	193	149	3013
9	3684	MIC	1557	1497	5057	383	5008	7638
10	4693	Earlington Heights	425	787	5117	2640	461	5459
11	4716	Allapattah	625	340	4755	801	339	4997
12	4856	Santa Clara	176	246	5040	127	278	5148
13	4977	Civic Center	726	775	4970	461	991	5678
14	4993	Culmer	531	161	4921	378	246	5546
15	5248	Overtown/Arena	219	259	5291	353	193	5386
16	5259	Govt' Ctr	916	2739	5251	1797	1918	5507
17	5696	Brickell	597	1147	3428	702	834	5639
18	5681	Vizcaya	52	174	2878	250	61	5450
19	5809	Coconut Grove	208	590	2756	934	342	4858
20	5939	Douglas Road	264	939	2374	1160	660	4358
21	6027	University	79	377	1699	357	223	4224
22	6009	South Miami	106	409	1401	549	312	3987
23	6110	Dadeland North	379	279	1098	929	398	3456
24	6097	SW 79th Ave	104	122	1198	345	166	3277
25	6090	Baptist Hospital	70	254	1180	346	154	3085
26	6084	874 Intermodal	29	99	996	232	54	2907
27	6078	SW 107th Ave	173	309	926	787	276	2396
28		SW 117th Ave	76	245	790	359	208	2245
29	6067	SW 127th Ave	70	127	621	326	116	2035
30	6057	SW 137th Ave	106	329	564	875	235	1395
31	6051	SW 147th Ave	24	124	341	563	49	881
32	6046	SW 157th Ave	0	241	241	881	0	0

Table 12.12: Alternative B1 Peak Period Transit Line Loads

			SW 152ND TO SW 104TH			SW 104TH TO SW 152ND		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	6307	SW 152nd Street	2581	0	0	0	208	208
2	6198	SW 120th Street	209	18	2581	8	44	244
3	6151	Killian Pkwy	708	30	2772	18	32	258
4	6071	Kendall Drive	1979	161	3450	59	181	380
5	5974	Sunset Drive	1176	127	5268	31	112	461
6	5723	Bird Rd	1237	198	6317	52	241	650
7	4238	FIU	596	90	7356	35	86	701
8	4909	NW 107th Ave	1894	413	7862	102	617	1216
9	4912	NW 97th Ave	1523	121	9343	59	248	1405
10	22321	NW 87th Ave	753	975	10745	62	771	2114
11	8071	NW 7th St	732	651	10523	93	1001	3022
12	7300	Blue Lagoon	142	151	10604	22	181	3181
13	22303	NW 57th Ave	340	548	10595	66	643	3758
14	4940	NW 42nd Ave	332	552	10387	164	333	3927
15	3684	MIC	983	1137	10167	243	2181	5865
16	4693	Earlington Heights	345	1535	10013	2252	250	3863
17	4716	Allapattah	1248	1255	8823	1154	475	3184
18	4856	Santa Clara	123	260	8816	128	142	3198
19	4977	Civic Center	143	1577	8679	113	897	3982
20	4993	Culmer	149	200	7245	146	206	4042
21	5248	Overtown/Arena	149	340	7194	405	117	3754
22	5259	Govt' Ctr	699	4053	7003	649	2831	5936
23	5696	Brickell	760	1514	3649	759	1047	6224
24	5681	Vizcaya	192	330	2895	481	274	6017
25	5809	Coconut Grove	129	508	2757	649	326	5694
26	5939	Douglas Road	118	1166	2378	868	777	5603
27	6027	University	19	348	1330	155	220	5668
28	6009	South Miami	36	390	1001	394	314	5588
29	6110	Dadeland North	54	311	647	3352	80	2316
30	6103	Dadeland South	1	204	390	690	2	1628
31	6167	SW 104th Street	0	187	187	1628	0	0

Table 12.13: Alternative B1 Off-Peak Period Transit Line Loads

			SW 152ND TO SW 104TH			SW 104TH TO SW 152ND		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	6307	SW 152nd Street	1072	0	0	0	294	294
2	6198	SW 120th Street	201	36	1072	14	87	367
3	6151	Killian Pkwy	501	121	1237	33	258	592
4	6071	Kendall Drive	685	259	1617	132	321	781
5	5974	Sunset Drive	425	162	2043	138	181	824
6	5723	Bird Rd	824	303	2306	182	372	1014
7	4238	FIU	185	194	2827	64	328	1278
8	4909	NW 107th Ave	1582	338	2818	254	705	1729
9	4912	NW 97th Ave	566	61	4062	65	94	1758
10	22321	NW 87th Ave	865	602	4567	241	643	2160
11	8071	NW 7th St	1132	833	4830	262	1035	2933
12	7300	Blue Lagoon	275	151	5129	93	148	2988
13	22303	NW 57th Ave	1243	247	5253	395	412	3005
14	4940	NW 42nd Ave	245	297	6249	214	167	2958
15	3684	MIC	1499	1832	6197	392	4815	7381
16	4693	Earlington Heights	326	1053	5864	2692	277	4966
17	4716	Allapattah	476	397	5137	758	232	4440
18	4856	Santa Clara	144	265	5216	130	235	4545
19	4977	Civic Center	574	757	5095	459	777	4863
20	4993	Culmer	436	159	4912	361	201	4703
21	5248	Overtown/Arena	193	240	5189	330	164	4537
22	5259	Govt' Ctr	763	2773	5142	1719	1504	4322
23	5696	Brickell	486	1138	3132	645	668	4345
24	5681	Vizcaya	40	163	2480	231	59	4173
25	5809	Coconut Grove	180	541	2357	864	276	3585
26	5939	Douglas Road	214	882	1996	979	537	3143
27	6027	University	59	323	1328	320	175	2998
28	6009	South Miami	71	378	1064	462	228	2764
29	6110	Dadeland North	109	310	757	1224	115	1655
30	6103	Dadeland South	8	233	556	513	5	1147
31	6167	SW 104th Street	0	331	331	1147	0	0

Table 12.14: Alternative C2 Peak Period Transit Line Loads

			MIC TO MIAMI METROZOO READ DOWN			MIAMI METROZOO TO MIC READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	22462	MIC	25	0	0	0	227	227
2	22465	Blue Lagoon	19	0	25	0	186	413
3	22467	Coral Way	8	28	44	60	45	398
4	22472	Turnpike	1	10	24	42	5	361
5	22473	MetroZoo	0	15	15	361	0	0

Table 12.15: Alternative C2 Off-Peak Period Transit Line Loads

			MIC TO MIAMI METROZOO READ DOWN			MIAMI METROZOO TO MIC READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	22462	MIC	7	0	0	0	24	24
2	22465	Blue Lagoon	0	0	7	0	25	49
3	22467	Coral Way	1	2	7	0	12	61
4	22472	Turnpike	7	1	6	10	8	59
5	22473	MetroZoo	0	12	12	59	0	0

Table 12.16: Alternative C3 Peak Period Transit Line Loads

			MIC TO MIAMI METROZOO READ DOWN			MIAMI METROZOO TO MIC READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	22462	MIC	63	0	0	0	435	435
2	22465	Blue Lagoon	26	0	63	0	377	812
3	22466	Tamiami Trail	36	6	89	75	101	838
4	22467	Coral Way	11	65	119	92	91	837
5	22469	Sunset Drive	13	9	65	125	74	786
6	22470	Kendall Drive	7	23	69	79	49	756
7	22471	Killian Drive	8	9	53	138	8	626
8	22472	Turnpike	4	19	52	58	9	577
9	22473	MetroZoo	0	37	37	577	0	0

Table 12.17: Alternative C3 Off-Peak Period Transit Line Loads

			MIC TO MIAMI METROZOO			MIAMI METROZOO TO MIC		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	22462	MIC	37	0	0	0	131	131
2	22465	Blue Lagoon	29	0	37	0	85	216
3	22466	Tamiami Trail	20	0	66	10	47	253
4	22467	Coral Way	27	33	86	59	73	267
5	22469	Sunset Drive	21	11	80	33	52	286
6	22470	Kendall Drive	8	14	90	29	15	272
7	22471	Killian Drive	7	34	84	95	22	199
8	22472	Turnpike	7	19	57	25	19	193
9	22473	MetroZoo	0	45	45	193	0	0

Table 12.18: Alternative C4 Peak Period Transit Line Loads

			MIC TO MIAMI METROZOO			MIAMI METROZOO TO MIC		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	22462	MIC	115	0	0	0	656	656
2	22465	Blue Lagoon	40	0	115	0	554	1210
3	22466	Tamiami Trail	48	43	155	166	145	1189
4	22467	Coral Way	15	91	160	117	110	1182
5	22469	Sunset Drive	23	11	84	179	108	1111
6	22470	Kendall Drive	12	39	96	152	62	1021
7	22471	Killian Drive	9	18	69	223	16	814
8	22472	Turnpike	6	20	60	101	12	725
9	22473	MetroZoo	0	46	46	725	0	0

Table 12.19: Alternative C4 Off-Peak Period Transit Line Loads

			MIC TO MIAMI METROZOO			MIAMI METROZOO TO MIC		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	22462	MIC	71	0	0	0	290	290
2	22465	Blue Lagoon	89	0	71	0	199	489
3	22466	Tamiami Trail	26	18	160	107	75	457
4	22467	Coral Way	27	74	168	111	105	451
5	22469	Sunset Drive	53	23	121	71	97	477
6	22470	Kendall Drive	10	20	151	64	26	439
7	22471	Killian Drive	14	78	141	159	33	313
8	22472	Turnpike	12	24	77	71	25	267
9	22473	MetroZoo	0	65	65	267	0	0

Table 12.20: Alternative C5 Peak Period Transit Line Loads

			MIC TO SW 157TH AVENUE			SW 157TH AVENUE TO MIC		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	22462	MIC	104	0	0	0	652	652
2	22465	Blue Lagoon	53	0	104	0	490	1142
3	22466	Tamiami Trail	37	38	157	210	133	1065
4	22467	Coral Way	19	81	156	113	102	1054
5	22469	Sunset Drive	17	24	94	169	85	970
6	22470	Kendall Drive	7	40	87	135	44	879
7	22471	Killian Drive	18	14	54	194	15	700
8	22472	Turnpike	4	19	58	108	11	603
9	22479	SW 137th Avenue	0	43	43	331	23	295
10	22480	SW 157th Avenue	0	0	0	295	0	0

Table 12.21: Alternative C5 Off-Peak Period Transit Line Loads

			MIC TO SW 157TH AVENUE			SW 157TH AVENUE TO MIC		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	22462	MIC	90	0	0	0	287	287
2	22465	Blue Lagoon	114	0	90	0	202	489
3	22466	Tamiami Trail	35	28	204	126	57	420
4	22467	Coral Way	34	110	211	107	104	417
5	22469	Sunset Drive	43	24	135	70	100	447
6	22470	Kendall Drive	7	19	154	61	21	407
7	22471	Killian Drive	16	79	142	149	27	285
8	22472	Turnpike	15	27	79	56	23	252
9	22479	SW 137th Avenue	2	64	67	174	26	104
10	22480	SW 157th Avenue	0	5	5	104	0	0

Table 12.22: Alternative D1 Peak Period Transit Line Loads

			FIU METRORAIL TO SW 152ND			SW 152ND TO FIU METRORAIL		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	4238	FIU Metrorail	186	0	0	0	2626	2626
2	5568	SW 127th Avenue	42	50	186	368	142	2400
3	5561	Coral Way	53	28	178	295	28	2133
4	5712	Bird Road	34	36	203	285	64	1912
5	5869	Miller Road	52	23	201	250	46	1708
6	7333	Kendale Lakes / SW 66th Street	37	40	230	424	28	1312
7	6057	Kendall Drive	64	75	227	487	71	896
8	6142	Killian Drive	64	42	216	302	31	625
9	6189	SW 120th Street	14	55	238	136	30	519
10	6244	SW 136th Street	0	99	197	113	44	450
11	6294	SW 152nd Street	16	16	98	129	10	331
12	6303	SW 152nd Street Park and Ride	0	98	98	331	0	0

Table 12.23: Alternative D1 Off-Peak Period Transit Line Loads

			FIU METRORAIL TO SW 152ND			SW 152ND TO FIU METRORAIL		
			READ DOWN			READ UP		
	NODE	STATION	ON	OFF	LOAD	ON	OFF	LOAD
1	4238	FIU Metrorail	356	0	0	0	1441	1441
2	5568	SW 127th Avenue	109	95	356	286	241	1396
3	5561	Coral Way	97	58	370	227	108	1277
4	5712	Bird Road	125	65	409	206	144	1215
5	5869	Miller Road	146	72	469	177	130	1168
6	7333	Kendale Lakes / S W 66th Street	211	154	543	356	175	987
7	6057	Kendall Drive	150	262	600	339	224	872
8	6142	Killian Drive	83	159	488	324	97	645
9	6189	SW 120th Street	55	127	412	188	63	520
10	6244	SW 136th Street	14	162	340	103	65	482
11	6294	SW 152nd Street	36	78	192	193	33	322
12	6303	SW 152nd Street Park and Ride	0	150	150	322	0	0

13 Tier II Detailed Operations and Maintenance Costs

The detailed service plans presented in Section 11 generated a number of inputs that are important to the development of the operations and maintenance (O&M) costs. The cumulative mileage is used to develop a figure for roundtrip distance. The round trip running time figure is calculated to include deceleration and acceleration time spent while making station stops, an average boarding and alighting time, and delays due to time spent stopped at intersections. Total travel time is used to calculate the roundtrip travel time and the vehicle cycle time. Using these figures and the planned peak headway, we are able to calculate the total number of trips. The value for vehicle service hours (VSH) is a function of cycle time multiplied by the total number of trips. Vehicle service miles (VSM) are calculated as the product of roundtrip distance and total number of trips. The peak vehicle requirement (PVR) value is a function of cycle time over peak headway. Finally, we arrive at a value for annual operating costs with the following function;

$$\text{Annual Operating Cost} = \text{VSH} * \text{unit cost}_{\text{VSH}} + \text{VSM} * \text{unit cost}_{\text{VSM}} + \text{PVR} * \text{unit cost}_{\text{PVR}}$$

Unit costs are based on 2006 year estimates developed using both Miami-Dade Transit and National Transportation Database figures. The following tables detail the projected operating costs and the component figures for each of the model alternatives.

Table 13.1 details the projected O&M costs for the four Kendall Drive alternatives. Annual costs for the three BRT alternatives range between $4.6 million and $5.2 million. The variation is due to the different service plans, travel times and number of required vehicles. The extremely high expenditure required to operate heavy rail transit systems is reflected in the projected $18.8 million annual O&M cost for the Kendall Metrorail option. The B1 HEFT Metrorail option was evaluated along a longer route than the Kendall Metrorail and is projected to require $19.7 million per year to operate.

Table 13.1: Operating Costs for Kendall Drive Alternatives

	A1	A2	A3	A4
Weekday Headways (mins)				
Peak	5	10	5	12
Off-Peak	10	20	10	20
Round Trip Running Time (mins)	58	56	56	33.6
Cycle Time (mins)	65	60	60	40
Round Trip Distance (miles)	20.1	20.6	20.6	17.5
Consist Length	1.0	1.0	1.0	4.7
Peak Vehicle Requirement	13	14	12	16
Annual Operating Costs (millions)	$4.8	$5.2	$4.6	$18.8

Table 13.2: Operating Costs for the HEFT Corridor Alternative

	B1
Weekday Headways (mins)	
Peak	12
Off-Peak	20
Round Trip Running Time (mins)	29
Cycle Time (mins)	40
Round Trip Distance (miles)	18.9
Consist Length	4.7
Peak Vehicle Requirement	16
Annual Operating Costs (millions)	$19.7

Table 13.3 lists the O&M costs for the CSX Corridor alternatives. Option C2 would provide DMU service to 5 stations along the CSX corridor at 30 minute peak headways at an annual cost of $5.2 million. Alternative C3 would operate at 20 minute peak headways and serve 9 stations at an O&M cost of $7.7 million per year. Both the C4 and C5 DMU options would provide 15 minute peak period headway service for approximately $12 million per year. Table 13.4 details the proposed BRT service along SW 137th Avenue. Projected O&M costs for alternative D1 are approximately $6.5 million per year. This figure is slightly higher than the Kendall Drive BRT options due to the longer length of the corridor.

Table 13.3: Operating Costs for the CSX Corridor Alternatives

	C2	C3	C4	C5
Weekday Headways (mins)				
Peak	30	20	15	15
Off-Peak	60	60	30	30
Round Trip Running Time (mins)	50	62	62	69
Cycle Time (mins)	60	75	75	75
Round Trip Distance (miles)	36.8	36.8	36.8	39.4
Consist Length	2.0	2.0	2.0	2.0
Peak Vehicle Requirement	4	7.5	10	10
Annual Operating Costs (millions)	$5.2	$7.7	$12.0	$12.2

Table 13.4: Operating Costs for the SW 137th Avenue Alternative

	D1
Weekday Headways (mins)	
Peak	5
Off-Peak	10
Round Trip Running Time (mins)	81
Cycle Time (mins)	90
Round Trip Distance (miles)	25
Consist Length	1
Peak Vehicle Requirement	20
Annual Operating Costs (millions)	$6.5

Table 13.5: Operating Cost Summary

	KENDALL DRIVE	HEFT	CSX CORRIDOR	SW 137TH AVE
BRT				
A1 – BRT	$4.8			
A2 – BRT	$5.2			
A3 – BRT	$4.6			
D1 – BRT				$6.5
DMU				
C2 - DMU @ 30 Mins			$5.2	
C3 - DMU @ 20 Mins			$7.7	
C4 - DMU @ 15 Mins			$12.0	
C5 - DMU @ 15 Mins			$12.2	
Metrorail				
A4 – Metrorail	$18.8			
B1 – Metrorail		$19.7		

14 Tier II Detailed Capital Costs

Guidance contained in *Procedures and Technical Method for Transit Project Planning*, Section II.3, Estimation of Capital Costs, Federal Transit Administration, September 1990, as revised, was used in preparing this estimate. The capital costs presented below have been developed to a level of detail appropriate for the concept-level work performed in this study. The capital costs are limited by the level of design detail that was available at this stage of project development. Similarly, cost estimates are also limited in their accuracy to a conceptual level of detail and are appropriate for comparative analysis purposes. A preliminary engineering design would be required to refine the capital cost estimates of any alternative that advances to the next phase.

Capital costs are generated by evaluating several aspects of the proposed services. Each value listed in the tables below is generated by multiplying a unit cost by a figure such as the number of stations or linear feet of track. Unit costs are based on 2006 year estimates developed using both Miami-Dade Transit and National Transportation Database data.

Each of the proposed services will require a particular number of vehicles to operate at the proposed headways. The total number of vehicles required to operate the services was generated in the previous section of operating cost calculations. The number of transit centers or stations is detailed in the alternatives descriptions and is used to develop an estimation for the number of park and ride spaces. The figures for guideway items include values such as exclusive BRT lanes, transit signal priority systems, rail signal systems, grade crossing protection, structures and power systems. The value for maintenance facilities is based on the number of required vehicles. In order to anticipate potential variances in assumptions made in the order-of-magnitude costs and actual implementation costs, a contingency cost is included.

No right-of-way costs were assumed for the BRT or Metrorail guideway alternatives given that each is proposed to operate within existing public alignments. A right-of-way cost of $25 million was assumed for each of the CSX corridor concepts. A formal agreement with CSX Transportation, Inc will be required before the actual lease or acquisition cost of the right-of-way can be determined. The $25 million cost is based upon the results of similar agreements from a selection of similar projects from around the country. A property acquisition cost is assumed at stations for parking. More detailed information on environmental mitigation, community integration and potential property needs will need to be quantified in the next phase of design to further refine costs. The following tables present the estimated component costs for each of the alternatives.

Table 14.1 details the projected capital costs for the four Kendall Drive alternatives. Total construction costs including project contingencies for the three BRT alternatives range between $249.7 million and $326.6 million. Option A1 proposes that a dedicated guideway be implemented along the entire length of the corridor from Dadeland South to SW 167th Avenue. Alternatives A2 and A3 would operate along the shoulders of the Snapper Creek Expressway and would require much less road construction.

Table 14.1: Capital Costs for the Kendall Drive Alternatives (millions)

	A1	A2	A3	A4
Vehicles	$8.6	$10.3	$8.0	$67.3
Transit Centers/Station	$23.3	$18.6	$18.6	$196.5
Guideway	$214.2	$157.1	$157.1	$949.9
Maintenance Facilities	$2.7	$3.3	$2.5	$50.7
Park and Ride Lots	$12.5	$12.6	$12.5	$81.2
Right-of-Way	$0	$0	$0	$0
Contingencies	$65.3	$51.8	$51.0	$336.4
Total	$326.6	$253.7	$249.7	$1,682.0

A Metrorail extension along Kendall Drive would provide high levels of service and limited impact to vehicular traffic, but at extremely high costs. The proposed Kendall Metrorail in alternative A4 is projected to require almost $1.7 billion to construct. The H1 HEFT Metrorail would provide service along a slightly longer route with costs also approaching $1.7 billion (Table 14.2).

Table 14.2: Capital Costs for the HEFT Corridor Alternative (millions)

	B1
Vehicles	$26.9
Transit Centers/Station	$152.8
Guideway	$1,111.4
Maintenance Facilities	$50.7
Park and Ride Lots	$7.2
Right-of-Way	$0
Contingencies	$337.3
Total	$1,686.3

Table 14.3 lists the projected costs for the four proposed CSX corridor DMU alternatives. Each of the options would require upgrades or replacement of the existing Class I/II and excepted track. Alternative C2 proposes service to five stations while C3-C5 would make nine station stops. The 30 minute peak headways proposed under C2 would require fewer vehicles to operate than the 15 minute peak headways proposed for C4 and C5. The total projected capital costs for the four DMU alternatives range from $221.9 million to $417.7 million

Table 14.3: Capital Costs for the CSX Corridor Alternative (millions)

	C2	C3	C4	C5
Vehicles	$16.7	$26.7	$36.7	$36.7
Transit Centers/Station	$6.2	$14.0	$14.0	$14.0
Guideway	$120.2	$120.2	$222.9	$237.7
Maintenance Facilities	$3.9	$7.4	$9.8	$9.8
Park and Ride Lots	$5.5	$11.0	$11.0	$11.0
Right-of-Way	$25.0	$25.0	$25.0	$25.0
Contingencies	$44.4	$51.0	$79.8	$83.5
Total	$221.9	$255.3	$399.2	$417.7

Projected capital costs for the D1 SW 137th Avenue BRT alternative come to almost $410 million. The service would operate much like the proposed Kendall Drive BRT options but would run along a longer corridor and would therefore require more vehicles to operate.

Table 14.4: Capital Costs for the SW 137th Avenue Alternative (millions)

	D1
Vehicles	$11.5
Transit Centers/Station	$18.6
Guideway	$280.1
Maintenance Facilities	$3.6
Park and Ride Lots	$12.5
Right-of-Way	$0
Contingencies	$81.6
Total	$407.9

Table 14.5 provides a summary of the projected capital costs from the Tier II alternative evaluation. Costs range from $221.9 million for the C2 CSX corridor DMU service to $1.686 billion for the HEFT corridor Metrorail. One method of evaluating the costs and cost effectiveness of transit projects is to compare their respective capital cost per mile of new service provided. There is no standard acceptable level of costs, but rather the costs listed in Table 14.6 allow for the relative value of the proposed improvements to be evaluated. The per mile capital costs for the proposed alternatives range from $12 million per mile for the C2 CSX DMU option to $197.2 million per mile for the A4 Kendall Metrorail. Projected capital cost per mile for the three Kendall Drive and one SW 137th Avenue BRT alternatives average to approximately $35 million per mile.

Table 14.5: Capital Cost Summary (millions)

	KENDALL DRIVE	HEFT	CSX	SW 137TH AVE
BRT				
A1 - BRT	$326.6			
A2 - BRT	$253.7			
A3 - BRT	$249.7			
D1 - BRT				$407.9
DMU				
C2 - DMU @ 30 Mins			$221.9	
C3 - DMU @ 20 Mins			$255.3	
C4 - DMU @ 15 Mins			$399.2	
C5 - DMU @ 15 Mins			$417.7	
Metrorail				
A4 - Metrorail	$1,682.0			
B1 - Metrorail		$1,686.3		

Table 14.6: Projected Capital Cost / Mile (millions)

	KENDALL DRIVE	HEFT	CSX	SW 137TH AVE
BRT				
A1 - BRT	$34.3			
A2 - BRT	$36.8			
A3 - BRT	$36.3			
D1 - BRT				$32.3
DMU				
C2 - DMU @ 30 Mins			$12.0	
C3 - DMU @ 20 Mins			$13.9	
C4 - DMU @ 15 Mins			$21.7	
C5 - DMU @ 15 Mins			$21.2	
Metrorail				
A4 - Metrorail	$197.2			
B1 - Metrorail		$178.4		

15 Tier II Traffic Analysis

Introduction

This section describes the preliminary traffic analysis that was performed by the project team. The purpose was to perform a planning level quantitative analysis to determine the potential impacts of operating the A1 bus rapid transit service (BRT) on Kendall Drive between SW 167 Avenue and the Dadeland South Metrorail station. The impacts quantified in this analysis include transit signal priority (TSP) at major intersections and geometric changes to incorporate BRT lanes along the median of Kendall Drive. Intersection delay analyses were performed corresponding to the anticipated implementation of the BRT alternative in 2030. The impacts of the alternative were quantified against no-build traffic conditions. The vehicle delay or time savings during the P.M. peak hour for the major intersections due to the BRT Alternative were estimated.

Methodology

To determine vehicle delay or travel time savings at intersections along Kendall Drive, the P.M. peak hour turning movement counts and signal timings were utilized. The existing traffic volumes were converted to peak season conditions by applying appropriate peak season factors obtained from the FDOT's Peak Season Factor Category tables. Thereafter, seasonally adjusted turning movement counts were grown to 2030 volumes using the appropriate growth factors obtained from the 2030 Miami-Dade Long Range Transportation Plan to represent traffic conditions expected to exist after the implementation of the BRT alternative. Table 15.1 lists intersections considered in this analysis. It also presents planned geometric alterations and resulting traffic redistribution considered for the impact analysis. Please note that traffic signal timings were optimized to reflect changes in traffic volumes by 2030.

Table 15.1: Kendall Drive Intersections, Proposed Geometric Changes, and Traffic Redistribution

INTERSECTING STREET	TSP?	PROPOSED GEOMETRIC CHANGES	TRAFFIC REDISTRIBUTION
SW 147 Avenue	Yes	None	
SW 137 Avenue	Yes	Remove EB & WB right-turn lane (1 -> 0)	
SW 127 Avenue	Yes	EB & WB left-turn lanes from 2 to 1	Assigned 50% of WBL from SW 125 Ave
SW 125 Avenue	Yes	Remove EB & WB left-turn lanes (1 -> 0)	50% of WBL assigned to median opening, other 50% to SW 127 Ave; 100% of EBL assigned to SW 122/124 Ave
SW 122/124 Avenue	Yes	Reduce EB left-turn lanes from 2 to 1	Assigned 100% of EBL from SW 122/124 Ave
Mills Drive	Yes	Remove EB & WB left-turn lanes (EB: 2 -> 1; WB 1 -> 0)	100% of EBL & WBL assigned to SW 117 Ave
SW 117 Avenue	Yes	Reduce WB left-turn lanes from 2 -> 1	100% of EBL & WBL from Mills Dr
SW 107 Avenue	Yes	Reduce EB & WB left-turn lanes from 2 -> 1	
SW 99 Court	Yes	WB left-turn lane (1 -> 0)	100% of WBL assigned to downstream median opening
SR 874 SB Ramps	Yes	None	
SW 97 Avenue	Yes	None	
SR 878 EB On Ramp	Yes	None	
SW 87 Avenue	Yes	EB & WB through lanes from 3 -> 2	
SW 79 Avenue	Yes	EB & WB through lanes from 3 -> 2	
SW 77 Avenue	Yes	EB & WB through lanes from 3 -> 2	
Dadeland Boulevard	No	Reduce WB through lanes from 4 -> 3	

Traffic Impacts due to Transit Signal Priority

The A1 BRT service along Kendall Drive would operate on 6-minute headways during the P.M. peak. As a result, the analysis was based on the assumption that a bus would arrive at an intersection either from the eastbound or westbound direction every 3 minutes. Uniform headways were assumed for the entire length of the study corridor. Due to right-of-way constraints, the number of BRT lanes provided would vary; where only one lane is provided, adjustments to the schedule would be required. There could be situations where one bus will have to dwell at a stop until a bus from the opposing direction arrives at the bus stop. This planning level analysis did not take into consideration operational complexities arising from such situations.

Any buses arriving towards the end of green signal period of the east-west through movement on Kendall Drive were assumed to be given an additional 10 second green time (transit signal priority). It was conservatively assumed that approximately one-third of the buses arriving during the east-west green phase would take advantage of TSP. As a result of this additional east-west green time, the movements of north-south vehicles would experience additional delay equal to the length of green time extension (10 seconds). However, green extension for the east-west movement would also result in 10 additional seconds for the east-west through movement.

Calculations:

- Reduction of delay for east-west through movement
- Increase in delay for other movements

Impact in vehicle hours per hour:

Benefits (more E/W through vehicles clearing the intersection during extra 10 seconds)

= [(number of vehicles per lane benefited × number of E/W through lanes) × (number of cycles per hour priority occurs) × savings of travel time]/3,600

Delays (additional wait of 10 seconds during priority for signal phases other than E/W through movement)

= [(fraction of vehicles delayed) × (length of delay)]/ 3,600

= [(ratio of cycles affected and cycles per hour × hourly traffic volume of the affected movements) × (length of delay)]/ 3,600

Traffic Impacts due to Geometric Alterations

Please refer to Table 15.1 for the assumptions made regarding traffic redistribution. The traffic analysis software package Synchro 6.0 was utilized to quantify the intersection impacts. One Synchro model was developed using the 2030 traffic volumes and optimized signal splits to establish no-build traffic conditions. Another Synchro model was developed by incorporating geometric changes and traffic redistribution to establish build traffic conditions. The difference in overall intersection delay obtained from the two models (build and no-build) was multiplied by the intersection traffic volume to determine the impact of geometric alterations.

Table 15.2 presents a summary of the existing right-of-way conditions on Kendall Drive and the proposed geometric alterations that would be required should a BRT system be implemented. The corridor is constrained for much of its length, limiting the possibility of widening the road. Many of the existing left-turn lanes would be removed in order to accommodate the dedicated BRT lanes and stations. The number of BRT lanes varies in order to minimize impacts to vehicular traffic.

Table 15.2: Summary of Kendall Drive Signalized Intersections and Proposed Changes

			EASTBOUND					WESTBOUND				
				# OF LANES (EXIST. | PROP.)					# OF LANES (EXIST. | PROP.)		
INTERSECTING ROADWAY OR OTHER LOCATION	PROPOSED STATION LOCATION	EXIST. SIGNAL?	2030 PM PEAK LT VOLUMES	LT	THRU *	RT	# OF PROPOSED BUSWAY LANES	2030 PM PEAK LT VOLUMES	LT	THRU *	RT
SW 167 Ave	Y	N	NA	0 | 1	2 | 2	0 | 0	2	?	1 | 1	2 | 2	0 | 0
SW 162 Ave	Y	Y	?	1 | 1	2 | 2	0 | 0	2	NA	0 | 1	2 | 2	0 | 0
SW 157 Ave	Y	Y	?	1 | 1	2 | 2	0 | 0	2	?	1 | 1	2 | 2	0 | 0
SW 152 Ave	Y	Y	104	1 | 1	2 | 2	0 | 0	2	190	1 | 1	2 | 2	0 | 0
SW 151 Ave		Y	?	1 | 1	3 | 3	0 | 0	1	?	1 | 1	3 | 3	0 | 0
SW 147 Ave	Y	Y	239	1 | 1	3 | 3	0 | 0	1	375	1 | 1	3 | 3	0 | 0
SW 142 Ave		Y	90	1 | 1	3 | 3	0 | 0	1	493	1 | 1	3 | 3	0 | 0
shopping center driveway		Y	?	1 | 1	3 | 3	0 | 0	1	?	1 | 1	3 | 3	0 | 0
SW 137 Ave	Y	Y	243	2 | 2	3 | 3	1 | 0	2	608	2 | 2	3 | 3	1 | 0
SW 133 Ave		Y	127	1 | 1	3 | 3	0 | 0	1	149	1 | 1	3 | 3	0 | 0
SW 132 Ave		Y	148	1 | 1	3 | 3	0 | 0	1	103	1 | 1	3 | 3	0 | 0
SW 127 Ave	Y	Y	191	2 | 1	4 | 4	0 | 0	2	319	2 | 1	4 | 4	0 | 0
SW 125 Ave		Y	118	1 | 0	4 | 4	0 | 0	2	207	1 | 0	4 | 4	0 | 0
SW 122/124 Ave	Y	Y	411	2 | 1	4 | 4	0 | 0	2-1	684	2 | 2	4 | 4	1 | 1
HEFT SB Off Ramp		Y	NA	0 | 0	3 | 3	2 | 2	2	NA	0 | 0	4 | 4	0 | 0
Under HEFT Overpass		N	NA	0 | 0	3 | 3	2 | 2	2	NA	0 | 0	3 | 3	1 | 0
HEFT NB Off Ramp		Y	NA	0 | 0	3 | 3	0 | 0	2	NA	0 | 0	3 | 3	0 | 0
Mills Drive		Y	396	2 | 0	3 | 3	0 | 0	2	60	1 | 0	3 | 3	1 | 1
SW 117 Ave	Y	Y	704	2 | 2	3 | 3	0 | 0	1	393	2 | 1	3 | 3	1 | 1
SW 117 Road		Y	191	1 | 1	3 | 3	0 | 0	1	86	1 | 1	3 | 3	0 | 0
SW 112 Ave		Y	NA	0 | 0	3 | 3	0 | 0	1	207	1 | 1	3 | 3	0 | 0
SW 107 Ave	Y	Y	369	2 | 1	3 | 3	0 | 0	1	424	2 | 1	3 | 3	0 | 0
SW 99 Court		Y	148	1 | 1	3 | 3	0 | 0	1	0	1 | 0	3 | 3	0 | 0
SR 874 SB Ramps	Y	Y	NA	0 | 0	3 | 3	0 | 0	2	344	1 | 1	3 | 3	0 | 0
Under SR 874 Overpass		N	NA	0 | 0	3 | 3	0 | 0	0	344	1 | 1	3 | 3	0 | 0
SR 874 NB Off Ramps		Y	NA	0 | 0	3 | 3	0 | 0	0	NA	0 | 0	3 | 3	0 | 0
SW 97 Ave		Y	137	1 | 1	4 | 4	0 | 0	0	161	1 | 1	3 | 3	0 | 0
SR 878 EB On Ramp		Y	450	1 | 1	3 | 3	0 | 0	0	NA	0 | 0	3 | 3	0 | 0
SW 90 Ave		Y	NA	0 | 0	3 | 3	0 | 0	1	?	1 | 1	3 | 3	0 | 0
SW 89 Ave (Hospital)	Y	N	NA	0 | 0	3 | 3	0 | 0	1	?	1 | 1	3 | 3	0 | 0
SW 87 Ave Galloway Rd		Y	334	1 | 1	3 | 2	0 | 0	2	268	1 | 1	3 | 2	0 | 0
SW 79 Ave	Y	Y	73	1 | 1	3 | 2	0 | 0	2	84	1 | 1	3 | 2	0 | 0
SW 77 Ave		Y	7	1 | 1	3 | 2	0 | 0	2	333	1 | 1	3 | 2	0 | 0
Under SR 826 Overpass		N	NA	0 | 0	4-3 | 3	0 | 0	1	NA	0 | 0	3 | 3	0 | 0
SR 826 NB On/Off Ramps		Y	NA	0 | 0	3 | 3	0 | 0	1	NA	0 | 0	3 | 3	1 | 0
Dadeland Mall Entrance		Y	?	1 | 1	3 | 3	0 | 0	1	?	1 | 1	4 | 3	0 | 0
Dadeland Blvd	Y	Y	166	1 | 1	3 | 3	0 | 0	1	157	1 | 1	4 | 3	0 | 0

Table 15.3: Summary of Kendall Drive Signalized Intersections and Proposed Changes

INTERSECTING ROADWAY OR OTHER LOCATION	CURB-TO-CURB WIDTH (EXIST. | PROP.)		PROPOSED ROADWAY CROSS SECTION ON WEST SIDE OF INTERSECTION (LEFT TO RIGHT, LOOKING EAST)	COMMENTS
	WEST SIDE	EAST SIDE		
SW 167 Ave	---	80' | 90'	22' - 10'v - 22' - 4' - 32' = 90'	minor widening to north and south
SW 162 Ave	82' | 90'	82' | 90'	22' - 10'v - 22' - 4' - 32' = 90'	minor widening to north and south
SW 157 Ave	80' | 90'	82' | 90'	22' - 10'v - 22' - 4' - 32' = 90'	minor widening to north and south
SW 152 Ave	81' | 87'	82' | 87'	22' - 9'v - 22' - 2' - 32' = 87'	minor widening to south
SW 151 Ave	94' | 94'	94' | 94'	31' - 5' - 12' - 5' - 41' = 94'	
SW 147 Ave	94' | 94'	94' | 94'	31' - 8'v - 12' - 2' - 41' = 94'	
SW 142 Ave	94' | 94'	94' | 94'	31' - 5' - 12' - 5' - 41' = 94'	
shopping center drive	94' | 94'	94' | 94'	31' - 5' - 12' - 5' - 41' = 94'	
SW 137 Ave	120' | 120'	120' | 120'	31' - 14'v - 22' - 2' - 51' = 120'	
SW 133 Ave	94' | 94'	94' | 94'	31' - 5' - 12' - 5' - 41' = 94'	
SW 132 Ave	94' | 94'	94' | 94'	31' - 5' - 12' - 5' - 41' = 94'	
SW 127 Ave	130' | 130'	130' | 130'	41' - 12'v - 22' - 4' - 51' = 130'	
SW 125 Ave	120' | 120'	120' | 120'	41' - 8' - 22' - 8' - 41' = 120'	left turns eliminated
SW 122/124 Ave	124' | 129'	147' | 147'	41' - 13'v - 22' - 2' - 51' = 129'	minor widening in northwest quadrant; busway would be one-lane wide on east side of intersection
HEFT SB Off Ramp	135' | 135'	---	41' - 6' - 22' - 6' - 60' = 135'	
HEFT Overpass	92' | 92'	92' | 92'	31' - 4' - 22' - 4' - 31' = 92'	curb-to-curb width does not include 2 EB RT ramp lanes, which are separated from other lanes by a pier
HEFT NB Off Ramp	---	97' | 97'	34' - 5' - 22' - 5' - 31' = 97'	
Mills Drive	97' | 97'	107' | 107'	31' - 6.5' - 22' - 6.5' - 31' = 97'	left turns eliminated
SW 117 Ave	97' | 102'	105' | 110'	30' - 8'v - 12' - 2' - 50' = 102'	minor widening to south
SW 117 Road	92' | 92'	92' | 92'	31' - 4' - 12' - 4' - 41' = 92'	
SW 112 Ave	92' | 92'	92' | 92'	31' - 14' - 12' - 4' - 31' = 92'	
SW 107 Ave	92' | 96'	92' | 96'	31' - 10'v - 12' - 2' - 41' = 96'	minor widening to north
SW 99 Court	92' | 92'	92' | 92'	31' - 4' - 12' - 4' - 41' = 92'	WB left turns eliminated
SR 874 SB Ramps	92' | 92'	---	30' - 8'v - 22' - 2' - 30' = 92'	EB and WB buses to join mainstream traffic east of this intersection; see note (2), below.
Under SR 874 Overpass	92' | 92'	94' | 94'	46' - 12' - 34' = 92' (existing)	(1) curb-to-curb width includes a 12' wide median protecting a bridge pier; (2) buses enter mainstream traffic in vicinity of SR 874 interchange.
SR 874 NB Off Ramps	---	94' | 94'	35' - 24' - 35' = 94' (existing)	see note (2), above
SW 97 Ave	94' | 94'	94' | 94'	34' - 4' - 56' = 94' (existing)	see note (2), above
SR 878 EB On Ramp	94' | 94'	94' | 94'	45' - 4' - 45' = 94' (existing)	see note (2), above
SW 90 Ave	83' | 88'	83' | 88'	30' - 12' - 12' - 4' - 30' = 88'	minor widening to south
SW 89 Ave (Hospital)	83' | 92'	83' | 92'	31' - 14'v - 12' - 4' - 31' = 92'	widening to south; EB station to be located 300'-400' east of intersection
SW 87 Ave Galloway Rd	87' | 87'	90' | 90'	22' - 7' - 22' - 4' - 32' = 87'	
SW 79 Ave	87' | 90'	87' | 90'	22' - 10'v - 22' - 4' - 32' = 90'	minor widening to north
SW 77 Ave	87' | 90'	87' | 90'	22' - 10' - 22' - 4' - 32' = 90'	minor widening to north
Under SR 826 Overpass	96' | 104'	86' | 104'	35' - 18' - 12' - 4' - 35' = 104'	curb-to-curb width includes an 18' wide median protecting a bridge pier; one-lane busway to be built south of existing bridge pier; widening beneath bridge to both north and south.
SR 826 NB Ramps	86' | 112'	100' | 102'	35' - varies - 12' - 4' - 35' = 112	widening to north and south west of intersection; (2) minor widening to south only east of intersection
Dadeland Mall Entrance	100' | 100'	100' | 100'	31' - 4' - 12' - 12'v - 41' = 100'	EB station only; EB buses to enter Kendall Drive at this intersection (queue jumper?)
Dadeland Blvd	100' | 100'	100' | 100'	31' - 12'v - 12' - 4' - 41' = 100'	WB station only

Table 15.4 presents a summary of the traffic impacts due to transit signal priority and geometric alterations at select intersections. The difference between transit signal priority impacts and geometric alterations impacts is presented under the "Net Impacts" column. The average impact per vehicle was calculated by dividing net impacts by total intersection volume. Please note that positive values indicate travel time savings whereas negative values indicate additional delays.

Table 15.4: Traffic Impacts of Proposed Kendall Drive BRT Alternative

	INTERSECTING STREET SIGNAL PRIORITY (VEH-HRS)	GEOMETRIC CHANGES (VEH-HRS)	NET IMPACTS (VEH-HRS)	AVG IMPACT PER VEHICLE (SEC)
SW 147 Avenue	1.06	n/a	1.06	1
SW 137 Avenue	0.68	-67.37	-66.69	-27
SW 127 Avenue	1.73	-14.79	-13.06	-5
SW 125 Avenue	2.32	7.84	10.16	5
SW 122/124 Avenue	1.71	-139.07	-137.36	-48
Mills Drive	1.16	66.98	68.14	32
SW 117 Avenue	0.35	-134.52	-134.89	-46
SW 107 Avenue	1.01	-67.48	-66.47	-30
SW 99 Court	1.03	-5.39	-4.36	-3
SR 874 SB Ramps	1.07	n/a	1.07	1
SW 97 Avenue	1.32	n/a	1.32	1
SR 878 EB On Ramp	1.36	n/a	1.36	1
SW 87 Avenue	0.29	-102.27	-101.98	-57
SW 79 Avenue	0.56	-30.02	-29.46	-21
SW 77 Avenue	0.43	-20.07	-19.64	-13
Dadeland Boulevard	n/a	-2.25	-2.25	-2
Average	1.07	n/a	-30.82	-13

Note: positive values indicate travel time savings; negative values indicate additional delays.

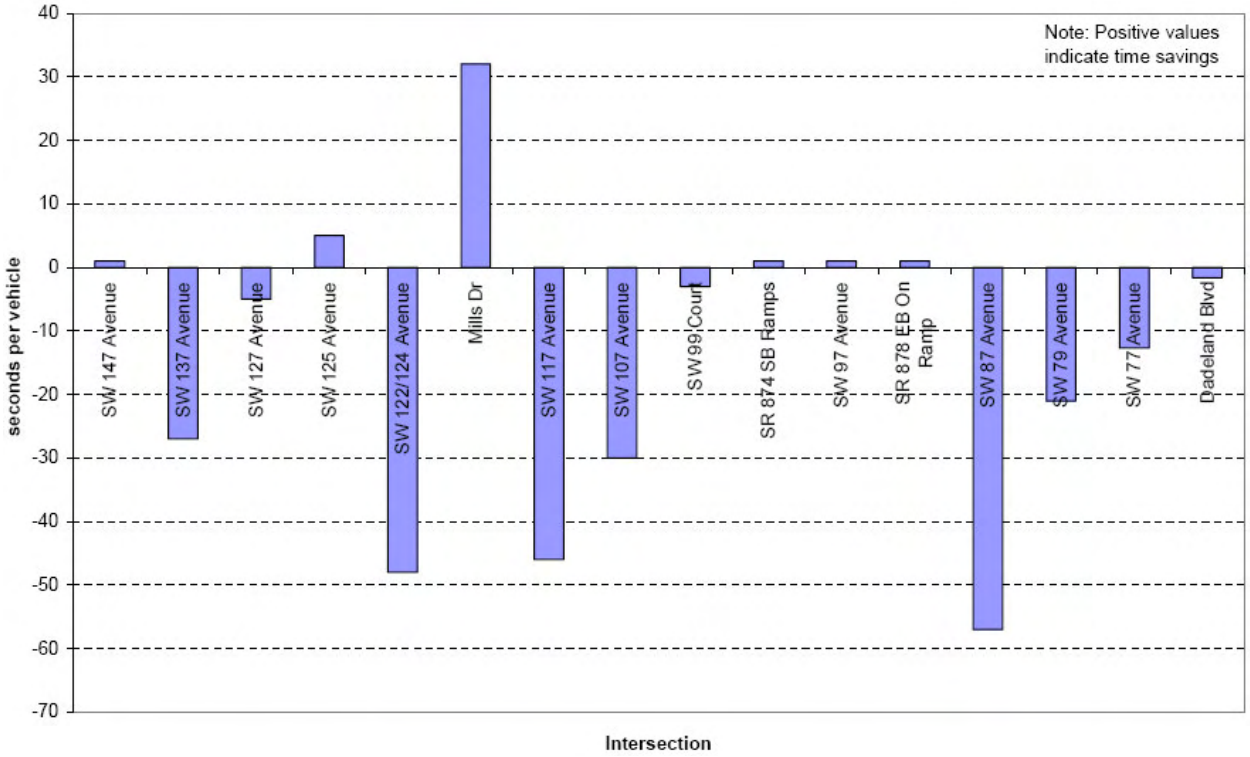
Figure 15.1 shows the net impact per vehicle at those intersections. As indicated in Table 15.2, transit signal priority generally results in marginal net travel time savings due to the additional green time available to the major street. However, geometric alterations such as left-turn lane closures, and/or left-turn lane reductions and traffic redistribution, would result in significant increases in intersection delay. In particular, the intersections at SW 137th Avenue, SW 122/124th Avenue, SW 117th Avenue, SW 107th Avenue, and SW 87th Avenue are shown to experience significant increase in travel time due to the proposed reduction of left-turn and/or through lanes and traffic redistribution.

Intersection Delay Impact in vehicle hours per hour:

- Overall intersection delay for 2030 no-build conditions = X seconds per vehicle
- Overall intersection delay for 2030 build conditions = Y seconds per vehicle
- Number of vehicles entering intersection per hour = Z
- Net impact of the alternative = (X-Y)*Z/3600 vehicle hours

Overall, when the impacts of the A1 BRT alternative to vehicular traffic are considered, the adverse impacts of geometric alterations outweigh the positive impacts of transit signal priority. However, the BRT system, with a capacity of around 60 persons per bus operating at 6-minute headways in each direction, would potentially increase the corridor's transit throughput by 1,200 persons during the P.M. peak hour. With signal priority and exclusive bus lanes, transit travel time would be expected to decrease significantly. Such decrease in transit travel time could encourage auto users to shift to transit.

Figure 15.1: Kendall Drive Travel Time Benefits per Vehicle (2030 Build vs. No Build



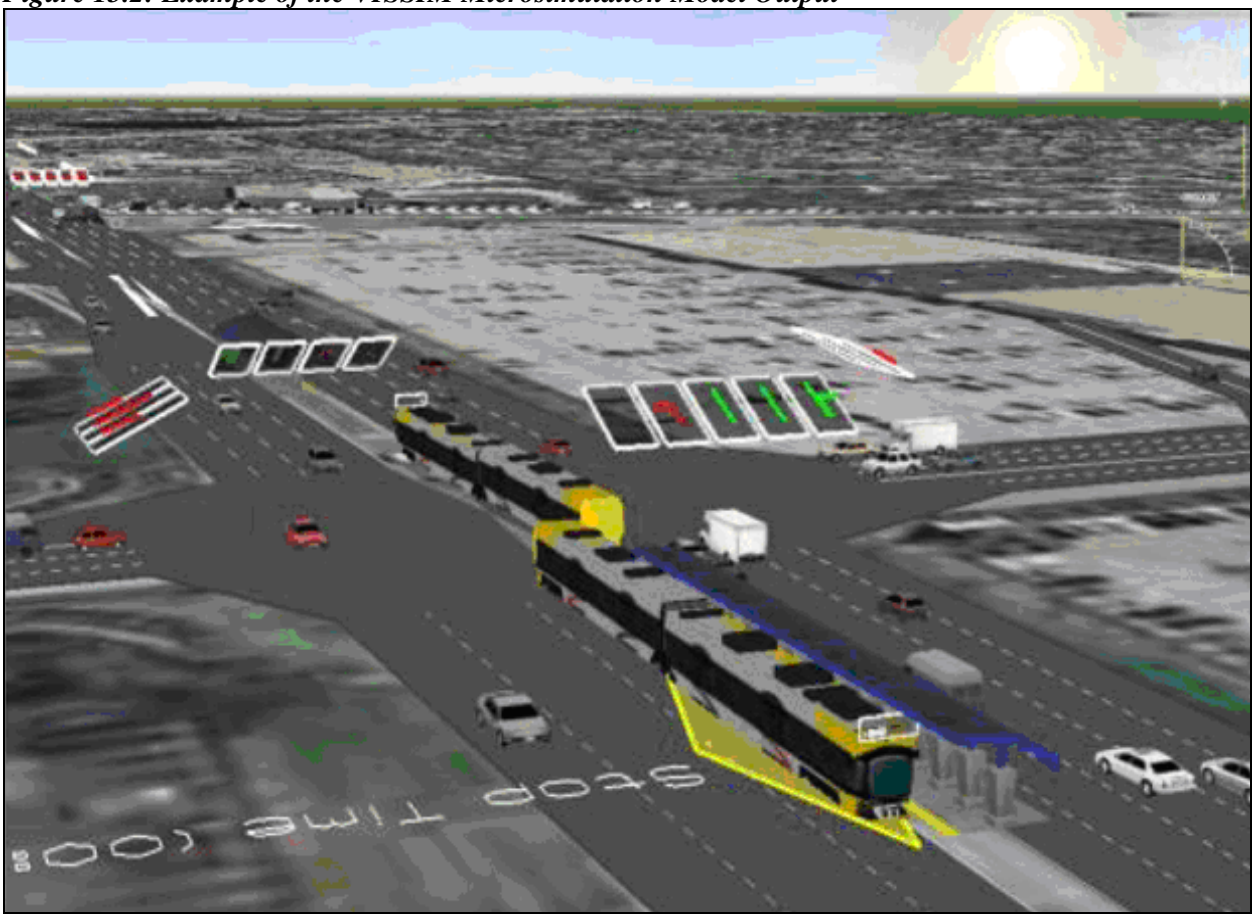
Traffic Microsimulation

Traffic microsimulation is a research technique that utilizes travel forecasts, transit operations to simulate the behavior of individuals (vehicles, people, etc.) over time. Even complex traffic conditions are visualized in an unprecedented level of detail providing realistic traffic models. The simulations are used to predict the likely impact of changes in traffic patterns resulting from changes to the transportation network.

Microsimulation has its greatest strength in modeling congested road networks and will continue to provide results at high degrees of saturation, up to the point of absolute gridlock. The resulting outputs from the model can reflect relatively small changes in the physical environment such as the narrowing or shifting of lanes.

The VISSIM behavior-based traffic microsimulation program was customized with specific information on the number and width of travel lanes and applied to a subset of the study area. Detailed information on existing and future traffic volumes, turning-movement traffic counts were applied to the transportation network. A set of 3D animations were produced for presentation to technical experts, decision makers and members of the public. They provide an additional view in to how effective a projected measure might be and can aid in making important decisions on proposed transportation improvements. Figure 15.2 shows an example screen-capture image of a VISSIM microsimulation model.

Figure 15.2: Example of the VISSIM Microsimulation Model Output



16 Tier II Alternative Evaluation

User Benefit Modeling

The value of any proposed transit improvement must be judged not only on the number of riders projected to use the system or the costs required to implement and operate the new service. The Federal Transit Administration (FTA) has developed a number of cost effectiveness measures collectively referred to as user benefits.

The user benefits calculations were generated using the FTA's SUMMIT Model which calculates the projected level of benefit provided by each of the alternatives. The generalized measures cover travel time savings, travel time cost savings and the cost per new transit trip generated by the proposed improvements. Only the alternatives that performed well from a ridership or cost perspective were modeled.

Table 16.1 shows that Alternative A4 provides the highest annual hours of benefit. Those benefits come at a high cost, however, and are projected to be over $93 per hour of user benefit. Costs per new transit rider were modest, at almost $34. Alternatives C3 and C4 had both high benefit and new rider costs and the lowest number of annual benefit hours. Alternatives A1 and D1 provided moderate and high levels for hours of annual benefit, and did so with low user benefit costs. Costs per new rider were $7.28 for A1 and $ 13.28 for D1. The high projected annual benefit hour figure for the D1 BRT service speaks to limited level of transit service now provided along SW 137th Avenue.

Table 16.1: Projected Annual Benefit Hours, User Benefits and Cost per New Transit Trip

ALTERNATIVE	ANNUAL BENEFIT HOURS	USER BENEFIT COST	COST PER NEW TRANSIT TRIP
A1: Kendall BRT	867,720	$ 23.59	$ 7.28
A4: Kendall MetroRail	1,575,000	$ 93.60	$ 33.83
B1: HEFT MetroRail	1,352,120	$ 109.96	$ 43.29
C3: CSX DMU / 20 min.	341,320	$ 51.36	$ 32.74
C4: CSX DMU / 15 min.	358,680	$ 94.01	$ 39.06
D1: SW 137th BRT	1,496,320	$ 19.35	$ 13.28

Tier II Evaluation

Table 16.2 below details the performance of each of the alternatives on projected ridership, costs, impacts and benefits. The BRT alternatives (A1-A3, D1) exhibit moderate levels of capital, O&M, user benefit costs and cost per new transit trip. Ridership was modeled to range from 10,048 for A1 to 5,834 for A3. In fact, three of the BRT services are projected to carry the third, fourth and fifth greatest number of riders of the ten alternatives.

Each of the BRT alternatives along Kendall Drive (A1-A3) are anticipated to result in adverse impacts to vehicular traffic due to the removal or reduction in width of travel lanes required to accommodate the BRT guideway. The utilization of exclusive lanes within the median prioritizes transit service and allows buses to bypass vehicular traffic. Many of the signalized and unsignalized left-turn lanes would need to be removed in order to provide space within the road right-of-way for the exclusive lanes and stations. The configuration of major intersections would be redesigned to minimize the impact to existing high levels of traffic. This may require that double left-turn lanes be reduced to one, or a reduction in the width or number of through lanes. Transit signal priority would allow buses to hold a green light or prompt a red light to change so that it could pass through the intersection. This system would retime signal network and build in controls that would allow officials to manipulate traffic lights and respond to changing traffic conditions.

Table 16.2: Tier II Evaluation

	PROJECT LENGTH (MILES)	PROJECTED TRAVEL TIME (MINUTES)		DAILY RIDERS (2030)	CAPITAL COST	ANNUAL O&M COSTS	ANNUAL BENEFIT HOURS	USER BENEFIT COST	COST PER NEW TRIP	IMPACTS TO VEHICULAR TRAFFIC
		CBD*	MIA**							
A1 – Kendall BRT	9.53	45 - 53	55 - 63	10,048	$326.6	$4.8	867,720	$23.59	$7.28	●
A2 – Kendall BRT	9.53	45 - 53	55 - 63	7,041	$253.7	$5.2	n/a	$ - -	$ - -	●
A3 – Kendall BRT	9.53	45 - 53	55 - 63	5,834	$249.7	$4.6	n/a	$ - -	$ - -	●
A4 – Kendall Metrorail	8.77	30 - 35	45 - 50	15,565	$1,682.0	$18.8	1,575,000	$93.60	$33.83	○
B1 – HEFT Metrorail	9.45	45 - 50	30 - 35	12,265	$1,686.3	$19.7	1,352,120	$109.96	$43.29	○
C2 – CSX DMU	8.72	45 - 50	25 - 30	600	$190.6	$5.2	n/a	$ - -	$ - -	○
C3 – CSX DMU	8.72	45 - 50	30 - 35	1,912	$224.1	$7.7	341,320	$51.36	$32.74	◉
C4 – CSX DMU	8.72	45 - 50	30 - 35	3,083	$368.0	$12.0	358,680	$94.01	$39.06	◉
C5 – CSX DMU	10.42	50 - 55	30 - 35	3,017	$386.5	$12.2	n/a	$ - -	$ - -	◉
D1 – SW 137th BRT	12.63	70 - 75	55 - 60	7,785	$407.9	$6.5	1,496,320	$19.35	$13.28	●

Table Key: High: ● Medium: ◉ Low: ○

* From the project terminus to Government Center and the Central Business District

** From the project terminus to the Miami Intermodal Center / Miami International Airport

Alternatives A2 and A3 were proposed to operate within exclusive lanes from SW 167th Avenue to SR 874 and then travel express along the shoulders of SR 874 and SR 878 to meet the Metrorail and Dadeland North station. Both were eliminated from additional study as their costs would similar to the A1 BRT, but were projected to carry fewer riders and provide lower mobility benefits. The expressway portion of the trip did not directly serve Baptist Hospital and downtown Kendall / Dadeland Mall. Bypassing two of the highest trip attractors along the corridor offset any benefit gained from the small reduction in travel times.

The Metrorail alternatives (A4 and B1) enjoy the highest projected levels of ridership, the lowest travel times and would result in few impacts to existing vehicular traffic within the study area. Alternative A4 may require that a small number of the existing left-turn lanes along Kendall Drive be removed to facilitate the placement of concrete pillars and traffic safety barriers however. Space for concrete support columns and traffic safety barriers would also be in limited supply for Alternative B1, due to the proximity of active, high-speed travel lanes of the Homestead Extension of Florida's Turnpike and the adjacent Snapper Creek canal. The Metrorail alternatives have high capital costs and would require land acquisition for station facilities and parking. The Kendall Drive Metrorail was shown to provide the highest level of annual hours of benefit and performed well against the alternatives B1, C3 and C4, from a cost per new transit trip perspective. The $93.60 user benefit cost that would be required to provide these benefits is still a very high number when compared with the BRT alternatives.

The A4 Metrorail extension along Kendall Drive would provide too few benefits in relation to its costs. The 15,565 projected riders do not justify the expenditure of more than $1.6 billion to construct and almost $20 million to operate every year. The Kendall Drive Metrorail was eliminated from further consideration at the end of the Tier II screening. Members of the public supported the idea of Metrorail from the perspective that it would provide a quick, one-seat ride to downtown and would result in very few impacts to vehicular traffic. Those benefits aside, more residents expressed a disapproval of the noise and visual impacts that the elevated tracks and stations bring and felt that the high level of required funding could be better spent elsewhere. The Kendall Drive Metrorail was eliminated from further consideration at the end of the Tier II screening.

The DMU alternatives (C2-C5) presented in this study generally have low capital and moderate operating costs but resulted in the lowest ridership numbers of any alternative that was evaluated. Traffic analysis performed on the CSX corridor indicated a low to moderate level of impact to vehicular traffic at grade crossings. DMU vehicles are smaller than conventional commuter or freight trains presently operating in

Miami-Dade County. This relatively new transit technology operates with a noise and vibration profile that is similar to that of a diesel bus. It is assumed that the noise, air pollution, or visual impact of intermittently passing DMU traffic would be below what is experienced in South Florida communities along the existing Tri-Rail system. In addition, upgrading track along the corridor to an FRA Class IV status would require that the deteriorated existing tracks be replaced with new continuously welded rail. This would provide an additional benefit to the community by improving safety and reduce the noise and vibration that is currently caused by freight traffic.

Alternatives C2 and C3 were eliminated at the end of Tier II as they performed poorly in ridership forecasts and did so at a lost cost per benefit ratio. The Alternative C5 option which routed service along the south of Tamiami Airport to SW 157th Avenue will not be advanced at this time as it performed at a cost to benefit ratio that was lower than for Alternative C4.

The provision of transit service along the CSX right-of-way provides an improvement to mobility along a corridor that is currently underserved. Recently constructed rail transit systems across the County have shown that providing increased mobility along a fixed route can induce changes in both travel and development patterns that cannot be accurately accounted for in travel demand models. This has allowed some of them to exceed ridership forecasts numbers by up to 50% or more.

17 Preferred Rapid Transit Strategy

Introduction

The Tier II screening evaluated how each of the ten alternatives performed on measures of projected ridership, costs and benefits. Feedback from elected officials and members of the public was an important part of the screening process and the development of a preferred rapid transit strategy. The Miami-Dade MPO is not currently seeking federal funding through the Federal Transit Administration's (FTA) New Starts project approval process for the improvements proposed in the Kendall Corridor Alternatives Analysis. The preferred rapid transit strategy will require additional refinement and dialog to account for complex engineering and environmental issues. A detailed implementation and funding plan must also be developed before any improvement strategy as a whole or any component could be presented to the FTA as a locally preferred alternative (LPA). The preferred transit strategy is composed of selected elements from the Tier II alternatives, and will serve as the set of improvements recommended for approval by the MPO Board.

The Tier II alternatives at the heart of the preferred rapid transit strategy (Figure 17.1) are the A1 BRT service along Kendall Drive and an option based on a combination of the C3 and C4 CSX DMU options and the A1 BRT. This adapted rail option would operate along the CSX Corridor from the MetroZoo to Kendall Drive and then turn east within a shared transitway. A smaller and lighter vehicle known as Diesel Light Rail Transit (DLRT) is proposed for this service. The eastern terminus and Metrorail transfer of each option was also moved from Dadeland South station to Dadeland North station. This decision was made because it allowed for an exclusive transitway for the entire length of the route, and would bypass the short mixed-traffic section along Dadeland Boulevard that is required to connect to Dadeland South station. Each component of the preferred rapid transit strategy has been designed to be able to operate independently of the other. The long-range transit strategy is envisioned to adapt over time to address the changing nature of travel within the greater Kendall Area.

The components of the strategy are as follows;

- Additional near term transit improvements such as "rapid-bus" services on SW 137th Avenue and reconfigurations of the KAT express bus network.
- A single-lane reversible BRT lane located within the median of Kendall Drive from SW 167th Avenue to SW 97th Avenue.
- Single-track DLRT service on the CSX Corridor from the Miami MetroZoo area to Kendall Drive.
- A double-lane transitway located within the median of Kendall Drive from SW 97th Avenue to Dadeland North station. This transitway would be utilized by BRT vehicles traveling east and west along Kendall Drive from SW 167th Avenue to Dadeland North and by DLRT vehicles traveling north and south between the MetroZoo and Dadeland North.

Kendall Drive Bus Rapid Transit

An advantage of this strategy is that is maintains through lanes along the corridor. Several changes were made to the A1 Kendall Drive BRT alternative to address concerns with the impact to vehicular traffic. Results from the traffic analysis suggested that the two-way exclusive busway would cause significant impacts to many of the major intersections along Kendall Drive. A mix of reversible single-lanes and a double-lane section is now proposed. It would provide a similar level of transit service as a double-lane busway, but at reduced impacts to vehicular traffic flow.

The single-lane reversible busway would be constructed within the existing Kendall Drive median between SW 167th Avenue and SR 874 (Figure 17.2). Many left-turns would still need to be removed under this alternative, but the negative impacts to major intersections would not be as significant as those

caused by a double-lane cross-section. The dedicated bus lane would operate in the eastbound direction during the AM peak period and in the westbound direction during the PM peak period. Buses would operate in the less congested westbound general travel lanes during the AM and the eastbound lanes during the PM.

Traffic congestion on Kendall Drive is less severe east of SW 97th Avenue. There are fewer major cross streets, development is less intense and more space is available within the right of way for the placement of two exclusive transit lanes within the median. The double-lane transitway (Figure 17.4) would be shared by both BRT and DLRT vehicles. Buses would operate within these exclusive lanes during both the peak and off-peak periods and provide frequent service to Dadeland North station.

Results of the Tier II user benefits modeling process also suggested that a BRT route served by a network of feeder buses would provide a higher level of service than a simple trunk-line BRT operation (Figure 17.3). There are five separate schedules under the proposed the Kendall Drive BRT. The trunk-line service would operate within the Kendall Drive single-lane reversible busway from SW 167th Avenue to SR 874 and then within the double-lane transitway to Dadeland North station. The four feeder routes would collect passengers within the neighborhoods of west Kendall and then travel within the busway to Dadeland North. The four proposed feeder routes could be adapted over time to better suit the unique needs and changing travel patterns of the growing west Kendall area.

The BRT trunk line and each of the feeder bus routes would operate between 5:00 AM and midnight. They would operate every 15 minutes during peak periods and every 30 minutes during the off-peak. These combined headways would provide 3 minute peak period headway service along some portions of the Kendall Drive single-lane reversible busway and double-lane transitway between SW 137th Avenue to Dadeland North station. The trunk line service would operate from along Kendall Drive from SW 167th Avenue to Dadeland North station and make the 9.8 mile trip in approximately 39 minutes (Table 17.1).

Table 17.1: Running Time for Kendall Drive BRT

STATION	CUMULATIVE MILEAGE	ARRIVE	DWELL TIME	DEPART
Dadeland North Metrorail	0.00	0:00:00	0:00:00	0:00:00
Dadeland Mall	0.58	0:02:06	0:00:30	0:02:36
SW 79th Avenue	1.05	0:05:02	0:00:30	0:05:32
Baptist Hospital	1.94	0:07:55	0:00:30	0:08:25
SW 97th Avenue	3.01	0:10:58	0:00:30	0:11:28
SW 107th Avenue	3.82	0:15:16	0:00:30	0:15:46
SW 117th Avenue	4.99	0:17:55	0:00:30	0:18:25
SW 122nd Avenue	5.57	0:20:59	0:00:30	0:21:29
SW 127th Avenue	5.99	0:23:21	0:00:30	0:23:51
SW 137th Avenue	6.98	0:26:19	0:00:30	0:26:49
SW 147th Avenue	7.82	0:29:39	0:00:30	0:30:09
SW 152nd Avenue	8.52	0:32:50	0:00:30	0:33:20
SW 157th Avenue	8.82	0:35:03	0:00:30	0:35:33
SW 162nd Avenue	9.32	0:37:01	0:00:30	0:37:31
SW 167th Avenue	9.82	0:38:58		

Figure 17.1: Short to Mid-Term Preferred Rapid Transit Strategy

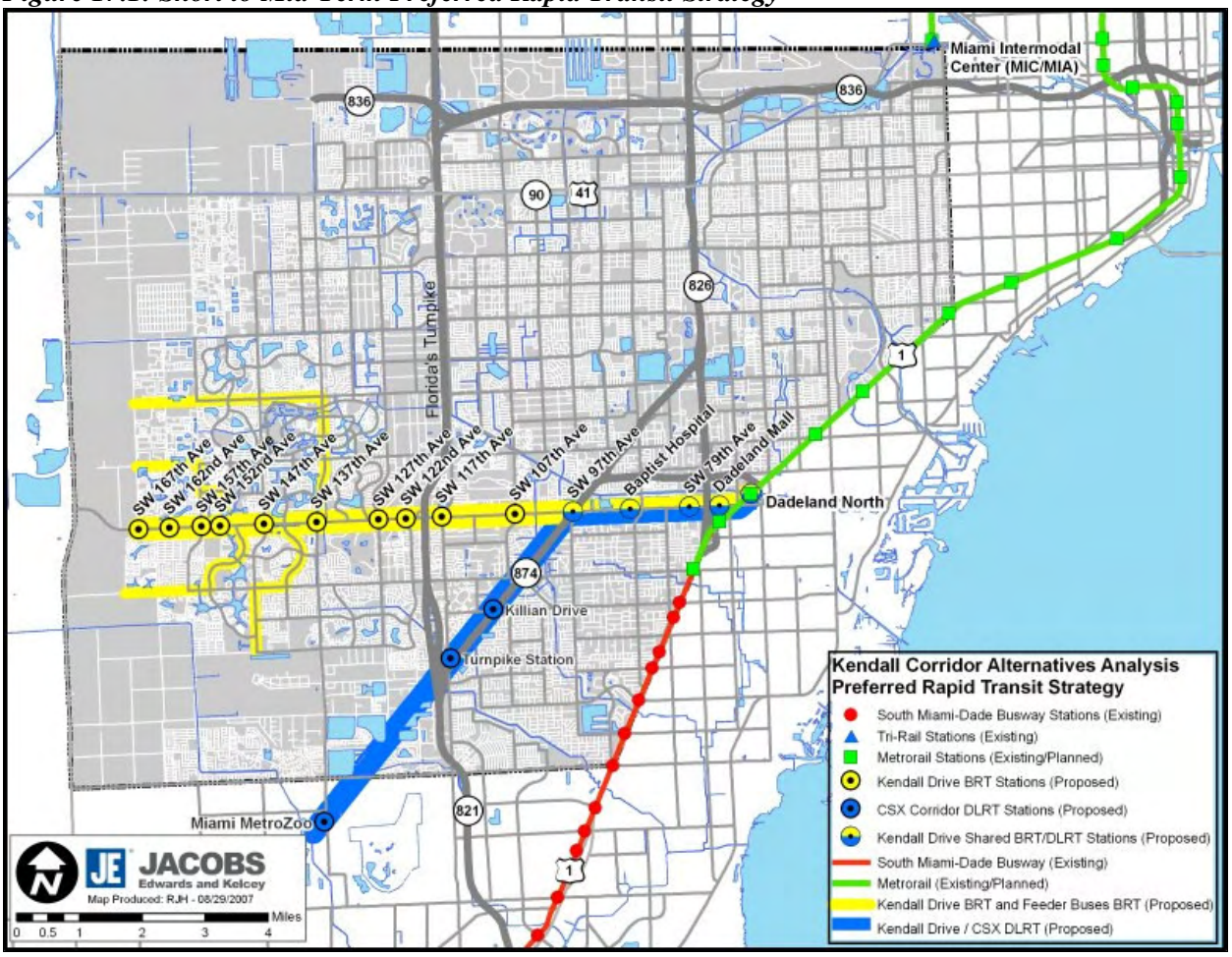
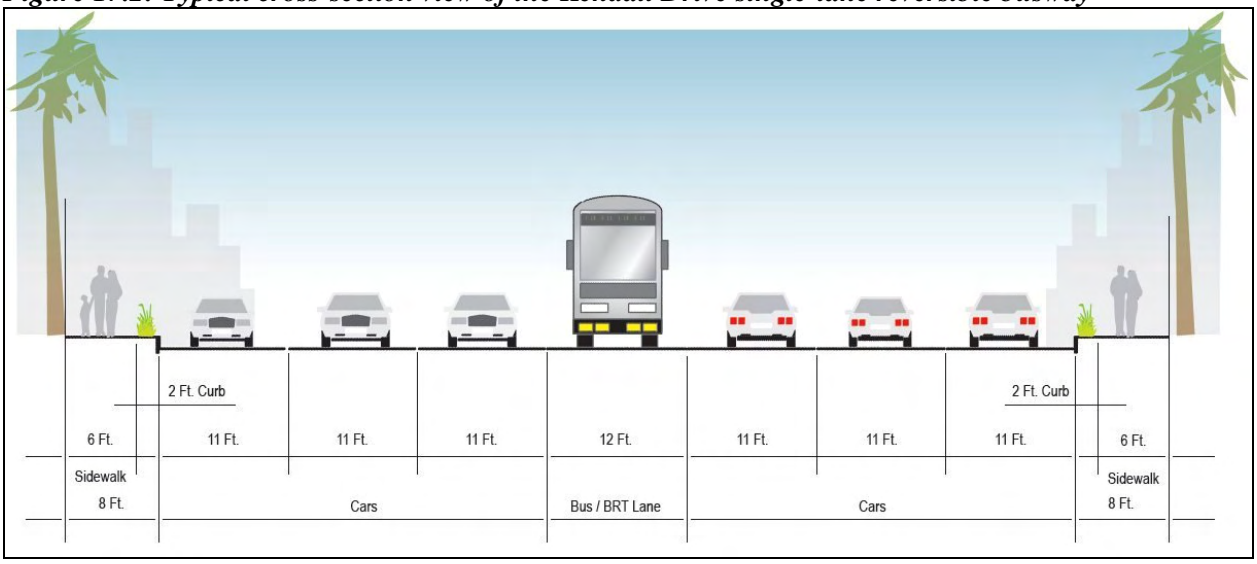


Figure 17.2: Typical cross-section view of the Kendall Drive single-lane reversible busway



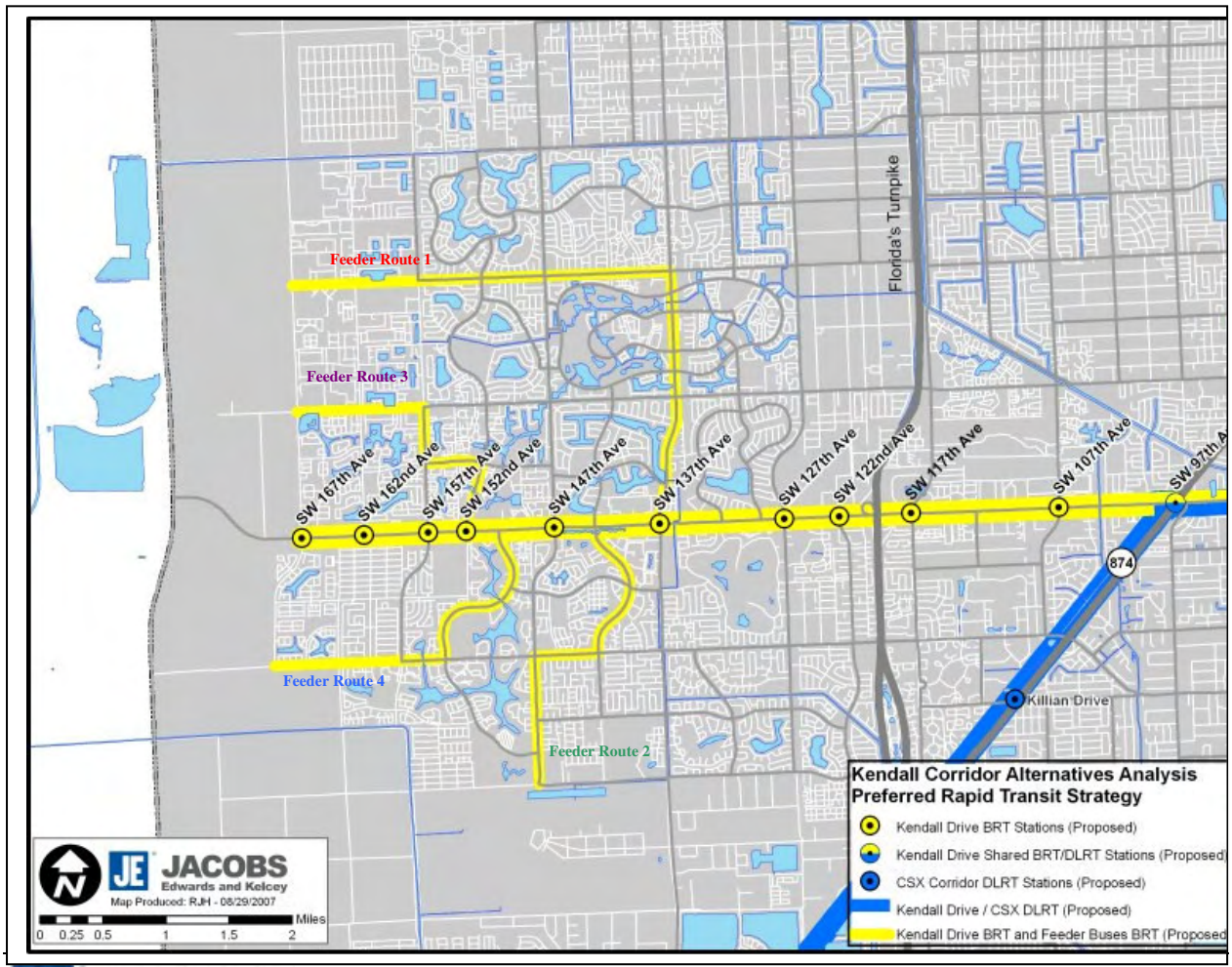
The inbound routing for Feeder Route 1 would travel from SW 167th Avenue and Miller Drive, east along Miller Drive to SW 137th Ave, south along SW 137th Ave to Kendall Drive, east in Kendall Drive single-lane reversible busway and double-lane transitway to Dadeland North Station. It would travel the length of this 12 mile trip in approximately 55 minutes.

Feeder Route 2 would begin at SW 147th Avenue and SW 120th Street north along SW 147th Avenue to Killian Parkway, east to SW 142nd Avenue and north along SW 142nd Avenue to Kendall Drive, east in Kendall Drive single-lane reversible busway and double-lane transitway to Dadeland North Station. The 10 mile trip would take approximately 42 minutes end to end.

The inbound Feeder Route 3 would travel from SW 167th Avenue and Sunset Drive, east along Sunset Drive to SW 157th Ave, south along SW 157th Ave to SW 80th Street, east along SW 80th St to SW 152nd Street, south along SW 152nd Street to Kendall Drive, east in Kendall Drive single-lane reversible busway and double-lane transitway to Dadeland North Station. The 11 mile trip is projected to take approximately 45 minutes end to end.

Feeder Route 4 would begin its inbound trip at SW 167th Avenue and Killian Parkway, travel east along Killian Drive to Hammocks Blvd, north along Hammocks Blvd to Kendall Drive, and east in Kendall Drive single-lane reversible busway and double-lane transitway to Dadeland North Station. It would travel the length of this 11 mile trip in approximately 45 minutes.

Figure 17.3: Kendall Drive BRT Feeder Bus Routes



Diesel Light Rail Transit

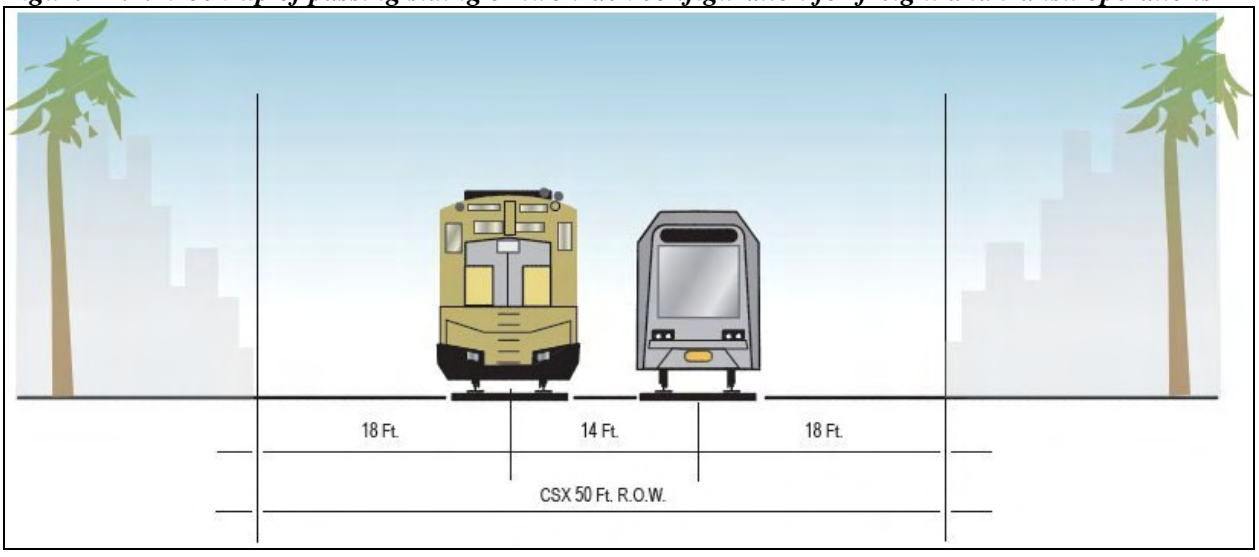
Both alignment and technology changes are proposed for the CSX Corridor alternatives. Ridership modeling did not provide evidence of a compelling need to serve the areas north of Kendall Drive or make a connection to the MIC. Furthermore, neighborhood opposition to the almost thirty at-grade highway crossings and narrow right-of-way along the northern portion of the corridor prompted the project team to consider the possibility of making a connection to Metrorail in the Dadeland area. This portion of preferred rapid transit strategy would operate with the Diesel Light Rail Transit vehicles currently in use on the River Line in New Jersey and selected for the Capital MetroRail currently planned for Austin, TX (Figure 17.6). These vehicles are not FRA-compliant, therefore there are restrictions on operations within a mixed railroad traffic environment. They have a benefit of being able to operate within a road right-of-way, much like a conventional streetcar or trolley. Additionally, the proposed redirection towards Dadeland North provides a more east-west orientation for the service that more directly addresses identified travel patterns and needs.

The C3 alternative proposed 20 minute peak headway service on a single track, while C4 called for 15 minute peak period service on a double-track alignment. The DLRT service is proposed to operate at 15 minute headways along a single-track alignment within the CSX Corridor between the MetroZoo and Kendall Drive. Two passing sidings would allow the DLRT to safely operate in both directions at 15 minute peak period headways (Figure 17.4). Table 17.2 details the projected running times for the DLRT service.

Table 17.2: Running Time for CSX Corridor/ Kendall Drive DLRT Service

STATION	CUMULATIVE MILEAGE	ARRIVE	DWELL TIME	DEPART
Dadeland North Metrorail	0.00	0:00:00	0:00:00	0:00:00
Dadeland Mall	0.58	0:02:05	0:00:45	0:02:50
SW 79th Avenue	1.05	0:05:17	0:00:45	0:06:02
Baptist Hospital	1.94	0:08:32	0:00:45	0:09:17
SW 97th Avenue	3.01	0:12:01	0:00:45	0:12:46
Killian Drive	4.12	0:16:52	0:00:45	0:17:37
Turnpike Station	5.72	0:19:45	0:00:45	0:20:30
Miami MetroZoo	9.12	0:24:10	0:00:00	0:00:00

Figure 17.4: Mock-up of passing siding or two track configuration for freight and transit operations



At Kendall Drive, the route would turn eastwards to Dadeland North, and would run along tracks placed within the paved double-lane transitway (Figure 17.5). This dual-mode operating condition exists in cities such as Denver, Portland and San Francisco where buses and light rail transit systems operate together. The DLRT vehicles would share stops with Kendall Drive BRT vehicles at SW 97th Avenue, Baptist Hospital, SW 79th Avenue and Dadeland Mall. The shared transitway would turn to the northeast where Kendall Drive meets U.S 1, and follow the former rail right-of-way under the Metrorail tracks to the transfer station at Dadeland North. The existing bus transfer facility could be redesigned to accommodate the high frequency BRT/DLRT service along Kendall Drive or a new facility could be constructed on adjacent property. Design of the transfer station and the terminal station at the MetroZoo would be dictated by operating procedures that may allow the DLRT vehicles to travel in a reversed direction or may require that they be physically turned around. The constraints imposed by these requirements would be further developed in the future should the DLRT alternative be advanced in to an engineering design phase.

Figure 17.5: Typical cross-section of the Kendall Drive double-lane shared BRT/DLRT transitway

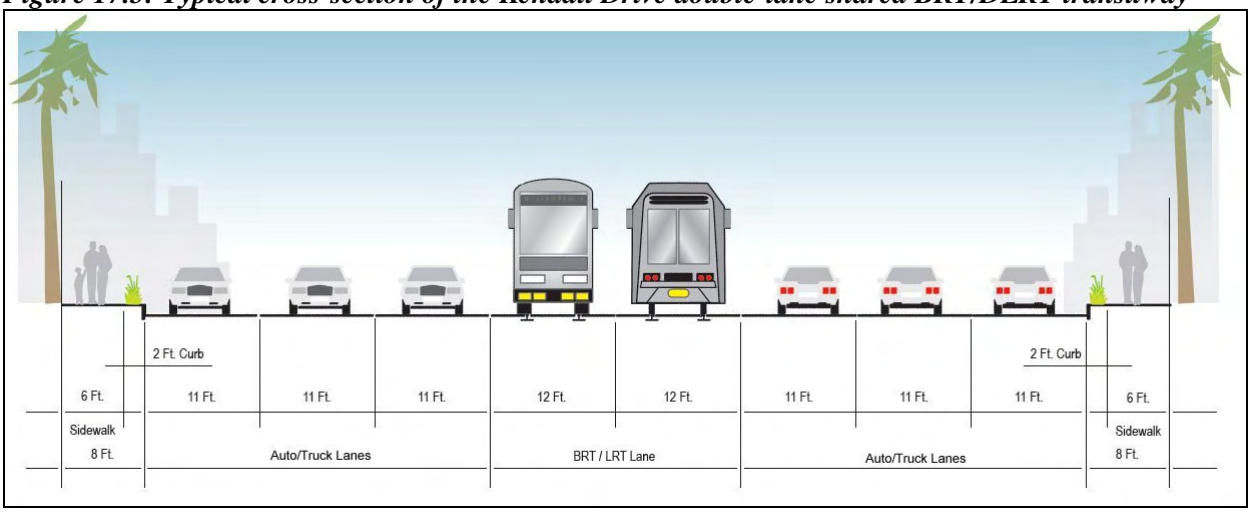


Figure 17.6: Simulation of DLRT operating within a street right-of-way(Austin, TX)

Source: Austin Capital MetroRail

Capital Costs

Table 17.3 lists the estimated capital costs for the preferred rapid transit strategy. The total cost for the Kendall BRT service including the four feeder bus routes and DLRT service along the CSX corridor is projected to be $442.7 million. The costs include the construction of the busway, transitway, light rail tracks, transit centers, stations, park-and-ride lots and maintenance facilities. It also includes the purchase of new vehicles, the acquisition of right-of-way from the CSX Corporation and a cost escalation contingency of roughly 25%.

The capital costs for the Kendall BRT are lower than were estimated during Tier II because the construction costs for the three mile shared transitway section of the alignment were accounted for in the DLRT guideway costs. This decision was made due to the fact that the installation of light rail tracks within a paved right-of-way requires much more intensive construction. The cost of the shared stations along the transitway was also included in the DLRT capital cost totals. These costs will need to be accounted for in the BRT guideway cost calculation should the DLRT component of the transit strategy not be advanced. The reduction in costs between the DLRT option and alternatives C3 and C4 is due mainly to the reduced length of the proposed alignment. Guideway costs for DLRT route were reduced by 50% from the C3 alternative and by 75% from C4.

Table173.3: Preferred Rapid Transit Strategy Capital Cost Breakdown

	TOTAL	VEHICLES	GUIDEWAY	TRANSIT CENTERS / STATIONS	MAINTENANCE FACILITY	PARK AND RIDE LOTS	RIGHT-OF-WAY	PROJECT CONTINGENCY
Kendall BRT	$ 245.1	$ 3.5	$ 165.1	$ 21.7	$ 1.1	$ 4.7	$ 0.0	$ 49.0
BRT Feeder 1	$ 5.0	$ 4.0	$ 0.0	$ 0.0	$ 0.0	$ 0.0	$ 0.0	$ 1.0
BRT Feeder 2	$ 5.0	$ 4.0	$ 0.0	$ 0.0	$ 0.0	$ 0.0	$ 0.0	$ 1.0
BRT Feeder 3	$ 5.0	$ 4.0	$ 0.0	$ 0.0	$ 0.0	$ 0.0	$ 0.0	$ 1.0
BRT Feeder 4	$ 5.0	$ 4.0	$ 0.0	$ 0.0	$ 0.0	$ 0.0	$ 0.0	$ 1.0
DLRT	$ 177.5	$ 31.1	$ 61.8	$ 6.2	$ 10.1	$ 7.9	$ 25.0	$ 35.5
Total	$ 442.7	$ 50.6	$ 226.9	$ 28.0	$ 11.2	$ 12.6	$ 25.0	$ 88.5

Operations and Maintenance Costs

The detailed service plans generated during Tier II were adapted to reflect the changes and additions to the proposed transit service. A slight increase was seen for the Operations and Maintenance (O&M) costs for the BRT service. This was mainly due to the additional feeder bus routes that would require new buses and more drivers. These routes would also provide a large amount of the trunk line service, offsetting those costs to some degree. Each of the feeder routes was projected to cost approximately $1.7 million per year to operate. The trunk line BRT service costs reduced from $4.8 million to $2.1 million. A further savings of $100,000 was accounted for by allocating the station maintenance costs for the shared BRT / DLRT stations to the light rail service's budget. The total annual cost required to operate the proposed BRT service would be $8.9 million. These costs are double of what those projected for Tier II Alternative A1, but would provide a much higher level of transit service.

The proposed DLRT service is projected to cost approximately $5.2 million to operate each year. This cost is reduced from the C3 and C4 O&M costs due mainly to the reduced length of the proposed alignment. The operating profile and cost calculations are shown in Tables 17.4 and 17.5. Operations costs are a function of the amount of service provided. The total number of vehicles and the annual vehicle service hours required to operate the service are based on the conceptual headway levels, number of trips and roundtrip travel times. The total projected operations and maintenance cost for the preferred rapid transit strategy is $14.3 million per year.

Table 17.4: Preferred Rapid Transit Strategy Operating Profile

	SERVICE SPAN		HEADWAY (MINS) WEEKDAYS		WEEKENDS	SERVICE SPAN HOURS WEEKDAYS		WEEKENDS	ONE-WAY TRIPS WEEKDAYS		WEEKENDS	ROUND TRIP TRAVEL TIME (MINS)	CYCLE TIME (MINS)
	BEGIN	END	PEAK	OFF-PEAK	ALL DAY	PEAK	OFF-PEAK	ALL DAY	PEAK	OFF-PEAK	ALL DAY		
Kendall BRT	5:00	23:59	15	30	20	6	13	19	50	54	78	1:17	80
BRT Feeder 1	5:00	23:59	15	30	20	6	13	19	50	54	78	1:04	90
BRT Feeder 2	5:00	23:59	15	30	20	6	13	19	50	54	78	1:01	90
BRT Feeder 3	5:00	23:59	15	30	20	6	13	19	50	54	78	1:07	90
BRT Feeder 4	5:00	23:59	15	30	20	6	13	19	50	54	78	1:12	90
DLRT	5:00	23:59	15	30	30	6	13	19	50	54	78	0:52	60

Table 17.5: Preferred Rapid Transit Strategy Operations and Maintenance Cost Calculation

	ROUND TRIP DISTANCE (MILES)	VEHICLE CONSIST LENGTH	DAILY VEHICLE REQUIREMENT	PEAK VEHICLE DAYS	ANNUAL VEHICLE SERVICE HOURS	ANNUAL VEHICLE SERVICE MILES	ANNUAL OPERATING COSTS
Kendall BRT	19.6	1	6	1,793.3	26,208	386,042	$ 2.2
BRT Feeder 1	15.5	1	7	2,017.5	29,484	305,453	$ 1.7
BRT Feeder 2	15.0	1	7	2,017.5	29,484	294,839	$ 1.7
BRT Feeder 3	17.8	1	7	2,017.5	29,484	349,875	$ 1.7
BRT Feeder 4	18.3	1	7	2,017.5	29,484	360,490	$ 1.8
DLRT	18.2	2	9	2,230.0	34,946	637,409	$ 5.3
Total			43	12,093.3	179,089	2,334,108	$ 14.3

Ridership Forecasting

Each of components of the preferred rapid transit strategy were again evaluated using the Bi-County Travel Model. Special care was taken to ensure that all walk-links, bus route transfers, parking costs and travel times were accurately reflected in the model. Table 17.6 shows that projected ridership rose for the Kendall BRT alignment from 10,048 daily riders to 12,419. While different in nature, the DLRT option was modeled to carry 3,708 riders per day, whereas the C4 alternative was projected to carry 3,083 riders. The combined ridership of the preferred rapid transit strategy was projected to be 13,060 riders per day. This figure is approaching the 15,565 projected daily riders on the A4 Kendall Metrorail alternatives, but at one-quarter of the capital cost outlay.

Table 17.6: Preferred Rapid Transit Strategy Operations and Maintenance Cost Calculation

	KENDALL BRT AND FEEDER ROUTES	DLRT	PREFERRED RAPID TRANSIT STRATEGY
Peak Inbound			
Total Riders	1,798	1,402	2,278
Maximum Load	199	882	301
Peak Outbound			
Total Riders	3,793	312	3,761
Maximum Load	184	224	167
Off-Peak Inbound			
Total Riders	2,789	1,439	3,009
Maximum Load	232	454	243
Off-Peak Outbound			
Total Riders	4,039	555	4,012
Maximum Load	344	294	366
Daily Trips	12,419	3,708	13,060

User Benefits Modeling

The FTA's SUMMIT Model was again used to calculate the projected levels of user benefit that would be provided by the proposed improvements. Updated measures of travel time savings, travel time cost savings and the cost per new transit trip were generated for the preferred rapid transit strategy. The values in Table 17.7 show that the combined package of transit improvements including the Kendall Drive BRT with the feeder bus routes and the DLRT service is projected to provide 810,320 annual hours of benefit to the traveling public. The cost of these user benefits is $47.60 per benefit hour and the cost per new transit trip would be $10.55. These values perform well when compared to the results from the Tier II evaluation, and with similar proposed transit improvements from around the country.

Table 17.7: Projected Annual Benefit Hours, User Benefits and Cost per New Transit Trip

ALTERNATIVE	ANNUAL BENEFIT HOURS	USER BENEFIT COST	COST PER NEW TRANSIT TRIP
Kendall BRT + Feeder Routes	887,880	$20.86	$5.33
DLRT	173,320	$65.38	$10.91
Preferred Rapid Transit Strategy	810,320	$47.60	$10.55

Integration with the Community

The preferred rapid transit strategy is comprised of a package of transit improvements that provide a good balance between costs and benefits. The number of riders projected to use the proposed system is greater than all but one of the Tier II alternatives. While the Kendall Metrorail was projected to carry over 15,000 riders per day, its capital, O&M and user benefit costs were all calculated to be significantly higher than those of the preferred rapid transit strategy. Furthermore, the addition of BRT feeder buses to the west Kendall neighborhoods and the inclusion of the diesel light rail connection between the southwest Kendall and Dadeland areas provides a greater level of mobility improvements than were seen with any of the Tier II alternatives.

The preliminary analysis of the preferred rapid transit strategy alternatives suggests that the proposed transit improvements would provide a positive net benefit to Kendall area residents. Transit improvements can lead to air quality improvements through a reduction in the number of vehicle miles traveled as commuters elect to leave their cars at home. The proposed improvements would operate within existing rights-of-way and would not cross the urban development boundary. No natural resource, water quality or species habitat impacts have been identified at this stage.

The Kendall Drive BRT service is anticipated to result in impacts to vehicular traffic due to the removal or reduction in width of travel lanes required to accommodate the exclusive BRT lanes. Many existing left-turn lanes would have to be eliminated to provide space within the road right-of-way for the exclusive lanes and stations and to minimize conflicts with turning vehicles. The single, reversible-lane busway proposed in the preferred rapid transit strategy however, would have a diminished level of impact on vehicular traffic than was calculated for the double-lane busway evaluated during Tier II. Should this option advance for further consideration a more detailed traffic assessment would be evaluated in an Environmental Impact Statement (EIS).

The benefit of using DLRT vehicles is that they can operate within the CSX rail freight corridor and through the residential and commercial environs of Kendall Drive. They do not require the expensive and unsightly overhead wires that are a distinctive characteristic of most conventional light rail systems currently operating around the world. These light rail vehicles operate with an engine that is very similar to those used by a typical city bus, and could potentially utilize a hybrid, bio-diesel, electric propulsion system.

The number of at-grade highway crossings would also be significantly diminished by reducing the portion of the CSX Corridor that would be used for transit service from 18.4 miles down to 6.1 miles. Both traffic impacts and safety concerns would be moderated by reducing the number of at-grade crossings from the

thirty-four evaluated during Tier II down to just four. The analysis performed on the CSX alternatives during Tier II evaluation indicated that a moderate level of traffic impacts would occur where the transit vehicles meet roads at the grade crossings. It is not anticipated that the operation of DLRT vehicles on 15 minute headways will significantly impact the traffic conditions along these roads. The DLRT vehicles are now proposed to operate through existing road intersections along the street-median running section of the Kendall Drive transitway. There are many examples across the country of light rail vehicles that run within the median of a road and operate in a manner comparable to a prioritized bus.

The DMU alternatives evaluated during Tier II were proposed to operate on the existing CSX freight rail tracks. To provide both passenger and freight service on the same track, some of the rock trains would have been shifted to outside the DLRT service span. This is a safety measure that the Federal Railroad Administration (FRA) refers to as temporal separation. Many residents were opposed to having rock trains operate through the night. The smaller, lighter DLRT vehicles proposed as part of the preferred rapid transit strategy are not compliant with FRA safety regulations and would not be permitted to operate on these same freight tracks. Alternatively, these vehicles meet the FRA spatial separation safety measures allowing that a separate track be constructed within the CSX corridor. The right-of-way south of Kendall Drive provides adequate space for this additional track and would permit freight operations to continue during the day.

Some degree of noise, vibration and visual impact can be expected should any of the alternatives be implemented. Kendall area residents and particularly those living adjacent to the CSX corridor are familiar with the rock trains that make several daily trips along the tracks. The new DLRT tracks would be constructed with continuously welded rail that minimize rail noise and vibration. An extremely smooth guideway is created by eliminating the track joints that are the cause of most train wheel noise. Detailed noise and vibration studies would be required as part of any further development of this alternative through the environmental impact and design phases.

Additional noise and vibration mitigation measures could be adopted should the DLRT option be implemented. The Miami-Dade Expressway Authority has proposed to construct a sound wall along the western edge of the SR 874 right-of-way, between the expressway and the CSX tracks. Placing this sound wall to the west of the CSX right-of-way was a desire expressed by many area residents and should be considered as part of any improvements along the corridor. Finally, Miami-Dade Transit could approach the FRA with a proposal to implement quiet zones at the highway-rail crossings along the CSX corridor. Quiet zones have not seen broad adoption in the United States, but are being proposed more often as communications and signaling technology continues to advance. These measures could be applied to the at-grade crossings at Killian Drive / SW 112th Street, Coral Reef Drive / SW 152nd Street and SW 137th Avenue. The crossing at Kendall Drive and SW 97th Avenue would incorporate a specialized transit signal system much like the rest of the Kendall drive transitway.

The preferred rapid transit strategy could encourage smart growth development in the Kendall area and provide alternatives to the automobile based development that characterizes the region. Miami-Dade County land use regulations automatically rezone properties to allow for additional density when a transit station is constructed nearby. Residents or employees of transit oriented developments may choose to walk to nearby transit stations or nearby retail shops instead of driving. The new LYNX light rail line in Charlotte, NC has experienced hundreds of millions of dollars of private investment prior to the opening of the system. Similar fixed-guideway transit improvements across the nation have encouraged economic development near stations and within their respective regions. The Kendall BRT and CSX DLRT transit improvements have the potential to attract similar economic development opportunities.

Table 17.6: Final Project Screening

	PROJECT LENGTH (MILES)	PROJECTED TRAVEL TIME (MINUTES)		DAILY RIDERS (2030)	CAPITAL COST	ANNUAL O&M COSTS	ANNUAL BENEFIT HOURS	USER BENEFIT COST	COST PER NEW TRANSIT TRIP	IMPACTS TO AUTO TRAFFIC
		CBD*	MIA**							
Kendall BRT w/ feeders	9.82	45 - 53	55 - 63	12,419	$265.1	$8.9	887,880	$20.86	$5.33	●
CSX DLRT	9.12	45 - 53	55 - 60	3,708	$177.5	$5.3	173,320	$65.38	$10.91	◉
Combined	15.93*	n/a	n/a	13,060	$442.7	$14.2	810,320	$47.60	$10.55	●

Table Key: High: ● Medium: ◉ Low: ○

*Accounts for 3.01 miles of the shared transitway

Implementation Strategy

The preferred rapid transit strategy is composed of a range of elements that should be considered as short, mid and long term improvements. It becomes harder to predict how travel and development patterns may change as one looks further in to the future. The proposed long-term improvements should be considered as conceptual projects that will require much additional evaluation once a more precise understanding of future travel demand conditions can be gained. A map of the proposed long-term preferred rapid transit strategy is shown in Figure 17.7.

Short-Term (1-5 years)

- Complete the planned "rapid-bus" upgrades to Kendall Drive and the County's "Buses-on-Shoulders" strategy
- An additional "rapid-bus" route is proposed to run north-south along SW 137th Avenue
- Begin implementation of the single-lane reversible busway on Kendall Drive between SW 97th Avenue and SW 167th Avenue.

It is conceivable that the single-lane reversible busway could build upon the "rapid-bus" improvements and be phased in over time. Intermodal transit centers or park-and-ride facilities at proposed mid and long-term station locations may also be implemented in the short-term and presage the construction of fixed-route transit system.

Mid-Term (5-15 years)

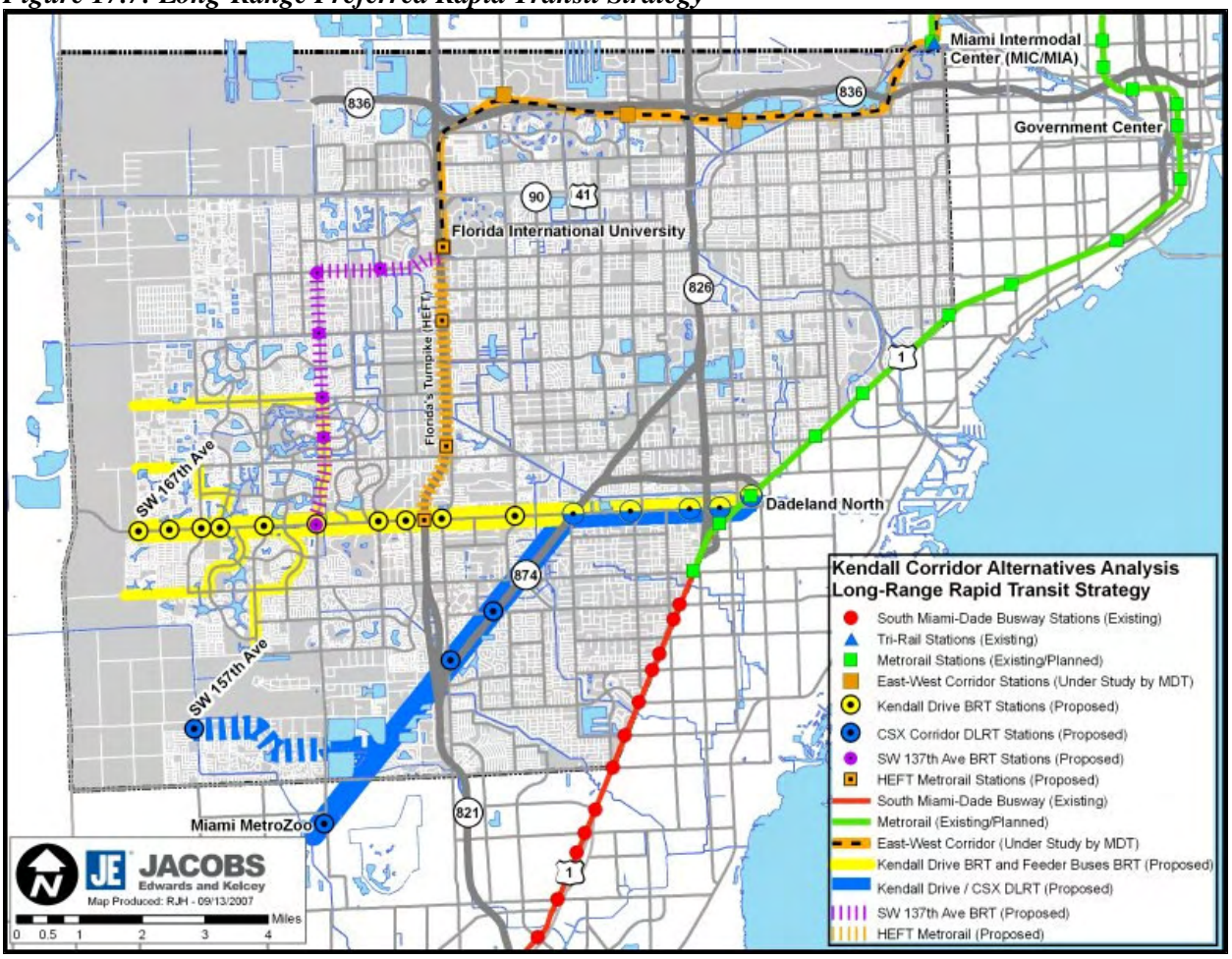
- Completion of the single-lane busway on Kendall Drive between SW 97th Avenue and SW 167th Avenue
- Construction of the dual-lane transitway on Kendall Drive from SR 874 to Dadeland North
- Implementation of DLRT service along the CSX Corridor and Kendall Drive transitway

Long-Term (15+ years)

- A double-lane exclusive busway could be provided on Kendall Drive west of SW 97th Avenue should demand warrant
- A second track could be added to the CSX Corridor portion of the DLRT route should demand warrant
- The Alternative C5 routing option to SW 157th Avenue may also bear reconsideration in the future as the southwest Kendall area continues to grow.
- The B1 Metrorail extension or the D1 BRT should be reevaluated as potential long-term improvements once the ongoing East-West Corridor project is finalized.

Alternatives B1 and D1, the HEFT Metrorail and SW 137th Avenue BRT performed well on one or more evaluation measures. The results of the Tier II analysis were based on the assumption that service to FIU by the East-West Metrorail would be in place. The future of that project remains uncertain, and the project team recommends that the north-south options devised to feed that system be revisited once a better understanding of future east-west transit service is developed.

Figure 17.7: Long-Range Preferred Rapid Transit Strategy



18 Conclusions

The study team recommends a preferred rapid transit strategy comprised of both Bus Rapid Transit (BRT) and Diesel Light Rail Transit (DLRT). It provides the best combination of user benefits and increased mobility and does so at relatively low costs. The combined Kendall Drive and CSX Corridor alignment provides a significant increase to the level of transit service in the greater Kendall area. Transit operations would be prioritized along one of the most important commercial and residential corridors in southwest Miami-Dade County. New travel opportunities are opened up to the expanding communities west of the Turnpike (HEFT) around the Tamiami Airport, providing easy access to the burgeoning downtown Kendall area and a connection to the region's Metrorail system.

The number of riders projected to use the proposed system on a daily basis is the second highest level calculated during the study. Projected capital costs would be near the middle of the range from $190 million to $1.7 billion for the evaluated alternatives. Operations and maintenance costs would be higher than projected for most of the alternatives, but provide a high level and frequency of service. A very reasonable level of user benefit hours would be realized should the transit strategy be implemented. These benefits are projected to be cost competitive with related transit projects or traffic mitigation measures. While there would be significant impacts to existing vehicular traffic patterns, experience has shown that changes in travel patterns encouraged by the increased mobility of a prioritized transit system can offset those impacts to some degree.

Several short-term transit improvements are planed for implementation within the study area. These small, incremental projects can begin to increase the level of transit service along Kendall Drive and set the stage for the larger investments proposed for the future. Additional long-term improvements have been identified that can further increase mobility within the Kendall area. Each of the short, mid and long term projects proposed in the preferred rapid transit strategy could be implemented separately. They have been designed, however, with the goal of building out a widely distributed and interconnected transit system. This systems-wide approach is being applied throughout Miami-Dade County in order to build upon existing investments and to ensure that future improvements are easily integrated.

The preferred rapid transit strategy provides a good starting point for what should be a long discussion. None of the alternatives are planned for construction at this time, and no final implementation decisions have been made. Several significant issues must still be resolved. No funding plan has been developed for any of the proposed improvements and the Miami-Dade MPO will need to begin the search for available funds. The magnitude of projected costs does provide for some degree of flexibility. It may be possible to find additional state or federal funding sources that could be used to implement the transit strategy without competing for money against other planned Miami-Dade transit projects. Additionally, lease and operating negotiations with the CSX Corporation must be completed to ensure that passenger service can safely operate within the existing freight operations along the right-of-way.

Should any component of the preferred rapid transit strategy advance for further consideration stakeholder concerns relating to potential environmental impacts such as traffic noise, vibration, and property value impacts will be evaluated in an Environmental Impact Statement (EIS). It is incumbent upon the residents and elected officials of the greater Kendall area, and Miami-Dade County as a whole to evaluate the costs and benefits of the proposed system. The merits of the preferred rapid transit strategy should be weighed carefully against both the real and perceived impacts of the proposed improvements.

Public Involvement

The technical evaluation detailed in this report is only one component of the project screening process. It produces data that describes the proposed projects in terms of estimated costs and user benefits. Review by technical committees, public officials and the community at large is also an integral part of the discussion regarding the value and impacts of any project.

Meeting announcements were distributed to elected officials, community groups and media outlets including both local and regional newspapers. Sign-in sheets were collected at each meeting and email announcements were distributed to attendee lists. A website (www.kendall-link.com) was also created for the purpose of announcing meetings and sharing study documents. Links were provided both to and from the Miami-Dade MPO website (www.miamidade.gov/mpo). Finally, a comment email address kendalllink@gmail.com was also available to collect additional comments online.

An initial set of public meetings were held on April 5th and 6th during 2006 at the Kendall Village Center and the West Dade Regional Library. These outreach events were held as a way to introduce residents to the study team and the scope of the study. Attendees discussed the project goals and objectives and provided initial feedback on the needs and desires of their community.

A second round of public outreach meetings were held on November 2, 2006 at the Wayside Baptist Church and November 8, 2006 at the West Kendall Regional Library. The goal of these evening open house meetings was to provide area residents and business owners with the opportunity to learn more about the initial phases of the study, express their views, and address questions about the Tier I alternatives. Approximately 100 people attended the two meetings that were held in both the eastern and western ends of the Kendall Corridor.

A short video describing the proposed transit technologies was shown to residents while discussions were held at project boards distributed throughout the room.

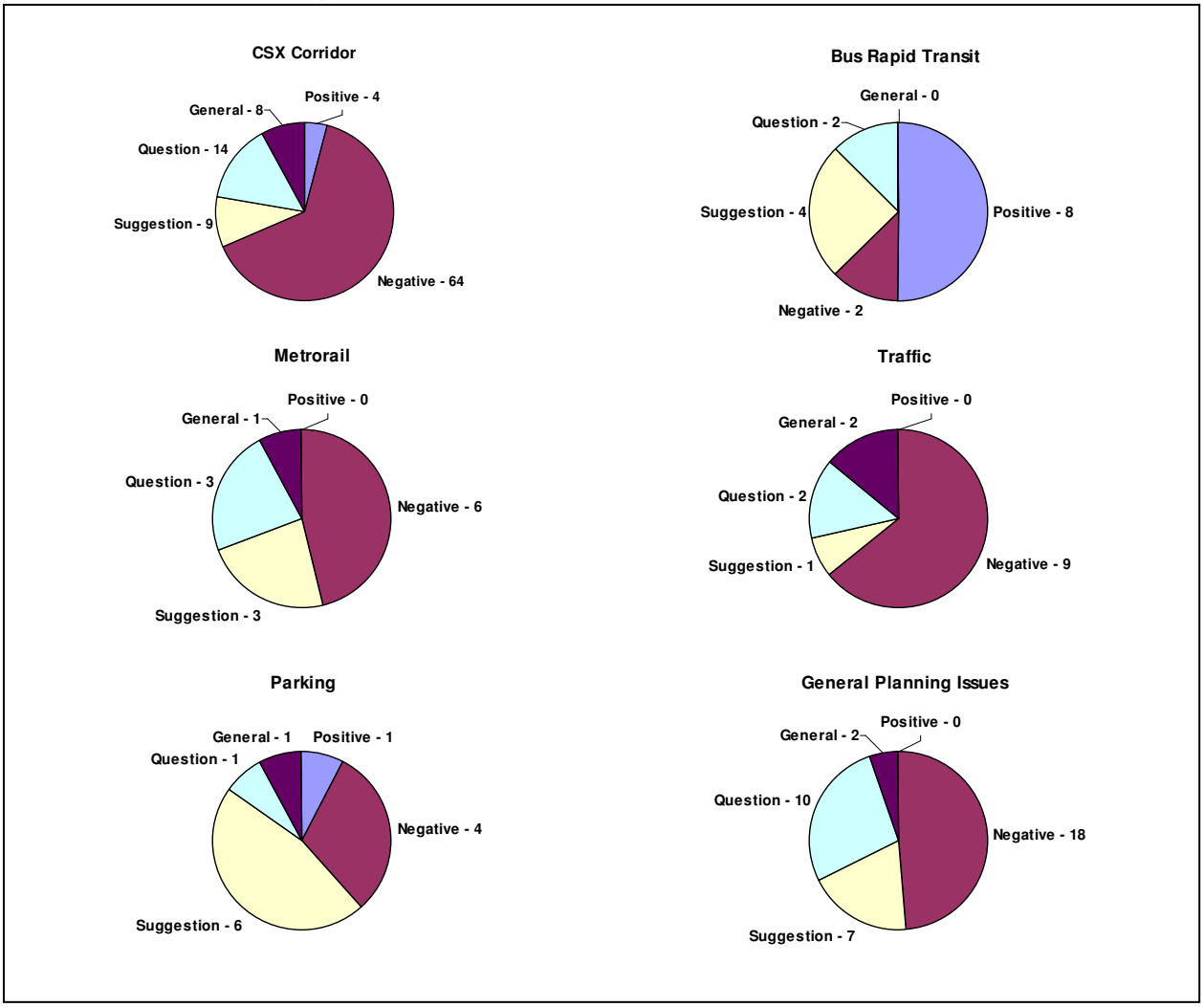
Attendees expressed concerns about project costs, station locations and impacts to traffic, parking, noise, vibration, and property values. They also shared comments and suggestions on issues that were important for the project team to study in more detail during the second phase of the study. These included the potential for grade-separated rail crossings, terminal-to-terminal rail service along the CSX corridor, and a transit corridor running along Krome Avenue that would meet the planned East-West Metrorail line at the Turnpike and SR 836 interchange.

The results from the Tier II analysis were shared with almost 200 residents on April 24th and 25th in 2007 at the Kendall Village Center and in the southwest Kendall area at the Country Walk Homeowners Association Clubhouse. The more detailed presentations included a discussion of the nine Tier II alternatives, their projected costs and forecasted levels of ridership. The project team also presented the results of the detailed traffic analysis of major intersections on Kendall Drive and the at-grade crossings along the CSX Corridor.

Many attendees expressed concern with how the CSX corridor alternatives would impact traffic, noise and vibration levels, air pollution, property values and quality of life along the proposed route. They also suggested that a new alternative exploring the potential BRT service along SW 137th Avenue should be added to the study. Figure 18-1 displays a short summary of the nature of comments received during the

outreach effort. They show not only the large number of negative comments on the CSX Corridor DMU proposals, but also the negative feelings towards the potential for Metrorail along Kendall Drive and potential traffic impacts of the proposals. Only 4% of the 99 comments regarding the CSX corridor were positive, while half of the 16 comments on the BRT proposals were positive. A log of spoken comments from each of the public outreach meetings can be found in Appendix 1.

Figure 18-1: Summary of Spoken Comments



A Frequently Asked Questions (FAQ) sheet and newsletter were prepared to address the main concerns of the residents and to further describe the alternatives under consideration Appendices 2 and 3. These items were posted to the study's website (Appendix 4) and distributed at the final round of open house meetings.

The final three meetings were held in the summer of 2007 on June 25th, 26th, and 27th at the Alpha-Omega Church, Kendall Village Center, and West Kendall Regional Library. Elected officials requested that this additional set of meetings be held before the project team finalized the Tier II evaluation and completed development of the preferred rapid transit strategy. Public opposition to the use of the CSX Corridor for rail rapid transit by those in attendance was almost unanimous and the community had begun to organize against it.

MPO Board Action

Multiple meetings to discuss the study progress were held with the Miami-Dade MPO Governing Board. The results and recommendations of the *Kendall Corridor Transportation Alternatives Analysis* were presented to the Miami-Dade MPO Governing Board for action at their October 5, 2007 meeting. The meeting was well attended and approximately 110 members of the public arrived to the Stephen P. Clark Government Center wearing red t-shirts with a "No CSX" logo. Board Member Joe Martinez stepped down from the dais and addressed the Board in support of the study alternatives. He discussed how the proposed improvements would not solve traffic congestion but that their intended purpose was to provide more travel options for the Kendall area. He admitted that some residents may be unhappy or inconvenienced should any of the alternatives be implemented, but that he felt the proposed transit improvements would benefit the community at large. The following is a concise summary of the discussions held.

Board Member Carlos Gimenez declared that he was against the proposed CSX corridor rail alternatives due to their high costs versus low ridership. He suggested that pursuing the northwest freight consolidation proposal that would remove freight from the Homestead Branch and then implementing BRT service would be a better option.

Board Member Katy Sorensen raised the question of whether land use in the Kendall area was dense enough to support any rail option. She was not comfortable with the prospect of shifting CSX freight operations to the night time in order to support passenger service. She felt that the traffic impacts resulting from the BRT alternatives would require additional analysis, but that they would be better than the CSX rail options. She urged the board to consider moving forward with the short-term bus service recommendations immediately.

Board Member Javier Souto requested that the any further Kendall corridor transit studies should include consideration of the FEC corridor from the MIC to Dadeland North. Rebecca Sosa felt that a more thorough analysis would be required before a decision could be made and requested that any mention of implementation, completion or construction be deleted from the study. She asked how the proposals related to those put forward in the People's Transportation Plan and urged that the community must look forward to a new future where transit played a more vital role in moving people.

North Miami Mayor Kevin Burns admonished residents of the area if so few riders are projected to ride the proposed transit lines. He also offered his support for further study of the northwest freight consolidation. Jose "Pepe" Diaz said that all the proposals had merit, but that the Board would need more information if they were to make a responsible decision. He wanted to see how the entire transit system of the future would work, and asked if the proposals were the best way to improve the existing system. Chairman Bruno Barreiro suggested that the fatal flaw in any of the proposed improvements were the at-grade crossings. He expressed his support for the region's Metrorail system and the benefit that a one-seat ride to downtown provides to users.

In the end, the MPO Board voted to accept the study's recommendations but requested that additional analysis be completed before a decision to advance the proposals in to the design phase could be made.

Next Steps

Elected officials and members of the public expressed broad support for implementing quality transit improvements in the greater Kendall area. Miami-Dade MPO Staff will determine a logical set of additional analyses to address the questions raised by the Board and at the public outreach events. Detailed traffic and environmental impact analysis and additional investigation into projected user benefits will need to be developed to address these concerns. This further analysis may represent an extension of this study or be included in a companion transit planning effort.

Should a preferred alternative be selected and be deemed worthy of additional study, the MPO Board could at that time decide to enter the Federal Transit Administration environmental analysis and review process. This detailed written statement would focus on the possible impacts of the proposed transit improvements and measures to mitigate any potential harm to the community and the natural environment. Typically, environmental reviews for proposed transit improvements address the impact areas of traffic congestion, air and water quality, noise and vibration, historic and cultural properties, parklands, contaminated lands, displacement of residences and businesses, and community preservation. During the federal environmental review process, local public transportation agencies are required to with state and other local agencies to comply with state and local environmental laws. Participation from technical committees, public officials and the community at large is an integral and federally mandated part of the environmental review process.

MPO RESOLUTION #36-07

RESOLUTION SELECTING A PREFERRED RAPID TRANSIT STRATEGY FOR THE KENDALL 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 the Preferred Rapid Transit Strategy for the Kendall 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, that the proposal for a Preferred Rapid Transit Strategy for the Kendall Corridor is hereby approved as follows:

1. Short-Term (1-5 years)
   - Planned "rapid-bus" upgrades to Kendall Drive and County's "Buses-on-Shoulders" strategy.
   - Evaluate an additional "rapid-bus" route to run north-south along SW 137th Avenue.
   - Evaluate single-lane reversible busway on Kendall Drive between SW 97th Avenue and SW 167th Avenue as a potential mid-term improvement.

2. Mid-Term (5-15 years)
   - Evaluate dual-lane transitway on Kendall Drive from SR 874 to Dadeland North.
   - Evaluate transit services along the CSX Corridor and Kendall Drive transitway. Staff shall explore the feasibility and advisability of all reasonable options.

3. Long-Term (15+ years)
   - Evaluate double-lane exclusive busway on Kendall Drive west of SW 97th Avenue should demand warrant.
   - Evaluate the addition of a second track to the CSX Corridor portion of the route should demand warrant.
   - Reconsider Alternative C5 routing option to SW 157th Avenue in the future as the southwest Kendall area continues to grow.
   - Evaluate an extension of Metrorail along the HEFT from FIU to SW 152nd Street or BRT along SW 137th Avenue once a better understanding of future east-west transit service is developed.

4. Evaluate transit service along the FEC Corridor from Dadeland North to the Miami International Airport.

5. Proposals for the advancement of any Kendall Corridor Preferred Rapid Transit Strategy component shall be brought back with supporting data and analysis to the MPO Governing Board for approval.

The adoption of the foregoing resolution was moved by Board Member Joe A. Martinez. The motion was seconded by Board Member Jose "Pepe" Diaz, and upon being put to a vote, the vote was as follows:

Chairman Bruno A. Barreiro-Aye
Vice Chairwoman Barbara J. Jordan-Aye

Board Member Kevin A. Burns	-Aye	Board Member Dennis C. Moss	-Absent
Board Member Jose "Pepe" Diaz	-Aye	Board Member Julio Robaina	-Absent
Board Member Audrey M. Edmonson	-Aye	Board Member Dorrin D. Rolle	-Aye
Board Member Shirley M. Gibson	-Aye	Board Member Marc D. Sarnoff	-Absent
Board Member Carlos A. Gimenez	-Aye	Board Member Natacha Seijas	-Absent
Board Member Perla T. Hantman	-Aye	Board Member Katy Sorenson	-Nay
Board Member Sally A. Heyman	-Absent	Board Member Rebeca Sosa	-Nay
Board Member William H. Kerdyk	-Aye	Board Member Javier D. Souto	-Aye
Board Member Joe A. Martinez	-Aye	Board Member Richard L. Steinberg	-Aye

The Chairperson thereupon declared the resolution duly passed and approved this 4th day of October, 2007.

METROPOLITAN PLANNING ORGANIZATION
M.P.O.

By _____
Zainab Salim, Clerk
MPO Secretariat

METROPOLITAN PLANNING ORGANIZATION DADE COUNTY FLORIDA MPO

Appendix 1 – Spoken Comments from the Public Outreach Events

Thursday, November 2, 2006 - Wayside Baptist Church

1)	CSX Corridor	The CSX DaMU option will kill Kendall traffic
2)	Metrorail	No Metrorail on Kendall Drive
3)	Metrorail	Remember past promises to not extend Metrorail or increase rail traffic through residential neighborhoods
4)	Traffic	We need something that will alleviate traffic, not make it worse
5)	CSX Corridor	Read the PB Southwest rail corridor report; there is not enough demand to justify the high costs
6)	CSX Corridor	Have you thought about building rail bridges at major roads so that the trains would not interfere with traffic

Wednesday, November 8, 2006 - West Kendall Regional Library

1)	CSX Corridor	The CSX DMU option will hurt Kendall traffic
2)	CSX Corridor	With 30 trains closing the crossing gates for 50 seconds at a time, that's 24 minutes a day that Kendall Drive will be stopped
3)	Planning	Have you looked at transit options that would travel north along Krome Avenue? Traffic would move against the dominant flow towards the urban growth boundary and then loop over to the East West corridor.
4)	BRT	Bus options are more flexible than rail options
5)	CSX Corridor	Have you considered a terminal to terminal DMU service with no intermediate stops? That would reduce the number of trains stopping traffic to 3 inbound trains in the morning and then 3 outbound trains in the afternoon.
6)	CSX Corridor	This is already a done deal. The agreement with CSX in Orlando acknowledged that the Homestead Branch could operate under the same or similar agreements.
7)	CSX Corridor	The CSX DMU option goes from nowhere to nowhere.
8)	Parking	There is nowhere to put parking at the stations along the corridor.

Tuesday, April 24, 2007 - Kendall Village Center

1)	CSX Corridor	The DMU will just add to congestion and not solve it
2)	CSX Corridor	I live adjacent to the CSX. I'm worried about my kids since they're already awakened by train noise at 4am. What is going to happen once there at 40 or 50 trains a day.
3)	CSX Corridor	The 45 second delay at the grade crossings doesn't sound reasonable to me since I regularly wait up to 20 minutes for the rock train now as it is.
4)	CSX Corridor	Can the DMU tracks be elevated on a bridge over Kendall Drive?
5)	Traffic	All the alternatives seem to be negatively impacting traffic and that doesn't seem right to me.
6)	CSX Corridor	The CSX DMU option runs north-south and doesn't alleviate any of the dominant east-west traffic.
7)	Outreach	Why wasn't this meeting better advertised and why was the location so hard to find?
8)	CSX Corridor	I'm concerned about the increased noise that the DMU will cause.
9)	Planning	This is not going to pass the EIS process and it will draw a class action suit. You should do a risk analysis to see what your chances of getting this passed really are before you

		waste any more money.
10)	BRT	BRT down SW 137th Avenue is a good idea
11)	Metrorail	Metrorail is too expensive and nobody rides it.
12)	CSX Corridor	The CSX DMU option will back up traffic on Kendall Drive all the way to SW 107th Avenue.
13)	Traffic	The VISSIM simulation is unrealistic and does not show anywhere near enough traffic.
14)	CSX Corridor	Claiming that the rail crossing gates will be down for only 45 seconds is not realistic
15)	CSX Corridor	There are no quiet zones in Florida and it is not realistic to think that they would be approved.
16)	CSX Corridor	Why is MDX building the sound wall between the highway and the tracks. They should build it west of the tracks.
17)	Planning	Beware of the inverse condemnation that this will most likely bring. That is when the government doesn't take your property and pay market value but then impacts your property values so much due to noise and pollution that you loose your property anyway.
18)	Planning	They keep wanting impose stuff on us that we don't want.
19)	Metrorail	Metrorail does not pay for itself, it's a white elephant. We can't afford to waste anymore money on rail transit.
20)	Planning	Make the current system more convenient.
21)	Parking	You need to consider putting more parking at the stations.
22)	CSX Corridor	Would the CSX tracks be improved, because they are in terrible shape now?
23)	CSX Corridor	How fast would the trains operate on the corridor?
24)	Outreach	You need to do a better job of informing the community.
25)	Traffic	Don't do something that is going to make traffic worse.
26)	Planning	Are the ridership numbers really just existing transit riders shifting to the new service?
27)	Parking	We need more parking at the Metrorail stations.
28)	Parking	There is nowhere to put parking for any of the propose stations, especially at SW 97th Avenue and Kendall Drive.
29)	BRT	Why not build an elevated BRT line down Kendall Drive
30)	BRT	How are people going to get to the BRT stations in the middle of Kendall Drive? Do you propose to have pedestrian bridges?
31)	Planning	I'm a retired engineer from Miami-Dade County. This is the worst presentation that I've ever heard. It did not address the costs of all other options including road improvements.
32)	Traffic	We need to fix the existing broken arterial system.
33)	BRT	What about pedestrian access to the Kendall BRT stations? I don't want to have to cross three lanes of traffic to get to the bus.
34)	Planning	What percentage of the total travelers in Kendall will this benefit?
35)	CSX Corridor	There is no public support for your CSX DMU plan.
36)	CSX Corridor	We need to build the freight rail bypass and get trains off the CSX corridor. Then we could put BRT on the CSX Corridor.
37)	Parking	Have you considered putting a huge park and ride lot at the Tamiami Airport?
38)	CSX Corridor	The CSX DMU may have a small benefit, but at great impact to the community.

39)	Metrorail	We need a complete transit system with Metrorail at its core.
40)	Parking	We need more parking at existing stations so that we can get cars off the road and on to transit.

Wednesday, April 25, 2007 - Country Walk Homeowners Association Clubhouse

1)	CSX Corridor	The SW 157th Avenue DMU station is too close to the UDB. SW 157th Avenue is most likely going to extend down in to Redlands.
2)	Planning	What is the travel time comparison of a trip downtown from the Coral Reef Drive station on the busway vs a trip downtown from the MetroZoo on the CSX DMU line?
3)	BRT	BRT is just like Metrorail, but it's on rubber tires instead.
4)	Traffic	The lag in traffic that happens after the gates go back up is called a shockwave and it impacts the ability for queuing at traffic stops to recover to regular flow.
5)	CSX Corridor	The Bonita Lakes HOA Board has voted to oppose the CSX DMU option.
6)	CSX Corridor	We need to pull up the CSX tracks and shift our focus to BRT and trails
7)	Metrorail	What ever happened to Metrorail along the US 1 corridor to Florida City?
8)	CSX Corridor	Our property abuts the CSX tracks and I'm just waiting to get a notice that my yard will be destroyed due to an eminent domain taking just like those poor people along SR 826.
9)	CSX Corridor	The CSX DMU is not going to pay for itself and it will be a drain on funds.
10)	CSX Corridor	The CSX DMU does not exhibit an adequate level of costs vs. benefits.
11)	Planning	You've way overestimated the ridership numbers.
12)	Traffic	I have a University of Toronto study on traffic delay that shows it takes several minutes for regular traffic to recover for even 45 seconds of stoppage.
13)	Traffic	It doesn't make sense to inconvenience 220,000 commuters for 3,500 riders.
14)	CSX Corridor	This will kill adjacent property values and impact adjacent quality of life.
15)	Planning	The route goes outside of the UDB.
16)	CSX Corridor	Is there a conflict of interest with developers funding commissioners that are supporting this?
17)	Metrorail	Why not reconsider Metrorail down US 1?
18)	CSX Corridor	CSX does not go to Florida City as you have told us.
19)	Planning	Is this just to support new commercial projects at the Zoo?
20)	Planning	We don't want more of the same kind of development.
21)	Planning	The money is not there to build the improvements that we already need.
22)	Parking	Instead of building huge parking lots for people to ride the train downtown, why not just spread government services around the city in to smaller offices?
23)	Planning	What are the transit vs. auto travel times for each of your options?
24)	Traffic	What is the auto LOS with and without your planned transit lines?
25)	Parking	It will be important to provide parking at the stations so that people will be able to access the transit lines.
26)	CSX Corridor	Do we really want to have passengers trains next to the animals at the zoo?
27)	BRT	The Kendall BRT should end at SW 137th Avenue

Monday, June 25, 2007 - Alpha-Omega Church

1)	CSX Corridor	How do we know that CSX will even cooperate with the plans?
2)	CSX Corridor	The costs for the options are out of wack and seem too low
3)	CSX Corridor	There is no state or federal money available for this.
4)	CSX Corridor	What is the opportunity cost of the $400 to $800 million this will cost?
5)	CSX Corridor	I see how the CSX DMU may benefit people in SW Kendal but it will impact property values within 1 to 2 miles of the line
6)	Planning	We don't need more density. Downtown Kendall is going to be a future ghetto.
7)	CSX Corridor	CSX sees the value of its property and is now in the real estate business.
8)	CSX Corridor	The DMU route goes from nowhere to nowhere and it is a waste of taxpayers money.
9)	Traffic	US 1 is a mess, we need to do something about it.
10)	Planning	Send buses from the Zoo east to the busway and up in to Dadeland South. Also send buses west to Krome Avenue and then north to the East-West transit line.
11)	CSX Corridor	Nobody appears to want the DMU plan, but CSX will benefit from improved tracks
12)	CSX Corridor	Quiet zones could be considered, but they are very hard to get approved
13)	CSX Corridor	I've read studies about continuously welded rail being more susceptible to cracking since it doesn't have joints that can flex.
14)	Outreach	I've signed up on the list before but haven't received any notification of the meetings.
15)	Parking	You haven't told us exactly where the stops and parking are going to go.
16)	BRT	Please don't destroy the beautiful median on Kendall Drive to put in bus lanes.
17)	Planning	People were forced out of their homes when Bird Road was widened, and it will probably have to happen again with this.
18)	Planning	What about putting transit on Bird Road, Coral Drive, SW 157th Avenue or Krome Avenue?
19)	CSX Corridor	If MDX hasn't been able to negotiate with CSX, what makes you think you will be able to?
20)	CSX Corridor	What about putting noise walls on both sides of the tracks?
21)	CSX Corridor	The DMU will hurt our quality of life, my children aren't sleeping as it is.
22)	CSX Corridor	The public and environmental costs for the DMU are very high and the study in to those impacts has been very limited and incomplete.
23)	Planning	What about transit around the boundaries of the study area to filter people around the congested areas?
24)	BRT	The BRT on SW 137th Avenue isn't far enough out, it should be on SW 152nd Avenue.
25)	Planning	What about the unused bus stations they built along SR 874? They built them and never used them and now they're building a performing arts center without enough parking.
26)	Parking	You haven't said anything about where you would put parking and there's no way any of this should go forward without a parking plan.
27)	CSX Corridor	The shortened CSX corridor you have presented is just a way to get your foot in the door and before we know it, the entire corridor will have trains running on it.
28)	CSX Corridor	CSX will get upgraded tracks so they can go faster, and there's no chance that we're going to get quiet zones on any of the crossings.
29)	CSX Corridor	Furthermore, with passenger service during the day, the rock trains are going to have to run all night.
30)	Planning	What happened to the MDX plan to run buses up SW 137th Avenue and east on the SR

		836 corridor?
31)	Planning	This is a flawed and costly analysis that has come at public expense and Dr. Eric Prince has made a better presentation at no cost.
32)	Planning	This may not be the best option, but we definitely need better transit
33)	Planning	I hope that you would consider using alternative fuels for any of the options
34)	Parking	We need more parking at transit stations and I haven't heard you mention anything about that.
35)	Planning	I think we should try to direct traffic to the west and away from the congestion.
36)	Planning	The options seem to have high costs but low levels of benefit.

Tuesday, June 26, 2007 - Kendall Village Center

1)	CSX Corridor	Adjacent property values will drop 40% if the DMU option moves forward
2)	CSX Corridor	The cost to lease or purchase the CSX tracks has been grossly underestimated and it will be far too expensive.
3)	Planning	Cost and ridership estimates are incorrect
4)	Outreach	The public notices have not been good enough
5)	CSX Corridor	The new DLRT option on Kendall Drive is just a sneaky way to get your foot in the door and then save the option of going to the MIC for the future.
6)	CSX Corridor	Why haven't you considered the proposed cargo consolidation that would get the rock trains off the CSX corridor?
7)	CSX Corridor	The Gannet report considered BRT on the CSX corridor, why wasn't this evaluated in this study?
8)	CSX Corridor	There is no way that this project will improve property values as you have claimed.
9)	CSX Corridor	Putting new tracks in the ground is inexplicable, we should be pulling them up and focusing on a more flexible transportation system.
10)	CSX Corridor	You should consider the freight consolidation proposal.
11)	BRT	I support BRT on Kendall Drive, SW 137th Avenue and potentially on the CSX corridor.
12)	CSX Corridor	It blows my mind that in this day and age, with global warming and traffic gridlock that people are against new passenger rail service
13)	CSX Corridor	Grade crossings function well on the Tri-Rail corridor and they shouldn't cause problems in the Kendall area.
14)	CSX Corridor	Across the nation, cities are building Transit Oriented Developments at stations and people are flocking to transit.
15)	CSX Corridor	The CSX DLRT option to Dadeland is the best of both worlds, it gets cars off the roads and gets people to where they want to go.
16)	Metrorail	Any plans to improve the existing Metrorail system? It's a good idea, but it is unpleasant to ride and people are packed in like sardines.
17)	CSX Corridor	I'm not against new transit, but make it quiet since the existing trains already wake my son up at night.
18)	Planning	This process has never addressed the traffic problem in greater Miami-Dade County.
19)	CSX Corridor	The DMU option is just a bandaid, and not a real solution.
20)	Traffic	The shockwave issue of traffic backing up when the trains cross major roads will negatively impact traffic for everyone.
21)	CSX Corridor	Please consider the freight consolidation plans

22)	CSX Corridor	This is just a way for CSX to get taxpayers to pay for new tracks.
23)	CSX Corridor	Who would be in charge of the rail line? CSX? Tri-Rail? MDT?
24)	CSX Corridor	Monday June 8th, 2007 Miami Herald story about Tri-Rail dispatching difficulties due to freight traffic
25)	CSX Corridor	The taxpayers will end up paying for new rail for CSX
26)	CSX Corridor	If passenger rail is running during the day then they are going to have to run freight trains all night long.
27)	BRT	We need a BRT system, not a train
28)	CSX Corridor	My living room is 50 feet from the tracks, what is being done for noise and privacy?
29)	CSX Corridor	If MDX can't talk to CSX, then why do you think you'll be able to?

Wednesday, June 27, 2007 - West Kendall Regional Library

1)	CSX Corridor	The CSX DMU is a terrible option.
2)	CSX Corridor	There is no federal money for the DMU option since it uses German technology.
3)	CSX Corridor	There is no way CSX will just let you use a portion of the corridor, they'll want you to purchase the whole thing.
4)	CSX Corridor	The new DLRT proposal to upgrade the tracks south of Kendall is just a way to get your foot in the door, and we all know that the CSX line north of Kendall will be the next one to get developed
5)	CSX Corridor	We should move freight rail off the CSX corridor and preserve it for some future, better transit technology
6)	CSX Corridor	The DMU is too costly for the low number of riders you are projecting
7)	CSX Corridor	It will destroy property values and increase noise
8)	Metrorail	We need to fix the system we already have, the stations are dirty and smell of urine.
9)	Planning	The failings of the Performing Arts Center were ignored in this study. They didn't build enough parking and the air conditioning system is inadequate.
10)	Traffic	Why not fix the broken arterial system.
11)	BRT	We need to make better use of the US 1 busway.
12)	CSX Corridor	More trains on the CSX corridor equals more noise and decreased property values
13)	CSX Corridor	Quiet zones are very difficult to implement
14)	CSX Corridor	There are too few riders for such high costs and impacts
15)	CSX Corridor	Why didn't you consider BRT on the CSX corridor?
16)	CSX Corridor	Using the CSX corridor is not the best way to alleviate traffic, it is just convenient since the right-of-way already exists
17)	CSX Corridor	It is not logical that DMU service would increase property values
18)	BRT	We should do the BRT options and not the DMU options
19)	CSX Corridor	Don't be fooled, they are going to put transit on the entire tracks sometime in the future
20)	CSX Corridor	This is just a taxpayer subsidy to MDX
21)	Planning	Will eminent domain be used to acquire land for these improvements?
22)	Planning	If eminent domain is not used, then property owners will end up suffering inverse condemnation.

23)	Traffic	Traffic is already bad on Kendall Drive, we can't afford to give up a lane for dedicated transit.
24)	Metrorail	I'm opposed to the Kendall Metrorail.
25)	BRT	The Kendall BRT would destroy the existing ambience of Kendall Drive
26)	Metrorail	"Metrofail" is not a solution to our problems
27)	CSX Corridor	The CSX DMU will increase noise and ruin property values
28)	CSX Corridor	Quality of life will be negatively impacted
29)	Metrorail	We should put Metrorail along the Turnpike
30)	Planning	I own the shell at Kendall and 97th Ave and had my gas station taken for Metrorail years ago at US 1 and Sunset. Am I going to loose my property again?
31)	CSX Corridor	Agree with all other criticisms of the CSX DMU and think the cost per new rider is too high for the other alternatives.
32)	Parking	Why not just build more park and rider lots, it would cost so much less and we would be using the system will already have.
33)	Outreach	There should have been more publicity about something that sounds like a done deal.
34)	Parking	I should haven't to pay $4 to park at Metrorail and then have to pay a fare.
35)	Traffic	The increased traffic from all the grade crossings makes this a terrible idea.
36)	Metrorail	Metrorail trains are filthy and need to be cleaned up before anyone will ride them.
37)	CSX Corridor	The CSX DMU is a waste of time and money.
38)	CSX Corridor	This is obviously just a bait and switch tactic for CSX to get upgrade tracks from the taxpayers.
39)	CSX Corridor	Your ridership numbers have kept going down, no matter how hard you tried to make them go up.
40)	CSX Corridor	The CSX Corridor is being pushed by a third party with an agenda.
41)	CSX Corridor	The CSX DMU is not worth $400 million, we could be spending our money on better things like parks and schools.
42)	Outreach	There should have been more notification about the meetings.
43)	CSX Corridor	The do no support the CSX DMU
44)	BRT	I support BRT on Kendall, and SW 137th and SW 157th Avenues
45)	Planning	We don't want to stop everything, we just want a good solution to our problems.
46)	CSX Corridor	How does the SR 874 / SR 878 and Kendall Drive intersection work with the rail line running through it?
47)	CSX Corridor	Why should we be building something that requires you to transfer? We should be building only one mode of rail transit.
48)	CSX Corridor	All the people want to go east to west, not southwest to northeast. This is a line from nowhere to nowhere.
49)	BRT	We should focus on BRT on Kendall and SW 137th Avenue
50)	Planning	You have been completely unresponsive, you're just not listening to us. We do not want the CSX DMU running through our backyards.
51)	Planning	We should be expending our efforts on encouraging rational growth.
52)	Planning	The MPO evaluation is stupid. Why haven't you evaluated BRT on the CSX corridor when 60% of the people I speak to support it?

Appendix 2 – Frequently Asked Questions Sheet

Date May/2007

KENDALL-LINK ALTERNATIVES ANALYSIS

FREQUENTLY AKSED QUESTIONS

Project Overview

The purpose of the Kendall-Link Study is to develop short, medium, and long range rapid transit recommendations within the Kendall area in Miami-Dade County. The study area stretches from SR 836 in the north, SW 152nd Street in the south, US 1 to the east, and Krome Avenue to the west. Improvements are being studied along four primary corridors centered on Kendall Drive, the Homestead Extension of Florida's Turnpike (HEFT), the CSX rail corridor and SW 137th Avenue. The evaluation process in Tier 2 included a wide range of alternative technologies focusing primarily on Bus Rapid Transit (BRT), Metrorail and Diesel Multiple Units (DMU).

The project team is nearing completion on the analysis of potential ridership, scheduling, and basic capital, operations and maintenance costs. This information has been shared with the public at a number of outreach events. A record was kept of the public comments at these meetings and this document aims to address the questions and that were raised.

Questions, Comments and Responses

1) The CSX DMU does not address any of the east-west traffic congestion issues.

U.S. Census journey to work data collected during the background research shows that 25% of trips within the study area travel in a generally north and south direction. The alignments along the CSX, HEFT and 137th Avenue corridors provide a logical route to serve many of these trips.

2) The 45 second delay caused by the rail crossing gates does not sound reasonable.

Existing freight trains along the CSX corridor are much longer and travel much slower than the proposed DMU service and often require the gates to be down for many minutes at a time. National experience with the type of operation and equipment that is proposed under the DMU alternative confirms that gate closure time would be approximately 45 seconds.

3) The CSX DMU will just add to congestion, not solve it.

Traffic in the study area is currently at or near roadway capacity and statistics indicate that it will continue to degrade in the future. The goal of providing new transit services is not to solve congestion, but rather to provide safe, efficient and reliable alternative travel choices for residents.

4) Don't make traffic worse to serve so few people. Prioritizing 3,500 rail commuters over 220,000 autos does not add up.

Traffic analyses completed for this project have shown that the impact of rail crossings to road congestion would be minimal and would not have a significant effect on the Kendall area's traffic operations.

5) The "shockwave" effect will impact queue recovery and cause more delay due to a buildup in traffic. Studies show that for every minute of stoppage, it takes 3 to 5 minutes to clear the traffic queue.

Motorists notice the "shockwave" effect when the light turns green, but it takes several seconds before the cars in front of them begin to move. This phenomenon occurs at every traffic signal. In the case of the Kendall Drive rail crossing, there are currently five traffic signals within roughly 250 yards on either side of the tracks, many of which stop traffic for more than 45 seconds at a time. The gates would be coordinated with these signals to control the flow of cars through this section of the corridor without significant additional delay.

6) The CSX DMU will negatively impact emergency vehicles.

Miami-Dade County is in the process of upgrading the traffic signal system which will allow emergency vehicles equipped with special transponders to send a high level priority request that would keep the light green. Coordination with the rail signal system would allow adequate time for any approaching DMU trains to stop and allow emergency vehicles to continue through the crossing without further delay.

7) Could the CSX tracks be elevated at the road crossings?

While it is technically feasible to build grade-separated rail crossings they are extremely expensive and in many instances area not feasible. To date the study team has taken a conservative approach in its planning and not incorporated grade separation as part of the project. This was done in order to evaluate a worst case scenario. Should the DMU alternative advance further in the project development process addition engineering and traffic studies will be performed to determine where grade separation is required and feasible.

8) A north and west freight rail bypass to the Rinker rock quarry should be built to take freight trains out of the neighborhood.

The 2004 Miami-Dade Rail Convertibity Study proposed that all freight traffic bound for the quarries be placed on new tracks running north of SR 836 and west of Krome Avenue. This would free up the Homestead Branch of tracks for non-freight activities. This project has been deemed by the MPO to be a complicated and longer range option that may be pursued in the future.

9) The tracks should be pulled up and the corridor used for BRT and a trail with overpasses at major intersections.

The rail right-of-way (ROW) and tracks are privately owned by the CSXT, Inc. Federal Railroad Administration (FRA) regulations and CSX operating rules limit the potential implementation of any parallel busways within the existing ROW.

10) The CSX DMU does not have a high enough level of benefits to offset the high projected costs. The rail line is not going to pay for itself.

The determination of conceptual level costs and benefits is part of the Alternatives Analysis process currently being undertaken for each of the alternatives in the study. Should any of these concepts advance to a more detailed level of study, a more rigorous investigation will be undertaken to further quantify the projected costs and potential benefits.

11) Would the CSX tracks be improved? At what speed would freight and passenger trains be allowed / able to operate?

The existing tracks along the corridor are in very poor condition, such that federal regulations prohibit passenger operations and limit the speed of existing freight trains. The DMU alternatives would replace the tracks with continuously welded rail and add a second track to portions of the corridor. This upgraded rail would considerably reduce the noise and vibration currently caused by freight trains and would allow for freight operations at maximum speeds up to 45 mph and passenger service up to 79 mph. Current geometric and operating conditions found within the corridor would not allow for the maximum speeds noted above to be achieved except in some very limited locations.

12) I'm often awoken by passing freight trains. Noise from the DMU is going to ruin our neighborhood.

DMU vehicles are much smaller and lighter than freight trains or even conventional commuter trains and operate with a noise and vibration profile that is similar to that of a diesel bus. Furthermore, DMU vehicles would only operate during the day, and noise from the existing freight trains would be significantly reduced by the upgraded rail as noted above.

14) Quiet zones are not a realistic goal, since none have been implemented in Florida.

Quiet zones are a relatively new concept and require the installation and integration of various infrastructure improvements. New rail passenger corridors provide an ideal environment to implement these technologies at the beginning of service and the MPO will continue to pursue this should any of the DMU alternatives advance. Most new rail systems in the United States currently being planned have evaluated and/or incorporated quiet zone technology.

13) Why not build the SR 874 noise/sound wall west of the tracks?

This proposal has merit. The sound wall has been planned and will be funded by MDX. The MPO is seeking to engage both MDX and CSX in a discussion regarding this opportunity. The outcome of this issue does not preclude the sound wall from being relocated in the future should the DMU alternative be advanced.

15) The rail line abuts my yard and it's obvious that eminent domain would be used to acquire enough land to develop a two track corridor.

The existing ROW provides ample space to develop a two track corridor for the majority of its route and it is likely that no residential property would be required for station facilities. The CSX corridor was laid out with adequate ROW to accommodate a two track section without additional property acquisition required.

16) How would you calculate the cost of lost property values? How do you quantify the loss of quality of life to adjacent properties?

It is difficult to quantify these values when the particulars of the project are still under preliminary study. Should any of the alternatives advance past the alternatives analysis phase, the federally mandated NEPA environmental review, process would study what the noise, vibration, air, water and land value impacts of any of the alternatives may be. National studies have in fact shown that residential properties with access to new passenger rail systems have experienced a positive to neutral effect upon property values.

17) What about crosswalks? How do you propose to provide pedestrian access to the BRT stations?

There are several operational and well documented median-running transit systems in the United States. Federal guidance also exists on building pedestrian safety in to BRT projects.

18) The traffic simulation video does not show a realistic representation of traffic on Kendall.

The data used to create the traffic simulation videos are based upon actual Miami-Dade traffic counts and FDOT standard traffic forecasting techniques. Much care has been taken to ensure that the simulations are representative of traffic conditions, and they will continue to be refined as more analysis is completed.

19) You have overstated ridership numbers.

The ridership forecasting process generates estimations using the Federal Transit Administration (FTA) approved Miami-Dade 2030 population and employment forecasts, the approved 2030 transportation network and the Miami-Dade+Broward Bi-County model. Industry standard procedures to generate trip attractions and distributions were developed during the Tier I evaluation phase and further refined for the Tier II alternatives.

20) Would existing transit users just shift to the proposed services? What percentage of travelers will this benefit?

Some degree of shifting from existing transit routes to a new service is to be expected. The project team is currently utilizing FTA tools to estimate the number of new transit riders, travel time savings and other user benefits. This information will be provided to the public during the next round of open houses.

21) How will people access the transit systems? Where will the parking go?

Accessibility is an important factor that affects potential transit ridership. Initial estimates of parking requirements have been developed in bus network. A more detailed engineering-level design will be completed to determine the parking requirement and capacity at each of the addition to potential reconfigurations of the local proposed stations should any of the alternatives advance. Land availability to accommodate projected parking demand was factored in to the selection of the proposed stations.

22) What happened to extending the Metrorail down US 1 to Florida City like we all wanted?

On June 22, 2006 the MPO voted to support the Modified Enhanced Bus Rapid Transit Alternative for the South Link Study. This provides for enhancements to the existing South Miami-Dade Busway and a Metrorail extension from Dadeland South Station to SW 104th Street with a possible future extension as demand warrants.

23) What about all the commercial and recreational development we've heard is slated for the zoo?

The study team is working with the Miami-Dade Planning Department to update the socio-economic forecasts for the zoo property in order to refine the ridership projections for each of the CSX corridor alternatives.

24) The meetings need to be advertised better, perhaps with a mailing to everyone in the neighborhood.

The MPO makes every effort to notify the public about upcoming meetings. Announcements are distributed to elected officials, community groups and media outlets. Email announcements are distributed to attendee lists collected at public meetings and advertisements are posted in local newspapers. It is prohibitively expensive to mail meeting announcements to all affected property owners. The study team appreciates additional input on how to best seek the participation of residents and business owners of the greater Kendall area as this study continues.

For further information, please contact:
Wilson Fernandez
Transportation Systems Manager
Miami-Dade MPO
305-375-1886
wilson@miamidade.gov

www.kendall-link.com

Appendix 3 – Project Newsletter

Date May/2007

KENDALL-LINK ALTERNATIVES ANALYSIS

NEWSLETTER

Project Overview

The purpose of the Kendall-Link Study is to develop short, medium, and long range rapid transit recommendations within the Kendall area in Miami-Dade County. The study area stretches from SR 836 in the north, SW 152nd Street in the south, US 1 to the east, and Krome Avenue to the west. Improvements were considered on Kendall Drive, the Homestead Extension of Florida's Turnpike (HEFT) and SR 874 / SR 826 / CSX corridors.

The Tier I evaluation process included a wide range of alternative technologies on three separate corridors. Analysis was completed on the ridership potential, scheduling, and basic capital, operations and maintenance costs. Several options were eliminated from further consideration based on poor performance in one or more sets of analyses. The following pages detail the alternatives that were evaluated during the Tier II analysis phase.

Tier I Alternatives

Kendall Drive Corridor

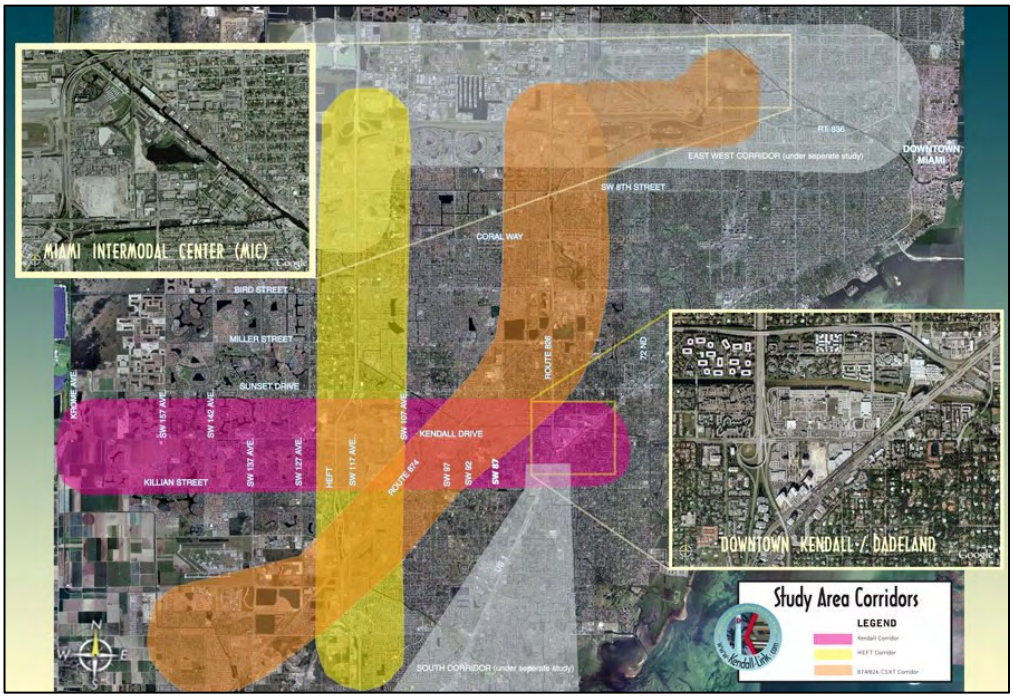
• Mixed-Traffic BRT	Eliminated
• Exclusive-Lane BRT	Advanced
• Elevated BRT	Eliminated
• Light-Rail Transit	Eliminated
• Metrorail	Advanced

Turnpike (H.E.F.T.) Corridor

• Expressway Bus	Eliminated
• Mixed-Traffic BRT	Eliminated
• Exclusive-Lane BRT	Eliminated
• Light-Rail Transit	Eliminated
• Metrorail	Advanced

SR 874 / SR 826 / CSX Corridors

• Expressway Bus	Eliminated
• Mixed-Traffic BRT	Eliminated
• Exclusive-Lane BRT	Eliminated
• Diesel Multiple Unit	Advanced



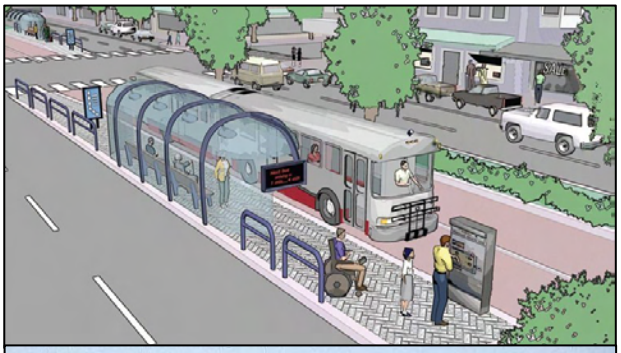
A1–A4: Kendall Drive Corridor

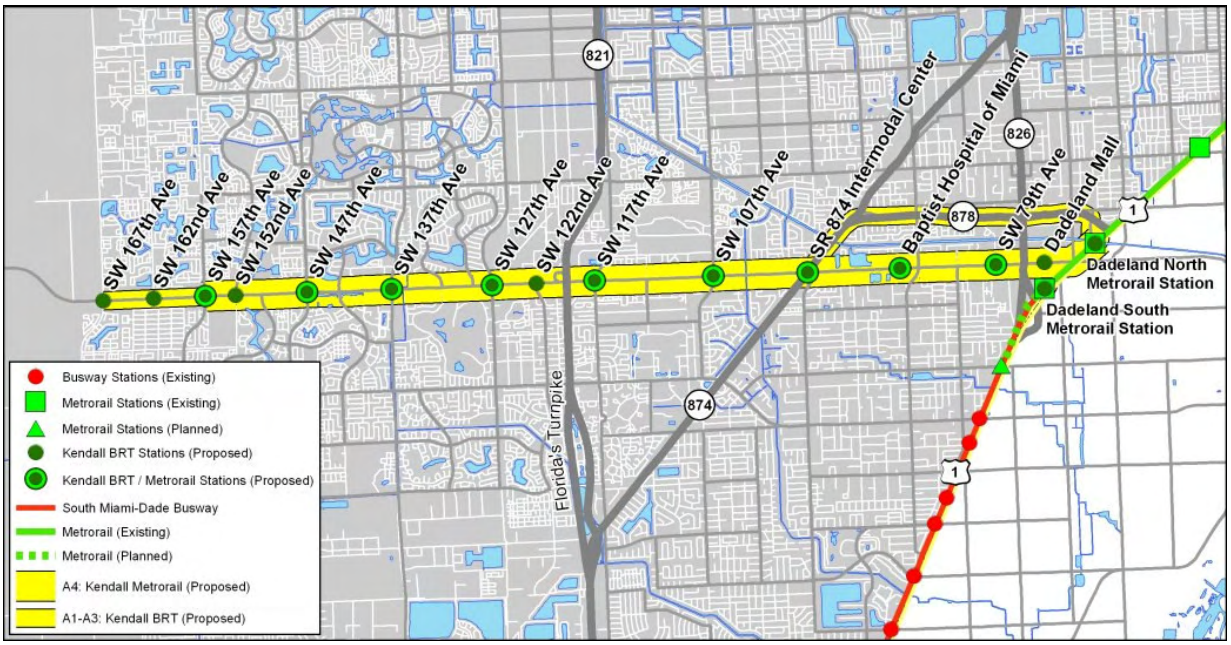
Three Bus Rapid Transit (BRT) alternatives and an extension of Metrorail are being studied along Kendall Drive. A BRT system utilizes high-tech, rubber-tired buses that are given priority over automobiles and serve stations similar to a rail system. BRT would operate in a dedicated lane located within the median of Kendall Drive, while Metrorail would operate on tracks elevated above the median.

Alternative A1 would operate within exclusive BRT-only lanes from SW 167th Ave to Dadeland South Station. Alternatives A2 and A3 would operate within a dedicated lane from SW 167th Avenue to SR 874, and then serve Dadeland North Station via the Snapper Creek Expressway.

Exclusive BRT lanes would physically separate buses from automobile congestion and traffic signal priority systems would hold green lights longer or change red lights quicker to allow buses to speed through intersections. BRT vehicles typically provide seating for 55 to 80 passengers operate at an average speed of around 45 mph. Service would operate every six minutes during peak travel times and every ten minutes in off-peak periods.

The proposed 8.8 mile Metrorail extension (A4) would begin at SW 157th Avenue and tie into the existing Metrorail tracks immediately south of the Dadeland North Station. Metrorail typically operates six-car electric trains with a maximum capacity of 1,000 passengers and a speed of about 70 mph. Service would be provided to stations spaced approximately one-mile apart and would operate every six minutes during the peak and every ten minutes in the off-peak.



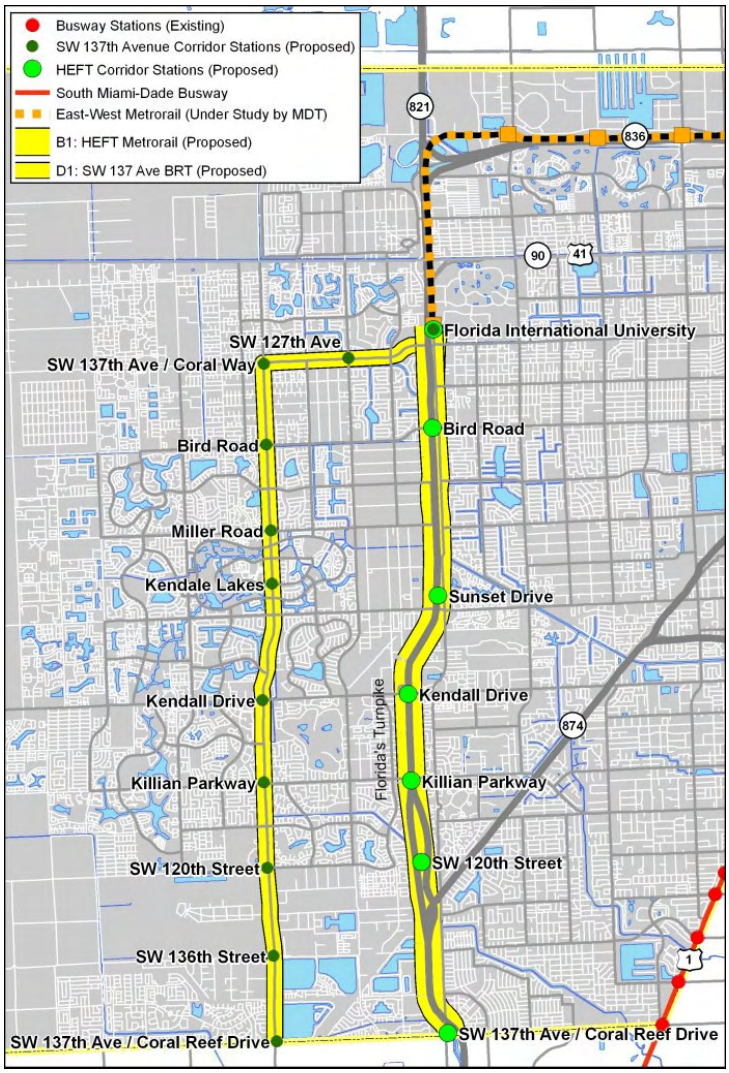


B1: H.E.F.T Corridor

Metrorail along the Turnpike is being studied in Tier II evaluation. The 9.5 mile route would operate as an extension of the planned East-West Metrorail corridor which is slated to terminate at Florida International University (FIU). Tracks would be elevated within the Turnpike right-of-way and operate typical six-car electric Metrorail trains with a maximum capacity of 1,000 passengers and a speed of about 70 mph. Stations would be approximately one-mile apart and would operate every 8.5 minutes during the peak and every 10 minutes in the off-peak.

D1: SW 137th Avenue

Alternative D1 proposes BRT service within an exclusive center-lane between the SW 152nd Avenue / SW 117th Avenue Park-and-Ride and the Florida International University (FIU) Metrorail Station. Patronage for the line was projected to be at a relatively healthy level of passengers per day. Capital costs for construction would be moderate and annual operations and maintenance costs would be low. While overall costs would be much lower than for Metrorail on the parallel HEFT Corridor, the BRT along SW 137th Avenue is projected to carry fewer riders and would cause more impact to traffic conditions.



CSX Corridor (C2-C5)

Four Diesel Multiple Unit (DMU) options running along the CSX corridor have been evaluated during Tier II screening. Rail track and grade crossings would be upgraded under each option. Continuously welded rail would allow for passenger operations at up to 65 mph and would significantly reduce noise from existing freight trains.

DMU cars are small, self-propelled rail vehicles that can run along existing freight railroad tracks. They are much smaller and lighter than freight trains or even conventional commuter trains and operate with a noise and vibration profile that is similar to that of a diesel bus. They may operate as a single or three paired cars and can carry approximately 165 passengers at an average speed of 35 mph.

The four options vary in the number of stations, the frequency of trains and the level of required upgrades to the infrastructure. Alternatives C2-C4 would operate over an 18.4 mile right-of-way from the Miami-Intermodal Center (MIC/MIA) to the Miami MetroZoo. Alternative C5 would provide service over 19.7 miles of track from the MIC to a station south of the Kendall-Tamiami Airport on SW 157th Avenue.

Alternative C2 would provide service to four stations every 30 minutes during the peak and 60 minutes in the off-peak. Alternative C3 would serve nine stations at peak and off-peak headways of 20 and 40 minutes respectively Both C4 and C5 would add a second track to a majority of the corridor and serve nine stations every 15 minutes in the peak and 30 minutes in the off-peak.

Tier II Evaluation

Operations and maintenance (O&M) costs, capital costs and ridership projections were prepared for each of the Tier II alternatives described above. Preliminary costs were generated during the Tier I evaluation stage using Federal Transit Administration standard costing methodology and refined as structural and service details were further developed. Preliminary ridership projections were also prepared during Tier I using the Miami-Dade Travel Model. Much effort has been expended during the second phase of evaluation to refine connecting bus service, transfer patterns, inter- and intra-zonal trip patterns and station access issues. Many of the alternatives saw significant changes in the number of daily projected riders due to this more rigorous analysis. A detailed traffic operations study was also undertaken. The analysis focused on the potential impact to automobile traffic due to lane removal along Kendall Drive to accommodate the BRT lanes and the impact to east-west traffic at the major CSX DMU grade crossings.

O&M costs are a function of cumulative mileage, travel time, planned headways, vehicle service hours,and the total number of trips required to run the service. Capital costs are computed based on the required number of vehicles, transit stations, guideway or roadway improvements, maintenance facilities, park and ride lots, right-of-way and construction contingencies. Each of the costs presented here have been developed to a level of detail appropriate for the concept-level work performed in this study. The capital costs are limited by the level of design detail that was available at this stage of project development. A preliminary engineering design would be required in order to refine the capital cost estimates of any alternative that advances to the next phase

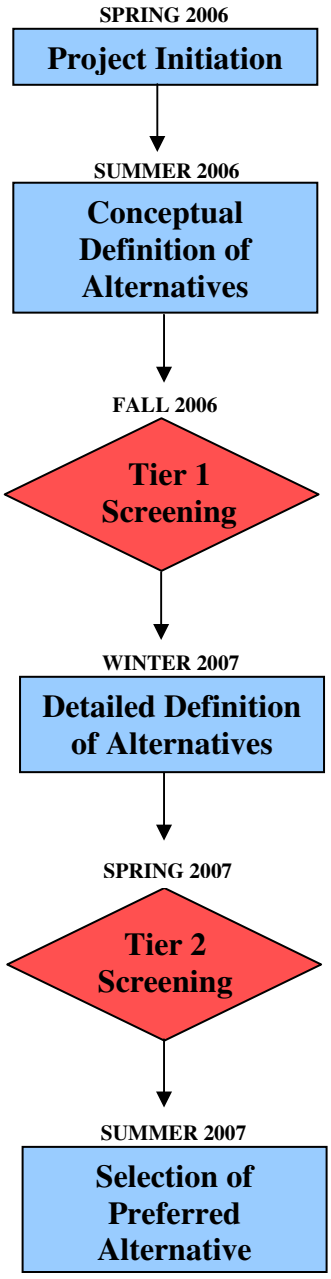
The table below displays the projected ridership, annual operations and maintenance costs, capital construction costs and capital cost per annual passenger mile. The table is shaded to help visually depict the projected number of riders or level of expenditure that would be required to introduce each of the proposed alternatives. A green shading represents a low value, yellow is medium and a red shaded cell depicts a high value.

	Daily Trips	Annual Operations and Maintenance Costs	Capital Cost	Capital Cost / Mile	Capital Cost per Annual Passenger Miles	Impact to Automobile Traffic
A1 - BRT	10,048	$4.80	$326.6	$34.3	$22.5	High
A2 - BRT	7,041	$5.20	$253.7	$36.8	$34.8	High
A3 - BRT	5,834	$4.60	$249.7	$36.3	$32.1	High
A4 - Metrorail	15,565	$18.80	$1,682.0	$197.2	$62.1	Low
B1 - Metrorail	12,265	$19.70	$1,686.3	$178.4	$81.2	Low
C2 - DMU	600	$5.20	$190.6	$12.0	$93.5	Medium
C3 - DMU	1,912	$7.70	$224.1	$13.9	$46.8	Medium
C4 - DMU	3,083	$12.00	$368.0	$21.7	$49.2	Medium
C5 - DMU	3,017	$12.20	$386.5	$21.2	$55.4	Medium
D1 - BRT	7,785	$6.50	$407.9	$32.3	$42.0	

Summary

Several conclusions on the costs vs. benefits can be made from the data. The Kendall Drive and SW 137th Ave BRT options provide user benefits at relatively low costs. From a cost per passenger mile perspective, the Kendall BRT A1 alternative performs the best. It provides BRT service from Dadeland South Metrorail Station to SW 167th Ave. with a capital cost of $22.53 per annual passenger mile.

Project Timeline



Alternative B1 and C2 perform poorly from a cost/benefit perspective with projected capital costs projected to be over $80 and $90 per annual passenger mile respectively. Comparatively, the A4 Kendall Metrorail is estimated to cost almost $20 less per annual passenger mile than the B1 HEFT Metrorail.

Each of the BRT alternatives are projected to cause significant impacts to vehicular traffic due to the removal of travel lanes for the BRT guideway. The analysis performed on the CSX corridor show that the traffic impacts of the DMU alternatives will be low to moderate. The Metrorail alternatives will have little to no adverse impacts to traffic. Traffic in the study area is currently at or near roadway capacity and statistics indicate that it will continue to degrade in the future. The goal of providing new transit services is not to solve congestion, but rather to provide safe, efficient and reliable alternative travel choices for residents.

Public Input

The technical evaluation detailed in this report is only one component of the project screening process. It produces data that describes the proposed projects in terms of estimated costs and benefits. Review by technical committees, public officials and the community at large is an integral part of the discussion regarding the value and impacts of any project.

Attendees at public meetings in the fall of 2006 and spring of 2007 have expressed concerns about project costs and impacts to traffic, parking, station locations, noise, vibration, and property values. The CSX DMU alternatives have been the focus of the majority of resident comments and concerns. Participants at these meetings also provided suggestions for additional study such as the SW 137th Avenue BRT alternative.

Next Steps

The MPO Board will consider the technical analysis and community input to determine a logical collection of transit improvements for the greater Kendall area during the summer of 2007. Additional information on projected user benefits, will be presented at this time. Should a preferred alternative be selected and be deemed worthy of addition study, the MPO Board may decide to enter in to the Federal Transit Administration environmental analysis and review process. This detailed written statement focuses on the potential impacts of a proposed project and mitigation measures that may reduce the harm to the community and the natural environment. Typically, environmental reviews for proposed transit projects address the impact areas of air and water quality, noise and vibration, historic and cultural properties, parklands, contaminated lands, displacement of residences and businesses, and community preservation. During the federal environmental review process, local public transportation agencies work with state and other local agencies to comply with state and local environmental laws.

Participate in the next round of public meetings;

MONDAY, June 25, 2007
7:00 PM to 9:00 PM
Alpha & Omega Church
7984 Miller Dr, Miami, FL 33155
TUESDAY, June 26, 2007
7:00 PM to 9:00 PM
Kendall Village Center
8625 SW 124 Avenue Miami, FL 33183
WEDNESDAY, June 27, 2007
7:00 PM to 9:00 PM
West Kendall Regional Library
10201 Hammocks Boulevard Miami, FL 33196

For further information, please contact:
Wilson Fernandez
Transportation Systems Manager
Miami-Dade MPO
305-375-1886
wilson@miamidade.gov

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Appendix 4 – Project Website

http://www.kendall-link.com

Kendall Corridor
Transportation Alternatives Analysis

Welcome to the Kendall-Link Study

Project Update

10/05/07

MPO Governing Board Discusses the Kendall-Link Study

The Miami-Dade Metropolitan Planning Organization (MPO) met on Thursday, October 4th, 20007 to adopt the Preferred Rapid Transit Strategy of Kendall Corridor Alternatives Analysis study. Board members expressed concern with the CSX Corridor Diesel Light Rail Transit (DLRT) proposal, and requested MPO Staff to further develop the technical analysis of this option. More than 100 Kendall area residents attended the meeting to hear the discussion and share their concerns with the media.

Near-term bus improvements have been programmed for Kendall Drive. Board members agreed that additional bus service improvements should be advanced along SW 137th Avenue. None of the proposed mid to long-term transit options are planned for implementation at this time and further technical analysis will be required to move them forward. It will be important to continue outreach efforts with residents and other stakeholders as the proposals continue to be refined.

Kendall Corridor
Transportation Alternatives Analysis

PROJECT SUMMARY

Introduction
The purpose of the Kendall-Link Study is to develop short, medium, and long range rapid transit recommendations within the Kendall area in Miami-Dade County. The study area stretches from SR 836 in the north, SW 152nd Street in the south, US 1 to the east, and Krome Avenue to the west. Improvements were initially considered on Kendall Drive, the Homestead Extension of Florida's Turnpike (HEFT) and SR 874 / SR 826 / CSX corridors.

Tier I Evaluation
The Tier I evaluation process included a wide range of alternative technologies on three separate corridors. Four alternatives with over twenty-one concepts were identified and analysis was completed on the ridership potential, scheduling, and basic capital, operations and maintenance costs.

Local bus, express bus, Bus Rapid Transit (BRT), Light Rail Transit (LRT) and Metrorail were evaluated along Kendall Drive. Express bus and BRT were evaluated on the SR 874 / SR 826 corridor and Diesel Multiple Unit (DMU) trains were evaluated along the CSX corridor. Express bus, BRT, LRT and Metrorail were also evaluated along the Homestead Extension of the Florida's Turnpike (HEFT) and the SW 107th Avenue corridor.

Project materials were presented to the public and the Miami-Dade MPO Board for comment and feedback. Several options were eliminated from further consideration based on poor performance in one or more sets of analyses. Tier I evaluation wrapped up during the fall of 2006.

Tier II Evaluation
The Tier II screening process evaluated the remaining alternatives in much more detail. Several additional transit concepts were suggested by the public and the MPO Board. This second study phase included the refined and more detailed technical analysis necessary to progress the options through to the selection of a locally preferred alternative. Five alternatives with a total of eleven concepts were evaluated during Tier II.

Three BRT concepts were evaluated on Kendall Drive in addition to a Metrorail extension. The Metrorail alternative on the HEFT was advanced for detailed study. Five DMU concepts, were evaluated along the CSX corridor and one BRT alternative was modeled along SW 137th Avenue. The in-depth study of each alternative addressed potential ridership and projected capital, operating and maintenance costs. Community integration indicators included interaction with automobile traffic circulation, potential noise and vibration issues and possible land requirements for stations and related parking.

The Tier II alternatives are as follows:

A: Kendall Drive Corridor

A1 Kendall Drive Center-Lane BRT between SW 167th Ave and Dadeland South map

A2 Kendall Drive Center-Lane BRT between SW 167th Ave and SR 874. Side-Lane map BRT to Dadeland North via Snapper Creek Expressway and to Dadeland South via Kendall Drive

A3 Kendall Drive Center-Lane BRT between SW 167th Ave and SR 874. Side-Lane map BRT to Dadeland North via Snapper Creek Expressway

A4 Kendall Drive Metrorail within median between SW 157th Avenue and map Dadeland North Metrorail Station

B: Homestead Extension of the Florida's Turnpike

B1 HEFT Metrorail between FIU Metrorail Station and SW 152nd Street map

C: CSX Corridor

C1 ~~DMU Service between Miami Intermodal Center and Miami Metrozoo with 2 Stations and 60 Minute Peak Headways / No Off-Peak Service~~ [eliminated]

C2 map DMU Service between Miami Intermodal Center and Miami Metrozoo with 5 Stations and 30 Minute Peak Headways / 60 Minute Off-Peak Headways

C3 map DMU Service between Miami Intermodal Center and Miami Metrozoo with 9 Stations and 20 Minute Peak Headways / 40 Minute Off-Peak Headways

C4 map DMU Service between Miami Intermodal Center and Miami Metrozoo with 9 Stations and 15 Minute Peak Headways / 30 Minute Off-Peak Headways

C5 map DMU Service between Miami Intermodal Center and SW 157th Avenue with 9 Stations and 15 Minute Peak Headways / 30 Minute Off-Peak Headways

D: SW 137th Avenue

D1 map SW 137th Avenue Center-Lane BRT between the SW 152nd Avenue / SW 117th Avenue Park-and-Ride and FIU Metrorail Station

Preferred Rapid Transit Strategy

The study team completed the Tier II evaluation and held two series of public outreach meetings to solicit input from Kendall area residents. As a result of the technical analysis and the public comment, a preferred rapid transit strategy composed of selected elements of the Tier II alternatives was developed.

It represents a compilation of mobility enhancements that address expressed community impacts and concerns. Each component of the preferred rapid transit strategy can be advanced as a stand alone project. The study recommendation provides a systems approach to the complexity of serving the varied travel markets in the Kendall area and connectivity to the County transit system. Each component of the preferred rapid transit strategy is described below.

Short to Mid-Term Preferred Rapid Transit Strategy

Short-Term (1-5 years)

1) Planned "rapid-bus" upgrades to Kendall Drive and the County's "Buses-on-Shoulders" strategy
2) An additional "rapid-bus" route is proposed to run north-south along SW 137th Avenue
3) Begin implementation of the single-lane reversible busway on Kendall Drive between SW 97th Avenue and SW 167th Avenue.

It is conceivable that the single-lane reversible busway could build upon the "rapid-bus" improvements and be phased in over time. Intermodal transit centers or park-and-ride facilities at proposed mid and long-term station locations may also be implemented in the short-term and presage the construction of fixed-route transit system.

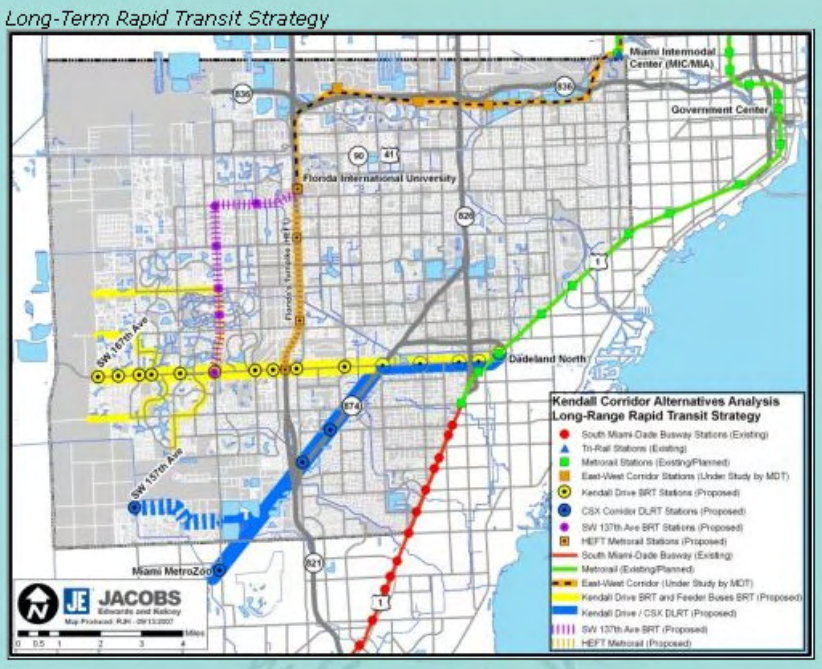
Mid-Term (5-15 years)

1) Completion of the single-lane busway on Kendall Drive between SW 97th Avenue and SW 167th Avenue
2) Construction of the dual-lane transitway on Kendall Drive from SR 874 to Dadeland North
3) Implementation of DLRT service along the CSX Corridor and Kendall Drive transitway

Long-Term (15+ years)

1) A double-lane exclusive busway could be provided on Kendall Drive west of SW 97th Avenue should demand warrant
2) A second track could be added to the CSX Corridor portion of the DLRT route should demand warrant
3) The Alternative C5 routing option to SW 157th Avenue may also bear reconsideration in the future as the southwest Kendall area continues to grow.
4) The B1 Metrorail extension or the D1 BRT should be reevaluated as potential long-term improvements once the ongoing East-West Corridor project is finalized.

Long-Term Rapid Transit Strategy



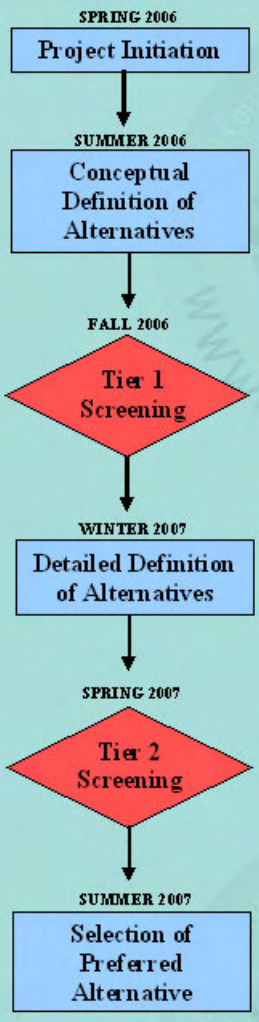
The preferred rapid transit strategy provides a good starting point for what should be a long discussion. None of the alternatives are planned for construction at this time, and no final implementation decisions have been made. Several significant issues must still be resolved. No funding plan has been developed for any of the proposed improvements and the Miami-Dade MPO will need to begin the search for available funds.

Should any component of the preferred rapid transit strategy advance for further consideration stakeholder concerns relating to potential environmental impacts such as traffic noise, vibration, and property value impacts will be evaluated in an Environmental Impact Statement (EIS). It is incumbent upon the residents and elected officials of the greater Kendall area, and Miami-Dade County as a whole to evaluate the costs and benefits of the proposed system. The merits of the preferred rapid transit strategy should be weighed carefully against both the real and perceived impacts of the proposed improvements.

Kendall Corridor
Transportation Alternatives Analysis

PROJECT SCHEDULE

Project Timeline



This Alternatives Analysis project is currently in the second phase of the typical Federal Transit Administration New Starts project development process. Should the MPO decide to advance any portion of this study forward, there are many more steps that would be required before any final decision would be made.

FTA News Starts Project Schedule (33 kb pdf)

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- Documents and Maps
- Newsletter
- Frequently Asked Questions (FAQ)

Visit the Miami-Dade MPO Kendall-Link page

Site Updated: 10/08/07

PUBLIC OUTREACH

The technical evaluation of project alternatives is only one component of the project screening process. It produces data that describes the proposed projects in terms of estimated costs and benefits.

Review by technical committees, public officials and the community at large is an integral part of the discussion regarding the value and impacts of any project.

The Kendall-Link project team has actively engaged the community at public meetings over the course of the study.

Meeting History

Wednesday, June 27, 2007
7:00 PM to 9:00 PM
West Kendall Regional Library
10201 Hammocks Boulevard, Miami, FL 33196

Tuesday, June 26, 2007
7:00 PM to 9:00 PM
Kendall Village Center
8625 SW 124 Avenue, Miami, FL 33183

Monday, June 25, 2007
7:00 PM to 9:00 PM
Alpha-Omega Church
7800 SW 56 Street, Miami, FL 33143

Meeting Notice for the June 25, 26 and 27, 2007 Public Meetings (36Kb PDF)

Wednesday, April 25, 2007
6:00 PM to 8:00 PM
Country Walk Homeowners Association Clubhouse
14601 Country Walk Drive, Miami, FL 33186

Tuesday, April 24, 2007
6:00 PM to 8:00 PM
Kendall Village Center
8625 SW 124 Avenue, Miami, FL 33183

Meeting Notice for the April 24 and 25, 2007 Public Meetings (36Kb PDF)

Wednesday, November 8, 2006
7:00 PM to 9:00 PM
West Kendall Regional Library
10201 Hammocks Boulevard

Thursday, November 2, 2006
7:00 PM to 9:00 PM
Wayside Baptist Church
7701 SW 98 Street

Meeting Notice the November 2 and 8 2006 Public Meetings (37Kb PDF)

Thursday, April 6, 2006
7:00 PM to 9:00 PM
West Dade Regional Library
9445 Coral Way
Miami, FL 33165

Wednesday, April 5, 2006
3:00 PM to 5:00 PM and 7:00 PM to 9:00 PM
Civic Pavillion at the Kendall Village Center
8625 SW 124 Avenue
Miami, FL 33183

Kendall Corridor
Transportation Alternatives Analysis

CONTACT US

You may ask questions or submit comments to the project email. All submissions will be read by the project team and comments will become part of the official project record.

kendalllink@gmail.com

For further information, please contact:

Wilson Fernandez
Transportation Systems Manager
Miami-Dade MPO
305-375-1886

wilson@miamidade.gov

You may also visit the Kendall-Link page on the MPO website:

http://www.miamidade.gov/mpo/m10-cs-kendalllink.htm

Kendall Corridor
Transportation Alternatives Analysis

PRESENTATIONS

The presentation from the September 2007 TPTAC and TPC meetings details the final evaluation results of the Kendall Corridor preferred rapid transit strategy.

September 2007 TPTAC and TPC Meetings (6.2Mb PDF)

The presentation from the June 2007 Open House meetings reviews the Tier II evaluation results and presents the Kendall Corridor preferred rapid transit strategy.

June 2007 Open House Meetings (5.3Mb PDF)

The presentation from the April 2007 Open House meetings details the results of the Tier II evaluation process.

April 2007 Open House Meetings (10.3Mb PDF)

The presentation from the November 2006 Open House meetings details the results of the Tier I evaluation process.

November 2006 Open House Meetings (1.9Mb PDF)

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- Frequently Asked Questions (FAQ)

Visit the Miami-Dade MPO Kendall-Link page

Site Updated: 10/08/07

TRANSIT TECHNOLOGIES

Tier I Evaluation

Many distinct forms of public transportation exist in the world. Not all of them are suited to the needs or constraints of the Kendall area. The project team undertook a review of transit technologies during the Tier I evaluation phase and was able to eliminate many of them from further study. Express bus, Bus Rapid Transit (BRT), Diesel Multiple Units (DMU), Light Rail Transit (LRT) and Metrorail were deemed suitable for the Kendall area.

Tier I Public Transportation Technology Review (1.7Mb PDF) - October 2006

Tier II Evaluation

During the Tier II evaluation, express buses were eliminated from the study since Miami-Dade Transit plans to implement them along the SR 874 / SR 826 corridors in the near future. Light Rail Transit (LRT) was also eliminated as the analysis showed it would provide a similar level of transit service benefits as BRT, but at much higher costs. The following video clips help to describe what BRT and DMU are and how they may operate in the Kendall area.

Bus Rapid Transit (BRT) Video (3.3Mb MPG)
Diesel Multiple Units (DMU) Video (4.2Mb MPG)

Preferred Rapid Transit Strategy

A new transit technology known as Diesel Light Rail (DLRT) has been proposed for operation along the CSX Corridor and along Kendall Drive. This new vehicle is much lighter and quieter than the previously studied Diesel Multiple Unit (DMU) trains. It operates with a conventional diesel or diesel hybrid bus engine and has the ability to operate within a street right of way much like a streetcar. DLRT is a new technology that has been successful along the South Jersey River Line and is currently being implemented in Austin, TX.

Simulation of DLRT operating within the median (Austin, TX)

Kendall Corridor
Transportation Alternatives Analysis

DOCUMENTS AND MAPS

Final Report Executive Summary - August 2007

Kendall Corridor Study Executive Summary (8.3Mb PDF)

Kendall Corridor Study Executive Summary *(Draft) (3.8Mb PDF)

* Only the layout and formatting were the changed between the draft and final versions of the document. No additional changes were made to the text or analysis since the draft was released to the public on September 4th, 2007.

Tier II Evaluation - April 2007

Alternatives A1 - A4: Kendall Drive (5.7Mb PDF)

Alternative B1: Homestead Extension of Flordia's Turnpike (HEFT) (4.8Mb PDF)

Alternatives C2 - C5: CSX Corridor (5.5Mb PDF)

Alternative D1: SW 137th Avenue (5.1Mb PDF)

Tier I Evaluation - July 2006

Kendall-Link Study Area Corridors (1.5Mb PDF)

Purpose, Need, Goals and Objectives (2.6Mb PDF)

FINAL REPORT