

Application for  
**Transportation Investment Generating Economic Recovery (TIGER)**  
Discretionary Grant Program

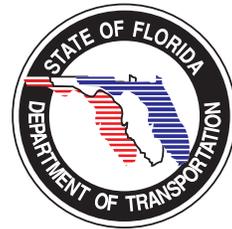


**75 EXPRESS  
BUS SERVICE**

# South Florida Express Lane System Improvements

I-75 Express Bus Capital Purchase/Regional Park-n-Ride Lot

03/19/2012





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## Introduction

The South Florida Express Lane System Improvements (I-75 Express Bus Capital Purchase/Regional Park-n-Ride Lot) project provides a new premium express bus service, new/expanded park-n-ride opportunities, kiss-n-ride opportunities, and innovative technologies to be coordinated with the construction of Managed Use Lanes (MUL)/Express Lanes within the I-75 Corridor. The project also includes an extension of the I-595 Express Bus route to the Regional Park-n-Ride Lot creating a seamless connection between regional routes.

The Florida Department of Transportation (FDOT) technical analyses indicate this project provides significant long- and short-term benefits. FDOT is pleased to submit this TIGER IV grant application demonstrating these benefits. The project is sponsored by FDOT with support from the Broward Metropolitan Planning Organization (MPO), the Miami-Dade MPO, the Southeast Florida Transportation Council (SEFTC), Broward County Transit (BCT), and Miami-Dade Transit (MDT).

**The applicant is requesting \$13,583,600 for this investment.** All supporting documentation is easily accessible as an attachment to this application.

**Table 1. Investment Summary**

Project Element	Cost (2011\$)	Funding Source
Griffin Road / I-75 Park-n-Ride Lot – Design	\$ 927,500	
Griffin Road / I-75 Park-n-Ride Lot – Construction	\$ 8,703,000	
Three (3) Bus Shelters	\$ 75,000	
Six (6) 60' Hybrid-Electric Buses	\$ 6,924,000	
Signage and Branding Installation	\$ 150,000	
Transit Signal Priority (TSP)	\$ 200,000	
<b>TOTAL PROJECT AMOUNT</b>	<b>\$16,979,500</b>	
FDOT Cash Match	\$ 3,395,900	FDOT (20 %)
<b>TIGER Funds Requested</b>	<b>\$13,583,600</b>	TIGER Request (80%)

## Summary of Benefits

The I-75 Express Bus Service and Park-n-Ride Lot fulfills and exceeds the selection criteria established by USDOT for the TIGER IV program. The benefits are estimated for at least 20 years and their value is discounted to 2012 using a real discount rate of 3 percent.

**Table 2. Benefits Summary**

Criteria	Benefit
✓ State of Good Repair	Eliminates more than 100 million vehicle-miles traveled
✓ Economic Competitiveness	Saves over \$37 million in vehicle operating costs
✓ Livability	Fills in a critical missing gap in transit service with high demand
✓ Environmental Sustainability	Provides \$600,000 of CO2 and non-CO2 emissions reductions
✓ Safety	Saves \$25 million in injury and fatality reductions
✓ Job Creation / Near-Term Economic Activity	Creates 227 jobs including near-term construction jobs, some of which will be served by workers from economically distressed areas
✓ Innovation	Strategies include TSP, interoperable fare cards, real-time information
✓ Partnership	Support from local agencies and integration with Commuter Services
✓ Positive Benefit-Cost	Provides a 1.85 benefit-cost ratio



## Project Description

Combining elements of a Highway Project eligible under Title 23 and a Public Transportation Project eligible under Chapter 53, Title 49, the South Florida Express Lane System Improvements (I-75 Express Bus Capital Purchase/Regional Park-n-Ride Lot) is comprised of six key components.

- Service will be implemented during reconstruction of the I-75 Corridor to add Express Lanes. Once the Express Lanes are operational in FY 2018, the State's operating funds will be replaced by funds generated by tolls
- Design and construction of a 522-space park-n-ride lot with kiss-n-ride spaces at the I-75 interchange at S.R. 818 (Griffin Road)
- Purchase of six (6) 60-foot hybrid-electric buses to provide environmentally-friendly public transit
- Transit signal priority (TSP) along the surface street portions of the route directly benefiting buses using the Griffin Road interchange
- Signage and express bus route branding installation at the bus stops, park-n-ride lots, and wayfinding signs throughout the surrounding community
- Extension of I-595 Express Bus route creating a seamless regional network



The I-75 Express Bus Service will be a premium service during peak hours only connecting residential areas of Broward County and employment centers in Miami-Dade County, while also providing reverse commute opportunities for an economically distressed population in Miami-Dade County. The I-75 Express premium transit service will primarily connect commuters in central-west Broward County with the Palmetto Metrorail Station, providing access to a large commercial and industrial employment center in the Town of Medley and the City of Doral, as well as via Metrorail to multimodal connections at the Miami Intermodal Center (MIC) and employment opportunities at Miami International Airport (MIA), downtown Miami, and all employment or activity centers accessible from any Metrorail station.

The I-75 Express Bus service will be branded as a high-level service to attract choice commuters who are currently primarily driving alone for this trip pattern. The project will create a modal shift from single-occupancy travel to public transit resulting in the long-term outcomes that will have a significant regional effect on South Florida with respect to the five long term outcomes specified in the Selection Criteria and Guidance for TIGER IV Discretionary Grants.

The reverse commute market will provide residents of western Miami-Dade County and residents along the Metrorail corridor with access to employment centers in western Broward County including the Cleveland Clinic and Weston Park of Commerce in the City of Weston, and the Sawgrass International Corporate Park and the Sawgrass Mills Malls in the City of Sunrise. The project provides a new direct express transit connection between west-central Broward County and western Miami-Dade County. Further, the extension of the I-595 Express Bus route to connect at S.R. 818 (Griffin Road) Park-n-Ride Lot provides a reverse commute connection from northwest Fort Lauderdale and east Broward County to opportunities in the City of Doral and the Town of Medley.

## Route Location

The I-75 Express Bus route connects residential, employment, and multimodal transportation centers in Broward and Miami-Dade Counties. A project map is provided on the following page. The proposed route includes access to two (2) counties, four (4) congressional districts, and eleven (11) municipalities. The I-75 Express Bus Service totals approximately 54 route miles of service.



The I-75 Express Bus will originate at the Bank Atlantic Center, an indoor arena hosting large sporting and entertainment events with a large regional parking resource located in the City of Sunrise, a suburb of Fort Lauderdale. The Bank Atlantic Center is also adjacent to Sawgrass Mills Mall, one of the nation’s largest outlet mall establishments, which attracts both residents and visitors to the area. The arena and mall are directly accessible from the Sawgrass Expressway (S.R. 869).



The I-75 Express Bus route will travel from the Bank Atlantic Center to the Sawgrass Expressway (S.R. 869) along Sunrise Boulevard. The bus route will travel south along the Sawgrass Expressway and continue onto I-75 southbound. The bus will make a scheduled stop at the proposed 522-space park-n-ride lot at the Griffin Road (S.R. 818) exit. This lot will be located at the southeast corner of the I-75/Griffin Road interchange and will benefit from TSP implemented to detect buses on the ramps. Once allowing patrons to board and alight at the Griffin Road park-n-ride lot, the I-75 Express Bus will continue southbound on I-75 into Miami-Dade County, merging onto southbound Palmetto Expressway (S.R. 826), and then exiting at NW 74<sup>th</sup> Street to access the Palmetto Metrorail Station, a transportation hub that provides connections to Metrorail, the Doral Trolley, and Metrobus. The Griffin Road Park-n-Ride lot will also allow for transfers between the I-75 and I-595 Express Bus service.

The corresponding northbound route will be similar to the southbound route, with some strategic modifications to increase reverse commute ridership. The northbound route departs Palmetto Station and travels northbound on S.R. 826, then exits onto northbound I-75, then exits onto Griffin Road to access the Griffin Road park-n-ride lot.

**I-75 Express Bus Provides Service to:**  
**2 Counties:** Broward and Miami-Dade  
**4 Congressional Districts:** 20, 21, 23, 25  
**Other Premium Transit Services:**  
Metrorail, Doral Shuttle and I-595 Express Bus System [ which will be extended to the Griffin Road Park-n-Ride Lot ]

In the vicinity of the City of Weston, the I-75 Express Bus will divert from I-75 to access some reverse commute destinations within the City of Weston. The route in the City of Weston travels northbound along Weston Road to S.R. 84. This route accesses the medical and business areas of the City of Weston, such as the Cleveland Clinic and the Weston Park of Commerce. After reaching S.R. 84, the I-75 Express Bus will travel eastbound to International Parkway in the City of Sunrise, then travel northbound through the Sawgrass Corporate Park before crossing Sunrise Boulevard and returning to the Bank Atlantic Center park-n-ride lot. The FDOT South Florida Commuter Services Team will heavily market the service in low income areas around Metrorail Stations promoting reverse commutes to jobs in Broward County.

## The South Florida Region

The I-75 Express Bus route is located in the Miami-Fort Lauderdale-Pompano Beach (Southeast Florida) Metropolitan Statistical Area (MSA). It is the 8th largest MSA in the United States having grown from 4 million people in 1990 to 5.6 million people in 2010 according to the United States Census Bureau. The route specifically services the urbanized counties of Broward and Miami-Dade.

The route will be primarily operated on Florida’s Strategic Intermodal System (SIS). One goal of the SIS is to provide direct connections from interstate highways to multimodal hubs. The proposed improvements in this project further this goal by providing multimodal transportation alternatives along I-75 to the Palmetto Metrorail Station.

## Express Lanes Network

South Florida’s regional transportation partners are working toward a common goal of expanding the managed use lanes (MUL) express lanes network to provide improved mobility, reliability, and trip options throughout the region. Florida Transportation Secretary Ananth Prasad stated that transportation officials are beginning to design an expanded network of variable-toll express lanes that would link the busiest expressways in Miami-Dade and Broward County over the next ten years, according to the article “Sunpass Lanes Proposed for I-75, Palmetto,” which was published in the

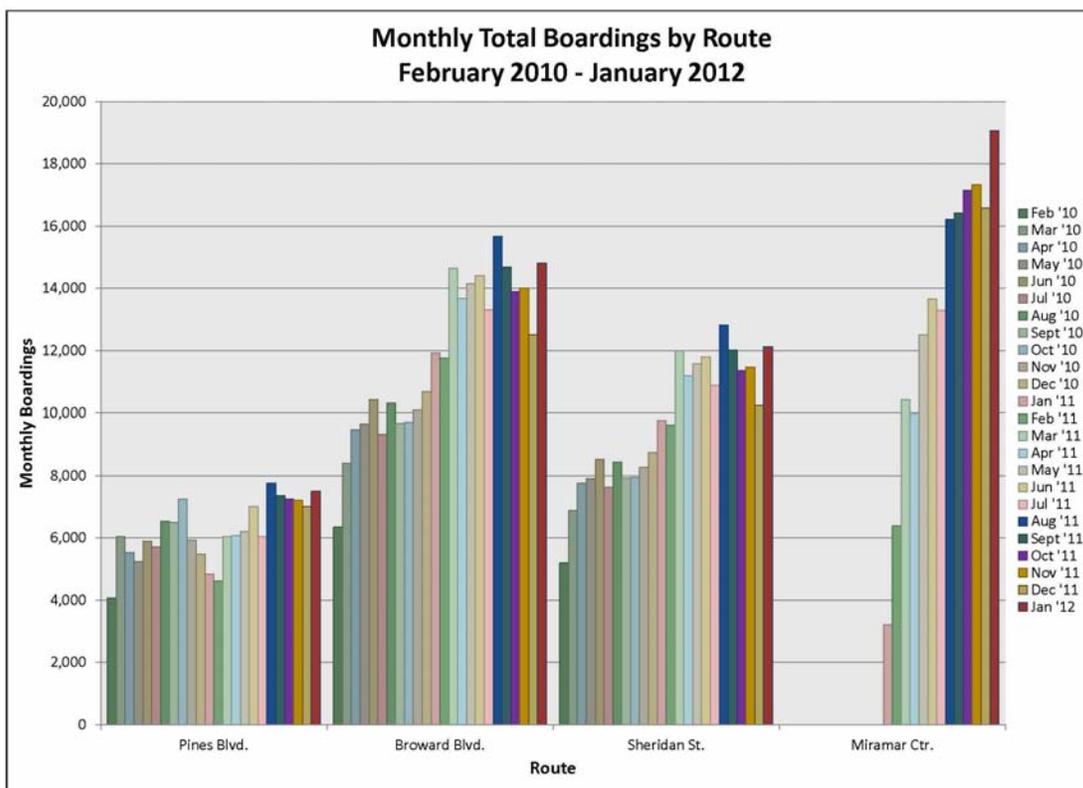


*Miami Herald* on August 11, 2011. It is anticipated that registered vanpools and carpools with three or more occupants (HOVs) will be able to use the express lanes for free. Tolls for non-high occupancy vehicles in the express lanes vary depending on the level of congestion. The Express Lanes operate with a congestion management approach in order to provide a preferred level of service. The toll rate is varied to maintain an operating speed above 50 mph.

The I-75 Express Bus route will become an important component of an interconnected network of express bus routes in South Florida including several 95 Express and 595 Express routes providing service to numerous destinations in the region. I-75 Express will provide an important new connection to the I-595 Express Bus service, City of Doral / Airport West and Town of Medley industrial employment centers, which are not currently served by the express bus network and are not currently connected by public transportation to large residential areas in western Broward County. The I-75 Express Bus route will also connect to Metrorail at its western terminus, the Palmetto Station.

### Building Upon Proven Success

FDOT desires to expand the MUL express lane system because the existing Miami-Dade segment of I-95 Express (Phase I of I-95 Express from the Golden Glades Interchange/S.R. 826 to I-395 near downtown Miami, both directions) has experienced proven success as measured by a wide range of mobility statistics. For instance, person throughput for the I-95 corridor in the Phase I section has increased dramatically. Travel speed tripled in the MULs after conversion from traditional HOV lanes to variable-toll express lanes with free registered vanpools and carpools. The general purpose lanes have also significantly benefitted from the I-95 Express project through an increase in travel speeds. Express buses operating in the I-95 Express lanes now enjoy faster and more reliable trips in and out of downtown Miami, which has led to significant increases in ridership, more park-and-ride utilization, and more buses added by Broward County Transit and Miami-Dade Transit systems.



Source: FDOT



Table 3 presents “Before-and-After” measured results for I-95 Express Phase I. The “Before” conditions reported in Table 3 are from the Spring 2008 data collection period (when I-95 contained one traditional HOV lane in each direction). The “After” conditions are from the Spring 2010 data collection period (after the construction of the I-95 Express Lanes, Phase I. Daily transit ridership in the corridor increased by 145 percent after the implementation of the I-95 Express Lanes as a result of the improved mobility conditions, more bus service, and enhanced trip reliability.

**Table 3. I-95 Express Peak Direction Before-and-After Results**

PERFORMANCE MEASURE	TIME FRAME	BEFORE	AFTER	PERCENT DIFFERENCE
TRAVEL SPEED (MPH), MULs only (1)	AM	20.3	60.9	+200%
	PM	18.1	48.5	+168%
TRAVEL SPEED (MPH), General Purpose Lanes only (1)	AM	15.2	54.2	+257%
	PM	18.8	36.5	+94%
VOLUME (VPH), All of I-95 (1)	AM	6,791	11,588	+71%
	PM	7,607	9,171	+21%
PERSON THROUGHPUT All of I-95 (1)	AM	8,471	14,134	+67%
	PM	9,858	12,746	+29%
TRANSIT RIDERSHIP (2, 3)	DAILY	1,746	4,286	+145%

Sources: (1) – 2010 I-95 HOV/MUL Monitoring Study, FDOT  
 (2) – Broward County Transit Technical Ridership Report (June 2011)  
 (3) – Miami-Dade Transit Technical Ridership Report (June 2011)

### Multimodal Service

The proposed I-75 Express Bus project connects a variety of multi-modal systems into an integrated whole to provide a more reliable, safe, and homogenous transportation network to the region and local community. In addition, due to increased fuel prices and the severe economic recession conditions that Florida has generally experienced since the downturn of the real estate and service industries, demand for alternative mobility options has increased. Increasing the attraction and convenience of these options will reach a wider demographic of users that may not have previously considered this travel alternative.

With the assistance of a TIGER IV award, the South Florida Express Lane System Improvements project will have a significant impact on service delivery and continued increases in ridership. The following regional multimodal resources will be connected by the proposed I-75 Express Bus route.

### Metrorail

Metrorail is Miami-Dade County’s 22-mile elevated rapid transit system that runs from the Palmetto Station in the northwest to Kendall in the southwest (Dadeland South Station). Along the way, Metrorail serves the largest destinations in Miami-Dade County such as the Hospital/Civic Center District, Government Center (downtown Miami), Brickell (financial district), Coconut Grove, University of Miami, and South Miami.

### Doral Trolley

The Doral Trolley is a rubber-tire local circulator that distributes passengers to and from the Palmetto Metrorail Station and the City of Doral / Airport West industrial and employment center. The Doral



Trolley is an important existing resource to be leveraged since it connects directly to major employment centers.

### Metrobus

Metrobus is Miami-Dade County’s extensive network of more than ninety (90) local and regional bus routes operated with a service fleet of more than 800 buses. Metrobus Route 87 connects to the Palmetto Metrorail Station and the proposed I-75 Express Bus route. Metrobus Route 87 provides trunk line service along 87<sup>th</sup> Avenue, a north-south arterial through the City of Doral / Airport West area.

### I-595 Express

Four (4) I-595 Express Bus routes are scheduled to begin service in Summer 2012 to connect residents in west-central Broward County with employment centers in Fort Lauderdale and Miami. This system will connect with I-75 Express Bus system at both the Bank Atlantic Center and Griffin Road Park-n-Ride lots.

## Connecting Vital Communities

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The I-75 Express premium transit bus service will primarily connect commuters from the large suburban residential communities in central-west Broward County (City of Weston and City of Sunrise) with the Palmetto Metrorail Station in Miami-Dade County. The I-75 Express Bus route will provide access to a large commercial and industrial employment center in the Town of Medley and the City of Doral, as well as the multimodal access described above. The Town of Medley/City of Doral/Airport West area is one of the region’s most strategic economic engines due to its prominence as an office and industrial hub. This section describes these key areas proposed to be connected by the I-75 Express Bus route.

### City of Weston and City of Sunrise (Broward County)

The City of Sunrise and the City of Weston together represent a population of about 150,000 residents, of which approximately 60 percent are of typical working age 18 to 64 according to the United States Census Bureau 2010 data. The City of Weston is one of the most desirable suburbs in Broward County with schools that are consistently A-rated by the Florida educational system. The City of Sunrise enjoys a prime location near three major expressways and is home to major shopping and employment areas. The City of Weston and the City of Sunrise represent a market comprised primarily of choice riders who will demand a premium service; however, the presence of approximately 6.5 percent of the population below the poverty line in these communities (according to United States Census Bureau 2010 data) indicates there is also the need for commuter-based transit service to boost access to employment and meet broader social equity goals.

### Town of Medley, City of Doral, and Airport West Industrial Center (Miami-Dade County)

The Town of Medley, City of Doral, and Airport West Industrial Center together represent a significant economic engine for South Florida due to large industrial, office, warehouse, and distribution centers. Growth of this market has traditionally stemmed from efficient access to transportation facilities, primarily the proximity to cargo areas of Miami International Airport (MIA), which has turned the area into a hub for distribution facilities of international cargo. S.R. 826 (Palmetto Expressway), S.R. 836 (Dolphin Expressway), and U.S. 27 (Okeechobee Road) serve truck traffic into and out of the area. Although for a few years, the economic downturn caused no new warehouse distribution or office space to be developed in this submarket, developers are starting to build new warehouse distribution space again according to the article “Miami’s Airport West Industrial Space Grows,” which was published in the South Florida Business Journal on October 21,



2011. This area also boasts one of the best submarkets of Class A office space in South Florida, with major corporate headquarters located here including Carnival Cruise Lines, Norwegian Cruise Lines, Benihana, Hellman Logistics, Amadeus IT Group, and Univision. Many Latin American airlines employ large call centers in the Airport West area including Avianca, Grupo TACA, and Martinair.

Overall, the Town of Medley, City of Doral, and Airport West area is a diverse attractor of employment trips that serve various income and skill levels.

### Reverse Commute Market

Miami-Dade County is classified as an economically distressed area as defined by Section 301 of the Public Works and Economic Development Act. The I-75 Express Bus reverse commute market is comprised of Miami-Dade County residents who would gain access to significant employment opportunities in west-central Broward. South Florida's largest office park, Sawgrass International Corporate Park, is located in the City of Sunrise and features 612 acres of facilities for corporate and regional headquarters, research and development, and flex space, according to the City of Sunrise. Also in the City of Sunrise, the Sawgrass Mills Mall provides additional employment opportunities. Cleveland Clinic and Weston Park of Commerce are both located along Weston Road and will be served by the reverse commute portion of the proposed I-75 Express Bus route. Again, FDOT will utilize the South Florida Commuter Services outreach staff to target and market low income communities in walking distance to Metrorail to access the service in reverse to jobs in Broward County.

### Anticipated Service

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The I-75 Express Bus will provide service every 30 minutes during the morning and evening peaks. Five total buses will be in service, with one bus designated as a spare. The buses and stations will be uniquely branded to identify the expectation of premium service.

The total anticipated ridership for the I-75 Express Bus route is approximately 850 average weekday passengers in 2015. By 2035 this ridership is anticipated to increase to approximately 1,390 average weekday passengers. Of this total ridership, approximately 75% is anticipated to travel in the peak directions (southbound in the morning and northbound in the afternoon) and 25% is anticipated to travel in the reverse commute direction. Additional information on the ridership projections is provided in the attached Benefit-Cost Analysis technical memorandum.

### Project Investment Costs

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FDOT calculated cost estimates in 2011 dollars (2011\$) for the capital and operational expenses associated with the project. Project capital costs include design and construction of the Griffin Road Park-n-Ride lot, the equipment and installation costs of three bus shelters, the purchase of six (6) 60-foot hybrid electric buses, the equipment and installation/implementation costs of transit signal priority (TSP), and signage and branding for the I-75 Express Bus service (see the attached benefit-cost analysis spreadsheet information, bcaspreadhseet.xlsx, "Costs" tab, row 12). Project operational expenses for 21 years of service (2015 – 2035) include the operations and maintenance costs of the I-75 Express bus service, as well as the maintenance of the new park-n-ride lot on Griffin Road at I-75. It was assumed the estimated life of a bus is 12 years; therefore, the cost of replacing the six buses when they reach 12 years of age (which will occur once during the 21 years of operational expenses considered herein) is also included in the total costs of the project ("Costs" tab, row 19).

Undiscounted costs in 2011 dollars are shown in Table 4.



**Table 4. Undiscounted Project Costs (2011\$)**

Project Costs	2011\$
Griffin Road / I-75 Park-n-Ride Lot – Design	\$927,500
Griffin Road / I-75 Park-n-Ride Lot – Construction <sup>(A)</sup>	\$8,703,000
Three (3) Bus Shelters	\$75,000
Six (6) 60' Hybrid-Electric Buses	\$6,924,000
Signage and Branding Installation at Two (2) Park-n-Ride Lots	\$150,000
Transit Signal Priority (TSP)	<u>\$200,000</u>
<b>Total Capital Costs</b>	<b>\$16,979,500</b>
Bus Operating and Maintenance	\$19,680,000
Park-n-Ride Lot Maintenance	\$1,194,433
Replacement of Buses (every 12 yrs)	<u>\$6,924,000</u>
<b>Total Operating and Maintenance Costs (21 Years)</b>	<b>\$27,798,433</b>
<b>Total Project Costs</b>	<b>\$44,777,933</b>

(A) – Includes mobilization, MOT, contingency and landscaping applied by FDOT  
 Source: Florida Department of Transportation, 2012

FDOT also provided estimated annual operating and maintenance costs for the six buses of the I-75 Express Bus service at \$960,000 per year beginning in July 2015 when the express bus service is expected to start revenue service. The park-n-ride lot maintenance was also estimated to start in July 2015 and was estimated based on the maintenance cost per parking space obtained from the most recent update of the FDOT State Park & Ride Lot Program Planning Manual. The proposed Griffin Road park-n-ride lot includes 474 regular parking spaces, 26 kiss-n-ride spaces, and 22 plaza spaces which are estimated to cost \$112 per space per year in 2011\$ to maintain, for a total of \$58,265 per year.

Table 5 presents the discounted present value of all costs. Costs are discounted to 2011\$ using the real discount rates of 3 percent and 7 percent as prescribed by the TIGER IV federal guidance.

**Table 5. Discounted Total Project Costs (2011\$)**

Discount Rates	3%	7%
<b>Project Costs</b>	<b>Discounted Present Value (2012)</b>	
Discounted Present Value of All Costs	\$34,419,215	\$25,923,018

Source: Cambridge Systematics, Inc.

## Local Match

Recent express bus and park-n-ride improvements invested by FDOT and its local partners in South Florida have increased system-wide transit ridership and improved economic competitiveness. FDOT is requesting **\$13,583,600** for the capital costs of the South Florida Express Lane System Improvements (I-75 Express Bus Capital Purchase/Regional Park-n-Ride Lot), which will allow the South Florida region to build upon this success by expanding this network to I-75.

As identified in Table 6, the local match will be a 20% cash match with state funds for the I-75 Express Bus service and the Regional Park-n-Ride Lot. This support has already been confirmed by FDOT as evidenced by the attached local match commitment letter. Additional value to the I-75 Express Service will be provided with the FDOT funded Bank Atlantic Center Park-n-Ride Lot. The



FDOT contribution to this project is already committed at a value of \$990,000. These FDOT allocated funds are not included as part of the FDOT cash match, but are additional funds FDOT is contributing that will benefit this project.

**Table 6. Local Match Commitment**

Source	Funding Amount (2011\$)	Percent
TIGER Grant Request	\$ 13,583,600	80%
FDOT Cash Match	\$ 3,395,900	20%

The highway infrastructure will be financed by FDOT, considering innovative project delivery options that account for the long-term planned tolling and subsequent revenue stream of the proposed I-75 managed lanes. The types of innovative financing models under consideration allow the near term transit costs to be paid for by conventional vehicular (single occupancy) commuters using the managed lanes. After FY 2018 it is anticipated that the I-75 Corridor will have an Express Lane Toll revenue stream that will contribute to the operating and maintenance costs of this project.

### Project Parties

The South Florida Express Lane System Improvements project will be provided through a collaboration of efforts between FDOT Districts 4 and 6 since this service accesses and serves both Districts. Both project parties fully support this project. The two FDOT Districts maintain a symbiotic relationship as they share mission objectives and face the same mobility challenges posed by increasing levels of vehicular congestion and increasing energy costs. By combining forces, the South Florida Express Lane System Improvements project expands the service area offered to transit patrons resulting in mutually beneficial gains in system performance, energy efficiency, and benefits to transportation system users.

### Agency Roles

The lead agency for this project is FDOT District 4 with the support and cooperation of FDOT District 6 and local partners who have provided support letters. FDOT will be fully responsible for the design, construction, and construction inspection of the proposed Griffin Road park-n-ride lot provided under this grant. FDOT will also be responsible for identifying the express bus operator for the bus procurement. Maintenance of the park-n-ride lots will also be the responsibility of FDOT.

### Project Delivery Approach

If awarded the TIGER IV Discretionary Grant monies, FDOT will administer the funds. Contract execution and all disbursement of grant and project funds will also be administered by FDOT.

Project delivery will be performed in accordance with existing FDOT contractual regulations. These regulations establish strict adherence to Federal requirements, including all labor and civil rights laws. In order to expedite the project delivery, various segments of the project may be contracted as Design-Build.

### Selection Criteria

The I-75 Express Bus clearly aligns with the primary and secondary selection criteria and is strongly supported with a positive benefit-cost analysis of 1.85 at a 3 percent discount rate. The summary below directly addresses the primary and secondary selection criteria to be used by the USDOT to evaluate applications and clearly indicates that this project meets and exceeds award requirements.



## Long Term Outcomes

### State of Good Repair

The purchase of hybrid buses is a positive step forward in terms of overall reliability and reduced maintenance costs over conventional diesel buses. Hybrid technology has provided improved design elements which have resulted in significant reductions in transmission and brake maintenance, and reduced overall service bay time compared to traditional buses. Improvements in overall reliability have been cited by several transit agencies currently using hybrid vehicles.



Hybrid buses have demonstrated improved maintenance costs on key bus components. For example, hybrid buses have demonstrated the ability to improve the reliability of diesel particulate filters on buses and help to reduce the brake wear and tear due to the regenerative braking. This results in lower operating costs that have been documented as up to a 15 percent reduction in operating costs due to the reduced stress and maintenance on the mechanical components such as brake linings, according to the Environmental and Energy Study Institute’s (EESI) “Hybrid Buses Costs and Benefits,” April 2007. This improvement has the potential to extend brake life up to 50 to 100 percent. The lower maintenance costs can also be attributed to the electric drive that has fewer parts; therefore, it requires less maintenance than a traditional transmission.

In addition to the benefits associated with the hybrid bus technology, the project will also improve the I-75 roadway conditions by providing travelers with an efficient alternative to personal vehicles resulting in a decrease in private automobile traffic with a corresponding decrease in vehicle-miles traveled (VMT). Additional information regarding the quantification of these benefits is provided in the attached Benefit-Cost Analysis. In addition, the implementation of TSP along the connecting arterial roadways is anticipated to provide additional benefits including travel time savings for buses.

### Economic Competitiveness

The South Florida Express Lane System Improvements project intends to increase the region’s economic competitiveness by reducing private automobile traffic operating costs, increasing trip reliability for buses on arterial streets with TSP, improving the transportation options to users between regional residential and economic centers, and reducing overall travel costs. The I-75 Express Bus route travels along a transportation corridor that connects a much larger regional transportation system over two counties and serves the Town of Medley, City of Doral, and Airport West employment center located in Miami-Dade County, an economically distressed area as defined by section 301 of the Public Works and Economic Development Act of 1965, as amended (42 U.S.C. 3161).

As indicated in the attached Benefit-Cost Analysis, the availability of an express bus transit route will provide a net savings in vehicle operating costs. The transit efficiency enhancements are further improved with TSP implementation that will help provide more efficient and reliable mobility for



transit users to jobs and other economic centers. Long-term employment benefits will be provided by improving overall mobility and job access for residents of Broward County and Miami-Dade County. In addition, an express bus service provides additional opportunities for the transportation disadvantaged. New job opportunities will be derived from new business start-ups and economic growth in the long-term due to improved transportation options. The end-of-line stations are anticipated to help attract new business to the area and retain existing businesses. Finally, the reverse commute opportunities provide travel options allowing for more new economic opportunities for residents of Miami-Dade County.

### Livability

The South Florida Express Lane System Improvements significantly reduce the cost of mobility for system users through the creation of more convenient transportation options for travelers. Furthermore the I-75 Express Bus route connects several multi-modal service points including park-n-ride lots and the Palmetto Metrorail Station. By providing Express Bus service to the Palmetto Metrorail Station, these multi-modal connections are extended to the transportation disadvantaged population along the Metrorail.

The USDOT, Department of Housing and Urban Development (HUD), and Environmental Protection Agency (EPA) created a high-level interagency partnership to better coordinate federal transportation, environmental protection, and housing investments. The South Florida Express Lane System Improvements also addresses two key “livability principles” identified as part of the Partnership for Sustainable Communities. Specifically the project provides more transportation choices and enhances economic competitiveness. The I-75 Express Bus provides safe, reliable and economical transportation to decrease household transportation costs, reduce the nation’s dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health. This project builds facilities that provide enhancements to the existing transportation system to make it more accessible, integrated, and efficient while offering flexibility of choices for true mobility alternatives to single-occupant automobiles. Also, the hybrid buses and cars specifically reduce reliance on foreign oil, reduce greenhouse emissions, improve air quality, and enhance public health. The I-75 Express Bus provides reliable and timely access to employment centers as well as expanded business access to markets.

The proposed I-75 Express Bus service is one component of the express bus system in South Florida. The proposed park-n-ride lots are recommended in the preferred alternative of the corresponding I-75 Project Development and Environment PD&E Study’s Project Development Summary Report (PDSR) attached to this application. Significant public involvement occurred as part of the I-75 PD&E study that encouraged community participation in the process. As documented in the attached Benefit-Cost Analysis, significant commuter savings can be realized with transit, and are anticipated to increase even further with the expansion of the MUL system on I-75.

Our society has become accustomed to the ability to utilize personal means of travel that are historically more convenient and comfortable. Increasing the safety, comfort, and convenience of public transportation will increase the consideration of the general public to seek alternative modes from the personal automobile. The movement towards livability recognizes that an attractive system will encourage a wider demographic of users beyond those that utilize the system due solely to economics.

### Environmental Sustainability

FDOT clearly recognizes the benefits of acquiring clean, energy efficient transit vehicles in the short- and long-term planning horizons. Documented research from the National Renewable Energy Laboratory (NREL) (<http://www.nrel.gov/docs/fy02osti/32427.pdf>) identifies that hybrid propulsion technologies offer promising gains in a wide spectrum of performance, efficiency, and maintenance



parameters. Key benefits of hybrid buses include: reduced greenhouse gas (GHG) emissions, fuel savings and economy, increased reliability, and reduced maintenance costs. Implementing the South Florida Express Lane System Improvements identified herein will improve transit service between major metropolitan areas and reduce air emissions. As shown in the attached Benefit-Cost Analysis, a reduction in emissions is anticipated due to the reduction in VMT.

### Safety

The South Florida Express Lane System Improvements project is anticipated to reduce the number of private automobile trips by providing transportation users with a multi-modal high occupancy alternative. This reduction in VMT is anticipated to reduce congestion and reduce crash exposure. Specifically as illustrated in the Benefit-Cost Analysis, a reduction in fatalities and injuries is anticipated due to the reduction in VMT and crash exposure.

### Job Creation and Near-Term Economic Activity

The South Florida Managed Lanes Improvements Project is anticipated to create 227 jobs. Table 7 summarizes the jobs created by quarter through the TIGER IV funding. The jobs represented above include direct, indirect, and induced jobs. These job projections were calculated using the information provided in the White House paper on estimates of Job Creation ([www.whitehouse.gov/administration/eop/cea/Estimate-of-Job-Creation](http://www.whitehouse.gov/administration/eop/cea/Estimate-of-Job-Creation)) with updates reflected in the January 31, 2012 Notice of Funding Availability.

**Table 7. Jobs Created**

Time Period		Number of Jobs
<b>2012</b>	Q3	2
	Q4	3
<b>2013</b>	Q1	3
	Q2	3
	Q3	3
	Q4	3
		3
<b>2014</b>	Q1	12
	Q2	17
	Q3	20
	Q4	20
<b>2015</b>	Q1	31
	Q2	38
	Q3	32
	Q4	26
<b>2016</b>	Q1	11
	Q2	4

In the near-term, construction jobs will be created with the construction of the Griffin Road park-n-ride lot. A portion of these construction jobs are anticipated to be provided by workers in Miami-Dade County, an economically distressed area as defined by section 301 of the Public Works and Economic Development Act of 1965, as amended (42 U.S.C. 3161). In addition, near-term manufacturing jobs will be created with the hybrid bus purchase, jobs that encourage manufacturing of environmentally-friendly technologies.

After construction and bus purchase, the South Florida Express Lane System Improvements will sustain job creation by creating reliable, premium transit service for the region allowing



transportation disadvantaged workers and choice riders alike to travel between residential and economic centers of Miami-Dade and Broward Counties. Many of the locations along the I-75 Express route provide multi-modal connections, such as the Palmetto Metrorail Station, thereby extending the coverage area available to I-75 Express Bus patrons.

### Innovation

Transit signal priority (TSP) will be provided on the connecting arterial roadways and interchange ramps, including Griffin Road, Weston Road, S.R. 84, and International Drive in the City of Sunrise, to improve bus trip reliability and travel time. TSP is a transit service enhancement strategy that can be used to help make transit service more reliable, faster, and cost effective. TSP facilitates the movement of transit vehicles through traffic signal-controlled intersections by modifying signal phases to provide advantages to the transit vehicles. TSP allows extension of a traffic signal's green time or a reduction of a traffic signal's red time to accommodate approaching buses.

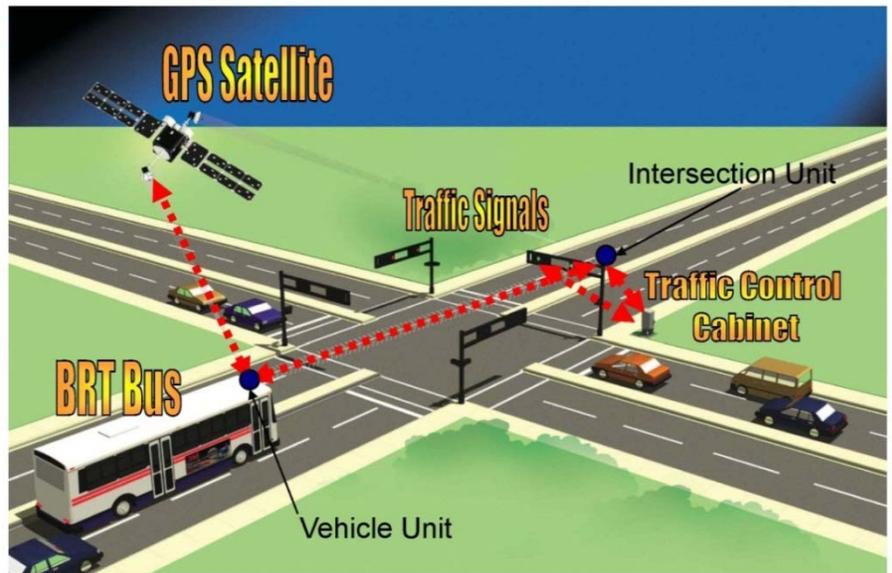
TSP is dependent upon innovative technologies that reside in both the transit vehicles and within the signal system to make changes to the upcoming traffic signal. TSP along with corresponding improvements to signal timing and progression have been shown in before-and-after studies to result in a measured increase in transit ridership, reduction in travel time, and even mode shift from automobiles to transit according to "The San Pablo Rapid BRT Project Evaluation," Federal Transit Administration, June 2006, FTA-FL-26-7022-2006.1.

FDOT District Four has conducted local evaluations of TSP in Broward County and concluded that TSP on express bus routes operating on 30 minute headways causes minimal or no impacts to side street traffic delay and queuing when used on all but principal arterial/principal arterial intersections, thereby ensuring net positive benefits. It should be noted that TSP reliability benefits were not monetized for purposes of this analysis and are not included in the 1.85 Benefit-Cost ratio.

In addition to TSP, additional innovation is anticipated in traveler information systems and the fare collection system. First, a mobile application is under development that is expected to attract more riders by providing real-time information to users. Text notifications will be sent to Express Bus patrons that subscribe to the service.

The service will be free to riders and will provide riders real-time information on bus location and provide alternative routes if needed, allowing riders more control of their individual commutes. The service is a downloadable application, or "app", that is customizable and provides database building capabilities. The pilot project is scheduled to begin the summer of 2012.

In addition, a regional fare card system is under development. FDOT is currently supporting the development of a fare integration and interoperability study to identify a blueprint for seamless travel between Broward County Transit, Palm Tran, Miami-Dade Transit, and Tri-Rail. The study objective



is to identify technical possibilities and define hardware and software requirements for transit vehicles and operations centers with the goal of leveraging existing equipment.

### Partnership

This application represents a combined collaboration between two Districts of FDOT, District 4 and District 6. Furthermore this project requires coordination with both Miami-Dade and Broward Counties resulting in a broad range of participants. Funding support is committed by FDOT, as evidenced in the funding commitment letter attached to this application. Support letters from the principal participants are also attached.

### Results of Benefit-Cost Analysis

Cambridge Systematics, Inc. conducted a Benefit-Cost Analysis following Federal USDOT guidance regarding evaluation criteria, discount and monetization rates, and evaluation methods prescribed in the Notice of Funding Availability (NOFA) of January 31, 2012, its webinars and additional guidance posted online ([http://www.dot.gov/tiger/docs/tiger-12\\_bca-resourceGuide.pdf](http://www.dot.gov/tiger/docs/tiger-12_bca-resourceGuide.pdf)), and other supporting documents suggested.

### Summary of Project’s Benefit-Cost Analysis

The principal results of the Benefit-Cost Analysis (BCA) are shown in Table 8. The I-75 Express Bus Capital Purchase/Regional Park-n-Ride Lot project has a benefit-cost ratio of 1.85 at a real discount rate of 3 percent, and 1.54 at a real discount rate of 7 percent. The Net Present Value (NPV) of the project is \$29.3 million at 3 percent and \$14.1 million at 7 percent. “Real” discount rates are inflation free. Table 8 summarizes the BCA results and validates the long-term economic benefits associated with this important investment.

**Table 8. Benefit-Cost Ratio and Net Present Value (2011\$)**

<b>Discount Rates</b>	<b>3%</b>	<b>7%</b>
<b>Project Benefits</b>	Discounted Present Value (2012)	
Economic Competitiveness Benefits	\$37,730,270	\$23,573,867
Safety Benefits	\$25,332,753	\$15,827,900
Sustainability Benefits	\$631,710	\$593,747
<b>Discounted Present Value of All Benefits</b>	\$63,694,733	\$39,995,514
<b>Project Costs</b>	Discounted Present Value (2012)	
<b>Discounted Present Value of All Costs</b>	\$34,419,215	\$25,923,018
<b>Benefit-Cost Ratio</b>	1.85	1.54
<b>Net Present Value</b>	\$29,275,518	\$14,072,496

Source: Cambridge Systematics, Inc.

Benefits included in the BCA and evaluated quantitatively in terms of the TIGER IV criteria are vehicle operating costs savings (Economic Competitiveness), reduction in the risk of accidents (Safety), and reduction in emissions (Sustainability). Livability and State of Good Repair benefits, also part of the TIGER IV evaluation criteria, were not quantified for the BCA but are discussed elsewhere in the application. These are summarized in Table 9 below.



**Table 9. Project Matrix – Summary of Economic Impacts, Benefits and Results**

Current Status & Problem to be Addressed	Change to Baseline	Type of Impacts	Population Affected by Impacts	Economic Benefits	Summary of Results	Page # in BCA <sup>(A)</sup>
Lack of mobility options to single-occupancy vehicle travel between west Broward County and Miami-Dade County on I-75 corridor during peak hours to access major employment centers in both counties.	New park-n-ride lot on Griffin Road and express/ premium bus service on I-75 corridor between Broward County and Miami-Dade County to provide increased access to major employment centers in both counties.	Reductions in monetary operating costs, risk of fatalities and injuries, and pollutants and greenhouse gases from drivers switching to transit, a lower-cost, safer, and less polluting mode.	Number of single-occupant vehicle travelers shifting to transit during peak hours to travel between west Broward County and Miami-Dade County.	<u>Economic Competitiveness:</u> Reduced vehicle operating costs (\$0.60 per mile).	<u>Total Benefit (3% discount rate) = \$63.7 M</u>	pp. 7-19
				<u>Safety:</u> Reduced risk of accidents (0.6 fatalities avoided and 52.3 injuries avoided).	<u>Economic Competitiveness:</u> Savings in vehicle operating costs = <b>\$37.7 M</b>	pp. 12
				<u>Sustainability:</u> Reduced amount of emissions/ pollution (27,120 metric tons).	<u>Safety:</u> Reduced accident costs = <b>\$25.3 M</b>	pp. 13
					<u>Sustainability:</u> Reduced cost of emissions/ pollution = <b>\$632K</b>	pp. 15

(A) Page refers to Benefit Cost Analysis Technical Memorandum included in the Appendix.

### Benefit-Cost Analysis Overview

As prescribed by the USDOT, benefits and costs should be shown in each year for the useful life of the project, at least 20 years, and both should be discounted to the year 2012 applying two different inflation-free discount rates to both the project costs and benefits (3 percent and 7 percent). These real discount rates reflect the opportunity cost of money net of the rate of inflation. To calculate the benefit-cost ratio, the present value of benefits and the present value of costs are calculated. The Present Value of Benefits (PV<sub>B</sub>) is the sum of the discounted present value of all benefits:

$$PV_B = \sum_{i=0}^n B_i / (1 + r)^i$$

where:

- B<sub>i</sub> = the benefit of the project in year i.
- r = the discount rate (e.g.,.03 for 3%)
- n = the number of years for which benefits are analyzed.

The Present Value of Costs (PV<sub>C</sub>) equals the sum of the discounted present value of all costs:

$$PV_C = \sum_{i=0}^n C_i / (1 + r)^i$$

where:

- C<sub>i</sub> = the cost of the project in year i
- r = the real discount rate (e.g.,.03 for 3%)
- n = the number of years for which costs are analyzed.

Projects benefits and costs are estimated for each year after work on the project is begun and for a period of at least 20 years in the future and shown in 2011 dollars.

The Benefit-Cost ratio (B/C) is defined as the ratio of the Present Value of Benefits and the Present Value of Costs: B/C = PV<sub>B</sub> / PV<sub>C</sub>. The Net Present Value (NPV) is the difference between the Present Value of Benefits and the Present Value of Costs: NPV = PV<sub>B</sub> – PV<sub>C</sub>.



## Project Economic Benefits

As indicated earlier, the modal shift from automobile travel to transit forms the basis for the estimation of the benefits produced by the implementation of the Regional Park-n-Ride Lot and the I-75 Express bus service. Therefore, the first step in the analysis was to estimate the affected population that will be impacted by the project investments and measure the number of passengers benefited by the project. This population is defined as the estimated ridership for the I-75 Express bus service once the project is operational mid-2015. It is assumed that the potential transit market represents the number of vehicle person trips who will switch to the new I-75 Express bus service.

### Affected Population (Transit Ridership Estimate)

The travel market analyzed is considered to be from the park-n-ride lots in Broward County to the Palmetto Metrorail Station and its surrounding areas. The project will also provide a reverse commute transit option to residents from Miami-Dade County who work in west-central Broward County, particularly to the Cleveland Clinic and corporate parks along Weston Road and International Drive in the City of Sunrise.

To estimate the travel demand of the new I-75 Express bus service, the ridership of the I-95 Express bus service traveling from the Miramar Town Center (southwest Broward County) to the Jackson Memorial area hospitals and downtown Miami in Miami-Dade County was evaluated (as discussed in the Building Upon Proven Success section of this application). The ridership trend of the Miramar I-95 Express bus route, which started service in January 2011 and in its first year ridership has grown exponentially, was used as the base model to estimate the expected travel demand from west-central Broward County to Miami-Dade County for the I-75 Express bus route given the similarity between the services.

The Miramar I-95 Express Bus and the proposed I-75 Express Bus both serve an untapped commute transit market between residential areas of Broward County and major employment centers in Miami-Dade County that previously did not have access to transit as a mobility option between the counties. However, the Miramar I-95 Express provides a one-seat ride to employment centers in Miami while the I-75 Express bus route will provide a two-seat ride to residents in west-central Broward going to employment centers in Miami-Dade County via the Metrorail system or the Doral Trolley (i.e. making a transfer at the Palmetto Metrorail Station). For this reason, the I-75 Express bus service was assumed to achieve slightly lower levels of ridership in its first year of operation than the Miramar I-95 Express route has achieved. Given the need to make a bus-rail transfer to access employment centers in Miami-Dade County accessible by the Metrorail system, a 25 percent transfer penalty is assumed. In other words, it is assumed the I-75 Express transit ridership will be 25 percent less than the Miramar I-95 Express route ridership to Miami due to the required transfer.

The proposed I-75 Express bus service characteristics and level of service are summarized in Table 10.



**Table 10. I-75 Express Proposed Bus Service**

Start of Operations	July 2015
Number of Seats per Bus	64 seats
Number of Allowable Standees	26 standees
Maximum Passenger Load per Bus	90
Daily Number of Trips	14 trips (peak hours only) 7 trips in AM (trips begin from 5:30 – 8:00 am) 7 trips in PM (trips begin from 3:30 – 7:00 pm)
Headway	30 minutes
Total Route Miles	54
Average Passenger Miles per Trip <sup>(A)</sup>	22
Premium Transit Fare per Trip <sup>(B)</sup>	\$2.35 (one-way) including free transfers
Transfer Penalty	25% Ridership Reduction

(A) – Average of the distance between the two principal origins and destinations.

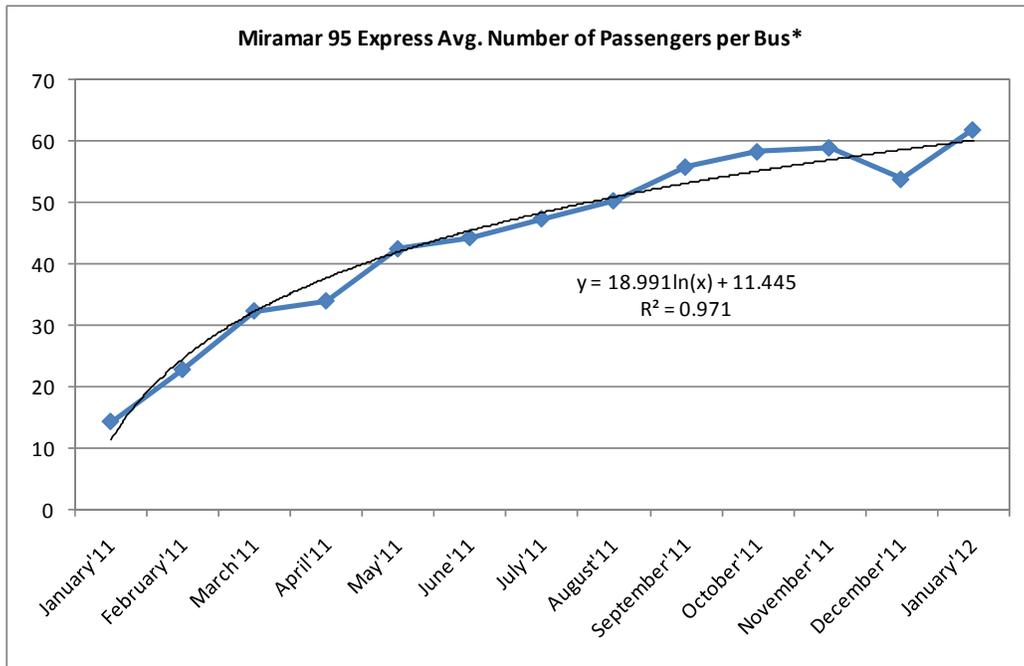
(B) – Assumed to be the same premium fare per trip as I-95 Express Bus service to Miami. For this analysis, it is assumed that the premium fare includes a free transfer to Metrorail, the Doral Trolley, or Metrobus.

Source: Cambridge Systematics, Inc.

A regression analysis of the Miramar I-95 Express bus ridership in the last year of operations was used to estimate the average weekday ridership expected for the commuter market of the I-75 Express Bus service (see the information provided in the attached spreadsheet, bcaspreadsheet.xlsx, “TransitTripsEst” tab, chart on A63, and Figure 1). Regression results indicate that in the first six months of service, the Miramar I-95 Express bus service is estimated to carry an average of 45 passengers per trip. Applying the 0.75 transfer penalty, or 25 percent ridership reduction, it was assumed the I-75 Express bus service in its peak/commute direction would grow to carry 34 passengers per bus in its first year in service, and grow to about 87 passengers per bus in 20 years based on the natural log regression of the average number of passengers per trip of the Miramar I-95 Express Bus service (“TransitTripsEst” tab, row 20). This estimated average daily number of passengers per trip was assumed to be the commuter transit market for each of the 14 daily trips assumed for the I-75 Express service from year 2015 to 2035. The estimated average weekday ridership is the average daily number of passengers per trip times the 14 daily trips assumed (“TransitTripsEst” tab, row 21). To obtain the total annual ridership for the I-75 Express Bus service, a 254 daily-to-annual expansion factor was used based on the bus service running fifty-two weeks in a year, five days a week except on six national holidays (“TransitTripsEst” tab, row 22).



**Figure 1. Regression Analysis to Estimate I-75 Express Bus Demand based on Miramar I-95 Express Bus Service**



Average Number of Passengers per Bus for Miramar I-95 Express Bus available in its first year of operation.  
 Source: Broward County Transit Monthly Ridership Reports and Cambridge Systematics, Inc.

The reverse commute market (from Miami-Dade County to Broward County) was assumed to be a percentage of the primary commute market. Given that the Miramar I-95 Express Bus service does not provide a reverse commute market to serve as an example, data readily available from peer agencies nationwide with routes having similar employment attractors to the I-75 Express route was used. Additional detail is included in the attached Benefit-Cost Analysis. The resulting I-75 Express reverse commute ridership was assumed to be 25 percent of the commute market discussed earlier (“TransitTripsEst” tab, row 29).

The group of transportation users who would benefit from the project is the estimated riders of the new I-75 Express bus. The methodology to develop the estimates of transit ridership is detailed in the attached Benefit-Cost Analysis. It is expected the express bus service will attract single-occupant vehicles and former carpoolers similarly to the Miramar I-95 Express bus service, where over 90 percent of the current transit riders used to drive before leaving their cars at a park-and-ride lot and getting on the express bus to Miami to complete their commute trip.

To estimate the number of vehicle trips saved once the project is operational, the estimated total transit ridership was divided by the regional average automobile occupancy (“TransitTripsEst” tab, row 43). The regional average automobile occupancy of 1.33 was assumed by researching the federally approved regional travel demand model, SERPM65 (Southeast Regional Planning Model). This takes into consideration transit users who could have shifted from driving alone or carpooling. Results of the transit trips estimation are summarized in Table 11.

**Table 11. Transit Ridership with Project (Build Scenario)**

I-75 Express Bus Travel Market	Total Transit Market	
	2015	2035
Average Number of Passengers per Round-Trip <sup>(A)</sup>	43	109
Average Weekday Ridership	597	1,522
<b>Total</b>	<b>2015 - 2035</b>	
Vehicle Trips Saved from Modal Shift to Transit	6,845,106	
Vehicle Trips Saved from Modal Shift to Transit	5,146,697	
Vehicle Miles Saved from Modal Shift to Transit	113,227,323	

(A) Includes commute trip and reverse commute trip.

Source: Cambridge Systematics, Inc.

The following sections describe the benefits included in the BCA and evaluated quantitatively in terms of the TIGER IV criteria based on the automobile trips and vehicle miles saved by the project due to the modal shift from automobile trips to transit.

- **Economic Competitiveness** – Vehicle operating costs savings.
- **Safety** – Reduction in the risk of crashes.
- **Sustainability** – Reduction in emissions.

**Economic Competitiveness Benefits**

Economic competitiveness benefits for the I-75 Express Bus service result from modal diversion from automobile trips to transit trips. Per federal guidelines published in the NOFA, economic competitiveness refers to the ability of the project to “measurably contribute over the long term to growth in productivity of the American economy.” In this case, the number of transportation users shifting from driving (a higher-cost transportation mode) to transit (a lower-cost transportation mode) reduce their operating costs by saving the expenses associated with owning, operating, and maintaining a vehicle. Transit fares are considered as equivalent components of cost for the I-75 Express Bus users. As a result, the net savings in operating costs for transit users (i.e. vehicle operating costs less the transit fares costs) were calculated and quantified for this analysis.

To obtain the monetized value for the vehicle operating costs savings, the annual data on driving costs per-mile published by the American Automobiles Association (AAA) was used as instructed by the TIGER IV additional guidance posted online ([http://www.dot.gov/tiger/docs/tiger-12\\_bca-resourceGuide.pdf](http://www.dot.gov/tiger/docs/tiger-12_bca-resourceGuide.pdf)). The AAA report indicates the composite average cost per mile of driving an average of 15,000 miles a year is 58.5 cents in 2010 dollars (<http://www.aaaexchange.com/Assets/Files/201145734460.DrivingCosts2011.pdf>). That cost was inflated to 2011 dollars using the CPI factor, for an average cost per mile of 60.15 cents. Cost components of the vehicle operating costs reported by AAA include fuel, maintenance and repairs, tire wear, insurance, license, registration and taxes, vehicle depreciation, and finance. Given that the operating costs are per mile and the average distance traveled per trip is 22 miles, the total cost of operating a vehicle per trip totals \$13.27. Transit fare per trip is assumed to be \$2.35; therefore, every vehicle trip that shifted to transit saves \$10.92 per trip. Multiplying those savings per trip by the number of vehicle trips assumed to have shifted to transit (“EconCompBen” tab, row 6) results in the total average operating costs saved by former drivers (“EconCompBen” tab, row 13). Table 12 provides a summary of the total value of economic competitiveness benefits due to the reduction of operating costs to transportation users switching from driving, a higher-cost transportation mode, to



transit, a lower-cost transportation mode. The dollar value of economic competitiveness benefits were discounted at both 3 percent and 7 percent as prescribed in the TIGER IV federal guidelines for a discounted present value of \$36.8 million at 3 percent and \$23.3 million at 7 percent.

**Table 12. Economic Competitiveness Benefits – Vehicle Operating Costs Savings (2011\$)**

<b>Summary of Economic Competitiveness Benefits</b>	<b>2015 - 2035</b>
Total Number of Vehicle Trips Saved with Project	5,146,697
Average Vehicle Costs Savings per Trip	\$10.92
Total \$ Value of Economic Competitiveness Benefits (undiscounted)	\$56,208,439
<b>Discounted Present Value (2012) of Vehicle Operating Costs Savings</b>	
Discounted Present Value (3%)	\$37,730,270
Discounted Present Value (7%)	\$23,573,867

Source: Cambridge Systematics, Inc.

**Safety Benefits**

Safety benefits are a function of the reduction in highway usage from the automobile users switching to the I-75 Express Bus service, estimated earlier. The project will improve safety because of the modal diversion from a less safe mode of travel, driving, to a safer mode of travel, public transportation. Crash incident costs, like other variable costs, are dependent on the reduction of VMT. To calculate the reduction in the risk of incidents and fatalities, the fatalities and injuries rate per billion VMT for passenger cars, and the fatalities and injuries rate per billion passenger-miles for transit motor bus were obtained from the Research and Innovative Technology Administration (RITA), Bureau of Transportation Statistics, National Transportation Statistics, Tables 1-35, 1-40, 2-21, and 2-33. These rates per mile are summarized in Table 13.

**Table 13. Safety Data per Mode, Fatality and Injuries Rate (2008)**

<b>2008 Safety Data per Mode</b>	<b>Passenger Car</b>	<b>Transit Motor Bus</b>
Total Fatalities	14,587	63
Total Injuries	1,304,000	5,805
Vehicle Miles (millions)	1,578,948	2,272
Passenger Miles (millions)	3,199,116	21,198
Fatalities Rate per Billion Vehicle-Miles	<b>9.24</b>	-
Fatalities Rate per Billion Passenger-Miles	-	<b>2.97</b>
Injuries Rate per Billion Vehicle Miles	<b>825.87</b>	-
Injuries Rate per Billion Passenger-Miles	-	<b>273.85</b>

Source: U.S. Department of Transportation, Research and Innovative Technology Administration (RITA), Bureau of Transportation Statistics, National Transportation Statistics, Tables 1-35, 1-40, 2-21, and 2-33 (2008 data).

Using the most recent data on fatalities and injuries rates per billion vehicle mile nationwide, the number of fatalities and injuries with and without the project were calculated to obtain the reduction in accidents for passenger cars and the number of accidents for transit motor bus. The product of the vehicle miles saved from the modal shift to transit and the fatalities and injuries rate for passenger cars per vehicle miles result in the number of fatalities and injuries for passenger cars reduced by the project (“SafetyBen” tab, rows 18 and 20). The number of fatalities and injuries from the new transit bus service was calculated by multiplying the total number of passenger miles by the fatalities and



injuries rate for transit motor buses (“SafetyBen” tab, rows 26 and 28). The difference between these two results is the net reduction in the risk of fatalities and injuries from the modal shift from driving to transit (“SafetyBen” tab, rows 30 and 32). These were then multiplied by the unit value of statistical life (\$6.2 million) and serious injuries (\$0.651 million assumed for all non-fatal incidents as a fraction of the value of statistical life) summarized in Table 14, to obtain the total value of safety benefits summarized in Table 15 (“SafetyBen” tab, rows 34, 36 and 38).

**Table 14. Value of Statistical Life and Injuries (2011\$)**

Maximum Abbreviated Injury Scale (MAIS)	Severity	Fraction of Value of Statistical Life (VSL)	Unit Value (2011\$)
MAIS 1	Minor	0.003	\$18,600
MAIS 2	Moderate	0.047	\$291,400
MAIS 3	Serious (A)	0.105	\$651,000
MAIS 4	Severe	0.266	\$1,649,200
MAIS 5	Critical	0.593	\$3,676,600
MAIS 6	Fatality/Unsurvivable	1	\$6,200,000

(A) – Serious Severity assumed for Non-Fatal Accidents.

Source: [http://www.dot.gov/docs/FY11\\_TIGER\\_NOFA.pdf](http://www.dot.gov/docs/FY11_TIGER_NOFA.pdf), Page 50310

Table 15 provides a summary of the total value of safety benefits due to the reduction of vehicle miles traveled from transportation users switching from driving to transit, a statistically safer travel mode. The total value of safety benefits was discounted at both 3 percent and 7 percent as prescribed in the TIGER IV federal guidelines for a discounted present value of \$25.3 million at 3 percent and \$15.8 million at 7 percent.

**Table 15. Safety Benefits – Reduction in Fatalities and Injuries (2015-2035)**

Summary of Safety Benefits	Passenger Car	Transit Bus
Changes in Fatalities with Project	-1.046	0.448
Change in Injuries with Project	-93.511	41.239
Net Reduction in Fatalities	-0.598	
Net Reduction in Injuries	-52.271	
Total Value \$2011 of Reduction in Fatalities (undiscounted)	\$3,710,610	
Total Value \$2011 of Reduction in Injuries (undiscounted)	\$34,028,705	
Total Annual Value of Safety Benefits (undiscounted)	\$37,739,315	
<b>Discounted Present Value (2012) of Safety Savings</b>		
Discounted Present Value (3%)	\$25,332,753	
Discounted Present Value (7%)	\$15,827,900	

Source: Cambridge Systematics, Inc.

**Sustainability Benefits**

Emission benefits were estimated based on the reduction of vehicle miles traveled with the project due to the modal shift from driving to transit. Five types of emissions were measured in this analysis: Volatile organic compounds (VOC), nitrous oxide (NOx), carbon dioxide (CO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), and particular matter (PM<sub>2.5</sub>). The EPA Motor Vehicle Emission Simulator (MOVES) run for the entire U.S. using all default inputs for passenger cars and transit buses in an urban restricted access roadway produced the consumption values for these pollutants in grams per mile for the year 2015 and year 2035 taking into account future regulations and trends (“Emission Rates” tab and Table 16). Values for intervening years were linearly interpolated.



**Table 16. Emission Rates for Passenger Cars and Transit Buses (2015 and 2035)**

Emission Rates (grams*/mile)	Passenger Cars		Transit Buses	
	2015	2035	2015	2035
Carbon dioxide (CO2)	325.801	269.65	1556.731	1556.69
Volatile Organic Compounds (VOCs)	0.0698	0.03729	0.50950	0.04958
Nitrogen oxides (NOx)	0.2701266	0.094452	7.69963	1.29913
Sulfur dioxide (SOx)	0.011729	0.003856	0.011729	0.010857
Particulate matter (PM)	0.010859	0.009256	0.403028	0.037809

\* 1 gram = 0.000001 metric ton

Source: MOVES output run by Cambridge Systematics, Inc., 2011.

The passenger cars emission rates were applied to the number of vehicle miles traveled saved due to the modal shift from driving to transit to obtain the amount of emissions saved (“SustainBen” tabs, rows 22-28). The transit buses emission rates were applied to the total number of average transit vehicle miles traveled by the express buses to obtain the amount of emissions produced by the express bus service (“SustainBen” tab, rows 43-49). Given MOVES currently does not model hybrid electric transit buses, which have lower emissions than the traditional diesel bus vehicle type included in MOVES, the transit bus emissions used in this analysis are higher than the I-75 Express bus emissions expected with the use of hybrid-electric buses. The difference between the passenger car emissions saved and the transit bus emissions produced in metric tons was calculated, separating the non-CO<sub>2</sub> pollutants of the CO<sub>2</sub> pollutants, in order to apply the value of emission reductions appropriately (“SustainBen” tab, rows 53-59). For each pollutant type, the dollar value of emission reductions was derived by multiplying the net annual reduction in metric tons of emissions by the appropriate monetization rate (“SustainBen” tab, row 81) as indicated in the federal guidance document using the monetized values for the vehicles manufactured for Model Year (MY) 2012-2016 and shown in Table 17.

**Table 17. Value of Emissions (MY 2012-2016)**

Type	\$ / metric ton (2007\$)	\$ / metric ton (2011\$) (A)
Carbon dioxide (CO2)	varies	varies
Volatile Organic Compounds (VOCs)	\$1,280	\$1,384
Nitrogen oxides (NOx)	\$5,217	\$5,643
Sulfur dioxide (SOx)	\$30,516	\$33,006
Particulate matter (PM)	\$285,469	\$308,758

(A) – 2007\$ values have been inflated to 2011\$ using a CPI factor.

Source: [http://www.dot.gov/tiger/docs/tiger-12\\_bca-resourceGuide.pdf](http://www.dot.gov/tiger/docs/tiger-12_bca-resourceGuide.pdf), Page 5.

The value of carbon dioxide varies per year and based on federal TIGER IV guidance, the “social cost of carbon at 3 percent discount” by year is used to convert CO<sub>2</sub> reductions in each year to dollar values (<http://www.epa.gov/oms/climate/regulations/scc-tds.pdf>, Table A1: Annual SCC Values 2010 – 2050 [in 2007 dollars]) (“SCC 3% tab). Values were inflated to 2011 dollars using a CPI factor. The total emission values were discounted at both 3% and 7%; for a discounted present value of \$631,710 at 3% and \$593,747 at 7%.

Table 18 summarizes the sustainability benefits throughout the project’s lifecycle.



**Table 18. Emissions Reduction Benefits (2015 – 2035)**

<b>Summary of Emission Benefits</b>	<b>2011\$</b>
Total Value \$ of Non-CO <sub>2</sub> Emission Benefits	\$104,109
Total Value \$ of CO <sub>2</sub> Emission Benefits	\$887,595
Total Value of Emission Benefits (Non-CO <sub>2</sub> + CO <sub>2</sub> )	\$991,703
<b>Discounted Present Value (2012) of Emissions Benefits</b>	
Discounted Present Value (3%)	\$631,710
Discounted Present Value (7%) <sup>(A)</sup>	\$593,747

(A) – Per Federal guidance, CO<sub>2</sub> benefits were discounted at 3 percent and combined with non-CO<sub>2</sub> benefits discounted at 7 percent.

Source: Cambridge Systematics, Inc.

## Project Readiness and NEPA

The South Florida Express Lane System Improvements is a component of the overall express bus network vision established by FDOT and coordinated with local transportation partners. The project is ready to move forward quickly to rapidly deploy the I-75 Express Bus service. The construction schedule for the express bus and park-n-ride components requested in this application is as follows:

- Design of Griffin Road Park-n-Ride: June 2012 – June 2013
- Construction of Griffin Road Park-n-Ride: December 2013 – June 2015
- Construction of Shelters: January 2014 – June 2014
- Construction of TSP: December 2013 – December 2014
- Implementation of Signage and Branding: December 2013 – December 2014
- Procurement of six (6) 60' Hybrid-Electric Buses: June 2014 – June 2015
- Bus and Park-n-Ride Operations: Begins June 2015

Additional design is required for the Griffin Road park-n-ride lot. However, no right-of-way concerns or acquisition is anticipated as part of the project. Therefore construction can occur rapidly as evidenced by the schedule above. The delivery of the six hybrid-electric buses is expected to begin in June 2014 and last 12 months, assuming one bus is delivered approximately every other month.

## NEPA Environmental Approvals

The National Environmental Protection Act (NEPA) process is underway and a Type 2 Categorical Exclusion as described in 23 Code of Federal Regulations (CFR) 771.115 and 771.117 is anticipated with the Location Design Concept Acceptance (LDCA) for the I-75 PD&E study anticipated by April 2012. Meetings between FDOT and the Federal Highway Administration (FHWA) occurred in September 2011 to review the Project Development Summary Report (PDSR), and FDOT is confident that approval will be granted in April 2012. The PD&E study, the PDSR, and the FDOT letter requesting approval by FHWA of the Type 2 Categorical Exclusion are attached to the application.

The I-75 PD&E study covers the limits for the Express Lanes and the interchange improvements along I-75 from S.R. 826 to I-595, as well as S.R. 826 from NW 103rd Street to NW 154<sup>th</sup> Street. The I-75 PD&E Study PDSR being reviewed now by FHWA also includes park-n-ride lots at Miami Gardens Drive and Griffin Road.



## Local Planning Support

In addition to the NEPA process, the project is supported at the local planning level. The project is included in the transit cost feasible plan for Broward's 2035 LRTP. Furthermore, a Transportation Improvement Program (TIP) Amendment was adopted by the Broward Metropolitan Planning Organization (MPO) on October 13 for the I-75 Corridor Design that includes the Griffin Road park-n-ride lot. This approval will effectively advance the project from 2014 to 2012. This amendment was forwarded with a unanimous recommendation from the Broward Technical Coordinating Committee (TCC) on September 26, 2011.

## Project Feasibility

The concept of Express Bus service in South Florida is both technically and financially feasible. Miami-Dade Transit is already offering Express Bus service on I-95 between Fort Lauderdale and downtown Miami, and between Sheridan Street (Hollywood) and downtown Miami. The I-95 Express Bus routes provide nonstop service on I-95 by utilizing the new I-95 Express Lanes between the Golden Glades Interchange (S.R. 826) and downtown Miami, with service every 15 minutes during weekday rush hours. The Fort Lauderdale park-n-ride hub at Broward Boulevard has experienced an increase in usage following introduction of express bus service to downtown Miami, according to FDOT's Spring 2011 Park-and-Ride Lot Utilization Report. The I-95 Express Bus service has seen a 145 percent increase in ridership between Spring 2008 and Summer 2011.

Furthermore, the I-75 Express Bus service can gain from the experience of the I-95 Express Bus implementation and operations. Finally, travel time savings may be realized for I-75 Express Bus after the I-75 express lanes (managed use lanes) are built (anticipated 2018).

## Federal Wage Rate Certification

FDOT certifies that it will comply with the requirements of subchapter IV of Chapter 31 of Title 40, United States Code, as required by the FY 2012 Continuing Appropriations Act. This certification is evidenced by the wage rate certification letter signed by the District Four Secretary attached to this application.

## Changes since the Pre-Application Submittal

The following changes to the project description have occurred since the TIGER IV pre-application was submitted on February 20, 2012.

- Project Title changed slightly from "South Florida Express Lane System Improvements (I-75 Park-n-Ride Lot/Express Bus Capital Purchase)" to "South Florida Express Lane System Improvements (I-75 Express Bus Capital Purchase/Regional Park-n-Ride Lot)" to better reflect the regional connectivity provided by the Park-n-Ride Lot
- A net reduction in project cost from \$20,036,250 to \$16,979,500 to reflect, a reduction in shelter costs for the park-n-ride shelter and the purchase of one additional bus
- Due to the decrease in total project cost, the total amount of non-federal funds committed to the project (local match) decreased from \$4,007,250 to \$3,395,900
- The net change in project costs since the pre-application results in a reduction of federal funding assistance requested. Federal funding assistance requested was reduced from \$16,029,000 to \$13,583,600.

