Prepared for: Miami-Dade Metropolitan Planning Organization
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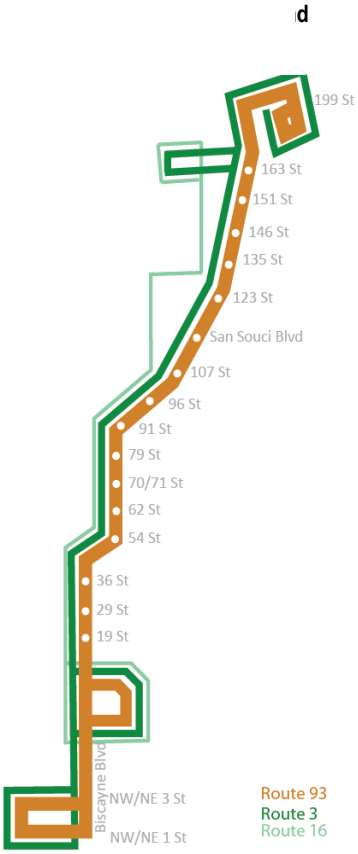


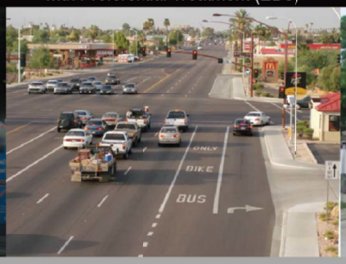
INTRODUCTION

The Biscayne Boulevard Corridor (Corridor), roughly defined as U.S. Route 1 from the Downtown Miami area to the Aventura Mall near the Miami-Dade – Broward County line, is one of the busiest transit corridors in Miami-Dade County (County) (Figure 1). The Corridor extends approximately 15 miles through the historic core of the County that was developed along the Florida East Coast (FEC) railroad and links Aventura, North Miami, North Miami Beach, and Miami Shores with the County's Central Business District located in the Downtown Miami area. It is one of the high priority transit corridors for the County.

In recent years, transit agencies have investigated several lower capital intensive options, including non-fixed-guideway systems. Miami-Dade Transit (MDT) adopted a similar approach and focused mainly on bus mode. Transit buses provide an essential transportation service in metropolitan areas, but are often viewed as slow and unreliable. MDT decided to enhance characteristics of bus mode to provide a better quality of service with more features. These transit improvements are referred to as "Enhanced Bus Services" (EBS). Miami-Dade Metropolitan Planning Organization (MPO) has taken the lead to develop implementation plans for Enhanced Bus Services. An EBS along Biscayne Boulevard will replace the existing Route 93. This study was tasked with identifying transit infrastructure improvements, defining service operational characteristics, capital needs, and fleet requirements. The scope of the implementation plan also included a branding plan, development of a visual identity, for all MDT enhanced bus services. This study seeks to maintain consistency with previous and ongoing planning efforts while advancing the status of transit planning in the County.

DEFINING "ENHANCED BUS SERVICE"

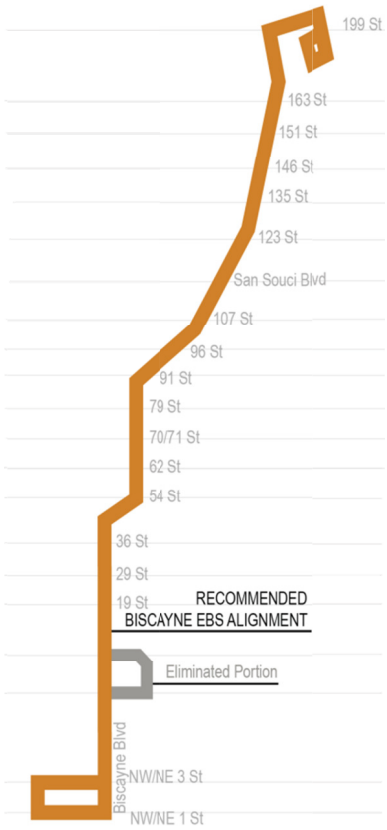
The Enhanced Bus Service category is defined as a hybrid between a limited-stop service and a Bus Rapid Transit service. EBS can also be seen as an intermediate step in the evolution of a limited-stop service to an ultimate configuration where buses will travel on dedicated bus-only lanes for a portion or the entirety of a route. A more detailed description of EBS is included in Figure 2.

	Limited-stop service in Mixed Traffic (MDT MAX services)	Limited-stop service in Mixed Traffic with Preferential Treatment (EBS)	Limited-stop service with Dedicated Right-of-Way (BRT)
			
Investment	Low - Infrastructure/amenities unchanged	Moderate, depends on ROW availability	Major investment
Visibility	Low - Indistinguishable from local service	Higher due to indistinguishable infrastructure	High visibility
Travel Time	Typically higher than auto by 30% or more	Can be comparable to auto	Typically better than or comparable to auto
Reliability	Less reliable than auto due to boardings	Nearly as reliable as auto	Highly reliable in typical conditions
Amenties	Indistinguishable from local service	Typically supported by more amenities	Highly reliable
Local Example(s)	Route 93 Route 288 Route 97	Planned Enhanced Bus Services	Services along the South Dade Busway
National Example(s)	Numerous Almost all transit agencies have limited-stop services	Services in: City of Portland, Oregon City of Chandler, Arizona City of San Francisco, California	Service in: Healthline in Cleveland, Ohio

RECOMMENDATIONS

ALIGNMENT

The Biscayne EBS will replace the existing Biscayne Max / Route 93 which currently loops around the Omni Terminal. The travel time and delay study for this effort identified that the loop increases travel time by as much as eight minutes, depending on the time of day. Generally, fixed and other premium modes of transit have a simplified route structure which is a straight-forward route alignment with little or no deviation connecting to or from a major trip generator/attractor. The Biscayne EBS is envisioned to have a line-haul, trunk service along Biscayne Boulevard and is to be supported by east-west local routes. Therefore, the route deviation to Omni Terminal is recommended to be eliminated. The recommended route alignment is included in Figure 3.



SERVICE HOURS

A 14.5-hour weekday service span is recommended for the first three years of operations. In the subsequent years, the service is assumed to have a 16-hour service on weekdays.

HEADWAYS

A 10-minute headway is generally considered the threshold at which schedules are no longer required. However, the current ridership and the presence of Route 3 do not call for an immediate support of a 10-minute headway. Therefore, a phase-implementation is recommended with an initial peak period service headway is 15 minutes.

Route 93 offers a 30-minute headway during off-peak periods. The passenger loads indicate lower transportation need during off-peak periods. While passengers during the off-peak period are typically less sensitive to headways, they do have greater incentive to use private autos because roadway congestion levels are low. Therefore, the Biscayne EBS is recommended to have a 20-minute headway during off-peak periods which can be improved in the subsequent phases of the service implementation.

RECOMMENDED STATION LOCATIONS

	STREET	CROSS-STREET	Northbound		Southbound	
			Preliminary Name	Location	Preliminary Name	Location
1	CBD TERMINAL		Downtown Terminal	N/A	Downtown Terminal	N/A
2	BISCAYNE BLVD	NE 4 ST	MDC	Farside	MDC	Farside
3	OMNITERT	NE 15 Street	Omni Station	Farside	Omni Station	Farside
4	BISCAYNE BLVD	NE 36 ST	Midtown Station	Farside	Midtown Station	Farside
5	BISCAYNE BLVD	NE 55 TE	Morningside Station	Farside	Morningside Station	Farside
6	BISCAYNE BLVD	NE 62 ST	Legion Park Station	Farside	Legion Park Station	Nearside
7	BISCAYNE BLVD	NE 79 ST	Miami Gateway Station	Farside	Miami Gateway Station	Nearside
8	BISCAYNE BLVD	NE 91 ST	Miami Shores Station	Farside	Miami Shores Station	Farside
9	BISCAYNE BLVD	NE 108 ST	NE 108 St Station	Farside	NE 108 St Station	Farside
10	BISCAYNE BLVD	SANS SOUCI BLVD	San Souci Station	Farside	San Souci Station	Farside
11	BISCAYNE BLVD	NE 123 ST	North Miami Station	Farside	North Miami Station	Farside
12	BISCAYNE BLVD	NE 135 ST	NE 135 St Station	Farside	NE 135 St Station	Nearside
13	BISCAYNE BLVD	NE 146 ST	North Miami Beach Station	Farside	North Miami Beach Station	Farside
14	BISCAYNE BLVD	NE 163 ST	NE 163 St Station	Farside	NE 163 St Station	Farside
15	BISCAYNE BLVD	NE 183 ST	NE 183/186 St Station	Farside	NE 183/186 St Station	Farside
16	AVENTURA BLVD	# 2900	Aventura Station	Farside	Aventura Station	Farside
17	AVENTURA MALL		Aventura Mall Station	Farside	Aventura Mall Station	Farside

PARK-AND-RIDE SITES

As the number of stops along a route is decreased, all efforts must be made to increase activity at locations where buses will stop. Pedestrian access from certain residential areas also remains a challenge along the corridor and park-and-ride sites/kiss-and-ride can provide another access option to potential riders from those areas. A park-and-ride site can attract new choice-riders to the service. A total of shared 17 park-and-ride/kiss-and-ride sites were identified with a series of recommendations associated with each of them. A park-and-ride lot at NE 79th Street is highly recommended due to high passenger activity at that intersection.

VEHICLES

The Peak Vehicle Required (PVR) is based on the lowest average speed, which is estimated to be 14 miles per hour during the peak period which will have the most service. Therefore, procurement of 18 new vehicles is recommended to meet the demands for Phase 1 and 2. The number of vehicles needed during off-peak period has been determined for cost estimation purposes.

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Intersections of Phase 1 TSP Implementation
1. NE 33 Street
2. NE 36 Street
3. NE 38 Street
4. NE 123 Street
5. NE 151 Street
6. NE 163 Street
Intersections of Phase 2 TSP Implementation
1. NE 6 Street
2. NE 62 Street
3. NE 82 Street
4. NE 191 Street
5. NE 186 Street

INTERSECTIONS RECOMMENDED FOR TSP IMPLEMENTATION

TSP improvements are recommended at 11 intersections along Biscayne Boulevard (Table 1). These locations were identified based on a Travel Time and Delay study. These locations were selected to provide meaningful benefits to transit but with appreciable distance between them to minimize impacts on signal progression.

QUEUE-JUMP OR BY-PASS LANES

Some of these locations have queuing issues, a problem that cannot adequately be solved by extending green time or truncating red time. TSP, along with queue-jump / by-pass lanes, will be required at these locations. Miami-Dade Public Works and Waste Management Department (PWWM) and Florida Department of Transportation (FDOT) outlined a detailed process for TSP and queue-jump lane implementation features. Given these requirements, the first phase of Biscayne EBS should use the existing infrastructure as the test case scenario for queue jump lanes. Two locations recommended for Phase 1 of EBS are: (1) Northbound and Southbound at NE 36 Street; and, (2) Northbound and Southbound at NE 163 Street.

A number of queue-jump lanes are recommended for the second phase of the Biscayne EBS project. These are based on availability of right-of-way and the need, as determined by the Travel Time and Delay study. To yield the highest impact, queue-jump lanes between NE 79 Street and NE 146 should be prioritized because passenger loads are higher in that segment and therefore, more passengers will benefit from queue-jump lanes.

ESTIMATED IMPACT OF THE PROPOSED IMPROVEMENTS

The estimated impact of the proposed improvements on travel time is included in Table 2. Travel time for the Biscayne EBS service is expected to be 8 percent to 14 percent less than that of the current Route 93 service. Travel time reliability and customer experience will improve substantially.

Table 2: **Estimated Travel Time and Travel Time Savings for Enhanced Bus Service**

TIME PERIOD - DIRECTION	DISTANCE (MILES)	SCHEDULE TIME (MIN)	AVG OBSERVED TIME (MIN)	ESTIMATED TSP SAVINGS (MIN)	ESTIMATED QUEUE JUMP SAVINGS (MIN)	ESTIMATED ALIGNMENT SAVINGS (MIN)	ESTIMATED STOP SAVINGS (MIN)	ESTIMATED TRAVEL TIME (MIN)	ESTIMATED TRAVEL SPEED (MPH)	ESTIMATED TRAVEL TIME SAVINGS
AM-NB	14.7	60	63	0.8	1.5	1.1	2.8	57	15.5	8.8%
AM-SB	15.0	60	57	0.9	1.2	1.7	2.1	51	17.6	10.4%
PM-NB	14.7	71	71	1.1	1.5	3.2	2.5	62	14.1	11.6%
PM-SB	15.0	66	75	1.9	2.4	4.2	2.1	65	13.9	14.0%

1. These savings for the Biscayne EBS are measured over Route 93. For example, savings for 14 percent could be interpreted as that the Biscayne EBS will reduce travel time by 14 percent over the existing Route 93.
2. TSP Savings – It includes travel time savings due to the reduction of control delay at six intersections. Six intersections are recommended for TSP implementation. The delay was measured as part of the Travel Time and Delay Study conducted for this study.
3. Queue-Jump Lane Savings – It includes savings due to the elimination of average control delay at two intersections. Two intersections are recommended for queue-jump lane implementation. The delay was measured as part of the Travel Time and Delay Study conducted for this study.
4. Alignment Savings – It includes travel time savings due to elimination of the Omni loop. The delay due to this loop was measured as part of the Travel Time and Delay Study conducted for this study.
5. Stop Savings – It includes travel time savings due to the elimination of Route 93 stop locations. The delay due to average dwell time was measured as part of the Travel Time and Delay Study conducted for this study.

COST ESTIMATES

In total, Phases 1 and 2 of the Biscayne EBS project are estimated to cost around $32 million. This is consistent with similar projects across the country where costs have ranged from $28 million to close to $50 million. It is noteworthy that there are a number of unknown factors and these preliminary estimates should be used for order-of-magnitude estimation purposes only. The costs for park-and-ride/kiss-and-ride lots are not included in this estimate.

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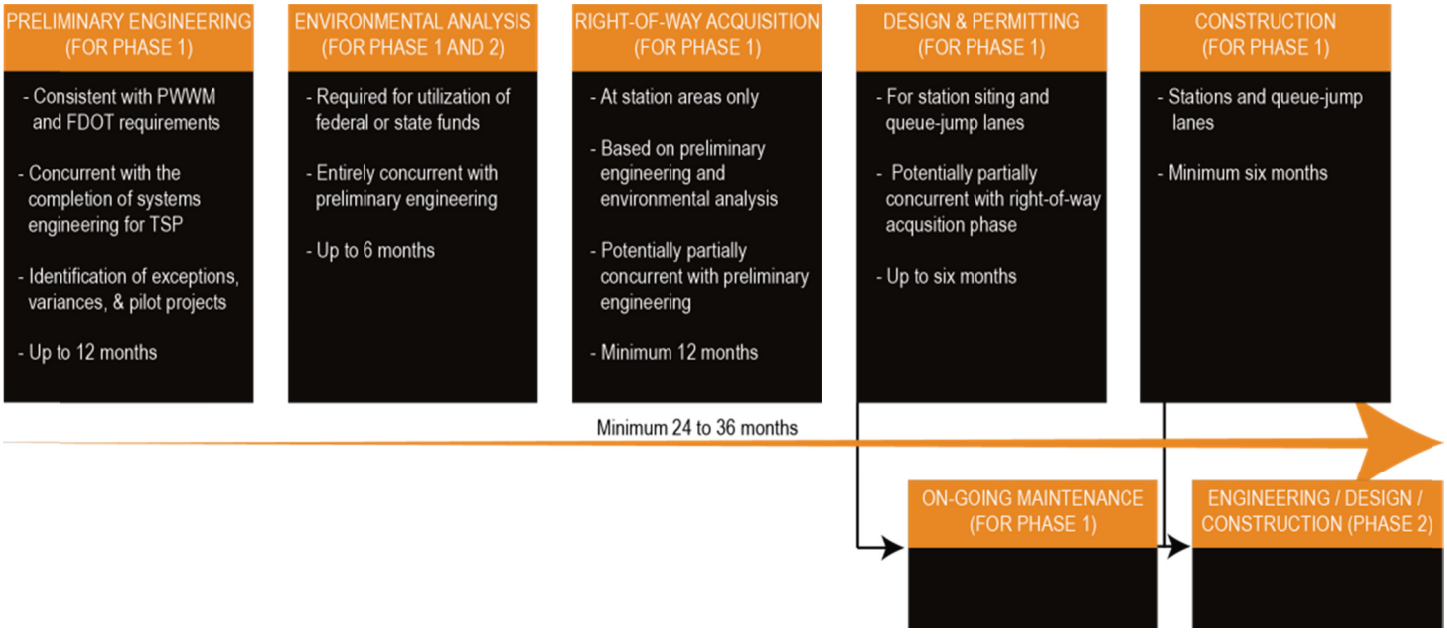
ITEM	ESTIMATE TOTAL AMOUNTS
Vehicles	$18,000,000
Station	
Construction	$7,861,320
Survey, Design, Permitting, CEI	$1,179,198
Infrastructure (Phase 1)	
Construction	$768,000
Preliminary Design and Traffic Eng.	$260,000
Infrastructure (Phase 2)	
Construction	$2,680,000
Preliminary Design and Traffic Eng.	$950,000
Environmental	$50,000
Total Estimated Project Capital Cost	$31,748,518

Different elements of the Biscayne EBS project are expected to be completed at different points in time. For instance, vehicle procurement, which typically takes a couple of years, is expected to be completed by FY 2014. MDT, in May 2012, entered in a Joint Participation Agreement (JPA) with FDOT, which will allow the agency to get matching funds through the State Transit Corridor Program. The agency, with matching funds, has a committed funding to the tune of $18,000,000 for vehicle procurement. The remaining elements of the projects are unfunded at this point. It is expected that the agency can utilize CITT funds for a portion of the project. Additional JPAs, especially for O&M costs through FDOT's Transit Service Development Program remain a possibility for the first three years of the EBS service.

It is assumed that Phase 1 infrastructure improvements (TSP and queue-jump lanes) will be completed by FY 2015. Phase 1 will act as a pilot case and therefore, Phase 2 is estimated to be completed by FY 2017.

IMPLEMENTATION TIME-FRAME

Figure 4: **Process for Biscayne EBS Implementation**



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