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EXECUTIVE SUMMARY

This report presents the findings of a Pedestrian/Bicycle Safety Study at the intersection of SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard, located in Miami-Dade County, Florida. The study was initiated following a request from the City of North Miami Beach to explore possible solutions to alleviate the current traffic and safety conditions at this location. Four major new construction developments have been approved in close proximity to the SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard intersection. As a result, pedestrian/bicycle safety measures are needed to give this neighborhood a sense of community and facilitate more personal interaction among the residents. The purpose of this study is to investigate and document existing traffic operations conditions, alternative modes of transportation; i.e., bus transit, pedestrian ways, bicycle connections, etc, and develop alternative solutions that are economically and environmentally feasible.

The City of North Miami Beach is served by both north-south and east-west major arterial thoroughfares. The SR 5/US 1/Biscayne Boulevard located in the eastern portion of the City provides north-south traffic movements throughout Miami-Dade County and beyond to Broward County. The SR 826/NE 163rd Street/North Miami Beach Boulevard is a major east-west connector through the City. The SR 826/NE 163rd Street/North Miami Boulevard travels through the heart of the City of North Miami Beach Business District. Due to its history and character, it provides the focus of business life and is recognized by the community as the center point of commercial activity. Accessibility and mobility throughout this roadway is of utmost importance to link all activity centers that provide services to the community: schools, hospitals, and commercial establishments.

A Pedestrian & Bicycle Safety Analysis was prepared by Dover, Kohl & Partners for the City of North Miami Beach in 2004. This study evaluated the existing network of streets and trails recommending physical improvements to the network and proposing plans for future pedestrian and bicycle trails for the City. The Snake Creek Bike Trail Planning and Feasibility Study, prepared by Kimley-Horn & Associates in 2005, evaluated the development of a non-motorized trail within the Snake Creek Canal (C-9) between NE Miami Gardens Drive and Florida’s Turnpike. The Florida Department of Transportation (FDOT) conducted a safety study at the SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard intersection, as part of the high crash location investigations.

In 2005, the City of North Miami Beach experienced a boost in market demand for higher density housing. At the same time, the residents augmented their concerns about building heights, traffic congestion, open spaces and sustaining quality of life in the City. As a result, the City initiated a “Visioning Process” in May, 2005 to “reach an agreement regarding the desirable characteristics, appropriate scale and suitable locations for future projects that may be proposed”. The Mayor and City Council commenced “Smart Growth North Miami Beach”; an all-inclusive process aimed at creating a unified vision for the City’s future and invited all stakeholders to participate. Throughout the workshops, stakeholders identified priorities which were organized into ten (10) principles of Smart Growth.

The land use split for the City of North Miami Beach is as follows: 50% residential, 20% commercial, 10% recreational and the remaining is classified as other. Only a small percentage of the land is vacant, which means there is not much opportunity for new developments other than by replacement of existing development.

A crash analysis for the period of January 1st, 2004 through December 31st, 2006 revealed a total of 111 crashes reported at the intersection during the three-year period. Rear-end collisions were the leading type of crashes at the intersection, accounting for forty-three percent (43%) of the crashes experienced during the three-year period. Angle collisions were the second leading type of crashes, accounting for sixteen percent (16%) of the crashes at the intersection followed by sideswipe crashes with fourteen percent (14.41%). Four (4) pedestrian/bicycle crashes occurred at the intersection in 2005.

According to the 2025 Bicycle Facilities Plan from the Miami-Dade County Bicycle/Pedestrian Program, the study corridor was identified by the public as a “Candidate Project”. However, after the evaluation and prioritization process, the segment was classified as a Category I, un-funded on-road bicycle project. Category I includes projects that are not feasible due to identified right of way constraints. In 2007, FDOT added bicycle lanes on both directions along SR 826/NE 163rd Street/North Miami Beach Boulevard from SR 5/US 1/Biscayne Boulevard to the Oleta River State Park Entrance as part of a resurfacing job.

Miami-Dade Transit currently has eight Metrobus Routes (Routes 3, 83, 93, 183, E, H, V and 246) servicing the corridors within the project limits. In addition, the NMB-LINE is a free transportation service in the City of North Miami Beach linking the major activity centers within the City and the surrounding area. Recommended public transportation/transit improvements are presented on Section 4.1 of the report.

The existing right-of-way is not sufficient to accommodate bicycles west of the intersection along SR 826/NE 163rd Street/ North Miami Beach Boulevard. Along SR 5/US1/Biscayne Boulevard the width of the northbound and southbound outside lanes width is 13 ft from NE 135 St to NE 186 St. Because of this condition, this section of SR...
5/US1/Biscayne Boulevard could be restriped to four 11 foot lanes, thus creating a 4 foot bike lane in each direction. This enhancement would improve safety by reducing conflicts between bicyclists and motor traffic. Bike lanes will connect to the existing bike lanes on Biscayne Blvd north of NE 207 Street, which extend into Broward County, and intersect the existing bike lanes on NE 163 St and NE 151 St as well as the bike lanes on NE 135 St that are being constructed by the City of North Miami. Although it may not be practical to restripe Biscayne Blvd at this time it should be included for the next time this section of roadway is resurfaced. The proposed Oleta River State Park and Eastern Trails will provide the connectivity to the residents living on the proximity to the study intersection with existing trails, parks and other amenities in the area.

Based on many factors, including but not limited to existing traffic congestion, crash records the following improvements are recommended for the study intersection.

The adoption of design guidelines and zoning regulations that ensure that new developments at the study intersection generate the highest number of walking trips.

Roadway enhancements recommended as part of this study include:

- Traffic operational improvements including, pavement markings, lighting, and pedestrian features would increase safety along the corridor.
- Improve sidewalks with curb cut ramps for handicap access at all approaches and provide sidewalk continuity at the southeast bus stop along SR 826/NE 163rd Street.
- Convert span-wire mounted traffic signals at the intersections to mast arms to comply with Miami-Dade County Hurricane standards.
- Upgrade existing pavement conditions by milling and resurfacing the roadway bed.
- Roadway improvements identified by the FDOT study include:
  - Increase the all-red clearance interval for the N/S approaches from 1 second to 2 seconds and provide an all red clearance interval of 1 second for the left-turn phases at the intersection.
  - Provide additional signal head at each of the N/S approaches and back-plates that are missing or have deteriorated for E/W signal heads at the intersection.
- Pedestrian improvements identified by the FDOT study include:
  - Install “Cross Only at Crosswalk” signs at both N/S approaches.
  - Install high-visibility pedestrian warning signs at the N/S approaches and eastbound approach.
  - Pedestrian countdown signals at all four corners of the intersection.
  - Provide high-emphasis crosswalks.

An elevated crossing SR 5/US 1/Biscayne Boulevard may be feasible. Requirement of such an option includes:

- Acquisition of right-of-way at both ends of the structure to be able to accommodate piers and ramps.
- A minimum vertical clearance for a pedestrian bridge over the roadway and railroad is 23 ft 6 in., according to the FDOT PPM, Chapter 2.
- Meeting the requirement for American Disability Act (ADA)
- Meeting the geometric requirements for a shared-use path as establish by FDOT PPM, Chapter 8
- Roadway approaches might need to be modified to accommodate for a center pier and corresponding barriers.
- Based on similar previous FDOT projects, the cost of such a bridge could range between $2.5 to $4.0 M. These costs do not include right-of-way acquisition cost.

Although this option could be feasible, it is not recommended based on cost.

Transit enhancement recommendations as part of this study include: Enhance rider convenience through improved services and amenities and by providing a NMB-LINE stop closer to the new proposed developments at the northeast corner of the study intersection.

- Install shelters at bus stops at all approaches to the intersection where not available. Shelters should be environmentally sensitive and be designed to reflect the community’s theme. Shelters should be properly lighted, so that waiting passengers feel safe and secure.
- Foster joint and associated development that encourages, and is compatible with, increased transit use.
- Identify traditional and non-traditional funding sources to provide for recommended improvements i.e. multimodal development program, transportation outreach program, joint development public/private partnerships, etc.

These recommendations, once implemented, will enhance the mobility and safety for both vehicular traffic and pedestrians along the corridor. All of the recommendations made in this report require minimal engineering design and will be the most cost effective to implement. A preliminary construction estimate reveals that the project can be constructed with a $ 2.2 million budget. Another benefit of implementing these options includes short-term construction duration which will minimized negatives impact to driving motorists as well as pedestrian, bicyclist and adjacent businesses. Lastly, none of the recommendation will require the acquisition of right of way.
SECTION 1  PROJECT ANALYSIS

1.1 Project Overview

The Pedestrian/Bicycle Safety Study at the intersection of SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard (See Fig. 1 Project Location Map) was initiated following a request from the City of North Miami Beach to explore possible solutions to alleviate the current traffic and safety conditions at this location. Four major new construction developments have been approved in close proximity to the SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard intersection. As a result, pedestrian/bicycle safety measures are needed to give this neighborhood a sense of community and facilitate more personal interaction among the residents. The purpose of this study is to investigate and document existing traffic operations conditions, alternative modes of transportation; i.e., bus transit, pedestrian ways, bicycle connections, etc, and develop alternative solutions that are economically and environmentally feasible. The general objective of the study is to investigate the possibility of implementing improvements based on:

- Long Range Transportation Planning for system preservation, development and enhancement;
- Short Range Transportation System planning and management;
- Intermodal Transportation Planning.

The project will identify different mobility concepts by analyzing various approaches, thereby reducing the need for costly future infrastructure investments, reducing potential environmental impacts, and propose different alternatives to improve existing conditions at this intersection. The measure of success of the short and long-term results of the project will largely depend upon the concept acceptance and review by the City of North Miami Beach. The study’s strategies and recommendations will also include physical improvements and enhancements to be implemented at the intersection and evaluated as a project that can be duplicated in other locations.

The project area consists of a diverse mix of land uses predominantly shopping centers, commercial, offices, parks and residential. The study will focus in increasing the efficiency and safety of the intersection while minimizing impacts on adjacent land uses.

In order to eliminate duplication of efforts and to expedite the study process, results from previous studies conducted at the intersection or adjacent area will be incorporated as part of the analysis. Some of the recommendations that will have a direct impact on the Study as it refers to transportation issues include:

- All-inclusive transportation enhancements to mitigate the increasingly congested roadway facility.
- Public safety opportunities at the intersection: sidewalk continuity; and the feasibility of bicycle facilities.
- Improved signage, including pedestrian and commuter information signs.
- Bus stops and amenities consistent and in accordance with the theme of the area.

In conclusion, this study will examine the existing conditions at the subject intersection and apply transportation development components through implementation strategies and recommendations, while analyzing preliminary cost estimates, right of way impacts, and potential funding sources.

1.2 Characteristics of the Project Area

The study area for the intersection of SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard falls within the municipal jurisdiction of the City of North Miami Beach. The area west of the intersection is highly urbanized and it is essentially built out, with diverse land uses including shopping centers...
and offices. East of the intersection land uses include shopping centers, conservation areas, parks, multi-family units and institutional facilities (See Figure 2 – City Limits and Major Roads).

1.3 Project Planning Objectives

The preliminary planning objectives include:

- Improve the efficiency of the transportation system.
- Provide for pedestrian/bicycle options.
- Reduce traffic congestion and facilitate operations at the intersection.

1.4 Study Area Definition

The main focus of this study is the intersection of SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard. These two facilities converge into a major signalized intersection within the City of North Miami Beach. The study area is urbanized with commercial and residential development. The segment west of the intersection is predominantly commercial while east of the intersection the land uses consist mainly of conservation areas, recreational parks and multi-family units.

The intersection of SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard is defined by the following criteria elements:

- The arterial connectivity of SR 5/US 1/Biscayne Boulevard as a north-south thoroughfare parallel to I-95.
- Direct connection to SR 826 / Palmetto Expressway and the beaches.

This study links employment centers, commercial and office areas, residential, recreational amenities, institutional, and all modes of transit into a coherent, cohesive, and functional community environment.

1.6 Review of Previous Studies

A Pedestrian & Bicycle Safety Analysis was prepared by Dover, Kohl & Partners for the City of North Miami Beach in 2004. As mentioned on the study, the three main reason for the study were: 1) community interest in recreational bicycling and jogging/walking trails is demonstrated by the constant use of the existing Snake Creek Canal Trail, 2) the existing trail has some problems that should be fixed with a comprehensive view, and 3) the nexus of the trail network needs to be the Fulford City Center, which has the beginnings of becoming a thriving pedestrian oriented mixed-use destination. This study evaluated the existing network of streets and trails recommending physical improvements to the network and proposing plans for future pedestrian and bicycle trails for the City. Nine additional routes were proposed as part of this study. These new routes will form a network connecting destinations within the City and its surrounding areas.

The City of North Miami Beach is served by both north-south and east-west major arterial thoroughfares. SR 5/US 1/Biscayne Boulevard located in the eastern portion of the City provides north-south traffic movements throughout Miami-Dade County and beyond to Broward County. The SR 826/NE 163rd Street/North Miami Beach Boulevard is a major east-west connector through the City. The SR 826/NE 163rd Street/North Miami Beach Boulevard travels through the heart of the City of North Miami Beach’s Business District. Due to its history and character, it provides the focus of business life and is recognized by the community as the center point of commercial activity. Accessibility and mobility throughout this roadway is of utmost importance to link all activity centers that provide services to the community: schools, hospitals, and commercial establishments.

Most of the City of North Miami Beach is contained within the established radius of influence. The radius extends as far as SR A1A/Collins Avenue to the east and N.E. 10th Avenue to the west. In the north-south direction, the radius of influence extends south to N.E. 135th Street and north to the Aventura Mall.
Figure 2. City of North Miami Beach Limits and Major Roads
The Snake Creek Bike Trail Planning and Feasibility Study, prepared by Kimley-Horn & Associates in 2005, evaluated the development of a non-motorized trail within the Snake Creek Canal (C-9) between NE Miami Gardens Drive and Florida’s Turnpike. The concept of a greenway along Snake Creek Canal was identified in the North Dade Greenways Master Plan. The study segment is a strategic connection between the existing bicycle trails of Snake Creek Park in North Miami Beach and the Snake Restoration Project and Greenway trail concept plan developed by the U.S. Army Corps of Engineers (USACOE) and South Florida Water Management District (SFWMD) between Florida’s Turnpike and NW 37th Avenue.

The study determined that the bike trail along the Snake Creek Canal right-of-way was feasible and would improve alternative travel mobility and provide park infrastructure for the local community. The proposed concept provides a continuous bike trail across the limits mentioned previously. Connector paths were identified to adjacent residential neighborhoods and commercial shopping centers. Appendix A includes an aerial overview of the study corridor.

The Florida Department of Transportation (FDOT) conducted a safety study at the SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard intersection, as part of the high crash location investigations. A High Crash Location study was completed in November of 2007, by C H Perez & Associates. The High Crash Location studies identify abnormal crash patterns at the locations under study, probable causes for these crashes and propose countermeasures to reduce them and improve the operation. Appendix B includes an extract of the FDOT report describing the project intersection study.

SECTION 2     PROJECT AREA SETTING

2.1 Existing Land Use

The land use pattern along the study area is divided between residential and non-residential uses (See Figure 3 – City of North Miami Beach Land Use Map and Figure 4 – Study Area Land Use Map).

Commercial establishments such as strip shopping centers, grocery stores, banks, restaurants, gas stations, educational facilities and miscellaneous shops predominantly characterize the western portion of the SR 826/NE 163rd Street/North Miami Beach Boulevard. The eastern portion of the corridor is depicted by multi-family units and commercial establishments on the north side of the corridor; and parks and recreational areas on the south side. The land use alongside SR 5/US 1/Biscayne Boulevard is primarily characterized by commercial establishments such as strip shopping centers, offices, banks, gas stations, educational facilities and miscellaneous shops. The Florida East Coast (FEC) Railroad tracks run parallel to and west of SR 5/US 1/Biscayne Boulevard. The surrounding development to the intersection is characterized by single family / multifamily units and other miscellaneous developments that serve the community needs.

The land use split for the City of North Miami Beach is as follows: 50% residential, 20% commercial, 10% recreational and the remaining is classified as other. Only a small percentage of the land is vacant, which means there is not much opportunity for new developments other than replacing existing development.
Figure 3. City of North Miami Beach Land Use Map
Figure 4. Study Area Land Use Map
The City of North Miami Beach approved four new developments in close proximity to the SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard intersection. The following developments will be located on the northeast corner of the intersection abutting SR 5/US 1/Biscayne Boulevard (See Figure 5):

- **Biscayne Office Building** at 16345 Biscayne Boulevard: 200,000+ square feet of commercial space.
- **Blue Palms** at 16385 Biscayne Boulevard: 314 dwelling units planned.
- **Riverwalk at NMB** (Keystone Grand) at 16375 and 16395 Biscayne Boulevard: 295 dwelling units planned.

The **Marina Grande** development is located 0.627 mi. north of the study intersection at 17201 Biscayne Boulevard facing the Maule Lake Marina. The luxury condominiums will consist of two 24-story towers with 234 units each. Each tower will have its own parking garage and private docks for the residents.

From the aforementioned proposed developments, the Marina Grande Condominium is the only development currently under construction. During field visits, it was noted that the existing buildings on the properties at 16375 and 16395 Biscayne Boulevard are being remodeled into restaurants.

### 2.2 Adopted Comprehensive and Neighborhood Plan Elements By The City of North Miami Beach

In 2005, the City of North Miami Beach experienced a boost in market demand for higher density housing. At the same time, the existing residents augmented their concerns about building heights, traffic congestion, open spaces and sustaining the quality of life in the City. As a result, the City initiated a “Visioning Process” in May, 2005 to “reach an agreement regarding the desirable characteristics, appropriate scale and suitable locations for future projects that may be proposed”. The Mayor and City Council commenced “Smart Growth North Miami Beach”; an all-inclusive process aimed at creating a unified vision for the City’s future and invited all stakeholders to participate. Throughout the workshops, stakeholders identified priorities which were organized into ten (10) principles of Smart Growth. Among these priorities were the following:

1. **Take advantage of existing communities assets:**
   - Inventorying the community’s existing assets by listing, prioritizing and updating the improvements needed to protect, improve and/or enhance them.

2. **Foster Walkable, Close-Knit Neighborhoods**
   - Implement the recommendations for sidewalks and other street improvements outlined in the November 2004 Pedestrian and Bicycle Safety Analysis Report.

3. **Provide a Variety of Transportation Choices**
   - Prepare a Transportation/ Urban Design Master Plan that identifies potential roadway network improvements; opportunities for public transportation; recommendations for revisions to site planning and/or urban design requirements; and other recommendations for minimizing congestion and managing the City’s transportation needs.
   - Continue implementing the City’s Bicycle/ Pedestrian Master Plan outlined on the 2004 Pedestrian and Bicycle Safety Analysis Report.
   - Work to “take control” over the design of all the major roadways in North Miami Beach including state and county roads to ensure that they are aesthetically pleasing, pedestrian and bicycle friendly, and accommodate various modes of public transit shelters, stops, stations, etc.

As the City of North Miami Beach moved forward in its search for a more livable and attractive community, a plan was necessary to gather all ideas and concepts put together through the “Visioning Process”. This was accomplished through a series of public meetings and person-to-person discussions with City staff and the consulting firm working on the project. As a result of these efforts, the City created the North Miami Beach Urban Design Plan. The NMB Urban Plan is one step in the process toward a future vision for the City of North Miami Beach.

The study intersection and surrounding area’s land use is regulated by the City of North Miami Beach Future Land Use Plan. Future land uses for this area are consistent with the existing pattern of uses. According to information provided by the City of North Miami Beach, there are no land use amendments under consideration for this area at this time.

The ultimate development of any transportation improvement should be consistent with the future plans of the City of North Miami Beach. Close coordination with the business and residential community will ensure a successful project:

- Starts with a clear vision as to what is to be accomplished.
- Balances the travel modes.
- Improves current conditions to maximize future enhancements
- Reflects the local history.
Figure 5. Proposed Developments at NE corner of study intersection
2.3 General Socio-economic Characteristics

The City of North Miami Beach is a multi-ethnic community with an integrated mix of cultures, ages, races and backgrounds. Its population is growing as new families move into the City. According to the year 2000 U.S Census Bureau, the City had a population of 40,786 residents. Current estimates place the population at 42,736 residents.

AREA DEMOGRAPHIC CHARACTERISTICS

Population (year 2006): 42,000
Males: 19,499 (47.8%), Females: 21,287 (52.2%)
Land area: 5.2 square miles
Median resident age: 34.4 years (2007)
Median household income: $46,442 (year 2006)
Housing Value Ranges (2006): Single Family: $90,000 to $3,400,000 and Condominiums: $60,000 to $900,000

Races in North Miami Beach:
- White (Non-Hispanic) (24.8%)
- Black (39.0%)
- Asian (4.0%)
- Hispanic (30.0%)
- Other race (4.6%)
(Total can be greater than 100% because Hispanics could be counted in other races)

For population 25 years and over in North Miami Beach
- High school or higher: 68.3%
- Bachelor's degree or higher: 14.2%
- Graduate or professional degree: 5.9%
- Unemployed: 5.9%
- Mean travel time to work: 30.2 minutes
49.7% Foreign born (83.1% Latin America).

Industries providing employment:
- Educational, health and social services (16.9%)
- Retail Trade (16.2%)
- Arts, entertainment, recreation, accommodation and food services (14.0%)
- Professional, scientific, management, administrative, and waste management services (10.3%)

North Miami Beach compared to Florida state average:
- Unemployed percentage above state average.
- Hispanic race population percentage significantly above state average.
- Median age below state average.
- Foreign-born population percentage significantly above state average.
- Renting percentage above state average.
- Percentage of population with a bachelor's degree or higher below state average.

2.4 Housing and Ownership Patterns

The City of North Miami Beach has a total of 15,350 housing units. The percentage of single family and condominium/apartment units is 49.8% and 50.2% respectively. The area of study shows a profile comprised of low-density residential, single family units west of SR 5/US 1/Biscayne Boulevard. A mix of single family units and multi family units characterized the area east of the corridor.

2.5 Major Activity Centers (MAC)

Fulford City Center is the heart of the City located along Hanford Boulevard (NE 164th Street). The City Center is a revitalized destination for the community with a mix of uses and local amenities. Also, the following have been identified as the Major Activity Centers (MAC) along the project corridor and the surrounding project area: the 163rd Street Mall, the City Hall, Intracoastal Mall, Aventura Mall, Florida International University (FIU) – Biscayne Campus (see Figure 6 Local Facilities and Major Activity Center). The Greynolds Park and Oleta River State Park located within the City Limits provide numerous recreational activities to the community.

The main hospital serving the area is the Jackson North Medical Center located in the western portion of the City. This center provides a variety of services including 24 hour adult and pediatric emergency care, maternity, orthopedics, surgery and inpatient and outpatient rehabilitation. Other hospitals within five miles of the City include Aventura Hospital & Medical Center, North Shore Medical Center, and Memorial Regional Hospital. These centers are considered to be high traffic/transit generators and should be provided with the appropriate links and diversified modes of transportation in order to serve the community and its ultimate purpose as points of destination.
Figure 6. Local Facilities and Major Activities Center
SECTION 3 ROADWAY AND TRAFFIC CHARACTERISTICS AND ANALYSIS

3.1 Bicycle/Pedestrian Facilities Evaluation

An increasing number of Miami-Dade county residents are choosing walking and biking as their means of transportation. In 1997, the Miami-Dade County Metropolitan Planning Organization (MPO) prepared the North Dade Greenways Master Plan, which proposed a network of corridors offering a variety of trails connecting residential neighborhoods and MACs throughout the area. In 2001, the current Bicycle Facility Plan was adopted by the Miami-Dade County MPO. The 2025 Bicycle Plan builds on the 1997 Bicycle Plan developing a series of new quantitative tools to objectively evaluate the transportation network. Projects were ranked generating a priority list of corridors for improvements and identifying funding sources. According to the 2025 Bicycle Facilities Plan, the following corridors within the study location were identified by the public as a "Candidate Project":

1. SR 5/US 1/Biscayne Boulevard, between NE 82nd Street and County Line; and
2. SR 826/NE 163rd Street/North Miami Beach Boulevard, between SR A1A/Collins Avenue and SR 5/US 1/Biscayne Boulevard.

However, after the evaluation and prioritization process, both corridors were classified as a Category I, un-funded on-road bicycle project. Projects included in Category I are not feasible due to right of way constraints.

NE 163rd Bicycles Lanes

In 2007, FDOT added bicycle lanes along SR 826/NE 163rd Street/North Miami Beach Boulevard from SR 5/US 1/Biscayne Boulevard to the Oleta River State Park Entrance at Interama Boulevard as part of a resurfacing project. The designated bicycle lanes were provided in both directions within the limits mentioned previously. Bicycle lanes are not proposed west of the intersection alongside SR 826/NE 163rd Street/North Miami Beach Boulevard due to right of way constraints.

Snake Creek Trail

Currently, the Snake Creek Trail is the only existing bike/pedestrian trail within the City limits. The paved trail is approximately 2.0 mi. in length along the Snake Creek Canal from NE 11th Avenue and Miami Gardens Drive to West Dixie Highway and NE 167th Street. Lighting is provided for most of its length. The trail is used on a daily basis by bicyclists, joggers, and walkers. The bikeway forms a loop creating an ideal location for endurance exercises by runners and bicyclists. Bicycles need to ride on sidewalks at intersections and bridges; and no cars are allowed on the trail. The 2004 study mentioned in Section 1.6 has identified several improvements for the existing bikeway loop, which are focused on making the trail safer for the users.

Proposed New Routes and Trails

Nine new additional routes were proposed as part of the 2004 study. These new routes will form a network connecting destinations within the City to its surroundings areas. A map depicting the study proposed routes is shown in Figure 7 on page 12. Out of these nine routes, the Oleta River State Park Bikeway and the Eastern Trail will be located within the study limits. Both routes are described in further detail in the pages that follow. Furthermore, the 2005 study by Kimley-Horn & Associates evaluated the opportunity to extend the trail within the Snake Creek Canal between NE Miami Gardens Drive and the Florida’s Turnpike. The study segment is a strategic connection between the existing bicycle trails of Snake Creek Park in North Miami Beach and the Snake Restoration Project and Greenway trail concept plan developed by the United States Army Corps of Engineers (USACOE) and South Florida Water Management District (SFWMD) between the Florida’s Turnpike and NW 37th Avenue.
Figure 7. Existing Snake Creek Trail and Proposed Routes (Dover, Kohl & Partners Study, 2004)
Oleta River State Park
This trail connects the Snake Creek Bikeway with the Oleta River State Park through the following path:
• From the Snake Creek Canal south on N.E. 22nd Avenue to Hanford Boulevard (NE 164th Street)
• East behind the block with Laurenzo's Market to NE 163rd Street,
• Then crosses Biscayne Boulevard and continues on SR 826 Sunny Isles Boulevard to the signalized intersection at the entrance to Oleta River State Park.
According to the 2004 study the lanes will be striped on both sides of the street along the route. The sidewalk should be widened on the north side of the SR 826 Sunny Isles Boulevard. The Miami-Dade MPO has recommended funding the bike lanes for this route in fiscal year 2009/2010.

Eastern Trail
This Trail connects the Snake Creek Bikeway, City Hall, Julius Littman Performing Arts Theater, Victory Park Municipal Swimming Pool, East Greynolds Park to the Oleta River State Park Trail. This route starts at N.E 171st Street and the Snake Creek Canal and goes along the following path:
• East past the Victory Park Swimming Pool and north to N.E. 172nd Street,
• Crosses Biscayne Boulevard and continues through the East Greynolds Park where it connects to the proposed Oleta River State Park Bikeway.
This trail will require a new bridge across the waterway. According to the 2004 study, a striped lane is not necessary and the path through East Greynolds Park will be a multi-purpose trail.

The community living at the proposed developments will be connected at both trails and thereby to the network of trails being proposed around the City of North Miami Beach.

Americans with Disabilities Act (ADA) Program Support
The Americans with Disabilities Act of 1990 (ADA), as implemented by volume 59 Code of the Federal Register § 36 CFR Part 1191, requires that all public entities with responsibility or authority over streets, roads, or walkways develop a transition plan containing a schedule for the provision of pedestrian ramps where pedestrian walkways cross curbs. The ADA standards that are applicable to a project of this nature are those listed under Section 14 of the Federal Register entitled Public Right-of-Way. They mandate that all areas, elements and facilities intended for pedestrian access, circulation, and use that are constructed, installed or altered in the public right-of-way shall comply with the provisions set forth in the ADA guidelines.

Public Sidewalks
Pedestrian facilities within the study location are in fair to good condition. For SR 5/US 1/Biscayne Boulevard sidewalks are provided on both sides of the facility. However, sidewalks are located immediately adjacent to the vehicle travel lanes providing very little or no protection for pedestrians. While for SR 826/NE 163rd Street/North Miami Beach Boulevard, sidewalks are only provided on the north side of the facility east of the intersection. Due to the environmentally projected parks located adjacent to the facility, sidewalks are not provided on the south side. Figure 8 illustrates the location of sidewalks at the intersection.

The sidewalk width in the corridor area should be at least 6ft wide and must be clear of obstructions. This width allows pairs of pedestrians to walk side-by-side or to pass each other comfortably. It generally provides enough width for some street furniture, and places for people to stop. More width is desirable to accommodate bus shelters. In general, the rule is: the wider the sidewalk, the more pleasant and safe for the pedestrian experience. Sidewalks should follow FDOT Index 310 and should be accessible routes with a minimum of 48" clear path. Cross slopes should be less than two percent (1:50) and surfaces should be level without protruding objects.

Curb Ramps
Ramps should adhere to Section 4.7 of the ADA Accessibility Guidelines and FDOT Roadway and Traffic Design Standards, January 2008, Index 304. Ramp width shall be 48 inches minimum having a tactile texture for visual contrast and slip resistance. Curb Ramp running slopes at unrestrained sites shall not be steeper than 1:12 and cross slope shall be 0.02 or flatter. At marked crossing crosswalks, the bottom of the ramp run shall be contained within the markings. This will allow wheelchair access through the sidewalk network.

Pedestrian Signal Controls
It is important for the safety of pedestrians to properly place signal control systems in the correct location for crossing the street. Signal controls should be placed within reach of both a handicapped person and a child at a preferred front elevation of 48 inches and never above 54 inches.
Signage
Proper signage is also an important element in the safety aspects for pedestrian traffic. Signs should adhere to Section 4.30 of the ADA Accessibility Guidelines and FDOT January 2008 Roadway Design and Traffic Standards, Index 17355. Letters and numbers shall have a width-to-height ratio between 3:1 and 1:1 and a stroke-width-to-height ratio between 1:5 and 1:10. The suspended or projected overhead height above finished floor should be a minimum of 80 inches with a minimum character height of 3 inches.

3.2 Existing Roadway Characteristics
SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard is a major signalized four-leg intersection in the City of North Miami Beach. Within the project limits both facilities have been assigned a functional classification of Urban Principal Arterial. The existing speed limit is posted at 45 mph along both facilities. The FEC railroad runs parallel and to the west of SR 5/US 1/Biscayne Boulevard.

Typical Section/Intersection Approach Geometry
SR 826/NE 163rd Street/North Miami Beach Boulevard is a six-lane divided road oriented in an east-west direction. The geometry at the intersection approach is as follows:

- Eastbound Approach: Three (3) 11 ft through lanes, dual left-turn bays (one 10 ft and one 11 ft wide), and one 11 ft right-turn bay.
- Westbound Approach: Three (3) 11 ft through lanes, dual 11 ft left-turn bays, and one 13 ft right-turn lane controlled by a yield sign.
- East of the intersection a 4 ft designated bicycle lane is provided in both directions.
- Vehicles are restricted from performing U-turn maneuvers at both approaches.

SR 5/US 1/Biscayne Boulevard is an eight-lane divided facility oriented in a north-south direction. The lane geometry at the intersection approach is as follows:

- Northbound Approach: Three (3) 12 ft and one (1) 13 ft through lanes, dual 12 ft left-turn bays, and one 12 ft right-turn bay.
- Southbound Approach: Three (3) 12 ft and one (1) 13 ft through lanes, dual 12 ft left-turn bays, and one 12 ft right-bay.
- Vehicles are restricted from performing U-turn maneuvers at the northbound approach.

Figure 8 depicts the lane geometry described above for the study location.
Figure 8. Intersection Approach Geometry
• East: SR 826/NE 163rd Street/North Miami Beach Boulevard and NE 26 Avenue at 0.410 mi.
• West: SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 909/ West Dixie Highway at 0.127 mi.

Lighting
It is important for pedestrians and motorists to feel a sense of security within their environment. Proper illumination can increase users' awareness by providing high visibility, which reduces conflicts. Lighting along SR 5/US 1/Biscayne Boulevard and SR 826/NE 163rd Street/North Miami Beach Boulevard is provided by standard cobra head luminaries mounted on aluminum poles along the east side of Biscayne Boulevard and the north side of NE 163rd Street.

Pavement Condition
SR 826/NE 163rd Street/North Miami Boulevard was recently milled and resurfaced between the following limits:
• From NE 10th Avenue to West Dixie Highway in 2006 (FM# 412637-2-52-01)
• From SR 5 to 900 ft east of NE 35th Avenue in 2007 (FM# 407630-2-52-01)

Based on FDOT’s Pavement Conditions Forecast Report dated January 2, 2008, the Department rated the pavement conditions for SR 5/US 1/Biscayne Boulevard within the project limits as follows:

<table>
<thead>
<tr>
<th>TABLE 3.1 PAVEMENTS CONDITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section BMP</td>
</tr>
<tr>
<td>21,633</td>
</tr>
</tbody>
</table>

This report rates each section of pavement for cracking and ride on a 0-10 scale with 0 being the worst and 10 the best. Any rating of 6.4 or less is considered deficient pavement and should be evaluated further. The report also estimates the rating for the next 5-year period.

Existing Bridges
There are two bridges in close proximity to the intersection. Bridge #870961 is located approximately 0.19 miles north of the subject intersection on SR 5/US 1/Biscayne Boulevard. The bridge spans over the Snake Creek Canal with a length of 160 feet. The second bridge is located on SR 826/NE 163rd Street/North Miami Beach Boulevard. It spans over the Oleta River for 221 feet.

3.3 Existing Traffic Volumes and Operations
The primary purpose of collecting existing traffic data and examining roadway characteristics is to verify vehicular volumes, as well as, provide field information for the analysis of existing conditions. Identification of existing deficiencies in safety and operating conditions assists in assessing improvements for future traffic. The following table depicts the latest available traffic counts in the project’s area:

<table>
<thead>
<tr>
<th>TABLE 3.2 ANNUAL AVERAGE DAILY TRAFFIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Counter Location</td>
</tr>
<tr>
<td>SR 826/NE 163rd, 200 feet East of SR 5/US 1</td>
</tr>
<tr>
<td>SR 5/US 1, 300 feet South of NE 163rd Street</td>
</tr>
</tbody>
</table>

The study corridor is a Class II two-way arterial (2.00 to 4.50 signalized intersections per mile) with an average daily traffic of 66,500 for SR5/US1/Biscayne Boulevard and 58,000 for SR 826/NE 163rd Street/North Miami Beach Boulevard. As per FDOT’s 2002 Level of Service Handbook, the facilities are currently operating at Level of Service D and F, respectively, which represents traffic congestion, long delays and ultimately breakdown flow conditions.

3.4 Access Management
Based on the District Access Management Classification System and Standards the facilities within the project limits have been designated as follows:
• Class 5: SR 5/US 1/Biscayne Boulevard.
• Class 2: SR 826/NE 163rd Street/North Miami Beach Boulevard from Golden Glades Interchange to SR 5/US 1/Biscayne Boulevard
• Class 7: SR 826/NE 163rd Street/North Miami Beach Boulevard from SR 5/US 1/Biscayne Boulevard to SR A1A/Collins Avenue

Facilities with the access management designation above and posted speed of 45 mph have the following minimum spacing criteria as shown in Table 3.3.
Connection Spacing requirements and definitions are presented in Florida Administration Rule 14-97, FDOT Plan Preparation Manual, and FDOT Standard Index 515. Figure 9 below presents a graphical representation of typical driveway connection scenarios and how to measure the distances between driveways. Tables 3.4 and 3.5 present the connection spacing requirements for all access classifications.

Within the study area, at the northeast corner a total of two (2) driveways were identified along SR 826/NE 163rd Street/North Miami Beach Boulevard and three (3) along SR 5/US 1/Biscayne Boulevard. Since both facilities are State Road, any new driveway opening or change must be permitted by FDOT. At this moment none of the proposed new developments near the intersection have applied for driveway openings.

### Crash Analysis

As mentioned previously in Section 1.6, FDOT conducted a safety study in November of 2007 at the SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard intersection, as part of the high crash location investigations. The study by C H Perez & Associates identified rear-end, left-turn and sideswipe crashes as the abnormal crash patterns for the three year study period (2001-2003). The yearly crash totals for the study period were 54, 37, and 36, respectively. Four (4) pedestrian/bicycle crashes occurred during the 2001-2003 period; yielding one fatal pedestrian crash in 2002. The contributing causes for the ped/bike crashes were failure to yield right-of-way and obstructing traffic. The report documented the probable causes for the abnormal crash patterns and general countermeasure used as the base for proposing improvements to this intersection. Appendix B includes an extract of the FDOT report describing the above information.

For this Pedestrian/Safety Study, crash data for the three-year period January 1, 2004 through December 31, 2006 were obtained from the FDOT District VI Traffic Operations safety database. The crash data included information on:

### TABLE 3.3 ACCESS SPACING CRITERIA*

<table>
<thead>
<tr>
<th>Feature</th>
<th>Class 2</th>
<th>Class 5</th>
<th>Class 7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum Spacing (Feet)</td>
<td>Minimum Spacing (Feet)</td>
<td>Minimum Spacing (Feet)</td>
</tr>
<tr>
<td>Full Median Opening</td>
<td>2,640</td>
<td>1,320</td>
<td>660</td>
</tr>
<tr>
<td>Directional Median Opening</td>
<td>1,320</td>
<td>660</td>
<td>330</td>
</tr>
<tr>
<td>Signal Spacing</td>
<td>2,640</td>
<td>1,320</td>
<td>1,320</td>
</tr>
</tbody>
</table>

* Access Management Guidelines Rule 14-97

### TABLE 3.4 CONNECTION SPACING STANDARDS*

<table>
<thead>
<tr>
<th>Access Class</th>
<th>Median Type**</th>
<th>Connection Spacing (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&gt; 45 mph</td>
</tr>
<tr>
<td>2</td>
<td>Restrictive w/Service Roads</td>
<td>1,320</td>
</tr>
<tr>
<td>3</td>
<td>Restrictive</td>
<td>660</td>
</tr>
<tr>
<td>4</td>
<td>Non-Restrictive</td>
<td>660</td>
</tr>
<tr>
<td>5</td>
<td>Restrictive</td>
<td>440</td>
</tr>
<tr>
<td>6</td>
<td>Non-Restrictive</td>
<td>440</td>
</tr>
<tr>
<td>7</td>
<td>Both Median Types</td>
<td>125</td>
</tr>
</tbody>
</table>


### TABLE 3.5 CORNER CLEARANCE STANDARDS AT INTERSECTIONS

<table>
<thead>
<tr>
<th>Position</th>
<th>Access Allowed</th>
<th>Minimum (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Restrictive Median</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approaching Intersection</td>
<td>Right In/Out</td>
<td>115</td>
</tr>
<tr>
<td>Approaching Intersection</td>
<td>Right In Only</td>
<td>75</td>
</tr>
<tr>
<td>Departing Intersection</td>
<td>Right In/Out</td>
<td>230 (125*)</td>
</tr>
<tr>
<td>Departing Intersection</td>
<td>Right Out Only</td>
<td>100</td>
</tr>
<tr>
<td>Without Restrictive Median</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approaching Intersection</td>
<td>Full Access</td>
<td>230 (125*)</td>
</tr>
<tr>
<td>Approaching Intersection</td>
<td>Right In Only**</td>
<td>100</td>
</tr>
<tr>
<td>Departing Intersection</td>
<td>Full Access</td>
<td>230 (125*)</td>
</tr>
<tr>
<td>Departing Intersection</td>
<td>Right Out Only**</td>
<td>100</td>
</tr>
</tbody>
</table>

* Access Class 7 and Interim “Special Case at 35 MPH or less.” ** The connection design must not allow unpermitted movements.
The crash statistics for the intersection under analysis are summarized in Table 3.6 (See Appendix C for detailed crash information). The data shows a total of 111 crashes reported at the intersection during the three-year period. Thirty (30) crashes were reported in 2004, forty (40) in 2005 and forty-one (41) in 2006. No fatalities were reported at the intersection during the study period. However, sixty-one percent (61%) of the crashes resulted in injuries and fifty-five percent (55%) involved property damage only. Rear-end collisions were the leading type of crashes at the intersection, accounting for forty-three percent (43%) of the crashes experienced during the three-year period. Angle collisions were the second leading type of crashes, accounting for sixteen percent (16%) of the crashes at the intersection followed by sideswipe crashes with fourteen percent (14.41%). These results concurred with the crash patterns identified by the FDOT study. Four (4) pedestrian/bicycle crashes occurred at the intersection in 2005.

The average weighted safety ratio at the intersection for the study period was 1.585. The safety ratio compares the actual crash rate at a study location with the critical crash rate for similar segments throughout the State. Locations with safety ratios greater than or equal to 1.0 are considered high crash locations. The safety ratio is calculated from the following relationships:

\[
\text{SafetyRatio} = \frac{\text{ActualCrashRate}}{\text{CriticalCrashRate}}
\]

\[
\text{CriticalCrashRate} = R + K \frac{R}{M} - \frac{1}{2M}
\]

Where:
- \(R\) = Average crash rate for the category of highway being tested (crashes per million vehicle miles)
- \(M\) = Average vehicle exposure for one year at spot (million vehicle miles)
- \(K\) = 1.645, indicating 95 percent probability that crash rates above the critical rate are abnormal, and are therefore designated as high crash locations
3.6 Right of Way Constraints, Needs and Potential Impacts

The existing right-of-way (ROW) limits were obtained from FDOT ROW maps. The ROW at the project location for SR 826/NE 163rd Street/North Miami Beach Boulevard is approximately 160 feet east of the intersection and 140 feet west of the project location. The right-of-way for SR 5/US I/Biscayne Boulevard is approximately 160 feet. The property lines define the limits of the existing right-of-way within the study area.

3.7 Potential Intersection Conflict Analysis

At the study intersection all movements are protected, and during the field observations there were no conflicts between the left-turns and through movements.

3.8 Transit Services Network

Miami-Dade Transit (MDT)

Miami-Dade Transit (MDT) has been a department of Miami-Dade County since 1961. MDT operates four transit modes: bus, heavy rail, automated guideway, and demand responsive service. Together these modes comprise an integrated multi-modal transit system.

MDT’s Metrobus Routes 3, 83, 93, 183, E, H, V and the Night Owl Shuttle (246) service the corridors within the project limits (See Appendix D for detailed route maps). Routes E, H, V and Night Owl Shuttle (246) connect to other modes of transportation at the Golden Glades hub. Regular Metrobus fare is $1.50. Discounted fares are available to Medicare recipients, people with disabilities, and Miami-Dade students in grades 1-12. All routes use Metrobuses that are equipped with bike racks capable of carrying two bicycles as part of the MDT’s “Bike & Ride” program.

NMB-LINE

The NMB-LINE is a free transportation service in the City of North Miami Beach (See Appendix D for detailed route map) that offers two ways to ride on the line. The NMB-LINE shuttle operates five days a week and everyone can ride this service. The “B-line” shuttle stops at various locations on its route throughout North Miami Beach and connects to other county buses and shuttle services. Riders connect to Miami-Dade and Broward Transit buses, at the Walmart shuttle stop. While at the Intracoastal Mall riders connect to the Sunny Isles Community Shuttle Service which goes to Aventura Mall and Aventura Hospital. The NMB-LINE Door-to-Door service operates by request of the users. Riders must be City residents to use the service, which comes to their home and takes them to any site within the incorporated areas of North Miami Beach.

South Florida Regional Transportation Authority (SFRTA)

On July 1, 2003, legislation passed by the Florida Senate and House of Representatives, transformed the Tri-County Commuter Rail Authority (Tri-Rail) into the South Florida Regional Transportation Authority (SFRTA.) The new Authority was created with a vision to provide greater mobility in South Florida, thereby improving the economic viability and quality of life of the community, region and state. The Authority's mission is to coordinate, develop and implement a viable regional transportation system in South Florida that endeavors to meet the desires and needs for the movement of people, goods and services. Tri-Rail is the commuter rail with train service from Miami to Fort Lauderdale and Palm Beach. The closest station within the study area is located at the western boundary of the city on the west side of the Golden Glades Interchange. MDT routes E, V, and the Night Owl (246) connects riders to the rail system.
Park & Ride Facilities
No Park & Ride or multimodal facilities exist within the study corridor limits at this time. The nearest Park & Ride lot is located at the Golden Glades Park & Ride facility. This facility is a transfer center adjacent to I-95 and the Golden Glades Tri-rail station where there is substantial parking available with an overhead canopy, benches, bus route information, and telephones. There is regular security and a fairly high level of activity throughout the day.

3.9 Planned or Committed Improvements
According to the 2004 Bicycle and Pedestrian Study, new trails are being proposed which will connect the City to its surroundings areas. The Oleta River State Park Bikeway and the Eastern Trail will be located within the study limits. Also, the 2005 Snake Creek Study proposes improvements to the trail at its northern end. FDOT will be programming on the upcoming Fiscal Year the improvements described on the 2007 safety study. There are no other known public infrastructure planned and/or committed developments within the project corridor at this time.

SECTION 4 CONCEPTUAL PLANNING
4.1 Conceptual Project Implementation Strategies and Recommendations
Additional pedestrian space and amenities can be created through the land development process if the appropriate regulations and urban design standards are in place. Street-level retail uses, plazas, paseos, transit shelters and bike parking can generate pedestrian activity that increases drivers awareness of pedestrians through the ‘safety-in-numbers’ effect. Surface parking next to the street creates the worst pedestrian environment. The adoption of design guidelines and zoning regulations will ensure that new development at the NE 163 St/Biscayne Blvd intersection generates the highest number of walking trips.

Roadway enhancements recommended as part of this study include:

- Safety is a major aspect in the development of this project. Traffic operational improvements including, pavement markings, lighting, and pedestrian features would increase safety along the corridor.
- Improve sidewalks with curb cut ramps for handicap access at all approaches and provide sidewalk continuity at the southeast bus stop along NE 163rd Street.
- Convert span-wire mounted traffic signals at the intersections to mast arms to comply with Miami-Dade County Hurricane standards.
- Upgrade existing pavement conditions by milling and resurfacing the roadway bed.
- Roadway improvements identified by the FDOT study include:
  - Increase the all-red clearance interval for the N/S approaches from 1 second to 2 seconds and provide an all red clearance interval of 1 second for the left-turn phases at the intersection.
  - Provide additional signal head at each of the N/S approaches and back-plates that are missing or have deteriorated for E/W signal heads at the intersection.
  - Pedestrian improvements identified by the FDOT study include:
    - Install “Cross Only at Crosswalk” signs at both N/S approaches.
    - Install high-visibility pedestrian warning signs at the N/S approaches and eastbound approach.
    - Pedestrian countdown signals at all four corners of the intersection.
    - Provide high-emphasis crosswalks.
  - An elevated crossing SR 5/US 1/Biscayne Boulevard may be feasible. Requirement of such an option includes:
    - Acquisition of right-of-way at both ends of the structure to be able to accommodate piers and ramps.
    - A minimum vertical clearance for a pedestrian bridge over the roadway and railroad is 23 ft 6 in., according to the FDOT PPM, Chapter 2.
    - Meeting the requirement for American Disability Act (ADA)
    - Meeting the geometric requirements for a shared-use path as establish by FDOT PPM, Chapter 8
    - Roadway approaches might need to be modified to accommodate for a center pier and corresponding barriers.
    - Based on similar previous FDOT projects, the cost of such a bridge could range between $2.5 to $4.0 M. These costs do not include right-of-way acquisition cost.

Although this option could be feasible, it is not recommended based on cost.

The following are recommendations to improve the current public transportation system for the community:

- Enhance rider convenience through improved services and amenities and by providing a NMB-LINE stop closer to the new proposed developments at the northeast cover of the study intersection.
- Install shelters at bus stops at all approaches to the intersection where not available. Shelters should be environmentally sensitive and be designed to reflect the community’s theme. Shelters should be properly lighted, so that waiting passengers feel safe and secure.
- Foster joint and associated development that encourages, and is compatible with, increased transit use.
- Identify traditional and non-traditional funding sources to provide for recommended improvements i.e. multimodal development program, transportation outreach program, joint development public/private partnerships, etc.
These recommendations, once implemented, will enhance the mobility and safety for both vehicular traffic and pedestrians along the corridor. All of the recommendations made in this report require minimal engineering design and will be the most cost effective to implement. A preliminary construction estimate reveals that the project can be constructed with a $2.2 million budget. Another benefit of implementing these options includes short-term construction duration which will minimized negatives impact to driving motorists as well as pedestrian, bicyclist and adjacent businesses. Lastly, none of the recommendation will require the acquisition of right of way.

4.2 Bicycle/Pedestrian Master Plan

The existing right-of-way is not sufficient to accommodate bicycles west of the intersection along SR 826/NE 163rd Street/ North Miami Beach Boulevard. Along SR 5/US1/Biscayne Boulevard the width of the northbound and southbound outside lanes is 13 ft from NE 135 Street to NE 186 Street. Because of this condition, this section of SR 5/US1/Biscayne Boulevard could be restriped to four 11 foot lanes, thus creating a 4 foot bike lane in each direction. This enhancement would improve safety by reducing conflicts between bicyclists and vehicles. These new bike lanes will connect to the existing bike lanes on Biscayne Blvd north of NE 207 Street, which extend into Broward County, and intersect the existing bike lanes on NE 163 Street and NE 151 Street as well as the bike lanes on NE 135 Street that are being constructed by the City of North Miami. Although it may not be practical to restripe Biscayne Blvd at this time it should be included for the next time this section of roadway is resurfaced. The proposed Oleta River State Park and Eastern Trails will provide the connectivity to the residents living on the proximity to the study intersection with existing trails, parks and other amenities in the area.

4.3 Preliminary Cost Estimate

Preliminary cost estimates for the elements of this study include roadway and transit improvement (See Table 4.1). The preliminary construction cost estimates are based on FDOT average unit cost historical database for 2007 projects.

4.4 Potential Funding Sources

There are several potential sources of funding which are discussed in this section.

Public / Private Partnerships

The combination of governmental and private sector brings a great partnership opportunity to finance, develop, own, and manage a wide range of facilities. The Joint Development opportunities offered by City / County sponsoring a project brings to this equation the type of funding support to attract private investors. Public / private partnerships are mutually beneficial because both can pull resources, share responsibilities, and benefit from the economic results.

Transportation and Community System Preservation Pilot Program

This funding source helps a community achieve locally determined goals such as: improving transportation efficiency; reducing the negative effects of transportation on the environment; providing better access to jobs,
services, and trade centers; reducing the need for costly future infrastructure; and revitalizing underdeveloped and Brownfield sites. It is a competitive annual grant application process administered through the DOT.

**Florida Forever Act**
This funding source from the Department of Community Affairs (DCA) is to assist local government implementation of conservation, recreation, and open space elements of local comprehensive plans through a program of grant awards to local governments or nonprofit environmental organizations for the acquisition of community-based projects, urban open spaces, parks, and greenways.

**Community Development Block Grant (CDBG) Programs**
CDBG funds, administered by Miami-Dade County, have been used in various communities for property acquisition, public works, community service facilities, code enforcement clean-up efforts, and the reconstruction and rehabilitation of residential and non-residential properties.

**Miami-Dade County People Transportation Plan**
The plan provides for twenty percent of surtax proceeds to be distributed annually to those cities existing as of November 5, 2002 that meet the following conditions: (i) Provide the same level of general fund support for transportation that is in their current budget in subsequent Fiscal Years, and (ii) Apply 20% of any surtax proceeds received to transit uses in the nature of circulator buses, bus shelters, bus pullouts bays or other transit-related infrastructure. In addition, the plan stipulated that any city that cannot apply the 20% portion of surtax proceeds may contract with the County for the County to apply such proceeds on a County project that enhances traffic mobility within that city and immediately adjacent areas.

**SECTION 5 COORDINATION EFFORTS WITH FDOT AND THE CITY OF NORTH MIAMI BEACH.**

**5.1 Agencies Coordination**
To better assure that improvements to the intersection are achieved, coordination with applicable agencies is of utmost importance. Coordination should begin early in the process and must be maintained throughout the project conception and completion. Agencies that should be coordinated with include:

- Florida Department of Transportation
- Miami-Dade Transit (MDT)
- Metropolitan Planning Organization (MPO)
- South Florida Water Management District (SFWMD) (one corridor passes over the Snake Creek Canal)
- Miami-Dade County Public Works (signalization work)
APPENDIX A

SNAKE CREEK BIKE TRAIL PLANNING AND FEASIBILITY STUDY
BY KIMLEY-HORN & ASSOCIATES
2005
MIA-MI-DAE COUNTY
PARK AND RECREATION DEPARTMENT
SNAKE CREEK BIKEWAY
PLANNING AND FEASIBILITY STUDY

MIAMI-DAE COUNTY
PARK AND RECREATION DEPARTMENT
AUGUST 26, 2004
305-739-7890

Legend:
- City Parks
- Railroads
- Highways
- Major Streets

Proposed Greenway Connection
Proposed Greenway Project

Snake Creek Bike Path

North Miami Beach Greenway

0 2,000 4,000 6,000 8,000
0.2 0.4 0.6 0.8 1.0
1 inch equals 2,727 feet

2005 FEASIBILITY STUDY – SNAKE CREEK CANAL CORRIDOR
APPENDIX B

FDOT LEVEL THREE HIGH CRASH LOCATION
BY CH PEREZ & ASSOCIATES
2007
3.6.0 Intersection of Biscayne Boulevard & SH 828/NE 163rd Street

Biscayne Boulevard and SH 828/NE 163rd Street is a major signalized four-leg intersection. Biscayne Boulevard is an eight-lane urban roadway divided by a raised median oriented in a north-south direction with a posted speed limit of 45 MPH. NE 163rd Street is a major urban roadway divided by a raised median. The Florida East Coast (FEC) railroad runs parallel to Biscayne Boulevard on its west side. The intersection approach geometry is as follows:

- Northbound Approach – Dual left-turn bays, four through lanes, and one right-turn bay.
- Southbound Approach – Dual left-turn bays, four through lanes, and one right-turn bay.
- Eastbound Approach – Dual left-turn bays, three through lanes, and one right-turn bay.
- Westbound Approach – Dual left-turn bays, three through lanes, and one right-turn lane (under yield controlled).

NE 163rd Street was recently milled and resurfaced in years 2005-2006. A new westbound bike lane ending at Biscayne Boulevard was provided.

Vehicles are restricted from making U-turn maneuvers at the northbound, eastbound, and westbound approaches of the intersection. Vehicles are allowed to turn right on red at all four approaches of the intersection. A condition diagram detailing the lane configurations and existing roadway features is shown in Figure 10.

Photographs 15 and 16 provide additional pictorial information about the intersection.
PEDESTRIAN / BICYCLE SAFETY STUDY
INTERSECTION OF SR 826/NE 163rd STREET/NORTH MIAMI BEACH BOULEVARD AND SR 5/SUS/BISCAYNE BOULEVARD

Signal Timing & Phasing

<table>
<thead>
<tr>
<th>Phase I</th>
<th>Phase II</th>
<th>Phase III</th>
<th>Phase IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>NET (secs)</td>
<td> </td>
<td> </td>
<td> </td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

Legend:
- Pedestrian Movement
- Pedestrian Waiting
- Crosswalk Location

FIGURE No. 19
EXISTING DIAGRAM
SR-5/BISCAYNE BLVD. AT NE 155th ST

URS
3.6.1 TRAFFIC CONTROL

The study intersection is controlled via mast arm traffic signal assemblies with pedestrian features. The traffic signal information for the intersection was obtained from the Miami-Dade Traffic Signs & Signals Division database and is included in Appendix A. The intersection operates under the following signal timing and phasing shown as Figure 20:

![Traffic Signal Diagram](image-url)

Photograph 1A: N&S (Left) & S&B (Right) Approaches at NE 163rd St.

Photograph 1B: EB (Left) & WB (Right) Approaches at NE 163rd St.
3.6.2 DATA COLLECTION

The data collection effort for this study consisted of 4-hour Turning Movement Counts (TMCs) collected on February 15, 2007 (Thursday). This data was collected from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM. The traffic count data and other volume characteristics are summarized in Table 47, below. The data sheets can be found in Appendix B. The traffic data was multiplied by the seasonal factor of 0.96 obtained from the 2006 Florida Traffic Information CD to conduct the operational analysis of the intersection.

Table 47: Summary of Volume Characteristics at NE 163rd St.

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3.6.3 CRASH PATTERNS

The abnormal crash patterns as detailed in the Level 2 study consisted of Rear-end, Left-turn, and Sideswipe crashes. The yearly crash totals were 54, 37, and 38 for years 2001, 2002, and 2003, respectively. As such, the improvements developed will strive to reduce these types of crashes and improve the operation at this intersection. Table 48 below, details the abnormal crash type, probable cause, and general countermeasure. These general countermeasures were then used as the foundation to evaluate the proposed improvements under the Level 2 Study.

Table 48: General Crash Countermeasures at NE 163rd St.

<table>
<thead>
<tr>
<th>Crash Pattern</th>
<th>Probable Cause</th>
<th>General Countermeasure</th>
</tr>
</thead>
</table>
| Rear-end      | a) Saturated traffic conditions  
b) Large intersection  
c) Slippery surface  
d) Large number of turning vehicles  
e) Poor visibility of signals  
f) Inadequate signal timing  
g) Lighting  
h) Crossing pedestrians | a) Adjust signal timing/security interval  
b) Provide additional signal heads  
c) Provide logo sign  
d) Overlap pavement  
e) Create turning lane/prohibit turns  
f) Improve location of signal heads  
g) Remove signals  
h) Improve lighting  
i) Improve signing and crosswalks |
| Sideswipe     | a) Improper lane changes  
b) Inadequate design  
c) Improper maintenance  
d) Inadequate pavement markings  
e) Inadequate channelization  
f) Inadequate signing | a) Provide destination signs  
b) Provide wider lanes  
c) Perform necessary road surface repairs  
d) Refurbish pavement markings  
e) Channelize intersection  
f) Provide turning bay  
g) Provide lane use and illuminated signs |
| Left-turn     | a) Left-turners failure to yield the right-of-way to opposing traffic and pedestrians for traffic signal  
b) Large volume of left-turns  
c) Restricted right of way  
d) Excessive speed | a) Consider a staggering left-turn phase or increase the all-red clearance for left-turns  
b) Provide turn-  
c) Reverse left-turn traffic  
d) Provide adequate channelization  
e) Improve intersection offset  
f) Remove right obstruction  
g) Reduce speed limit |

Note: This table also includes the probable causes and countermeasures previously identified in the Level 2 Study. These are highlighted in bold text.
3.6.4 PROPOSED IMPROVEMENTS

The following conceptual roadway improvements were developed based on the operational and crash history of the intersection under the Level 2 Study. As previously stated, Rear-end, Left-turn, and Sideswipe crashes are the three crash types to be targeted for mitigation. While evaluating the following improvements, consideration was given as to whether any improvements would be physically and economically feasible. The proposed improvements are as follow:

Recommendations

Objectives

The purpose of these recommendations is to improve the following conditions:

- Improve traffic operations and intersection clearance.
  - Target: Rear-end, Sideswipe, and Left-turn crashes
- Improve signal head conspicuity for N/S and signal visibility for E/W approaches.
  - Target: Rear-end crashes
- Improve pedestrian crossing at the intersection.
  - Target: Pedestrian/Bicycle crashes

Improvements

1. Optimize signal timing and evaluate clearance interval at the intersection.

   These recommendations will be evaluated through an operational analysis and clearance review that will be conducted through this study. The final recommendations will be stated in the operational section of this report, if it is determined that it is feasible to make these changes. The County's method for calculating the clearance interval will be used as guidance.

2. Provide an additional signal head at the N/S approaches and missing back-plates for E/W signal heads at the intersection.

3. The following pedestrian improvements were not originally recommended in the Level 2 Study; however, given the degree of injury for the pedestrian crashes that took place during the 2001-2003 crash periods, these recommendations are suitable for the study intersection:

   - Install "Cross Only at Crosswalk" signs (R9-2) at both N/S approaches.
   - Install high-visibility pedestrian warning signs at the N/S approaches and eastbound approach, and pedestrian countdown signals at all four corners of the intersection.
   - Provide high-emphasis crosswalks.

3.6.5 REVIEW OF CLEARANCE INTERVAL

The all-red clearance interval for the intersection was reviewed, as indicated in the Level 2 Study, using the County's guideline. This method uses the intersection clear distance from the stop bar to the farthest traffic lane of potential conflict with cross-street traffic. The recommended all-red clearance interval for a clear distance of approximately 125-130 feet (on Biscayne Boulevard) and an approaching speed of approximately 45 MPH is between 1.9 and 2.0 seconds. For E/W on NE 163rd Street, these values are slightly above 2.0 seconds. These values were obtained from a Table derived by the County for several distance and speed combinations. The existing all-red clearance interval for the N/S and E/W approaches are 1 second and 2 seconds, respectively, according to the County. The left-turn phases for N/S and E/W do not have an all-red clearance interval. Those are all dual left-turn movements with a high demand of traffic. Therefore, it is recommended to increase the all-red clearance interval for the N/S approaches from 1 second to 2 seconds and provide an all-red clearance interval of 1 second for the left-turn phases at the intersection.

3.6.6 CAPACITY ANALYSIS

An operational analysis was performed for the existing and proposed conditions for both the AM and PM peak traffic periods using Synchro Version 6 Traffic Software. The primary Measures of Effectiveness (MOEs) used were volume/capacity (v/c), total delay (control and queue), Level of Service (LOS), # of Vehicle Stops, and 95th Percentile Queue (feet). Computer printouts of the level of service analysis are included in Appendix C.
PEDESTRIAN / BICYCLE SAFETY STUDY
INTERSECTION OF SR 826/NE 163RD STREET/NORTH MIAMI BEACH BOULEVARD AND SR 5/US 1/BISCAYNE BOULEVARD

Level Three High Crash Location Investigation November 2007

Existing Conditions

AM Peak Period
During the AM peak period, the intersection is operating at poor LOS E and below capacity. Refer to Table 49, below. There are two failing movements and few operating at LOS F. The through movements and left-turn movements are operating at LOS E. The northbound through movements (left/thru/right) are being serviced at poor LOS E. The longest queue at this approach is for the right-turn movement. All through movements at the intersection, with the exception of the northbound through, have similar queue lengths extending for approximately 460-feet long.

<table>
<thead>
<tr>
<th>Time</th>
<th>A 1</th>
<th>A 2</th>
<th>B 1</th>
<th>B 2</th>
<th>C 1</th>
<th>C 2</th>
<th>D 1</th>
<th>D 2</th>
<th>E 1</th>
<th>E 2</th>
<th>F 1</th>
<th>F 2</th>
<th>G 1</th>
<th>G 2</th>
<th>H 1</th>
<th>H 2</th>
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</table>

PM Peak Period
During the PM peak period, the intersection is operating near capacity at LOS E. Refer to Table 50, below. All left-turn movements at the intersection are operating at failure level. The eastbound through traffic is being serviced at LOS E and experiencing long queues (19 vehicles). The northbound through movement is also operating near failure at LOS E with long queues extending approximately 25 vehicles long, which is the longest through queue at the intersection.

<table>
<thead>
<tr>
<th>Time</th>
<th>A 1</th>
<th>A 2</th>
<th>B 1</th>
<th>B 2</th>
<th>C 1</th>
<th>C 2</th>
<th>D 1</th>
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<td>12</td>
</tr>
</tbody>
</table>

Proposed Conditions
After reviewing the signal timing information and taking into account the recent timing changes at this intersection by the County, no signal timing changes will be recommended.

Therefore, based on the results of the safety and operational reviews, the following improvements are recommended, as illustrated in Figure 21 on the following page.

1. Increase the all-red clearance interval for the N/S approaches from 1 second to 2 seconds and provide an all-red clearance interval of 1 second for the left-turn phases at the intersection.

2. Provide an additional signal head at each of the N/S approaches (missing or deteriorated) for the E/W signal heads at the intersection.

The carrying capacity of the existing traffic signal assembly should be reviewed by a structural engineer licensed in the state of Florida, due to the additional weight that the signal heads and back-plates would impose on the string cable assembly.

3. The following pedestrian improvements were not originally recommended in the Level 2 Study, however, given the degree of injury for the pedestrian crashes that took place during the 2001-2003 crash periods, these recommendations are suitable for the study intersection.
   - Install "Cross Only at Crosswalk" signs (R9-2) at both N/S approaches.
   - Install high-visibility pedestrian warning signs at the N/S approaches and eastbound approach, and pedestrian countdown signals at all four corners of the intersection.
   - Provide high-emphasis crosswalks.
PEDESTRIAN / BICYCLE SAFETY STUDY
INTERSECTION OF SR 826/NE 163rd STREET/NORTH MIAMI BEACH BOULEVARD AND SR 5/US 1/BISCAYNE BOULEVARD

APPROVALS:
1. INCREASE THE ALL-RED CLEARANCE INTERVAL FOR THE N5E APPROACHES FROM 1.5 SECONDS TO 3 SECONDS AND PROVIDE AN ALL-RED CLEARANCE INTERVAL OF 1.5 SECONDS FOR THE LEFT-TURN PHASES AT THE INTERSECTION.
2. PROVIDE AN ADDITIONAL SIGNAL LED AT EACH OF THE N5E APPROACHES AND BACK-PLATES (MISSING OR DETERIORATED) FOR E/W SIGNAL HEADS AT THE INTERSECTION.
3. PEDESTRIAN IMPROVEMENTS:
   A) INSTALL "CROSS ONLY AT CROSSWALK" SIGNS (PB-2) AT BOTH N5E APPROACHES.
   B) INSTALL HIGH-AMPERAGE PEDESTRIAN WARNING SIGNS AT THE N5E APPROACHES AND EASTBOUND APPROACH, AND PEDESTRIAN COUNTDOWN SIGNALS AT ALL FOUR CORNERS OF THE INTERSECTION.
   C) PROVIDE HIGH-DURABILITY CROSSWALKS.

FIGURE No. 21
PROPOSED CONDITION DIAGRAM
SR-5 / BISCAYNE BLVD. AT NE 163rd ST
3.6.7 BENEFIT / COST ANALYSIS
A Benefit/Cost analysis (B/C) was performed for the proposed improvements, which includes an evaluation of the potential reduction of crashes upon the implementation of these recommendations and its associated estimated cost. In addition, it focused on the resolution of safety and operational related issues.

Cost Estimate
The preliminary cost was estimated for the proposed improvements and is presented in Table 51. A detailed cost estimate for the proposed improvements is also included in Appendix D. The estimate includes the cost of preliminary engineering, construction oversight, and a percentage for contingency.

Table 51: Preliminary Construction Cost Estimate for Proposed Condition at NE 163rd St.

<table>
<thead>
<tr>
<th>SAFETY IMPROVEMENTS</th>
<th>COST</th>
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<tr>
<td>ROADWAY CONSTRUCTION</td>
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<td>SIGNING &amp; PAVEMENT MARKINGS</td>
<td>$7,370.28</td>
</tr>
<tr>
<td>DRAWS SIGNAL</td>
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</tr>
<tr>
<td>PRE-SUBTOTAL</td>
<td>$45,413.36</td>
</tr>
<tr>
<td>10% Contingency</td>
<td>$4,541.34</td>
</tr>
<tr>
<td>10% Mobilization</td>
<td>$4,541.34</td>
</tr>
<tr>
<td>10% Maintenance of Traffic</td>
<td>$4,541.34</td>
</tr>
<tr>
<td>15% PE &amp; CET</td>
<td>$6,912.00</td>
</tr>
<tr>
<td>25% Small Project Premium</td>
<td>$11,203.43</td>
</tr>
<tr>
<td>GRAND ESTIMATED TOTAL</td>
<td>$77,202.72</td>
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</tbody>
</table>

Crash Reduction Factors (CRF)
Crash reductions were achieved via the detailed improvements for the described improvements. Reductions are featured in the Benefit/Cost worksheets, which can be found in Appendix E. Since the proposed improvements include different improvements to reduce a percentage of all crashes, the factors must be implemented in such a fashion that crash reductions are not over-represented. This is accomplished by weighing the combined effects of the improvement types and their CRFs. As previously stated in the Crash Patterns section of this report, there are 127 crashes targetable for mitigation for the study intersection.

As previously stated, these calculations were performed following the methodology outlined and CRF values included in the following three sources (presented in order of priority):

- FDOT’s List of CRFs
- “Development of Accident Reduction Factors” (June 1996).

Table 52 illustrates in detail the CRF computations for the various safety-related improvements recommended.

The proposed improvements consist of capacity and safety improvements. The accident reduction is as follows (all CRFs used below were obtained from the FDOT’s Final Report):

1. The pedestrian improvements being recommended will be grouped and deducted as one improvement, given the nature of these recommendations. A single CRF for these improvements is not provided by the FDOT report; therefore, the following individual CRFs will be grouped and applied as one, based on the following formula:

$$ CRF_{ped} = CRF_1 + (1-CRF_1) \times CRF_2 + (1-CRF_2) \times (1-CRF_3) \times CRF_3 + ... $$

- Pedestrian signing (p. 31), install high visibility pedestrian warning and “Cross Only at Crosswalk” signs – CRF is 4% of all crashes.
- Upgrade signal (p. 36), install pedestrian countdown signals at study intersection – CRF is 25% of all crashes.
- Add/Improve pedestrian crosswalk (p. 45), provide high-emphasis crosswalks – CRF is 25% of all crashes.

A grouped CRF value of 46% will be used conservatively for these pedestrian improvements. Therefore, this value will be reduced by 95% to 2.30%.

2. Install signal head, increase the all-red clearance interval, and provide back-plates: A CRF of 10% of all crashes will be applied congruently for these improvements (p. 37). This value will be reduced by 5% to 2.50%.

Applying the CRFs as mentioned above to the total number of crashes possible for reduction, yields 6.0 crashes for the next three years or 2.0 crashes per year.
#### 3.6.7 B/C Calculation

The B/C value for the safety improvements proposed was calculated at 18. The safety-related improvements proposed could result in the reduction of 2.0 crashes per year. There are no operational improvement benefits. Table S3 below shows the summarized results of the safety B/C calculation. Detailed calculations of the safety B/C analysis are included in Appendix E.

<table>
<thead>
<tr>
<th>Description</th>
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<tr>
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<tr>
<td><strong>B/C</strong></td>
<td><strong>18</strong></td>
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</table>

Given the positive results of the B/C analysis, the proposed improvements are recommended for implementation at the study intersection.

#### 3.6.8 Conclusion / Recommendations

Based on the safety and operational deficiencies identified by the study for the intersection of Biscayne Boulevard and NE 163rd Street and positive B/C results, the proposed improvements are recommended for implementation as stated below.

**Improvements**

1. Increase the all-red clearance interval for the N/S approaches from 1 second to 2 seconds and provide an all-red clearance interval of 1 second for the left-turn phases at the intersection.

2. Provide an additional signal head at each of the N/S approaches and back-plates (missing or deteriorated) for E/W signal heads at the intersection.

   The carrying capacity of the existing traffic signal assembly should be reviewed by a structural engineer licensed in the state of Florida, due to the additional weight that the signal heads and back-plates would impose on the string cable assembly.

3. The following pedestrian improvements were not originally recommended in the Level 2 Study; however, given the degree of injury for the pedestrian crashes that took place during the 2001-2003 crash periods, these recommendations are suitable for the study intersection.
   - Install "Cross Only at Crosswalk" signs (R9-2) at both N/S approaches.
   - Install high-visibility pedestrian warning signs at the N/S approaches and eastbound approach, and pedestrian countdown signals at all four corners of the intersection.
   - Provide high-emphasis crosswalks.
## BISCAYNE BLVD AT NE 103RD ST

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**URS**

**PEDESTRIAN / BICYCLE SAFETY STUDY**

**INTERSECTION OF SR 826/NE 163rd STREET/NORTH MIAMI BEACH BOULEVARD AND SR 5/US 1/BISCAYNE BOULEVARD**
APPENDIX C

CRASH DATA
## Crash Summary

### Section
- **SR 826**
- **Intersecting Roadway:** SR 5
- **Mileposts:** 3.695 to 3.695

### Study Period
- From January 1, 2004 to December 31, 2004

### County
- Miami-Dade

### Summary Table

<table>
<thead>
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<th>No.</th>
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### Crash Data Analysis

| Total No. | Fatal | Injury | PDO | Left Turn | Right Turn | Side Impact | Ped/Bike | One Vehicle | Day | Night | Wet | Dry | Speed | FT/TV | DsA | 18.67% | 66.23% | 10.57% | 66.23% | 10.57% | 0.00% | 0.00% |
|-----------|-------|--------|-----|----------|------------|-------------|-----------|-------------|-----|-------|-----|-----|--------|-------|-----|-------|-------|-------|-------|-------|-------|-------|-------|
|           | 0     | 10     | 12  | 2        | 0          | 0           | 0         | 0           | 0   | 0     | 0   | 0   | 0      | 0     | 0   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     |

### Additional Notes
- **For Spots Location:**
  - **Critical Crash Rate (H):** Enter State Road SR 826, Enter Beginning MP 3.695
  - **Average Crash Rate (A):** Enter Ending MP 3.695
  - **Average Vehicle Exposure (V):** K is a constant

### Calculations

- **Actual Crash Rate:** \( \frac{30}{66,200} = 0.458 \)
- **Critical Crash Rate:** \( 0.458 \)
- **Safety Ratio:** \( \frac{30}{66,200} = 0.000 \cdot 0.000 \)

### Additional Information
- **Total Vehicles Entering ADT:** 66,200
- **Spot Accident Rate:** 1.042 MV

---

**Note:** Continue by entering the year...
**FLORIDA DEPARTMENT OF TRANSPORTATION**

**CRASH SUMMARY**

**STATE ROUTE:** SR 826

**COUNTY:** Miami-Dade

**ADT:** 53,038

**SPOT ACCIDENT RATE:** 2.066

### CRASH DATA 2005

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**Note:** Continue by entering the year...

For Spots Location:
- **SR 826**
- **Enter Beginning MP:** 3.695
- **Enter Ending MP:** 3.695

- **Critical Crash Rate (H)**
- **Average Crash Rate (A)**
- **Enter the ADT**
- **Enter the Number of Crashes**
- **Suburban, Rural or Urban**
- **Avg Vehicle Exposure**

**K** is a constant

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**Safety Ratio** = 1.80747395

**Enter the Year**

**Enter Average Crash Rate**

**Enter the ADT**

**Enter the Number of Crashes**

**Suburban, Rural or Urban**

**Avg Vehicle Exposure**

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**Actual Crash Rate** = 2.06612363

**Critical Crash Rate** = 1.80747395

**Safety Ratio** = 1.80747395

---

**Note:**
- **Entry State Road SR 826**
- **Entry Beginning MP:** 3.695
- **Entry Ending MP:** 3.695

---

**Note:**
- **Suburban, Rural or Urban**
- **Avg Vehicle Exposure**

**K** is a constant

**Critical Crash Rate Calculations**

1. **Enter the Year**
2. **Enter Average Crash Rate**
3. **Enter the ADT**
4. **Enter the Number of Crashes**
5. **Suburban, Rural or Urban**
6. **Avg Vehicle Exposure**

**Actual Crash Rate =**

**Critical Crash Rate =**

**Safety Ratio =**

---

**CRASH DATA 2005**

**Note:**
- **Suburban, Rural or Urban**
- **Avg Vehicle Exposure**

**K** is a constant

---

**Note:**
- **Enter State Road SR 826**
- **Enter Beginning MP:** 3.695
- **Enter Ending MP:** 3.695

---

**Note:**
- **Suburban, Rural or Urban**
- **Avg Vehicle Exposure**

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---

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- **Enter State Road SR 826**
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**Note:**
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- **Avg Vehicle Exposure**

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**Note:**
- **Enter State Road SR 826**
- **Enter Beginning MP:** 3.695
- **Enter Ending MP:** 3.695

---

**Note:**
- **Suburban, Rural or Urban**
- **Avg Vehicle Exposure**

**K** is a constant

---
## Pedestrian/Bicycle Safety Study

**Intersection of SR 826/NE 163rd Street/North Miami Beach Boulevard and SR 5/US 1/Biscayne Boulevard**

**Florida Department of Transportation**

### Crash Summary

**Section:** 87030000  
**State Route:** 826  
**Intersecting Roadway:** 5  
**M.P.:** 3.695 to 3.695  
**Engineer:** MTV  
**Study Period:** From 1/06 to 12/06  
**County:** Miami-Dade

### Crash Data 2006

<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Time</th>
<th>Type</th>
<th>Contributing Cause</th>
<th>Fatal</th>
<th>Injury</th>
<th>Prop</th>
<th>Day</th>
<th>Night</th>
<th>Wet</th>
<th>Dry</th>
<th>Speed</th>
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<tbody>
<tr>
<td>1</td>
<td>6/29/2006</td>
<td>Thu 1700</td>
<td>w/ MV on Other Road</td>
<td>0 0 1</td>
<td>Day</td>
<td>Dry</td>
<td>Unknown</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5/7/2006</td>
<td>Sun 1800</td>
<td>All Other</td>
<td>0 0 1</td>
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<td>Dry</td>
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<td></td>
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<tr>
<td>3</td>
<td>5/10/2006</td>
<td>Sun 1800</td>
<td>Rear End</td>
<td>0 0 1</td>
<td>Day</td>
<td>Wet</td>
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<td></td>
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<td>5/30/2006</td>
<td>Fri 1900</td>
<td>Rear End</td>
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</tr>
<tr>
<td>5</td>
<td>5/29/2006</td>
<td>Sun 1900</td>
<td>Rear End</td>
<td>0 1 0</td>
<td>Day</td>
<td>Dry</td>
<td>Careless Driving</td>
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<td>5/25/2006</td>
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<td>Sideswipe</td>
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</tr>
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<td>5/22/2006</td>
<td>Wed 1900</td>
<td>Angle</td>
<td>0 0 1</td>
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<tr>
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<td>Fri 1300</td>
<td>Rear End</td>
<td>0 0 1</td>
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</table>

### Total

- **Total No. Fatal:** 25  
- **Total No. Injury:** 23  
- **Total No. Prop:** 7  
- **Total No. PDO:** 23  
- **Total No. Angle:** 2  
- **Total No. Left Turn:** 1  
- **Total No. Right Turn:** 1  
- **Total No. Rear End:** 23  
- **Total No. Sideswipe:** 2

### Notes

- **Note:** Continue by entering the year...

### Suburban, Rural, Urban

- **S:** Suburban  
- **R:** Rural  
- **U:** Urban

### Calculation

**Total Vehicles Entering / ADT:** 51,110

**Spot Accident Rate:** 2.1984

---

**Note:**
- **For Spots Location:**  
  - Enter State Route: 826  
  - Enter Beginning MP: 3.695  
  - Enter Ending MP: 3.695

---

**Enter the Year:** 2006  
**Enter Average Crash Rate:** 0.579  
**Enter the ADT:** 51,110  
**Enter the Number of Crashes:**

- Suburban: 18.65519  
- Rural: 34.15  
- Urban: 34.15

**Avg Vehicle Exposure:** 18.65519

**Safety Ratio:** 3.24845

---

**Actual Crash Rate =** 2.19775453

**Critical Crash Rate =** 1.3198348

---

**Total Vehicles Entering / ADT:** 51,110

**Spot Accident Rate:** 2.1984
APPENDIX D

TRANSIT ROUTE MAPS
Route V

- No service available Saturday and Sunday.
- No hay servicio disponible sábados y domingos.
- Pa genyon sévri sanmi ak dimansh.
APPENDIX E
PHOTO INVENTORY
PEDESTRIAN /BICYCLE SAFETY STUDY
INTERSECTION OF SR 826/NE 163rd STREET/NORTH MIAMI BEACH BOULEVARD AND SR 5/US 1/BISCAYNE BOULEVARD

ALONG SR 826/ 163rd STREET/NORTH MIAMI BEACH BOULEVARD
PEDESTRIAN / BICYCLE SAFETY STUDY
INTERSECTION OF SR 826/NE 163RD STREET/NORTH MIAMI BEACH BOULEVARD AND SR 5/US 1/BISCAYNE BOULEVARD
ALONG SNAKE CREEK CANAL TRAIL