Waterborne Transportation Feasibility Study

between

Black Point Marina and Downtown Miami

TPO
Miami-Dade Transportation Planning Organization

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Prepared By:

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Table of Contents

List of Figures

List of Tables

Chapter 1
Background

Introduction

The Miami-Dade Transportation Planning Organization (TPO) has conducted a Waterborne Transportation Feasibility Study between Black Point Marina and downtown Miami. The purpose of this study is to assess the implementation of an alternative mode to improve travel time and accessibility into Downtown Miami. Today, commute times between southern Miami-Dade County and downtown Miami can often take more than two (2) hours during the peak morning and evening travel periods. Furthermore, the existing roadway network provides limited capacity and coupled with a growing travel demand is unable to assure a reliable commute time between these two areas.

This study provides an assessment of the existing conditions within the southeastern section of the County to include the Black Point Marina. Specifically, Black Point is being evaluated to determine how the marina could be converted into a multimodal transit location to include a park-and-ride area, connecting feeder transit and shuttle service as well as the necessary waterside requirements necessary to implement a waterborne commuter service. In addition, several other potential locations for waterborne service were identified and evaluated as part of this study. These include Dinner Key Marina in Coconut Grove and three Downtown Miami options for connecting service: the Riverwalk Metromover station adjacent to the Miami River, Chopin Plaza, and the Sea Isle Marina. Each waterside location was evaluated to identify existing infrastructure, multimodal connectivity, and proximity to adjacent land uses that would facilitate optimal accessibility between points while also enabling efficient loading and unloading of passengers. An analysis of the potential travel market, and associated estimated capital and operating costs were also prepared for this study as well as the identification of potential funding sources.

This was a limited effort such that recommendations for next steps is outlined in the last section of this report for purposes of continuing efforts that advance the implementation of waterborne transit service for the citizens of Miami-Dade County. Information and data prepared from previous studies by Miami-Dade County on waterborne transit services were utilized to the extent applicable for this study to avoid duplication of effort. The specific documents that were reviewed are presented in the following section.

Previous Studies

There have been similar previous study efforts completed by Miami-Dade County in evaluating the feasibility of implementing a type of water borne transportation as an alternative travel option for citizens. An overview of each of these efforts is provided in the following section. Specifically, there have been three reports that have been formally prepared over the last 10 years. The three reports profiled include

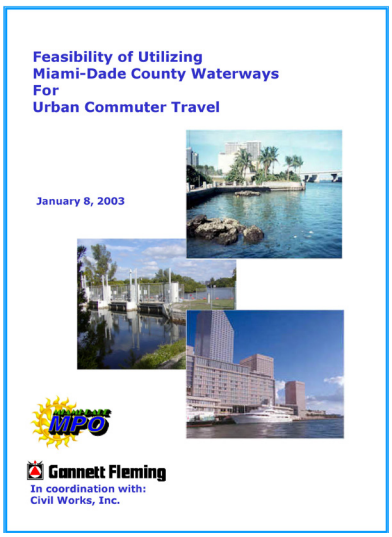
» 1. Feasibility of utilizing Miami-Dade Waterways for Urban Commuter Travel, **2003**

» 2. Development of a Service Plan for Waterborne Transportation Service in Miami-Dade County, **2004**

» 3. Waterborne Transportation, a working paper that evaluates potential waterborne transit routes in north and central Miami-Dade County, **2016**

Feasibility of Utilizing Miami-Dade County Waterways for Urban Commuter Travel (2003)

This study reviewed existing successful operations to identify characteristics of waterborne transportation service applicable to Miami-Dade County. The study then assessed the feasibility of using County waterways for commuter travel by identifying applicable vessel types, feasible routes, and comparing the travel time between identified origins and destinations. An assessment of applicable policies and regulations was completed to identify the requirement and approvals necessary to implement this type of service.



Characteristics of Successful Waterborne Services

The study reviewed previous efforts to provide water taxi in Miami-Dade, as well as successful local and national waterborne services. The purpose of this review was to identify the type of characteristics necessary for the implementation of a waterborne transportation system in Miami-Dade County. Successful waterborne transit systems were found to be reliable, convenient, and competitive. Most successful operations provide service between two (2) to three (3) stops. Typical commute lengths range from 20 to 90 minutes and service headways were 30 minutes or longer.

For Miami-Dade County, the study recommended that waterborne transportation connect to existing land-based transit services with transfers accepted between the two systems. Commute time within the waterborne system should be comparable to that of competing travel modes (e.g., autos and transit). Headways for service that cross Biscayne Bay may be as long as 60 minutes. Headways for multiple stop service should recognize peak hour demand and competing modes. Similarly, park and ride facilities should be provided where travel demand is also identified. The study determined that a financial subsidy for this service would be required to keep fares competitive with the cost of competing transportation modes.

Waterborne transit systems were classified into three primary categories: Class I, Water Taxi Service with passenger capacities of 100 or fewer, Class II, Water Ferry Service (passenger only) on vessels with greater than 100 person capacities typically operating in bays and harbors, and Class III, Water Ferry Service accommodating automobiles and passengers. The study determined that there are service opportunities within Biscayne Bay and within the waterways downstream of the salinity dams for all the three categories of transit service. Upstream of the salinity dams, service opportunities are limited to Class I and II. Limitations to Class II and III service are the water depth and vertical clearance within a particular canal.

Regulations and Funding Sources

Various funding sources were identified in the study including the Ferry Boat Discretionary Program (FBDP), Congestion Mitigation and Air Quality Improvement Program, Bus and Bus-Related Capital Investment Grants, Urbanized Area Formula Grants, Formula Grants, Job Access and Reverse Commute, and the Clean Fuels Formula Grant Program.

Operating Constraints

Operating constraints within the currently navigable waters, including Biscayne Bay, consist of water depth, no entry zones/speed zones, bridge vertical clearances, seagrass locations, channel locations, and existing dock locations. Areas with idle and slow speed restrictions may impact the feasibility of the waterborne service due to an increase in travel time. Protected seagrass exists within several portions of Biscayne Bay, primarily within the Biscayne Bay Aquatic Preserve south of the Rickenbacker Causeway. To limit impact to seagrass and marine habitats, waterborne transit service may be required to use dredged channels, primarily the Intracoastal Waterway within Biscayne Bay. The Dade County Manatee Protection Plan (DCMPP) and the designation of Biscayne Bay as an Aquatic Preserve restrict the ability to construct new docks in some parts of the study area. New or modified docking facilities are subject to the Marine Facility Siting Criteria adopted in the DCMPP.

Feasible Waterways

Waterborne commuter transportation was generally found to be feasible throughout Biscayne Bay. Even though most of the Bay is subject to limits associated with speed zones, seagrass beds, and the construction of new or the expansion of existing dock facilities, only the area northwest of Virginia Key and a section of the Little River Canal are subject to No Entry restrictions.

At least some portion of the canals examined in the study were identified to be non-navigable. Only the Miami River and the Coral Gables Canal were found to have no control structures within close proximity to Biscayne Bay that would limit waterborne transportation opportunities.

Preliminary Service Routes and Termini

The study identified general terminal locations, not specific docking locations, because constraints associated with access, ownership, and use were not determined. The study identified five (5) preliminary routes for further analysis, but only two (2) are relevant to the current study:

- Route 1 Biscayne Bay serving Coconut Grove, Miami, Miami Beach,
- Route 2 Biscayne Bay serving Coconut Grove, Miami, North Miami, and Bal Harbour

Travel Time Analysis

A travel time comparison was performed using the Miami-Dade Transportation Model. In general, travel time comparisons between waterborne service and the automobile and transit modes indicate that waterborne conventional vessels are competitive in Biscayne Bay.

Opportunities

The study confirmed the potential for successful waterborne commuter service in Miami-Dade County. It identified a potential waterway network on which commuter service could be provided. Travel time comparisons found that waterborne transportation using conventional vessels could be competitive with the automobile.

Waterborne commuter service was recommended to be limited stop or express service, consistent with the service plans of other successful operations. The recommended vessel type for service within the Currently Navigable Waterways including Biscayne Bay is Class I, Class II Service or Class III, and for the Non-Navigable Waterways is Class I or II.

The study recommended additional service planning for the potential routes including a transit demand analysis. In addition, the study recommended that Miami-Dade County evaluate and identify a proposed organizational structure for operation of a waterborne transit system. Coordination with regulatory agencies was also recommended to determine the opportunities for access to existing docking facilities and the conditions associated with the permitting of new docking facilities.

Development of a Service Plan for Waterborne Transit Services (2004)

Development of a Service Plan for Waterborne Transit Services builds upon the results from the 2003 study previously mentioned. The study's objective was to further assess the feasibility of waterborne public transportation in Miami-Dade County and develop a service plan to determine the financial commitment required to implement a waterborne service in Miami- Dade.

The report examined the requirements and characteristics needed to initiate a waterborne transit system in Miami-Dade County. The study noted that many of the proposed system needs are similar to the characteristics of successful Australian water transit systems.

Terminal Requirements

An assessment of available service stop locations determined that most existing marinas were either private facilities or part of park spaces. The use of any private marinas will require arrangements with those private entities while utilizing park space was considered antagonistic towards the recreational purposes of public parks. In addition, it will require replacing the amount of park space lost due to the transportation project.

The study identified three (3) types of terminals based on the surrounding land use:

- Central Business District (CBD) - The downtown Miami terminal will be the largest terminal in the system and it should be located within walking distance of Metrobus and Metromover stations. It was also recommended to provide a bus turnaround loop at the terminal. The study recommended locating the CBD terminal near Bayside or Bayfront Park to increase accessibility to popular entertainment districts within Downtown. The study also noted that terminals in Brickell, Pace Park / Omni, Lincoln Road / South Beach, and possibly Coconut Grove would operate in a similar manner as a CBD terminal.
- Suburban terminals – These will typically be designed to accommodate only one vessel. The "footprint" of this terminal was recommended to be mostly on the water to minimize the amount of valuable real estate. These terminals should be provided with parking facilities and bus services.
- Small Community Terminals -These are typically small infrastructure that serve only as stops. Possible locations could be in public right-of-way such as a street-end or the area under a causeway for a water transit stop.

Water Transit Vessels

The study recommended the use of a low wake wash catamaran with demi hulls that exhibit a length to beam ratio of 20:1 or greater. Passenger capacity was recommended to be about 125. The vessel should have a shallow draft, not to exceed three (3) to four (4) feet. The vessel should have maximum height of 12 feet, to allow travel under the Venetian Causeway Bridge.

Route Structure

The study developed four (4) prospective water transit routes and a Miami downtown circulator. 1) The South Beach Route was designed to serve the Downtown Miami CBD Terminal and the South Beach area of Miami Beach. 2) The West Shoreline Route (South) connects Downtown Miami with Brickell, Mercy Hospital, and Coconut Grove. The West Shoreline Route (North) was designed to serve the Biscayne Bay communities north of Downtown. 3) The North Beach Route was designed to serve the area from Haulover to the Venetian Causeway. 4) The Key Biscayne Route was designed to serve primarily tourists traveling Miami Beach and Coconut Grove to Virginia Key and Crandon Park.

The Downtown Circulator was envisioned to provide convenient access to waterside Downtown destinations. The route was recommended to have a hub at the main CBD Terminal to allow for an easy transfer from/to the main routes. This circulator service would also operate with smaller vessels with a capacity of 20 to 50 passengers.

Service Frequencies

The study proposed headways of no more than 20 minutes during peak travel periods and a range from 30 minutes to 60 minutes during non-peak periods of the day. It was also recommended for daily service span to approximate the service spans of the other transit services in Miami-Dade County such as Metrobus and Metromover.

Patronage Projection

The projected patronage is approximately 1.7 million annual passengers, which is anticipated to require a five (5) year maturity period. Initial annual patronage is expected to be approximately 600,000 with larger percentage increases in the first five (5) years of service that are expected thereafter. It was estimated that half of these passengers will transfer from existing Metrobus services; therefore, a connection to the transit system is considered vital. Projections also estimated that 35% of potential riders is expected to switch from private automobiles.

Costs and Revenues

The capital cost estimated to implement the proposed water transit system is approximately $125 million to $150 million. An annual operating cost for the proposed route network is approximately $22 million at a five (5) year system maturity. The year five (5) operating deficit is projected to be in the range of $11 million to $18 million.

Demonstration Project

The study recommended pursuing a demonstration water transit project to provide an assessment of the performance and utilization of the system. The study performed a route prioritization analysis that determined the "South Beach Route" to be the most effective initial route for demonstration purposes.

Conclusion

The final recommendation was to develop waterborne transit service for Miami-Dade County on Biscayne Bay through a public/private partnership if a waterborne transit demonstration project, or pilot program, was deemed successful.

Waterborne Transportation Pilot (2016)

Miami Dade County developed a pilot project to identify a waterborne service that could provide a direct connection between areas of high congestion located adjacent to the waterways while resulting in the least disruption to waterfront properties, wildlife, and sea grasses and in compliance with the speed zones. The two express routes identified include a North-South and East-West route as described below:

The North-South Express Route Is proposed to start at Haulover Marina to Sea Isle Marina (near Omni Transit Station). The estimated travel time varied between 35 minutes (May 1st thru November 14th) and 50 minutes (November 15th thru April 30th). Four (4) vessels are required to maintain a frequency of 15 minutes.

The East-West Express Route is proposed to start at Sunset Harbor Marina to Sea Isle Marina or from Miami Beach Marina to Chopin Plaza/FEC dock (near Bayfront Metromover Station. The East-West route travel time is approximately 10 minutes. In order to maintain a frequency of 10 minutes, two (2) vessels are required.

The proposed service would operate from about 5:30 AM until 12:00 midnight to match the service spans of connecting transit services.

Vessel Type

The recommended vessel is a low wash catamaran with a capacity of 42-52 passengers, with a speed capacity of 28 mph. The vessels should be equipped with air condition and will ideally have an open deck. The vessels should be designed for operations in waves up to four (4) feet high and winds of 10-20 knots. The vessel should have a maximum height measured above the water line less than 12 feet which is the minimum clearance for the Venetian Causeway Bridge.

The Pilot project sought the use of the existing docking facilities at the Haulover Park Marina, Miami Beach Marina, Sea Isle Marina, Sunset Harbor Marina and Chopin Plaza Park. Each of the locations possessed authorizations that allow transitory slip use for waterborne transportation provided adequate water depth exists for proposed vessels to safely access these facilities. However, if any work in, over, or upon tidal waters at these locations is necessary for mooring of subject vessels, a DERM Class I permit is required.

The following field observations were recorded as part of the pilot study for the various docking facilities identified for the two routes of proposed waterborne service.:

- Haulover Park Marina: The distance between the dock and bus drop-off/pick-up location would be of roughly 180 feet. This marina appears to have sufficient parking to serve as a park-and-ride, it has fueling facilities, and an ADA compliant public slip.
- Miami Beach Marina: Water Taxi service is already available at this location as well as fueling stations. The marina is accessible by the Miami Beach Local bus service and trolleys.
- Sea Isle Marina: The Sea Island Marina entrance is 1,200 feet from entrance to the Omni Transit Station. Depending on the vessel type, the drop-off locations could be placed just south of the Marina, in which case, the walking distance to the transit station would be reduced to 800 feet. This marina also has fueling capabilities.
- Sunset Harbor Marina: An additional docking slip will be added for Waterborne Transportation. The South Beach Local provides access to this location.
- Chopin Plaza Dock: This location has an existing dock and connectivity to several modes of transportation. The Bay Front Park Metromover station is within walking distance from the Dock.

Chopin Plaza Dock

FEC Dock

- FEC dock: The FEC dock requires minor upgrades, is ADA accessible and within 1,000 feet of the Park West Metro mover station.

Estimated Costs

An estimate of costs was prepared to include staffing, operating costs and revenues based upon estimated patronage and passenger fares. The pilot study recommended that each vessel in service is operated by a captain and a mate over the course of three (3) full-time shifts to operate the system. At the terminal, it is recommended that passenger ticketing be automated, and for each docking location to have a staff member to assists passengers. Other personnel needed for the operations and maintenance will be engineers and mechanics. Estimated total wages are $2,132,000.

It is was determined that a fleet of seven (7) vessels would be required to operate the service as proposed for a estimated capital cost $2,800,000. Estimated upgrades at docking terminals were estimated to be an additional $310,000. The proposed route network for the pilot project utilizes existing infrastructure. The study recommended the use of temporary passenger shelters for weather protection. A Financial Analysis for the proposed waterborne transportation service is summarized in Table 1 below:

Table 1 - Summary of Financial Analysis

Passenger Forecast	**150,000 (7 vessels)**		
Passenger Fares	**$4.50**	**$2.65(express fare)**	**$2.25 regular fare**
Annual operations Revenues	$ 675,000	$ 397,500	$ 337,500
Direct Costs	$ 3,284,491	$ 3,284,491	$ 3,284,491
Total Administrative Costs	$ 444,700	$ 418,190	$ 418,190
Total Expenses	$ 3,729,191	$ 3,729,191	$ 3,729,191
Surplus/Deficit	($3,054,191)	($ 3,331,691)	($3,391,691)

The Miami River was also evaluated for water taxi service to include an assessment of 12 possible locations for service stops. Each site would require a Miami-Dade County DERM Class I permit. Several of the sites were identified as having water depth issues (beneath the 2nd Avenue Bridge, North Shore, Metrorail North Shore, Riverwalk Metromover station South Shore and Miami Circle Park).

2040 LRTP Review

A review of the 2040 Long Range Transportation Plan (LRTP) was conducted to determine if existing planned transportation projects would have an effect on the study area. Seven (7) projects were identified within three (3) miles of Black Point Marina as shown in Table 2. Four (4) of the projects entail bike/ped improvements while the remaining three (3) address improvements on the Homestead Extension of Florida's Turnpike (HEFT).

The bike/pedestrian projects are unlikely to increase future potential ridership, as the only project which connects Black Point with a population center (Project ID NM252) is maintenance related.

Some widening of the HEFT is planned to take place within five (5) years, but the larger widening project is not planned to be constructed for at least nine (9) years. This widening mostly occurs to the south of SW 248th Street (the exit which leads to Black Point Marina). Combined with the addition of express bus service along HEFT, this will result in travel time savings for those commuting to Black Point as well as directly commuting to downtown.

The SMART Plan South Corridor rapid transit project was moved to a Priority I project by the Miami-Dade TPO in the Fall of 2017. While this project is not listed in Table 2 below due to being located beyond the three (3) mile catchment area, the significance of the project and fact that it serves the same travel shed is worth noting.

Table 2 - Relevant 2040 LRTP Projects

Description	Priority	Project ID
HEFT - Express bus service on managed lanes between Dolphin Station Intermodal Terminal and SW 344th St	Unfunded	MDT155
HEFT - Widen to eight (8) lanes from SW 137 Ave to SW 216 St, including express lanes	LRTP Priority III (2026-2030)	TP102
HEFT - Add lanes from SW 288 St to SW 216 St	LRTP Priority I (2015-2020)	TP4233722
Trail Improvements to Biscayne Trail "C" from Biscayne National Park to Black Point Park	LRTP Priority I (2015-2020)	NM19
Bicycle Facility Improvements along SW 112th Avenue from SW 256 St to SW 248 St	Unfunded	NM23
Bicycle Facility Improvements along SW 216 St from S Dixie Highway to HEFT	Unfunded	NM24
S. Dade Greenway Bridges - Trail bridge improvements to Biscayne and Black Creek Trails	LRTP Priority I (2015-2020)	NM252

Study Coordination

The waterborne feasibility study involved extensive coordination with a number of stakeholders through the participation of three (3) Project Advisory Committee (PAC) meetings. The agencies that actively participated in this study included representatives from the National Park Service, Florida Department of Transportation (FDOT), Miami-Dade TPO, Miami-Dade DTPW, Miami-Dade County Department of Environmental and Resource Management (DERM), Miami-Dade County Parks and Recreation, the Downtown Development Authority (DDA), the City of Miami, and Cutler Bay. The U.S. Coast Guard and Army Corps of Engineers were also invited to participate throughout the duration of the study.

Additional coordination involved a waterside field review of the various locations being evaluated in July 2017. This review included a timed south to north run, with stops at Black Point Marina, Matheson Hammock Marina, Dinner Key Marina, Chopin Plaza, and several points within the mouth of the Miami River. This field review, involving members from the Miami-Dade TPO, DTPW and Parks and Recreation, facilitated the preliminary identification of waterside deficiencies by location as well as desired improvements to facilitate an efficient connection for passengers.

A list of advisory committee members and meeting notes documenting this coordination is provided in the Appendix for reference.

PAC Meeting # 1 - May 4, 2017

The first PAC meeting was held at Government Center in early May 2017. Representatives attended from the National Park Service, the Cities of Miami and Cutler Bay, the Miami Downtown Development Authority (DDA), the TPO, DTPW, RER, Miami-Dade County Parks, and FDOT. The meeting commenced with a presentation which covered general characteristics of the corridor, observed marina conditions, and estimated landside travel times between the two points. Meeting participants provided useful insights into logistical challenges and suggestions for study refinement, including the evaluation of additional docking facilities at Black Point Marina.

PAC Meeting # 2 - August 28, 2017

The second PAC meeting took place at the end of August 2017. The meeting included participation from County RER, DTPW, Parks, and FDOT, TPO and DDA representatives. A presentation was made that covered the findings from a waterside field review. Participants offered suggestions for further evaluation, such as multimodal links at the route termini, and provided ideas for further exploration.

PAC Meeting # 3 - November 17, 2017

The final PAC meeting took place on November 17, 2017. The meeting focused on the feasibility of the service,and explored potential capital and operational costs. Vessel types were also evaluated. Representatives from County RER, DTPW, Parks, and FDOT participated in the meeting.

Chapter 2
Existing Conditions

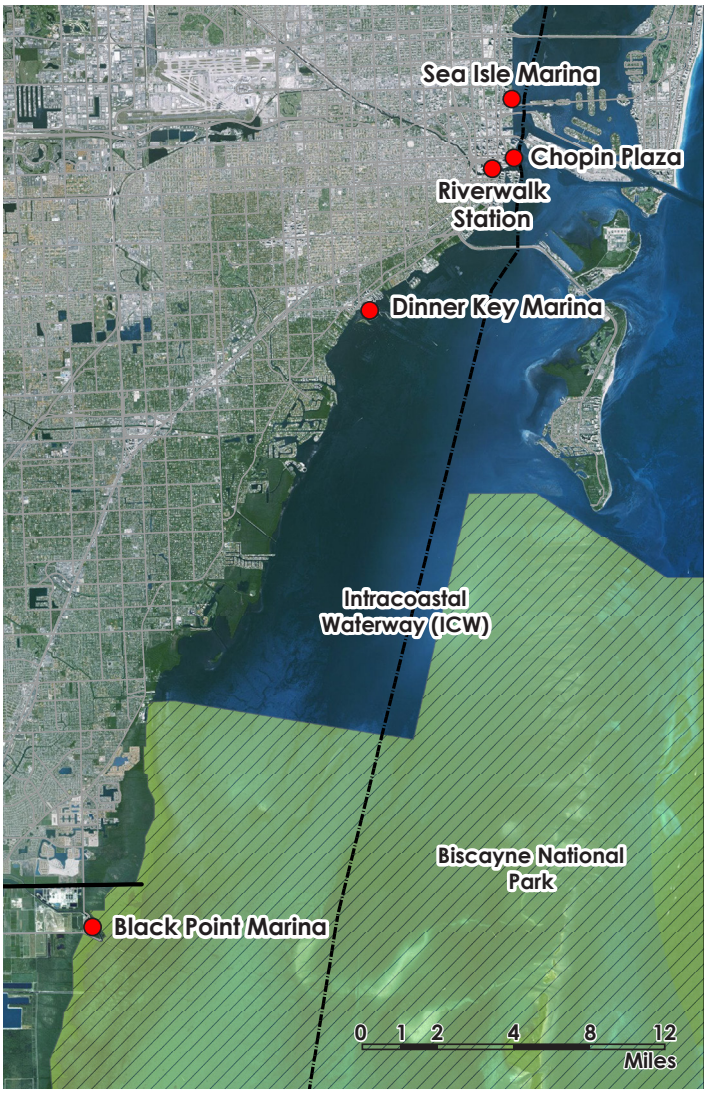
Black Point sits at the intersection of SW 248th Street and SW 87th Avenue, approximately 19 miles from downtown Miami. During peak period commuting times, vehicular travel to Downtown from this area takes between one (1) and two (2) hours. Average travel speeds can be as low as 10 miles per hour. The primary means of travel between these destinations is on Florida's Turnpike and MDX toll roads, or the use of U.S. 1, a major arterial. There is a clear need for an alternate mode of transportation to provide an alternative mode of travel to help alleviate this congestion. A fixed-route, scheduled, waterborne transit services between Black Point Marina and Downtown Miami has been proposed, and is evaluated in this document to determine its feasibility.

The study area is 20 miles in length. Five (5) coastal municipalities border the study area – Cutler Bay, Palmetto Bay, Pinecrest, Coral Gables, and Miami.

Water transportation from Black Point to Downtown is being evaluated in part because of the significant population growth in the southern part of the County. Over the last two decades, south Miami-Dade County saw a large influx of new residents. The areas surrounding Black Point Marina have seen 46 percent population growth between 2000 and 2015; by comparison Miami-Dade County saw 17 percent growth, and Florida saw 22.5 percent of growth during the same time frame.

This population growth has placed greater demands on South Miami-Dade's transportation network. U.S. 1 and the Florida Turnpike, two principal north-south roadways, suffer from significant congestion during peak travel periods. These roads, and secondary routes, including Old Cutler Road, present limited to no opportunities for expansion.

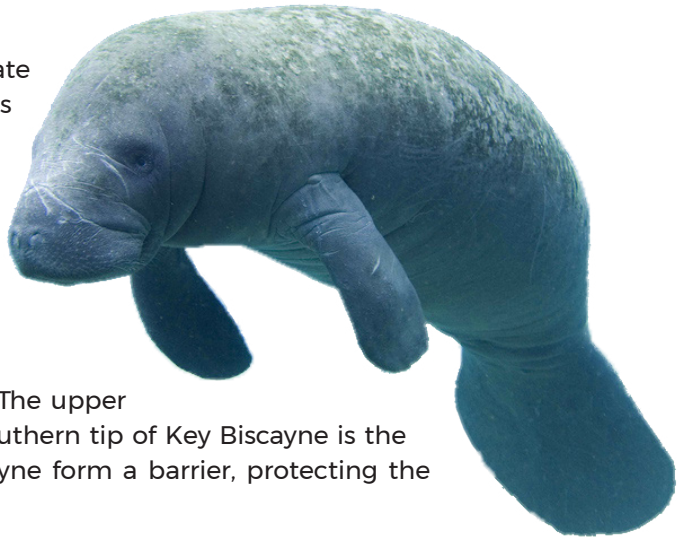
Figure 1 - Possible Station Locations



Given the corridor's population growth and the limited opportunities for expanding the existing transportation network, there is a clear need for transit to provide an alternative mode of travel to help alleviate this congestion. A fixed-route, scheduled, waterborne transit service between Black Point Marina and Downtown Miami was proposed, and is evaluated in this document to determine feasibility.

Higher average travel speeds and a more direct route ostensibly make for a viable transit service, but transit service on Biscayne Bay poses a unique set of challenges. The water surrounding Black Point Marina and Downtown Miami are protected, low-wake zones, which require vessels to travel at reduced speeds. Furthermore, the seafloor in Biscayne Bay is particularly shallow, which adds distance to an otherwise direct route. These aspects are evaluated in this section.

Waterside Conditions



The proposed water transportation route would operate on Biscayne Bay. The Bay is a shallow waterbody, depths range from two to 10 feet and rarely exceeds 12 feet. The shallow bottom means that navigation on the bay can be hazardous, particularly at low tides. The channels leading from the Marinas navigate particularly shallow coastal waters where average depths range from two (2) to five (5) feet. Navigational markers at the entrances to the marinas must be followed with caution.

Biscayne Bay can be generally divided into three sections. The upper portion of the bay, located between Port Miami and the southern tip of Key Biscayne is the upper bay. The land barriers of Virginia Key and Key Biscayne form a barrier, protecting the waters from larger ocean swells.

The middle portion of the bay can be desribed as the area between the southern end of Key Biscayne and the beginning of the upper Keys, including Elliot, Boca Chita and Sands Keys. This stretch of the bay is open and generally unprotected from larger ocean swells; consequently this area experiences less predictable sea conditions than the other parts of the Bay.

The lower portion of the bay between Elliot Key and Key Largo runs from the south end of Biscayne Bay to Card Sound Road. This stretch of the bay is generally protected from larger ocean waves.

The proposed water transportation route traverses the majority of the upper and middle bay. This means that a significant stretch of the transit route's service would be operated on a stretch of the open, unprotected section of water between Sands Key and Key Biscayne. Consequently, the transportation service from Black Point will be susceptible to marine conditions that result in periodic cancellations due to small craft advisories that could impede safe navigation. That idea is explored later in this report.

The southern terminus of the route, Black Point Marina, is connected to Biscayne Bay by a two (2) mile channel that requires boats to adhere to a no wake, idle speed restriction. Beyond the channel there is an additional 1,000 foot slow speed buffer. According to County staff, with these speed restrictions it takes approximately 20 minutes to get from Black Point Marina to the open water at the mouth of Black Point Channel, where there is still the 1,000 foot slow speed buffer to pass through before resuming full speed travel. Three (3) miles east of the last buoy for Black Point Channel is the Intracoastal Waterway (ICW). The ICW passes through the Featherbed banks, a small shallow area which must be avoided in the transition between the Channel and the ICW.

Beyond Black Point Marina, three (3) other potential locations were identified and assessed to provide connecting services or serve as additional point to point services. These three locations include **Dinner Key, Chopin Plaza, and Riverwalk Station.**

- Dinner Key: The ICW allows for full speed travel, however there is an additional 2,000 feet of slow speed buffer surrounding Dinner Key due to the small islands protecting the marina. Once the trip towards downtown resumes, the water taxi can again travel at full speed until it passes beneath the Rickenbacker Causeway, where there is a small Idle speed zone directly beneath the bridge, and a 1000' slow speed buffer immediately north.
- Chopin Plaza: This location presents the fastest downtown stop from Black Point. It is the closest and has the least speed restricted zones to pass through.
- Riverwalk Station: This area presents the most advantageous location for riders, but reaching it requires passing beneath the Brickell Avenue Bridge and penetrating the Miami River, which is an idle speed zone out to the northeast corner of Brickell Key.

Figure 2 - Downtown Miami Waterside Conditions

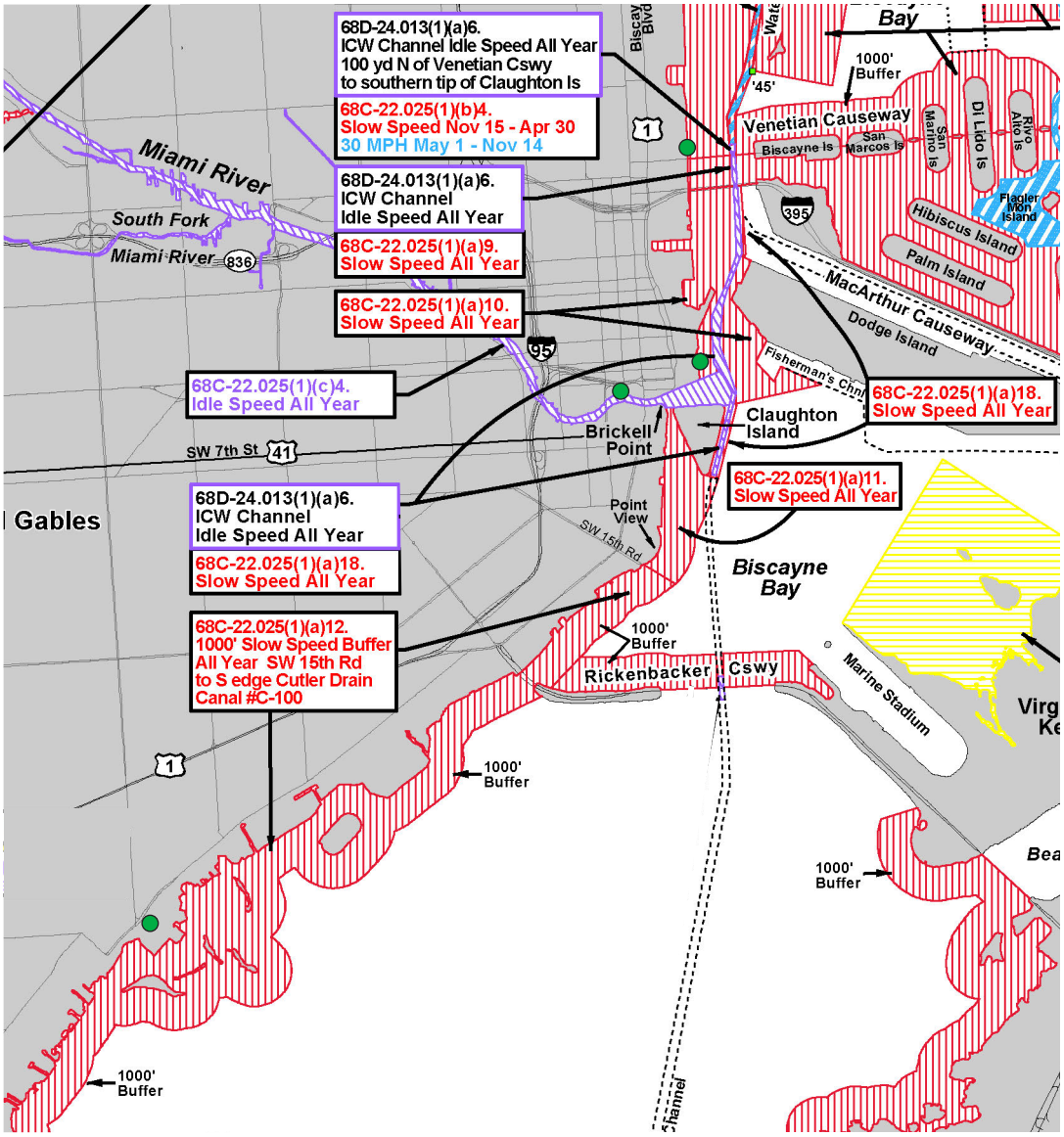
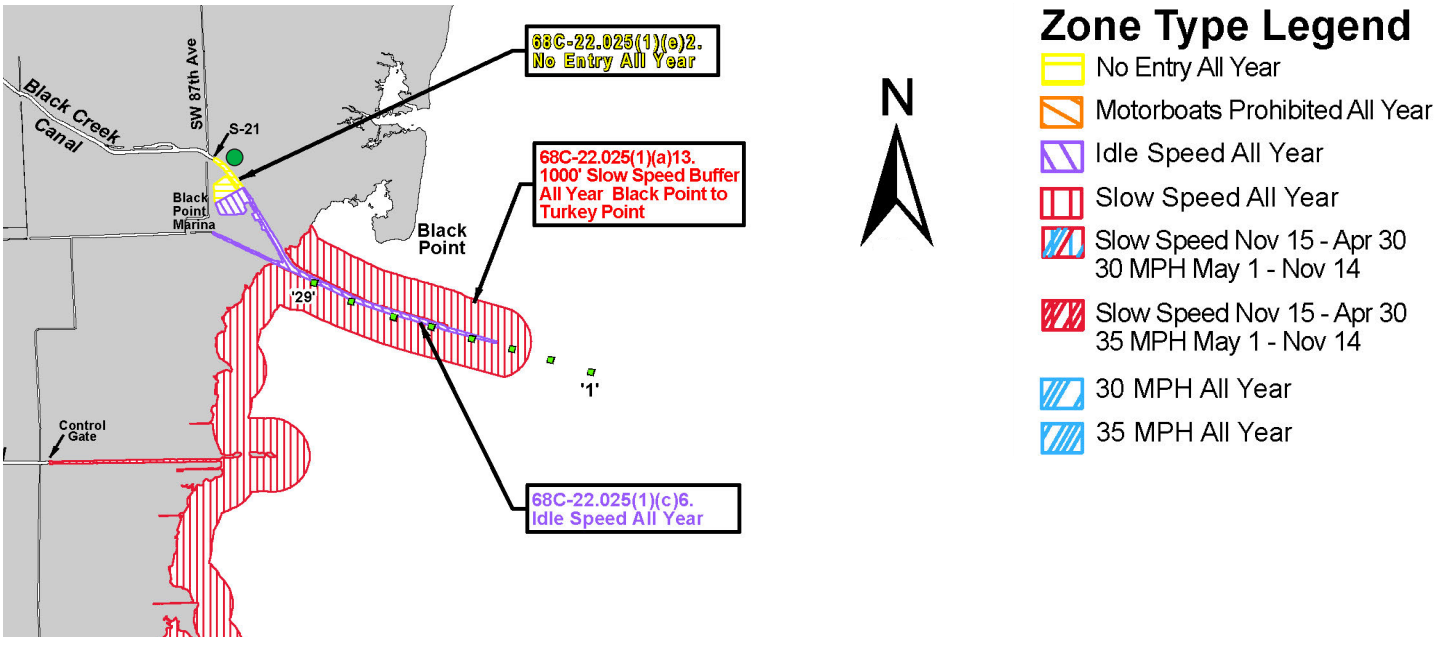


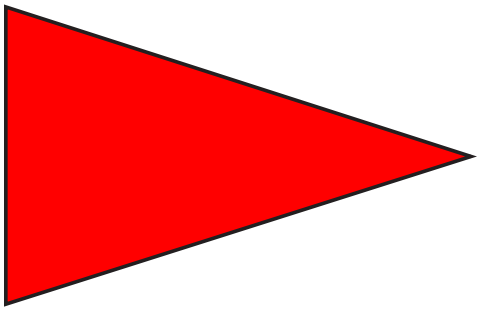
Figure 3 - Black Point Waterside Conditions



Sea Condition Assessment

If the proposed water transportation service is to be successful in attracting commuters, it must provide reliable services on a regular fixed schedule. Sea conditions on Biscayne Bay are anticipated to play a role in determining whether this type of passenger service between the Black Point Marina and downtown Miami is achievable from a weather perspective.

Figure 4 - Small Craft Advisory Flag



This analysis looks at weather conditions, specifically wave heights and wind speeds to assess conditions on Biscayne Bay. Combined, these two factors comprise the elements that the National Weather Service (NWS) uses to issue Small Craft Advisories. Small Craft Advisories vary throughout the United States, but for the southern states, including Florida, advisories are issued when wave heights exceed seven (7) feet and wind speeds exceed 20 knots for two (2) hours or more. The NWS does not define the vessel size that it classifies as a small craft, but for the purposes of this analysis, it is assumed that vessels operating this passenger service would be precluded from operating during small craft advisories.

This assessment evaluates historical conditions from the U.S. Army Corps of Engineers' Wave Information Study Hindcast Station Dataset. This dataset provides a 35-year retrospective of wind speed, wind direction, wave height and other measurements that are measured hourly. In total, the dataset includes nearly 307,000 hourly measurements between 1980 and 2014. Observation stations are distributed along the coast, situated a few miles offshore.

This analysis looks at observation stations 63472 and 63473, which are offshore and adjacent to the Biscayne Bay study area. Table 4 summarizes the findings for the two (2) observation stations. Overall, wind speeds exceed 20 knots nearly five (5) percent of the 35-year observational period. While wave heights exceed seven (7) feet in height about 1.6 percent and 1.5 percent at stations 63472 and 63743, respectively. However, the percent of the year where both conditions (excessive wind speed and wave heigh) exist are 1.4 percent and 1.3 percent respectively.

Assuming there are 255 weekday service days in a calendar year, the water transportation service may encounter an estimated three (3) to five (5) days during the year where conditions are too hazardous for operations.

Table 3 - Assessment of Wave and Wind Conditions Within the Study Area

Station	Station Location		Percent of measurements where winds are >20 kts	Percent of measurements where waves are >7 ft	Percent of measurements where both criteria are met/ Estimated percent of year with Small Craft Advisories	Estimated Number of Days of Missed Service per Year
	Latitude	Longitude				
63472	25.67	-80	4.9%	1.6%	1.4%	3-5
63743	25.58	-80	4.9%	1.5%	1.3%	3-5

This analysis is constrained by the data used. Historical conditions on Biscayne Bay are not necessarily indicative of future conditions. Moreover, observation stations are located further offshore in deeper water than where the water transportation is expected to operate. However, even doubling the service interruptions to six (6) to 10 per year, would not constitute a fatal flaw for the water transportation service between Black Point and Downtown Miami. If this program is to move forward into a pilot program, contingencies for a replacement to waterborne service would need to be implemented for inclement weather. Replacement service could be accomplished through coordination with the Miami-Dade County DTPW to dispatch a bus to the Marina or downtown Miami location to provide backup service, for example. Alternatively, South Florida Commuter Services offers an Emergency Ride Home voucher program that reimburses the costs of taxis when the need arises for passengers needing to complete their return trip.

Black Point Overview

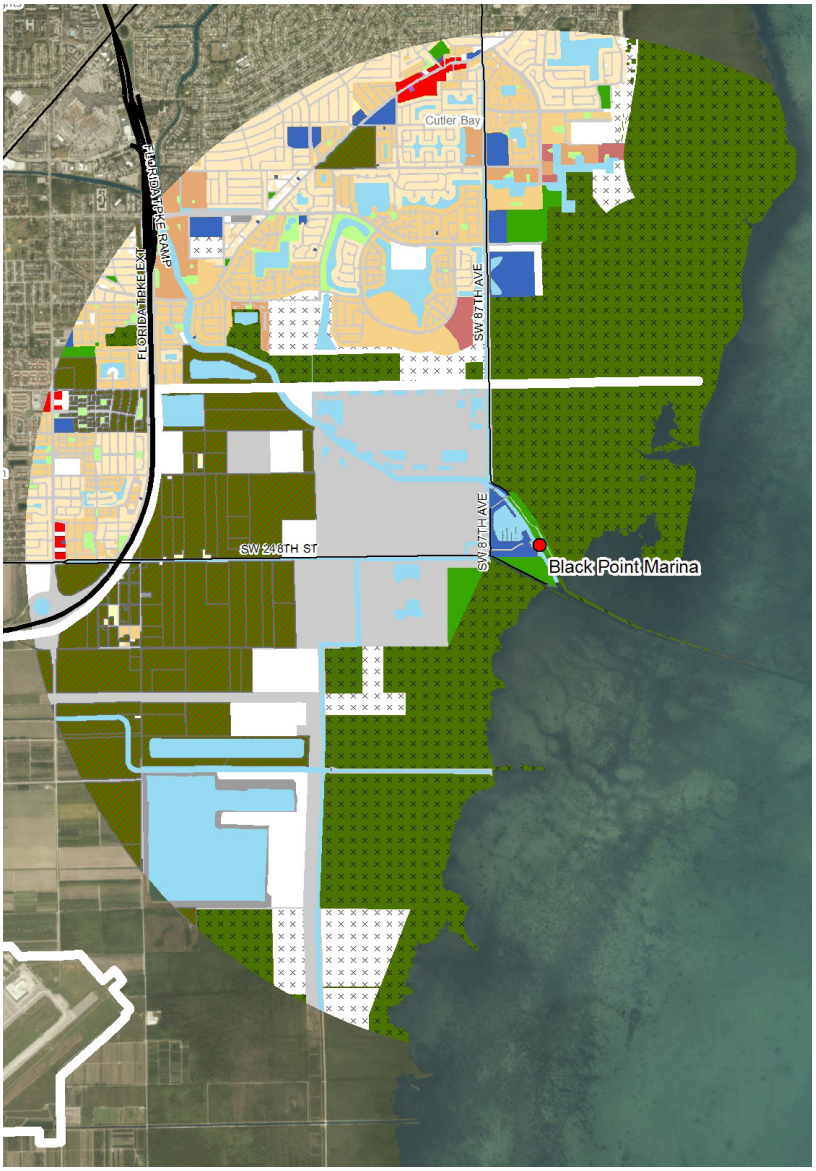
Black Point sits outside the Urban Development Boundary (UDB), nestled between the South District Wastewater Treatment Plant, Miami-Dade Landfill, and the environmentally sensitive mangroves and waters of Biscayne National Park. The Marina can be accessed along two roads - SW 87th Avenue to the North, and SW 248th Street to the West.

There is no development within a mile of Black Point, and the nearest homes must drive two (2) miles or more to reach the Marina. Active individuals can also access Black Point through two established bike trails; Black Creek Trail runs four (4) miles along Black Creek to connect with U.S. 1, and the Biscayne Trail which runs 2.5 miles along SW 87th Avenue to connect with Old Cutler Road and the Old Cutler Trail. Because of this location, the typical quarter-mile or half-mile walkshed catchment area was eschewed in favor of a larger three-mile study area, more suited to a park-and-ride typology. Additionally, Black Point is only 2.5 miles away from Turnpike Exit nine (9) to SW 112th Avenue, connected by SW 248th Street which is unsignalized and free of traffic. This presents the opportunity for Black Point Marina to act as an intercept park-and-ride for commuters as distant as Florida City, more than 12 miles to the south-west.

Existing Land Use

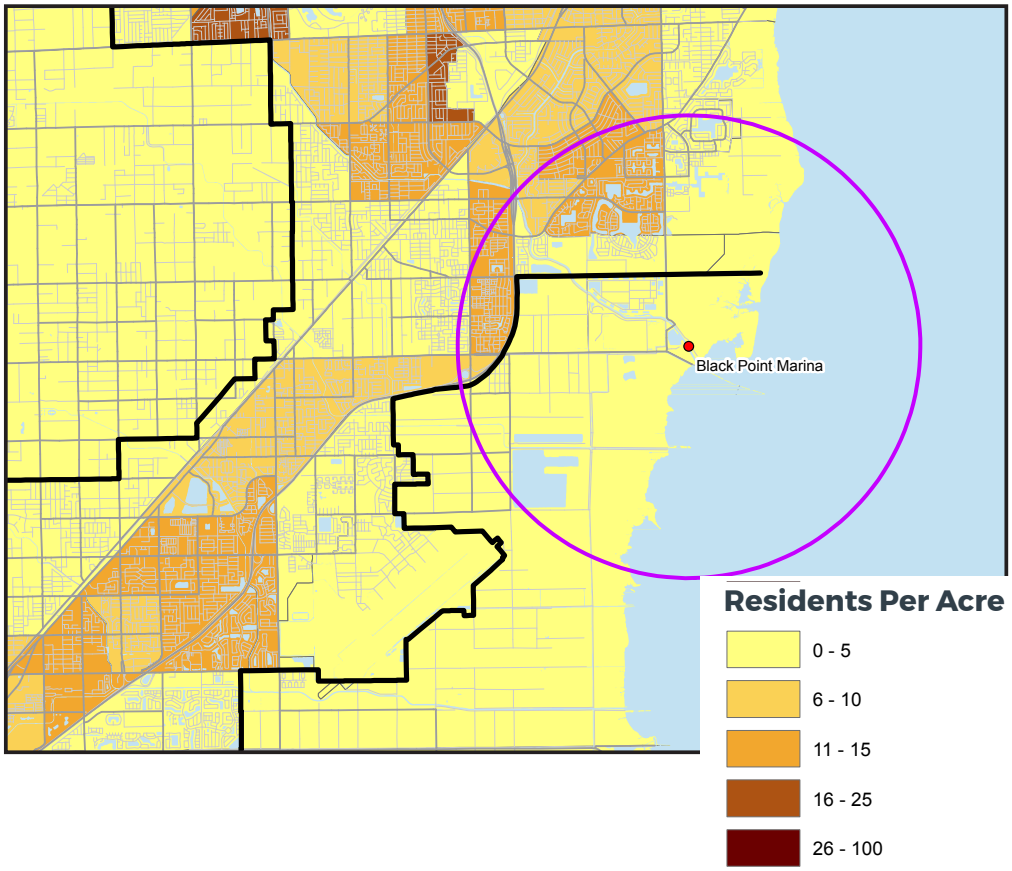
Within the three-mile study area, existing land use is dominated by Biscayne National Park, transportation/utilities, agriculture, and low to middle density residential uses.

Figure 5 - Black Point Existing Land Use



	Black Point Marina Existing Land Use	Total Acres
	Protected Environment	3209.1
	Transportation, Communication & Utilities	1923.3
	Agricultural	1370.5
	Low/Mid Density Residential	691.2
	Mid Density Residential	641.1
	Vacant Protected	493.8
	Vacant	422.1
	Institutional	148.7
	Mid/High Density Residential	123.6
	Public Parks	120.6
	Private Parks	75.3
	Industrial	67.9
	High Density Residential	37.0
	Commercial	34.5
	Low Density Residential	11.3
	Office	0.8

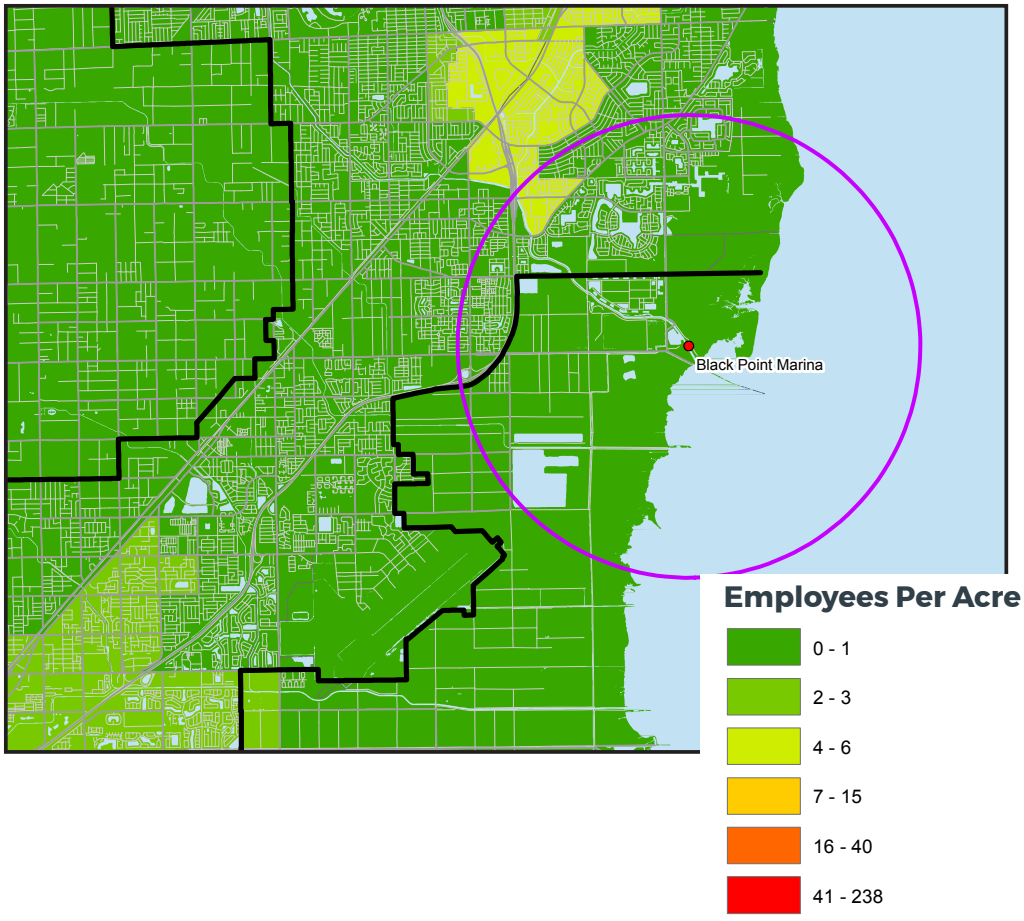
Figure 6 - Black Point Population Density



Population Density

Population density within the three mile buffer is not especially high. The highest concentration exists in the northeastern section of the three (3) mile buffer which includes parts of Cutler Bay, Princeton, and Goulds. A significant portion of the travel market would be expected to come from beyond the buffer, exiting the Turnpike to take this alternate route. The majority of the land use within the area immediately surrounding Black Point Marina are single family residential which exist outside of the environmentally protected areas of the Biscayne National Park and adjacent mangroves.

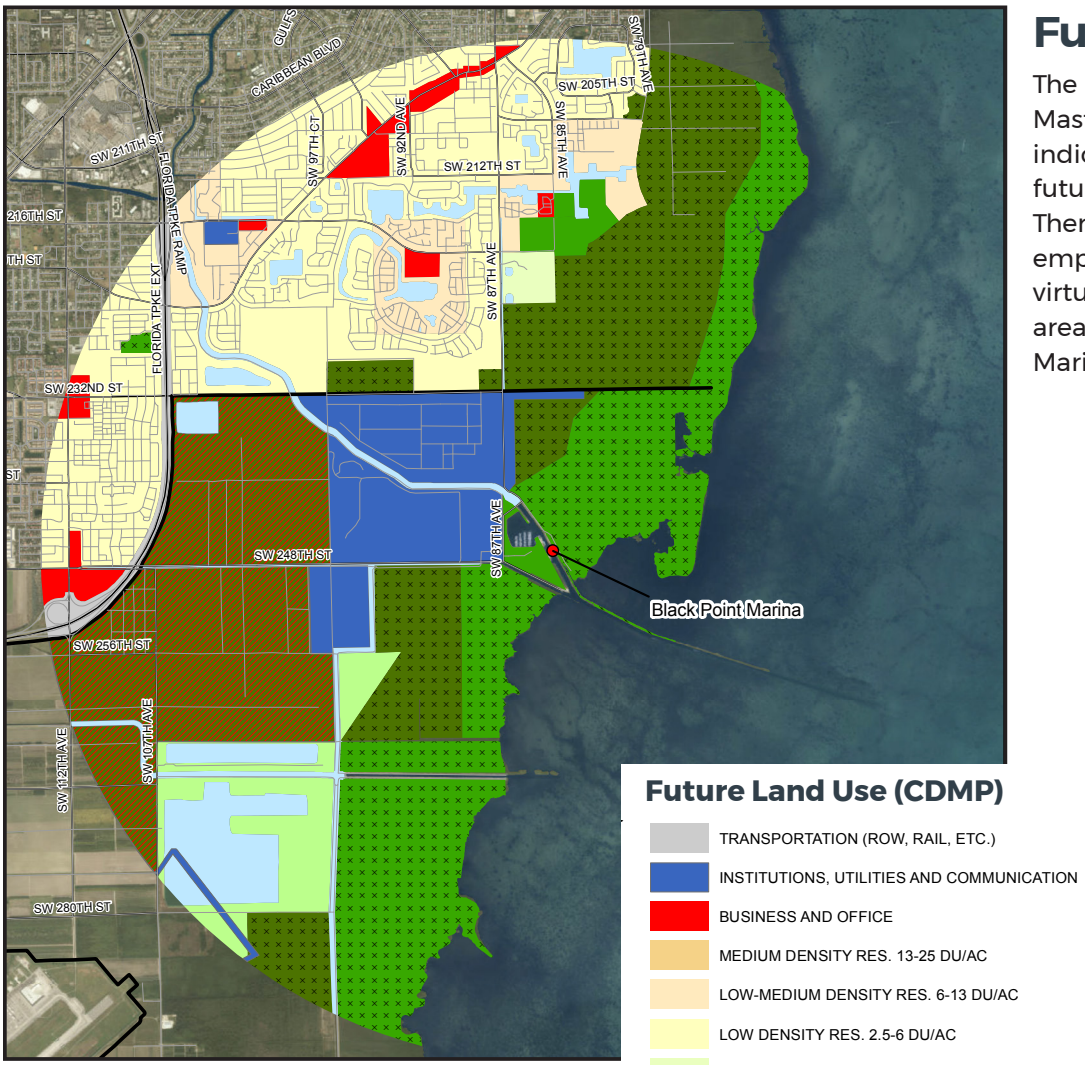
Figure 7 - Black Point Employment Density



Employment Density

Employment density throughout the area is extremely low. Almost all residents must travel outside their local area for work. There is little employment outside of the U.S. 1 Corridor in Southwest Miami-Dde County. Moreover, there are few opportunities for further employment expansion outside of the Urban Development Boundary.

Figure 8 - Black Point Future Land Use



Future Land Use (CDMP)

- TRANSPORTATION (ROW, RAIL, ETC.)
- INSTITUTIONS, UTILITIES AND COMMUNICATION
- BUSINESS AND OFFICE
- MEDIUM DENSITY RES. 13-25 DU/AC
- LOW-MEDIUM DENSITY RES. 6-13 DU/AC
- LOW DENSITY RES. 2.5-6 DU/AC
- ESTATE DENSITY RES. 1-2.5 DU/AC
- OPEN LAND
- PARKS AND RECREATION
- ENVIRONMENTALLY PROTECTED PARKS
- ENVIRONMENTALLY PROTECTED
- AGRICULTURE
- WATER

Future Land Use

The Comprehensive Development Master Plan (CDMP) does not indicate any major changes to the future land use in the study area. Therefore, the population and employment density will remain virtually unchanged in those areas adjacent to the Black Point Marina.

Black Point Marina

Black Point Marina is a fully functional facility. It has extensive docking facilities, six (6) slips, a dock side bar and restaurant (Black Point Ocean Grill), large picnic pavilion, and a jetty which extends 1.5 miles into the Bay, enabling fishing enthusiasts to cast from shore. The Southern portion of the property has been leased to a private owner, the Loggerhead Club and Marina.

Docking Facilities

The docking facilities at Black Point Marina house 180 boats, with an approach depth of 4.9 feet and a dock side depth of 5.5 feet.

There is a dock southwest of the restaurant which has a handicap accessible ramp, but it has been suggested by Marina staff that a faster and cheaper docking site would be along the sea wall north of the boat slips, as indicated on the map below.

Parking

The staff at Black Point communicated that while the Marina is utilized at or beyond capacity on weekends, during the week activity is minimal and most parking spaces go unused. Black Point Marina features 283 total parking spaces, with 10 being reserved for handicap vehicles and 36 reserved for marina patrons, leaving up to 237 available for use by potential transit riders.

Table 4 - Black Point Marina Parking

Parking Lot	Parking	Handicap	**Total**
Circle	19	5	**24**
A-Dock	36	1	**37**
Mid Lot	114	4	**118**
Back Lot (Bikers)	104	0	**104**
Total	**273**	**10**	**283**

Accessibility

The existing docking site at Black Point Marina is handicap accessible.

Figure 9 - Black Point Marina Potential Docking Sites

Figure 10 - Black Point Marina Drop-off Circle and Potential Docking Site

Figure 11 - Black Point Ocean Grill Outdoor Seating

Figure 12 - Black Point Marina Handicap Accessible Ramp

Figure 13 - Black Point Marina Drop-off Point and Potential Docking Site

Coconut Grove Overview

Coconut Grove is one of the original neighborhoods in Miami-Dade County. Its marina is located adjacent to the Miami City Hall. With the capacity to accommodate nearly 600 boats, Dinner Key Marina is the largest wet slip facility in Florida. This location is the former home to the Pan Am Airways seaplane terminal. The area surrounding the marina is currently undergoing a revitalization - the City of Miami established the Coconut Grove Master Plan which sought to "transform the underutilized waterfront into more cohesive and vibrant public spaces."

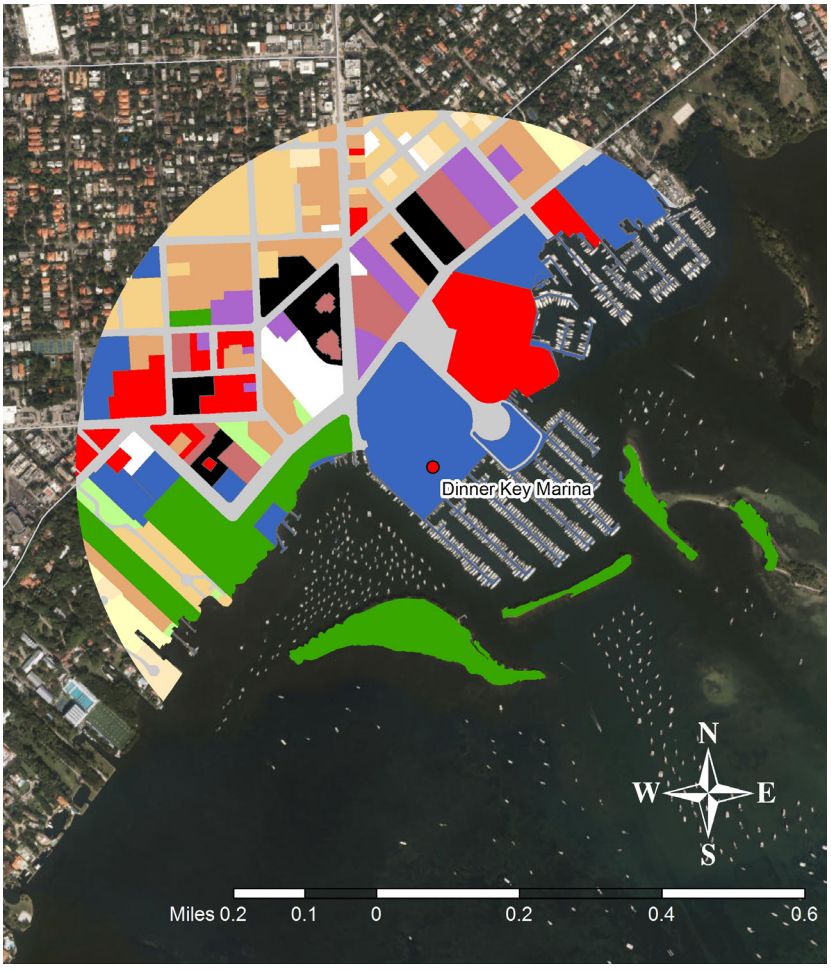
The first step in this revitalization was the construction of Regatta Park, a seven-acre park adjacent to the waterfront.. Subsequent improvements include the addition of retail and restaurant spaces. In addition to these improvements, Coconut Grove includes a diverse assortment of land uses; high rise office buildings, condos, hotels, shops and recreational uses all lie within the half-mile walkshed.

Access to Coconut Grove is somewhat restricted; only one road, Main Highway, provides access to the area from the south. Main Highway is a two-lane road which contours south Miami-Dade's coastline. The road offers no significant opportunities for expansion, which limits potentials for added capacity. Furthermore, several schools are located along Main Highway, which increases traffic congestion during peak travel periods.

Existing Land Use

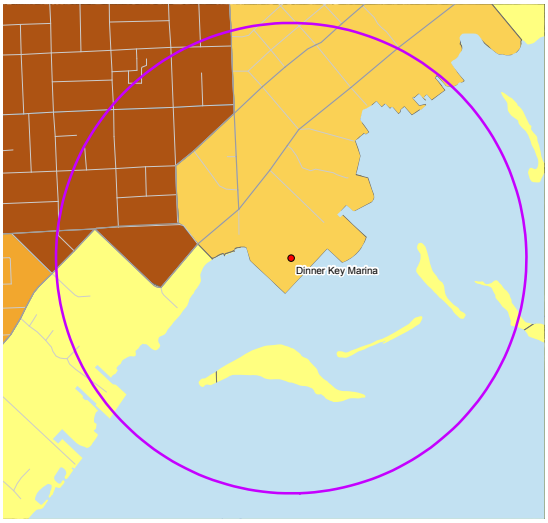
The area surrounding Dinner Key Marina is highly diverse. Boating uses, schools, bars and restaurants, retail, office, hotel, residential and recreational uses are all well represented within the study area. This mixture, combined with the limited routes and considerable traffic entering downtown, means that Dinner Key Marina may act as both an origin and destination point for a Water Taxi travelling between Black Point and Downtown.

Figure 14 - Coconut Grove Existing Land Use



Coconut Grove Existing Land Use	Total Acres
Institutional	46.8
Transportation, Communication, and Utilities	40.8
Public Parks	34.1
Commercial	25.5
Mid/High Density Residential	25.4
Mid Density Residential	21.1
Hotel/Motel	12.4
Office	10.3
High Density Residential	10.0
Vacant	7.1
Low/Mid Density Residential	4.2
Low Density Residential	4.0

Figure 15 - Coconut Grove Population Density



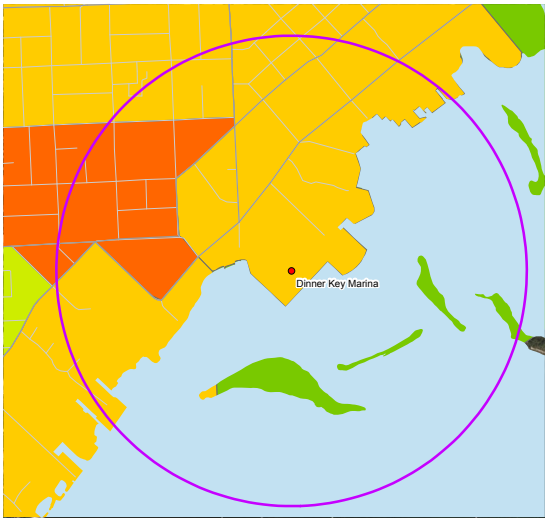
Population Density

Population density in Coconut Grove is sufficient to act as an origin point for transit into downtown. There are multiple large apartment and high rise condominium buildings within the half mile walkshed. The single family residential land uses are generally situated on small lots, ensuring relatively high densities for the land use type.

Residents Per Acre

- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 25
- 26 - 100

Figure 16 - Coconut Grove Employment Density



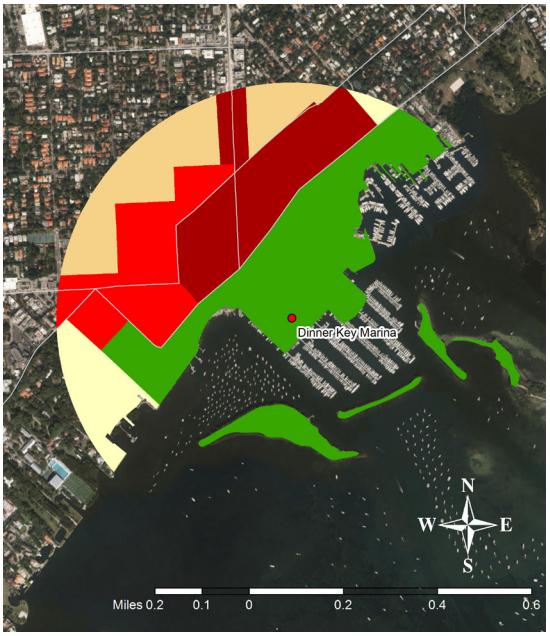
Employment Density

Significant employment density exists within the Coconut Grove Walkshed. Dinner Key Marina is also served by the Coconut Grove Circulator (DTPW Route 249), DTPW routes 22 and 48, and the Miami Trolley. Coconut Grove is a regional attractor, with a varied mix of commercial mid and high rises, shopping, dinning, state parks, and historic attractions. Coconut Grove is also home to several public and private schools. The varied mix of entertainment, commercial, and residential attractors in relatively close proximity means that Coconut Grove could serve both as an origin and a destination station, with balanced ridership and low dead-head probability.

Employees Per Acre

- 0 - 1
- 2 - 3
- 4 - 6
- 7 - 15
- 16 - 40
- 41 - 238

Figure 17 - Coconut Grove Future Land Use



Future Land Use

While Coconut Grove already has a lively pedestrian downtown area, the CDMP shows a clear focus on increasing commercial activity moving forward. On the Future Land Use Map, many lots currently occupied by strictly residential functions are designated Mixed Use or Business and Office.

Future Land Use (CDMP)

- BUSINESS AND OFFICE
- OFFICE/RESIDENTIAL
- MEDIUM DENSITY RES. 13-25 DU/AC
- LOW DENSITY RES. 2.5-6 DU/AC
- PARKS AND RECREATION

Dinner Key Marina

Dinner Key Marina is the flagship facility for the City of Miami's Marina system, located in Coconut Grove next to Miami City Hall. The area surrounding it is highly walkable, with extensive landscaping and tree-canopy coverage. For this reason, the walkshed around this docking site was extended to one-half-mile.

Dinner Key is 14.1 miles away from Black Point, with a boating trip length of 19.5 miles.

While Dinner Key Marina is only 3.5 miles from the southernmost Metromover station, traffic entering downtown and parking considerations still make waterborne transit a viable option for commuters.

Docking Facilities

The docking facilities at Dinner Key Marina house 582 boats, with 225 more moored just beyond. It has protected slips to a seven (7) foot draft, an approach depth of 26 feet, and a mean low water dock depth of 23 feet. The two most likely docking sites are indicated on the figure 19 below but more detailed study is required once a vehicle is chosen.

Parking

Dinner Key Marina features multiple large public parking lots. Discussions must be held with Miami Parking Authority regarding availability of these lots for commuter purposes.

Accessibility

Potential docking points are handicap accessible.

Figure 18 - Dinner Key Marina Potential Eastern Docking Site

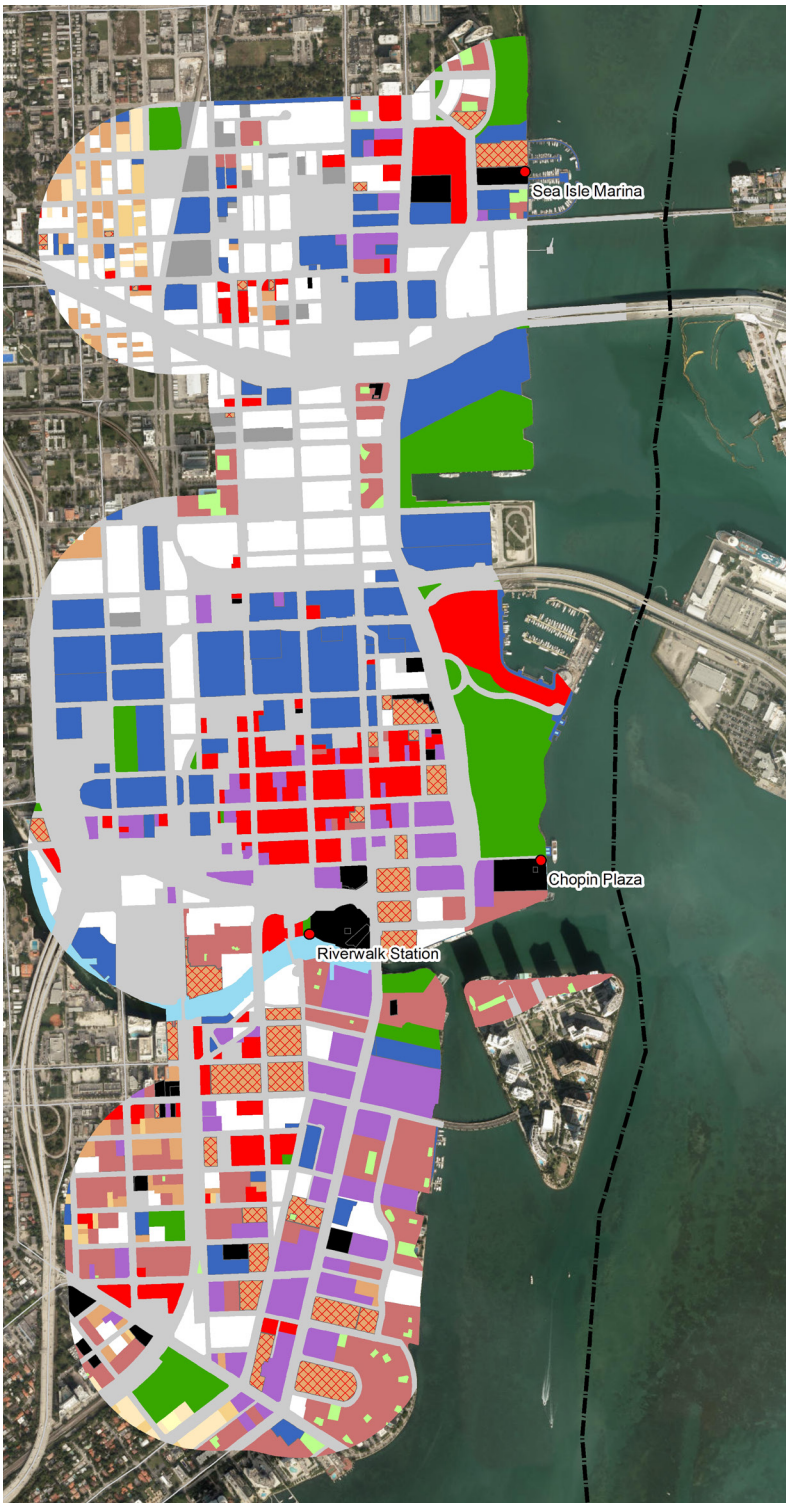
Figure 19 - Dinner Key Marina Potential Docking Sites

Downtown Miami Overview

Three potential docking sites in downtown Miami are herein explored: Chopin Plaza, Riverwalk Metromover Station, and Sea Island Marina. All three potential downtown docking sites are within 1,000 feet of a metromover station, therefore the catchment area was expanded to include a quarter-mile walkshed around the entire metromover system. Furthermore each of these locations would warrant minimal if any infrastructure improvements to initiate a pilot waterborne service.

Downtown Miami is 18.5 miles away from Black Point, with a boating trip length of 22.4 miles from Black Point, and 6.5 miles from Dinner Key.

Figure 20 - Downtown Existing Land Use



Existing Land Use

Downtown Miami is the largest employment center in the area, as is evident by the existing land use map. Downtown is dominated by governmental, commercial and office uses, as well as vacant lots and residential high rises. The prevalence of vacant lots demonstrates the remaining capacity Miami has as an employment center.

Future Land Use

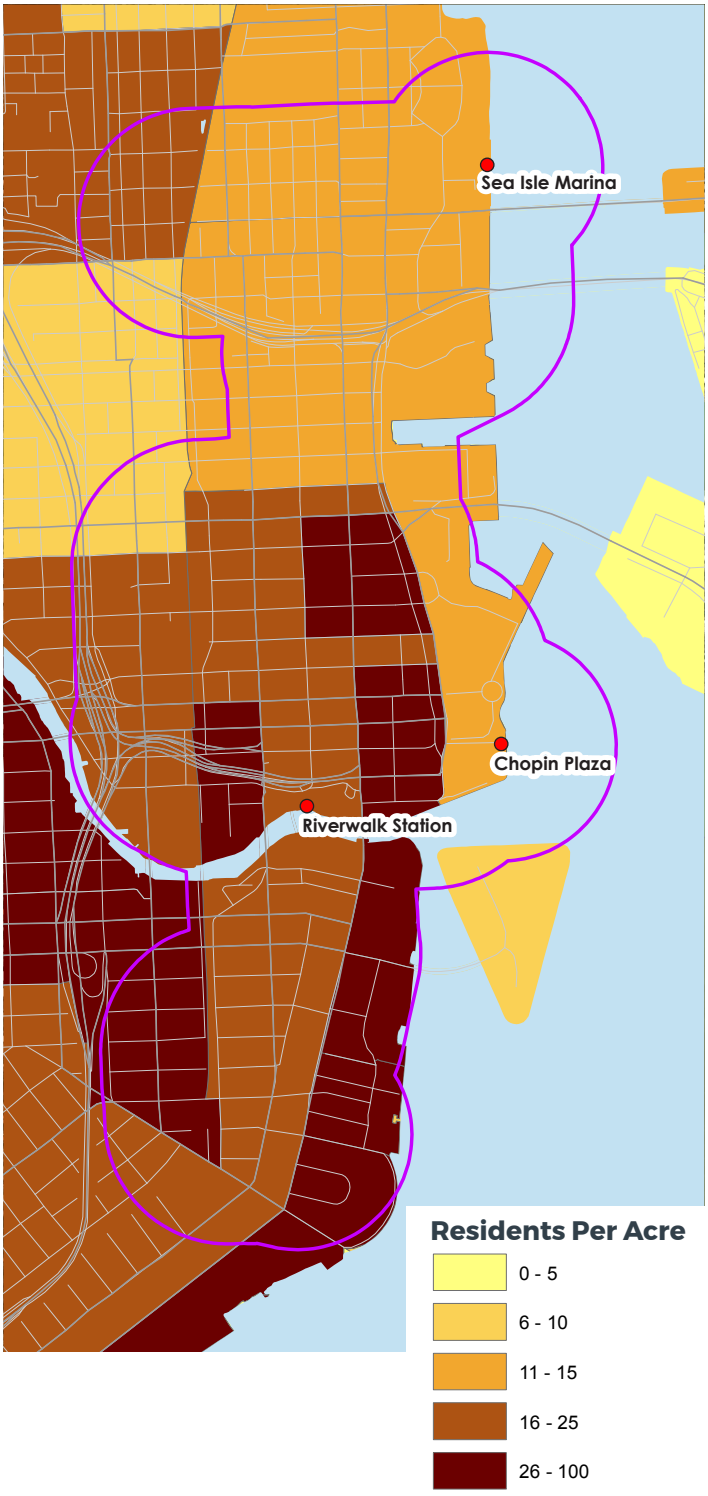
While the Future Land Use Map from the CDMP indicates no major changes, mixed use development in the area continues to transform downtown from an employment center to a complete mixed urban environment.

Downtown Existing Land Use	Total Acres
Transportation, Communication, and Utilities	448.9
Vacant	154.6
Institutional	143.2
High Density Residential	93.1
Office	77.0
Public Parks	75.0
Commercial	67.8
Mixed Use	44.1
Hotel/Motel	22.0
Mid/High Density Residential	19.6
Industrial	13.6
Low/Mid Density Residential	7.0
Mid Density Residential	5.5

Population Density

Population density in Downtown Miami is very high, with a concentration in Brickell the Brickell area. Overall, this area has undergone a construction boom in recent years with a number of completed residential high-rises opening.

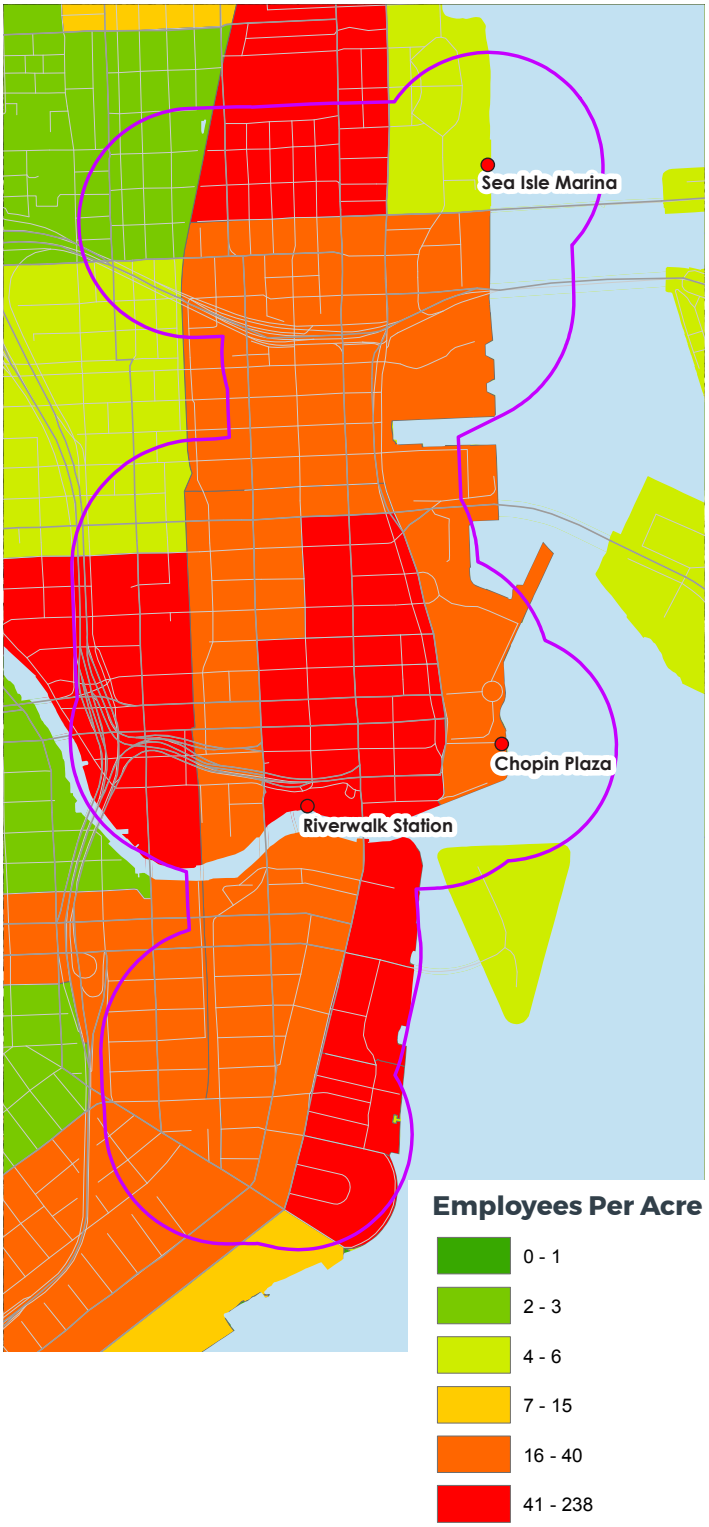
Figure 21 - Downtown Population Density



Employment Density

Employment density downtown is extremely high. Downtown Miami is the largest employment center in the region, which carries through to the Brickell area as well.

Figure 22 - Downtown Employment Density



Chopin Plaza Dock

Chopin Plaza is located at the easternmost end of SE 2nd Street, directly in front of the Intercontinental Hotel and adjacent to Bayfront Park.

Docking Facilities

The Chopin Plaza docking facilities (figure 24) are currently occupied by the Seafair, a luxury yacht which is rented out as an event venue. This boat pays over $7,000 per month in docking fees. It has been suggested that modifications could be made to the dock allowing both operations to operate simultaneously.

Accessibility

The Chopin Plaza docks are located 750 feet east of the Bayfront Park Metromover station, directly between Bayfront Park and the InterContinental hotel as shown in figure 23. There is a contiguous sidewalk network that connects to the metromover station, and the boarding facilities are fully handicap accessible. There is a passenger drop-off turnaround directly in front of the dock, enabling riders to seamlessly transfer to/from a taxi or rideshare vehicle if they desire.

Figure 23 - Chopin Plaza Metromover Connection

Figure 24 - Chopin Plaza Dock

Sea Isle Marina

Sea Isle Marina is located at the eastern end of NE 16th Street, directly north of the Venetian Causeway.

Docking Facilities

The docking facilities at Sea Isle Marina house more than 200 boats, with an approach depth of 33 feet, and a mean low water dock depth of 42.5 feet.

There are two potential docking sites for a water taxi at Sea Isle Marina as indicated on the map below. The northern option is in line with NE 16th Street, and provides a more pleasant environment as riders make landfall. The southern option is directly adjacent to NE 15th street, and provides a shorter path to the metromover station. Side loading and front nose loading are possible at both locations.

Accessibility

Sea Isle Marina is located just a block and a half from the Adrienne Arsht Metromover Station. Of the two potential docking sites, the southern option is just 800 feet from the metromover station, while the northern option is 300 feet further, at 1,100 feet, as shown in figure 25.

Figure 25 - Sea Isle Marina Metromover Connection

Riverwalk Station Dock

Riverwalk Station is located in Fort Dallas Park, just southeast of the intersection of South Miami Avenue and SE/SW 3rd Street.

Docking Facilities

The docking site at Riverwalk Station is a wooden deck approximately 120 feet long, with piers every 10 feet. It is not level with the Riverwalk, being separated by landscaping, lighted bollards, a raised ledge, followed by three steps down to the wooden dock. This facility suffered extensive damage during Hurricane Irma in September 2017, and will need to be rebuilt. Moreover, the dock must be retrofitted to ensure wheelchair accessibility.

Accessibility

Riverwalk Metromover Station is located directly adjacent to Fort Dallas Park. While Riverwalk station is near the center of the Miami Riverwalk, the Riverwalk is currently blocked just one block west of Fort Dallas Park by the One River Point Condo construction site.

Figure 26 - Riverwalk Station Metromover Connection

Figure 27 - View Towards Riverwalk Station Potential Docking Site

Figure 28 - Riverwalk Station Potential Docking Site - After Hurricane Irma

Figure 29 - View From Riverwalk Station Potential Docking Site

Chapter 3
System Needs and Characteristics

Existing Facilities

The existing facilities at Black Point Marina are generally turnkey for the commencement of passenger services. The parking, passenger processing areas, vessel access, road and road access all could feasibly accommodate service with little further preparations. These different amenities are described in greater detail in the following section.

Black Point Marina

Parking

Existing parking facilities at Black Point Marina should be able to accommodate commuter service. Parking is paid by app or station, operated by Pay by Phone/policed by the Miami Parking Authority. The Black Point lot, which fills to capacity during Saturday and Sunday marina peak periods, is largely vacant during the week. A total of 283 spaces are available at Black Point Marina. Approximately 10 percent of those were observed to be in use during a field review in the spring of 2017. Conversations with the Dock master suggested that the observed usage rate was typical of weekdays at the marina.

Passenger Processing Areas

Sheltered waiting areas were available at the Black Point Ocean Grill. The restaurant operates between 11:00 AM and 10:00 PM Monday through Thursday and from 11:00 AM to 1:00 AM on Fridays. Morning passenger loading operations would pose no conflicts with the restaurant's operations, while the afternoon and evening service should similarly present limited conflicts.

Known Natural Environment Issues

Environmental issues are a key concern for the operation of the proposed service from Black Point Marina. A significant portion of Biscayne Bay is protected by its designation as Biscayne National Park, which limits commercial activities within its limits. Biscayne National Park's covers the lower two thirds of the Bay, with the boundary of the park terminating close to the southern point of Key Biscayne.

Biscayne National Park Commercial Use Authorization (CUA)

Approximately 50 percent of the route mileage will be operated within the park's limits, which will necessitate the acquisition of a Commercial Use Authorization (CUA) permit from the National Park Service (NPS). The CUA is available for a diverse assortment of activities, including vessel transportation. The permit is designated for the "provision of nonexclusive, suitable commercial services to park area visitors as long as… the services… compliment resource protection…" CUAs are valid for one calendar year.

In 2017, CUA applicants must complete an application, and pay a $230 application fee. NPS also charges vessel and captains fees. These range between $130 and $350 per vessel each year, and $14 per captain per year. At the time of the writing of this report, NPS was in the process of reviewing the CUA fees, and indicated that the rates were expected to increase for 2018 and subsequent years.

Miami-Dade County Department of Environmental Protection (DERM) Class I Permit

Miami-Dade County's Department of Regulatory and Economic Resources (RER) generally requires Class I permits before performing any work in, on, over or upon tidal waters or coastal wetlands in the County or any of its municipalities. These permits are required to manage impacts from construction on these environmentally sensitive lands. Class I permit costs are predicated on construction costs. They can range from $250 for projects under $2,500 to $28,000 for projects costing over $1 million. Other fees may also be applicable, including Biological Assessments, repeat assessments, and covenant recordings. A Class I permit would potentially be needed in cases where dock construction or modification is necessary to acommodate the vessels for waterborne service.

DERM Marine Facilities Operating Pemit (MOP)

In addition to Class I permits for construction work, existing marine facilities such as marinas would be required to obtain a Marine Facilities Operating Permit. A MOP is required for recreational boat docking facilities with 10 or more slips; any boat storage facilities contiguous to tidal waters with 10 o more dry storage spaces; or for commercial boat docking facilities, regardless of the number of slips. MOPs are valid for one year, and facilities must pass regular inspections to remain in good standing. MOPs cost between $75 and $1,380 per year, depending on the number of slips and the active uses at the facility.

Level of Service along Surface Routes

The roadway Level of Service (LOS) was evaluated along the travel routes. Available traffic counts were obtained from the FDOT traffic data website. These traffic data represent existing conditions along various segments of the routes.

Along Old Cutler Road, the majority of the segments evaluated operate at a deficient LOS (E and F) as highlighted. While this corridor provides a route to downtown, it cannot support the long-term traffic demand. A summary of the existing conditions is provided in Table 5 below.

Table 5 - Old Cutler Road Level of Service

Site No.	Count Location	AADT	Lanes	LOS
87067500	OLD CUTLER RD, SOUTH OF FRANJO RD	22,200	2	F
87000451	OLD CUTLER RD, SOUTH OF SW 184TH STREET	17,800	2	F
87000451	OLD CUTLER RD, SOUTH OF SW 152ND STREET	22,200	2	F
87067508	OLD CUTLER RD, SOUTH OF SW 136TH STREET	17,800	2	F
87067503	OLD CUTLER RD, SOUTH OF KENDALL DR	16,100	2	C
87067501	OLD CUTLER RD, SOUTH OF ROUNDABOUT (SW 72ND STREET)	17,200	2	F

Along U.S. 1, the majority of the segments that were evaluated operate at a deficient LOS as highlighted. While this corridor continues to provide a viable route to downtown, it cannot support the long-term traffic demand with acceptable LOS. A summary of the existing conditions is provided in Table 6 below.

Table 6 - U.S. 1 Level of Service

Site No.	Count Location	AADT	Lanes	LOS
87020000	SR 5/US-1, NORTH OF ALLAPATTAH RD/SW 112 AV	52500	6	C
87020000	SR 5/US-1, SOUTH OF CORAL REEF DR/SW 152 ST	68500	6	F
87020000	SR 5/US-1, SOUTH OF KILLIAN DR/SW 112 ST	72000	6	F
87020000	SR 5/US-1, SOUTH OF SR 826/PALMETTO EXPWY	95000	6	F
87030000	SR 5/US-1, SOUTH OF SR 94/KENDALL DR/SW 88 ST	48500	6	C
87030000	SR 5/US-1, EAST OF OF SW 57 AVE.	74500	6	F
87030000	SR 5/US-1, SOUTH OF GRAND AV(CORAL GABLES)	77500	6	F
87030000	SR 5/US-1, SOUTH OF SW 27 AV/SR 9	91000	6	F
87030000	SR 5/US-1, NORTH OF RICKENBACKER CSWY	26500	4	D
87030000	SR 5/US-1, SOUTH OF SE 8 ST/SR 90/TAMIAMI TRL	29000	6	E

Along the expressways, the majority of the segments along the HEFT, Don Shula and Palmetto Expressways operate with acceptable LOS. However, the segments along the Dolphin Expressway operate at a deficient LOS as highlighted. While this corridor continues to provide a viable route to downtown, it marginally supports the traffic demand. A summary of the existing conditions is provided in Table 7 below.

Table 7 - Expressways Level of Service

Site No.	Count Location	AADT	Lanes	LOS
87471000	HEFT/SR-821 M/L, SOUTH OF QUAIL ROOST DR	137000	8	D
87471000	HEFT/SR-821 M/L, SOUTH OF RICHMOND DR/SW 168 ST	159500	8	E
87005000	SR 874/DON SHULA EXPWY, SOUTH OF KILLIAN PKWY	90000	6	C
87005000	SR 874/DON SHULA EXPWY, NORTH OF KILLAN PKWY	114500	8	C
87005000	SR 874/DON SHULA EXPWY, NORTH OF SW 87 AV	84000	6	C
87260000	SR 826/PALMETTO EXPWY, NORTH OF SW 40 ST	211000	12	C
87260000	SR 826/PALMETTO EXPWY, NORTH OF SW 24 ST	250000	10	F
87260000	SR 826/PALMETTO EXPWY, NORTH OF SW 8 ST	174000	10	D
87260000	SR 826/PALMETTO EXPWY, NORTH OF FLAGLER ST	196000	8	F
87200000	SR 836/DOLPHIN EXPWY, WEST OF RED RD/NW 57 AV	196500	8	F
87200000	SR 836/DOLPHIN EXPWY, EAST OF LEJEUNE RD	163000	6	F
87200000	SR 836/DOLPHIN EXPWY, 300' W NW 27 AV	156000	6	F
87200000	SR 836/DOLPHIN EXPWY, 400' W NW 12 AV	114000	6	E

Ground Travel Time Assessment

An estimate of travel time throughout the study area between the Black Point Marina and downtown Miami was performed to understand conditions during the peak travel periods. Travel times by automobile was estimated in two ways. First, field observations were made by recording peak period commute times to downtown Miami along three (3) different travel routes. Then, a google maps application was utilized in real-time to estimate travel times from potential origin points, as well as their return trips. This approach seeks to provide a diverse sampling of travel times for potential riders, and allows a comparison of these observed trips with the actual commutes as measured in the field.

Travel Time by Field Observations

Travel times by automobile were collected during the first week of October 2017. The commute times were collected during a weekday for three inbound routes and two outbound routes between the Goulds / Cutler Bay residential neighborhood near Black Point Marina and the business district in downtown Miami. The data was collected by recording the time as key intersections were crossed.

Travel Time to / from the Waterborne Terminal

A commute route was traversed inbound to Black Point Marina using Old Cutler Road and SW 87th Avenue as the primary route. The inbound route began at 6:14 AM from the intersection of SW 112th Avenue and Old Cutler Road in the Goulds neighborhood. The travel time was approximately 10 minutes to Black Point Marina. The outbound route began at 6:01 PM from the marina to Goulds. The travel time was approximately 11 minutes to the intersection SW 112th Avenue and Old Cutler Road.

Local Route: Old Cutler Road

A commuter route was traversed inbound to downtown Miami using Old Cutler Road as the primary route. The inbound route began at 7:49 AM from the intersection of SW 112th Avenue and SW 248th Street south of the Goulds neighborhood. The travel time was approximately one (1) hour 48 minutes to the Brickell Financial District. The travel time to Government Center was an additional 14 minutes. Data was not collected for the outbound route along Old Cutler Road. A summary of the inbound travel times is provided below.

Table 8 - Travel Times to Downtown via Old Cutler Road

Time	Description	Travel Time (hr:min)
7:49 AM	Begin Route - SW 112th Avenue at SW 248th Street	
7:53 AM	SW 248th Street at SW 97th Avenue	0:04
7:55 AM	SW 97th Avenue at SW 232nd Street	0:02
7:56 AM	SW 232nd Street at SW 87th Avenue	0:01
	School zone at SW 216th Street	
8:11 AM	SW 87th Avenue at Old Cutler Road	0:15
8:43 AM	Old Cutler Road at SW 168th Street	0:32
9:13 AM	Old Cutler Road at SW 88th Street	0:30
9:19 AM	Old Cutler Road at SW 42nd Avenue/Ingram Terrace	0:06
9:27 AM	MacFarland at Bayshore Drive	0:08
9:37 AM	Bayshore Drive at Brickell Avenue	0:10
	Total	**1:48**

Expressway Route: Florida's Turnpike-Don Shula-Palmetto-Dolphin

A commuting route was traversed inbound to downtown Miami using the expressways as the primary routes. The inbound route began at 6:55 AM from the intersection of Caribbean Boulevard and Anchor Road in the Cutler Bay neighborhood. The travel time was approximately one (1) hour 29 minutes to Government Center via HEFT, SR 874, SR 826, and SR 836. The travel time to the Miami-Dade College Wolfson Campus was an additional six (6) minutes. A summary of the inbound travel times is provided in Table 9.

The outbound route began at 4:10 PM from Government Center. The travel time was approximately one (1) hour 13 minutes to the intersection of Caribbean Boulevard and Anchor Road via SR 836, SR 826, SR 874, and HEFT. The travel time to the intersection of SW 112th Avenue and SW 248th Street was an additional 12 minutes. A summary of the outbound travel times is provided in Table 10.

Table 9 - Travel Time to Downtown via Expressways

Inbound to Downtown		
Time	**Description**	**Travel Time (hr:min)**
6:55 AM	Begin Route - Caribbean Blvd at Anchor Road	
7:01 AM	Caribbean Blvd at U.S. 1	0:06
7:02 AM	Turnpike On Ramp	0:01
7:16 AM	SW 152nd Street	0:14
7:22 AM	Turnpike at Don Shula Expwy	0:06
7:28 AM	SW 104th Street / Killian Pkwy	0:06
7:31 AM	Snapper Creek Expwy	0:03
7:39 AM	Palmetto Expwy	0:08
7:46 AM	SW 24th Street / Coral Way	0:07
7:52 AM	Dolphin Expwy	0:06
8:10 AM	SW 42th Avenue / Le Jeune Road	0:18
8:15 AM	SW 27th Avenue	0:05
8:19 AM	I-95	0:04
8:21 AM	I-95 Off Ramp at NW 8th Street	0:02
8:23 AM	NW 8th Street at NW 2nd Avenue	0:02
8:24 AM	Government Center	0:01
	Total	**1:29**

Table 10 - Travel Time from Downtown via Expressways

Outbound from Downtown		
Time	**Description**	**Travel Time (hr:min)**
4:10 PM	Begin Route - Government Center	
4:14 PM	I-95 On Ramp	0:04
4:17 PM	Dolphin Expwy	0:03
4:33 PM	SW 27th Avenue	0:16
4:37 PM	SW 42th Avenue / Le Jeune Road	0:04
4:40 PM	SW 57th Avenue	0:03
4:46 PM	Dolphin Expwy at Palmetto Expwy	0:06
4:53 PM	SW 40th Street / Bird Road	0:07
4:54 PM	Palmetto Expwy at Don Shula Expwy	0:01
4:56 PM	Snapper Creek Expwy	0:02
4:59 PM	SW 88th Street / Kendall Drive	0:03
5:10 PM	Don Shula Expwy at Turnpike	0:11
5:18 PM	SW 184th Street	0:08
5:22 PM	Turnpike at Caribbean Blvd	0:04
5:23 PM	End Route - Caribbean Blvd at Anchor Road	0:01
	Total	**1:13**

Toll Fares along Surface Routes

Of the three surface routes where travel times were collected, only the expressway routes have tolls. Florida's Turnpike Enterprise (FTE) operates the tolls on the HEFT while MDX operates the tolls on the Don Shula and Dolphin Expressways. The inbound and outbound trip costs $2.40 each way for Sun Pass users while a Toll-by-Plate costs $4.80 each way.

Major Arterial Route: U.S. 1

A commute route was traversed inbound to downtown Miami using U.S. 1 as the primary route. The inbound route began at 6:32 AM from the intersection of SW 112th Avenue and SW 248th Street south of the Goulds neighborhood. The travel time was approximately two (2) hours 23 minutes to Government Center. The travel time was the same (2 hours 23 minutes) to the Miami-Dade College Wolfson Campus. A summary of the inbound travel times is provided in Table 11.

The outbound route began at 3:52 PM from Government Center. The travel time was approximately two (2) hours 19 minutes to the intersection of SW 112th Avenue and SW 248th Street south of the Goulds neighborhood. A summary of the outbound travel times is provided in Table 12.

Table 11 - Travel Time to Downtown via U.S. 1

Inbound to Downtown		
Time	**Description**	**Travel Time (hr:min)**
6:32 AM	Begin Route - SW 112th Avenue at SW 248th Street	
6:35 AM	SW 232nd Street	0:03
6:38 AM	SW 224th Street	0:03
6:40 AM	Old Cutler Road	0:02
6:42 AM	SW 216th Street	0:02
6:44 AM	SW 112th Avenue at U.S. 1	0:02
6:52 AM	SW 184th Street	0:08
7:26 AM	SW 152nd Street	0:34
7:47 AM	SW 104th Street	0:21
7:51 AM	SW 88th Street/Kendall Drive	0:04
8:05 AM	SW 57th Avenue	0:14
8:16 AM	SW 42th Avenue	0:11
8:25 AM	SW 40th Street/Bird Road	0:09
8:34 AM	SW 27th Avenue	0:09
8:44 AM	I-95 On Ramp	0:10
8:48 AM	I-95 Off Ramp at SW 8th Street	0:04
8:51 AM	SW 8th Street at SW 2nd Avenue	0:03
8:55 AM	Government Center	0:04
	Total	**2:23**

Table 12 - Travel Time from Downtown via U.S. 1

Outbound from Downtown		
Time	**Description**	**Travel Time (hr:min)**
3:52 PM	Begin Route - Government Center	
4:04 PM	SW 7th Street at I-95 On Ramp	0:12
4:10 PM	U.S. 1 Off Ramp	0:06
4:28 PM	SW 40th Street/Bird Road	0:18
4:36 PM	SW 42th Avenue	0:08
5:04 PM	SW 57th Avenue	0:28
5:14 PM	SW 88th Street / Kendall Drive	0:10
5:19 PM	SW 104th Street	0:05
5:49 PM	SW 152nd Street	0:30
5:57 PM	SW 184th Street	0:08
6:01 PM	SW 200th Street	0:04
6:03 PM	U.S. 1 at SW 112th Avenue	0:02
6:07 PM	SW 216th Street	0:04
6:08 PM	Old Cutler Road	0:01
6:08 PM	SW 224th Street	0:00
6:09 PM	SW 232nd Street	0:01
6:11 PM	End Route - SW 112th Avenue at SW 248th Street	0:02
	Total	**2:19**

Travel Times by Online Mapping Application

Vehicular travel times to downtown Miami from a greater number of origin locations within the three-mile Black Point catchment area can be estimated using an online mapping application such as Google Maps. Origin locations were identified which were approximately the same as the start of the manually timed runs conducted in the field to establish a baseline differential between the two methods. The online mapping application was found to be approximately 15 minutes faster for the morning commute and 10 minutes faster for the evening commute.

Transit Times can also be estimated by online mapping application with the DTPW Transit App, which utilizes the Waze program to calculate point-to-point travel times by analyzing Metrobus and Metrorail schedules to determine travel and transfer times for each leg of the trip.

Methodology

Origin points based on existing Traffic Analysis Zones (TAZs) were chosen to eliminate outliers and achieve a representative sample of potential riders within the three-mile analysis area around Black Point Marina. Each TAZ containing residential development had a single address chosen to represent a typical residence within that TAZ. The summary of this analysis is depicted in Table 13 and Figure 30. Table 13 depicts origin points and estimated travel times by private vehicle and transit. Figure 30 depicts a representative sample from Table 13, with five hypothetical commuters coming from three TAZs within three miles of the marina, and two from neighborhoods further to the south that could also benefit from the proposed service. Commuters 1, 2, and 3 are identified in Table 13 by a red circle next to their corresponding row.

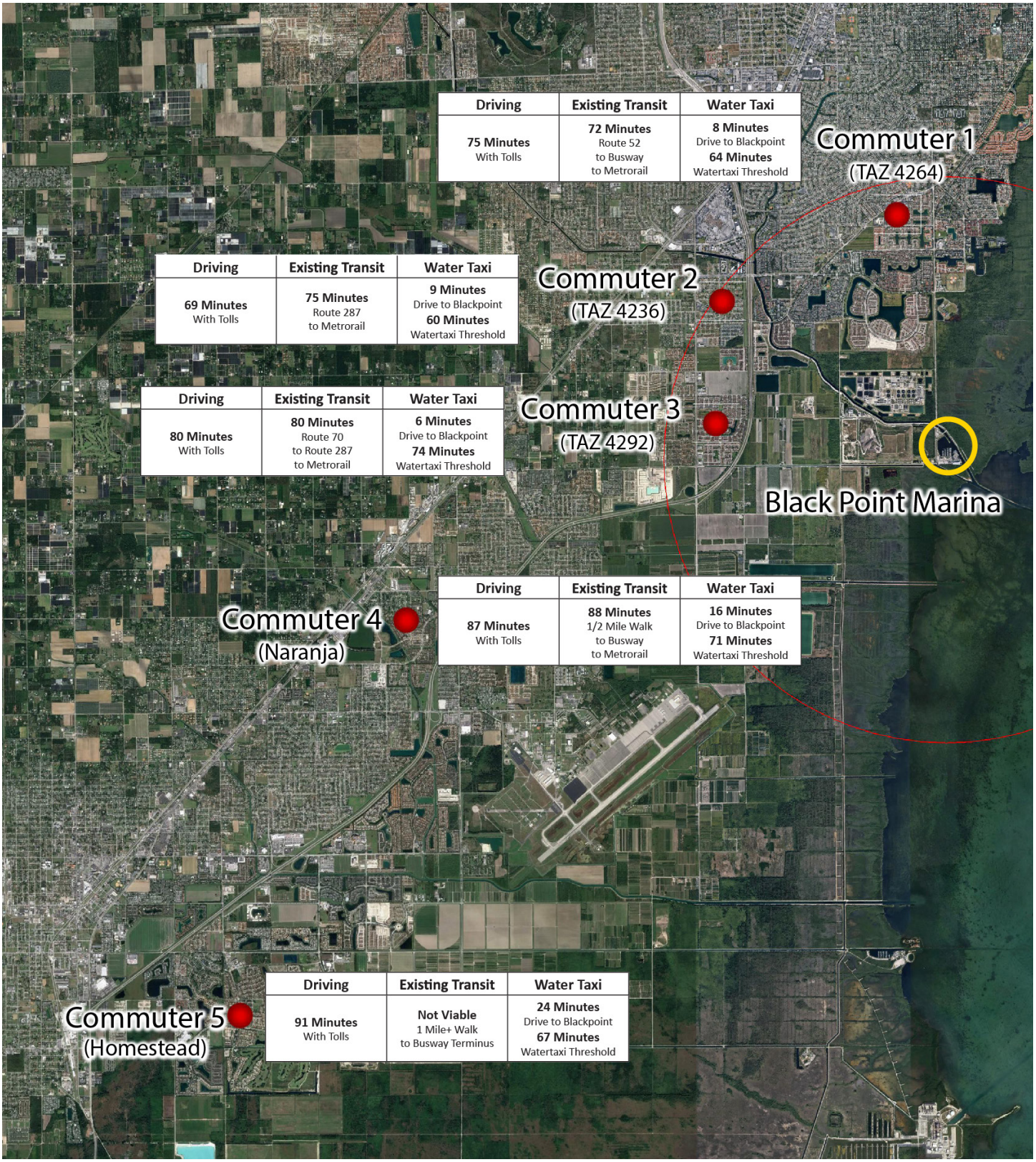
Existing transit routes were also mapped and analyzed to determine the most direct transit route from each origin point to the destination point in downtown Miami. All routes transferred from bus to Metrorail at Dadeland South Station for the final leg of the trip. In Table 13, the transit route to Dadeland South Station populates column three (Transit Route to Metrorail). Transit time was then calculated using the DTPW Transit App. Door-to-door transit times varied from 75 minutes up to 113 minutes.

Drive time for private vehicles was determined using Google Maps. Routes were input in real time, with morning departure times between 7:14 AM and 7:24 AM on April 18, 2017. This time was chosen so that arrival times would be between 8:15 and 9:00 AM. Evening departure times were between 5:58 and 6:08 PM on April 17, 2017. A final drive time was measured with Google Maps from each origin point to Black Point Marina, to be added onto any potential waterborne transit times estimations.

Table 13 - Estimated Travel Times by Online Mapping Application

1	2	3	4	5	6
TAZ	**Address**	**Transit Route to Metrorail**	**Existing Transit Time**	**Approximate Drive Time**	**Drive Time to/from Black Point**
4236	10860 SW 220th St	52 to Transitway	106m	66m	8m
4258	20150 SW 80th Ave	287	75m	61m	10m
4260	8662 SW 207th Ter	287	75m	61m	8m
4262	9503 SW 220th St	287	77m	65m	7m
4263	9037 SW 214th St	287	77m	63m	8m
4264	9034 SW 206th St	287	75m	62m	9m
4274	21400 SW 103rd Ave	287	80m	67m	8m
4275	21945 SW 104th Ct	287	80m	66m	9m
4276	21904 SW 218th St	287	80m	67m	8m
4277	22804 SW 105th Ave	52 to Transitway	113m	74m	8m
4293	22665 SW 110th Ave	52 to Transitway	107m	73m	9m
4292	24055 SW 109th Ct	70 to 287	95m	64m	7m
4291	11320 SW 245th St	70 to 287	95m	68m	7m
		Average	**86.6m**	**66m**	**8.25m**

Figure 30 - Estimated Travel Times for Representitive Transit Riders



Water Travel Time Analysis

Since travel time analysis was performed to understand existing travel conditions between Downtown Miami and Black Point, it was also important to understand potential travel time for a waterborne service. The success of implementing a waterborne service will rely on how competitive this service can be with existing travel times experienced on the road network. Therefore, a field review of the waterside conditions was conducted on Tuesday, July 19th, 2017. Representatives from the TPO, Miami-Dade County Parks, DTPW, and the study consultant participated in the tour. A captain and vessel was provided by a local boat operator. Weather conditions were optimal – the temperature was in the high 80s and winds were blowing from the southeast at approximately nine (9) knots. The seas were calm with approximately two (2) foot waves.

Over the course of four hours, the study team conducted field observations of two potential sites at Black Point Marina, Matheson Hammock County Park, Dinner Key Marina in Coconut Grove, and multiple sites near the mouth of the Miami River. Additional details regarding the travel times to and from Dinner Key and Matheson Hammock are available in the appendix.

Black Point Marina to Downtown Travel Time

The trip can be generally divided into three segments. The first segment is the Black Point Channel, a two-mile narrow cut connecting the marina to the open bay. No-wake speeds must be observed within the channel. Total segment one travel time was 20 minutes. The second segment, between the mouth of Black Point Channel and the Rickenbacker Causeway is the open water portion of the route. It runs through the northern portion of Biscayne National Park, and no speed restrictions exist. 25 knot speeds were followed for this segment of the route, the presumed cruising speed for the service. Transit time for this portion of the route was approximately 30 minutes. The third and final segment of the route is between the Rickenbacker Causeway and the mouth of the Miami River. This segment is also speed limited - vessels must adhere to low wake speeds due to shallow bottoms and manatee protection considerations. This segment also takes approximately 20 minutes.

Within the Downtown area, the travel times are low. It takes just three minutes for vessels to travel from Chopin Plaza to the proposed Riverwalk stop, despite idle speed restrictions within the Miami River. Travel times from Chopin Plaza to Bayside Marketplace are approximately two minutes. Travel to Sea Isle Marina would require boats to cross under two additional bridges, including Venetian Causeway, with clearances of just 12 feet. Walking distances from Sea Isle to the closest transit station, the Omni Metromover Station are approximately 1,100 feet, as compared to 750 feet and 200 feet, respectively from Chopin Plaza and the proposed Riverwalk stop.

Figure 31 - Vessel Path and Travel Times

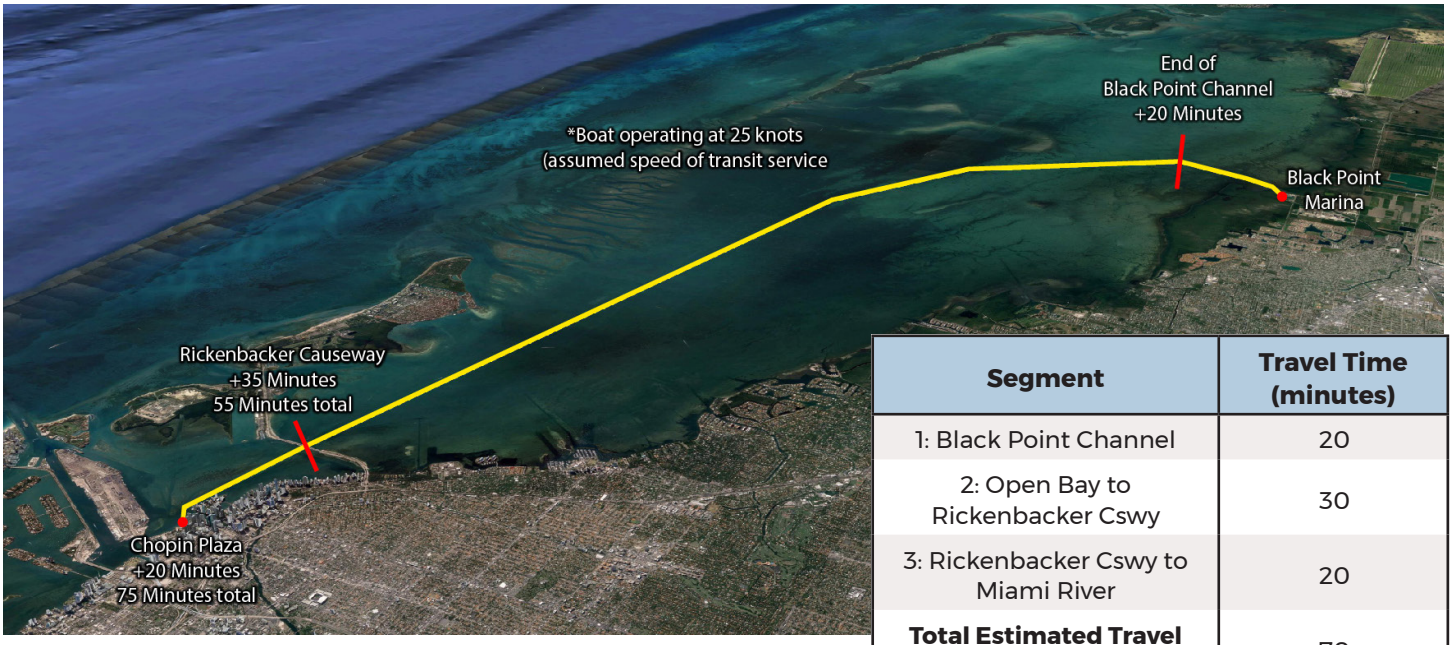


Table 14 - Waterborne Travel Times

Segment	Travel Time (minutes)
1: Black Point Channel	20
2: Open Bay to Rickenbacker Cswy	30
3: Rickenbacker Cswy to Miami River	20
Total Estimated Travel Time	70

Patronage Estimation

To identify potential ridership for this service, FDOT's South Florida Resident Job Linkage Reporting Tool (SFRJL) was used to determine patronage demand. This tool combines the Census Transportation Planning Product and Longitudinal Employer-Household Dynamics products from the US Census to identify potential ridership and commuting patterns within South Florida. Data is available for origin-destination modeling within Miami-Dade, Broward, and Palm Beach Counties. Trips can be modeled to and from TAZs, Municipalities, and Counties.

For the purposes of this analysis, a layered approach was utilized. The first layer was determined by a selection of TAZs that are between from zero to three miles from Black Point Marina. The second layer consists of TAZs that are three to five miles from the marina. The third and fourth layers consist of the TAZs within Homestead and Florida City, respectively. Trips from each of these origin points was calculated to Downtown Miami. Downtown Miami was defined as the TAZs east of I-95 between NE 15th Street in the Omni area to SE 15th Road in Brickell.

According to the SFRJL data, approximately 9,800 individuals who live in south Miami-Dade work in the Downtown area. Within the first layer, three (3) miles of Black Point Marina, 2,400 residents work in Downtown. In the scond layer, the TAZs three (3) to five (5) miles from the Marina, 4,900 work in Downtown. An additional 2,500 residents of Homestead and Florida City work in the Downtown area. Reverse commutes were also considered from Downtown to each of the four layers. Approximately 100 trips in total originate in Downtown and terminate in the four south Dade analysis zones. The results of this analysis are available in Table 15.

Ridership on the water service will be attractive primarily to those individuals who are able to reduce commuting time. Thus, the target travel market for the service is primarily concentrated in the immediate surrounding area of 0-3 miles from the Marina, and the furthest removed residents of Homestead and Florida City. All told, approximately 5,000 commuters could comprise the target demographic for this service.

Estimated daily ridership demand could be approximately 300 passengers. This assumes a modal shift of three percent. Travel movements within the study area are highly imbalanced and significantly directional - based upon the outputs from the SFRJL analysis, one percent of all trips in the peak AM period are made in the southbound direction. The service provided should reflect this reality - AM peak service should only be northbound, and PM peak service should only be southbound.

Figure 32 - Screenshot of SFRJL Tool

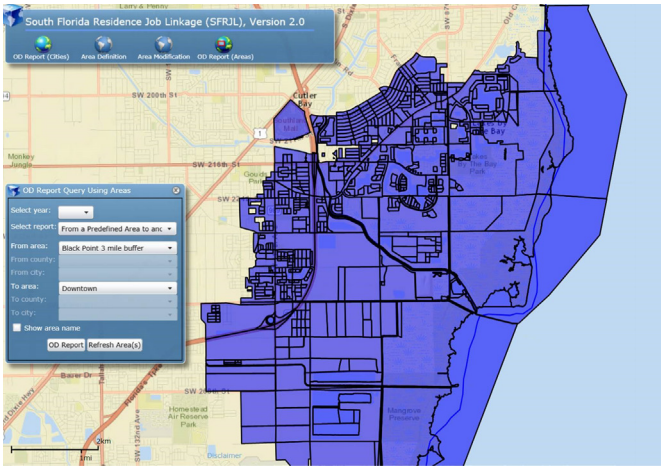
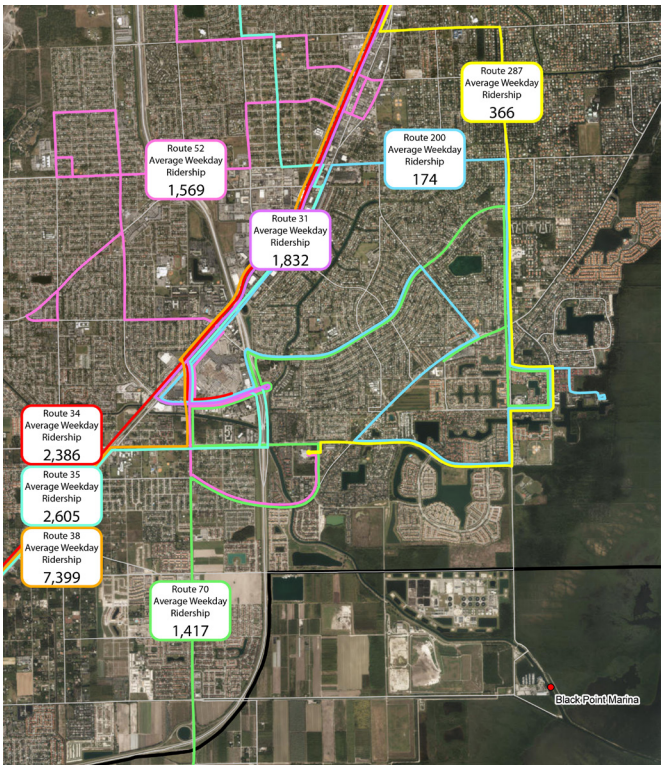


Table 15 - Approximate Commuter Counts

Layer	Northbound Commutes	Southbound Commutes
1: 0 - 3 miles from Black Point	2,400	10
2: 3 - 5 miles from Black Point	4,900	60
3: Homestead	2,100	20
4: Florida City	400	10
Total	**9,800**	**100**

Figure 33 - Average Weekday Ridership of Existing Transit Routes (September 2016)



Chapter 4
Cost and Revenue Estimations

Vessel Requirements

Right-sizing a vessel to the service demands and the character of its operating environment is essential. Procuring a vessel that is too large could incur higher maintenance and crewing expense, and will pose challenges for maneuvering and overnight storage. Conversely, a smaller vessel can artificially cap service demand. Additionally, smaller vessels may be more vulnerable to trip cancellation in response to small craft advisory-inducing conditions.

In evaluating a suitable vessel type for providing the proposed waterborne passenger service there are several factors for consideration given the existing environmental conditions of the Biscayne Bay as well as service demands. These factors include:

- Seaworthiness Considerations
- Operational Flexibility
- Passenger Capacity
- Passenger Comfort

Seaworthiness Considerations

As presented in earlier section of the report the Biscayne Bay can provide for variable conditions that may suspend this type of service or create conditions that affect passenger comfort and smooth operations. The vessel type will need to operate within a low to medium sea conditions (one – four feet waves). Furthermore, due to the distance that needs to be traversed between the Black Point Marina and downtown Miami a minimum speed will need to be maintained to assure the 70-minute travel time is maintained. It has been determined through field observations that a vessel will require engines that can operate at a minimum service speed of 25 knots (~28 mph). To accomplish this, vessels should be equipped with adequate engines, with a heavy-duty rating to minimize breakdowns and life cycle maintenance needs. The vessel should also be of a lightweight aluminum or fiberglass construction.

Operational Flexibility

The vessel type will also need to be flexible in order to provide service operations to ensure it is compatible with the physical constraints and natural environment sensitivity of the Biscayne Bay and service area. The physical constraints posed by providing this type of service is the various heights of bridge structures throughout Miami-Dade County. Since it is envisioned that waterborne service should be able to access any of Miami-Dade's waterways a vessel should be capable of traversing under these bridges. Specifically, existing bridges that can have an operational impact on water transportation service include the Brickell Avenue bridge, which has a minimum height clearance of 23 feet, and the Venetian Causeway bridge, which has a vertical height clearance of 14 feet. Therefore, a recommended vessel will be required to have a maximum height of less than 14 feet.

The recommended vessel type for this service must have a shallow keel depth to account for Biscayne Bay's shallow bottom, where the low tide depth can be as low as two feet. The hull design will also need to provide good stability while also maintaining a low wake to minimize any disturbance to the protected sensitive areas of the Biscayne Bay. A vessel should have a minimum fuels capacity of 300 gallons with 100 gallons of water and 150 gallons of waste water to supply at least one-day of operating service.

Passenger Capacity

A smaller vessel, one that can transport up to 49 passengers, will have certain advantages over a larger boat. Boats with capacity for 49 or fewer passengers are exempt from meeting additional costly construction and safety equipment certification requirements as mandated by the U.S. Coast Guard. For instance, smaller boats are required to have a single bulkhead. Smaller vessels would also have an easier time sustaining 25 knot cruising speeds without incurring added operational and maintenance costs of larger or additional engines. Based on information provided by existing

passenger vessel operators, 49 passenger boats can be acquired between $800,000 and $1.5 million, depending on the type of equipment and whether vessels are competitively procured.

Larger vessels (over 49 passengers) have more stringent U.S. Coast Guard-mandated safety standards. Where smaller passenger vessels are only required to have one bulkheads, larger vessels are required to have five watertight bulkheads and accompanying pumping systems. In short, larger vessels are technically more complex, require larger engines to maintain 25 knot cruising speeds, and consequently will be significantly more expensive. Vessels that can accommodate 150 passengers are costlier; added safety requirements and equipment can increase vessel cost six-fold – prices can range from $5 to $6 million per boat.

Passenger Comfort

The approximate 20-mile distance and travel time warrants a boat that can provide a level of passenger comfort to attract riders and sustain passenger demand. A vessel should provide comfortable finished interiors with, cushioned seating, carpeting, and a minimum of one (1) public restroom. In addition, the boat should be furnished with high quality marine grade windows, sufficiently sized air conditioning, that is capable of maintain a minimum 68-degree interior temperature during the summer months. It is also suggested that a minimum of 10 percent of total capacity is provided in exterior seating. The vessel needs to have a functional design that facilities passenger boarding and offloading. A vessel should be capable of bow and side loading with gates of at least 60 inches in width.

Recommendation

The recommended vessel for this service will accommodate up to 49 passengers, will be a catamaran style boat for improved water stability and a shallower keel depth, and will have a low profile to account for bridge height restrictions in Miami-Dade County. The boat will be able to sustain a minimum cruising speed of 25 knots. A vessel of this size can be safely operated by a crew of two – a deck hand and a captain, which will help keep operational costs low. This vessel will have a climate controlled cabin and seating for 49. It will be capable of bow or side passenger loading. It should be noted that these recommendations are consistent with the findings of the Waterborne Transportation study efforts completed by Miami-Dade County DTPW in early 2017.

Figure 34 - Reccomended Vessel Type (Front View)

Figure 35 - Reccomended Vessel Type (Side View)

Capital Cost Estimations

If the proposed Black Point passenger service becomes operational, it likely would begin as a pilot program. Evaluations of existing docking facilities indicate that vessels could feasibly commence service with existing infrastructure on the ground. A permanent service will require more amenities, including shelters, ticketing offices, and dedicated docking facilities, but none of these elements are impediments for service to commence in the short term. Thus, this cost estimate initially assumes minimal, essential capital costs for service implementation - vessel acquisitions.

As discussed in the previous section, 49 passenger boats can be acquired for between $800,000 and $1.5 million, depending on the type of equipment and whether vessels are competitively procured. Assuming a middle value of $1.15 million per vessel, this translates to a per passenger seat cost of approximately $23,000. Vessels that can accommodate 150 passengers are costlier; added safety requirements and equipment can increase vessel cost six-fold – prices per vessel are in the range of $5 to $6 million per boat. These larger vessels cost approximately $37,000 per passenger seat.

Operating Cost Estimations

Operating Service Assumptions

A proposed operating plan has been developed based upon the existing observed travel data, as well as the trip distance and trip time between Black Point Marina and downtown Miami. Due to the 20-mile distance between the origin and destination, it would not be possible for a vessel to complete more than a single trip per peak period. With an estimated 70-minute run time based upon speed of 25 knots, a round trip run starting at 5:45 AM would arrive at 6:55 AM in downtown Miami, and would return to Black Point no earlier than 8:50 AM. This totals a 140-minute trip time, not including dwell time for passenger unloading and loading, at the tail end of the AM peak period. Based upon this restriction, the peak period service will require a 1:1 ratio between service runs and passenger vessels. Service from closer points on the corridor could reduce this ratio and will be explored later in this report.

The proposed peak service would depart a location every 20-minutes over a one-hour service period during the AM and PM travel times. AM passenger service would begin at 6:30 AM at Black Point Marina, and continue until the last departure at 7:30 AM. Afternoon return passenger service would commence at 4:30 PM with the last boat leaving at

Table 16 - Proposed AM Service Schedule

Leave: Black Point	Arrive: Downtown
6:30 AM	7:40 AM
6:50 AM	8:00 AM
7:10 AM	8:20 AM
7:30 AM	8:40 AM

Table 17 - Proposed PM Service Schedule

Leave: Downtown	Arrive: Black Point
4:30 PM	5:40 PM
4:50 PM	6:00 PM
5:10 PM	6:20 PM
5:30 PM	6:40 PM

5:20 PM. This would result in four (4) northbound runs during the AM peak period, and four (4) southbound runs for the PM peak periods.

These operating times were in response to the commuting and ridership estimation analysis developed as part of this study. This analysis utilized existing available travel data for a designated catchment area near Black Point Marina (one, three, and five miles) for purposes of identifying potential passengers seeking to reach the downtown Miami area. Approximately 10,000 commuters from the south Miami-Dade area to Downtown Miami, and fewer than 100 commuters from Downtown to south Miami-Dade. Given the unbalanced passenger demand between the two locations the proposed service is a peak period peak directional service with vessels making a one-way trip during both service periods.

Operating Costs

Operational costs for this waterborne passenger transportation service have been developed for peak period service. The cost estimates prepared for this study were developed with extensive input from Boston Harbor Cruises, the largest maritime employer in the City of Boston and captains the largest private passenger vessel fleet in the nation. For more than 90 years, Boston Harbor Cruises has provided ferry services, whale watching tours, and other waterborne transportation on Boston-area waterways. Boston Harbor Cruises operates a fleet of 53 vessels with 250 year-round employees. The costs presented in this section are based upon Boston Harbor's operating experience for similar type of passenger services. The costs are generally aligned with estimates developed for previously completed studies of waterborne passenger transportation services in South Florida.

Estimated Vessel Maintenance Costs

The vessel expense budget assumes four (4) vessels. Repairs and maintenance are assumed to cost $20,000 per vessel per year while Insurance costs are estimated to be $35,000 per vessel per year. Each vessel is assumed to consume 150 gallons of marine diesel per day. With four (4) vessels in operation, that totals 600 gallons of fuel per day. With 255 service days per year, just over 150,000 gallons at $2.50 per gallon assumption results in a total estimated fuel cost of $382,500 for in the first year.

Table 18 - Estimated Vessel Expenses (2017 dollars)

Vessel Expenses (Assumed 4 vessel operation)	Cost Per Year
Repairs and Maintenance	$80,000
Supplies	$6,000
Depreciation	$500,000
Interest Expense	$241,000
Fuel	$383,000
Insurance	$140,000
Total Vessel Expenses	**$1,350,000**

Source: Boston Harbor Cruises, 2017

Estimated Labor Costs

Labor costs assume four (4) full-time captains and four (4) full-time deck hands. Captains are budgeted at $65,000, and deckhands at $40,000 per year. Additionally, part-time captains and deckhands are budgeted for vacation and sick days. Two part-time captains and two part-time deckhands are budgeted at $25,000 and $15,000 per year respectively. An additional $205,000 in management costs are budgeted per year for front office, ticket sales, and mechanical work. Overall, labor costs come out to $768,000 in the first year.

Table 19 - Estimated Labor Expenses (2017 dollars)

Labor Costs	Cost Per Year
Captains (4 x $65,000)	$260,000
Crew (4 x $40,000)	$160,000
Part Time Captains (2 x $25,000)	$50,000
Part Time Crew (2 x $15,000)	$30,000
Management	$205,000
Payroll Tax (9%)	$63,000
Total Labor Expenses	**$768,450**

Source: Boston Harbor Cruises, 2017

Ten Year Cost Estimates

In addition to the first year estimated expenses, a ten-year pro forma was prepared to present estimated operating expenses over a longer timeframe. A ten year cost estimate assumes two (2) percent inflation year-on-year which is applied to repairs, supplies, fuel, and insurance. The boats are amortized over the ten-year period, and are depreciated at $0.5 million dollars per year. Interest payments are factored into the boat costs.

Vessel costs are calculated at approximately $1.35 million in the first year, decreasing gradually thanks to lower interest payments to a tenth-year cost of $1.24 million.

When both labor and vessel costs are combined, total operational costs equal approximately $2.1 million per year and $21 million over the ten-year period.

Table 20 - Ten Year Labor Costs (2017$)

Labor Costs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Salaries and Wages										
Crew	$500,000	$510,000	$520,000	$531,000	$541,000	$552,000	$563,000	$574,000	$586,000	$598,000
Management	$205,000	$209,000	$213,000	$218,000	$222,000	$226,000	$231,000	$235,000	$240,000	$245,000
Payroll Taxes										
Crew/ Maintenance	$45,000	$46,000	$47,000	$48,000	$49,000	$50,000	$51,000	$52,000	$53,000	$54,000
Administrative	$18,000	$19,000	$19,000	$20,000	$20,000	$20,000	$21,000	$21,000	$22,000	$22,000
Total Personnel Costs	**$768,000**	**$784,000**	**$799,000**	**$815,000**	**$832,000**	**$848,000**	**$865,000**	**$883,000**	**$900,000**	**$918,000**

Source: Boston Harbor Cruises, 2017

Table 21 - Ten YearVessel Costs (2017$)

Vessel Costs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Repairs and Maintenance	$80,000	$82,000	$83,000	$85,000	$87,000	$88,000	$90,000	$92,000	$94,000	$96,000
Supplies	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000	$7,000	$7,000
Depreciation	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000
Interest Expense	$241,000	$221,000	$200,000	$177,000	$154,000	$129,000	$103,000	$76,000	$47,000	$17,000
Fuel	$383,000	$390,000	$398,000	$406,000	$414,000	$422,000	$431,000	$439,000	$448,000	$457,000
Insurance	$140,000	$143,000	$146,000	$149,000	$152,000	$155,000	$158,000	$161,000	$164,000	$167,000
Total Vessel Expenses	**$1,350,000**	**$1,342,000**	**$1,333,000**	**$1,323,000**	**$1,313,000**	**$1,300,000**	**$1,288,000**	**$1,274,000**	**$1,260,000**	**$1,244,000**

Source: Boston Harbor Cruises, 2017

Passenger Fares

The proposed operational service for providing waterborne services between Black Point Marina and downtown Miami would charge a passenger fare to offset operational expenses. Since this would be a public service within Miami-Dade County the starting point of determine passenger fares resides with following the pricing of passenger fares on the existing transit service network as operated by the Miami Dade DTPW. Therefore, an assumption of a one-way fare of $2.25 is considered for the analysis of this study. Based upon the passenger capacity and proposed service the amount of passenger fares that can be collected is governed by the number of passengers that can be transported on any given day. To estimate passenger fare revenues an analysis of varying passenger capacities on a vessel was calculated and are displayed in the Table below.

Table 22 - Farebox Recovery Ratios by Variable Fare and Ridership

Potential Farebox Recovery Ratios			
Fare	**60% Occupancy**	**80% Occupancy**	**100% Occupancy**
$2.25	6%	8%	11%
$5.00	14%	19%	24%
$8.00	23%	30%	38%

For example, if each vessel was at full capacity during every morning and afternoon service run, then a fare box recovery ratio of ≈11 percent would be achieved. This translates into approximately $250,000 of farebox revenue. Since this is a unique service, a suggestion is to also charge a premium for that service. With passenger fare pricing, a balance needs to be struck so not to overcharge a passenger for a service which could potentially result in passengers opting for other travel alternatives. Furthermore, if a premium fare is to be offered then the passenger service will need to exhibit a consistent reliability and service schedule.

Typically, public transit services within the United States operates at a loss and require a subsidized amount to cover service operations. However, given the existing fare box recovery ratio being achieved by DTPW for Metrobus and Metrorail it is recommended that a fair and reasonable passenger fare be priced such as to recover a minimum of 25 percent of expenses through passenger fare revenues.

The financing of the proposed waterborne transit service will require various funding sources for implementation. Today, applicable funding sources are available from the Federal government and the State of Florida. An overview of various funding programs is presented in the following sections as eligible sources for the implementation and operation of a waterborne service.

Chapter 5
Funding Assessment

Federal Funding Sources

There are several available funding sources from the U.S. Department of Transportation that provide capital funding for waterborne transportation services. Funding is allocated for existing and newly established services and is eligible to be expended on terminal facilities and passenger vessels. An overview of applicable Federal funding programs follows.

Federal Transit Administration Passenger Ferry Grant Program

The Federal Transit Administration (FTA) has established a federal discretionary grant program for purposes of supporting passenger ferry service. Grants are awarded based upon a competitive evaluation process for projects that best exhibit a demonstration of need, provide benefits as related to safety and a state of good repair; regional/ local prioritization; project readiness; technical and financial capacity of an applicant; and, connectivity to other transportation modes.

Since 2015, 21 applications have been submitted for evaluation with a total amount requested of $98 million. To date, 18 projects have been funded for a total amount of approximately $59 million[1]. This program provides financing for capital projects that: 1.) Support the existing passenger ferry service; 2.) Establish new ferry service; and, 3.) Repair and modernize ferry boats, terminals and related facilities/equipment.

For FY 2017, a Notice of Funding Opportunity was published by the FTA requesting project proposals to submit competitive applications by October 23rd. A total of $30 million has been authorized for this fiscal year to fund eligible passenger ferry projects. The Federal share under this grant program is up to 80% of eligible costs.

Federal Highway Administration Ferry Boat Program.

The Ferry Boat Program as authorized by the Fixing America's Surface Transportation (FAST) Act provides funding grant assistance for the construction of waterborne vessels and terminal facilities. Funds are allocated based upon statutory formula with a greater weight given to the number of passengers carried on a waterborne system. For example:

- 35% based on the number of ferry passengers;
- 35% based on the number of vehicles carried by each ferry system; and
- 30% based on the total route nautical miles serviced by each ferry system. [23 U.S.C. 147(d)]

The FAST Act also guarantees that a State with an eligible entity under the program will receive a minimum of $100,000 in Ferry Boat Program funding each fiscal year. [23 U.S.C. 147(f)].

The construction or purchase of a waterborne vessel, terminal facility for private ownership is not eligible for Ferry Boat Program funding. This program can provide up to 80% of the federal funding share for eligible project costs. The following Table lists the amount of funding currently available under the Ferry Boat Program. Previous award amounts range from $300,000 to $6 million for various projects that involve the purchase/replacement of vessels and/or the construction of terminal facilities.

Table 23 - FHA Ferry Boat Program Authorized Funding '17-'20

Fiscal Year	2017	2018	2019	2020
Authorization	$80 M	$80M	$80M	$80M

Source: U.S. Department of Transportation, FHA Ferry Boat Program, 2016

TIGER Grant

The U.S.DOT TIGER Grant program provides discretionary funding on a competitive basis for transportation related capital investments. Applicants are required to identify matching funding sources with projects eligible for up to 80% of federal funding assistance. Although the grant program has primarily funded surface transportation projects, several ferry services have received TIGER grant awards over the last several years. However, it should be noted that successful applicants have been for major port infrastructure and intermodal type projects. Since 2014, TIGER grant awards have ranged from $2.5 million to $20 million for waterborne transportation services.

State Funding Sources

Florida Inland Navigation District – Waterway Assistance Program Grant

The Florida Inland Navigation District (FINDS) Waterway Assistance Program (WAP) grants offers funding assistance to local governments for waterway improvement projects. The types of eligible projects applicable to this study include public navigation, boat docking and mooring facilities, and public waterway access facilities which provide a use and benefit to the public. As part of the application request process, a project sponsor is required to secure and demonstrate the funding source and amount that will be put up as a match to WAP funds being requested. A minimum local funding match of 50% or equal match from a project sponsor is required under the WAP program. Over the last 28 years, the WAP program has provided more than $205 million in funding assistance to local governments to perform waterways improvement projects throughout the District that includes Miami-Dade County. [2]

Florida Department of Transportation's Congested Corridor Transit Funding Program

This program was created to provide funding to urbanized areas for projects that seek to relieve traffic congestion. Therefore, a waterborne service that provides an alternate mode of transportation that reduces traffic congestion within a travel corridor would be eligible to qualify for funding. These funds are discretionary and designated based upon documented need. An eligible project must be identified in a Transit Development Plan, Congestion Management System plan of a formal study undertaken by a public agency [3]. A transit corridor project is also required to have defined goals and objectives that are consistent with a Metropolitan Planning Organization's long range transportation plan the Florida Transportation Plan and approved by the district FDOT office.

Eligible projects may receive up to 50% of the non-federal match of capital costs. Operating costs are also eligible to receive funding under this program. Furthermore, the State could program up to 100% of total project costs for those projects that exhibit a regional or statewide significance.

[1] *Federal Register / Vol. 82, No. 162 / Section B Federal Award Information*

Chapter 6
Gap Analysis

Opportunities and Challenges

This chapter provides a summary of the Waterborne feasibility study conclusions and next steps that are framed as opportunities and challenges for this type of service between Black Point and Downtown Miami.

Opportunities

Based upon this feasibility study's results, the following opportunities have been identified for the implementation of waterborne service between Black Point Marina and Downtown Miami.

Proximity to major transportation corridors: Despite its relatively remote location, Black Point Marina is well situated to capture potentially significant volumes of commuters coming from points to the south – especially the Florida City and Homestead communities. Located approximately two miles from the Homestead Extension of the Florida Turnpike, Black Point Marina would be a relatively short drive for many. Rapid access from the Marina to the Turnpike can serve as a selling point for commuters who would prefer an alternate mode of transportation that would provide passengers a comparable travel time with the automobile when commuting to Downtown Miami.

Underutilized parking on weekdays: Black Point Marina has a relatively large parking lot (283 spaces) that is underutilized on weekdays. On a typical weekday, less than 10 percent of the lot is occupied. The Marina typically experiences peak period demand on weekends when recreational boaters in Miami-Dade County are most likely to use the public boat ramps. The low weekday usage provides an opportunity for the available parking to be utilized by daily commuter passengers without impacting the current volume of weekday marina demand.

Grant Funding: For waterborne services several funding sources are available for eligible project expenses such as the acquisition / capital cost of vessels as well as passenger facilities. However, a detailed financial analysis is recommended to better identify the amount of grant funding needed to balance the operating and capital costs against potential revenue.

Challenges

Several challenges for implementing this service have also been identified and question the feasibility of providing a service between Downtown Miami and Black Point Marina. Specifically, these challenges include the marina location, operational considerations, carrying capacity, passenger balance, and costs.

Marina Location: Black Point Marina is situated in a relatively remote southeast corner of Miami-Dade County which lies outside of the Urban Development Boundary (UDB). Thus, this restricts cultivating the type of development that could feasibly sustain a waterborne transportation passenger service. Moreover, the surrounding and adjacent land uses to the marina are not particularly conducive for additional residential development. As an example, the Miami-Dade County landfill is situated immediately to the east of the marina, a wastewater treatment plant is located to the northwest, and protected mangroves bracket the marina on the north and the south. The relatively little development surrounding Black Point Marina suggests that demand will be relatively low, coupled with the additional time to drive, park and access the marina. Furthermore, intermodal connectivity with existing transit service such as Metrobus is prohibitive since DTPW does not operate transit outside of the UDB. Any connections made to this type of services would occur through intercepting automotive traffic and utilizing the parking capacity at the marina as a park-and-ride facility during weekdays.

Operational Considerations: Black Point Channel Length – Navigating the Black Point Channel requires vessels to operate at slow speed through the channel's two-mile no-wake zone. The channel is approximately 10% of the distance between Black Point Marina and Chopin Plaza; however, the channel transit time of 20 minutes is almost 30% of the transit time between both terminal locations.

Locating a dock closer to the open bay would decrease run time and operating costs, but would require an additional capital investment to construct a new facility. Recently restored docks exist, traditionally referred to as shrimp boat docks along the Goulds Canal. Situated about 0.4 miles closer to the mouth of the open bay, a ferry service from this location could reduce transit time by about five (5) minutes. However, the shrimp boat docks would require substantial capital investment to provide a viable operational point. Furthermore, passenger facilities and a convenient connection to the Black Point Marina are wholly absent from this point, no shelter exists, and limited parking is available. Either additional parking would have to be built at this site, or a shuttle service would be required from Black Point Marina, an additional operating expense, as the docks are located .4 miles from the entrance to Black Point Marina.

Passenger Carrying Capacity: For this waterborne service to be viable, it should increase the corridor's passenger carrying capacity. To accomplish this, a new water route needs to provide sufficient volume with frequent enough service to help alleviate traffic congestion on the parallel roadways such as the Florida Turnpike, U.S. 1 and Old Cutler. However, given the distance between Black Point and Downtown, high passenger volumes will be difficult to achieve, since vessels can provide one peak-period run, or three runs during each peak period when three vessels are in operation. An increase in passenger carrying capacity can be accomplished in one of two ways; first, the vessel size can be increased from a proposed 49-passenger vessel to a 150-passenger vessel. This presents several challenges, particularly increased capital and operational costs as well as operational flexibility to potentially service other coastal areas of Miami-Dade County. The second alternative is to provide more frequent service by acquiring more vessels. Given the inability to reuse vessels for subsequent runs, this alternative would be inefficient and not cost-effective. Moreover, given that the waterborne service travel time between Black Point and Downtown Miami does not offer significant time savings when compared with auto travel, the demand for this service will likely not manifest itself.

Passenger Balance: Given the distance and travel time to reach each destination the proposed service is would provide one directional peak period service in the AM (northbound) and PM (southbound). Thus, there is no return passenger service until the next peak period runs. This create a passenger imbalance as well as minimizes or relegates vessel use to six hours a day. A shorter route with more frequent service would provide a bidirectional passenger base which would also help to balance costs rather than having vessels sit and be stored while idle in between peak period service runs.

Capital and Operating Costs: Due to the distance between Black Point and Downtown Miami, vessel travel times are approximately 70 minutes. When accounting for both run time and terminal layover time, a total round trip time will exceed two and a half hours. Since the service is anticipated to be highly one-directional – northbound in the AM peak periods only; southbound in the PM peak periods only – a vessel looking to complete two northbound trips would require nearly four (4) hours of roundtrip travel time, putting a second run or trip outside of the peak period window.

As previously mentioned one could acquire more vessels to provide more frequent service however, this would significantly increase capital costs (new vessel acquisition), and operational costs (additional captains and crews to operate the vessels, additional maintenance costs), without necessarily significantly increasing passenger carrying capacity. For this study, estimated vessels acquisition costs range between $800,000 and $1.2 million dollars each. A large initial capital outlay would be unjustifiable until the service can be demonstrably successful, which is in turn complicated by the expected low passenger volume.

Conclusion

The proposed waterborne service between Black Point and Downtown Miami is not feasible given the length of the service route and amount of travel time. Both factors limit passenger carrying capacity and result in high operation costs with a limited passenger benefit. One consideration is to provide service to Black Point Marina once a ferry network is established based upon a foundation of short and quick routes between multiple destinations that attract various types of passenger trips (work, home based, tourist etc.) In effect, shorter more efficient waterborne service routes would increase passenger revenue while limiting operating costs. The shorter more efficient ferry routes could then be utilized to subsidize longer routes such as the Black Point Marina. Additional vessels will be needed to operate a larger network, which would increase capital costs. However, scheduling service to operate over shorter distances while connecting to multiple activity areas could further offset operation costs from passenger revenues.

Waterborne Service Recommendation: Matheson Hammock

Matheson Hammock Marina, located near the intersection of Old Cutler Road and SW 88th Avenue (Kendall Drive) in Unincorporated Miami-Dade County could serve as a potential alternative to Black Point. The marina offers two key advantages over Black Point – proximity and a shorter channel. Both these factors reduce total transit time, increasing the possibility service with greater frequency with fewer vessels.

Initial analyses of this location were performed while collecting data and information to determine the feasibility of a Black Point Marina service. Total one-way transit time from Matheson Hammock to Downtown Miami is approximately 35 minutes, which is approximately one-half the travel time from Black Point Marina. Travel distance is also approximately half – at about 10.5 miles. The Matheson channel is approximately a half-mile in length, which minimizes the distance vessels must operate at low wake speeds.

Due to the shorter distance and higher operating speeds, the same service from Matheson to Downtown can be operated with half as many vessels – two (2) boats instead of four (4). Alternatively, service can operate for twice as long – instead of a single hour of peak period service, operations could be run for two (2) hours using the same number of vessels that the Black Point run could sustain for just a single hour, since vessels can be reutilized for subsequent runs on this shorter travel distance.

There are a few drawbacks to using Matheson Hammock. First, the marina does not have a Marine Operating Permit (MOP) for commercial vessels. In its current capacity, the marina is used for recreational craft only. A request for commercial vessels to use Matheson would have to be submitted to the County's RER Department. Although Matheson Hammock falls within the Urban Development Boundary, it is surrounded by single-family housing on suburban-style large lots. The nearest multi-family housing developments are over two miles from the marina. The sidewalk network on the streets surrounding Matheson Hammock is incomplete, which would complicate access by alternatives to passenger vehicles.

Another challenge to service from Matheson is the relative proximity to Downtown Miami. Water travel time would be competitive with driving – the 35-minute water travel time is on the low end for travel time estimates during the peak AM period when compared to driving via Old Cutler Road and US-1. Google Maps estimates driving travel times to range from 30 to 60 minutes.

Figure 36 - Potential Docking Site at Matheson Hammock

Recommended Next Steps – Gap Analysis

The proximity of many activity areas and urban centers near the Biscayne Bay and Intracoastal waterway lend itself to presenting an opportunity to implement a feasible waterborne transit service as an alternative transportation mode for Miami-Dade County. The following identified items warrant additional analysis and consideration for the advancement of waterborne passenger service as a viable transportation alternative: 1.) Establish a Ferry Boat network; 2) develop a financial strategy for implementation; and 3) establish criteria for implementation.

1) Establish a Ferry Boat Network: As documented in previously, completed study efforts have identified the utilization of waterways to provide an alternative transportation connection. Currently, the Miami-Dade County Department of Public Works (DTPW) have begun to identify service route for implementation. Based upon this feasibility study and the ongoing DTPW efforts should continue to advance the implementation of various short water routes to transport people between the Miami-Dade County mainland across the Intracoastal Waterway to connect the eastern coastal communities. Specifically, routes have been proposed for connecting Miami-Beach Marina, Haulover Beach, Chopin Plaza to name a few locations, which is the beginning of creating a ferry boat network. These shorter and quicker routes enable vessels to remain in service throughout the day to establish a passenger base that could offset or minimize operational expenses through farebox revenues.

2) Establish a Financial Strategy: A well supported and detailed financial strategy is needed to advance waterborne service within Miami-Dade County. A financial strategy would begin to identify the local funding sources and determine the level of commitment to establish a pilot service, the first step in the creation of a network. A documented and supportive financial strategy would also demonstrate to funding partners the County's commitment to implement this type of service. This would also place the County in a competitive position when pursuing funding grant programs as previously identified in the earlier sections of this report. A financial strategy could also facilitate the programmatic funding of required infrastructure to advance waterborne service such as storage, maintenance facilities as well as docking facilities and passenger terminal amenities.

3) Establish Design Criteria: The results of this feasibility study coupled with the efforts of DTPW provides enough preliminary information to initiate a process for defining service specifications such as identifying docking facilities design criteria, passenger terminal requirements as well as initiating the definition of specifications on vessel type required for service implementation. These studies have begun to identify specific criteria in terms of defining vessel type, passenger capacity, etc., that would provide the flexibility to serve various destinations while enduring variable environmental conditions that exist within the Biscayne Bay and Intracoastal waterways.

Chapter 7 - APPENDIX

Complete Trip Travel Time		
	Total Time (minutes)	Time From Last Checkpoint (minutes)
Black Point Marina	0	
Matheson Hammock	44.5	44.5
Dinner Key	53	8
Mouth of Miami River	75	21.5
River Walk	78	3
		77
Total Transit Time:	**1 hour 18 minutes**	

Point-to-Point Travel Time		
From	To	Minutes
Black Point Marina	Matheson Hammock	44.5
Matheson Hammock	Dinner Key	8
Dinner Key	Miami River	21.5
Miami River	River Walk Metromover Station	3

TPO
Miami-Dade Transportation Planning Organization

Waterborne Transportation Feasibility Study between Black Point Marina and Downtown Miami
Study Advisory Committee Meeting #1
May 4, 2017
10:00 AM

Sign-In Sheet

Name	Organization	Email Address	Phone No.
IRENE HEGEDUS	OTPW	Ihegedus@miamidade.gov	786-469 5395
Sandra Harris	City of Miami	Sandrahar@miamigov.com	(305) 416-1278
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Patrice Gillespie Smith	Miami DDA	PGSmith@miamidda.com	305 579-6675
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Kevin C Walford	TPO	KwalFord@miamidadempo.org	305 375.2642

Miami-Dade Transportation Planning Organization

Study Advisory Committee Meeting # 1 – Minutes

Meeting: GPC VI-24 – Waterborne Transportation Feasibility Study between Black Point Marina and Downtown Miami
Date: Thursday, May 4, 2017
Time: 10:00 AM
Location: Stephen P. Clark Center, CITT Conference Room
111 NW 1st Street, 10th Floor
Miami, FL
Attendees:

Name	Representing
Carissa DeCramer	Biscayne National Park
Sandra Harris	City of Miami
Marc O'Keefe	City of Miami
Irene Hegedus	DTPW
Jay Bogaards	MD County Parks
Vinod Sandanasamy	MDC Dept of Regulatory and Economic Resources (RER)
Lee Hefty	MDC RER – Dept. of Environmental Resource Mgmt (DERM)
Dionne Richardson	FDOT
Patrice GIllespe-Smith	Miami DDA
Kathryn Lyon	Planning & Zoning Cutler Bay
David Henderson	TPO
Kevin Walford	TPO
John Lafferty	WSP | Parsons Brinckerhoff
Zachary Parnas	WSP | Parsons Brinckerhoff
Thomas Rodrigues	WSP | Parsons Brinckerhoff

Minutes

Introductions

Presentation by WSP Parsons Brinckerhoff

- Irene Hegedus Suggests we utilize the City of Miami database of future potential infrastructure improvements she has used in the past to predict future service needs. This can be obtained from the Planning Department or the Miami DDA.
- Chopin Plaza dock is currently being rented for $7,000 per month by gallery boat. Need to explore the feasibility of adding to the dock to accommodate water taxi. Irene believes this can be feasible. Environmental factors need to be evaluated, however.

Miami-Dade Transportation Planning Organization

Study Advisory Committee Meeting # 1 – Minutes

- DTPW Transit App shows point to point travel time in real time, and is connected to Waze. Irene recommended it as a tool for improving the accuracy of existing transit time estimations
- Hydrofoil boats were suggested as a potentially viable high-speed alternative to traditional boat designs. However, hydrofoils are likely a non-starter due to the fatal consequences to manatees and impacts of debris in the water on ride quality.
- Water taxi system would operate as an extension of Metrobus
- Past water taxi efforts in Miami have failed due to price, costing ~$20 per ride. Past services have been feasible as tourist attractions, but not as a commuting service.
- DERM Report has data on Deering Bay and water depths throughout Biscyane Bay and Miami River that can be shared with WSP PB staff.
- Waterborne transportation is envisioned to work as a P3. The County hopes to contract an operator who would acquire, operate and maintain their own boats.
- Commercial use authorization for commercially operated boats in the Biscayne National Park currently costs ~$250 but prices will be rising, approaching $1,000 beginning next calendar year (2018).
- Jay Bogaards, from Miami-Dade County Parks, states that it takes 20 minutes to get out of Blackpoint Channel due the idle speed zone running the length of the channel. This is a significant share of the total boat travel time. Attempts should be made to reduce it – for instance, by relocating the departing dock to the current Shrimp Boat docks at the mouth of the channel.

TPO
Miami-Dade Transportation Planning Organization

Waterborne Transportation Feasibility Study between Black Point Marina and Downtown Miami
Study Advisory Committee Meeting #2
August 28, 2017 1:30 PM

Sign-In Sheet

Name	Organization	Email Address	Phone No.
Julian Guevara	DTPW	Julianq@miamidade.gov	3-7733218
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Tom Morgan	MDPROS	TMorgan@Miamidade.gov	305-365-3015
Jay Bosgards	MPO	JayBos@miamidade.gov	305 342 - 9934
Vinod Sandanasamy	RER/Planning	vinod.sandanasamy@miamidade.gov	305-979-6764
LEE HEFTY	RER DERM	heftyl@miamidade.gov	305-372-6754
PAMELA SWEENEY	RER DERM	SWEENPA@miamidade.gov	305-372-4594
David Henderson	TPO	david.henderson@mdtpo.org	375-1647
THOMAS RODRIGUEZ	WSP	thomas.rodriguez@gmail.com	3/ 614-3142
John Lafferty	WSP	John.Lafferty@wsp.com	" 3163

Miami-Dade Transportation Planning Organization

Study Advisory Committee Meeting # 2 – Minutes

Meeting: GPC VI-24 – Waterborne Transportation Feasibility Study between Black Point Marina and Downtown Miami
Date: Monday, August 28, 2017
Time: 1:30 PM
Location: Stephen P. Clark Center, CITT Conference Room
111 NW 1st Street, 10th Floor
Miami, FL
Attendees:

Name	Representing
Irene Hegedus	DTPW
Julian Guevara	DTPW
Jay Bogaards	MD County Parks
Tom Morgan	MD County Parks
Vinod Sandanasamy	MDC Dept of Regulatory and Economic Resources (RER)
Lee Hefty	MDC RER – Dept. of Environmental Resource Mgmt (DERM)
Pamela Sweeney	MDC RER – Dept. of Environmental Resource Mgmt (DERM)
Dionne Richardson	FDOT
Patrice Gillespe-Smith (teleconference)	Miami DDA
David Henderson	TPO
John Lafferty	WSP
Thomas Rodrigues	WSP

Minutes

Introductions

Presentation by WSP

- Black Point Marina: Lee Hefty asked whether bow loading is critical at the Black Point Marina unless there are multiple vessels providing service at this location at one item. John responded that at most you could expect two vessels at one time at Black Point given the operating schedule. John also clarified that the bow loading/offloading was preferred given since it would require a smaller footprint for a passenger loading area. At Black Point Marina, several passenger loading options were identified but not all are service ready and would require modifications to docks for a waterborne passenger service. When discussing the shrimp boat channel it was noted that the channel and walking path are susceptible to flooding from the King Tides.

Study Advisory Committee Meeting # 2 – Minutes

- Matheson Hammock: Noted the availability of the existing sea wall which may provide a passenger loading/unloading point with minimal modifications.

- Dinner Key: Irene Hegedus suggested that WSP review the Master Plan prepared for this area. A parking garage may be proposed at Dinner Key. It was noted that Phase 1 the Master Plan has been implemented.

- Chopin Plaza: Patrice (DDA) suggested that Chopin Plaza dock can be modified very quickly with virtually no cost.

- Riverwalk: Irene noted that the City of Miami owns the Fort Dallas Park which already has ADA access from street level to the Riverwalk, and good proximity to downtown. The one potential challenge is to determine whether front loading is possible to eliminate and conflict with cargo traffic on the Miami River. Additional ADA ramps are needed to access the docking area.

- Miami River: Irene informed the group that The City of Miami has identified 13 docking locations throughout the Miami River area. However, consideration needs to be given to vessel size to avoid potential conflict with cargo vessels. Irene noted that the County was looking at new technologies such as solar powered hydro foils manufactured in France.

- Lee Hefty asked about vessel speed in the ideal conditions as being identified as 25 knots. Thomas further clarified that this was the predominant run time speed during the field review and further clarified that the point to point run time observed all no low and wake zones. Question was whether this would be a practical speed given variable conditions of the Bay. This would be further clarified upon a completion of additional analysis of vessel type and conditions of the Bay.

- Irene suggested that the study should also assume the costs for additional transit and trolley service to provide that multimodal connection. David Henderson asked about the necessity of providing a transit connection at Black Point. Irene emphasized the DTPW objective is to promote multimodal connections.

- Travel Time: Lee commented that anybody that lives north of Black Point is going from their house to downtown. If they were to travel south this would increase travel time.

- It was suggested that Deering Estate or the old FP&L site be considered as other locations for water borne passenger service. Thomas stated that we looked at these sites which had restricted access based upon field review observations.

- Vessel Type: Should consider capability with not only Brickell Bridge but also Venetian (14 foot clearance – 12'6" max height). This will ensure vessels could be used throughout the County. Irene feels that this type of vessel would have a passenger capacity of 49 or less. Once you involve a larger vessel (145 passenger capacity) this introduces additional constraints for height and width

clearances. Irene noted that a 145 person vessel is ~$2.5 M versus a 45 person vessel which is ~ $400k. Irene also commented that vessels used on the Biscayne Bay will need to undergo and pass a U.S. Coast Guard stability test to receive open water certifications.

- Travel Markets: It was commented that the team needs to keep in mind that the LEHD data is including markets that are north of Black Point Marina which would require a trip south to head north. This needs to be factored in when estimating the potential travel market.

- Policies: Suggestions was to add to the list the Department of Environmental Protection and Fish and Wildlife Agency.

- Irene asked whether the City Miami has submitted any type of permit requested to DERM on docks. None were identified.

- Haulover Demonstration Project Update: Irene provided an overview of the Haulover demonstration route between Haulover and Sea Isle which would operate three hours in peak periods with a 15 to 20 minute frequency. Other hours would be less frequent service.

- David asked Irene what other services did she evaluate: Two tours north south and east-west for Miami Beach. Purdy Avenue was identified as a primary location whereas the Miami Beach Marina was not interested. One of the reasons is that there is no parking or minimal parking capacity. Irene's also mentioned that the City of Miami requested that DTPW look at service to Blue Lagoon. DTPW has done an assessment of implementing waterborne service to the MIC.

  Meeting adjourned at 3:10PM

TPO
Miami-Dade Transportation Planning Organization

Waterborne Transportation Feasibility Study between Black Point Marina and Downtown Miami
Study Advisory Committee Meeting #3
November 17, 2017 9:30 AM

Sign-In Sheet

Name	Organization	Email Address	Phone No.
Tom Morgan	Parks	TMorgan@Miamidade.gov	305-365-3015
IRENE HEGEDÜS	DTPW	ihegedus@ "	786 469-5395
David Henderson	TPO	david.henderson@mdtpo.org	305-375-1647
PAMELA SWEENEY	RER-DERM	sweenpa@miamidade.gov	305-372-6594
Marc O'Keefe	City of Miami	mokeefe@miamigov.com	305-250-5402

Miami-Dade Transportation Planning Organization

Study Advisory Committee Meeting # 3 – Minutes

Meeting: GPC VI-24 – Waterborne Transportation Feasibility Study between Black Point Marina and Downtown Miami
Date: Friday, November 17, 2017
Time: 9:30 PM
Location: Stephen P. Clark Center, CITT Conference Room
111 NW 1st Street, 10th Floor
Miami, FL
Attendees:

Name	Representing
Irene Hegedus	DTPW
Julian Guevara (teleconference)	DTPW
Pamela Sweeney	RER-DERM
Tom Morgan	MD County Parks
Vinod Sandanasamy (teleconference)	MDC Dept of Regulatory and Economic Resources (RER)
Patrice Gillespe-Smith (teleconference)	Miami DDA
David Henderson	TPO
Chris Dube (teleconference)	FDOT
Carissa DeCramer	Biscayne National Park
Marc O'keefe	City of Miami
John Lafferty	WSP
Thomas Rodrigues	WSP
Zach Parnas	WSP

Minutes

Introductions

Presentation by WSP

- Irene Hegedus: Boats may be run every 15 minutes, beginning at 6:00AM to maximize the number of people who can be delivered to downtown by 8:00 AM.
- Irene Hegedus: boats must be able to clear Venetian Causeway, the lowest bridges in the region, for other services which may take place between AM and PM Commutes.
- Irene Hegedus: Metal Vessels require significantly more maintenance and are far more noisy than fiberglass. DTPW has eliminated metal vessels from their selections.
- Irene Hegedus: Boats used in Ohio system are lower cost than those found in this study and should be investigated – will email info to consultant team.

Study Advisory Committee Meeting # 3 – Minutes

- Irene Hegedus: Entering the river is favorable, but not at the cost of service time or reliability.
- Riverwalk station is ideally situated to tie into metromover station as it is on the Brickell loop, one stop south of Knight center (a favored transfer station to both inner and omni loop). Chopin Plaza is less favorable as Bayfront park station requires taking inner loop and transferring to Brickell loop.
- Irene Hegedus: Costs can be minimized by capturing as much additional revenue as possible from generating activities beyond transit service (advertising, rental for events, etc).
- Blackpoint expresses concern about where to store boats overnight.
- Jim Wolfe suggested TAP grant to Irene Hegedus as a way to assist with operational funds up to $1 Million.
- Chris Dube: State funds are also available for commuter assistance, but funds are competitive so project must show value over proposals from other entities.
- Chris Dube: Rule 1490 – if you take one dollar of state or federal money, a new level of safety standards must be satisfied.
- DOT District 4 assisted with previous service in Broward County
- David Henderson: Venetian Causeway is expected to need a large amount of bridge work that requires closures in the future, and service between sunset harbor and sea isle marina may be an option for waterborne service
- Irene Hegedus: What we need is more origin/destination information about employees for
- Tom Morgan: Daytime mooring costs should be considered in addition to night time storage.
- Irene Hegedus: Need a Title 6 study on any new route that DTPW choses to implement.
- David Henderson: PPP allows boats to be used for entrepreneurial purposes between transit service hours if boats are rented for transit service.
- Better structure to measure service costs by service hour than by number of trips
- Boat size means there will be plenty of times when service cannot run due to weather. Contingency plan should be developed so that commuters are not stranded when this occurs. A couple of options discussed included providing shuttle service from Black Point Marina, and using South Florida Commuter Services travel vouchers.
- How do we provide return service to origin points when waterside conditions change and return trips are not safe.
- Status of Sunny Isles Beach Demo project: Commissioner Soto has requested an update of the reports from 2000-2004. Says the Bay is a no-brainer but also wants to do the river. Next steps are to issue and RFI and then and RFP, but commission approval is needed first.
- FINE (Florida Inland Navigation System) will provide 50% of the cost for facilities.

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