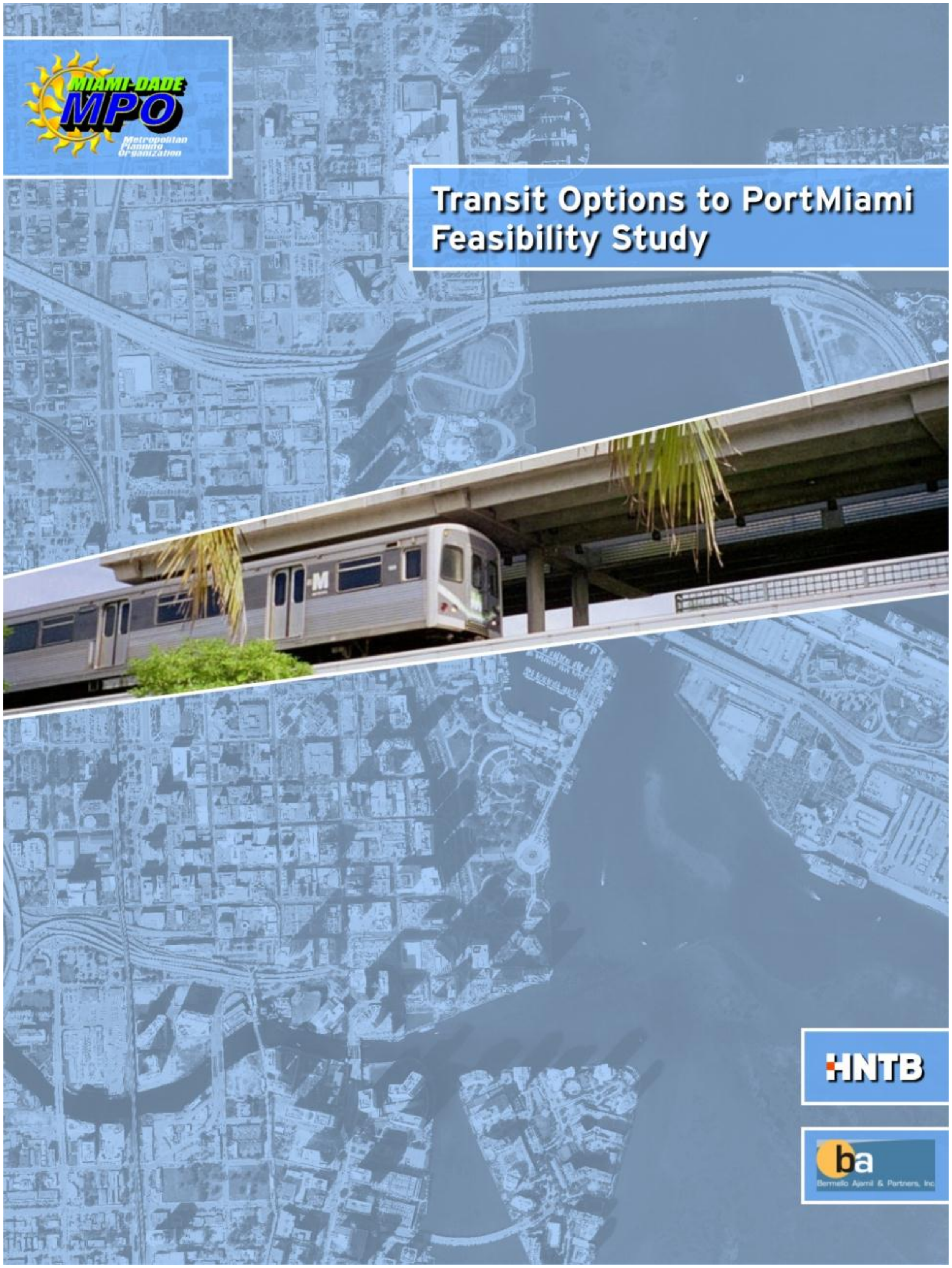
MIAMI-DADE MPO
Metropolitan Planning Organization

Transit Options to PortMiami Feasibility Study



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Transit Options to PortMiami Feasibility Study

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Prepared by

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In Conjunction with

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1 Introduction

1.1 Purpose of Study

The purpose of this MPO study, *Transit Options to PortMiami Feasibility Study*, is to examine the potential for providing a transit connection between PortMiami and Downtown Miami. This study seeks to analyze several modes, routes and combinations of transit to PortMiami.

In order to accommodate future growth, PortMiami is continually expanding its intermodal capabilities. The PortMiami Tunnel is currently under construction and is anticipated to be completed in 2014. This project will allow port traffic to move more efficiently to and from the expressway system. Also, through its partnership with Florida East Coast (FEC), PortMiami is augmenting its freight traffic by reinstating its rail service and developing a new rail yard facility. However, these projects only improve some elements of the PortMiami's intermodal capabilities. The transportation alternatives for cruise passengers and the growing number of Port employees continue to be limited, and the land required for additional parking is constrained. With this anticipated future growth, and with the construction of the tunnel which provides additional roadway access for freight, the opportunity to study and implement alternatives to other modes of transportation becomes a necessity. This proposed transit connection would expand PortMiami's intermodal capabilities for cruise passengers and Port employees.

A new transit connection would provide opportunities for less vehicle traffic to the Port, thereby further reducing emissions due to idling, and enhancing the Port's vision of attaining clean air quality in the region.

1.2 Downtown Context

Greater Downtown Miami is divided into several districts which consist of the Downtown area proper, Brickell area to the south, the Omni District to the north and Park West. Once, predominately populated by offices and retail, the area over the past decade is now home to 200,000 residents and 190,000 employees creating the beginning of a vibrant urban core for Miami-Dade County. With a population of 2.5 million, Miami is the county seat of Miami-Dade County and the largest city in a metropolitan region of 5.4 million people that includes Palm Beach and Broward Counties as well.

Transportation to and from Downtown Miami is provided by several limited access roads I-95, I-395, I-195, and US 1, as well as an elevated heavy-rail (Metrorail) system, an elevated people mover system (Metromover), and 20 bus lines.

Figure 1: Aerial View of PortMiami

At the center of downtown Miami, in the middle of Biscayne Bay, PortMiami is located and it is one of the most significant economic centers of Miami-Dade County. PortMiami is an island port connected to mainland by Port Boulevard an elevated bridge over the Intracoastal Waterway that serves all of the cargo and cruise activities and connects to both US-1 and the downtown arterial roads. Port Boulevard also runs between the American Airlines Arena and Bayside and provides access to those facilities.

The port is owned and operated by the Seaport Department of Miami-Dade County. Through its cargo and cruise activities, PortMiami has indicated that it contributes over $18 billion annually to the South Florida economy and helps provide direct and indirect employment for over 176,000 individuals. In 2010 PortMiami handled more than 4.1 million cruise passengers and 7.3 million tons of cargo. It is the number one port in the world for cruise passengers, and one of the US largest container ports.
The modern cruise industry began at PortMiami in the 1960’s and not only has flourished, but those start-up cruise companies have now grown to be multi-national firms, with the largest three companies maintaining the corporate headquarters in Miami. One of them, Royal Caribbean has its world headquarters in PortMiami proper.

Figure 2: Rail and Port Boulevard Bridges

Downtown Miami is connected to PortMiami by three bridges. The first vehicular bascule bridge was built as part of the original Dodge Island Port in circa 1960’s. This vehicular bridge has not been used and has been left in place in an open position since a new high-level fixed bridge was built. A rail bascule bridge was also built in the 1960’s and has remained idle for many years. However, it is now undergoing rehabilitation as part of the Port’s new Intermodal strategy that will provide intermodal container service and allow containers from PortMiami to be shipped across the US.

The high-level bridge was built as part of the 1979 Ports Master Plan and executed in the 1980's. The bridge is a six-lane section segmental design with high grades. The bridge was built as a result of an Agreement between the City of Miami and Miami-Dade County. The Agreement predicated the construction of the bridge with the County's commitment to build a tunnel to relieve port traffic from the Downtown streets. The Agreement also envisioned the potential to connect the port and the Downtown with a potential mass-transit connection and provided for part of the bridge to be converted for such use.

1.3 PortMiami Master Plan

In October 2011 the Miami-Dade Board of County Commissioners adopted the most recent PortMiami 2035 Plan. The plan provided for the future growth of the cruise and cargo business through the Port, and identified existing conditions, as well as estimates of future trends. In particular the plan reviewed the existing conditions and forecasted cruise passengers.

The plan also provides for additional development in the port. In general this means that the underlying need for the desired transit connection appears to be equally important for cruise passengers as well as for the transportation needs of the employees at the Port.

1.3.1 Cruise Passengers Land Transport Trends

The number of cruise passengers passing through the Port is projected to grow from its current 4 million passengers to over 6 million annually by 2035.

The plan noted that a change in paradigm had taken place in the way that cruise lines marketed and transported cruise passengers to PortMiami. This was different than as originally envisioned when the east-west (airport-seaport) transit connection was studied by Transit in the 1990's.
Several major new mega-trends are now dominating land travel of cruise ship passengers to ports. Understanding these is critical to understanding the market and its potential as it relates to any mass-transit system serving PortMiami.

1. The cruise passengers now terminating or originating at PortMiami, or for that matter at most major US homeports, are now more independent and typically arrange their land transportation to the Port on their own. The days of packaged air-sea travel are mostly history. Cruise lines have found that this provides them with a more competitive edge and ability to control costs and profits.
2. Cruise lines are moving ships to many ports along the coast of the US, allowing a higher ratio of drive passengers to reach the homeport.
3. Even at super-ports such as PortMiami, the ratio of drive-in passengers has exploded over the past ten years.
4. Passenger driving to the hinterland is expanding, and people are driving hundreds of miles to get to the ports. At PortMiami, the South Florida region, as

well as entire State of Florida, becomes a prime source of drive-in passengers.

5. Ports like PortMiami have invested heavily in new parking facilities to meet the demand.
6. Ports have begun to see parking as a major source of revenue, not dependent on the Cruise lines. As a result, some of the highest parking rates can now be found in many cruise ports. At PortMiami the daily rate of $20/day is significantly higher than at Miami International Airport (MIA) and yet the demand continues to increase.
7. Cruise lines have recently discovered this revenue source and are negotiating hard to obtain a participation in the parking revenue. At PortMiami, this has already happened.

In general, although the size of the air-sea market has decreased, the drive-in market in South Florida has increased dramatically. When combined with $20.00 per day parking, the fundamentals are there to switch passengers from passenger-only vehicles to a Tri-Rail, Metrorail with a direct port connection. In places like San Francisco, people are even using the City's light rail trolley along the Embarcadero to get to the cruise terminal. As such, the recently completed PortMiami 2035 Master Plan includes the construction of a transit connection and central Port terminal station to expedite the arrival/departure of cruise passengers and Port employees to the center of the Port.

1.3.2 Parking

Given the projected growth of passengers, the limited amount of land at the Port and the disperse nature of the ports' current cruise terminals, there is a need to convert passengers driving to the cruise to using mass transit, as well as consolidating the parking into a more efficient and centrally located and connected central facility.

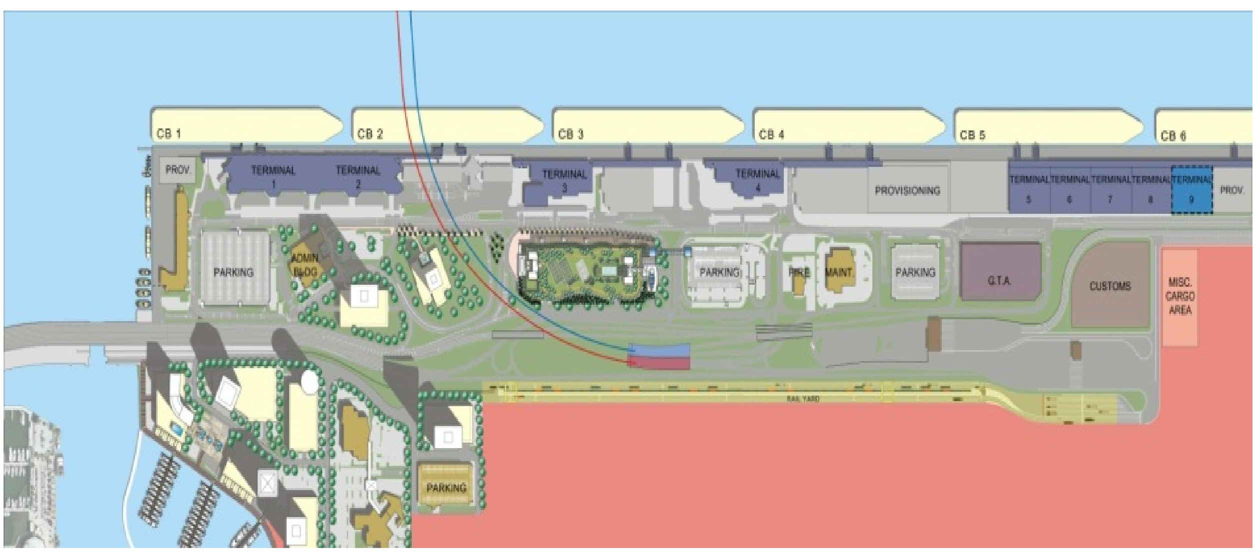

Figure 3: PortMiami - Terminal and Parking Plan

One of the major issues facing the Ports' transportation is the imbalance between terminal usage and parking. Currently the Port has 7 cruise terminals and each terminal is separated by a significant distance. Each terminal also has a stand-alone parking structure. It is not unusual for the parking requirements for each terminal to be totally out-of-balance with the traffic of that particular terminal, creating a situation where one parking facility is at capacity while others are not. This necessitates the shuttling of customers between parking structures. This both significantly lowers the service to the passenger, while at the same time increases the operating costs.

The Master Plan includes an integrated transportation center at the Port with the transit connection designed to integrate as many of the garages on the north side of the Port, allowing a more rational use of the asset.

1.3.3 Commercial Development

Figure 4: PortMiami - Commercial Development Area

The Master Plan also envisions new commercial development zones and areas within the Port that will increase the office space and potentially include a World Trade Center and hotel at the Port that might include exhibition space. This additional development will generate additional traffic.

1.4 Transit Facilities in the Downtown

1.4.1 Metrorail

Figure 5: Metrorail

Downtown Miami is well served by transit. The backbone of the downtown transit system is Metrorail, which is an elevated heavy-rail system on the west side of Downtown. In this part of Downtown the Metrorail guideway is parallel to I-95. Metrorail has two lines - the Orange Line provides 10 minute peak hour service between the Miami Intermodal Center, which serves Miami International Airport (MIA) and Dadeland South. The Miami Intermodal Center also provides connections to Amtrak and the Tri-County Commuter Rail system serving the three county area. The second Metrorail route is the Green Line providing 10 minute peak hour service between the Palmetto Station and Dadeland South.

Metrorail base fare is $2.00 for a one-way fare throughout the system. Metrorail operates 4 car trains (two married pairs) and carries about 70,000 passengers per day. The greater Downtown Miami area is served by three Metrorail Stations which are served equally by the two lines. The Historic Overtown/Lyric Theater Station handles about 1,800 passengers per day, which is currently one of the most underutilized stations in the system. The Government Center Station is the heaviest utilized station in the system handling 11,600 passengers daily, many of whom are transferring to the Metromover to circulate throughout the Downtown core. The Brickell Station on the far southern end of Downtown handles 4,500 passengers and also provides a transfer to the Metromover.

Metrorail is fed from the south at the Dadeland South Station by the South Dade Busway providing premium transit connections between Homestead/Florida City and Downtown Miami. Metrorail is fed from the north at the Tri-Rail Metrorail Station by the Tri-Rail Commuter Rail service which extends to Palm Beach County.

Figure 6: Metromover

1.4.2 Metromover

Greater Downtown Miami is served by the Metromover, which is an elevated rubber tired circulator (people mover) system. The system includes the inner loop which serves the downtown core with 2 car trains, and the outer loop which operates as two independent routes – the Omni Loop and the Brickell Loop with one car trains. The Metromover provides free service to about 30,000 riders per day.

The Metrorail's Overtown station is not directly served by the Metromover. It is a two-block walk to the nearest Metromover station (the Wilkie D. Ferguson Jr. Station),

PortMiami is not served by the Metromover. The three nearest Metromover stations located on the mainland are College/Bayside, College North, and Freedom Tower, which is only on the Omni Loop.

1.4.3 Seaport Connection

MDT Bus Route 243 – Seaport Connection operates similar to a circulator with the following characteristics:

- 30 minute frequency
- Operates Monday – Friday
- 6:30 AM to 6:30 PM (no service during midday, about 9:30 AM to 3:00 PM)
- Average Weekday Ridership ranged from 100 to 84 (May 2012 to January 2012, respectively).

1.4.4 Commuter Rail Service

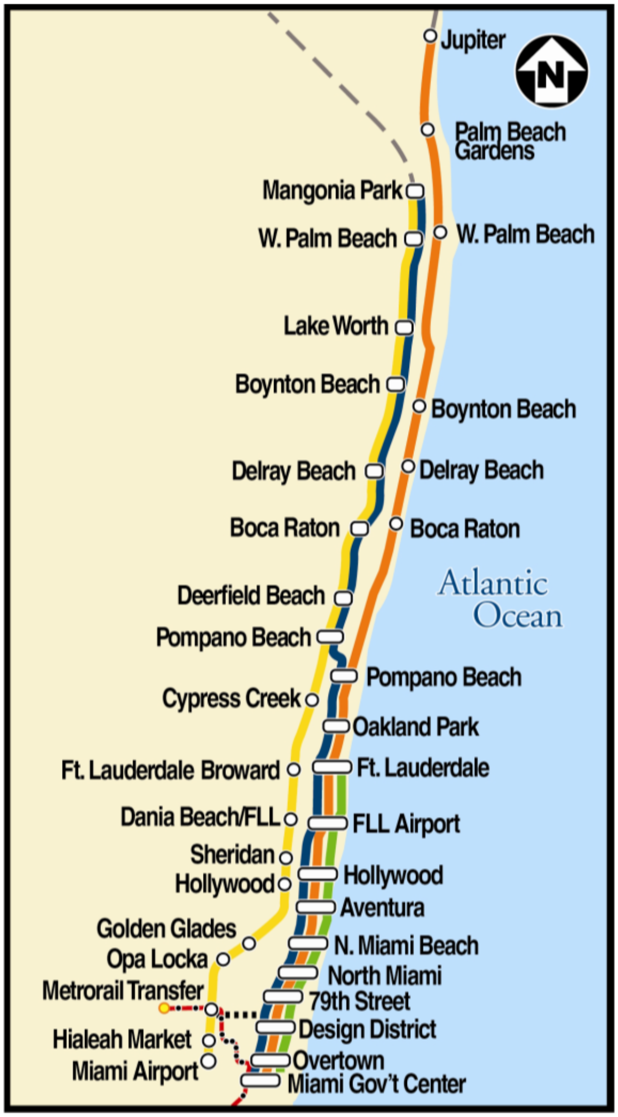

Figure 7: Potential Future Commuter Rail

Tri-Rail provides commuter rail service between Mangonia Park in Palm Beach County and the Miami Intermodal Center adjacent to MIA. The service operates on the CSX rail tracks and is operated by the South Florida Regional Transportation Authority. Users on Tri-Rail can reach Downtown Miami indirectly via a transfer to Metrorail which can occur at two different stations.

There are currently multiple plans for additional commuter rail and intercity rail along the Florida East Coast (FEC) Rail line, which as the name implies, lies along the east coast of Florida and provides direct service to Downtown Miami. Currently it is unclear as to who will provide what kind of rail service, with what kind of frequency, and between what cities. There is a proposal to provide inter-city rail service between Orlando and Downtown Miami with stops in Palm Beach and Ft. Lauderdale. There are also plans underway to provide commuter rail service between Jupiter and Downtown Miami with more frequent stops. Regardless of the type of service provided, a major station is being planned in Downtown Miami along the FEC Railroad tracks adjacent to the Overtown Metrorail Station and extending south toward the Government Center Station. The FEC station is proposed to go over the Metromover facilities near the Wilkie Ferguson Metromover Station.

2 Initial Tier 1 Alternative Concepts

The purpose of this effort is to analyze various alternatives for consideration that will provide direct transit access to PortMiami. This study evaluated alternatives for several rail transit modes. Bus transit was not considered in detail because Miami-Dade Transit and private bus operators already provide this type of limited indirect service. The City of Miami's new Trolley service travels along Biscayne Boulevard and could be considered for limited service. However, rubber tire alternatives would not be able to accommodate the demand estimated nor the frequency required for any future Port-to-Downtown connection.

Each rail alternative considered, proposed both dual eastbound and westbound directions trackage and guideway to provide a constant loop from the connecting station to PortMiami. This will provide lower headways between transit vehicles and provide increased ridership capacity.

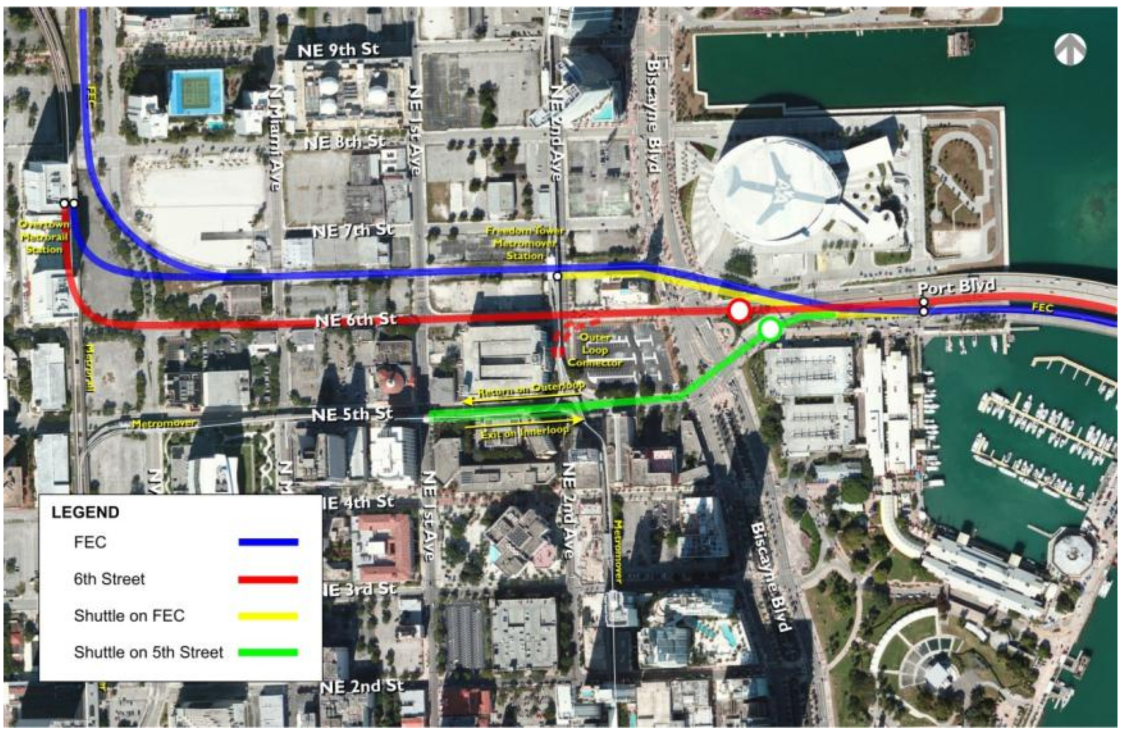

Figure 8: Potential Alignments

A total of eight alternatives were evaluated in Tier 1. These alignment alternatives are explained in the following paragraphs and shown in Figures 8 and 9.

1. Commuter Rail Service to the Port
2. Metrorail Extension to the Port
3. Metrorail Shuttle between Overtown and the Port
4. Metromover Shuttle between the Freedom Tower Station and the Port
5. Metromover Shuttle between Overtown and the Port

6. Metromover Outer Loop Extension from the Freedom Tower Station
7. Metromover Inner/Outer Loop Extension from the College North Station
8. Light Rail (Street Car) Shuttle from Overtown to the Port

Figure 9: Port Side Alignment

Figure 10: Metrorail in Downtown Miami

2.1 Alternative 1 – Commuter Rail Service to the Port

This alternative, as shown in Figure 14, proposes an extension of the commuter rail service to the Port. This option would have the potential to bring Port passengers and employees from the South Florida region directly into the Port. Passengers from the Airport and Metrorail would require a transfer from the Overtown Station. For this alternative to work, the FEC would need to reconsider the design of their Downtown Central terminal to allow the train to continue on to the Port. The service would cross the newly upgraded rail bridge onto the Port. New track would need to be laid on the Port side to serve the passenger terminals.

Figure 11: Metromover as a 1 Car Train

Figure 12: Light Rail Train at a Station in a Downtown environment

Figure 13: 3-car Commuter Rail in a Downtown environment

Because of operating limitations for speeds entering and exiting the stations and the size of the stations, it is assumed that only two stations would be provided. The first station would serve the future employment concentration in the southwest corner of the Port and the second station would serve the Port passengers. Moving sidewalks would be used to distribute passengers to the correct terminals.

2.1.1 Operating Plan

The commuter rail service to the Port would be provided as an extension of either the Florida Department of Transportation's planned South Florida East Coast Corridor service or the private All Aboard Florida service, as they are developed. The service would utilize the trains as they are made up to serve Downtown Miami. Headways would also be dictated by the service provided. It is assumed that service would match Tri-Rail service – 20 minutes in the peak hour, 30 minutes in the peak period, and hourly service during the off-peak.

The trains would enter the Downtown Central Terminal and allow transfers from Metrorail and Metromover heading for the Port. Port-bound passengers from the north would remain on the train which would pull out to a switch back to the main line, reverse direction, and proceed to the Port. Passengers leaving the Port would return to the Central Terminal through a similar series of movements.

2.1.2 Costs

This alternative as a two-mile extension would not require additional vehicles for this operation. The existing track and rail bridge have already been upgraded as a part of an early TIGER II grant. The only capital cost would be the additional track on the Port side and the construction of at-grade stations.

2.1.3 Capacity

The average two level commuter railcar holds approximately 150 seated passengers per vehicle with adequate room for luggage. Train length is limited by platform size.

2.1.4 Opportunities

This alternative would provide the following benefits
- This alternative would be implemented simultaneously with either of the FEC projects.
- There would be little incremental additional cost to the service.
- Offers the highest capacity vehicles.

2.1.5 Drawbacks

- This alternative would have a very low capacity because of the limited headways proposed for the service
- The service would operate at-grade across Downtown impacting traffic on all major north/south arterials.
- Federal Rail Administration standards would need to be implemented along the rail bridge to accommodate both passenger and freight movements.
- The service frequency would be tied to Commuter Rail operations along the corridor and may not serve the needs of cruise passengers.
- Mixing increased freight operations and passenger service across a one-track bascule bridge will likely lead to undesirable service conflicts. Moreover, the funding received for improvements to the bridge was tied to increased freight operations to the Port, not commuter service.
- Operating limitations will limit the number of stations for this service and
- The plans for construction of the rail passenger station in Downtown would require substantial maneuvering and switching to serve both facilities.

Figure 14: Alternative 1

2.2 Alternative 2 – Metrorail Extension to the Port

This alternative proposes a 1.9-mile elevated Metrorail extension from the Historic Overtown/Lyric Theatre Metrorail Station to PortMiami. See Figure 15. There are two operating scenarios for this alternative:

1. Re-orientation of existing service so a direct line is operated from the MIC station to PortMiami.
2. Re-orientation of service so that there is a direct line from Dadeland South to PortMiami.

A straddle bent type elevated guideway structure will be required in order to provide sufficient vertical and horizontal clearance without encroaching on either the FEC Railroad corridor or on NE 6th Street. The proposed Metrorail extension will be elevated above the Freedom Tower Metromover Station at NE 2nd Avenue thereby requiring a third level structure that will be approximately 50-ft to 60-ft above the existing ground. This alternative will also provide a new station on-site at the American Airlines Arena.

A Metrorail extension to the Port will not be able to use the existing bridges for the guideway and will require bridging the Intracoastal Waterway with a new structure. Depending upon the timing of the construction of the rail line, either two or three stations will be constructed at the Port.

The length of the rail line inside the port will be directly dependent upon the timing of the cruise terminal development. The first station will be located in the southwest corner of the Port to serve the proposed World Trade Center. The second and third stations will serve the cruise terminals. A cross-over will be required at the PortMiami Metrorail terminus point to connect the eastbound and westbound track alignments.

2.2.1 Operating Plans

2.2.1.1 Operating Option A

Operating option A is based on a new service pattern – MIC to the Port via a switch at the Overtown station. Service on the Palmetto and MIA patterns would remain the same as current; the new pattern would operate as an additional service. Another option would be to operate two lines: one from Dadeland to the Palmetto and one from the MIC to the Port.

- Headways: Assume 20 minute peak headways and 30 minute off-peak headways on the additional service.
- Vehicles: Two car trains are assumed – three trains in the peak period and two trains in the off-peak period.
- Comment: This configuration would require a transfer for all passengers except those originating at stations between the MIC and Overtown. The transfer would be convenient and occur in the Overtown station. A transfer would be inconvenient for cruise passengers with baggage and unfamiliar with Metrorail.

Figure 15: Alternative 2

Currently, Metrorail operates at 5 minute peak hour headway between Earlington Heights to Dadeland South. The switching system on the Metrorail system is limited to 3.5 minute headways so it would not be possible to insert a third operating line, using current headways, between Earlington Heights and Dadeland South. Therefore, current operating plans would need to be adjusted to accommodate the new line.

2.2.1.2 Operating Option B

This option is based on a new service pattern –Dadeland South to the Port via the switch north of the Government Center Station. Service on the Palmetto and MIA patterns would remain the same as current; the new pattern would operate as an additional service. Combining the Port pattern with the current pattern would disrupt service levels north of Downtown; this is considered unacceptable.

- Headways: Assume 20 minute peak headways and 30 minute off-peak headways on the new route.
- Vehicles: Two car trains are assumed – three trains in the peak period and two trains in the off-peak period.
- Comment: This configuration would require a transfer for passengers originating north of Government Center. The transfer would be convenient and occur in the Government Center Station. A transfer would be inconvenient for cruise passengers with baggage and unfamiliar with Metrorail.

Currently, Metrorail operates at 5 minute peak hour headways between Earlington Heights to Dadeland South. The switching system on the Metrorail facility is limited to 3.5 minute headways so it would not be possible to insert a third operating line, using existing headways, between Earlington Heights and Dadeland South. Therefore, headways on the existing lines would need to be adjusted to accommodate this option.

2.2.1 Metrorail Turning Radii

Minimum Metrorail turning radius is 1270 feet. In order to extend the Metrorail tracks from the curve north of the Overtown Station to the FEC track, the maximum radius that can be obtained is 650 feet. In order to extend the Metrorail to NE 6th Street, the maximum curve that can be obtained is about 850 feet. Therefore, none of the extension options for Metrorail are feasible from a design perspective.

2.2.2 Costs

The 1.9-mile guideway has a per mile cost of $210 million (recent Airport extension estimate) and would be the highest. The cost of the elevated stations is very high. Miami-Dade Transit has sufficient vehicles to operate this service so additional vehicles would not need to be purchased.

2.2.3 Capacity

Metrorail cars have an average seating capacity of 60 passengers depending upon configuration. Miami-Dade Transit operates 4-car trains during the peak period and stations are designed to accommodate 8-car trains. The new elevated stations and vertical circulation systems must be designed to handle the crush loads of Arena events and weekend peak period cruise ship debarkation.

2.2.4 Opportunities

- Could provide direct one seat ride from MIA to the Port or from Dadeland to the Port.
- Seated capacity of the trains can more comfortably handle the crush loads.

2.2.5 Drawbacks

- Fatal Flaws - the maximum radius available from Overtown Station to the NE 6th Street or to the FEC alignment is 600 feet. The minimum radius coming out of a station should be at least 1,000 feet.
- Highest cost alternative
- An elevated structure adjacent to the historic Freedom Tower will create an impact.
- Metrorail construction will require a new bridge across the Intracoastal Waterway to get to the Port. This will increase the costs and duration of the environmental process.

2.3 Alternative 3 – Metrorail Shuttle between Overtown and the Port

This alternative, shown in Figure 16, proposes a 1.9-mile Metrorail shuttle operation from the Historic Overtown/Lyric Theatre Metrorail Station to PortMiami using either the FEC corridor or the NE 6th Street corridor. Shuttle operations would not need to be integrated into the existing Metrorail service plans. This alternative will require the construction of a new station and vertical circulation for the Overtown terminus of the shuttle. A straddle bent type elevated guideway structure will be required in order to provide sufficient vertical and horizontal clearance without encroaching on either the FEC Railroad corridor or NE 6th Street. The proposed Metrorail alignment will be elevated above the Metromover line along NE 2nd Avenue thereby requiring a third level structure that will be approximately 50-ft to 60-ft above the existing ground. This alternative will also provide a new station on-site at the American Airlines Arena.

A Metrorail extension to the Port will require the construction of a new bridge across the channel. Depending upon the timing of the construction of the rail line, either two or three stations will be constructed at the Port. The length of the rail line will be directly dependent upon the timing of the cruise terminal development. The first station will be located in the southwest corner of the Port to serve the proposed World Trade Center. The second and third stations will serve the cruise terminals. A cross-over will be required at the PortMiami Metrorail terminus point to connect the eastbound and westbound track alignments.

2.3.1 Operating Assumption

- Headways: Trains could run frequently because of the very short distance of about 1.9 miles. Assume 10 minute peak headways and 20 minute off-peak headways. More frequent headways would be required on weekends to handle disembarking passengers.
- Vehicles: Two car trains are assumed – two trains in the peak period and one train in the off-peak period. Full 6-car trains will be needed to accommodate crush loads on the weekends.
- Comment: This configuration would require a transfer for all passengers. The transfer would be convenient and occur in the proximity of the Overtown station. A transfer would be inconvenient for cruise passengers with baggage and unfamiliar with Metrorail.

2.3.2 Costs

The cost 1.9 mile guideway has a per mile cost of $210 million and would be the highest. The cost of the elevated stations is very high. Miami Dade Transit has sufficient vehicles to operate this service without having to acquire new vehicles.

2.3.3 Capacity

Metrorail cars have an average seating capacity of 60 passengers depending upon the configuration. Miami-Dade Transit operates 4-car trains during the peak period and stations are designed to accommodate 8-car trains. The new elevated stations and vertical circulation systems must be designed to handle the crush loads of Arena events and weekend peak period cruise ship debarkation.

2.3.4 Opportunities

- This alternative does not require revision or impact to current Metrorail operations since it is only a shuttle service.
- Does not impact Metrorail operations during construction.
- A shuttle would be able to support various train lengths to meet demand for the debarkation of multiple large ships simultaneously.

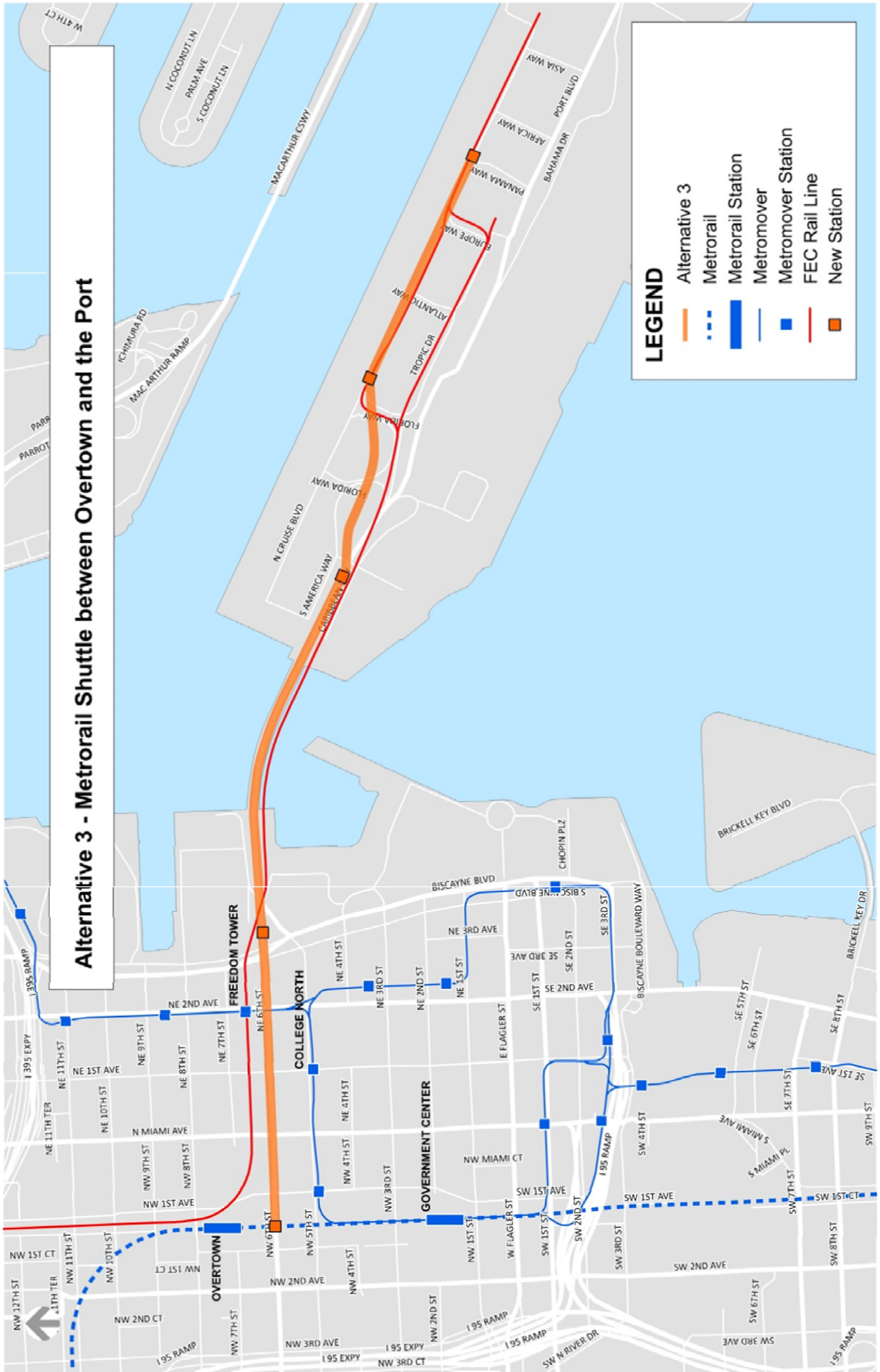

Figure 16: Alternative 3

2.3.5 Drawbacks

- Depending upon construction techniques, an alignment on NE 6th Street could take a lane of traffic or close the sidewalk.
- An elevated structure 50-60 feet in the air adjacent to the Freedom Tower will be an historic preservation issue.
- A new structure will need to be constructed across the channel to reach the Port at a significantly high cost. The environmental process for this alignment will be significantly drawn out due to the construction in the channel.
- Will need to connect the shuttle tracks back to the Metrorail mainline in order to access the maintenance and storage yard.
- An east-west oriented Metrorail station will be difficult to design given the height of the current Metrorail alignment at Overtown and the location, height, and size of the proposed commuter rail terminal.
- Will require transfer of passengers to reach the port.

2.4 Alternative 4 - Metromover Shuttle between Freedom Tower Station and the Port

As illustrated in Figure 18, this alternative is a 1.6 mile Metromover shuttle between the Freedom Tower Metromover Station (Figure 17) on the Omni Loop to PortMiami using the FEC Railroad corridor. A new transfer station will be required at the existing Freedom Tower Metromover Station to allow passengers to navigate between the Omni Loop and the PortMiami shuttle.

Figure 17: Freedom Tower Metromover Station

The existing Port Boulevard Bridge will be retrofitted by removing one (1) vehicular travel lane in the eastbound direction in order to provide sufficient spacing to accommodate the Metromover. Due to limited horizontal spacing on the Port Boulevard Bridge, a single transit guideway will be utilized. A dual transit guideway will be utilized before and after the bridge. This alternative will also provide a new station on-site at the American Airlines Arena. Depending upon the timing of the construction of the rail line, either two or three stations will be constructed at the Port. The length of the guideway will be directly dependent upon the timing of the cruise terminal development. The first station will be located in the southwest corner of the Port to serve the proposed World Trade Center. The second and third stations will serve the cruise terminals.

Figure 18: Alternative 4

2.4.1 Operating Plan

- Headways: Assumed 6 minute peak headways and 10 minute off-peak headways. On Saturday and Sunday mornings headways would need to be much higher to accommodate crush loads due to debarkation of multiple cruise ships.
- Vehicles: One car trains are assumed – four trains in the peak period and two trains in the off-peak period. Two car trains will be needed on the weekends.
- Comment: This configuration would require two transfers for most passengers. The transfer would be convenient and occur in the Freedom Tower station, and the frequencies are high. The transfers would be inconvenient for cruise passengers with baggage and unfamiliar with Metromover.

2.4.2 Costs

The per mile cost of the elevated Metromover is $174 million and the elevated stations are $28 million each. (Costs have been based upon the recently completed MIA Mover construction). Miami-Dade Transit only has 29 Metromover vehicles so additional vehicles would be needed. However, a new structure across the Intracoastal Waterway would not be needed since the existing port bridge could be retrofitted for this alternative.

2.4.3 Capacity

Each Metromover vehicle has a standing capacity of approximately 90 people. The current vehicles are configured for 12 seated passengers, with no secure area for luggage. Luggage requirements would cut the standing capacity in half. However, this is the most common form of cars used at airports where passengers and luggage regularly utilize. A separate shuttle would not limit the capacity of the Inner or Outer Loop and could operate vehicles as frequently as every 2 minutes to clear crush loads.

2.4.4 Opportunities

- This alternative will not impact operations on the Omni Loop either during construction or in operations.
- The Port Bridge was designed to support the Metromover Extension to the Port with minimal cost for retrofit.

2.4.5 Drawbacks

- A Metromover shuttle will require two transfers in the Downtown area.
- An elevated structure adjacent to the Freedom Tower could be an historic preservation issue.

Figure 19: Metromover Interior

- Will need to connect the shuttle tracks back to the Metromover mainline in order to access the maintenance and storage yard.
- Will need to construct a new station adjacent to the current Freedom Tower Station.
- The surge demands caused by the debarkation of multiple cruise ships simultaneously will likely overload the vehicle and the transfer station capacity.
- Additional Metromover vehicles will need to be acquired.
- Passengers will be forced to stand and control their luggage.

2.5 Alternative 5 – Metromover Shuttle between Overtown and the Port

This alternative, illustrated in Figure 20, proposes a 1.9-mile Metromover shuttle operation from south of the Historic Overtown/Lyric Theatre Metrorail Station to PortMiami utilizing the NE 6th Street corridor. This alternative will require the construction of a new station and vertical circulation for the Overtown terminus of the shuttle. The proposed Metromover alignment will be elevated above the existing Metromover line along NE 2nd Avenue thereby requiring a third level structure that will be approximately 50-ft to 60-ft above the existing ground. This alternative will also provide a new station on-site at the American Airlines Arena.

The existing Port Boulevard Bridge will be retrofitted by removing one (1) vehicular travel lane in the eastbound direction in order to provide sufficient spacing to accommodate the Metromover. Due to limited horizontal spacing on the Port Boulevard Bridge, a single transit guideway will be utilized. A dual transit guideway will be utilized before and after the bridge. Depending upon the timing of the construction of the rail line, either two or three stations will be constructed at the Port. The length of the rail line will be directly dependent upon the timing of the cruise terminal development. The first station will be located in the southwest corner of the Port to serve the proposed World Trade Center. The second and third stations will serve the cruise terminals. A cross-over will be required at the PortMiami Metromover terminus point to connect the eastbound and westbound track alignments.

2.5.1 Operating Assumption

- Headways: Trains could run frequently because of the very short distance of about 1.91 miles. Assume 10 minute peak headways and 20 minute off-peak headways. More frequent headways would be required on weekends to handle debarking passengers.
- Vehicles: Two car trains are assumed – two trains in the peak period and one train in the off-peak period.

- Comment: This configuration would require a transfer for all passengers. The transfer would be convenient and occur in the proximity of the Overtown station. A transfer would be inconvenient for cruise passengers with baggage and unfamiliar with Metromover.

2.5.2 Costs

The cost of the 1.9-mile guideway would be $174 million per mile. The cost of the elevated stations is high. Miami-Dade Transit would need to acquire additional vehicles to operate this service.

2.5.3 Capacity

Metromover cars have a standing capacity of 90 passengers. The current vehicles are configured for 12 seated passengers with no secure area for luggage. Luggage requirements would cut the standing capacity in half. A separate shuttle would not limit the capacity of the Inner or Outer Loop and could operate vehicles as frequently as every 2 minutes to clear crush loads.

2.5.4 Opportunities

- Can provide service with only one transfer downtown.
- Does not require revision to current Metromover operations.
- Does not impact Metromover operations during construction.
- A shuttle would be able to operate as many trains as necessary to meet demand for the debarkation of multiple large ships simultaneously.

2.5.5 Drawbacks

- Depending upon construction techniques, an alignment on NE 6th Street could take a lane of traffic or close the sidewalk.
- An elevated structure 50-60 feet in the air adjacent to the Freedom Tower will be an historic preservation issue.
- Additional Metromover vehicles will need to be acquired.
- Passengers will be forced to stand and handle their own luggage.
- Will need to connect the shuttle tracks back to the Metromover mainline in order to access the maintenance and storage yard.
- An east-west oriented Metromover station will be difficult to design given the height of the current Metrorail alignment at Overtown and the location, height, and size of the proposed commuter rail terminal.

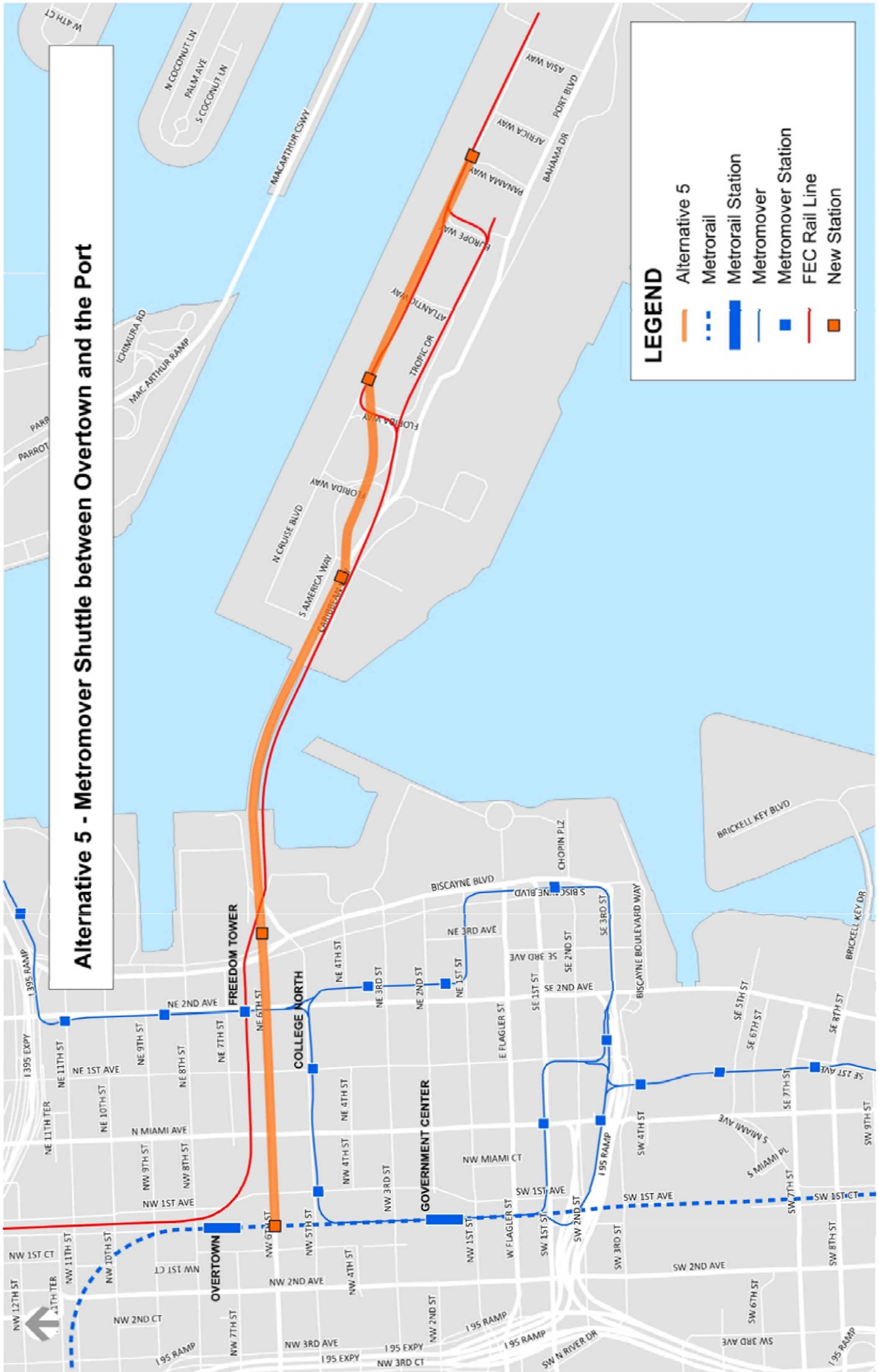

Figure 20: Alternative 5

2.6 Alternative 6 – Metromover Outer Loop Extension from the Freedom Tower Station

The alternative shown in Figure 21 proposes a 1.6 mile extension beginning just south of the Freedom Tower Metromover Station by providing a new mover switch to provide access to PortMiami.

The existing Port Boulevard Bridge will be retrofitted by removing one (1) vehicular travel lane in the eastbound direction in order to provide sufficient spacing to accommodate the Metromover. Due to limited horizontal spacing on the Port Boulevard Bridge, a single transit guideway will be utilized. A dual transit guideway will be utilized before and after the bridge. This alternative will also provide a new station on-site at the American Airlines Arena. The elevated guideway will be positioned on the south side of NE 6th Street to prevent encroachment on the Freedom Tower historical building. This will require removing one (1) vehicular travel lane from the roadway alignment. Pedestrian access will be maintained on both the north and south sides of NE 6th Street.

Depending upon the timing of the construction of the rail line, either two or three stations will be constructed at the Port. The length of the rail line will be directly dependent upon the timing of the cruise terminal development. The first station will be located in the southwest corner of the Port to serve the proposed World Trade Center. The second and third stations will serve the cruise terminals.

2.6.1 Operating Plan

Operate Metromover to the Port as an additional service operating on the Outer Loop. Every third train would leave the loop and travel to the Port via a new switch on the east side of the loop.

- Headways: Assume 4 minute peak headways and 6 minute off-peak headways.
- Vehicles: One-car trains are assumed – five trains in the peak period and four trains in the off-peak period.
- Comment: This configuration would provide one transfer service from the Government Center Metrorail station to the Port. The transfer would be convenient and occur in the Metrorail/Metromover station, and the frequencies are high. The transfers would be inconvenient for cruise passengers with baggage and unfamiliar with Metrorail and Metromover.

2.6.2 Costs

The elevated Metromover is $174 million per mile, and the elevated stations are $28 million each. Miami-Dade Transit only has 29 vehicles so additional vehicles will be needed.

Figure 21: Alternative 6

2.6.3 Capacity

Each Metromover vehicle has a standing capacity of approximately 90 people. The current vehicles are configured for 12 seated passengers, with no secure area for luggage. Luggage requirements would cut the standing capacity in half. Operations on the Port Loop would be limited to the capacity of the Outer Loop. However service on the Omni and Brickell Loops can be altered to put more vehicles on the Port Loop to clear crush loads.

2.6.4 Opportunities

- This alternative will only require one transfer in Downtown Miami to access the Port.
- The Port Bridge was designed to support the Metromover Extension to the Port.
- Shorter extension indicates potential for less cost.

2.6.5 Drawbacks

- Operations on the Omni Loop will be impacted during construction when the Port Loop is tied into the current track.
- The Outer Loop operates near its capacity so adding a third Loop to the Port will impact headways on the Omni and Brickell Loops.
- The capacity of the Metromover vehicles and the Outer Loop is likely to be severely overburdened during the simultaneous debarkation of multiple cruise ships.
- Additional Metromover vehicles will need to be acquired.
- Passengers will be forced to stand and control their luggage.

2.7 Alternative 7 – Metromover Inner/Outer Loop Extension from the College North Station

Figure 22: Metromover Switch Area at NE 5 Street and NE 2 Avenue

Figure 23 shows an alternative that proposes a 1.8-mile Metromover extension that would switch from the inner loop just east of the College/North Station to a new guideway that would have to cross the Outer Loop at the curve then cross the Omni Loop. The new line would proceed to a new Arena/Bayside Station then cross the bridge into the Port. It would return from the Port then the guideway would fly over the Omni Wye and merge into the outer loop proceeding in a counter-clockwise direction through the Government Center Station to the existing crossover wye just west of the Knight

Center. This cross-over allows trains to reverse directions between the loops. The existing Port Boulevard Bridge will be retrofitted by removing one (1) vehicular travel lane in the eastbound direction in order to provide sufficient spacing to accommodate the Metromover. Due to limited horizontal spacing on the Port Boulevard Bridge, a single transit guideway will be utilized.

A dual transit guideway will be utilized before and after the bridge. The elevated guideway will be positioned on the south side of NE 5th Street which will require removing one (1) vehicular travel lane from the roadway alignment. Pedestrian access will be maintained on both the north and south sides of NE 5th Street. Depending upon the timing of the construction of the rail line, either two or three stations will be constructed at the Port. The length of the rail line will be directly dependent upon the timing of the cruise terminal development. The first station will be located in the southwest corner of the Port to serve the proposed World Trade Center. The second and third stations will serve the cruise terminals.

2.7.1 Operating Plan

Operate Metromover to the Port as an additional service. This service would need to be integrated with both the Inner Loop and the Outer Loop.

- Headways: Assume 4 minute peak headways and 6 minute off-peak headways.
- Vehicles: One-car trains are assumed – five trains in the peak period and four trains in the off-peak period.
- Comment: This configuration would provide one transfer service from the Government Center Metrorail station to the Port. The transfer would be convenient and occur in the Metrorail/Metromover station, and the frequencies are high. The transfers would be inconvenient for cruise passengers with baggage and unfamiliar with Metrorail and Metromover.

2.7.2 Costs

The elevated Metromover is $174 million per mile, and the elevated stations are $28 million each. Miami-Dade Transit only has 29 vehicles so additional vehicles will be needed.

2.7.3 Capacity

Each Metromover vehicle has a standing capacity of approximately 90 people. The current vehicles are configured for 12 seated passengers, with no secure area for luggage. Luggage requirements would cut the standing capacity in half. Operations on the Port Loop would be limited to the capacity of the Inner and the Outer Loops. However, service on the Inner and Outer Loops can be altered to put more vehicles on the Port Loop to clear crush loads.

Figure 23: Alternative 7

2.7.4 Opportunities

- This alternative requires only one transfer in Downtown Miami to access the Port.
- This alternative would provide the shortest Metromover ride between Government Center and Port Miami.
- The Port Bridge was designed to support the Metromover Extension to the Port.

2.7.5 Drawbacks

- Construction will impact operations of both the Inner and Outer Loops as the Port Loop is tied into the existing tracks.
- Both the inbound and outbound tracks will need to be elevated over the Metromover north of the College/Bayside stations.
- Headways on both the Inner Loop and the Outer Loop will need to be adjusted to accommodate the new loop.
- The capacity of the Metromover vehicles is likely to be severely overburdened during the simultaneous debarkation of multiple cruise ships.
- Additional Metromover vehicles will need to be acquired.
- Passengers will be forced to stand and handle their own luggage.

2.8 Alternative 8 Light Rail (Street Car) Shuttle from Overtown to the Port

The Light Rail alternative, shown in Figure 24, provides a 1.9-mile light rail technology operating as a shuttle between the Overtown Metrorail Station to PortMiami. New tracks and overhead catenary lines would be constructed along NW/NE 6th Street and the Port Boulevard Bridge. This alternative will require the construction of all new at-grade stations along the length of the shuttle.

This alternative will also provide a new station on-site at the American Airlines Arena, and depending upon the timing of the construction of the rail line, either two or three stations will be constructed at the Port. The length of the rail line will be directly dependent upon the timing of the cruise terminal development. The first station will be located in the southwest corner of the Port to serve the proposed World Trade Center. The second and third stations will serve the cruise terminals. A cross-over will be required at the PortMiami Metrorail terminus point to connect the eastbound and westbound track alignments.

2.8.1 Operating Assumption

- Headways: Trains could run frequently because of the very short distance of about 1.9 miles. Assume 10 minute peak headways and 20 minute off-peak headways. More frequent headways would be required on weekends to handle debarking passengers.
- Vehicles: Two car trains are assumed – two trains in the peak period and one train in the off-peak period. Full 6-car trains will be needed to accommodate crush loads on the weekends.

- Comment: This alternative would require a transfer for all passengers. The transfer would be convenient and occur in the proximity of the Overtown station. A transfer would be inconvenient for cruise passengers with baggage and unfamiliar with the system.

Figure 24: Alternative 8

2.8.2 Costs

Light Rail costs were averaged from the 3 recently completed light rail extensions (Salt Lake City, Sacramento, and Dallas) for an average cost of $65 million per mile. The cost of the 1.9-mile guideway would be the lowest. The cost of the at-grade stations is minimal. All new vehicles would need to be acquired and a new maintenance and storage facility would need to be built in the vicinity of the Downtown.

2.8.3 Capacity

Light Rail cars have an average seating capacity of 60 passengers depending upon the configuration. As a shuttle, frequency and train lengths can be changed to accommodate anticipated demand. Stations can be sized to accommodate large crowds with luggage.

2.8.4 Opportunities

- Does not require revision to current Metrorail or Metromover operations.
- Does not impact Metrorail or Metromover operations during construction.
- A shuttle would be able to support various train lengths to meet demand for the debarkation of multiple large ships simultaneously.
- Would only require one transfer for all passengers in Downtown Miami.
- Light Rail operations are designed for frequent stop operations.
- Potential for a starter line for other light rail services in Central Miami and Miami Beach.

2.8.5 Drawbacks

- Light Rail operations will impact traffic operations on NE 6th Street and on the Port Boulevard Bridge.
- Light Rail operations will impact traffic operations on all north/south streets in Downtown Miami.
- Will need to acquire a new fleet of vehicles.
- Will need to construct a new maintenance and storage yard.
- Overhead catenary provides additional visual impacts to an already cluttered Downtown.

3 Port Bridge Suitability

A number of the alternative concepts included extension of either the Metrorail, the Metromover, or light rail over the existing Port Boulevard Bridge to provide access to PortMiami. The concepts assume the existing Port Boulevard Bridge will be retrofitted by removing one (1) vehicular lane in the eastbound direction in order to provide sufficient spacing to accommodate a transit guideway. This section addresses the preliminary feasibility and structural evaluation of the existing bridge to provide passage of a transit guideway.

The existing Port Boulevard Bridges (Bridge Nos. 875000 and 875001) were constructed in 1991 and consist of 16 segmental concrete box girder spans supported on hammerhead piers founded on driven pile foundations. The existing westbound bridge typical section consists of three travel lanes with reduced shoulders and a sidewalk separated by traffic railing. The existing eastbound bridge typical section consists of three travel lanes with reduced shoulders.

Per the original construction contract documents, Sheet 130 of 227, the eastbound bridge was originally detailed to provide a 10'-6" corridor located along the right (outside) edge of the deck to accommodate the "Downtown Component of Metrorail (DCM)" – the Metromover. In this configuration, provisions for a future traffic railing were made with threated couplers embedded in the deck and the following adjacent vehicular section, from left to right: a 1'-4 " traffic railing, 6'-0" inside shoulder, two twelve-foot travel lanes and a ten-foot outside shoulder, which complete the bridge deck. (See Figure 25 – Typical Section).

It should be noted that the traffic railing width which separated the DCM corridor from the travel lanes per the original construction plans was 1'-4" in width; the current traffic railing width is 1'-6" which will require adjustment of the typical section. Final evaluation for the required horizontal clearance to the Metromover and the resulting typical section should be conducted during subsequent investigation.

The original design loading for the placement of the DCM was based on the following live load limitations, as stated in the original construction documents plan sheet 23 of 227:

- No more than two fully loaded vehicles (27 kips per axle, crush load) (20' axle spacing) will be allowed on the bridge anytime, except as indicated below.
- Only two fully loaded vehicles (27 kips per axle) pulling or pushing two fully loaded vehicles (27 kips per axle) at a velocity of two miles per hour, or placed stationary, bumper-to-bumper, resulting from a system breakdown shall be allowed anywhere in the bridge. For such condition, vertical impact, centrifugal force and horizontal impact will be zero. Further, such load condition shall be considered for AASHTO groups III and IV only.

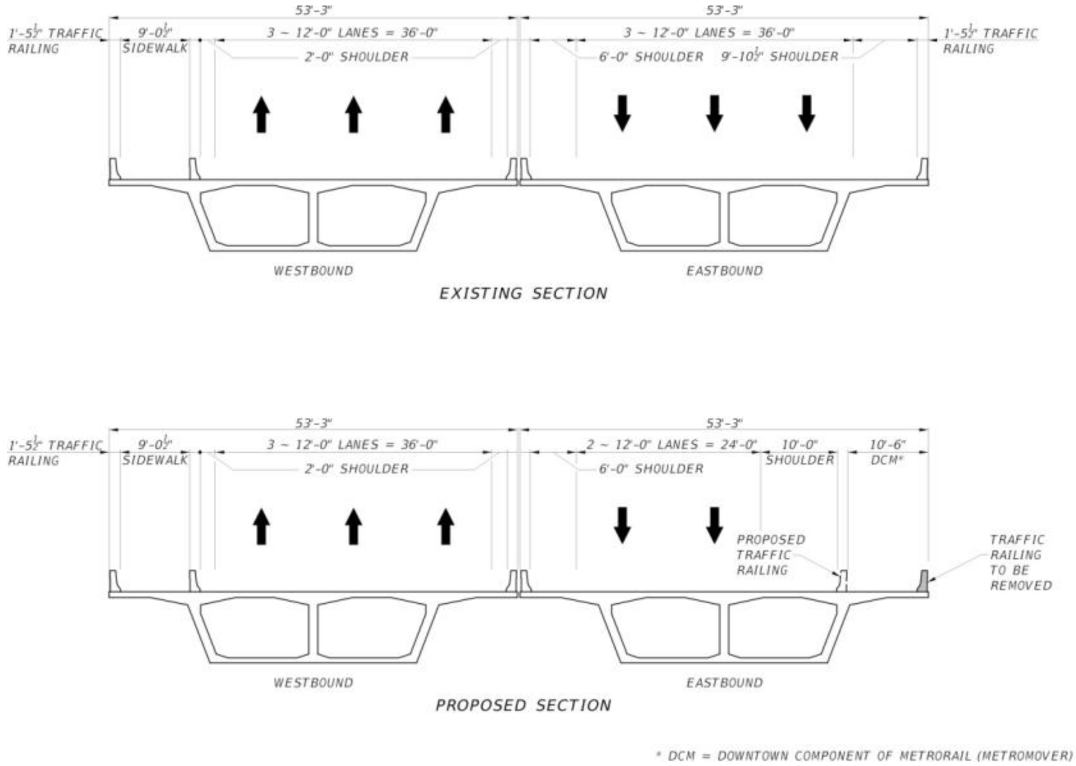

Figure 25: Port Boulevard Bridge Typical Section

The design of the bridge was based on the 1983 Edition AASHTO Standard Specifications for Highway Bridges, which included the provisions for a live load vehicle composed of an HS 20-44 truck or lane loading. The bridge was designed to satisfy the Load Factor Design requirements of the AASHTO Bridge Design Specifications and Post-Tensioning Institute Design and Construction Specifications of February 1988 for Segmental Concrete Bridges.

The existing bridges consist of two cell precast/cast-in-place concrete post-tensioned concrete box girders. The design location of the DCM, as indicated on Sheet 130 of 227, was on the right overhang or wing of the eastbound bridge. Review of the existing construction plan documents reveals that the reinforcing and post tensioning of the existing bridges is symmetric to the centerline of the bridge. Further, the reinforcing and tendon layout is the same for the eastbound and westbound bridges.

According to the August 21, 2012 inspection report, load rating of the existing bridge was performed on 4/6/2003 and the bridge currently has an Operating Rating of 70.92 tons and an Inventory Rating of 43.92 tons. Based on this analysis, the bridge is at or above the legal loads and does not require weight restriction posting. The inspection report does not appear to indicate structural deficiencies which would alter the load rating analysis.

Based on this review of the existing bridge, in both the original design and current conditions, **the Port Boulevard Bridge appears to have sufficient structural capacity to support the proposed Metromover Extension to the PortMiami.** It is recommended that the design loading of the proposed Metromover fall within the limits of the DCM loading presented herein and based on the original design.

However, the crush load for the Metrorail is shown to be 110.9 kips which is much greater than the Metromover load. Based on this comparison**, it is clear that the existing Port Boulevard Bridge will not be capable of handling the Metrorail loading.**

Further evaluation of the bridge based on the final configuration should be performed with considerations for the current bridge condition, including any subsequent inspections performed. Investigation into the capacity of the structure based on current design criteria should also be performed.

4 Ridership Estimates

The potential users of a future transit link can be segregated into the following categories:

- Cruise Passengers
- Port Employees
- Visitors
- Future demand from commercial development
- Others users outside the Port along the new corridor (i.e. Bayside and AA Arena)

Each of the user types responds to a different demand pattern and schedule and, as such, it was important to estimate the demand generated by each.

Since no detailed information was in existence about many of these potential users, a variety of techniques were utilized to generate ridership demand; these are shown in Table 1 below.

Table 1: Ridership Demand Techniques

Ridership	Information needed	Source	Method
Cruise passengers	Percent by source market	Cruise lines	Interviews
Port employees	Numbers and propensity	Major employers	Surveys
Future development	Master Plan	ITE	Standard travel forecast method
Arena / Bayside	Annual visitors and number of events	AAArena, Bayside, Bayfront Trust, DDA	Interviews
Business visitors	Demand	Major employers	Surveys of employers

4.1 Workers at the Port

PortMiami has one of the largest concentrations of employees in the Downtown area. Employees can be divided into the following groups:

- Seaport Department employees
  - Support
- Tenants
- Government Personnel

- Cargo
  - Permanent
  - On-call
  - Truckers
- Cruise
  - Permanent
  - Terminal operations

A variety of sources were used to determine the overall employment population at the Port, among them were past economic impact studies, employee information from major employers and an inventory of tenants and leasable space. A summary of employment by certain major population segments is shown in Table 2. The table shows three categories of people: those permanently stationed at PortMiami, those stationed elsewhere, and employees that commute to work at PortMiami, without necessarily having to report to an office, but rather work in the yards or terminals.

Another source used, is the inventory of leasable space at the port. This totals approximately 286,000 SF, and assuming an employee density of 6 people per 1,000 SF, this equates to a population of 1,700 employees.

When all the sources are brought together, the result of people that must travel to PortMiami as employees, either as permanent or part-time is shown in Table 2. This table shows an estimate of approximately 7,000 people working on the island at different times in 2012.

Subsequently, based on the forecast growth of the port in its major business lines of cargo, cruise and development, these numbers have been extrapolated outward through the Master Plan period of 2035 and shown in Figure 26. It is important to note that one of the planned areas of growth is the proposed World Trade Center Complex which has not yet been approved and which may change overtime.

Table 2: Employment Base at PortMiami					
	Employ	% on transit with free parking	# of transit riders	% on transit with $10 parking	# of transit riders
Surface Transportation					
Rail	236	0	0	0	0
Truck	1,563	0	0	0	0
Maritime Services					
Terminal Employees	480	5%	24	10%	48
ILA/Dockworkers	508	1%	5	5%	25
Towing	14	1%	0	5%	1
Pilots	33	1%	0	5%	2
Agents	84	5%	5	10%	8
Maritime Services	224	3%	7	7%	16
Warehousing/Consolidators/Forwarders	507	2%	10	6%	30
Government	393	7%	27	14%	55
Marine Construction/Dredging	215	4%	8	8%	17
Barge	46	1%	1	5%	2
Tenants	26	5%	1	10%	3
Banking Insurance Law	39	5%	2	10%	4
Port Authority*	417	2%	8	5%	21
Leasable Space	1,700	5%	85	10%	170
Commute Trips between downtown/Port	2,000	5%	100	10%	200
Total	6,786		283		607
Forecast World Trade Center	8,000	7%	560	14%	1,120
Forecast Employment Transit Users			843		1,727
Boardings from Port Employees (times 2)			1,686		3,454

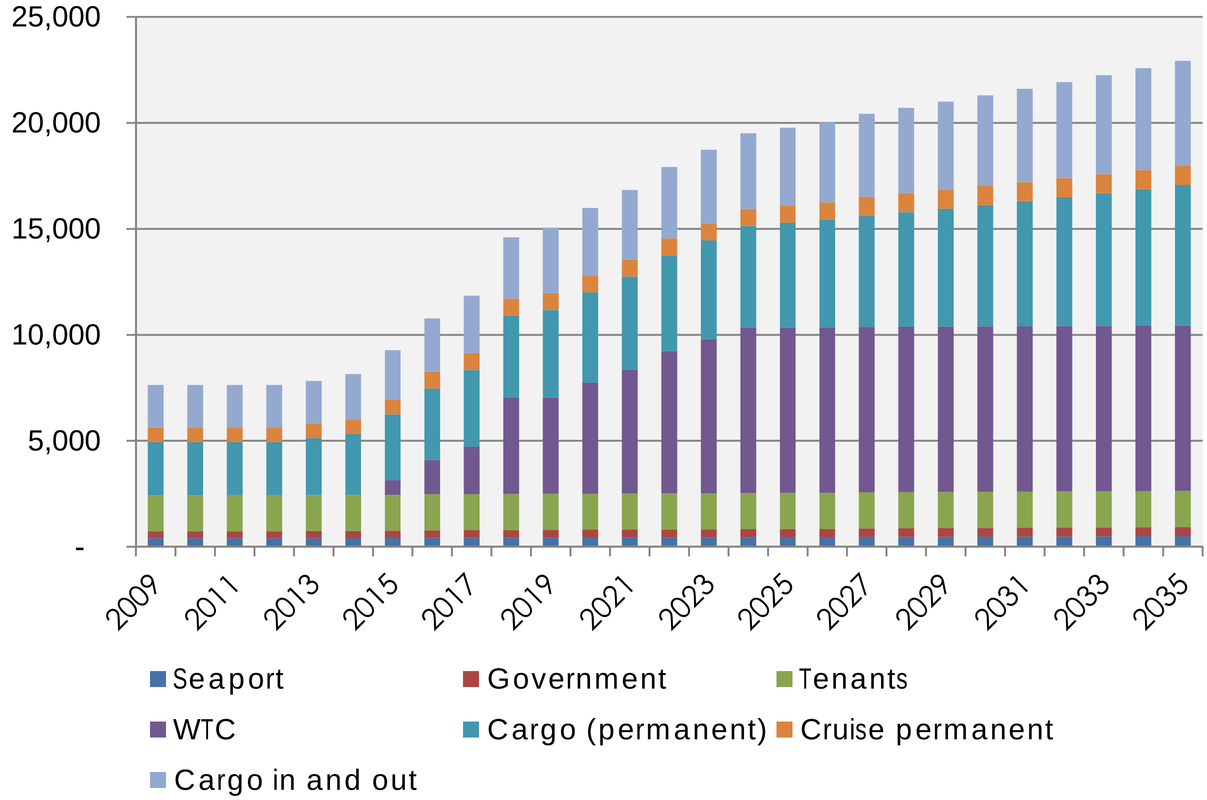

Figure 26: Forecast Employment at Port Miami

To further determine potential ridership, an online and employer distributed survey was completed of the current employees at the Port. The results provided a meaningful sample as there was overwhelming response with 687 surveys collected and analyzed. Such a sample size is significant and gives great weight to these results.

Among the findings of the survey were:

- 84% of the employees commute 5 days per week
- 67% to 72% commute at the normal peak hours of the day
- 87% of the employees commute by private vehicle and only 9% use the current bus service
- 82% of the employees do not leave the Port once they arrive
- About 60% are interested in using mass-transit if available
- And 66% would change travel patterns if parking was not free at the Port

Based on the above and the forecast population, employee potential ridership estimates are shown above in Table 2. This is an unconstrained forecasts without yet having a particular technology and alignment, and the final estimates will be reduced based on the configuration.

4.2 Passengers

Cruise passengers are the other major source of ridership. To determine the potential use of a mass transit system, the study has taken a different approach than was previously done for the east-west study. When the last ridership study of cruise passengers was done, the air-sea combination was the predominant travel pattern for cruise passengers. Cruise lines used to book the packages as a unit and, as such, the major travel pattern was an airport to port connection. Since then, travel patterns and business models have changed dramatically, and a larger amount of passengers now drive to the Port from longer distances. This has resulted in an explosion of parking demand at the Port. Most cruise lines no longer book air service for their guests. As such, to determine ridership, it was important to establish source markets for passengers.

This information combined with the Port's forecast for passengers as shown in Figure 27, and the seasonality patterns also provided in the Master Plan yields a forecast of ridership by location. These have also been correlated with studies done at MIA to determine the number of cruise passengers arriving and departing by air.

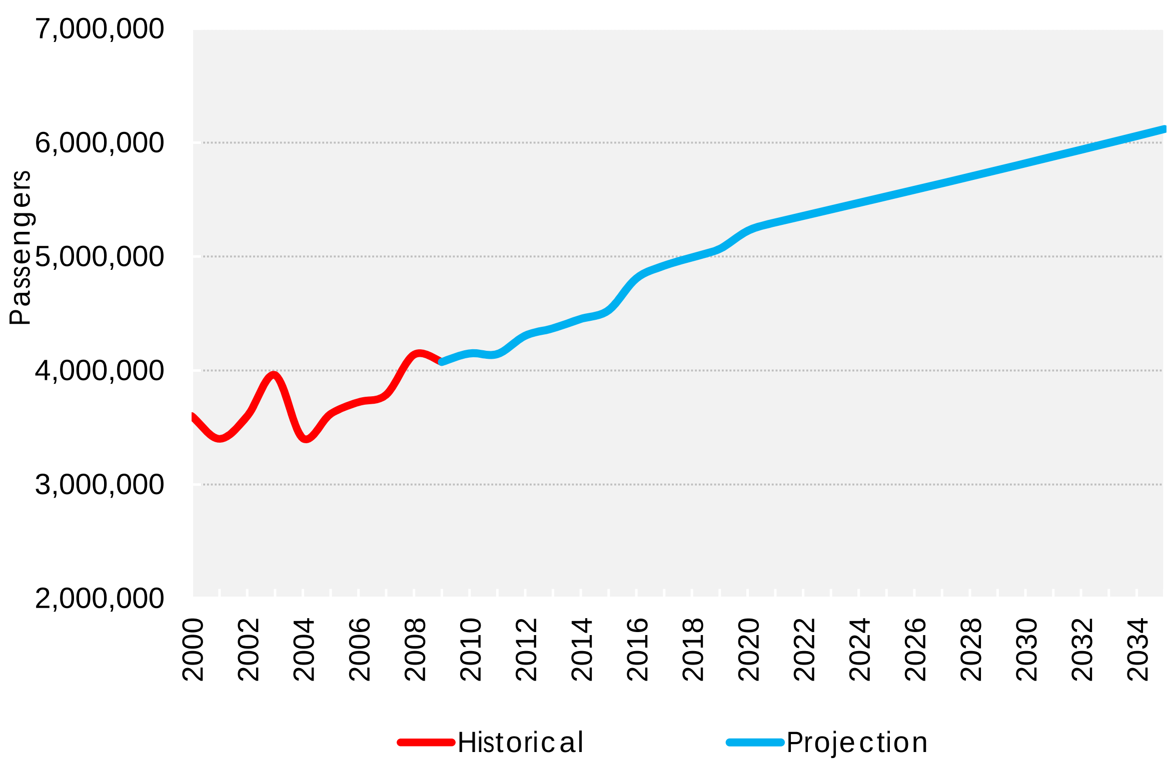

Figure 27: PortMiami's Passenger Forecast

The cruise passenger ridership potential is shown in Figure 28 by source market. A series of assumptions were made to achieve the geographic distribution of passengers:

- A percentage of US and International passengers would be coming from MIA and only would use the system one-way as it is assumed that, in one direction or another, the passenger might be staying in Miami and not traveling between the airport and seaport.
- The number of passengers (only US and International ridership) using airport by correlating the airport surveys with the surveys undertaken as a part of this study. (67%)
- The local and Tri-County ridership's was calculated at 30% and 35%.
- Luggage will be handled by the passenger and, as such, the more transfers that the passenger needs to make, the higher the drop-off of users.
- The system would not capture any passengers coming from or to Florida (outside of the Tri-County area) as they would be traveling by car.
- Parking for cruise passengers at the Port remains at or above the current rates.

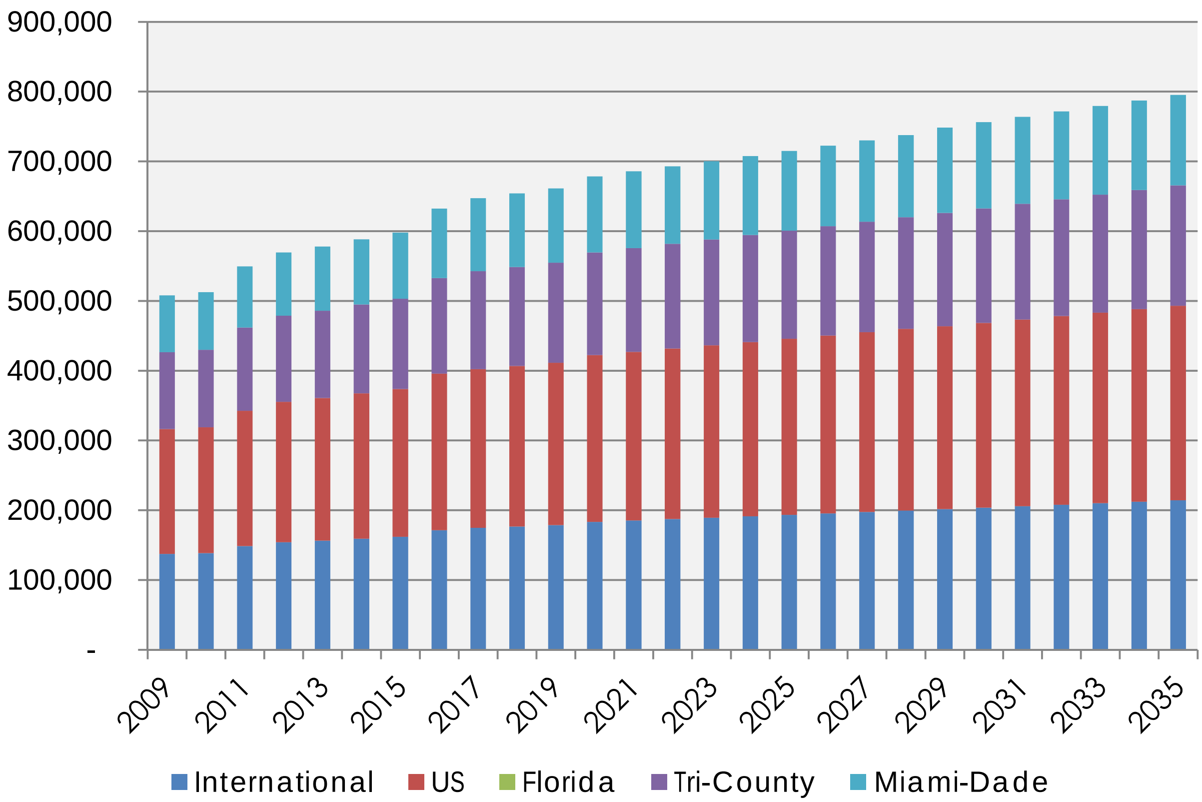

Figure 28: Annual Cruise Passenger Ridership potential by source location

Cruise passenger ridership (Shown in Figure 28) was then calculated per the following methodology:

- First the ridership was divided by source market (International, US, Florida, Tri-County, Miami-Dade County) based on data received from the cruise lines.
- The next step was to subdivide the ridership into 3-4 day cruises, 7-day cruises, and longer cruises derived from master plan.

- Based on the fact that a passenger taking a one week vacation would need to pay over $140 in parking, the market capture ranged between 30% and 35% for different segment of those passengers that would be inclined to drive to the port from the service area of the different transit alternatives studied.
- A 50% factor to airport-seaport was assigned, as most people do not do a round trip from the air to sea; most have a pre or post.
- Providing and average rail capture rate of 12.5%.

4.3 Port Users and Ridership

Based on combining the above forecasts for employees, visitors, future development and passengers the forecast annual ridership is shown in Table 3. It appears that opening year for the Port Rail project could not be any earlier than 2025, so ridership projections are not shown prior to that date.

Table 3: Estimated Annual Boardings

	Projected Employees	Annual Boardings	Cruise Passengers	Cruise Boardings	Total Boardings
2013	7,800		4,643,000		
2015	9,300		4,807,000		
2020	16,000		5,441,000		
2025	20,000	996,800	5,739,000	700,000	1,696,800
2030	21,000	1,193,000	6,045,000	740,000	1,933,000
2035	23,000	1,477,000	6,361,000	790,000	2,267,000

4.4 Crush Loads

Figure 29: Parked Cruise Ships at PortMiami

Annual passenger forecast must be translated into daily and peak loads associated with cruise ship operations. On Saturdays during peak season, as many as 7 ships can dock at Port Miami in the morning. With the expansion of the terminals that number will grow to 9 ships in about 10 to 15 years. According to the Port's Master Plan, the average passenger load in 2013 is 2,400 per ship that would mean that 16,800 passengers are being deposited at the Port in a three hour window. Already however, many ships are carrying 5,000 passengers, and the Port Master Plan is expanding the terminals to accommodate 8 ships at a time by 2017. If the average passengers per ship grows to 4,000 passengers with 8 ships in Port at once, then 32,000 passengers would have to depart to Port area in three hours. Table 4 shows the calculations for the number of passengers per hour given these two scenarios.

Table 4: Cruise Passenger Crush Loads		
Assumption:	**7 ships at 2400 PAX/ship**	**8 ships at 4000 PAX/ship**
Debarking PAX:	**16,800**	**32,000**
Clearance time:	3 Hour Window	3 Hour Window
Passengers/Hour	5,600 PAX	10,666 PAX
Assume 12.5% on Rail	840 PAX/Hour	1,333 PAX/Hour

5 Tier 1 Evaluation

5.1 Project Feasibility

Based upon the potential for passenger ridership, it would appear that a transit extension to PortMiami is feasible. It also appears that engineering or environmental can be overcome so that rail service could be extended to PortMiami.

5.2 Tier 1 Evaluation Matrix

Table 5 summarizes the results of the Tier I assessment of the 8 alternatives.

Table 5: Tier 1 Evaluation Matrix

Alternatives	Operational Impacts	Passenger Convenience	Traffic Impacts	Capital Costs	Operating Costs	Feasibility
Commuter Rail	Medium	Poor	High	Low	Low	Feasible
Metrorail Extension MIC to Port	High	Good	None	Highest	High	Fatal Flaw
Metrorail extension From Dadeland	Very High	Fair to Good	None	Highest	Very High	Fatal Flaw
Metrorail Shuttle	None	Fair	High	Highest	High	Feasible
Metromover Shuttle from Freedom Tower	None	Poor	None	High	Medium	Feasible
Metromover Shuttle from Overtown	None	Fair	None	High	Medium	Feasible
Metromover Ext. from Freedom Tower	High	Fair	None	High	Medium	Feasible
Metromover Ext. on 5th Street	Very High	Fair	High	High	Medium	Feasible
Light Rail	None	Fair	High	Medium	High	Feasible

5.3 Recommended Tier 1 Alternatives

5.3.1 Alternative 1

The Commuter Rail Alternative is not recommended for further consideration because of the high potential for operational conflicts between the passenger and the freight operations across the single track bascule bridge and the limited headways on the commuter rail serving the Port during crush loads. However, if any of the potential passenger rail operators choose to bring passenger rail into the Port on existing rail lines, this supplemental service would be feasible.

5.3.2 Alternative 2

The Metrorail Extension should not be considered further due to a fatal flaw with inadequate curve radius.

5.3.3 Alternative 3

The Metrorail Shuttle should continue to be evaluated as an alternative because of passenger capacity available for crush passenger loads (will become the new Alternative 1).

5.3.4 Alternative 4

The Metromover Shuttle from Freedom Tower should be dropped because of the level of service offered to the passenger by requiring two transfers for all passengers bound for the Port.

5.3.5 Alternative 5

The Metromover Shuttle from Overtown will continue to be evaluated because of lower Operating and Maintenance costs and lack of impacts (will become new Alternative 2).

5.3.6 Alternative 6

The Metromover Extension from the Freedom Tower Station should be retained because of the simplicity of implementation (will become new Alternative 3).

5.3.7 Alternative 7

The Metromover Extension from the College North Station should be dropped because it impacts every aspect of the Metromover operations during construction and operation and requires a difficult switching structure for trains bound for the Port.

5.3.8 Alternative 8

The Light Rail Alternative appears to provide a suitable level of passenger service at a reasonable cost (will become the new Alternative 4).

6 Tier 2 Alternatives

6.1 Alternative 1 – Metrorail Shuttle between Overtown and the Port

This alternative proposes a Metrorail Shuttle from the Historic Overtown/Lyric Theatre Metrorail Station to PortMiami utilizing the NE 6th Street corridor. The proposed Metrorail line will be elevated above the Metromover line along NE 2nd Avenue thereby requiring a 3rd level structure that will be approximately 50-ft to 60-ft above the existing ground. Two options of this alternative are provided below that will have differing impacts on the NE 6th Street roadway users.

- **Option 1 -** This option proposes a straddle bent type elevated guideway structure to provide sufficient vertical and horizontal clearance without encroaching on the vehicular travel lanes along NE 6th Street. The straddle bent columns will be located within the existing sidewalk corridor; therefore, pedestrian access will be prohibited with this option. Vehicular access will be maintained on NE 6th Street with this option.
- **Option 2 -** This option proposes to use a single column type elevated guideway structure to provide sufficient vertical and horizontal clearance without encroaching on the pedestrian sidewalk corridor. The elevated guideway column will be located within the existing roadway corridor; therefore, vehicular access will be prohibited with this option. Pedestrian access will be maintained on NE 6th Street with this option. NE 6th Street is one way westbound and provides direct access between the Port and I-95. Even with the construction of the Port Tunnel this roadway route will always be necessary. Moreover, NE 6th Street also provides access to the Miami-Dade College Parking Garage**. Therefore, this construction option will be dropped from further consideration**.

The existing Port Boulevard Bridge has been analyzed and will not support a Metrorail guideway. Therefore, this alternative will require the construction of a guideway across the Intracoastal Waterway. This alternative will also provide a new station on-site at the American Airlines Arena. The configuration of the guideway within PortMiami will require horizontal curves that are longer in length to provide a smooth transition between tangent sections. A cross-over will most likely be required at the PortMiami Metrorail terminus point to connect the eastbound and westbound track alignments.

Because Metrorail is grade separated, it offers the fastest trip to the Port with an average speed of 30 miles/hour.

The Alternative would incur the cost of extensive station modifications at Overtown and the construction of a new station at Overtown. It would not impact current Metrorail operations. This option would require 100% of the Port passengers to transfer. This option would still require switching tracks to be constructed so the trains could return to the maintenance/storage yard. It appears that the connection back to the existing Metrorail facility would need to occur between the Culmer Station and Civic Center Station. This connection would be lengthy and cause a major impact on the Overtown area.

6.1.1 Crush Load

On Saturday and Sunday between November and April the Port can have seven ships debarking passengers simultaneously. The average number of passengers per ship is about 2,400 persons. With the Master Plan, the number of cruise ship berths and the size of the cruise ships will be increasing. There are already ships that accommodate 5,000 passengers; however, for this study, it is assumed that the average capacity will be 4,000 passengers per ship. The following Table shows the number of vehicles that would need to be operating to carry the peak debarkation loads assuming that 12.5% of the passengers use the rail line to access the Port.

Table 6: Alternative 1 Crush Loads

	Opening Year	Build Out
Assumption:	**7 ships at 2,400 PAX/ship**	**9 ships at 3000 PAX/ship**
Debarking PAX:	**16,800**	**32,000**
Clearance time:	3-Hour Window	3-Hour Window
Passengers/Hour	5,600 PAX	10,666 PAX
Assume 12.5% on Rail	700 PAX/Hour	1,333 PAX/Hour
Metrorail with 60 seated PAX/car	12 cars/hour	22 cars/hour

A one-way trip on the shuttle could be completed in 7 minutes, providing a 15 minute round-trip. Therefore, each train can complete 4 trips during peak hours, resulting in a demand for 8 vehicles to operate the shuttle. MDT currently has 48 vehicles that are not used in peak service, so no additional vehicles would need to be acquired for this service.

6.1.2 Costs

Metrorail costs were estimated from the recently completed Airport Link (MIC/Earlington Heights Connection). That cost was $210 million per mile. Station costs are estimated from the elevated stations on the Honolulu elevated rail project where the stations averaged $24 million. The total cost of the Metrorail is about $739 million. This project assumes that there are sufficient cars in the Metrorail fleet to operate the shuttle as long as the track is connected to the main line

Table 7: Alternative 1 Costs

	Distance	# Stations	Guideways	Stations	Total
Metrorail Shuttle	1.9 miles	5	$399 million	$120 million	$519 million
Tie into Existing	1.05	--	$220 million		$220 million
					$739 million

Using 2011 NTD data for operating costs per revenue hour, MDT costs for Metrorail was $275 per revenue hour. It was estimated that the new Metrorail Shuttle Alternative would operate for approximately 10,500 revenue hours including weekends. The estimated annual operating and maintenance costs are estimated to be $2.88 million (2011 dollars).

6.1.3 Environmental Considerations

For Alternative 1 there were no identified impacts to wetlands or any identified adjacent historical resources. Land uses along the project consists of vacant non-residential, vacant residential, retail/office, public/semi-public and institutional. Four contamination sites were identified along the alignment.

The elevated east-west orientation of this Alternative is in close proximity to the elevated east-west Metromover will create a visual impact on this part of Downtown. The third level structure as it crosses the outer loop of the Metromover will also create a visual impact on Freedom Tower. The structure necessary to access the main Metrorail facility will cause a major impact to the Overtown Community. Finally the construction of a new bridge across the Miami Channel will require extensive environmental coordination and clearance prior to construction.

6.2 Alternative 2 – Metromover Shuttle between Overtown and the Port

This alternative proposes a 1.9-mile Metromover shuttle operation from south of the Historic Overtown/Lyric Theatre Metrorail Station to PortMiami utilizing the NE 6th Street corridor. This alternative will require the construction of a new station and vertical circulation for the Overtown end of the shuttle. The proposed Metromover alignment will be elevated above the existing Metromover line along NE 2nd Avenue thereby requiring a third level structure that will be approximately 50-ft to 60-ft above the existing ground. This alternative will also provide a new station on-site at the American Airlines Arena. It will cross the Port Boulevard Bridge onto the Port where three stations will be provided. The first station would be located in the southwest corner of the Port to serve the proposed high density commercial development (possible World Trade Center). Two additional stations will be provided front of the cruise terminals.

Even though it is grade separated, the Metromover provides the slowest trip to the Port with an average speed of 12 miles per hour.

6.2.1 Crush Load

On Saturday and Sunday between November and April, the Port can have seven ships debarking passengers simultaneously. The average passengers per ship is about 2,400 persons. With the Master Plan, the number of cruise ship berths and the size of the cruise ships will be increasing. There are already ships being designed to accommodate 4,000 passengers, however for this study it is assumed that the average capacity of will be 4,000 passengers per ship. Table 8 shows the number of vehicles that would need to be operating to carry the peak debarkation loads assuming that 12.5% of the passengers use the rail line to access the Port.

Table 8: Alternative 2 Crush Loads

	Opening Year	Build Out
Assumption:	**7 ships at 2,400 PAX/ship**	**9 ships at 3000 PAX/ship**
Debarking PAX:	**16,800**	**32,000**
Clearance time:	3-Hour Window	3-Hour Window
Passengers/Hour	5,600 PAX	10,666 PAX
Assume 12.5% on Rail	700 PAX/Hour	1,333 PAX/Hour
Metromover with 40 seated PAX/car	18 cars/hour	34 cars/hour

The Metromover vehicle has a standing capacity of 90 passengers. 40 passengers per vehicle was assumed for this study to account for large amounts of luggage. The operation of two-car trains on Saturday and Sunday morning would require 17 trains per hour to depart the Port at 3.5 minute headways. Each train would be able to make the one-way trip in 10 minutes (6 minutes running time and 4 minutes dwell time) so each vehicle would make 3 round trips per hour –requiring 12 new vehicles.

6.2.2 Costs

Metromover costs were estimated from the recently completed MIA Mover. That cost was $174 million per mile. Station costs are estimated from the Airport station at a cost of $28 million. The cost of construction for the Metromover is about $470 million. This project assumes that there are no extra cars in the Metromover fleet so all new vehicles will need to be purchased bringing the total construction cost to $498.8 million. The MIA Mover costs included the storage facility for a stand-alone system.

Table 9: Alternative 2 Costs					
	Distance	# Stations	Guideway	Stations	Total
Metromover	1.9 miles	5	$330 million	$140 million	$470 million
Vehicles	# Vehicles	Cost/vehicle			
	12	$2.4 million			$28.8 million
Total					$498.8 m

Using 2011 NTD data for operating costs per revenue hour, MDT costs for Metromover was $215 per revenue hour. It was estimated that the new Metromover Shuttle Alternative would operate for approximately 10,500 revenue hours including weekends. The estimated annual operating and maintenance costs are estimated to be $2.2 million (2011 dollars).

6.2.3 Environmental Considerations

For Alternative 2 there were no identified impacts to wetlands. Land use consists of Vacant Nonresidential, Vacant Residential, Retail/Office, Public/Semi-Public and Institutional. Four contamination sites were identified along the alignment. The elevated alignment will visually impact the historic Freedom Tower.

6.3 Alternative 3 – Metromover Outer Loop Extension from the Freedom Tower Station

This alternative proposes to provide an extension beginning just south of the Freedom Tower Metromover Station by providing a new railway switch to provide access to PortMiami. The elevated guideway will be positioned on the south side of NE 6th Street to prevent encroachment on the Freedom Tower historical building. This will require removing one (1) vehicular travel lane from the roadway alignment. Pedestrian access will be maintained on both the north and south side of NE 6th Street. This alternative will also provide a new station on-site at the American Airlines Arena/Bayside. The existing Port Boulevard Bridge will be retrofitted by removing one (1) vehicular travel lane in the eastbound direction in order to provide sufficient space to accommodate the Metromover. Due to limited horizontal spacing on the Port Boulevard Bridge, a single transit guideway will be utilized. A dual transit guideway will be utilized before and after the bridge. Once at the Port, three stations will be provided. The first station would be located in the southwest corner of the Port to serve the proposed high density commercial development (possible World Trade Center). Two additional stations will be provided front of the cruise terminals.

This Alternative would operate off the outer loop, which currently operates 2 routes – each on 6 minute headways for a combined headway of three minutes. The system can accommodate the addition of a third loop, but headways will need to be adjusted for all outer loop routes. If all routes continued at 6 minute headways, the additional loop would drop headways to 2-minutes. Operation of the three routes on the outer loop would need to be carefully monitored to maintain critical spacing between the trains.
Even though it is grade separated, the Metromover provides the slowest trip to the Port with an average speed of 12 miles per hour.

6.3.1 Crush Loads

On Saturday and Sunday between November and April the Port can have seven ships debarking passengers simultaneously. The average passengers per ship is about 2,400 persons. With the Master Plan, the number of cruise ship berths and the size of the cruise ships will be increasing. There are already ships capable of handling over 5,000 passengers, however for this study it is assumed that the average capacity will rise to 4,000 passengers per ship. Table 10 shows the number of vehicles that would need to be operating to carry the peak debarkation loads assuming that 12.5% of the passengers use the rail line to access the Port.

Table 10: Alternative 3 Crush Loads

	Opening Year	Build Out
Assumption:	**7 ships at 2,400 PAX/ship**	**9 ships at 3000 PAX/ship**
Debarking PAX:	**16,800**	**32,000**
Clearance time:	3-Hour Window	3-Hour Window
Passengers/Hour	5,600 PAX	10,666 PAX
Assume 12.5% on Rail	700 PAX/Hour	1,333 PAX/Hour
Metromover with 40 seated PAX/car	18 cars/hour	34 cars/hour

The Metromover vehicle has a standing capacity of 90 passengers. Forty (40) passengers per vehicle were assumed for this study to account for large amounts of luggage. The operation of two-car trains on Saturday and Sunday morning would require 17 trains per hour to depart the Port at 3.5 minute headways. Each train would be required to transverse the entire loop, estimated at 25 minutes so each vehicle would make 2 round trips per hour –requiring 17 new vehicles. This headway on the Port Loop added to the Outer Loop with the combined 3 minute headways provided by the Omni and the Brickell Loop is not within the operating capacity of the system. This becomes a fatal flaw in the operation of any extension of the Metromover into the Port.

6.3.2 Costs

Metromover costs were estimated from the recently completed MIA Mover. That cost was $174 million per mile. Station costs are estimated from the Airport station at a cost of $28 million. This project assumes that there are no extra cars in the Metromover fleet so all new vehicles will need to be purchased. The MIA Mover costs include the storage facility for a stand-alone system. The total cost of the Metromover is about $430.8 million.

Table 11: Alternative 3 Costs

	Distance	# Stations	Guideway	Stations	Total
Metromover	1.6 miles	4	$278 million	$112 million	$390 million
Vehicles	# Vehicles	Cost/vehicle			
	17	$2.4 million			$40.8 million
Total					$430.8 million

Using 2011 NTD data for operating costs per revenue hour, MDT costs for Metromover was $215 per revenue hour. It was estimated that the new Metromover Extension Alternative would operate for approximately 18,500 revenue hours including weekends and full operations around the outer loop. The estimated annual operating and maintenance costs are estimated to be $3.98 million (2011 dollars).

6.3.3 Environmental Considerations

For Alternative 3 there were no identified impacts to wetlands. Land use consists of Vacant Nonresidential, Vacant Residential, Retail/Office, Public/Semi-Public and Institutional. Four contamination sites were identified along the alignment. The elevated alignment will visually impact the historic Freedom Tower.

6.4 Alternative 4 – Light Rail Shuttle from Overtown to the Port

This alternative proposes to provide an at-grade light rail shuttle from the Historic Overtown/Lyric Theatre Metrorail Station to the PortMiami. New tracks and overhead catenary lines would be constructed along NW/NE 6th Street and the Port Boulevard Bridge. This alternative will require the construction of all new at-grade stations along the length of the shuttle. This alternative will also provide a new station on-site at the American Airlines Arena, and depending upon the timing of the construction of the rail line, either two or three stations will be constructed at the Port. The length of the rail line will be directly dependent upon the timing of the cruise terminal development. The first station will be located in the southwest corner of the Port to serve the proposed World Trade Center. The second and third stations will serve the cruise terminals. It would not impact current Metrorail or Metromover operations. This option would require 100% of the Port passengers to transfer.

The Light Rail operating on surface streets in a downtown environment would expect to operate at about 15 miles per hour.

6.4.1 Crush Load

On Saturday and Sunday between November and April the Port can have seven ships debarking passengers simultaneously. The average passengers per ship is about 2,400 persons. With the Master Plan, the number of cruise ship berths and the size of the cruise ships will be increasing. There are already ships being designed to accommodate 5,000 passengers. However, for this study, it is assumed that the average capacity will be 4,000 passengers per ship. Table 12 shows the number of vehicles that would need to be operating to carry the peak debarkation loads assuming that 12.5% of the passengers use the rail line to access the Port.

Table 12: Alternative 4 Crush Loads

	Opening Year	Build Out
Assumption:	**7 ships at 2,400 PAX/ship**	**9 ships at 3000 PAX/ship**
Debarking PAX:	**16,800**	**32,000**
Clearance time:	3-Hour Window	3-Hour Window
Passengers/Hour	5,600 PAX	10,666 PAX
Assume 12.5% on Rail	700 PAX/Hour	1,333 PAX/Hour
Light Rail with 60 seated PAX/car	12 cars/hour	24 cars/hour

6.4.2 Costs

Light Rail costs were averaged from the 3 recently completed light rail extensions (Salt Lake City, Sacramento, and Dallas) for an average cost of $65 million per mile. Station costs averaged $5 million. 60-passenger light rail vehicles are estimated at $3.6 million. Each train would be able to make the one-way trip in 10 minutes (6 minutes running time and 4 minutes dwell time) so each vehicle would make 3 round trips per hour thus requiring 8 new vehicles. The total cost of Alternative 4 is estimated at $187 million.

Table 13: Alternative 4 Costs					
	Distance	# Stations	Guideways	Stations	Total
Light Rail Shuttle	1.9 miles	5	$123 million	$25 million	$148 million
8 Vehicles					$29 million
Maintenance and Storage					$10 million
Total					$187 million

Using the average 2011 NTD data for operating costs per revenue hour for four systems operating light rail (Seattle, Portland, Charlotte, and Santa Clara) the cost for light rail was $267 per revenue hour. It was estimated that the new Light Rail Shuttle Alternative would operate for approximately 10,500 revenue hours including weekends. The estimated annual operating and maintenance costs are estimated to be $2.8 million (2011 dollars).

7 Tier 2 Summary Evaluation and Recommendation

Upon closer examination of more detailed data, the difficulty of implementing rail transit to the Port becomes apparent, even for the previously identified feasible alternatives.

Table 14: Tier 2 Alternative Summaries

	Peak Demand	Capital Cost	O&M Costs	1 way trip time	Impact
Alternative 1 Metrorail Shuttle	Yes	$739 million	$2.88 million	7 minutes	Major impact to Overtown
Alternative 2 Metromover Shuttle	Yes	$498.8 million	$2.2 million	10 minutes	None
Alternative 3 Metromover Extension	No	$430.8 million	$3.98 million	25 minutes	Impacts existing Mover operations
Alternative 4 Light Rail Shuttle	Yes	$187 million	$2.8 million	8 minutes	Minor impact to traffic

Alternative 1 Metrorail Shuttle between Overtown and the Port and Alternative 3-Metromover Outer Loop Extension from the Freedom Tower Station should not be considered further. Only Alternatives 2 (the Metromover Shuttle from Overtown) and 4 (Light Rail Shuttle from Overtown) have not exhibited a fatal flaw and both seem to have lower capital and O&M costs.

8 Implementation Plan

8.1 Financing Plan

8.1.1 Planning, Preliminary Design, and Environmental Clearance

The planning, preliminary design and environmental clearance tasks were previously funded by the Federal Transit Administration under the guise of Alternatives Analysis, which was required prior to entering design for a New Starts transit project. The requirement for Alternatives Analysis has been dropped from the new federal requirements but enough planning, preliminary design, analysis and environmental clearance must be done to qualify for the entrance into design. This work will need to be funded locally from a variety of sources to supplement the normal planning budget received by the Miami-Dade Metropolitan Planning Organization. Additional planning money could come from the Florida Department of Transportation, PortMiami, the City of Miami, Miami-Dade Transit and the Downtown Development Authority.

8.1.2 Design and Construction

Regardless of the Alternative selected, the financing plan would be the same. The Financial Plan that is being recommended has several parts. The design, guideway, structures and vehicles have the potential of being funded from three different sources. The financing plan uses as little New Starts/Small Starts money as possible to improve the chances of receiving federal dollars. As it stands, competition is extremely tight for both the New Start and Small Start money and a strong financial plan will improve the chances for federal participation. The outlook for the next transportation legislation is uncertain. If the legislature decides to withdraw the general revenue funds from transportation and force the US Department of Transportation to return to reliance on just the Transportation Trust Fund, federal funding could drop by at least 30%. Therefore, this plan attempts to minimize the reliance on FTA funds. Capital funds from:

- 33% from FTA New Starts/Small Starts. Projects over a total of $250 million do not qualify for Small Starts funding.
- 33% FTA match from FDOT, and
- 33% local funding from the People's Transportation Plan ½ cent sales tax money. The Port Connector is a portion of the East-West Line's Airport/Seaport Connector.

The stations could be funded from a number of local sources:

- The Shuttle Transfer Station should be funded from CRA money. The initial station is in the CRA project area and should qualify for that money.
- The Arena/Bayside station could be paid for by a joint assessment on Bayside and the American Airlines Arena. If Bayside and the Arena choose not to participate in the funding of the new station, then it should be dropped from the plan since both Bayside and the Arena are already served by the Metromover.

- The new station on the southwest corner of the Port is proposed to be funded by the developer of the World Trade Center (or equivalent development). This station could also be financed from lease payments made to the Port for development on the property.
- The two stations on the Port should be financed from any combination of Port revenues derived from the cruise industry.

8.1.3 Operating and Maintenance Costs

The expansion of transit systems around the country has been slowed because of the difficulty in identifying sources of revenue to pay for the operating and maintenance costs resulting from that service expansion. The annual O&M costs of each of the recommended alternatives range from $2 to $3 million annually. One of the requirements for federal participation includes a strong commitment to fund the O&M costs. One of the purposes of this transit line is to reduce the parking burden at the Port. The cost savings from constructing and maintaining the garages should be part of the funding package. Similarly the proposed World Trade Center developer and the Arena should contribute to the O&M costs to alleviate the burden. Finally, the restoration of one or both of the pennies of the Local Option Gas Tax that Miami-Dade does not collect, should be reinstated to help finance the cost of this project.

8.2 Schedule

The schedule below represents a conservative, but likely, time schedule for the implementation of a Transit extension project to the Port. It is unlikely that the project could be operational before 2025 considering the difficulty in arranging funding and the added difficulty in constructing a rail project through Downtown Miami and across the Intracoastal Waterway.

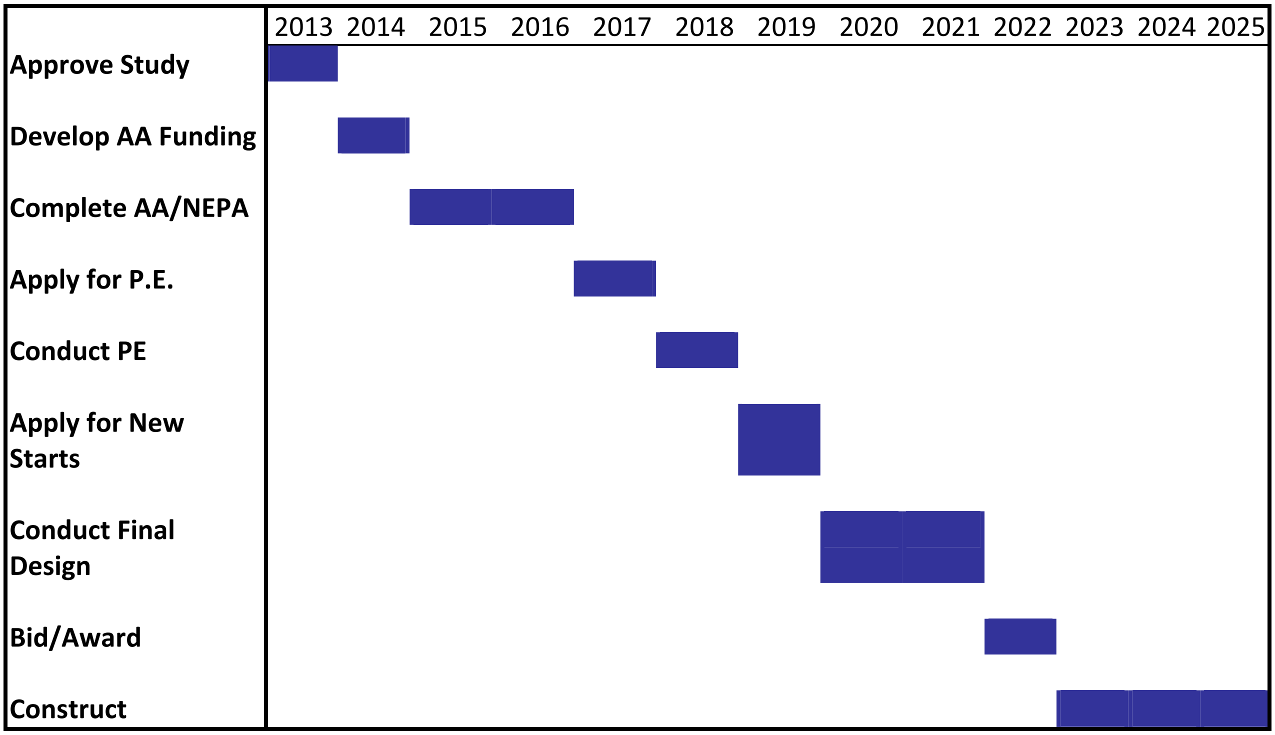

Figure 30: Implementation Schedule for Transit to Port Project