



## Transit Options to PortMiami Feasibility Study



### 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 as recommended by the most recent PortMiami 2035 Plan adopted by the Miami-Dade Board of County Commissioners. 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 construction of the tunnel which will provide 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 alike.

A new transit connection would provide opportunities, such as decreased vehicular traffic to the Port; reducing emissions due to idling, and advancing the Port's vision of attaining clean air quality in the region.

# Initial Tier 1 Alternative Concepts

## Commuter Rail Service to the Port - Alternative 1

A two-mile extension of the commuter rail service to the Port, using either the FDOT's planned South Florida East Coast Corridor service or the private All Aboard Florida service, as they are developed.

### Advantages

- 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
- Only capital costs would be needed for additional track on the Port side and construction of at-grade stations
- Implementation would be simultaneous with either of the FEC projects
- The service would offer the highest capacity vehicles

### Drawbacks

- Passengers from the Airport and Metrorail would require a transfer from the Overtown Station
- FEC would need to reconsider the design of their Downtown Central terminal to allow the train to continue on to the Port, requiring substantial maneuvering and switching to serve both facilities
- With limited headways, limited station locations and infrequent service, this option would have lower capacity as a service and may not serve the needs of cruise passengers



## Metrorail Extension to the Port - Alternative 2

A 1.9-mile elevated Metrorail extension from the Historic Overtown/Lyric Theatre Metrorail Station to PortMiami. There are two operating scenarios for this alternative: 1) Re-orientation of existing service so a direct line is operational from the MIC station to PortMiami; or, 2) Re-orientation of service so a direct line from Dadeland South to PortMiami is available. This alternative requires a 50-ft to 60-ft elevated guideway to provide clearance to the existing FEC Railroad corridor, as well as a new bridge across the Intracoastal Waterway to the Port.

### Advantages

- A direct ride from MIA or Dadeland directly to the Port

### Drawbacks

- Has the highest cost estimate at \$210 million per mile.
- The minimum turning radius (1270 feet) is not met with either of the operating scenarios



## Metrorail Shuttle between Overtown and the Port - Alternative 3

A 1.9-mile Metrorail shuttle operation from the Historic Overtown/Lyric Theatre Metrorail Station to PortMiami using either the existing FEC corridor or the NE 6<sup>th</sup> Street corridor. This alternative will require the construction of a new station and vertical circulation for the Overtown terminus of the shuttle, a 50-ft to 60-ft elevated guideway to provide clearance to the existing FEC Railroad corridor and the Metromover, and a new bridge. There will be a new station on-site at the American Airlines Arena and either two or three stations constructed at the Port; one serving the proposed World Trade Center and the other two serving the cruise terminals.



### Advantages

- Does not require revision or impact to current Metrorail operations since it is only a shuttle service and does not impact Metrorail's operations

### Drawbacks

- Relatively high construction costs of \$210 million cost per mile
- A new bridge is needed to cross the channel
- The elevated guideway downtown will cause historic preservation issues with the Freedom Tower



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

A 1.6 mile Metromover shuttle between the Freedom Tower Metromover Station on the Omni Loop to PortMiami using the FEC Railroad corridor. A new transfer station will be required. There will be a new station on-site at the American Airlines Arena and either two or three stations constructed at the Port; one serving the proposed World Trade Center and the other two serving the cruise terminals. The cost per mile of the elevated Metromover is \$174 million plus \$28 million for each station.

### Advantages

- The operations of the Omni Loop would not be impacted, and a new bridge across the channel wouldn't be necessary

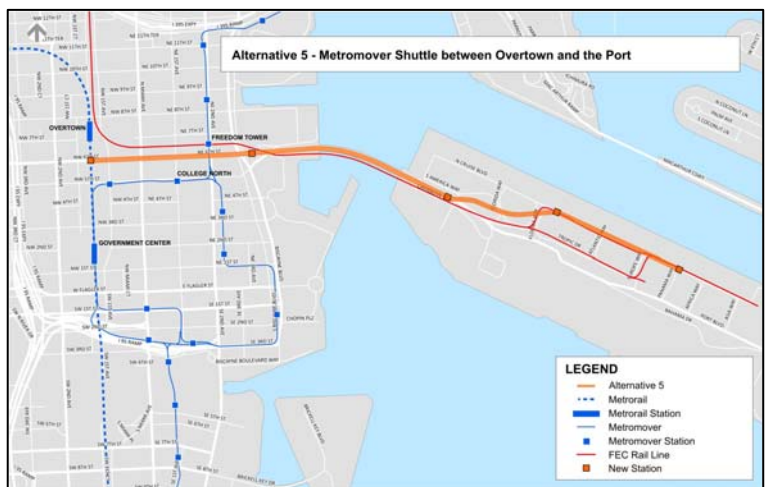
### Drawbacks

- Relatively high cost per mile
- Possible capacity limitations, especially for cruise passengers with luggage
- Two transfers may be required for most passengers at the Freedom Tower station, which could be inconvenient for cruise passengers with baggage, etc.
- More Metromover vehicles would be needed to operate the shuttle service
- The shuttle would have to connect to the Metrorail mainline to access the maintenance and storage yards, as well as construction of a new station adjacent to the Freedom Tower station



### Metromover Shuttle between Overtown and the Port - Alternative 5

A 1.9-mile Metromover shuttle operation from south of the Historic Overtown/Lyric Theatre Metrorail Station to PortMiami utilizing the NE 6<sup>th</sup> Street corridor. This alternative will require the construction of a new station, vertical circulation for the Overtown terminus of the shuttle and a 50-ft to 60-ft elevated guideway to provide clearance to the Metromover along NE 2<sup>nd</sup> Avenue. The existing Port Boulevard Bridge will be retrofitted by removing one vehicular travel lane in the eastbound direction in order to provide sufficient spacing to accommodate the Metromover. There will be a new station on-site at the American Airlines Arena and either two or three stations constructed at the Port; one serving the



proposed World Trade Center and the other two serving the cruise terminals.

### Advantages

- This shuttle doesn't impact the current operations of Metromover
- Shuttles would be able to meet the potential high demands for ridership with frequent headways
- Only one transfer is needed at the Overtown station, although may be inconvenient

### Drawbacks

- High cost of elevated stations plus and the \$174 million per mile cost estimate for the shuttle
- The alignment along NE 6<sup>th</sup> Street could take a lane of traffic or close a sidewalk
- Historic preservation issues due to the close proximity to the Freedom Tower
- Overall design of the station will be difficult due to the east-west orientation needed around the existing structures present
- Additional Metromover vehicles will also be required for the shuttle service

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

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. An elevated guideway will be positioned on the south side of NE 6<sup>th</sup> Street to prevent encroachment on the Freedom Tower historical building. There will be a new station on-site at the American Airlines Arena and either two or three stations constructed at the Port; one serving the proposed World Trade Center and the other two serving the cruise terminals.

### Advantages

- The extension is shorter than other proposed alternative, and will be supported by the existing Port Bridge, both of which save on costs

### Drawbacks

- Operations on the Omni Loop will be impacted during the construction of the Port Loop, and once the Port Loop is in operation, the headways for the Omni and Brickell loops will be negatively impacted
- Will require removing one vehicular travel lane from the NE 6<sup>th</sup> Street alignment
- The existing Port Boulevard Bridge will be retrofitted by removing one vehicular travel lane in the eastbound direction in order to provide sufficient spacing to accommodate the Metromover
- More Metromover vehicles would be required

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

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. There will be a new station on-site at the American Airlines Arena and either two or three stations constructed at the Port; one serving the proposed World Trade Center and the other two serving the cruise terminals.

### Advantages

- Has the shortest ride to the Port from downtown and would operate on the existing Port Bridge



**Drawbacks**

- Would require a transfer at the Metrorail/Metromover station, which could be inconvenient for passengers unfamiliar with the system or with extra luggage
- More Metromover vehicles would be required
- The construction of this Port Loop would impact the Inner and Outer Loops of the existing Metromover, as well as increasing network headways once operational

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

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 6<sup>th</sup> Street and the Port Boulevard Bridge, as well as new at-grade stations along the length of the shuttle. There will be a new station on-site at the American Airlines Arena and either two or three stations constructed at the Port; one serving the proposed World Trade Center and the other two serving the cruise terminals.



**Advantages**

- It is by far the cheapest alternative at \$65 million per mile and the at-grade stations costs are minimal
- Would not impact current Metrorail or Metromover operations at any point during construction or operation
- Would be able to accommodate various demands in ridership
- Could act as the catalyst for more future light rail developments in Miami and create good precedent for the city

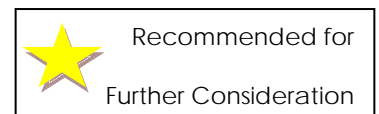
**Drawbacks**

- New vehicles would need to be acquired and a new maintenance and storage facility would need to be built
- Passengers would require one transfer in Downtown Miami
- Because the light rail would operate at grade, traffic would be affected throughout downtown and on the Port Bridge

**Initial Tier 1 Alternatives Evaluation**

After reviewing each alternative based on the following criteria, four of the alternatives were recommended for further consideration.

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 5 <sup>th</sup> Street	Very High	Fair	High	High	Medium	Feasible
★ Light Rail	None	Fair	High	Medium	High	Feasible





## Tier 2 Alternative Concepts

Potential future passengers taking transit to the Port can be broken down into the categories of cruise passengers, Port employees, visitors, and other users of the Port. A variety of sources were used to determine the overall employment population at the Port, such as past economic impact studies, major employer surveys, and the PortMiami 2035 Master Plan. Employment projections combined with the forecasted growth of cruise passengers help illustrate the future demand for transit ridership to the Port. Annual passenger forecasts must be translated into daily and peak loads associated with cruise ship operations to predict service demands for transit ridership to the Port. The table below compares Tier 2 alternatives' crush loads for current operations and for 2035.

Estimated Annual Boardings					
	Projected Employees	Annual Employee 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

Tier 2 Alternative Crush Loads		
	Opening Year	Build Out
Assumption	7 ships at 2,400 PAX/ship	9 ships at 3,000 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
Metromover with 40 seated PAX/car	18 cars/hour	34 cars/hour
Light Rail with 60 seated PAX/car	12 cars/hour	22 cars/hour

### Metrorail Shuttle between Overtown and the Port – Alternative 1

A proposed Metrorail Shuttle from the Historic Overtown/Lyric Theatre Metrorail Station to PortMiami utilizing the NE 6<sup>th</sup> Street corridor. It will be elevated above the Metromover line along NE 2<sup>nd</sup> Avenue thereby requiring a 3<sup>rd</sup> level structure that will be approximately 50-ft to 60-ft above the existing ground.

Land uses along the project consists of vacant non-residential, vacant residential, retail/office, public/semi-public and institutional. The estimated annual operating and maintenance costs are estimated to be \$2.88 million (2011 dollars).

#### Advantages

- Shorter than other proposed alternatives, and will be supported by the existing Port Bridge, both of which saves on costs
- No identified impacts to wetlands or any identified adjacent historical resources

#### Drawbacks

- The height of the structure would create visual impacts Downtown
- Will require the construction of a new guideway across the Intracoastal Waterway, which will require extensive environmental coordination and clearance prior to construction
- The extension of the Metrorail traveling through Overtown to connect to the existing storage/maintenance facility will cause a major impact to the Overtown Community

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

### Metromover Shuttle between Overtown and the Port - Alternative 2

- A 1.9-mile Metromover shuttle operation from south of the Historic Overtown/Lyric Theatre Metrorail Station to PortMiami utilizing the NE 6<sup>th</sup> Street corridor. This alternative will require the construction of a new station and a third level structure that will be approximately 50-ft to 60-ft above the ground. There will be a new station on-site at the American Airlines Arena and either two or three stations constructed at the Port; one serving the proposed World Trade Center and the other two serving the cruise terminals. Land uses consist of Vacant Nonresidential, Vacant Residential, Retail/Office, Public/Semi-Public and Institutional. The estimated annual operating and maintenance costs are estimated to be \$2.2 million (2011 dollars)

Alternative 2 Costs					
	Distance	# Stations	Guideway	Stations	Total
<b>Metromover</b>	1.9 miles	5	\$330 million	\$140 million	\$470 million
<b>Vehicles</b>	# Vehicles	Cost/vehicle			
	12	\$2.4 million			\$28.8 million
<b>Total</b>					\$498.8 m

#### Advantages

- The extension is shorter and will be supported by the existing Port Bridge, both of which saves on costs
- No identified impacts to wetlands or any identified adjacent historical resources

#### Drawbacks

- Even though it is grade separated, the Metromover provides the slowest trip to the Port (avg. 12mph)
- The elevated alignment will visually impact the historic Freedom Tower
- Twelve new vehicles would be needed

### Metromover Outer Loop Extension from the Freedom Tower Station - Alternative 3

An extension beginning just south of the Freedom Tower Metromover Station by providing a new railway switch to provide access to PortMiami, operating off the outer loop. An elevated guideway will be positioned on the south side of NE 6<sup>th</sup> Street to prevent encroachment on the historical Freedom Tower building. There will be a new station on-site at the American Airlines Arena and either two or three stations constructed at the Port; one serving the proposed World Trade Center and the other two serving the cruise terminals. Land uses consist of Vacant Nonresidential, Vacant Residential, Retail/Office, Public/Semi-Public and Institutional. The estimated annual operating and maintenance costs are estimated to be \$3.98 million (2011 dollars)

Alternative 3 Costs					
	Distance	# Stations	Guideway	Stations	Total
<b>Metromover</b>	1.6 miles	4	\$278 million	\$112 million	\$390 million
<b>Vehicles</b>	# Vehicles	Cost/vehicle			
	17	\$2.4 million			\$40.8 million
<b>Total</b>					\$430.8 million

#### Advantages

- No identified impacts to wetlands for this alternative

#### Drawbacks

- The 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
- The elevated alignment will visually impact the historic Freedom Tower

### Light Rail Shuttle from Overtown to the Port - Alternative 4

An at-grade light rail shuttle from the Historic Overtown/Lyric Theatre Metrorail Station to the PortMiami with new tracks and catenary lines along NW/NE 6<sup>th</sup> Street and the Port Boulevard Bridge. It will require the construction of new at-grade stations along the length of the shuttle. There will be a new station on-site at the American Airlines Arena and either two or three stations constructed at the Port; one serving the proposed World Trade Center and the other two serving the cruise terminals. The estimated annual operating and maintenance costs are estimated to be \$2.8 million (2011 dollars).

Alternative 4 Costs					
	Distance	# Stations	Guideways	Stations	Total
<b>Light Rail Shuttle</b>	1.9 miles	5	\$123 million	\$25 million	\$148 million
<b>8 Vehicles</b>					\$29 million
<b>Maintenance and Storage</b>					\$10 million
<b>Total</b>					\$187 million

#### Advantages

- Would not impact current Metrorail or Metromover operations

#### Drawbacks

- Requires one transfer for all passengers

## Tier 2 Alternatives Evaluation

Tier 2 Alternative Summaries						
	Meets 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

★ Recommended for Further Consideration

The final recommended alternatives for further study are the **Metromover Shuttle** and the **Light Rail Shuttle**.

## Implementation Plan and Schedule

- Project Development (PD) and NEPA completed by locals (per MAP-21)
- PD and NEPA could be completed by 2016 if funding secured
- Engineering and New Starts applications process 2017-2019
- Stations funding opportunities: CRA, Arena/Bayside, Port, City, adjacent developers
- Design/Engineering and Construction equal participation from FTA, FDOT and locals
- O & M costs should be shared by Port passengers, cruise ships and the Port
- Final design in 2021
- Construction by 2025

