MIAMI SURFACE SHUTTLE SERVICES:

FEASIBILITY STUDY FOR TRANSIT CIRCULATOR SERVICES IN DOWNTOWN MIAMI, BRICKELL, OVERTOWN, AND AIRPORT WEST

Prepared for the

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EXECUTIVE SUMMARY

The concept of shuttle, or local circulator, bus service is gaining popularity around the country as a service that satisfies certain niche transit markets and helps promote different public policy objectives. Shuttle services can improve mobility for employees, residents, and visitors of certain areas while helping to relieve traffic congestion, and it can contribute to economic development in an environmentally favorable way. The Downtown Development Authority of Miami (DDA) initially expressed its desire to implement shuttle services along Flagler Street as part of that corridor's more comprehensive redevelopment, often referred to as the Flagler Marketplace plan. This plan calls for changing Flagler Street from one-way operations to two-way, adding many new street amenities, and redirecting the large buses that currently serve Flagler Street to other streets in the downtown area. There is also a desire on the part of the retailers on and around Flagler Street to provide a shuttle service that could conveniently link them with the hotels and residential areas north and south of the immediate downtown area.

Representatives of the Brickell community are also interested in new shuttle services that would help promote a true "village" atmosphere where people live, work, shop, and enjoy leisure activities within relatively short distances of each other. The more eastern portion of the Brickell area is experiencing substantial new growth of hotels, residential towers, and offices. These new developments will clearly add to traffic congestion and competition for parking, possibly decreasing the attractiveness of the area. Those who work and live in Brickell are primarily interested in a service that would provide fast, convenient service between Metrorail/Metromover and the new developments east of Brickell Avenue. Business interests along Flagler Street are interested in a service they hope would be faster and more direct than the Metromover to tie Brickell to the downtown. The DDA asked the Miami-Dade Metropolitan Planning Organization (MPO) to help fund a study to examine the feasibility of establishing surface shuttle services in those areas. The MPO agreed to fund the study, but also added the task of including the feasibility of providing such services in the Overtown community as well as the area referred to as Airport West.

The Miami circulator services proposed in this report can serve a number of purposes, as suggested above. Similar to Metromover, a circulator service can help tie together the various communities that make up greater downtown Miami by providing direct and reliable service between offices, residences, shopping districts, parks, historic sites, greenways, and transportation facilities. It can help create a more pedestrian-friendly atmosphere by taking large buses off of certain streets. New shuttle service can be provided where no public transit service currently exists, and a user-friendly service can attract people to travel to areas that are in the initial stages of redevelopment. It can encourage greater use of public transit, including Metrorail, that can help minimize the congestion that will occur with the new developments that will be taking place throughout downtown and Brickell. A direct circulator service can also assist the county's efforts in providing access to jobs for those coming off welfare.

In terms of feasibility, a circulator service can be designed to serve virtually any area, including the four areas that are subject to this study. While there are some one-way street patterns that can create less than desirable routings throughout downtown Miami, there are no conditions that prevent the design of circulator service. This report includes a number of options for such routes. The report also concludes that the type of services possible are truly exciting and could help the development of the downtown area significantly, and give public transit a new and positive image in the area. *The key to feasibility is funding* - can sources of funds be found to help pay for whatever services are designed? Fortunately, a variety of sources of funds were secured by the Miami-Dade Transit Agency (MDTA) and Tri Rail to start the transit services that are most needed to serve commuters who need public transit to get to and from their jobs in the Airport West area. Those services are expected to start by September 2000. It also appears there will be funding for a one-vehicle circulator service for the Brickell community that could start as early as December 2000. For the other areas, this report concludes that funding new services is possible, but not without a champion or champion who wants to see this service implemented, and not without partnerships between local interest groups, private interests, the DDA, the City of Miami, Miami-Dade County, the Miami-Dade Metropolitan Planning Organization, the Florida Department of Transportation, the Miami Parking System, and perhaps other groups interested in historical and environmental protection. There are a variety of programs or financing techniques that can provide the dollars necessary to fund the capital and operating costs associated with providing a high level of circulator services in the Flagler, Brickell, and Overtown area. However, there needs to be a concerted effort for the groups noted above to coalesce around a service plan and agree to work as partners to help fund and implement the service that is described in the report.

This report is intended to be *a feasibility study* that helps determine whether or not local circulator services can be designed and funded. It helps define the possibilities of what can be provided, but it is not the last word on where or when such services will be implemented. Rather than try to provide every last detail describing new circulator services, this report gives options on the types of services that could be implemented and determines that there are sufficient resources to encourage the needed partners to work together to help make these services a reality. Since we conclude that it would be possible to fund the services noted in the report, the next appropriate step would be for a lead agency, such as the Transportation Management Association of downtown Miami, to help facilitate the discussion among partners to see if there is support for moving forward for any of the options in this report. Once general agreement is reached on the concepts and options, more detailed work can be done to operationalize the options selected.

It is recommended that services be established in phases, starting with the Brickell area where substantial new development will be completed before the end of the year. The improvements to Flagler Street will not be completed until the middle of 2001. It is recommended that shuttle services along the length of Flagler Street can be postponed until such time as the street becomes a two-way operation. Services in Overtown could be started consistent with the implementation of redevelopment activities along NW 3rd Avenue in late 2001 or early 2002.

BACKGROUND AND PURPOSE OF REPORT

The concept of shuttle bus service is gaining popularity around the country as a service that satisfies certain niche transit markets and different public policy objectives. Shuttle services can improve mobility for employees, residents, and visitors of certain areas while helping to relieve traffic congestion, and they can contribute to economic development in an environmentally favorable way. Due to the use of minibuses, shuttle services can often be provided at a lower cost than regular fixed route transit.

The Downtown Development Authority of Miami (DDA) initially expressed its desire to implement shuttle services along Flagler Street (as part of that street's more comprehensive redevelopment) and in Brickell in anticipation of that area's substantial new growth of hotels, residences, and offices. The DDA asked the Miami-Dade Metropolitan Planning Organization (MPO) to help fund a study to examine the feasibility of establishing surface shuttle bus services in those areas. The MPO agreed to fund the study, but added the tasks of reviewing the feasibility of providing such services in the Overtown community as well as in the area referred to as Airport West. The MPO then engaged the Center for Urban Transportation Research (CUTR) to conduct the feasibility analysis for the provision of bus shuttle services in the various areas.

This report will review each of the sub-areas noted above for their potential for supporting shuttle services. Alternative routes and levels of service will be presented, along with the approximate capital and operating expenses associated with each. The advantages and disadvantages of different types of buses (such as standard diesel or alternative fuel vehicles) will be examined, as well as who might operate the service and where maintenance and storage facilities could be located. Perhaps most importantly, the report will identify the potential sources of funds for paying for these services.

DESCRIPTION OF THE STUDY AREAS

This study will review the feasibility of establishing shuttle services in four different areas. Three of the areas are in close geographic proximity to each other. While these three areas are all adjacent to each other and will be considered as a whole, each subarea has distinct characters of their own and will be reviewed separately as well:

1. **The Flagler Street corridor** represents the heart of historic Miami and includes the blocks both north and south of Flagler Street from the Miami River to Biscayne Boulevard.

2. **Brickell** lies subjacent to the Flagler Street corridor, on the south side of the Miami River. The study area is bordered by the Miami River on the north, 15th Road on the South, Brickell Key and Biscayne Bay on the east, and SW 3rd Avenue on the west.

3. **The Overtown community** is situated just north of the Flagler Street corridor. It is generally bounded by NW 20th Street to the north, NW 5th Street to the south, the Florida East Coast Rail Road to the east, and the Miami River/NW 7th Avenue to the west.

In addition to these three subareas, which together will be referred to as "greater downtown Miami", this study will also review the feasibility of establishing shuttle services in the area known as **"Airport West"**. This area is generally bounded by NW 74th Street/Okeechobee Road to the north, SW 7th Street to the south, the Florida Turnpike to the west, and LeJuene Road to the east.

Brickell

The area commonly referred to as "Brickell" has the potential to be one of the most exciting urban neighborhoods in the state of Florida. It has proven to be an attractive location for Class A high-rise office developments since the 1980s, contributing to the development of one of the largest financial and banking districts in the world. There are approximately 5 million square feet of office space in the Brickell area, with almost one million more square feet under construction. A considerable amount of new high rise condominium residential developments have either been built or are being built south of 15th Road, from Brickell Key to SW 3rd Avenue. Over 8,000 housing units currently exist, while 3,000 more are planned. Over 15,000 people live in the Brickell area, and more than 5,000 new residents are expected within the next three years. In addition, four new five-star hotels are all being constructed in Brickell. In the recent past, a full-service Publix and Walgreens have been built at Coral Way and SW 2nd Avenue to provide convenient community shopping services supportive of residential living. The Brickell area has some of the finest restaurants in all of Miami, as well as fast food eateries. There are four parks and a tremendously important historic site (the Miami Circle) that are located in the study area. The majority of residents and employees have views of Biscayne Bay or the Miami River. And all of this is happening in an area less than a square mile in size.

In short, Brickell is a mixed-use, high density area that provides a setting for the development of an urban community where residents can live, work, eat, shop, and relax within close distances. Officials sometimes refer to the concept of the "Brickell Village", given its potential to become a true urban neighborhood that is economically vibrant and very liveable due to the opportunities for residents, visitors, and employees to access much of the area without the need for a car. The types of densities and mixed uses in Brickell clearly lend themselves to supporting mass transit services.

Existing Transit Service in Brickell

Before considering new shuttle services in an area, it is appropriate to consider whether existing transit services satisfy the needs of the community. Given the limited availability of public funds, it is important not to suggest service that would duplicate existing services.

The west side of Brickell is served by the Brickell Metrorail station at SW 1st Avenue and SW 11th Street. Metrorail is a 20 mile long heavy rail service that provides access to Brickell from as far south as South Dixie Highway and Kendall Drive, to as far north as West Palm Beach, when one considers its connection to Tri-Rail. In another two years, Metrorail will extend its northwestern terminus to the Palmetto Expressway, making access from northwest Miami-Dade and Southwest Broward County that much easier. Metrorail provides service every six minutes in both directions during peak hours, and every 15 minutes during off-peak hours. Hence, Metrorail makes Brickell accessible to well over 1,000,000 people in three counties who can complete their commute to work without bringing an automobile into Brickell.

The middle of the study area is served by four Metromover stations along Southeast First Avenue (at 5th Street, 8th Street, 10th Street, and 14th Street), and one station co-located with the Metrorail station at SW 1st Avenue and 11th Street. The service provided by Metromover runs north and south, and is primarily in place to connect Brickell to downtown, and to serve as a distributor/collector for those using Metrorail. One advantage of Metromover is that it provides unimpeded access between downtown Miami and Brickell by virtue of a fixed high bridge over the Miami River. Metromover provides service every five minutes in both directions along the Brickell leg. Once in downtown Miami, the inner loop of Metromover provides service every two minutes.

Metrobus provides service with a number of routes. In the western portion of Brickell, Route #8 provides a high level of service (10 minute frequency during the peak, 15 minutes off-peak). This route travels east and west through the county along SW 7th and 8th Streets, stops at the Brickell Metrorail station, and then accesses Flagler Street via SW 2nd Avenue. Route #6 accesses Brickell from the west, stopping at the Metrorail station, and then enters downtown Miami via SW 2nd Avenue. However, service on Route #6 is provided only once an hour.

A number of Metrobus routes serve Brickell Avenue. Route #24 travels east and west along Coral Way, then travels along Brickell Avenue on its way to downtown Miami. Service is provided every 15 minutes during peak hours and every 30 minutes during off-peak hours. Route #48 travels along Biscayne Bay from the Coconut Grove area to downtown, going through the study area along Brickell Avenue on a once-an-hour basis. Finally, Route "B" provides a high level of service along Brickell Avenue on its way between Key Biscayne and downtown Miami. It provides service every 15 minutes during the peak hours, and every 30 minutes during off-peak hours. In addition, Route "B" connects to the Brickell Metrorail station on every trip, providing some east-west service between the Metrorail station and Brickell Avenue along SW 7th and 8th Streets. All of these bus routes take passengers to the bus terminal in downtown Miami via SW/E 2nd Street.

As can be seen from the description of current transit services, Brickell is well connected to regional bus

and rail transit service, befitting its nature as a major employment center. Given its close proximity to downtown Miami, Brickell also enjoys the availability of bus routes that pass through on their way to and from the downtown area. In addition, Metromover serves the dual purpose of feeding Metrorail and connecting much of Brickell to downtown Miami. It is not unreasonable to question if additional service would be truly beneficial.

The Needs and Potential Markets for Shuttle Services in Brickell

Although the Miami-Dade Transit Agency has invested heavily in transit infrastructure and service in Brickell, a new type of transit service could contribute to the future livability and sustainability of this relatively unique, high density area. The types of transit services that are lacking in Brickell, and would not duplicate existing MDTA service, are those that would serve the more eastern developments along Brickell Bay Drive and Brickell Key. There are major new developments being built in those areas, including all of the new hotels noted earlier, and some high-rise residential towers. Brickell Key, with its mixed uses of over 2,000 residential units, office towers, shops, and hotel, is situated a half mile from the nearest transit service. What is also lacking is a neighborhood circulator, where residents and visitors can easily access a minibus that would take them quickly and directly to points of convenience or interest (whether that be work, leisure, or shopping) within Brickell or in the Flagler Street corridor.

There is concern that the additional development that is planned for Brickell will result in traffic that could overwhelm certain intersections, strain parking facilities, and reduce the attractiveness and livability of the community. As noted above, the Brickell area is exploding with new development. In addition to the substantial development that is already in place, there are four new five-star hotels being built, including the J.W. Marriot, the Mandarin Oriental, the Four Seasons, and the Espiritu Santu which together will add 1,500 new hotel rooms and 1,200 new employees. All of these developments are east of Brickell Avenue. In addition to these hotel units, more than 1,000 new residential units in towers such as Tequesta Three on Brickell Key and The Mark on Brickell Bay Drive are being constructed as of the writing of this report. Developments such as the Millenium Project and Barclay's Financial Center will feature close to a million new square feet of office space. A high density area with mixed uses is generally regarded by planners as a relatively ideal environment for instituting transit services. In short, it appears there could be a tremendous potential new market for local shuttle services in Brickell.

The project manager for this report met and/or and spoke with many of the representatives of the business community in the Brickell area to learn more about what types of shuttle services would be most appreciated by employees, residents, and visitors to the area. The project manager also tried to be sensitive to not suggesting services that duplicated or competed with existing transit services provided by the Miami-Dade Transit Agency. The intent was to identify shuttle services that would complement existing services and enhance the likelihood of more people using transit in Brickell.

The feedback received from multiple sources was that there would be an interest in using shuttle services

that could get people back and forth between the more eastern portions of the Brickell area (particularly Brickell Key) and Metrorail. The closest Metromover station still requires a walk of almost 15 minutes to Brickell Key, and eight minutes to Brickell Bay Drive. The normal range for those who would use transit is to walk no more than five minutes or one-quarter of a mile. There is a natural anticipation that higher levels of traffic congestion will result from the new development that is scheduled to occur in Brickell. There is also a concern that parking will become more difficult to find, and expensive to provide. These conditions should make using public transit a more attractive option, even to those with automobiles, whether they be current or future employees. While higher income people often do not use rubber-wheeled transit, they are good candidates for rail transit, and they could be tempted to use a shuttle if connects with Metrorail/Metromover, and it is direct, convenient, and considered nice enough.

In addition, Brickell area representatives noted that the many hotels being built in the area will be offering hundreds of entry level positions in the hospitality industry, and there will be a need to provide alternative means of transportation for those who find it difficult to afford commuting by car. This might include many WAGES clients who are discontinuing welfare benefits and joining the workforce. A shuttle providing fast service from Metrorail or Metrobus stations to these employment sites would be ideal for such people.

A number of people expressed interest in being able to take a direct shuttle to lunch places throughout Brickell. For instance, professionals and residents who work and live on Brickell Key would like to be able to access the fine restaurants along 10th Street without the need to drive their cars through traffic and fight for parking. Other employees on Brickell Key, particularly those without automobiles, might want to access less expensive fast food eateries located on 8th Street. There are also people in other parts of Brickell that would like to eat at restaurants located on Brickell Key.

A number of people noted an interest in being able to access downtown Miami and Flagler Street without having to walk to Metromover and go through the change of cars at the Knight Center station. Many people expressed frustration with Metromover's reliability (even though records show the Metromover to be quite reliable). The managers of buildings on Brickell Key and along Brickell Bay Drive noted that many of the people who resided in Brickell worked downtown and might prefer a more direct surface shuttle that could get them to the heart of Flagler Street in half the time, assuming the bridge is in the down position, with very little walking required.

Finally, there was an interest in being able to access the shopping available at the new Publix and Walgreens at Coral Way and SW 2nd Avenue. Parking at Publix in particular is physically tight and sometimes unavailable due to high demand. The managers at Publix and Walgreens expressed support for such a service, and the availability of shuttle services could eliminate trips made by car between the residential areas of eastern Brickell and these stores.

It should also be noted that some representatives in Brickell stated that having a local circulator dedicated to Brickell's destinations would be far more likely to be patronized than the typical 40 foot MDTA buses that are part of routes that serve many other areas of the county. There would be a greater sense of

"community ownership" if a shuttle was dedicated to serving the Brickell area. Having a shuttle vehicle with its own identity would help passengers recognize the service and feel it was uniquely available to serve their needs. Given the number of MDTA buses that go through the area, people can get confused in terms of which route goes where (some go directly downtown, some go to the Metrorail station). In addition, most of the trips made within Brickell would be quite short, and there would be reluctance to pay the full MDTA fare of $1.25 for such short trips.

Optional Circulator Routes in Brickell

Five different options for providing transit circulators in the Brickell area are described below. When designing transit services, it must be recognized that there are always trade-offs to consider between costs, service coverage, and service frequency. Transit service is very expensive to provide, and routes that try to be everything to everyone soon become very expensive and/or unattractive to passengers due to their winding nature. Decisions need to be made that result in the most direct service possible, the most frequent service possible, at the least cost possible. The primary principles that were followed in the development of the route options described below were:

- To provide transit service where none is provided now and minimize duplication of MDTA service;
- To link any new circulator service with other transit transfer points including Metrorail, Metromover, and Metrobus whenever possible to encourage greater use of transit to access the Brickell area from the region;
- To make the routes easy to understand, having the route travel in both directions on the same roads whenever possible;
- To make the circulators connect to the major points of interest within the area as expressed by community representatives;
- To keep each passenger's trip taken on the circulator services as short as possible while still serving as many destinations as possible;
- To make frequency of service no worse than one shuttle vehicle every 20 minutes; and
- To recognize that the Brickell area is relatively small in size, filled with relatively energetic people who can be expected to walk a block or two as part of the urban lifestyle. Service does not have to be designed to go to every destination's front door.

Brickell Shuttle - Option 1

Brickell Option #1

This option is designed to serve as an internal circulator within Brickell that has a more east-west orientation and connects very directly with the Brickell Metrorail station. The advantages of this route are that it provides very direct access to other transit modes at the Brickell Metrorail Station; it serves the restaurants along SW 10th Street and the fast-food restaurants and shops along SW 8th Street; it goes past the Publix/Walgreens shopping center on Coral Way; it avoids crossing the bridge to Flagler Street, thereby improving its schedule's reliability; it is designed to avoid being caught in the southbound traffic on Brickell Avenue that gets backed up by the bridge when it opens; and perhaps most importantly, it provides the greatest frequency of service at the lowest cost. This route could be completed in 15 minutes with one vehicle. Hence, everyone on the route would have a shuttle vehicle pass their location every 15 minutes, and only one vehicle would be required, making Option #1 only half as expensive as the other options described below. Looked at another way, Option #1 could provide service every seven and-a-half minutes at the same expense that Options #3, and #5 provide service every 20 minutes.

The average one-way trip by any passenger would take approximately six minutes. For instance, a passenger traveling to or from Metrorail and Brickell Key could complete their trip in approximately six minutes. A passenger going from Eckerds on SW 8th Street to the Barclay Financial Center would complete their trip in about seven minutes, even though they would experience what they might regard as a "detour" through Brickell Key.

The major disadvantage of this route is that it is a one-way loop. One-way loops are easy enough to understand, but they can be very frustrating to passengers. For instance, if someone from the Millenium development at Brickell and 14th Street wanted to go to the restaurants on SW 10th Street, the trip *to* the restaurant would only take two minutes on Option #1. However, the return trip *from* the restaurant would take almost 13 minutes because they would have to travel all the way around the one-way loop to get back to the Millenium development. Part of the delay in the return trip would be accounted for by the short "layover" that the circulator vehicle would most likely take at the Brickell Metromover station. For this reason, loops are generally discouraged in transit planning, although they sometimes can not be avoided due to one-way street patterns. Another major disadvantage of this route is the obvious fact that it does not access Flagler Street directly. Option #1 would rely on getting people to and from the Metrorail/Metromover station quickly and allow people to complete their trip to downtown Miami via the Metromover. This option avoids duplicating transit service provided by MDTA, but it does not satisfy the desire to provide relatively quick and direct access to Flagler Street via a surface shuttle for those who work and live in eastern Brickell. A final disadvantage of Option #1 is that it goes past only two parks in Brickell.

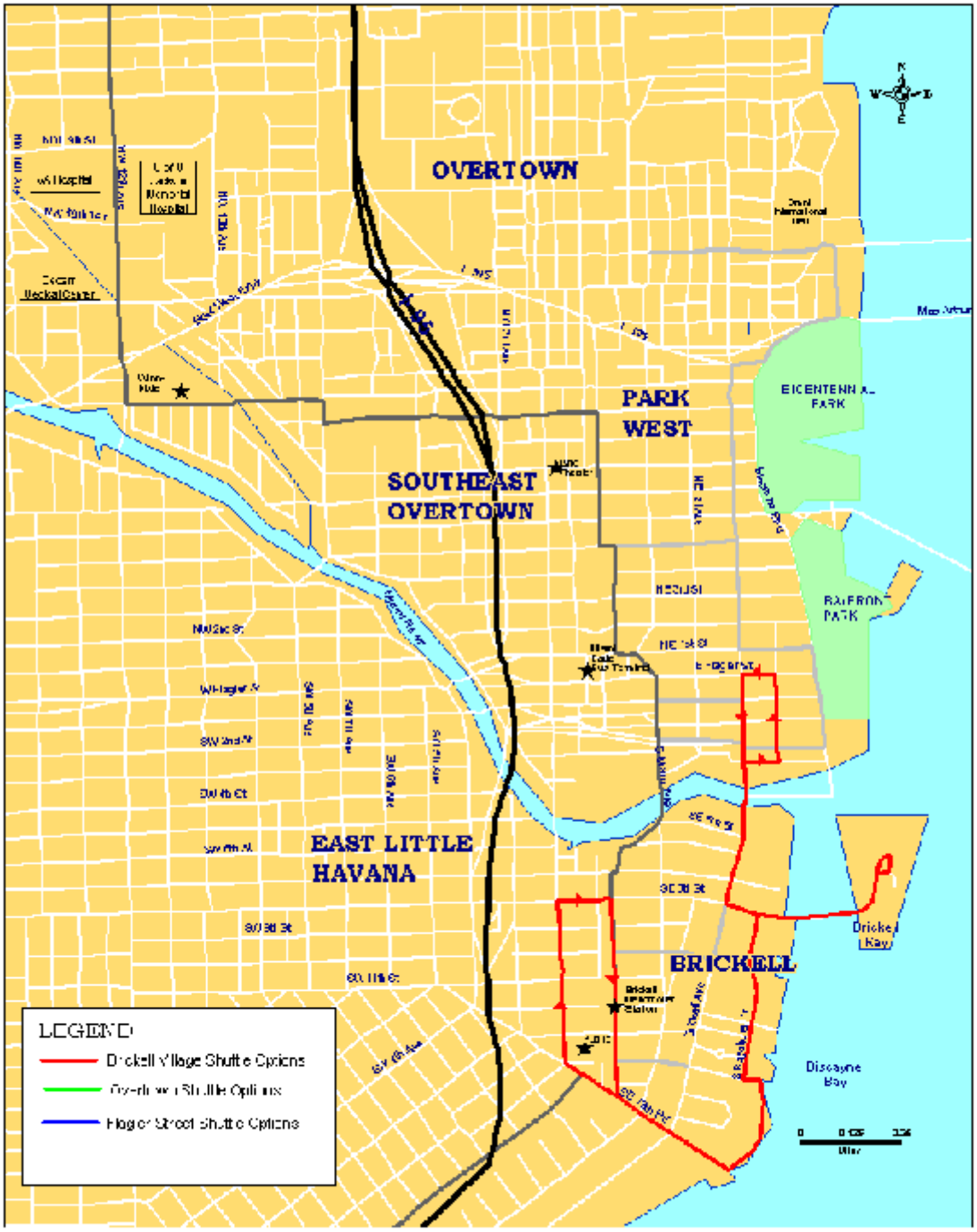
Brickell Shuttle - Option 2

Brickell Option #2

Option #2 is very similar to Option #1 and has all the same advantages . It retains the character of an internal circulator for the Brickell area without crossing the Miami River. This option continues to provide direct service to Metrorail/Mover/Bus, and it adds additional stops in the northern portion of Brickell traveling north on Miami Avenue to allow the circulator to service SE 5th Street. By extending the route in this direction it provides direct service to the restaurants along Miami Avenue such as Tobacco Road and the Fishbone Grill. It also passes the FDOT offices before traveling east on SE 5th Street where it would bring passengers close to the Capital Grill, the Sheraton Hotel, and Brickell Park on Brickell Avenue. It would then travel back to SE 8th Street via Brickell Avenue and continue east to Brickell Key.

This route is superior to Option #1 since it equalizes available service to restaurants and hotels in the Brickell area, and provides access to Brickell Park and the Miami Circle site. This option also shares the same disadvantages of being a loop and not connecting directly to downtown Miami. The additional disadvantage of this one-way loop option is that it takes longer to complete (approximately 20 minutes instead of 15 minutes) with one vehicle. This means service would be provided in the Brickell area only three times per hour rather than four times per hour with one vehicle. In addition, the average trip on the shuttle would be approximately eight minutes rather than six minutes due to the greater distance the route covers. Two vehicles providing ten-minute service would be much more attractive. Service would be more frequent than Option #1 and the second vehicle would provide some "insurance" of continuing service should one of the vehicles suffer a breakdown. The obvious disadvantage of providing a second vehicle is that the cost for providing the service would double.

Brickell Shuttle - Option 3



Brickell Option #3

This route attempts to provide service that ties the eastern portion of the Brickell area to the heart of Flagler Street, Metrorail, and the Publix shopping center in the most straightforward and fastest manner possible, providing bi-directional service on the same roads, with loops at both ends. It provides convenient connections with other transit modes at the Brickell Metrorail station by pulling right up to the entrance gate of the rail station on SW 1st Avenue. Option #3 provides service to the Publix/Walgreens shopping center, letting passengers on and off within a half-block of the stores' entrances. Option #3 also gets passengers within one long block of the restaurants on SW 10th Street, and within one block of the fast-food eateries and stores (such as dry cleaners and Eckerds) along SW 8th Street.

The major difference between Option #3 and the first two options is that this route crosses the Miami River on the Brickell Avenue bridge. Option #3 takes considerably longer to complete (40 minutes round trip versus 15 or 20 minutes) given its greater length. There is also less certainty of schedule adherence given the risks associated with crossing the bridge. It would take two vehicles to provide 20 minute service. While Option #3 provides excellent connections with other transit service in Brickell, it does not provide convenient connections with existing transit services in downtown Miami. The possibility of connecting with a frequent shuttle service along Flagler Street will be covered later in the report.

Brickell Shuttle - Option 4

Brickell Option #4

This option is extremely similar to Option #3. It travels through the Brickell area in exactly the same fashion as Option #3, but also adds service along Flagler Street to allow the shuttle vehicle to access all other MDTA buses at the downtown terminal at Flagler Street and SW 1st Avenue. The advantage this option offers is to anyone who accesses Brickell from any of the 20 bus routes that enter MDTA's downtown terminal. This may be a particular advantage for the employees who will work in the new hotels that are currently being built in Brickell. Of course, any transportation options that help employees get to work are an advantage to the employer as well, helping ensure that their employees are able to get to work on time.

The disadvantage of this option is that it takes five minutes longer (a total of 45 minutes) to complete a round trip. This length of time is hard to divide into easy-to-remember frequencies with only two shuttle vehicles. Two vehicles could not provide service once every 20 minutes; they would be providing service once every 22.5 minutes, making "clockface headways" impossible. With three vehicles, service could be provided every 15 minutes which would provide easy-to-remember schedules, but the expense to provide service would increase by 50%.

Brickell Shuttle - Option 5

Brickell Option #5

The last option considered for this report ties together different elements of all the first four options. This option attempts to retain much of the internal circulator service provided by Option #1, while minimizing the effects of a loop at the southern end of the route. As the map for Option #5 shows, this route would serve eastern Brickell much as Options #1 and #2 by traveling along SW 14th Street, Brickell Avenue, and SW 10th Streets, and would serve the Brickell Metrorail station very directly. However, rather than traveling along SW 2nd Avenue, the route would leave the Metrorail station and proceed south along SW 1st Avenue, go east on 15th Road, then north on Brickell until it reached SE 14th Street where it would go east and proceed along the same route as Options 3 and 4 back to Flagler Street. It would take 40 minutes to complete a round trip on this route if it ended at Flagler and SE 2nd Avenue, or 45 minutes to complete if it accessed the bus terminal in downtown Miami. This route does not provide as much direct access to the residential towers south of SE 14th Street, but it does come within two blocks of all of those units. (There is a possibility that the community of condominiums north of 14th Street will seek to close Brickell Bay Drive to through traffic). It also does not provide service to SW 2nd Avenue and SW 8th Street, but it does provide direct service to the restaurants along SW Tenth Street. Essentially, this route trades off SW 2nd Avenue for SW 10th Street, and provides more direct service to the Barclay Financial Center and less direct service to the high rise residential towers south of SE 14th Street.

Summary of Brickell Options

The circulator service options described above all require at least two vehicles, with the exception of Options #1 and #2 that require only one. Option #1 provides the best frequency at the lowest cost, although it does not serve as much of the Brickell area as Option #2, and it does not access Flagler Street as do Options #3, #4, and #5. Option #1 can provide 15-minute service, connect most of east and west Brickell, and provide fast service to and from the Brickell Metrorail/Mover/Bus station with one vehicle. Option #2 provides a bit more service coverage throughout Brickell than Option #1, but takes longer (20-minute round-trip versus fifteen) to complete. Both fifteen minute and twenty minute service allow for "clockface headways" which means the vehicles would always come to every destination at the same time within the hour during every hour of service throughout the day. This provides easier opportunities to promote the service and allows regular users to become familiar with when the shuttle will come past their point of pick up. The average trip on Option #1 would take six to seven minutes, while the average trip on Option #2 would take eight to ten minutes.

Options #3 and #5 could provide 20-minute service with two vehicles. This would mean the average time passengers without a schedule would need to wait for a shuttle vehicle would be 10 minutes. The average travel time for most trips taken on the shuttle would be approximately eight to ten minutes for all options except #1, where the average travel time for trips would be six to seven minutes. Twenty minute service may be sufficient to serve the trips most likely to be taken by residents who are shopping, or by commuters returning home from work. However, it is not as frequent as one would want to serve lunchtime trips to and from restaurants when people generally have only one hour away from their jobs. It is also less than

desirable for those who are trying to get from home to work on schedule. Option #4 provides 15-minute service, but is clearly the most expensive of all the options.

It should also be noted that Options #3 through #5 require crossing the Brickell Avenue bridge and will be subject to the uncertainties of that bridge's operation. Records obtained from the Florida Department of Transportation indicate that the bridge opens approximately 30 times a day. The average length of time that traffic is delayed is approximately 4 minutes and 30 seconds. The bridge opens on demand, and there is no way to build the bridge's openings into a predictable shuttle schedule. Therefore, there will be times when a trip between Flagler Street and the Brickell area will take another four minutes and 30 seconds longer than other trips. While this uncertainty will frustrate some trips, there appears to be enough interest in providing a direct surface link between the two areas to make this option available. Some might say the four-and-a-half minute delay would be no worse than the additional time it currently takes to walk to Metromover, wait for its arrival, and wait for the transfers at Knight Center station to complete their trips.

Two vehicles would be required to provide 20 minute service for all options except Option #1 which would only require one vehicle to provide service every 15 minutes, unless it was decided to provide service every seven-and-a-half minutes for this more internal circulator route. Given the types of demands for the service as expressed by community representatives, service should be made available from 6:30 a.m. to 6:30 p.m. Monday through Saturday. At an estimated rate of $45 per hour, the annual cost of providing two vehicles for thirteen hours a day (including one hour for "deadhead service" to and from the starting point of service), six days a week would be $365,040. The annual cost of providing service with one vehicle as called for in Option #1 would be $182,520. The annual cost of providing 15-minute service with three vehicles as called for in Option #4 is $547,560

Because this is new service for much of the Brickell area, passengers might be expected to pay a fare of $.25, which is the cost of a transfer fare on the MDTA system. The City of Miami would also need to agree to forsake approximately 20 parking spaces on streets such as Brickell Bay Drive and Southwest 2nd Avenue to allow room for shuttle bus stops. Whenever available, the shuttle should be allowed to use existing MDTA bus stops on Brickell Avenue and SW 2nd Avenue and SW 8th Street.

This report recommends that Option #1 be implemented, assuming the county's Access to Jobs grant is approved by the federal government. That grant provides sufficient funds to operate one vehicle for one year. This will give the community the time to promote a new circulator service that provides a fairly good level of frequency within the Brickell community and encourages greater use of all the modes of public transportation available in the area. Should the circulator prove successful during the first year of operation and the community would like to see more service, it could determine which of the other options are most attractive and affordable.

Flagler Street Corridor

Downtown Miami has many of the characteristics of other central cities in the United States. It is the center of county government, it has a number of cultural attractions, and it is a major employment center with millions of square feet of office space. Much of the development in the Flagler Street corridor is older than that in the Brickell area, and the percentage of office buildings that are regarded as Class A is lower. There are a number of historic buildings, including the Gusman Theater in the corridor. The Miami-Dade Community College Wolfson Campus is just a few blocks north between NE 1st and 2nd Avenues. While there are relatively few housing opportunities in the corridor, there are major mixed-use development proposals for the area along the Miami River east of SE 2nd Avenue (known as "One Miami"). At the west end of the corridor is the Miami River, while the east end of the corridor terminates at Bayfront Park. Both of these water-based assets are underutilized for leisure activities at the present time. Near the west end of the Flagler corridor at SW 1st Avenue is the downtown bus terminal where 20 MDTA bus routes converge within one block of the Metrorail/Metromover Government station. Levels of Service on the streets of the Flagler corridor are generally good (LOS B and C), although cars pulling in and out of street parking spaces, and trucks making deliveries, can cause aggravation to traffic trying to move forward.

What gives the Flagler Street corridor a bit of a different character than most downtowns in Florida is the level of retail activity that it enjoys. While most downtowns have seen the retail function migrate to the suburbs, downtown Miami still hosts numerous stores ranging from Burdines, Marshalls, and Ross, to electronics stores and a thriving jewelry district. While the employees working in the downtown area do some of their shopping here, much of the retail activity can be attributed to visitors. Flagler Street is generally alive with pedestrians during the daytime hours. In spite of these positive signs, the DDA believes that Flagler Street has fallen short of its potential as a full-day, year-round, street-oriented marketplace and an exciting pedestrian promenade. Some storefronts are currently shuttered, and after 5 p.m. the downtown area becomes far less patronized and attractive.

The Downtown Development Authority is very excited about the prospects for renewed private investment in the downtown, and has developed plans for improving the Flagler Street Corridor. The Flagler Marketplace plan calls for the following improvements:

- Conversion of Flagler Street from a one-way to a two-way traffic operation, including a cul-de-sac and additions to the existing bus terminal at NW 1st Avenue;
- Relocation of large MDTA buses to other streets in the downtown area;
- Improved street lighting;
- Improved street landscaping;
- Sidewalk enhancements;
- Repaving of the street;

- Downtown destination and informational signage, banners, and information kiosks.

The DDA hopes to see these improvements implemented by mid- 2001. One component of the successful implementation of such a plan is the establishment of a shuttle service that would take the place of the large MDTA buses that currently traverse Flagler Street.

Existing Transit Services in the Flagler Street Corridor

Downtown Miami serves as the single largest hub of transit services provided by the Miami-Dade Transit Agency. Twenty routes enter the city from points north, south, east, and west to converge at the Central Bus Terminal between Flagler Street and SW 1st Street along SW 1st Avenue. This transfer facility is currently undersized, and many buses need to exercise their layover on the surrounding streets. The facility is also located over a block away from the Metrorail/Metromover Government Center Station. Part of the plans to improve Flagler Street include an expansion of the bus transfer terminal that would bring it closer to the rail station by extending the terminal to NW 1st Street.

Clearly, the Flagler Street corridor in downtown Miami does not lack for transit service. Many of the 20 routes that enter the bus terminal go through downtown Miami on a combination of Flagler Street, NE/W 1st Street, and SE/W 1st Street. These routes contribute to approximately 100 buses per hour going through the Flagler corridor between Biscayne Boulevard and the Central Bus Terminal. Downtown Miami is also served by Metromover, with eight stations located on the inner/outer loop, that encircles the immediate downtown area.

The Needs and Potential Markets for Shuttle Services in the Flagler Corridor

The downtown Flagler corridor is relatively short (six-tenths of a mile from the Government Center to Biscayne Boulevard) and can be relatively easily walked by casual shoppers. The important question to be answered, in light of the substantial amount of transit service already available, is - what ultimate purpose would a shuttle serve? One answer may be that the shuttle on Flagler Street could serve a broader purpose of tying Flagler to its neighbors to the north and south. As noted earlier, there are substantial hotel and residential developments in Brickell that could help patronize the retail activities in the Flagler corridor. There is also hope that redevelopment near the Omni area will create new markets for downtown retail and office activity. Shuttles that connect those areas with Flagler Street might not have to traverse all of Flagler Street on a frequent basis as long as people are able to find the shuttle in a centrally located shuttle stop (for instance, between SE 2nd and 3rd Avenues).

On the other hand, a frequent shuttle service from Bayfront Park to the bus terminal could result in greater use of all the retail opportunities along Flagler Street. Making all stores and offices accessible with a

comfortable and frequent shuttle can make the entire corridor more attractive since the effort one would need to expend to get to any place on Flagler Street would be minimal. An enclosed, air-conditioned shuttle would minimize the effects of hot or rainy weather and make shopping on Flagler Street a more pleasant experience. Attractive shuttles can also entice people to go to destinations that they might not otherwise think of trying to reach, such as the Miami River area once it starts to redevelop as a waterfront attraction of restaurants and parks. In short, a frequent shuttle along Flagler Street could help to expand every shopper's opportunities and help unify the entire downtown Flagler corridor from east to west. A ground shuttle service that connects the downtown with residential areas both north and south would also respond to retailers who feel disappointed in Metromover's indirect access to the heart of Flagler Street.

In Memphis, Tennessee and Des Moines, Iowa, shuttles are designed to take people to and from remote parking garages to minimize traffic on their major downtown street, and encourage more parking on the perimeters of the downtown. A shuttle along Flagler could assist Miami in this way as well. There are a number of parking facilities on the west end of Flagler Street, many of which have space available for additional cars at the present time.

Ultimately, a small fleet of shuttle buses could replace most of the large bus service in the Flagler corridor if the service was very frequent and connected the Omni bus transfer center with the downtown bus terminal. MDTA's large buses are clearly not pleasant components of the downtown area. The buses' diesel engines are quite loud and emit unwanted exhaust, both of which are made worse by the "urban canyon" nature of the downtown area. Given their need to make connections and schedules, these 13-ton buses seem to move fairly fast and can be scary to some as they rumble by. All in all, these large buses are not consistent with a pedestrian-friendly, shopping-intensive atmosphere that the city wishes to promote.

CUTR staff met with members of the Downtown Miami Transportation Management Initiative (TMI) during March 2000 to discuss what alternatives they would support to improve transportation services in downtown Miami. Among the top 10 alternatives identified by the private sector members of the TMI were:

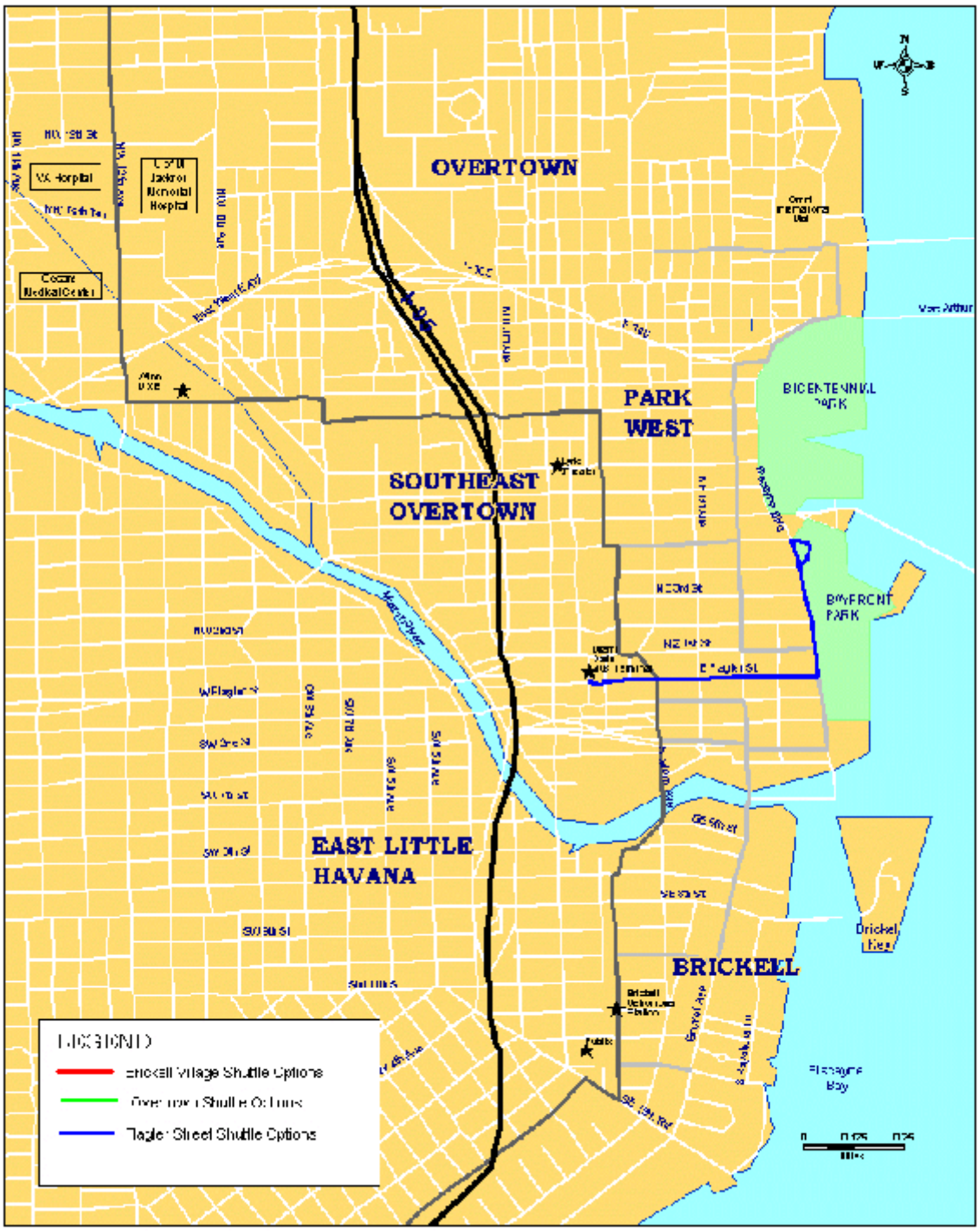
- To expand mass transit routes and schedules;
- To provide shuttles to transit facilities and satellite parking;
- To have more and smaller buses; and
- To develop employer-based shuttles to the city.

Optional Circulator Routes on Flagler Street

Three different options for providing shuttle services along Flagler Street are described below. Once the improvements to Flagler Street are completed, the shuttle service will be able to travel on Flagler Street in both directions, making the service very easy to understand. The general principles that were followed in the development of the options were:

- The shuttle service should be frequent enough that people would not need a schedule to use it;
- The shuttle should serve as much of the length of Flagler Street as is appropriate given current levels of development; and
- The shuttle should connect with other transportation modes whenever possible.

Flagler Street Shuttle - Option 1



Flagler Street Shuttle Option #1

This option provides service from the Central Bus Terminal to Bayside Marketplace via Flagler Street and Biscayne Boulevard. This is an extremely straightforward and easy route to understand that serves virtually all the developed blocks along Flagler Street as well as Biscayne Boulevard up to NE 4th Street. Part of the reason for this routing is that it ties together two major attractions (Bayside and Flagler Street) and the more attractions and destinations that there are on a shuttle route, the more likely people are to use it. There is also a very convenient turn-around point at Bayside that would allow the shuttle to pick up and drop off passengers at Bayside and continue quickly back to Flagler Street. This would enable the route to stay on Flagler Street and Biscayne Boulevard in both directions, thereby avoiding any confusing loops and excessive left hand turns at the east end of the route. In addition, having the shuttle go as far as Bayside would get people closer to the seaport, thereby reducing the length of taxi trips to cruise ships in the Port of Miami, and within two blocks of the new American Airlines Arena. This routing would also allow people to be picked up and dropped off closer to the Hotel Intercontinental and directly in front of Bayfront Park. This route would pass directly by the Bayfront Metromover station and be within one block of the Government Center Metrorail/Metromover station.

This option connects the shuttle with all of the MDTA buses that access the Central Bus Terminal, providing for easy transfers between the two services. The presence of a frequent shuttle service would make it unnecessary for MDTA routes #77 and #11 to travel east of the bus terminal as they presently do to take passengers directly to any destinations as far east as Biscayne Boulevard. This would enable MDTA to "save" the cost of operating two large buses in its service planning and its budget. It would also result in having 16 fewer large buses going through the Flagler Street corridor each hour.

A round trip on Option #1 is 1.7 miles long and could be comfortably completed in 15 minutes. Service could be provided in both directions every five minutes with three vehicles in operation, or every three minutes with five vehicles in operation. Assuming service is provided between 6:30 a.m. and 6:30 p.m. Monday through Saturday, a five-minute level of frequency provided by three vehicles working 13 hours a day (including one hour "deadhead" service to get to and from the start of service) would cost approximately $547,560 per year. Three minute service requiring five vehicles in service would cost approximately $912,600 per year.

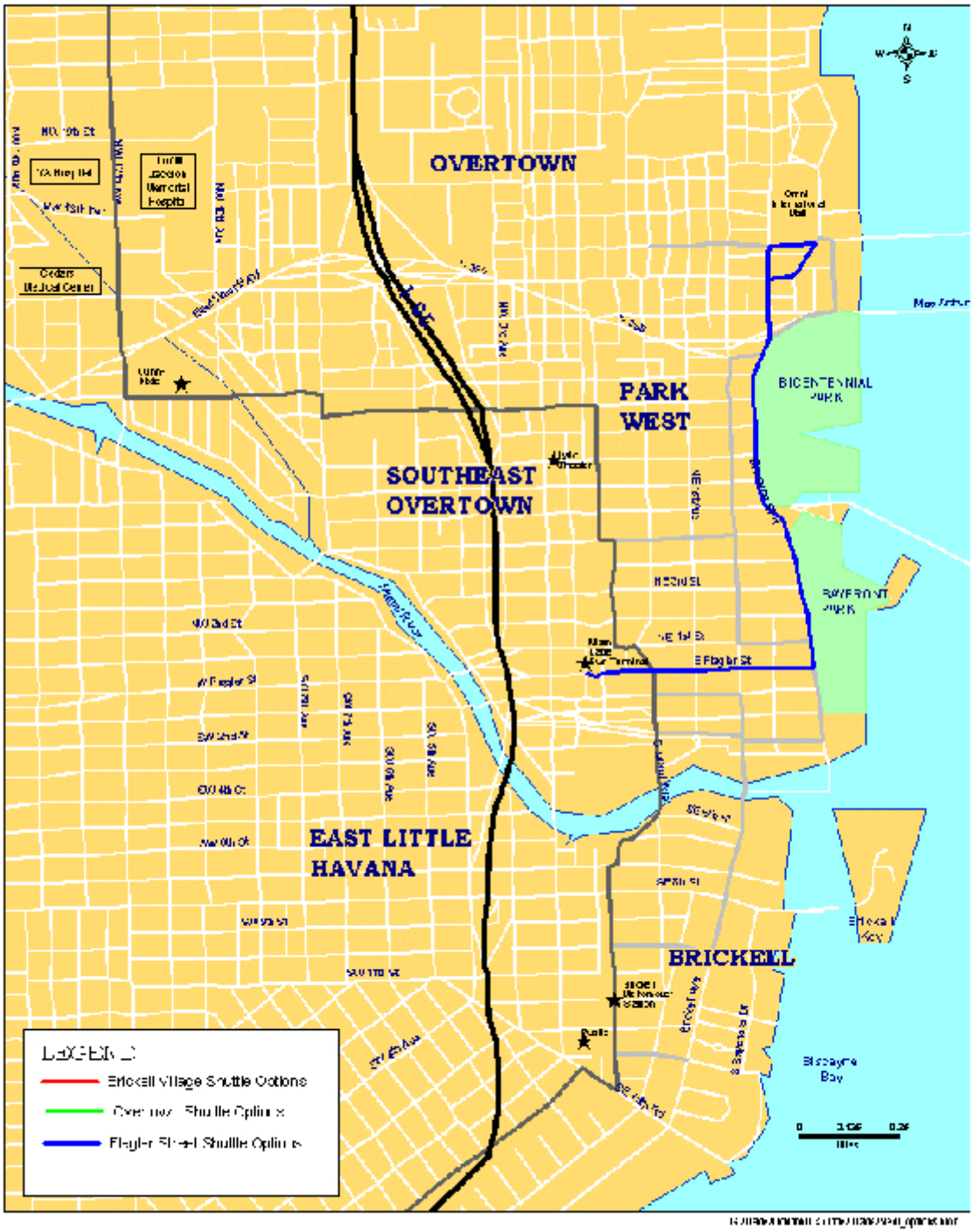
Flagler Street Shuttle - Option 2

Flagler Street Shuttle Option #2

This option offers the same basic service as Option #1 by traveling between the Central Bus Terminal and Bayside Marketplace. However, it also includes service further west to the Miami River. The primary advantage of this route is that it would help in the redevelopment of the northeast side of the Miami River by making it convenient for people to access by the shuttle. It has been the experience of other cities that attractive shuttle service will encourage people to go to places they might not otherwise think of going to. In addition, this option would also provide shuttle access to those who park their cars in the Miami Parking System facilities located under I-95 and its ramps entering downtown. Option #2 would pass by the parking lot at NW 1st Street and River Drive, as well as Parking Lots #14, #15, and #33 located along SW 1st Street. Greater utilization of these parking facilities could decrease the amount of automobile traffic in the downtown area, and possibly provide an incentive for the Miami Parking System to contribute to the cost of operating the shuttle. This route would also provide direct access to a planned greenway that will be designed to follow the Miami River all the way from Biscayne Bay.

The disadvantage of this plan is that extending the route to the Miami River would add another mile to the round trip distance of the route. An additional five to six minutes would be required to complete a round trip. Four vehicles would be required to provide service every five minutes on this extended route, increasing the cost of providing service every five minutes to $730,080 per year. To provide service every three minutes over the extended route would require seven buses at a total cost of $1,277,640 per year. Given the high costs associated with the addition of each new vehicle, it might be appropriate to delay considering this option until the redevelopment along the river is underway. One option to consider to keep costs lower would be to provide service to the Miami River only during lunchtime, for instance between 11:00 a.m. and 2:00 p.m. Mondays through Fridays. This type of service would cost an additional $46,800 per year for a total operating cost of $594,360 for five minute service, or an additional $93,600 for service every three minutes for a total operating cost of $1,006,200 per year.

Flagler Street Shuttle - Option 3



Flagler Street Shuttle Option #3

This option is clearly the most ambitious, the most controversial, and the most in need of partners to accomplish. Yet it is not inconceivable, and could result in the most exciting opportunities for overall improvement of the environment of the downtown. Option #3 calls for providing shuttle service between the Central Bus Terminal and the Omni bus transfer center at Biscayne Boulevard and NE 14th Street.

This is clearly the longest route option proposed, with a round trip length of 3.5 miles. In spite of its greater length, the round trip could be completed in 20 minutes because much of the area along Biscayne Boulevard north of NE 4th Street does not have major development or destinations. This would require a minimal number of stops and allow the shuttle vehicles to travel at a good pace on this stretch of the route. This option would allow passengers to access the American Airlines Arena and the new Performing Arts Center when it is built.

One of the major advantages of this option is that it connects the hotels and new residential developments occurring near the Omni with Flagler Street via the shuttle. Of course, this is already possible through a number of MDTA bus routes that follow the same route. This observation leads to the other major potential advantage of this option. *A shuttle service that is very frequent and free could replace much of the large bus service that now travels between the Omni and the Central Bus Terminal*. This proposed option presents problems as well as wonderful possibilities. One significant problem is that this option proposes to truncate (terminate) many (but not all) of the bus routes at the Omni transfer facility rather than allow them to complete their trip to downtown Miami. The most negative aspect of this proposal is that the subject of truncating bus routes outside of the downtown is controversial and has been rejected in the past. Truncating the bus routes at the Omni has been proposed before as a way of saving MDTA more than $2.7 million per year in operating expenses. The theory was that passengers could use the Metromover to complete their trip to the downtown area. While these monetary savings to MDTA would be tremendous, passengers were not looking forward to having to change from a bus to the Metromover at Omni with less than two miles to go to complete their trip. Passengers on buses truncated at the Omni would be required to change elevations to the Metromover platform, wait for a Metromover car to arrive, and face a trip that was at least a few minutes longer to complete their trip downtown on a vehicle with very few seats. Passengers' travel time was going to be increased by as much as ten minutes. It's not surprising that passengers did not consider this a bargain.

However, transferring to a ground shuttle service might not be as objectionable. Virtually all of the bus routes coming from the north and east (Miami Beach) enter the Omni bus transfer center. If shuttle vehicles going to Flagler Street were available at the Omni every two to three minutes, there would be no need to change elevations to the Metromover, very little increase in the passenger's overall travel time, and a good chance of having a seat on the shuttle. The transfer to the shuttle would be free.

Another way to make this option more acceptable would be to allow some of the large MDTA buses to

continue on through to the downtown. Routes such as the #3, that travels along Biscayne Boulevard and Route S that comes from Miami Beach, carry crush loads, and it would be unrealistic and foolish to require passengers to exit a 40 or 60 foot bus and cram into a 22 foot shuttle. However, a number of other routes with lighter passenger loads could be terminated at the Omni and passengers would have the option of (1) taking the shuttle, (2) using Metromover if it better accommodated their final destination, or (3) transferring to any of the large MDTA buses that are continuing through to the downtown area.

The major advantage of this option is that it removes almost two-thirds of the large bus traffic from the downtown area. This would significantly reduce the emissions and the noise from MDTA's buses as they travel through the downtown. It would also increase the sense of pedestrian safety on Flagler and the surrounding streets.

This is clearly the most expensive of all the options to provide shuttle service along Flagler Street. Frequency would need to be high - no worse than every three minutes, and preferably every two minutes. This level of frequency would be required to provide sufficient capacity for the passengers transferring from the MDTA large buses at Omni to smaller shuttle buses to complete their trip to downtown. A high level of frequency is also required to make the transfer from MDTA large buses to smaller shuttle buses as painless as possible in terms of travel time for passengers. They should not be expected to wait, particularly if the weather is inclement, for a vehicle that allows them to complete their trip. Providing service every three minutes would require seven vehicles that would provide a capacity of transporting approximately 600 passengers per hour one way. Providing service every two minutes would require 10 vehicles that would be able to transport 900 passengers per hour one way. Providing service in this fashion from 6:00 a.m. to 7:00 p.m. Monday through Saturdays would cost $1,375,920 per year for service provided by seven shuttle vehicles every three minutes, or $1,965,600 per year for service provided by ten shuttle vehicles every two minutes.

Summary of Flagler Street Shuttle Options

The options for service described above provide a wide range of choices for those who will determine what type of shuttle service is most appropriate for the Flagler Street corridor. With as few as three vehicles, shuttle service could be provided between the Central Bus Terminal and Bayfront Marketplace every five minutes in both directions from 6:30 a.m. to 6:30 p.m. Mondays through Saturdays for $547,560 a year. This option would remove only 16 large buses per hour from the streets of downtown Miami if MDTA agrees to terminate routes #11 and #77 at the Central Bus Terminal. A more comprehensive approach to providing shuttles that removes approximately 70 large buses from downtown Miami during the same days and hours would require 10 vehicles at an annual operating cost of $1,965,600. The subject of how these services could be paid for will be covered more thoroughly in the section of the report on potential funding sources. It is enough to say at this point that the most probable way for the most comprehensive (and expensive) option to be funded (Option #3) would be by having the MDTA become a full partner in the provision of service, whereby they would help pay for the new shuttle service through the savings they

realized from truncating some routes that currently travel from the Omni to the Central Bus Terminal in downtown Miami.

MDTA officials would most likely be very reluctant to accept this option because of the burden it places on passengers to change vehicles. Whenever possible, transit agencies try not to make their passengers "transfer" during their trips. In general, transferring makes a trip by public transit less attractive and could discourage ridership. However, there is precedent for the service proposed under this option. In Denver, Colorado, the Regional Transit District terminates all of their bus routes heading for the downtown at two transfer facilities approximately one mile apart from each other. If passengers wish to complete their trip downtown via transit, they are required to transfer to large buses that run every 60 seconds on the "Sixteenth Street Mall", a one-mile pedestrian/transit facility in the heart of downtown. This necessity to transfer is simply regarded as a non-issue by transit officials and passengers given the high level of frequency available to passengers, and the fact that no fare is required to ride the shuttle. A two-minute level of service would probably be sufficient in downtown Miami to make transferring a non-issue to MDTA passengers. Of course, a two minute frequency would also provide a wonderful level of service throughout Flagler Street for those not using MDTA's regional bus routes.

It is proposed that any shuttle service along Flagler Street be provided for free. Most of the trips would be less than four minutes. Passengers would be reluctant to pay a fare for such short trips. Requiring payment could severely slow the process of boarding and delay the schedule and forward progress of the shuttle which would be expected to be more heavily used than the other shuttles in Brickell and Overtown. In Option #3, a shuttle service would be replacing existing transit service for which most people have already paid a full fare.

It should be noted that the Flagler Street optional routes do not address the potential of providing shuttle services to and from the Port of Miami. This facility is certainly a major source of tourists who shop in the downtown area during certain days. However, a round trip through the port would take 20 minutes for serving an area with sporadic demand. It would not make good sense to incorporate the Port of Miami into a route that also serves Flagler Street since there would be no need for two to five minute service to and from the Port throughout the day on an every day basis. It might make better sense to have a stand-alone route that provides service every 20 minutes from the Port connecting to the other shuttles on Biscayne Boulevard, or possibly to incorporate the Port into a route that also serves Overtown on an east-west route along 8th Street. Passengers wishing to go downtown could transfer to the more frequent shuttle serving Flagler Street. This would be more likely if Option #3 for serving Flagler Street was put into effect. In the meantime, MDTA intends to provide 60-minute shuttle service to the seaport from the Government Center on a regular basis starting in September with funds made available from a job access grant from FDOT. This will not have a dramatic effect on accessing retail activity on Flagler Street, but will help people who are leaving welfare and finding work at the port.

Overtown

Overtown is the largely African American community located north of downtown Miami with a rich history, but an uncertain future. This community is primarily residential, with some neighborhood businesses and other commercial/industrial uses located in its more northeasterly portions. Prior to 1960, Overtown was a relatively stable and vibrant community of almost 40,000 residents. While the community was clearly economically challenged, there was a much greater sense of neighborhood coherence due to the co-location of higher income residents, neighborhood schools, and hundreds of locally owned businesses.

After 1960, a number of forces including school desegregation, increased housing opportunities in other areas for higher income minority residents, speculative apartment construction, disinvestment, and urban renewal produced major negative effects on the Overtown community. Many of these forces caused a dispersion of former residents to other areas, and a reduction in neighborhood togetherness. Perhaps just as importantly, rumors of freeway construction, followed by actual construction of multiple transportation corridors, accelerated the decline of the community. Hundreds of businesses and residences were purchased and destroyed to accommodate the construction of I-95, I-395, and Metrorail. These actions removed a large part of the economic base of the community, and created physical barriers that divided what was once a singular community into four different parts that became a particularly difficult place to live.

Today, Overtown is a shell of what it once was - the proud center of the African American community of Miami-Dade County. The population of the area has shrunk from 33,000 people in 1950 to approximately 8,000 today. Overtown is currently experiencing the most extreme economic hardship of any community in Miami-Dade County. The 1990 census indicated that only 34 percent of Overtown's working-age residents were employed. Over half of all families in Overtown were shown in the 1990 census to be below the poverty line. There is substantial underinvestment in this area that is located so close to major centers of economic growth, including the Civic Center to the northwest, the booming areas of Brickell, and the expected development that will occur in downtown Miami and the Omni area.

Existing Transit Services in Overtown

MDTA currently provides a high level of service through Overtown. A number of regional routes serving downtown Miami pass through Overtown on a north-south basis. Route #77 travels along NW 7th Avenue and River Drive, providing service every 10 minutes during peak hours, every 15 minutes during the midday, and every 20 minutes on Saturdays. Route #21 provides service from the Jackson Memorial complex to downtown Miami by going through Overtown along NW 3rd Avenue between NW 17th Street and NW 11th Street, then along NW 5th Avenue between NW 11th Street and NW 5th/6th Streets, and finally along NW 2nd Avenue from NW 5th Street to the Central Bus Terminal. Service on Route #21 is provided every 30 minutes on weekdays and every 60 minutes on Saturdays. Route #2 provides service essentially along NW 2nd Avenue from NW 14th Street to the Central Bus Terminal. Route #2 runs every 15 minutes throughout the day on weekdays, and every 20 minutes on Saturdays.

East- west service is provided by MDTA on Route #7 which travels from NW 7th Avenue to NE 1st Avenue along NW 6th Street. Route #7 runs every 20 minutes throughout the day on weekdays, and every 30 minutes on Saturday. In addition, the Route "M" travels in an east-west direction from Jackson Memorial along NW 17th Street to NW 3rd Avenue, then along NW 14th Street to the Omni. Service on the "M" is provided every 30 minutes during weekdays, and every 60 minutes on weekends.

There are two Metrorail stations serving Overtown, including the Overtown Arena station at NW 7th Street and NW 1st Avenue, and the Culmer Station at NW 11th Street and NW 7th Avenue. Metrorail provides six minute service during peak hours, and 15 minute service during off-peak hours. The Metromover system lies just south and east of Overtown, with the closest station located at NW 5th Street and Miami Avenue.

In addition to the bus and rail services provided by MDTA, there are a number of legal private jitneys that operate through Overtown including King Jitney and Tri Rail Jitney. These jitneys provide service at the same cost as MDTA, though there are no agreements to accept transfers between the public and private providers of service at this time.

The Needs and Potential Markets for Shuttle Service in Overtown

Florida International University produced a well researched and documented report in 1998 entitled "The Historical Impacts of Transportation Projects on the Overtown Community". That report documents the devastating effects that prior transportation projects have had on Overtown that have resulted in community leaders having little trust towards public decision makers. The FIU report suggests that any future transportation projects be designed to improve residents' access to economic opportunities and retail areas, including Bayside, Flagler Street, the Omni, Jackson Memorial, the Port, and (though not mentioned in the report) the booming areas of Brickell.

As shown above, MDTA and private jitneys provide a good level of service to many destinations including Flagler Street, Jackson Memorial, and the Omni. Clearly, a new shuttle service would not be intrusive to the community, and could further improve residents access to areas where jobs are being created. A shuttle service could also improve access to human services, job training, parks, schools, and new shopping centers for daily conveniences such as the Winn Dixie Marketplace.

In addition to recommending improved access to economic opportunities in the surrounding areas for Overtown residents, the various plans developed for Overtown call for the improvement of the infrastructure of the area to create a more favorable environment for business and housing. The emphasis in the near future is in the development of the Folklife Village in the heart of historic Overtown between NW 8th and 10th Streets and 2nd and 3rd Avenues. A revitalization in this area within Overtown could generate renewed pride and interest among residents, and attract visitors to enjoy the rich history of the African American community in Miami-Dade County.

The options for shuttle routes in Overtown are based on the principles within the various community development plans summarized in the FIU report, as well as information received from neighborhood and city planners, as well as the staff of the community redevelopment agency who are very familiar with the issues in the community. The primary interest is in providing an east-west shuttle through the heart of the community that provides access to a number of public services and places, historic sites, redevelopment areas, multiple transportation modes, shopping, and economic opportunities.

Optional Shuttle Routes for Overtown

Three different options for shuttle service are provided below, all of them sharing some common characteristics of traveling through the community on an east-west basis. The general principles followed in the development of these options are:

- To avoid obvious duplication with existing transit services in the community;
- To connect with as many other transit modes as possible to encourage greater use of public transit;
- To provide residents with access to multiple work, human service, and shopping opportunities;
- To provide service that would encourage non-residents to visit the historic attractions in Overtown;
- To support redevelopment efforts that are currently underway;
- To be consistent with plans for bike and pedestrian improvements and plans for greenways that are intended to connect the Miami River to the Biscayne Bay through Overtown.

Overtown Shuttle - Option 1

Overtown Shuttle Option #1

This option provides a basic east-west service through Overtown from Biscayne Boulevard to NW 12th Avenue, primarily along NW 10th/11th Streets and NW 8th Avenue. The service is designed to start on Biscayne Boulevard at Bayside where it could connect with the Flagler Shuttle. From there it heads north past the American Airlines Arena to NE 8th Street. The route would proceed west along NE/W 8th Street past the Park West Metromover station and the proposed telecommunication center at NE 1st Avenue. The route would continue toward Miami Arena and the Overtown Arena Metrorail station at NW 1st Avenue where hundreds of thousands of square feet of new office space developments are anticipated. On the north side of NW 8th Street are high density residential developments between Miami Avenue and NW 1st Avenue that also feature the 9th Street Pedestrian Mall. The route would turn north on NW 2nd Avenue past the Lyric Theater on its way to NW 11th Street, going through part of the planned Folklife Village and redevelopment areas between NW 8th and 11th Streets. The route would proceed west on NW 11th Street, passing two short blocks south of Gibson Park. At NW 5th Avenue the route would be one block north of the Jefferson Reaves Sr. Health Center and Reeves Park. One block further west the route would go past Booker T. Washington Senior High School. Continuing in a westbound direction, the route would cross NW 7th Avenue and pull into the Culmer Metrorail station before proceeding to its final destination at the new Winn Dixie Marketplace just east of NW 12th Avenue.

This route provides new service in the community that is not currently being provided by MDTA or private jitneys. It "connects the dots" of many different points of interest for residents and non-residents. It is consistent with the redevelopment plans for the heart of Overtown that focus on historic elements of the community. It is also consistent with plans for a greenway through the community that is attempting to connect multiple parks in this section of the city. Option #1 provides connections with Metrorail service and also provides quick access to the new full-service Winn Dixie Marketplace which provides residents with a wide range of food choices and pharmaceutical items at competitive prices.

A round trip on this route could be completed in 20 minutes. Therefore, one vehicle could provide service every 20 minutes in both directions. A twenty minute frequency of service provides the opportunity for easy-to-understand "clockface headways" where the shuttle vehicle will pass by any point at the same times during every hour of service. Assuming the service ran from 6:30 a.m. to 6:30 p.m Monday through Saturdays, the annual operating costs for providing this service would be $182,520 with one vehicle. Providing 10 minute service with two vehicles would cost $365,040 per year. Given the lower densities of development in the Overtown area, it might be more appropriate to start with a service that ran every 20 minutes until such time as demand required greater service. The Winn Dixie Marketplace would provide a convenient layover spot for the bus at the end of a round trip to allow the vehicle operator to have a few moments to use a restroom or just take a short break.

The advantages of this route are that it is relatively inexpensive, fairly easy to understand (although the one-way nature of some of the streets make it less-than-ideal), and the trips taken on the route will be completed quickly. There is little traffic on the local roads that will cause delay of the shuttle, and no

bridges to be concerned with. The disadvantages of the route are that it requires passengers to transfer if they are going to Flagler Street, and it does not reach as far west as the Jackson Memorial Hospital complex. It is also not a true neighborhood circulator that gets close to all of the residents in the various sections of Overtown.

Overtown Shuttle - Option 2

Overtown Shuttle Option #2

Option #2 is virtually identical to Option #1, but it adds service to the Jackson Memorial Hospital complex. The route continues west on NW 11th Street to NW 12th Avenue and turns east on NW14th Street. Passengers would be let off on NW 14th Street to access all of the medical offices, requiring a walk of one to three blocks. The route would then go south on NW 10th Avenue to NW 10th Street to continue with all the service noted in Option #1.

The obvious advantage of this route is that it takes passengers very near the medical complex (Cedar Medical Center, VA Hospital, and Jackson Memorial Hospital). This would be a valuable service for both employees and patients of these facilities. The primary disadvantage associated with Option #2 is that it takes 25 minutes to complete a round trip. This addition of five minutes removes the possibility of providing service once every 20 minutes with one vehicle, thereby losing the advantage of the clockface headways as noted earlier. Service could be provided every twenty-two and one half minutes, or it could be slowed down to once every 30 minutes to retain an easy-to-understand schedule. If it was changed to provide service every 30 minutes, the shuttle could spend more time taking passengers more directly into the Jackson Memorial Hospital facilities via NW 16th Street, making their walk access to the various facilities there that much easier. As noted in Option #1, providing service with one vehicle every 30 minutes would cost $182,520 per year to operate. Service could be provided every 15 minutes with two vehicles at an annual operating cost of $365,040.

Overtown Shuttle - Option 3

Overtown Shuttle Option #3

This option is identical to Option #2, but it provides a direct connection with Flagler Street that voids the need to transfer to another vehicle to access downtown Miami. Rather than connect with Biscayne Boulevard, Option #3 turns south on NE 2nd Avenue and proceeds to Flagler Street, then heads back to 8th Street via NE 1st Avenue. This route's round trip could be completed in 30 minutes with one vehicle, or in 15 minutes with two vehicles. The costs associated with these two choices would be the same as those noted in Option #1.

Overtown Option #3 might not be necessary if Flagler Option #3 were implemented. In that option, a very high frequency of shuttle service (every two to three minutes) is provided along Biscayne Boulevard, connecting with Overtown options #1 and #2 at NE 8th Street. This would allow those using the Overtown shuttle to access Flagler Street with a very quick and easy transfer that would enable them to reach downtown only a couple of minutes slower than in Overtown Option #3. However, the return trip to Overtown would require a more carefully planned transfer since Overtown Options #1 and #2 would provide service only once every 20 minutes. Overtown Option #3 not only provides better access to downtown Miami for Overtown residents, it provides more potential shoppers for the stores in the rejuvenated Flagler corridor. In addition, it provides Overtown residents with easier access to the job opportunities that might be available in the new developments in Brickell, as well as job training opportunities available through Miami-Dade Community College's Wolfson campus. This routing option would also provide an easy connection to the shuttles noted in Brickell options 3 through 5.

Summary of Overtown Shuttle Options

The advantages and disadvantages of each individual route option for Overtown have already been described. However, it would also be possible to combine Overtown Option #3 with Brickell route options 3 and 5, whereby the same vehicles could serve Overtown route Option #3 and either of Options 3 and 5 in Brickell. There are a number of advantages to combining these routes. First, this would eliminate the need for passengers to transfer buses when traveling to and from Overtown and Brickell, making travel more convenient for those going between those two locations. Many residents of Overtown might want to use the service to get to jobs in Brickell. Residents of Brickell might want to go to the Wolfson campus of Miami-Dade Community College, visit the Folklife Village, have a direct ride to Jackson Memorial Hospital or shop at the Winn Dixie. Second, it could increase the likelihood of gaining funding for the route through certain federal resources that are available to pay for services that help people as they leave welfare and enter the work world. Third, it would equalize the level of service throughout the greater downtown area and help unite the various neighborhoods that are to receive shuttle service.

Should a composite route be developed that would combine services to Overtown and Brickell, four vehicles would be required to ensure 20 minute service. One significant liability to this option is the negative effects the bridge openings could have on schedule reliability in *both* Overtown as well as Brickell. If

service were provided between 6:30 a.m. and 6:30 p.m. Monday through Saturday, the annual operating costs would be approximately $730,080. These services could be phased in depending on the demand and availability of funds.

Airport West

The Airport West Transportation Management Initiative (TMI) in Miami is interested in establishing public shuttle service within its boundaries to help minimize traffic congestion that occurs during weekdays in this area of concentrated employment. CUTR has been asked to help determine the feasibility of, and possible alignments for, such public transit shuttle routes to alleviate traffic congestion, increase access to area employment from existing MDTA bus and rail facilities, and allow midday trips (such as for lunch, shopping, or other errands) for employees in the area.

The area known as Airport West surrounds the Miami International Airport and is home to several industrial centers, corporate parks, shopping facilities (including Miami International Mall, Mall of the Americas, and the planned Dolphin Mall, an outlet mall that will be located just east of the Florida Turnpike south of NW 25th Street), hotels, and other major employers. The most dense concentration of employment is near SR 826 and SR 836 in and around the airport. The full Airport West area is bounded by Okeechobee Road (U.S. 27) on the north; Le Jeune Road (NW 42nd Avenue) on the east; Flagler Street on the south; and the Florida Turnpike on the west. For a more focused study, the northern boundary was moved south to NW 42nd Street and NW 36th Street (this street is NW 42nd to the west of NW 87th Avenue and NW36th Street to the east of NW 87th Avenue). This shift did not preclude consideration of the needs of employers north of 36th Street, however, such as the Doral Resort and the Koger Center.

The Airport West area is characterized by extremely heavy traffic volumes in the peak morning and afternoon rush periods as well as midday. Traffic is most congested in the areas near SR 826 (Palmetto Expressway) for both north- and southbound traffic as well as east- and westbound traffic. Within the area, there are several roadway segments that operate below acceptable levels of service (there are a number of improvements planned in the MPO's Transportation Improvement Program, however). Currently, Airport West is underserved by the Miami-Dade Transit Agency (MDTA), although additional service has been proposed, as described in later sections of this report.

Population and employment within Airport West is expected to grow slowly but steadily. It is forecast that, between 1995 and 2020, population will grow 40 percent, and employment will increase 36 percent.

Information Gathering

As part of this effort, CUTR, with the help of the Airport West TMI, contacted nearly 40 major employers, leasing managers, and other stakeholders within Airport West to help determine the need for the services under consideration and to solicit input as to what the recommended services should accomplish. Seventeen of the employers and leasing managers (for shopping malls and corporate parks) contacted by CUTR agreed to a face-to-face meeting or answered a series of questions via fax. They included representatives of Delta Airlines, Holiday Inn/Crowne Plaza, Hotel Sofitel, Miami Airport Marriot, Radisson Mart Plaza, ICF Kaiser Engineers, Norwegian Cruise Lines, Blue Cross-Blue Shield, Neighborhood Health Partnership, STAF Airlines, Swiss Chalet Fine Foods, Inc., Koger Center, Radisson Plaza, Mall of the Americas, Post, Buckley, Schuh & Jernigan, Inc., Airport Corporate Center, and the Waterford/Hogan Group. Points of discussion included the following:

- perceptions of traffic congestion and parking problems
- workday hours of employees
- employee complaints or problems with traffic congestion
- current public transit use among employees
- possible areas for shuttles to serve (origins, destinations)
- hours of service and possible pick-up/drop-off points for a shuttle system
- types of shuttle vehicles (minibuses, alternative fuel, etc.)
- goals for a shuttle service in the Airport West area
- levels of interest in partnering to help support a shuttle service in the area

Regarding perceived traffic congestion, all of the respondents agreed that it is a major problem throughout the Airport West area. While traffic levels are high throughout the day, as one would expect, congestion is the worst in the morning and afternoon peak periods. Roadways cited as most troublesome include NW 36th Street/NW 42nd Street between SR 826 and the Turnpike; NW 25th Street between the airport and the Turnpike, NW 87th Avenue between SR 836 and NW 36th Street, Milam Dairy Road (NW 72nd Avenue), and the intersection of SR 826 and SR 836. Field visits to the area by CUTR staff confirmed these observations. None of those surveyed indicated any serious parking problems.

Those interviewed or surveyed were asked about the general workday hours of their respective employers/employees. This would give insight as to the best span of service for any recommended shuttle service. Due to the mix of job types that exist in Airport West, answers to this question were varied. Most of the employees of the offices and corporate parks in the study area have regular business hours of between 8:00 - 9:00 a.m. and 5:00 - 6:00 p.m. According to the respondents, those with employees working these normal business hours sometimes do complain about the traffic or have trouble getting to work on time. In many instances, however, the respondents believed that the major factor behind the rush period traffic is the congestion that occurs on SR 826 and SR 836, especially near their intersection. None of those reporting the normal business hours indicated any major problems attracting or retaining employees

due to traffic problems.

The hotels, airlines, and other employers in Airport West often have workday hours or shifts that differ from the "regular" workday. Various shifts for hotel workers, and for those who work in warehouse or cargo facilities, can start as early as 4:30 a.m., and end as late as 1:00 a.m. Many of these workers can avoid the periods of peak traffic volumes on the area's roadways. However, some of these types of jobs are entry-level and/or earn relatively lower salaries; thus, some workers, especially in the hotel industry, do not have access to vehicles and find it difficult to access the jobs in the area from the few transit routes that currently operate in the region. One of the respondents, representing one of the hotels in the area, gave an example of a promising prospective employee who, that day, called to turn down the job offer because he could not travel to the hotel at the times necessary via transit.

The stakeholders were also asked about the number of employees currently using a mode of transportation other than driving alone. Many, while assuming that most of their employees drove personal vehicles to work, were not aware of the level of transit use among their employees. A few responded that they knew of "one or two" employees that utilized public transit. Another responded, "We have one that rides Tri-Rail and one that rides the bus." These responses were not surprising, given that the Airport West area is currently underserved by MDTA. The hotel representatives, however, had a clearer idea of the number of employees using transit or carpooling, and were aware that a relatively large portion of their workforces relied on modes of transportation other than driving alone.

Any shuttle service implemented in Airport West will have little use if it does not go where people in the area would like to go, or need to go. The stakeholders were asked for input regarding origins and destinations for shuttle service. Responses to this question varied widely: some envisioned commuter service originating far outside the study area, such as Kendall, Miami Gardens, and even Broward County, while others pictured later evening service that would provide travel options for hotel guests to restaurants and shopping destinations in the area.

Regarding commuter service, the most commonly cited origins included Metrorail and Tri-Rail. Desired commuter destinations included nearly all of the employers in the Airport West area, especially those along NW 87th Avenue, NW 33rd Street, and NW 36th Street/NW 42nd Street, and including the major industrial/corporate centers. For a midday shuttle, respondents indicated desirable destinations such as Miami International Mall, the Mall of the Americas, as well as a few other restaurants in the area, originating from places of employment. Desired hours of operation included the typical rush hours (approximately 7:00 - 9:00 a.m. and 4:00 - 6:00 p.m.). There was also some interest in lunchtime or midday service operating from approximately 11:30 a.m. to 1:30 or 2:00 p.m. Nearly all of the respondents felt they would consider, or felt their employees would consider, using the shuttle service if it stopped at or near their place of work. It would be a "welcome service," most believed, as long as the service was frequent, on-time, clean, and did not have too many stops.

Most of the respondents favored the idea of using alternative-fuel technology, if available, to operate shuttle

service in Airport West. According to some, alternative-fuel vehicles would project a positive image for the service and might, at the least, give the impression of counteracting the pollution from the many cars, and especially trucks, that travel the roadways throughout Airport West. Most would also like to see smaller, more agile vehicles that could easily traverse the congested lanes of the area.

To gain a clear understanding of the exacts needs and desires of the area stakeholders (i.e., those who would use and benefit from the shuttle service), a question was asked as to what the goals of a shuttle service in Airport West should be. They were asked, in essence, what the service should accomplish. The most common responses included:

- Relieve stress resulting from harried commutes (this was the most popular response);
- Effectively and safely transport people to and from work with a mode other than the single-occupant vehicle–to decrease the number of cars on the roads;
- Accommodate as many work shifts as possible;
- Target employers with large numbers of employees who work on site;
- Provide access to employment within Airport West for those without access to a vehicle.

Finally, it was explained to the respondents that the level and quality of services that a shuttle service can provide will depend largely upon the level of funding available from both public and private partners. The respondents were asked if they would be interested in helping support such a service either directly, or indirectly through activities such as purchasing transit passes. A few answered simply that they would not be interested in supporting the operation of a shuttle, beyond possibly providing some ridership. Others wanted to take a "wait-and-see" approach, or further research the idea. Many of those with whom CUTR spoke, however, were possibly interested in helping support a transit shuttle service in the Airport West area. Understandably, however, most prefer to not make any commitments until proposed routes and schedules are approved and available.

In addition to the interviews and surveys of the area employers and stakeholders, CUTR made several field visits to the area to observe traffic patterns and conditions, and examine the physical attributes of potential origins and destinations to determine their accessibility by a transit vehicle.
Based on the previously-mentioned discussions with area employers/leasing managers and other stakeholders, the Airport West TMI, and MDTA, as well as on previous studies and the field visits, CUTR formulated alternative route alignments for a public transit shuttle service.

Existing Transportation Service in Airport West

Prior to developing any alternative route alignments for transit shuttle service in Airport West, CUTR examined existing public and private transportation services that currently operate within the Airport West study area. Private transportation services are limited to taxi service and some hotel shuttle buses that are

primarily used for transporting hotel guests to and from the airport. Existing MDTA bus service within Airport West is described below (and is shown color-coded in blue on the accompanying map:

- Route 7, 7A - Route 7, one of the most heavily traveled routes in the system, is a trunk route that serves the Government Center and Overtown Metrorail Stations, as well as the Downtown Bus Terminal in Downtown Miami. In addition, the route serves Miami International Airport and Miami Springs. Route 7A serves the Mall of the Americas and Miami International Mall. Route 7 has an approximate span of service from 5:30 a.m. to 9:30 p.m. with 40- minute headways.

- *Route 71* - This crosstown route has only the northern portion of its alignment in the Airport West study area, serving Miami International Mall. To the south, this route also serves FIU South and Miami-Dade Community College (Kendall campus). Route 71 has approximately 60-minute headways and operates from 5:30 a.m. to 9:00 p.m.

- *Route 36, 36A* - Route 36 is one of the more heavily traveled routes in MDTA's system and is considered a crosstown route. This route, which travels to Miami Springs, serves the Omni Metromover Station as well as the Allapattah Metrorail Station. Route 36A also travels to the Koger Center industrial park, one of the largest employers in the Airport West area. Route 36 operates from 5:30 a.m. to 9:00 p.m. Headways vary from 60 minutes in the off-peak to very frequent service (15-20 minute headways) during the a.m. and p.m. peak periods.

- *Route 132 (Koger)* - This route is a Tri-Rail shuttle that travels along NW 36th Street to serve the Koger Center industrial park (one of the largest employers in the Airport West study area, as mentioned previously). The route also serves the Ryder facility (also one of the largest employers in the study area). This shuttle operates a.m. and p.m. peak period service only.

- *Route 95* - This is a North Dade route that serves the Earlington Heights Metrorail Station, Miami International Airport, Doral Estates, and the Miami-Dade Police Department headquarters. Route 95 is an express route that travels southbound in the a.m. peak and northbound in the p.m. peak.

- *Route 87* - This crosstown route serves the Okeechobee Metrorail Station and basically bisects the Airport West study area, serving several destinations along the way including the Miami-Dade Police Department headquarters and the Mall of the Americas. The route continues south of Airport West and serves Dadeland Mall and the Dadeland North Metrorail Station. Route 87 has an approximate service span between 6:00 a.m. and 8:00 p.m., with 30-minute peak period headways and 60-minute off-peak headways.

- *Route 73* - This is a crosstown route that also serves the Okeechobee Metrorail Station. The northern portion of this route is beyond the Airport West study area and serves Miami Lakes and Hialeah. The southern portion bisects the study area, primarily along Milam Dairy Road (NW 72nd Avenue) and extends south to Dadeland Mall and the Dadeland South Metrorail Station. The span of service for Route 73 is from approximately 5:30 a.m. until 10:30 p.m., with 30-minute headways in the peak and 60-minute headways in the off-peak.

Additional Developments

MDTA has long been aware of the need for additional transit service in the Airport West area. During the course of this study, CUTR was able to provide information that helped MDTA develop the alignments for three new routes to serve the area: the Doral Connection, the Airport West Connection, and the Airport/Blue Lagoon Connection. In addition, beginning June 25, 2000, MDTA will implement the Airport Connection, which will run from the airport terminal to the cargo area. The other three routes are described below:

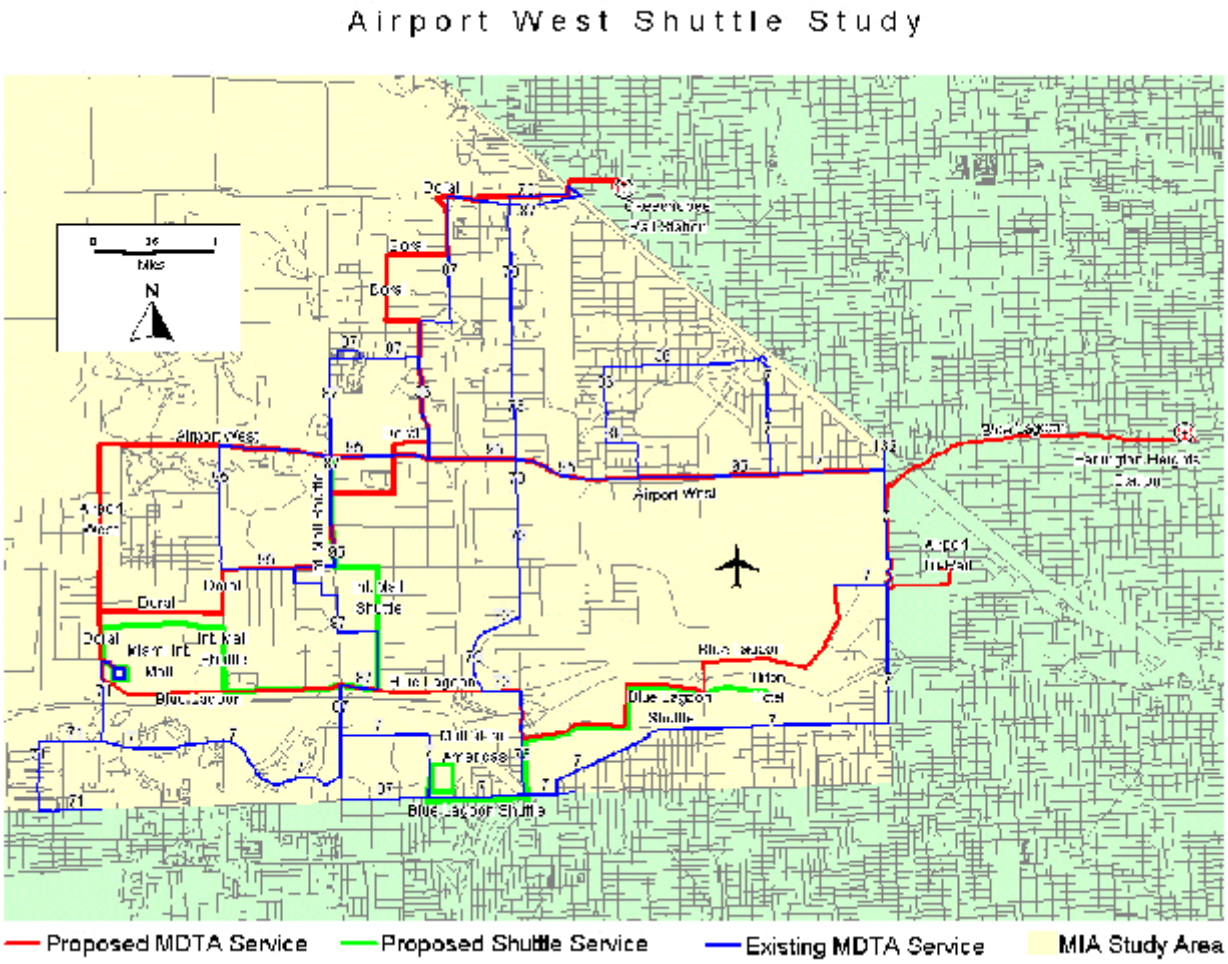
- *Doral Connection* - This route runs southwest from the Okeechobee Metrorail Station to Miami International Mall. Major destinations along the route include the Ryder facility, Miami-Dade Police headquarters, and the International Corporate Center. This route will have 30-minute peak headways and 45-minute midday headways, and will run from 5:30 a.m. until 7:00 p.m.

- *Airport West Connection* - This route will originate at the Allapattah Metrorail Station and run west along NW 36th Street/NW 41st Street to NW 107th Avenue. The route will then travel south along NW 107th Avenue to the Miami International Mall. MDTA will seek funding for this route through Job Access and Reverse Commute grants. It is likely this route will begin operating by the end of the 2000 calendar year.

- *Airport/Blue Lagoon Connection* - The area just south of the airport, known as Blue Lagoon, has long been underserved by public transit. MDTA has proposed a new route that will originate from the Earlington Heights Metrorail Station and will travel southwest to the Mall of the Americas. This route will provide access to the airport terminal as well as Tri-Rail's airport station. The alignment follows Perimeter Road from the airport to NW 57th Avenue and south to Blue Lagoon Drive, serving the Airport Hilton Hotel, Hotel Sofitel, and tenants of the Waterford Group. The Miami Merchandise Mart Radisson Hotel, on NW 7th Street, will also be served. As with the Airport West connection,

MDTA will seek funding for this route through Job Access and other federal grants. At the earliest, this route will begin operating at the end of the 2000 calendar year.

The impending implementation of the Airport Connection and the Doral Connection will be first steps in meeting the needs of commuters in Airport West. The routes will provide better access to employment in the area for those dependent on public transportation, and will provide a feasible alternative to many of those who currently drive alone to their jobs in Airport West. The other two routes, the Airport West Connection and the Airport/Blue Lagoon Connection, once implemented, will further increase access to the area's employment and provide a commute alternative for still more area employees.



Alternatives for Shuttle Service in Airport West

The development of the new MDTA routes, as described above, will provide additional commute alternatives for employees in the Airport West area, and will help meet the goal of increasing access to the various job types that exist within Airport West, especially from Metrorail and Tri-Rail. In looking to best allocate limited resources, the shuttle route alternatives presented below are designed as midday, or lunchtime, services. The availability of such services could help persuade more employees to use transit to commute to work, since they wouldn't need a car to get to lunch. The implementation of frequent midday service that serves several of the major employers in the study area as well as destinations such as Miami International Mall, Mall of the Americas, and other area restaurants, will help ease midday

congestion in the area. The proposed shuttle route alignments are highlighted in green in the illustration of existing and proposed transit services for the Airport West area:

- ***Blue Lagoon Shuttle*** - This shuttle route will run from the Miami Airport Hilton Hotel west to the Mall of the Americas. It will travel along Blue Lagoon Drive, serving the Hotel Sofitel and the employees in the Waterford corporate center, serving the Mall of the Americas via Milam Dairy Road (NW 72nd Avenue) and West Flagler Street.

- ***International Mall Shuttle*** - This shuttle route will provide service to the Miami International Mall for several of the employers in Airport West that are located along NW 84th Avenue, NW 25th Street, NW 87th Avenue, NW 36th Street, and NW 12th Street. Restaurant destinations along NW 87th Avenue will also be served.

Cost estimates for both shuttle routes are based upon a $45 cost per revenue hour of service, 250 annual weekdays of service, and the availability of vehicles through contracting or county fleet. The shuttles are recommended to operate from 11:00 a.m. until 2:00 p.m. Below are two alternatives for each shuttle alignment: one based on 20-minute headways, and one based on more frequent 15-minute headways. Costs are expected to increase approximately five percent per year.

- ***Blue Lagoon Shuttle***

  - Alternative "A" is based on a 15 mph average speed for two vehicles for 20-minute service. This alternative would result in a $67,500 annualized operating cost, displayed as follows:
    First Year - $67,500
    Second Year - $70,875
    Third Year - $74,419
    Fourth Year - $78,140
    Fifth Year - $82,047

  - Alternative "B" is also based on a 15 mph average speed, but uses three vehicles for 15-minute headways. This alternative results in a $101,250 annualized operating cost:
    First Year - $101,250
    Second Year - $106,313
    Third Year - $111,629

Fourth Year - $117,210
Fifth Year - $123,071

- ***International Mall Shuttle***

  - Alternative "A" is based on a 12 mph average speed using three vehicles for 20-minute headways. This alternative results in a $101,250 annualized operating cost:
    First Year - $101,250
    Second Year - $106,313
    Third Year - $111,629
    Fourth Year - $117,210
    Fifth Year - $123,071

  - Alternative "B" is based on a 12 mph average speed using four vehicles for 15-minute headways. This alternative results in a $135,000 annualized operating cost:
    First Year - $135,000
    Second Year - $141,750
    Third Year - $148,838
    Fourth Year - $156,280
    Fifth Year - $164,094

If funding is available, Alternative "B" for both shuttle routes would be the recommended options. Especially during the midday, it will be important for service to as frequent as possible, to attract riders. Employees are particularly time sensitive to the need to get back to work within an hour during their lunch break. In addition, bus shelters would be an important passenger amenity. On average, shelters cost approximately $4,000, and can be paid for by private advertising. It is anticipated that between 16 and 20 shelters would be needed for the two shuttle routes described above.

It may be possible to contract this service through a provider such as VPSI, Inc. For a relatively conservative 10,000 annual miles, a 12-month vehicle lease would cost $14,700 (including maintenance at $0.15 per mile). Insurance could be as high as $4,800 per year, and fuel would cost approximately $2,500 annually. In total, one vehicle accruing 10,000 annual miles would cost approximately $21,500 per year. For comparison, a vehicle accruing 20,000 annual miles (should the vehicles be used to provide additional service) would cost approximately $31,400 per year, including maintenance, insurance, and fuel. It is important to note that these figures are estimations only. In addition, driver costs are not included, and would need to be contracted separately. It is estimated that driver costs would total about $14 per hour: for four hours per day (250 annual days of service) per vehicle, driver costs would be approximately $14,000 per year.

Using Alternative "B" for the two shuttle alignments, costs for a five-year timeframe are shown below (costs are assumed to increase five percent annually):

- ***Blue Lagoon Shuttle***

  - Alternative "B" uses three vehicles for 15-minute headways. This alternative results in a $106,500 annualized operating cost. Costs would be about $30,000 more per year if each vehicle provided twice the number of miles.
    First Year - $106,500
    Second Year - $111,825
    Third Year - $117,416
    Fourth Year - $123,287
    Fifth Year - $129,451

- ***International Mall Shuttle***

  - Alternative "B" uses four vehicles for 15-minute headways. This alternative results in a $142,000 annualized operating cost. Costs would be about $40,000 more per year if each vehicle provided twice the number of miles.
    First Year - $142,000
    Second Year - $149,100
    Third Year - $156,555
    Fourth Year - $164,383
    Fifth Year - $172,602

OPTIONS FOR OPERATING THE SHUTTLE SERVICES

Potential Service Providers

There are a number of different entities that could operate the services described in this report. They could be provided directly by MDTA. Miami-Dade County has broad jurisdiction over the provision of public transportation services as prescribed in the county's charter. As everyone knows, MDTA is the major provider of transit services throughout the county with a fleet of 136 heavy rail cars, 29 Metromover cars, and over 600 buses. That agency provides bus service to over 210,000 passengers a day, from 4:30 a.m. to 2:00 a.m. The agency will soon be providing some bus services 24 hours a day with funding they will receive from the federal government through an Access to Jobs grant. MDTA operates its bus service from three different garages located in the north, central, and south parts of the county. The agency operates passenger vehicles that are as small as cutaway vans to articulated buses that are 60 feet long. The agency is clearly capable of providing whatever kind of shuttle services are contemplated in this report.

Shuttle services could also be provided through other entities including the City of Miami or the Transportation Management Association of the DDA or possibly the TMI for Airport West through its

association with South Florida Commuter Services. For instance, in Broward County, the county has reached interlocal agreements with ten different cities that now provide local circulator services with their own staffs of operators and mechanics. Those cities have concluded that there is an advantage in providing a circulator service that can be tailored to their citizens' needs (rather than having only regional bus service that goes through their city). Broward County provides minibuses to the cities through its ability to secure state and federal capital grants for transit vehicles. Broward County provides technical assistance in terms of scheduling and marketing the services, and also provides $20,000 per vehicle, per year in subsidies to each city to help pay for the operating expenses of the service. The cities are responsible for all other costs, and for providing the service with their own personnel.

There is also precedent within Miami-Dade County for interlocal agreements, where municipal circulator services are now being provided in the cities of Miami Beach, Aventura, and North Miami. The City of Hialeah will soon have its own local circulator services as well. Given the county's authority over public transit services, these local services can only be instituted through an interlocal agreement with Miami-Dade County, meaning the county must approve of the proposed routes and services. These interlocal agreements generally provide that the majority of the local circulator routes must be within the city that is sponsoring the service, which would clearly not be a problem with the services being proposed for the greater downtown Miami area. Fares charged for the service must be consistent with MDTA's fare structure, and each service would be required to accept transfers from the other. The interlocal agreements provide that any additional formula-driven federal or state revenues the county receives due to increased passengers will be provided to the city to help pay for the service. In reality, this amount would be modest and account for less than10% of the cost of providing the service. There are other standard elements of the interlocal agreements including the need to provide adequate insurance and ridership reports.

The City of Miami is a full service city with a municipal fleet of vehicles maintained by the city's General Services Administration. That department has a major garage and maintenance facility at 1390 NW 20th Street (not far from the proposed shuttle services for Overtown, Brickell, and Flagler Street). CUTR project managers visited that site and spoke with the managers of the department who indicated that their facility was bursting at the seams, and could not reasonably accommodate the high maintenance associated with transit vehicles. This does not mean that the city could not still be responsible for providing the services. In Miami Beach and Aventura, the cities have contracted with a private company (Coach USA) for the provision of local circulator services. In Aventura, the private company is responsible for all elements of the service including bus operations and maintenance of the vehicles. The vehicles in use are 24 foot diesel engine minibuses that provide hourly service throughout the city. In Miami Beach, the city has contracted with Coach USA only for the bus operations and dispatch functions, while retaining the responsibility for maintaining a fleet of electric vehicles with their own city staff mechanics. In both Aventura and Miami Beach, the cities are ultimately responsible for the quality of the service provided through appropriate monitoring of the contract, but the service on the street is actually being provided by private employees under contract to the cities. Hence, if there is a great desire on the part of the City of Miami to be recognized as the provider of shuttle services, there are more than enough examples of how it can be done. If the city was to seek competitive proposals to have another public or private agency

operate the service, they would need to notify MDTA of this opportunity and allow MDTA to respond to the request for proposals.

As noted above, MDTA is clearly capable of providing such services as well. This agency has not elected to pursue providing such services in the cities where local shuttles are now being operated, citing other priorities that require its attention. However, there might be greater interest by MDTA in being considered to provide these services, particularly in the greater downtown Miami area, since they are responsible for so much transit service in that area. MDTA's central bus maintenance facility is located at NW 32nd Avenue and 34th Street, which is within 15 minutes of the circulator routes proposed for the downtown area. MDTA's southern garage at Coral Way and SW 74th Avenue is located within 15 minutes of the Airport West area. The close proximity of these facilities would help minimize the "deadhead" mileage associated with providing transit service. Deadhead mileage is the distance buses must travel from their initial dispatch from the garage to the start of actual route service. All of the expenses associated with operating a bus start as soon as the bus leaves the garage, so it is advantageous to have as few deadhead miles as possible.

MDTA currently has the ability to provide services with minibuses at a reduced cost due to previous negotiations with the Transit Workers Union (the bargaining representative of MDTA bus operators and mechanics, among others). The cost of $45 an hour for service, which has been used throughout this report, is based on the approximate cost of service if provided through the "B" Division of MDTA. It is possible that service could be provided at lower cost through a private provider. For instance, Aventura is providing service through a contract with Coach USA for approximately $35 per hour, but that rate was based on conditions as they existed almost two years ago, before fuel prices almost doubled and competition for employees became more intense. It also includes no street supervision services.

What Agency Should Provide the Service?

Which method of operating is best? What agency should manage and/or provide these proposed services? In the case of the proposed services for greater downtown Miami, it depends to a large extent on the level of interest of the City of Miami in this service. In Miami Beach, the city saw the electric shuttle services as vital to its sustainability and quality of life. Traffic along Ocean Drive and Collins Avenue near the Art Deco District was becoming unmanageable as people wanting to access the popular clubs and restaurants cruised for parking spaces that were hard to find. As a partial solution to this condition, the City of Miami Beach put a great deal of effort into planning and implementing a highly customized service that made it possible for people to park at remote parking facilities and use a frequent electric minibus service to get to where they wanted to go along the beach. Miami Beach officials believed that this service was so important to the success of the area that they wanted control of the service. They also knew they were using new technology, and believed that specialized skills could best be developed in a local environment. The city was committing a considerable amount of its local dollars to the service, and felt they wanted more control over their investment. In addition, they did not want the service to be provided by another agency

with many other potential priorities that could distract that agency from making the electric shuttle a complete success. The reason most cities throughout Broward and Miami-Dade counties have elected to provide or manage such services is that they welcome the accountability and want to put more local energy into the service that they regard as politically popular. Local control gives a bit more flexibility to the local area in terms of schedules and routes. Utilizing private transit companies under contract also gives greater flexibility in changing service when necessary. As of this date, it appears the cities of Miami Beach and Aventura are satisfied with the quality of services being provided by a private transit company working under a contract with the cities. This option is certainly available to the City of Miami if it wishes to pursue it, and if the county agrees with it.

On the other hand, the City of Miami might not view the services proposed in this report in the same way that other local governments have regarded their own shuttle services. It might feel that the services being proposed are straightforward enough to allow the county to be the provider. The city might rather not be bothered with attempting to operate and maintain the vehicles themselves, or to have to go through the competitive proposal process and then be responsible for managing a contract with a private provider. The city might not want to be responsible for providing a new public transit service and assuming the potential liabilities associated with it. Funds for operating the service might come from sources other than the city's general funds (such as special assessment district revenues or savings from truncated MDTA bus routes), thereby reducing the city's interest in accountability. If there is general agreement about the routes and levels of service to be provided, the city might well wish to work directly with the county - assuming the county is interested in providing the service.

At this time, it is not clear if there is enthusiasm at MDTA to provide the types of services suggested in this report. That agency might believe that it provides more than sufficient service to the downtown area, and it might believe that surface shuttle service between Brickell and Flagler Street would "compete" with Metromover. Assuming the county could agree with the basic concepts of the shuttle services, it might be willing to act as the provider. There would be good logic to this because all services in the greater downtown area would benefit by being managed by one agency with responsibility for the passengers' well being. In addition, MDTA and county leaders should want to be involved with something that contributes to the positive development of greater downtown Miami. If Flagler Option #3 (which calls for truncating most buses at Omni and the Central Bus Terminal) was selected as the preferred method of serving the Flagler corridor, it would be absolutely appropriate for MDTA to be the provider of service, to help ensure accountability for the coordination of all transit service in the downtown area. If Flagler Options #1 or #2 are selected, it would not be as critical for MDTA to be responsible for the service, unless MDTA agreed to truncate a few of its routes at the downtown terminal. In order to avoid problems with its union work force, MDTA might want to replace the work lost due to the truncations with the new shuttle services.

To summarize, the major factors determining what entity should provide the service in greater downtown Miami are as follows:

- the shuttle route options that are selected for implementation along Flagler Street;

- the level of interest the City of Miami has in controlling and paying for the provision of service;
- the level of interest the county has in providing the service;
- the type of vehicle technology that will be used to provide the service.

CUTR recommends that if funding for the service can be secured, and if MDTA still has the opportunity to provide service through its less expensive "B" Division (the labor agreement is being negotiated at the time of this report), then the county would be the best entity to provide the services throughout greater downtown Miami. This would especially be the case if MDTA is to help contribute toward the costs of paying for the service by truncating any of its routes in the Flagler corridor and converting the savings to help pay for the operating expenses of the shuttles. In addition, if electric vehicles are the preferred choice of technology, then this report will argue that the county should be the preferred provider. This point will be explored further in the next section of the report.

If, on the other hand, the Flagler Shuttle Options #1 or #2 are preferred, the vehicle technology selected is commonly available to private bus companies, the county no longer has the "B" Division within the MDTA, and no MDTA routes are truncated, then it would be advisable to strongly consider contracting for the services provided.

For Airport West, it might be better to provide the services through a private contract. This service is intended to be provided only during lunch hours, and its ultimate success is less certain than the services being suggested for greater downtown Miami. This service could be started by a private provider under contract, possibly to the TMI, but more likely to the county. The service could also be provided with standard minibuses with standard engines that are commonly available to private bus companies. This option would result in having the service provided by an entity with considerable experience and expertise. Initial capital investments could be avoided by contracting for the service. It also assures the sponsor of maximum flexibility in increasing or decreasing the service as "cleanly" as possible (no layoffs of county employees if service is discontinued, and faster provision of increased service if required).

VEHICLE TECHNOLOGY OPTIONS

Minibuses vs. Full Size Buses

Local circulator services are typically provided with minibuses. It is contemplated that all of the service route options described in this report can be provided with minibuses that are approximately 22 to 24 feet in length. These vehicles can seat between 16 and 20 passengers, with capacity for another 10 to 15 standees. Clearly, the routes proposed to serve Brickell, Overtown, and Airport West would not need any more passenger capacity than a minibus provides. Each route is short, and passengers would be getting on and off throughout the short routes, thereby freeing up capacity along the way. While there might be an occasional exception, it is not anticipated that more than 25 passengers would be on a minibus at one time during a typical one-way trip. MDTA's average passenger load throughout the system is 36 passengers per hour. With each minibus providing three to four trips per hour, there would be a capacity of between 75 to 100 passengers per hour per bus.

It is impossible to predict just how much demand there will be for any of the proposed routes. In Miami Beach, they did not anticipate the incredible popularity of the electric shuttles and the effect of free fares. The seven buses they placed in service were insufficient to satisfy the demand from passengers. The city now charges a quarter for the service which has reduced ridership by approximately 40 percent. Miami Beach will soon receive four more electric minibuses to provide the additional capacity the route needs. The only route that would test the capacity of the minibuses in greater downtown Miami would be Flagler Option #3. Since this option contemplates substituting minibus service for existing MDTA service, capacity could be a question if service is provided once every three minutes with seven minibuses. Service would need to be provided once every two minutes with ten minibuses to help ensure sufficient capacity. If the service becomes very popular, there could be a need to consider larger or more vehicles.

Minibuses are the preferred type of vehicle to use for local circulator service due to their greater maneuverability, and their more neighborhood-friendly size. The smaller size of a minibus would be most advantageous in areas such as Brickell Key where the minibus would be able to negotiate the roundabout in the center of Claughton Island, whereas a 40 foot bus could not. A minibus could also maneuver more easily through the Winn Dixie shopping center in Overtown and into entrances of restaurants and hotels in Airport West. The smaller size of the vehicle would be more in keeping with the pedestrian activity on the streets throughout greater downtown Miami. These smaller vehicles also have faster acceleration to help ensure better schedule adherence.

Low Floor Buses versus Conventional Buses

The advantages of minibuses for local circulator services are fairly evident, and whenever possible, they

should be used. In addition, minibuses with "low floors" are preferable as well. Low floor minibuses have no steps for passengers to climb to get on or off the vehicle. This makes boarding easier for everyone, particularly the elderly and disabled, a parent with a baby stroller, or a shopper with a wheeled basket to help transport groceries . Low floors on buses utilize manually activated ramps to accommodate wheelchairs, thereby eliminating the need for hydraulic wheelchair lifts (all vehicles used in the proposed service would need to be accessible to the disabled, with the exception of commuter vans that might be used in a pilot project in Airport West). Perhaps most importantly, low floor minibuses also help speed the boarding and debarking process for every passenger, thereby contributing to faster route service and more reliable schedules. This would be particularly important for the Flagler Street route options, assuming those routes will carry a considerably greater passenger load, and stop almost every block to pick passengers up or let them off. The only disadvantage to requiring low floor minibuses is that they are more expensive than conventional minibuses, and not many public or private bus companies have such vehicles in stock. Should low floor buses be required, it would increase the capital costs of providing the proposed services.

Conventional vs. Alternative Fuel Vehicles

Two of the study areas expressed a preference for utilizing electric vehicles. The representatives of Brickell Key noted their status as an island that must be environmentally sensitive. Association managers at Brickell Key actually volunteered to provide a place to store an electric vehicle on the island if funding could be found to operate the service, and if a facility couldn't otherwise be secured. The representatives of Airport West suggested that using electric vehicles would help counteract the pollution they see emitted, particularly by the truck traffic, in this highly congested area. Representatives of the Retailers Association of downtown Miami did not seem to feel as strongly about the need for using alternative fuel minibuses. Their primary objective was to get customers from Brickell and Omni to Flagler Street to shop. Conventional fuel vehicles would be adequate to meet this objective.

Virtually everyone talked to by CUTR was familiar with the Electrowave Shuttle service on Miami Beach. Everyone acknowledged how the electric vehicles helped provide greater visibility for the service which helped in its promotion and marketing. However, even Miami Beach officials believe that the basic demand for local circulator service was there, whether the vehicles were powered by electric batteries or conventional fuels. As noted above, the electric battery powered vehicles used in Miami Beach gave the service greater visibility, and added to the quality of the environment in the entertainment district with its many pedestrians and sidewalk cafes. After two years of experience, it is hard to imagine any other type of vehicle being used on Miami Beach.

The following section will highlight basic information about electric vehicles and cover their advantages and disadvantages. This information was gathered by CUTR as a result of attending a workshop organized by the Southern Coalition for Advanced Transportation in Atlanta, Georgia in November 1999. CUTR also met with staff of the City of Miami Beach who are responsible for the maintenance of the Electrowave

vehicles and the monitoring of the service provided by Coach USA.

The Basics of Electric Vehicles

A pure Electric Vehicle (EV) is a vehicle that uses a rechargeable battery for fuel. They are very simplistic. The major components of the power train of an EV are a battery pack, a motor, transfer gear (instead of a transmission), and a controller. There is only one moving part in an electric motor, compared to 847 moving parts in an internal combustion engine. This relative simplicity results in a reduced parts inventory and reduced routine maintenance.

A *hybrid* electric vehicle (HEV) uses two fuels for propulsion. One is a rechargeable battery, while the other can be gasoline, diesel, propane, CNG, or other fuel supply for a small alternative power unit (APU) that constantly charges the batteries.

The benefits of EVs are well established. They reduce emissions to zero or near zero. They require far less oil and fuel, thereby relieving dependence on foreign oil which results in more stabile fuel prices. EVs are twice as fuel efficient as internal combustion engines. They are virtually silent except for a minor whir from a turbine APU. They emit no offensive smells or exhaust. Eliminating both noise and smell is particularly important for operations in downtown areas that are looking to encourage more pedestrian and sidewalk activities. EVs have no transmissions and therefore are low floor for easier boarding and debarking. No matter where they have been used, EVs have proven to be fantastic for public relations and rider acceptance.

Operating Characteristics of Electric Vehicles

Pure electric vehicles will provide an average range of 40 to 80 miles (or 4 to 8 hours of service) on lead acid batteries, depending on the ability of the vehicle operator to avoid uneven acceleration. Special training is needed for EV operators. Range is also dependent on topography, but the flat nature of Miami minimizes this as a factor. Crossing the Brickell Avenue bridge would not be a problem for an electric minibus. The top speed of an electric minibus is 40 to 50 miles per hour. There are gauges on board vehicles to inform the operator of how much energy is left in the batteries. The vehicle will slow down gradually before losing all its power (an EV will not suddenly "conk out" in the middle of a route). Nickle cadmium batteries cost more, but provide a bit more power and range. More advanced batteries are being developed each year. Cells within batteries can be replaced. Battery manufacturers are now willing to offer three year warranties. Batteries are 98 percent recyclable and are always sent back to the supplier. Battery packs cost between $10,000 and $12,000.

Battery packs on EVs take six hours to slow-charge. The batteries last between 800 to 3,000 cycles

(charges and discharges). Maintenance and operation techniques will determine how long they will last within that range. An operator needs to be prepared to swap out the battery pack after about five to eight hours of service. In spite of the weight and size of the battery pack, swapping out the batteries is a relatively fast and simple process. The vehicle is taken to its maintenance site where a technician uses a heavy duty dolly to take out the battery pack from the vehicle. The technician positions that battery pack in its place for recharging and then puts a new fully charged battery pack in the vehicle. The process takes no more than five minutes, but the bus also has to be removed from service to complete this process. How long this takes depends on how near the maintenance facility is to swap out batteries. In Miami Beach, the process takes a little less than 15 minutes since the facility is near, but not right along, the Electrowave route. This points out the need to have a maintenance facility right along the route, if at all possible.

Without rapid recharge equipment (discussed in the next paragraph), all-electric vehicle operations need to have at least three sets of batteries for every vehicle; one that is in the vehicle, one that is being charged, and one that is fully charged and ready to place in the vehicle. A fully charged battery pack should not be placed into an in-service vehicle immediately after its slow-charging cycle is complete. This subjects the battery to too much heat, and it is heat that ultimately kills batteries.

The industry is now producing "rapid recharge" equipment for battery packs. These pieces of equipment, which cost approximately $40,000 apiece, can fully charge a battery pack in approximately 20 minutes (versus the six hour slow charge technique noted above). If an EV is being used on a route that has a schedule that allows it to have a half-hour layover, it can be fully charged and ready for another service cycle fairly quickly. The advantage of rapid recharge equipment is that personnel are not required to take care of swapping out battery packs during service cycles of the vehicle. A new technique that is being used is the concept of "opportunity recharges". With this technique, a vehicle operator plugs the battery pack in the vehicle into the rapid recharge equipment for approximately five minutes. This does not fully recharge the batteries. It only recharges them to about 60 percent of their capacity, but that is enough to keep them going for another three to four hours. The EV industry has determined that this method is probably the best for the longevity of battery packs. There is a "sweet spot" for batteries to be charged at about 40 to 70 percent of their capacity. Rapid rechargers get the batteries substantially recharged before damaging heat builds up. This process can be continued throughout the day. This technique minimizes the need for spare battery packs, and eliminates the need to have personnel readily available to swap out battery packs throughout the day.

Hybrid electric vehicles give operators the most flexibility of all options. These vehicles have small turbine engines (APUs) powered by fossil fuel. They run very efficiently because they operate at a rather low and constant speed. The purpose of these APUs is to provide constant power to generate the battery packs, and in warm weather service areas such as Miami, they help power the air conditioning systems. The range of a hybrid electric vehicle is considerably greater than an all-electric vehicle, because it does not have to be taken out of service for recharging as long as the APU has fuel. Industry representatives note that the typical range for the hybrid-electric vehicle is between 150 and 350 miles. The downside to this option is that each hybrid electric vehicle costs approximately $40,000 more than an all-electric vehicle (which

costs approximately $200,000). Advanced Vehicle Systems, the producer of the 22 foot hybrid-electric vehicles used in Chattanooga, has won a statewide bidding process, making it possible for Florida's public transit providers to purchase these vehicles without going through the competitive bid process.

The appropriate option of electric bus operations (pure electric with battery swap outs; pure electric with rapid rechargers; or hybrid electric) will be determined by the following factors: how the routes will be operated (in terms of frequency, layover, etc.); how many buses are going to be operated; and, most importantly, where the maintenance facility is going to be located. Pure electric vehicles are the least expensive to buy, but will require extra battery packs and personnel to swap them out while the vehicles are in service. Rapid rechargers eliminate the need for personnel to do swap-outs, and reduce the need for extra battery packs, but the rapid rechargers themselves cost $40,000 apiece. Hybrid electric vehicles require no rapid rechargers or personnel to swap out batteries, but they cost $40,000 more per vehicle. Unless a maintenance facility can be found within close proximity to the proposed routes, hybrid electric vehicles would be the only feasible option.

Where EVs are being used in the United States

There are now about 200 EV minibuses operating in the United States. The most prominent examples of municipal shuttle services using EVs are in Chattanooga, Tennessee; Miami Beach; Norfolk, Virginia; Santa Barbara, California; Portland, Maine; Cape Cod, Massachusetts; and Cedar Rapids, Iowa. The market for such vehicles could conceivably explode. Tempe, Arizona has ordered 30 new EVs, Los Angeles is ordering over 20, and Alabama is purchasing approximately 25 for Birmingham, Mobile, and the Gulf shores area. Denver's Regional Transit District has ordered 40 and 45 foot electric buses to operate in its downtown mall. Emory University in Atlanta uses five EVs to provide internal circulation services on its campus. Coconut Creek in Broward County will soon have four EVs in service as circulators throughout the city. EVs are used at national parks, airports, amusement parks, and mega-shopping centers.

Chattanooga is regarded as the laboratory for EVs. This was one of America's dirtiest cities in the 1950s. City officials saw the opportunity to redevelop their downtown by, in part, using electric shuttle buses that would serve as parking garage intercepts. Twenty-three all-electric vehicles are used on a downtown route that connects parking garages, recreational and cultural destinations, major employers, tourist facilities, and the river. Over one million passengers a year are carried on this system. AVS (the electric minibus manufacturer) and the Electric Vehicle Transportation Institute are also located there.

Miami Beach is also becoming famous world-wide for its EV shuttle program. It uses the same approach as Chattanooga in terms of vehicles and routing. It anticipates increasing the frequency of service on South Beach, and extending the service to North Beach. The city would like to buy another 25 vehicles over the next five years. Everyone on the beach wants to be a part of their success. The only weakness of the program was that it was too successful in terms of attracting passengers, resulting in overcrowded minibuses

and passed-by passengers.

Lessons Learned from Around the Country

There are a number of common experiences among the various cities that have implemented EV shuttle services that offer helpful lessons to other areas that are considering this type of service:

1. Most importantly, make sure the mechanical characteristics of the bus match the operating characteristics of the routes. The propulsion system must provide the power and range that is needed. Maintenance facilities should be on or near routes.

2. There must be a champion for the project, whether it is an elected official, a transit general manager, a maintenance manager, etc. Someone must really want this type of service and want to make it work.

3. Both mechanics and operators need full training on EV and electric technologies. There are many nuances they need to appreciate.

4. Care must be exercised in the selection of batteries, since they are the fundamental fuel that drives the vehicle.

5. Public agencies should leverage the public relations value that EV shuttle service invariably generate. EVs are non-intrusive and extremely popular with the public for all the right reasons. All the sponsors can improve and/or build their reputation around it.

6. A "shakedown" period should be expected, where some "bugs" in the vehicles are discovered. It is still a new industry, and each vehicle is hand-made. In spite of the advances in the industry, there will always be problems with new vehicles. Make sure there are sufficient spares.

7. Involve the experts. Sponsors of the service should get the help of the Southern Coalition for Advanced Transportation and the Electric Vehicle Transportation Institute. The sponsor should ensure that the EV manufacturer is committed to standing behind the product and is willing to provide considerable on-site training. The manufacturer should know the characteristics of the routes that will be served before finalizing design of the vehicles. The local utility company can help with the specifications of the maintenance facility and where to locate charging units.

8. Sponsors should understand the infrastructure requirements of an EV service. The local utilities

company can advise the sponsor of the peak and off-peak times for electric service, and when electric rates would be least expensive.

9. In terms of routes, frequency is the key. Also, linear routes tend to be more successful than looped routes. They are more direct and easier to understand.

Facilities for Maintaining and Storing Electric Vehicles

If the services proposed in this report are provided by conventional fuel vehicles, the issue of where a maintenance facility is located is relatively minor. Conventional fuel vehicles have great range (from 250 to 350 miles on a full tank of fuel), and they can handle all the service they will provide in a day on one tank of fuel. There would be no need for the vehicles to return to the maintenance facility in the middle of the day unless an unexpected mechanical problem occurred that could not be corrected by a service vehicle in the field.

If, on the other hand, pure electric vehicles are used, there must be a maintenance facility in close proximity to the circulator routes. Indeed, the implementation of Miami Beach's Electrowave service was delayed for many months due to the difficulties in finding an appropriate maintenance facility. The operating range of such vehicles is quite small, and a single charged battery pack will not have sufficient power to accommodate substantial deadhead mileage and 12 hours of service. In addition, a charging facility must be relatively close by to minimize the amount of time a vehicle is removed from service in order to get recharged. The opportunity to place rapid rechargers at strategic places along the routes provides greater flexibility for electric vehicles, but it would still be advantageous to have a maintenance facility specifically designed for such vehicles near the circulator routes. This would also drastically reduce any costs associated with "deadhead mileage".

CUTR visited a number of agencies to see if there might be an opportunity to store and maintain electric vehicles at their sites. Miami Beach operates its EV shuttle service from the city's fleet vehicle maintenance facilities on the east end of the MacArthur Causeway. Electrowave managers understood the logic in having a City of Miami service dispatched from the existing Miami Beach facility where there was already expertise in maintaining such vehicles. However, they claimed they were having difficulty with the minimal space they had at their site, and it was only going to get worse when they receive four new electric minibuses later this year. They share the site with 900 other city vehicles, including garbage trucks, public works trucks, and all other city vehicles. Miami Beach officials are hoping to build a new maintenance facility closer to the middle of the city, in keeping with their desire to extend EV shuttles further north. This new facility, which would be designed to handle as many as 45 electric vehicles, might not be available for five years. If the new facility is located further north, its practicality as a site for Miami's vehicles would be much reduced, unless hybrid-electric vehicles are used. Hybrid-electric provides sufficient range to obviate the need to return to the facility in the middle of the day to get recharged.

It was noted earlier that CUTR also met with the vehicle fleet managers for the City of Miami at their facility at 1390 NW 20th Street. That facility is located within a mile of the service that is proposed for Overtown.

However, that facility is over capacity at the present time, and managers there did not believe that facility would be able to reasonably accommodate the special attention that electric vehicles providing public transit service would require.

The administrator of the Brickell Key Management Association volunteered to provide a charging site for an electric vehicle. While it is possible that a rapid recharger might be located there as a strategic place to conduct "opportunity charges", it is not likely that a facility on the Key could accommodate any more than two vehicles, making it a possible storage site only if no other service is provided in the greater downtown area.

CUTR project managers also met with representatives of Florida Power and Light. For obvious reasons, the staff of FP&L are very supportive of the use of electric vehicles and were very helpful in establishing the Electrowave service. They were asked if the FP&L substation facility located just north of the Miami River between SW 2nd Avenue and the Metrorail guideway could possibly serve as a maintenance and storage site for an electric vehicle service. This location is ideally situated in the middle of the circulator routes for greater downtown Miami, and electric vehicles would no doubt receive priority from an agency dedicated to providing electric service. Unfortunately, FP&L representatives have advised that their facility is also relatively crowded, and would not be able to handle the demands of a fleet of as many as 15 electric vehicles. However, they left the possibility open of being able to accommodate one or two vehicles.

The Miami-Dade Transit Agency's central bus facility is located at NW 32nd Avenue and 34th Street. This facility is approximately 15 minutes away from the circulator routes proposed for greater downtown Miami. There is sufficient space to accommodate a relatively small fleet of new vehicles, but this site would only suffice for hybrid-electric vehicles given its distance from the proposed routes.

There are three other interesting possibilities for providing a maintenance and storage site for electric vehicles very near the proposed routes. The first of these options might be the least possible, but it should be explored nonetheless. There is a major new development known as "One Miami" that is going to be built in downtown Miami near SE 2nd Avenue and the Miami River. This development is planned to have 1.2 million square feet of office space, 400,000 square feet of retail space,100,000 square feet of conference center space, 300 condominium units and 300 hotel rooms, as well as hundreds of thousands of square feet of parking. A maintenance facility for a small electric vehicle fleet could possibly be fit in the parking garage of this new development which will be in the dead center of the proposed circulator routes for greater downtown Miami. Approximately 15,000 square feet would need to be made available, with some area having ceiling space of 20 feet to allow for vehicles to be placed on lifts. The development might welcome the attention such a facility brings to a development. People from all over the world come to visit such facilities, helping the image of the sponsor, and possibly bringing more business to the development. If there is still room for negotiations with the developer, perhaps some sort of partnership could be developed between the public and private sector to develop a maintenance and storage facility at this new development.

A second possibility is also a bit of a stretch, but should be explored. Advanced Vehicle Systems has expressed an interest in establishing a service center in southeast Florida if a critical mass of electric vehicles are purchased and placed in service there. Miami Beach is hoping to purchase 25 more vehicles in the next five years. The services proposed in this report call for as many as 17 electric vehicles to be purchased and placed in service. Coconut Grove is considering the establishment of shuttle service to help alleviate traffic congestion and reduce noise and emissions in its business district. Other municipalities might also consider establishing some similar type of service. It is possible that this level of electric shuttle activity could attract AVS to establish a service center that might be expanded into a storage and maintenance facility as well, in partnership with public sponsors of electric shuttle service. There might be vacant sites in or near Overtown that could be affordable, be near the circulator routes, and provide some environmentally sound economic opportunities for Overtown residents.

The third option is the most interesting, the most possible, and perhaps the most appropriate location for a facility to house an electric vehicle fleet. While searching for possible locations for a maintenance and storage facility, CUTR project managers were advised of the building and grounds at 650 NW 8th Street in Overtown. This site contains a 30,000 square foot building that is currently underutilized as a Commercial Drivers License testing site. The interior of the building is barely being used at the present time, and would require significant rehabilitation. However, part of the reason it is such an interesting option is that it is the building that once housed the electric trolleys that operated in downtown Miami prior to 1950. Would it not be exciting and appropriate, especially when considering a new electric vehicle shuttle service, to utilize the building that housed previous electric public transportation services? The old expression "what goes around, comes around" comes to mind. And what goes around and comes around as much as local circulator shuttles? The major advantage of this facility is its location (two blocks away from the Overtown routes, and as little as six blocks away from the Flagler route). This would keep the options of utilizing an all electric service available. Another advantage is that the proximity of the site almost eliminates the deadhead mileage associated with providing transit service, thereby reducing operating costs by almost eight percent. The site is located in Overtown, which could provide some opportunities for jobs and further investment in the area. In fact, the site might also be of interest to AVS as their service center, as noted in the previous paragraph. Given Overtown's status as an Economic Empowerment Zone, there are incentives available to encourage investment in the area. Given the building's previous use and history, it might be possible to receive funds to rehabilitate the building through programs dealing with historic preservation.

CUTR staff spoke with the owner of the building who indicated that it was available to sell or to rent. Renting this building would cost approximately $75,000 to $100,000 per year.

POTENTIAL FUNDING SOURCES

The real key to determining if the services described in this report are feasible is whether or not funding can be found to pay for the operating and capital expenses. The costs for the services range, depending on what options are selected. The combined operating costs for services in all four study areas range from $1,044,000 to $2,819,000 per year. For the services in the three areas of the downtown alone, the combined operating expenses range from approximately $914,000 to $2,636,000 per year, depending on the routes selected and the frequency of service. Capital expenses could range from next to nothing (if conventional vehicles are used from existing facilities), or as much as $4,800,000 for new electric vehicles and another $500,000 to purchase and/or build a new maintenance facility. Hence, the availability of funds may well determine just what options are selected.

There are no "slam dunk" grant sources that are going to make all of these services immediately available. The City of Miami is just recovering from a severe financial crisis that required a state oversight board to review its budgets and expenditures to ensure the city remained fiscally solvent. Miami-Dade County is in better shape financially than the city, but it is limited in how much it can increase appraised values on its primary source of revenue (property taxes) each year. The Miami-Dade Transit Agency has only recently been taken off a "Management Watch" status that was imposed by the County Manager's office to deal with the agency's budget deficit. The state is far more interested in funding road construction than in funding transit, as evidenced by the Governor's Mobility 2000 plan that calls for over $4 billion to be spent almost exclusively on roads. Federal dollars for transit have increased by approximately eight percent a year for the past three years, but MDTA's backlog of capital replacement and rehabilitation requirements for both bus and rail easily lay claim to any funds that might be available for capital purposes. In addition, these new services would compete with other local circulator services, such as Miami Beach's planned expansion and Hialeah's local shuttles, for any grant funding that might be available.

In spite of these discouraging conditions, there are a number of sources of funds and techniques that could conceivably provide the funds necessary to pay for these services. It will require buy-in and cooperation from a variety of public and private partners to make this happen. It will then take a local champion to provide leadership and oversight, and a full time staff person to coordinate the various efforts that will be necessary. The next section of the report will describe the sources of funding that might be available to pay for operating and/or capital expenses associated with these proposed services.

Florida Department of Transportation Funding Programs

The "Fast Track" Program

This past year, Florida implemented a new program that complemented the work of the Freight Stakeholders' Task Force. The Fast Track program is a unique approach to strengthen our State's economic competitiveness and improve our business climate through transportation. Fast Track allowed public transportation projects that have been unfunded or underfunded in the past to receive priority consideration for accelerated funding in the first year of the work program.

The Governor and Secretary of Transportation announced the program in early September 1999, and set a deadline for a broad range of applicants for November 1. In its first year, $59 million in funds previously dedicated to high-speed rail were available to fund high-priority projects in aviation, rail, transit, seaport, space, or intermodal freight or passenger facilities.

A Fast Track Selection/Advisory team was formed including transportation executives outside the FDOT using candidates recommended by the Florida Chamber, the Freight Stakeholders Task Force, the MPO Advisory Council, and the Governor's Office of Tourism, Trade, and Economic Development.

During October 1999, a selection/advisory team, supported by FDOT staff, went to work developing specific criteria for a quantitative methodology to screen and score projects. The Selection Committee met twice in November, 1999, and recommended projects to be funded to the Secretary of DOT. Final funding decisions have been made. The vast majority of the projects involved enhanced road capacity, but there were three transit projects that were approved for funding.

As noted above, transportation projects funded through this program are intended to increase the state's economic competitiveness and improve our business climate. FDOT District VI staff have indicated that a downtown circulator program would be weak in terms of meeting the criteria for the program. However, a few transit projects around the state were funded through this program last year, including the capital costs associated with a neighborhood transit center to serve as a focus for local circulator services in Pompano Beach. Its best chance would be for the proposed services in this report to be promoted as a way of creating a more inviting business environment for Miami that would result in greater retail activity, better access for employees to get to and from work, and improved traffic conditions based on trips being taken by people who would otherwise utilize cars and contribute to debilitating levels of congestion. These funds are very competitive, and assuming the program is continued, applications would need to be forwarded to the state by fall of 2000, with funds coming available in summer of 2001. Should this source of funds be considered, it is recommended that the criteria for the program be carefully reviewed to determine if it is worthwhile to expend the effort required to apply for the grants. Funds from this program

are available only for capital projects. Consequently, this program could help pay for the acquisition of vehicles and facilities associated with the services described in this report.

Public Transit Service Development Program

The Public Transit Service Development Program was enacted by the Florida Legislature to provide *initial* funding for *special* projects. The program is selectively applied to determine whether a *new or innovative* technique or measure can be used to improve or expand public transit. Service Development Projects specifically include projects involving the use of new technologies, services, routes, or vehicle frequencies; the purchase of special transportation services; and other such techniques for increasing service to the riding public as are applicable to specific localities and transit user groups. Projects involving the application of new technologies or methods for improving operations, maintenance, and marketing in public transit systems can be funded through the program. Funding of Service Development Projects are subject to specified times of duration, but no more than three years. If deemed successful by their own measures, Service Development Projects have to be continued by the public transit provider without additional Public Transit Service Development Program funds.

Each district FDOT office develops and submits a program of eligible Service Development projects to the Central Office by the first working day of July each year, for implementation beginning July 1 of the following fiscal year. Projects are developed in consultation with eligible recipients, and the need for such projects is justified in the recipient's Transit Development Plan (TDP). For example, a project to initiate a new marketing campaign must be generally supported in the recipient's TDP with a statement of need for improved marketing efforts, as well as an objective to provide these efforts.

As delineated in *Section 341.051, Florida Statutes*, the Department is authorized to fund Service Development Projects that will improve system efficiencies, ridership, or revenues. The following are eligible functional areas along with specified time durations for Service Development Projects: projects that improve system operations, having a duration of no more than three years; projects that improve system maintenance procedures, having a duration of no more than three years; projects that improve marketing and consumer information programs, having a duration of no more than two years; and projects that improve technology involved in overall operations, having a duration of no more than two years.

The Department provides up to one-half of the net project cost, but no more than the amount of funding committed by the local project sponsor. Any proposed state participation of more than 50% of the net project cost are for projects of statewide significance. The final determination of whether a project qualifies for more than 50% state participation is made by the FDOT Central Office in Tallahassee. District offices are notified of the determination before the appropriation request is forwarded to the Legislature.

This state program could help fund operating or capital costs associated with any of the services described in this report. It might be the most likely source of state money for the proposed Airport West shuttles.

There might still be some Service Development funds available in the current fiscal year to apply to the Brickell or Flagler Services, based on prior discussions between the Miami DDA and FDOT District VI officials. If not, requests for such funds need to reach FDOT by mid-May of 2000 in order to be considered for funding starting in July of 2001. FDOT budgets approximately $2,000,000 per year that is distributed throughout the seven districts of the department. Again, there is severe competition for this program's funds, not the least of which comes from MDTA which has many projects they would like to try on a pilot basis.

Transit Corridor Program

The FDOT Central Office annually reviews all existing (i.e. currently approved and operating as of the annual review) projects, and then allocates to each district sufficient funds to cover these ongoing projects. First priority for funding under this program is for existing projects meeting their adopted goals and objectives. Any remaining funds are allocated to each of the districts by formula, based on each districts' percentage of the total state urbanized population. It is generally recommended that new corridor funding requests be submitted to the district FDOT office at least 12 months prior to the initial year of funding need.

The districts may program up to one hundred percent (100%) of the cost for transit corridor projects, as provided by statute, involving the activities indicated below, either by grants to a public entity or by a Department contract for services for part of or all services necessary to plan and execute a transit corridor project including, but not limited to:

- Development of Transit Corridor Plans;
- Design and construction or installation oversight of project facilities and improvements;
- Providing guidance and administrative support to the Technical Advisory Group during planning and implementation of the project;
- Development of marketing and public relations activities;
- Capital acquisition and investments based on study findings and as agreed to by the project Technical Advisory Group, including but not limited to:

  1. Rolling stock such as buses, vans, light rail vehicles and other high occupancy vehicles.
  2. Purchase of land for installation of project facilities and right of way for transportation corridor improvements.
  3. Construction and installation of facilities, such as Park and Ride lots, shelters and stations.

4. Transportation corridor improvements such as turn lanes, traffic controls, and exclusive lanes or facilities for high occupancy vehicles.

C Operational costs including but not limited to:

1. Pre-service preparations
2. Service operating deficits
3. Marketing and public relations
4. Project administration
5. Security and traffic control
6. Equipment and project lease, including appraisals
7. Commuter transportation services
8. Carpool and vanpool activities
9. Other Transportation Demand Management strategies targeting employers along the corridor or legitimate costs deemed appropriate by the District

Each corridor project must have clearly defined goals and objectives. Milestones have to established by which progress toward the goals and objectives can be measured. Decision points should be established where continuation of certain elements of the project or the entire project can be acted upon. The goals, objectives, milestones, and decision points must be defined by the grantee, be consistent with the Local Government Comprehensive Plan(s), Strategic Regional Policy Plan, Metropolitan Planning Organization Long Range Transportation Plan and the Florida Transportation Plan, and approved by the district office initiating the project. After the initial two year period, projects consistently meeting milestones can be reauthorized by being added to the Department's work program.

This program is particularly pertinent to the Flagler shuttle options described in this report. Both Biscayne Boulevard and Flagler Street are considered state roads, and the shuttle services described in any of the three options for Flagler circulators could be eligible for funding under the Corridor Program. This funding program requires more planning and accountability in terms of measures of success. However, the major advantage of this program is that it can fund virtually 100 percent of operating and capital costs for an unlimited number of years as long as the project's goals are being met. Once again, applications for these funds should be submitted a year in advance of planned implementation. This would mean an application for these funds should be made by June 2000 for implementation in July 2001.

Federal Flexible Funding Programs

Flexible funding programs authorized by ISTEA have been maintained in the Transportation Equity Act for the 21st Century (TEA-21). Many of these sources may be used for either transit or highway projects. The following flexible funding programs may be used for transit projects: the Surface Transportation Program

(STP) and the Congestion Mitigation and Air Quality Improvement (CMAQ) programs. Both the STP and CMAQ programs are discussed below.

Flexible funds, such as STP funds, can be transferred from the FHWA to FTA for project approval. Flexible funds which are programmed for transit specific projects must result from the local and state planning and programming process, and must be contained in an approved State Transportation Improvement Program (STIP). Once transferred, these funds are treated as FTA formula funds and may be used for any non-operating purpose eligible under the FTA program. (Note: CMAQ may be used for operating assistance within the parameters set for that program)

Surface Transportation Program (STP)

TEA-21 authorizes $33.3 billion nationally for STP over the life of the Act. STP funds are distributed among the states based on each state's lane-miles of federal-aid highways, total vehicle miles traveled on those highways, and estimated contributions to the Highway Account of the Highway Trust Fund. Once the funds are distributed to the states, suballocations are developed for each local area. STP funds may be used for any transit capital project including bus terminals and facilities, and rolling stock. A state/local match of 20% is required for STP funds. However, toll revenue credits may be used as a soft match for this program.

Public agencies who are interested in pursuing STP funds for use on transit capital projects must work with their local metropolitan planning organizations and district DOT offices to obtain access to those funds. For example, in Volusia County the transit agency, VOTRAN, was able to obtain a formal resolution by the Volusia County MPO to annually set aside 20 percent of the county's STP apportionment for VOTRAN.

Congestion Mitigation and Air Quality Program

The CMAQ program was reauthorized in the recently enacted TEA-21. The primary purpose of the CMAQ program is to fund transportation projects and programs in nonattainment and maintenance areas which reduce transportation-related emissions. Over $8.1 billion dollars is authorized over the 6-year program (1998-2003), with annual authorization amounts increasing each year during this period. All projects and programs eligible for funding must come from a conforming transportation improvement program that is consistent with the National Environmental Policy Act (NEPA) requirements.

Eligible projects include capital funding to establish new or expanded transportation projects and programs and operating assistance, under limited circumstances. Operating assistance under the CMAQ program is limited to 3 years, in most cases. The establishment or implementation of Transportation Control

Measures (TCMs) generally satisfy program criteria and include programs for improved public transit. CMAQ can fund up to 100% of the project costs for eligible activities.

It is unknown whether this source will continue to be made available to Florida's urban areas. Those urbanized areas that were classified as maintenance areas by the US Department of Environmental Protection may be reclassified as attainment areas prior to the expiration of TEA-21, thereby eliminating the potential for CMAQ funding in these areas. However, if the Miami area remains eligible for CMAQ funds, this program would be particularly appropriate to help pay the costs associated with the purchase of electric vehicles which measurably reduce the amount of ozone, carbon monoxide, and particulate matter pollution. However, it should be noted that all known amounts available to Miami-Dade County for the next three years are already programmed for other projects.

Other Federal Transportation Programs

Transportation and Community and System Preservation Pilot Program

The Transportation and Community and System Preservation Pilot (TCSP) program is a comprehensive initiative of research and grants to investigate the relationships between transportation and community and system preservation and private sector-based initiatives. The TCSP is a FHWA program being jointly developed with the Federal Transit Administration, the Federal Rail Administration, the Office of the Secretary, and the Research and Special Programs/Volpe Center within the US Department of Transportation, and the US Environmental Protection Agency.

The TCSP provides funding for grants and research to investigate and address the relationship between transportation and community and system preservation. The States, local governments, metropolitan planning organizations (MPOs), tribal governments, and other local and regional public agencies are eligible for discretionary grants to plan and implement transportation strategies which improve the efficiency of the transportation system, reduce environmental impacts of transportation, reduce the need for costly future public infrastructure investments, ensure efficient access to jobs, services and centers of trade, and examine development patterns and identify strategies to encourage private sector development patterns which achieve these goals.

The services identified for the greater downtown Miami area are very much in keeping with the goals of this program, particularly if alternative fueled vehicles are used. The proposed shuttle services would help eliminate the need for extensions of the Metromover system in both Brickell and Overtown. Electric vehicles could help reduce the environmental impacts of transportation in the downtown area. The service would help get people to jobs in the booming parts of downtown Miami and Brickell, and encourage continued development within these areas with concentrated transit services.

A total of $120 million is authorized for this program for FY's 1999-2003. Grant applications for TCSP grants are due to the appropriate FHWA Division Office in January of each year (FY 2001 applications were due by January 31, 2000). Grant projects are awarded in October of each year. Again, competition for these funds is severe, and of the $35 million made available in FY 2000, $25 million was earmarked by Congress. Only 35 of 530 submitted applications were funded last year, receiving anywhere from $100,000 to $1,000,000. A strong case can be made for the services described in this report.

Transportation Enhancement Program

The Transportation Enhancement Program (TEP) is a federal program administered by the Florida Department of Transportation (FDOT). TEP guidance and direction are provided by the FDOT Environmental Management Office, whereas the selection and implementation of most enhancement projects are handled by the FDOT district offices with input from metropolitan planning organizations or county commissions.

Funding for transportation enhancement projects is provided by the Federal Highway Administration (FHWA) through the Federal Transportation Equity Act for the 21st Century (TEA-21). This funding is intended for projects or features that go beyond what has been customarily provided with transportation improvements. This program is for projects that are related to the transportation system but are beyond what is required through normal mitigation or routinely provided transportation improvements. TEP is not a grant program, rather projects are undertaken by project sponsors, and eligible costs are reimbursed.

The following 12 activities are eligible for funding under the Transportation Enhancement Program:

- Provision of facilities for pedestrians and bicycles;
- Provision of safety and educational activities for pedestrians and bicyclists;
- Acquisition of scenic easements and scenic or historic sites;
- Scenic or historic highway programs (including the provision of tourist and welcome center facilities;
- Landscaping and other scenic beautification;
- Historic preservation;
- Rehabilitation and operation of historic transportation buildings, structures, or facilities (including historic railroad facilities and canals);
- Preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian or bicycle trails);
- Control and removal of outdoor advertising;
- Archaeological planning and research;

- Environmental mitigation to address water pollution due to highway runoff or reduce vehicle-caused wildlife mortality while maintaining habitat connectivity; and
- Establishment of transportation museums.

Funds can be used for planning, project development and environmental studies, design work, right-of-way acquisition, construction operations, and construction engineering and inspection services. Applications for enhancement funds are taken in February/March of each year by the district FDOT offices for eligible activities. Approximately $12 million will be available in FYs 2002 through 2004. Transportation enhancement funds are provided in an 80%/20% ratio of federal to state/local.

Federal Transit Administration Urbanized Area Formula Transit Grants

The Federal Transit Administration provides funding to transit agencies throughout the nation through two primary programs. The first is the Urbanized Area Formula transit Grant program, commonly known by its authorizing legislation as Section 5307, that provides funding to urbanized areas to support capital expenses in areas of over 200,000 population. As the title of the program implies, local transit authorities are entitled to these funds (assuming they meet all federal guidelines and requirements), and receive their share of these funds on a formula basis that takes into account the area's population, population density, and the amount of service miles provided. The Miami-Dade Transit Agency is the sole recipient of these funds in the county, although they can share parts of these funds with other local transit providers through an interlocal agreement such as has happened in Miami Beach, Aventura, and North Miami. The total dollars shared with municipalities through this program is relatively minimal (less than 10 percent of the cities' costs of providing the local services). However, it is not known if the City of Miami is interested in providing the service itself or through a contractor.

Federal Transit Administration Major Capital Grant Program

Commonly known by its authorizing legislation as Section 5309, this program provides capital assistance for new rail and other fixed guideway systems, modernization of rail and other fixed guideway systems and for new and replacement buses and facilities. There are approximately $535 million dollars available nationwide to help purchase buses and bus facilities. Funds from this source are available on a competitive basis (not distributed by formula). The "competition" for these funds is primarily political (rather than based on skills in grantsmanship). All of the funds for buses and bus facilities from this source are "earmarked" by Congress, with little input from the FTA staff. Once Congress has made its decisions on what areas will receive the funds, FTA prefers to work with only one designated recipient in any urban area, if at all possible. In this case it would be MDTA. However, that agency could act as a pass-through on behalf of a local city, if there is an interlocal agreement between the city and the county that allows the buses

purchased by the county to be used in a locality for a particular program. This is what has happened with the Electrowave service in Miami Beach.

For the upcoming fiscal year, the Clinton administration has proposed that $100 million dollars in this program be set aside to purchase alternative fueled buses and their facilities. CUTR has worked with EV Ready Broward and the Southern Coalition for Advanced Transportation to include the purchase of 12 electric minibuses for use in Miami in a consortium grant proposal that will hopefully garner the support of Senators and Congressional Representatives from throughout the southeastern United States. The additional political leverage this consortium can bring to bear should be more effective than every area in the southeast going after funds on their own. While it is unlikely that each area in the southeast will get as many buses as they hope to, there is a good chance that funds for as many as three to five electric vehicles might be available to use in the City of Miami in Fiscal Year 2001.

Access to Jobs and Reverse Commute Grant Program

In 1996, Congress passed the Personal Responsibility and Work Opportunity Reconciliation Act that radically changed the way welfare programs would be administered throughout the country. Welfare recipients may now only be eligible for benefits for a total of five years, with no more than two consecutive years of benefits received at one time. This legislation requires most people currently receiving welfare benefits to prepare to find work. As a way of helping welfare recipients make the transition to work, the Federal Transit Administration created the Access to Jobs and Reverse Commute Grant Program to help welfare recipients and low-income individuals access employment opportunities. Funds from this program are available to pay for a wide range of transportation services that link those needing jobs with areas that have jobs. Throughout the country this has often meant providing transportation from the inner city where many welfare recipients work to the outer suburban areas where the new jobs are being created. However, there is no reason that a transportation service can't be approved for grant funding if it connects inner city residents with other central city employment opportunities (e.g., Overtown to Brickell).

Miami-Dade County has been earmarked to receive $1.1 million dollars from this program to help establish the kinds of transportation services described above. Those $1.1 million dollars must be matched by an equal amount, but the match may come from other federal sources as well as other state and local sources. Miami-Dade County already has many ideas for funding routes that connect welfare recipients with job opportunities, but there still might be time to include the Overtown Shuttle service described in this report into such a grant program.

Community Development Block Grant Funds

This federally funded nationwide program administered by the Department of Housing and Urban Development provides $4.8 billion on a formula basis to support a wide variety of community and

economic development activities, with priorities determined at the local level. While this program is not focused on transportation, communities can use CDBG funds for the construction of transportation facilities, or for operating expenses and vehicle acquisition for community transportation services in low and moderate income areas. Funds from this source could be used to pay for either capital or operating expenses of shuttle services in the Overtown area. There is a great deal of local input into how these federal funds are used, and any thoughts of using CDBG funds for the purpose of purchasing buses, bus facilities, or shuttle services would need the support of the Overtown community which has many other needs and redevelopment aspirations. It is perhaps more likely that CDBG funds could be used for amenities such as bus shelters along the route serving Overtown.

LOCAL SOURCES OF FUNDING

Special Taxing District Funding

Chapter 18 of the Code of Miami-Dade County provides the county with the authority to establish Special Taxing Districts to help finance the provision of a wide range of public improvements and services, including public transit improvements or services. Special taxing districts may embrace not only an unincorporated area in the county, but also all or part of one or more municipalities in the county; provided however, that no such district shall be comprised solely of a municipality or embrace all or a part of a municipality without the approval of the governing body of such municipality. Special taxing districts for public transportation improvements may embrace the transporting of people by conveyances, or systems of conveyances, traveling on land or water, local or regional in nature, and available for use by the public, or a project undertaken by a pubic agency to provide public transit to its constituency, and may include but shall not be limited to the acquisition, design, construction, reconstruction, or improvement of a governmentally owned or operated transit system or ancillary facilities and improvements related thereto.

It is the intent of the county code to provide for the construction and the financing of public improvements and of providing services in areas in the county where such improvements and services could not conveniently be made available otherwise; that the cost of such improvements and services be borne on an equitable basis by those who receive the benefits thereof; and that property receiving special benefits be assessed in proportion to, but not in excess of, such special benefits. Indeed, this is how the local capital match for the Metromover system was secured. The special assessments for the areas of downtown Miami associated with the inner loop of the Metromover system have just been terminated within the past year. The special assessments for Brickell and the northeast sections of downtown associated with the Omni and Brickell loops of the Metromover will continue in effect until the year 2004.

While the county has the authority to establish special districts, it obviously would only want to do so on the condition that there is support for such a district within the proposed district. No issuance of bonds to pay for capital improvements can be accomplished without the consent of a majority of the property owners in the district.

Before a special taxing district of this nature can be established, there needs to be a report completed that documents the benefits that will be realized as a result of the improvements or services. The report that was completed for the special assessment district established for the Metromover concluded that the estimated benefits of the project would be $256 million due to higher prestige, additional floor space made possible

by better access and higher demand, less parking required, premium rents, higher occupancy, increased sales, and increased property values.

The establishment of a special taxing district could generate revenues that could conceivably pay for all or a part of the operating and capital costs associated with the shuttle services in both greater downtown Miami and in Airport West. This report could not gauge the sentiment for the support for such a district, though some of the retailers along Flagler Street indicated an interest. Of course, that support might depend on the costs associated with the project, and how much excitement and benefit new bus service would generate. They might be willing to pay for such services if the cost is relatively modest and helps attract new shoppers to Flagler Street. They might also be willing to pay if the service is more ambitious and results in an exciting new environment in the downtown area, where the large buses are removed from the downtown streets and they are replaced by clean electric vehicles.

Savings from Truncated MDTA Bus Routes

Most of the operating costs associated with the service in the Flagler/Biscayne corridor could be paid for through the savings realized by truncating a number of routes at the Omni and the Central Bus Terminal. As noted earlier in the report, this is a controversial option that has been discussed by the County Commission before and rejected. This option was proposed a few years ago as a way of saving as much as $2.7 million dollars in operating expenses a year. Passengers would be required to transfer from the two transit transfer facilities in order to complete any trips to the downtown. In the past, the only option available to passengers was to use the Metromover, requiring a change in elevation, a wait for the Metromover car, and longer travel time to complete their trip on a vehicle with virtually no seats.

The Flagler Street Options all anticipate that some existing bus service by MDTA could be eliminated if a frequent shuttle was established along this downtown corridor. In Flagler Street Options #1 and #2, MDTA bus routes #11 and #77 could be terminated at the Central Bus Terminal instead of being routed through the downtown to complete a loop before heading back west. The county would save the costs of operating one bus on each route, which results in a savings of approximately $400,000 per year. Those savings could be converted into shuttle services, helping to pay for the majority of the expenses in Flagler Option #1, and a significant part of Option #2. Passengers would be required to transfer from their buses, but a minibus would be running every three to five minutes from the transfer facility to Biscayne Boulevard. Many of the passengers from routes #11 and #77 work within a block or two of the transfer center, and could walk the short distance if they preferred to do so, rather than wait a minute or two for a shuttle.

Flagler Option #3 is far more ambitious and requires the majority of MDTA buses to be truncated at the Omni and Central Bus Terminal. MDTA buses with the heaviest passenger loads such as the #3 and the "S" would complete their trips into the downtown, but the remainder would complete their service at the transfer facilities. Passengers would have three options: (1) they could take the Metromover if that system provided more direct service to their final destination, or (2) they could either remain on, or transfer to, one

of the MDTA buses that continues its service into downtown, or (3) they could transfer to a very frequent shuttle bus that would run every two minutes and get them to their final destination just as fast as regular MDTA bus service. This option would only make sense if the service was provided by electric vehicles, since the number of buses traveling through downtown would actually increase. The major benefit of this service is that it would serve a dual benefit of transporting regional travelers as well as shoppers who simply wish to travel on the shuttle for a few blocks.

This option would only work if MDTA is willing to cooperate, and if MDTA is the operator of the service. Union employees could rightfully grieve if their jobs are eliminated due to this project. MDTA would be skeptical of these options because they might believe there is little to gain for them. However, being part of a major improvement in the downtown is a major public relations accomplishment (just as the Electrowave has become a popular service on Miami Beach). If the real mission of a transit agency is to improve the community of which they are a part, they should give serious consideration to these options to help pay for such services if the community enthusiastically supports them. The savings they contribute would cost them nothing, and those dollars contributed to the project could serve as the match for any number of other state and federal sources of funds.

Other Private Contributions

CUTR asked property owners in Brickell and Airport West if they would be willing to contribute toward the costs of providing shuttle services. The response was somewhat muted in Airport West, but the representatives in Brickell were much more open to the idea. The manager of the Brickell Key Master Association expressed a willingness to tack on a fee to each unit on the island to generate funds to help pay for the service. It is possible other residential complexes in Brickell, as well as the major new hotels, would be willing to do something similar. This type of revenue generation occurs in Broward County in the major condominium complexes known as Century Village. A fee of approximately $4 per unit per month is paid by each residential unit to help pay for the extensive circulator services that are provided on an otherwise fare-free basis to all residents. This allows unlimited access to such services by the residents of the condos. Although many of the residents still drive and do not use the bus services, they understand the benefits for their neighbors and support the monthly payments.

Something similar might be developed in the Brickell area in particular. This area has a significant number of residential units and hotels, and a significant amount of wealth. This type of revenue generation would not require a special assessment to be established. It could be done through the voluntary actions of the residents and businesses of the area. Although such a funding mechanism might be easier to establish, it is also more prone to uncertainty given its voluntary nature. If certain parties should "drop out" of their voluntary agreement to pay, the source of revenue for operating the service would diminish, and the communal sense of fairness and equity would be destroyed. However, it should still be kept as an option, particularly for services that benefit Brickell Key. This development's nature as an island causes the service to be a little more expensive to provide (requiring route deviations from the primary service area). In

addition, Brickell Key was not subject to the special assessments for the Metromover capital funding project. Mostly, however, Brickell Key is an enthusiastic supporter of better transit services, and already has a market for such services that will only grow larger as the island continues to develop. They would probably be willing to contribute to the costs of new shuttle services that helps reduce traffic on their causeway, and helps their residents and employees gain access to areas of interest without adding to the traffic congestion in the Brickell area.

Businesses such as Publix and Winn Dixie stand to benefit in terms of better access for their employees and customers. These businesses could be asked to help sponsor promotions for the service, and could also provide facilities for minibus operators when they need to take a brief break.

Revenues from the Miami Parking System

In other cities where downtown shuttle services are provided, a good portion of the funds to pay for their operation come from parking revenues. These services are designed to serve as feeders to and from parking facilities located on the immediate periphery of their downtowns. The shuttle services described in this report do not emphasize this function, although they are mentioned in Flagler Street Option #2. If the shuttle services are ultimately designed with the intent to serve as a "parking intercept", that makes parking facilities more attractive and increases their revenues, it is not unrealistic to hope that the Miami Parking system could contribute toward the cost of operating such shuttle services. Again, these funds could be used as a match for funds from other sources.

Local Option Gas Tax

The City of Miami benefits from portions of the local option gas taxes levied by Miami-Dade County. It is highly likely that any proceeds already being collected are completely committed to roadway and traffic engineering improvements. However, it might be possible for the city to indicate that any new revenues from this source that exceed existing amounts would be dedicated to helping to pay for the operations of the shuttle. The city must realize that its downtown is the primary beneficiary of this service, and consequently, they need to demonstrate a commitment to funding this service. In Miami Beach, that city has committed over $600,000 per year to help pay for the operating costs of this service. The City of Miami might still be recovering from severe financial stress, but it must also be an active participant in the funding of a service that benefits its well being so directly. If the local option gas tax provides insufficient funds for this purpose, then it should review other sources such as property taxes to help pay for some portion of them.

Impact Fees or Mitigation Fees in Lieu of Impact Fees

There are some major developments that have been proposed for development in downtown Miami and Brickell that will be adding impacts to the local transportation system. Although the level of service of the roads in downtown Miami is relatively good, the City would want to keep it that way. The city and the county might have the opportunity to assess impact fees on these new developments that could be used to help pay for some of the costs associated with the proposed shuttle services. In Broward County, impact fees are collected at the time land is platted, and can be used for the capital costs associated with providing transit services in the area of the developments. In Miami Beach, the city is hoping to establish a steady source of revenue for operating its Electrowave through a mitigation fee in lieu of impact fees. The City of Miami and Miami-Dade County might wish to review the feasibility of establishing similar provisions for the new developments in greater downtown Miami and Airport West.

Revenues from the Shuttle Service

This report suggests that any shuttle service that is implemented as part of the Flagler Street corridor be made available on a fare-free basis. This service will satisfy very short trips that would not deserve a fare, or longer trips that are currently made on the county transit system that in effect have already been paid for. In order to encourage ridership and interest, fares should be waived, at least for the first few months of service on all the other proposed routes. Any fare charged after that time would need to be consistent with the fares charged by MDTA. A fare of $.25 would be the same fare as MDTA charges for transfers, and would be appropriate to charge for service that provides relatively short trips that connect them to other regional transit services. It should be noted that there is great sensitivity to fares. The Electrowave service saw its ridership decrease by approximately 40% when it introduced a fare of $.25 in mid-1999. The revenue that might be expected from fares received in Brickell, Overtown, and Airport West would probably account for no more than five to eight percent of the revenue necessary to operate the service. However, charging a fare does discourage vagrants from using the service.

Another possible source of revenue that the shuttle service itself might generate is through selling advertising on the outside and/or inside of the minibuses. This might take the form of ads on placards that promote consumer products or services. Some regard this as unsightly, but it could generate thousands of dollars a month in revenue for the service. Another approach is to sell space to sponsors of the service with their names prominently placed on the vehicle in ways that don't appear quite so commercial. The agency that operates the service should focus on working with local businesses to sponsor the service as a way of generating revenue, and as a way of promoting partnerships with such businesses who will do other things to help promote the new service. Since their names would be associated with the vehicles, they would have a vested interest in helping the service to succeed.

Assistance from Other Partners

Depending on the nature of the technology used, and the ultimate design of routes, there might be other partners that can help to promote the service in one way or another. For instance, if it is decided to proceed with the services using electric vehicles, Florida Power and Light might help in designing maintenance facilities, and possibly contribute toward the cost of charging units, as it did for Miami Beach. In Alabama, the state's utility system provided the local share (20 percent) of the capital costs for purchasing the electric vehicles.

If the routes help promote other public programs, there might be the chance that these programs could provide funding for facilities such as bus stops or shelters, or help promote the new shuttle services. For instance, the routes could promote the fact they go past many of Miami's historic sites and buildings. The routes could also complement the work going on with the Miami River Commission's efforts to establish a continuous greenway along the river, and connecting the river to the bay through Overtown.

CONCLUSIONS

This report provides various options to provide service in the four study areas. These options range from a relatively modest level of services in each area to more ambitious options that help integrate services throughout greater downtown Miami.

This report also identifies a number of potential sources of funds to help pay for both the capital and operating costs of these services. In spite of the financial challenges many of the local governments are experiencing at the present time, even the most ambitious of these options could be a reality within 24 months if many different parties agree on the concepts for the service, and agree to participate as partners in making the concepts a reality. For instance, the City of Miami should not simply regard the provision of transit services as the County's responsibility. The services described in this report are customized for areas within the City of Miami, and they must be willing to contribute financially as a partner. So should the private interests who are the most likely to benefit from these services. The county must be enthusiastic in sharing a vision for a revitalized downtown that they can help create by being open to serving the downtown very differently than they are now. A combination of savings from truncating selected routes, revenues from special taxing districts, contributions from management associations, operating grants from FDOT, revenues from the City's parking system, some sort of impact fees, and revenues from fares and sponsorships would spread the burden of financing the services, and minimize the impact on any single agency or entity.

There are multiple sources of grants available on a competitive basis to help pay for the capital costs of these services. If the technology used is conventional, capital costs could be greatly reduced, and options for providing the service with private contractors becomes more realistic. However, electric vehicles would result in more benefits for the areas served by being quiet and clean, and by making the service easier to promote.

All of the partners in this service should be looking at a bigger picture with a longer view, particularly if electric vehicles are the preferred option. There could be opportunities to share maintenance facilities, and even vehicles, between a variety of providers in the area. For instance, Miami Beach wants to expand its electric shuttle service and will require larger maintenance and storage facilities.
Coconut Grove might also want to provide similar services. If the parties representing greater downtown Miami also want to provide service with electric vehicles, all shuttle service providers in the area should consider how they might work together to help each others' interests. For instance, Miami Beach might not need to purchase as many new vehicles as they forecast needing to serve the nighttime demand if

vehicles from Miami were available to use after their daytime service is complete. Perhaps one maintenance facility can help serve the needs of others (e.g., Coconut Grove) to reduce capital costs in the future. Perhaps all of these areas together could help convince an electric vehicle manufacturer to locate a service facility in southeast Florida.

The next important step is for a committee representing all of the interests mentioned in the report to get together and select the options they want to see implemented. This is easier said than done. For instance, Florida Power and Light representatives have already indicated that the service must be designed to succeed if they are to be a partner, and this success will depend on frequency. Better frequency of service is more attractive to passengers, but it is also more expensive to provide. There will be many other strategic issues to decide.

CUTR will help facilitate such meetings if requested. Total costs could then be determined, and a plan of action could be developed that identifies the operating agency and the responsibilities of the all partners. The plan could be implemented in phases, and might have to be, given the major developments occurring in Brickell at the time of this report. Implementation in phases is more financially feasible, and would allow time for all of the elements of the plan to be put into place. Many grant applications will need to be completed and submitted, a Special Taxing District might need to be established, etc. Some staff person will need to be given the lead responsibility in organizing everyone's efforts to make these services happen, and a recognizable champion for the service would help give this project the priority it will need.