



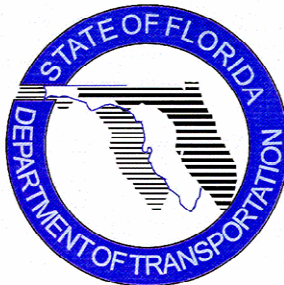
MAINTENANCE FACILITY LOCATION ASSESSMENT

TECHNICAL MEMORANDUM

**CENTRAL BROWARD
EAST-WEST TRANSIT ANALYSIS
BROWARD COUNTY, FLORIDA**

FINANCIAL PROJECT ID NUMBER 411189-2-22-01

**FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT 4**



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1. INTRODUCTION

This analysis identifies possible locations for a Light Rail Transit (LRT) or Bus Rapid Transit (BRT) maintenance facility for the proposed the Central Broward East-West Transit Analysis. The identification of maintenance facility locations is being conducted as part of the Tier 2 evaluation, which considered four (4) build alignment alternatives:

Alignment #1: I-595/SR 7/Broward Boulevard

Alignment #2: I-595/SR 84/Andrews Avenue

Alignment #3: Sunrise Boulevard/Broward Boulevard "A"

Alignment #4: Sunrise Boulevard/Broward Boulevard "B"

A description of each of these alignments is provided in the *Tier 2 Summary Report*. For each of these alignment alternatives, two transit technologies are being considered, Bus Rapid Transit (BRT) and Light Rail Transit (LRT). If BRT service is provided, the preference is for vehicles to be serviced at existing bus maintenance facilities if space is available. Light rail vehicles, however, require specially designed maintenance facilities that include rail lines and can accommodate the overhead power supply.

Based on similar projects and the projected fleet size, it is estimated that a site of eight (8) to twelve (12) acres would be sufficient for either the BRT or LRT maintenance facility for the proposed Central Broward East-West Transit Analysis LRT Alternative. The LRT facility would require more space due to the longer turning radius of rail vehicles as opposed to buses. The LRT maintenance facility also would require an electrical substation as well as the overhead catenary power system, adding to its costs. For cost estimating purposes, it is assumed that the maintenance facility would require a site of 15 acres. The projected site size for either the BRT or LRT maintenance facility includes space for employee parking in addition to the yard and structures.

A main criterion for the location of an LRT maintenance facility is that it be able to connect to the proposed guideway by a yard lead (spur). A yard lead would not be required for the BRT maintenance facility since the vehicles could reach the yard on existing streets. It is preferred that the maintenance facility be located on vacant land, if available, and with an industrial future land use designation. A second option is to locate on land with existing industrial or commercial uses, where vacant land is not available. Considerations evaluated include the ability to provide rail spur access, existing land uses, parcel sizes, environmental factors, land ownership, location along alignment and compatibility with surrounding uses. Siting an LRT maintenance facility has more constraints than siting a BRT facility and as such this report's analysis focuses on meeting the needs of LRT.

This memorandum describes the five areas analyzed for the placement of a maintenance facility and the issues associated with each. While there are several potential locations near the western terminus (Sawgrass Mills/ Office Depot Center), these locations were not evaluated as a result of conversations with representatives from the City of Sunrise who strongly discouraged the location of a maintenance facility in this area since it would be incompatible with the City's future development plans. Figure 1 shows these five areas on an aerial photograph. The five areas are:

1. Florida's Turnpike and I-595/State Road 84
2. State Road 7/US 441 and I-595/State Road 84

3. I-95 and State Road 84
4. Andrews Avenue and I-595
5. Port Everglades Area

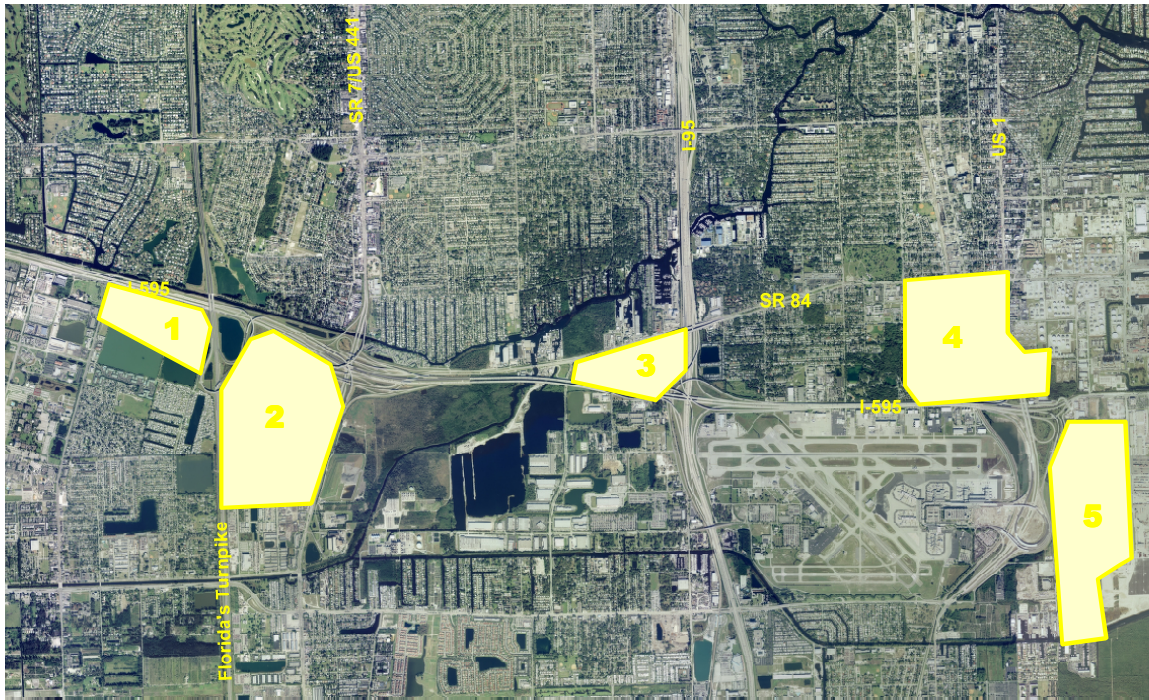


Figure 1. Maintenance Facility Analysis Areas

2. LOCATION ASSESSMENTS

This section provides an evaluation for each of the areas considered. In general, these areas are located in the vicinity of I-595 and State Road 84. A western location is preferred to reduce deadhead (non-revenue service) time since a majority of riders will be traveling east in the morning and west in the evenings. Areas with industrial uses are preferred, since environmental and property value concerns of residents make locating such a facility difficult. Also, some communities are more reluctant than others to allow land to be converted to public uses and removed from the tax rolls. For these reasons, certain western locations were omitted from this analysis and the remaining areas were chosen because of the amount of industrial land in each.

2.1 FLORIDA'S TURNPIKE AND I-595/STATE ROAD 84

This area is located in the Town of Davie and is south of I-595/State Road 84, west of Florida's Turnpike, east of Davie Road and north of Nova Drive. The area has a Regional Activity Center (RAC) future land use designation on the Broward County Land Use Plan and is part of the South Florida Education Center. Figure 2 provides an aerial photograph of the location and shows individual parcels as identified by the Broward County Property Appraiser.

There is a small amount of vacant land (see parcels marked "A" on Figure 2) in the northeast portion of the area, and the area closest to the interchange has existing industrial uses, which

consist of warehousing, distribution terminals, trucking facilities and manufacturing uses. There is a six-acre vacant parcel adjacent to the submerged parcels (see parcels marked “B” on Figure 2), which could potentially be expanded with fill. None of the other parcels in the area is large enough to accommodate the maintenance facility; however, the parcels are large in size and only a few would need to be assembled to create a parcel of sufficient size to accommodate an eight (8) to twelve (12) acre maintenance facility.

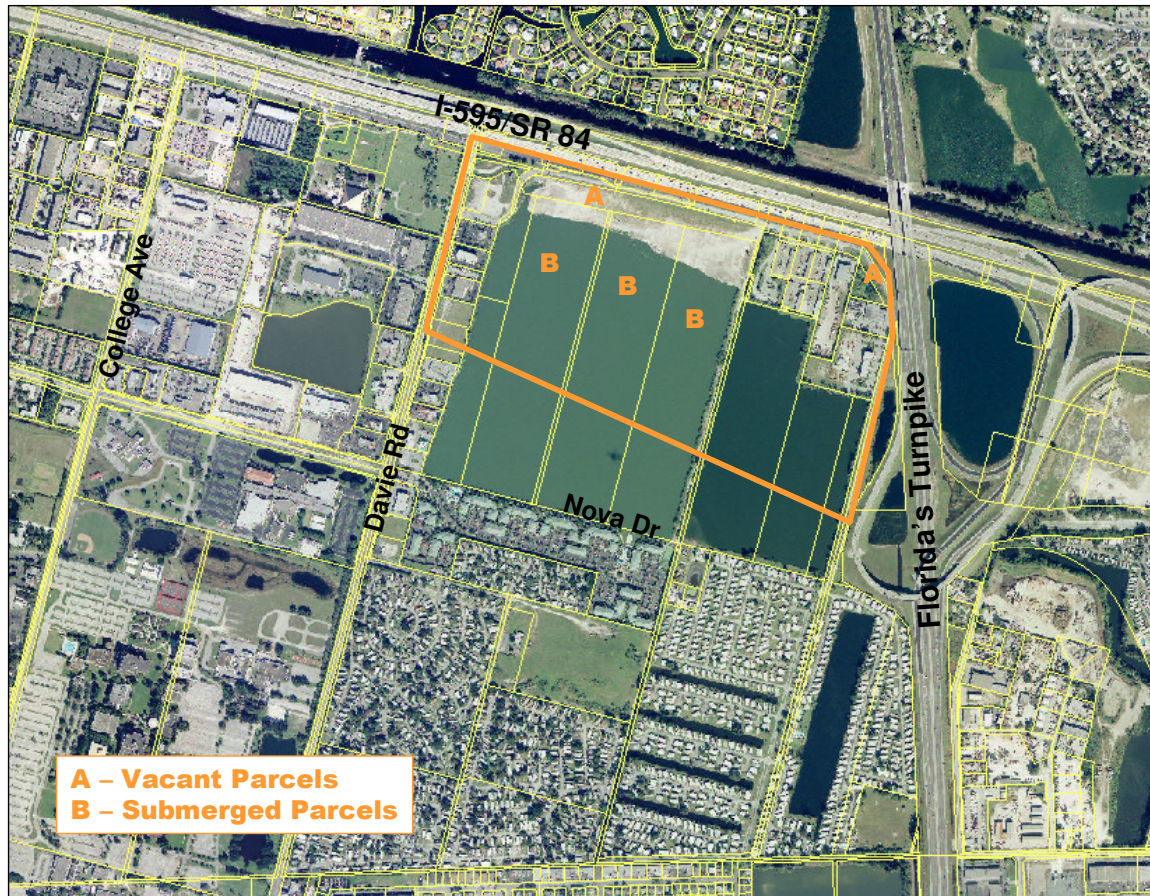


Figure 2. Florida's Turnpike & I-595/State Road 84

The South Florida Education Center is located in the remainder of this area. Per the Broward County Land Use Plan, the RAC is to have industrial uses on between 15 and 30 percent of its 2,244 acres. Land to the east of Florida's Turnpike has industrial future land use designations and consists of many trucking, manufacturing and other industrial uses. Low-density residential exists north of I-595/State Road 84.

In this area, the guideway would be located on the south side of the I-595 right-of-way and it is anticipated the guideway would cross over Florida's Turnpike. It would be possible to provide access to a maintenance facility in this area; however, there may be grade issues for parcels closest to Florida's Turnpike.

A wellfield is located south of Nova Drive between Davie Road and Florida's Turnpike. The location of the maintenance facility nearby may require design elements to ensure groundwater protection.

2.2 STATE ROAD 7/US 441 AND I-595/STATE ROAD 84

This area is located in the Town of Davie and lies south of I-595, west of State Road 7/US 441, east of Florida's Turnpike, and north of Orange Drive, concentrating on parcels north of Oakes Road. The land in this area has an industrial future land use designated per the Broward County Land Use Plan. Figure 3 provides an aerial photograph of the location and shows individual parcels as identified by the Broward County Property Appraiser.

A majority of the parcels are developed with truck terminals, manufacturing or other industrial uses. However, there is a large mobile home park (see parcel "C" on Figure 3) in the center of the area. Several parcels are of sufficient size to accommodate an eight (8) to twelve (12) acre maintenance facility. A few parcels, particularly those more interior to the quadrant, along Burriss Road, are vacant. Parcels identified "B" on the figure are under construction and the parcel marked "A" is primarily vacant and could offer access to the guideway. There are other parcels of sufficient size in this area to support the facility, but most are occupied with active businesses or are set back from the proposed guideway. Some of the uses span multiple parcels and are under common ownership, making potential land assembly efficient.

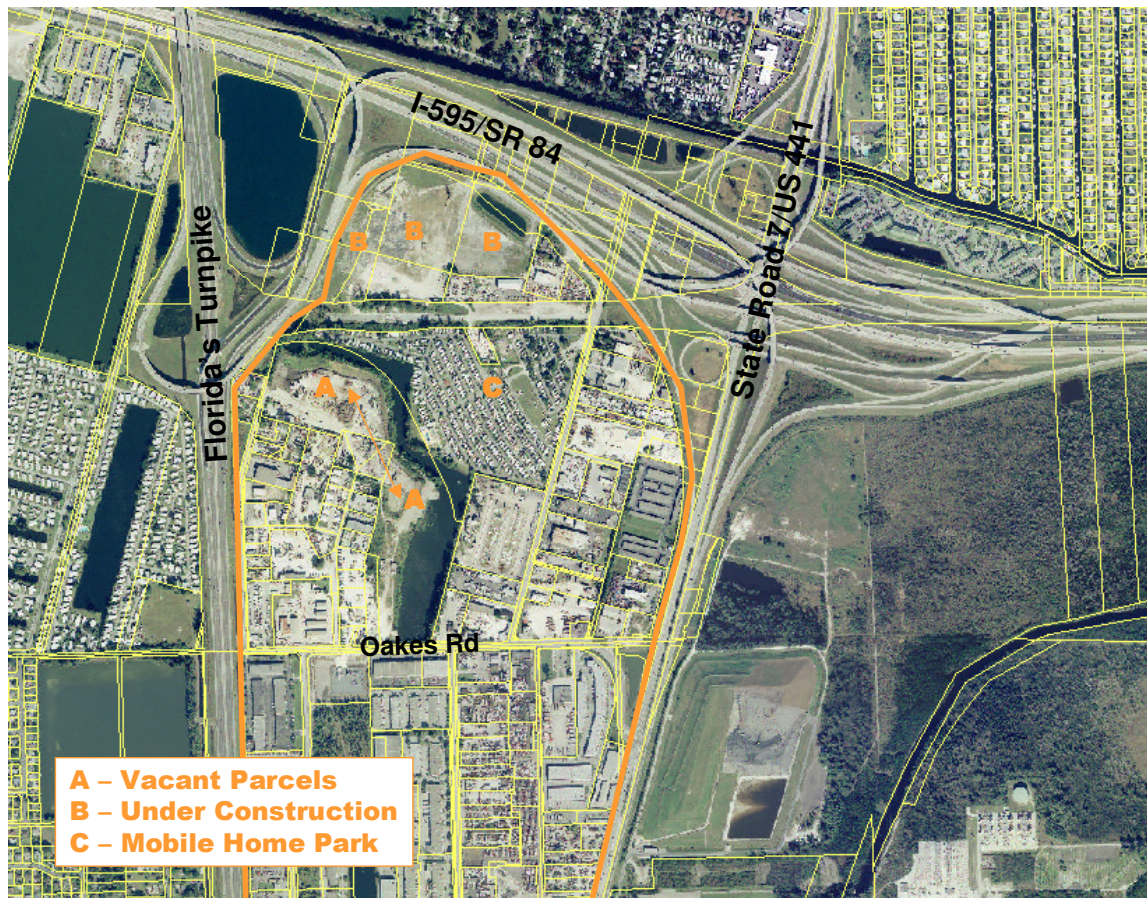


Figure 3. State Road 7/US 441 & I-595/State Road 84

This area is surrounded by transportation facilities to the west, east, and north. A canal to the south separates the area from commercial uses. The area to the north, across I-595/State Road 84 consists of low-density residential uses.

In this area, the guideway configuration is recommended to be placed on the south side of the I-595 right-of-way. The guideway most likely will parallel existing ramps to cross from eastbound I-595 to northbound State Road 7/US 441 for an alignment going north on State Road 7/US 441 and will be parallel to State Road 84 ramps for an alignment continuing along State Road 84. In either case, the guideway configuration will be at upper levels of the interchange and grade issues may impact the ability to provide access to a maintenance facility in the area. Existing right-of-way along I-595, Florida's Turnpike, State Road 7/US 441, or any of the myriad interchange ramps could be used to provide a yard lead to the area.

The Florida Petroleum Reprocessors site, a contaminated (superfund) site on the EPA National Priority List (EPA ID: FLD984184127A), is located on SW 50 Avenue, south of SW 34th Place. This one-acre site was a former waste oil reprocessing facility that resulted in extensive groundwater contamination. Three removal actions have occurred on site and the fourth and final removal action was scheduled for 2004, but has been delayed. There is a consent decree with the US Environmental Protection Agency that allows transportation development and standard construction in the area bounded by Peters Road, Florida's Turnpike, SR 7 and Orange Drive. Redevelopment of contaminated sites for industrial uses is preferred to other types of uses as a means to reduce potential impacts to those using or occupying the site.

A wellfield is located south of Nova Drive, west of Florida's Turnpike and a second, larger wellfield is north of the area across I-595/State Road 84. Pond Apple Slough, a major wetland and county preserve, is located on the east side of SR 7. The location of a maintenance facility in this analysis area should not impact these facilities. This determination would be made as part of the environmental analysis conducted during the Preliminary Engineering phase.

2.3 I-95 AND STATE ROAD 84

The area is located in the City of Dania Beach and is surrounded by major roadways. State Road 84 is to the north of the area, I-595 to the south, and I-95 to the east. The land in this area has industrial or commercial future land use designations in the Broward County Land Use Plan. A majority of the parcels are developed with existing commercial and industrial uses. The commercial uses are predominately along State Road 84, with the industrial uses closer to the interstate highways. Figure 4 provides an aerial photograph of the location and shows individual parcels as identified by the Broward County Property Appraiser.

There are no parcels of sufficient size to accommodate an eight (8) to twelve (12) acre maintenance facility. However, there are several parcels (parcels marked "A" on Figure 4) approximately four (4) to six (6) acres in size that could be assembled into a larger parcel. These parcels contain two motels and a single-family residential unit.

The uses to the south of this area, south of I-595, are predominately commercial and industrial. Pond Apple Slough is located southwest from the area, across I-595. The area to the north consists of marina and marine uses and conservation (Secret Woods park). The area to the east consists of I-95, with residential uses located farther east.

A maintenance facility in the area is suitable only if the alignment follows State Road 84 to the airport or downtown Fort Lauderdale. In this area, the guideway configuration is recommended to be in the median of State Road 84 and a yard lead to a maintenance facility anywhere along this segment would need to cross State Road 84.

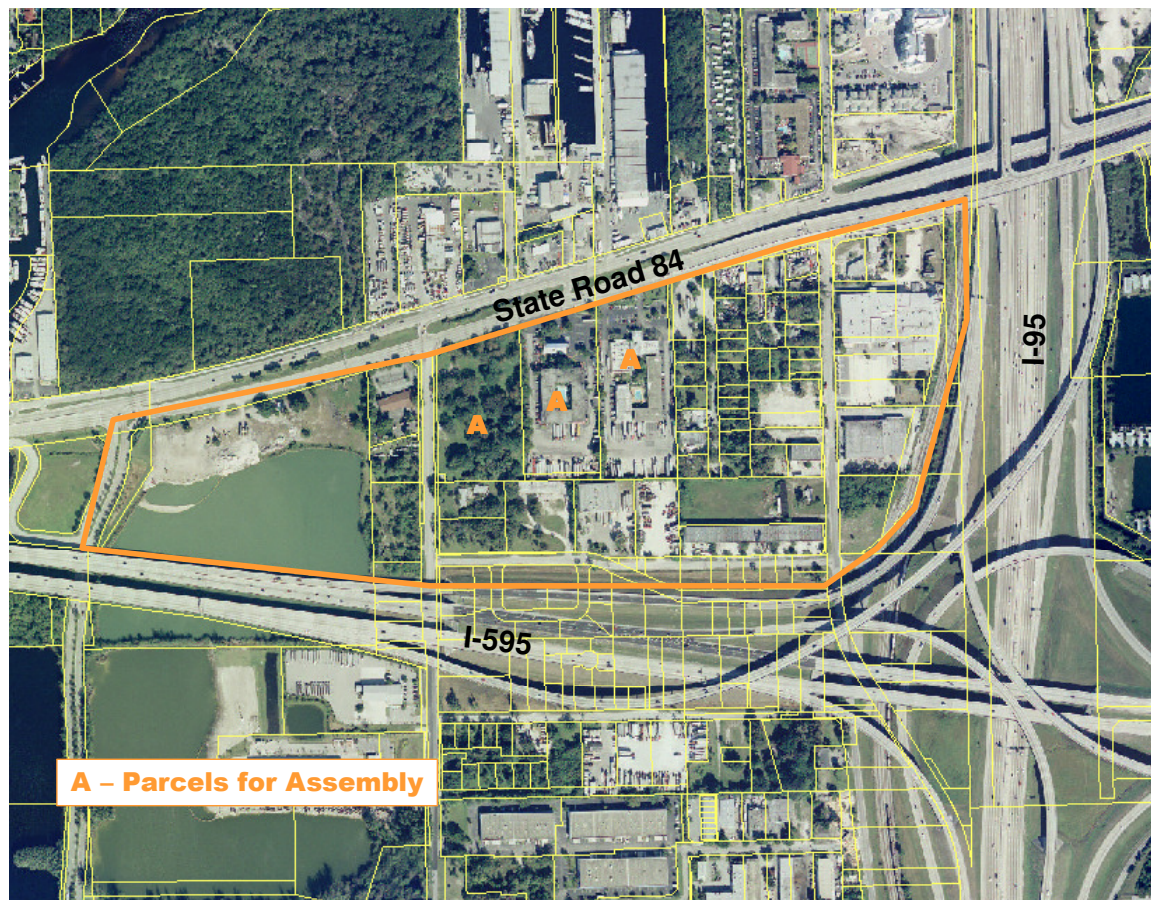


Figure 4. I-95 & State Road 84

2.4 ANDREWS AVENUE AND I-595

This area is bounded by SW 24th Avenue to the west, State Road 84 to the north, I-595 to the south, and Federal Highway/US 1 to the east. A parcel to the east of US 1/Federal Highway is included in the area since it is vacant and has a transportation future land use designation. Figure 5 provides an aerial photograph of the location and shows individual parcels as identified by the Broward County Property Appraiser.

This area is predominately located in the City of Fort Lauderdale. South of SE 28th Street, the portion of the area immediately adjacent to Federal Highway/US 1 is located in unincorporated Broward County. Land east of Federal Highway/US 1 and south of SE 24th Street is located in the City of Dania Beach and the City of Hollywood.

This area is almost fully developed with industrial and commercial uses. The activities located in the area include trucking and freight terminals, warehousing, construction and materials storage, and manufacturing uses. There are few large parcels in the area; however, several businesses span multiple parcels, making land assembly reasonably efficient. Parcels identified with "A" on Figure 5 reflect the larger parcels. The parcels identified in Figure 5 with a "B" are vacant and in public ownership by Broward County. The Port Everglades Master Plan calls for these parcels to become a cruise-processing center. Other areas in public ownership are

denoted with “C” on Figure 5. Although there are several parcels in the area adjacent to the Florida East Coast Railway, the entire block, with rights-of-way, may be of sufficient size to accommodate a maintenance facility. The other area denoted with a “C” adjacent to SW 4th Avenue, is under control of the port, and is of sufficient size to support a maintenance facility.

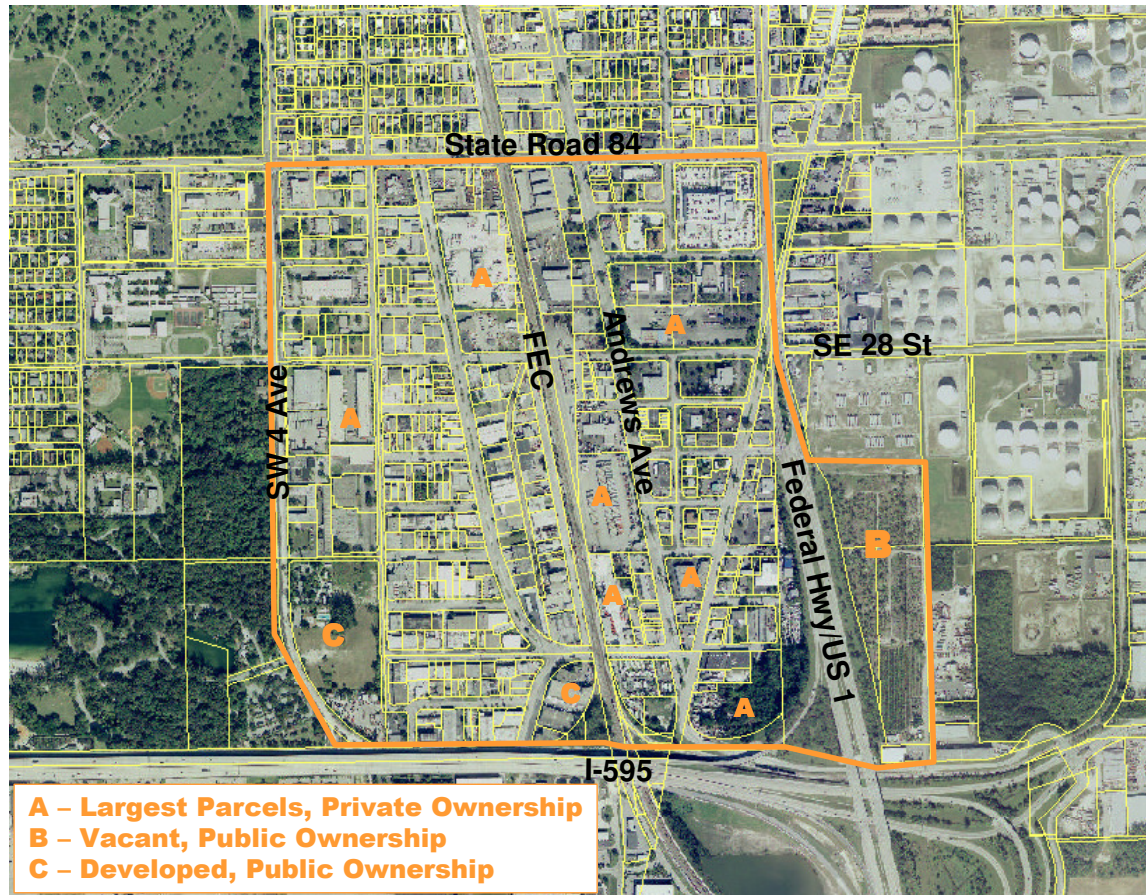


Figure 5. Andrews Avenue & I-595

The Fort Lauderdale/Hollywood International Airport is located south of this area and Port Everglades is to the east. Community facilities and residential uses, with small commercial uses, are to the north and west of the area.

The guideway configuration in this area is anticipated to be on the east side of Andrews Avenue to SE 30th Street, where the alignment will head east and then south in the median of Federal Highway/US 1. An alternate alignment, depending on grades and turning radii, would follow Federal Highway/US 1 from Broward Boulevard to the airport, using the median in this area. The area has a grid network and alleys in some areas that could be used to provide access from the guideway to the maintenance facility. Coordination with the proposed airport-seaport-convention center people mover system may impact the choice of a site in this area.

The FEC railroad line runs through the center of this area and the maintenance facility should be located on the same side of the tracks as the guideway to avoid multiple crossings. Although vehicles are initially delivered via truck and not rail, locating the maintenance facility near to rail access may prove beneficial for other equipment delivery or for the delivery of fuel.

2.5 PORT EVERGLADES AREA

This area consists of properties east of Federal Highway/US 1, south of Eller Drive. The area along Federal Highway/US 1 is located in unincorporated Broward County. Land east of Federal Highway/US 1 and the I-595 interchange ramps is located in the City of Dania Beach and the City of Hollywood. Figure 6 provides an aerial photograph of the location and shows individual parcels as identified by the Broward County Property Appraiser.

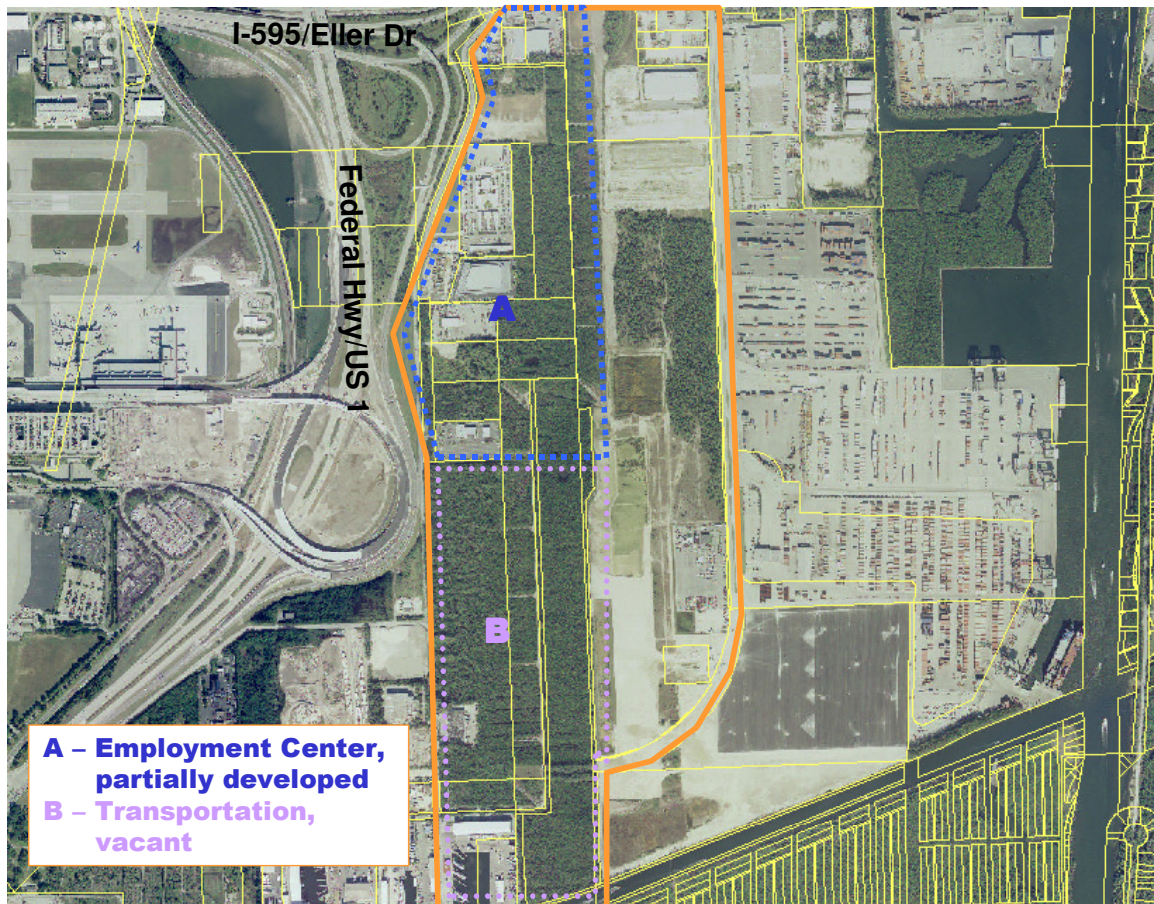


Figure 6. Port Everglades Area (Southport)

This area is the southern portion of Port Everglades, or Southport, which is primarily a containerized cargo terminal, but also accommodates an administration campus and a Foreign Trade Zone. The Port Everglades Master Plan (July 2000) identifies 261 undeveloped acres for port expansion. The area north of the airport entrance ramps (blue “A” area of Figure 6) is designated Employment Center in the Broward County Land Use Plan and this area is currently undergoing partial development. The area to the south of the ramps (purple “B” area of Figure 6) has a transportation future land use designation and is the last area of the port slated for expansion.

This area is almost entirely in public ownership, through Broward County and the seaport, and consists of large vacant parcels that can be subdivided for new uses. The airport is to the west

and port facilities are to the north and east. High-density residential uses are located south of the cutoff canal.

The guideway configuration in this area is anticipated to be in the median of Federal Highway/US 1 and will access an intermodal facility near the airport entrance ramps. Maintenance facility access would be possible along the transportation rights-of-way of Federal Highway/US 1, I-595, and the airport access ramps. Coordination with the proposed airport-seaport-convention center people mover system may impact the choice of a site in this area.

In general, commuter service providers are cognizant of security issues, especially at maintenance facilities where vehicles are stopped for extended periods. Location of a maintenance facility within Port Everglades, and in close proximity to the airport, requires additional sensitivity to security concerns. Seaport security access procedures and other regulations, such as for surveillance, may need to be followed when operating a maintenance facility in the area. While meeting port security regulations may result in additional operating costs, relying on and modifying an existing security system may reduce maintenance facility security setup costs.

3. EVALUATION OF ANALYSIS AREAS

The matrix in Figure 7 shows the evaluation results of the five analysis areas. The evaluation is qualitative in nature and based on the information summarized in Section 2 above. A fully shaded circle designates a high (most desirable) rating; a partially shaded circle shows a medium rating, and the lowest (least desirable) rating is shown with an open circle. The weight of each criterion is identified as low, medium, or high, with greater weights given to criteria that are more critical to maintenance facility siting. The criteria used during the evaluation include:

- Existing land uses – an assessment of the uses in the area and compatibility with the proposed maintenance facility. For this criterion industrial uses are preferred, with existing transportation uses being the most desirable. The next most preferred existing land uses are commercial uses. Residential uses, particularly single-family residences, are the least preferred. This criterion has a high weighting since local governments generally are more willing to accommodate a maintenance facility where other transportation or industrial uses exist already.
- Surrounding lands uses – an assessment of the uses surrounding the area, compatibility or the ability to screen a maintenance facility, and potential community acceptance. This criterion focuses on the compatibility of a maintenance facility with surrounding uses. As with the existing land uses criterion, surrounding transportation, industrial, and commercial uses, in that order, are preferred. Residential uses, and single-family residential in particular, are the least desirable surrounding uses. This criterion has a high weighting since compatibility and complaints from surrounding uses can hinder the establishment of a facility.
- Yard Lead Access – an assessment of the ability to access a maintenance facility from the nearby guideway. The criterion evaluates such items as distance from the guideway (closer is better), roadway or railway crossings (no or minor crossings are preferred), and grade issues (similar grades for maintenance facility and guideway are desired). This criterion has a high weighting for an LRT facility since the design and construction impacts to connect to the guideway can be significant. The yard lead access criterion is not applicable for BRT because existing roadways can be used to access a maintenance facility.

- Vacant Land – an assessment of the amount of vacant industrial land in the area. (Note: The vacant land is based on property appraiser information at the time of this report. Parcels may be under construction.) This criterion recognizes that vacant parcels, versus those occupied by existing businesses or uses, provide the best opportunity to obtain property for a maintenance facility. This item has a medium weighting due to the built-out nature of central Broward County, and using properties with existing uses is highly probable.
- Parcel sizes – an assessment of the number of parcels of adequate size or the efficiency of assembling land to create a site for the maintenance facility. For this criterion, larger parcel sizes or adjacent parcels in common ownership are preferred to reduce acquisition overhead. Smaller parcel sizes require aggregating parcels and when multiple owners are involved there is a potential for contention and delay. The criterion is weighted medium because the ability to find a single parcel of sufficient size is unlikely.
- Public Ownership – an assessment of the amount of land currently in public ownership. For acquisition purposes, land in public ownership is preferred since title or easements can be easily obtained, while keeping costs minimal. This criterion is given a medium weighting because of the cost advantages for publicly owned land; however, finding existing public land is not essential to maintenance facility siting.
- Environmental Considerations – an assessment of environmental issues that may arise during final site selection. The environmental conditions assessed in this report are preliminary and are meant only to highlight major issues that need to be addressed, such as the location of a wellfield or major existing contamination, when establishing a maintenance facility. Because of this high level assessment, the criterion is weighted low. More detailed environmental issues can be considered when a more complete location evaluation is performed.
- Location – an assessment of the area with regard to the alignment, with western parcels being preferred. Western locations are preferred over more eastern sites due to the travel time savings western parcels would experience when starting and ending service each day, due to the expected morning west-to-east travel. This criterion has a low weight since higher operating costs result only from retrieving and returning a vehicle to the maintenance facility each day.

The Port Everglades, Andrews Avenue, and State Road 7/US 441 & I-595/State Road 84 areas are the three areas with the largest areas and concentrations of industrially designated land. As such, they receive a high rating for this criterion. The Florida's Turnpike & I-595/State Road 84 area has some vacant land, but to a lesser extent, and the I-95 & State Road 84 area has no vacant land. For these reasons, these two areas receive a medium and low rating, respectively.

The Port Everglades, State Road 7/US 441 & I-595/State Road 84, and I-95 & State Road 84 areas have the most compatible surrounding uses for a maintenance facility, since industrial and commercial uses are dominant in these areas. The Andrews Avenue area receives a medium rating because of the amount of industrial and commercial uses in the surrounding areas, whereas the Florida's Turnpike & I-595/State Road 84 receives a low rating due to nearby residential development.

		Existing Land Uses	Surrounding Land Uses	Yard Lead Access	Vacant Land	Parcel Sizes	Public Ownership	Environmental	Location
AREA	Weight	High	High	Med	Med	Med	Med	Low	Low
Turnpike & I-595/SR 84 (1)		●	○	●	○	●	○	●	●
SR 7/US 441 & I-595/SR 84 (1)		●	●	●	●	●	○	●	●
I-95 & SR 84 (2)		○	●	○	○	●	○	●	○
Andrews Ave & I-595 (1)		●	●	○	○	○	●	●	○
Port Everglades Area (1)		●	●	●	●	●	●	●	○
(1) - Applicable to all alignments		● High rating							
(2) - Applicable to all Alignment 2 only		○ Medium rating							
		○ Low rating							

Figure 7. Area Evaluation Matrix

Providing yard access is most efficient and feasible in the Port Everglades and Florida’s Turnpike & I-595/State Road 84 areas, followed by the area of State Road 7/US 441 & I-595/State Road 84. As such, all three areas receive high ratings for this criterion. The I-95 & State Road 84 receives a low rating due to the need to cross State Road 84, and the Andrews Avenue area receives a low rating because of roadway crossings and potential railway crossings.

Vacant land is virtually non-existent in all areas, except for the Port Everglades area where land has been set aside for port expansion, and this area receives a high rating for the vacant land criterion. The State Road 7/US 441 & I-595/State Road 84 area has a few vacant parcels and receives a medium rating. Vacant land is minimal in the remaining three areas and each receives a low rating.

Large parcel sizes are located in the Port Everglades and State Road 7/US 441 & I-595/State Road 84 areas, and these areas receive high ratings. The I-95 & State Road 84 and Florida’s Turnpike & I-595/State Road 84 areas have larger parcels should land assembly be required and receive medium ratings. The Andrews Avenue area has few, if any, parcels of sufficient size for a maintenance facility and receives a low rating.

The Port Everglades area has the most land in public ownership, followed by the Andrews Avenue area, and they receive high and medium ratings, respectively. The remaining three areas have little land in public ownership and receive low ratings.

Only two areas have environmental concerns, and the State Road 7/US 441 & I-595/State Road 84 and I-95 & State Road 84 areas receive medium ratings for this reason. The remaining three areas receive high ratings for the environmental criterion.

None of the analyzed locations are in the western portion of Broward County, so none receive a high rating. The Florida's Turnpike & I-595/State Road 84 and State Road 7/US 441 & I-595/State Road 84 areas lie in the central section of the county and receive medium ratings. The other three areas receive low ratings.

The Port Everglades area appears to be the most suitable area to locate a maintenance facility since it scores the highest in almost all criteria. The second-most opportune area is the State Road 7/US 441 & I-595/State Road 84 area since it meets the high-weighted criteria regarding existing and surrounding land uses and yard access and meets the medium-weighted criteria better than the other areas. The remaining three areas have differing advantages and disadvantages, making them comparable in the level of possibilities available.

4. CONCLUSION

The purpose of this memorandum is to identify areas to be considered when locating a BRT or LRT maintenance facility of eight (8) to twelve (12) acres in size. Five areas were selected and evaluated based on several criteria, including existing and surrounding land uses, land availability and assemblage issues, and yard access configurations. Two areas – the Port Everglades area east of the airport and the State Road 7/US 441 & I-595/State Road 84 area in the Town of Davie – are recommended for further site evaluation and selection.