

FDOT D4 Office of Modal Development

# Broward County Clean Air Cooperative Transit Implementation Plan

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## **INTRODUCTION**

This document represents the Final Report documenting the second phase of the Broward County Clean Air Cooperative planning project. During the first phase, the project team researched the project service area and produced informational materials regarding a planned electric or electric-hybrid vehicle-based circulator service for eastern Broward County, Florida, including central Fort Lauderdale and the Fort Lauderdale-Hollywood International Airport. Creating an operating plan for circulator service represents the second phase of this project.

The proposed transit circulator system will use electric or electric-hybrid vehicles that will serve eastern Broward County and the Fort Lauderdale-Hollywood International Airport. Key goals of this study are:

- Identify target markets within the study area
- Identify major transit attractors in the study area
- Propose routing and scheduling options to connect target markets with transit attractors
- Recommend a preferred transit routing and scheduling plan, including intra-airport circulation
- Provide a phased implementation plan
- Make specific recommendations for capital and operating needs

Based on these objectives, the Project Team comprised of Kittelson and Associates, Inc. (KAI) and LKC Consulting Services, Inc. (LKC) has developed a circulator system using electric or electric-hybrid vehicles that will serve eastern Broward County and the Fort Lauderdale-Hollywood International Airport.

This document is divided into the following chapters:

- Introduction
  - Chapter One: Background
- Existing Conditions
  - Chapter Two: Transit Demand
  - Chapter Three: Transit Supply
- Transit Service Concepts
  - Chapter Four: Transit Service Concepts
  - Chapter Five: Implementation Plan

**CHAPTER ONE:  
 BACKGROUND**

This purpose of this chapter is to present background information on the study process so far. This chapter is separated into the following sections:

- Study Area Definition
- Project Goals and Objections
- Current Project Status

**STUDY AREA DEFINITION**

The study area consists of the eastern central area of Broward County, Florida. The study area is generally bounded by Sunrise Boulevard on the north, the South Florida Rail Corridor (TriRail, CSX) on the west, State Road 84 on the south, and the Atlantic Ocean on the west. Additional portions of the study area extend south along the US Highway 1 corridor to Young Circle in Hollywood. The Fort Lauderdale and Hollywood central business districts, the Fort Lauderdale-Hollywood International Airport, and Port Everglades are included in the study area. Portions of the cities of Fort Lauderdale, Dania Beach, and Hollywood, and parts of unincorporated Broward County are also a part of the study area. The study area is shown in **Figure 1.1**.

The cities of Fort Lauderdale, Hollywood, and Dania Beach, as well as the rest of Broward County make up the Fort Lauderdale Metropolitan Statistical Area (MSA). Broward and Dade Counties comprise the Miami-Fort Lauderdale Consolidated Metropolitan Statistical Area (CMSA).

**Table 1.1** shows the population of the study area and its constituent parts.

**Table 1.1  
 Study Area Population, 1990-2000**

Geographic Unit	Area (Sq. Mile)	Population		Increase, 1990- 2000	Pop. Density (2000)
		1990	2000		
Fort Lauderdale	33.5	149,377	152,397	2.0%	4,549.2
Dania	6.2	13,024	20,061	54.0%	3,235.6
Hollywood	29.1	121,697	139,357	14.5%	4,788.9
Fort Lauderdale MSA*	422.9	1,255,488	1,623,018	29.3%	3,837.8
Miami-Fort Lauderdale CMSA**	2,430.0	3,192,582	3,876,380	16.3%	1,595.2

\* - Consists of Broward County

\*\* - Consists of Broward and Dade Counties

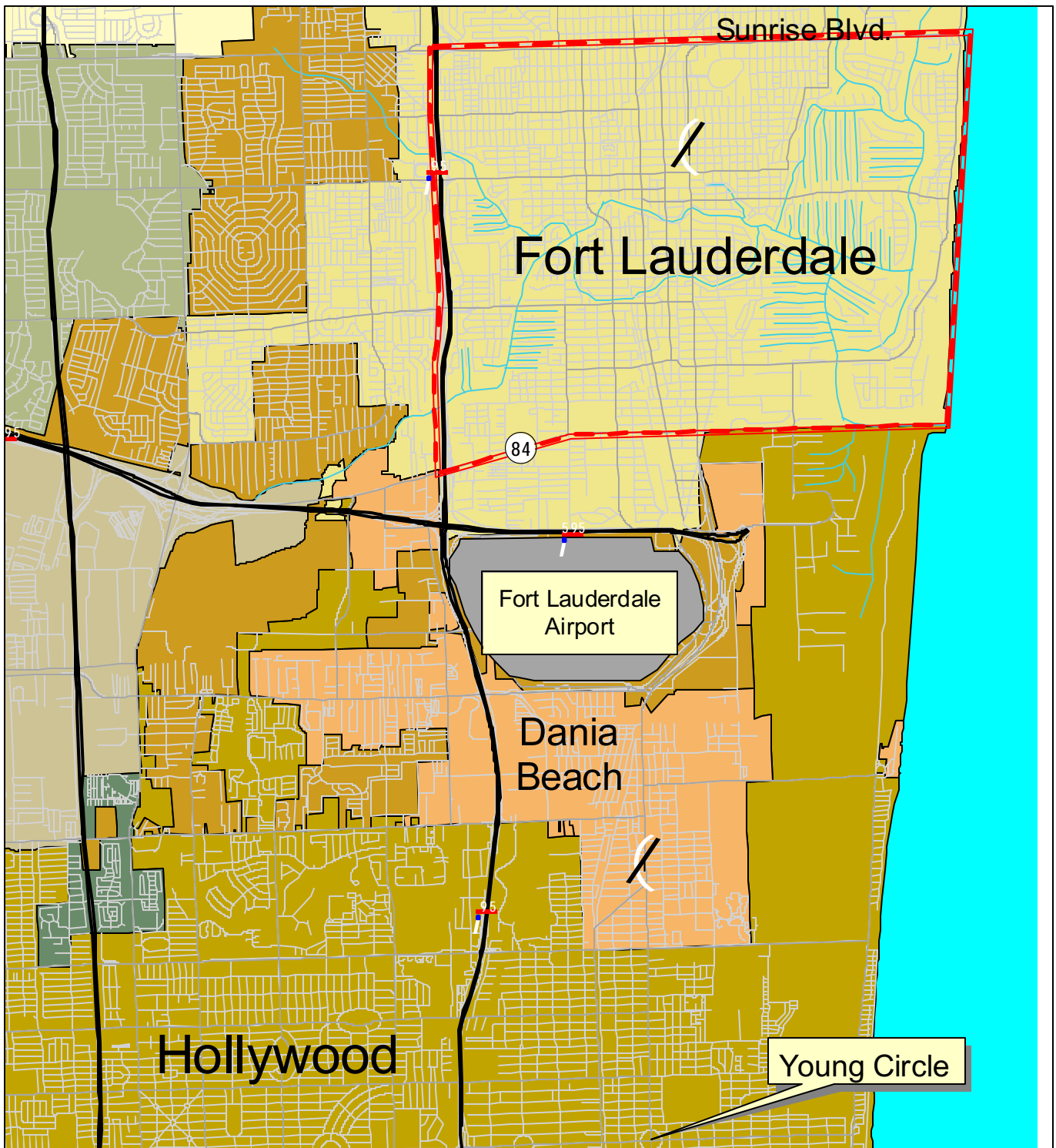
Source: 2000 US Census


Downtown Fort Lauderdale represents the largest concentration of employment, tourist attractions, social services, and cultural amenities within Broward County. Attractions include major employers; the county administrative offices; the Riverwalk Arts and Entertainment District (which includes the Broward Center for the Performing Arts, the Museum of Discovery and Science, the Fort Lauderdale Historical Museum, and the Broward County Library); and the Las Olas entertainment district. The area also includes a joint campus of Florida Atlantic University, Broward Community College, and Fort Lauderdale College. Downtown Fort Lauderdale is shown in **Figure 1.2**.

East of downtown Fort Lauderdale is the Intracoastal Waterway. Atlantic beaches, hotels, and a high-density residential area are located across the Intracoastal Waterway from downtown Fort Lauderdale on the barrier island. South of Downtown Fort Lauderdale is the Port Everglades area, which includes the port itself; two cruise ship terminals; the campus of the Art Institute of Fort Lauderdale; and the Broward County Convention Center. South of Port Everglades is Fort Lauderdale-Hollywood International Airport. West of downtown Fort Lauderdale, Interstate 95 runs in a north-south direction.

The primary public transportation provider in the county is Broward County Transit (BCt), which operates fixed route transit throughout Broward County. Much of BCt's service operates from a central hub located within downtown Fort Lauderdale. The Downtown Fort Lauderdale Transportation Management Association (TMA) provides circulation service in the downtown area (TMAX). Downtown Fort Lauderdale is also served by the TriCounty Commuter Rail Authority (TriRail), which has two stations within the study area. Several downtown-area hotels and cruise ship lines using the cruise terminal in Fort Lauderdale offer charter services, generally between their facilities and the airport. Finally, water taxi service operates along the New River and Intracoastal Waterway.

The study area also includes Interstate 95 High Occupancy Vehicle (HOV) lane system, which runs north-south along the western boundary of the study area. Both the HOV lane and the TriRail Stations are separated from the airport, port, and Central Business District by approximately two miles via congested surface roads. TriRail currently operates commuter / feeder service between the stations and the central business district and the airport. However, the Port of Fort Lauderdale has no transit service.



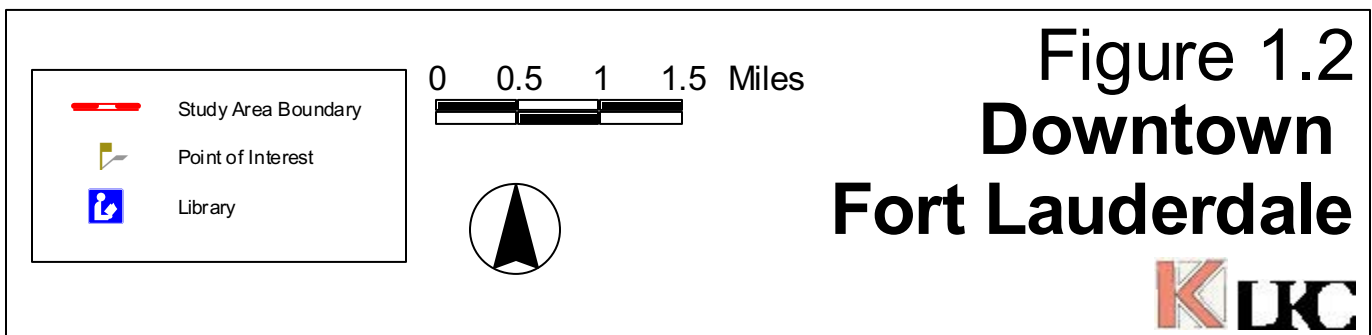
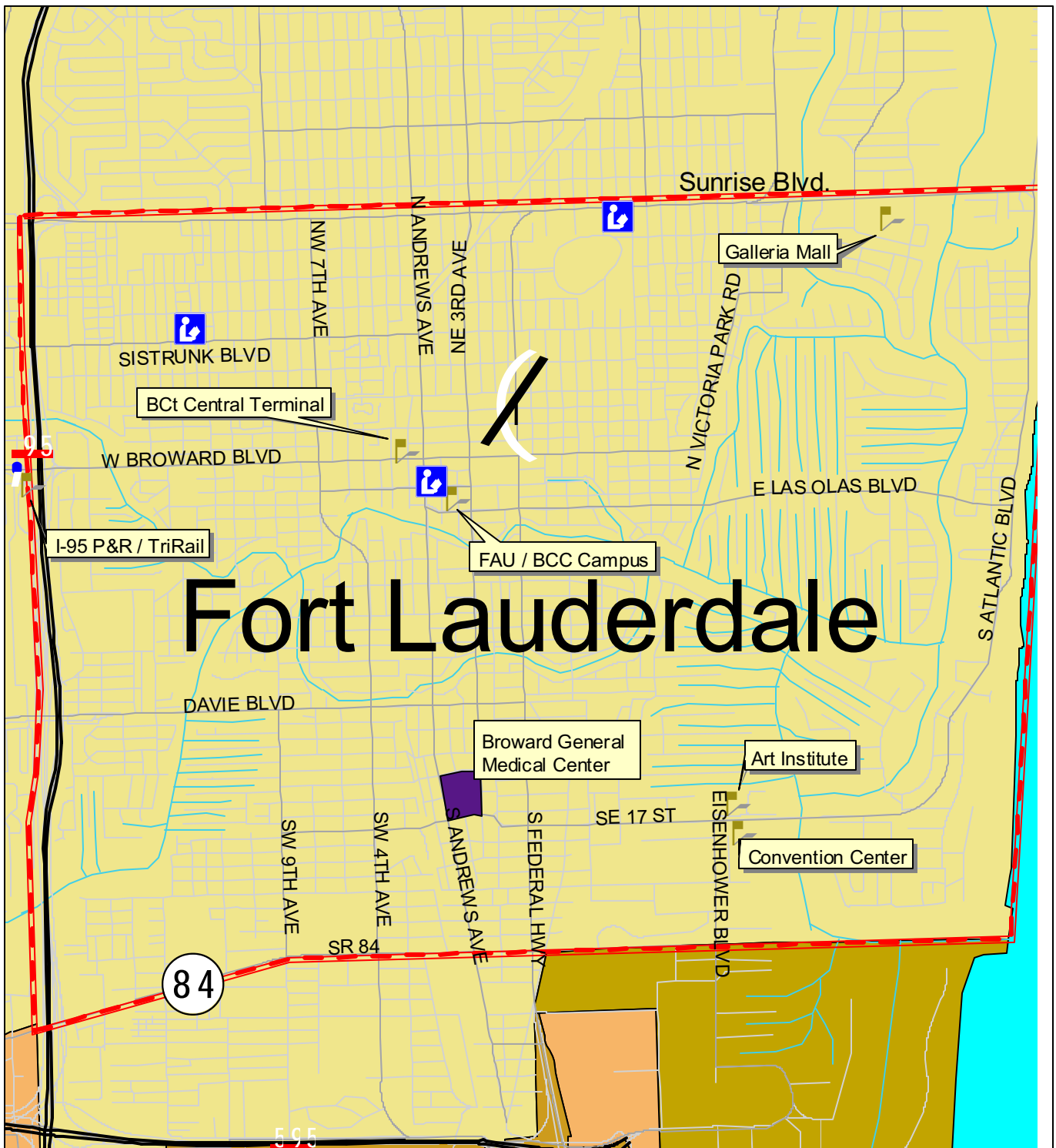
 Study Area Boundary

0 0.5 1 1.5 Miles



# Figure 1.1 Study Area





## GOALS AND OBJECTIVES

As part of the kick-off meeting for this study, LKC created a set of study goals and objectives to guide the study and evaluate its conclusions. The full set of goals and objectives is included below.

**Goal 1:** Improve mobility within the study area

**Objectives:**

- Provide alternatives to private automobile use
- Connect major transit attractors and generators
- Reduce congestion
- Identify infrastructure deficiencies and recommend improvements

**Goal 2:** Design a transit circulator system for the study area

**Objectives:**

- Provide transit access to key destinations within the study area
- Connect downtown Fort Lauderdale, the beach, the Broward County Convention Center, the cruise ship terminal, and Fort Lauderdale-Hollywood International Airport
- Provide intra-airport circulation

**Goal 3:** Provide innovative multimodal solutions to mobility problems within the study area

**Objectives:**

- Assess the feasibility of electric and electric-hybrid transit vehicles
- Assess the feasibility of a station car service and electric bike rental from park & ride lots or other major transit generators
- Address pedestrian and bicycle access within downtown Fort Lauderdale
- Identify opportunities for intermodal connections

**Goal 4:** Improve the quality of service for transit users within the study area

**Objectives:**

- Assess the transit quality of service of existing transit service
- Identify opportunities to implement new transit services
- Develop new transit services that connect major transit attractors and generators
- Encourage balance between modes of transportation

**Goal 5:** Develop new transit markets

**Objectives:**

- Provide transit access to non-traditional transit attractors such as tourist attractions, the beach, the Las Olas entertainment district, and the convention center
- Create appealing services that will attract patrons who are not currently transit users
- Market services to visitors, such as cruise ship or convention center patrons

**Goal 6:** Contribute to improving regional air quality

**Objectives:**

- Use advance public transportation systems (APTS) technology such as electric or electric-hybrid vehicles
- Reduce vehicle miles traveled in the study area
- Make transit use to the study area from other areas more attractive

**Goal 7:** Develop a phased implementation plan for any recommended alternative

**STUDY STATUS**

This document represents the first submission of all project deliverables as a single report. Based on input received, this document will be revised and re-submitted as the Final Report, which will conclude the scope of work on this project.

Note that during the time that this documentation has been prepared, there may have been some changes within the study area or to some of the existing providers that will not be reflected in this memorandum.

## CHAPTER TWO: TRANSIT DEMAND

This section provides information on existing and potential demand for transit services in the study area. Transit demand refers to the existing and potential demand for transit trips within the study area. Target markets consist of individuals and groups that generate transit demand. The following target markets have the potential to use transit within the Study Area:

- Employees / Work Trips
- Students / Educational Trips
- Shopping Trips
- Recreational Trips
- Trips by Visitors to the Area

The transit trips they are able to and desire to take are largely dictated by the location of major transit attractors and generators.

### EMPLOYEES / WORK TRIPS

The study area represents the single largest concentration of employment located within Broward County. More than one in ten Broward County jobs are located within the core study area (downtown Fort Lauderdale) bounded by Sunrise Boulevard, I-95, SR84, and Highway A1A. A larger number of employers are located within the larger study area if the US Highway 1 corridor between downtown and Young Circle (including Fort Lauderdale-Hollywood International Airport) is included.

Several significant employment concentrations are located within the larger study area. They include:

- The core downtown Fort Lauderdale area, bounded roughly by Davie Blvd., US Highway 1, 9<sup>th</sup> Avenue, and 2<sup>nd</sup> Street.
- The Galleria Mall area and nearby hotels located near the intersection of Sunrise Blvd. and Highway A1A
- The Broward General Medical Center
- The Fort Lauderdale-Hollywood International Airport
- Downtown Hollywood / Young Circle
- The Broward County Convention Center / Cruise Ship Terminal area

Employment data collected in the year 2000 was supplied at the Traffic Analysis Zone (TAZ) level by Broward County. **Table 2.1** presents the total employment in each of the employment centers identified above. **Figure 2.1** shows the location of the TAZ that make up each of these employment centers.

**Table 2.1**  
**Employment Centers within the Study Area**

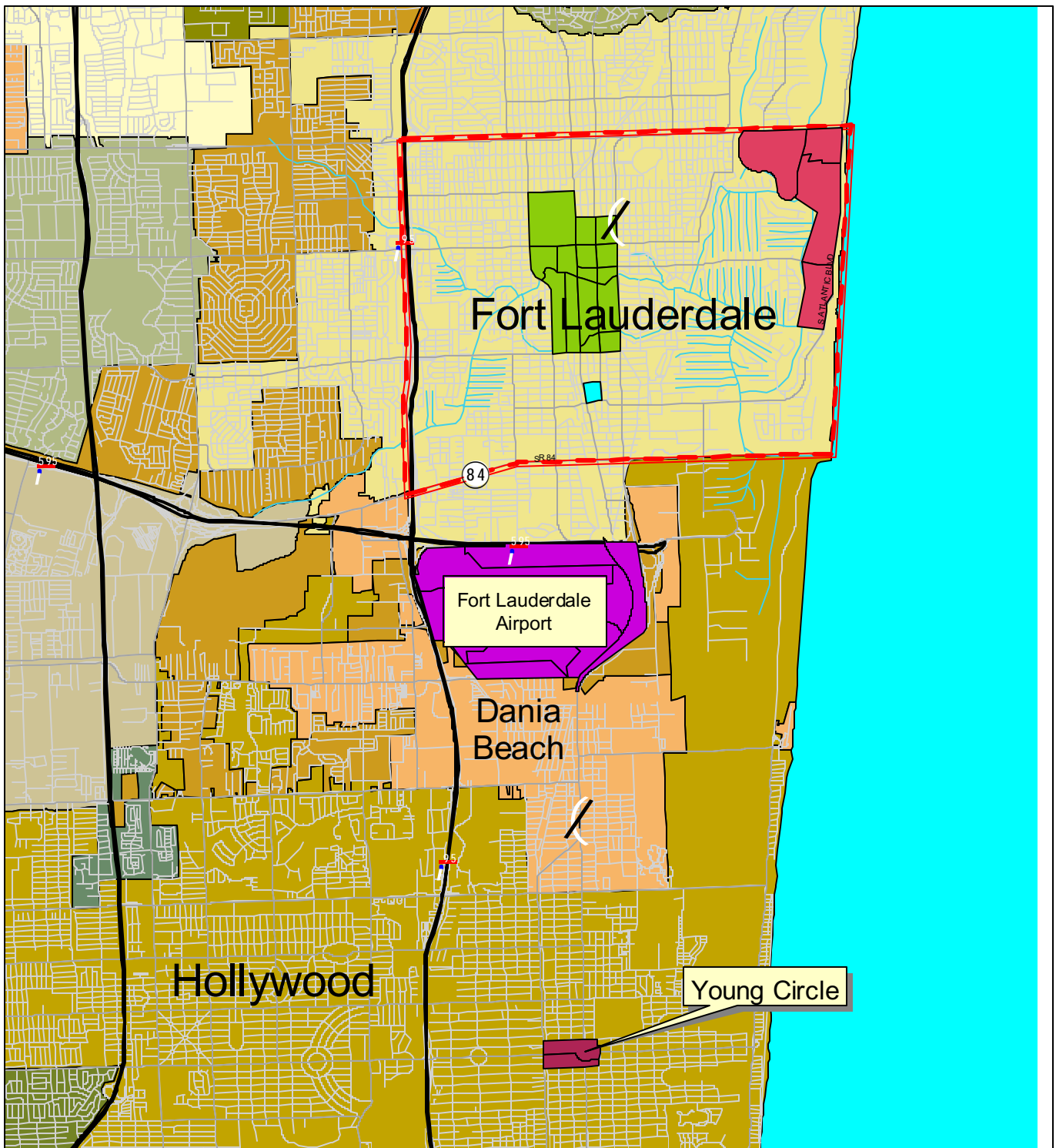
Area	Total Employment	Percent of Total Broward	Area (Sq. Mi.)	Employment / Square Mile
Downtown Fort Lauderdale	23,400	3.7	1.02	23,400
Galleria / Beach	6,000	1.0	0.86	7,000
Medical Center	2,800	0.5	0.03	97,500
Airport	4,300	0.7	2.36	1,800
Downtown Hollywood	2,600	0.4	1.14	19,400
<b>Total, Employment Centers</b>	<b>39,100</b>	<b>6.2</b>	<b>5.41</b>	<b>7,227</b>
Total, Study Area	76,900	12.3	18.51	4,200
Total, Broward County	626,400	100	422.90	1,500







Source: Broward County, 2000

The study area represents a relatively high density of employment. Although the study area only represents 12 percent of the total employment within Broward County, the area represents only 4 percent of the total county area. The core downtown area represents almost 4 percent of the total employment within the county, but less than one percent of the area.

Note that although the Fort Lauderdale-Hollywood International Airport was listed as having a relatively low population density in **Table 2.1**, the airport is actually the single largest job site in Broward County. The airport's web site claims that the airport employs 9,000, of whom approximately 6,750 report for work in a given day. Although the airport is large in area, employees are concentrated into several much smaller job sites.


**Figure 2.2** shows the density of employment within the study area. Each dot on the map represents ten jobs.



-  Study Area Boundary
-  Core Downtown
-  Broward General Medical Center
-  Galleria-Beach Area
-  FLL Airport
-  Central Hollywood

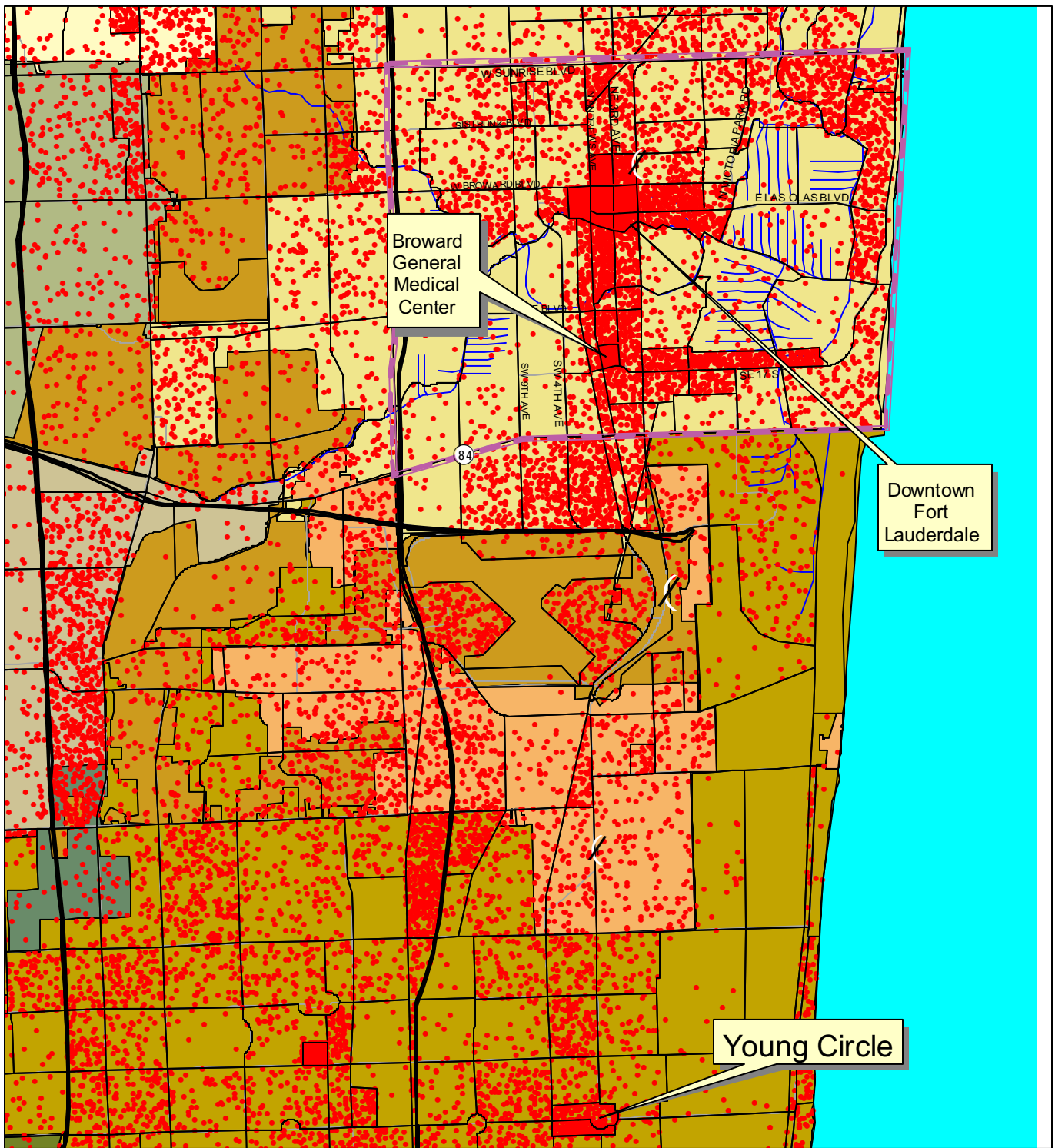


0 0.5 1 1.5 2 Miles



# Figure 2.1 Employment Areas





Employment  
1 Dot = 10  
Study Area Boundary



# Figure 2.2 Study Area Employment Density



Transit services that a circulator system could provide for workers within the study area include:

- Connections between major transportation hubs and work places
  - BCt Central Terminal & Young Circle
  - TriRail Stations
  - Fort Lauderdale-Hollywood International Airport
  - I-95 Park & Ride Lot
- Lunchtime trips (meals / shopping)
- After-work entertainment-oriented trips (i.e., Las Olas)
- Connections between work and residential areas within the study area

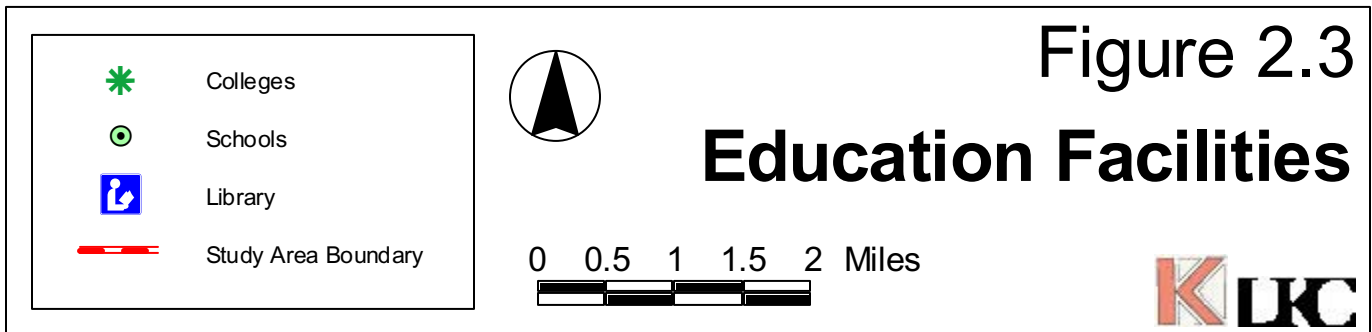
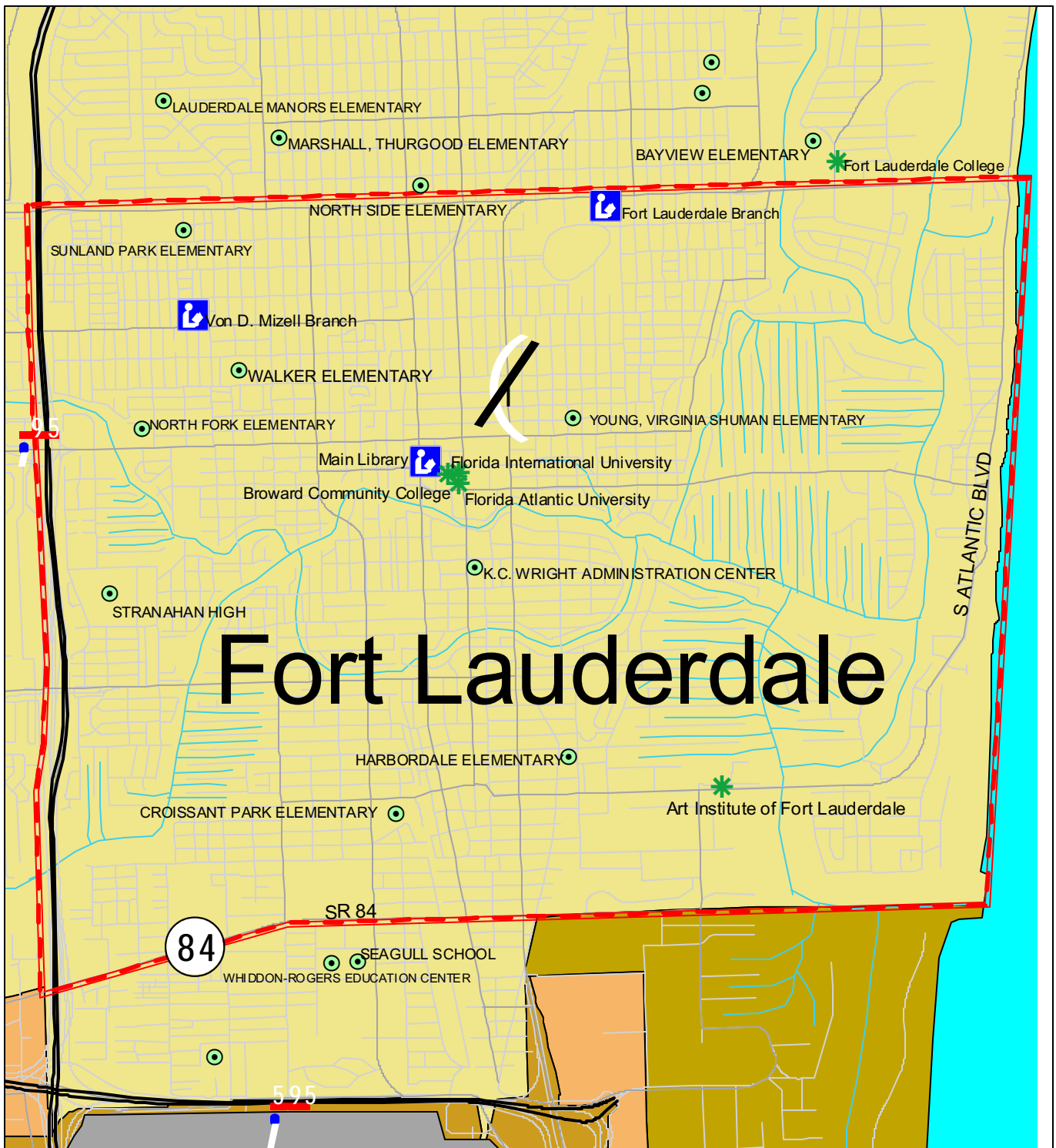
More information on existing passenger activity at transportation hubs is given below.

### **STUDENTS / EDUCATION TRIPS**

The downtown Fort Lauderdale area includes a concentration of educational facilities. These facilities include:

- Colleges and universities
- High, middle and elementary schools
- Libraries
- Museums

The characteristics of each are described below. **Figure 2.3** shows the location of educational facilities within the study area.



## **Colleges and Universities**

Three colleges and universities are located within the study area:

- Art Institute of Fort Lauderdale
- Broward Community College
- Florida Atlantic University/Florida International University (FAU/FIU)

The campuses of the Broward Community College and FAU/FIU are located in a combined high-rise downtown campus at the intersection of Las Olas and SE 2<sup>nd</sup> Avenue. The FAU/FIU campus currently includes approximately 1,000 students. Approximately 1,500 students are enrolled at the BCC Campus. Combined, the two campuses employ approximately 100 people. Both include traditional daytime and night classes.

The Art Institute of Fort Lauderdale is located at the intersection of Southeast 17<sup>th</sup> Street and Eisenhower Boulevard, near Port Everglades and the Convention Center. Enrollment and employment data for the Art Institute was not available.

## **High, Middle and Elementary Schools**

One high school, two middle school, and six elementary schools are located in or adjacent to the study area. They include:

- *High Schools:* Stranahan High School
- *Middle Schools:* Bayview Middle School, Olsen Middle School
- *Elementary Schools:* Croissant Park Elementary, Dania Elementary, Hollywood Central Elementary, North Fork Elementary, Northside Elementary, Walker Elementary
- *Other:* KC Wright Administration Building, Seagull School, Whidden-Rodgers Education Center

Although elementary school students are generally too young to use public transportation, other students and employees at any of the schools could use a circulator system.

## **Libraries**

Three libraries are located within the study area:

- The Broward County Central Library in downtown Fort Lauderdale
- The Fort Lauderdale Branch Library on Sunrise Blvd.
- Dania Beach Branch Library
- The Hollywood Beach Reading Center

## **Museums**

Nine museums are located within or adjacent to the study area. They include:

- The Bonnet House
- The Hollywood Art & Culture Center
- The Fort Lauderdale Antique Car Museum
- The Fort Lauderdale History Museum
- The Fort Lauderdale Museum of Art
- The International Swimming Hall of Fame
- The Museum of Science and Discovery
- The Old Dillard Museum
- The Stranahan House

Target markets for educational facilities will vary. Generally, most include students and employees traveling from outside of the area. Therefore, a circulator system would connect the educational facilities to major transit hubs, such as the BCt terminal or a TriRail station. Travel may occur between facilities, such as between schools and the Central Library.

## **SHOPPING TRIPS**

Shopping centers and other retail facilities can be major transit attractors and generators. Both patrons and employees may use transit to reach such locations. In particular, major shopping malls are major attractors because they represent large employment sites. In addition, businesses selling low-order goods such as grocery stores and drug stores can be major transit attractors and generators.

One shopping mall is located within the study area, The Galleria, located on Sunrise Boulevard. Other retail facilities are scattered throughout the study area, in particular along Sunrise Boulevard; Las Olas Boulevard; US Highway 1; Southeast 17<sup>th</sup> Avenue; Highway A1A; and around the downtown area.

The following grocery stores are located within the study area:

- Publix (SE 17<sup>th</sup> Street / SE 13<sup>th</sup> Avenue)
- Publix (Sheridan / US Hwy 1)
- Publix (Young Circle)
- Winn-Dixie Supermarket (Cordova / SE 17<sup>th</sup> Street)
- Winn-Dixie Supermarket (SW 9<sup>th</sup> Ave. / SR84)
- Winn-Dixie Supermarket (NW 9<sup>th</sup> Ave. / W. Sunrise Blvd.)
- Winn-Dixie Supermarket (Dania Beach / US Hwy 1)

Target markets include anyone without a car who needs to shop. However, most people who do not live in the downtown area will choose to access supermarkets and other low order goods in their own neighborhoods in most cases. Therefore, transit service to shoppers is limited to people who live or work in the study area and to people needing to access higher order goods that may not be present in their neighborhoods (such as those available at the Galleria Mall).

## **RECREATIONAL TRIPS**

Recreational trips can be made by both residents of the Fort Lauderdale area and visitors to the area (tourists). Trips made by visitors to the area are described in the next subsection.

The study area has a number of tourist and recreational transit attractors of interest to local residents. They include:

- Beaches
- Parks
- Las Olas Entertainment District
- Tourist Attractions and Museums

Typically, recreational and tourist attractors are not considered to be important transit attractors. Because patrons have a choice as to whether they will go to these attractors, a very high quality of transit service is needed to attract patrons. Peak travel times can be different for work trips. Patrons may go to these attractors on weekends or at night, when parking is often free and widely available and transit service is not as extensive as during weekdays.

### **Beaches**

Fort Lauderdale beaches are located along the east side of Ocean Boulevard from Sunrise Boulevard to south of South Beach Park and Southeast 17<sup>th</sup> Avenue. The Fort Lauderdale beaches are city owned between Sunrise Boulevard and Seabreeze Boulevard, and south of Seabreeze Boulevard the beach is a city park (South Beach Park). Within Fort Lauderdale, the west side of Ocean Boulevard is characterized by a number of hotels and motels and high-rise residential buildings, mixed with commercial facilities oriented towards beach visitors (souvenir shops, fast food restaurants, etc.).

South of Fort Lauderdale, access to the beach is cut off by Port Everglades and the Intracoastal Waterway. South of Port Everglades, a barrier island is home to the Nova University Oceanographic Laboratory, a Coast Guard station, a U.S. Navy facility, and Lloyd State Park. South of Lloyd State Park in the City of Hollywood, beach front land is privately owned, and development is primarily in the form of high rise residential buildings.

Fort Lauderdale's beaches attract large numbers of both local residents and tourists, especially on weekends. Potential target markets include beach goers and employees at hotels and shops along the beaches. Usage is particularly high on weekends when parking is very limited along the beach and the demand among beach visitors is highest. Currently, TriRail operates a shuttle connecting the beach with the Fort Lauderdale TriRail Station on weekends.

## **Las Olas Entertainment District**

The Las Olas entertainment district represents a concentration of restaurants, bars, and nightclubs located along a one-half mile segment of Las Olas Boulevard between US Highway 1 and 17<sup>th</sup> Avenue. Businesses are primarily small and have little or no parking. Street and public parking are limited. Traffic and parking can be a problem for the area during weekend evenings.

A potential target market would be connecting Las Olas with downtown offices for lunch and after-work trips. Another market would be connecting Las Olas with the convention center and cruise ship terminal so visitors to Fort Lauderdale could go there for lunch or shopping.

## **Parks**

Several parks are located within the study area. Parks serve as destinations in and of themselves, such as the beach parks. Other parks serve only their surrounding areas. Major parks located within the study area include:

- Sunland Park
- Holiday Park
- Hardy Park
- Croissant Park
- Snyder Park
- South Beach Park
- Lloyd State Park
- West Lake Park

No statistics were available showing utilization for each park. Local residents could use transit service to access parks within the study area. However, demand is likely limited as most people would prefer to access parks close to where they live or work and would not need transit service.

## **Tourist and Cultural Attractors**

Several tourist and cultural attractors bring people into the study area. Both residents of the Fort Lauderdale area and visitors from outside of the area may visit such attractors. Such attractors include:

- Museums
  - The Fort Lauderdale Museum of Art
  - The Museum of Discovery and Science
  - The Old Dillard Museum
  - The Stranahan House
  - The Bonnet House
  - The International Swimming Hall of Fame
  - The Graves Museum of History
  - The Fort Lauderdale Antique Car Museum
  - The Hollywood Museum of Art & Culture
- Performing Arts Spaces
  - The Broward Center for the Performing Arts
  - Las Olas

- Other Attractions
  - Bahia Mar Yacht Center
  - Jungle Queen Boat Rides
  - Dania Jai Alai

Potential target markets include local residents, generally transferring at a transit node like the BCt Terminal; and tourists who do not have cars.

### **TRIPS BY VISITORS TO THE AREA**

The Fort Lauderdale area represents a major destination for visitors from outside of the immediate area. The area represents a destination for tourists and convention-goers, as well as a terminal for cruise ship patrons. Although most visitors do not arrive with their own automobiles, few use existing transit services to access their destinations.

Potential markets for transit among visitors to the area include:

- Fort Lauderdale-Hollywood International Airport
- Hotels / Motels
- The Broward County Convention Center
- Cruise Ship Terminals
- Tourist Attractions

### **Fort Lauderdale-Hollywood International Airport**

The primary point of arrival for visitors who do not have their own automobiles is the Fort Lauderdale-Hollywood International Airport (FLL), which is located south of Fort Lauderdale and north of Hollywood and Dania Beach, within unincorporated Broward County. The airport location is shown in **Figure 1.1**.

FLL is a major international airport. Sixteen million passengers used the airport during 2000. More than 260,000 tons of cargo was also shipped through the airport. The airport serves 558 flights, more than 43,000 passengers, and handles 715 tons of freight during an average day.

Access to the airport is via Interstate 595 and US Highway 1. The airport is located adjacent to Port Everglades, and serves as the primary airport for passengers bound for cruises from the Port Everglades cruise ship terminal each year.

The most obvious patrons of FLL are travelers who must go there to catch flights. Within the broad category of travelers, there are two sub-categories:

- Travelers who are catching or returning from flights
- People dropping off or picking up travelers

Approximately 4,700 of the 43,000 daily passengers are headed to the cruise ship terminal.

Adding the number of people dropping off or meeting passengers at the airport increases the estimate of traffic. The vast majority of passengers arrives by automobile, either private automobile or taxi cab. Broward County collected traffic counts at the main entrance to the airport. Any vehicle headed to on-site parking or picking up or dropping off passengers at one of the terminals would have to pass the traffic

count point. In 2000, the seasonally adjusted average vehicle count at that point was 24,300 vehicles per day. Most employees would enter the airport via other entrances, so the majority of this count is made up of travelers. The count also does not include airport patrons who use off-site parking.

According to BCt, in 2000, an average of 190 passengers boarded BCt buses at the airport each weekday. An additional 476 people boarded the TriRail Shuttle at the Fort Lauderdale Airport TriRail Station. No available data indicates what percentage of these people is passengers and what percentage is airport employees. Even if all 666 boardings are passengers bound for the airport, this only represents 1.5 percent of daily passengers at the airport. Transit service is not presently a significant method for passengers to reach the airport.

**Hotels / Motels**

The Fort Lauderdale area is a major tourist and convention destination with a large number of hotel and motel rooms, most of which are located within the study area. **Table 2.2** shows the location of those hotels and motels.

**Table 2.2  
Hotels and Motels in Broward County**

Location	Number of Hotels/Motels	Number of Rooms
Core Study Area*	114	8,230
Extended Study area**	120	8,466
City of Fort Lauderdale	165	13,335
City of Dania Beach	8	1,066
City of Hollywood	65	4,318
Total, 3 Cities	238	17,719
Broward County	365	25,529

\* - the area bounded by I-95, SR84, Sunrise Blvd., and the Atlantic Ocean

\*\* - the Core Study Area plus the US Highway 1 Corridor to Young Circle

Source: Greater Fort Lauderdale Convention & Visitor's Bureau

Potential target markets among hotel guests include:

- Connecting hotels with the airport
- Connecting hotels with the Broward County Convention Center
- Connecting hotels with the beach or other tourist attractions
- Connecting hotels with transit hubs for hotel employees

**Cruise Terminal / Port Everglades**

Two passenger cruise ship terminals are located at Port Everglades:

- The Midport terminal, located adjacent to the convention center
- The Northport terminal, located in the Port Everglades complex

The cruise ship terminals at Port Everglades attract 2.4 million patrons per year (Fiscal Year 2000), not including cruise line employees, or 6,500 passengers per day. Of these patrons, approximately 80 percent (1.9 million) come from outside of the three-county southeast Florida area, and approximately 90 percent of these (1.7 million, or 4,700 per day) arrive via Fort Lauderdale-Hollywood International Airport.

Passengers who drive to the cruise terminal can park at which ever of the two terminals their ship is leaving from. The cost to park is \$10 per day. The Midport Terminal has space for 2,000 cars. On average, passengers and employees park 1,200 cars overnight in the garage, although that number varies depending on the season. The garage runs close to capacity during January.

The Northport Terminal has space for 2,395 cars. Overnight use averages 650 to 700 cars. Garage space at the Midpoint Terminal is shared with the Convention Center, and often, the garage is over capacity. Capacity problems are expected to worsen as the Convention Center expansion is completed.

The majority of cruise ship patrons travel from the airport to the cruise ship terminals. Passengers arrive from the airport via taxicab or chartered bus service operated by the cruise ship lines.

Generally, cruise ship lines arrange bus transportation from the airport to the cruise terminals. However, because patrons arrive on different flights, some may have to wait at the airport until other passengers arrive, or may have to see to their own transportation.

Passengers who arrive before their ship is ready to leave can in some cases wait aboard the ship. The terminal has minimal waiting facilities and no luggage storage. For cruise ship passengers who have to wait hours for their ship to leave, the ability to easily and reliably travel to Fort Lauderdale or other nearby areas could provide an incentive to leave the terminal area. Such passengers may want to go to the beach, get lunch, go shopping, or otherwise entertain themselves. Taxicabs frequently wait at the terminal to take waiting passengers into Fort Lauderdale while they are waiting for their ships to leave. Taxicab fare to most destinations in central Broward County is \$10 or less.

Target markets among cruise ship terminal users include:

- Cruise ship employees traveling from another transportation hub
- Cruise passengers traveling between the airport and the cruise terminal
- Cruise passengers traveling to Fort Lauderdale while waiting for their ships to leave

### **Convention Center**

The Greater Fort Lauderdale-Broward County Convention Center (GFLCC) is located within the study area at the intersection of Eller Boulevard and Southeast 18<sup>th</sup> Street. The location of the convention center is shown in **Figure 1.1**.

The GFLCC consists of the following facilities:

- A main building, with over 600,000 square feet of exhibition space
- A cyber café and restaurant
- A 2,500-space parking garage, which is shared with the cruise ship terminal
- Two small overflow parking areas (400 spaces total)

During 2000, almost 380,000 guests visited the GFLCC for various conventions, trade shows, and other events. A similar number of guests is expected in 2001. The Greater Fort Lauderdale Convention and Visitors Bureau (GFLCVB) estimates that 55 percent of these are from the Fort Lauderdale metropolitan area; 15 percent are from elsewhere in Florida; and 30 percent are from out-of-state. The busiest time of the year is between January and May.

The GFLCC employs approximately 60 people full-time. The number of employees in the building at any one time varies depending on what kind of event is happening, but as many as 300 employees can be working at a time for a major show.

The majority of visitors arrive at the convention center via one of two methods:

- Local residents and visitors with rental cars arrive via private automobile
- Many visitors arrive via shuttles from area hotels

No data were available as to the percentage of visitors that arrive via private automobile or shuttle. BCt Route 40 provides transit service to the GFLCC. In 2000, an average of 60 passengers per day alighted at the two closest bus stops, at the intersection of Eisenhower Boulevard and Southeast 18<sup>th</sup> Street. Many of these passengers were probably headed to destinations other than the GFLCC, however, such as the Art Institute of Fort Lauderdale across Southeast 17<sup>th</sup> Street. The GFLCVB did not know how many employees, if any, used BCt to reach the convention center.

Parking at the GFLCC is full an estimated twenty to twenty-five times per year, in which case the GFLCC finds overflow space elsewhere and operates shuttles to the center. On a typical “busy” day, the garage is ninety to ninety-five percent full during the day. Note, however, that of the 2,500 spaces available in the garage, cruise lines use 300 to 500.

Many area hotels offer shuttle service to the convention center. The GFLCC did not know how many patrons use this method to reach the center. Such shuttles would most likely only be available for trips between hotels and the convention center, and could not be used to reach downtown Fort Lauderdale or other areas.

Potential target markets for circulator service from the convention center include:

- Service connecting the center with the airport
- Service connecting the center with area hotels
- Service connecting the center with entertainment or shopping facilities, such as Las Olas or the Galleria
- Service for employees connecting the center with transit hubs
- Service from overflow parking facilities

## CHAPTER THREE: TRANSIT SUPPLY

The purpose of Chapter Three is to provide information regarding transit services available within the study area. Existing transit supply provides transit trips to the attractors described in the previous section.

Chapter Three is divided into three sections:

- *Transit Providers*, which inventories transit operators active in the study area and provides operating statistics, as available; and
- *Passenger Infrastructure*, which inventories bus stops, transfer centers, rail stations, and other passenger amenities available to transit patrons.
- *Transportation Level of Service*, which provides a quantitative measure of the level of service experienced users of transit in the study area.

### TRANSIT PROVIDERS

The purpose of this section is to inventory the transit service currently available in the study area. Transit services are currently provided by the following agencies:

- Broward County Transit (BCt)
- TriRail
- Downtown Fort Lauderdale Transit Management Agency (TMA)
- Intra-airport transportation services
- Hotel transportation services / charter services
- Water Taxi service

Transit attractors served by these agencies are discussed in the previous sections. This section will present operating statistics as available for each agency. Current transit service to the area is shown in **Figure 3.1**.

### Broward County Transit

BCt is the primary transit provider in Broward County. BCt offers fixed route service countywide, assists communities with providing local shuttle service, and funds paratransit service through a competitive brokerage system.

**Table 3.1** shows the annual operating statistics for fixed route transit for BCt in fiscal year 1999 (the most recent year for which National Transit Database information was available).

**Table 3.1**  
**1999 Operating Statistics, Broward County Transit**

<b>Service Type</b>	<b>Fixed Route Transit</b>
Annual Revenue Miles	10,599,000
Annual Revenue Hours	775,000
Annual Unlinked Trips	26,470,000
Average Weekday Unlinked Trips	88,000
Vehicles Available for Maximum Service	243
Operating Expense per Revenue Mile	\$4.55
Operating Expense per Revenue Hour	\$62.31
Operating Expense per Trip	\$1.82
Trips per Revenue Mile	2.50
Trips per Revenue Hour	34.17
Annual Operating Expenses	\$48,269,000
Annual Fare Income	\$15,268,000
Fare Recovery	32%

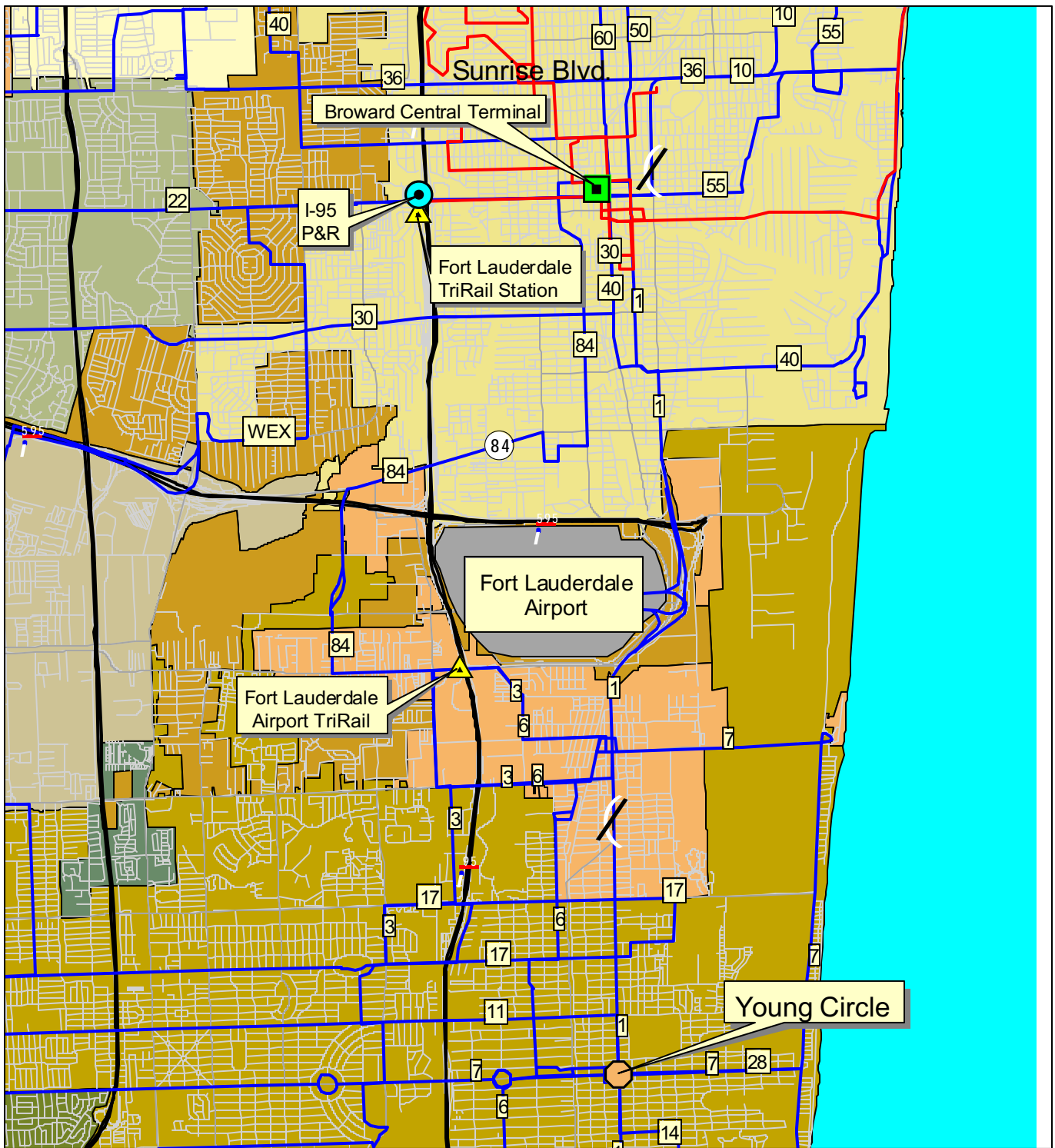
*Source: 1999 National Transit Database*

Within the study area, BCt operates 24 routes. **Table 3.2** shows BCt routes in the study area, including the major transit attractors they serve and their average daily ridership. **Figure 3.1** shows the BCt routes and major passenger facilities.

**Table 3.2**  
**BCt Routes in Downtown Fort Lauderdale**

<b>Route</b>	<b>Major Attractors</b>	<b>Daily Ridership (2000)</b>
Route 1	Central Terminal Young Circle	5,521
Route 3	Airport TriRail	850
Route 6	Young Circle Airport TriRail	1,596
Route 7	Young Circle	3,342
Route 9	Central Terminal Young Circle Fort Lauderdale TriRail	2,891
Route 10	Central Terminal	3,247
Route 11	Central Terminal	4,167
Route 14	Central Terminal	3,295
Route 15	Airport TriRail	579
Route 17	None	460
Route 20	Central Terminal	1,331
Route 22	Central Terminal Fort Lauderdale TriRail	3,736
Route 28	Young Circle	2,770
Route 30	Central Terminal	1,961
Route 31	Central Terminal	4,327
Route 36	None	7,042
Route 40	Central Terminal	3,355
Route 50	Central Terminal	4,524
Route 55	Central Terminal	1,733
Route 60	Central Terminal	2,389
Route 81	Central Terminal Fort Lauderdale TriRail	2,633
Route 84	Central Terminal Airport TriRail	1,059
Western Express	Central Terminal	Unknown
Western Express	Central Terminal	Unknown
<b>Total</b>		<b>62,808</b>

Source: BCt



— BCt Routes  
1 BCt Route Number  
— TMAX Routes

0 0.5 1 Miles



# Figure 3.1 Transit Service



## TriRail

The Tri-County Commuter Rail Authority (TriRail) operates commuter rail service between the Miami Airport in Dade County and Mangonia Park in Palm Beach County. TriRail has seven stops in Broward County, of which two are located in the study area:

- Fort Lauderdale Station (Broward Boulevard / I-95)
- Fort Lauderdale Airport Station (Griffin Boulevard / I-95)

TriRail's service is two-direction and operates seven days per week and as often as every hour during peak weekday service. TriRail has plans to increase headways to one half-hour. In September 2001, TriRail recorded 64,000 rail boardings in Broward County, an average of 2,769 per weekday. **Table 3.3** shows boarding and alighting data at the two TriRail Stations located within the study area.

**Table 3.3**  
**TriRail Rail Boardings and Alightings, September 2001**

Station	Average Boardings and Alightings					
	AM Peak	PM Peak	Off-Peak	All Wkdy	Sat	Sun
Fort Lauderdale						
Boardings	273	184	170	627	309	217
Alightings	174	305	147	626	337	213
Fort Lauderdale Airport						
Boardings						
Alightings	96	92	81	269	146	99
	91	142	78	311	154	118
Total						
Boardings	369	276	251	896	455	316
Alightings	265	447	225	937	491	331

Source: TriRail, 9/01

TriRail also operates shuttle service between its stations and major activity centers, including downtown Fort Lauderdale and the Fort Lauderdale-Hollywood International Airport. TriRail offers shuttles from the Fort Lauderdale and Fort Lauderdale Airport Stations. Other transit providers also serve the stations.

**Table 3.4** shows the boarding and alighting activity on the TriRail Shuttles.

**Table 3.4**  
**TriRail Shuttle Route Boardings, May 2001**

Route	Average Weekday Boardings	2001 Annual Weekday Boardings (projected)*
Fort Lauderdale	293	73,800
Fort Lauderdale Airport	174	43,800
Total	467	117,600

\* - Projection based on an assumption of 251 annual weekdays with service

Source: TriRail, 5/01

## Downtown TMA

The Downtown Fort Lauderdale Transportation Management Association (DFLTMA) is a non-profit organization that acts as the Transportation Management Association for downtown Fort Lauderdale. The DFLTMA operates a shuttle service called TMAX. TMAX is funded in part from BCt and in part via a dedicated regional gasoline sales tax. TMAX offers seven bus routes:

- Downtown-Courthouse Loop circulator route
- Northwest Circulator route
- Park & Ride service from the Lauderdale Marketplace parking lot
- Galt / North Beach Community Bus Route
- Lauderdale Manors Community Bus Route
- TriRail Shuttle between Fort Lauderdale TriRail, downtown and the beach
- Weekend version of the TriRail Shuttle serving Las Olas and the beach

During 2000, all TMAX routes recorded approximately 250,000 passenger boardings, an average of 819 daily boardings (assuming seven days per week of service). Actual weekday boardings are likely much higher.

Table 3.5 shows the total annual and average daily boardings for each of the TMAX routes.

**Table 3.5  
TMAX Passenger Boardings, 2000**

Route	Days of Service	Boardings (2000)	
		Annual	Weekday
Courthouse	Weekday	146,851	587
Courthouse, lunch version	Weekday	3,755	15
Northwest	Weekday	37,245	149
Park & Ride	Weekday	13,846	55
Galt / North Beach	Weekday	855*	N/A
Lauderdale Manors	Weekday	13,283*	N/A
TriRail Shuttle	Weekday	20,579	82
Weekend TriRail Shuttle	Friday & Saturday	29,852**	284
Total		266,266	1,172

\* - Galt / North Beach and Lauderdale Manors routes are new in 2001; annual ridership is a 2001 year-to-date

\*\* - Annual Weekend TriRail Shuttle ridership is Friday & Saturday service only

Source: TMAX

## Charter Bus Services

Area hotels and cruise ship lines provide limited charter bus and shuttle service to their patrons including:

- Shuttles from hotels to the airport
- Shuttles from hotels to the convention center
- Shuttles from the cruise ship terminal to the airport

Hotel shuttle services are reserved for hotel guests and cruise ship patrons, and are not available to the general public. Shuttle service can be directly operated, as is often the case with hotel shuttles, or they can be contracted, as is the case with cruise ship shuttles.

Although these shuttles provide a valuable service to the patrons that can use them, their lack of access for the general public does not allow them to act in the capacity of a public transit service. Also, even those patrons who can use the services are bound by restrictions placed by the operators. One example is cruise ship patrons who arrive alone as opposed to on charter flights may not be able to use a shuttle to get to the cruise ship terminal, or they may have to wait for hours in the airport until enough other patrons have arrived.

### **Intra-Airport Services**

FLL is a sprawling site that employs thousands of people and sees thousands of airline passengers every day. Activity centers within the airport include the main passenger terminals; the control tower; rental car lots; remote parking lots; cargo handling facilities; and maintenance and repair facilities. Such facilities are widely dispersed. Generally, employees can park at their remote job sites. However, many employees and almost all passengers who must move between sites at the airport depend upon shuttle buses to do so.

Traffic congestion is an issue for the passenger terminal area at peak times. The large numbers of shuttle buses that serve the airport are a component of the congestion. Shuttles are often traveling to the same areas, and are frequently not at capacity. Operating a single shuttle system has been identified by the airport as a possible solution for some of the congestion problems at the airport.

### **Water Taxi Service**

BCt has been a partner in waterbus service using the New River and Intracoastal Waterway since October 2001. The service uses ten ferries connecting Oakland Park Boulevard (north of the study area) with the Broward County Performing Arts Center and 17<sup>th</sup> Street. The system has a total of 22 stops and operates on one-hour headways. The ferries are ADA-compliant and have a capacity of seventy passengers. They operate at the same times as BCt buses do, and use a common fare system.

Ridership data are not yet available for this service.

## **PASSENGER INFRASTRUCTURE**

Passenger infrastructure is divided into two classes of facilities:

- Transit facilities (transit centers, rail stations, park & ride lots)
- Bus stops

Each is described below.

### **Transit Facilities**

Downtown Fort Lauderdale represents the central node of Broward County's transit systems. The area is served by five transit facilities:

- Central Terminal
- Young Circle
- Fort Lauderdale TriRail Station
- Fort Lauderdale Airport TriRail Station
- I-95 HOV Lane / Park & Ride Lot

Each transportation provider in the study area provides or uses transportation facilities that are themselves both transit attractors and transit generators. The location of these facilities and of BCt routes serving central Fort Lauderdale are shown in **Figure 3.1**.

### Central Terminal

Although BCt's service is county-wide, the agency's primary transit hub is the Central Terminal, which is located on the block bounded by Broward Boulevard, Northwest 2<sup>nd</sup> Street, Northwest 2<sup>nd</sup> Avenue, and Northwest 1<sup>st</sup> Avenue. The following routes serve the Central Terminal:

- BCt Routes: Routes 1, 9, 10, 11, 14, 20, 22, 30, 31, 40, 50, 55, 60, 81, 84, and two Western Express routes
- TMAX Routes (stop on adjacent streets): DFLTMA Park & Ride, Downtown / Courthouse Loop, Las Olas / Beaches, Northwest Circulator, TriRail Shuttle

During 2000, BCt recorded more than 8,300 average weekday boardings and more than 7,900 average weekday alightings at the Central Terminal. The Central Terminal was by far the busiest boarding and alighting point in the entire BCt system (16,300 total boardings and alightings versus 6,200 at the second busiest location, Lauderhill Mall).

TMAX boarding and alighting counts were not available by location.

### Young Circle

Young Circle in the City of Hollywood represents a major BCt transit node for service in the southern part of Broward County. Young Circle is located in the downtown area of the City of Hollywood, at the intersection of Hollywood Boulevard and US Highway 1. Young Circle is the southernmost point in the study area.

Although no passenger facility is located at the circle, the circle represents a major transfer point. The following BCt bus routes serve the circle: Routes 1, 6, 7, 9 and 28. In 2000, there were 1,400 average daily boardings and 1,200 alightings at Young Circle, making it the third busiest stop in the BCt system.

### TriRail Stations

TriRail is a commuter rail system serving Dade, Broward and Palm Beach Counties. Trains operate in two directions on a rail right-of-way that parallels Interstate 95. Two TriRail stations are located within the study area:

- Fort Lauderdale Station, located at Broward Boulevard
- Fort Lauderdale Airport Station, located at Griffin Road

In addition to TriRail service, the Fort Lauderdale station also receives Amtrak service. The station locations are shown in **Figure 1.1** and **3.1**. Each of the stations has TriRail shuttle service and is served by BCt bus routes. **Table 3.1** shows the BCt routes that serve each station.

**Table 3.6**  
**Bus Routes at TriRail Stations**

TriRail Station	TriRail Shuttle	BCt Routes	Other Routes
Fort Lauderdale	FL1	9, 22, 81	TMAX Shuttle, "Swap Shop" shuttle
Fort Lauderdale Airport	FLA1	3, 6, 15, 84	SFEC Campus Shuttle

Source: BCt, TMAX

Passenger boarding and alighting activity at the stations is shown in **Table 3.7**.

**Table 3.7**  
**Passenger Activity at TriRail Stations**

Station	Average Weekday Boardings (2000)				
	TriRail Trains	TriRail Shuttle	BCt	Other Shuttles	Total Boardings
Fort Lauderdale	627	258	85	271*	1,241
Fort Lauderdale Airport	269	178	29	NA	476
Total, All Stations	896	436	114	271	1717

\* -- TMAX TriRail Shuttle Only

Source: TriRail, TMAX, BCt

#### I-95 Park & Ride / HOV

FDOT maintains a 770-space park & ride lot at the intersection of Broward Boulevard and Interstate 95. The lot is connected to the high-occupancy vehicle lanes that are located in the inside north and southbound sides of Interstate 95. The park and ride lot is connected to I-95 via a dedicated ramp from both directions. Dedicated park and ride ramps also provide a connection between the HOV lanes and Broward Boulevard. HOV lanes and ramps are available to general-purpose traffic outside of peak traffic hours.

The park & ride lot is designed to allow commuters to travel to Broward Boulevard via the Interstate 95 HOV lanes and park in the lot, using transit to reach downtown Fort Lauderdale. TriRail and Amtrak patrons may also use the lot, which is adjacent to the Fort Lauderdale station. The park and ride lot serves the same routes as the TriRail Station (BCt routes 9, 22 and 81; TriRail Shuttle FL1; TMAX Shuttle).

FDOT conducts biannual parking lot utilization surveys. In the fall of 2000, an average of 105 parking spaces was used on weekdays. Utilization increased slightly to 107 spaces in the spring of 2001. The level of usage increased significantly by the fall of 2001, to a daily average of 138 spaces.

Six hundred and fourteen passengers board buses and 627 board trains at the Fort Lauderdale TriRail Station, for 1,241 total transit boardings on an average weekday. How many patrons are using the park and ride lot and transit as well is unknown.

**Bus Stops**

Although passenger infrastructure includes the major transit facilities listed above, the majority of the places where passengers interface with Broward County’s transit systems is at the more than 1,000 bus stops located throughout the county. Bus stops vary widely in their amenity levels. Bus stops may include shelters, benches, trashcans, and maps or other transit information. Other stops may only consist of a sign.

BCt serves approximately 390 bus stops within the core portion of the study area (the area bounded by Sunrise Boulevard, I-95, the Atlantic Ocean, and Fort Lauderdale-Hollywood International Airport), which includes downtown Fort Lauderdale. Another 60 bus stops are located along US Highway 1 from the airport to Young Circle.

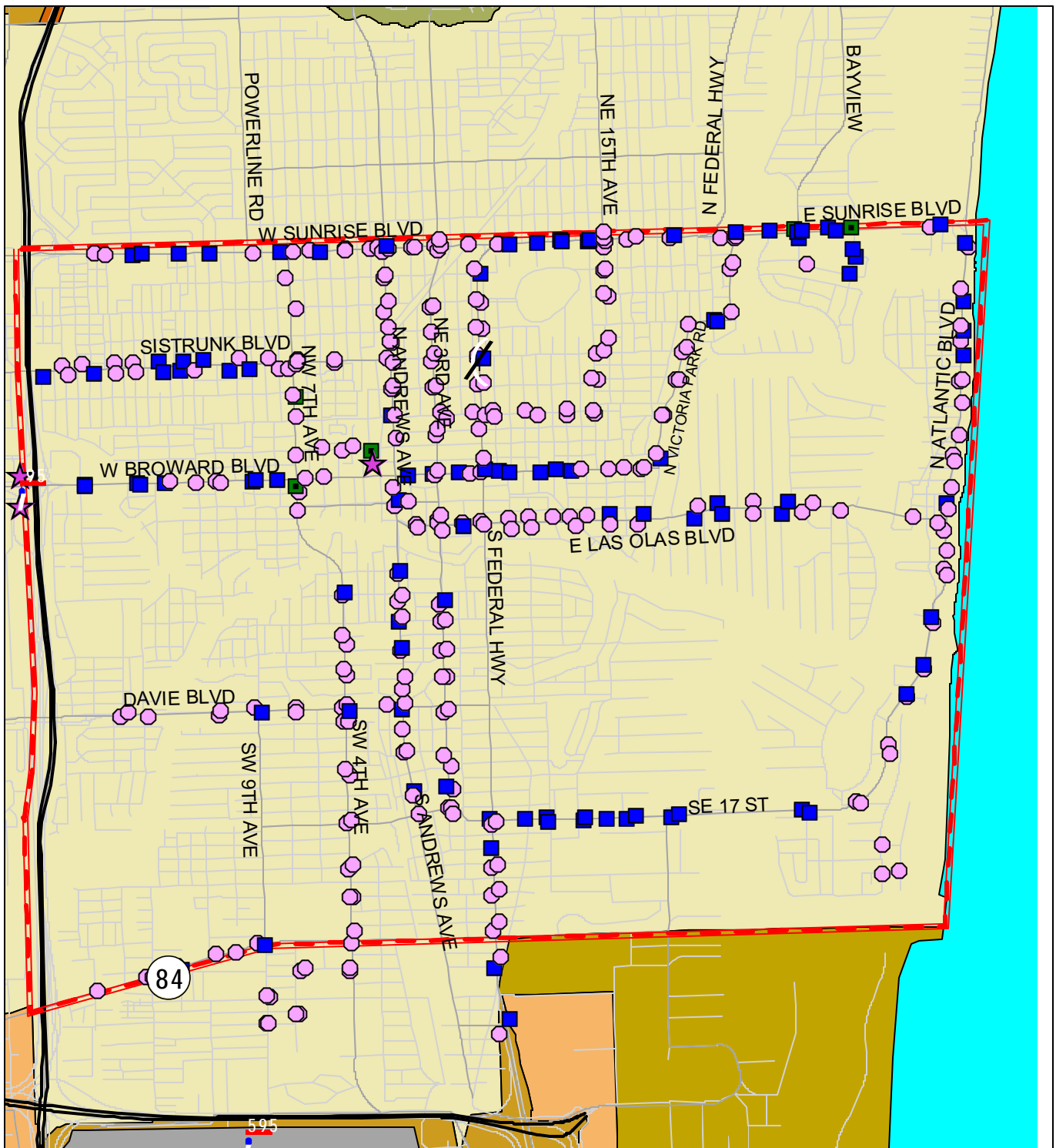
Table 3.8 presents the number of stops of each type among the stops within the study area.

**Table 3.8  
 BCt Bus Stop Amenities**

<b>Amenity</b>	<b>Core Area</b>	<b>South US 1 Corridor</b>	<b>Total, all stops</b>
No amenities / pad only	265	19	284
Trash Can Only	11	5	16
Bench Only / Bench & Trash Can	102	30	132
Shelter	5	5	10
Unknown	7	1	8
<b>Total</b>	<b>390</b>	<b>60</b>	<b>450</b>

Source: BCt

Figure 3.2 shows the location and level of amenities of BCt stops within the core study area.








-  Study Area Boundary
-  Broward Central Terminal
- Bus Stops**
-  Shelter
-  Bench
-  No Amenity

Figure 3.2  
**Downtown Bus Stops**

0 0.3 0.6 Miles



## TRANSPORTATION LEVEL OF SERVICE

Existing transit and roadway operational conditions for a number of corridors that may accommodate the proposed Broward County Clean Air Cooperative (CAC) Downtown Fort Lauderdale Circulator project are described in this section. The focus of this evaluation is to determine what levels of service are currently provided to the transit and roadway modes, while identifying constraints and opportunities for the provision of future transit service that would avoid major conflict and congestion points on the system.

### Transit Quality of Service

The study area is bordered by I-95 on the west and the Atlantic Ocean on the east. Sunrise Boulevard forms the northern boundary and Griffin Road the southern boundary, with an extension south on US 1 to Hollywood Boulevard. The roadway network consists of eighteen (18) primary roadways that have been considered for the provision of future transit service. Primary roadways include:

- Griffin Road / SR 84
- SE 17<sup>th</sup> Street
- SE 12<sup>th</sup> Ave. / Davie Blvd.
- Las Olas Blvd.
- SW 2<sup>nd</sup> Street
- Broward Blvd.
- NW / NE 2<sup>nd</sup> Street
- NE 4<sup>th</sup> Street
- Sistrunk Blvd.
- NW 7<sup>th</sup> Ave. / SW 4<sup>th</sup> Ave.
- Andrews Ave.
- NE 3<sup>rd</sup> Ave. / SE 3<sup>rd</sup> Ave.
- US Highway 1
- SW 2<sup>nd</sup> Ave.
- Eisenhower Blvd.
- SR A1A

Existing transit services provided in the study area include:

- Sixteen Broward County Transit (BCt) Routes, shown on **Figure 3.1** and **Table 3.2** by the route number.
- Five Downtown Fort Lauderdale Transportation Management Association shuttles (TMAX) including one Tri-Rail feeder.

The study area is shown in **Figure 1.1**. Transit service is shown in **Figure 3.1**. Bus stops in the downtown Fort Lauderdale area are shown in **Figure 3.2**.

### Methodology

The transit level of service has been determined using the recommended approach from the FDOT Central Office's "Transit Level of Service (LOS) Methodology" Memorandum. Six steps were used to determine level of service:

1. Roadway corridors and their lengths were identified for analysis. Corridor length is important so that a weighted LOS for the entire corridor can be determined if desired.
2. The corridors were divided into 59 segments, each with common transit service levels, pedestrian conditions and traffic characteristics. Smaller corridors, such as Griffin Road, remained undivided.
3. Transit frequency for each segment was determined. The frequency of a particular bus route was included in the segment analysis if the bus route operated on more than half of the segment. Frequency is calculated for segments with more than one bus route by summing all of the bus

frequencies along the segment during the analysis period. Three bus routes (9, 22 and 81) provide average frequencies of two, three and two buses per hour respectively for the weekday period operate along Broward Blvd between I-95 to NW 7<sup>th</sup> Street. The frequency of bus service for this segment is calculated at seven buses per hour.

4. The impact of pedestrian conditions was determined and was used to modify the transit conditions. Bus frequency is affected by three pedestrian conditions: pedestrian LOS, connections to transit stops, and crossing difficulty. Pedestrian LOS is described below:

**a) Pedestrian LOS** Since a separate pedestrian LOS analysis was not required, pedestrian LOS was estimated using the conditions described in **Table 3.9**. Within the study area, sidewalks information was obtained using the “Missing Sidewalk” information.

**Table 3.9**  
**Pedestrian LOS Impact on Transit Quality of Service**

Pedestrian LOS	Adjustment Factor to Bus Frequency	Conditions
A	1.15	Sidewalk away from roadway with curb parking and trees
B	1.10	Sidewalk away from roadway with curb parking
C	1.05	Sidewalk away from roadway
D	1.00	Sidewalk adjacent to roadway
E	0.85	Sidewalk w/out raised curb
F	0.55	No sidewalk

**b) Connections to Transit Stops** The adjustment factor for sidewalk connections to the transit stops is 1.05 if there is a paved connection, and is 0.90 if no paved connection exists between sidewalk and bus stop. The default value (if information is not available or unknown) is 1.00. The majority of the sidewalks within the study area are paved and without any obstacles. Thus, the default value of 1.00 for sidewalk connections was used to provide a conservative estimation of accessibility.

**c) Crossing Difficulty** Crossing difficulty is directly proportional to traffic volumes and crossing length, and indirectly proportional to the number of signalized intersections per mile. Hence, the following variables were required to determine the crossing difficulty factor: arterial class, median type, number of through lanes, and automobile level of service. Note that the arterial classifications for the non-state roadways were not available, and the adjustment factor for crossing difficulty was assumed to be 1.00. For the other roadways, **Table 3.10** was used.

**Table 3.10**  
**Crossing Difficulty Factor Determination**

Conditions That Must Be Met				Crossing Difficulty Factor
Arterial Class	Median Type	Number of Through Lanes	Automobile LOS	
I	R, NR, None	2	A or B	1.05
II	R, NR, None	2	A, B or C	
III	R, NR, None	≤4	A or B	
IV	R, NR, None	≤4	All levels of svc	
I	R, NR, None	≥4	B, C, D or F	0.80
	Restrictive	≥8	All levels of svc	
II	R, NR, None	≥4	C, D, E or F	
	Restrictive	≥8	All levels of svc	
III	R, NR, None	≥4	D, E or F	
	Restrictive	≥8	All levels of svc	
All cases not included in conditions for factor 1.05 and 0.80 =				1.00

5. The impact of span of service is important for a daily analysis, and is a factor in adjusting the bus frequency. The adjustment factors range from 0.55 for limited hours service (0 to 3 hours per day) to 1.15 for extended hours service (19 to 24 hours per day). Span of service is show in **Table 3.11**. Adjustment factors were applied based on these values.

**Table 3.11**  
**Frequency & Span of Service, Existing BCt Bus Routes**

Bus Route	Headway (min)		Frequency (bus/hr)		Operation (hours)
	Weekday	Weekend	Weekday	Weekend	
1	20	30	3.0	2.0	18.0
9	40	60	1.5	1.0	16.5
10	30	45	2.0	1.3	18.0
11	30	40	2.0	1.5	18.5
14	30	40	2.0	1.5	16.0
20	40	40	1.5	1.5	15.5
40	30	40	2.0	1.5	17.5
55	40	60	1.5	1.0	16.0
22	20	30	3.0	2.0	18.0
30	30	45	2.0	1.3	17.0
31	30	45	2.0	1.3	18.0
36	40	30	1.5	2.0	19.0
50	30	40	2.0	1.5	18.0
60	30	40	2.0	1.5	17.5
81	30	60	2.0	1.0	17.5
84	30	60	2.0	1.0	14.0
DFLTMA Park & Ride (a)	30	N/A	2.0	0.0	2.0
Las Olas / Beaches (b)	30	30	2.0	2.0	8.0
TMAX TriRail Services (c)	N/A	120	0.0	0.5	14.0
TMAX Downtown / Courthouse (d)	10	N/A	6.0	0.0	10.5
Northwest Circulator (e)	60	60	1.0	1.0	8.0

- Transit level of service was determined depending on the adjusted frequency for each segment. The LOS varies from A to F, similar to auto LOS. LOS A indicates that passengers do not need schedules to plan their trip because service is so frequent. LOS F indicates that service is unattractive to all riders.

Existing Transit Level of Service

The existing transit level of service analysis was completed for the weekday and weekend conditions (due to heavy tourist demand). The frequencies and spans of service of these existing transit services are shown in **Table 3.11**.

The detail analysis can be found in **Table 3.12** and the final results are illustrated in **Figure 3.3**. Of the 59 transit network segments, 19 currently operate at LOS F during the weekday. A further eight segments operate at LOS E and 17 segments operate at LOS D.

**Table 3.12 Existing Transit Levels of Service**

ROAD NAME	Limits	Length (mi.)	Bus LOS for segment of facility	
			Weekday	Weekend
Griffin Road	I-95 to US 1	1.3	F	F
SR 84	Andrews Ave to US 1	0.3	F	F
	US 1 to Eisenhower Blvd	0.8	F	F
SE 17th Street	Andrews Ave to US 1	0.3	D	E
	US 1 to SR A1A	1.1	E	E
SE 12th Ave / Davie Blvd	I-95 to SW 4th Ave	1.3	E	E
	SW 4th Ave to Andrews Ave	0.2	E	E
	Andrews Ave to SE 3rd Ave	0.2	F	F
	SE 3rd Ave to US 1	0.2	F	F
Las Olas Blvd	Andrews Ave to NE 16th Ave	0.9	C	C
	NE 16th Ave to SR A1A	1.5	C	C
SW 2nd St	SW 7th Ave to Andrews Ave	0.4	D	E
Broward Blvd	I-95 to 7th Ave	1.2	B	C
	7th Ave to Andrews Ave	0.4	B	C
	Andrews Ave to 3rd Ave	0.2	D	E
	3rd Avenue to US 1	0.2	D	E
NW/NE 2nd Street	NW 15th Ave to NW 12th Ave	0.2	F	F
	NW 12th Ave to NW 7th Ave	0.5	F	F
	NW 7th Ave to Andrews Ave	0.4	C	C
	Andrews Ave to NE 3rd Ave	0.2	A	E
	NE 3rd Avenue to US 1	0.2	F	F
NE 4th Street	NE 3rd Ave to NE 14th Ave	0.9	C	C
Sistrunk Blvd	I-95 to NW 7th Ave	1.2	D	E
	NW 7th Ave to Andrews Ave	0.4	C	E
	Andrews Ave to NE 3rd Ave	0.2	F	F
	NE 3rd Avenue to US 1	0.2	F	F
Sunrise Blvd	I-95 to NW 9th Ave	1.0	D	D
	NW 9th Ave to NW 7th Ave	0.2	B	D
	NW 7th Ave to Andrews Ave	0.4	E	E
	Andrews Ave to NE 3rd Ave	0.2	F	F
	NE 3rd Avenue to US 1	0.3	F	F
NW 7th Ave / SW 4th Ave	Sunrise Blvd to Sistrunk Blvd	0.5	C	E
	Sistrunk Blvd to Broward Blvd	0.5	D	E
	Broward Blvd to New R. Bridge	0.3	D	E

			Bus LOS for segment of facility	
SW 2nd Ave	New R. Bridge to Davie Blvd	0.8	D	E
	Davie Blvd to SR 84	1.0	D	E
	Perimeter Rd to SR 84	0.7	F	F
Andrews Ave	Sunrise Blvd to Sistrunk Blvd	0.5	B	D
	Sistrunk Blvd to Broward Blvd	0.5	B	D
	Broward Blvd to New R. Bridge	0.3	B	D
	New R. Bridge to Davie Blvd	0.8	C	D
	Davie Blvd to SR 84	1.1	D	E
NE 3rd Ave / SE 3rd Ave	Sunrise Blvd to Sistrunk Blvd	0.5	D	E
	Sistrunk Blvd to Broward Blvd	0.5	E	F
	Broward Blvd to New R. Bridge	0.4	F	F
	New R. Bridge to Davie Blvd	0.6	F	F
	Davie Blvd to SE 17th St	0.5	C	D
US 1	Sunrise Blvd to NE 6th St *	0.6	E	E
	NE 6th St to Broward Blvd *	0.5	E	E
	Broward Blvd to New R. Tunnel *	0.3	F	F
	New R. Tunnel to Davie Blvd *	0.7	F	F
	Davie Blvd to SE 17th St *	0.5	F	F
	SE 17th St to SR 84 *	0.6	D	E
	SR 84 to Fort Lauderdale Airport	1.5	D	E
	FTL Airport to Griffin Rd	1.0	D	E
	Griffin Rd to Sheridan St	1.0	D	E
	Sheridan St to Hollywood Blvd	1.0	D	E
Eisenhower Blvd	SR 84 to SE 17th St	0.5	F	F
SR A1A	SE 17th St to Las Olas	1.9	E	E

19

8

17

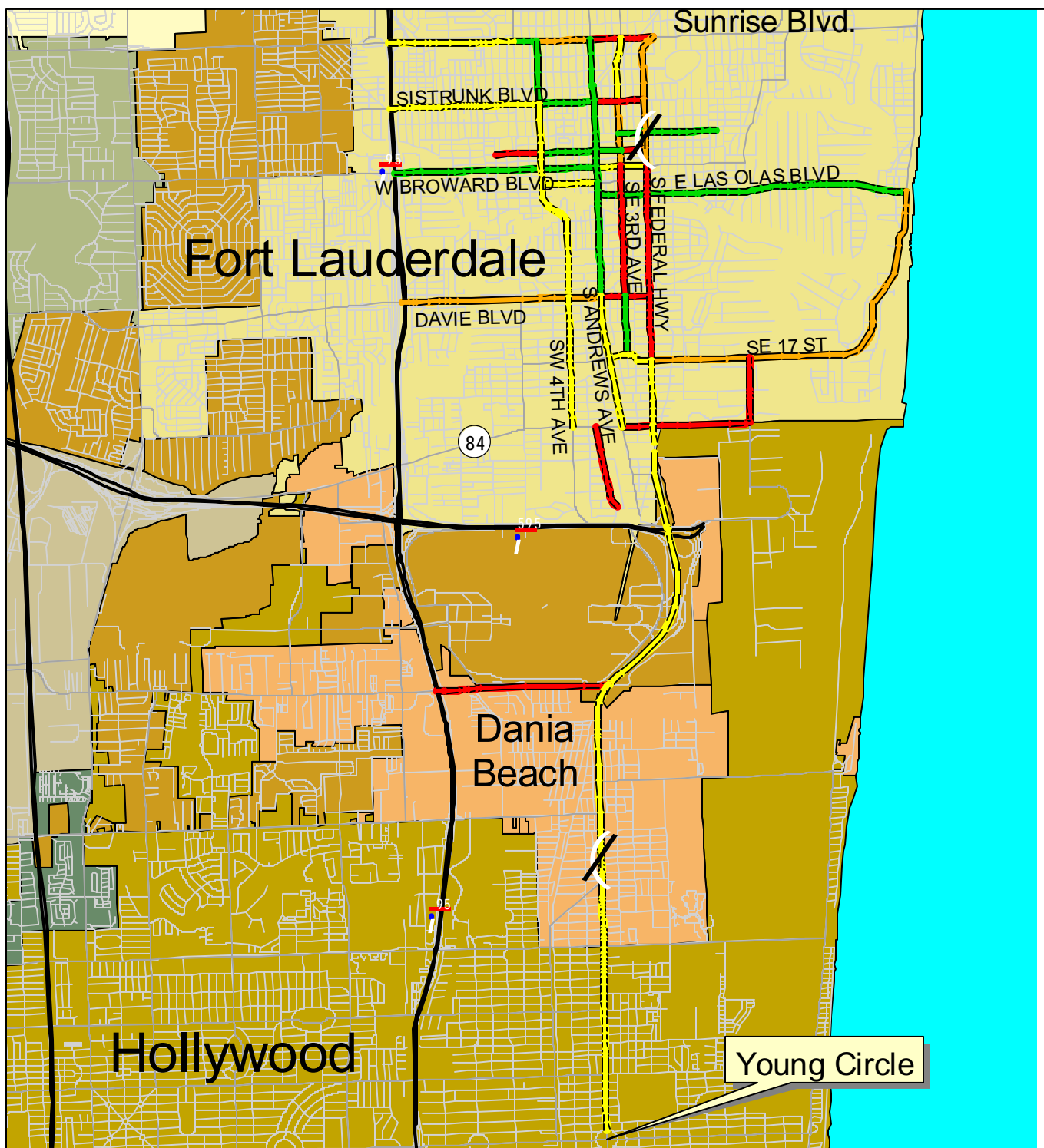
Sidewalks information obtained from the "missing sidewalk" sheet

Pedestrian LOS depends on the locations of sidewalk from the roadway

No obstacle is assume to bus stop

Arterial Classifications are not available for the non-state roads

For divided median, median type = R, for undivided median, median type = NR



Corridor Level of Service	
<span style="color: green;">—</span>	A, B, C
<span style="color: yellow;">—</span>	D
<span style="color: orange;">—</span>	E
<span style="color: red;">—</span>	F

0 0.5 1 1.5 Miles



Figure 3.3  
**Transit Level of Service**



### Existing Roadway Level of Service

The roadway level of service analysis was conducted for the same segments as the transit analysis. The methodology was based on ArtTab, which the Florida Department of Transportation utilizes for evaluating Arterial streets, and is based on threshold capacities calculated using the Highway Capacity Manual (2000 Edition).

Where appropriate the LOS was adopted from other studies, including:

- HOV study, completed by Kimley-Horn & Associates, Inc
- Fort Lauderdale Beach Transportation Improvement Study, completed by Kittelson and Associates, Inc.

LOS for all other segments was based on the Broward County Year 2000 Annual Average Daily Traffic (AADT) map, dated April 2001. The roadway cross-section and the number of signals within the segments were found using GIS maps obtained from Broward County. SW 2<sup>nd</sup> Street and NW 4<sup>th</sup> Street are two local roadways with no available volumes. AADT for these two roadways were found by reviewing and interpolated the nearby roadways with similar traffic characteristics. Functional classification, roadway classification, and AADT are shown in **Table 3.13**.

Levels of Service for the corridor segments are shown in **Figure 3.4**. Among the 59 segments, ten currently operate at LOS F, one at LOS E and 18 at LOS D.

**Table 3.13 Roadway LOS in Study Area**

Segment	Functional Classification	No. of Lanes	LOS
<b>Griffin Road</b>			
I-95 to US 1	State Minor Arterial	6	C
<b>SR 84</b>			
Andrews Ave to US 1	State Minor Arterial	6	C
US 1 to Eisenhower Blvd	City Collector	4	C
<b>SE 17th Street</b>			
Andrews Ave to US 1	City Collector	4	C
US 1 to SR A1A	State Minor Arterial	6	C
<b>SE 12th Ave / Davie Blvd *</b>			
I-95 to SW 4th Ave	State Minor Arterial	4	D
SW 4th Ave to Andrews Ave	State Minor Arterial	4	D
Andrews Ave to SE 3rd Ave	State Minor Arterial	4	C
SE 3rd Ave to US 1	State Minor Arterial	4	C
<b>Las Olas Blvd</b>			
Andrews Ave to NE 16th Ave	City Collector	4	C
NE 16th Ave to SR A1A	State Collector	4	C
<b>SW 2nd St</b>			
SW 7th Ave to Andrews Ave	City Collector	2	C
<b>Broward Blvd *</b>			
I-95 to 7th Ave	State Principal Arterial	6	F
7th Ave to Andrews Ave	State Principal Arterial	6	F
Andrews Ave to 3rd Ave	State Principal Arterial	6	D
3rd Avenue to US 1	State Principal Arterial	6	D
<b>NW/NE 2nd St *</b>			
NW 15th Ave to NW 12th Ave	City Collector	2	C
NW 12th Ave to NW 7th Ave	City Collector	2	C
NW 7th Ave to Andrews Ave	City Collector	2	D
Andrews Ave to NE 3rd Ave	City Collector	2	D
NE 3rd Avenue to US 1	City Collector	2	C
<b>NE 4th Street</b>			
NE 3rd Ave to NE 14th Ave	County Minor Arterial	2	C
<b>Sistrunk Blvd *</b>			
I-95 to NW 7th Ave	County Urban Collector	4	D
NW 7th Ave to Andrews Ave	County Urban Collector	4	C
Andrews Ave to NE 3rd Ave	County Urban Collector	2	C
NE 3rd Avenue to US 1	County Urban Collector	2	C
<b>Sunrise Blvd *</b>			
I-95 to NW 9th Ave	State Principal Arterial	6	F
NW 9th Ave to NW 7th Ave	State Principal Arterial	6	F
NW 7th Ave to Andrews Ave	State Principal Arterial	6	F

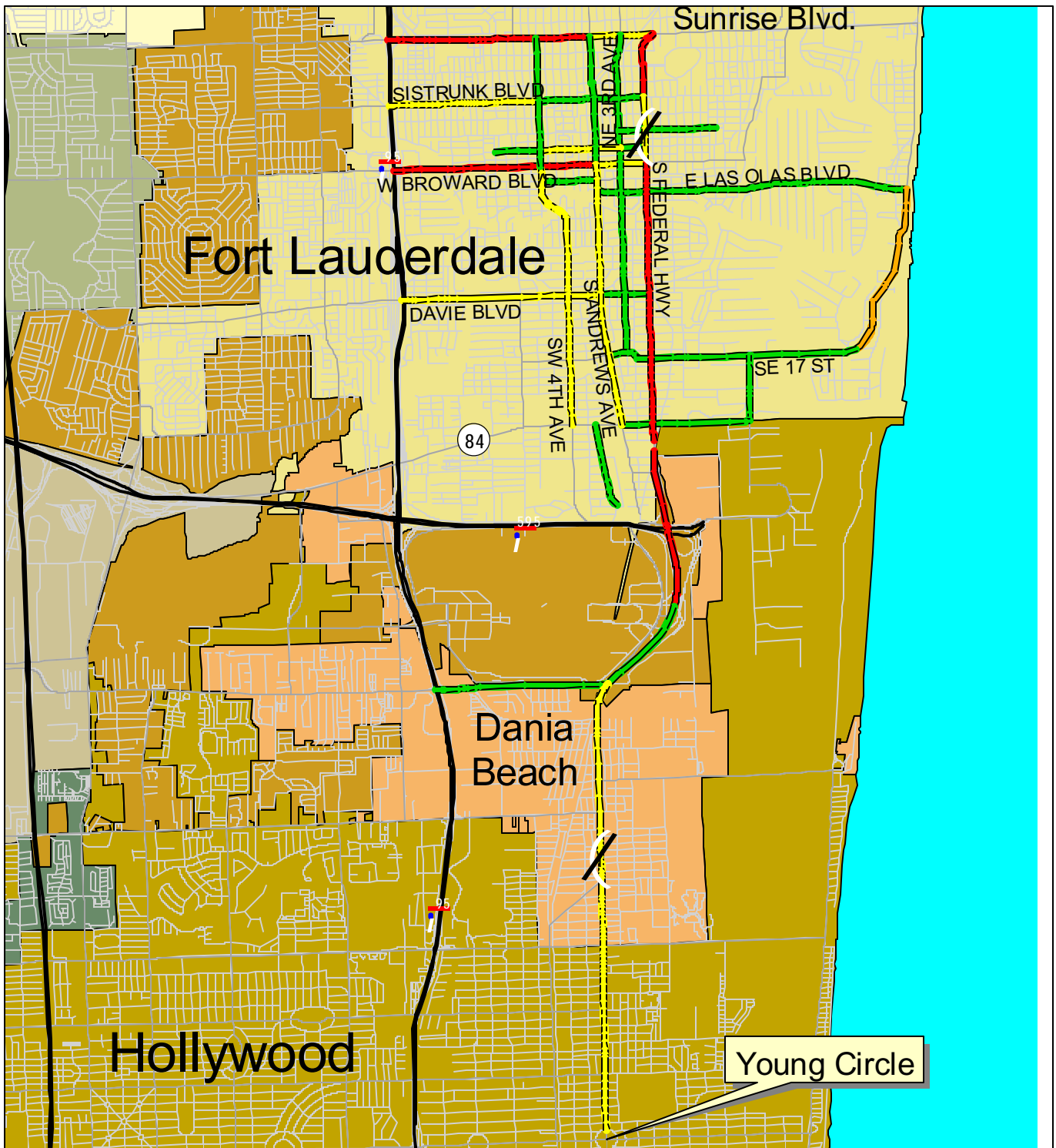
Segment	Functional Classification	No. of Lanes	LOS
Andrews Ave to NE 3rd Ave	State Principal Arterial	6	D
NE 3rd Avenue to US 1	State Principal Arterial	6	D
<b>NW 7th Ave / SW 4th Ave</b>			
Sunrise Blvd to Sistrunk Blvd	County Minor Arterial	4	C
Sistrunk Blvd to Broward Blvd	County Minor Arterial	4	C
Broward Blvd to New R. Bridge	County Minor Arterial	4	D
New R. Bridge to Davie Blvd	County Minor Arterial	4	D
Davie Blvd to SR 84	County Minor Arterial	4	D
<b>SW 2nd Ave</b>			
Perimeter Rd to SR 84	City Unclassified	2	C
<b>Andrews Ave *</b>			
Sunrise Blvd to Sistrunk Blvd	County Minor Arterial	4	C
Sistrunk Blvd to Broward Blvd	County Minor Arterial	4	C
Broward Blvd to New R. Bridge	County Minor Arterial	4	D
New R. Bridge to Davie Blvd	County Minor Arterial	4	D
Davie Blvd to SR 84	County Minor Arterial	4	D
<b>NE 3rd Ave / SE 3rd Ave *</b>			
Sunrise Blvd to Sistrunk Blvd	County Minor Arterial	4	C
Sistrunk Blvd to Broward Blvd	County Minor Arterial	4	C
Broward Blvd to New R. Bridge	County Minor Arterial	4	C
New R. Bridge to Davie Blvd	County Minor Arterial	4	C
Davie Blvd to SE 17th St	County Minor Arterial	4	C
<b>US 1</b>			
Sunrise Blvd to NE 6th St *	State Principal Arterial	6	F
NE 6th St to Broward Blvd *	State Principal Arterial	6	D
Broward Blvd to New R. Tunnel *	State Principal Arterial	6	E
New R. Tunnel to Davie Blvd *	State Principal Arterial	6	F
Davie Blvd to SE 17th St *	State Principal Arterial	6	F
SE 17th St to SR 84 *	State Principal Arterial	6	F
SR 84 to Fort Lauderdale Airport	State Principal Arterial	6	F
FTL Airport to Griffin Rd	State Principal Arterial	6	C
Griffin Rd to Sheridan St	State Principal Arterial	6	D
Sheridan St to Hollywood Blvd	State Principal Arterial	6	D
<b>Eisenhower Blvd</b>			
SR 84 to SE 17th St	City Collector	4	C
<b>SR A1A **</b>			
SE 17th St to Las Olas	State Minor Arterial	4	C

Sources

\* From Kimley-Horn & Associates, Inc.

\*\* From Fort Lauderdale Beach PD& E Study

† Estimated AADT



Roadway Level of Service

- C
- D
- E
- F

Figure 3.4  
**Roadway Level of Service**

0 0.5 1 1.5 Miles



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## Summary of LOS Findings

The main findings of this analysis are as follows:

- The automobile levels of service and the transit levels of service for the 59 roadway segments are shown in **Table 3.14**.

**Table 3.14**  
**Summary of Findings**

Roadway Type	Number of Segments with LOS			
	A-C	D	E	F
Transit	15	17	8	19
Roadway	30	18	1	10

- The automobile levels of service for the roadway segments are slightly better than the transit levels of service (48 segments with roadway LOS D or better versus 32 segments with transit LOS D or better).
- Many of the smaller local roadway segments have no transit services or transit services with low frequency (part of SE 3<sup>rd</sup> Ave, SW 2<sup>nd</sup> Ave, and Davie Blvd).
- All roadways analyzed have LOS of C or worse. Parts of the major roadways, such as Broward Blvd, Sunrise Blvd and US 1, fail.

## **CHAPTER 4 TRANSIT SERVICE CONCEPTS**

### **INTRODUCTION**

The purpose of this chapter is to present a range of service concepts for alternative fuel circulator transit services within the Study Area. The following service concepts could be implemented individually or combined as a service network. They are designed to meet transit needs as defined in the previous chapters. Service concepts were refined through meetings with the CAC, and the service concept descriptions here include these refinements.

The following service concepts were evaluated in this study:

- Route A: Airport Express Service
- Route B: Airport-Cruise Terminal Shuttle
- Route C: Convention Center-Hotel Shuttle
- Route D: Downtown Circulator Routes
- Route E: Airport Circulation Routes

Implementation, funding and operating information is included in Chapter 5.

In addition, this chapter includes information on the use of Station Cars within the study area.

## **ROUTE A: AIRPORT EXPRESS**

An airport express route (herein designated Route A) would provide limited stop transit service between downtown Fort Lauderdale, Fort Lauderdale-Hollywood International Airport (FLL) and Young Circle in Hollywood. This service would be targeted both to travelers using FLL and FLL employees. It would replace existing airport service via Route 1 (which would no longer enter the airport).

### **Target Market**

On a given day, FLL serves 43,000 passengers and employees 6,750 people (source: FLL). Transit captures only a small portion of these airport trips. According to Broward County Transit (BCt), in 2000 an average of 190 people per day boarded Route 1 at the airport. An additional 476 passengers boarded the TriRail shuttle at the Fort Lauderdale Airport Station. There is no existing data to show what percentage of these transit boardings are airline passengers and how many are employees. The 666 daily transit boardings represent 1.3% of the approximately 50,000 daily employees and passengers at the airport.

Private automobiles and taxis account for the majority of trips to FLL. In 2000, an average of 24,300 vehicles passed the main airport entrance point. The second largest mode is private shuttle bus service, in particular to the cruise ship terminals at Port Everglades. According to FLL, 4,300 daily passengers are cruise ship patrons, of which the bulk are transported via shuttles operated by cruise ship lines.

### **Service Concept**

In the short-term, Route A would operate in FLL on the lower level access road. Specific stop locations at the airport are to be determined. In the longer term, the route would serve the remote check-in and transportation center at the airport.

Between FLL and downtown Fort Lauderdale, service would operate with limited stops, generally at major route transfer points or at major activity centers (see **Figure 4.1**). The route would operate on Andrews, which is generally less congested than Highway 1 (see **Figure 3.4**). Route A would circulate through the core of downtown Fort Lauderdale to provide curbside service to major employment and educational facilities, and then end at the Broward Central Terminal. The Broward Central Terminal is the busiest point in the BCt system, with over 16,000 daily boardings and alightings. Central Terminal would serve as a connection point between the airport service and regional fixed route and downtown circulator services. The route would layover on Brickell Avenue adjacent to the transit center.

South of the airport, Route A would also serve downtown Hollywood. The route would travel between Hollywood and FLL via Highway 1, terminating at Young Circle. With five routes and 1,400 daily boardings, Young Circle is the third busiest transit facility in the BCt system.

Route A is shown in **Figure 4.1**.

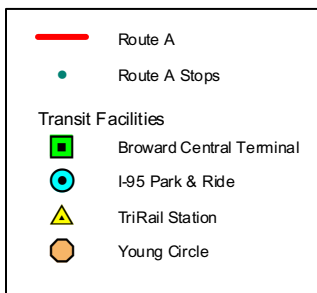
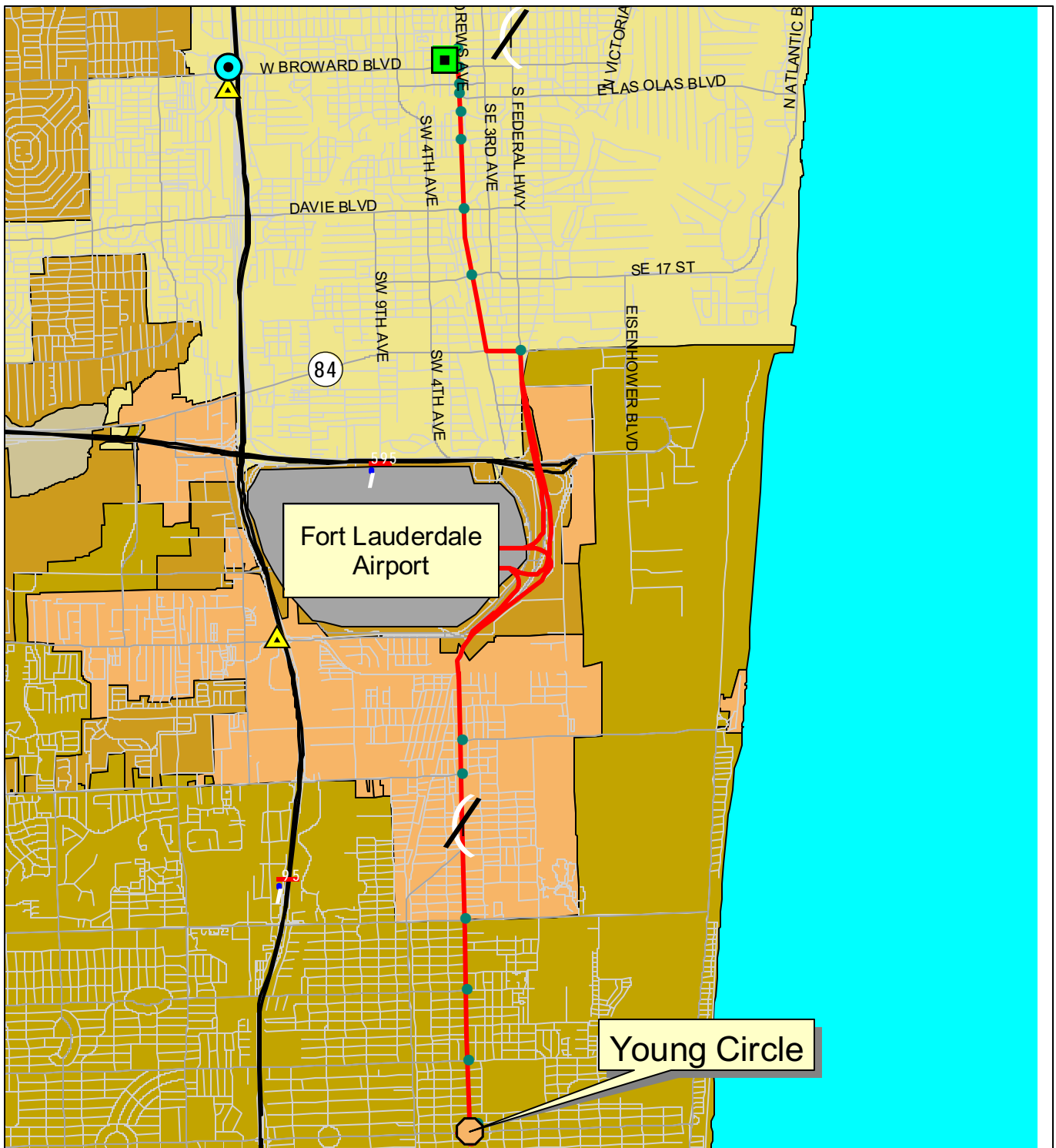


Figure 4.1  
**Route A: Airport Express**



**Assumptions**

The following service assumptions were used to generate service statistics for Route A:

- Span of Service: 6:00 A.M. to 11:00 P.M.
- Frequency: 15 Minutes (Weekday Peak Period) / 30 Minutes (Off-Peak / Weekends)
- Ridership productivity is equal to the BCt 2000 system average of 31.55 boardings per revenue hour
- Operating cost is equal to the TMAX cost projection of \$34.00 per revenue hour, with an adjustment of 20 percent to account for costs related to using electric or electric-hybrid vehicles (to a cost of \$43.20 per revenue hour)
- Average passenger fare is \$0.58 (2000 BCt average)

Service statistics for Route A are shown in **Table 4.1**.

**Table 4.1  
Route A Service Statistics**

Statistic	Weekday	Saturday	Sunday	Annual
Span of Service	6am-11pm			
Peak Frequency	15 minutes	30 minutes		
Base Frequency	30 minutes			
Peak Vehicles	6	3	3	
Total Fleet	8			
Vehicle Hours	74	54	54	24,000
Vehicle Miles	1,080	811	811	358,000
Revenue Hours	61	43	43	19,900
Revenue Miles	934	707	707	310,000
Operating Cost	\$3,200	\$2,400	\$2,400	\$1,054,000
Fare Revenue	\$1,100	\$800	\$800	\$364,000
Net Operating Cost	\$2,100	\$1,600	\$1,600	\$690,000
Net Cost / Revenue Hour	\$34.53	\$37.02	\$37.02	\$34.67
Net Cost / Revenue Mile	\$2.25	\$2.26	\$2.26	\$2.23
Passenger Boardings	1,916	1,362	1,362	628,000
Boardings / Revenue Hour	31.5	31.5	31.5	31.6
Boardings / Revenue Mile	2.05	1.93	1.93	2.03
Net Cost / Boarding	\$1.10	\$1.17	\$1.17	\$1.10
Fare Recovery (%)	34%	33%	33%	35%

If the service captures 3 percent of the air travel market and 5 percent of the airport employee market, weekday boardings would be about 2,000, which is consistent with the statistics shown in **Table 4.1**.

Transit service linking the Fort Lauderdale Convention Center with the airport was also proposed, and is described in more detail under Route C, below.

## **ROUTE B: AIRPORT-CRUISE TERMINAL SHUTTLE**

A convention center / cruise terminal shuttle (herein designated Route B) would provide limited stop transit service between FLL and the Midport and Northport Cruise Ship Terminals and the Broward County Convention Center. This service would be oriented towards conventioners and cruise ship passengers. It would replace existing shuttle services offered by cruise ship lines.

Note that the Airport is currently proposing a “people mover” fixed guideway transit service to provide this connection at some time in the future. Exact routing and implementation schedule are not known at this time. Such a service would replace Route B should Route B be implemented. Route B could serve as an interim step during construction.

Note also that security concerns in the wake of September 11, 2001 may result in changes to the way that passengers and baggage are processed both at the airport and at the cruise terminals. It is not yet known how this will affect transit services.

### **Target Market**

According to FLL, on an average weekday, 4,300 cruise ship patrons pass through the airport. Currently, the majority are transported to their cruise terminals by shuttles operated by the cruise ship lines. Some passengers also travel by taxi cab. The following deficiencies have been identified for the current system:

- Multiple cruise ship shuttles loading or unloading simultaneously at the airport causes traffic congestion
- Multiple cruise ship shuttles traveling along the same route represent an inefficient service that is very expensive to the cruise lines
- Because it is not cost-effective to operate a shuttle for a limited number of passengers, some arriving passengers are forced to wait around the airport terminals until enough cruise passengers arrive to warrant operating the shuttle

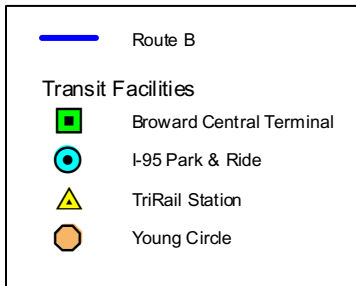
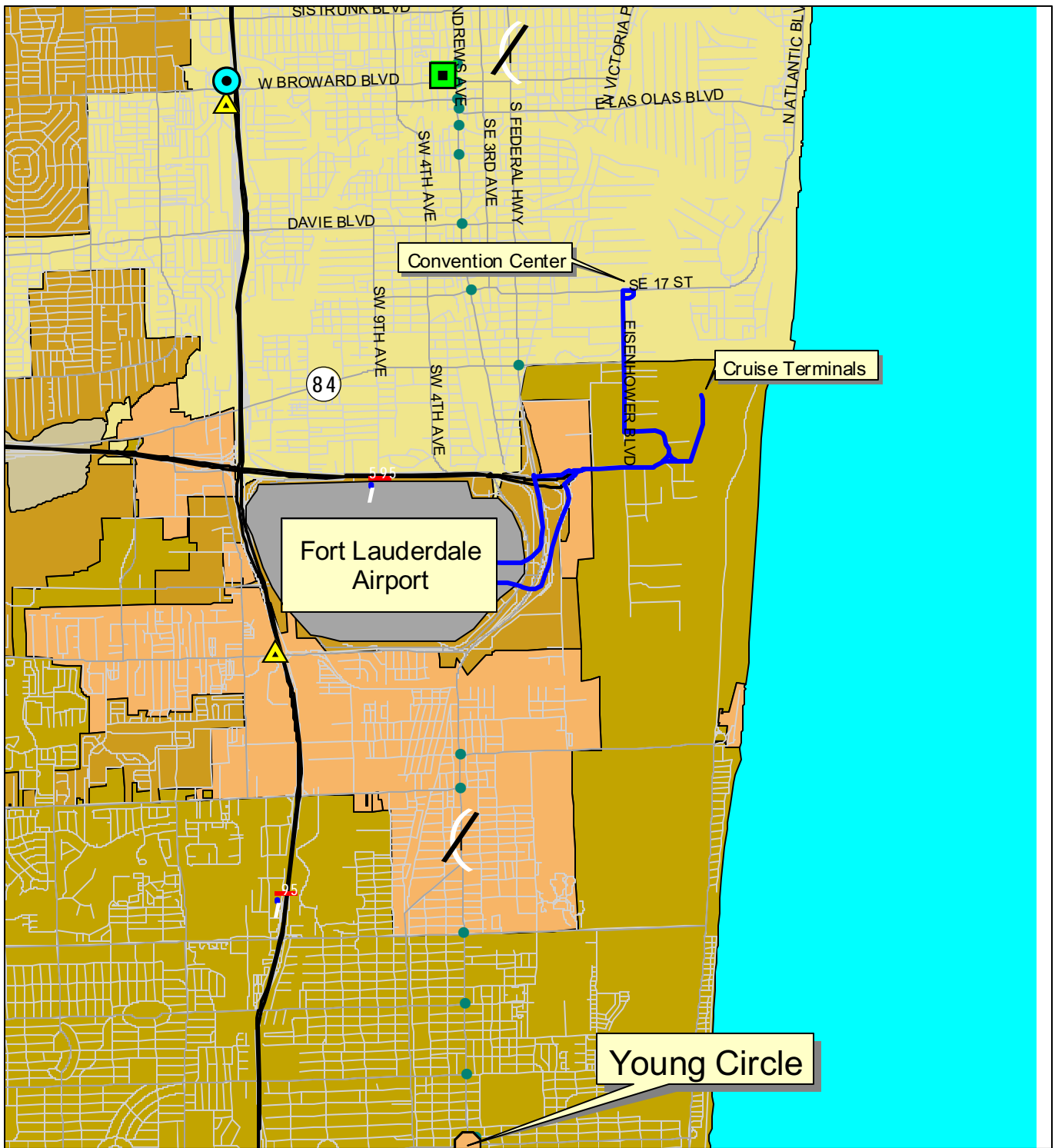
When large numbers of cruise ship patrons arrive on simultaneous flights (as with charter flights) or are all transported between an arriving cruise ship and the airport at once, it may be cost effective to operate a charter bus service between the cruise terminal and the airport. At other times, Route B could provide a connection to allow small groups of travelers the flexibility to travel to the cruise terminals when they arrive. The service could also connect patrons with transportation services to downtown Fort Lauderdale or other destinations, so patrons are not forced to wait around the airport or cruise terminals between connections.

### **Service Concept**

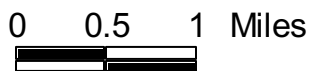
In the short-term, Route B would serve the cruise terminals, the Convention Center, and the lower level access road at FLL. Specific stop locations at the airport are to be determined. Convention Center service allows patrons to connect to taxis, other CAC routes, or BCt service. In the longer term, the route would serve the remote check-in and transportation center at the airport. Note that there may be changes to the suggested routing based on security concerns at Port Everglades.

The route is shown in **Figure 4.2**. Buses would operate non-stop from the airport to the Midport Terminal, then to the Northport Terminal. Buses would layover at the cruise terminals to not block traffic at the airport or convention center.

**Figure 4.2** shows Route B.



**Figure 4.2**  
**Route B: Airport-Cruise Terminal Shuttle**



**Assumptions**

The bulk of cruise ship patrons would continue to use charter service. However, Route B could provide valuable supplemental service or in some cases all service when patrons are not arriving on a single charter flight.

Route B would only need to operate on days when cruise ship service is scheduled, and only at times that correspond to the arrival of cruise ship patrons. Route B is modeled based on the following assumptions about cruise ship schedules:

- Cruise ships either depart or arrive 150 days / year
- Service on cruise ship days would operate from 7:00 A.M. to 10:00 P.M.
- Buses would operate at one-half hour headways, which could be modified to meet flight and cruise schedules; during peak times, additional vehicles may be put into service to handle high passenger loads
- Ridership assumes 25 percent of the cruise ship market, or about 1,000 riders per cruise day
- Operating cost is equal to the TMAX cost projection of \$34.00 per revenue hour, with an adjustment of 20 percent to account for costs related to using electric or electric-hybrid vehicles (to a cost of \$43.20 per revenue hour)
- Average passenger fare is \$0.58 (2000 BCt average), although cruise ships may wish to negotiate free service for their patrons.

Service statistics for Route B are shown in **Table 4.2**.

**Table 4.2**  
**Route B Service Statistics**

<b>Statistic</b>	<b>Cruise Day (150 / year)</b>	<b>Annual</b>
Span of Service	6am-11pm	
Peak Frequency	30 minutes	
Base Frequency	30 minutes	
Peak Vehicles	2	
Total Fleet	3	
Vehicle Hours	32	5,000
Vehicle Miles	354	53,000
Revenue Hours	20	2,900
Revenue Miles	307	46,000
Operating Cost	\$1,400	\$205,000
Fare Revenue	\$600	\$85,000
Net Operating Cost	\$800	\$120,000
Net Cost / Revenue Hour	\$40.98	\$41.38
Net Cost / Revenue Mile	\$2.61	\$2.61
Passenger Boardings	973	146,000
Boardings / Revenue Hour	49.8	50.3
Boardings / Revenue Mile	3.17	3.17
Net Cost / Boarding	\$0.82	\$0.82
Fare Recovery (%)	43%	41%

## **ROUTE C: CONVENTION CENTER / HOTEL SHUTTLE**

A convention center / hotel shuttle (herein designated Route C) would provide limited stop transit service in the “Convention Center Campus” area along SE 17<sup>th</sup> Street between US Highway 1 and the Fort Lauderdale Beach. The primary purpose of the service would be to connect hotels with the convention center. Additional versions of the route would connect the convention center and campus area with Fort Lauderdale Beach, Las Olas Boulevard, and the Fort Lauderdale-Hollywood Airport. This service could replace existing shuttle services offered by some hotels. Some operating costs for this service could be subsidized by area hotels.

### **Target Market**

During 2000, the Greater Fort Lauderdale Convention and Visitors Bureau (GFLCVB) reported that the convention center received 380,000 annual visitors per year. Of those, 45 percent were from outside of the Fort Lauderdale area, and 30 percent were from out of state. Assuming 75 percent of out-of-town visitors would stay at a hotel, approximately 600 conventioners per day would seek hotel rooms. Because convention center business is not spread evenly over every day of the year, the actual number of patrons for a large convention could be much larger than 600.

According to the GFLCVB, there are more than 25,000 hotel and motel rooms in Broward County. Of these, more than 8,000 are located within the study area (see **Table 1.6**). Hotels used by conventioners are primarily located near the convention center along 17<sup>th</sup> Street between US Highway 1 and the Intracoastal Canal. Movement between the convention center and these hotels is primarily by hotel shuttle bus, taxi, or rented car. Along SE 17<sup>th</sup> Street between Federal Highway and the Intracoastal Waterway, there are approximately 4,000 hotel rooms.

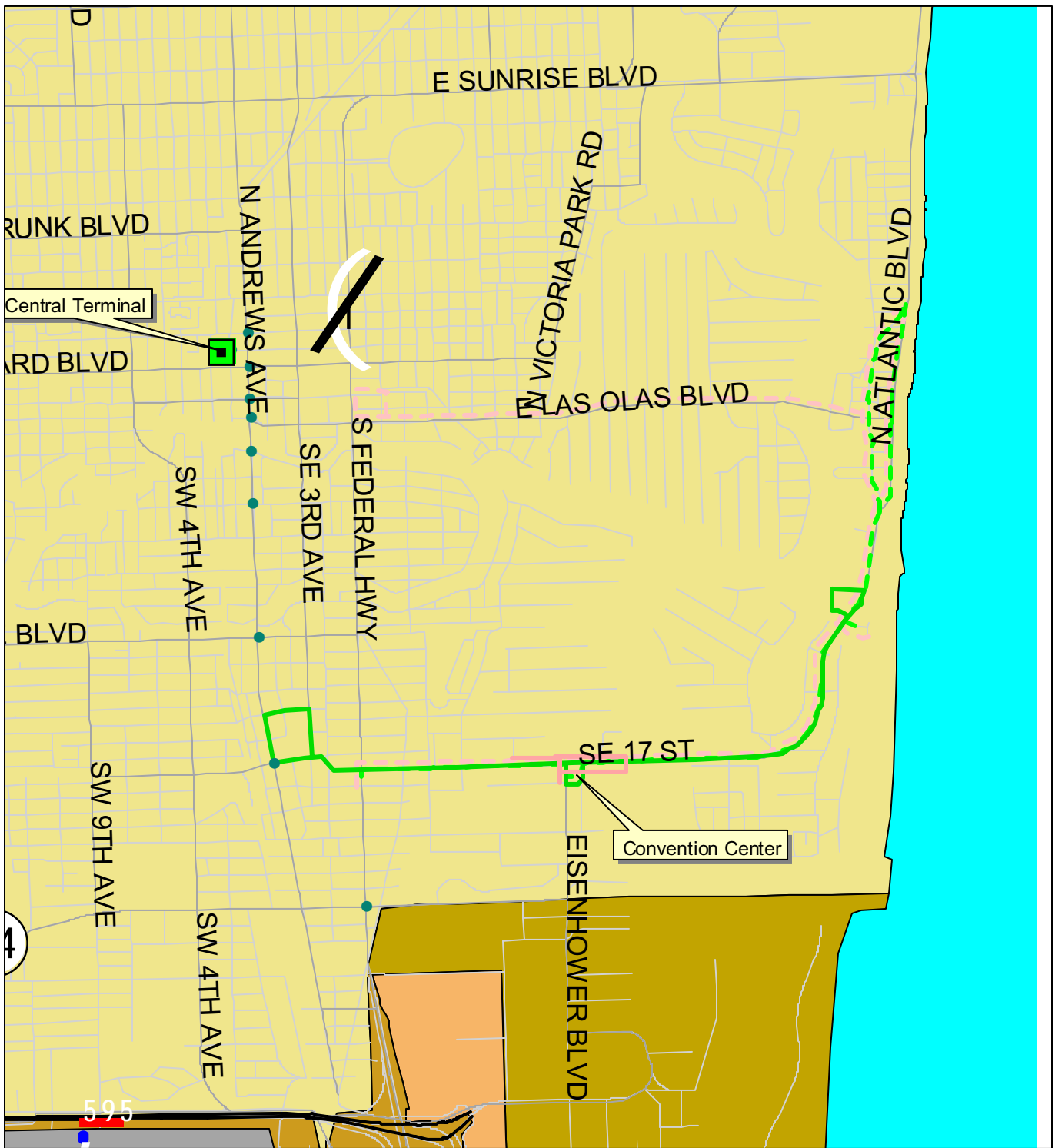
The second highest concentration of hotels near the convention center is along Fort Lauderdale Beach (on Highway A1A). The Fort Lauderdale Beach itself is a destination for visitors to Fort Lauderdale. In addition to service between hotels and the convention center, there is also a potential demand among convention center patrons for a connection to shopping and dining areas. The greatest concentrations are along Las Olas Blvd. between Fort Lauderdale Beach and downtown and at the Galleria Mall.

### **Service Concept**

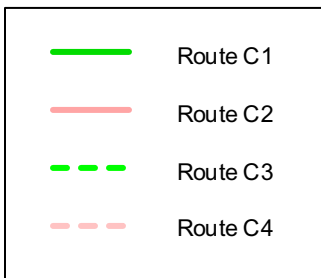
The Convention Center-Hotel Shuttle is primarily oriented towards the needs of convention center patrons who are staying in hotels near the convention center. There are several versions of Route C, which serve different parts of the hotel market:

- Route C1 is dedicated to the convention center market, and operates only on SE 17<sup>th</sup> Street between US Highway 1 and Holiday Drive / Harbor Drive during off peak periods. During major conventions, the route operates to Bayshore Drive.
- Route C2 is a peak period service during major conventions; Route C2 only operates between the convention center, the Marriott Hotel, the Renaissance Hotel, and the Water Taxi Stop under the 17<sup>th</sup> Street Bridge
- Route C3 further increases the number of potential hotels, operating between Andrews Avenue and Terramar Street at all times
- Route C4 follows Route C3 but includes service via Las Olas to the Broward Central Terminal in downtown Fort Lauderdale
- Route C5 includes the area served by Route C2, but also serves Fort Lauderdale-Hollywood International Airport

The route is shown in **Figure 4.3**.



**Figure 4.3**  
**Route C: Convention Center**



0 0.2 0.4 Miles



Route C1 and C2 are envisioned as preliminary routes, to be partially funded through fees applied to room rates during conventions (see Chapter 5). Route C1 would operate year-round, while Route C2 would only operate during major conventions, referred to as “Citywide” events. According to the GFLCVB, in the year from October 2001-September 2002, there were 24 citywide events which lasted a total of 93 days.

Service statistics for Routes C1 and C2 are shown in **Table 4.3**. **Table 4.3** is based on the following assumptions:

- There are 93 “Peak” days per year (days during Citywide events); all other days when service operates are “Base” days
- Routes operate from 7:00 A.M. to 10:00 P.M.
- Routes operate on 12 minute (base) or 10 minute (peak) headways during AM peak, midday, and PM peak periods, and on 24 minute (base) or 20 minute (peak) headways at night
- Ridership productivity is equal to the BCt average of 31.55 passengers per revenue mile
- Operating cost is equal to the TMAX cost projection of \$34.00 per revenue hour, with an adjustment of 20 percent to account for costs related to using electric or electric-hybrid vehicles (to a cost of \$43.20 per revenue hour)
- Average passenger fare is \$0.58 (2000 BCt average)

**Table 4.3  
Route C1 & C2 Service Statistics**

Statistic	Base (C1 Only)	Peak (C1 & C2)	Annual
Span of Service	6am-11pm		
Peak Frequency	12 minutes	10 minutes	
Base Frequency	12 minutes	10 minutes	
Peak Vehicles	4	8	
Total Fleet	8		
Vehicle Hours	62	124	28,000
Vehicle Miles	603	1,241	275,000
Revenue Hours	49	100	22,100
Revenue Miles	486	1,001	221,000
Operating Cost	\$2,700	\$5,400	\$1,204,000
Fare Revenue	\$900	\$1,800	\$405,000
Net Operating Cost	\$1,800	\$3,600	\$799,000
Net Cost / Revenue Hour	\$37.01	\$35.97	\$36.15
Net Cost / Revenue Mile	\$3.70	\$3.60	\$3.62
Passenger Boardings	1,532	3,152	698,000
Boardings / Revenue Hour	31.5	31.5	31.6
Boardings / Revenue Mile	3.15	3.15	3.16
Net Cost / Boarding	\$1.17	\$1.14	\$1.14
Fare Recovery (%)	33%	33%	34%

Other versions of Route C are seen as future extensions to the route, the implementation of which would depend on the expansion of funding. Some or all of the other routes could be served by expansions to the existing Downtown TMA service (see Chapter 3). Service would at all times also serve the proposed waterbus station at the 17<sup>th</sup> Street Bridge.

Routes C3 and C4 are expansions to Route C1. **Tables 4.4** and **4.5** show the impacts of operating these routes instead of Route C1, using the same assumptions.

**Table 4.4**  
**Route C2 & C3 Service Statistics**

<b>Statistic</b>	<b>Base (C3 Only)</b>	<b>Peak (C2 &amp; C3)</b>	<b>Annual</b>
Span of Service	6am-11pm		
Peak Frequency	12 minutes	10 minutes	
Base Frequency	12 minutes	10 minutes	
Peak Vehicles	5	8	
Total Fleet	8		
Vehicle Hours	81	124	33,000
Vehicle Miles	876	1,277	350,000
Revenue Hours	71	103	28,200
Revenue Miles	706	1,030	282,000
Operating Cost	\$3,500	\$5,400	\$1,419,000
Fare Revenue	\$1,300	\$1,900	\$516,000
Net Operating Cost	\$2,200	\$3,500	\$903,000
Net Cost / Revenue Hour	\$31.15	\$33.98	\$32.02
Net Cost / Revenue Mile	\$3.12	\$3.40	\$3.20
Passenger Boardings	2,225	3,247	889,000
Boardings / Revenue Hour	31.5	31.5	31.5
Boardings / Revenue Mile	3.15	3.15	3.15
Net Cost / Boarding	\$0.99	\$1.08	\$1.02
Fare Recovery (%)	37%	35%	36%

**Table 4.5**  
**Route C2 & C4 Service Statistics**

<b>Statistic</b>	<b>Base (C4 Only)</b>	<b>Peak (C2 &amp; C4)</b>	<b>Annual</b>
Span of Service	6am-11pm		
Peak Frequency	12 minutes	10 minutes	
Base Frequency	12 minutes	10 minutes	
Peak Vehicles	7	10	
Total Fleet	10		
Vehicle Hours	112	156	44,000
Vehicle Miles	1,169	1,629	460,000
Revenue Hours	94	131	37,100
Revenue Miles	943	1,314	371,000
Operating Cost	\$4,800	\$6,700	\$1,897,000
Fare Revenue	\$1,700	\$2,400	\$678,000
Net Operating Cost	\$3,100	\$4,300	\$1,219,000
Net Cost / Revenue Hour	\$32.89	\$32.73	\$32.86
Net Cost / Revenue Mile	\$3.29	\$3.27	\$3.29
Passenger Boardings	2,972	4,142	1,170,000
Boardings / Revenue Hour	31.5	31.5	31.5
Boardings / Revenue Mile	3.15	3.15	3.15
Net Cost / Boarding	\$1.04	\$1.04	\$1.04
Fare Recovery (%)	35%	36%	36%

Route C5 connects the airport with the convention center and the hotels in the immediate area around the convention center. Route C5 is intended to supplement service on Route C1, C3 or C4. Route C5 would operate on hourly headways on all days other Route C vehicles are operating. Operating statistics for Route C5 are shown in **Table 4.6**.

**Table 4.6**  
**Route C5 Service Statistics**

<b>Statistic</b>	<b>Convention Day (357 / year)</b>	<b>Annual</b>
Span of Service	6am-11pm	
Peak Frequency	60 minutes	
Base Frequency	60 minutes	
Peak Vehicles	1	
Total Fleet	1	
Vehicle Hours	18	5,000
Vehicle Miles	200	53,000
Revenue Hours	8	2,100
Revenue Miles	181	48,000
Operating Cost	\$800	\$201,000
Fare Revenue	\$100	\$38,000
Net Operating Cost	\$700	\$163,000
Net Cost / Revenue Hour	\$88.02	\$77.62
Net Cost / Revenue Mile	\$3.87	\$3.40
Passenger Boardings	249	66,000
Boardings / Revenue Hour	31.3	31.4
Boardings / Revenue Mile	1.38	1.38
Net Cost / Boarding	\$2.81	\$2.47
Fare Recovery (%)	13%	19%

## **ROUTE D: DOWNTOWN CIRCULATOR**

Routes D1 and D2 are downtown circulators. The primary purpose of the D Routes is to connect major BCt and TriRail passenger facilities and the I-95 Park & Ride lot with downtown employment and to provide for internal circulation within the downtown area. This function is currently provided by line-haul BCt bus service within the downtown area, by the TMAX Circulator Service, and by the TriRail Shuttle.

Route D service represents an expansion of the service provided by the existing TMA and TriRail service, and could potentially either supplement or replace some or all of these other services.

### **Target Markets**

Downtown Fort Lauderdale represents both the largest overall employment center in Broward County and the county's largest transit market. The purposes of the downtown circulator routes are:

- To connect major transit facilities (Central Terminal, TriRail) with downtown employment and educational facilities
- To provide internal circulation in the downtown area
- To provide an alternative to the automobile for intra-downtown trips
- To provide service to non-work destinations such as tourist attractions, shopping, museums, etc.

According to TriRail, approximately 600 commuters use the Fort Lauderdale TriRail Station on the average weekday. On an average weekday, 7,900 BCt patrons alight at the Central Terminal. This represents 8,500 existing transit "arrivals" in downtown Fort Lauderdale.

According to Broward County, there are more than 76,000 employees working within the study area. Of these, approximately a third (23,000) works in the core area of downtown Fort Lauderdale.

### **Service Concept**

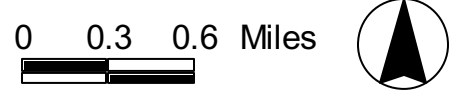
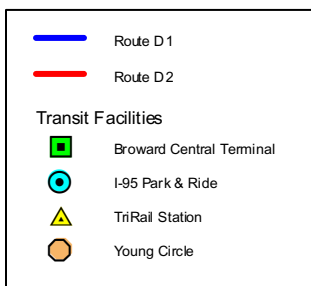
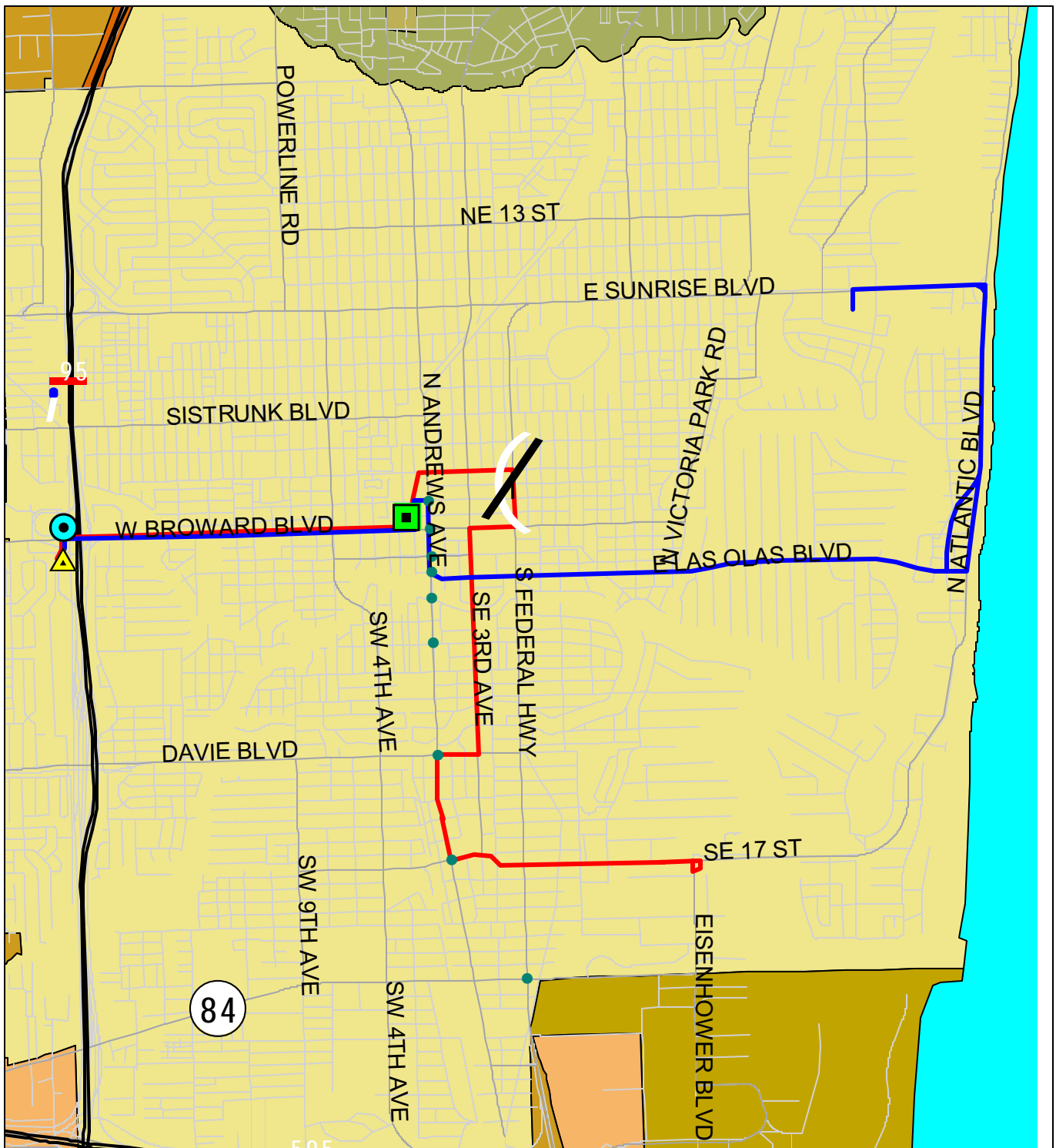
Two circulator routes are proposed, one for the northern portion of the downtown area and one for the southern portion. Both serve the Fort Lauderdale TriRail Station and the Central Terminal. Routes were designed to maximize potential service to major employment concentrations. **Figure 2.2** shows the location of employment in Fort Lauderdale.

Route D1 serves the northern portion of the study area. The service area includes downtown Fort Lauderdale, Las Olas Blvd., Fort Lauderdale Beach, and the Galleria Mall area. This route would provide connector service between downtown and the Las Olas District. On weekends, it also would provide a connection between TriRail and the beach.

Route D2 serves the southern portion of the study area. The service area includes downtown Fort Lauderdale, the Broward General Medical Center, and the convention center. On weekends, it would be extended via 17<sup>th</sup> Street and Highway A1A to connect the TriRail Station with the Fort Lauderdale Beach south of Las Olas Blvd.

The proposed expansion of the City Cruiser route to the Broward General Medical Center would serve roughly the same route as Route D2.

**Figure 4.4** shows Route D.



**Figure 4.4**  
**Route D:**  
**Downtown Circulator**



**Assumptions**

The following assumptions were used to develop operating statistics for Routes D1 and D2:

- Combined, Routes D1 and D2 would capture 20 percent of 8,500 transit “arrivals” at the Central Terminal and Fort Lauderdale TriRail Station (about 3,400 daily trips assuming two trips per passenger) (this capture rate would be reduced if the existing TMAX service continues to operate).
- Service would operate every 15 minutes during work hours (roughly 7 am to 6 pm weekdays), with lower frequencies at other times. Bus schedules would be coordinated with TriRail Schedules.
- Service would be 7 days per week.
- Fare would be \$0.50 per passenger (one-half the current BCt fare).
- Operating cost is equal to the TMAX cost projection of \$34.00 per revenue hour, with an adjustment of 20 percent to account for costs related to using electric or electric-hybrid vehicles (to a cost of \$43.20 per revenue hour)

Operating statistics for Route D are shown in **Table 4.7**.

**Table 4.7  
Route D (Combined) Operating Statistics**

Statistic	Weekday	Saturday	Sunday	Annual
Span of Service	6am-11pm			
Peak Frequency	15 minutes	30 minutes		
Base Frequency	30 minutes			
Peak Vehicles	10	5	5	
Total Fleet	12			
Vehicle Hours	150	81	81	46,000
Vehicle Miles	1,729	1,039	1,039	547,000
Revenue Hours	134	73	73	41,600
Revenue Miles	1,408	863	863	447,000
Operating Cost	\$6,500	\$3,500	\$3,500	\$2,005,000
Fare Revenue	\$1,100	\$400	\$300	\$321,000
Net Operating Cost	\$5,400	\$3,100	\$3,200	\$1,684,000
Net Cost / Revenue Hour	\$40.33	\$42.44	\$43.81	\$40.48
Net Cost / Revenue Mile	\$3.84	\$3.59	\$3.71	\$3.77
Passenger Boardings	3,870	1,419	913	1,106,000
Boardings / Revenue Hour	28.9	19.4	12.5	26.6
Boardings / Revenue Mile	2.75	1.64	1.06	2.47
Net Cost / Boarding	\$1.40	\$2.18	\$3.50	\$1.52
Fare Recovery (%)	17%	11%	9%	16%

**ROUTE E: AIRPORT SHUTTLE**

Internal airport circulation was identified at the outset of this study as a goal for the EV-Circulator System. Specifically, the circulator was to connect the passenger terminals with a centralized off-site car rental facility. At this time, the need for such a service is uncertain. In the short-term, individual rental car companies will continue to provide their own shuttle services to their own decentralized remote parking locations. In the long term, airport documents suggest that a fixed-guideway tram system will connect the terminals with a remote rental car facility. Therefore, it is in the medium term – between the time that the centralized facility is built and the time that the tramway can be completed – that the circulator system may be needed within the airport.

**COMBINED ANNUAL STATISTICS**

Combined annual statistics for Routes A-D are presented in **Table 4.8**. **Table 4.8** includes Route A, Route B, Route C1 & C2, and (combined) Route D. Route E is not included in **Table 4.8**.

**Table 4.8  
Route A-D, Combined Annual Statistics**

Peak Vehicles (incl. 20% Spare)	41
Vehicle Hours	103,000
Vehicle Miles	1,233,000
Revenue Hours	86,600
Revenue Miles	1,025,000
Operating Cost	\$4,468,000
Fare Revenue	\$1,174,000
Net Operating Cost	\$3,294,000
Net Cost / Revenue Hour	\$38.04
Net Cost / Revenue Mile	\$3.21
Passenger Boardings	2,577,000
Boardings / Revenue Hour	29.8
Boardings / Revenue Mile	2.51
Net Cost / Boarding	\$1.28
Fare Recovery (%)	26%
Vehicle Hours	103,000

## SHARED CARS

### Introduction

As part of the second phase of the Broward County Clean Air Cooperative project, Kittelson and Associates, Inc. (KAI) assesses the potential use of Shared Cars to supplement transit service in the study area. Car Sharing programs are those in which a driver can rent a car for a short period of time (as little as an hour) and pay for only the time and the mileage. These programs are often implemented in cities where public transit is the main means of transportation and/or parking spaces are limited. The purpose of this research is to gain knowledge on the organization and implementation of these programs to use in the start-up of a similar strategy enhancing the Downtown Fort Lauderdale Circulator service.

### Research Results

It is important to note the different definitions for “Station Car” and “Shared Car”. A station car is one that is privately owned and used for non-transit portion of the trip to/from work or home. Station cars are typically small and low-speed, utilize alternative fuel power (often electric) and given priority parking at transit terminal/stations, Park-n-Ride lots and Kiss-n-Ride lots. A **shared car** is a shared vehicle, associated with more than one driver and essentially available for short-term rental. Shared cars belong to a network and are available through reservations only. Shared cars appropriate in an urbanized setting as an extension to the transit network.

There are several successful Car Sharing programs around the country. Most of them are in major metropolitan areas such as Boston, Portland and Washington, D.C. The fee schedule, membership rules, and other requirements vary among the cities and the organizations. The common features are the location (all near the transit facilities or in dense neighborhoods) and rates (include gasoline and insurance). A few of these organizations are partners with nearby transit agencies and car rental companies to enhance services. The following car share programs were researched:

#### Zipcar.com

##### *Structure:*

- Reserve online up to 2 months in advance for 1-hour minimum.
- Unlock the car with a proximity card and drive away
- Return to the same reserved location before the reservation time expires
- Walk away, free of car ownership responsibilities
- If return late, the penalties are \$25 per hour or portion of an hour late, with a minimum charge of \$25.

#### Flexcar.com

##### *Structure*

Flexcar features a network of vehicles parked in leased parking spaces in neighborhoods where members live and work. Individuals and businesses can reserve these vehicles for use and pay only for the time the car is used. A member can reserve a car when one needs it and returns it to the original location. At the end of the month, a credit or debit card will be charged for the time used.

Flexcar operates in the Seattle, Portland, Vancouver, WA and Washington DC metropolitan areas. Each city has its own characteristics that dictate where cars are located. Generally they are either near transit stops or in high-density neighborhoods. In Seattle where there is not any type of rail or subway system, the cars started in high-density neighborhoods, while in Washington, DC since the public partner is a rail

system, the cars are near stations. As use of the cars increase, cars are added to the fleet. In Seattle and Portland's case the cars are parked within 4 or 6 blocks of existing cars so that the network grows.

#### CityCarShare.org

##### *Structure*

- Reserve car online.
- Use provided fob to open the car door and enable the ignition.
- Drive off.
- Refuel (if needed) use City CarShare gas card.
- Return the car to its parking spot.
- The on-board computer automatically tracks time and mileage.
- Receive a bill at the end of the month.

A summary of the information presented above can be found in **Table 4.9**.



**Table 4.9  
Station Car Summary**

Name	Location	Membership	Cost	Gas	Insurance	Penalty	Type of Vehicles	Restrictions	Extras
<b>Zipcar</b>	106 in Boston (2 coming soon)	<ul style="list-style-type: none"> <li>▪ \$30 application fee</li> <li>▪ \$75 annual fee, members pay for time and mileage per month.</li> </ul>	\$5 to \$16 per hour plus \$0.40 per mile	Included. Members must refuel if the tank is ¼ or less with supplied credit card.	Comprehensive loss and liability	\$25/hour or portion of an hour late \$25 minimum	Volkswagen products and Honda Civics. Adding Ford Focus and hybrid vehicles	Return to the same location	No hourly fee from midnight to 6 am
	26 in Washington, DC (3 coming soon)	<ul style="list-style-type: none"> <li>OR</li> <li>▪ \$30 monthly, members pay for anything more than \$30</li> <li>▪ \$300 deposit</li> </ul>							
<b>Flexcar</b>	55 in Seattle	<ul style="list-style-type: none"> <li>▪ \$25 membership fee</li> <li>▪ No deposit</li> </ul>	Various plans From 5 hours for \$35 with 50 miles to 100 hours for \$525 with 100 miles \$2 extra for specialty vehicles	Included	Include liability, comprehensive and collision		Honda Civics, Specialty vehicles (pick-up trucks, vans, high-end sedan) at certain locations	Return to the same location	No hourly fee from 11 pm to 7 am. Partner with Amtrak and Enterprise
	11 in Washington, DC (17 coming soon)								
<b>CityCarShare</b>	Portland, OR	\$100/year or \$10/month membership fee	\$2.00 per hour plus \$0.40 per mile						
	11 locations in San Francisco and 1 in the Bay area	<ul style="list-style-type: none"> <li>▪ \$25 (\$30 for business) application fee</li> <li>▪ \$300 (500 business) deposit</li> <li>▪ \$10 monthly administration fee</li> </ul>	<ul style="list-style-type: none"> <li>▪ \$2.50 per hour plus \$0.45 per mile</li> <li>▪ Charges are capped after 10 hours per day.</li> </ul>	Included. Member must refuel if the tank is ½ or less before returning car with supplied credit card.	Comprehensive	\$5 (\$10) if cancel reservation 5 (1) hours before reserved time	VW Beetles, Golf and Jetta	Must be at least 25, CA driver license and 3 year driving history. Return to the same location	15 min grace period. Partner with Enterprise Rent-a-car



## Implementation Considerations

To learn more about the implementation of a car-sharing program using electric vehicles as planned by the Clean Air Cooperative, KAI contacted TH!NK, a Ford Company, which specializes in the innovative electronic vehicles. In 2000, TH!NK introduced 400 vehicles into seven one-year car-sharing programs around the county. These test markets were densely developed activity centers such as college campuses, downtown areas and transit terminals in the four states Michigan, New York, Georgia, and California. The 400 vehicles used were TH!NK model *city*. These vehicles, introduced in the fall of 2002, are two-door, two-seater, hatchbacks whose features are highlighted below:

### Electric Vehicle Advantages:

- Powered by batteries, which are easily charged by an off-board device called a power control station. The PCS input plugs into a standard 220V outlet and output plugs into the vehicle. Charging the *city* costs about half the equivalent cost of gasoline.
- Safety equipment includes driver's side air bag, safety belts with pre-tensioners, front & rear crush zones, and side-impact beams in the doors. The TH!NK *city* meets European certification standards, which are different than US standards, and are imported in a special federal importation program for demonstration program purposes.
- Accelerates from 0-30 mph in under seven seconds and boast a top speed of 56 mph. Estimated in-city driving range, per charge, is 50 miles. In many ways, it will perform like any other car, but with less maintenance and no gasoline.
- The TH!NK *city*'s electric engine is powered by water-cooled Nickel Cadmium batteries which require no water maintenance. Aside from pollution, another problem with conventionally fueled vehicles is the ongoing maintenance of a transmission powered by combustion. Such systems require regular oil, coolant, and other fluid changes, as well as exhaust and muffling systems. Not so with electric engines. The average maintenance fee is approximately \$80 for every 3000 miles.
- Whisper-quiet ride which produces zero emissions
- Thermoplastic body panels are dent resistant and non-corrosive
- Much smaller than a regular vehicle which suits for crowded metropolitan areas.
- Roadside assistance is available.
- Fuel level monitor allows the reservation center office assign the appropriate vehicle for the suitable trip length.

### Electric Vehicle Disadvantages:

- TH!NK *city* is for short distance trip (~50 miles before recharging is needed).
- It normally takes 4 to 6 hours to have the vehicles fully charged. Vehicle must be at a designated charging location.
- No child seat or bike rack is available. However, a bike can be placed in the back with one bike-wheel removed.

## Participation/Subscription Requirements

Research on program implementation has indicated that successful operation requires a “subscription” rate of approximately 150-200 people per vehicle, with four vehicles being a reasonable minimum at one location. This translates to a commitment from 600 to 800 participants to support a single carshare facility.

### Car Share Summary

- A car-sharing program is attractive to transit riders who do not use their cars everyday and/or those who only need the cars for a short period of time. It serves as an excellent extension to transit service. The programs are popular in metropolitan areas where parking is limited.
- Generally, the locations are either near transit stops, rail stations, or in high-density neighborhoods.
- The rental cost is based on time and mileage and includes gas and insurance.
- The typical vehicle available is a 4-door sedan. Some locations have other specialty cars for lease with addition charges.
- Due to the limited number of vehicles in the fleet, vehicles must be returned to the same location they were picked up. In most cases, there is only one vehicle at each location. As use of the cars increases, cars are added to the fleet. In some cases, cars are parked within 4 or 6 blocks of existing cars so that the network grows.
- Many of the CarShare organizations are partners with the local transit agencies to increase membership. However, no data are available relating to transit ridership and car-sharing membership or usage.

For Fort Lauderdale area, the following five locations have been identified as potential locations for the car-sharing programs:

- i. Fort Lauderdale Convention Center, located south of SE 17th Street on Eisenhower Blvd. This location will serve the out-of-towner guests attending conferences at the Convention Center or near-by hotels' conference centers. It will also serve the Fort Lauderdale Art Institute of Technology's students.
- ii. City Park Garage located on the east side of the Broward County Main Library. This location will serve the downtown transit terminal, the Florida Atlantic University/Broward Community College downtown campuses, the Broward County Government Center, the Broward County Main Library, and nearby office buildings.
- iii. Tri-Rail/Amtrak Station located on the southwest corner of Broward Blvd. at the I-95 interchange. This location will serve the Tri-Rail and Amtrak train riders an option for their non-transit portion of the trip.
- iv. Sheridan Tri-Rail Station located ¼ mil west of I-95 interchange on Sheridan Street. Similar to the Broward Blvd station, this facility will serve the train riders
- v. Downtown Transit terminal located on the northwest corner of Broward Blvd and Andrews Avenue. This is the main terminal for the Broward County Transit system. As many as 17 routes stop here throughout the day.

Each of these facilities would have 4 vehicles. The vehicles cost about \$20,000 to \$25,000 each and require storage in secure locations. The installation of the facility varies from \$4,000 to \$12,000 per facility, not including the signing and striping. The charging unit is about \$300 to \$400 for each vehicle. These installation and charging costs are often covered by State Funds / Grants as they support the Clean Air Acts. Other costs to be considered are the software purchase/updates and the personnel trainings. Reservation agents will keep track of the availability of the vehicles and monitor all vehicles' fuel levels. Software is available for purchased and is regularly updated. Only one reservation center would be required for all five locations. The fare-collector (at the rail and bus stations), the valet staff (at the convention center) and the security personnel (at the City Park Garage) can be trained to be rental agents.

Sufficient participation (600-800 per location) remains a potential obstacle in the Fort Lauderdale market.

## CHAPTER 5: IMPLEMENTATION

The purpose of Chapter 5 is to document an implementation strategy for the Broward County Clean Air Cooperative to use for initiating alternative-fuel circulator service. The implementation strategy includes the following steps:

- Prioritization of Service
- Detailed Transit Operations Plan
- Funding / Operating Costs
- Next Steps

The implementation plan is based on the transit service alternatives described in Chapter 4 and on input received over the course of several CAC meetings.

### PRIORITIZATION OF SERVICE

To implement all routes noted in the previous Chapter (Routes A, B, C and D) would cost approximately \$3.3 million per year in net operating costs, depending on which versions of Route C are operated. Such implementation would also require 41 vehicles including spares. Although all of the proposed services may eventually be implemented in some form in the future, successful implementation requires the prioritization of potential routes.

#### Prioritization Criteria

Prioritization was based on criteria developed in the June CAC meeting. The criteria were as follows:

- Probability of Success
- Ability to Secure Outside Funding
- Visibility
- Connectivity

Measures were attached to each of the four criteria in order to use them to distinguish between the five possible CAC Circulator Routes. Each is described below, and the four are summarized in **Table 5.1**.

#### Probability of Success

“Success” can be a measure of multiple service characteristics, but generally, a successful transit service is seen as one that carries the maximum number of riders. Ridership is typically described in terms of service effectiveness and service efficiency.

Service effectiveness is measured in terms of the total number of riders carried. Potential ridership was calculated for the four routes in Chapter 4. **Table 5.1** summarizes the projected ridership on the circulator routes.

**Table 5.1**  
**Potential Ridership, CAC Routes**

Route	Ridership		
	Weekday / Peak	Weekend / Off-Peak	Annual
Route A	1,900	1,400	628,000
Route B	1,000	0	146,000
Route C1 & C2	3,200	1,500	698,000
Route D1 & D2	3,900	1,400 (Saturday) 900 (Sunday)	1,106,000

Another measure of “Success” is service efficiency. Service efficiency is measured in terms of passenger boardings per revenue hour or revenue mile, which are referred to as measures of productivity. It is also referred to as “productivity.” **Table 5.2** shows the service efficiency of the four CAC routes.

**Table 5.2**  
**Service Efficiency, CAC Routes**

Route	Passengers / Revenue Mile	Passengers / Revenue Hour
Route A	2.03	31.6
Route B	3.17	50.3
Route C1 & C2	3.16	31.6
Route D1 & D2	2.47	26.6

**Table 5.1** shows that Route D has the highest ridership, followed by Route C, then Route A, then Route B, which only operates 150 days per year. The opposite order occurs in **Table 5.2**: Route B has the highest productivity on those days when it operates, while Route C has the second highest productivity. Route A has the lowest productivity in terms of passenger boardings per mile, largely because of the express portions of the route (where it is adding miles but not picking up passengers). Route D has the lowest productivity per revenue hour, possibly because it operates late at night and on weekends when it is adding revenue hours but ridership is lower.

Ability to Secure Outside Funding

A second measure of the probability of success is the probability that service will be implemented at all. Although money has been set aside for capital purchases (such as vehicles), there is no currently identified outside funding source for operating expenses for CAC routes (though some money may be available through BCt). Therefore, the route with the highest probability of success may be the one that has the best chance of receiving funding.

Several potential sources for outside funding have been identified. **Table 5.3** summarizes outside funding sources for the four routes.

**Table 5.3  
 Potential Outside Funding Sources**

Route	Outside Funding Source	Chance of Securing Funding
Route A	None	None
Route B	Cruise ship lines, cruise terminal / Port Everglades	Moderate short term (until PeopleMover implemented); depends on willingness of cruise lines to participate
Route C1 & C2	Convention Center hotels	Good
Route D1 & D2	None	None

**Table 5.3** shows that Route C has a good chance of finding at least partial outside funding from hotels (see below). Route B may also be able to secure some funding from the cruise ship lines or from the airport, but this is less certain. Outside funding sources for Routes A and D have not been identified. However, given that they serve a potentially important circulation function within the Downtown Fort Lauderdale area, some or all of their funding may be available from the DFLTMA in addition to or in place of the existing funding for the TMAX shuttle.

Visibility

High visibility for the CAC project is very important for two reasons:

- To improve public perception of transit service
- To make service easier to use

Improved public perception of transit is an important benefit of the use of appealing, alternative-fuel vehicles. Improving public perception of transit can lead to increased interest in using transit service by the general public, and can create general support for transit agencies even among the population that does not use transit. Clearly-marked alternative-fuel vehicles also publicize the effort to clean the air in Broward County.

High visibility also makes the service easier to use. High visibility will make the public more aware of what services are offered by the transit agencies. It also may encourage both residents and visitors to use the service.

Visibility is measured in terms of both the frequency that vehicles are in service and the amount of time they spend operating on major roads. **Table 5.4** shows the annual revenue hours that vehicles are in service on each route, and shows the two-way route miles of service on arterial streets (as defined by Broward County).

**Table 5.4  
 Measures of Visibility**

Route	Annual Revenue Hours	Route Miles on Arterials
Route A	19,900	8.4
Route B	2,900	4.2
Route C1 & C2	22,100	5.4
Route D1 & D2	41,600	21.1

Not surprisingly, **Table 5.4** shows that the two routes that serve the most specialized populations – cruise ship patrons in the case of Route B and convention center patrons in the case of Route C – have the lowest visibility. However, **Table 5.4** may understate Route C’s visibility given that it is highly visible within the area frequented by its target market. On the other hand, the routes that operate in downtown Fort Lauderdale and serve the general population – Routes A and D – have the highest visibility, especially to the general public.

Connectivity

Because the purpose of the circulator routes is to improve circulation throughout the central Fort Lauderdale area, connectivity is very important. Connectivity measures how many opportunities there are to transfer between a circulator route and another mode of transportation or another transit service. Connectivity is measured in terms of the number of major transit nodes each route serves. The major nodes within the study area include:

- Fort Lauderdale TriRail Station
- Fort Lauderdale Park & Ride / HOV Ramp
- Broward Central Station Transit Center
- Young Circle (Hollywood)
- Fort Lauderdale Galleria
- Broward County Convention Center
- Broward General Hospital Medical Center
- WaterTaxi Terminal
- Fort Lauderdale-Hollywood International Airport
- Cruise Terminals

**Table 5.5** shows which circulator routes interact with which major nodes.

**Table 5.5  
Connectivity**

Route	Major Transportation Nodes	Number of Connections
Route A	Broward Central Station Young Circle Airport	3
Route B	Convention Center Airport Cruise Terminals	3
Route C1 & C2	Convention Center WaterTaxi Terminal Medical Center	3
Route D1 & D2	TriRail Station Park & Ride Broward Central Station Galleria Convention Center Medical Center	6

Route D was designed to connect major transportation nodes, which is reflected by the fact that it serves twice as many as the other routes.

Evaluation

**Table 5.6** shows a comparison of the four routes based on the four criteria above. Each route is ranked from 1 to 4, with 4 being the best of the four and 1 being the worst.

**Table 5.6  
 Implementation Criteria**

Criteria	Metric	Route A	Route B	Route C	Route D
Probability of Success	Ridership	2	1	3	4
	Productivity	2	4	3	2
Ability to Secure Outside Funding	Operating Funds from Private Sources	1	3	4	2
Visibility	Revenue Hours, Miles on Arterials	3	1	3	4
Connectivity	Transportation Nodes Served	3	3	3	4
<b>Total</b>		<b>11</b>	<b>12</b>	<b>16</b>	<b>16</b>

**Table 5.6** shows that if the four criteria are weighed evenly, Routes C and D perform better than Routes A and B.

Through discussion with the CAC Steering Committee, Route C was selected as the highest priority for a full operations plan. The reason for Route C’s selection was the possibility of securing partial funding through the Event Transportation Fee (see below) and the smaller capital (vehicle) requirements of the route, indicating the project’s likelihood of quick initiation. Route D was selected as secondary priority, with Route B and Route A was selected as the third and lowest priorities, respectively.

**OPERATIONS PLAN**

Detailed operations plans were developed for the two most promising services, Routes C and D.

**Route C Convention Center Campus**

Because only Route C is a candidate for funding at this time, a more detailed operations plan was developed for Route C as part of the implementation plan.

Route Design

A detailed route operations plan was developed for Route C over the course of several CAC meetings and in the CAC route refinement meeting in August, 2002. For the initial implementation of Route C, the following operating plan is proposed:

*During Major Conventions*

According to the Greater Fort Lauderdale Convention and Visitor’s Bureau (GFLCVB), there are approximately 24 major (“Citywide”) conventions per year, representing 91 days. On those days, the approximately 77 percent occupancy rate for hotels immediately adjacent to the convention center (between the Intracoastal Waterway and Federal Highway) represents approximately 1,700 potential transit patrons (1,100 rooms x 2 people per room x 77 percent occupancy).

To serve that market, during conventions a special shuttle (Route C2) would operate a loop connecting the convention center with the water taxi stop on the Intracoastal Waterway, and the hotels on the north side of SW 17<sup>th</sup> Street as far west as Eisenhower Drive (Renaissance Hotel) using two vehicles. This route would operate entirely on the frontage roads adjacent to SE 17<sup>th</sup> Street and would therefore not be delayed by traffic signals. The shuttle would operate between 6 a.m. and 11 p.m. at ten-minute headways (20 minute headways after 6 p.m.).

Route C1 would connect the convention center campus to a larger set of hotels by operating as far west as Andrews Avenue and SE 17<sup>th</sup> Avenue and as far north as Ocean Blvd. and Bayshore Drive. This area includes approximately 3,900 hotel rooms, with another 200+ proposed. During major conventions, Route C1 would operate at 10 minute headways from 6 a.m. to 6 p.m., and 20 minute headways from 6 p.m. to 11 p.m. Six vehicles would be required for this service.

*At Other Times*

During the remaining 164 days service operates in Fort Lauderdale, a reduced frequency version of Route C1 would continue to provide service to the convention center. The off-peak version of Route C1 would operate 7 days a week at 12-minute headways from 6 a.m. to 6 p.m. and 24 minute headways from 6 p.m. to 11 p.m. Route C1 would also operate a slightly shorter route, from Andrews Avenue to Harbor Drive. Route C1 would require four vehicles in peak service.

Frequency and Span of Service

Table 5.7 summarizes the span of service for Route C.

**Table 5.7  
 Frequency and Span of Service, Route C**

Days	Route	Span of Service	Frequency	
			6am-6pm	6pm-11pm
During Major Conventions	C1	6am-11pm	6 / Hour	3 / Hour
	C2	6am-11pm	6 / Hour	3 / Hour
Outside of Major Conventions	C1	6am-11pm	5 / Hour	Every 24 minutes

*Annual Ridership*

Annual ridership is a function of a route’s productivity. Productivity measures the number of passenger boardings per revenue hour the route is in service. For 2000, BCt averaged a productivity of 31.55 boardings per revenue hour. Using this productivity, Route C would record approximately 700,000 annual boardings (1,500 per day outside of conventions, or 3,200 per day during major conventions).

To check the predicted ridership against the number of hotel rooms along Routes C1 and C2, the following assumptions were used:

- During major conventions, 90 percent of patrons of hotels served by Route C2 are convention-goers, while 20 percent of other hotels served by Route C1 are convention-goers.
- Outside of major conventions, 10 percent of hotels served by Route C1 are convention-goers.
- Average occupancy rate is 77 percent.
- Transit users ride twice per day on average.
- The average hotel room includes 1.5 persons.

Based on these assumptions, if transit captured 75 percent of the potential market, it would carry 2,700 daily passenger trips during conventions or 1,400 outside of conventions. This estimate is approximately 85 percent of the model output (during conventions) or 95 percent of the model output (outside of conventions), which is fairly close considering non-conventioner trips are not included.

*Operating Statistics*

**Table 5.8** shows operating statistics for the starter service on Route C.

**Table 5.8  
Route C1 & C2 Service Statistics**

<b>Statistic</b>	<b>Base (C1 Only)</b>	<b>Peak (C1 &amp; C2)</b>	<b>Annual</b>
Span of Service	6am-11pm		
Peak Frequency	12 minutes	10 minutes	
Base Frequency	12 minutes	10 minutes	
Peak Vehicles	4	8	
Total Fleet	8		
Vehicle Hours	62	124	28,000
Vehicle Miles	603	1,241	275,000
Revenue Hours	49	100	22,100
Revenue Miles	486	1,001	221,000
Operating Cost	\$2,700	\$5,400	\$1,204,000
Fare Revenue	\$900	\$1,800	\$405,000
Net Operating Cost	\$1,800	\$3,600	\$799,000
Net Cost / Revenue Hour	\$37.01	\$35.97	\$36.15
Net Cost / Revenue Mile	\$3.70	\$3.60	\$3.62
Passenger Boardings	1,532	3,152	698,000
Boardings / Revenue Hour	31.5	31.5	31.6
Boardings / Revenue Mile	3.15	3.15	3.16
Net Cost / Boarding	\$1.17	\$1.14	\$1.14
Fare Recovery (%)	33%	33%	34%

### *Funding / Operating Costs*

As noted in Table 5.3, the gross operating cost for Route C would be approximately \$1,200,000 per year. The net cost (gross cost – fares) would be approximately \$800,000. One of the strengths of Route C versus the other routes is the potential availability of an existing funding source: the “transportation fee.”

No transportation fee has yet been agreed upon by any hotels in the area or by the convention center. Availability of such funds is purely speculative, and would ultimately depend on negotiations with hotels, the convention center, and convention planners.

Currently, during major conventions, hotels pay a transportation fee of approximately \$5.00 per room per night to major meeting planners. This fee is used to provide transportation between the hotels and the convention centers, and sometimes to other destinations. Transportation is contracted to private providers. For last year (October 2001-September 2002) the transportation fees totaled \$330,085.

The Broward County Convention Center predicted approximately \$231,000 would be available per year in the immediate future under the current transportation funding program. It is not clear at this time whether the reduced amount is due to reduction in occupancy or commitments of funding for other programs.

The proposed level of service offered during major conventions via Routes C1 and C2 is high enough to be competitive with any privately provided transportation. It has the added advantage of being an existing, reliable transit service using appealing alternative fuel vehicles. Operating the vehicles at high frequencies provides more flexibility to convention-goers than scheduled charter service. They can come and go at will during service hours.

If the entire fee from last year was applied to the gross annual operating cost of transit service for Routes C1 and C2, it would cover approximately 27 percent of the total gross operating cost. If applied to the net, it would cover approximately 41 percent of the cost. However, convention-goers who pay the room fee would most likely not pay a fare. Therefore, fare recovery would drop by about \$77,000 ( $\$330,000 / \$5$  per room per night = 66,000 room nights; 66,000 room nights x 2 trips per day x \$0.58 average fare = \$77,000). Therefore, the room fee would cover approximately 38 percent of the net operating cost.

Given the high visibility of the service to tourists, there may also be opportunities for additional revenue sources in the form of advertising on or in buses.

### **Other Routes**

Of the other four routes, Route D is the most likely (and next highest priority) for implementation. Route D would most likely operate as a modification and expansion of the existing TMAX downtown shuttle service. The changes to the existing TMAX routes would enhance connectivity between major employment areas (downtown, Broward General Medical Center), major transportation nodes (the Fort Lauderdale TriRail station, Broward Central Station, and the Fort Lauderdale Galleria), and the proposed Route C (see above).

### *Route D Route Design*

The primary purpose of the D Routes is to connect major BCt and TriRail passenger facilities and the I-95 Park & Ride lot with downtown employment and to provide for internal circulation within the downtown

area. This function is currently provided by line-haul BCt bus service within the downtown area, by the TMAX Circulator Service, and by the TriRail Shuttle.

Route D service represents an expansion of the service provided by the existing TMA and TriRail service, and could potentially either supplement or replace some or all of these other services. Two circulator routes are proposed, one for the northern portion of the downtown area and one for the southern portion. Both serve the Fort Lauderdale TriRail Station and the Central Terminal. Routes were designed to maximize potential service to major employment concentrations.

Route D1 serves the northern portion of the study area. The service area includes downtown Fort Lauderdale, Las Olas Blvd., Fort Lauderdale Beach, and the Galleria Mall area. This route would provide connector service between downtown and the Las Olas District. On weekends, it also would provide a connection between TriRail and the beach.

Route D2 serves the southern portion of the study area. The service area includes downtown Fort Lauderdale, the Broward General Medical Center, and the convention center. On weekends, it would be extended via 17<sup>th</sup> Street and Highway A1A to connect the TriRail Station with the Fort Lauderdale Beach south of Las Olas Blvd.

The proposed expansion of the City Cruiser route to the Broward General Medical Center would serve roughly the same route as Route D2.

*Frequency and Span of Service*

**Table 5.9** summarizes the span of service for Route D.

**Table 5.9  
Frequency and Span of Service, Route D**

Route	Span of Service	Frequency	
		Peak	Off-Peak
Route D1 (North)	6am-11pm	4 / Hour	2 / Hour
Route D2 (South)	6am-11pm	4 / Hour	2 / Hour

*Annual Ridership*

Combined, Routes D1 and D2 would capture 20 percent of 8,500 daily transit “arrivals” at the Central Terminal and Fort Lauderdale TriRail Station (about 3,400 daily trips assuming two trips per passenger). At this capture rate, weekday productivity is 28.9 passengers per revenue hour. The capture rate would be reduced if the existing TMAX service continues to operate. Including reduced capture rates for weekends, Route D would carry approximately 1.1 million annual passengers.

*Operating Statistics*

**Table 5.10** shows operating statistics for the starter service on Route D.

**Table 5.10**  
**Route D Service Statistics**

Statistic	Weekday	Saturday	Sunday	Annual
Span of Service	6am-11pm			
Peak Frequency	15 minutes	30 minutes		
Base Frequency	30 minutes			
Peak Vehicles	10	5	5	
Total Fleet	12			
Vehicle Hours	150	81	81	46,000
Vehicle Miles	1,729	1,039	1,039	547,000
Revenue Hours	134	73	73	41,600
Revenue Miles	1,408	863	863	447,000
Operating Cost	\$6,500	\$3,500	\$3,500	\$2,005,000
Fare Revenue	\$1,100	\$400	\$300	\$321,000
Net Operating Cost	\$5,400	\$3,100	\$3,200	\$1,684,000
Net Cost / Revenue Hour	\$40.33	\$42.44	\$43.81	\$40.48
Net Cost / Revenue Mile	\$3.84	\$3.59	\$3.71	\$3.77
Passenger Boardings	3,870	1,419	913	1,106,000
Boardings / Revenue Hour	28.9	19.4	12.5	26.6
Boardings / Revenue Mile	2.75	1.64	1.06	2.47
Net Cost / Boarding	\$1.40	\$2.18	\$3.50	\$1.52
Fare Recovery (%)	17%	11%	9%	16%

*Funding / Operating Costs*

As noted in **Table 5.10**, the gross operating cost for Route D would be approximately \$2,000,000 per year. The net cost (gross cost – fares) would be approximately \$1,700,000. One of the strengths of Route D versus the other routes is the potential use of TMAX or even TriRail funding to pay for some or all of the operating costs of the route.

**Route A & B**

Routes A & B are the lowest priority for funding and operations. As such, they are not included in this implementation plan. Information on route design, ridership, operating costs, and operating statistics are included for both in Chapter 4 of this report.

**POTENTIAL USE OF FEC CORRIDOR RIGHT-OF-WAY**

The Florida East Coast (FEC) Railroad corridor directly connects Fort Lauderdale Airport with downtown Fort Lauderdale and could potentially provide an ideal busway corridor to allow rapid and reliable bus service between these two points. To evaluate the potential for this, an analysis was conducted to determine the physical issues associated with using the FEC corridor between North Perimeter Road and Sunrise Boulevard for rapid bus service. In conducting the analysis, 100-scale aerial photography of the corridor was used. The criteria evaluated include: available right-of-way, at-grade crossings, existing bridges, and drainage considerations.

**Potential Right-of-Way**

Potential right-of-way adjacent to the rail line (the area were a busway could potentially be constructed) was estimated from the aerial photography obtained from Broward County. Because the estimation was performed using a scale and visual observation of physical property boundaries (hedgerows, fence lines, etc), the reported values should be viewed as approximations (actual right-of-way boundaries were not provided as part of this study). Table 1 provides a summary of the potential available right-of-way at critical sections in each segment along the corridor. The minimum width required to provide a busway lane is approximately 15 feet, although additional area is typically needed for provision of drainage.

**Table 5-11  
 Approximate Right-of-Way**

Segment From	Segment To	Potential Available Right-of-Way Limitation (ft)*	Notes
N. Perimeter Road	SR 84	10	Spur lines exist on both sides of the rail line. Horizontal clearance issues at the ramp overpass structures will also need to be analyzed.
SR 84	Davie Boulevard	10	Spur lines exist on both sides of the rail line. Freight yards on east side abut rail line.
Davie Boulevard	SW 6th Street	40 (east side)	West side narrows to 30 ft near Davie intersection.
SW 6th Street	Broward Boulevard	40 (east side)	Constraints on west side near SW 2nd Street intersection.
Broward Boulevard	NE 6th Street	15 (east side)	Narrows near NE 6th Street intersection, 40 ft most of section.
NE 6th Street	Sunrise Boulevard	35 (east side)	West side is approximately 20 ft.

- This is the minimum estimated width available outside of the train operation envelope (i.e. if 20' is available on the west side and 10' on the east side, the reported width is 10').

As shown in Table 5-11, the areas with the least amount of right-of-way are from Perimeter Road to Davie Boulevard. This is due to the presence of spur railroad lines in these areas. The constraints on the west side of the rail corridor near SW 2nd Street may also influence the location of a potential busway.

While there are areas where less than 15 feet of right-of-way currently exist outside the railroad clearance zone, these occur where the railroad is not ‘centered’ in the right-of-way, and moving the tracks could result in sufficient right-of-way to provide two busway lanes within the right-of-way. While significant costs would be involved, moving tracks is not prohibitively expensive.

**At-Grade Crossings**

Table 5-12 provides a summary of the number of at-grade crossings located in the study corridor. There are 17 existing at-grade crossings in total in the study segment.

**Table 5-12  
At-Grade Crossing Summary**

Segment From	Segment To	Segment Length (feet)	Number of Tracks	Number of At-Grade Crossings
N. Perimeter Road	SR 84	4,100	4	0
SR 84	Davie Boulevard	5,330	5	4
Davie Boulevard	SW 6th Street	2,545	2	3
SW 6th Street	Broward Boulevard	2,725	2	3
Broward Boulevard	NE 6th Street	3,315	2	4
NE 6th Street	Sunrise Boulevard	3,280	2	3
<b>Total</b>		<b>21,295</b>		<b>17</b>

The operation of bus service in the FEC rail corridor would result in the following issues associated with at-grade crossings with east-west roadways:

- All at-grade rail crossings will need to be upgraded to existing standards of FDOT and FRA. Although the major crossings at SR 84, Davie Boulevard, Broward Boulevard, and Sunrise Boulevard likely meet current standards, minor crossings such as 6th Street and 7th Street may need to be updated with a traffic control system agreed upon by the railroad, with significant cost implications.
- A new traffic control system will need to be determined for the combined rail line and bus service crossings with east-west streets (seventeen locations), also with significant cost implications.
- There will be some (although limited) additional impact to east-west streets (especially SR 84, Davie Boulevard, Broward Boulevard, and Sunrise Boulevard) from the added gate closings associated with bus service pre-emption. This will need to be quantified.
- New at-grade crossings between the proposed bus service and existing rail spurs will be required. Based on a review of aerial photography, spurs exist in the segment between North Perimeter Road and SR 84 and between SR 84 and Davie Boulevard. Although conflicts between bus service and rail traffic on spur lines is likely to be minimal, a protective signaling system will need to be agreed upon with the railroad for these crossings. To ensure smooth and efficient busway operations, it is recommended that railroad operations on these spurs be scheduled to avoid conflicts with peak transit service. Agreements with the affected businesses can be pursued to ensure their deliveries occur prior to morning peak hour traffic and after evening peak hours.

None of the issues discussed above presents a fatal flaw to operation of bus service in the railroad corridor, but there are significant cost and permitting implications. Any required relocation of utilities would further add to the costs of implementing this busway.

## **Existing Bridges**

The FEC rail corridor has two bridge crossings in this section – over the New River and the Tarpon River. Depending on the condition of the existing bridge structures at those locations, it will be necessary either to build a new bridge serving both the FEC rail and the bus service, or add to the existing bridges (including the construction of adjacent structures to accommodate the bus service). Because the bridge over the New River is primarily in the open position to allow watercraft to navigate the New River, it will be necessary to consider issues associated with a bridge opening schedule to serve bus traffic. Federal environmental processes will impact the alternatives considered at both locations, and it is likely that bridge costs will be high.

However, a phased approach can be used to avoid impacting the bridges while the study process is being conducted and funding is being generated. For example, bus service from Fort Lauderdale Airport to Davie Boulevard could be initiated along the FEC corridor in the segment south of the bridge crossings (assuming other constraints can be resolved) that would then tie into Andrews Avenue or US 1/Federal Highway and continue downtown. This would allow for a potential savings in travel time and more reliable service. When the existing bridges need major rehabilitation or replacement, consideration can then be given to incorporating bus service into potential designs.

## **Drainage Requirements**

Typically, any available right-of-way in the railroad corridor is reserved for on-site drainage retention necessitated by the flat topography and high intensity rainfall characteristics of south Florida. Paving any of this land to provide a busway would require providing drainage for the double uses of the railroad tracks and the adjacent busway. While relatively expensive, this can be accomplished by installing railroad underdrains which feed into a closed drainage system, with catchpits to drain the bus lanes.

Ballast walls may be required to accommodate the busway, drainage requirements and grade changes between tracks and neighboring terrain within railroad RIGHT-OF-WAY. These are small retaining walls that prevent ballast toe spreading and can accommodate elevation changes up to three feet.

## FUNDING STRATEGIES

As noted in the above implementation plan, none of the proposed routes is self-funding, even with contributions from area hotels or cruise ships. Some public funding must be used to subsidize the operating and capital costs of service. A wide variety of Federal, State and local funding sources are available, but applications for funding are often competitive and must be renewed regularly. This section will provide a brief description of funding sources that could potentially be available for use by the CAC for transit service.

Potential funding sources include:

- Federal sources
  - Section 5303
  - Section 5307
  - Section 5309
  - CMAQ
- State sources
  - Toll credits
  - State Infrastructure Bank
- Local sources
  - Broward County/BCt funding
  - City of Fort Lauderdale/TMA funding
  - Hotel transportation fee
  - Advertising

### Federal Funding Sources

#### Section 5303

Section 5303 funds are used for planning efforts. Typically, funding is distributed to local Metropolitan Planning Organizations (MPOs), who then use it to fund their regional planning initiatives or distribute funds to local agencies. Section 5303 funds are not available to subsidize capital or operating expenses; however, they may be available to help fund future planning efforts.

#### Section 5307

Section 5307 funding is distributed to urbanized areas based on a formula that takes into account their population, population density, and revenue miles of fixed route bus service. Additional funding is available as an “incentive” bonus to reward high ridership. The MPO is the designated recipient of 5307 funding.

Section 5307 funding is roughly split between vehicle maintenance and capital purchases (usually buses). If CAC service is contracted, 5307 funding may not be available to fund maintenance work on buses; however, some funds may be available to assist in vehicle purchases.

#### Section 5309

Section 5309 funds are discretionary funds used to subsidize major capital expenses on an as-needed basis. Local match varies depending on the availability of funds, and can range from 20 percent to 80 percent. A typical local match would be 50 percent on capital facilities and 20 percent on vehicles.

Like 5307 funds, Section 5309 funding is administered by the MPO. However, since funding is made on a project-by-project basis, if the CAC applied for funding, the MPO would be obliged to pass through any funding.

In the case of CAC service, 5309 funding would be most appropriate to fund vehicle purchases.

### Congestion Mitigation and Air Quality (CMAQ)

CMAQ funds are distributed to urbanized areas that are EPA air quality non-attainment areas. CMAQ funds are intended to address both air quality and congestion by funding demonstration projects that have the potential to improve the efficiency of local transportation networks. 43 percent of all CMAQ funding goes to support transit projects. In FY1999, the Miami urbanized area (which includes Fort Lauderdale) received \$23 million in CMAQ funding.

Projects like the CAC service are exactly the type of project that CMAQ was designed to assist. The CAC project has the potential to decrease air congestion through both the use of alternative fuel technology and by reducing the need for people living, working and visiting central Fort Lauderdale to use personal automobiles.

CMAQ funding is distributed to MPOs, which have the discretion to accept applications for projects and to determine both the level and duration of funding. The CAC is strongly encouraged to work with the MPO to secure funding commitments to help initiate service. Note that CMAQ is a demonstration program – after 1-3 years, funding ceases and CMAQ money must be made up for elsewhere.

## **State Funding Sources**

### Toll Credits

Most federal grant programs require local matching funds. In states that use excess toll revenue to pay for infrastructure improvements without federal aid, agencies within the State are allowed to take credit for the value of the improvements to match grants for other projects. Broward County Transit already takes advantage of soft match for capital grants for bus purposes, meaning that their bus purchases are effectively 100 percent funded by the federal government. It is reasonable to assume that soft match might be used for some or all of the matching requirements for capital expenditures for the CAC project.

### State Infrastructure Bank (SIB)

The SIB is a revolving loan and credit enhancement program consisting of two separate accounts. The federally funded SIB account is capitalized by federal money matched with state money as required by law; the state-funded SIB account is capitalized by state money only.

The SIB can provide loans and other assistance to public and private entities carrying out or proposing to carry out projects eligible for assistance under state and federal law. Highway and transit projects are eligible for SIB participation. SIB participation from the federally funded SIB account is limited to projects which meet all federal requirements pursuant to the Transportation Equity Act for the 21<sup>st</sup> Century, Public Law 105-178, Section 1511, 23 USC §181 note, and the applicable federal guidelines. SIB participation from the state-funded SIB account is limited to a transportation facility project that is on the State Highway System or that provides for increased mobility on the State's transportation system in accordance with Section 339.55, Florida Statutes.

The SIB can leverage funds through loans, and credit enhancement assistance to improve project feasibility. The SIB cannot provide assistance in the form of a grant. The amount of any loan or other assistance may be subordinated to other debt financing for a project with an investment grade rating of “BBB” or higher. Loans from the SIB may bear interest at or below market interest rates, as determined by FDOT.

There are some serious impediments to the use of the SIB to help finance the project:

- Current funds in the state SIB are low, and will become even lower over the next several years. Information provided by Florida DOT staff indicates that the state SIB is anticipated to be down to \$9.1 million in FY 2002-2003, dropping to a low of \$0.8 million in FY 2004-2005. Anticipated loan repayments are expected to raise the balance to \$52.7 million by FY 2006-2007. So, in the short term, there is not much money in the SIB, but later in this decade, the state SIB may become a more viable option.
- The federally funded SIB has a little more money in the short term, and may be a viable option. However, the federally funded SIB has more restrictive requirements that may not be acceptable to Broward County Transit.
- The SIB is a competitive program, and there is no guarantee that the project will be accepted by the program.

Florida DOT has not yet announced its deadline for SIB applications for FY 2002-2003, but may do so shortly. DOT staff are still encouraging applications, and also are encouraging agencies to take advantage of the federal SIB if they can.

## **Local Funding Sources**

### Hotel Transportation Fee

As noted above, some of the operating costs for Route C may be subsidized through a hotel transportation fee charged to guests on a per-room night basis during major convention. The amount of funding, if any, generated through this fee will vary depending on what arrangement is negotiated with hotels, the convention center, and convention planners.

In FY2000, the hotel transportation fee generated \$330,000. However, the convention center has reported that in FY2004, only \$231,000 per year will be available through this fee.

At the \$330,000 rate, the hotel fee would generate approximately 38 percent of the net cost of operation for Route C.

### Broward County Transit

The study area for this project falls completely within the service area for Broward County Transit (BCt, see Chapter 3). BCt currently provides partial funding for the Downtown TMA service through its community bus program. Community bus program funds may be available to the CAC service in one of two ways:

- The TMA can operate CAC bus routes (especially Routes A and D)
- The convention center-port area could form a new TMA (especially Routes B and C)

The community bus program provides funding from two sources: BCt pays approximately half the cost of the program, and the other half is provided via a regional gasoline tax.

### Advertising

Advertising on buses can generate local funding that can be used for either operating or capital costs. Advertising revenues will vary depending on market and advertising type. Bus advertising generally takes the form of wraps that cover the exterior of buses; smaller signs placed on the inside or outside of buses; or signs placed at capital facilities (such as on benches or at shelters).

In some cases, advertisers will pay the cost of passenger shelters in exchange for advertising space. Such shelters are used throughout the BCt service area.

### General Fund

Broward County or Fort Lauderdale also has the option of subsidizing service through their general funds.

### **Funding Strategy**

Ultimately, funding for the CAC project will require use of a combination of Federal, State and Local funding sources. The most promising sources include:

Section 5309 Funds – Section 5309 funds can be earmarked for use as capital funding for specific projects. In the case of the CAC project, 5309 funding could be used for vehicle purchases and chargers / maintenance facilities. The Federal match is generally around 80 percent for vehicle purchases. State toll credits could be used for the local share, which would preserve local funds to pay for operating costs.

Competition can be fierce for 5309 money at the Federal level. CAC would do well to coordinate its requests with those of other Southeast Florida agencies and to work with the region's congressional delegation. Alternative fuel projects and projects with a high potential for private sector funding like the CAC system should be competitive for securing 5309 funding.

CMAQ Funds – CMAQ funds should be used to fund operating deficits in the opening years of the CAC service. CMAQ funds are intended for demonstration projects like the Route C service and can be used for operating expenses. Note that CMAQ funds only last 1-3 years, so CAC must use that time to secure other funding sources. CAC could re-apply for CMAQ funds to be used to expand service, such as adding new routes.

Toll Credits – as noted above, use of Federal 5309 funds for vehicle purchases will likely require a local match of at least 20 percent, and possibly as much as 50 percent. State toll credits could be used for local match, which would mean the local capital costs would be essentially zero.

Local Funds – all possible local funding sources will need to be utilized in order to cover the cost of operating the CAC service. At a minimum, hotels and the convention center must be convinced to subsidize the Route C service, which, after all, primarily benefits their guests and employees. Advertising aimed at tourists and visitors could also raise operating money or be used to subsidize the costs of building passenger infrastructure.

Ultimately, a local agency will need to take over funding of any remaining local share of operating costs. Whether that agency is the TMA or BCt will depend on the availability of funding from that agency.