TECHNICAL MEMORANDUM ONE

Technical Memorandum One is the first of three Technical Memoranda prepared for the Transit Development Plan for the Broward County Clean Air Cooperative. The Technical Memorandum includes the results of the first three tasks of the scope of work for this project. Each of the four chapters comprising the Technical Memorandum will eventually become sections of the project's Final Report.

This Technical Memorandum is organized into the following chapters:

- Chapter One: Introduction
- Chapter Two: Transit Demand
- Chapter Three: Transit Supply
- Chapter Four: Transportation Infrastructure

Chapters One and Four correspond to Tasks One and Four in the scope of work for his project. Chapters Two and Three correspond to Task Two.

CHAPTER ONE
INTRODUCTION

Chapter One documents the underlying assumptions and reasons for conducting this study. The contents of this chapter were negotiated through the scoping process and the project kick-off meeting in September 2001. Chapter One is divided into the following sections:

- Study Purpose
- Study Area
- Study Goals and Objectives

STUDY PURPOSE

The current study represents 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) will develop a circulator system using electric or electric-hybrid vehicles that will serve eastern Broward County and the Fort Lauderdale-Hollywood International Airport.

STUDY AREA

The study area consists of the eastern area of Broward County, Florida. The study area is generally bounded by Sunrise Boulevard on the north, the TriRail Corridor 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 cross the Intracoastal Waterway from downtown Fort Lauderdale. 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 is Interstate 95.

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 (TMAX) provides circulation service in the downtown area. 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.

Figure 1.1
Study Area

Figure 1.2
Downtown Fort Lauderdale

GOALS AND OBJECTIVES

As part of the kick-off meeting, 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

CHAPTER TWO
TRANSIT DEMAND

INTRODUCTION

Chapter Two 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. Workers, students, shoppers, and tourists all have the potential to generate demand within the study area. Target markets consist of individuals and groups that generate transit demand. The transit trips they are able to and desire to take are largely dictated by the location of major transit attractors and generators.

Target markets in this section are defined in terms of major transit attractors. The major transit attractor categories evaluated in this chapter are:

- Employers
    - Downtown Fort Lauderdale
    - Elsewhere in the study area
- Fort Lauderdale-Hollywood International Airport
- Port Everglades / Cruise Ship Terminal
- Broward County Convention Center
- Educational facilities
- Shopping / retail facilities
- Recreation / tourist facilities

This subsection also provides information on existing transit target markets and on markets that could be developed by new services.

EMPLOYERS / WORK TRIPS

The study area represents the single largest concentration of major employers located within Broward County. More than one in ten Broward County jobs are located within the core study area defined by Sunrise Boulevard, I-95, SR84, and Highway A1A. An even larger number of employers are located within the study area if the US Highway 1 corridor between downtown and Young Circle is included.

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

- The core downtown Fort Lauderdale area, bounded roughly by Davie Blvd., US Highway 1, 9th Avenue, and 2nd 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
- Broward 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 1.2** presents the total employment in each of the employment centers identified above. **Figure 1.3** shows the location of the TAZs that make up each of these employment centers.

Table 1.2
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
Total, Employment Centers	**39,100**	**6.2**	**5.41**	**7,227**
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

Figure 1.3
TAZs by employment area

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.

Figure 1.4 shows the density of employment within the study area. Each dot on the map represents ten jobs.

The Downtown Fort Lauderdale Traffic Management Association (TMA) provided a list of major employers located in the downtown Fort Lauderdale area. **Table 1.3** shows the name and location of employers with more than 100 employees according to the TMA.

Table 1.3
Major Employers in Downtown Fort Lauderdale

Company	Address	Employees
Randstad Creative Talent	350 E. Las Olas Blvd.	300
Wachovia Bank	350 E. Las Olas Blvd.	100
KPMG, LLP	450 E. Las Olas Blvd.	150
Templeton Investment	500 E. Broward Blvd.	500
Holland & Knight, LLP	1 E. Broward Blvd.	120
Shared Technologies Fairchild	200 E. Broward Blvd.	350
Rubin McClosky	200 E. Broward Blvd.	215
Certified Vacations	110 E. Broward Blvd.	650
Intelletravel	110 E. Broward Blvd.	800
Downtown Development Authority	101 NE Third Ave.	100
Downtown Development Authority	220 SE Second Ave.	200
Deputy Administration	201 W. Broward Blvd.	250
Total		**3,735**

Source: Downtown TMA

Note that by far the majority of employers identified in the downtown area by the TMA did not include their total employment. Therefore, the employers listed in Table 1.3do not represent a total list of major employers (between them, they account for approximately 16 percent of employment within the downtown area).

Figure 1.5 shows the location of all downtown employers identified by the Downtown TMA.

Figure 1.4
Downtown employment density

Figure 1.5
Downtown Employers

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.

FORT LAUDERDALE-HOLLYWOOD INTERNATIONAL AIRPORT

Fort Lauderdale-Hollywood International Airport (FLL) 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.

FLL is the largest single employment site in Broward County. According to FLL, approximately 9,000 employees work for the airport or for a company operating at the airport. Approximately 6,750 of 9,000 employees report for work in a given 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.

Two types of trips are made to FLL:

- Airline passengers or people meeting or dropping off passengers
- Employees working at the airport

Each type of trip is discussed below.

Travelers

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, and 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.

Employees

FLL is the largest single employment site in Broward County. Approximately 9,000 people are employed by the airport or another company with operations at the airport. Potential employers include:

- The Broward County Department of Aviation
- Airlines
- Rental car companies
- Restaurant or store operators at the airport
- Freight companies
- Mechanics

Airport employment sites are scattered around the airport, with many jobs located distant from the main terminal complex. For example, workers at rental car companies may work at their company's locations in the terminals, or they may work at their company's remote parking sites. Most employers with work sites that are not at the main terminal have their own parking.

No data was available showing how many employees use transit to reach the airport. In order to do so, most employees would have to take either BCt or the TriRail Shuttle to the

passenger terminals and then use some other means to reach remote employment sites. In 2000, 666 passengers boarded either BCt Route 1 at the airport or the TriRail Shuttle at the Fort Lauderdale Airport Station. If all 666 passengers were airport employees, this would represent approximately ten percent of the average daily workforce. However, given that many employees work non-standard hours, it is unlikely that all employees would be able to use transit service.

Potential target markets at the airport include:

- Passengers traveling between the airport and downtown Fort Lauderdale
- Passengers traveling between the airport and other transportation hubs, such as TriRail Stations or the BCt Terminal
- Employees traveling to the airport
- Cruise ship patrons
- Convention center patrons
- Passengers traveling between the airport and hotels located in central Broward County

Passengers and employees also need intra-airport circulation. No estimates of total passenger loads for intra-airport travel were available. Potential users of intra-airport circulation include:

- Airport employees traveling between remote work sites or parking and the main passenger terminals
- Patrons traveling between the main passenger terminals and remote car rental sites
- Patrons traveling between the main passenger terminals and remote parking

More information about intra-airport transportation will be included in the service development portion of the Second Technical Memorandum.

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

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 18th 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 18th 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 17th 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

EDUCATIONAL ATTRACTORS

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 1.6** shows the location of educational facilities within the study area.

Figure 1.6
Educational Facilities

Colleges and Universities

Three colleges and universities are located within the study area:

- Art Institute of Fort Lauderdale
- Broward Community College
- Florida Atlantic University

The campuses of the Broward Community College and Florida Atlantic University are located in a combined, high-rise downtown campus at the intersection of Las Olas and 2nd Avenue. The Florida Atlantic 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 17th 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.
- 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

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

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 17th Avenue; Highway A1A; and around the downtown area.

The following grocery stores are located within the study area:

- Publix (SE 17th Street / SE 13th Avenue)
- Publix (Sheridan / US Hwy 1)
- Publix (Young Circle)
- Winn-Dixie Supermarket (Cordova / SE 17th Street)
- Winn-Dixie Supermarket (SW 9th Ave. / SR84)
- Winn-Dixie Supermarket (NW 9th 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 chose 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).

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. **Figure 1.7** shows the location of these facilities and of BCt routes serving central Fort Lauderdale. More detailed information about transit services is provided later in this Technical Memorandum.

Figure 1.7
Transit Service

Central Terminal

BCt is the primary transit provider within Broward County. 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 2nd Street, Northwest 2nd Avenue, and Northwest 1st 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 **1.7**. Each of the stations has TriRail shuttle service and is served by BCt bus routes. **Table 1.4** shows the routes that serve each station.

Table 1.4
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 1.5**.

Table 1.5
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 were 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.

Target Markets

BCt and TriRail already perform the task of bringing transit patrons from outlying areas of Broward and the surrounding counties into central Fort Lauderdale. The role of a circulator system is to enhance the attractiveness of BCt and TriRail's services by connecting the terminals of their transit systems with major attractors and generators.

Examples of markets that could use the circulator system via transfer from BCt or TriRail include:

- Workers in downtown Fort Lauderdale or surrounding areas
- Students in the study area
- Travelers accessing the airport, cruise ship terminal, or Amtrak station

In addition, a circulator system could enhance the attractiveness of other transit modes by allowing easy circulation within the study area for those patrons who chose to take transit and leave their cars at home.

RECREATIONAL ATTRACTORS

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

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

Recreational attractors are shown in **Figure 1.8**. 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.

Figure 1.8
Recreational attractors

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 1.6** shows the location of those hotels and motels.

Table 1.6
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

Beaches

Fort Lauderdale beaches are located along the east side of Ocean Boulevard from Sunrise Boulevard to south of South Beach Park and Southeast 17th 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 17th 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.

CHAPTER 3
TRANSIT SUPPLY

INTRODUCTION

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 two sections:

- *Transit Providers*, which inventories transit operators active in the study area and provides operating statistics, as available; and

- *Passenger Amenities*, which inventories bus stops, transfer centers, rail stations, and other passenger amenities available to transit patrons.

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 (TMAX)
- 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 1.7**.

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 1.7 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 1.7
1999 Operating Statistics, Broward County Transit

Service Type	Fixed Route Transit
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 1.8** shows BCt routes in the study area, including the major transit attractors they serve and their average daily ridership.

Table 1.8
BCt Routes in Downtown Fort Lauderdale

Route	Major Attractors	Daily Ridership (2000)
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
Total		**62,808**

Source: BCt

TriRail

The TriRail 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 1.9** shows boarding and alighting data at the two TriRail Stations located within the study area.

Table 1.9
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	96	92	81	269	146	99
Alightings	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 (see **Table 1.4**).

Table 1.10 shows the boarding and alighting activity on the TriRail Shuttles.

Table 1.10
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 1.11 shows the total annual and average daily boardings for each of the TMAX routes.

Table 1.11
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 number 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 started a water taxi service using the New River and Intracoastal Waterway in October 2001. The service uses ten ferries connecting Oakland Park Boulevard (north of the study area) with the Broward County Performing Arts Center and 17th 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 is not yet available for this service.

PASSENGER AMENITIES

Passenger amenities in the study area take the form of one of the following:

- Transit centers
- TriRail Stations
- Bus stops

Broward Central Station is the only transit center in the study area. Central Station provides a high level of passenger amenity, including sheltered waiting areas, benches, information and maps, and off-street access to buses. TriRail Stations provide similar levels of amenities. Bus stops, however, 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 operates approximately 390 bus stops within the core portion of the study area (the area bonded 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 1.12 presents the number of stops of each type among the stops within the study area.

Table 1.12
BCt Bus Stop Amenities

Amenity	Core Area	South US 1 Corridor	Total, all stops
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
Total	390	60	450

Source: BCt

Figure 1.9 shows the location and level of amenities of BCt stops within the core study area.

Figure 1.9
Passenger amenities

CHAPTER FOUR
TRANSPORTATION INFRASTRUCTURE

INTRODUCTION

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 chapter. 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.

ASSESS EXISTING TRANSIT QUALITY OF SERVICE

Introduction

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

Existing transit services provided in the study area include:

- Sixteen Broward County Transit (BCt) Routes, shown on **Figure 1.7** and **Table 1.8** 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 1.7**. Bus stops in the downtown Fort Lauderdale area are shown in **Figure 1.9**.

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 7th 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 1.13**. Within the study area, sidewalks information was obtained using the "Missing Sidewalk" information.

Table 1.13
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 1.14** was used.

Table 1.14
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 1.15**. Adjustment factors were applied based on these values.

Table 1.15
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

6. 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 1.16**.

The detail analysis can be found in **Table 1.17** and the final results are illustrated in **Figure 1.10**. 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 1.17: Existing Transit Levels of Service

Figure 1.10
Transit LOS

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 2nd Street and NW 4th 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 1.18**.

Levels of Service for the corridor segments are shown in **Figure 1.11**. Among the 59 segments, ten currently operate at LOS F, one at LOS E and 18 at LOS D.

Table 1.18
(old table 5)

Figure 1.11
Roadway LOS

SUMMARY OF 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 1.19**.

Table 1.19
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 3rd Ave, SW 2nd 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.

FINDINGS

The analysis of transit attractors within the study area (Chapter 2) revealed that there are several significant nodes of potential transit use, including:

- Downtown Fort Lauderdale
- Fort Lauderdale Beach
- Convention Center / Cruise Ship Terminal
- Fort Lauderdale Airport

In addition, there are several existing transportation nodes within the study area, including:

- I-95 HOV Lane / Park & Ride Lot
- Central Station and Young Circle
- TriRail Stations

Transit service and automobile access to the transportation nodes identified within this chapter from elsewhere in the Fort Lauderdale area is generally good. Transportation within the study area, however, is problematic. Effective transportation is hindered by traffic congestion; by a lack of transit service or by service fragmented among different providers; and by a lack of parking at some facilities.

Although there is significant transit use within the study area, the portion of all trips carried by transit is small.

Technical Memorandum Two will address transportation within the study area by proposing a network of circulator systems. These systems will connect the major attractors identified in Chapter Two of this Technical Memorandum. They will supplement (or in some cases replace) the transit services identified in Chapter Three of this Technical Memorandum. Finally, they will be constrained by, or rectify the transit and transportation infrastructure deficiencies identified in Chapter Four of this Technical Memorandum.