

APPENDIX D

SECTION 15 ANALYSIS

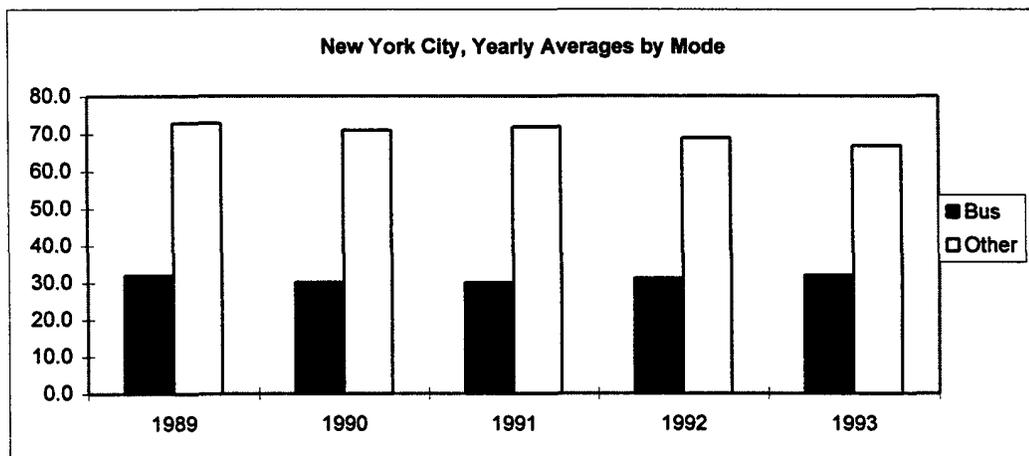
AVERAGE PASSENGERS PER REVENUE VEHICLE HOUR OF OPERATORS IN NEW YORK CITY

5 Year Average Annual PRVH

Agency	Motor Bus	Trolley Bus	Heavy Rail/ Rapid Rail	Light Rail Street Car	Commuter Rail	Other
Port Authority-PATH			96.3			
NY-MTA-NYCTA	59.4		91.5			
New Jersey Transit	30.4			79.06	43.2	
NY-MTA-Metro North RR					58.9	
NY-MTA-Long Island RR					53.3	
NY-Westchester-Liberty(91-93)	47.2					
NYCDOT-Green Bus (91-93)	46.3					
NY-MTA-Long Island Bus	43.7					
NYCDOT-Triboro(91-93)	42.1					
NYCDOT-Queens (90,92-93)	41.1					
NJ Transit (Contract) (91-92)	35.3					
NJ-NJTC/Academy (91-93)	18.0					
NYCDOT-Bus Tours (91-93)	14.9					
NYCDOT-Command Bus(91-93)	14.7					
NJ-NJTC/Suburban (91-93)	14.1					
NJ-NJTC/Hudson Transit (91-93)	8.9					

Average Annual PRVH by Mode

Year	Bus	Other
1989	32.1	73.1
1990	30.1	71.1
1991	30.1	72.1
1992	31.2	69.0
1993	31.9	66.8



AVERAGE PASSENGERS PER REVENUE VEHICLE HOUR OF OPERATORS IN CHICAGO

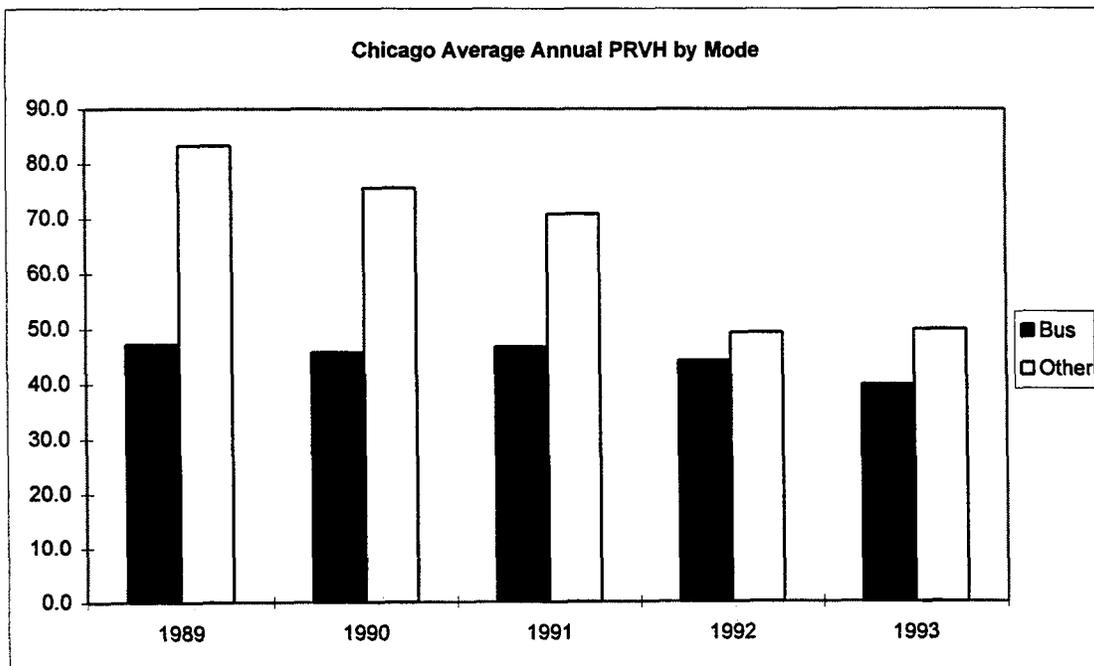
5 Year Average Annual PRVH

Agency (reporting in 1992 and 1993)	Motor Bus	Trolley Bus	Heavy Rail Rapid Rail	Light Rail/ Street Car	Commuter Rail	Other
Chicago-Metra/BN RR					98.9	
Chicago-RTA-Metra					70.5	
Chicago-RTA-CTA	54.5	65.6				
Chicago-Metra/C&NW RR (91-93)					62.2	
Chicago-RTA-Pace*	37.7					8.3

* Other: VP, 1992 -1993 only

Average Annual PRVH by Mode

Year	Bus	count	Other	count
1989	47.3	3	83.4	4
1990	45.7	3	75.6	4
1991	46.8	2	70.9	4
1992	44.2	2	49.3	6
1993	39.8	3	50.0	6



AVERAGE PASSENGER PER REVENUE VEHICLE HOUR OF OPERATORS IN HIGH DENSITY CITIES WITH POPULATION GREATER THAN 1 MILLION (WITH RAIL)

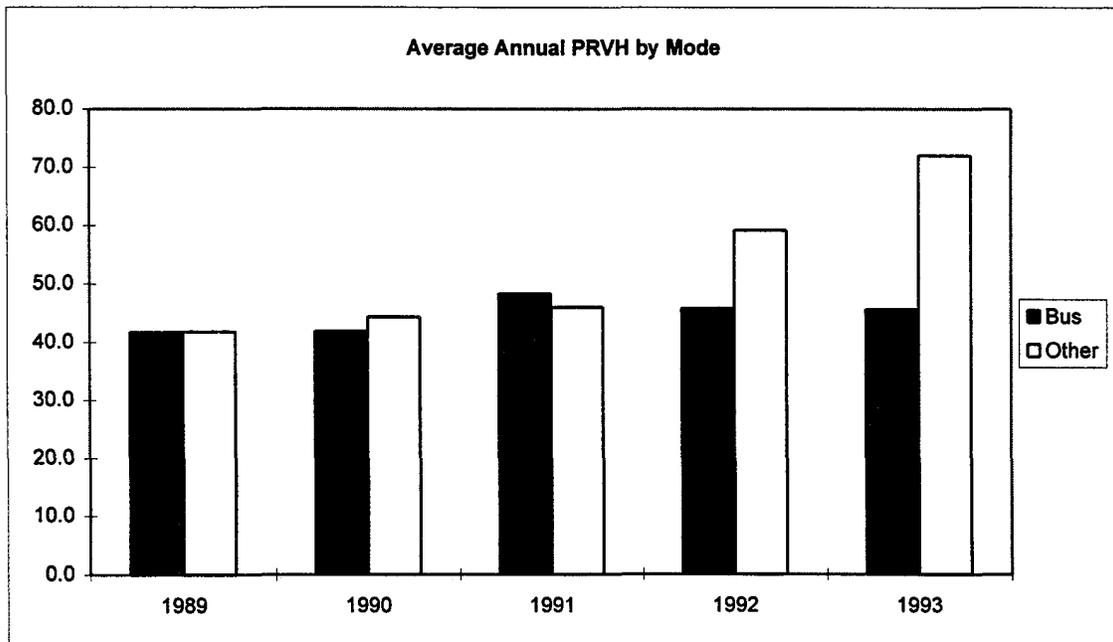
5 Year Average Annual PRVH

Agency (reporting in 1992 and 1993)	Motor Bus	Trolley Bus	Heavy Rail/ Rapid Rail	Light Rail/ Street Car	Commuter Rail	Other
LA-LACMTA/SCRTD* (91-93)			113.5	67.2		
Miami-MDTA	35.1		75.9			87.4
LA-Santa Monica	66.1					
LA-LACMTA/SCRTD	58.1					
LA-Long Beach Transit	40.8					
LA-OCTA	34.4					6.8

* LR: 91-93 only, HR: 93 only

Average Annual PRVH by Mode

Year	Bus	count	Other	count
1989	41.8	6	41.8	4
1990	41.9	6	44.3	4
1991	48.3	5	45.9	5
1992	45.7	5	59.1	4
1993	45.5	5	72.0	5



AVERAGE PASSENGERS PER REVENUE VEHICLE HOUR OF OPERATORS IN MEDIUM DENSITY CITIES WITH POPULATION GREATER THAN 1 MILLION (WITH RAIL)

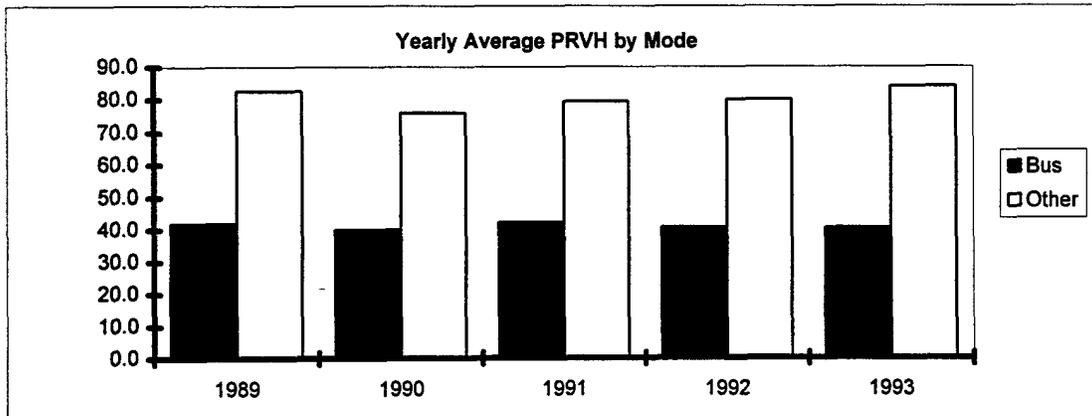
5 Year Average Annual PRVH

Agency (reporting in 1992 and 1993)	Motor Bus	Trolley Bus	Heavy Rail/ Rapid Rail	Light Rail/ Street Car	Commuter Rail	Other
Boston-MBTA	47.0	56.4	155.5	241.6	40.4	
Washington-WMATA	50.7		127.8			
SF-Golden Gate 1	22.1					135.2
San Francisco-Muni2	71.7	86.7		103.8		78.6
Philadelphia-SEPTA	51.7	77.4	101.5	92.3	54.4	
Baltimore-Maryland-MTA3	51.7		87.9	33.9		1.8
Portland-Tri-Met	37.9			82.4		
New Orleans-RTA4	57.4			81.9		1.6
Sacramento-RT	31.3			80.9		
San Francisco BART			59.4			
San Jose-SCCTD	31.1			50.9		
Maryland-Ride-On	41.4					4.0
San Diego Transit	37.0					
Oakland-AC-Transit	36.1					
SF-SamTrans	31.2					
San Diego-NCTD	23.7					

- 1-Other=FerryBoat
- 2-Other=CableCar
- 3-LR: 92-93 only
- 4-Other=DR, 1992 only

Average Annual PRVH by Mode

Year	Bus	Other
1989	42.0	82.7
1990	40.0	75.9
1991	42.2	79.4
1992	40.6	79.9
1993	40.4	84.0



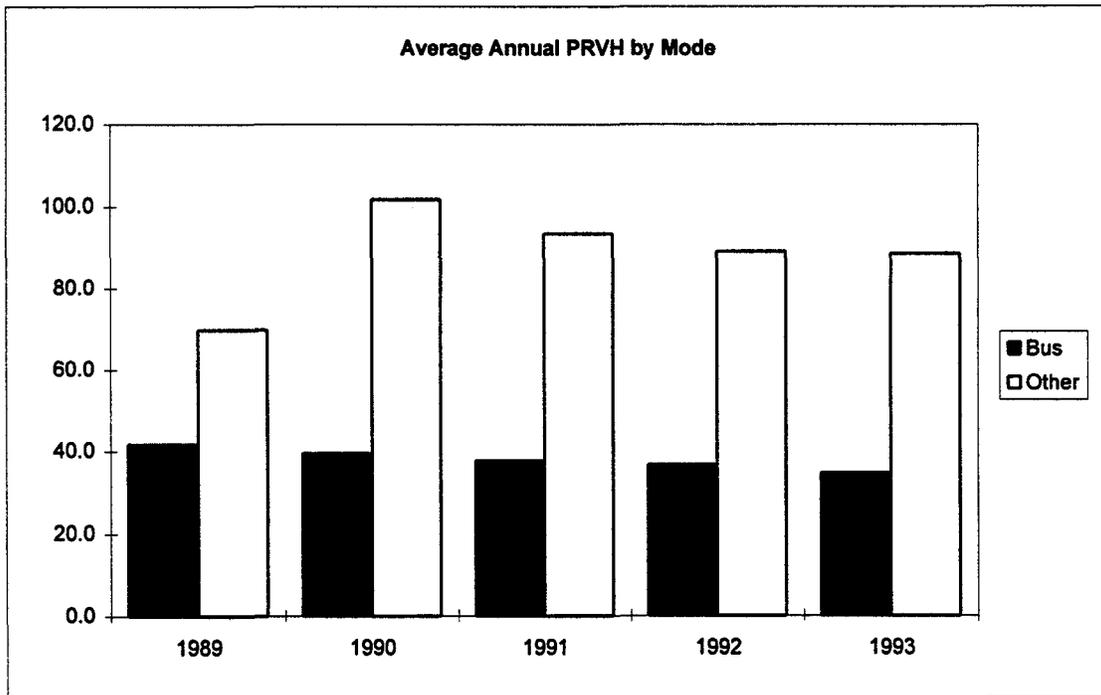
AVERAGE PASSENGERS PER REVENUE VEHICLE HOUR OF OPERATORS IN LOW DENSITY CITIES WITH POPULATION GREATER THAN 1 MILLION (WITH RAIL)

5 Year Average Annual PRVH

Agency	Motor Bus	Trolley Bus	Heavy Rail/ Rapid Rail	Light Rail/ Street Car	Commuter Rail	Other
(reporting in 1992 and 1993)						
Pittsburgh-PAT	36.56			66.44		161.44
Atlanta-MARTA	39.4		104.24			
Cleveland-RTA	38.16		89.58	105.16		3.58

Average Annual PRVH by Mode

Year	Bus	count	Other	count
1989	41.7	3	69.7	6
1990	39.4	3	101.7	6
1991	37.7	3	93.3	6
1992	36.6	3	88.9	6
1993	34.7	3	88.4	6



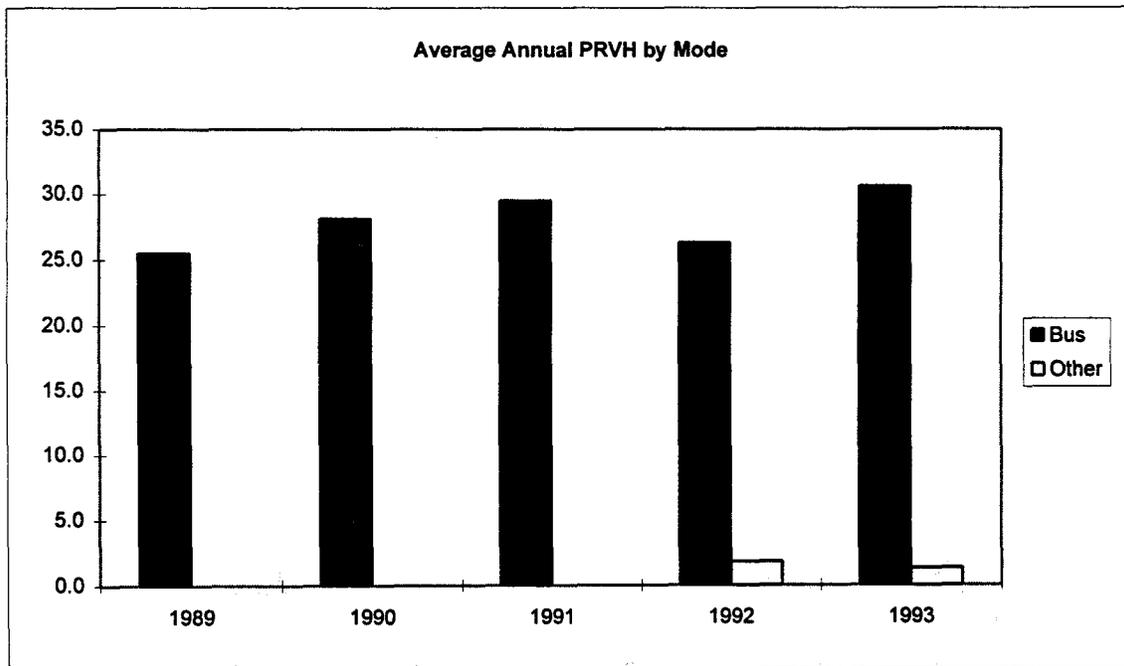
**AVERAGE PASSENGERS PER REVENUE VEHICLE HOUR
OF OPERATORS IN HIGH DENSITY CITIES
WITH POPULATION GREATER THAN 1 MILLION (WITHOUT RAIL)**

5 Year Average Annual PRVH

Agency	Motor Bus	Trolley Bus	Heavy Rail/ Rapid Rail	Light Rail/ Street Car	Commuter Rail	Other
(Reporting in 1992 AND 1993)						
San Juan-MBA	28.0					1.55

Average Annual PRVH by Mode

Year	Bus	count	Other	count
1989	25.5	1		1
1990	28.1	1		1
1991	29.5	1		1
1992	26.3	1	1.8	1
1993	30.6	1	1.3	1



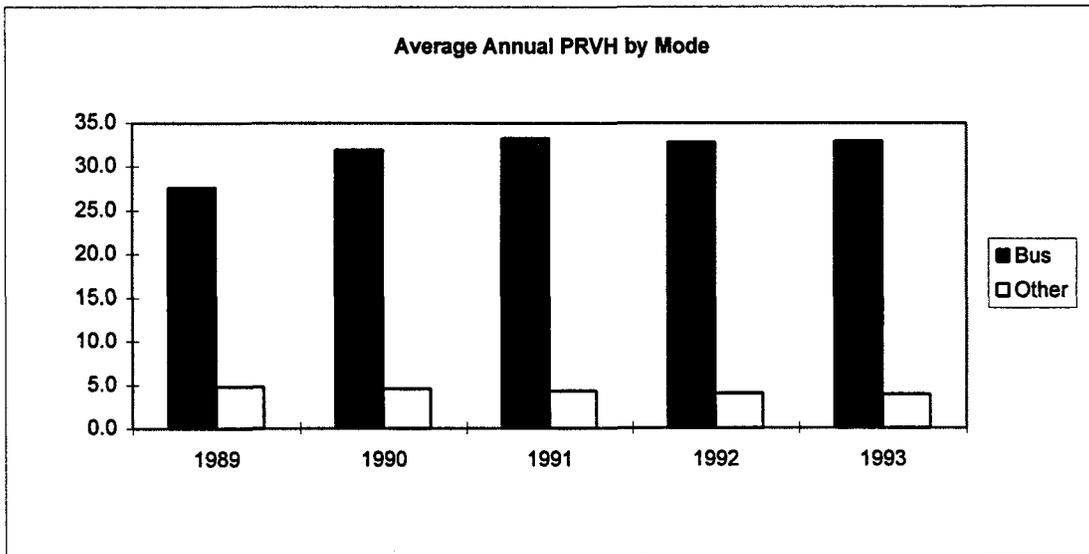
**AVERAGE PASSENGERS PER REVENUE VEHICLE HOUR
OF OPERATORS IN MEDIUM DENSITY CITIES
WITH POPULATION GREATER THAN 1 MILLION (WITHOUT RAIL)**

5 Year Average Annual PRVH

Agency	Motor Bus	Trolley Bus	Heavy Rail/ Rapid Rail	Light Rail/ Street Car	Commuter Rail	Other
(reporting in 1992 and 1993)						
Ft. Lauderdale-Bct	28.2					
Detroit-SMART	22.0					4.3
Detroit-D-DOT	44.8					

Average Annual PRVH by Mode

Year	Bus	count	Other	count
1989	27.6	3	4.8	3
1990	31.9	3	4.6	3
1991	33.2	3	4.3	3
1992	32.8	3	4.0	3
1993	32.9	3	3.9	3



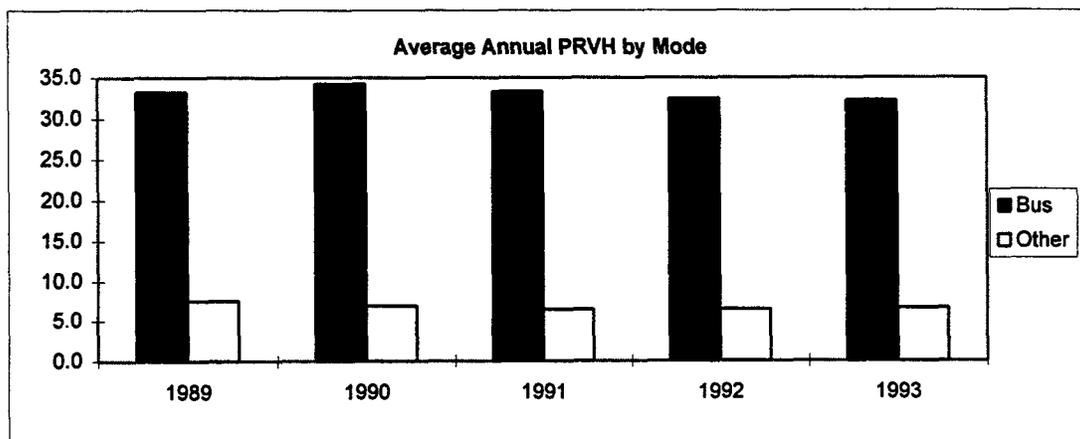
**AVERAGE PASSENGERS PER REVENUE VEHICLE HOUR
OF OPERATORS IN LOW DENSITY CITIES WITH POPULATION GREATER
THAN 1 MILLION (WITHOUT RAIL)**

5 Year Average Annual PRVH

Agency (reporting in 1992 and 1993)	Motor Bus	Trolley Bus	Heavy Rail/ Rapid Rail	Light Rail/ Street Car	Commuter Rail	Other
Seattle-Metro	38.8	64.0		20.0		11.8
Minneapolis-St. Paul-MTC	43.1					
Phoenix-Phoenix TS/ATC (91-93)	43.0					
Denver-RTD (Other: DR, 90-93)	41.9					16.2
Milwaukee-County	41.9					
Houston-Metro	38.3					
Cincinnati-SORTA	37.3					
Dallas-DART	37.2					
St. Louis-Bi-State	34.8					3.0
San Antonio-VIA	33.8					2.0
Kansas City-KCATA (Other: DR, 93)	30.6					5.0
Newport News-Pentran	25.4					3.7
St. Petersburg-PSTA	23.4					2.4
San Bernardino-OMNITRANS	22.1					
Tampa-Hartline	22.0					
Norfolk-TRT (Other: VP only, no DR)	19.5					11.0
Dallas-DART/ATE (91-93)	18.5					
Fort Worth-The T	15.7					2.3

Average Annual PRVH by Mode

Year	Bus	count	Other
1989	33.2	19	7.5
1990	34.2	19	6.9
1991	33.3	19	6.4
1992	32.5	19	6.4
1993	32.3	18	6.6



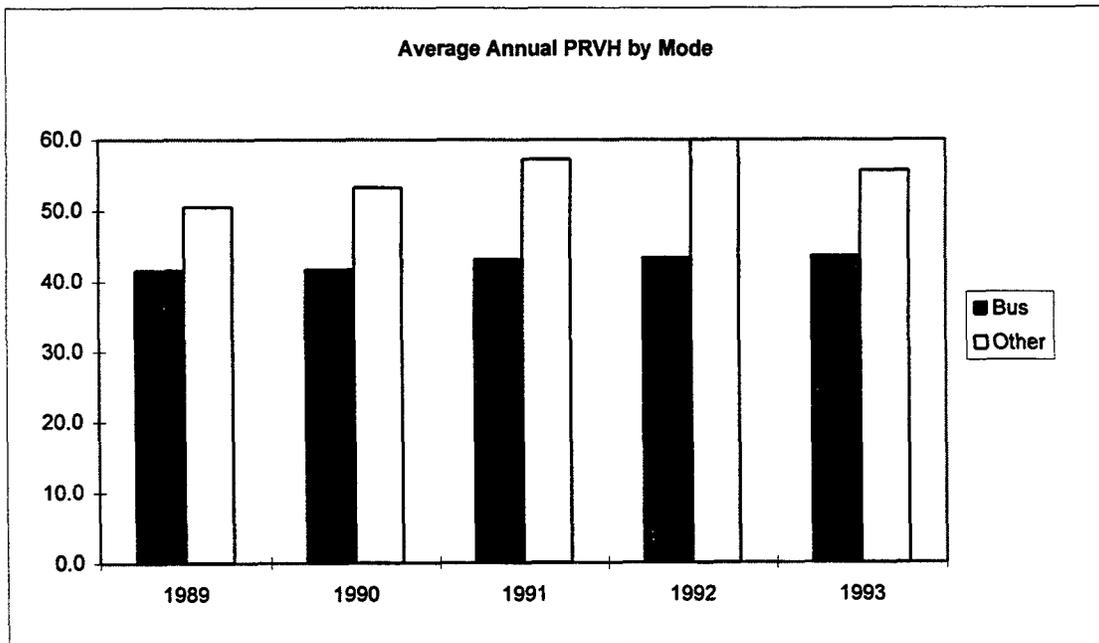
AVERAGE PASSENGERS PER REVENUE VEHICLE HOUR OF OPERATORS IN MEDIUM DENSITY CITIES WITH POPULATION 500,000 - 1 MILLION

5 Year Average Annual PRVH

Agency (reporting in 1992 and 1993)	Motor Bus	Trolley Bus	Heavy Rail Rapid Rail	Light Rail/ Street Car	Commuter Rail	Other
Buffalo-NFTA	29.16			107.8		
Honolulu-DTS	67.48					
Salt Lake City-UTA	31.56					2.92

Average Annual PRVH by Mode

Year	Bus count	Other count
1989	41.7	50.6
1990	41.8	53.3
1991	43.2	57.3
1992	43.4	60.0
1993	43.6	55.7



AVERAGE PASSENGERS PER REVENUE VEHICLE HOUR OF OPERATORS IN LOW DENSITY CITIES WITH POPULATION 500,000 - 1 MILLION

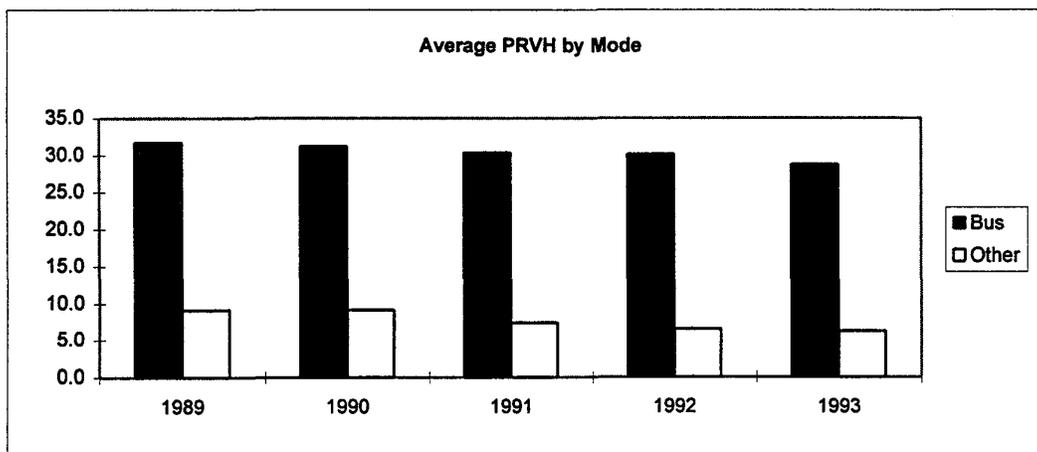
5 Year Average Annual PRVH

Agency (reporting in 1992 and 1993)	Motor Bus	Trolley Bus	Heavy Rail Rapid Rail	Light Rail/ Street Car	Commuter Rail	Other
Jacksonville-JTA	21.2					68.9
Richmond-GRTC	51.4					
Hartford-CT Transit	41.4					
Louisville-TARC	39.3					5.5
El Paso-Sun Metro	38.6					
Austin-Capital Metro	37.5					2.7
Tucson-Sun Tran	36.8					2.0
Providence-RIPTA	34.4					
Rochester-RTS	33.0					3.4
Indianapolis-Metro	32.2					
Memphis-MATA	32.0					4.1
Dayton-RTA	23.6	29.7			3.9	
Columbus-COTA	29.3					
Nashville-MTA	28.3					7.4
Albany-CDTA	25.8					2.1
Birmingham-Max	24.5					
Orlando-LYNX	24.4					
Tacoma-Pierce Transit*	23.9					3.5
Akron-Metro	22.7					5.3
Omaha-TA	20.0					2.1
Oklahoma City-COTPA	19.5					1.3
Nashville-MTA (92-93)						19.4
Birmingham-Max (91-93)						9.7
El Paso-Sun Metro (89,90,93)						2.6
Indianapolis-Metro(89-92)						1.8

* Also VP, 13.8

Average Annual PRVH by Mode

Year	Bus	count	Other	count
1989	31.7	22	9.2	16
1990	31.2	22	9.1	17
1991	30.4	22	7.3	17
1992	30.1	22	6.5	18
1993	28.7	22	6.2	19



AVERAGE PASSENGERS PER REVENUE VEHICLE HOUR OF OPERATORS IN LOW DENSITY CITIES WITH POPULATION 200,000 - 500,000

5 Year Average Annual PRVH

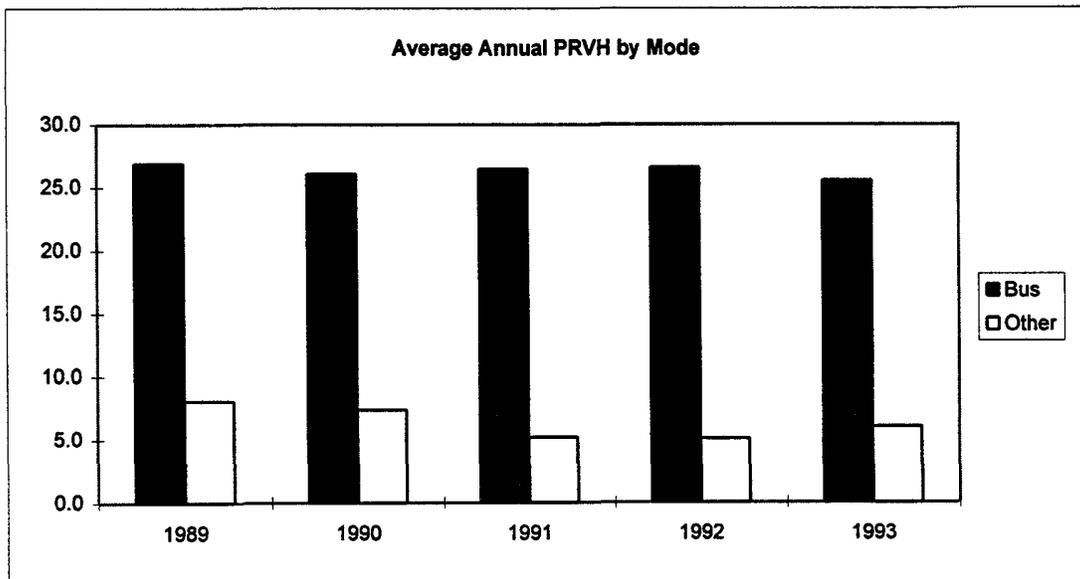
Agency (reporting in 1992 and 1993)	Motor Bus	Trolley Bus	Heavy Rail Rapid Rail	Light Rail/ Street Car	Commuter Rail	Other
Syracuse-RTA-Centro	37.9					3.2
Charlotte-CTS**	35.2					14.5
Madison-MMT	30.9					2.8
Worcester-WRTA	28.1					3.7
Spokane-STA*	20.8					11.4
Toledo-TARTA	19.1					
Metropolitan Tulsa TA (89,90,93)	18.0					15.6
Albuquerque-Sun Tran (Other: DR,	17.8					1.5

*DR = 3.4

** DR = 2.58

Average Annual PRVH by Mode

Year	Bus	count	Other	count
1989	26.9	9	8.0	8
1990	26.0	9	7.4	8
1991	26.4	7	5.2	8
1992	26.6	7	5.1	8
1993	25.5	9	6.0	9



APPENDIX E CASE STUDIES

Agency: **AUSTIN-CAPITAL METROPOLITAN
TRANSPORTATION AUTHORITY**
(Capital Metro)
2910 East Fifth Street
Austin, TX 78702
(512) 389-7400

Contact: **Tim Newby**
Assistant General Manager

NEW SERVICE CONCEPTS

- Free Fare Program
- FLYERS (Limited stop routes)
- Multi-use Transfer
- Partnership with University of Texas
- Reduced Price Weekend Fare

TARGET MARKETS/ USER GROUPS

Non-Riders, Potential
Transit Users
Suburb to CBD
Riders who typically use
"Chaining of Trips"
University Students and
Faculty
Families

REASONS FOR HIGH PRODUCTIVITY

- Change in Transfer Policy
- Expansion of Service to University population
- Successful promotion of family weekend transit use
- Growth of Ride Finders Program

SYSTEM PROFILE

The Capital Metropolitan Transportation Authority (Capital Metro) initiated service in 1985 with an extensive system of routes. Ridership response was slow. Routes were developed using a radial system into the CBD. Travel to the CBD is still the most successful service that Capital Metro provides. In recent years, Capital Metro has experienced a 3 percent growth in ridership and productivity, with most success attributed to the provision of services to university students, special events riders, and riders with trips to downtown as their destination. Growth in ridership comes

from the increase in trips to the CBD and reverse commutes from the CBD to the suburbs.

RIDER PROFILE (US Census Data 1990)

- 3.41 percent Total Transit Use
- 43.23 percent Female
- 22 percent Immigrants
- 27 percent Black
- 24 percent Hispanic
- 74 percent Single

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- All Potential User Groups
During the last 3 months of 1989, the Board of Directors of Capital Metro initiated a free fare program as a demonstration project. The program was not designed to target specific riders or markets, but to increase utilization of the vehicles already in service. Capital Metro was created in 1985 with lots of service, but ridership response was slow, and buses were empty. This program was an attempt to overcome public criticism and to "fill the buses." Because of the initial success of the project, it was extended through 1990. Ridership increased from 70,000 daily boardings to a high of 130,000, a much greater increase than anticipated.

Capital Metro estimates that changing the fare policy resulted in retention of about 6 percent of this additional market. Instead of returning to the original fare policy at the end of the program, the price of discount passes was cut in half, and cash fares returned to \$0.50. It is assumed that the increase in new ridership was minimal and that the greatest increase came from existing riders who used the system more frequently during the demonstration period. The cost estimate for the project is \$1 million.

- Single Parents
A year and a half ago, Capital Metro changed its transfer policy to allow riders to use a transfer to reboard and continue travel on the same route. This change was in response to an increase in "chaining of trips," where riders left the bus to drop off children at day care, go gro-

cery shopping, or pick up dry-cleaning before reaching their destination. Capital Metro felt that permitting reboarding would improve service for these riders. Time for reboarding was increased to 3 hours on weekdays and 4 hours on weekends. Transfers are free if requested at the time the fare is paid. There has been no attempt to quantify the effect of the new transfer policy, but 2 years ago there was no growth in ridership despite a 3 to 4 percent increase in population. Following the change in transfer policy, there has been a 3 percent growth in ridership.

- Commuters

1. Service expansion is focused on the development of new routes, called FLYERS, which provide limited stop service between the suburbs, the CBD, state offices, and the university.
2. Capital Metro is beginning to implement a development strategy that will focus on major corridors. Specific corridors will be identified on a policy basis (not justified by current ridership) in preparation for the introduction of light rail. By promoting the use of "transit-friendly amenities" such as passenger shelters and headways in the 10- to 15-min range, growth of these corridors will be encouraged.

As part of this strategy, Capital Metro is working with land use planners to facilitate the approval of higher density apartments along the pre-determined corridors. They are also in the early stages of a pilot project to develop "traffic signal preemptions." The development of these corridors is seen as a way to ensure equitable delivery of service. The bond issue for light rail will go to the voters early next year. Light rail service will be under the same umbrella as Capital Metro so there will not be a problem with competition. Bus routes will be restructured to provide feeder service for light rail.

3. Capital Metro works with major employers to match workers to carpool or vanpool service. The cost is \$10 a month to participants, with the driver of the vanpool riding for free. Currently, there are 121 vanpools operating as part of the voluntary trip reduction program. In 1995, the estimate is 395,000 vanpool trips; there is no mechanism for comparable tracking of carpool riders.

This vanpool program has the highest usage in Texas, including Houston. Vans are being added to the program at the rate of 30 to 40 per year. With 25 percent growth anticipated in the program each year, Capital Metro expects to have 400 in service within 5 years.

- University Students

Capital Metro has developed a partnership with the University of Texas to operate special shuttles from student housing areas to campus as well as provide campus circulator shuttles. Management attributes part of their increase in ridership to the successful tapping of the uni-

versity population. The UPASS Program at the University of Washington in Seattle serves as a model for the University of Texas program. This program uses a combination of vanpooling, Capital Metro shuttles, taxis for "guaranteed rides home"—whatever works best for this rider population.

The cost of the pass is covered by student activity fees. To encourage use by faculty and staff, the university subsidizes the pass from the revenue resulting from increased parking fees. The university already uses smart cards for library services. Fare boxes could be equipped with card readers allowing for debit usage. The University of Washington has as a component of its program surplus parking set aside for pass holders that need to drive their cars on an occasional basis, such as a doctors appointment. Regular vanpool riders can use their pass for a day of parking service 3 days a month.

- Families

In January 1994, Capital Metro began a program designed to target families and promote weekend ridership. The weekend fare was reduced to \$0.25 and included a transfer slip valid for the entire day. The program which ran for 6 months was very successful in attracting new riders. Ridership continued after return to regular fare.

- Special Events

Capital Metro provides shuttle service for many special activities in the Austin area. Shuttles typically run from close-in shopping malls, park-and-ride lots, and high school and state parking lots. Most events are near the waterfront, and passengers are charged \$1 round trip fare. Service is provided to community events, such as the Aqua Fest, 4th of July Fireworks, and University of Texas football games. During the Christmas season, there are Light Tours in replica trolleys. Management estimates that special events service costs about \$250,000 annually. Their policy states that if 25 percent of the expenses are not recovered for a particular event, service for that event would be discontinued. There is no monitoring of this service to estimate the effect on new ridership, it is used primarily as a marketing tool.

MONITORING PRACTICES

Capital Metro uses market research to define markets, identify potential riders, and plan deployment of new service. The agency examines what types of inducements the potential rider pool needs to make mass transit a viable option. Origin and destination data, as well as detailed information on places and markets, are loaded into a geographical information system and analyzed. On-board studies are conducted every 3 years with pulse type studies in between. Capital Metro uses focus groups to look at all their services (e.g., public information dissemination, pass programs, pre-payment programs, and distribution sites). On-board surveys are

used to modify service, generally for more qualitative than quantitative changes.

FARE STRUCTURE AND PASS PROGRAM

Cash-paying riders account for 50 percent of all trips. Twenty-five percent use passes and 25 percent use transfers. The UPASS for University of Texas students is paid as a flat fee out of the student activity fund. A sticker is placed on student ID cards which are then valid as passes on any type of transit service at no extra charge. There is also a Metro Pass which can be used for all local transit services, including premium services, such as door-to-door service, paratransit service in some zones, and some FLYER routes. The advantage of this pass is the provision of premium services at the Metro rate of \$10 a month for adults and \$5 for public school students.

There is a separate Express Park and Ride Pass which costs \$17 a month with students riding at half fare. There are also discounted ticket booklets used by social service agencies for their clients. The overall strategy is to minimize the use of cash fare and maximize the use of pre-paid passes. Reduction in the use of cash fares leads to a reduction in boarding time and improved service delivery. As part of the move away from cash transactions, the use of Smart Cards to reduce dwell time has been proposed. This would lead to a reduction in run time, a reduction in costs, and increased efficiency.

ROUTE-SPECIFIC INFORMATION AS AN INDICATOR OF GROWTH TRENDS

1. The #62 Quail Valley Corridor serves the growing north-central area of the city and provides feeder service to a FLYER limited stop route. It is in a high growth area, with several industrial sites which attract reverse-commute riders, a community college that has a growing student body because of enrollment caps at the university, and residential service for a minority population that has experienced higher than average disbursement during the 1980s and migrated to the north-central part of the city.
2. A new cross-town route introduced 3 years ago travels through large population centers, with a high concentration of student housing, and high technology employment sites. The middle of the route is characterized by low-income projects, with a major grocery store and retail strip, and a high school. The other end of the route is mixed residential, with multiple origins and destinations. Usually cross-town routes are not strong growth routes. This one has higher growth than expected.
3. The toughest market to provide service for, and consequently the least successful, has been the suburb-to-suburb service. Capital Metro is trying to deal with this market through the vanpooling and teleride pro-

grams. Also the CBD-to-suburb reverse-commute routes have been unsuccessful. Capital Metro is working on plans to improve this service. Non-CBD trips within the city limits need improvement. Because the system operates on a radial orientation, travel within the city without travel into the CBD is limited.

Agency: **BOSTON-MASSACHUSETTS BAY TRANSPORTATION AUTHORITY (MBTA)**
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 Boston, MA 02116
 (617) 722-5176

Contact: **Geoff Slater**
 Director of Planning

NEW SERVICE CONCEPTS

- New Transit Superstations
- New Commuter Rail Lines
- Cross-Town Bus Routes

TARGET MARKETS/ USER GROUPS

Commuters
 Commuters
 Students, Patients, and Employees at Hospitals and Universities

REASONS FOR HIGH PRODUCTIVITY

- Growth in commuter rail riders (8 percent per year for last 3 years)
- Additions to two commuter rail lines
- 45 percent of workers in downtown Boston use mass transit
- Stable population growth
- Cross-town bus routes

SYSTEM PROFILE

The actual service area of the MBTA is defined by the boundaries of Route #128 and includes 78 cities and towns. Both rapid transit and bus service are confined to these service area boundaries, while commuter rail service extends beyond these limits. The southern lines provide service as far south as Providence, Rhode Island, and two northern lines extend to the New Hampshire border. The transit system has undergone a transformation during the last 3 years.

Commuter rail travel has been growing at the rate of 8 percent a year for the last 3 years—this is actual growth, not shifting from other modes. Boston area population has been stable for the last 15 or 20 years, although there have been population shifts within the region during the last 10 years.

Generally, there has been outward movement into the more distant suburbs but still within the MBTA service area. This movement has caused a shift to commuter rail. According to management, riders prefer rail over bus, even with the added expense. There is pressure from rail advocates to increase the number of rail lines, but MBTA believes that in certain corridors, rail is not justified. Along the North Shore, for example, Express Bus service is more convenient than commuter rail. The buses are able to travel further into downtown Boston, reducing the number of riders who need to transfer.

RIDER PROFILE (US Census Data 1990)

- 14.53 percent Total Transit Use
- 59 percent Female
- 24 percent Immigrants
- 20 percent Black
- 69.5 percent Single

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- Commuter Services
 1. South Station has been completely rebuilt to accommodate Amtrak, private bus carriers, Express Bus Lines, and the commuter Red Line. South Station is considered to be one of the best rail stations in the country.
 2. North Station is also undergoing renovations to become a superstation. When completed, North Station will facilitate intermodal transfers, allowing for connections between commuter rail lines and heavy rail, without leaving the terminal.
 3. MBTA is adding two commuter rail lines. Last fall, the Framingham line was extended to Worcester, a previously unserved city west of Boston. Prior to the opening of the new line, Worcester was served only by private bus companies that carried 150-200 riders a day. Now with only limited service (i.e., three trips in the morning and three in the late afternoon), they are carrying 400 riders a day in each direction. After the completion of five additional stations between Worcester and Framingham in 1996, ridership is projected to rise even more.
 4. After the completion of the Middleborough-Plymouth line in 1996, projections are for a total ridership of 6,010, with 3,200 new riders being added to the system. This line serves the Southern Corridor, which has the added push of bad highway access and the worst highway congestion leading into downtown Boston. In terms of ridership and growth potential, this area of the state provides the best mass transit market.

- Cross-Town Bus Routes

With the addition of three new cross-town bus routes, MBTA has been able to improve the quality of transit service to employees and patients at several hospitals and medical centers, and to faculty, staff, and students at several universities.

These routes have limited stop service, more like the rapid transit system, and are aimed at linking these institutions, eliminating the need to travel into downtown and then out again. The purpose of these routes was to provide improved service for existing riders, not to generate new riders. However, current estimates are for 7,500 riders on these routes, one-third of them new riders. The MBTA will conduct a survey to identify the changes in ridership generated from this new service.

- Special Events

1. Patriots Games. Two commuter rail lines serve the Patriots games, as well as two buses from the rapid transit stations. Games are sold out in advance, and people are taking advantage of transit services. It took time to generate a market, but now there are plenty of riders.
2. Red Sox Games. On the Framingham Line, there is a station at Fenway Park that is only open for games. MBTA also adds extra service on its Green Line, before and after games, to North Station and Boston Garden.
3. For annual events, such as the Fourth of July and New Years Eve, extra service is added, and for New Years Eve, transit service is extended. Trains that generally stop at midnight run until 2 AM.
4. The biggest special event ever held was SAIL BOSTON. Tall Ships were in the harbor, and MBTA ran massive shuttle service from South Station to the waterfront. The shuttles carried 2 million riders a day. MBTA has never evaluated special events riders to determine if they become regular riders.

MONITORING PROCESS

For the first time since 1978, MBTA is conducting a bus study to evaluate ridership and system performance. Historically, they only tracked total ridership by mode. Now they are attempting to do their first comprehensive study, which they estimate, will take 2 years to complete. In 1993, they began the commuter rail survey, and in 1994, the light rail and heavy rail surveys were started. The current plan is to conduct systemwide on-board surveys every 6 years, and special projects surveys as needed.

FARE STRUCTURE AND PASS PROGRAM

Overall, there is an even split between riders who pay cash and those who use passes. MBTA estimates that 40 percent pay cash and 40 percent use passes, 8 percent of riders are seniors or have disabilities, 3 percent students, 4 percent chil-

dren, and 6 percent travel fare free (half authorized and half fare evasion). These percentages change according to mode, with riders on commuter rail using passes 63 percent of the time, and light rail riders using passes only 33 percent of the time. The Green Line (Light Rail) from downtown is so heavily traveled that when it switches from underground to surface travel, all doors are opened which results in 31 percent of outbound passengers traveling as authorized free riders.

There was a small fare increase in September 1991, raising the base bus fare from \$0.50 to \$0.60 which had no effect on ridership. Monthly unlimited use passes range from \$20.00 for bus to \$150.00 for the most comprehensive commuter rail pass which is valid on all lower level services. Combination passes, good on multiple modes, are available and priced according to mode and zone.

Agency: **BROWARD COUNTY MASS TRANSIT DIVISION (BCt)**
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Contact: **Sylvia Smith**
Assistant General Manager of Planning and Scheduling

NEW SERVICE CONCEPTS

- Community Bus Service Routes
- Simplified Intra-County Transfers

TARGET MARKETS/ USER GROUPS

- Seniors, Disabled, and Trailer Park Residents
- Commuters

REASONS FOR HIGH PRODUCTIVITY

- Population growth
- High percent wheelchair and senior riders
- Community bus service routes
- Restructuring of existing routes to eliminate deviations
- Reduction in frequency of service on selected routes
- Large Saturday ridership

SYSTEM PROFILE

Since 1988, an increasing number of riders who use wheelchair and mobility aids have been switching to public transit because of the limitations of existing paratransit services and the more reliable and less costly service for this population provided by the public bus system. BCt has had a steady 4 percent growth in ridership despite a fare increase in April 1995. Management credits this increase in ridership to

heavy promotion of weekly and monthly passes marketed as an alternative to paying higher fares. Given that there has been no change in the size of the fleet in 5 years and a reduction in frequency of service, this growth trend was unexpected.

BCt serves a diverse market with year-round, seasonal, and tourist populations. Year-round riders are largely service workers traveling to hotels, restaurants, and hospitals, which accounts for Saturday service almost equivalent to weekday ridership. Although BCt recognizes the need to build service for the tourist and convention market, they have been unable to respond to the increase in demand during the peak season from November 1 to Easter.

RIDER PROFILE (US Census Data 1990)

- 2 percent Total Transit Use
- 64 percent Female
- 38 percent Immigrants
- 59 percent Black
- 10 percent Hispanic
- 71 percent Single

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- Disabled and Elderly
 1. BCt restructured existing routes by "straightening them out" and eliminating deviations into trailer parks. This service change was paired with the development of community bus service routes. BCt signed interlocal agreements with six municipalities to provide free shuttle service (one community imposed a fare of \$0.25) with stops at senior centers, malls, hospitals, grocery stores, and so forth. The shuttles travel on 90-min fixed-route schedules with feeder service to the public transit system. BCt leases the mini-buses to municipalities for \$10 a year, provides \$18,000 a year for maintenance, and assists in the development of schedules and routes. The estimated annual cost to each municipality ranges between \$50,000 and \$75,000. Costs are kept down by using part-time retiree drivers and service hours adapted to passenger needs.

This program was started in 1990 in one community, with participating municipalities added at the rate of one per year. Two additional communities are considering participation. Specific ridership information is not yet available; however, additional buses have been requested. To encourage rider input on design of routes and schedules, BCt will begin a needs assessment this month.
 2. The current fleet is 78 percent accessible, with a target date of January 1996 for 100 percent accessibility. Twenty-eight percent of the agency's riders are disabled or reduced fare elderly.

3. For riders with developmental disabilities or who are illiterate, the transit guide has been revised to code routes by color.
- Commuters
 1. Limited stop service during peak commute and reversecommute hours has been expanded to accommodate residents at the western edge of Broward County where the greatest population growth has occurred. Currently, BCt has only one park-and-ride lot, although two additional lots are under consideration.
 2. Several bus routes have stops that facilitate transfers to Metro Dade Transit and Cotran (Palm Beach) bus lines. BCt also provides connecting service to Tri-Rail, a commuter rail system serving three adjoining counties, Broward, Dade, and Palm Beach. Operating for 5 or 6 years with funding from all three counties, Tri-Rail is not seen as competition by BCt. With elimination of state funding, Tri-Rail introduced a zone fare in mid-April of this year which led to a significant reduction in Tri-Rail's ridership. The rail riders may be using BCt instead.
 - Tourist and Convention Market
 1. Although BCt recognizes the need to build service for the tourist and convention market, they have been unable to respond to the 15 percent increase in demand during the peak season from November 1 to Easter.
 2. Currently BCt contracts with a private company to provide service between the airport and the cruise ship docks. A 1-mi-long light rail link between the airport and the seaport is on the drawing boards. BCt supports this link as a way to reduce traffic on the roadways during the peak season.
 - Special Events
 1. BCt recently signed a 10-year contract to provide shuttle service at the regular park-and-ride fare to the Air and Sea Show and the annual Fourth of July fireworks display.
 2. BCt continues to run charters to the Dolphin football stadium during football season at a round trip fare of \$7.00 and regular and special routes to transport students to the fairgrounds during the Broward County Fair.

MONITORING PROCESS

1. BCt monitors 15 randomly selected full routes and segments each year and uses the information collected to modify scheduling. For example, riders connecting from east-west routes to north-south routes are now able to move through transfer points within 5 min.
2. In response to petitions asking for changes in service, telephone surveys are conducted to verify that petition signers are bus riders, prior to initiating any actual monitoring of the route in question.

FARE STRUCTURE AND PASS PROGRAM

A fare increase was initiated in April because of a \$500,000 reduction in federal funding. The anticipated decrease in ridership did not occur, and there was a 14 percent increase in youth ridership and an overall increase of 4 percent. Management attributes this increase to the aggressive marketing of monthly (\$30) and weekly (\$8) passes. These passes are available to students, seniors, and disabled riders at half price and are good for weekend and summer use as well. They are easily purchased at public libraries, transit terminals, and the MTA store. County employees can get passes through payroll deduction.

ROUTE-SPECIFIC INFORMATION AS AN INDICATOR OF GROWTH TRENDS

The routes in BCt's service area that continue to grow the fastest typically cross several city and community lines, with stops at major destination points, and serve "a mixed bag" population. Route #1 provides service from the condo areas in So. Broward County to the airport and downtown terminal allowing riders to travel to either Dade or Palm Beach County with one transfer. Route #18 provides service for the largest inner-city minority neighborhood to a shopping center in Dade County, Margate Transit Terminal, and a community college campus. Route #36 provides service from the western most point in the county to the beach by way of a regional shopping center.

The least productive routes measured in terms of passengers per mile include the #87 Park and Ride Shuttle. Management suggests that poor ridership, typically six or eight passengers, is because of a frequency problem. On this route, there is one run in the morning and one run in the afternoon. Management suggests that a switch to mini-buses and a graduated pay scale for the drivers, based on the size of bus, would improve productivity on this route. The #75 is a oneway loop between the West Terminal and trailer parks. It makes 15 runs a day starting at 5:50 AM. Management would like to initiate a later start time in order to more effectively use resources. Buses on routes where early starts are unnecessary could be freed for use elsewhere. The #11 Beach Run provides service to professionals and other commuters unsuccessfully. Limited stop service is needed to attract riders to this route.

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Contact: **Bob Gower**
Superintendent of Service and Planning

NEW SERVICE CONCEPTS

- | | |
|--|-------------------|
| • Route Restructuring | All Riders |
| • Six New Suburban Transit Centers | Reverse Commuters |
| • Improved Express Service | CBD Commuters |
| • Increased Service to Suburban Malls | Weekend Shoppers |
| • Barrier-free Self-service Zone on Light Rail | CBD Riders |

TARGET MARKETS/ USER GROUPS

REASONS FOR HIGH PRODUCTIVITY

- Elimination of non-productive service (plan to reduce service by 23 percent)
- Increase in passenger miles, longer trips from suburbs
- Fare increase in July 1995
- Major route restructuring to eliminate deviations and simplify the system
- Improved coordination of transfers with construction of six suburban transit centers

SYSTEM PROFILE

Buffalo, New York, is an urban area in northern New York state, with a population of 954,332. The transit system has a service area that encompasses two counties and an urbanized area with two urban centers, Buffalo and Niagara Falls.

The regional population has been stable, but there has been a shift in population growth from the inner city and inner suburbs to an outer ring of suburbs. In terms of employment, the region has suffered a loss in industry-related jobs and a consequent shift in population based on location of employment sites.

In the 1960s, an extensive expressway system was built based on growth projections that did not materialize. Therefore there is no highway congestion, unless construction or weather-related. This free flow of traffic, even during peak hours, works to the detriment of mass transit. There is also an abundance of inexpensive downtown parking, which further works against the growth of mass transit.

NFTA was founded in 1974 as a public bus system with service based on a fixed-route radial system. In addition to the fixed-route service, NFTA has several cross-town routes, express service from park-and-ride lots, and service between the two urban centers.

In 1985, NFTA added a 6.5-mi-long light rail system within the Buffalo city limits, with a barrier-free self-service honor system within a 1-mi radius of downtown. Ridership has fallen on light rail from a high of 30,000 passengers a day to a current ridership of 27,000 a day. Two years ago, NFTA started a major route restructuring program in an attempt to simplify the system with the elimination of route deviations and a focus on major transportation corridors.

As part of the route restructuring, express service was revamped and new route numbers assigned. The CBD is still the primary transit destination, although retail shopping and job sites are shifting from the inner city and inner suburbs to an outer suburban ring.

RIDER PROFILE (US Census Data 1990)

- | | |
|----------------|-------------------|
| • 5.06 percent | Total Transit Use |
| • 66 percent | Female |
| • 6 percent | Immigrants |
| • 37 percent | Black |
| • 70 percent | Single |

Ridership has been stable, although there was a slight decrease (10 percent) since last year. Riders are typically lower income, female (70 percent), and on work-related trips. Thirty-eight percent of all riders are on work trips, and 30 percent are public school students in grades 8 through 12.

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- **Route Restructuring**
Two years ago, NFTA began a major route restructuring with plans to phase in changes over a 1½-year period. The purpose of the route restructuring was to simplify the system, by eliminating deviations and focusing on major corridors where the transit market was good. There were no costs involved in the restructuring; service remained at the same level.
The new routing has only been in place for a few months, so it is too soon to determine the success of the project in terms of generating new markets. However, the restructuring project has had a positive effect on reverse-commute trips to the suburbs with a gradual increase in both ridership and passenger miles.
- **New Transit Centers**
As part of the restructuring, NFTA constructed six new suburban transit centers at a cost of \$2 million. These suburban transit centers have been operational since December 1994. The purpose of this project was to coordinate and improve transfers.
- **Express Service**
Although there has been a decline in ridership, work trips to downtown remain the primary market and most successful aspect of NFTA's radial system. Because the length of trips and reverse-commute market have been increasing, express routes were renumbered and included in the route restructuring plan.
- **Increased Service to Suburban Malls**
As part of the route restructuring, NFTA has increased weekend service to suburban shopping malls. According to management, these routes are among the system's least successful.

- **Free-Fare Zone**
On the light rail line, within a radius of 1 mi of downtown, NFTA is utilizing a barrier-free self-service honor system. They spot check the system for abuses and feel that it works well with abuse limited to only 1 to 2 percent of riders.
- **Special Events**
Special event service is provided by the light rail system. Regular service is utilized, and fares remain the same; however, extra cars are added to the trains. There is a terminal at the outer perimeter of the rail line which has a parking capacity of 14,000 spaces. Shuttle service to professional football games is provided with express buses from six suburban transit centers.

FARE STRUCTURE AND PASS PROGRAM

NFTA increased the base fare in July 1995, from \$1.10 to \$1.25. The zone surcharge of \$0.20 remained the same, resulting in a \$1.45 fare to the transit centers. It is too soon to tell the effect of this increase. Passengers who are seniors, have disabilities, or are children under 12 ride for half price.

Thirty-two percent of riders use monthly passes, which range in price from \$44 a month for a one-zone pass to \$53 for an all-zone unlimited ride pass. Twelve percent use student passes. These student passes are purchased by the school system and are valid only during school hours and on rides from home to school and back again. The student pass includes a photo for identification purposes. There is no surcharge for express service with either a cash fare or pass. NFTA is beginning to promote the idea of a pass program with employers. Five employers have indicated that they would participate.

MONITORING PRACTICES

The guidelines call for a comprehensive survey to be conducted every 4 or 5 years. However, the last on-board survey was conducted in 1988. According to management, there is no coordinated effort to monitor the system. Service changes are based on requests from individuals or businesses. Management characterizes the system as reactive, not proactive. At the present time, the agency is completing the annual customer satisfaction survey.

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Operations Planner
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NEW SERVICE CONCEPTS

- Three categories of service: community service, campus service, and evening/weekend service
- Shorter headways at night for security reasons
- Low-floor buses on community routes
- High-capacity buses on campus routes
- Convention transportation service, primarily when classes are not in session

TARGET MARKETS/ USER GROUPS

University students, faculty, and staff

Conference attendees

REASONS FOR HIGH PRODUCTIVITY

- Compact service area (34 sq mi)
- University of Illinois, the dominant trip generator/attractor
- Pro-transit policies and practices on campus
- Frequent service
- Long span of service (until 2 AM)
- Campus and community services coordinated

SYSTEM PROFILE

The Champaign-Urbana Mass Transit District serves the twin cities of Champaign and Urbana, Illinois. The urbanized area has a population of 115,524. The University of Illinois dominates the area numerically and geographically. The university has approximately 35,000 students and about 15,000 faculty and staff. The campus straddles the line between the two cities.

MTD initiated campus service to supplement its network of community routes. Total system ridership increased dramatically. Prior to the change, MTD carried less than 3 million annual passengers. It carried 8.5 million in FY95. Systemwide productivity averaged 25 passengers per hour in FY89, prior to the new services; 41 passengers per hour in FY90, the first year of new services; and 53 passengers per hour in FY95, 6 years later.

Services are provided with a fleet of 80 buses. Its community routes are operated with full-size low-floor coaches. Most of its campus services are operated with 10 articulated coaches. One route to new buildings on the edge of campus uses a small, low-floor bus.

RIDER PROFILE (US Census Data 1990)

In FY90, the first year of the campus/community service concept, MTD carried 5.4 million passengers. This was an increase of 95 percent over the previous year, when MTD

carried 2.8 million riders. In FY95, 6 years after the start of the campus/community service concept, MTD carried 8.5 million passengers.

MTD operates three categories of routes: weekday community, evening/ weekend community, and campus. The distribution of ridership among these categories was as follows in FY90 and FY95:

	FY90	FY95
Weekday Community	59 percent	45 percent
Evening/Weekend Community	12 percent	19 percent
Campus	29 percent	36 percent
Total	100 percent	100 percent

MTD staff notes that the campus service behaves the opposite of the community service. For example, in bad weather, community service ridership goes down because many trips are discretionary; campus ridership goes up. The reverse is true in good weather.

University students, faculty, and staff ride community routes as well as campus routes. More than half of all riders are "I-riders," meaning those that show an ID card for fare payment. This fare category constituted 57 percent of the 5.4 million boardings in FY90 and 63 percent of the 8.5 million boardings in FY95. Ridership in all other fare categories is at a much lower level. For example, adult cash riders were 15 percent of the total in FY90 and only 7 percent in FY95. Annual pass riders were 10 percent in FY90 and 8 percent in FY95. School riders (high school and younger) were about 6 percent of the total.

POLICY CHANGES THAT AFFECT SYSTEM PERFORMANCE

The University of Illinois adopted several pro-transit policies as follows:

- Students elected to pay a semester transportation fee, which provides access to the entire public transit system by showing their ID card. Initially, the amount was \$10. The current fee is \$18 per semester.
- The University will pay 80 percent of the price of an annual transit pass for faculty and staff. The first new route provided access from a remote parking lot. Its success enabled the University to avoid the construction of new parking decks on campus. Further, more than 1,000 parking spaces have been eliminated on campus as a result of MTD services. Five million dollars' worth of new parking garage construction has been postponed along with the annual amortization, operating, and maintenance costs associated with these new facilities.

- The university also has a comprehensive TSM program to encourage carpooling and ridesharing and reduce the demand for faculty and staff reserved parking.
- The university raised its reserved parking fees more than 30 percent in 1989, and an additional 24 percent with escalating annual increases after 1990. This policy resulted in a 37 percent decline in student registered cars on campus.

On the Illini route, MTD "sacrifices" productivity for passenger security reasons. It operates more frequent service in the evening to shorten passenger waiting time. This results in more hours of service being operated at a time when fewer riders are being transported.

MTD operators provide up to \$1.00 in change for passengers and sell tokens on-board the bus. These services are in effect on daytime service. Exact change is required after 7:00 PM.

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

MTD began implementing the campus/community transit system in the fall of 1989. Previously, there was no campus-oriented service. The first new route introduced was a shuttle from a remote parking lot to campus. Other routes were added to provide frequent service for short trips around the campus area. These include the Quad route and the Illini campus circulator route.

The Quad route is in service from 7:30 AM to 5:30 PM, Monday through Friday, with a 5-min headway. The parking lot shuttle also is on a 5-min headway and operates a slightly longer span of service. The Scamp route to the new buildings on the edge of campus has the same span of service but operates with a 20-min headway. Finally, the Illini campus circulator route operates from approximately 7:00 AM to 2:00 AM. It is on a 15-min headway during the daytime. This same route operates every 10 min in the evening, so passenger waiting time is less.

Few changes have been made to the community services, yet. The distinction between weekday and evening/weekend service has existed within the system for many years. The intent in designing the campus/community service was to have the community routes bring people to the campus, where they can transfer to the campus routes. Campus routes also are used by those living on campus.

MTD also provides transportation services to conventions held in the area. Champaign hosts one conference every 3 years that attracts 20,000 people. Approximately 400,000 passengers trips are made during this conference. Smaller events also are accommodated. The service for these events does not disrupt regular transit services. Many occur when classes are not in session. When necessary, MTD will borrow buses from other transit systems to accommodate these events.

MONITORING PRACTICES

Routine farebox data desegregates ridership by route and by fare category.

On-board surveys are conducted periodically. A major study is done every 4 to 5 years and includes passenger attitudes, awareness, perceptions, and on-off counts. The last major study was oriented to the start-up of the campus/community service concept.

FARE STRUCTURE AND PASS PROGRAM

MTD achieved a farebox recovery rate of 34 percent in FY95. This is similar to its FY90 performance level of 33 percent. Prior to the introduction in new services (FY89), it recovered 25 percent of its costs from the farebox.

The basic cash fare is \$0.75 per ride. A reduced cash fare of \$0.25 is offered to senior citizens and persons with disabilities. Exact fare is required after 7:00 PM. Transfers are free. An all-day transfer good on Saturday or Sunday is sold for \$1.50.

MTD sells tokens and a variety of passes. Nine adult tokens are sold for \$5.00. Ten school tokens (high school and younger) are sold for \$3. Twelve senior citizen/handicapped tokens are sold for \$2. Tokens are sold by drivers on-board prior to 7:00 PM.

MTD sells annual passes, semester passes, and the Uni Pass. All require a photo ID card. The annual pass is good for any 12-month period. Prices are \$150 for adults, \$90 for school students (high school and younger), and \$50 for senior citizens and persons with disabilities. Full-time University of Illinois employees can purchase a Uni Pass for \$30, good for any 12-month period. MTD receives the balance of \$120 for the annual pass from the university.

University of Illinois students pay an \$18 per semester fee and ride free on any route by showing a valid student ID card. University faculty/staff ID cards are accepted on the campus routes. Students at Parkland College in Champaign can purchase a semester pass for \$70. A pass for the summer session is sold for \$35.

MTD also sells a summer flash pass for \$15. When first introduced, the intended market was high school students. The flash pass is now directed at college students and younger. The summer pass is available to any student who was enrolled in any school in the previous spring.

Fares were increased from \$0.50 to \$0.75 on August 30, 1992. At the same time, discount tokens were introduced at a price of 10 for \$5.00, which was equivalent to the old fare. MTD staff indicates that both ridership and revenue increased.

ROUTE-SPECIFIC INFORMATION AS AN INDICATOR OF GROWTH TRENDS

The entire MTD system averages a productivity level of 53 passengers per hour. MTD tracks passengers per hour for all routes on weekdays, evenings, Saturdays, and Sundays.

The three strongest routes within the system all are campus routes: the Quad, Illini, and Shuttle routes. In FY95, the 12 weekday community routes carried between 31 and 69 passengers per hour. The strongest community route was the Orchard Downs route, which provides service to the married student housing complex and many of the Urbana dormitories. The weakest routes in the system are those operated on weekends and average about 26 passengers per hour.

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 Manager of Transportation Alternatives

NEW SERVICE CONCEPTS

TARGET MARKETS/ USER GROUPS

- | | |
|-------------------------|--|
| • Cross-Town Service | Asians, other minorities, middle-class "choice" riders |
| • Center City Loop | Uptown workers |
| • Easy Rider Circulator | Non-transit riders, neighborhood residents |
| • BEATRUSHOUR Campaign | Peak hour commuters |
| • Commuter Caper | Uptown commuters |

REASONS FOR HIGH PRODUCTIVITY

- Elimination of unproductive routes and services
- 30 percent growth in express riders in 1994
- High cost of parking

SYSTEM PROFILE

The transit system of the Charlotte Department of Transportation is characterized by an extensive system of radial routes and the recent addition of several cross-town routes. There are also commuter routes that extend into surrounding counties and cross the state line providing service for residents of South Carolina. The routes, with the exception of the four new cross-town routes, are on a radial system that rarely intersects—because of this, most riders must travel into the center of the city "uptown" before they can transfer.

RIDER PROFILE (US Census Data 1990)

Express riders on CTS are typically middle-aged white women, less than 40 years old, clerical and middle manage-

ment workers with 2 cars, and a car available for the work trip. They are primarily traveling from three small towns on the southeast side of Charlotte to "uptown."

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- **Minority Workers and Choice Riders**

A year ago, CTS initiated cross-town bus service. This service was designed to reduce travel time by providing connectivity between remote areas of the city. With these new routes, the need for transfers and travel to the center of town was reduced. The cross-town route system allows riders to travel on one bus all the way from the northwest side of town to the northeast side where the university is located. If one imagines a clock face, only the area from 9 to 1 is currently without service. This new service costs about \$75,000 a year. It is already considered a success because the goal of 13 passengers per hour has nearly been achieved.

- **Uptown Workers**

At the urging of the City Council, CTS created a City Loop at the cost of \$400,000 a year. This inner-city loop as well as a reverse-loop ran simultaneously in opposite directions. After an 18-month test period, the loop service was evaluated and discontinued. It was determined that this route did not attract any new markets and was carrying an average of only 8 passengers per hour.

- **Disabled and Elderly**

CTS responded to a request from the Department of Parks and Recreation to provide a new route to the Marion Deal Senior Citizen Center. This center has a swimming pool equipped for persons with disabilities. CTS ran 10 trips a day at the cost of \$80,000 a year. There are only two riders a day (probably 1 person traveling round trip). This service will terminate as of August 1.

- **Out-of-State Commuters**

Two years ago, a consortium was established between the cities of Charlotte, North Carolina, and Rockhill, South Carolina, and the states of North and South Carolina. The purpose of the consortium was to provide transit service from Rockhill to Charlotte. Rockhill, South Carolina, is only 20 min outside of Charlotte, although across the state line. Rockhill is home to many people employed in "uptown" Charlotte.

A limited-stop route, using over-the-road coaches, was introduced. Because the target riders are uptown commuters, service is provided only during peak hours. During the first year demonstration, Charlotte contributed \$15,000 and the state of North Carolina contributed \$50,000. Now that the demonstration is over, the state is no longer funding the project, so Charlotte is contributing \$50,000. The goal of 200 passengers a day is within reach; the route currently has 150 riders with four trips. CTS

considers this project a success, because it keeps more than 100 cars out of the city every day.

- **Non Transit Riders and Neighborhood Residents**

The Easy Rider Neighborhood Circulator was introduced by the city to provide 12-passenger low-floor vans to two low-income neighborhoods. The neighborhood circulator was designed to facilitate travel to shopping, recreation programs, head-start programs, and prenatal clinics and provide feeder service to regular transit routes.

MONITORING PRACTICES

The most recent on-board surveys were conducted by CTS in 1990 and 1993. They are not generally used for marketing strategy, but to identify the needs of the non-rider.

The goal of the monitoring process is to "get those not on board, on board." By asking those riders already on board where they would really like to have the buses travel and where they need to go, CTS hopes to identify under-served areas and add routes in response.

FARE STRUCTURE AND PASS POLICY

Forty-four percent of CTS riders pay cash fares; the rest use some form of pass. There has been one recent fare increase which had no effect on ridership. The riders who are elderly or have disabilities pay half fare during non-peak hours and on Saturdays and Sundays, and students pay half fare on school days. Children traveling with an adult pay half fare anytime.

CTS sells monthly passes that are good for unlimited rides, including weekend use. The local pass costs \$29 a month, and the express pass sells for \$35 a month. CTS also sells a weekly pass for \$7.00. Each month, 2,000 local, 11,000 express, and 13,000 weekly passes are sold. There are 20 outlets available for pass purchases, including a chain of grocery stores, and many employers purchase passes and then sell them to their employees. The city buys passes and sells them to their employees at half price, and the county purchases passes at full price and also sells them at half price. There is a summer pass available for students at a cost of \$30.

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Contact: **Charlie Carson (1995)**
Director of Planning and Scheduling

Ginny Schneider (1996)
Assistant General Manager
Planning and Marketing

NEW SERVICE CONCEPTS

- Cross-Town Services

TARGET MARKETS/ USER GROUPS

Retail Shoppers/Workers
Major Employers

REASONS FOR HIGH PRODUCTIVITY

- Elimination of under-utilized service
- Streamlining and modification of existing service to meet needs of current riders

FACTORS THAT INHIBIT GROWTH OF MASS TRANSIT

- Steady decline in population
- Downsizing of industrial sector (in some industries as much as 60 percent)
- Budget constraints that dictate caretaker function for CTTRANSIT
- Obsolete radial system (60+ percent of riders in Hartford do not have CBD as destination point)
- Extensive expressway system built for unrealized population projections
- Highway improvements that greatly reduce rush hour congestion on Interstate
- Competition with ride-share agency that operates vanpool and carpool service
- Inexpensive and accessible downtown parking (average \$40/month or \$4/day)
- High cost of express bus pass (average \$80/month), peak hour service only

SYSTEM PROFILE

In the greater Hartford area, there has been a steady decline in population from 240,000 to 187,000 at the last census, and a corresponding decline in public transit ridership. Public bus service in Hartford is based on a traditional radial system with downtown pulse points, designed many years ago. The service area extends in a 30-mi radius from downtown Hartford and includes 25 park-and-ride lots and 15 express routes along main arteries into the CBD.

Although the entire fleet has been replaced since 1990, it consists entirely of standard 40-ft transit buses, which limits the amount of restructuring that CTTRANSIT is able to do. Travel patterns have shifted with industry downsizing. More than 40 percent of public transit riders do not have the CBD as a destination point and do not want to backtrack into downtown in order to reach their destination.

During the 1960s, an extensive expressway system was built based on growth projections that did not materialize. This highway system works to the detriment of mass transit. There is a free flow of traffic even in peak hours. Express

routes have been losing ridership at the rate of 3 percent a year for the last 6 or 7 years.

Until the late 1980s, buses always ran full, with standing room only. Since industry downsizing and highway improvements, there are seldom standees and often empty seats. Ridership declined from 16 million in 1985 to 12.5 million in 1995.

RIDER PROFILE (US Census Data 1990)

- 19 percent Market Penetration (percent of area population using CTTRANSIT in past month)
- 43 percent Household Incomes of more than \$20,000
- 60 percent Female
- 38 percent Black
- 33 percent Caucasian
- 18 percent Hispanic
- 56 percent More than 35 years of age
- 41 percent Employee full-time
- 14 percent Employee part-time
- 16 percent Own 2+ cars
- 35 percent Own 1 car
- 46 percent Own no car
- 20 percent College graduate
- 19 percent Some college
- 41 percent High school graduate

Typically, passengers are poor and elderly, traveling cross-town to visit relatives, friends, or social service agencies, and to shop (there are only two supermarket chains in Downtown Hartford). These shopping and personal trips equal the number of work-related trips on public transit.

TRIP PURPOSE

- 22 percent Work
- 23 percent Non-grocery shopping
- 21 percent Personal business

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- All potential user groups
 - Changes in service have been limited to restructuring and redirecting of existing radial routes to reach new outlying destinations such as shopping malls and large-scale retirement communities.
- Students
 - CTTRANSIT has no public school contract, no student passes, or arrangement with any community college or university. Student ridership is about 4 percent.

- Express Service
CTTRANSIT has been losing riders on the suburb-to-city routes at the rate of 3 percent a year for the last 6 or 7 years. Express service operates at peak hours only and not all routes have comparable local service. Because of the radial system, it has been difficult for CTTRANSIT to provide reverse-commute service.

MONITORING PRACTICES

Until 8 years ago, CTTRANSIT did a complete survey of each route every 18 months. Comprehensive market research was conducted in 1995. A 5-year plan has been developed in response, involving data collection. Statistics are compiled monthly and compared with prior year performance.

FARE STRUCTURE AND PASS PROGRAM

There have been four fare increases since 1991. The base fare will have increased from \$0.85 in 1991 to \$1.50 in 1996. CTTRANSIT uses a complicated zone-fare structure with surcharges for express service. Until 2 years ago, fares for local and express service within the same zone were equal.

The Pass Program consists of a local or express monthly pass, and the cost is based on 20 rides per month, but rides are unlimited. Thirty-two percent of riders use these monthly passes. Because there was no picture or signature required, this pass could be used by other family members. With the new electronic fare boxes, this is no longer the case. There are no student, elderly, or disabled passes. There are 10-ride storage tickets which can be purchased.

Agency: **LANSING—CAPITAL AREA TRANSPORTATION AUTHORITY (CATA)**
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Manager of Service Development

NEW SERVICE CONCEPTS

- Fast Track Shuttle (discontinued)
- Downtown Shuttle

TARGET MARKETS/ USER GROUPS

- Downtown Workers
- State Employees

REASONS FOR HIGH PRODUCTIVITY

- Elimination of non-productive service
- Fare increases
- Interlining of routes

- Service evaluation team that strictly enforces performance standards

FACTORS THAT INHIBIT GROWTH OF MASS TRANSIT

- Headquarters for several automobile manufacturers
- Inexpensive and abundant downtown parking
- Population growth located in jurisdictions outside service area
- Competitive relationship with university-owned and -operated bus system
- 50 percent of downtown workers are state employees; state provides free to low-cost parking (\$8/month)
- No congestion, so no incentive to reduce downtown traffic

SYSTEM PROFILE

The CATA system is based on a radial route pattern, with several pulse points and no transfer facility. There are 15 routes. Six of these routes carry 75 percent of the riders, with one of the six carrying 40 percent. The CATA service area is dominated by a large number of college students, who attend Michigan State University and Lansing Community College, one of the 20 largest community colleges in the country.

The students account for 60,000 out of a total population of a quarter million. CATA encompasses five jurisdictions, the City of Lansing, the City of East Lansing, where MSU is located, and three suburban townships, Meridien, Delhi, and Lansing Township. All are within the boundaries of Ingram County. CATA is authorized to serve the two adjacent counties, where most of the recent population growth is concentrated; however, neither have joined the transportation authority. CATA, in its current configuration, is unable to follow the growth.

Approximately 30 percent of workers commute on public transit. Express fares are very high, and there are no park-and-ride lots, so CATA cannot capture the suburban market in the township areas, where the population growth is occurring.

In 1987, in anticipation of budget cuts, fares were increased by \$0.25. Ever since, CATA has been attempting to recapture the one million riders they lost during the 2-year period following the fare increase. Prior to 1987, the student population was guilty of significant abuse of the public bus system. There was heavy ridership among the students, however they were frequently paying the \$0.25 youth fare, not the student fare. After the fare increase and better monitoring of abuses in the system, the student market decreased significantly.

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- Downtown Shuttle
In 1990, in conjunction with the state government, CATA initiated downtown shuttle service that carried state

employees from the state parking lot, located on one side of the city, to the state office buildings on the other side of town. The state employs 12,000 workers in downtown Lansing. At its peak, the shuttle carried 300 passengers a day. Subsequently, the state built a close-in parking system for its employees, with prices ranging from \$18 a month for covered parking spaces to free parking on gravel lots. Demand for the shuttle disappeared.

- **Fast-Track Shuttle**

In early 1990, in the midst of a major downtown development campaign, the Lansing Downtown Development Agency allocated \$32 million for 5,000 additional parking spaces. In the interim, they arranged with CATA to provide shuttle service from surface lots, located 2 mi from downtown Lansing. The cost was \$25 a month for parking and shuttle service, and included two tickets per month for emergency mid-day taxi service back to the parking lot.

From the summer of 1990 to 1993, this shuttle service carried 13,000 riders a month. In 1993, the city completed construction of a large number of low-cost parking spaces. Ridership declined to 10 or 20 riders a day, and the service was eliminated in late 1993.

- **Special Events**

Michigan State University runs its own shuttle for all athletic events. CATA uses vintage trolleys for downtown festivals. The trolleys are considered a promotional tool.

- **Route Interlining**

CATA has created a system of through routes, by renumbering buses as they pass through the downtown area and continue on. With interlining, 25 percent of CATA's riders can travel through downtown on one bus without having to transfer.

FARE STRUCTURE AND PASS PROGRAM

Twenty-six percent of CATA's riders use passes. There is a monthly pass priced at \$35, and a student pass that costs \$25. There is a flat fare of \$1 on all services. Since 1992, there were two fare increases, which resulted in a loss of 8 percent per year in ridership.

MONITORING PRACTICES

CATA conducts on-board surveys every year and nonrider surveys every 2 years.

Agency: **LA-SANTA MONICA MUNICIPAL BUS LINE (THE BIG BLUE BUS)**
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Contact: **Bob Aire**
 General Manager

NEW SERVICE CONCEPTS

- El Segundo Commuter Service Aerospace Workers
- Community College Shuttle Students, Faculty, and Staff
- Summer Shuttles Tourists
- Lunch Hour Shuttle Downtown Workers and Tourists

TARGET MARKETS/ USER GROUPS

REASONS FOR HIGH PRODUCTIVITY

- Low fares
- Reliability
- Clean buses
- High passenger per revenue hour

SYSTEM PROFILE

The Santa Monica Big Blue Bus Line has been providing service since 1928. The philosophy of management is to provide high-quality, low-cost service on the street, so riders will not be "deflected." All buses are clean and the service is reliable; in fact, the Big Blue Bus Line has been cited as an example of how to maintain clean buses. Although the municipality of Santa Monica itself is only 8 sq mi, the service area of the bus system encompasses 51 sq mi. The Big Blue Bus Line provides primarily boulevard service and as such does not lend itself to route restructuring.

The bus system includes two types of service—express or freeway service into downtown Los Angeles during peak hours, which carries an estimated 2,000 riders per day, and local service with trips averaging 3 mi or 15 min, a market which is declining slightly. The Big Blue Bus Line carries 18 million riders per year—one-third of them travel entirely within Santa Monica, one-third within Los Angeles, and one-third cross from one to the other.

Ridership peaked in 1980 and then declined by 8 or 9 percent after the riots which eliminated service along Pico Boulevard. In general, ridership on the Big Blue Bus Line is more dependent on the economy than on service changes.

RIDER PROFILE (US Census Data 1990)

- 6.34 percent Total Transit Use
- 53 percent Female
- 68 percent Immigrants
- 14 percent Black
- 9 percent Asian

- 64 percent Hispanic
- 66 percent Female

In Los Angeles, there is no tradition of public transit; ridership is economically determined. The Big Blue Bus Line is targeting those riders who are marginally using an automobile, where the car is not necessary for work trips. They are aiming at clerical workers and entry-level professionals who could save money on parking and insurance by riding the bus.

Fifty percent of the Big Blue Bus Line riders earn less than \$20,000 a year, and at the high end are the express riders into downtown Los Angeles. Management has also noticed marked growth in the Hispanic market which it is targeting through the Catholic Church. In general, the Big Blue Bus Line has a 6 to 10 percent market share of riders traveling to work and a 13 percent market share of students traveling to UCLA.

The Big Blue Bus Line has increased the reverse-peak market. In response to a request for earlier service from stock brokers who needed to arrive in downtown Los Angeles before 6 AM, earlier trips were introduced. On these early runs to downtown, the buses were carrying 15 passengers. However, on the return trip there were an unanticipated 55 riders. An extra trip had to be added which leaves downtown at 6:10 AM. The passengers on this first trip are day workers and domestics, who are new riders to the system.

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- Commuters

El Segundo Commuter Service

Last October, the Big Blue Bus Line introduced commuter service between Santa Monica and El Segundo, with funding from air quality management and a gas company grant. El Segundo is a major employment center for the aerospace industry. Several aerospace employers, including TRW and Hughes, are within a compact area. The route was designed by getting addresses of potential riders from employers, plotting residences on a map, and creating a route to serve the maximum number of workers. Four 30-ft buses with plush reclining seats, televisions, and video players are being used for this 45-min trip. So far, it has had limited success. Although the buses are designed to hold 25 passengers, they are currently getting only 10 riders per trip, or 40 to 50 passengers a day. However the new riders are fiercely loyal, and prior to the introduction of the service were traveling alone in private vehicles. The fare for this 20-mi-long trip is \$2.00 each way.

- Students

Community College Shuttle

After the Northridge Earthquake, the community college in Santa Monica lost its parking structure. The school pays a flat fee to the Big Blue Bus Line to provide shuttle ser-

vice from a remote parking lot to the college campus. All day and evening service is provided for 800 passengers a day. The college does the marketing and the promotion; the Big Blue Bus Line does the scheduling and routing.

- Tourists

Free Summer Shuttle

During the summer, the hotels sponsor a free shuttle that travels between the two major shopping areas (the Promenade and Main Street). Twenty-five-ft-long 22-passenger buses carry 500 to 600 riders per day.

Lunch Hour Shuttle

Also during the summer, the downtown business district promotes a shuttle that circulates during the lunch hour between the Colorado Business Park and downtown Santa Monica. This free service is used by tourists and downtown workers.

- Special Events

The Big Blue Bus Line has been providing shuttles to the Rose Parade for many years and has a package that includes transportation plus a ticket to the parade. They typically use 15 or 20 buses, but if the economy is good, they may have to use as many as 30 buses.

The Big Blue Bus Line provides shuttles to fairs and festivals as the opportunity presents itself. This line has never provided service for athletic events—such service does not work in Los Angeles because the freeway system and parking facilities are too accessible.

The Big Blue Bus Line runs monthly tours, as a nonprofit item, to promote their community image—not to generate new riders. Fares are charged that cover expenses, and three to five buses are used to travel to specific locations such as Theater in Orange County or an apple festival.

MONITORING PRACTICES

Santa Monica conducts a study every 3 years on all routes. On a daily basis, staff keep tabs on the needs and opinions of riders by distributing "green sheets" which are returned to operators. This may lead to service changes, such as adjusting service on overloaded routes by reducing headways or increasing frequency. New routes are not needed; lack of accessibility to buses is not an issue.

FARE STRUCTURE AND PASS PROGRAM

The Big Blue Bus Line does not use passes. There are punch cards for students who account for 15 percent of riders. The punch cards are available for students under 21 who are enrolled in public or private school and may be used only for transportation to and from school.

The local fare is \$0.50 and has not changed since 1983. In 1991, there was an increase in the express fare from \$0.80 to \$1.25. Transfers are free for the Big Blue Bus Line buses and

cost \$0.25 if changing to another bus line. Schedules are designed so that buses pulse out of downtown at night, facilitating transfers between lines.

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NEW SERVICE CONCEPTS

- | NEW SERVICE CONCEPTS | TARGET MARKETS/
USER GROUPS |
|---------------------------------------|--------------------------------|
| • Expanded Peak Period Express Routes | Commuters |
| • Timed Transfer Centers | Commuters/Seniors/
Students |
| • Adopt-a-School Program | Students |
| • Metrolink Shuttle Routes | Commuters |

REASONS FOR HIGH PRODUCTIVITY

- New subregional transit operator providing service on lines formerly operated by a large, regional operator
- Extensive service expansion
- Increased ridership on commuter express lines
- Employer incentives for public transit users
- Discounted transit passes
- Foothill's response to LACMTA strike resulted in many new riders; a large number have been retained
- Special lines implemented after January 1994 earthquake serve more riders in and out of Los Angeles

SYSTEM PROFILE

Foothill Transit is a unique "public-private partnership" in the delivery of public transit services. Foothill Transit was established as the San Gabriel Valley Transportation Zone, which encompasses the eastern portion of Los Angeles County known as the San Gabriel and Pomona Valleys. The service area of 327 sq mi consists of 20 cities and adjacent unincorporated areas of Los Angeles County.

Foothill Transit began operating transit service in December 1988, replacing service formerly provided by the regional transit operator (SCRTD, now LACMTA). The zone was created to operate 14 transit lines. Currently, Foothill Transit operates a total of 21 lines, including 10 express lines and 11 local lines. These services require a fleet of 215 buses.

Foothill Transit is publicly owned and controlled and privately operated. It has no employees of its own. All services are performed by contract with private firms, which provide all dispatchers, drivers, mechanics, fuel, parts, insurance, a bus yard, and road supervision. The management and administrative services are provided through a management services contract.

Foothill Transit has attracted additional riders each year of its operation. In FY94, there were more than 11 million passenger boardings. Passenger productivity, measured as passengers per hour, has remained in a range of about 27 to 30 passengers per hour for the past 6 years. Annual fluctuations reflect service expansion, downturns from the local economy, and the response to external events including earthquakes and a strike at LACMTA.

Since its inception in 1988, Foothill Transit has consistently provided transit services at significant savings compared with the costs of the previous operator. Foothill Transit prepared the following comparison of its recent performance with the estimated performance on the same lines operated by the SCRTD, assuming the LACMTA continued to operate these lines:

	LACMTA Equivalent Operations 1994	Budgeted Foothill Transit 1995	Difference
Operating Cost	\$34,791,542	\$24,144,630	(30.6 percent)
Farebox Revenue	\$7,202,935	\$10,500,000	45.8 percent
Subsidy Required	\$27,588,607	\$13,644,630	(50.5 percent)
Vehicle Service Hours	277,569	435,000	56.7 percent
Boardings	8,025,620	12,000,000	49.5 percent
Peak Buses	119	190	59.5 percent
Cost per Passenger	\$4.34	\$2.01	
Cost per Hour	\$125.34	\$55.50	
Passengers per Hour	28.9	27.6	
Farebox Ratio (Revenue/Cost)	20.7	43.5	

Data Source: Foothill Transit

Essentially, Foothill Transit is operating more service, carrying more passengers, and incurring lower costs. Its performance in selected indicators also shows improvement over the LACMTA equivalent operations, with passenger productivity showing only a slight decline while operating significantly more service.

RIDERSHIP PROFILE (US Census Data 1990)

Foothill Transit carried 11,052,000 passengers in FY94. Almost one-half of these riders (5,135,907) were carried on express services on weekdays. Another 3,120,965 were transported on local services on weekdays. The balance were weekend riders.

Foothill Transit has registered ridership increases each year that it has operated. During the past 3 years, its ridership rose from 6.9 million in FY92, to 9.8 million in FY93,

to 11.1 million in FY94. Its passenger productivity during these same years has ranged from 27.2 to 28.0 passengers per hour.

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- Commuters—New service has been added to areas previously unserved. A prime example is Route 690, a peak-period express service begun in 1991 between Montclair and Pasadena. This represents the first commuter express service oriented toward an employment center other than downtown Los Angeles. Metrolink train riders constitute a specific new market being targeted; three new shuttle routes are scheduled to start in November 1995.
- Transfers—Foothill Transit is implementing a network of eight timed transfer centers. The specific locations were developed based on an extensive study, including a rider survey, that identified a major concern among transit users as the inability to smoothly transfer from one line to another. The timed transfer system is being designed to guarantee that connections between bus lines are made easily.
- Students—The current marketing plan targets students on the local routes through participation in community "Adopt-a-School" programs.
- Outreach to Hispanic Community—Foothill Transit estimates that between 20 and 30 percent of its ridership is Spanish-speaking. FT is committed to developing appropriate communications campaigns which appeal to current and prospective Hispanic riders. This outreach effort includes preparing bilingual versions of printed materials and targeting publicity efforts to media outlets serving the prospective Hispanic customer.

MONITORING PROCESS

Foothill regularly monitors the travel needs of ridership segments to determine where the greatest demand is and to schedule appropriately. The largest effort to date has been the COA/Strategic Master Plan of 1994, which addresses each community in the service area in terms of demographics, transit usage, and latent transit demand. Every existing bus line was evaluated; many of the lines had not been altered significantly since they were transferred to the zone from SCRTD/LACMTA (mostly between 1988 and 1991). Comprehensive service changes and expansions were proposed and are being implemented as a result.

In FY94-95, Foothill initiated an Attitudes and Awareness Study. Results of this study will allow FT to more accurately profile the demographics of its riders and to develop marketing messages that will be more effective in reaching potential customers.

FARE STRUCTURE AND PASS PROGRAM

Local riders pay a flat fare of \$0.85. Express riders are charged a premium, which is based on the length of the nonstop freeway portion of the trip, including the El Monte busway. There are five different express zones. Seniors and citizens with disabilities pay a reduced fare of \$0.40 with no express zone charges. Students using a monthly pass or Metrocard pay a reduced fare of \$0.60. Transfers are available between routes and to/from other connecting systems for \$0.10.

Monthly passes are available for the above categories. Also, there are joint Foothill/LACMTA monthly passes. Foothill Transit also is a participant in the regional Metrocard stored-value debit-card program.

There have been some limited-time marketing promotions that include special fares or fare coupons or special deals with local business that can be obtained by showing a valid monthly transit pass.

Foothill's base fare has remained at \$0.85 since it began operating in 1988. During the same period, the regional operator increased its base fare to \$1.35.

ROUTE-SPECIFIC INFORMATION AS AN INDICATOR OF GROWTH TRENDS

The greatest ridership increase is on Foothill's commuter express lines. Total boardings on the express routes rose by 88 percent between FY92 and FY94. At the same time, the level of service expanded: there was an increase of 67 percent in revenue vehicle hours and 59 percent in miles.

The fastest-growing routes in Foothill Transit's service area include Route 187, a local route providing east-west service through the length of the service area, along the northern tier; Route 480/481, a freeway express service that also operates via local streets, especially in the more distant areas; Route 498, a freeway express commuter service that operates directly between downtown Los Angeles and the suburban points, with few intermediate stops.

Inter-county service between Los Angeles County and neighboring San Bernardino County has traditionally been a weak link. Providers rarely crossed county lines, leaving a 2-mi void and limiting through travel. In response to this issue, Foothill established Line 480 in July 1994, providing service to the Montclair Transfer Center. The Montclair Transfer Center is the main link between Foothill Transit and bus service in San Bernardino and Riverside Counties, operated by Omnitrans and the Riverside Transit Agency. Currently, Omnitrans coordinates its bus schedule with Foothill Transit service at the center to provide customers with convenient transfers. In February 1995, Foothill expanded service on Line 690 from Claremont to Montclair. Foothill receives some of its ridership from Park-and-Ride users at the Montclair Center. The center is also the site of a daycare facility.

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NEW SERVICE CONCEPTS

TARGET MARKETS/ USER GROUPS

- Express Service from Park-and-Ride Lots
 - Local Service to Employment Centers
 - U-Pass Program
 - Vanpool Program
 - Community-Based Service
- Out-of-County Commuters
 - In-County Commuters; Major Employers
 - University of Washington Students/Faculty/Staff
 - Target Employers/ Employees
 - Lower Density Areas

REASONS FOR HIGH PRODUCTIVITY

- Effective route restructuring
- Customized routes to major employment centers
- Expanded vanpool service
- High development area

SYSTEM PROFILE

Snohomish County is just north of Seattle in the growing Puget Sound Region. The county has an area of 1,300 sq mi and a population of more than 510,000 people. Snohomish County Public Benefit Transportation Area (PTBA), called Community Transit (CT), was created in 1975. CT is the primary provider of public transportation in Snohomish County.

CT provides local and commuter fixed-route transit services. Local routes are designed to provide basic mobility within the PTBA and access to transfer opportunities. CT local service is operated using 122 standard and articulated transit coaches. Commuter routes operate predominantly in peak directions and during peak periods and are designed toward specific employment-related destinations. Commuter route design emphasizes the park-and-ride lot system in the county. The commuter routes serve downtown Seattle, Bellevue, and Redmond. This service is provided by a contractor, using a fleet of 89 coaches.

CT also provides In-County Commuter service on 11 local routes to the Boeing Everett plant, customized to meet that employer's needs. CT's vanpool program leases vans

to qualified commuter groups with an origin or destination in Snohomish County. Currently, CT operates 75 vans from its fleet, which was recently expanded to 142 vans. Three vans are lift-equipped. Some 83 percent of the vanpools operating today travel to Snohomish County employment centers.

Community Transit recognizes that fixed-route transportation is not the answer to all transportation needs in the PTBA service area. CT is emerging from its traditional role as a bus company and is positioning itself as a market-driven company. The transition from a product-driven agency to one that is market-driven will feature new roles for vanpool/carpool programs, local bus operations, and community outreach initiatives. CT is aggressively developing innovative ways to tailor service in transportation pockets by using demand-response, smaller buses, and an increased emphasis on vanpools and carpools.

RIDERSHIP PROFILE (US Census Data 1990)

CT carried 5.4 million total riders in 1994. The distribution by service type, provided below, shows the relative strength of the local and intercounty commuter markets:

	Annual Riders	Percent of Total
Suburban/Local	2,276,660	42.2
Inter-County Commuter	1,912,121	35.4
U-Express	599,296	11.1
In-County Commuter	264,954	4.9
Vanpool	206,450	3.8
DART	138,787	2.6
TOTAL	5,398,268	100.0

CT has registered continuous ridership increases over the past 5 years. Over the past 3 years, average weekday boardings for the bus system as a whole have increased from 17,481 in 1993 to 20,507 in 1995, an increase of 17 percent. These trends were not consistent by service type, however, as follows:

Average Daily Boardings

Percent Service Type	1993	1994	1995	Change
Local	6,568	7,087	9,188	39.9
Intercounty Commuter	7,432	7,300	7,943	6.9
In-County Commuter	1,164	1,052	903	-28.9
University Boardings	2,317	2,626	2,473	6.7
Bus System Total	17,481	18,065	20,507	17.3

CT staff indicated that ridership on all commuter routes was increasing steadily until 1992 when the definition changed for high-occupancy vehicle (HOV) lane use. Vanpool ridership was expected to hold steady or decline slightly in 1994 because of dramatic personnel shifts and layoffs at Boeing-Everett.

The entire CT bus system averages a productivity level of 21.8 passengers per hour. As shown below, productivity varies by service type as follows:

Service Type	Passengers per Hour
Local	17.3
In-County Commuter	14.9
Intercounty Commuter	30.9
University	31.8

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- *Customized Routes*—CT operates In-County Commuter Service consisting of 11 routes serving Boeing, the largest employer in the county. These routes are open to the general public but customized to meet Boeing's needs.
- *University Service*—To serve the University of Washington, a U-PASS program was introduced in 1991 by a partnership of Community Transit, Seattle Metro, and the University. The U-PASS is a flexible package of transportation benefits that allows students, faculty, and staff to choose from various commuting options at a greatly reduced price.
- *Expanded Vanpool Service*—Vanpool service has been expanded to better serve the commuter market. Vanpool ridership experienced a 73.6 percent increase between 1991 and 1994.
- *Local Route Restructuring*—The South County Route Network Analysis led to overall fixed-route system changes in 1992. These changes included individual route and schedule adjustments, and changes in the fundamental local network orientation. Two routes were terminated; most of the remaining routes were changed. A South County transit center was established west of Highway 99, eliminating forced trips to the Lynnwood transit center for those who wish to transfer to the Highway 99 corridor.
The North County route changes in 1993 resulted in a 5 percent overall increase in ridership. Two routes were discontinued, two routes were added, and several routes were expanded. Time adjustments enhanced weekday service on several routes, including minor time adjustments on Routes 210 and 280. Average weekday boardings on Routes 210 and 280 increased by 75 percent and 77 percent, respectively. Ridership more than doubled on both new routes in their second year.
- *Community-Based Services*—In new subdivisions, and particularly in the less densely populated parts of the service area, alternatives to fixed-route bus service may prove more attractive. Services oriented only to a specific residential area with connections at a community center to the fixed-route bus network could provide service tailored to the community's needs.

MONITORING PROCESS

CT evaluates its operations based on annual performance in the following six performance centers: Local Fixed-Route Service; In-County Commuter Service, Commuter Service; University Service; Disabled Service; and Vanpool Service.

The MPO does annual modeling. Community Transit uses this as input to conduct geographic analyses.

An on-board survey was conducted in July 1993 as part of a regional project to measure transit ridership and overall traffic patterns. In 1993, CT hired a firm to conduct a system market research study (SMRS) to analyze its routes and target markets and to provide input into structuring for the future. This study was completed in 1994. The foundation of the SMRS project was the telephone survey of 1,603 households in Snohomish County, conducted in May/June 1993. The survey profiles both current customers and non-customers in terms of demographics, current transportation behaviors, and attitudes. Five distinct groups were defined, ranging from Group A ("pro-bus") to Group E ("pro-car"). The five groups are as follows:

- Group A: 24 percent of Snohomish County population; strongest pro-transit responses; concerned about future traffic and environment;
- Group B: 16 percent of Snohomish County population; supporters of pro-transit issues; still feel safe in their cars;
- Group C: 18 percent of Snohomish County population; most uncomfortable with new things and new people; smallest percentage of commuters;
- Group D: 25 percent of Snohomish County population; will stay in car if gas prices are low; starting to feel unsafe in their cars; and
- Group E: 17 percent of Snohomish County population; pro-car attitudes; will always choose their car—convenience is a major factor.

The SMRS concluded that those individuals that constitute Groups A and B and a small segment of C are the primary targets for conversion to transit users. Based on the data collected, this segment constitutes 50 percent of the total marketplace and 64 percent of the commuters in the county. Almost half (49.6 percent) of this segment currently commutes by single-occupant vehicle. Therefore, according to the SMRS, the potential for increasing market share exists within the three most promising groups.

FARE STRUCTURE AND PASS PROGRAM

Current fares for local service are \$0.80 with a reduced fare of \$0.40 for seniors and those with disabilities. Fares for the In-County Commuter are \$1.00. A fare of \$1.50 is charged for Commuter (Express) service, with a \$0.75 fare for seniors and those with disabilities. Fares for the

U-Express are \$1.35 regular and \$0.65 for seniors and those with disabilities.

Ridership by fare category in 1994 was as follows:

Category	Percent
Local	45.1
Commuter	37.8
University	11.9
In-County Commuter	5.2
TOTAL	100.0

Local, commuter, and university riders can purchase monthly or annual passes; in-county commuter riders can purchase a monthly pass. Also, a local all-day pass is available to provide unlimited rides for the price of a roundtrip fare.

A fare increase was implemented in 1991 to keep fares in line with inflation. Ridership continued to increase despite the fare increase. CT also has experienced a growth in revenues from sales tax and gas tax.

ROUTE-SPECIFIC INFORMATION AS AN INDICATOR OF GROWTH TRENDS

Commuter express service on I-5 is Community Transit's most recognized and most successful service. It serves a well-defined consumer need and is the only current market where transit can be competitive with the single-occupant vehicle.

Two of the top performers, Routes 610 and 210, are local routes that bisect the dense portions of the PTBA. These two routes carry nearly 15 percent of CT passengers.

In addition to Route 610's performance indicating the importance of Highway 99, Route 620 also travels along Highway 99 for a portion of the route. Route 620 is the fifth best route in the system. The activity associated with the Highway 99 corridor and its proximity to residential areas make it an important transit corridor from the perspective of CT's riders.

The strength of the current market for commuter service to downtown Seattle is also shown. Five of the top ten heaviest traveled routes in the system are in this category. Currently, as many people use commuter service to Seattle as use local fixed route. As of Spring 1994, there were approximately 3,500 trips to downtown Seattle and 1,300 trips to the U-District daily.

The SMRS suggests that the future growth of the King County commuter market will not be in downtown Seattle or the U-District but will be oriented to the I-405 corridor east of Lake Washington and other employment sites in north Seattle between South Lake Union and the Northgate area.

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 Chief Engineer for Strategic Investments

NEW SERVICE CONCEPTS

- Electrification of Ronconcomo Line
- New Parking Garage
- Shuttles to Rail Stations
- Dual-Mode Trains
- Rehabilitation of Penn Station
- Planned extension of LIRR to Grand Central Station

TARGET MARKETS/ USER GROUPS

- Commuters (Discretionary Riders)
- Kiss and Ride Commuters
- Commuters Traveling from Stations with Inadequate Parking
- Commuters to NYC Transferring at Jamaica Station
- Commuters
- Commuters

REASONS FOR HIGH PRODUCTIVITY

- Increased capacity using bi-level coaches
- Reduced travel time
- Elimination of transfers
- Service adjustments (reallocation of trains)
- Shuttles to rail stations
- 15 percent fare increase in 1990
- 93 percent reliability

SYSTEM PROFILE

The Long Island Rail Road, originally a branch of the Pennsylvania Rail Road, was purchased by the State of New York in 1965 and is managed by the MTA. It operates as a commuter rail system, with nine separate branches, and provides service from Long Island and the borough of Queens into Manhattan. The service area of the LIRR encompasses 3,990 sq mi with a population of 11,720,000. Average ridership for weekday trips is 325,000.

At peak travel times, this commuter service operates at capacity or exceeding capacity, so attempts to develop new service concepts for the choice riders in this market focus on reducing travel time and improving accessibility and parking at the 134 rail stations.

The price of automobile travel into New York City is extremely high, traffic congestion is horrendous, and when tolls and parking costs are included, more expensive and

more time-consuming than traveling on the LIRR. Consequently, the LIRR has a 73 percent market share of peak commuter travel from Nassau and Suffolk counties into New York City.

There has been a general system wide decline in commuter ridership (approximately 1 percent), attributed primarily to unemployment factors. Although off-peak ridership is up, there is not enough of an increase to offset the commuter decline, so revenue was down at the end of the last quarter.

Parking is an issue at many stations. Ridership exceeds the parking capacity. Management believes that if they could increase parking, they could increase ridership.

RIDER PROFILE (US Census Data 1990)

- 46 percent Total Transit Use
- 63 percent Female (bus)
- 49 percent Female (subway)
- 38 percent Immigrants (bus)
- 43 percent Immigrants (subway)
- 30 percent Black
- 21 percent Hispanic
- 60 percent Single

The average rider on the LIRR is a commuter riding by choice (73 percent market share), who remains a loyal patron for an average of 9 years. There is also a small reverse-commute market, a leisure market that uses the trains to reach the beaches at the East End of the island (14 percent market share), and an off-peak market that uses the trains for shopping and theater (30 percent market share).

There has been a demand shift among early morning commuters. With an earlier arrival time in the city, ridership has increased by 20 percent on those trains, from 580 riders to the 700 range. Comfort is an important issue for those riders who travel a long distance. The LIRR is attempting to improve the seating in its newer coaches to attract riders.

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- Commuters

1. Electrification of the Ronconcomo Line

In 1987, the main Ronconcomo Line, at the eastern most edge of the LIRR commuter area, was electrified, reducing travel time from 1½ hr to 1 hr on the 51.5 mi stretch from Ronconcomo into the city. By converting this route from diesel to electric, riders were able to eliminate the transfer at Jamaica Station, the last stop before entering the tunnel into Manhattan. Diesel engines are not allowed in the tunnels entering Manhattan. This change generated a tremendous increase in ridership, resulting in the addition of a train since 1990. This line still continues to show growth in all segments

of the market from construction workers to white collar workers.

2. New Parking Garage

The parking area at the end of the Ronconcomo Line was at capacity and needed to be expanded. During the summer, a new parking structure was completed providing more than 1,000 parking spaces. The new garage has not changed ridership numbers; the intent was to relieve the parking problem. Riders are assessed a \$25 per month parking fee to offset the cost of the facility which was \$9 million. At this point, riders are still reluctant to pay for parking, and in November rail fares are increasing from \$180 a month to \$200 a month, a 25 percent increase, if one includes parking costs, over what commuters were paying earlier this year. The Master Plan for the LIRR includes changing all free surface lots to pay lots.

3. Feeder Shuttles

The LIRR added a fixed-route neighborhood shuttle in Farmingdale in an attempt to alleviate parking problems at that rail station. The shuttle provides feeder service to trains that are not at capacity. The Port Jefferson line has a similar feeder shuttle at milepost 52 that was introduced 3 years ago. An additional shuttle is planned for the Stonybrook area which is experiencing similar problems.

4. Reverse-Peak Train

A reverse-peak train was recently introduced on the Port Jefferson line to build that market. The service has not been very successful because of frequency problems. It has been difficult to promote the reverse-peak market since there are not enough trains available when needed. On branches where the line is double tracked, like Garden City or Hemstead, the reverse-peak market could be targeted.

5. Dual-Mode Trains

LIRR is purchasing dual-mode trains for its Port Jefferson line. Because diesel trains cannot travel through the tunnel into the city, all trains must stop at Jamaica Station and passengers must transfer to electric trains. Switching to dual-mode trains eliminates the need for transfers at Jamaica Station and reduces travel time by 12 min. With the new equipment and platform extensions, the LIRR hopes to increase the number of trains during peak hours from 38 trains per hour to 42 trains per hour.

6. Pennsylvania Station Rehabilitation

The rehabilitation of Pennsylvania Station was completed last year. The cost for the renovations was \$200 million. The new, clean, air-conditioned station has improved passenger flow and generated considerable positive exposure.

- Special Events

During peak hours, trains already operate at capacity, so the LIRR cannot provide special event service during those

times. Service is provided for annual events such as the U.S. Tennis Open with special stops at Shea Stadium Station, and the U.S. Golf Open at Southhampton which increases ridership by 5,000. Events at Madison Square Garden, such as Rangers hockey games and the Democratic National Convention are easily served by existing service and do not create new markets.

FARE STRUCTURE AND PASS PROGRAM

Thirty percent of all passengers pay cash fares: 8 percent pay full cash fare and 21 percent pay off-peak cash fares. Seventy percent of total riders use monthly passes, with 95 percent of commuters using monthly passes. There is a promotional child's fare of \$0.50 for up to four children per adult. This fare is used primarily for public relations purposes, not to generate revenue. An average 9 percent fare increase has been proposed for November 1995, weighted by zone.

MONITORING PRACTICES

Customers are surveyed annually using origin and destination studies. Surveys are distributed on platforms and trains and with mail-and-ride tickets. Service adjustments are made in response to rider counts. Trains are reduced by the number of cars that are underutilized and put on branches that need them for growth.

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 Transit Development Coordinator
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 Manager of Planning

NEW SERVICE CONCEPTS	TARGET MARKETS/ USER GROUPS
-----------------------------	------------------------------------

- | | |
|--|-------------|
| <ul style="list-style-type: none"> • None | <p>None</p> |
|--|-------------|

REASONS FOR HIGH PRODUCTIVITY

- Fare increase in 1992

SYSTEM PROFILE

RTA in New Orleans operates traditional bus service and light rail service into downtown and provides most of the

public school transportation for the district. There is also limited service for the tourist market.

RIDER PROFILE (US Census Data 1990)

- 9.11 percent Total Transit Use*
- 61 percent Female
- 6.7 percent Immigrants
- 72 percent Blacks (bus)
- 87 percent Blacks (light rail/streetcar)
- 72.5 percent Singles

*Commute to work

MONITORING PRACTICES

RTA conducts on-board surveys every 3 to 5 years. These surveys are not used for marketing purposes but could be used for decisions concerning service changes.

FARE STRUCTURE AND PASS PROGRAM

Five percent of RTA passengers use passes; 95 percent pay cash fares. The 5 percent that use passes are a combination of workers, public school students, and tourists. Monthly passes marketed for workers are sold for \$40 a month. Public school students receive passes paid for by the school system. RTA considers the student population to be their most successful market segment. For tourists, there are two types of passes: a 1-day pass sells for \$3.00 and a 3-day pass sells for \$8.00.

The base cash fare is \$1.00 with a \$0.10 transfer fee. The fare for Elderly and Handicapped (E and H) is \$0.40 for fixed-route service and \$1.00 for wheelchair-lift service.

ROUTE-SPECIFIC INFORMATION AS AN INDICATOR OF GROWTH

The most successful and fastest growing route in the RTA system is the Riverfront Streetcar. It provides service to leisure riders, primarily the tourist market.

Also successful and growing are two express routes that provide commuter service from middle-income suburban areas.

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NEW SERVICE CONCEPTS

- "Edmonton-style" timed transfer system, with multiple transfer points and coordinated schedules
- Community-based paratransit, Travelers to non-CBD destinations
- Extend-a-ride fare (transfer)
- Tours of local sights and other tourist-oriented services (e.g., ferry service)
- Comprehensive ridesharing services
- "Product Manager" model of marketing

TARGET MARKETS/ USER GROUPS

- Transit dependents, Military families, Travelers to non-CBD destinations
- Low-density areas
- Trip chaining
- Area visitors
- Commuters

REASONS FOR HIGH PRODUCTIVITY

- Revised fixed-route network to accommodate timed transfers
- Many fare/pricing innovations
- Expansion of service on express bus routes

SYSTEM PROFILE

Tidewater Regional Transit (TRT) provides regular route transit to the cities of Chesapeake, Norfolk, Portsmouth, Suffolk, and Virginia Beach. The urbanized area is 253 sq mi with a population of 900,000. The area is influenced by the U.S. Navy, such that the transit system lost approximately 50,000 riders during Operation Desert Storm as both military personnel and their dependents left the area.

TRT operates a fleet of vehicles that is a mix of traditional heavy-duty buses, raised-roof paratransit vans, passenger vans, rubber-tired trolley replica buses, and ferry vessels. TRT categorizes its service as three distinct service groups: transit and paratransit; tourist (summer); and ridesharing.

TRT is known within the transit industry for its innovations. It was one of the first systems to introduce paratransit service, community-based service for the general public, and ridesharing and vanpooling. TRT also has many innovative elements in its fare structure, as a way of segmenting its markets. Examples include deep discount pricing, the Fare Cutter Card, and the Extend-a-Ride transfer.

RIDER PROFILE (US Census Data 1990)

In FY 1994, TRT carried 8.3 million passengers, of which 6.9 million were on its bus services. The others used the

other five services: Maxi Ride, trolley, ferry, Handi-Ride, and vans.

Productivity in FY 1994 on the bus service averaged 18.6 passengers per hour. The productivity of TRT's Maxi Ride service was 3.5 passengers per hour. The trolleys carried 17.3 passengers per hour, while the higher capacity ferries carried 79.5 passengers per hour.

TRT bus ridership over the past 10 years has declined. Its passenger productivity for fixed-route bus service has shown a similar decline. Recently, year-to-year trends have been more stable.

The largest recent change in bus ridership on regular route transit services occurred between FY90 and FY91. Annual bus ridership decreased from 8,540,179 in FY90 to 7,443,829 in FY91. This was largely the result of Operation Desert Storm, which took military personnel and dependents from the area. Ridership continued to decline, to 7,059,517 in FY92 and 6,880,249 in FY93. In FY94 ridership increased slightly, to 6,882,577. As shown below, the recent ridership trends for the other services were mixed.

Service	Annual Riders		
	FY93	FY94	Percent Change
Bus	6,880,249	6,882,577	0.03
Elderly and handicapped	161,453	178,971	10.85
Maxi-Ride	78,372	79,655	1.64
Trolley	728,026	610,796	-16.10
Ferry	485,123	481,492	-0.75

The trolley and ferry serve the tourist market, which was affected by heavy rainfall during July and August 1994 (over 14 inches fell on the Hampton Roads area).

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

In anticipation of declining subsidies, TRT has had to reduce service over the last decade; however, a considerable effort has been made in trying to get the most out of each bus on each route. Because transit operates for the benefit of passengers, it is very desirable to combine efficient route design with a network design. Timed transfers have served both as an operating system and a customer service approach.

TRT introduced a timed transfer system in multiple phases, from 1989 through 1991. All routes and schedules were revised from a radial network to a system of multiple hubs and spokes. Schedules promote coordinated transferring. There are 13 transfer locations in the service area. From two to six routes meet at a location. There are no elaborate facilities because passengers are not waiting long (off one bus and onto the next). As part of a guaranteed connection program, drivers may wait up to an extra 2 min beyond scheduled leave time for other buses due at the transfer point.

TRT's Direct Transfer Bus system is popular with riders and the essential thrust of its service delivery network. About

40 to 45 percent of bus trips involve a transfer. More than half of all transfers occur outside the downtown area.

TRT eliminated the dispatch function on Maxi-Ride, its community-based paratransit services. Services operate within a small area (25 sq mi). There is only one vehicle per area. The vehicle is equipped with a cellular phone. Passengers call the driver directly to request a pick-up. The driver develops the most appropriate route and schedule to accommodate the requests.

The Summer Youth Pass has given TRT a vehicle for marketing to the next generation of bus riders and commuters while marketing the direct transfer benefits to their parents.

TRT's emphasis of late has been on increasing ridership of the HOV Express Buses. TRT has had success marketing the HOV concept, as evidenced by the 6,000 vehicles per day using them to commute and the 700 people who have signed up for the Guaranteed Ride Home Program.

MONITORING PRACTICES

TRT has good route-level statistics in its monthly performance report. It gets fare category information from the fare-box. More detail on segments comes from specific market research efforts.

TRT does periodic market research. Typically, its research is small scale and project-specific. Most research is conducted after a change has been implemented and is part of the evaluation.

An example of a more comprehensive survey was one conducted in December 1991 to determine a profile of the transit riders, identify transit origins and destinations, determine trip purpose, and identify potential improvements to the TRT system. This particular survey was conducted of 3,361 riders on all regular weekday bus routes. Similarly, a survey was conducted of residents as part of the Short Range Transit Development Program, completed in July 1993, to better understand their attitudes toward transportation issues, their awareness and perception of TRT services, and their potential for making more use of existing and future local public transportation services. A total of 1,200 telephone interviews were conducted. An on-board survey also was conducted as part of this effort.

FARE STRUCTURE AND PASS PROGRAM

TRT achieved a farebox recovery rate of 46 percent in FY95.

There have been no fare changes since 1990. TRT's pricing consists of cash fares, discount ticket books, and Fare Cutter cards. Other pricing categories include additional zones, Extend-a-Ride, express surcharge, and reduced fares for senior citizens, persons with disabilities, and children. The current base cash fare is \$1.10. An additional \$0.55 charge is required when crossing a zone. There is an express

surcharge of \$0.10 and an HOV Express fare of \$1.50. TRT offers half fares to senior citizens, persons with disabilities, and children. Consistent with its timed transfer system, there is no charge for transfers. The Extend-A-Ride fare, which permits the passenger to get on and off the same bus route, is priced at \$0.55.

Ticket discounts are the core of TRT's fare strategy. Tickets are sold for \$0.80 each, reflecting a significant discount off the cash fare. Reduced-fare tickets also are sold. TRT also sells two Fare Cutter Cards. A passenger who purchases this monthly card pays only \$0.25 per boarding. A one-zone card is sold for \$20.00 and an all-zone card is \$38.00.

The current cash fare for Maxi-Ride and Handi-Ride is \$2.20. Maxi-Ride users can pay with tickets, using two bus tickets or \$1.60. Handi-Ride users can use a zone ticket for \$1.10. Other special fares are in effect for the ferry, seasonal trolleys, tours, and festival shuttles.

A fare restructuring was to be implemented on November 5, 1995. Zone fares will be discontinued, reflecting TRT's conclusion that distance is not an appropriate market. The emphasis instead will be on discounts, distinguishing markets by their sensitivity to discounts and their willingness to pay. The cash fare will be a flat rate of \$1.50. Discount tickets will be sold in a book of ten for \$10.00. TRT will keep the Fare Cutter Card, pricing it at \$32.00 plus \$0.25 per ride. The HOV Express Bus fare and the express surcharge are being discontinued. Maxi-Ride and Handi-Ride both will become a flat rate of \$3.00 (twice the base fare). Transfers will remain free under the fare restructuring. The Extend-A-Ride ticket will become \$0.75.

ROUTE-SPECIFIC INFORMATION AS AN INDICATOR OF GROWTH TRENDS

During the period from October 1994 through June 1995, the entire TRT bus system averaged a productivity level of 22.3 passengers per hour. The performance of individual services was as follows:

Service Type	Passengers per hour
Fixed-route	19.3
Maxi-Ride	3.8
Handi-Ride	0.2
"Visitor"	19.4
Ferry	68.8

Cross-town routes have proven to be a growing market; ridership has increased even more with timed transfers. The timed transfer system is more suitable to the geographic pattern.

Routing has been refined on the express services (HOV and park-and-ride). From October 1994 through June 1995, productivity on the five express routes was 11.6 passengers

per hour. However, productivity on Route 40N Park-and-Ride was 40.3 passengers per hour.

In addition to the naval base routes, TRT has added HOV express bus routes to downtown Norfolk and to the medical center in Norfolk. TRT also is working with PenTran, the transit operator for the Hampton/Newport News area regarding improvements to interregional express bus service.

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Sheila Barbareni
Transit Planner

Mark Navares
Transit Planner

employment centers, unserved. With the exception of two route extensions and several cross-town routes (Color Lines) in the northernmost edge of Phoenix, there has been very little new service added since 1990. Because there are multiple contractors providing bus service in the Phoenix area, there is some duplication of service.

RIDER PROFILE (US Census Data 1990)

- 1.98 percent Total Transit Use
- 53 percent Female
- 18 percent Immigrants
- 12 percent Black
- 28.54 percent Hispanic
- 64 percent Single

The profile of Phoenix area bus riders differs from the national average in two respects: nationally, seniors account for 7 percent of bus riders, in Phoenix, only 3 percent are over age 65, while 18 and under riders account for 17 percent of the Phoenix ridership, which is significantly higher than the national average of 10 percent.

NEW SERVICE CONCEPTS

- Cross-Town Routes (Color Lines)
- DASH
- Dial-A- Ride
- Bike and Ride Program
- Magnetically Coded Fare Collection Boxes

TARGET MARKETS/ USER GROUPS

- Workers at Major Employment Centers, Residents of North Phoenix
- Downtown Workers
- General Public on Sundays and Holidays
- Students
- All Riders

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- Workers at Major Employment Centers—Color Lines
RPTA responded to the constraints of the grid system and piece-meal approach to service delivery with route restructuring in the East Valley. In March 1994, they introduced Color Line Service designed to serve major employment centers and other major destination points such as Arizona State University and Sky Harbor Airport.
New routes were created by taking the most productive segments of existing routes and realigning them along transportation corridors. The lines were linked together and headways reduced by 15 to 20 min. The Color Lines do not operate on a grid—they follow natural geographic boundaries. Riders who previously had to transfer can now make a "one-seat trip." While ridership has increased on the Color Lines, there has been a corresponding decline on the grid-line routes.
- Downtown Workers—Downtown Area Shuttle (DASH)
A free downtown circulator was introduced in Phoenix in November 1990. It was sponsored by a partnership of the downtown merchants and financed with an Air Quality Management grant. It operated on a 10 min loop through downtown and provided service to the state capital. During the first couple of years, growth was high and ridership peaked at 650,000 passengers a year.
In July 1992, funding ended and a \$0.25 fare was initiated. There were also concerns from the downtown merchants that there were a significant number of homeless using the shuttle. The circulator route passed by several

REASONS FOR HIGH PRODUCTIVITY

- Rapid population growth
- Increase in service miles
- Creation of regional public transportation authority
- Route restructuring (cross-town routes)
- Bike and ride program

SYSTEM PROFILE

In 1986, with the creation of the Regional Public Transportation Authority (RPTA) in Phoenix, bus service increased by more than two million miles. Despite that increase, Phoenix Transit operates on a grid system which leaves segments of its service area, including major

downtown homeless shelters. With the addition of the fare, ridership declined. As ridership declined, service was cut back. In March 1995, there were additional service reductions and the shuttle now provides service to the capital only during lunch hours. Ridership has declined from a high of 1,500 riders a day, to less than 600 a day. Seventy percent of current users are lunchtime riders.

There is no indication that DASH riders are typical public transit riders. RPTA never attempted to determine if the introduction of DASH provided an incentive for increased overall transit ridership into the downtown area. It is assumed that it did not, since riders do not fit the typical transit profile. Because of ridership declines, service will most likely be discontinued soon.

- Seniors and Disabled, General Public on Sundays and Holidays—Dial-A-Ride

Prior to March 1993, Phoenix Transit offered a weekday general public Dial-A-Ride in the north end of Phoenix where fixed-route service was limited at best or non-existent. Through a contract with the Arnett Cab Company, mini-vans provided service in the 130 sq mi area that was sparsely populated. Because fixed-route service has been added to that area with route extensions and several new cross-town routes, the weekday general public Dial-a-Ride has been discontinued.

Because there is no fixed-route service in the Phoenix area on Sundays and some designated holidays, Dial-A-Ride service is available to the general public on those days. In recent years, Phoenix Transit purchased accessible vans using federal funds. These vans are now being used by Arnett Transportation to operate the Dial-A-Ride program.

The base fare for the general public is \$2.40 with a surcharge of \$1.20 for each additional zone. There are nine zones in the service area. The average trip is two or more zones, so the average fare is \$3.60 or more.

About one-quarter of the 475 riders on Sundays are general public riders who typically travel to transfer points where they connect with one of the other seven Dial-A-Ride programs in the Valley. The eight Dial-A-Ride programs do not cross jurisdictional boundaries, so a passenger may wait as much as 2 hr at a transfer point to switch to a different carrier.

- Students

Bicycle Racks

Phoenix Transit is the first transit agency to equip its entire fleet with bicycle racks that can accommodate two bicycles per bus and has installed bicycle lockers at many frequently used cyclist destinations. The cost for the project was \$80,000. No performance tests have been conducted to determine if this project generated any new bus riders, but management considers the project to be a successful part of its attempt to attract "environmentally conscious" riders.

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NEW SERVICE CONCEPTS

- The Link/STV Feeder Routes
- THREE for FREE
- Summer Ride
- Passport to Adventure
- Contract with University of Pittsburgh

TARGET MARKETS/ USER GROUPS

- East End Residents (discontinued)
- CBD Workers, Shoppers, and Tourists
- Teenage Riders/School Age Children
- Summer Riders, Children, and Parents
- Students, Faculty, and Staff

REASONS FOR HIGH PRODUCTIVITY

- Service cuts (6.8 percent of service eliminated)
- HP Flyer express routes
- Route deviation to traffic generators
- STVs on non-productive routes
- Fare increases
- High percent senior riders

FACTORS THAT INHIBIT THE GROWTH OF TRANSIT

- Lack of reverse-commute service
- Abundant fringe parking with free shuttle service to CBD
- Light rail ridership at capacity

SYSTEM PROFILE

Pittsburgh has a traditional radial system with 50 percent of riders still traveling into the CBD. The population of the city of Pittsburgh has declined from more than 300,000 to less than 250,000, while the surrounding counties continue to grow. PAT has been unable to keep pace with the growth. New service cannot be added without corresponding reductions in existing service. The growing market is a reverse-commute market.

RIDER PROFILE (US Census Data 1990)

- 8.87 percent Total Transit Use
- 63 percent Female
- 3 percent Immigrants
- 25.2 percent Black
- 62 percent Single

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- **The Link**
This project was initiated in November 1990 as a year long demonstration to test the viability of small transit vehicles in older neighborhoods. Twenty-four passenger vehicles were substituted on 6 non-productive routes, which fed into main trunk lines at two transfer points. Although frequency was reduced to hour headways, the demonstration was successful, and ridership doubled.
- **Three for Free**
Within the CBD, and for all trips originating in the downtown area, riders travel fare free on bus and light rail. There is barrier-free entry at all three rail stations in the CBD (three stops for free) allowing for free travel from one downtown destination to another and on all buses boarded in downtown Pittsburgh. This service is well utilized by those working and shopping in downtown and has been a great selling point for the convention and tourist trade. Trains operate at capacity.
- **Passport to Adventure**
This program provides free rides in the summer to children 11 and under when accompanied by an adult. The passport also provides free admission to local cultural and recreational attractions when the child is accompanied by an adult paying full-price admission.
- **Summer Ride**
A program designed to enable inner-city teenagers to get summer jobs and keep them by providing a bus pass for children 18 and under, at a cost of \$45. The pass looks like a drivers license, with a photo ID, and is valid from June 1 through August 31 in all 5 zones with no restrictions. It can be used to travel to summer day camps, as well as other recreational activities. Pass holders are entitled to discounts at retail stores, bowling alleys, and so forth.
The City of Pittsburgh also purchases the Summer Ride Pass for summer school students. The target market for this program was teenage riders—in fact, most riders are 8- and 9-yr-olds. During the first year of the program, PAT estimates that there were 95,000 trips; by last year, the number had risen to 225,000, with an expectation of an increase this summer.
- **Special Events**
 1. PAT successfully provides shuttles for Steelers Games, Pirates Games, and University of Pittsburgh events at a special round trip fare of \$2.50.

2. For the USGA Open at Oakmont Country Club, PAT was able to provide no-fare express service using special access ramps. During a week-long period, PAT provided service for 105,000 spectators under a \$100,000 contract. Eighty percent of the riders for that event had never ridden the bus before.

3. To celebrate the 100th year anniversary of Carnegie-Mellon Institute, PAT provided 24-hr, round-the-clock shuttles connecting four locations participating in the celebration.

- **Contract with University of Pittsburgh**

PAT has arranged to provide service from two neighborhoods onto campus for a lump sum payment of \$4,000 a week. The University is the largest employer in the area, and on-campus parking is scarce and expensive. A University ID card is used as a bus pass. This experiment expires next spring, but PAT hopes that it will be successful and can be expanded to other campuses as well.

MONITORING PROCESS

Ridership is monitored on a trip-by-trip basis, using eight checkers who ride the buses. Public meetings are held to get input from the community.

PASS AND FARE STRUCTURE

Fifty percent of riders use some sort of prepaid instrument. Tickets are sold in books of 10 and are priced according to zone. There are annual passes and 6-month passes. Purchasers of annual passes pay for 10 months of service and receive 2 months free. Purchasers of 6-month passes get 1 month free. PAT operates on a zone system with the cost of annual passes ranging from \$400 to \$1,130. There is a surcharge for light rail trips, and a surcharge on cash fares paid during peak hours. Six companies participate in the Transit Check Program, in which employers purchase a transportation voucher in denominations of \$15 to \$60 for distributing to employees as a benefit. The employer, in return, receives a tax break.

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Contact: **Henry Church**
Assistant General Manager

NEW SERVICE CONCEPTS

- | | |
|--------------------------------------|-------------------------|
| • Express Service from Park-and-Ride | Suburban Commuters Lots |
| • Summer Ride and Read Program | Middle School Students |
| • Development of Service Routes | Low-income Workers |

REASONS FOR HIGH PRODUCTIVITY

- Compact service area
- Elimination of unproductive routes and Sunday service
- Reduction in frequency of service
- Well-established monitoring practices
- 71 percent captive riders

FACTORS THAT INHIBIT GROWTH OF MASS TRANSIT

- State regulations prohibiting expansion of transit service
- Negative population growth
- Demise of downtown commercial district
- Surplus of inexpensive and accessible parking
- Excellent road system providing quick and easy access to CBD

SYSTEM PROFILE

GRTC has a compact service area essentially defined by the Richmond city limits. Service is provided through a radial route system that extends to the county boundaries and in a few instances beyond.

Despite a declining population base in the city (from 230,000 to 203,000) and a corresponding decline in ridership, GRTC has maintained good productivity rates. Unlike most other urban transit providers, it was not burdened by a surplus of service introduced prior to 1990. When the city assumed control of GRTC 20 years ago, unproductive routes were cut back.

Although Richmond has historically been a good transit town (a public transit system has been in place since the late 1850s), ridership has declined steadily in recent years. Beginning in 1991, passenger trips dropped dramatically with an average decline of 9.4 percent. By 1993, ridership was down an additional 11.1 percent.

Suburbanization of the surrounding counties has occurred. Transportation services have been unable to follow. In the Commonwealth of Virginia, transit companies cannot provide service to adjoining jurisdictions without their approval. GRTC provides limited service to Henrico County in the west end of Richmond, but no service to Chesterfield County where most of the growth has occurred in the last 15 years.

RIDER PROFILE (US Census Data 1990)

GRTC's typical rider is employed (80 percent), a transit rider for more than 5 years (58 percent), a female between the ages of 18 and 44 (67 percent), a resident of a household with a total income of less than \$20,000 (60 percent), and does not have a vehicle available to make the trip (71 percent).

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- Disabled and Elderly
 1. By providing maps and schedules through social service agencies and retirement homes, senior and disabled riders are encouraged to use the public transit system rather than paratransit.
 2. Since 1982, GRTC has been buying accessible buses. During peak hours, the fleet is 80 percent accessible, and during off peak hours there is 100 percent accessibility. By 1996 there will be 100 percent accessibility during peak hours. Disabled riders account for 3,600 trips per year out of a total of 9 million.
 3. Paratransit services are provided under contract with a private operator—roughly 140,000 trips per year. Fare is \$2.25 and no passenger has a ride time of more than 1 hr, with most trips under 45 min.
- Downtown Workers and Tourists

From early 1993 to July 1994, GRTC ran a fare-free downtown trolley from 11 AM to 2:30 PM. It carried 250,000 passengers per year. In July 1994, a \$0.25 fare was imposed. Ridership dropped in half. The frequency was cut from 6 min to 12 which led to the loss of the lunchtime crowd. Service ended July 1, 1995.
- Commuters

GRTC has attempted to increase ridership on park-and-ride routes by encouraging employer subsidies. Bus fares are subsidized for the first 90 days of employment, but once the subsidy ends, ridership drops and few riders are retained.
- Service Workers

In an effort to expand service for low-income workers, GRTC developed a route known as the Jobs Bus which travels along the corridor where many service-sector employers are located. The intent was to enable hotel and restaurant workers to travel to their place of employment.
- Students
 1. The Read and Ride Program was developed in cooperation with the school system and the public libraries. It was designed to encourage students to use the bus and read during the summer. Free bus tickets are awarded to the participants—one ticket for every four books read. The program was introduced in 1992 with 30 students and by last summer had grown to 200 participants.

- 2. The city of Richmond is entering into a partnership with Virginia Commonwealth University and the state to encourage development of a biotechnical research triangle. GRTC is involved in this project to the extent that it is developing a new transit corridor. This would enable them to provide service with a circulator shuttle that would travel between the university, the research triangle area, and the state offices.
- Newcomers
Through local real estate agents, GRTC provides a welcoming package to new residents which includes maps and six free bus tickets. This program has had very limited success in generating new riders.
- Special Events
GRTC does not provide any service for special events. Even when Richmond hosts the NCAA finals, ample parking in the coliseum area is available.

MONITORING PRACTICES

GRTC monitors two-thirds of the 48 routes in its system each year and compares that data with the previous year. They systematically check the first 32 routes 1 year, then the last 16 and first 16 the following year. A system-wide average is computed for effectiveness (passengers per hour) and efficiency (revenue). Each route is measured and graded against the system averages, and recommendations for service cuts are based on the grades. They use this process to monitor changes in ridership and locate unserved residential or employment sites.

Within the traditional service area, there have been no significant changes in ridership patterns in the last 20 years. Ridership continues to be distributed evenly throughout the system, and the decline in ridership is also spread evenly. Twenty years ago, 20 percent of the riders transferred, today 20 percent of the riders still transfer. The marketing department conducts on-board surveys once a year. Riders always want an increase in frequency of service.

FARE STRUCTURE AND PASS PROGRAM

- 1. The Pass Program was eliminated in 1991 on the advice of a consultant. Prior to 1991, there was a weekly pass that was freely transferable, with no picture ID required. This program generated lots of riders but no revenue.
- 2. Since 1990, GRTC has raised fares four times, including twice in 1993. The fare structure includes a cash fare and a discounted fare purchased in books of 10 tickets. Transfer fees vary depending on the method of payment. Riders with disabilities, senior citizens, and school children ride for half fare.
- 3. Henrico County uses zone fares. The additional charges for service to the county range from \$0.15 to \$0.45. Fares on each route are based on distance, but the system is so

complicated that frequently operators on the same line are charging different fares for the same service.

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Assistant General Manager

NEW SERVICE CONCEPTS

- New Rail Stations
- Route Restructuring
- Shuttles from Light Rail Stations
- Office and Commercial Development at Light Rail Stations (Planned)

TARGET MARKETS/ USERGROUPS

- Commuters, Faculty, Staff, and Patients at UCMC
- Commuters
- Employees in Developing Industrial Area
- Light Rail Patrons

REASONS FOR HIGH PRODUCTIVITY

- Growth in light rail system (3.1 percent per month 1994–1995)
- Route restructuring in southern sector in 1994
- Reduced travel time (1 percent reduction increased ridership by 1.8 percent)
- Shuttles from light rail stations to employment centers
- Timed transfer between bus and rail system
- Fare increase in 1992
- Elimination of non-productive routes (replaced with through routes that combined most productive segments)

SYSTEM PROFILE

Sacramento, an urbanized area with a population slightly in excess of 1 million people, is the state capital of California. The Sacramento Regional Transit District (RT) has a service area of 295 sq mi and provides both light rail service and local and express bus service.

In April of 1987, Sacramento expanded its service with a light rail system that became fully operational on two segments in 1988. Ridership increased from 16.7 million trips in FY89 to 21 million trips in FY93. Since 1993, ridership on light rail has increased at the expense of ridership on the bus system. During the last year, light rail ridership has been increasing at the rate of 3.1 percent per month while rider-

ship on the bus system has decreased by 2 percent. This was preceded by a slight reduction in bus service in 1992.

The system is organized to provide timed transfers between modes, and there has been substitution between modes on some routes. The first parallel bus route was introduced in August 1995. It provides express service during peak hours with a travel time of 15 min less than light rail.

State employees working in the CBD provide the primary transit market. Sacramento is home to California State University, as well as several junior colleges and a large community college. CSUS students account for 3 percent of the total transit market, and university students as a whole, for 7 percent.

RIDER PROFILE (US Census Data 1990)

- 2.38 percent Total Transit Use
- 54 percent Female (bus)
- 64 percent Female (subway)
- 71 percent Female (L.R.)
- 13 percent Immigrants
- 14.6 percent Black
- 62 percent Single

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- Commuters

Route Restructuring

In 1994, RT reoriented and restructured service in the South Sector to better serve that market. Non-productive service was replaced with through routes that took the most productive segments of existing routes and combined them. Arterial streets with heavy commercial traffic that had previously not been linked together were combined into through routes with more frequent service to major attractions.

Routes that did not meet performance standards were abandoned or served less frequently. A major shopping mall serves as a transit center for a number of these routes. This south area restructuring has started to generate new ridership. Ridership in June 1995 was 12 percent higher than June 1994 on the restructured routes. Management hopes to see this level of growth from this point forward.

Parallel Routes

In the summer of 1995, the first parallel bus service was introduced on the Orange Vail Citrus Heights Route. There are two trips a day, one in the morning and one in the afternoon. It is considered a premium service, and the fare is \$2.00 each way. Travel time is 15 min faster than the comparable light rail route. If the service is successful, management will consider adding additional parallel routes. RT patrons are requesting the service.

New Rail Stations

Two new light rail stations were added to the Folsom Line at 39th and 48th Streets at a cost of \$600,000 each. The purpose of the expansion was to increase the level of utilization of existing service. These stations are in high- and middle-income residential neighborhoods. The new stations are more elaborate and were designed with input from the neighborhood residents.

Before these sites were completed, the nearest stations were located 30 blocks away. Ridership increased significantly, attracting some new riders, but there was a corresponding decrease on the bus line that served this area. The 39th Street Station is on the northern fringe of the UC Medical Center and there is new hospital construction in the area as well. The station includes a turnaround for the free shuttle bus that serves the medical center.

Shuttle Loop

RT created a new shuttle route to serve a developing industrial area in the south. The old army depot is being converted to private use. The shuttle connects the light rail station to a major computer assembly plant which employs several thousand workers.

- Students

Although the University operates its own on-campus shuttle, RT provides additional service to Cal State students with a number of routes between light rail stations and an on-campus terminal, through the campus with a circulator, and off campus to nearby apartment complexes.

Since the introduction of a special student pass which allows the holder of student ID cards to ride for "free," ridership in this market has increased by 300 percent. CSUS students, however, account for only 7 percent of total RT ridership. The Student Association pays a portion of semester fees to cover the cost of the pass. RT also provides service to several junior colleges and a large community college.

- Special Events

The Sacramento Jazz Jubilee Festival, an annual event, takes place on the 4 days of Memorial Day weekend. RT operates free shuttle buses paid for by the private non-profit corporation that sponsors the festival. Additional trains, increased frequency, and later service are added on light rail to accommodate the 30,000 additional riders that the festival generates.

In 1991, there was a surge in ridership that can be explained by two special events: the Railfair and the Sacramento Jazz Jubilee Festival.

FARE STRUCTURE AND PASS POLICY

The base and peak fare for both the bus system and the light rail system is \$1.25. Transfers are free and are valid for 90 min. Fifty percent of RT riders pay the fare in cash.

Forty percent of bus passengers and 37 percent of light rail patrons pay the full cash fare; the remaining cash riders, such as seniors, disabled, and youth riders, pay a discounted cash fare. There are ticket books available at a 10 percent discount at 60 RT sales outlets.

The proportion of riders that use passes is 50 percent. The monthly pass is \$45, with some employers paying a portion of the monthly pass cost. There is a special student pass used by Cal State University students. This pass is paid for with student activity fees and allows students with valid picture IDs to ride for "free." Most students using this pass travel at off-peak hours. The county Department of Welfare purchases passes from RT for eligible clients to facilitate travel to social service agencies dispersed throughout the area.

There was a fare increase in 1992 at the time the fare plan was simplified. RT resists imposing fare increases until a \$0.25 increase is required. Management has adopted a policy of keeping the fare structure easy to understand.

MONITORING PRACTICES

RT employs retired professionals to audit their service annually. On-board surveys are conducted every few years. On-time performance is monitored and used as a basis for schedule adjustment. Service that is 10 min late is registered as a missed trip and another vehicle is inserted if available. Passenger service reports with both complaints and commendations are written up and turned over to management. Census data and the 1989 on-board survey were used for route restructuring.

ROUTE-SPECIFIC INFORMATION AS AN INDICATOR OF GROWTH

RT computes a composite rank for each route based on passengers per day, per revenue hour, per mile, and so forth. The route that has experienced the most growth is Route #88. This route travels from downtown, out the interstate to South Natomas (highest density area outside the CBD; low-income single-family and multifamily residential) to the Arden\Del Paso light rail station. This route carries 1,200 passengers a day, with a 41.5 PRH average (compared with a system average of 31 PRH) and has a fare box recovery of 31.3 percent which is 50 percent higher than the 23.2 percent average systemwide.

The second most successful route is #87, which travels from downtown to the northern part of South Natomas, which is even lower income. This route makes a big loop, from the light rail station at UC Medical Center through an active commercial strip, past the university and terminates at a large community college. This route has a PRH of 36.

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NEW SERVICE CONCEPTS

- Expanded Park-and-ride System
- Route Restructuring and Extensions
- Suburban Circulators
- Downtown Circulator

TARGET MARKETS/ USER GROUPS

- Suburban Commuters
- University Students, Shoppers
- Apartment Complexes
- Tourists

REASONS FOR HIGH PRODUCTIVITY

- Route restructuring
- Elimination of unproductive segments (26 percent cutback in October 1995)
- Expanded headways
- Fare increase (100 percent)
- High percent captive riders (75 percent)
- Large university population

FACTORS THAT INHIBIT GROWTH OF MASS TRANSIT

- Lack of CBD employment and commercial district

SYSTEM PROFILE

San Antonio had one of the most productive transit systems in the country and in 1989 was voted best transit agency by APTA. In 1990, VIA was carrying 42,000 passengers a day and had a passenger per hour rate of 38.

RIDER PROFILE (US Census Data 1990)

- 3.91 percent Total Transit Use
- 55 percent Female
- 20 percent Immigrants
- 14 percent Black
- 69.34 percent Hispanic
- 66 percent Single

San Antonio has a high percentage of low-income captive riders, (30 percent have a household income less than \$10,000) living in scattered-site Section #8 housing, with no

automobile available. There is also a high percentage of university students who use public transportation to reach the campus, where parking is a problem, and for shopping and recreational purposes.

SERVICES CHANGES THAT AFFECT PRODUCTIVITY

- **Commuters**
Park-and-Ride
 San Antonio has developed an extensive park-and-ride system fed by a combination of local, cross-town, and circulator routes. The park-and-ride system is designed to resemble a wheel and spokes with an inner loop 8 mi out and an outer loop 16 mi out at the expressway. There are 26 bus routes that lead from the park-and-rides into the main terminal.
- **Tourists**
Downtown Loop
 San Antonio has several downtown streetcar routes that circulate within the CBD. The streetcars make a one-directional 30-min loop, targeting the tourist market by passing in front of hotels and the Alamo.
 Originally the service was free, then a \$0.10 fare was added. Last year, the cost increased to \$0.25 and has since been raised to \$0.50. Seventy percent of the ridership is the tourist market. When the service was free, there were 12,000 riders a day. That has declined to 8,000 riders daily.
- **Suburban Market**
Apartment Complex Circulators
 San Antonio decided to develop routes that targeted numerous suburban apartment complexes that had no previous service. Single routes were paired together providing service to 35 apartment complexes with more than 8,000 apartments. The largest complex has more than 1,000 apartments.
 The average trip length on these circulator routes is less than 3 mi and buses run every 30 min during peak hours and once an hour off-peak. The routes run between the University of Texas and the apartment complexes and pass the Medical Center and several telemarketing firms where students are employed part-time, and ultimately feed into a terminal with 11 CBD and cross-town routes.
- **Special Events**
 Special events service is provided annually for several festivals from park-and-ride lots into downtown at an average cost of \$5. In April, Fiesta Week with parades, food booths, concerts, and so forth, draws a ridership of 86,000. In August, over a long weekend, there is the Texas Folklife Festival, where there is also no parking available, and that 4-day event gets a ridership of 54,000.

MONITORING PRACTICES

Random monitoring is conducted using on-board surveys to develop ridership profiles used by the market research department.

FARE STRUCTURE AND PASS PROGRAM

On October 1 there was a fare increase which raised the base fare from \$0.40 to \$0.75 and the express fare from \$0.75 to \$1.25. A \$0.10 transfer fee was also added. A 20 percent decline in ridership is expected in response to this increase, but there has not been sufficient time to evaluate the effect.

Pass usage had been at about 9 percent to 10 percent but is expected to jump to about 30 percent in response to the fare increase. The 25 percent of riders who were transfers are expected to become pass users in order to avoid the transfer fee. There is a monthly pass valid for 40 rides which is subject to much abuse. More than one person can use the same pass, and many riders share passes. There is a half fare pass for students, the elderly, and riders with disabilities; and school districts provide passes for those students who live outside the 2-mi radius.

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 Director of Advance Planning

NEW SERVICE CONCEPTS

TARGET MARKETS/ USER GROUPS

- | | |
|--|--|
| <ul style="list-style-type: none"> • Bus Tunnel and Breda Buses • LINC (Pilot Project) • U-PASS • STV Feeder Routes • Free Ride in Downtown • Late Night Stops on Demand • All-Day Tourist Pass • Seasonal Schedule Adjustments • Customized Shuttle Routes | <ul style="list-style-type: none"> All Passengers Traveling through Downtown Ballard Residents University of Washington Students, Faculty, and Staff Underserved Suburban Communities Downtown Workers, Shoppers, and Tourists Late Night Riders Concerned With Security Weekend Tourists University of Washington, Tourist Market Suburban Employment Sites, Private Schools |
|--|--|

REASONS FOR HIGH PRODUCTIVITY

- Bus tunnel (reduced travel time through downtown)
- Reallocation and consolidation of existing service

- Electric trolley routes (short routes through highest density neighborhoods)
- U-PASS at University of Washington (37,000 students, second major transit market)
- Use of smaller transit vehicles on circulator and new feeder routes
- Development of new suburban van routes (suburb to suburb)

SYSTEM PROFILE

METRO's service area includes all of King County and is largely a 1970s radial system with peak emphasis. Management is proposing a 6-year plan that would restructure service to accommodate changing travel patterns. There is an increase in multipurpose trips and trips to employment sites in the suburbs, both of which shift ridership away from peakhour concentration.

Because of trip-chaining, more flexible service is required. They propose to offer better service with fewer coaches and fewer fixed routes, with increased emphasis on feeder service at the tails of main trunk lines.

RIDER PROFILE (US Census Data 1990)

- 7.18 percent Total Transit Use
- 55 percent Female
- 12.6 percent Immigrants
- 10.10 percent Black
- 63 percent Single

SERVICE CHANGES THAT AFFECT PRODUCTIVITY

- Bus Tunnel and Breda Buses
METRO opened a new 1.5-mi-long bus tunnel, with five stations, in September 1990. There was no route restructuring for the tunnel project, just selected routes that would benefit from reduced travel time. Several new routes were added successfully.
In conjunction with the tunnel opening, the fleet was converted to Breda Buses, 60-ft dual-powered articulated vehicles that operate on electric power in the tunnel and diesel power outside of the tunnel. The plan is that the tunnel could be converted to light rail later on. At the same time, I-90 was completed which also reduced travel time.
- LINC (Local Initiative Neighborhood Circulator)
LINC was developed as a 9-month demonstration project to be funded with federal grants. The project was designed to experiment with small vans, free fares, and circulator routes in outlying suburban communities.
Four circulator routes were developed to provide all-day

flexible service to neighborhood centers and park-and-ride lots, connecting at several transfer points with large-capacity buses that travel by freeway to downtown. Although successful, the project is currently not affordable and will soon be discontinued.

- U-PASS
METRO developed a partnership with the University of Washington (UW) in 1992. With 37,000 students, the university is the second major transit market in Seattle. As such, UW decided to invest in transit by subsidizing additional service. All students, faculty, and staff are entitled to a U-PASS which is attached to the back of the UW ID card. The cost of the pass is included in tuition charges. As part of the program, the cost of on-campus parking was raised significantly. At the same time, the Seattle Bus Tunnel was opened, reducing travel time. New routes were added and frequency on existing routes was increased from 30-min headways to 15 min. Ridership stayed constant on these routes despite the increased frequency, so actually total ridership doubled.
- Special Events
Included in the purchase price of season tickets for athletic events at UW is a Transit Ticket that entitles the holder to free shuttle service to the stadium. UW pays 100 percent of the cost for this service.
- Free Ride Downtown
All transit riders traveling within the downtown area, including the tunnel, ride free until 7 PM. Riders coming from outside downtown pay a fare upon boarding; riders leaving downtown pay when debarking. Originally, designed to reduce dwell time, the free ride concept has been modified. Riders traveling within the downtown after 7 PM are now required to pay the fare. This was done to minimize the problem of vagrants riding for free all night.
- Experimental Night Security Program
METRO is testing a concept in which passengers riding at night are allowed to request a stop at any location along the route, not just at officially designated bus stops. This concept has been developed to enhance customer security.
- New Small Vehicle Shuttle Routes
METRO is encouraging the use of 16-passenger shuttles for all-day low-frequency circulator routes in low-density remote suburbs. These routes connect suburban communities to each other and to otherwise unserved employment sites.

FARE STRUCTURE AND PASS PROGRAM

Seattle operates with a simple two-zone fare. The city is zone #1, the rest of the county, zone #2. There is no additional charge for premium service—local and express service cost the same. There is a higher charge for travel during peak hours. Fares range from \$0.85 off peak to \$1.60 for zone #2 during peak hours. Passes are coded with electromagnetic stripes; this reduces dwell time and facilitates data collection on travel patterns and ridership.

MONITORING PRACTICES

METRO uses two types of monitoring. Several years ago, the fleet was equipped with Automatic Passenger Counters (APCs) and Automatic Vehicle Locators. The APCs are attached to fare boxes and odometers and collect data on loadings and lightings at every stop. Human monitors confirm that the APCs are working correctly. The APCs allow METRO to track changes in travel patterns regularly.

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 CEO

NEW SERVICE CONCEPTS

TARGET MARKETS/ USER GROUPS

- | | |
|---------------------------------|--|
| • Expanded Park-and-Rides | Commuters |
| • Oswego Loop Service | Intercity Commuters |
| • SUNY Oswego On-campus Service | University Students
(20 percent total riders) |
| • Suburb-to-Suburb Service | Employees at Major Industry Site |
| • Jobs Express | Chrysler and Carrier Employees |
| • Fare Deal Program | Manpower Trainees |

REASONS FOR HIGH PRODUCTIVITY

- Prudent service reductions (midday frequency cut from 30 min to 1½ hours)
- Elimination of least productive routes, primarily late night and weekend service
- Successful takeover of bankrupt bus carrier
- High percent student ridership
- 33 percent fare increase

SYSTEM PROFILE

CNY Centro operates transit services in three counties of northern New York State, Onondaga, Cayuga, and Oswego, as well as in the metropolitan area of Syracuse. Eighty-five percent of Centro's service is provided in Onondaga County, which includes the city of Syracuse. The remaining 15 percent is distributed evenly, 5 percent in Cayuga County, 5 percent in Oswego County, and 5 percent in intercity routes. Service in metropolitan Syracuse is

delivered through a traditional radial system and one cross-town route. Current traffic patterns require additional cross-town service but financial constraints inhibit the ability to increase service.

As a result of cutbacks in funding (a 60 percent reduction in federal funding and a 50 percent loss in local funding), Centro experienced significant downsizing with a 20 percent reduction in service between October 1994 and April 1995 and an additional 20 percent cut anticipated in the next few months. These cuts in service led to a 6 percent decline in ridership and an increase in cost per mile. (In the State of New York, all local function is tied to mortgage recording fees; reductions in home sales led to the 50 percent decrease in the availability of local funds.) Public hearings resulted in cuts being made predominantly in late-night and weekend service.

A recently completed economic impact report showed that any major reduction in service would lead to increased costs to the taxpayer at the rate of \$28 million because of increased unemployment and Medicare costs. With the proposed service cutbacks, it was estimated that 28 percent of the workers affected would probably become unemployed because of inability to get to jobs, 64 percent would be able to find another way to get to work, and 8 percent might or might not be able to get to work.

RIDER PROFILE (US Census Data 1990)

- 3.72 percent Transit Riders
- 62 percent Female
- 2 percent Immigrants
- 24 percent Black
- 69 percent Single

According to management, Centro riders are typically female, 20 to 32 years old, working in downtown Syracuse. Centro experiences its highest ridership in January, February, and March during winter storms and the resulting hazardous driving conditions. The increases in ridership are highest among female riders. "DON'T SLIDE, RIDE" billboards are used to promote winter ridership.

SERVICES CHANGES THAT AFFECT PRODUCTIVITY

- Commuters
 Park-and-Ride Lots
 Centro expanded the number of park-and-ride lots from 2 locations in 1990 to 14 in 1995. Locations that serve as trip generators, such as major shopping centers, are used to provide the additional park-and-ride lots.
- Oswego Loop Service
 In 1993 and 1994, Centro took over the services of a bankrupt private bus company that provided connecting

service between the cities of Oswego, Fulton, and Mexico. With a change in service from local to express, travel time was reduced. Schedules were modified, routes restructured, and the level of service increased and integrated to provide better "connectivity." Since the takeover, ridership is up by 30 percent.

Cross-Town, Suburb-to-Suburb Route

Centro developed a new cross-town route that provides service to employees at a major employment site. One bus, carrying between 35 and 40 riders, travels between two suburban locations, allowing passengers to commute directly to work without having to travel into downtown first. When a major employer relocated its industrial site from one suburb to another, Centro added this new route to provide service to the new location. This new service is not subsidized by the employer.

Jobs Express

Centro operates a Jobs Express Route that shuttles employees from Cayuga County and Oswego County to the Chrysler and Carrier plants. The shuttles carry about 100 passengers each and travel on the New York State Thruway.

- **University Students**

Centro recently took over all on-campus bus service for SUNY (State University of New York) at Oswego and is under contract to provide free transportation to SUNY students holding a valid student ID. University students account for 20 percent of total Centro ridership. The agency also provides on-campus service for Syracuse University and has done so for the last 20 years.

- **Manpower Trainees and Employees**

Fair Deal Program

During the summer, Centro introduced a monthly pass for a new and growing market. Centro is marketing monthly passes to Onondaga County to enable manpower trainees to get to JTPA programs and work sites.

Monthly passes are also being marketed to employers. Ten to 12 employers participate in the Fair Deal Program. Employers are being encouraged to subsidize monthly bus passes and a guaranteed-ride-home plan that uses taxis, buses, or private vehicles. This program was just recently introduced, so it is too soon for an evaluation; passes were sold out in September, which is an indication that the program is working. The program is being promoted to employers with the suggestion that if parking is subsidized, monthly passes should also be subsidized.

- **Special Events**

Centro provides special events service to Syracuse University football and baseball games. Shuttles run from park-and-ride lots to the stadiums. Special event service is provided to the New York State Fair held during August and September each year. Shuttles run from six remote park-and-ride lots to the fairgrounds. During the 12-day event, shuttles carry an estimated 450,000 fairgoers.

MONITORING PROCESS

On-board surveys are conducted two to three times a year. Demographic information is gathered to help identify potential markets. Telephone surveys of non-riders are also conducted regularly.

FARE STRUCTURE AND PASS PROGRAM

There is a complicated fare structure with eight zones and a \$0.25 surcharge per zone. There is no surcharge for express service. On April 20, 1995, base fares increased by 33 percent from \$0.75 to \$1.00. Ninety-three percent of Centro riders pay cash fares.

Also in April of this year, the first monthly pass was introduced to compensate for the fare increase. An introductory price of \$40 a month with unlimited rides was offered. On November 1, an extension fare pass became available at a \$10 increment for each extra zone.

Centro provides 80 percent of bus service to junior and senior high schools. The Board of Education issues passes to students which are valid only on school routes and during school hours. The transit agency is reimbursed on the basis of the number of passes issued.

ROUTE-SPECIFIC INFORMATION AS AN INDICATOR OF GROWTH TRENDS

Because of a parking problem on the Syracuse University campus, a new route was introduced 3 years ago that provides service from a regional shopping mall with lots of parking spaces to the university campus. This route has the highest ridership in the system and is the fastest growing route in the system.

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NEW SERVICE CONCEPTS

- New Transit Centers

TARGET MARKETS/ USER GROUPS

Minorities, Transit Dependent, Transfers

- Bike and Ride Program Cyclists, Environmentally Concerned Riders
- Environmentally Friendly Buses Educated, Choice Riders

REASONS FOR HIGH PRODUCTIVITY

- Route expansion in minority areas
- Rapid population growth
- Special events and seasonal activities service
- Reduction in parking spaces at University of Arizona
- Express and limited express service

SYSTEM PROFILE

In 1969, the City of Tucson assumed control of the public transit system. With the exception of limited rural transit, public transportation in Pima County is restricted to metropolitan Tucson. Public transit services are provided primarily by Sun Tran's fixed-route bus system. Sun Tran operates within the City of Tucson and provides limited service to unincorporated Pima County, the City of South Tucson, and the Town of Oro Valley.

Sun Tran operates five types of fixed-route service: (1) radial routes (37 percent) provide service throughout the city and county; (2) connective routes (43 percent) provide service to facilitate transfers; (3) express and limited express routes (almost 20 percent) originate at park-and-ride lots and other major trip generators; (4) subscription service provides direct service to a specific trip generator; in this case, Hughes Aircraft; and (5) special temporary service is provided to special or seasonal events or activities, such as football shuttles. Accessible fixed-route service was initiated in June of 1991.

RIDER PROFILE (US Census Data 1990)

- 2.87 percent Total Transit Use
- 50 percent Female
- 16.5 percent Immigrant
- 7 percent Black
- 26 percent Hispanic
- 63 percent Single

SERVICES CHANGES THAT AFFECT PRODUCTIVITY

- Environmentally Conscious Riders and Cyclists
 1. Bike and Ride Program

Sun Tran has equipped 142 buses in its fleet with bicycle racks that can accommodate two bicycles per bus and has installed weatherproof bicycle storage lockers at

many locations, including park-and-ride lots and transit centers. The lockers are rented at a cost of \$2.00 per month plus a key deposit. Sun Tran has also provided bike racks at some locations for people who would like to leave their bicycles at a bus stop and ride the bus. The cost for the project was \$80,000. No performance tests have been conducted to determine if this project generated any new bus riders, but management considers the project to be a successful part of its attempt to attract "environmentally conscious" riders.

2. Environmentally Friendly Buses

Under the compressed natural gas (CNG) program, Sun Tran is gradually replacing the existing fleet with CNG buses. Currently, 26 percent of the fleet is CNG dedicated; projections are that 48 percent of the fleet will be converted by next year. Specific markets or areas are not being targeted; the older equipment is being replaced as needed. Consequently, the CNG buses are used throughout the system.

These buses are more expensive to purchase and much more expensive to maintain. The CNG Program is primarily a marketing strategy to increase ridership, particularly among more educated riders. Sun Tran has no hard data to substantiate the claim that people like newer, cleaner buses, but management hears from riders that they do.

- Minorities, transfer riders

Two new transit centers have been constructed since 1990. The Laos Transit Center, built in 1991, provides transfer service to riders from the neighborhoods on the southeast side of Tucson that are heavily populated by minorities. The new transit centers each provide a covered waiting area and other amenities. The Ronstadt Transit Center, built in 1993 in downtown Tucson, operates as a central transfer point with connections to all parts of the city and provides connecting service for Van Tran passengers.

- Special Events

Sun Tran operates special events shuttles to University of Arizona home football and basketball games, the Rodeo Parade, the Gem and Mineral Show, the Rockies' spring training baseball games, and the Winterhaven Festival of Lights.

University of Arizona football shuttle service began in the early 1980s, but since 1990, ridership has increased by 35 percent, despite an increase in fare to \$1.00. Boarding points have been increased from the original two (at shopping malls) to four; stops now include Pima Community College and a large grocery store. Many of these shuttle users have become regular bus riders. Informal surveys conducted by management indicate that shuttle riders have become regular riders.

SunTran has added six minibuses to its fleet for use on the downtown circulator route, the University of Arizona downtown shuttle, and for special and seasonal events or activi-

ties, such as the Winterhaven shuttle during the Christmas season and the University of Arizona football shuttles.

MONITORING PROCESS

Every 3 years, Sun Tran conducts a comprehensive marketing survey. In the interim years, the marketing team targets specific market segments with mini-surveys and telephone surveys. On-board surveys are conducted as needed on randomly selected routes. The surveys are designed to elicit information that will be used to increase ridership.

To add new routes, a comprehensive market analysis is done. The market is tested for 90 days, then surveyed for viability.

Sun Tran expects that new "environmentally friendly" buses will attract more riders with greater educational levels and more non-captive riders, particularly females 19 to 35, because of continuous construction delays on the interstate. Sun Tran also expects to see more riders with disabilities—some by choice and others because of changes in ADA eligibility requirements.

FARE STRUCTURE AND PASS PROGRAM

Fifty-five percent of Sun Tran riders pay cash; 45 percent use passes. Of the pass users, 15 percent are TUSD (Tucson Unified School District) students, 15 percent are employees, and 15 percent are social service clients. Student passes are sold to the school district at a discount and then distributed to the students; employee passes are sold to employers at full fare, then subsidized and sold at a reduced rate to the

employee (21 employers, including the U of A, participate); social service passes are sold to agencies at one-third of the full fare then distributed by the agencies to clients for free.

Sun Tran also promotes a program, called GO CARD, which provides summer passes to students for \$38. The University of Arizona Pass Program and Pima Community College Pass Program have shown increased use during the past few years.

There was a recent fare increase of \$0.25 for regular riders, \$0.10 for students, and \$0.05 for senior citizens, riders with disabilities, and low-income riders. Sun Tran estimates that for every \$0.05 increase in fare, ridership drops by 10,000 passengers per month, but overall revenue has increased. The normal increase in ridership is 8 percent, but it is actually up only 3 percent following the first full cycle after the fare increase. Transfers, which are free, are obtained when the fare is paid and are valid for 1 hr. Transfers are available for connecting buses and continued travel in either direction.

ROUTE-SPECIFIC INFORMATION AS AN INDICATOR OF GROWTH TRENDS

The routes in Sun Tran's service area that continue to grow the fastest are the #8 and #16. Both provide service from the minority neighborhoods to the downtown area and then to the outer edges of the city. Route #11, another of Sun Tran's most successful routes, provides service to such major destinations as the airport. Productive routes in the system, measured in ridership, are the downtown circulator, started only 5 years ago, and several express routes. These express routes that have a ridership of only 10 to 15 passengers will probably be phased out and the riders served by adding a leg to an existing route.
