UMTA/TSC Project Evaluation Series

The Lift : Special Needs Transportation in Portland, Oregon

Final Report
August 1979

Service and Methods Demonstration Program

U.S. DEPARTMENT OF TRANSPORTATION
Urban Mass Transportation Administration
and Research and Special Programs Administration
Transportation Systems Center

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Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
UMTA-OR-06-0004-79-1		

4. Title and Subtitle	5. Report Date
The LIFT: Special Needs Transportation in Portland, Oregon	August 1979
	6. Performing Organization Code
	8. Performing Organization Report No.
7. Author(s) Thomas A. Cooper, Jr., Sydwell Flynn and Pamela Bloomfield	
9. Performing Organization Name and Address Crain and Associates * 1145 Merrill Street Menlo Park, CA 94025	10. Work Unit No. (TRAIS) UM927/R9742
	11. Contract or Grant No. DOT-TSC-1081
	13. Type of Report and Period Covered Final Report October 1976-June 1979
12. Sponsoring Agency Name and Address U.S. Department of Transportation Urban Mass Transportation Administration Office of Transportation Planning Management and Demonstrations Washington, DC 20590	14. Sponsoring Agency Code

15. Supplementary Notes
* U.S. Department of Transportation
Research and Special Programs Administration
Transportation Systems Center, Cambridge, MA 02142

16. Abstract

This final report contains results of the evaluation of the LIFT, Portland's Special Needs Transportation Project. The purpose of the UMTA Service and Methods Demonstration was to test a transit operator's ability to provide demand responsive transportation to handicapped and elderly persons and coordinate this service with contracting social service agencies. Project operations and development, costs, impacts, workability, and cost-effectiveness are discussed in this report.

The demonstration proved that a transit operator can coordinate with social service agencies to serve their clients and extend coverage to other transportation handicapped persons who did not previously have access to public transportation. In addition, the project had a substantial impact on the travel behavior of regular users and achieved a high penetration of the wheelchair market. However, the LIFT operating cost per trip was higher than rates charged by taxis of private-non-profit carriers, and the impact on the total transportation handicapped market (22,000 persons) was not great. About 6,000 persons registered, and the majority of registrants did not become regular users because they did not perceive that they needed specialized public transportation. By the time the project ended, the transit operator, Tri-Met, had emerged as the lead special needs transportation agency in Portland and the LIFT was largely responsible for the agency's leadership role. Significantly, Tri-Met coordination efforts have not yet led to increased efficiency of special needs transportation.

17. Key Words	18. Distribution Statement
Transportation Handicapped, Elderly, Special Needs Transportation, Demand-responsive, Agency Coordination, Automated Fare Identification Recorder	DOCUMENT IS AVAILABLE TO THE PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	248	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

PREFACE

Current federal regulations require that public transportation services be designed to benefit handicapped and elderly persons. As part of this emphasis, the Urban Mass Transportation Administration - together with local support from the City of Portland and the State of Oregon - sponsored a Service and Methods Demonstration (SMD) to test a specialized service which provided door-to-door transportation for handicapped and elderly persons. This report covers the Portland demonstration project--the Lift--during two years of operation, December 1976 through December, 1978.

The work was performed by Crain & Associates of Menlo Park, CA. Tom Cooper was the Principal Investigator and Project Manager. Sydwell Flynn and Pamela Bloomfield conducted parts of the fieldwork, performed data analyses, and wrote sections of the report. John Phillips contributed analyses on service supply and Jane Van Dusen edited the report. Ruth Campbell and Barbara Law typed the review draft. Don Kendall was the technical monitor at TSC and, in addition to providing helpful comments on the review draft, contributed pictures of the LIFT in operation. The authors wish to thank Dennis Chapman, Special Needs Transportation Coordinator; the Citizens Advisory Committee; and Peggy Macko who supervised survey operations for their contributions to the evaluation effort.

METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
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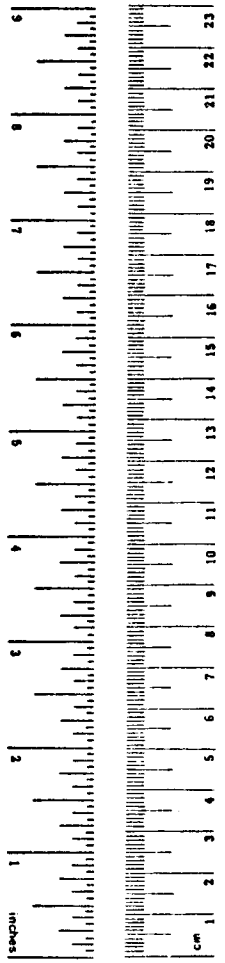
	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
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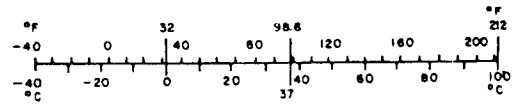

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1. EXECUTIVE SUMMARY

The Portland Special Needs Transportation Demonstration, the LIFT, is a project in which Tri-Met (the regional transit authority), in coordination with local social service agencies, provides door-to-door transportation service to eligible handicapped and elderly clients on an advance reservation basis. Eligibility for the LIFT service was based upon a functional (rather than clinical) definition of transportation handicap--a person was considered eligible for the service if they had difficulty performing certain functions that were necessary in riding a fixed route bus, e.g., reading directions, standing for more than 10 minutes, moving in crowds, etc. Tri-Met schedules rides on a fleet of 15 lift-equipped buses operated by Tri-Met, supplemented by transportation provided through a Tri-Met contract with local private providers, i.e., taxis. Fares are $3.00 per trip for agency-affiliated passengers, with the $3.00 paid by the sponsoring agency, and $.50 per trip for eligible general passengers, with the fare paid by the passenger.

This report covers the two years of the demonstration, from December 1976 to December 1978. (A previous report covered the first year of operations. See report number UMTA-OR-06-0004-78-2, June 1978.) During this time, the LIFT project experienced gradual but steady growth in terms of client registration and trips delivered. As of December 1978 the LIFT system was providing 370 trips per day; 18% of these trips were by LIFT-sponsored taxis and 17% of all trips were taken by persons using a wheelchair. This report documents the following conclusions regarding the LIFT demonstration:

1. The LIFT is not a cost-effective means of providing special-needs transportation to elderly and handicapped markets. The primary reason for this is that the high union wage rates that Tri-Met must pay

LIFT drivers and controllers far outweigh any economies of scale that might have resulted from coordination and consolidation of Special Needs Transportation (SNT) service. In the fall of 1978, Tri-Met drivers earned $8.61 per hour plus fringe benefits, compared with the estimated $6.00 per hour for taxi drivers. Cost per trip for LIFT service was about $8.86 versus a figure of $6.96 for private sector service.

2. The LIFT project enabled Tri-Met to extend coverage to a large segment of the TH market that is not affiliated with a social service agency and to integrate the social service agency sponsored and unsponsored passenger. The LIFT registered 2377 of these general passengers; at the close of the demonstration 55% of all LIFT trips--about 200 per day--were being delivered to this group.

3. The LIFT project was instrumental in establishing Tri-Met as a legitimate coordinator of special-needs transportation (SNT) services in Portland. Also, the LIFT was a visible reminder to the community of their responsibility towards and commitment to the transportation handicapped.

4. The LIFT demonstration tested the use of a functional definition of transportation handicap (rather than clinical) for service eligibility. This functional classification worked well in distinguishing those clients who needed the service from those who did not. Few complaints were received on rider eligibility issues.

5. The LIFT did not have a dramatic impact on the travel patterns of all of the estimated 22,000 TH persons in Portland. Although the LIFT registered 5914 people,

about 27% of the TH market, only one-fourth of those registered actually used the service. The average rider used the service for one round trip per week.

6. The LIFT does have a significant impact on the travel behavior of regular users, i.e., those people who use the service for more than one or two round trips per week. On-board surveys indicated that the LIFT provided two-thirds of the trips made by regular users. One - fourth of those surveyed stated that without LIFT service they would be forced to forego the trips they are making, and those who have the option of switching to alternative modes view these modes as more costly and less convenient than LIFT service.

7. The LIFT did achieve a 50% penetration of the wheelchair market in terms of registration. 20% of all LIFT trips were for wheelchair passengers.

8. The main reason the majority of eligible users did not use the LIFT was they did not perceive they needed this specialized type of service; they have alternative means of transportation, mainly the automobile, that serve their trip needs. Lack of awareness of the service and defects in LIFT service were not significant reasons for non-use of the LIFT.

9. An Automatic Fare Identification Recorder (AFIR) was intended to automatically record passenger and trip information for recordkeeping and agency billing purposes. This technological innovation, the AFIR, did not receive a complete test in Portland due to mechanical failure of the AFIRs.

10. During the demonstration the LIFT delivered slightly over 50% of its trips to agency-sponsored passengers,

primarily to clients of the Area Agency on Aging (AAA) and the Department of Public Welfare (DPW). Other social service agencies signed up for the service but used it irregularly for their clients. Generally AAA and DPW were enthusiastic about the LIFT, especially the courtesy and helpfulness of the drivers. Complaints from these two agencies centered on reliability. Agencies which did not use the service as extensively as they might have also cited reliability as a problem. These latter agencies also commented that the limited LIFT capacity forced them to call too far in advance to schedule conveniently. These non-using agencies tended to rely on other modes for their clients' trips, including agency-owned vehicles.

11. In response to complaints about scheduling problems, Tri-Met reduced the 48-hour advance reservation time to 24 hours. However, due to limited LIFT capacity and the large number of regularly recurring trips, potential users are still not assured of receiving a ride, even if they call before the 24-hour deadline.

12. Overall, the LIFT averaged about 10 minutes late for pickups; this varied by time of day. Delivery times were generally ahead of schedule, although peaking problems caused some trips to be very late, i.e., more than 30 minutes late. The average trip time was about 25 minutes.

13. The LIFT system used taxi service during peak periods and for those trips where it would not be practical to use a LIFT bus (eg., the trip could not be grouped). Taxi riders rated this mode as more reliable and more comfortable than LIFT buses. Also travel time is less in taxis. Taxi trips amounted to 10% - 15% of LIFT system trips during the second year of the demonstration.

14. The analysis shows that LIFT reliability is as good as could be expected, given the nature of the clientele served and the peaks in demand that occur throughout the service day (lateness closely paralleled demand); furthermore, reliability improved in the second year of the demonstration. It is difficult to imagine how reliability could improve enough to meet agency expectations. These findings suggest that a coordination strategy that utilizes a variety of paratransit modes on an as-needed basis, i.e., that establishes a reserve capacity, will be more successful in penetrating the agency trip market than the fixed-capacity paratransit fleet which has inherent limitations on service reliability.

15. The LIFT project demonstrates several advantages of paratransit as an SNT mode. Paratransit extends coverage to a greater number of TH people and is flexible. The LIFT demonstration indicates that the TH market likes this form of service.

16. Significantly, the LIFT coordination and consolidation efforts have not led to increased SNT system efficiency. In fact, per trip costs have significantly increased over the past two years compared to pre-demonstration costs. However, recent developments show movement towards a more cost-effective service.

2. INTRODUCTION

2.1 OVERVIEW

The Portland Special Needs Transportation (SNT) demonstration project—the LIFT—provides door-to-door transportation services for elderly and handicapped persons living in the Portland city limits who cannot use the regular transit system and who do not have access to alternate means of private transportation. Service is provided by the Tri-County Metropolitan Transportation District of Oregon (Tri-Met). The 15 vehicles used are medium-sized diesel buses equipped with a retractable lower step, wheelchair lifts, and two-way radios.

All rides are prescheduled. The LIFT provides service to the general public and to clients of social service organizations and public agencies which have contracted with Tri-Met for service. Passengers arrange for service by calling the Tri-Met Control Room directly or by calling their sponsoring agency which, in turn, calls Tri-Met. Eligible riders are issued a Special Needs Bus Pass which they display to the driver upon boarding the bus. Cost of the ride is shared by the passenger and Tri-Met, or the sponsoring agency and Tri-Met.

The specific purposes of the demonstration were to:

1. Test a transit operator's ability to provide special service to a special group and coordinate this service with the social service agencies involved,
2. Test the cost-effectiveness and value to social service agencies and users of the automated fare collection equipment,
3. Determine the demonstration's impact on the target group, and

4. Assess the service's impact on the social service agencies which contract with Tri-Met for LIFT service for their clients.

2.2 PROJECT OBJECTIVES

2.2.1 Service and Methods Demonstration Objectives

The Portland demonstration addresses three SMD objectives:

1. To increase the area coverage of transit services,
2. To increase the utilization (passengers per hour) of transit vehicles, and
3. To improve the mobility of transit dependents.

The objective of increasing the area of coverage is indirectly addressed by adding demand-responsive capability and fully accessible vehicles to existing transit capabilities. This allows people who previously did not have accessible transportation to use the service. The vehicle utilization objective is addressed by promoting agency coordination, providing subscription rides, and giving group rides priority over individual trips. The objective of improving the mobility of transit dependents is addressed in that the project provides a very personalized transportation service to the target group.

2.2.2 Grantee Objectives

The Special Needs Transportation project is part of Tri-Met's regional effort to provide good transportation service for the handicapped and elderly and to evaluate which is the best method, over the long run, to provide these services. The project comes at a time when comprehensive federal regulations have been enacted which require

that transit companies make special efforts to provide service for handicapped and elderly persons. It is the intention of Tri-Met's Board of Directors that the SNT project, in coordination with other local special transportation programs, satisfy all applicable laws and regulations. A second Tri-Met objective was to determine the applicability of automated fare-collection equipment for regular transit use.

In order to monitor project performance, Tri-Met has developed some performance measures in the areas of cost, customer satisfaction, ridership volumes, and client impact. Data on these measures are gathered periodically and analyzed to determine overall system performance.

2.3 ORGANIZATIONAL ROLES

The Portland project is funded under a U.S. Department of Transportation, Urban Mass Transportation Administration (UMTA) Services and Methods Demonstration (SMD) grant. The project is being staffed and implemented by the Tri-County Metropolitan Transportation District (Tri-Met), Portland, Oregon. DAVE Systems installed and provided training for the scheduling/dispatch operation. The Transportation Systems Center (TSC) of the U.S. Department of Transportation is responsible for evaluation of the project. Crain & Associates is acting as a contractor to TSC for the evaluation effort. Crain & Associates has coordinated with Tri-Met for its on-site evaluation and data collection efforts. Transportation services are being provided by Tri-Met's fleet of 15 Mercedes-Benz diesel buses, which were specially purchased for the demonstration project.

The funding and timing of the grant through June 1979 are as follows:

Funding:

Federal	$ 916,768
Local	
Tri-Met	510,000
City of Portland Agency Contracts State of Oregon	349,848
TOTAL	$1,776,616

Timing:

Date of Grant Award	7/75
Actual Start Date	12/76
Planned Termination Date	6/79

2.4 PROJECT ISSUES AND INNOVATIONS

The provision of special transportation service to handicapped and elderly persons is an area in which most public transit systems are only beginning to gain experience Thus, establishing such a system on a city-wide basis, as in the Portland demonstration, posed many questions or issues as the project progressed. This section will discuss these issues in three broad categories:

1. The project's workability,
2. Its productivity or cost-effectiveness, and
3. Its impact on the target market.

Project innovations relating to these issues will also be discussed.

2.4.1 Workability

Specific issues covering the workability of the Special Needs Transportation project fall into two categories:

1. Issues relative to Tri-Met's experience in coordinating the efforts of social service agencies and private paratransit providers, and
2. Issues relative to certain operational innovations and project characteristics.

Within these two categories, the following questions are addressed:

1. What have been the impacts of the demonstration on SNT system efficiency and effectiveness; i.e., the cost of transit service to the TH market and system coverage?
2. How have social service agencies reacted to the LIFT program?
3. What was the degree of cooperation between Tri-Met, other paratransit providers, and social service agencies which use the LIFT system?
4. How effective was the role of the Citizens Advisory Committee in channeling community input into Tri-Met policy-making regarding the LIFT?
5. Do the eligibility criteria and ride prioritization system constitute an effective and useful way of controlling demand and restricting the service to those who are transportation handicapped?
6. How effective and useful was the automated fare collection equipment and accompanying reporting and billing system?
7. What role did market research play in project planning and implementation?

2.4.1.1 Organizational Cooperation Between Transit Operator and Contracting Social Service Agencies - The concept of organizational cooperation is not a new one. In fact, federal statutes and regulations pertaining to social service

agency transportation programs generally contain specific requirements for coordination. However, most agency transportation projects continue to operate side by side, with little effort toward avoiding duplication or fragmentation of service. Typically, each agency has its own vehicles, staff, facilities, and budget. Although the value of a coordinated transportation effort (increased service capacity, improved vehicle productivity, and operating efficiency, etc.) is generally apparent to those involved in providing transportation services, the barriers to such coordinative efforts are also substantial. These include differing eligibility restrictions, franchise and labor problems, accounting problems, turf problems (i.e., preserving agency identity and control), and amount of available funds.

An innovation of the Portland demonstration was that the transit company became the coordinating agent. Tri-Met contracted with social service agencies which had a need for handicapped and/or elderly transportation. The agencies registered their own clients for service and arranged for their trips,* a procedure which allowed agencies to maintain their identity with clients and control client trips. Clients registered for service were required to meet the eligibility criteria developed by Tri-Met. Tri-Met also provided the vehicles, drivers, and a centralized billing system. These interrelated activities all required a substantial amount of coordination. Issues related to this aspect of LIFT service include:

1. How have Portland agencies and public organizations responded to this new, transit operator-provided service? Were they anxious or reluctant to contract for service?

*Passengers who are not connected with an agency call Tri-Met directly to arrange their trips.

2. What was the impact of LIFT service on agency transportation policies and on their clients' trip-making?
3. What portion of agency trips was served by the LIFT?
4. Did the service meet the needs of their particular clients?
5. Did they approve of their mediative role between Tri-Met and the client?
6. Have those agencies which were engaged in paratransit activities and now have contracted with the LIFT for transportation service been able to get out of the transportation business?
7. Has the new service freed agencies, in terms of time and personnel, to concentrate on other areas, or are there new demands for paperwork, coordination, scheduling?
8. Are there cost savings involved?
9. For all agencies, including those who had not previously provided transportation, how effective is the LIFT service? Does it get their clients where they need to go? Are clients better able to avail themselves of agency services? Has the number of clients for a specific program (for example, one that offers nutritional hot meals at a central location) increased due to LIFT service?
10. Did the centralized billing system work satisfactorily?
11. Was Tri-Met satisfied with cooperation they received from agencies? Were they inundated by institutional problems? Was the bureaucracy of large state-run agencies an impediment?
12. In sum, was the LIFT system able to avoid many of the problems that have plagued other efforts to coordinate agency transportation?

2.4.1.2 Coordination With Subcontracting Taxicab Companies - Taxis and wheelchair vans are used to provide service when they are more cost-effective than using a LIFT bus; as, for example, for a single passenger going a long distance. Tri-Met has contracted with two taxi companies and one wheelchair van company to provide this service.

1. How much has the LIFT increased business for these companies?
2. Has it caused any change in their level of operating efficiency?
3. Has it increased paperwork and accounting problems?
4. Are the drivers asked to give special help to the handicapped and elderly riders?
5. How cost-effective are these modes?

2.4.1.3 Coordination of Private, Nonprofit Transportation Providers Operating in the Portland Area

1. Is LIFT service competing with these nonprofit companies?
2. What effect has the LIFT had on their business?
3. Is there any coordination of services among these providers?
4. How cost-effective are these modes?

2.4.1.4 Demonstration Impact on Tri-Met - In providing service to this specialized group of handicapped and elderly persons, Tri-Met entered a new arena of service wherein it was required both to operate and to coordinate an SNT service.

1. What has been the impact of the project on management?
2. What has been the impact on accounting and finance personnel?
3. How effective is the computerized billing and reporting system for Tri-Met's needs?

4. How effective is communication among administrative, planning, and operating personnel?
5. What new procedures (accounting, paperwork) are required of Tri-Met because of the federal grant?

2.4.1.5 Automated Fare Collection and Billing System - When the demonstration began, one of its objectives was to test the workability of the automated fare collection and billing system. Each of the LIFT's 15 buses was equipped with an automatic fare identification recorder (AFIR); passengers were to insert their Special Needs Bus Pass in the AFIR upon boarding and deboarding. However, the AFIRS proved to be unworkable due to mechanical and electrical failures and were removed from the LIFT buses in November 1978. This report will assess this project innovation by documenting the reason for its failure. However, many questions relating to the intended use of these automatic fare boxes (including questions about the applicability of such equipment to regular transit service) will remain unanswered as they did not receive a true test in this demonstration.

2.4.1.6 Eligibility Criteria and Ride Prioritization - A predemonstration household survey[1] indicated that the incidence of transportation handicapped persons in Portland is 5.75% or about 22,000 persons. Because these figures suggested that demand for LIFT service would exceed capacity, it was thought to be important to control or curtail demand in a fair and effective way in order to match the capacity of the system to service supply.

There are a number of ways to curtail transportation

[1] Results of this random survey of 5,688 Portland households are contained in Incidence Rates and Travel Characteristics of the Transportation Handicapped in Portland, Oregon, Crain & Associates, U.S. Department of Transportation, Washington, DC, Report No. UMTA-OR-06-0004-77-1, April 1977.

demand: increase the price for trips; limit the level of transit service to certain areas, days, or hours; restrict the size of the vehicle to be used; allow trips only for certain purposes; require prescheduling vs. demand-responsive service; or restrict the target market and limit use by degree of handicap. In the Portland project, eligibility criteria based on a functional definition of "handicap" were developed to ensure that service is made available to those who really need it. Only those persons who meet these criteria may use the LIFT. However, since it was anticipated that the demand for service of those certified as eligible would still be greater than the system can accommodate, a ride prioritization system was also developed. This project innovation bases service availability on a priority ranking based on trip purpose, number of passengers in the trip, and destination. (Eligibility criteria and the system of ride prioritization are described further in Section 4.1.1.)

Other issues of concern when the LIFT project began included:

1. How fair would these restraints on LIFT demand be for both clients and the contracting agencies? Would they control demand to a desired level or would they be too restrictive?
2. Would agency personnel who register people for LIFT service feel that the eligibility criteria worked as an effective screening device?
3. How workable is the ride prioritization system? Is it actually being used as a method of curtailing demand?

As the project evolved, many of these issues were resolved or became moot, but they are mentioned here to convey the Tri-Met and evaluation concerns as they existed in 1976.

2.4.1.7 Citizens Advisory Committee - The original demonstration application which Tri-Met submitted to UMTA included provisions for establishing an advisory committee which would include handicapped and elderly members. It was Tri-Met's intent that the advisory committee assist Tri-Met personnel in the design and operation of the project and also make recommendations for future expansion or modification of LIFT service. However, no citizen advisors were involved in drafting the demonstration grant proposal.

The report addresses several questions about how the committee operated and its impact on policy:

1. At what point should citizen involvement begin?
2. How did the Portland community and, specifically, the handicapped and elderly population respond to the concept of establishing a special transit system to meet their needs? Were they asked?
3. Once citizen input was solicited, how were committee members chosen?
4. Were all affected parties represented?
5. How important were the committee's inputs regarding key SNT decisions?

2.4.1.8 The Role of Market Research - Tri-Met was anxious to avoid errors which seem to have plagued other demand-responsive systems; in particular, they wished to ensure that no service was promised which could not actually be delivered. Thus, several questions were addressed through market research in 1976, including:

1. What is the incidence of transportation handicapped (TH) persons within the city of Portland?
2. What type of system best suits TH travel needs?
3. What is current TH travel behavior?

To answer these questions, a comprehensive household survey

was conducted to search out and interview transportation handicapped persons; i.e., those persons who are unable to use Portland's fixed-route bus service. Based on this definition, the survey's intent was not to determine the medical reason for a person's incapacities but, rather, whether he/she could or could not use conventional public transportation. Thus, a functional rather than medical definition of handicapped was employed. Eight specific activities that are often required when a person attempts to use a conventional, fixed-route, fixed-schedule transit system were defined. During the survey, any household members who indicated a problem with any of the eight activities were interviewed in depth about the severity of their transportation dysfunction and their travel behavior, and were asked to evaluate six different transit modes (ranging from fixed-route systems to door-to-door bus service with a lift) according to their own physical ability to use them. Results of this survey were reported in the previously-cited report, Incidence Rates and Travel Characteristics of the Transportation Handicapped in Portland, Oregon.

An innovation of the Portland demonstration was to base service design on these research data and on a functional rather than medical definition of handicapped. These data were available to both Tri-Met and DAVE Systems, with whom Tri-Met contracted to design the LIFT service. Some pertinent issues addressed in this report are:

1. How useful were these data during the planning phase of the project?
2. To what extent were they used in determining eligibility and level of service?
3. How accurately do the data predict travel demand and behavior of transportation handicapped persons?

2.4.2 Cost Effectiveness

The second general issue of concern in the Portland demonstration was the cost-effectiveness of providing specialized transportation. Cost-related issues were:

1. What was the total cost per passenger trip?
2. What were the cost/revenue ratios?
3. What was the productivity per vehicle hour?
4. What proportion of these costs was for labor?
5. How much were costs influenced by the requirement to pay union-scale wages?
6. What other factors influence LIFT costs?
7. How cost-effective was the LIFT operation compared with known alternative ways of providing specialized transportation to handicapped and elderly persons?
8. Did the LIFT system cost less than the one it replaced—that is, the proliferated system of social service agency transportation?

2.4.3 Project Impacts on Target Market

The third general issue of concern in the demonstration has to do with project impacts on the target market. Key questions addressed in this report include:

1. What percentage of Portland's transportation handicapped population registered for service?
2. How much has the trip-making of users increased as a result of LIFT service?
3. Are these actually "new" trips or do they simply reflect a mode shift from a less convenient or more costly mode of transportation?
4. What benefits did the LIFT provide the riders in terms of increased opportunities and convenience?
5. What were the reasons for relatively low usage of the service?

2.4.4 Summary

The Portland demonstration will provide some information on most of the issues cited above. The operational workability of the project is described in Chapters 4, 5, 6, and 8 of this report; the cost-effectiveness of the project is analyzed in Chapter 7; client impacts are examined in Chapter 5.

The three issues mentioned above are important considerations in assessing the extent to which a transit operator—through operating a paratransit service for TH people and coordinating the efforts and resources of providers and funders (i.e., agencies)—can improve SNT system effectiveness and efficiency. When the demonstration began, Portland, like most other medium-sized metropolitan areas, did not have adequate transit coverage for the TH market. Transportation that did exist consisted of a proliferation of fragmented social service programs, each funded separately, resulting in duplication of effort and inefficiency. Tri-Met's LIFT program and coordinating efforts had the potential for lowering SNT system unit costs through eliminating these inefficiencies. Furthermore, by offering service to social service agencies which had no transportation program and to TH persons not affiliated with a social service agency, the LIFT program promised to extend coverage to those who had never before had access to a special needs transportation service.

2.5 EVALUATION OVERVIEW

2.5.1 Approach

The project sponsors were concerned with two broad categories of questions in evaluating the LIFT project:

1. How well did the system perform in providing special needs transportation service?
2. What were the nature, magnitude, and distribution of the transportation benefits and impacts?

This section describes nine data sources used during the evaluation to gather information regarding these questions. Data from the predemonstration household survey were used throughout the evaluation to interpret data from the sources described below.

2.5.1.1 On-Board Surveys of Users - These surveys provided information on how LIFT service has affected the travel behavior of its riders and how the passengers rate system performance. Five on-board surveys have been conducted: in April, July, and December of 1977 and in March and October of 1978.

Past survey experience indicates that comparing results between large-scale surveys entails a considerable risk, regardless of the sample size. There always appear to be exogenous factors that are not controllable and thus tend to confuse such comparisons. To obtain an accurate picture of how LIFT service affected travel behavior, it was decided to conduct more frequent, smaller sample surveys and to interpret the results as time-series data rather than to conduct large-scale surveys. A series of on-board surveys was conducted about every four months to show trends in user behavior and to permit a determination of travel pattern changes; i.e., was LIFT service allowing its riders to make "new" trips or did they simply shift to the LIFT from less convenient or more costly modes of transportation?

2.5.1.2 Follow-Up Interviews - Follow-up phone interviews with a small sample of those surveyed during the on-board surveys were conducted to check the reliability and accuracy of the information gathered in the on-board surveys, and to provide some qualitative information in order to enrich understanding of the statistical survey results. Because of their small number, these follow-up interviews were not intended to be statistically significant; however, they were intended to describe how LIFT services affected the lives of specific persons. The follow-up interviews were conducted on the phone at night with those persons who had been surveyed on LIFT buses during the day. The sampling procedure used was to randomly select ten to twenty interviewees who had volunteered their phone number during the day.

2.5.1.3 Certification Data - Data of a socioeconomic nature were gathered on each client for the purpose of granting the applicant eligibility to use the service. (A patron registration application is contained in Chapter 4.) These data were then keypunched (minus any specific client identifiable information, such as the client's name and address) and computer-processed to provide information about the population that was using LIFT service and to analyze project demand and impact. A total of 5,914 of these certification interviews were tabulated; these are reported on in Chapters 5 and 8.

2.5.1.4 Operational Performance and Cost Data - Operational data consist of a wide variety of quantitative information available about riders (who is using and how often), trips (length, purpose, travel time), performance and cost (passengers per vehicle mile and per vehicle hour, reliability, ratio of subsidy to operating cost, administrative costs, etc), and agencies (number of clients using service, number of registrants, subsidy paid, etc.).

2.5.1.5 Agency Interviews - Social service agencies and non-profit organizations within Portland may contract with Tri-Met for the LIFT to provide transportation services for agency clients who meet Tri-Met's eligibility criteria. The agency surveys were conducted with contracting agencies three times during the evaluation: before the project began, at an interim point, and at the project's completion. Their purpose was to provide information on how these agencies were attempting to meet their clients' transportation needs before LIFT service was available; any improvements the LIFT service provided agencies in terms of cost, distribution and amount of trips, and freeing the agency to concentrate on other types of service; and agency perceptions of how the LIFT system dealt with operational and accountability problems.

Fourteen agencies were interviewed as part of the "before" survey, twelve agencies were interviewed during the interim survey, and nine agencies were interviewed in the final survey. Agencies that did provide transportation service before LIFT service began as well as those which did not were interviewed. The samples are not intended to be statistically representative of all types of social service agencies.

2.5.1.6 Tri-Met Survey - This survey consisted of a series of semistructured interviews with the management, dispatch staff, drivers, and other personnel within Tri-Met who are associated with the LIFT project. These interviews were intended to solicit relevant Tri-Met opinions and attitudes and have provided insight into the effectiveness and efficiency with which the LIFT service is provided.

Two surveys were conducted: one at an interim point and one at the end of the second year of the demonstration. These included interviews with the Special Transportation Coordinator, Tri-Met's Director of Finance, the Project Accountant, the Director of Planning, the Advertising and Promotion Manager in charge of marketing the LIFT, and the Legislative Relations and Press Relations Manager.

2.5.1.7 Survey of Subcontracting Taxicab Companies - Two taxi companies and one wheelchair-van company are under contract with Tri-Met to provide rides for LIFT clients when necessary. Interviews were conducted with personnel from all three companies to determine the impact of LIFT service on their operations and their record-keeping systems.

2.5.1.8 Survey of Nonprofit, Private Transportation Providers - There are two private transportation providers in the Portland metropolitan area that provide door-to-door transportation service for handicapped and elderly persons.

Personnel from these two organizations were interviewed at the end of the second year of the demonstration to determine the impact of LIFT service on their operations.

2.5.1.9 Nonuser Survey - This was a second-year evaluation task. Approximately 300 nonusers were interviewed to determine their reasons for not using LIFT service, some idea of their trip purposes and patterns, and their socioeconomic characteristics. Interviewees came from three sources: persons identified as transportation handicapped in the predemonstration survey who are not registered for service, registrants who are nonusers, and nonusers identified by community organizations. Approximately 100 moderate and heavy users of LIFT service were interviewed for comparative purposes.

2.5.1.10 Predemonstration Survey - The previously cited report, Incidence Rates and Travel Characteristics of the Transportation Handicapped in Portland, Oregon, provided data on the numbers and characteristics of the transportation handicapped population within the target area. These data were used to provide a background to and framework for the analysis of LIFT impacts on the target population. The survey results were also useful to local planners in setting up the LIFT system.

2.5.2 Scope of Report

This report covers the first two years of LIFT operation from the fall of 1976, when registration of LIFT clients first began, through December of 1978.

The report addresses each of the issues mentioned in Section 2.3. Chapters 2 and 3 set the stage for the analysis by outlining the issues and analysis procedures and by describing the demonstration setting. Chapter 4 describes the

project operation and recounts the project's evolution from preimplementation through the fall of 1978. Chapter 5 deals with project demand and its impact on clients, and Chapter 6 deals with supply. Chapter 7 analyzes the economics of the LIFT system, and Chapter 8 assesses the project's institutional impact on social service agencies, Tri-Met, and other transportation providers. Finally, Chapter 9 summarizes the conclusions reached in the report.

All survey materials and discussion aids used to gather demonstration data are contained in the appendices of this report.

3. DEMONSTRATION SETTING

3.1 GEOGRAPHIC AND DEMOGRAPHIC CHARACTERISTICS OF PORTLAND

The city of Portland, Oregon is the demonstration project site. The largest city in the state, Portland is located on the Oregon-Washington border, across the Columbia River from Vancouver, and covers an area of 89 square miles. Much of the city is on level terrain; however, elevations vary from a few feet above sea level to 1,073 feet, at the top of Council Crest. The average elevation is 175 feet.

Portland has a very definite winter rainfall climate. The winter season is characterized by relatively mild temperatures (43° on average), cloudy skies, and almost daily rains; in the summer months, temperatures average 65° and precipitation is infrequent. Snowfalls are generally short-lived; most years are completely free of snow.

The population of the Portland Standard Metropolitan Statistical Area (SMSA) is 1,109,100,* approximately 41% of the total state population. (The SMSA includes Clackamas, Multnomah, and Washington counties in Oregon and Clark County in Washington; see Figure 3-1.) The population of the city of Portland, the service area of the demonstration, is approximately 385,000. The rate of population growth of the Portland area exceeds that of the nation; Portland is the fastest growing population center in the Pacific Northwest.

The city has an uncommonly high percentage of residents over 65 years of age: 14.7%, as compared with the national percentage of 10% who are 65 or over. The percentage of work-disabled Portland residents is comparable to that of other cities: 7%. (Approximately 96% of Portland's residents are white; the rest are Spanish-speaking, native American, and Black.)

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*As of July, 1976.

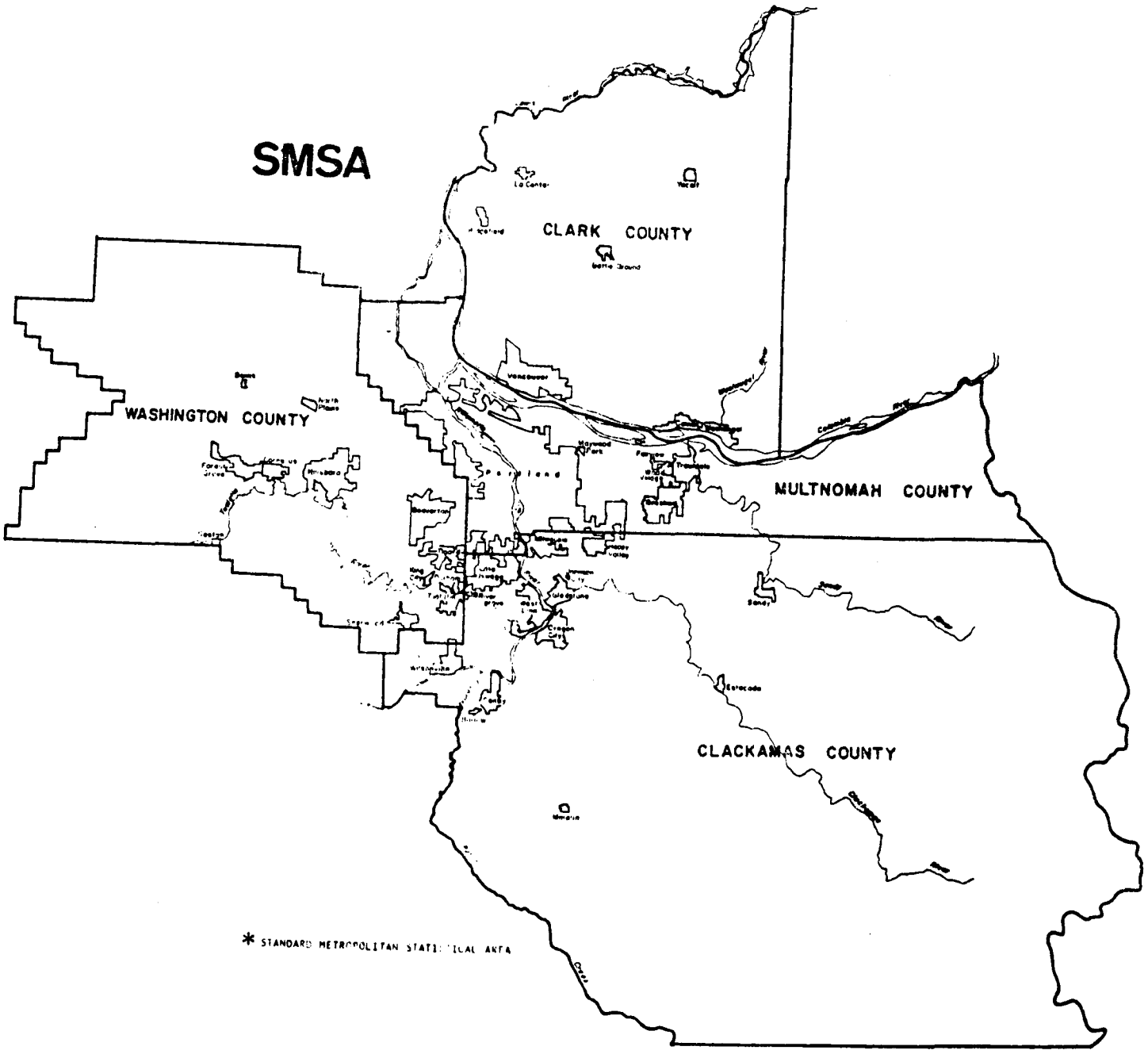

FIGURE 3-1.

PORTLAND STANDARD METROPOLITAN STATISTICAL AREA

According to recent research, the median income in Portland is $13,315. The rate of increase in the cost of living is often lower than that of other cities on the West Coast. The employment category with the largest portion of the work force is that of wholesale and retail trade; manufacturing ranks second, and services, third. Industries whose impact on the labor market is significant include forest products, food processing, primary metals, chemicals, fabricated metals, machinery, transportation equipment, textiles and apparel, furniture and electrical equipment. The unemployment rate as of March, 1979 was 5.7% of the labor force in the Portland SMSA.

3.2 TRANSPORTATION CHARACTERISTICS OF PORTLAND

Portland, which is located 65 miles inland from the Pacific Ocean, is one of the world's largest fresh water ports. The city is served by four transcontinental railroads (Burlington Northern, Milwaukie Road, Southern Pacific and Union Pacific), two interstate bus lines (Trailways and Greyhound), and nine airlines. Highways, freeways and expressways radiate in all directions from the Portland area; these include portions of the interstate freeways connecting Oregon with all states in the country. Over 90% of the Oregon interstate system is now open to traffic, including all of Interstate Highway 5, which connects Oregon with Washington and California. Major additions to the Oregon freeway system are now under construction in East Multnomah County.

Downtown Portland is laid out in a grid pattern with short (200-foot long) blocks; most downtown streets are one-way, with parking lanes on both sides. Five bridges across the Willamette River lead directly into downtown, connecting it with the eastern and northern parts of the city. In the first half of 1973, 147,000 vehicles entered downtown on an average day; this number may have decreased slightly since then.

The local mass transit system is operated by the publicly-owned and -operated Tri-County Metropolitan Transportation District of Oregon (Tri-Met), which provides public bus transportation throughout Clackamas, Multnomah and Washington counties. Tri-Met operates 515 buses on 66 bus routes; the fares are moderately low (45¢ and 65¢). During peak hours, buses operate at five to twenty minute intervals; during off-peak hours, most buses operate on fifteen to sixty minute schedules, although buses in some sparsely-populated areas operate less frequently. The hours of operation vary with the particular route. In addition to scheduled service, Tri-Met offers charter bus service.

According to recent analyses performed by Tri-Met staff, Tri-Met ridership characteristics are as follows:

Grade school children	4%
High school students	10%
Senior and disabled citizens	12%
Adult rides	74%

Those over 65, disabled, or legally blind may pay only 10¢ during weekday non-rush hours (9AM to 3PM) and ride free of charge on weekends and evenings (after 7PM). To qualify for these fare reductions, passengers must present to the driver either a Medicare card or an Honored Citizen Card, available at Tri-Met's Customer Assistance Office. Passengers holding either card may also avail themselves of Tri-Met's Senior Escort Program, which provides senior citizens with an escort and individual bus-riding instruction, free of charge, on weekdays from 9AM to 3PM; arrangements must be made 24 hours in advance. More than 70,000 Honored Citizen Cards have been issued since the program began. In addition, Tri-Met has designated the 288 square block downtown Portland area as "Fareless Square"; passengers boarding and leaving the buses within Fareless Square may ride free of charge at all times.

Tri-Met recently constructed a $16 million transit mall in the downtown area of the city. The Portland Mall runs eleven blocks on S.W. Fifth and Sixth Avenues, from Burnside to Madison Street, providing two exclusive lanes for buses, one lane for other vehicular traffic, and convenient pedestrian access. It is estimated that the mall will triple the people-carrying capacity of Fifth and Sixth Avenues by separating auto, bus and pedestrian traffic; thus, it will serve as the central axis of the public transit system. General pedestrian traffic is separated from bus-loading areas, where 31 protected passenger shelters and 8 trip-planning kiosks provide seating as well as complete route and schedule information for all Tri-Met lines. The Urban Mass Transportation Administration (UMTA) contributed $12,692,732 (80%) to the Mall project; Tri-Met contributed $3,173,183 (20%).

Aside from farebox revenues, Tri-Met's major sources of income are federal grants* and tax on gross payrolls in the Tri-county area; the current rate is six-tenths of 1% (.006). Exempt organizations include political subdivisions, educational and religious institutions, and financial and insurance companies.

The demonstration service area is also served by two major taxi companies, which collectively operate 320 taxicabs; the latter furnish approximately 1,200,000 passenger-trips per year.

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*Federal funds are received from the U.S. Department of Transportation. Federal dollars from the Urban Mass Transportation Administration (UMTA) pay 80% of the cost for capital items such as buses, passenger shelters, and the construction of the Portland Mall. In addition, the federal government provides monies in varying formulas for transportation planning, special projects like the LIFT, and approximately four million dollars a year operating subsidy.

3.3 THE TRANSPORTATION HANDICAPPED MARKET

3.3.1 Characteristics of the Transportation Handicapped

The Portland project, an exemplary demonstration within UMTA's Service and Methods Demonstration (SMD), pertains specifically to the SMD objective of improving transportation services for "transportation handicapped" persons. The latter are defined in the UMTA regulations as those who "are unable, without special facilities or special planning or design, to utilize mass transportation facilities and services as effectively as persons who are not so affected." In the predemonstration household survey performed by Crain & Associates, 11,500 persons were screened for transportation handicaps and 471 persons were interviewed. Data from this survey show:

1. Approximately 22,138 (5.75%) Portland citizens are transportation handicapped.* Of these, 12,320 (3.2%) are estimated to be severely transportation handicapped, and 9,818 (2.55%) are estimated to be moderately transportation handicapped.

2. Handicap incidence increases dramatically with age: the incidence among persons 65 years of age and over is 27.5%.

3. Of those who are severely transportation handicapped:
   a. 67% are elderly,
   b. 67% are female,
   c. 60% have annual household incomes of less than $5,000,

*More precisely, the target market of the demonstration project consists of those functionally transportation handicapped (TH) persons who are dependent upon public transportation and cannot afford to use taxis exclusively. The target group, then, can be assumed to be smaller in number than the TH group; otherwise, however, the target market can be assumed to resemble the TH market; i.e., to exhibit similar travel characteristics. A more detailed discussion of the target market is found in Chapter 5.

d. 25% live alone,
e. 50% live in households owning one or more automobiles,
f. 25% are licensed to drive,
g. 55% usually or always have access to automobile transportation,
h. 7% are employed, and
i. 2% are seeking employment.

4. The most prevalent health problems of those classified as transportation handicapped, in order of frequency, are as follows: arthritis, orthopedic problems, visual impairment, heart ailment, and stroke. About 50% use one or more aids; i.e., support canes, help provided by another person, walker, wheelchair, and crutches, in that order of prevalence.

Table 3-1 summarizes the demographic characteristics of Portland's elderly and transportation handicapped populations.

3.3.2 Travel Patterns of the Transportation Handicapped

With regard to the travel patterns of the elderly and transportation handicapped in Portland, the survey (cited above) revealed the following:

1. Able-bodied elderly persons make 1.4 one-way non-walking trips per day, whereas the moderately transportation handicapped make 1.2 trips per day, and the severely transportation handicapped make 0.8 trips per day. The national average of trips per day made by the general public is 2.2. Figure 3-2 provides a graphic comparison of these findings.

TABLE 3-1. DEMOGRAPHICS OF ELDERLY AND HANDICAPPED*

	ABE		MTH		STH	
	%	Std. Dev.	%	Std. Dev.	%	Std. Dev.
Female	61.7[a]	3.0	69.1	3.4	67.4	2.6
Male	38.3	3.0	30.9	3.4	32.6	2.6
10-15 Years of Age	na	na	1.1[b]	0.8	0.6[b]	0.4
16-20 " " "	na	na	0.0	?	2.5	0.9
21-59 " " "	na	na	17.7	2.8	22.8	2.5
60-64 " " "	na	na	10.8	2.3	6.6	1.4
65+ " " "	100	?	70.4	3.3	67.4	2.6
$0-$4,999 Household Income	40.3	3.2	63.9[c]	3.7	58.7	3.0
$5,000-$9,999 Household Income	36.1	3.1	21.3	3.1	19.9	2.4
$10,000-$14,999 " "	11.6	2.1	7.7	2.1	9.8	1.8
$15,000-$24,999 " "	7.7	1.7	3.6	1.4	8.7	1.7
$25,000+ " "	4.3	1.3	3.6	1.4	2.9	1.0
1 Person in Household	33.3	2.9	54.0	3.6	27.8	2.5
2 Persons in Household	54.2	3.0	30.7	3.4	37.2	2.7
3 " " "	7.0	1.5	3.2	1.3	12.0	1.8
4 " " "	1.5	0.7	2.1	1.0	6.9	1.4
5+ " " "	1.1	0.6	1.6	0.9	2.2	0.8
Institutionalized Persons	2.6[d]	1.0	7.4	1.9	12.3	1.9
Licensed to Drive	56.2	3.0	38.4	3.6	25.3	2.5
0 Autos in Household[e]	31.1	2.8	51.9	3.6	50.8	2.8
1 " " "	52.7	3.0	36.0	3.5	32.5	2.6
2 " " "	15.8	2.2	9.5	2.1	13.2	1.9
3 " " "	0.4	0.4	2.6	1.2	3.5	1.0
0 Drivers in Household[f]	30.8	2.8	51.3	3.6	50.2	2.8
1 " " "	41.4	3.0	33.9	3.4	29.7	2.6
2 " " "	26.4	2.7	13.2	2.5	14.8	2.0
3+ " " "	1.5	0.7	1.6	0.9	5.3	1.3
Auto Always Available[g]	57.4	3.0	37.1	3.5	36.2	2.7
Auto Usually Available	16.3	2.2	14.5	2.6	19.7	2.3
Auto Sometimes Available	13.3	2.0	25.3	3.2	25.2	2.5
Auto Never Available	13.0	2.0	23.1	3.3	18.8	2.2
Drive Daily[h]	41.0	3.9	34.2	5.3	27.6	4.5
Drive Frequently	36.0	3.8	35.2	5.4	33.7	4.7
Drive Weekly	5.6	1.8	3.8	2.2	6.1	2.4
Drive Occasionally	17.4	3.0	26.6	5.0	32.7	4.7

*From the previously cited predemonstration survey.

TABLE 3-1. DEMOGRAPHICS OF ELDERLY AND HANDICAPPED (cont.)

	ABE		MTH		STH	
	%	Std. Dev.	%	Std. Dev.	%	Std. Dev.
Working Full Time	6.3	1.5	9.6	2.1	5.2	1.3
Working Part Time	9.6	1.8	3.7	1.4	1.6	0.7
Student	0.4	0.4	1.6	0.9	2.3	0.8
Keeping House	3.3	1.1	1.6	0.9	6.5	1.4
Retired--Not Looking	80.1	2.4	82.4	2.8	82.6	2.2
Unemployed--Looking	0.4	0.4	1.1	0.8	1.9	0.8
1 Year at Address	7.4	1.6	12.8	2.4	11.2	1.8
1-3 Years at Address	10.0	1.8	9.0	2.1	13.4	1.9
3-5 Years at Address	7.4	1.6	10.1	2.2	9.9	1:7
5-10 Years at Address	11.2	1.9	10.1	2.2	11.5	1.8
10-15 Years at Address	10.4	1.9	11.2	2.3	12.8	1.9
15+ Years at Address	53.5	3.0	46.8	3.6	40.9	2.8

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[a] 61.7% of able-bodied elderly are female.

[b] This age distribution is from the 10% survey sample.

[c] 63.9% of moderately handicapped live in households having total incomes of less than $5,000. Persons in institutions supplied their own personal income. Note that 14% of those interviewed refused to supply this information.

[d] 2.6% of able-bodied elderly live in "institutions" rather than "households."

[e] Includes persons living in institutions.

[f] Includes persons living in institutions.

[g] "Auto available" means as a driver or as a passenger.

[g] Drivers only.

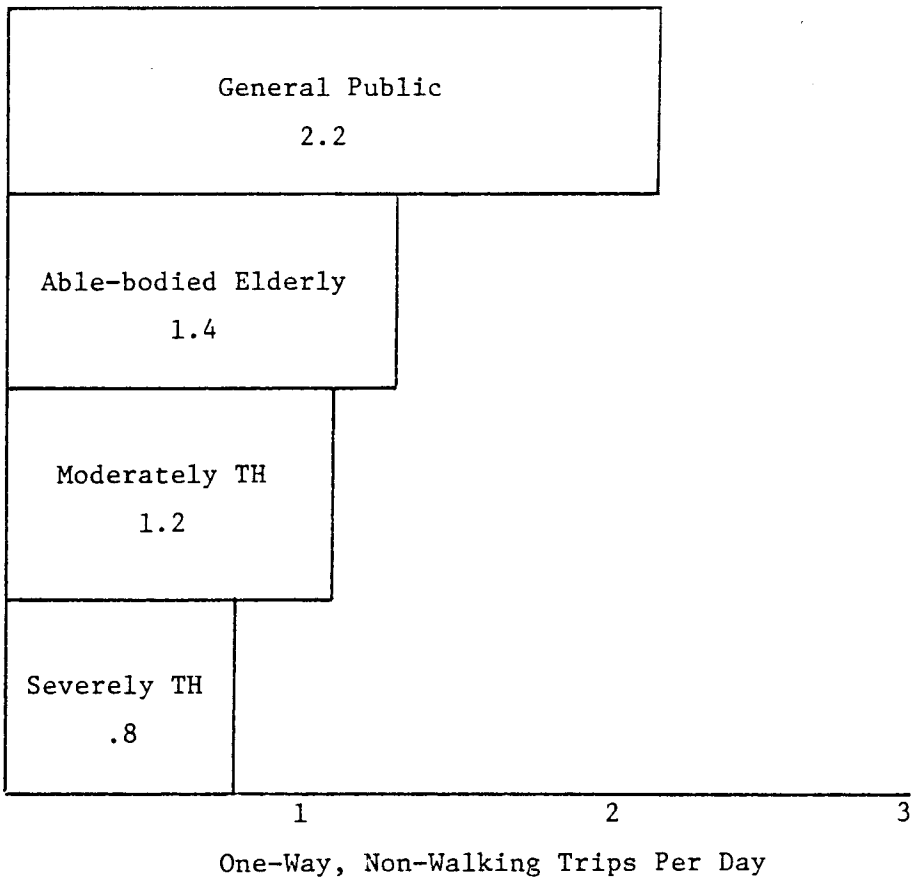


FIGURE 3-2. TRIP RATES

2. About 11% of the transportation handicapped group use wheelchairs or walkers; the trip-making rate of this group (0.5) is lower than that of the severely transportation handicapped group (0.8). The former group also makes fewer "optional"—e.g., recreational—trips. Table 3-2 shows a breakdown of trip rates according to demographic variables such as sex, age, and income.

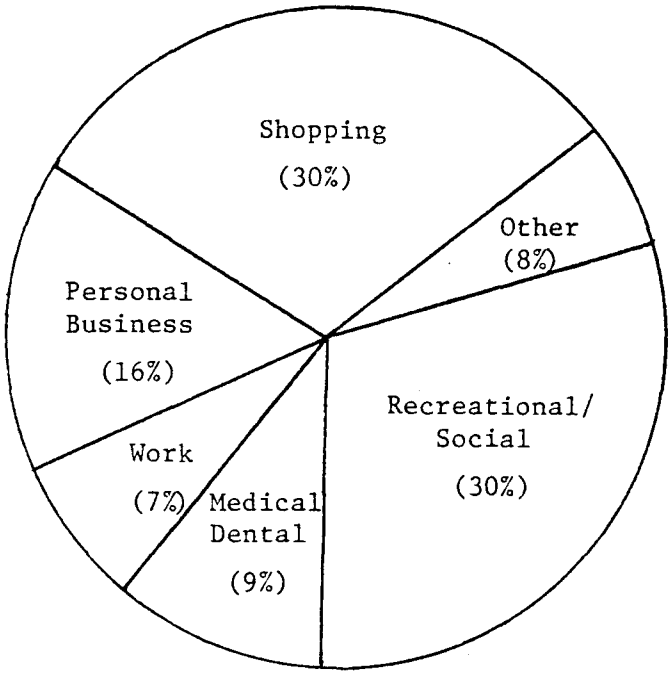
3. The most common trip purposes of the transportation handicapped are shopping, recreational/social activities, personal business, medical/dental appointments,

TABLE 3-2. TRIP RATES VERSUS DEMOGRAPHIC VARIABLES*

	ABE	MTH	STH
Overall			
Trips per Day	1.4	1.2	0.8
Total Trips, 48 Hours	768	463	520
Male	1.7	1.3	0.8
Female	1.2	1.2	0.9
10-15 Years of Age	N.A.		
16-20 " " "	N.A.	N.A.	1.3
21-59 " " "	N.A.	1.8	1.2
60-64 " " "	N.A.	1.3	0.8
65+ " " "	1.4	1.1	0.7
$0-$5,000 Income	0.9	1.0	0.7
$5,000-$10,000 Income	1.6	1.4	1.0
$10,000-$15,000 "	1.3	1.6	0.6
$15,000-$25,000 "	2.4	2.7	1.6
$25,000 + Income	0.4	2.8	1.1
Driver's License	1.8	1.9	1.3
No Driver's License	0.9	0.8	0.7
Auto Always Available	1.8	1.9	1.1
Auto Usually Available	1.1	0.8	0.8
Auto Sometimes Available	0.8	0.8	0.7
Auto Never Available	0.7	0.9	0.4

*From the previously cited predemonstration survey.

and work; their relative proportions are illustrated below:



4. The automobile is used for over 75% of all trips; the severely transportation handicapped ride as passengers rather than drivers more frequently (51% of the time) than the moderately transportation handicapped (32% of the time). About 20% of the moderately transportation handicapped trips and 10% of the severely transportation handicapped trips are made on the present bus service. In addition, lower-income transportation handicapped persons tend to use buses and taxis disproportionately more than the transportation handicapped population as a whole.

4. PROJECT OPERATIONS AND DEVELOPMENT

4.1 PROJECT DESCRIPTION

All Portland residents who are physically or mentally unable to use regular bus service and who do not have access to alternate means of transportation are eligible for Special Needs Transportation (SNT) or LIFT service. People using wheelchairs, walkers, and crutches automatically qualify.

Service is provided by a fleet of 15 Mercedes-Benz diesel buses equipped with wheelchair lifts, tie-downs and a retractable lower step. Twelve of the vehicles accommodate eight passengers and two wheelchairs; three vehicles accommodate six passengers and four wheelchairs. All of the buses are equipped with two-way radios. Pictures of LIFT buses are shown in Figure 4-1. Rides are dispatched from the Special Needs Control Room, a separate operating unit within Tri-Met's Operations Division. During the demonstration period, LIFT operations are closely coordinated with the Planning Department. Bus operators are Tri-Met drivers who volunteered for the LIFT. They were selected, in part, on the basis of their safety records and their desire and/or special experience in working with handicapped and elderly persons. Drivers received a DAVE systems special training course on how to handle problems of the TH before service began.

Service is provided from 6:30 AM to 6 PM, Monday through Friday, is only available to residents of the city of Portland, and operates principally within the Portland city limits.

The LIFT service carries two types of passengers:

> Agency-Sponsored Passengers: This passenger is sponsored by a public agency which has agreed to a contract with Tri-Met for LIFT service. Rides are $3.00 per one-way trip. No fare is required from the passenger.

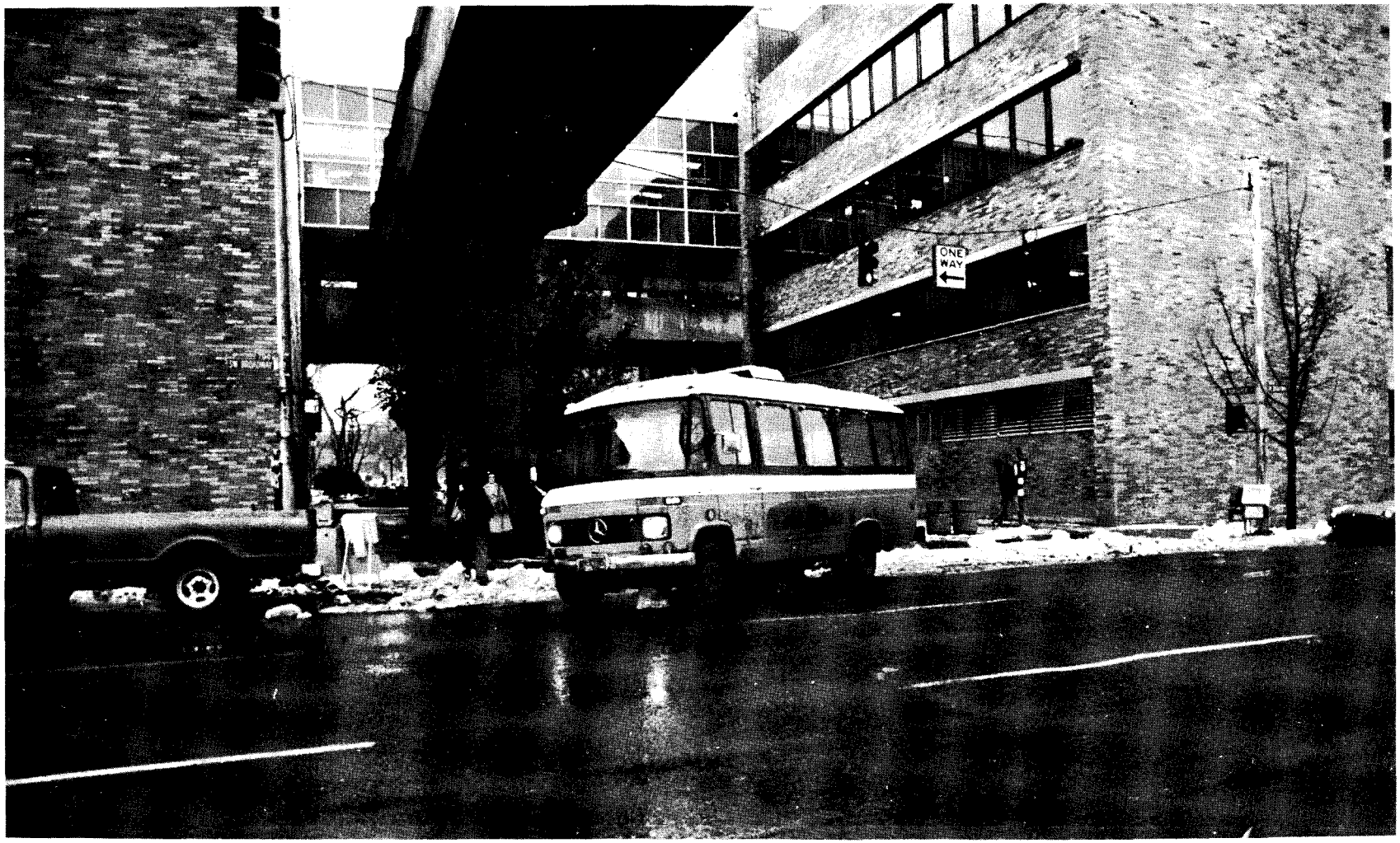


FIGURE 4-1. LIFT BUS IN OPERATION

General Passengers: This passenger is neither affiliated with an organization nor sponsored by a public agency. General passengers pay a cash fare of 50¢ per one-way trip on the LIFT. The cash fare is deposited in a farebox similar to those currently used on Tri-Met's regular buses.

It should be noted that many agency-sponsored passengers also ride as general passengers for trips not covered by their sponsoring agency. For example, a client of the Welfare Division might ride as an agency-sponsored passenger for a medical trip (the only type of trip paid for by the Welfare Division) and also ride as a general passenger for shopping trips, paying the 50¢ cash fare.

Agency-sponsored and affiliated clients are registered (certified as eligible) by the contracting agency. At this time a Patron Registration Application (see Figure 4-2) is filled out for each client. This form provides information on handicap, mobility aids used, reasons why the person cannot use public transit, and demographic information. General passengers apply for registration materials, fill out the required information themselves, and have the application verified by one of the following types of individuals:

1. Medical professional (physician or nurse),
2. Physical or occupational therapist,
3. Social service agency representative,
4. Teacher,
5. Counselor, or
6. Social worker or case worker.

Persons who do not know anyone who can verify their applications are asked to call the Tri-County Community Council for help.

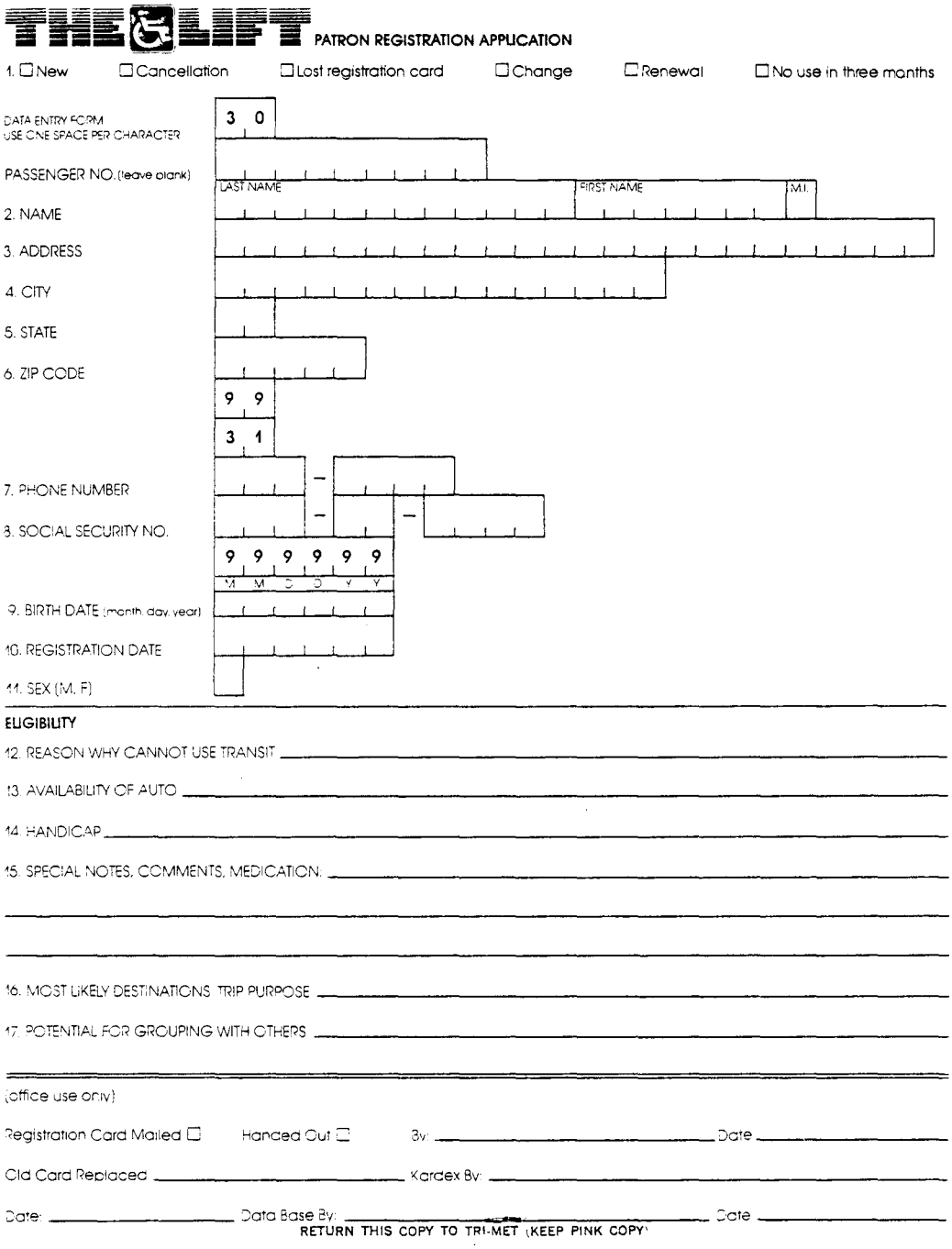


FIGURE 4-2.

PATRON REGISTRATION APPLICATION

All certified passengers receive a Special Needs Bus Pass, a plastic card similar to a credit card, shown in Figure 4-3. Bus passes come in two colors: general passengers who deposit a cash fare are issued blue passes; all others have orange passes. This color coding lets the drivers know which passengers will be depositing cash fares and which will not. The first of the seven digits on the card signifies the type of passenger: agency-sponsored, affiliated, or general. The second digit indicates any special aids the passenger needs. This allows the dispatcher to schedule appropriate space for wheelchaired persons and provide the extra seating needed for those who must travel with an attendant. The remaining five digits are used to identify the registrant.*

The LIFT provides door-to-door service; passengers receive driver assistance in getting on and off the bus and to and from their homes.** Upon boarding the bus each passenger displays his or her bus pass to the driver and deposits a fare, if appropriate. The driver manually records the passenger's ID number on a control sheet which already contains information (conveyed by the control room to the driver) about the passenger's origin and destination. This information is keypunched each day and stored on a diskette. These data are then used to

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*As discussed in Chapter 5, many registrants have registered as both general passengers and agency passengers and therefore have two or more ID cards.

**The contract between Tri-Met and the agencies served states that "the agency shall hold Tri-Met and its employees harmless from, and shall indemnify Tri-Met and its employees for any and all claims for damages suffered or allegedly suffered as a direct or indirect result of providing such assistance."

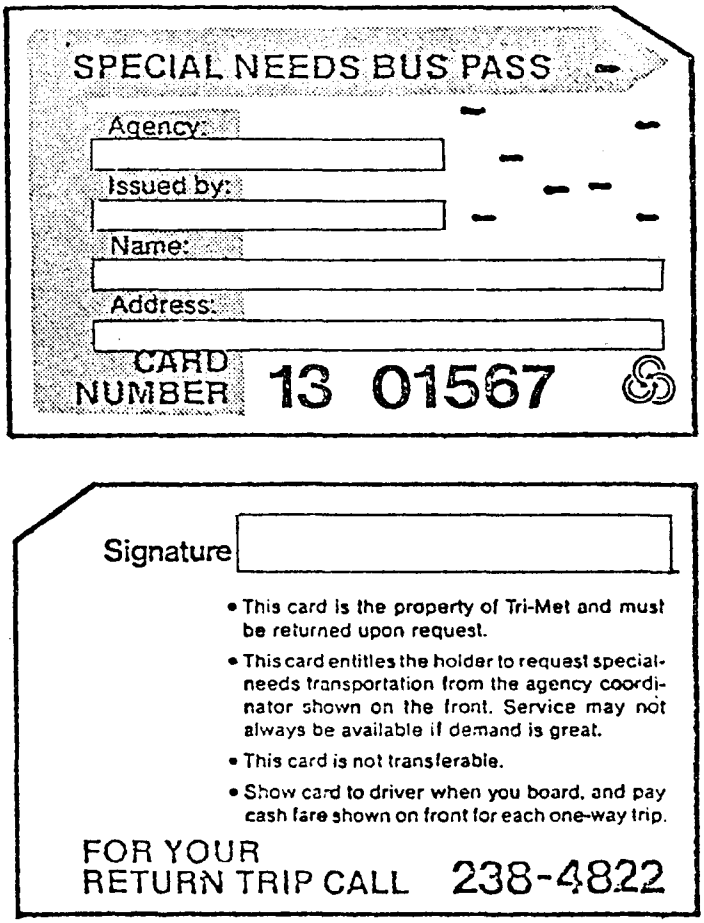

FIGURE 4-3.

SPECIAL NEEDS BUS PASS

produce daily, weekly, or monthly reports covering operations, cost, billing, etc.* Pictures on page 46 give a visual description of how the boarding process works.

All rides are scheduled 24 hours in advance.** To arrange for service, agency-sponsored and affiliated passengers call their sponsoring agency, which, in turn, calls the LIFT in accordance with Tri-Met scheduling procedures. General passengers call Tri-Met directly to arrange for service. Passengers are supplied with the phone number (on reverse side of bus pass) and instructions on how to call for their return trip. Return trips are provided on both a presecheduled and demand-responsive basis. All rides are manually scheduled by a staff of four dispatchers from Tri-Met's Control Room. The control room, as shown in Figure 4-5, includes a large wall map of the service area, radio console, and the required data collection and scheduling equipment.

Services are also provided by two taxi companies and a private wheelchair transportation firm. This alternative is used when it is a more cost-effective method than using a LIFT bus. A taxi would be used, for example, to transport a single passenger going a very long distance when this trip could not be grouped with others. Taxis are dispatched to pick up and deliver LIFT clients in the following way: one of the dispatchers places an order with the taxi company, relaying the

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*This record-keeping function was to have been taken over by the Automatic Fare Identification Recorders (AFIR's) which were installed on each of the buses. It was planned that passengers would insert their Special Needs Bus Passes in the AFIR upon boarding the bus, eliminating the need for manual records. However, due to mechanical and electrical failure the fareboxes were dismantled in November, 1978.

**The 24-hour prescheduling requirement has been in effect since September, 1978; previously a 48-hour advance notice was required.

FIGURE 4-4. PASSENGERS BOARDING THE LIFT BUS

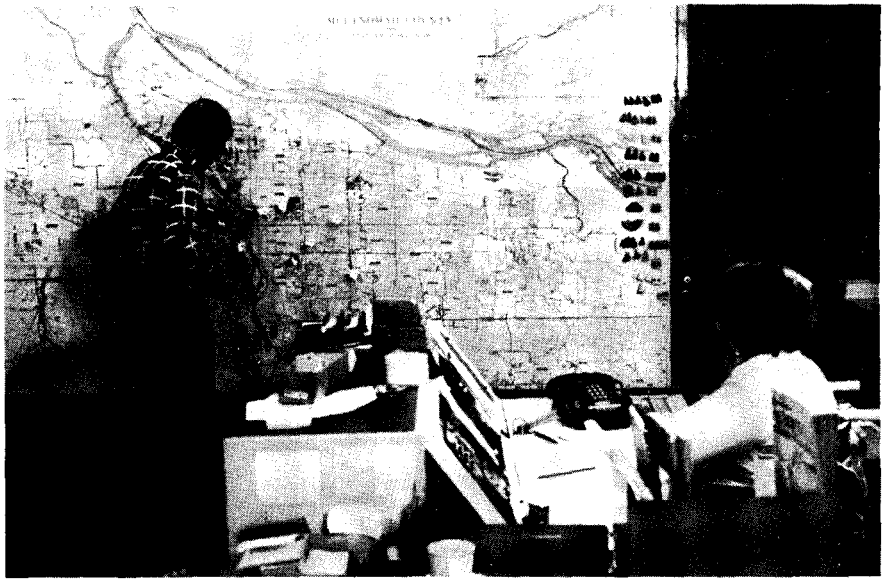

FIGURE 4-5. LIFT CONTROL ROOM

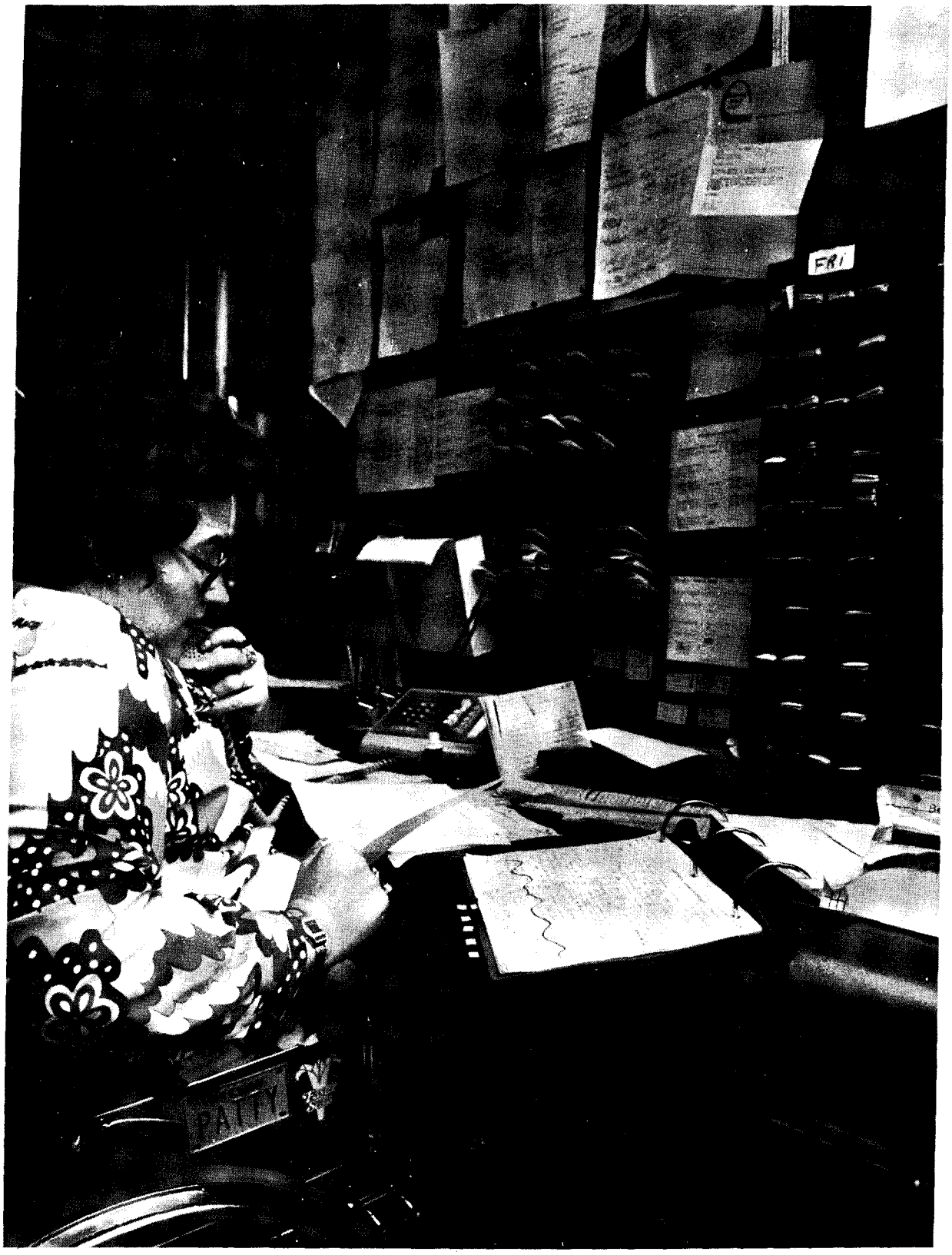

FIGURE 4-5. LIFT CONTROL ROOM cont.

necessary pick-up/delivery information and a purchase order number. At the time the rider is to be picked up, the taxi radios the necessary information to one of its drivers. The driver records information on a special sales draft, which is delivered to the taxi office grouped with other similar invoices, and forwarded to Tri-Met at the end of the month.

4.1.1 Eligibility Criteria and Ride Prioritization

There are approximately 22,000 people* in Portland who have difficulty using or cannot use regular bus service. The unconstrained trip demand of this group could not possibly be met by the LIFT. Data from the predemonstration survey show that TH people make 1.4 trips per day. Applying this trip rate to the TH population and assuming that one-tenth of all TH trips could be diverted to the LIFT, the unconstrained daily demand of 1.4 trips per day x 22,000 TH ÷ 10 would be 3,080 trips per day. Operating personnel optimistically estimated that the 15 LIFT buses could serve 850 trips per day. Analysis in this report shows that a more realistic daily capacity is about 400 trips per day. Therefore, potential demand for the service is as much as six times the available transportation.

Due to the anticipated imbalance between demand and supply Tri-Met took three measures to manage the demand. They:

1. Developed a two-day advance reservation policy,**
2. Developed eligibility criteria, and
3. Implemented a ride rationing or prioritization scheme.

These actions were approved by the Citizens Advisory Committee.

The eligibility criteria are presented in Figure 4-6. These criteria are based on a functional rather than a medical definition of handicap to ensure that LIFT service is only available to people who really need it. For example, a person

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*Data from predemonstration survey cited earlier.
**Lowered to one day in September 1978.

TABLE 4-1.

ELIGIBILITY CRITERIA FOR LIFT PASSENGERS

Registration will be limited to those mobility disadvantaged persons of all ages who are physically or mentally unable to access the regular transit system and cannot use an automobile, and who meet both of the following criteria. (Those persons who need a wheelchair, walker, or crutches in order to travel are automatically eligible.)

A. Are transportation disadvantaged in one or more of the following categories:

   a. Unable[1] to get on or off a regular public transit bus;

   b. Unable to walk from home to the nearest bus stop;

   c. Unable to wait standing for more than 10 minutes;

   d. Unable to move in crowds;[2]

   e. Unable to read information signs;[3]

   f. Unable to grasp coins, tickets or handles;

   g. Unable to understand and follow transit directions;

   h. Unable to utilize a regular public transit bus in the performance of life-sustaining activities; and

B. Are unable to drive a car or do not have access to a vehicle for transportation.

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1 The word "unable" means that performing the function is absolutely impossible or causes severe and continuing pain. It does not mean discomfort or occasional pain.

2 Difficulty keeping balance in a regular transit bus is not considered a transit disadvantage since federal regulations require seats for the handicapped near the entrance of all buses.

3 This does not include foreign language problems.

who has lost an arm and would be considered handicapped by a medical definition may have no problem using regular bus service and is not considered transportation handicapped by this functional definition.

Ride prioritization is based on several factors: trip purpose or need, length of trip, number of persons served, and location of facility to be served. A priority system based on need alone can result in low efficiency and high cost per rider because it does not allow for discretionary trips which might be completed with little effect upon the level of service. For example, visiting a friend in the hospital (moderate need) can be combined with a trip by a neighbor for a medical appointment at the same hospital (urgent need). On the other hand, providing only group trips, for example, would tend to eliminate many critical trip needs. Thus a two-dimensional approach to the priority-ranking problem that categorizes trip priority not only by need but also by number of people served was recommended. This system attempts to serve those with the greatest need and at the same time keep trip cost to a manageable level. It was developed through the joint efforts of Tri-Met and DAVE Systems and is shown in Figure 4-7.

Five levels of need and five levels of magnitude were developed which yield a total of 25 combinations. Each combination can be ranked in terms of priority. Highest priority is accorded regularly scheduled medical trips taken by many passengers to the same facility. This, for example, might be people with chronic conditions visiting Bess Kaiser Hospital for a weekly check-up. Second priority is for regularly scheduled income-producing work or school trips taken by many passengers to the same facility. This, for example, could be a group of students sponsored by the State Vocational Rehabilitation Division taking regularly scheduled courses at Portland Community College. Third priority is given to life-support activities (shopping, collecting Social Security checks, etc.) by a number of people traveling to the same facility, such

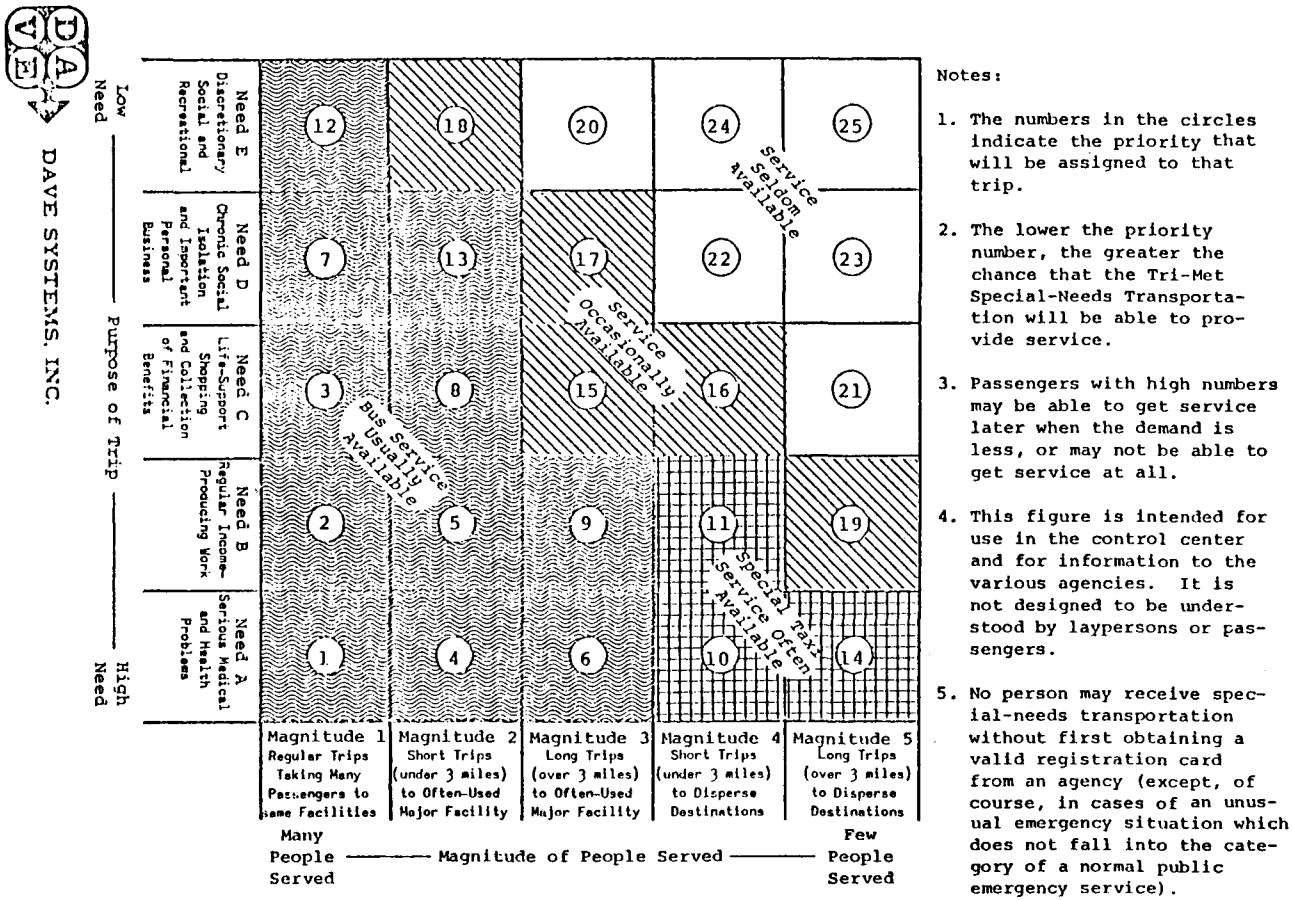

FIGURE 4-6. PRIORITY RANKING FOR PASSENGERS WHO ALREADY HAVE A VALID REGISTRATION CARD

as a shopping center. This system continues, allowing for 25 levels of priority. Lowest priority is given to social and recreational trips over three miles in length, to diverse destinations.

4.1.2 Organizational Structure

The organizational structure of the Special Needs Transportation Project is shown in Figure 4-6. The General Manager's office has overall responsibility for the project. The Finance Department distributes operational results, prepares a monthly budget summary, and bills agencies. The Special Transportation Coordinator monitors all schedules for implementation of the program and calls to the attention of appropriate parties any problems which may be developing; he is Tri-Met's contact with the Citizens Advisory Committee (CAC), UMTA, TSC, consultants, and any agencies that contract for LIFT service. He works directly with agency personnel to negotiate contracts and to work out any client-related problems. He also oversees promotional activities. The Manager of LIFT Operations is in charge of operations and reports directly to Tri-Met's Director of Operations. As a matter of practice, operational discussions are worked out between him and the Special Transportation Coordinator. His duties include responsibility for day-to-day operation of LIFT service and other contract carriers, management of personnel and equipment, and maintenance and scheduling. The Schedule Department provides computer-related assistance.

4.2 PROJECT EVOLUTION

In July, 1973, Tri-Met adopted a resolution to "undertake planning efforts to consider provision of specialized transportation services for the disadvantaged elderly and handicapped

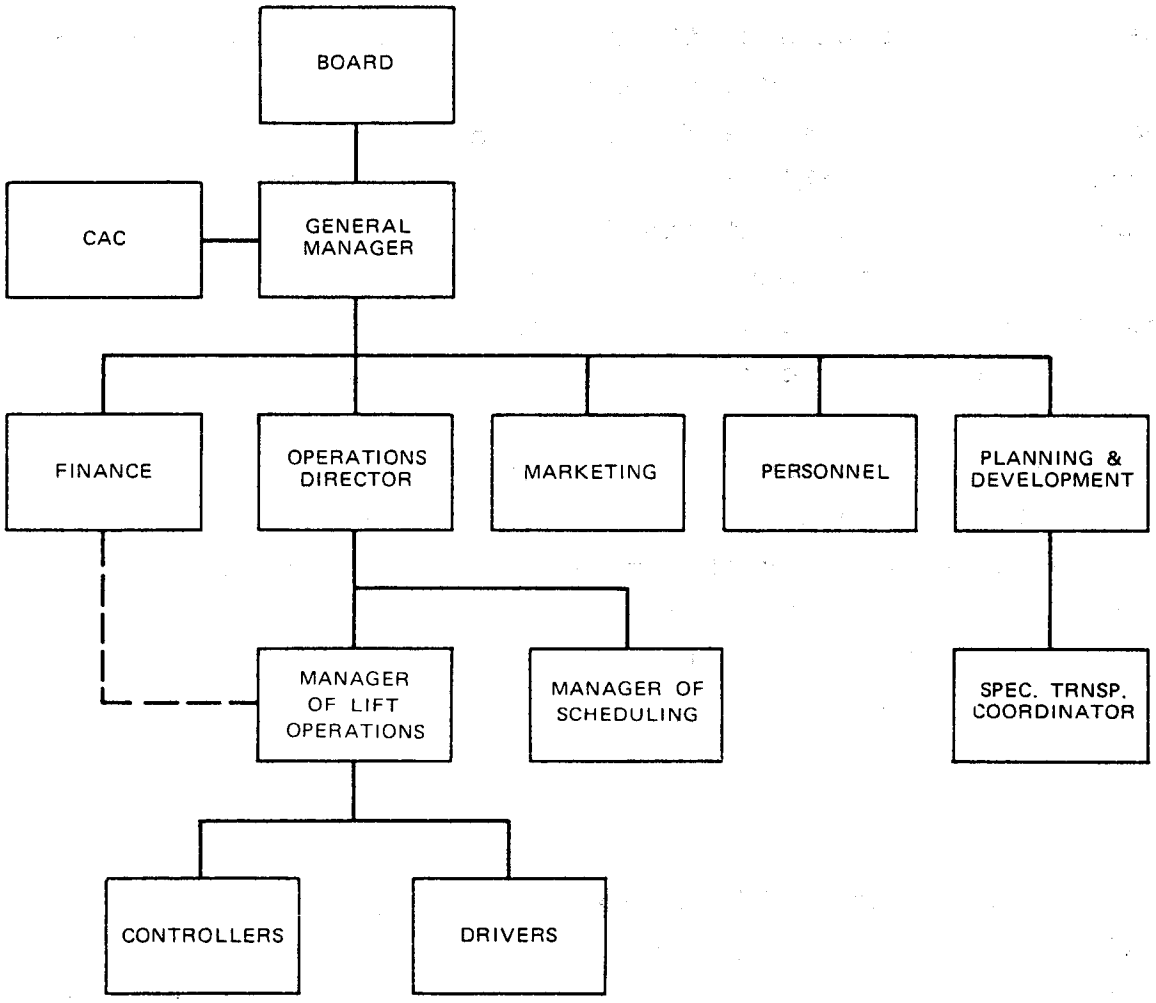

FIGURE 4-7. ORGANIZATIONAL CHART

residents of the tri-county area." Providing service to the handicapped and elderly population of Portland had been a concern of the city for some time. In 1972, the City Council approved funds to study the problems of the mobility disadvantaged. Based on the results of the study, the City Council appropriated $20,000 which was combined with a grant from the State of Oregon early in 1974; this grant became the basis for a Special Transportation Unit within the City of Portland's Human Resources Bureau (HRB). The Unit aimed at coordinating the efforts of 40 agencies that had been identified as providing transportation to handicapped and elderly persons. Initially only nine agencies were involved in the consortium; this number eventually increased to 15 agencies.

However in October 1974, in keeping with its policy to operate as few programs as possible, the Human Resources Bureau made the decision to contract out services then being provided by the City's Special Transportation Unit. The contract was awarded to Special Mobility Services (SMS), a private non-profit transportation project which operated a fleet of wheelchair-accessible vans. SMS was not able to provide all the necessary transportation and, thus, Metro Mobility (MM), a similar organization which used volunteer drivers, came into being.

It was within this context of fragmented and overlapping transportation services to the elderly and handicapped that Tri-Met, with the cooperation of Portland's Bureau of Human Resources, stated their intention in a proposal to UMTA to "demonstrate the viability of transit company operated, demand-responsive special transportation . . . combining the resources and transit expertise of Tri-Met with the resources and social service expertise of the Bureau of Human Resources of the City of Portland."*

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*From Demonstration Grant Proposal, March, 1975.

To allow for citizen input, Tri-Met held a public hearing on February 19, 1975 at the Multnomah County Courthouse in Portland, a month prior to submitting the proposal. There was some criticism that the public hearing came too late in the planning stage, as the basic design of the system outlined in the proposal (door-to-door service using specially-equipped vehicles) had already been determined. In all, 29 persons testified, representing the following offices or organizations:

Governor's Office
State Senator
County Commissioner
Mayor of Portland
Tri-County Community Council
Architectural Barriers Council (2)
Bureau of Human Resources (3)
Jewish Community Center
Guidance Clinic
Taxi cab companies (2)
Handicapped groups (3)
Senior Citizen groups (11)
No affiliation (1)

The speakers pledged support for the proposed service and expressed concerns about the following: area and time of service, duration of project, coordination with existing services, role of cab companies, overlapping of coordinative efforts, cost of rides, and eligibility criteria.

The proposal was submitted in March, 1976 and led to a federal grant in July for a three year demonstration project. Most of fiscal year 1976 was devoted to formulating a work program for the project, investigating vehicle types, investigating the available technology in automatic fare boxes, and developing vehicle specifications. Bids were requested for the automated fare collection equipment, the management information system and

the vehicles. Tri-Met also contracted with a firm to develop the manual scheduling and dispatching operation.*

As an innovation of the project, service design was to be based on market research. Thus, in February and April of 1976, a comprehensive "before" household survey was conducted to measure the incidence rate of transportation handicapped people -- those who could not use regular bus service -- their pre-demonstration transportation behavior, and their attitudes, perceptions and problems relative to traveling within Portland. In May 1976, results of this survey were given to Tri-Met and DAVE Systems so they could begin to design the demonstration system based on the research and a functional definition of transportation handicapped.**

Initial plans on certification, system performance standards, and fare collection hardware were developed in July. It also became apparent at this time that the automatic fare boxes would not be ready by the time LIFT Service was scheduled to begin. This situation necessitated operating a manual fare collection and trip recording system during the early months of operation.

A Citizens Advisory Committee was formed. Five of the eleven member committee are handicapped and/or senior citizens. The other members represent organizations or interests that work with the target population. The Committee first met on August 12, 1976, and continues to meet monthly. Because of the importance

*The Mitre Corporation was selected to help write specifications for the equipment, and to serve as an intermediary consultant to select the two companies which would provide the hardware and software and to integrate their efforts. Scope Electronics of Reston, Virginia was selected to provide the Automatic Fare Identification Recorders (AFIR's) and Boeing Computer Service to develop the software for the AFIR's. Mercedes-Benz was selected to provide the vehicles, Motorola to equip the buses with two-way radios, and the Environmental Equipment Corporation to retrofit the buses with wheelchair lifts. DAVE Systems of La Habra, California was selected to develop a scheduling and dispatching system for the 15-bus system.

**Results are contained in the previously cited report; see note page 15.

of the Committee's role in the planning process, a more detailed description of its formation and role is given in Section 4.3.1.

Early in August, DAVE Systems submitted their report describing preliminary eligibility, registration and priority criteria. Deciding who would be eligible to ride the LIFT was considered a critical aspect of the program since the potential demand for special needs transportation greatly exceeded the capacity of the system. Eligibility was based on inability to use regular bus service and lack of alternative transportation. An approach to the priority-ranking problem was recommended which categorizes trip-priority not only by need but also by the number of people who are served. (See Section 4.1.1.) These eligibility criteria and service priorities were reviewed by the Citizens Advisory Committee and approved by Tri-Met's Board of Directors in October.

By September 1976, the control room equipment had been specified and purchased, and a computer software contractor who would design the system for processing of billing and management information, selected. Tri-Met adopted a fare of $3.00 for agency clients, slightly less than the amount SMS had charged for comparable service. General passenger fare was $.50. In both cases, Tri-Met paid for the difference between trip cost and fare collected.

Publicity regarding LIFT Services had, at this point, been primarily channeled to potential contracting public agencies or non-profit organizations, not to the general public. This was in keeping with Tri-Met's policy of developing LIFT ridership in a controlled, gradual manner to insure that promised service was delivered reliably and professionally. This policy and general efforts at marketing LIFT services are described further in Section 4.3.2.

As a result of the agency-directed publicity, during September the first contract was signed between Tri-Met and the City of Portland Human Resources Bureau to provide service for eight Area Agency on Aging (AAA) contracting agencies throughout the

city.* Tri-Met's Special Needs Coordinator conducted a training session for personnel of these eight agencies on how to register their clients for LIFT service. The issue of confidentiality arose at this point, and a policy statement was worked out between AAA personnel and Tri-Met. The policy stated that information compiled on clients shall be used solely for the purpose of providing social services and that no client identifiable information shall be disclosed without the individual's informed consent. Once this issue of confidentiality was resolved, the process of registering clients was begun.

The first edition of a Special Needs Newsletter -- prepared to inform any interested parties of the current status of the project -- was distributed in September to over 120 public and government officials, local organizations and individuals concerned with the handicapped and elderly, the media, and any private citizen who requested it.

In November 1976, Tri-Met invited open competitive bids from taxi companies and companies providing wheelchair transportation to provide supplemental transportation services for LIFT clients for trips which would be non-productive or uneconomical for the LIFT buses to serve. The taxi contract was awarded to Portland's two largest companies, who had submitted their bid as a joint venture. The contract for supplemental wheelchair transportation was awarded to the only company to submit a bid.

The first five of fifteen buses arrived in October and the dispatch room was readied for operation. An additional nine buses arrived in November and the Citizens Advisory Committee was invited for a pre-demonstration ride on one of the buses and a tour of the dispatching facilities. The training of 18 drivers and five controllers was conducted during the second and third

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*The eight AAA centers within the city of Portland provide information, referral and counseling services to persons over 60, for the purpose of promoting client independence. Centers with group facilities sponsor such activities as dances, potlucks, card games, craft programs and tours.

weeks of December, and LIFT service began Monday, December 20th, 1976. At this time, 1,315 people were registered for LIFT service.

In its first two weeks of operation (December 20-31), the LIFT provided 898 trips to the elderly AAA clients. Demand for service these first two weeks was lower than expected, probably due to the Christmas Season (e.g., on Christmas Eve day there were only 39 requests for service) as well as a general hesitancy on the part of many handicapped and elderly persons to switch to a new and unknown system. No complaints were received, there were a number of letters of commendation, and the general feeling was that the LIFT was off to a good start.

During January contracts for LIFT service were signed with four agencies: Volunteers of America, Department of Vocational Rehabilitation, Goodwill Industries and the Crippled Childrens Division of the University of Oregon Health Sciences Center.

The marketing of LIFT services to general passengers, those individuals not connected to any agency or organization, began in March. Interested parties could write or call Tri-Met or come by in person to pick up a registration packet which contained a description of the LIFT, eligibility criteria, and an application form. By the end of April, 4,000 registration packets had been mailed; however, only 450 general passengers had been registered as eligible for service. The low return rate was caused, in part, by the requirement for verification of disability.

Four additional agency contracts were signed with the Muscular Dystrophy Association, the State of Oregon Welfare Division, Child Neurology Clinic and Westside Schools (for mentally retarded adults) bringing the total of agencies that had contracted for LIFT service as of May 1977 to nine.

The first on-board survey of LIFT passengers was conducted

in April. One hundred forty-six passengers were interviewed about their current travel behavior and perceptions of LIFT Service. Ridership at this point was almost exclusively composed of elderly AAA clients. (Results of this and subsequent surveys are discussed in Chapter 8.)

General passengers were integrated into the system in May; and during that month, the LIFT provided 731 trips for general passengers, 16% of the total trips provided in May. The LIFT was now providing 220 trips a day or approximately 4,500 trips a month.

Ridership continued to climb steadily for the next two months; by the end of July, it had reached approximately 6,400 rides per month or 320 rides per day. Slightly less than 4,000 (unduplicated) persons had now been registered for service; this included approximately 400 additional general passengers, bringing their total registration to approximately 900. To stimulate additional registration of general passengers, a special promotional campaign was initiated by the Special Transportation Coordinator. The campaign consisted of a direct mailing of 15-20,000 brochures and 2,500 posters to local agencies and social organizations whose clients might be eligible for LIFT service.

A second on-board survey of 100 passengers was conducted during July. General passengers as well as agency-sponsored clients were interviewed regarding their transportation habits and perceptions of LIFT service.

By October, the automated fare collection equipment had been installed on all the LIFT buses. Because the equipment proved to be unreliable, drivers were still recording trip data manually. During this month, the LIFT delivered 7,150 trips, an average of 340 trips per day. General passengers accounted for 39% of the total ridership. Sixteen percent of the rides were taken by wheelchaired persons.

During November a third on-board survey of 100 LIFT passengers and 100 LIFT sponsored taxi users was conducted. At this

time about 12% of the rides delivered by the Special Needs Transportation project were provided by taxis.

By December, after one full year of operation, there were signs that LIFT ridership was beginning to level off. However, the percentage of general passenger trips continued to rise and now accounted for 49% of total ridership. A total of 4300 persons had been registered for LIFT service; 73% of these were agency-sponsored clients, 27% were general passengers.

In January, Tri-Met began efforts to amend its 13(c) agreement with the local union; the existing agreement limited taxi (non-union) expenditures to $55,000 a year. An evaluation team from DAVE Systems, the firm which had helped Tri-Met set up the dispatch operations, in analyzing the productivity and efficiency of LIFT operations concluded that cost per trip could be cut if a larger portion of the many-to-many type trips could be handled by taxis rather than LIFT buses. To implement this change, the union would have to agree to lift the $55,000 ceiling. This question was referred to the national union in July; in November (1978) the ATU (Amalgamated Transit Union) agreed to increase the annual expenditure for taxicab services to $100,000.

A fourth on-board survey of 101 LIFT passengers was conducted in March and a nonuser telephone survey was conducted in May to determine why persons who were eligible for LIFT service had not registered for service. Additionally, a portion of LIFT clients who were considered low users (i.e., they had taken less than three one-way trips over a three month period) or were considered nonusers (they had taken no LIFT trips over a three month period) were interviewed. (Results of this nonuser survey are reported in Section 5-4.)

Because of Tri-Met budgetary cutbacks, some cost-cutting changes were made regarding LIFT personnel; by June the LIFT operation was functioning with 11 drivers, four controllers and one operating supervisor. During June 1978, the LIFT delivered 7,825 trips, an average of 356 trips per day. General passengers by then accounted for 56% of all trips. Seventeen percent of the rides were taken by wheelchaired persons.

In September the prescheduling time required to reserve a space on the LIFT was reduced from 48 hours to 24 hours. The problems with the automated fare equipment noted earlier continued to persist; subsequently, Tri-Met sent a letter to UMTA asking that the existing fare boxes be removed from the buses and this element of the project be discontinued. In October UMTA agreed to discontinue testing the automated equipment; the fare boxes were removed from the buses on November 17, 1978.

On November 5, LIFT ridership reached an all-time high: 502 passenger trips were provided. During this month an average of 414 trips per day were delivered. The final on-board survey was conducted. LIFT registration now stood at 5914 persons; 60% were agency-sponsored passengers and 40% were general passengers.

4.3 PROJECT IMPLEMENTATION ACTIVITIES

This section will discuss specific features of the project in greater detail than was done in the previous section (Project Evolution) as well as problems encountered in implementing the project.

4.3.1 Citizens Advisory Committee

Tri-Met's original demonstration application, submitted to UMTA in March 1975, stated that "an advisory committee will be established which will include three at-large handicapped and elderly community members (at least one member from each category), three social service agency memebers and one member representing Tri-Met, the City of Portland and CRAG (Columbia Region Association of Governments)."

The role of the Citizens Advisory Committee was conceived as an important one from the very start. Committee members were to be involved in the design of the program, evaluating it during

the operation of the LIFT, and make recommendations for future expansion or modification of the LIFT. The particular responsibilities for the committee were contained in the charge to the committee by the General Manager on July 6, 1976.

Committee members, selected by open nomination, were persons who 1) directly represented handicapped and elderly persons, and 2) represented social service agencies and other organizations who provide services to the target group. In July 1976, the General Manager of Tri-Met sent letters to 22 individuals and organizations inviting their recommendations for the Citizens Advisory Committee. In addition, the Special Transportation Coordinator requested prospective committee members from an additional 10 organizations. The Special Transportation Coordinator then talked personally with all applicants suggested for committee membership to impress upon them the importance of the task and the time required to serve on the committee, and to request from them, if selected, a commitment to the project.

An attempt was made to balance committee membership between persons with technical expertise and those with none, between those connected with organizations and those with no organizational affiliation, and between those who will actually purchase services (individuals, agencies) and those who will not.

Tri-Met selected eleven persons to serve on the committee. Of these eleven, five were elderly and/or handicapped themselves. In addition, members were appointed to represent the following organizations:

City of Portland Bureau of Human Resources
Area Agency on Aging
United Cerebral Palsy Association
State Vocational Rehabilitation Division
The Multnomah Association of Retarded Citizens

The Columbia Region Association of Governments (CRAG)

Oregon Architectural Barriers Council

Crippled Childrens Division,
University of Oregon Health Sciences Center

Buck Ambulance Company

Neighborhood House (City of Portland Area Agency on Aging)

PACT Senior Service Center (City of Portland Area Agency on Aging)

The Committee first met on August 10, 1976. During the months of August through October, the Committee met an average of three times a month and spent the vast majority of its time reviewing proposals for service design submitted by Tri-Met. These proposals included eligibility criteria, ride prioritization, fare policy, registration of general passengers, marketing strategy and program identification, and the service goals and criteria for evaluation of the program. During these first months, the Committee's input was invaluable. Its effectiveness showed in the following areas:

1. The Committee pinpointed areas where Tri-Met's initial policies may have been in error. For example, the original eligibility criteria stated that the service was for persons who were unable to use regular, fixed-route bus service. The Committee suggested the addition "if cannot use bus for life-support activities." This, then, would allow a person to use the service who can walk to and get on a regular bus, but cannot carry packages and thus needs the specialized door-to-door service the LIFT provides.
2. The Committee pinpointed problem areas not anticipated by Tri-Met. For example, the decision to exclude income as a basis for eligibility was made by Tri-Met in large part because of input from Committee discussions.

3. The Committee sensitized Tri-Met personnel to concerns of handicapped and elderly persons.
4. Finally, the Committee provided a sounding-board for members of the handicapped and elderly community concerned about the LIFT.

The LIFT started operation on December 20, 1976. Since that time, the activities of the Committee have been primarily involved with monitoring the operations of the LIFT and suggesting ways in which to improve service provided. Each month, the Special Transportation Coordinator of Tri-Met, who provides staff support to the Committee, reports on service during the previous month and solicits suggestions from the Committee. The pictures in Figure 4-7 illustrate one of these working sessions.

Another important function of the Committee during the operational phase is that of assisting in the evaluation, both short-term and long-term, of the LIFT. This included reviewing questionnaires for on-board surveys conducted on the LIFT; many of the Committee's suggestions were incorporated into the final survey forms.

A third critical function of the Committee is to provide input to Tri-Met as to the future of the LIFT after the end of the demonstration period, and the relationship of the LIFT to other Tri-Met programs for the elderly and handicapped in the tri-county area.

There are some questions about whether the Committee became involved in the overall planning process early enough to have a significant impact on determining the nature of service to be provided. Their first meeting was held four months before service began. No citizens' group was involved in writing the grant application (March, 1975) which basically designed the system; nor was there any citizen input into the comprehensive, pre-demonstration household survey (e.g., regarding questionnaire content, best methodology for reaching handicapped and elderly, etc.).

FIGURE 4-8. CITIZENS ADVISORY COMMITTEE WORKING SESSION

In retrospect, the failure to elicit their participation at an earlier point in the planning process was probably a mistake, in view of the invaluable role the Committee has played since the project's inception.

4.3.2 Marketing the LIFT

The marketing strategy adopted by Tri-Met to promote its LIFT service was, first, to accurately identify the target population to be served, and then to gradually provide service to those who needed it. Tri-Met was most concerned that it not commit the same error that seemed to have been committed by other Dial-A-Ride programs in the country: promising more than could be delivered. Situations such as those experienced by the Santa Clara County Dial-A-Ride -- where 80,000 phone calls were received for the first day of service in response to massive publicity -- were to be avoided at all costs. The policy was one of gradual, controlled system growth rather than explosive growth which could threaten the system's ability to operate.

LIFT service was planned and implemented in a highly-charged political atmosphere in which the issue of special transportation was becoming a major community cause. Local organizations and their spokespeople had easy access to the local Portland media to promote the cause of the equal rights of the handicapped in general and special transportation in particular. Because the LIFT program had been in planning for at least a year and a half, expectations were high.

In early August, 1976, several prominent handicapped individuals walked, or were wheeled, from Portland to Salem, the state capital, in an effort to dramatize the lack of transportation facilities usable by the handicapped. In a meeting with the Director of the State Department of Human Resources, one of the Governor's highest appointees, their message was clearly delivered: a higher and more intensive effort by government at all levels

to increase transportation facilities for the handicapped was a must. Interest in the LIFT program, still in the planning stages, was heightened. Local units of government, including the Portland City Council, expressed concern as to the starting day of the LIFT project.

However, in order to pursue its policy of controlled system growth, Tri-Met refrained from extensive promotional efforts which had characterized other demand-responsive systems. Prior to implementation, information on the LIFT was primarily channelled to potential contracting public agencies or non-profit organizations. Specifically, the decision to delay the availability of LIFT service for general passengers -- those not affiliated with agencies or organizations -- was directly related to the controlled growth strategy.

In September, 1976, Tri-Met began publishing Special Needs News, a newsletter prepared to inform various public agencies, local organizations and individuals concerned with handicapped and elderly persons about the current status of the project. The only general publicity generated by Tri-Met prior to the start of the LIFT and in its early months of operation related to actions taken by local governmental jurisdictions in approving funding for the LIFT and the two-week training course for LIFT drivers in early December. On December 20, 1976, the LIFT began actual operation with no mention in the public press;* however, it carried every passenger sponsored by the City of Portland's Area Agency on Aging who requested service. This low-keyed approach continued through the first two and one-half months of LIFT service.

The company retained by Tri-Met to do advertising and marketing for its fixed route system suggested the name "The LIFT" for this specialized service, and designed special stylized lettering to communicate the sensation of being uplifted. This lettering

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*There had been several articles of a purely descriptive nature in The Oregonian and the Oregon Journal.

was accompanied by the international accessibility symbol and became the system's logo. LIFT buses are orange, the lettering on the side of each bus is purple, and the international accessibility symbol is green.

In March, Tri-Met began to publicize the availability of LIFT service to general passengers, those people not connected to an agency or organization. A Rider's Guide was printed. Details of how interested parties could register for service were published in the Special Needs News. As of April Tri-Met had distributed 4,000 registration packets in response to requests from potential general passengers.

Service for general passengers began on May 2, 1977 and by the end of June accounted for 29% of all trips. Although this ratio of general passengers to agency-sponsored passengers was considered acceptable at this point, Tri-Met was aware that the pre-demonstration household survey data indicated that most potential LIFT users would be general passengers rather than agency-sponsored or affiliated passengers. Thus, in July an increased marketing effort was made to reach additional potential general passengers. A packet was mailed to 2,000 locations in the city of Portland, publicizing the LIFT and the purposes for which it could be used. Packets consisting of a display poster, general information brochure and a letter explaining LIFT service were sent to every doctor's office in the city of Portland, hospitals and clinics, and neighborhood associations. Individuals were encouraged to display the poster and to request additional materials through use of a prepaid reply card.

The return rate of the reply cards was 9% as of September 1. Additional information distributed in response to these requests amounted to 20,000 information brochures and 250 posters. By the end of September, general passengers accounted for 38% of all rides taken on the LIFT; by December their share of rides had risen to 46%.

There were no further marketing efforts during 1978 as the LIFT was operating at capacity levels during most of that year. The Manager of LIFT Operations does hold monthly meetings with the personnel of agencies who have contracted for service with Tri-Met to go over any complaints or suggestions they may have. However, this is more of a public relations effort than a marketing effort.

The nonuser survey (discussed in Section 5.4) provided information on how Portland residents, both those who are registered for service and those who are not, had heard about the LIFT. Not surprisingly, many people had been informed of LIFT service through their agency affiliation as two-thirds of the registered group are agency-sponsored passengers. The second highest source of information was through friends, relatives or co-workers. Newspaper advertising was third, rating well above that of radio and television advertising. Responses are shown in Table 4-2.

TABLE 4-2.

SOURCE OF INFORMATION ABOUT LIFT

	% Respondents Mentioning This Source
Agency	36.3
Word of mouth	22.9
Newspaper	19.6
TV	12.4
Saw LIFT bus on street	11.8
Brochure	4.7
Radio	4.3
Doctor, nurse, public health	2.8
Received something in mail	1.2
Other	2.3
Can't recall	4.3
	122.6*

*Total exceeds 100% as multiple answers were allowed.

4.3.3 Contract Negotiations Between Tri-Met and Social Service Agencies

In January 1976, Tri-Met conducted a brief review of potential subscribers to the LIFT project, gathering information from five agencies about transportation services and costs. At this time, initial value judgments were made concerning the agencies toward which Tri-Met should aim its services.

The Special Transportation Coordinator used the information in the above review when he first began contacting potential contracting agencies. His emphasis, initially, was to contact those state and federal agencies with the biggest number of clients and with established funding mechanisms to cover client transportation costs. However, all Portland agencies which inquired about service were considered as potential clients. An example of this is Goodwill Industries, a private corporation, which had not previously contracted for any kind of transportation services.

At the present time, 19 agencies have contracted for LIFT service. They range from the City of Portland Human Resources Bureau, whose Area Agency on Aging clients now account for almost half of LIFT ridership, to the Child Neurology Clinic, which currently has only two children registered for service. LIFT impacts on agencies are covered in more detail in Chapter 8.

The Special Transportation Coordinator is responsible for negotiating the contract between Tri-Met and each of the contracting agencies. The following are his observations on the negotiating process:

1. All agencies contacted were initially enthusiastic over the prospect of contracting with Tri-Met for transportation services; however, they did not necessarily hasten to work out and sign such an agreement. Thus, the contract negotiator must constantly take the initiative in such negotiations, particularly by helping agency personnel to maneuver through their own bureaucracy, and to foresee and avoid problems which would have the effect of delaying service.
2. Contract negotiations should start with an agency representative who has authority to commit his organization to an agreement (if he/she chooses to do so). This is far more efficient than initiating efforts with personnel at lower levels in the hierarchy and having to work up the ladder. When negotiations are taking place with a top administrator within the organization, problems which come up can be worked out fairly quickly. However, if negotiations are begun at a low level within the organization's structure, each change must be approved by someone higher up the ladder. This process is extremely time-consuming and frustrating.
3. Communication should be facilitated between all possible players involved in the negotiating process -- particularly communication between the administrative and legal departments of an organization. Some state agencies are assigned an Assistant District Attorney whom they may consult regarding contractual matters. However, because the agency must pay for such consultation, they frequently ignore this service. Administrators who are making legal judgments without adequate legal knowledge may create unnecessary problems and costly and time-consuming changes in the contract may be required. Such a rewrite rarely yields substantive changes in the actual content.

4. Contracts should not be negotiated through the political process. Any contracts signed with a City agency must, of course, meet the approval of all members of the City Council. However, if issues which arise are worked out in public meetings, changes may be made which are not germane to the problem. This situation can be avoided if there is an intentional effort on the part of the contract negotiator to make himself/herself available to the political persons involved in order to work out any strong objections they may have in advance of the public meeting. This allows differences to be resolved more efficiently.
5. It is helpful for the contract negotiator to have a legal background. It gives the negotiator authority to speak in legal matters with persons at low levels of administration and serves to give him/her credibility with those persons at higher levels of administration. It is also invaluable in dealing with other lawyers. Since it places both parties on an equal footing, the negotiator can ward off demands for unnecessary changes in the contract.
6. The coordinating body should allow several months for the contract negotiating process because it takes so long to finalize these agreements.

4.3.4 Operational Problems

LIFT service began on December 20, 1976 using ten of its fifteen buses. Tri-Met had decided to start service with ten drivers, anticipating that initial start-up problems and the need for drivers to familiarize themselves geographically (since they would be picking up passengers on small back streets with which the drivers were unfamiliar) would allow the system to keep ten drivers at a good, productive level. However, Tri-Met misjudged the demand for LIFT services in these early months of operation. The slow start may have been due to the fact that

Opening day was five days before Christmas, perhaps not the best time to begin a new service for this particular target group. Also, early ridership was made up entirely of Area Agency on Aging clients, and these elderly clients were perhaps hesitant to try a new and unknown system. Whatever the reasons, the start was slower than anticipated: there were not enough riders to keep ten buses operational, and this resulted in a high vehicle cost per hour due to labor costs paid for driver standby time. Union regulations require that each driver is guaranteed a full day's work. Thus Tri-Met cannot employ extra drivers when demand is high, during morning hours, and fewer drivers when demand is low, during afternoon hours.

It would have been possible to transfer some of these LIFT drivers back to Tri-Met's regular, fixed-route system, but in the interest of keeping morale high, the decision was made to keep all ten drivers on LIFT service. This decision, however, seems to run contrary to a principal advantage of having such service provided by a transit operator, namely, that the size of the transit company allows a flexibility and shuffling of personnel between the fixed-route and special system.

The lack of grouped rides is a major problem and one which contributes to the high cost per passenger trip (See Section 7.5.7.). The ride prioritization system discussed earlier gives top priority to regularly scheduled trips taken by many passengers to the same facility; the requirement that rides be scheduled 48 hours in advance is to facilitate the grouping of such rides. However, such trips have failed to materialize; most trips are one-to-one, a single passenger being carried to a single destination.

The automated fare collection equipment (AFIR) has caused a number of problems. Early in the planning stage it became apparent that the fare boxes would not be ready by the time LIFT service was scheduled to begin. This necessitated developing a manual system for recording trip data during the early months of

operation but had the advantage of allowing a comparison between the manual and automatic systems. By October, 1977, AFIRs had been installed on all the LIFT buses but were not sufficiently reliable to use exclusive of the manual system. The automated equipment continued to break down because of design fault; its sensitive electronic equipment is not able to function properly in the hostile bus environment. The fare boxes were finally removed in November 1978. This will be explained in detail in Chapter 6.

The software component of the system was to produce daily, weekly or monthly reports covering operations, cost, billing and statistical analysis. However, the required reports were not produced until July, seven months after the start of service, because initial programming was done incorrectly. This was due to a lack of coordination between the hardware and software contractors and the fact that there was no pre-existing program. Hardware problems cited earlier also caused delays. Tri-Met is considering severing their relationship with Boeing, the software contractor, as they now have internal programming and hardware capability to produce the needed data. An in-house system may prove to be more efficient particularly as regards special statistical analyses which were difficult to obtain from the Boeing system.

4.3.5 Integration of SNT System with Other Transit Services

Federally-subsidized programs for the elderly and handicapped have been characterized by increased consultation with and involvement of private operators in the recent past. Foremost among the documents delineating this federal concern are the UMTA regulations for the transportation of the elderly and the handicapped

(promulgated April 30, 1976), and the proposed UMTA paratransit policy (promulgated October 20, 1976). In addition, the UMTA regulations governing the 16 (b)(2) program require consultation with affected private operators prior to the purchase of vehicles under this program.

Since the inception of the LIFT system, Tri-Met has involved private operators to the maximum extent possible. The original grant application provided for alternate service to be furnished by taxis or private buses during the hours and days the LIFT did not operate; this service was to be provided to major destinations in Portland at a slightly higher cost than the LIFT bus. This configuration was altered in the latter stages of project planning and implementation; under the revised arrangement, private operators were to provide supplemental transportation services for trips which would be non-productive or uneconomical for the LIFT buses to serve. These trips generally consist of a single passenger riding a long distance.

Tri-Met let two subcontracts for supplemental services: one for taxi service, and one for service provided by a wheelchair transportation van, the latter to be used for people who, because they are confined to electric wheelchairs, cannot get in and out of taxis.

For both subcontracts, Tri-Met invited open competitive bids from all eligible carriers in the service area for these supplemental services. In the case of the taxi contract, the three taxi companies serving the Portland area were invited to bid. Of these, the two larger companies, Broadway and Radio Cab Companies, submitted the only bid as a joint venture, and were awarded the contract on this basis. In the case of the smaller supplemental contract for services on a wheelchair transportation van, only one of ten potential bidders responded, the Buck Ambulance Company, and that company was awarded the contract.

A potential problem of how to interface with the private providers existed with the LIFT. A mechanism had to be designed so that the LIFT Control Room could communicate quickly with dispatchers for the private providers in order to facilitate instantaneous and efficient ride referrals. With the help of DAVE Systems, of La Habra, California, forms were designed to accomplish this. In addition to communicating trip origin and destination information to the taxi/wheelchair transportation company dispatcher, the forms and procedures designed also allow for easy approximation of charges by the LIFT Control staff, thereby facilitating financial planning.

Central to the cooperative arrangement between Tri-Met and the private providers assisting the LIFT are two supplemental 13(c) agreements between Tri-Met and the Amalgamated Transit Union (ATU), Local 757, which is the exclusive bargaining agent for Tri-Met employees. These Supplemental 13(c) agreements provided that an initial $50,000 (and subsequent $5,000) out of the LIFT Demonstration monies could be used for transportation services not provided by ATU employees. This ceiling was raised to $100,000 in November, 1978 and 20% of the funds devoted to the operation of the LIFT buses. Without these agreements, all labor would have to have been provided by ATU employees, and would have pushed the costs of provided LIFT services higher.

5. PROJECT DEMAND AND IMPACT ON THE TARGET MARKET

5.1 INTRODUCTION

This chapter examines the demand for LIFT service in Portland and analyzes the impacts the LIFT has had on the target market. The first section will describe the number and proportion of people who have registered for the service and compare them with the total transportation handicapped population in Portland. The second section will look at those persons who actually use the service and discuss the impact of the LIFT on their travel behavior. The third section will analyze the impact of LIFT service on the target market as a whole and explore reasons why people who are eligible for the LIFT do not use the service or use it infrequently.

5.2 LIFT REGISTRANTS

After two years of registration, 5914 persons have been registered for LIFT service. Although detailed registration trend data are not reported here, conversations with Tri-Met staff reveal that after an initial rush, the registration rate remained steady for several months, increased when general passengers were introduced to the service, and has since remained steady at about 30 per week.

In the discussion which follows, these LIFT registrants will be compared to the total transportation handicapped (TH) population in Portland. Data on this latter group are derived from the pre-demonstration household survey conducted in the spring of 1976. In that survey a functional rather than a medical definition of handicapped was employed.

The 5914 persons registered for LIFT service fall in two categories: 3537 or 60% are agency-sponsored passengers and 2377 or 40% are general passengers -- i.e., persons not sponsored by or affiliated with an agency. To allow for comparisons among these two groups, the tables which follow will be broken down by type of passenger. There are 372 persons registered as both agency and general passengers. In the figures quoted above and in the tables which follow, such persons were identified as agency passengers,

that is, these 372 persons are counted in the agency passenger total (3527) but are not counted in the general passenger total (2377).

In the tables which follow, figures are based on all persons who were registered with the LIFT on November 15, 1978, approximately two years after the start of LIFT service. Comparable figures for LIFT registrants as of December 15, 1977 (one year after the start of service) were analyzed to determine if the profile of LIFT clients has changed over the two year period. This analysis showed no significant differences; hence, only the 1978 figures are shown.

5.2.1 Demographic Data

Table 5-1 gives the demographic data of the registered group. Three out of four persons registered for LIFT service are over 65 years of age. The average age for all registrants is 70. In both groups females out-number males more than two to one. The income and car availability data for registrants shows that LIFT clients were primarily lower income persons who have limited access to an automobile, relative to the TH population as a whole.

A comparison of the registered group with Portland's transportation handicapped population as a whole shows that the age and sex profile of both groups is very similar. This indicates that the LIFT service is not "missing" a particular group in its marketing efforts, at least as far as age and sex are concerned; however, based upon registration data it appears that the LIFT is serving the elderly segment more than the non-elderly.

TABLE 5-1.

DEMOGRAPHIC DATA

	Agency-Sponsored	General	All Clients	Pre-Demo Survey**
AGE GROUP				
Under 10	1.1	2.1	1.5	*
10-15	0.3	1.0	0.6	0.8
16-20	0.5	1.0	0.7	1.2
21-59	15.4	15.8	15.5	20.3
60-64	8.2	5.8	7.1	8.7
65 and over	74.6	74.4	74.5	68.9
Mean Age	70.4	69.6	70.0	
SEX				
Males	30.6	27.6	29.2	31.7
Females	69.4	72.4	70.8	68.3
INCOME				
Under $5000	NA	NA	73.8	61.0
$5-- 10,000	NA	NA	17.5	21.5
$10 - 15,000	NA	NA	3.6	08.9
$15 - 25,000	NA	NA	4.0	06.4
$25,000 and over	NA	NA	1.1	03.2
CAR AVAILABILITY				
Car always available	NA	NA	5.3	36.6
Car usually available	NA	NA	11.3	17.4
Car sometimes available	NA	NA	52.7	25.2
Car never available	NA	NA	30.7	20.7

*Children under 10 were not interviewed in the pre-demonstration survey.

**Refers to total TH population, both MTH and STH

5.2.2 Inability to Use Public Transit

To be eligible for LIFT service, riders declare that they are physically or mentally unable to use the regular transit system. At the time clients are registered for LIFT service, they are asked to indicate why they are unable to use regular transit. Table 5-2 gives a breakdown of these responses. (Most people mentioned more than one reason for being unable to use regular transit.)

The most frequently mentioned reasons -- "unable to get on and off the regular bus," "unable to walk to bus stop," "unable to wait standing for more than 10 minutes," and "unable to use the bus for life-sustaining activities" -- indicate that the majority of registrants' transportation handicaps stem from restrictions on mobility. This is slightly more true of the general passenger than the agency passenger. The category "unable to use the bus for life-sustaining activities" was used to indicate passengers who are unable to use regular transit if they must carry groceries or other packages from the bus stop to their home. It also includes passengers who could, for example, get to a doctor's appointment by regular transit service, but are too tired at the end of their appointment to make the return trip except by the specialized door-to-door service the LIFT provides.

Compared to the TH population as a whole, almost twice as many LIFT registrants have a problem getting on and off a bus. They also have more difficulty walking to a bus stop and waiting for a bus. This is to be expected as those persons with the most severe mobility restrictions are precisely the group the LIFT is intended to serve. The ratio shifts, however, with the reason "unable to move in crowds": almost twice as many persons in the overall TH population list this as a reason for being unable to use regular transit as do LIFT registrants. This may be because persons who are unable to or fearful of moving in crowds are the least likely group to travel under any condition and are thus less inclined to register for LIFT service.

TABLE 5-2.

REASONS WHY REGISTRANTS CANNOT USE REGULAR TRANSIT

	% of Total Passengers	% of Agency Passengers	% of General Passengers	Pre-Demo Survey*
1. Unable to get on and off bus	61	60	62	34
2. Unable to walk to bus stop	60	56	65	42
3. Unable to wait standing for 10 minutes	46	46	47	40
4. Unable to use bus for life-sustaining activities	27	34	18	N/A
5. Unable to move in crowds	18	20	15	35
6. Unable to read information signs	14	12	17	18
7. Unable to understand or follow transit directions	11	12	8	13
8. Unable to grasp coins, tickets, handles	5	5	5	9
(n)	5914	3537	2377	

*Of the persons classified as transportation handicapped in this survey, figures in this column indicate the percentage of persons who stated they had "great difficulty" with or were unable to perform this function.

5.2.3 Health Problem

Table 5-3 gives the incidence of specific health problems among LIFT registrants. This information is taken from the patron registration application (see pg. 39). The columns show agency and general passengers to be similar except that agency-sponsored passengers have a higher incidence of emotional and mental problems. LIFT clients are quite similar to the overall TH population except that they are less inclined to have arthritis and hearing problems. It may be that these two problems are not, in many cases, mobility-limiting impairments requiring a specialized service such as the LIFT. On the other hand, persons with mental or emotional problems would be highly dependent on a personalized door-to-door service; thus, there is a higher incidence of this problem among LIFT clients than among the TH population.

TABLE 5-3. HEALTH PROBLEM (%)*

Health Problem	Agency-Sponsored	General	All Clients	Pre-Demo Survey**
Orthopedic Problem	20.0	21.3	20.8	20.2
Visual Impairment	20.2	19.7	19.9	19.9
Heart Ailment	17.2	17.9	17.6	20.6
Arthritis	12.6	17.9	15.6	38.0
Emotional and Mental Problems	14.3	5.5	9.4	-
Hearing Problems	7.0	7.9	7.4	12.8
Stroke	6.6	6.9	6.7	5.2
Respiratory Problems	7.0	5.3	6.1	6.2
Diabetic	4.7	5.3	5.0	-
Spinal Cord Injury	4.7	4.8	4.9	4.3
Speech Impairment	3.6	2.8	3.2	-
Cancer	3.2	3.3	3.2	2.3

*All other health problems mentioned had incidence rates below 2.5%. Columns total more than 100% as some clients listed more than one health problem.

**3% of those surveyed indicated they had no health problem. Columns with no entry have incidence rates below 2%.

5.2.4 Mobility Aids Used

Table 5-4 gives figures on the type of mobility aid used by LIFT registrants and indicates that the general passenger relies more heavily on an escort than the agency passenger.

TABLE 5-4. MOBILITY AID USED (%)

Type of Mobility Aid	Agency-Sponsored	General	All Clients	Pre-Demo Survey
Accompanied by escort	14.7	17.2	15.9	11.1
Walker or crutches	7.4	7.3	7.4	11.3
Wheelchair or wheelchair & escort	15.7	17.8	16.6	6.2

The number of wheelchair users registered for LIFT service is almost three times their incidence in the TH population; this indicates that the LIFT attracts a high percentage of severely transportation handicapped persons.

5.2.5 Client Affiliation

Table 5-5 shows client affiliation. A distinction is made between registrations and registrants (unduplicated persons) as 739 clients are registered with more than one agency. Half of these multiple-agency clients (372 persons) are registered as both general and agency-affiliated passengers. There is also a large group of clients registered with both AAA and Public Welfare, and some clients are registered with more than two agencies.

The table shows that general passengers comprise the largest segment of registrations, accounting for almost half of total registrations. AAA-affiliated clients and Public Welfare clients are by far the largest groups of agency-sponsored passengers and together account for half of all registrations.

TABLE 5-5.

PASSENGER AFFILIATION

	Registrations		Registrants	
	n	%	n*	%
General Passenger (no agency affiliation)	3173	46.8	2377	40.2
Area Agency on Aging (composed of eight separate neighborhood agencies)	2049	30.2	1675	28.3
Public Welfare	1361	20.1	998	16.9
Metropolitan Family Services	78	1.2	64	1.1
Vocational Rehabilitation	56	0.8	23	0.4
Muscular Dystrophy Association	25	0.4	10	0.2
University of Oregon Health Sciences Center	24	0.4	19	0.3
Portland Public Schools	4	0.1	2	0.0
Volunteers of America	3	0.0	3	0.1
Child Neurology Clinic	2	0.0	1	0.0
Veterans Administration	2	0.0	1	0.0
Urban Indian Council	2	0.0	2	0.0
Westside Schools	1	0.0		0.0
Persons registered with multiple agencies	--	--	739	12.5
Total	6780		5914	

*In this column persons registered with more than one agency or as both an agency-sponsored and general passenger are included only in the figure for "Persons registered with multiple agencies."

5.2.6 Cancellations

During the project's two-year history, 353 persons have had their LIFT registration cancelled, about 5% of total registrations. These cancellations are due to the death of the client or to an agency's need to cancel certain clients' eligibility due to budgetary restraints. (This problem is discussed further in Section 8.3.3.) The great majority of these cancellations (296) have been AAA-affiliated clients. Only 25 of the cancellations were general passengers. The figures below show the number of cancellations by quarter for the project's two-year history. Overall, these cancellation figures may be understated because Tri-Met has no systematic way of removing the names of persons who have died, moved away, or do not use the service from the registration file.

Quarter	1977	1978
Jan-Mar	19	65
Apr-June	13	54
Jul-Sept	21	67
Oct-Dec	65	49
	118	235

The figures show no particular cancellation trends. One would expect there to be few cancellations in the early months of operation and more cancellations as the project progressed.

A comparison of the cancelled group with agency-sponsored passengers as a whole shows no significant differences except that, as would be expected, the cancelled group is somewhat older: 86% were 65 years of age or older, versus 75% of all agency passengers.

5.3 PROJECT DEMAND AND USER CHARACTERISTICS

This section will analyze the travel behavior of LIFT users - how frequently they use the service, at what time and for what purpose. Two data sources were used to gather information regarding these questions. The first source was LIFT records. The trip ticket kept on each trip provided by LIFT service gives information on day of service, pick-up time, and delivery time. The drivers' records give information on the passenger's ID number and the trip origin and destination.

The second source of information was provided by on-board surveys of LIFT riders. Three on-board surveys were conducted during the first year (April, July, November 1977), two during the second year (March, October 1978). Approximately 100 LIFT clients were interviewed in each survey (146 during the first survey). Survey workers rode LIFT buses throughout the survey week, and insofar as possible, attempted to balance the sample by geographic area, time of day, day of week, and type of passenger (agency-sponsored or general). The results, however, do not comprise a representative sample; thus, in those areas where the data may be affected by a disproportionate response, survey findings will deviate from what would have occurred if a truly proportional sample had been possible.

5.3.1 Volumes

Figure 5-1 shows the growth in ridership over the first two years of the project. The line for all passengers includes trips taken on LIFT buses and LIFT-sponsored taxis.

The data show that after a brief leveling off in April 1977, ridership began a steady climb in May with integration of the general passengers into LIFT ridership. November and December 1977 show a decline in ridership due to poor weather and the holiday season. Ridership continued to rise steadily throughout the second

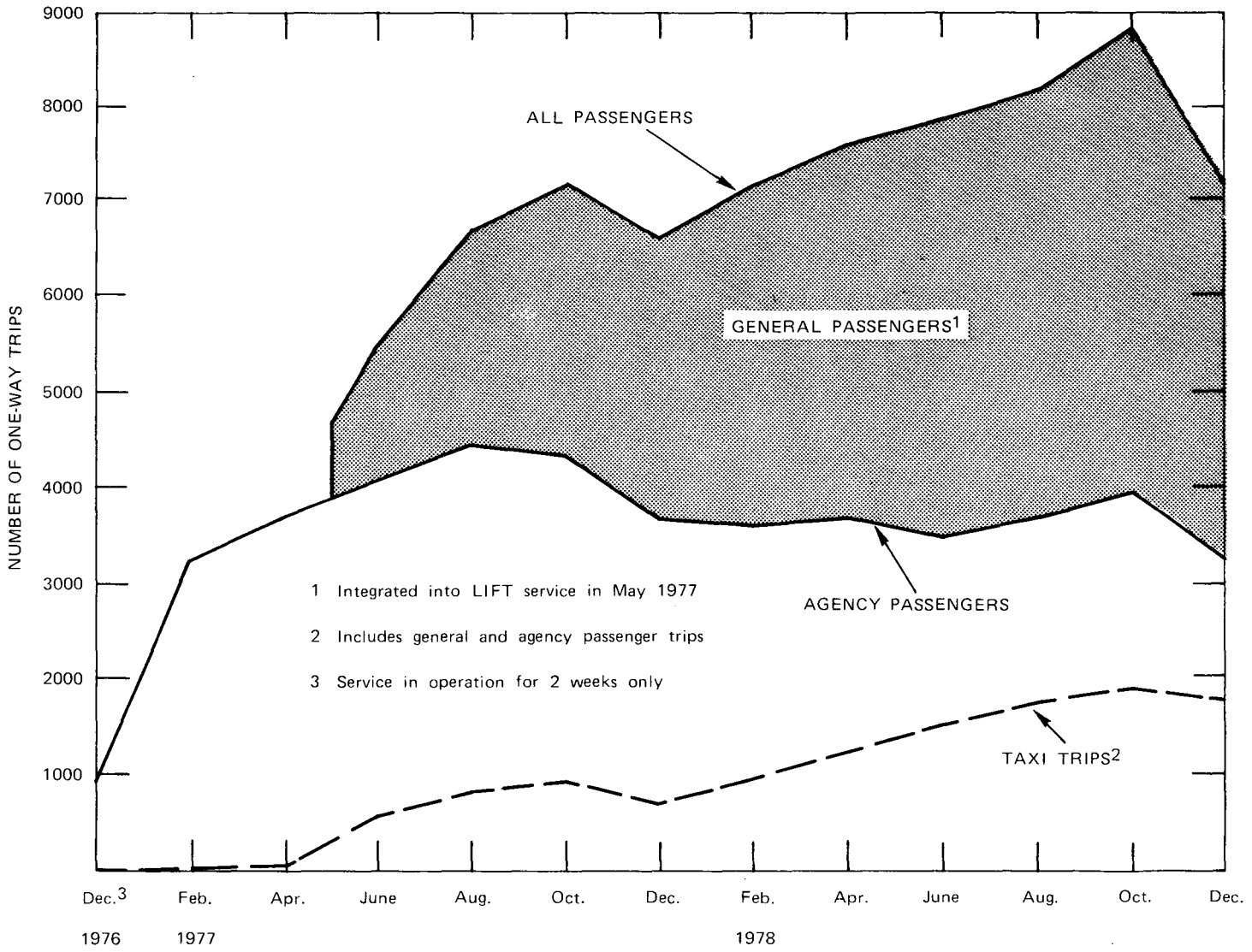

FIGURE 5-1. PROJECT RIDERSHIP BY MONTH

year. Again there was a drop in November and December; this was due to miserable weather conditions during these two months and also due to the fact that the LIFT began, in December, to turn down certain "non-critical" trips in order to improve service standards and to reduce the amount of driver overtime.

The bottom line of Figure 5-1 shows the number of rides provided each month by taxi. The taxi mode is used when it is a more cost-effective mode than using a LIFT bus, e.g., for many-to-many trips from origins that are not close to normal LIFT routes and when LIFT buses are behind schedule and taxis must be substituted.

There is a ceiling on the number of taxi trips that can be delivered each month. According to the initial agreement between Tri-Met and the labor union, up to $55,000 of the demonstration funds could be spent on taxi (non-union) services. This agreement was amended in November 1978 to increase the annual expenditure for taxicab services to $100,000.* Since taxi trips are running about $5.00 apiece, approximately 20,000 trips will be allowed. This results in about 1700 trips per month, or about 80 per day.

The actual number of trips provided by LIFT buses and LIFT-sponsored taxis, the number of agency and general passengers by month, and the average number of trips provided per day are given in Appendix D.

5.3.2 Trip Frequency of LIFT Clients

In order to determine the average trip frequencies of LIFT passengers, all LIFT trips made during June through September of 1977 and January, April, July and October of 1978 were analyzed. The results of this analysis show that approximately 20-25% of all persons who are registered with the LIFT use the service at least once during a given month. These users average approximately six one-way trips per month. However, this figure is somewhat skewed by a small number of people who use the

*In anticipation of this agreement, Tri-Met began to increase the proportion of trips provided by taxi in April 1978.

LIFT on a frequent, regular basis, e.g., those who commute to work daily. Thus, a more accurate trip rate indicator may be the mode -- two one-way trips per month--which indicates that most people use the LIFT infrequently.

Figure 5-2 constitutes a percentage frequency distribution of the trips taken by LIFT riders in September 1977 and October 1978. Usage for these two months is almost identical indicating that ridership patterns have changed little over the two years. Note that approximately 90% of those riding the LIFT those months made 1-15 one-way trips, or 1-7 round-trips, during the month.

Breakdown of the October 1978 data between agency and general passengers indicates that, overall, general passengers have a slightly higher trip-making rate than agency passengers as shown by their greater percentages in categories at the upper end of the scale. In the category which would include persons who regularly use the LIFT to travel to work (i.e., 41-45 one-way trips/mo.) their percentage is triple that of agency passengers.

Selected trip frequency categories for agency and general passengers are shown below. Categories which were omitted show no significant difference between these two groups of passengers.

Trips Made	% Users This Month	
	Agency	General
1-5	58.5	68.2
6-10	26.7	13.7
16-20	3.1	3.9
21-25	1.2	2.3
36-40	1.4	2.5
41-45	0.8	2.3

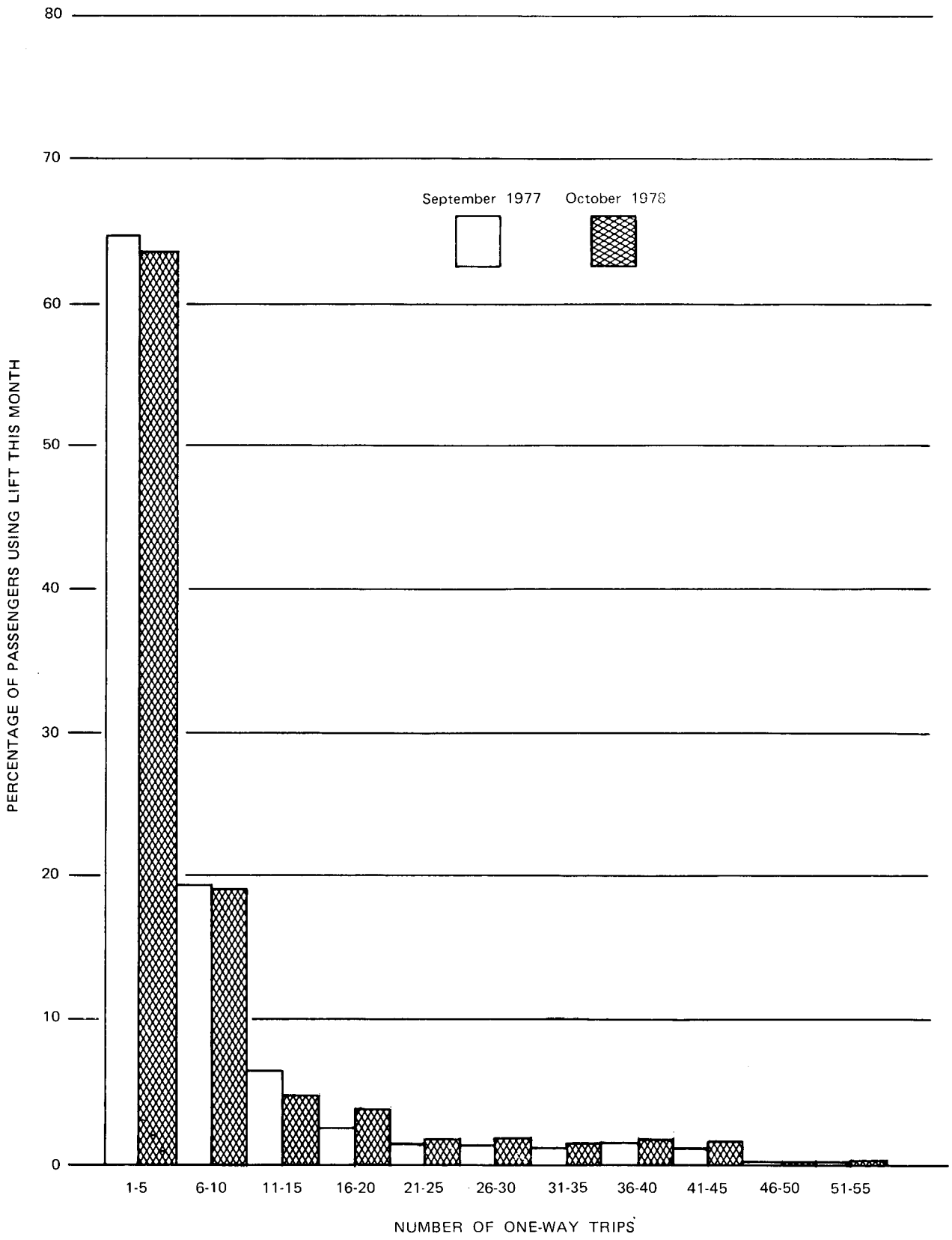

FIGURE 5-2. TRIP FREQUENCY OF PROJECT USERS BY MONTH: SEPTEMBER 1977 AND OCTOBER 1978

5.3.3 LIFT Ridership by Time of Day

Figure 5-3 gives a distribution of trips by time of day. The data show that service is spread rather evenly throughout the day. Service peaks somewhat between 8-10 AM and again between 1-4 PM and drops considerably after 5 PM. Three-fourths of all trips are between 9 AM and 4 PM.

5.3.4 Handicap Characteristics of LIFT Riders

The identification number of each passenger is recorded for each trip made on the LIFT. The second digit of this number indicates whether or not the rider uses a mobility aid and the type of aid used. Table 5-6 presents trips taken during September 1977 and October 1978 by mobility aid used. Two-thirds of LIFT riders do not require an aid; those using a wheelchair comprise 18% of all trips. During the first year of operation wheelchair trips averaged 17% of all LIFT trips; during the second year of operation this figure rose to 19%.

TABLE 5-6.

RIDERSHIP BY MOBILITY AID USED

	Sept 1977		Oct 1978	
	N	%	N	%
No aid used	4151	64.7	5462	65.5
Accompanied by attendant	675	10.5	796	9.5
Walker or crutches	511	8.0	482	5.8
Wheelchair	645	10.1	916	11.0
Wheelchair and attendant	432	6.7	687	8.2
TOTAL	6414		8343	

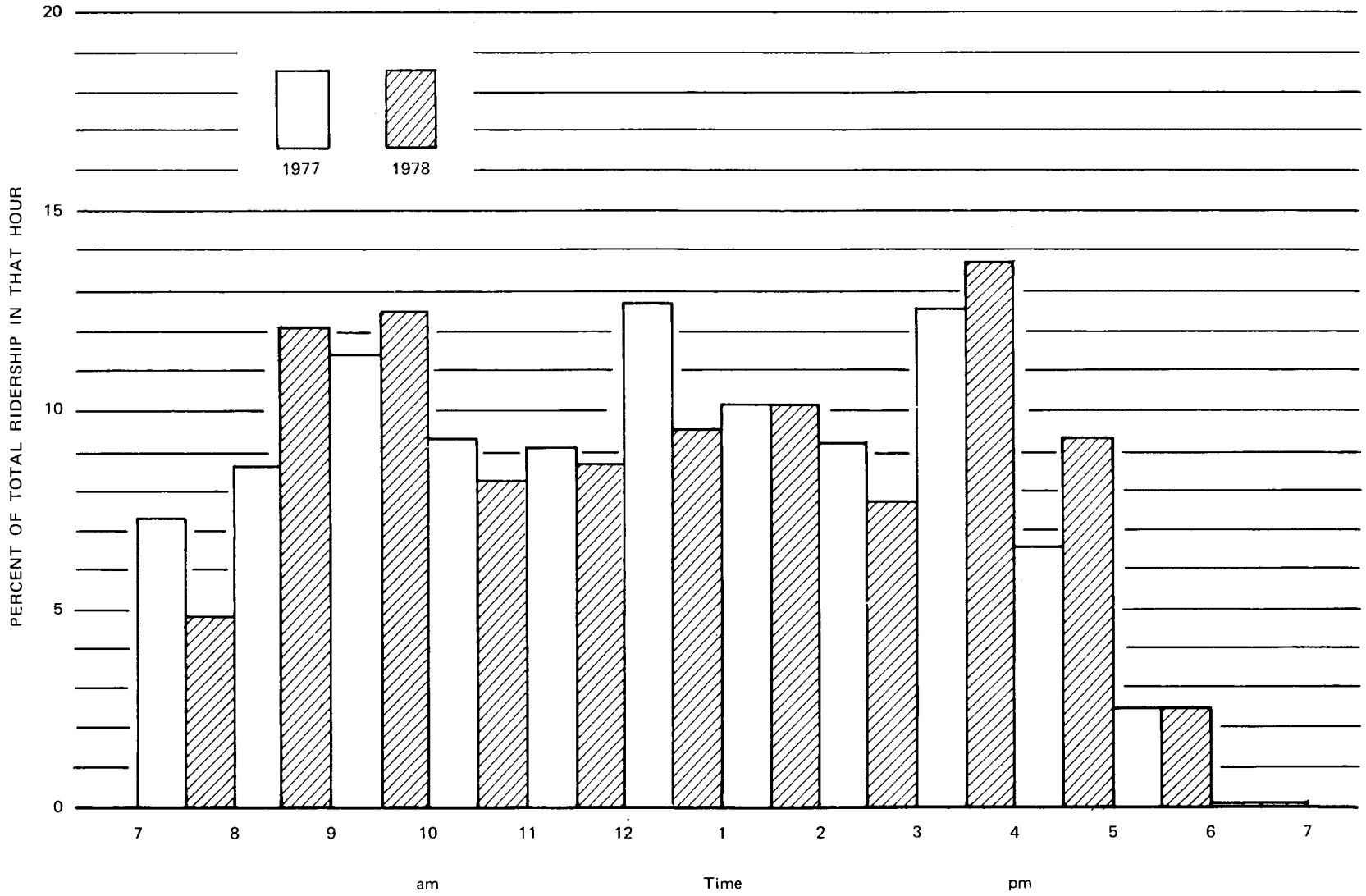

FIGURE 5-3. RIDERSHIP BY TIME OF DAY

5.3.5 Trip Purposes Served

The most common trip purposes of LIFT clients are medical/dental visits, school attendance and social/recreational activities. Table 5-7 shows the variation in trip purpose between agency and general passengers. The figures were compiled using data provided in drivers' daily trip records during September 1978. These data were found to be consistent with trip purpose information gathered in the on-board surveys.

TABLE 5-7.
TRIP PURPOSE - SEPTEMBER 1978

	All Passengers*	% Agency Passengers*	% General Passengers*
Medical/Dental	40	40	40
School**	18	10	23
Social/Recreational	15	18	14
Shopping	11	23	4
Personal Business	10	7	11
Work	5	1	8
Other	1	2	1

*Columns may not total 100% due to rounding.
**Includes Adult Day Care Center.

The table shows that agency passengers use the LIFT more for shopping and social/recreational trips than do general passengers, who, in turn, use the LIFT more to go to school and work. This corroborates the data presented earlier on trip frequency which indicates that general passengers have a slightly higher trip-making rate than do agency passengers due to their use of the LIFT for regular, repeated purposes.

5.4 IMPACT ON TARGET MARKET

5.4.1. Penetration of TH Market by Registrants and Users

Section 5.2 indicated that as of December 1978, 5,914 persons have been registered for LIFT Service. In comparison, the number of persons in Portland who have difficulty using regular bus service - based on a pre-demonstration household survey - is estimated to be 22,000 persons.* Using this figure as a basis for determining how many of the target population are being served, market penetration in terms of registrants after two years of operation is 27% of the transportation handicapped population (1.5% of the total population of Portland).

Table 5-8 shows market penetration in terms of age and sex of registrants and indicates that penetration rates are somewhat higher for women and older persons.

TABLE 5-8.
MARKET PENETRATION BY AGE & SEX

Sex	Penetration Rate
Male	24.5
Female	27.8
Age	
10-15	19.5
16-20	13.4
21-59	20.2
60-64	22.4
65 +	29.0

*5.75% of Portland's population of 385,000.

Of particular concern in this demonstration is the degree to which the LIFT addressed the needs of the most severely transportation handicapped group. The pre-demonstration survey showed that 11.8% of Portland's TH population, or about 2,600 people, use a wheelchair or walker to get around. During the two-year demonstration period, 1,410 people who reported they used a wheelchair or walker as a mobility aid registered for LIFT service. Thus, the LIFT achieved a 54% penetration of this severely transportation handicapped group. This 54% figure may slightly overstate the true penetration figure since registration records have not been thoroughly and systematically purged to remove inactive records. Nevertheless, it seems safe to say the LIFT has registered about half of the wheelchair/walker market, a rather remarkable accomplishment considering low market penetration rates reported elsewhere and considering the lack of widespread reliance on special transportation service reported by nonusers (see Section 5.4.3).

The figures on market penetration presented thus far are based on the number of persons registered for LIFT service. If market penetration is analyzed in terms of users, the figures are considerably smaller. Section 5.3 indicated that only one-fourth or approximately 1,500 of those who are registered as LIFT clients actually use the service in a given month. This amounts to 7% of the eligible TH population of Portland. (Reasons for this low usage will be discussed further at the end of this chapter.)

Figure 5-4 illustrates overall LIFT penetration of the target market - Portland's transportation handicapped population- by registrants and by users. Users are defined as those making more than three LIFT trips in a three month period.

5.4.2 Impact of LIFT Service on Regular Users

Although the LIFT is used by only a small portion of Portland's total TH population, the LIFT plays an important and

necessary role in the lives of those people who rely on LIFT service as thier main source of transportation: it allows many to make trips they would otherwise be unable to make, and it results in several non-travel impacts.

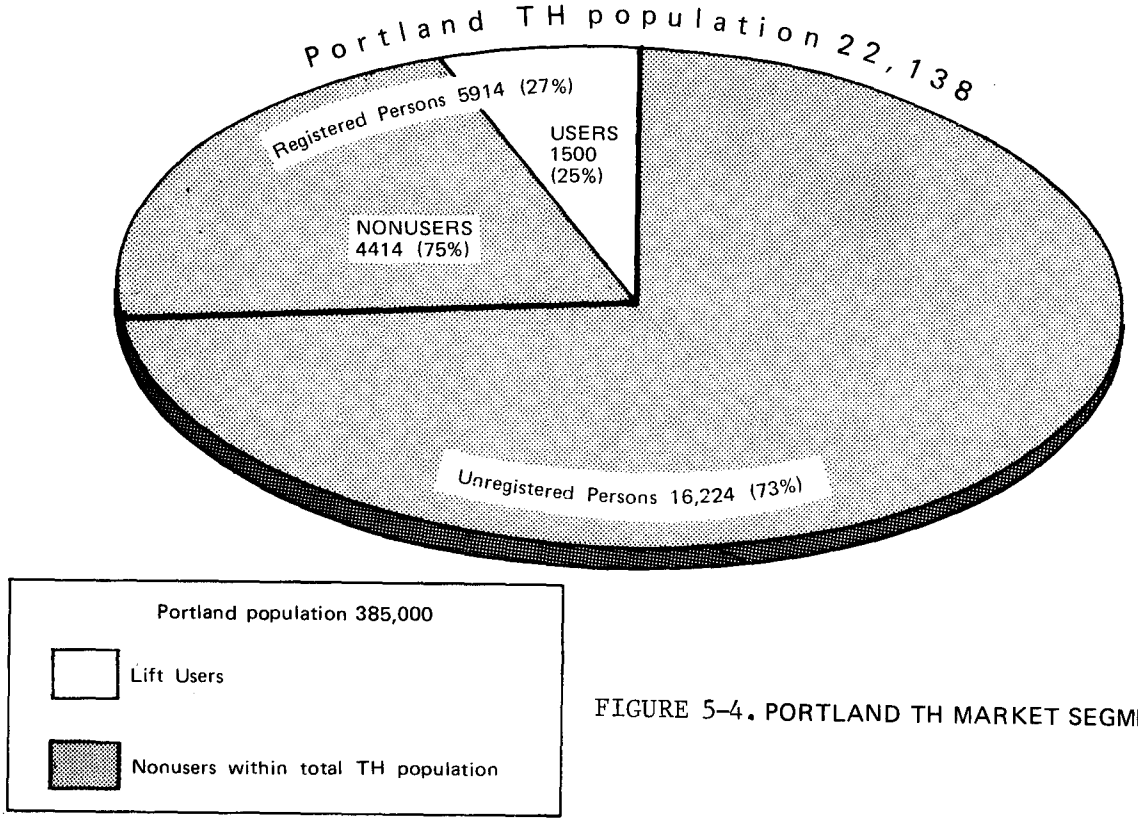

FIGURE 5-4. PORTLAND TH MARKET SEGMENTS

5.4.2.1 Mode Choice of LIFT Clients - In order to determine the extent to which LIFT clients are utilizing other modes of transportation in addition to the LIFT, passengers in all on-board surveys were asked what types of transportation they had used during the past seven days (excluding walking trips and trips that occurred the day of the survey) and how many one-way trips they had made by each mode. Table 5-9 shows these responses for the first, second and fifth on-board surveys; the data indicate that LIFT trips account for almost two-thirds of all trips made.

These data should be interpreted with some caution as it may be difficult for clients to accurately remember their travel behavior for the past seven days. Also, the on-board surveys would be more likely to obtain information from heavy LIFT users since this group is more likely to be using the service when the surveys were conducted. Nevertheless, it seems reasonable to conclude from the data that LIFT service outranks other modes of transportation in providing for the travel needs of those clients who use it regularly.*

TABLE 5-9.

TRAVEL MODES OF LIFT RIDERS

	Percent of Trips			
	First Survey (Apr. 77)	Third Survey (Nov.77)	Fifth Survey (Oct. 78)	Total
LIFT	51%	64%	77%	65%
Driven by Friend/ relative	15	8	11	11%
Taxicab[a]	8	11	6	9%
Bus	11	9	4	8%
Walk	6	3	1	3%
Agency provided	3	3	-	2%
Drive self	4	1	-	2%
Other	2	-	-	-
Percent of clients who made no trips in given week	16%	14%	20%	17%

[a]Not lift sponsored

The table also indicates a trend: as the demonstration progressed the clients the LIFT attracted tend to be people

*This conclusion is further corroborated by the data presented in Table 5-13 in which LIFT users indicate that LIFT service provides for 58% of the trips they make and in Table 5-9 where the LIFT accounted for 65% of all user trips.

with an increasing reliance on LIFT service. When LIFT service first began it provided service for half of its regular clients' trip needs; toward the end of the second year it was providing service for over three-fourths of these clients' trip needs.

It should again be emphasized that these figures tend to exaggerate the LIFT's impact on the user group as a whole. The group surveyed is disproportionately composed of heavy users; most users did not rely on the LIFT to the extent reported in Table 5-9, as Figure 5-2 indicates.

5.4.2.2 Perceived Alternatives to the LIFT - Clients interviewed in the on-board surveys were asked to consider how they would make a given trip if LIFT service were not available. Table 5-10 compares the responses to this question; the data indicate that the LIFT enables a significant portion of LIFT riders to make trips they otherwise would not have made.

TABLE 5-10.

PREDICTED TRAVEL BEHAVIOR
IF LIFT WERE NOT AVAILABLE

	First Year %	Second Year %
Would switch to a different mode of transportation	60	60
Would not make trip	29	28
Don't know	11	12

The group who state they would switch to a different mode of transportation if the LIFT were not available would rely heavily on taxis (41%), friends and relatives (23%), or the bus (17%). Other alternatives mentioned were agency transportation, Care Car or walking. Clients generally regarded these alternate modes as being less convenient for them than LIFT service.

The survey data indicate that if the LIFT were not available the proportion of LIFT users who would make a particular trip would vary according to the type of trip. Table 5-11 illustrates this variation. The data show that approximately two-thirds of medical and work trips would still be made via another mode; on the other hand, only about a third of social/recreational trips would be made. Apparently, trips for the most critical purposes would be more likely to occur than trips for less pressing needs.

TABLE 5-11.

PREDICTED TRAVEL BEHAVIOR
IF LIFT WERE NOT AVAILABLE
BY TRIP PURPOSE

	% Who Would Make Trip	
Trip Purpose	First Year	Second Year
Medical/Dental	71	68
Work	63	72
Personal Business	53	67
Shopping	53	57
School*	50	48
Social/Recreational	30	38

*Includes Adult Day Care Center

By type of aid used, the proportion of LIFT users who reported they would make a particular trip if the LIFT were not available is as follows:

	% Who Would Make Trip
No aid used	57
Accompanied by escort	62
Walker or crutches	65
Wheelchair	56
Wheelchair and escort	66

These data are rather surprising: wheelchaired persons are just as likely to make a particular trip using an alternate mode as are persons who use no aids. One would tend to expect that the more cumbersome the aid, the more difficult it would be to accomodate the trip given the absence of LIFT service. Apparently this is not the case.

5.4.2.3 Non-Travel Impacts of LIFT Service - The ten follow-up interviews (discussed in Section 2.5.1.2 and Appendix A) provided information on the non-travel impacts of LIFT service. For many clients, the LIFT service replaced non-sponsored taxi service as thier most frequent mode of transportation; some clients indicated that their reliance on taxis had forced them to forego other necessities which the LIFT service now enables them to afford. One man who is legally blind uses the LIFT each day to commute to work. The LIFT results in very real cost savings: cabs used to cost $180.00 a month; the LIFT costs about $20.00 a month. A number of people indicated they made more trips now than before because of the cost savings the LIFT provides.

The lessened reliance on friends and relatives for transportation and the resulting sense of increased independence and mobility constituted a clear advantage of the LIFT for many of those interviewed. One woman said that without the LIFT, she wouldn't "get out" to socialize, that the LIFT has "brightened her life." Another said that she was "not as lonesome any more," that she felt "better all around, keeping active and motivated." Such comments were typical, as was that of the woman who said that the LIFT enabled her to visit her husband in the nursing home more frequently than would be possible without the LIFT service.

For some, the LIFT provides a greater sense of security than do other travel alternatives. One man uses the LIFT to travel to radiation therapy four times a week at a private hospital. If LIFT service were not available, he would have to

go to another hospital where he feels he would receive inferior care and treatment. Because his ailment leaves him confused and forgetful at times, he particularly appreciates the security the LIFT offers and believes "The drivers will take good care of me while I'm on the bus."

Finally, clients frequently described the LIFT's impact in terms of increased access to goods and services, especially groceries. A number of clients stated that they "ate better" as a result of the LIFT: one said that he could buy groceries for less money at a store which was outside his neighborhood but accessible via the LIFT; another said that she could now select her own groceries, whereas she had relied on a friend or relative to do her grocery shopping before. In addition, two clients said that the LIFT enabled them to do volunteer work several days a week at Volunteers of Amercia.

5.4.3. Reasons for Nonuse or Low Use of LIFT Service

The data on trip frequency presented in the previous section indicate that only one-fourth of the total number of people registered for the LIFT use the service in a given month. Most of those who do use the service are infrequent riders, making one or two round trips per month. This low usage is not an unusual phenomenon for a specialized transportation system.

In the Naugatuck Valley of Connecticut, a specialized transportation service similar to the LIFT has been operating for six years. Of the 12,000 individuals in the target market, 600 are regular users of this service.[2]

The City of Danville, Illinois provided door-to-door shared ride taxi service for persons over 65 years of age and handicapped persons of all ages at 1/3 or under the regular

[2] The Valley Transit District: Specialized Transportation for the Elderly, Handicapped and Low-Income in the Lower Naugatuck Valley, Connecticut, Document # UMTA-CT-06-0003-79-1, February 1979.

trip cost. After 14 months of registration, 40% of the eligible population had registered for service; of this group only about 50% used the project discount during a given month.[3]

A study of similar subsidized taxi programs for elderly persons in the San Francisco Bay Area corroborates these low usage figures. In two East Bay cities, San Leandro and Fremont, only 50% and 33%, respectively, of persons registered in the program used the service in a given month.[4]

Thus, at a time when federal regulations mandate that public transportation systems be made accessible to handicapped and elderly persons, nationwide findings show that there is under-utilization of many special needs transportation systems in terms of the percentage of eligible people registered for the service and in terms of the usage rate among those who have registered. The Portland situation presents an opportunity to 1) gain an insight into the reasons for this under-utilization and 2) determine the characteristics of this nonuser group. To investigate reasons for underutilization of the service in Portland, a Nonuser Survey was conducted in the spring of 1978 of persons who are eligible for the LIFT but do not use the service or use it infrequently. Three main groups of people were interviewed: 1) Persons identified as transportation handicapped during the predemonstration household survey (1976) who have not registered for LIFT service; 2) persons registered for LIFT service judged to be nonusers, i.e., they made less than three one-way trips on the LIFT over a three-month period; and 3) registered persons who actually use the system, i.e., they made three or more one-way trips on the LIFT over a three-month period. A total of 485 persons were interviewed: 63% were

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[3]This program was discontinued when a city-wide bus system was instigated. See User-Side Subsidies for Shared Ride Taxi Service for Danville, Illinois. Phase I, Document # UMTA-IL-06-0034-77-1, June 1977.

[4]See Subsidized Taxi Programs for Elderly and Handicapped Persons in the San Francisco Bay Area, Crain & Associates, August 1977.

registered for LIFT service and 37% were not; 37% were classified as LIFT users, 64% were judged to be nonusers. (A more detailed description of the Nonuser Survey sample is provided in Appendix C.) Data derived from the Nonuser Survey is presented below and in the section which follows.

Each person interviewed in the Nonuser Survey except those judged to be regular users were asked why they did not use LIFT service or used it infrequently. If the respondent gave more than one reason, he/she was asked to single out the primary reason. The responses are shown in Table 5-12.

Analysis of the data presented in this table shows the following:

1. By far the most important reason why people do not use the LIFT - reported by 41% of the sample - is their ability to provide for their transportation needs in other ways. This fact is further corroborated by Table 5-13 which shows trip modes for users and nonusers in this sample. Three-fourths of nonuser trips were made in a personally owned vehicle, as a passenger in another's car or on a regular bus. In contrast, only 31% of user trips were made by these modes.
2. The second general reason why people do not use the LIFT is lack of knowledge about the specialized service. A total of 18% report they are unaware of the service, of how to register for service, or of their own eligibility.
3. The third reason for nonuse offered by 18% of the sample relates to the characteristics of the TH population, i.e., that some TH persons are not inclined to travel much by any means, that the severity

of their handicap prevents using the service, or that they intend to register but have not done so.

4. Finally, alsmot 12% of the sample cite problems with the service itself (scheduling, trip length, reliability).

TABLE 5-12.

REASONS FOR NOT USING LIFT SERVICE

Use alternative forms of transportation		42.8%
Gets rides with others	18.2%	
Drive self	11.8%	
Ride bus	10.8%	
Other agency provides	2.0%	
Lack of knowledge of service		18.1%
Didn't know about LIFT	11.4%	
Didn't know how to sign up	4.7%	
Didn't know I was eligible	2.0%	
Personal restrictions		17.6%
Don't need, don't travel much	9.1%	
Too handicapped to use	6.1%	
Intend to register but haven't	2.4%	
Service restrictions		11.6%
Scheduling too difficult *	6.1%	
Trip takes too long	2.4%	
Service unreliable	1.4%	
No escort available	1.7%	
Other**(all under 1.0%)		9.7%
		99.8%

*Includes those who felt the complexity of the scheduling procedures were difficult and those who complained about the 48-hour (later reduced to 24-hour) advance reservation time.

**Includes: Current health situation prevents use, problems with registration (lost card, hasn't received card, etc.), use LIFT only for medical purposes, problems with ride (too rough, not enough support, etc.), no weekend service, walk where need to go (neighbors, grocery store), use LIFT as much as needed.

TABLE 5-13.

TRIP MODES OF LIFT USERS AND NONUSERS

	% Nonusers[a]		Users[b]	
	n[c]	%[d]	n	%
Drive self	70	27.7	4	3.3
Rides with other	88	34.8	20	16.3
Bus	32	12.6	7	5.7
LIFT	4	1.6	71	57.7
Taxi	7	2.8	3	2.4
Agency provides	5	2.0	5	4.1
Walk	42	16.6	12	9.8
Mixed mode	5	2.0	1	0.8
	253	100.1	123	100.1

[a] All unregistered persons and registered persons who make less than three one-way trips on the LIFT over a 3 month period.

[b] Registered persons who make three or more one-way trips on the LIFT over a three month period.

[c] Number of round trips taken over a two-day period - yesterday and today. Trip totals for both days were almost identical.

[d] Columns do not total 100% due to rounding.

5.4.4 Factors Influencing LIFT Registration and Usage

The above analysis has discussed differences between LIFT registrants and Portland's TH population and between user and nonuser populations. In order to support this analysis and to gain insight into the relative importance of the demographic variables in determining the likelihood of a person's registering for and using LIFT services, discriminant analysis was used to analyze the data. This statistical technique selects the linear combination of variables that best classifies or discriminates between two or more groups of cases, in this case between users and

non-users and between registrants and non-registrants. The variables tested in the analysis included: degree of car availability, mobility (i.e., trip totals), income, age, sex, the number of drivers in the household, and use or nonuse of mobility aids.

Table 5-14 shows the coefficient values for the significant variables in distinguishing between registrants and non-registrants and between users and nonusers. The higher the value of the coefficient, the more important the variable is in distinguishing between the respective categories.

TABLE 5-14.

COEFFICIENTS DERIVED FROM DISCRIMINANT ANALYSES

Variable	Registrants/Non Registrants	Users/Nonusers
Car Avail.	.68204	-.79725
Trip Total	.31	.1397
Income	.25441	
Age	.24824	.46629
# Drivers	.16577	.19243
Mobility Aids	-.10431	

Not surprisingly, car availability is more than twice as important in discriminating between registrants as the other variables. The second column on Table 5-14 indicates that car availability is also the most important variable in discriminating between users and nonusers. (The negative coefficient reflects the fact that the scale on which degree of car availability was measured was inverted on the analysis so that a high numerical rating indicated a car was never available and a low rating indicated a car was always available.) Age is also important in clarifying users and nonusers.

Note that for both discriminant functions, car availability is by far the most important variable in distinguishing the respective sub-groups. Also, the number of drivers in a household was a significant variable in each function. These two facts taken together indicate that if a person has alternative means of transportation, in terms of both car and driver, he or she is more likely to be a nonuser and nonregistered. The mobility factor (i.e., trip total) was also significant in both functions, indicating that more mobile people tend to be nonusers and nonregistered. Finally, the age variable which appears in both functions seems to indicate that the more restricted elderly are also less likely to be registered and users than younger people.

Note that whereas the two discriminant functions seem to include relevant variables, the classification power of both equations was fairly low. The registration/nonregistration equation was able to classify only 74% of the cases correctly and the user/nonuser equation classified only 63%. The reason for this is undoubtedly the fact that all persons in the sample were known to be transportation handicapped and it would be expected that their similarities would be stronger than their differences, i.e., that it would be fairly difficult to accurately discriminate between the two subgroups.

A more detailed breakdown comparing the demographic characteristics of registered and unregistered persons and users and nonusers is presented in Table 5-15. The data show that persons who do not register for or use LIFT service are slightly older and more affluent, have greater access to a car and are less likely to be in the work force or a student.

TABLE 5-15.

DEMOGRAPHIC COMPARISON OF SURVEY GROUPS

	Registered	Not Registered	User *	Nonuser
Male	23.6	24.2	24.4	23.2
Female	76.4	75.8	75.6	76.8
Age 10-15 yrs.	.3	.6	.6	.3
16-20	3.0	1.1	5.2	.6
21-59	14.5	12.4	22.1	9.1
60-64	7.9	10.7	7.0	9.9
65 & older	74.3	75.1	65.1	80.0
Persons Per Household				
1 Person HH	57.7	46.0	51.5	54.7
2 Person HH	29.3	39.7	28.7	35.5
3 or more	13.0	14.4	19.9	10.0
Cars Per Household				
No Car HH	74.9	49.4	74.1	61.3
1 Car HH	18.6	37.6	16.7	30.0
2 or more	6.5	12.9	9.2	8.8
Car Availability				
Car always available	5.3	33.0	1.2	23.4
Car usually available	11.3	21.6	12.3	16.8
Car sometimes available	52.7	30.1	55.0	38.3
Car never available	30.7	15.3	31.6	21.4
Possession of Driver's License				
Have driver's license	7.4	33.9	5.8	23.0
Employment				
Work	12.0	9.7	18.6	7.0
Student	3.3	2.3	5.2	1.6
Keep House	11.0	25.7	5.2	21.9
Retired	58.8	50.9	55.2	57.1
Unemployed	.7	1.1	1.2	.6
Disability	14.3	10.3	14.5	11.7
Income				
Under $5,000	73.8	52.9	68.8	64.3
$5-10,000	17.5	28.0	19.1	22.8
$10-15,000	3.6	8.9	5.1	5.9
$15-25,000	4.0	8.3	5.1	5.9
$25,000 and over	1.1	1.9	1.9	1.1
Refused	(10.4)	(11.8)	(9.8)	(11.4)

*More than three LIFT trips in a three-month period.

6. SERVICE SUPPLY

6.1 INTRODUCTION

This chapter of the report covers the supply of special transportation services to LIFT-system users in 1977 and 1978. The following topics are addressed:

1. Equipment
2. Coverage
3. Pricing
4. Scheduling
5. Dwell-Time Analysis
6. Trip Characteristics
7. Client Assessment of LIFT-System Service
8. Comparison of LIFT and Taxi Service

The analysis includes the impact of demand on service supply where the data are available.

Most of the data used in this chapter derive from samples of dispatch trip tickets that are used to record the passenger's name and ID number, the requested and actual pick-up times, the requested and actual delivery times, and the origin and destinations for each trip. The samples were taken in 1977 and again in 1978 to assess the change in system performance over the course of the project.

Two major sampling problems were encountered in 1977. First, the dispatch stubs for tour trips (several passengers leaving from a common origin and traveling to a common destination) did not indicate the number of passengers on the trip. Since tour trips comprise about 10% of all passenger trips, the lack of data on tour trips may bias the information on demand by time of day and on trip times by day and time of day. However, this potential bias could not have affected the overall conclusions reported in this chapter.

Second, there were systematic errors in the recording of times on the tickets, i.e., the error rate for afternoon trips was much higher than that for morning trips, and, consequently, more afternoon trips were eliminated from the sample.

In order to understand the reason for the erroneous data in the 1977 sample, it is necessary, first, to understand how the sample was constructed. The procedure for choosing sample trips was to select every 6th trip from the entire population of SNT trips for four months. If an error was found (i.e., if there was less than complete information on scheduled and actual pick-up and delivery), the instruction to the data analyst was to take the next ticket stub in the sequence and record the data on that ticket. This procedure was intended to yield a representative picture of LIFT demand, reliability, and trip times. From cross checking with other data, we know that afternoon trips were undersampled with this procedure. The reason for this undersampling is that afternoon "return" trips are not time-stamped when the request for pick-up is called in or are stamped erroneously, i.e., there were more errors in the afternoon. This was due to dispatcher error and difficulty with the stamping machine, particularly during hectic parts of the day, and to the fact that dispatchers did not follow stamping procedures for many return trips.

The effect of undersampling afternoon return trips in 1977 was that (1) distribution of demand by time of day was altered and (2) statistics regarding the overall reliability and trip length were affected to the extent that afternoon trips are different from morning trips.

In an attempt to correct this error, a second sample of pick-up times was conducted in 1977. The sampling procedure, which used less stringent trip-stub rejection criteria, yielded a realistic estimate of demand by time of day.

In the sample conducted in 1978, similar problems with erroneous trip stubs were encountered. These problems were anticipated, however, and the sample size was expanded so that enough complete stubs were analyzed to report statistically accurate information.

6.2 LIFT EQUIPMENT

6.2.1 Rolling Stock

LIFT buses, as stated in Chapter 4, are Mercedes Benz diesel buses, equipped with radios and retrofitted with lifts. Generally, Tri-Met has been pleased with their operation. However, the following observations are relevant:

1. The bus engines make a great deal of noise, particularly when climbing hills. Passengers complained about this aspect of the service: in 1977, noise was the most common complaint about the service. In response to this problem, Tri-Met put hoods over the engines to muffle the noise. Passengers still felt that the noise was excessive, but the percentage saying it was "not satisfactory" declined slightly. Drivers agreed that the engines were noisy but seemed to accept this as unavoidable.
2. The jerking motion the bus makes when shifting gears (they have automatic transmissions) is unpleasant to many riders. This jerking motion is more pronounced on hills, and buses must traverse many hills in Portland to reach their destinations. The wheelchair passengers, who are tied down and facing the front, are less susceptible to this jerking motion than the side-seated ambulatory passengers. (Three out of four passengers rated the comfort of the ride as "satisfactory.")

3. The wheelchair lifts seem to need repair fairly frequently, primarily because of problems with the hydraulic system that propels them. Also, the retractable step in the front of the buses have needed repair more frequently than expected, according to drivers and control-room personnel.

In the beginning of the demonstration, Tri-Met had some maintenance problems with the buses, primarily because mechanics who were servicing them were not familiar with the diesel engine. These problems were resolved when the mechanics received appropriate training and as they gained more experience with the equipment. Maintenance problems were not out of the ordinary during the second year of operation.

6.2.2 AFIRs: Automated Fare Information Recorders*

The automated fare-collection equipment described in Chapter 4 was intended to be a major innovation in the Portland demonstration. It was intended to provide the following data on each trip: passenger ID number, time on, time off, date, travel time, zone on, zone off (or mileage on, mileage off), and total mileage. These data were to be used in billing agencies and in analysis of client trip-making. The AFIR equipment never was fully operational; finally, in November 1978, the fare boxes were removed from the buses. Figure 6-1 is a photograph, taken before November 1978, showing the farebox positioned in the bus next to a LIFT driver.

Although several factors contributed to the failure of the AFIR test, there appear to be two major interrelated causes for system failure:

1. There was a high level of equipment failure due to inadequate specifications and failure of equipment to meet the specifications to which they were built.

*Information for this Section was taken from an evaluation prepared by Applied Resource Integration entitled "Performance Evaluation of the Automatic Fare Information Recorder Unit."

FIGURE 6-1. LIFT DRIVER AND FAREBOX

2. Tri-Met did not properly maintain the units and, furthermore, did not make sufficient organizational commitment to the implementation of the AFIR system.

These two explanations are interrelated. Part of the reason for equipment failure was lack of preventive maintenance, care, and attention to the fare boxes, and this lack of attention derived, in fact, from exasperation with equipment performance.

Among the environmental conditions and specific manufacturing and installation problems that led to system failure were:

1. A number of initial component failures within the units, including:
   a. key-lock on/off switch, and
   b. voltage regulators (that were located inside the fare box where the heat was too great).
2. Inadequate wiring of the AFIRs into the bus. The AFIRs were inadequately grounded at the start, and wire gauge and wiring runs proved inadequate and caused fretting and short-circuiting.
3. A much higher long-term card-reader sensitivity to wear and dirt than was predicted in the testing phase.
4. Data recording and processing problems, including continuing errors in records, missing carriage return/line feeds, generation of alphabetic characters (which were not supposed to be produced by the system), and blank or missing records. Thus, the system could not accurately relay information to the computer. The specifications with regard to the data-recording subsystem were unrealistically low.

5. Due to sunlight radiation and engine heat, the temperature specifications were exceeded.
6. Vibration in the vehicles was higher than the specified operational environment. This led to loosening of connectors and joints.
7. Failure of the Passenger I.D. cards.
8. Low voltages interfered with AFIR operations. The proper voltage range was not accurately specified.

Reasons for system failure attributable to Tri-Met are:

1. Less driver care than required by the AFIR units.
2. Lack of specified maintenance and cleaning.
3. Improper handling and storage of tapes.
4. Neglect in providing staff with the necessary technical background to maintain the system.
5. Inadequate attention to the AFIR system. Tri-Met regarded this aspect of the demonstration as strictly secondary to the main purposes of the demonstration.

In addition to the problems and causes mentioned above, many of the passengers using the LIFT were too handicapped to use the AFIR equipment or forgot (or had lost) their cards. The drivers had to operate the AFIR system for those passengers who could not use it and manually recorded ID numbers for those passengers who had lost or forgotten their cards. This raises serious questions about the labor-saving advantages of such a system for the transportation handicapped clients. Even if the equipment had operated properly, drivers would still have to spend significant time recording passenger and trip information, and these data would have to be manually inputted to the computer. It is doubtful that the use of AFIR equipment could have proven cost-effective for this segment of the transportation market.

6.3 COVERAGE

In the fall of 1977, during the weekday hours of 7 AM and 7 PM, the LIFT was providing 96 bus hours of service per day. In 1978, hours of service changed from the 7 AM to 7 PM time period to 6:30 AM to 6:30 PM in response to the heavy demand for work trips early in the morning and the low utilization of service toward 7 PM. The bus hours of service for one day were reduced to 88 hours, as part of Tri-Mets system-wide economy cutback. Figure 6-2 illustrates how these 96 bus hours of service are distributed over the 12-hour day in 1977. This figure indicates that the number of buses available for service ranged from a low of one bus during the 6:30 PM to 7 PM time-period to 12 buses during the 2 PM to 3 PM period. On average, there were eight vehicles in service at any one time. Therefore, the average availability of service in 1977, expressed in terms of the ratio of square miles to number of vehicles in service, is about one vehicle for each 12 square miles covered.

In 1978, the 88 hours per day were spread slightly differently and corresponded more closely to LIFT demand. Figure 6-2 shows a more gradual introduction of buses into service beginning at 6:30 AM: the number of buses in service between 6:30 AM and 8:00 AM ranged from 1 to 6 in 1978 compared to the immediate introduction of 6 buses during the 7-8 AM time-period in 1977. On average, a service level of 9 buses were available per service hour in 1978 instead of the average of 10 in service in 1977. Thus, the vehicle coverage ratio was decreased in 1978 to a LIFT bus for each 13 square miles.

To supplement LIFT bus coverage, the SNT project used taxis for slightly over 10% of total trips delivered during the fall months of 1977. As described earlier, these were typically used to (1) help meet peak-load situations when the LIFT was behind schedule and (2) serve those trips where

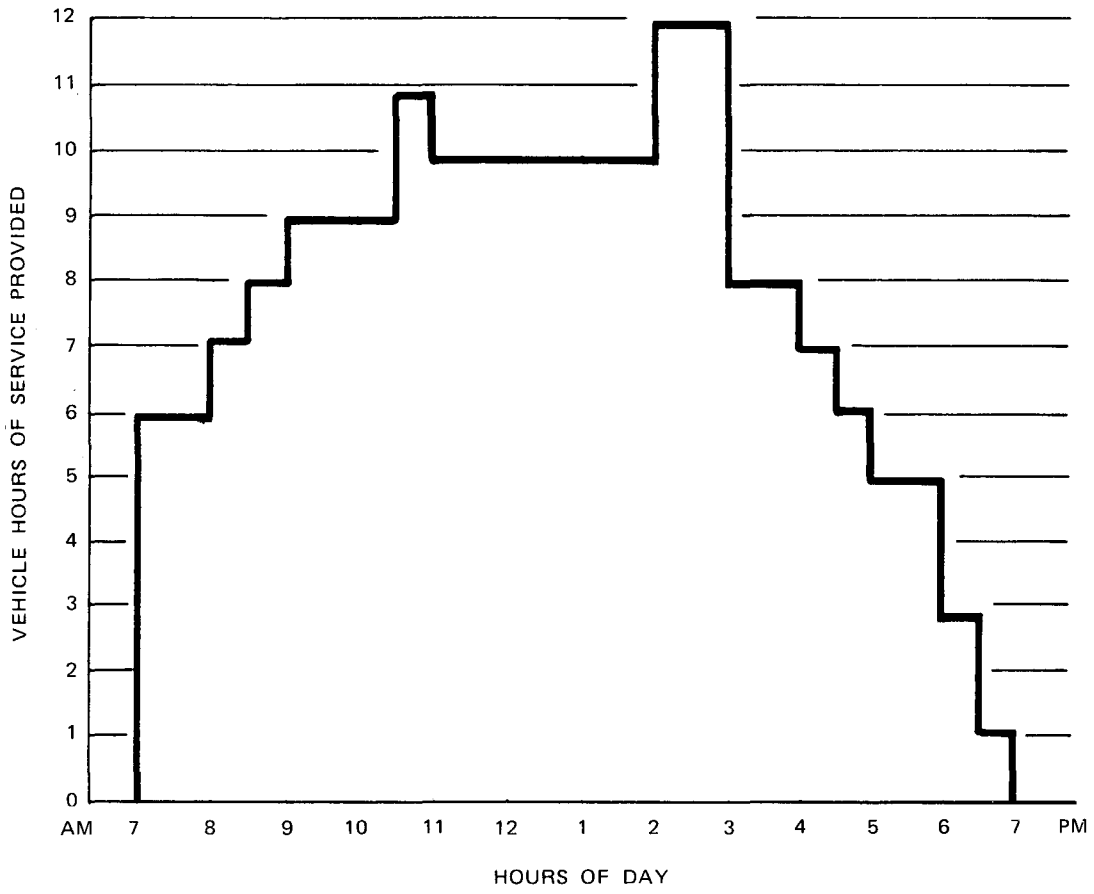

FIGURE 6-2. SERVICE BY HOUR OF DAY, 1977

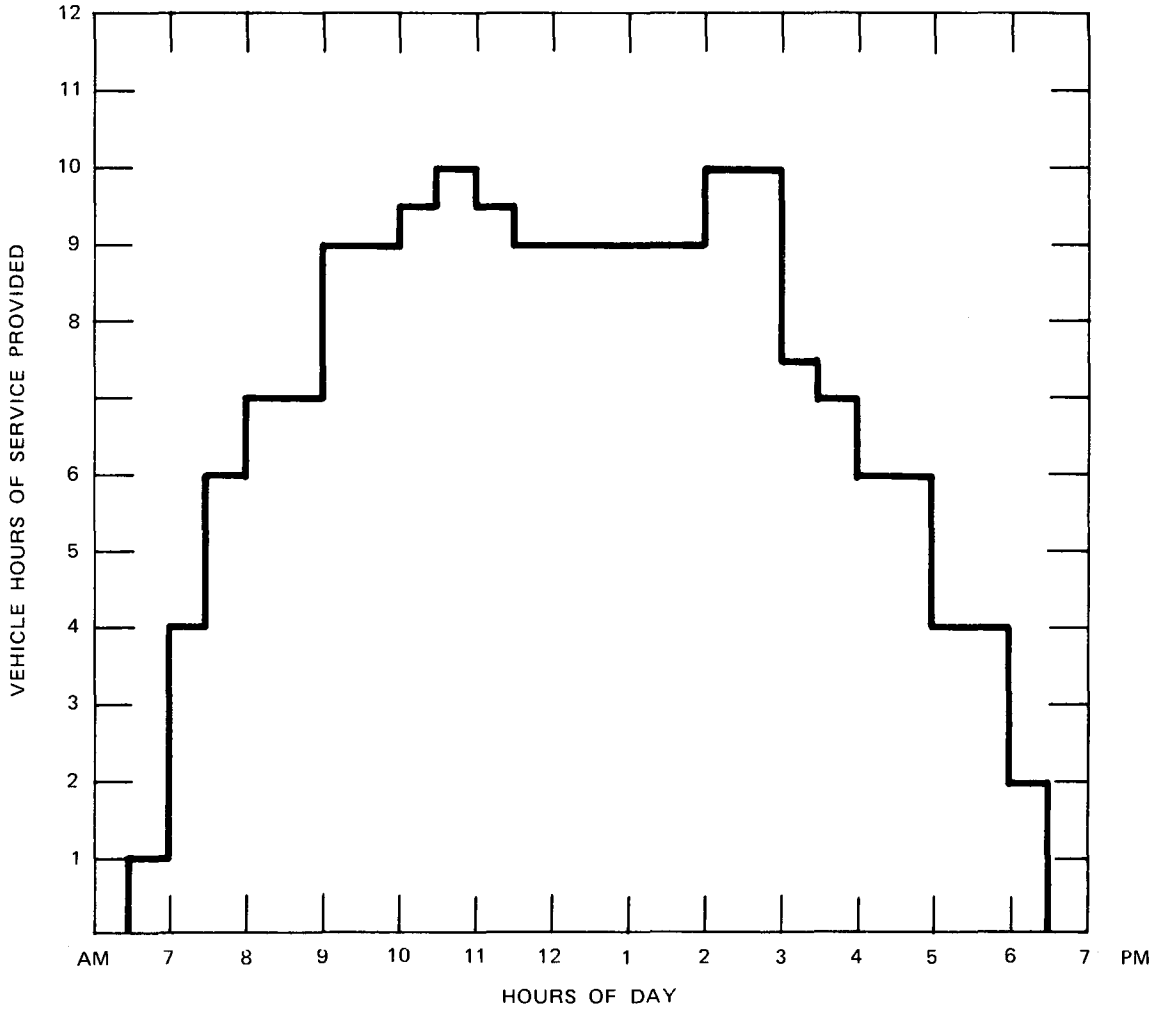

FIGURE 6-3. SERVICE BY HOUR OF DAY, 1978

the origin or destination was out of the way and/or could not be easily grouped.

There was a limit of about 40 taxi trips per day that could be provided in 1977, in accordance with the terms of the agreement with the union (pursuant to 13(c) regulations) which stipulated that no more than $55,000 could be spent during the year on taxi service. If this agreement had not been in effect, the SNT service would undoubtedly have made further use of cabs for the many-to-many trips during the first year of the demonstration.

In the second year, an agreement with the union resulted in a doubling of the taxi service component to about 80 trips per day. This increase in taxi service to LIFT clients more than compensated for the decrease in bus hours of service, and, consequently, total LIFT-system ridership continued to grow during the second year of the demonstration.

Figure 6-4 illustrates the overall demand serviced by time of day by both taxis and the LIFT in 1978. The figure indicates that dispatch personnel made judicious use of taxis in the early morning and late afternoon to smooth demand.

6.4 PRICING

As reported in Chapter 4, the fare costs assumed for passenger trips on the LIFT varied according to the type of passenger. These fares were lower than those on transportation modes used before LIFT service began. Table 6-1 compares costs assumed by different parties by different passenger-mode combinations. For LIFT trips, the costs to the passenger and the agency were fixed, regardless of trip length, hour of service, or type of vehicle (taxi or LIFT). Under this concept, agencies were charged $1.50 per client trip when the following conditions were met:

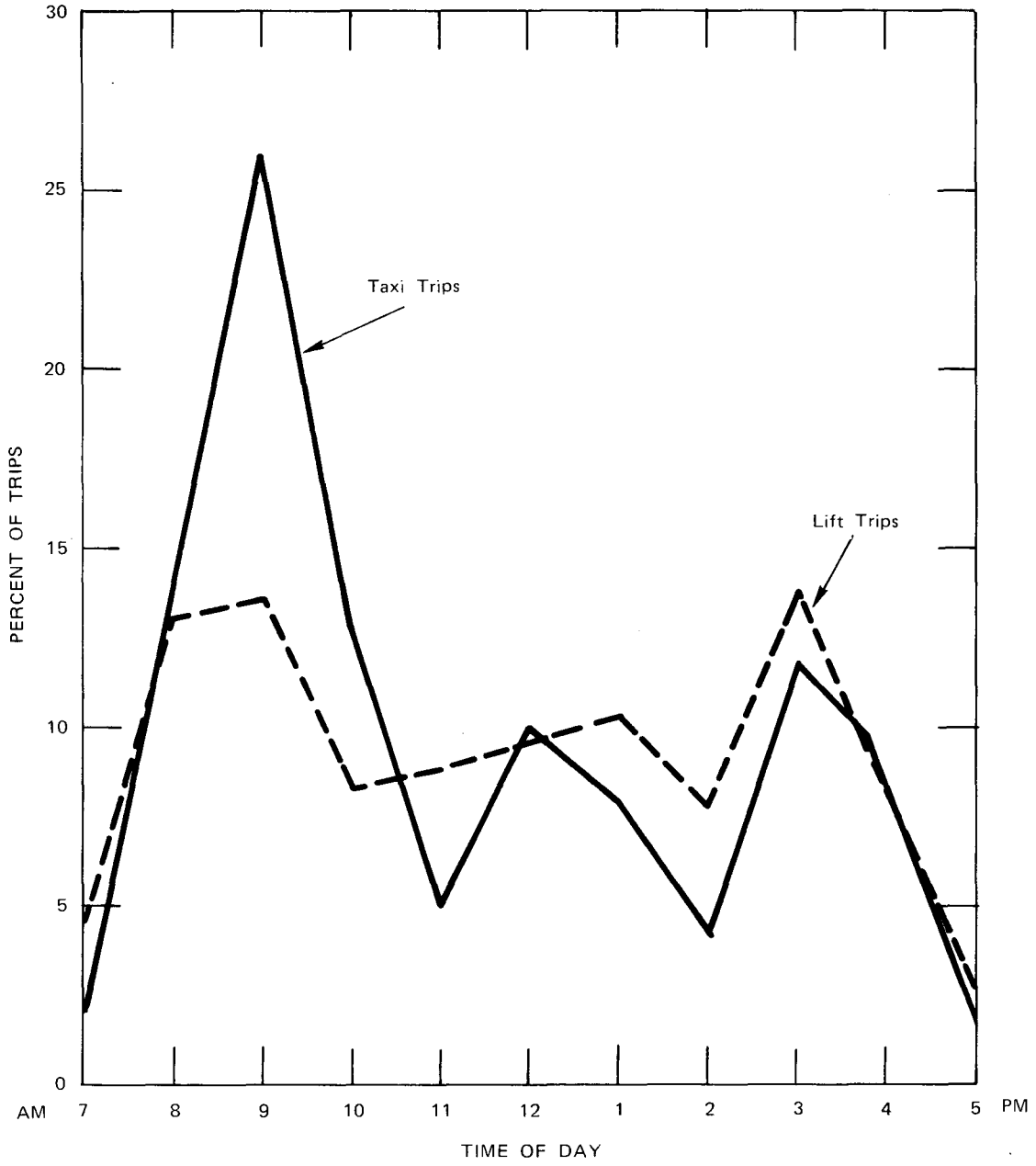

FIGURE 6-4. LIFT AND TAXI USAGE BY TIME OF DAY

1. Group rides were scheduled three days in advance,
2. The group contained five eligible passengers, and
3. All members of the group were capable of being served by one LIFT bus and had either a common origin, a common destination, or both.

TABLE 6-1.

TRIP-COST FUNDING BY PASSENGER TYPE

Mode	Trip Cost Assumed By Passenger	Agency	Tri-Met
Agency Passenger—LIFT	0	$3.00	Balance of trip costs
General Passenger—LIFT	50¢	0	Balance of trip costs
Group Trips	0	$1.50	Balance of trip costs
Agency Passenger—SMS*	0	$3.00-$4.00	0
Agency Passenger—Buck Chair Car	0	over $10.00	0
Independent Passenger—Buck Chair Car	over $10.	0	0

*Special Mobility Service, a private, nonprofit transportation project.

The intent of this new fare policy was to increase ridership and improve the productivity and efficiency of LIFT service.

In Portland, the price of transportation must be related to two distinct types of markets: (1) the agency market for transportation for its clients and (2) the individual passenger market. The agency demand is, of course, derived from its clients' demand; however, as shown earlier, the agency assumes part of the cost of client trips and, in this sense, can be considered a consumer of transportation services.

The $3.00 price of LIFT trips to agencies is a decrease in cost to the agency for most agency trips. AAA agencies,

which consume about half of all LIFT trips, had contracted for $10,000 worth of transportation service per month from Special Mobility Services (SMS) prior to the beginning of LIFT service in December 1976. Based on the number of trips served (from 2,500 to 3,300 trips per month), the cost per passenger trip, which was completely covered by the AAA agencies, fluctuated from $3.00 up to $4.00. Thus, the savings to AAA agencies using LIFT service are zero to $2.50 per trip over the previous contracting system, depending on whether the person was riding alone or as part of a group.

Passengers' fare savings with the LIFT are substantial. An October sample of LIFT origins and destinations showed an average trip length by the most expeditious routes of about 4.3 miles. This trip would cost a passenger $5.20 in a regular taxi. Wheelchair passengers requiring a vehicle with a lift could have purchased a trip of 4.3 miles from Buck Ambulance for over $10.00. A private automobile one-way trip of 4.3 miles would cost about 75¢, assuming a 17¢ per mile operating cost. By comparison, LIFT agency passengers pay nothing and general passengers pay only 50¢.

The relatively low LIFT general passenger fare has been seen as a benefit by both agency-affiliated and nonaffiliated passengers. Many agency clients have registered as general passengers to take advantage of the low-cost transportation in those circumstances in which agencies will not assume the cost of trips: 10% of the 5,900 registrations are dual registrations.

There was some indication during the second year of the demonstration that agencies were taking advantage of the general passenger fare by encouraging affiliated passengers to use their general-passenger pass and pay 50¢ for what would normally appear to be an "agency" trip. This practice is prohibited in the contract between Tri-Met and the social service agencies, and the agencies vehemently denied violating their contract. They claimed that they reviewed their

files and found that some of their clients no longer met their trip funding criteria.

Regardless of the interpretation of what was done, it is a fact that agency-funded ridership was reduced during the latter months of the second year while general-passenger ridership climbed dramatically. LIFT drivers noticed that former agency passengers were now paying the general-passenger fare for the same trips they were taking under agency sponsorship. It would appear that the agencies were at least interpreting the terms of the contract to suit their own ends. The incentives to shift the burden of funding special transportation to Tri-Met were certainly prevalent in the existing fare structure and the provider-side nature of the subsidy.

6.5 SCHEDULING OF SERVICE

One important feature of the LIFT service is the advance scheduling of rides. It was planned that this advance notice would both restrict the demand that was expected to outstrip supply and provide enough advance notice so that trips could be grouped into productive tours. When the LIFT began service in 1976, there was a two-day advance notice requirement. In practice, the anticipated two-day advance planning stretched into a much longer period—as much as five days when the weekend was considered. Many agencies complained that they were not able to schedule necessary client trips because it was difficult for clients to plan that far ahead. Many clients are simply not able to plan that far ahead because they are not aware of their trip needs (e.g., a quasi-emergency medical appointment) or because they are not mentally capable of planning that far in advance. Similarly, general passengers were not entirely satisfied with the scheduling of trips because of the long lead-times required.

Because of dissatisfaction with the long lead-time required to schedule a LIFT trip, Tri-Met reduced the required time to 24 hours. This still left enough time to efficiently build tours. This reduction did not solve the problem, however. The passenger who wanted to schedule a trip on short 24-hour notice was more often than not turned down because LIFT capacity (both taxi and LIFT bus) was still usually filled two days in advance.

The foregoing discussion refers mainly to the first leg of a round-trip. Scheduling for the return trip presented problems to the controllers. On-board surveys indicated that about half of the LIFT trips were for medical purposes. It is difficult to specify when the return leg of this type of trip will be made. Therefore, LIFT controllers instructed passengers to "call in" when they were ready to be picked up for the return trip. Obviously, this largely unpredictable demand is particularly difficult to group or coordinate with already scheduled trips. The result was often that the person expecting a return trip had no clear idea when the bus would come (even when a promised pick-up time was stated), and service to the individual with the firmly scheduled trip was not timely. Client perceptions of timeliness of service are reported in Section 6.8.1.

6.6 DWELL-TIME ANALYSIS

A survey of vehicle dwell-times was conducted in order to determine loading and unloading times for LIFT passengers. This section reports on the results of this survey.

The relative proportions of agency and general passengers sampled were roughly 55% and 45%; wheelchair passengers accounted for just over 20% of the sample. Over one-third of all passengers boarding the LIFT were making medical trips; the remaining trip purposes were divided fairly evenly among shopping, school, social/recreational, and personal business,

as shown below:

Trip Purpose	%
Medical/Dental	38
Shopping	15
School	14
Social/Recreational	11
Personal Business	10
Other	6
Work	4
Unknown	2
Church	0
	100

Nearly three-quarters of those observed received assistance from the driver in boarding the LIFT bus; of course, this figure includes all wheelchair passengers, since the latter require operation of the wheelchair lift-mechanism at the back of the bus. The percentage breakdown of all boardings with regard to assistance required is shown below:

Assistance	%
None	22
Driver	73
Escort	5
	100

The high proportion of passengers requiring driver assistance is reflected in the average wait time of those sampled; wait time is defined as the amount of time elapsed between arrival of the bus at the pick-up point and the passenger's movement from the door to the bus. If the driver must go to the door to assist the passenger, wait time consists of the time between the vehicle's arrival and the driver's assistance in walking the passenger from the door to the bus. (This would include time consumed in

ringing the doorbell, waiting on the porch, etc.). As shown in Table 6-2, the mean wait time for all observations was 49 seconds; however, the standard deviation was nearly twice that amount, or 84 seconds. The origin-to-bus time—i.e., the time required by the passenger from the doorstep (or curb) to the bus entrance—averaged 32 seconds. This figure varies less than the wait-time statistic; the standard deviation was approximately 30 seconds.

Comparison of wheelchair and nonwheelchair passengers reveals lower wait times for nonwheelchair passengers: 44 seconds vs. 64 seconds for wheelchair passengers. (The variation in wait times was quite large for both groups.) However, wheelchair passengers showed lower origin-to-bus times than nonwheelchair passengers: 28 seconds vs. 34 seconds. Presumably, the driver can push a wheelchair from the doorstep to the bus faster than a LIFT user can walk that distance, with or without assistance. Wait times and origin-to-bus times also varied according to the number of passengers being picked up. With two or more passengers, the average wait time and origin-to-bus time was somewhat higher than with a single passenger. However, only about one-tenth of the boardings sampled involved two or more passengers.

As expected, passengers entering the bus by the front steps exhibited shorter loading and unloading times than wheelchair passengers entering the bus via the lift apparatus, as shown below. Of course, the time required to unload two or more passengers was substantially greater; in fact, for both wheelchair and nonwheelchair passengers, these times were roughly twice as long for two or more passengers as for a single passenger.

Finally, the mean times required by the driver to assist passengers from the curb to their destinations and to return to his seat in preparation for departure of the vehicle were 47 seconds and 22 seconds, respectively. The

TABLE 6-2.

LIFT DWELL TIME ANALYSIS

	No. of Observations	Mean Time (in seconds)	Standard Deviation (in seconds)
Loading Times:			
Wait Time, All	124	48.8	83.6
Wait Time, Wheelchair	30	64.2	72.2
Wait Time, Non-Wheelchair	94	43.9	86.7
Wait Time, 2+ Passengers	15	57.4	49.1
Origin-to-Bus Time, All	124	32.4	30.0
Origin-to-Bus Time, Wheelchair	30	64.2	72.2
Origin-to-Bus Time, Non-Wheelchair	94	33.7	30.8
Origin-to-Bus Time, 2+ Passengers	15	37.7	40.2
Loading Time, Front—All	94	35.6	29.3
Loading Time, Front—2+ Passengers	9	64.7	50.5
Loading Time, Lift—All			
Lower Lift	30	38.7	15.0
Load Lift	30	20.8	10.8
Raise Lift	30	15.1	7.3
Secure Passenger	30	79.2	51.6
Total	30	153.8	
Average Passenger Loading Time:		145.4 or 2 minutes 25 seconds	
Unloading Times:			
Unloading Time, Front—All	103	30.6	21.6
Unloading Time, Front—2+ Passengers	20	38.8	19.4
Unloading Time, Lift—All	25	77.8	37.2
Unloading Time, Lift—2+ Passengers	7	97.7	43.1
Driver Assistance Time, Curb to Destination	51	47.0	43.2
Driver Return Time, All*	127	21.7	30.1
Driver Return Time, Wheelchair	25	44.9	27.5
Driver Return Time, Non-Wheelchair	103	15.9	27.9
Average Passenger Unloading Time:		80.2 or 1 minute 20 seconds	
Sum of Average Loading and Unloading Times:		225.6 or 3 minutes 46 seconds	

*Includes observations requiring zero driver return time.

driver return time for wheelchair passengers was substantially higher than for nonwheelchair passengers: 45 seconds vs. 16 seconds.* This differential can be accounted for by the additional time required for the driver to raise the lift apparatus after having lowered the wheelchair passenger on the apparatus and wheeled the person to the doorstep. If the average time to raise the lift, 15 seconds, is subtracted from the driver return time for wheelchair passengers, the resulting figure is a more reasonable 30 seconds.

LOADING TIMES

	Average Time in Seconds
Front loadings	36
Wheelchair loadings:	
Lower lift apparatus	39
Load passenger	21
Raise lift apparatus	15
Secure passenger	79
	154
UNLOADING TIMES	
Front unloadings	31
Wheelchair unloadings*	78

*A detailed breakdown of the time required for each function was obtained for loadings only.

Overall, the average passenger requires a loading time of 145.4 seconds, or almost 2-1/2 minutes, and an unloading time of 80.2 seconds, for a total of 225.6 seconds, or about 3-1/4 minutes. The time required to load and unload a wheelchair passenger is 232 seconds or almost four minutes. The escort times in loading and unloading the average passenger are 81.2 seconds and 39.8 seconds respectively.

*Both figures have standard deviations of 28 seconds.

respectively. Thus, the escort function consumes a total of 121 seconds per passenger, on average. At a level of 350 passengers per day, roughly 700 minutes, or almost 12 hours per day, are consumed by the driver escort function.

6.7 TRIP CHARACTERISTICS

In order to assess quality of service, a simple random sample of dispatch stubs was taken from the months of April, May, and October of 1977 and April, May, and October of 1978. From each stub, the following times were noted: requested pick-up time (RPT), actual pick-up time (APT), requested delivery time (RDT), and actual delivery time (ADT). From this information, it is possible to calculate delay in pick-up (RPT-ADT), delay in delivery (RDT-ADT), and trip length (ADT-APT). This Section reports this information for the two years and uses the data to estimate travel speed.

6.7.1 Reliability

Figures 6-5 and 6-6 show LIFT reliability by time of day compared with demand for 1977 and 1978, respectively. The 1977 pattern indicates that lateness increased during mornings and peaked between 9 and 10, when the LIFT averaged over 20 minutes late for pick-ups. This degree of lateness decreased substantially during the 11 AM to 1 PM time-period, to about 10.5 minutes. For the rest of the day, delay in pick-up fluctuated, but declined to an average low of 5.7 minutes late during the 4 to 5 hour. Overall, the LIFT averaged 12 minutes late for pick-up for the day.

In 1978 (see Figure 6-6), the average number of minutes late peaked again around the 8 to 10 AM time-period, when the LIFT averaged between 5 and 15 minutes late for pick-up. Similar to the experience in 1977, lateness then decreased around 11 AM and peaked again in the early afternoon, rising to over 20 minutes late in the late afternoon.

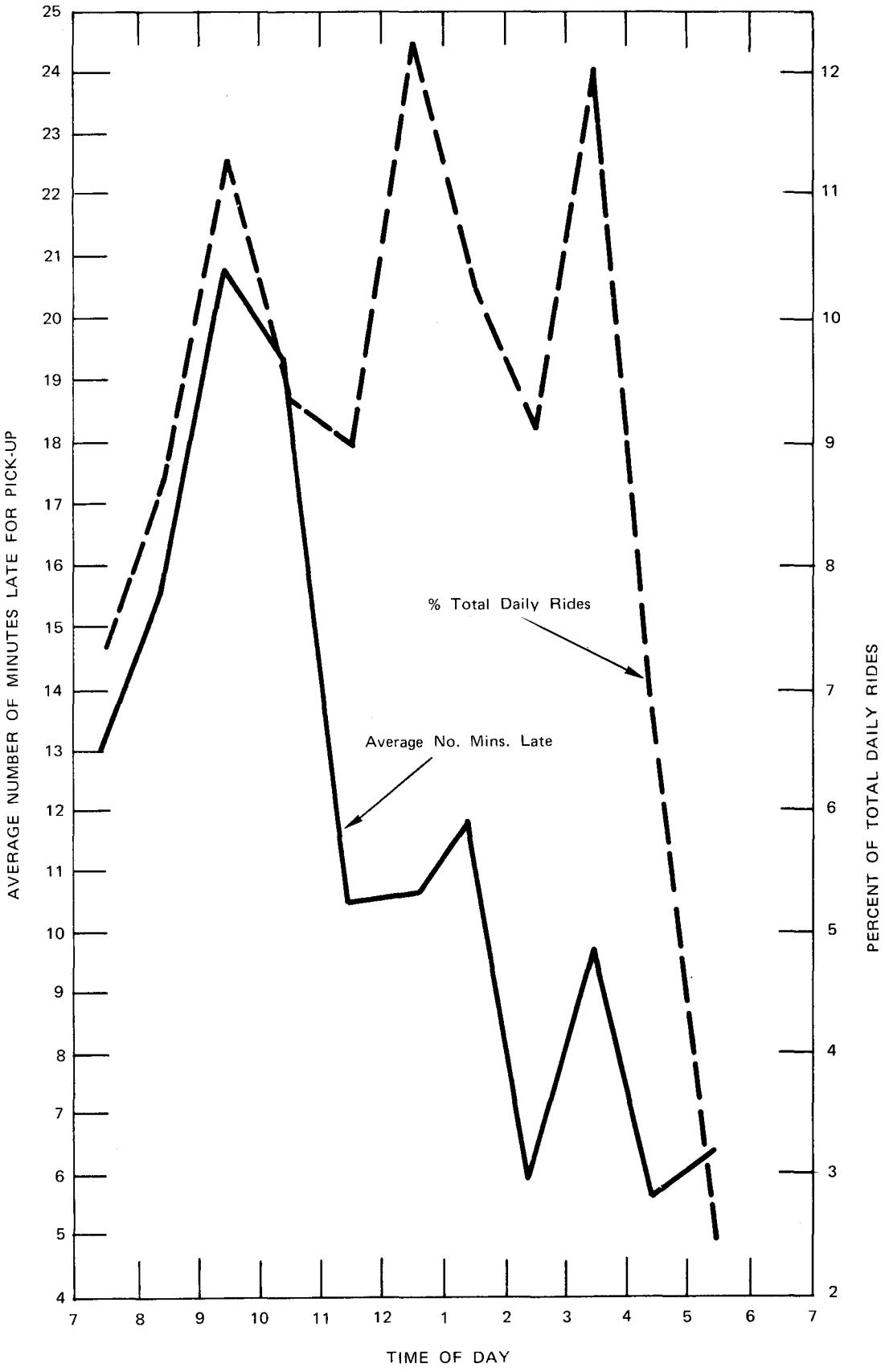

FIGURE 6-5. LIFT RELIABILITY BY TIME OF DAY COMPARED WITH DEMAND, 1977

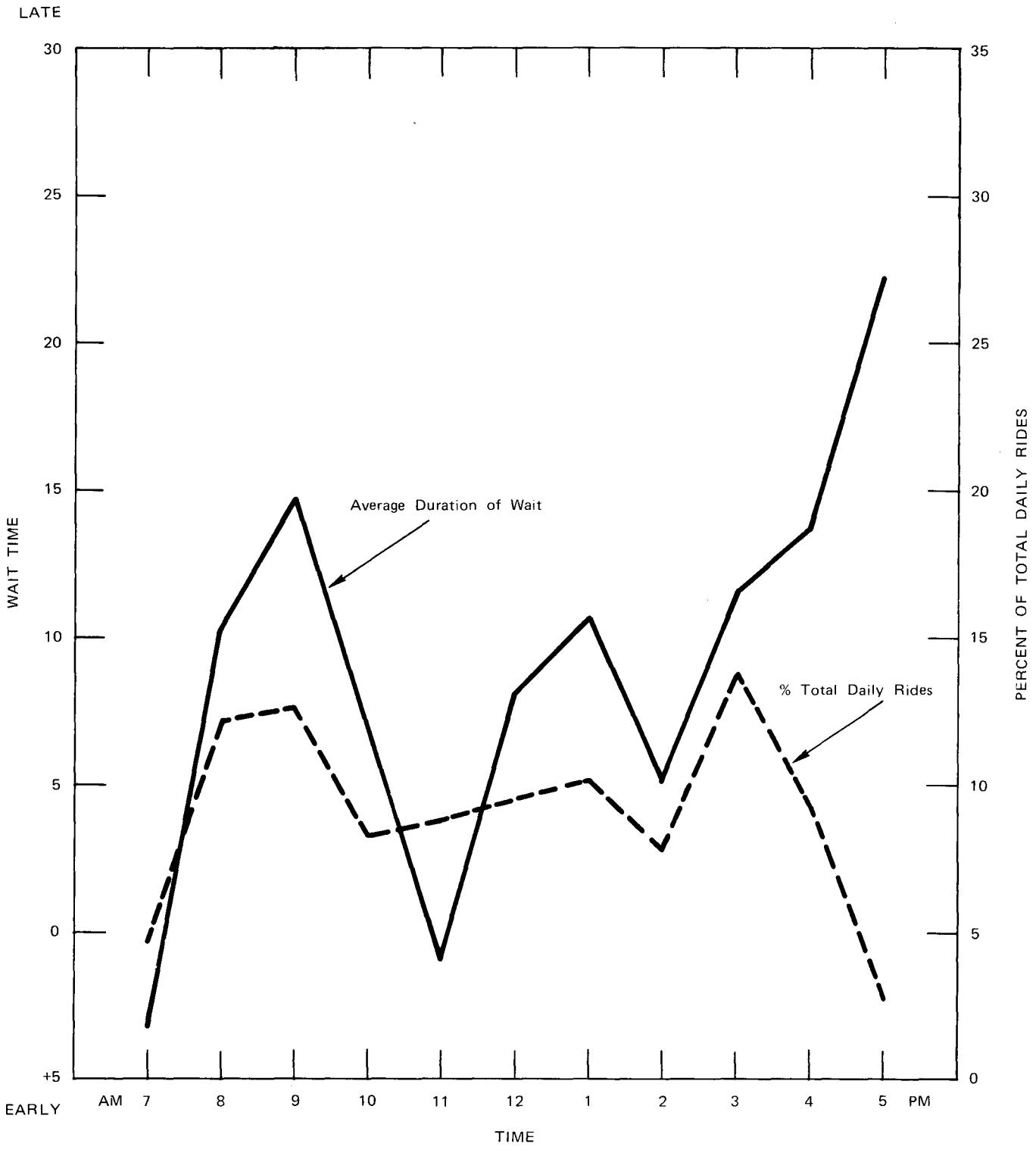

FIGURE 6-6. LIFT RELIABILITY BY TIME OF DAY COMPARED WITH DEMAND, 1978

The line indicating "% of Total Daily Rides" indicates that surges in lateness closely coincided with the percent of total daily rides for both years. In 1977, the overall relationship between reliability and demand was not a close one after 11 AM. This was due to the increased number of vehicles available after this time-period. The higher coverage to demand ratio, then, or the improvement in reliability after the first three hours of service was undoubtedly explained by the larger number of vehicles in service per unit of demand.

In 1978, the wait times more closely coincided with demand times than in 1977. This closer relationship reflects more accurate matching of service hours to demand in the second year. With the ratio of service hours to demand constant, there is relatively little slack in the system to accommodate surges in demand; trips which exceed system capacity are therefore delayed. The exception to the close matching of demand and lateness occurred late in the day when the number of vehicles in service decreased with respect to demand and when the unscheduled "return" trips occurred. Figure 6-7, which compares wait time with coverage, illustrates this point.

Figure 6-8 compares LIFT on-time performance in 1977 and 1978. The figure indicates, as stated earlier, that the LIFT was on average 12.6 minutes late for pick-up in 1977 and that this was reduced to 8.9 minutes late in 1978. Notice that the distributions indicate that this apparent improvement in performance was achieved primarily through reducing the percentage of trips that were more than 40 minutes late. Also, 1978 results show a higher percentage of early pick-ups, which reduces average lateness. This improvement in average lateness during the second year is probably TriMet's reaction to the agency complaints about extreme lateness in delivery in 1977. The shift changes that occurred in 1978 (more capacity in the AM hours) were designed to improve delivery times for morning trips. The result of this activity is that many more trips were delivered well ahead of time in order to avoid lateness.

The data show that the LIFT continued to improve reliability as the project progressed. The mean wait time decreased

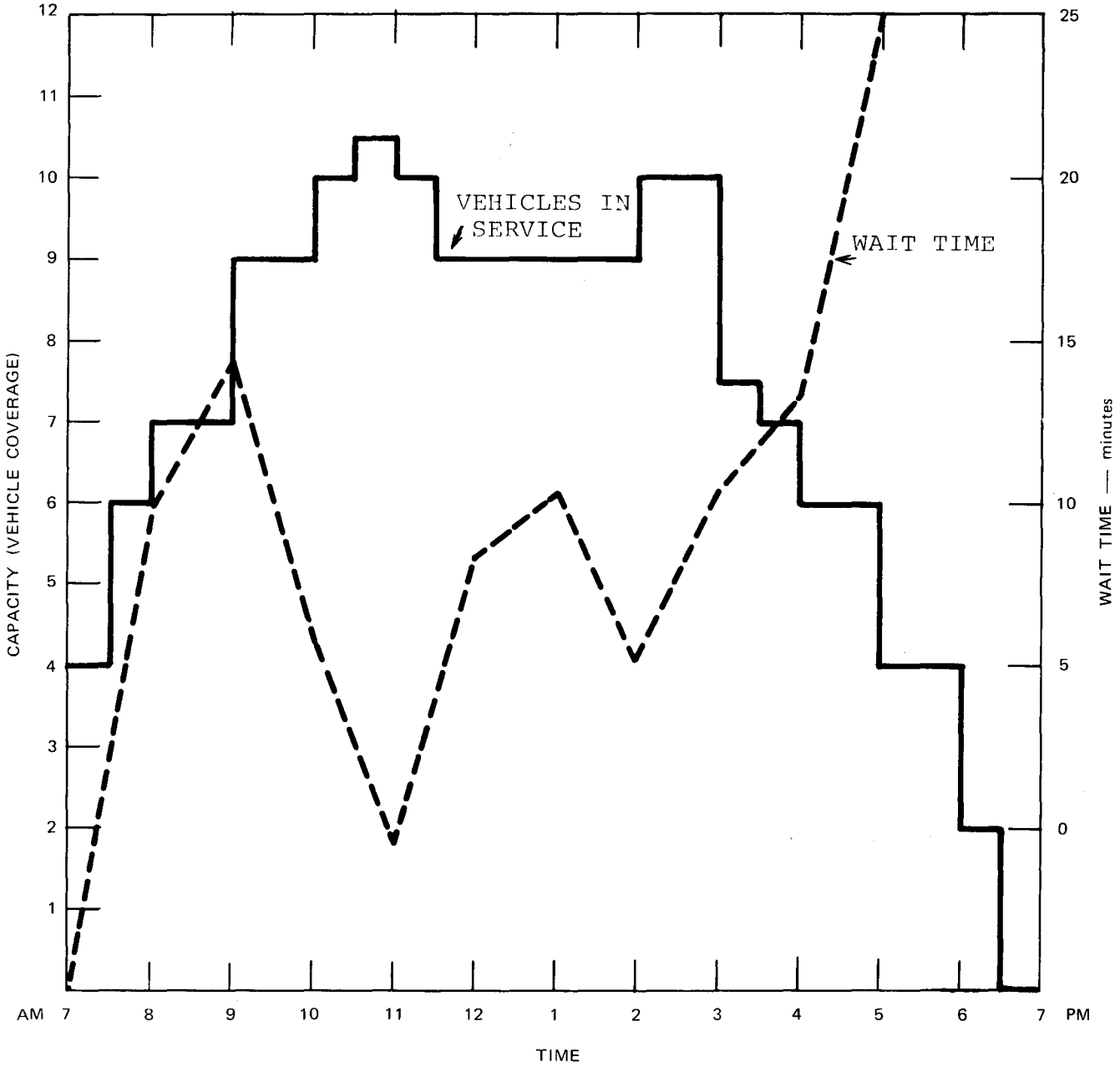

FIGURE 6-7. VEHICLE COVERAGE COMPARED WITH WAIT TIME BY HOUR OF DAY

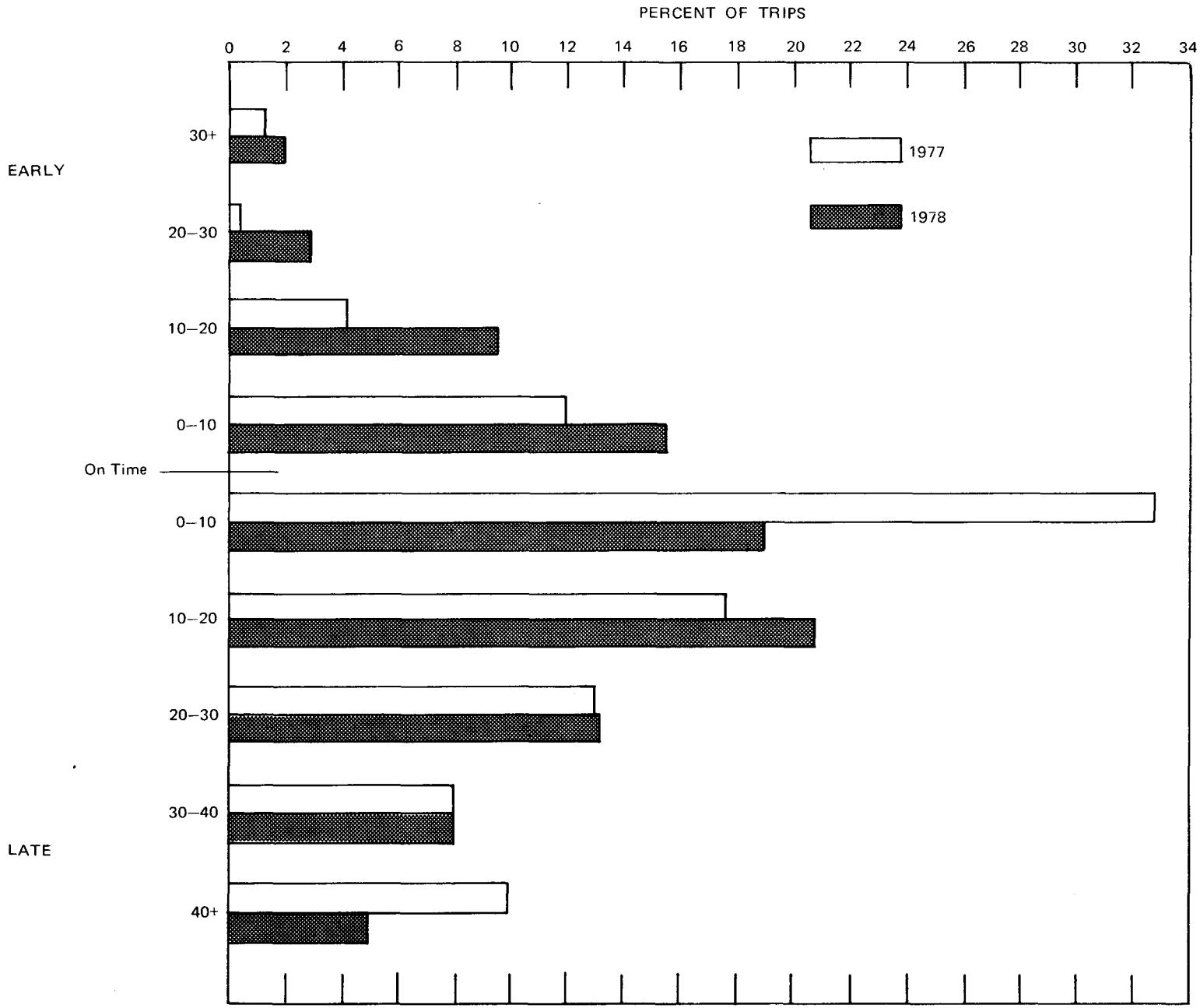

FIGURE 6-8. LIFT RELIABILITY

from an average of 9.6 minutes for April and May 1978 to an average of 7.6 minutes in September. The major reason for this average decrease was that extremely long wait times were reduced. No average wait time for any hour in the day in September exceeded 16.53 minutes, whereas in April and May the hour of 5-6 PM averaged 30.17 minutes late.

The reader should keep in mind that, while pick-up times seem poor, the LIFT controllers were also aware of delivery times, and it is these delivery times which controllers focused on in the dispatch process. The information that exists suggests that the LIFT has a much better performance with respect to delivery. In 1977, the mean delivery time was 8 minutes early, although 13% of all trips were more than 20 minutes late. Similar delivery results were reported in 1978.

The conclusion suggested by LIFT performance with respect to pick-up and delivery schedules is that there is a significant amount of slack in the scheduling process, i.e., controllers schedule pick-ups well in advance of the client's appointment, work, or meeting time so that he or she will not be late. This slack, however, means that the passenger must devote a larger portion of his or her time to travel because of the uncertainty about pick-ups and delivery.

In summary, the LIFT's reliability has not been outstanding, but it has improved steadily. Deliveries are, on average, closer to target, but the slack time between requested pick-up and actual delivery indicates that the traveler must devote a significant amount of his or her time waiting for the LIFT to pick him/her up and actually making the trip.

6.7.2 Trip Time and Travel Speed

Figure 6-9 compares trip times between 1977 and 1978. The 1978 trip was, on average, longer due to the higher percentage of trips greater than 30 minutes. Average trip time in 1977 was 22 minutes compared with a 28-minute figure for

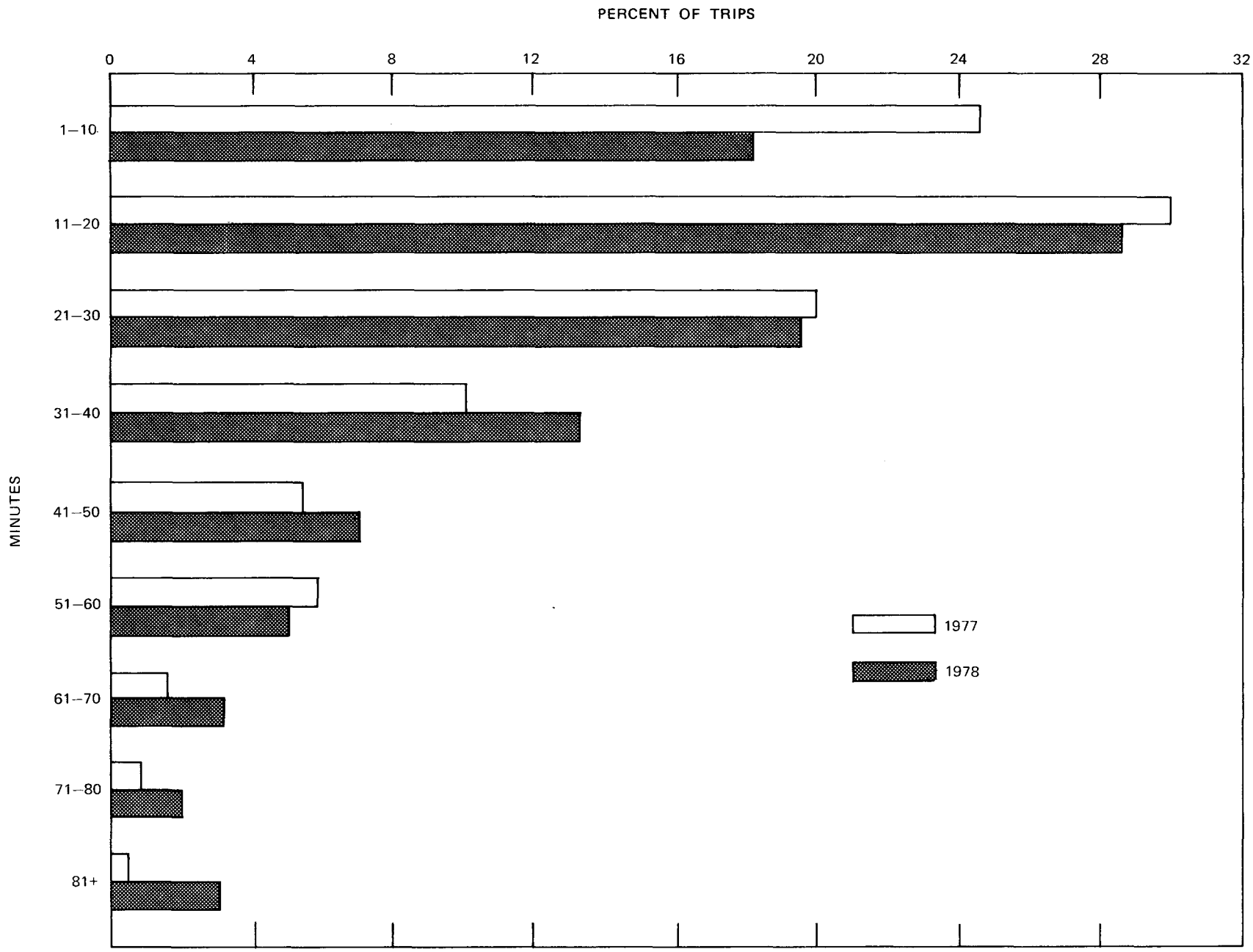

FIGURE 6-9. DISTRIBUTION OF TRIP TIMES

1978. Trip times ranged widely around this mean. In both years, about one-fourth of all trips were longer than 40 minutes.

Figure 6-10 indicates a relationship between level of demand and trip time. This relationship would be expected: the busier the buses, the higher the load factor and the greater the likelihood that the bus must deviate to drop off other riders on a tour before delivering the last person.

From a random sampling of LIFT origins and destinations in October 1977, it was found that the trip time in miles was about 4.3 miles if a traveler were driving. Therefore, effective travel speed from origin to destination in 1977 was 11.7 miles per hour; in 1978, the figure dropped to 9.2 miles per hour (assuming a similar trip length). The LIFT, of course, deviates from its course to pick up and drop off other passengers, so it actually covers much more than the 4.3 miles calculated between origins and destinations. Nevertheless, the effective travel speed figures are mentioned here so that the reader can compare them with the taxi and private automobile, which would average about 20 mph. The LIFT is roughly half as fast as personalized taxi, auto, or wheelchair van transportation. The length of the LIFT trip did not change much between 1977 and 1978.

Taxi trips were slightly longer than LIFT bus trips--about five miles per trip.

6.8 CLIENT ASSESSMENT OF LIFT SERVICE

6.8.1 Assessment of LIFT Bus Features

In the five on-board surveys, LIFT passengers were asked to rate 11 features of LIFT service. Table 6-3 shows the results of the surveys and compares the ratings by first and second year of operation.

LIFT clients sampled during the five surveys are nearly unanimous in their satisfaction with the mechanics of boarding the LIFT bus and using their Special Needs Bus Passes,

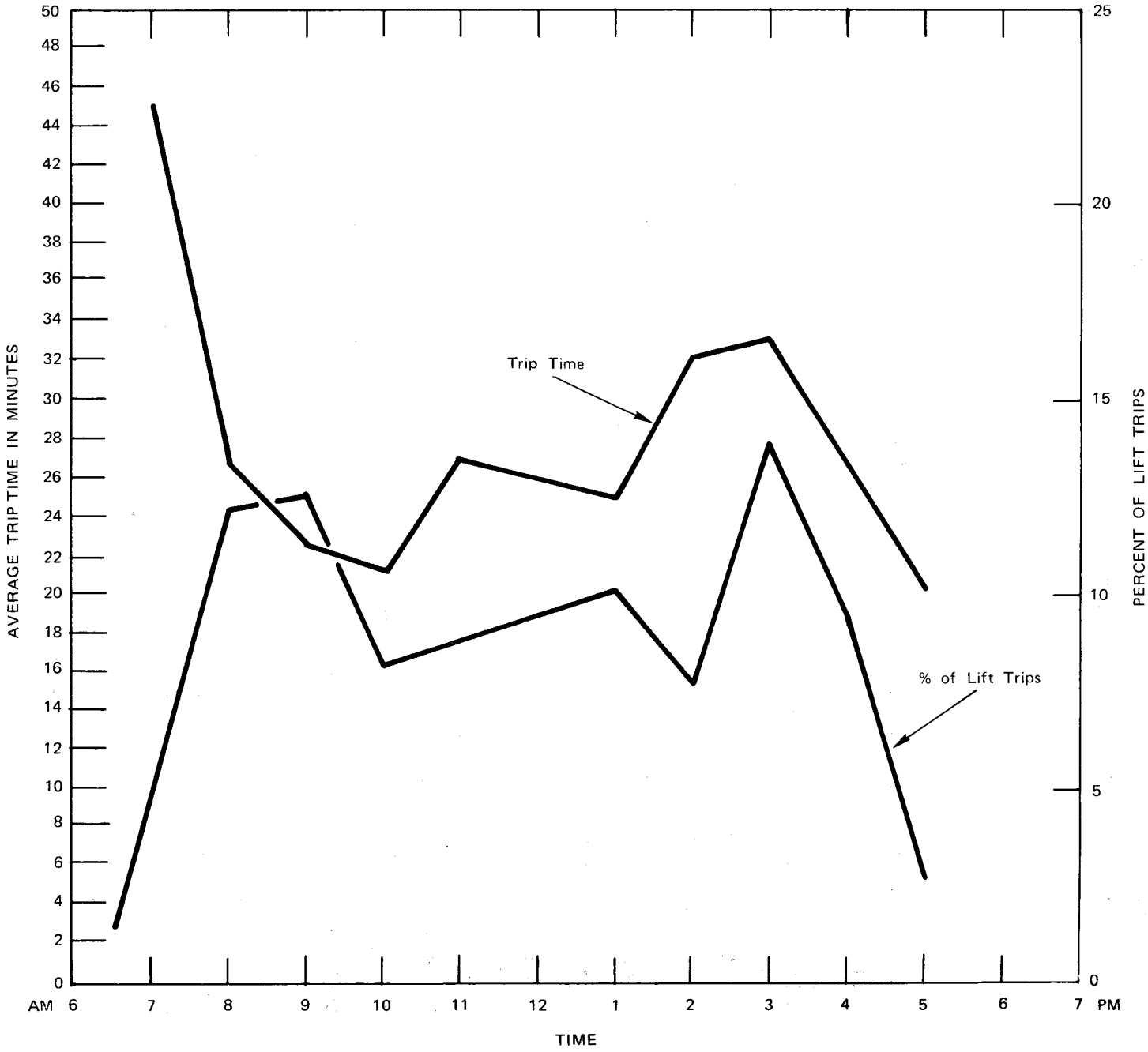

FIGURE 6-10. TRIP TIME COMPARED WITH DEMAND BY TIME OF DAY

with the courtesy and helpfulness of LIFT drivers, and with the experience of riding with strangers. Ratings concerned with scheduling a trip on the LIFT are somewhat less positive; however, over four-fifths of LIFT clients consider these procedures satisfactory.

TABLE 6-3.

CLIENT SATISFACTION

Feature	% Users Rating LIFT Service Features as "Satisfactory"	
	First Year	Second Year
Calling in advance for a ride	84	82
Planning your trip time to fit when a bus can come for you	85	83
Getting picked up on time	77	79
Getting up onto the bus	96	98
Using your Special Needs Bus Pass	97	99
Courtesy and helpfulness of the drivers	98	99
Riding on the bus with people you don't know	97	99
Comfort of the ride	76	75
Noise level on bus	51	57
Length of time you spend on the bus	95	90
Waiting time for return trip	78	76

The data show little variation over the two-year period in the rating of the timeliness of LIFT service. However, there has actually been a good deal of variation in these trends. Client satisfaction with the timeliness of the bus, whether being picked up at their home or on the return trip, was at an all-time high (88%) during the first on-board survey. Part of this decrease may have been attributable to a

change in the question format;* however, the enrollment of general passengers and the steadily increasing usage of the LIFT are also likely to account for timing problems which were not as prominent at the time of the first on-board survey. By the fourth survey, a little over three-fourths (76%) of the clients expressed satisfaction with this aspect of the service; by the fifth survey 79% were satisfied. This positive trend indicates that timing problems may be on the decline; however, this feature of LIFT service receives the most negative comments in open-ended interviews with LIFT riders and social service agency personnel. (This problem will be discussed further within this Section.)

Client dissatisfaction with the comfort and noise level of the ride has remained at approximately the same level throughout the five surveys. The seats immediately behind the driver face the aisle rather than the front of the bus; thus, some clients find it hard to brace themselves in their seats as the bus rounds a corner. The bumpiness of the ride is also frequently mentioned. Almost half of the passengers complain about the noise level of the buses; this feature draws criticism from LIFT drivers as well. However, in the last on-board survey (October 1978), 64% of those sampled gave the noise level a satisfactory rating. This higher rating was probably the result of a recent (at that time) tune-up of all LIFT engines and also due to the fact that the LIFT maintenance crew has become increasingly adept, over the two-year period, in working with the once-unfamiliar German engines. Finally, as people became more accustomed to the problems associated with riding on the LIFT, their tolerance for these problems may have increased.

*In the first survey, clients were asked to rate each feature as being "Satisfactory" or "Unsatisfactory"; for the subsequent surveys, this question format was changed to "Satisfactory" or "Needs Improvement" in an attempt to overcome client's reluctance to make negative comments about a service they clearly appreciate.

Clients were also asked an open-ended question regarding the features they most liked or disliked. The door-to-door service furnished by the LIFT and the courtesy and helpfulness of the drivers were features most often cited by clients. The drivers, in particular, received high praise, eliciting such comments as "The best drivers in the world" and "You can't beat the drivers; they are very kind and patient." The low cost of LIFT service and the sense of independence it promotes were also mentioned. The lateness of the LIFT buses, especially for return trips, was the negative feature most often mentioned by clients. The length and bumpiness of the ride, the lack of sufficient handles or supports, and the noise level were also cited fairly frequently.

6.8.2 Service Changes That Could Increase Ridership

In all surveys, clients were asked if they would make more trips on the LIFT given a series of hypothetical situations (e.g., "Would you make more trips on the LIFT if you didn't have to call for service so far ahead of time?"). Table 6-4 shows those responses which are in the domain of Tri-Met to accommodate.

TABLE 6-4.

CHANGED SERVICE CONDITIONS
THAT COULD LEAD TO INCREASED LIFT RIDERSHIP

Condition	% Saying They Would Ride More Often	
	First Year	Second Year
Service ran Saturdays	50	43
Service ran Sundays	45	34
Service ran later in the day	30	29
Client didn't have to call for service so far in advance	45	39*
There was better information on service	31	4

*The advance notice required was reduced from 48 hours to 24 hours in the second year of the demonstration.

In general, the largest proportions of passengers said they would make more LIFT trips if the service ran on Saturdays and Sundays, and if they did not have to schedule their rides so far in advance. The significant drop in those who felt that better information on service would increase their riding indicates that LIFT and agency personnel are communicating well with their clients regarding LIFT service.

However, these data should be interpreted with caution. If the respondents have commented favorably on the service (as most did), then they may have said that they would ride more often in order to be consistent with their previous responses. Furthermore, peoples' responses regarding their intended future behavior are not always reliable predictors of their actual behavior. Therefore, the figures probably overstate the increase in ridership that would result from a changed condition. However, they do show several areas where changes could lead to increased ridership.

6.8.3 Client Evaluation of Taxi Service Furnished by the LIFT

In certain instances, as when a LIFT's client pick-up point and destination cannot be readily integrated into LIFT bus schedules, Tri-Met contracts for taxi service for the client. (This procedure is discussed in greater detail in Section 8.4.2). During the demonstration, two one-hundred person surveys of clients who had ridden in a LIFT-sponsored taxi were conducted, one survey during the first year of operation, the latter survey at the end of the second year. Clients were interviewed within one or two days of the date of their taxi trip. Overall, taxi riders were quite pleased with the taxi service they had received, as Table 6-5 shows.

The table shows that client satisfaction increased during the second year in all categories but comfort of the ride. The second-year responses may be somewhat inflated due to the fact that the survey was conducted the week LIFT

service was resumed after having been closed down for a week* due to stormy weather. It may be possible that the sampled riders were so appreciative of having service resumed they were less objective than they might be ordinarily.

TABLE 6-5.

TAXI RIDER SATISFACTION

Feature	% Riders Rating Taxi Service Features As "Satisfactory"	
	First Year	Second Year
1. Calling in advance for a ride	85	99
2. Getting picked up on time	80	91
3. Getting into the taxi	88	90
4. Courtesy and helpfulness of drivers	81	88
5. Comfort of the ride	96	95
6. Waiting time for return trip	71	76

6.8.4 Comparison of Taxi Rider and LIFT Rider Satisfaction

A comparison of taxi-rider satisfaction and LIFT-rider satisfaction (Tables 6-3 and 6-5) shows that:

1. Taxis score significantly higher than the LIFT on the comfort of the ride,
2. The LIFT received significantly higher ratings on driver courtesy and helpfulness, and on ease of entering the vehicle, and
3. During the first year, the two modes received similar evaluations on calling in advance for the ride, getting picked up on time, and waiting to be picked up for the return trip. By the end of the second

*January 8-12, 1979.

year, taxi clients gave significantly higher ratings to the timeliness of the pick-up and the need to call in advance for the ride.

It should be noted that some of those who complained of the difficulty in entering the taxi use wheelchairs; these people expressed a clear preference for the LIFT, which does not require them to transfer into and out of their wheelchairs. Others who preferred the LIFT for these reasons complained that the taxi drivers did not provide adequate assistance from the curb into the taxi. To some extent, then, client perceptions of the ease of entering the vehicle are reflected in their evaluations of driver courtesy and helpfulness.

The third finding, as it pertains to the need to preschedule trips, is difficult to interpret. All clients call Tri-Met to schedule a trip and, after the trip purpose has been completed, notify Tri-Met that they are ready to be picked up for the return trip home. This procedure is followed regardless of whether the client is to be picked up by the LIFT bus or by a LIFT-sponsored taxi. Therefore, since the client may not call directly for taxi service, it is not clear why, in the second year, taxi riders are significantly more pleased with the need to preschedule their trip than are LIFT bus riders.

When asked to compare the experience of taking the taxi provided by Tri-Met with the experience of riding the LIFT bus, the taxi riders surveyed responded as follows:

1. The largest group preferred taxis to the LIFT buses. Of these, many cited the punctuality, reliability, and shorter travel time of taxis; others talked in terms of comfort of the ride, maintaining that taxis are less noisy and bumpy than the LIFT.

2. The next largest group had no preference. Most of these people were quite emphatic in expressing strong appreciation for both services. Some talked in terms of a trade-off; for example, "The taxi is more comfortable, but the LIFT drivers are pleasanter than the taxi drivers." A few clients were critical of both modes.
3. A third group preferred the LIFT buses to the taxis. Some of these clients used wheelchairs and, as noted earlier, found it difficult to transfer from the wheelchair to the taxi seat. The rest preferred the LIFT because of the drivers, who were perceived as friendlier, more courteous, and more helpful with escort and packages than the taxi drivers. Many clients commented that LIFT drivers "understand the needs of the handicapped better."

In sum, LIFT clients appear to be favorably disposed toward taxis as a means of transportation. If the taxi drivers were as consistently pleasant and helpful in providing escort assistance as the LIFT drivers appear to be, the level of satisfaction exhibited by taxi riders would probably be even higher.

6.9 COMPARISON OF LIFT AND TAXI SERVICE

The following discussion delineates comparative service aspects of the LIFT bus and privately owned taxicabs for the special needs transportation market. The purpose of this analysis is to (1) provide a benchmark for assessing LIFT service performance during the first year of the demonstration and (2) provide transportation policy makers and planners with information that is useful in assessing the available special transportation options.

Scheduling for LIFT buses and taxis was handled by the LIFT control room; thus, there is no difference between the scheduling convenience afforded LIFT and taxicab riders. However, the clients must often modify their trip times to meet the LIFT's scheduling requirements, whereas taxicabs, for the most part, will agree to make pick-ups at any time the client wants. Therefore, the taxicab is potentially superior to the LIFT in terms of affording the client more scheduling flexibility.

Consumer prices for taxicab and LIFT bus in the SNT system are identical. However, the average total cost of providing a trip on the LIFT, including the cost to all levels of government, is higher on the LIFT than on taxicabs. This is discussed more fully in Chapter 7.

Level-of-service comparisons between the taxicab and LIFT buses are difficult because the LIFT is an advance reservation service and taxicabs are typically demand-responsive. Within the SNT system where both taxicabs and LIFT buses are advance reservation service; however, comments from riders who are familiar with both modes suggest that taxis are more reliable in terms of picking up people on time.

Travel time for the two modes also differs significantly. Average travel time on the LIFT was about 22 minutes per trip in 1977. Although there are no comparable taxi travel times, if we assume a 20 mph average speed and an average trip length of 4.3 miles (the average distance between origins and destinations on the LIFT, without deviations to pick up other passengers), then the average taxi travel time would be about 13 minutes for the same trip. For an average trip of slightly over four miles, the taxi would take about 9 minutes less travel time.

A comparison of client perception of LIFT and taxicab features showed that clients felt that the taxicab offered a more comfortable ride. The LIFT was preferred in terms of ease of entering vehicle and driver helpfulness and courtesy.

7. LIFT SYSTEM ECONOMICS AND OPERATING PERFORMANCE

7.1 INTRODUCTION

This chapter reports on the efficiency of LIFT operations by presenting and analyzing cost, revenue, and operating data during the two-year demonstration period. These results are then compared with data on the system of social service agency transportation programs, which the LIFT supplanted, and with taxi costs. Throughout this section, the analysis will show the dynamics underlying cost, revenue, and operating figures. Cost figures for LIFT buses and supplemental taxi service are supplied separately.

Two sets of operating cost figures are developed for the LIFT, one that includes finance and depreciation charges and one that does not. Those figures which include the finance and depreciation charges may be more useful to other cities planning to provide special needs transportation service and needing to compare the total costs of alternative plans.

7.2 COST DERIVATIONS

7.2.1 LIFT Cost

Table 7-1 shows LIFT operating costs for the months of September through November 1977 and the same time period in 1978. The fall time period was selected because it is representative of LIFT performance for the year. The three-month span was chosen in order to smooth out month-to-month fluctuations in operating statistics that occur due to internal Tri-Met accounting policies and procedures. During the three-month period in 1977, 12 buses were employed and driven 73,582 miles; in 1978, 11 buses were driven 61,172 miles during this same three-month period. The

TABLE 7-1. LIFT SYSTEM COSTS

OPERATING COSTS		Sept.-Nov. 1977	Sept.-Nov. 1978
1. Tri-Met' reported operating costs: Sept.-Nov.		$131,719	$125,128
2. Additions made in the evaluation to reflect costs not accounted for in 1. above			
a. Rental space for bus parking and maintenance	$4,500		
b. Insurance @ $1000/operating vehicle/year	3,000		
c. Tri-Met overhead	1,500		
d. Maintenance labor	1,000	10,000	10,000
3. Total Operating Cost		$141,719	$135,128
ADDITIONAL COSTS			
4. Depreciation			
a. 15 buses @ $50,000. $750,000 straight line over 16.7 years (200 months)	11,250		
b. Radio equipment @ $25,000 straight line over 8.3 years (100 months)	750	12,000	12,000
5. Finance charge			
$662,500 capital cost at 10%/year		16,500	16,500
6. Total LIFT Cost		$170,219	$163,628
COSTS PER PASSENGER TRIP			
Operating Cost		$7.97[a]	$7.31[b]
Total LIFT Cost		$9.57[a]	$8.86[b]
Taxi Costs		$5.70[c]	$5.64[d]

[a] For 17,786 trips for the September-November, 1977 period.

[b] For 18,478 trips for the September-November, 1978 period.

[c] For 2,547 trips at a total cost of $14,511 during the September-November, 1977 period.

[d] For 5,155 trips at a total cost of $29,077 during the September-November, 1978 period.

decrease in buses in service in 1978 was due to budgetary cutbacks within Tri-Met; the significant decrease in bus miles was due to the decrease in buses in service and curtailment of overtime for drivers.

As Table 7-1 shows, the operating cost data from Tri-Met's accounting reports have been adjusted slightly upwards to reflect more realistic figures which include costs for property rental, insurance, administrative overhead in connection with personnel and billing, and maintenance labor. These adjustments add $10,000 to the Tri-Met reported operating costs. In addition, $12,000 in depreciation charges have been added to operating costs to derive total cost figures. This figure is based on $650,000 of capital expenses for 15 buses or $50,000 per bus. This $50,000 figure is the sum of an initial cost of $42,500 per bus plus an estimated $7,500 one-time overhaul during the 200-month useful life of the bus. Straight line depreciation is assumed for simplicity. Depreciation on the radio equipment is based upon an assumed useful life of 100 months, and amounts to $700 for the three-month period.

Finally, to account completely for all charges involved in providing a LIFT trip, a 10% interest expense has been added on the $662,500 capital cost ($42,500 per bus for 15 buses plus $25,500 for all radios). This amounts to $16,500 per three-month period.

The figures in Table 7-1 show that total LIFT operating costs per trip decreased slightly during the second year. The slightly lower figure in 1978 is due to increased efficiency and productivity which more than compensated for the 8% increase in labor costs during the intervening year. (The increased efficiency is discussed later in this chapter.) Estimated capital costs and finance charges added an average of $1.60 to trip costs in 1977 and $1.54 in 1978. These non-operating expenses amounted to about 15% of the total LIFT cost during the periods examined.

7.2.2 Taxi Cost

An important component of the Portland Special Needs Transportation (SNT) service is the trips provided by LIFT-sponsored taxis. Tri-Met has contracted with the two major local taxi operators and an ambulance company to provide service for LIFT clients whose trip origins and/or destinations cannot be easily integrated into normal LIFT bus routes. In 1978, the amount of taxi service utilized in Tri-Met SNT service doubled and, consequently, dispatch personnel diverted to taxis many of the trips the buses would normally have serviced.

As shown in Table 7-1, per trip costs for SNT taxi trips were $5.70 for the 1977 three-month period and $5.64 for 1978. Average taxi trip lengths for the two periods can be calculated from the average fare figures. (The cab companies charge $1.00 per flag drop and 90¢/mile.) Thus average mileage per cab trip was about 5.2 miles in the 1977 three-month period and about the same in 1978.

The comparative LIFT and taxi trip costs in Table 7-1 show that in 1977 the LIFT cost about $3.90 per trip more than the privately-provided trip. This difference is somewhat misleading because the LIFT carries about 18% wheelchair trips, which are more time-consuming and consequently more expensive to accommodate. In order to compare the private sector and LIFT service costs, 18% of the cost for private sector trips must be computed at a higher rate. Experience with the ambulance company during the first year of the demonstration revealed that wheelchair trips on the private transportation market cost about $13.00 for a 5-mile trip -- $10 per trip plus 60¢ per mile. Private trip costs can be computed by multiplying the percentage of non-wheelchair passengers (82%) by the taxi cost and the percentage of wheelchair passengers (18%) by the wheelchair van cost.

Private trip costs can be computed as follows:

Private sector trip cost = (% wheelchair passengers x private sector wheelchair trip cost + % regular passengers x taxicab trip cost)

= (.18 x $13.) + (.82 x $5.64)

= $6.96

Thus, the true difference between private sector and LIFT trip costs in 1978 was $1.90 per trip. This $1.90 differential is 70¢ less than the differential that existed in 1977 due to the improved efficiency of LIFT operations in 1978.

7.3 OPERATING COST BREAKDOWN

Table 7-2 portrays LIFT operating cost per trip by cost category for the months of September through November 1978. The figures show that $6.36 or 86% of the operating cost of a trip is labor with the balance of the costs divided between fuel, maintenance, insurance, rental and others. Labor costs include non-wage benefits, 1/4 or $1.48, and salary, 3/4 or $4.88. The operator's salary and benefits amount to over 1/2 the cost of a LIFT trip; fully loaded controller costs total over $1.00 per passenger trip.

Table 7-3 adds the per trip depreciation and finance charges to the figures in Table 7-2, thereby showing that at current operating levels capital costs amount to about 17% of total trip costs, or $1.55 per trip.

TABLE 7-2.

BREAKDOWN OF LIFT OPERATING COST

	Percent of Trip Cost		Dollar Cost Per Trip	
1. DIRECT LABOR				
Operators	43%		$3.17	
Controllers	13%		.93	
Administration	6%		.45	
Other	5%		.33	
		67%		$4.88
2. PAYROLL BURDEN				
Taxes	4%		.28	
Pension	1%		.08	
Insurance	7%		.49	
Workers Comp.	9%	21%	.63	$1.48
3. MATERIALS & SERVICES				
Repairs and maintenance	3%		.19	
Fuel	2%		.13	
Rental of facilities	3%		.24	
Insurance	2%		.16	
Telephone	1%		.04	
Other	3%	14%	.19	$.95
TOTAL		102%*		$7.31

*Percentages do not add to 100% due to rounding.

TABLE 7-3.

BREAKDOWN OF TOTAL LIFT COSTS

	Percent of Trip Cost		Dollar Cost Per Trip	
1. DIRECT LABOR				
Operators	36%		$3.17	
Controllers	10%		.93	
Administration	5%		.45	
Other	4%	55%	.33	$4.88
2. PAYROLL BURDEN				
Taxes	3%		.28	
Pension	1%		.08	
Insurance	6%		.49	
Workers compensation	7%	17%	.63	$1.48
3. MATERIALS AND SERVICES				
Repairs and maintenance	2%		.19	
Fuel	1%		.13	
Rental of facilities	3%		.24	
Insurance	2%		.16	
Telephone	1%		.04	
Other	2%	11%	.19	$.95
4. CAPITAL COSTS				
Depreciation	7%		.65	
Finance charges	10%	17%	.90	$1.55
		100%		$8.86

7.4 TIME-SERIES OPERATING DATA

7.4.1 LIFT Trip Costs

Table 7-4 indicates that LIFT ridership rose rather steadily during the demonstration until the third quarter of 1978 when driver cutbacks decreased service capacity. The figures in the table indicate that despite an 8% wage hike in 1978, average trip costs declined from almost $13.00 in the first three months of operation to $7.33 per trip in the last quarter of 1978. The decline in operating costs can be attributed to several factors, including: (1) the relatively fixed nature of the administrative and controller costs, (2) the absence of early training and start-up costs, (3) increased efficiency, particularly in the second year of operations when there were fewer drivers and controllers and more passengers.

Initially, the LIFT required six to eight buses and LIFT drivers to cover the 93 square mile area, even though the demand did not warrant that number of vehicles. The high start-up costs were also due to the usual front-end training costs (primarily labor hours) as well as a higher than average number of driver, dispatch, and agency scheduling errors, due to lack of experience with the system. These start-up costs have disappeared as operating personnel have gained more experience with the system. Also, as the demonstration progressed the administrative and dispatch costs were spread over a higher volume of trips, thereby reducing their contribution to individual trip costs.

In the second year, after an operations review by DAVE Systems, several operational and scheduling improvements were implemented (see Section 7.5) and the controller staff was decreased from five to four. Also, the number of LIFT drivers declined from twelve to eleven in the second year and top management decided to cut back on overtime in the last half of 1978.

TABLE 7-4.

LIFT COST AND OPERATING STATISTICS, BY QUARTER

	1977				1978			
	Dec-Mar	Apr-Jun	July-Sept	Oct-Dec	Jan-Mar	Apr-Jun	July-Sept	Oct-Dec
Trips	10,733	13,301	17,052	17,961	19,029	19,377	18,001	18,135
Vehicle Miles	51,785	56,550	68,284	71,417	75,248	77,853	67,820	59,768
Vehicle Hours	5,564	5,162	5,613	6,052	6,212	6,277	5,587	5,468
Total Cost ($)	138,838	130,913	129,999	143,970	158,996	155,461	131,759	132,948
Cost per Trip ($)	12.94	9.84	7.62	8.02	8.36	8.02	7.32	7.33
Cost per Vehicle Mile ($)	2.68	2.31	1.90	2.02	2.11	2.00	1.94	2.22
Cost Per Vehicle Hour ($)	24.95	25.36	23.16	23.79	25.59	24.77	23.58	24.31
Passengers Per Vehicle Hour	1.9	2.6	3.0	3.0	3.1	3.1	3.2	3.3
Miles Per Passenger Trip	4.8	4.3	4.0	4.0	4.0	4.0	3.8	3.3
Vehicle Miles/ Vehicle Hours	9.3	11.0	12.2	11.8	12.1	12.4	12.1	10.9

7.4.2 Cost per Vehicle Mile

Cost per vehicle mile has likewise declined from $2.68 per mile in the first quarter of 1977 to $2.22 in the last quarter of 1978. The cost decline is due to the increase in the vehicle miles of service delivered between start of operations and the final quarter and the slight decrease in total cost of LIFT service.

7.4.3 Cost per Vehicle Hour

Cost per vehicle hour, which is primarily a function of labor, has remained fairly stable during the demonstration at $23 to $25. Since the higher number of vehicle hours in a quarter generally means more overtime, the costs per vehicle hour have tended to be higher in those quarters with higher numbers of hours, except in the early period quarters when the ratio of vehicle hours to total driver hours was lower due to start-up dead time. Increasing wage rates have tended to raise the cost per vehicle hour over the course of the project.

7.4.4 Cost per Passenger Mile

A sample of LIFT trips conducted in early 1978 showed that the average length of a LIFT trip was 4.3 miles (direct origin to destination travel distance, not including detours). Based upon these data, the 18,135 trips delivered between October and December 1978 covered 77,981 passenger miles at a cost of $132,948 or about $1.70 per passenger mile.

7.4.5 Vehicle Utilization (Passengers/Hour)

Table 7-4 illustrates productivity (passengers transported per vehicle hour) over the two-year demonstration period. These data indicate that productivity climbed steadily. Early increases were due to growing demand and hence less idle time; later increases were due to improved operating efficiency.

This productivity is considered low for demand-responsive transportation, which typically averages between five and ten passengers per vehicle hour. However, the reader should keep in mind that LIFT clients not only require more assistance in boarding and unboarding (particularly wheelchair passengers), but are also less likely to be ready at pick-up times than passengers of many demand systems. Also, the drivers must drive more slowly for the more infirm clients than they would for fully able-bodied persons.

The size and land characteristics of Portland make it difficult to maintain high productivity. The 11 LIFT buses are spread over 93 square miles for a coverage ratio of one bus for every eight square miles. By contrast, taxis have a coverage ratio of one cab per square mile. Because of the high coverage ratio, LIFT buses must spend large portions of time deadheading to pick up passengers; consequently productivity is lowered. Also, the hilly terrain and the widely dispersed trip origins and destinations lower travel speeds and lengthen trip times.

Furthermore, characteristics of the trips delivered tend to lower productivity. About 50% of the trips delivered have been many-to-many medical trips whereas the expected high number of subscription shopping and recreational tours did not materialize. Furthermore, the average trip length, between four and five miles, is much longer than had been anticipated.

Finally, in the first year there was an oversupply of vehicles at certain times of the day and days of the week. Therefore, some vehicles were idle at times, and the ratio of passengers to vehicle hours was depressed. Management tightened this slack in the second year and, consequently, productivity rose.

7.5 EXPLANATION OF HIGH LIFT OPERATING COSTS

Section 7.2.1 explained that total per trip operating costs of LIFT service averaged $7.31 in the fall of 1978 and total costs including finance and depreciation were running at $8.86. These high unit costs are attributable to relatively low productivities and high input costs. This section explains the factors affecting costs and productivities and analyzes the extent to which they can be related to Tri-Met in its role as a public transit operator.

7.5.1 High Capital and Finance Costs

Capital and finance charges amount to about 17% of the total cost of a LIFT trip, or $1.55 per trip (see Table 7-3). By comparison, the U.S. Federal Highway Administration measures depreciation on an automobile at about 5¢ per mile or 25¢ for a five-mile trip.* Additional finance charges for a cab would be about 2¢ per mile. Thus the total capital-related cost per trip for a five-mile taxicab trip would be 35¢ versus $1.55 for the LIFT--a difference of $1.20.

7.5.2 Low Demand Density

A second explanation relates to low demand density of the market served. The LIFT serves only handicapped and elderly persons, while other transportation providers, by serving a broader cross section of people, are able to increase demand and lessen deadheading.

*U.S. Bureau of the Census, Statistical Abstract of the United States: 1976. (97th edition.) Washington, D.C., 1976.

7.5.3 Labor Costs

Labor costs for LIFT operating personnel are high, and raises parallel or exceed the cost of living. Table 7-5 shows hourly labor rates for drivers and controllers during the fall of 1977 and 1978. Although precise comparable hourly labor costs for taxis were not available, taxi operators indicated that $6.50 per hour was representative of what a driver could make in Portland. This $6.50 figure includes benefits as cab drivers are independent operators in Portland. Thus, the Tri-Met labor rate appears to be at least 60% higher than that of the private sector. To the extent that these costs are above the market rate, the LIFT total operating costs are higher than necessary.

TABLE 7-5.

HOURLY LABOR COSTS OF LIFT OPERATING PERSONNEL

	1977		1978		% Increase 1977-1978
Operators					
Wages	$7.96		$8.61		
Benefits*	1.75	$9.71	1.89	$10.50	8.1%
Controllers					
Wages	8.46		9.11		
Benefits	1.88	$10.34	2.00	$11.11	7.4%

*Benefits calculated at 22% of hourly wage rates.

7.5.4 Inflexible Work Rules

Another reason for the high costs that prevailed particularly during the first year of the demonstration is inflexible union work rules. As of the end of 1977, the 12 LIFT drivers were each guaranteed an eight-hour work day, for a total of 96 hours per day, 480 hours per week. According to union work rules, this schedule was fixed.

Thus, management cannot schedule resources only as needed to meet the demand, and there is idle driver time or slack time. In 1977 the amount of slack time was estimated to be over 13% of the total vehicle hours available. This estimate was based on the assumption that the weekday with the highest percentage of trips represents the capacity productivity (passengers per vehicle hour) figure. Table 7-6 shows the distribution by day of the week of trips for four months in 1977 and 1978. The pattern of demand during 1977 produces between 0 and 26 slack driver hours per day for a total of 65 slack hours in a week. Thus, the inflexibility caused by the union work rules has forced management into a peak-load staffing situation. Specifically, in order to meet the peak travel on Thursday, management has had to overstaff for the other days of the week. The hours provided, in this example, total at least 15% more than needed to meet demand.

TABLE 7-6.
DISTRIBUTION OF TRIPS BY DAY OF WEEK*

	% of Weekly Trips	
	1977	1978
Monday	16.9	19.9
Tuesday	18.3	18.8
Wednesday	20.2	18.8
Thursday	23.1	21.5
Friday	21.6	20.9

*Data are for June through September, 1977 and January, April, July, and October, 1978.

Similar inflexibilities existed during the day when the vehicle hours did not match actual demand. Although an individual driver's shift within the hour of the day is fixed in the short run, management can change it on a week's notice, according to Tri-Met officials. This gives management the flexibility of

responding to long-term trends within the service day; however, day-to-day modifications in driver schedules cannot be made. Altogether, it is estimated that driver hours allocated to the LIFT were at least 20% more than needed to provide the service during 1977.

This conservative 20% statistic in itself was not necessarily cause for alarm. Other providers probably overstaff (although to a lesser extent) in order to meet peak-load demand. However in Tri-Met's case, in contrast to that of other operators such as taxi companies, the organization assumes the full cost of overstaffing.

It should be noted that Tri-Met was able to smooth demand over the days of the week during the second year of the demonstration. Table 7-6 shows that the percent difference in 1978 between the busiest day, Thursday, and the least busy days, Tuesday and Wednesday, is 2.7%, much less than the 6.2% differential in 1977.

7.5.5 Dispatch Level of Effort

Aside from the wage rate paid controllers, it appears that the level of activity devoted to coordinated scheduling was high. During 1977, 40 controller hours were delivered per day; in 1978 one controller was removed and dispatch productivity rose. Table 7-2 shows that about $1.00 of the total cost of a LIFT trip is consumed by dispatching. If we assume that this $1.00 pays a dispatcher for 1/10 of an hour, then the time needed to schedule and dispatch a trip is 6 minutes. Note that the controller cutback in 1978 improved this figure over 1977 performance as did the increase in the number of easier-to-schedule group trips during that year.

In contrast to the 6 minutes of controller effort per trip for the LIFT, taxi companies report that scheduling and dispatching a cab takes about 1½ minutes at an estimated cost of 20¢ per trip. In this case the dispatch costs are spread over a large number of trips and will therefore be somewhat lower,

but the labor devoted to the function is much less. Thus, it appears that the time involved in prioritizing and scheduling trips and dispatching the vehicles constitutes one of the costliest aspects of the LIFT service.

Social service agencies report that the LIFT dispatch and control has relieved their counselors of some of their former transportation coordinating responsibilities, so the high LIFT cost is somewhat balanced by the savings at the agency level. However, most agencies say that these savings were not significant and did not result in staff cutbacks.

7.5.6 Operating "Areas for Improvement"

DAVE Systems, which reviewed the operations in late November 1977, found the following areas for improvement:

1. "Return" calls should be prescheduled and worked into productive tours.
2. Controllers should be more aggressive in scheduling all trips so that they could be better grouped.
3. Actual driver shifts should more accurately match demand levels. This inefficient scheduling of capacity resulted in lower productivity as well as lower levels of service.
4. Drivers, particularly back-up drivers, should become more familiar with addresses in residential neighborhoods so they would not waste time searching for origins and destinations.
5. Subscription tours should be marketed to increase productivity.

The LIFT made improvements in each of these areas in the second year of the demonstration. This improvement explains why operating performance improved despite increases in wage rates.

7.5.7 Demand Level Served

The final reason for high costs is the low level of demand serviced by LIFT buses. Originally, it was estimated that 800 trips per day could be handled by the 15-bus fleet. As it turned out, this level was never approached. In the first year, requested trips did not equal system capacity; in the second year it became clear that system capacity was much less than the 800 trip level that had been projected. Demand did not reach system capacity in 1977 for the following reasons:

1. The service was not able to sign as many agency contracts as had been anticipated.
2. Among registered clients, demand did not materialize as expected. During September 1977, for example, only 1,000 persons were served out of a registered population of 4,200. The persons who were served averaged only three one-way trips per month. This low utilization continued through 1978.
3. Related to the above, the high volume subscription tours for shopping and the like were "crowded out" by the high proportion of medical trips. People were "educated" to rely on the LIFT, for the most part, for high priority trips. This trend was reinforced in the later part of 1978 when the LIFT ride prioritization eliminated some non-medical trips.
4. Finally, Tri-Met intentionally followed a gradual, measured approach to introducing the LIFT service in order to maintain high service standards for LIFT agencies and clients and in order to avoid the gap, characteristic of several Dial-a-Ride programs, between expectations and performance. Consequently, registration and demand were less than they might have been with a more rapid introduction of the service. This gradual introduction of the service should not have an adverse impact on ultimate demand levels, however.

Analysis done in early 1978 indicated a relationship between cost per trip and ridership volumes for the entire LIFT system. This relationship is depicted in Figure 7-1. Data used to estimate curve AA' are from monthly operational statistics from January through October, 1977. As can be seen, as ridership per day increases, the cost per trip tends to decline. The relationship depicted in the figure takes into account the bus and driver hours that must be added to meet increased demand.

The curve suggests that as ridership increases to about 450 trips per day, unit costs would have fallen below $6. (Actually this would not have happened in 1978 due to the 8% increase in labor rates; with constant costs of inputs, however, costs would have fallen as demand levels increased.) In order to serve this level of demand, Tri-Met management would have had to increase the number of buses in service from 12 to 13 or 14 and increased the number of driver hours.

Instead, due to an agency-wide budget cut-back the number of buses in service was decreased to 11. Therefore, despite increased demands in the second year, particularly by general passengers, the LIFT could not significantly increase demand serviced -- and thereby reduce unit trip costs -- because of agency-wide budgetary policies.

7.6 TRI-MET'S ROLE IN THE PROVISION OF THE SNT SERVICE: IMPACT ON COST

One issue of particular concern in this demonstration is Tri-Met's ability to provide a coordinated service at a reasonable cost. This section attempts to assess the degree to which the high costs of LIFT service can be attributed to Tri-Met's role as a public operator.

The previous section showed that the approximate $8.92 total cost per trip figure could be explained by the following factors:

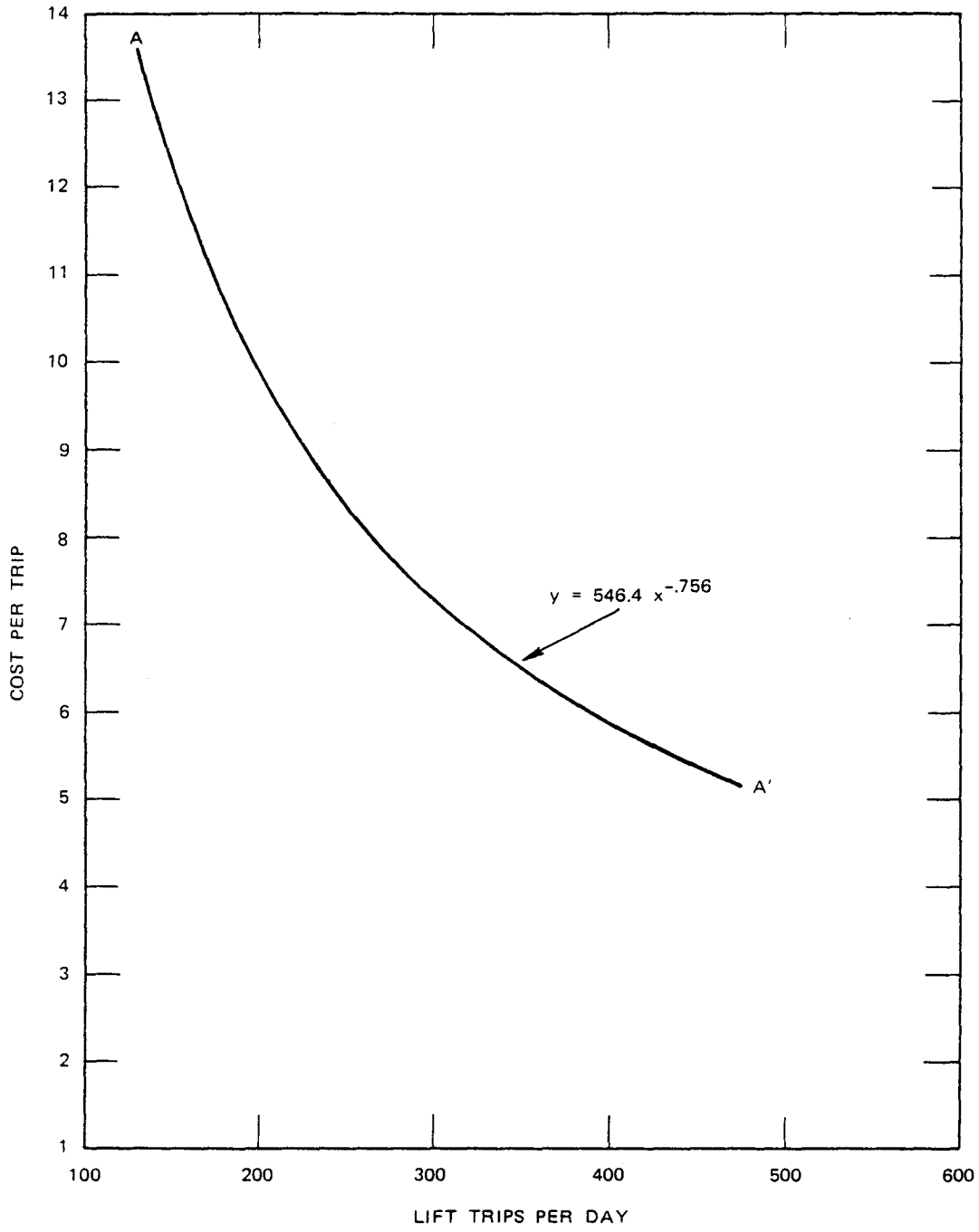

FIGURE 7-1. LIFT COST - VOLUME RELATIONSHIPS

1. Relatively high capital cost and finance charges;
2. Restricted nature of the market (only handicapped and elderly);
3. High labor costs;
4. Inflexible work rules;
5. High dispatch costs;
6. Various operational inefficiencies (a minor contributor to the high cost); and
7. Low level of demand serviced.

Of these seven factors entering into the high cost, perhaps only three, 3, 4 and 5 above, can be directly related to the fact that the service is being provided by the public transit operator. As discussed earlier, the union salary and wage cost at over $10 per hour is higher than comparable wage rates for drivers in the Portland area. The work rules which assure eight hours of work per day per person and make shifts in schedule difficult or impossible contributed to the lower productivity, mainly in the first year of operations.

The high capital costs might be considered indirectly related to the fact that a public rather than a private operator provided the service. The total cost of the LIFT buses is estimated at $50,000 apiece for a total front-end investment of $750,000. These buses were expected to last 16 years. Assuming a 10% interest rate and using present value analysis, it can be shown that the LIFT would have to generate almost $100,000 per year in revenues, just to cover these fixed capital costs. This $100,000 in revenues amounts to over 30,000 $3.00 trips just to cover capital costs. And capital costs, as shown in Table 7-3, are a small part of total trip costs.

This is not to say that Tri-Met should not have undertaken the LIFT demonstration: the project will have benefits for the rest of the country because of its demonstration nature. The project should not expect to generate enough revenue to break even. The regular bus operation in Portland only recovers about 30% of its cost from revenues. However, it does illustrate

that the fleet of buses is expensive and that the private sector, because of the built-in incentives to keep costs down, would find a cheaper way to provide the service.

Another factor that contributed to higher costs was the restriction of service levels to eleven buses per day. As mentioned earlier, this restriction was due to internal agency budgetary policy and was not related to any LIFT operational deficiency. Thus the fact that the LIFT was forced to operate below its potential fleet capacity can be attributed to its status as part of a large transportation agency.

7.7 REVENUE AND COST RECOVERY

Revenues generated from LIFT operations from December 1976 through January 1978 amounted to approximately $275,000. Figure 7-2 shows that revenue per quarter steadily increased along with ridership until the second year when it began to drop. Figure 7-2 also shows that general passenger revenues increased steadily until the second quarter of 1978. General passenger revenue (as a percent of total revenue) increased from 3% when the general passenger first began riding in May 1977, to over 19% in October 1977. Since Tri-Met only collects 50¢ from general passengers, compared with $3.00 from agency passengers, the increase in the proportion of general passengers has tended to lower the average fare: in January 1977 the average fare was $3.00 and in December 1978 it was $1.25.

There are several reasons underlying the drop in revenues during the second half of 1978. First, when the LIFT reduced the number of buses to 11, the total number of trips that could be delivered decreased and consequently, so did revenue. Secondly, during 1978 the LIFT developed a group fare of $1.50 per person for agency trips involving five or more people. To the extent that this group fare attracted passengers whose agencies would normally pay $3.00 per trip, total revenue would decrease. Also, if the $1.50 trips replaced $3.00 trips, i.e.,

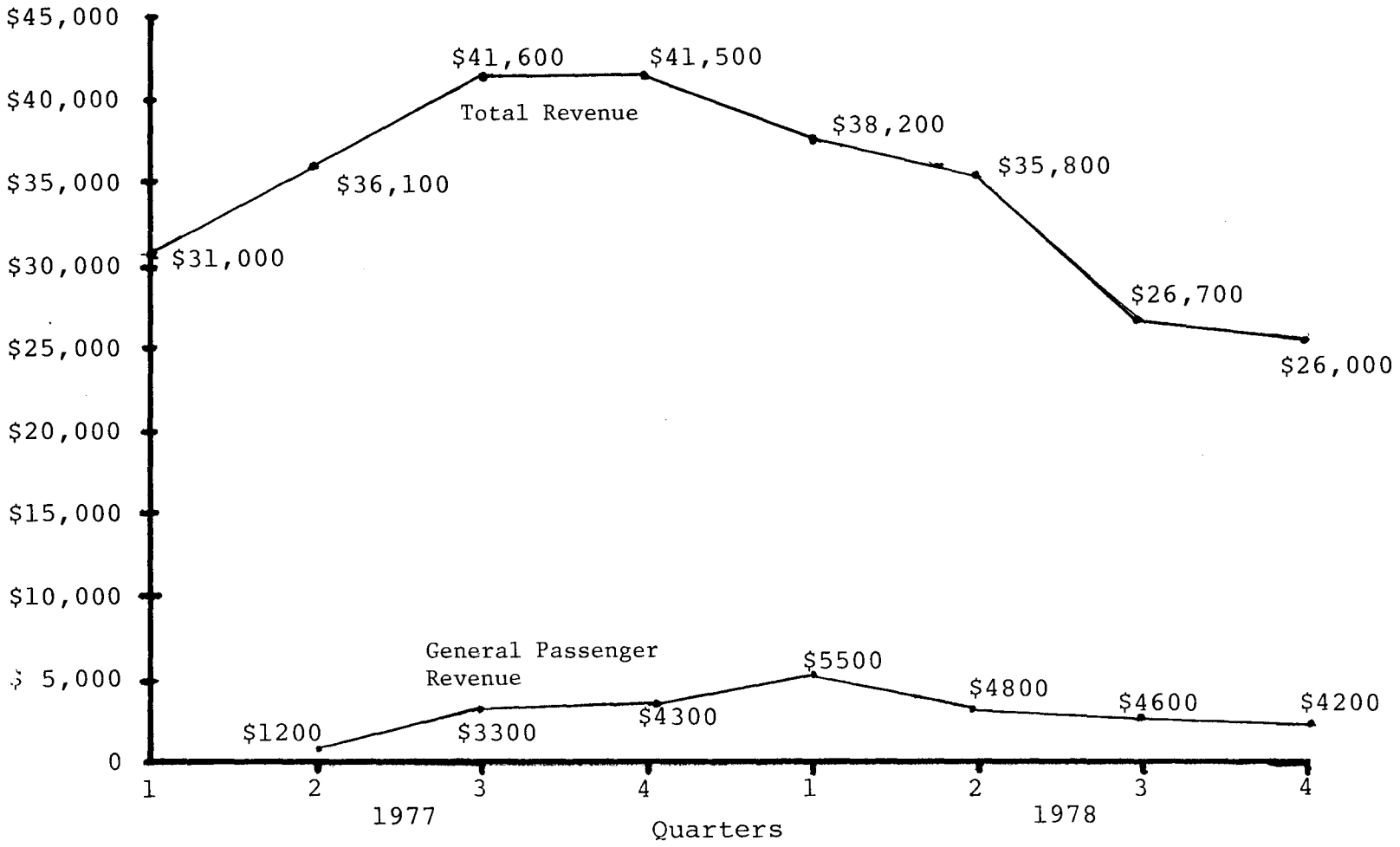

FIGURE 7-2. REVENUE BY QUARTER 1977-1978

if $3.00 trips were "crowded out" by these group trips, total revenue would decrease. Finally, there has been some shift of former AAA and welfare clients to general passenger status during the second year because of agency transportation budget cutbacks. Again, to the extent that this shift resulted in replacing $3.00 agency fares with 50¢ general passenger fares, total revenue would be reduced.

Figure 7-3 shows revenue as a percentage of cost over the duration of project operations. As the figure indicates, revenue/cost peaked in the third quarter of 1977 and has declined steadily since that time to a low of 16% in the last quarter of 1978. (The Tri -Met fixed route revenue recovery figure is 30%.) Assuming an average revenue figure of $1.14 per trip (which was the result for the last quarter of 1978) and a LIFT trip cost of $7.31, the Tri-Met subsidy is $6.17 per trip. For taxi trips the subsidy is somewhat lower, $4.48 ($5.64 - $1.16).

7.8 COMPARISON OF LIFT COSTS WITH SOCIAL SERVICE AGENCY COSTS

One purpose of the demonstration was to examine the degree to which coordination resulted in cost savings in provision of special transportation services. This section compares the LIFT costs to the transportation costs of contracting agencies before the LIFT became available. Agency transportation costs before and during LIFT operations are analyzed further in Chapter 8 of this report.

The LIFT has had the greatest impact on the AAA agencies, which consist of eight senior citizen centers operated by the City of Portland Department of Human Resources. By the summer and fall of 1976, the eight AAA agencies provided or contracted for approximately 4,000 passenger trips per month, or 48,000 trips per year. During 1975 and 1976, the bulk of the AAA trips were contracted to Special Mobility Services (SMS), a private, nonprofit transportation coordinating service. According to SMS staff, the number of trips serviced in this manner

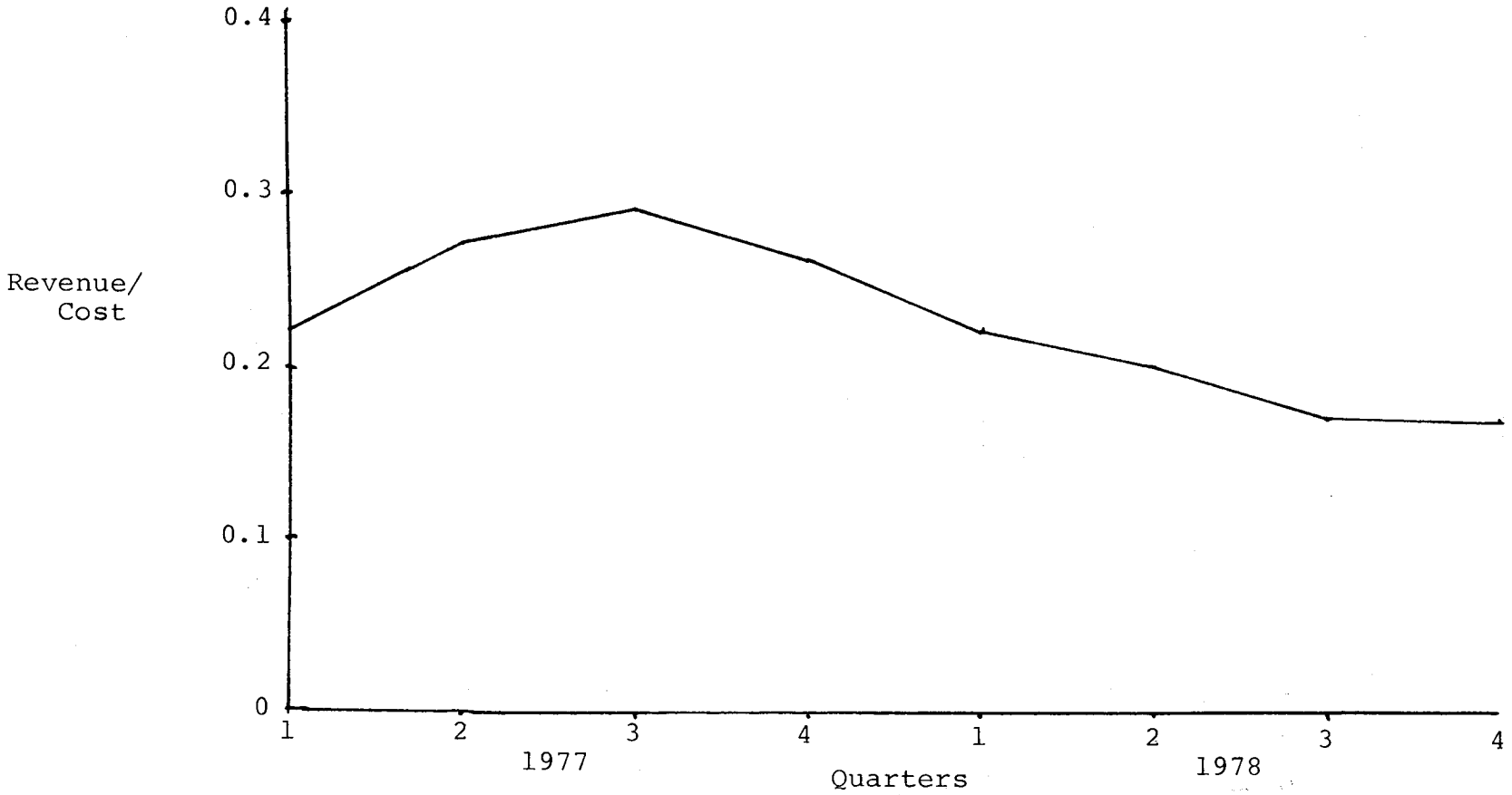

FIGURE 7-3. REVENUE/COST BY QUARTER 1977-1978

fluctuated up to a high of 3,500 a month, down to 3,000 and then 2,500 by the summer of 1977. One reason cited for the fluctuation was a change in financing regulations by the Bureau of Human Resources. The cost per passenger trip fluctuated from $3.00 up to $4.00. A service contract for actual cost (approximately $10,000 per month) was in effect, regardless of the number of trips provided. In December, the LIFT began providing the old SMS trips on the basis of a $3.00 per trip contract with a maximum allocation of $10,000 per month (i.e., 3,333 trips).

Metro Mobility,* another private, nonprofit agency using volunteers as drivers, provided service similar to the LIFT to AAA and other Portland agencies. This organization transports about 3,100 passengers per month (37,200 per year) with two station wagons and five 15-passenger vans with lifts. Table 7-7 gives a breakdown of their total operating costs, assuming a $3.50 per hour rate for volunteers.

TABLE 7-7.

ANNUAL COST BREAKDOWN FOR METRO MOBILITY

		$ Annually	% of Total Cost
1. OPERATIONS			
Actual expenses	$120,000		
Volunteers if paid @ $3.50/hr	60,000	$180,000	86%
2. DEPRECIATION		20,000[a]	10
3. FINANCE CHARGES		10,000[b]	5
TOTAL COST		$210,000	101%[c]

PROJECTED COST PER TRIP (37,000 trips per year) if using paid drivers = $210,000/37,000 trips = $5.65

ACTUAL COST PER TRIP (using volunteer drivers) = $150,000/37,000 trips = $4.05

[a] Based upon $100,000 acquisition cost for 2 station wagons and 5 buses and $20,000 in major repairs over a six-year life span.

[b] 10% of $100,000 capital cost.

[c] Does not add to 100% due to rounding.

*Metro Mobility went out of business in early 1979.

Thus, the LIFT cost to agencies of $3.00 per trip is less than the pre-LIFT trip cost only because of the financial arrangements whereby Tri-Met assumes much of the cost of a trip. Table 7-8 summarizes the results discussed in this section.

TABLE 7-8.

AGENCY AND GOVERNMENT COST PER TRIP BY TRANSIT PROVIDER*

	Agency Cost (1978)	Total Cost (1978)
LIFT buses	$3.00	$8.86
Supplemental taxi service	$3.00	$5.64
Special Mobility Services	$3.00-4.00	$3.00-4.00
Metro Mobility	$4.05	$4.05

*These data assume that the trips being provided are roughly equivalent.

As shown above, the true government cost of LIFT service is more than twice the cost of service provided before the LIFT began operations.

7.9 TRANSFERABILITY OF LIFT COST FINDINGS

Section 7.5 pointed out several reasons for the high cost of LIFT operations. In order to make these findings meaningful to people in other locales, this chapter concludes by commenting on whether the costs could have been lowered further by improved operational efficiency or whether the cause for high cost is largely inherent in the situation, i.e., that the specialized service is provided by the transit operator.

Given the improvements that occurred between the first and second year of the demonstration, one must commend the Tri-Met management and staff for their efforts and success in improving operational efficiency. Despite rising wage rates and declining demand, trip costs were lower in the second year of the demonstration. Nevertheless, LIFT trip costs are still far higher

than those incurred by other SNT alternatives. High union wage rates constitute the main reason for the high cost in Portland; this condition would exist in most U.S. cities. There appears to remain no major untested initiative that management could take which would result in significantly lower costs. Thus, this demonstration represents a thorough test of the cost-effectiveness of a transit operator's providing a special-needs transportation service. Any other cities considering such a system should carefully examine the cost implications, of public versus private-sector wage differentials.

8. THE LIFT AND TRI-MET"S ROLE AS SNT OPERATOR AND COORDINATOR

8.1 INTRODUCTION

Underlying the demonstration in Portland is the central premise that special transportation service can be delivered more efficiently and effectively with close cooperation and coordination among social service agencies, other involved organizations, and the transit operator. Specifically, the demonstration was intended to indicate the degree to which the transit operator, in this case Tri-Met, could achieve social service agency cooperation of transportation resources and the impact of this coordination on the cost, amount, and quality of service to the TH clients.

The analysis up to this point has focused on the passenger; i.e., the demonstration's impact on the target market and client reaction to the service. This chapter focuses on those organizations involved in using and/or providing special needs transportation; i.e., the social service agencies, private and nonprofit providers, and Tri-Met. First, an initial description is presented in order to portray the institutional goals and interrelationships that existed among these organizations when the demonstration began and to provide a background for interpreting the impact of Tri-Met's SNT coordinational and operational efforts. With this background established, the chapter next describes the demonstration's effect on the agencies that used the service. Then, the impact on the other providers of SNT service is discussed. Finally, the chapter assesses Tri-Met's performance in its dual role as operator of the LIFT and coordinator of SNT in the community.

Of particular interest are the advantages or limitations a transit operator has in operating and coordinating a special needs transportation service. Copies of all survey and interview materials used to assess project impacts on these groups are contained in the Appendices of this report.

8.2 THE INSTITUTIONAL SETTING: KEY ORGANIZATIONS AND THEIR INTERESTS

8.2.1 Goals and Potential Goal Conflicts

The organizations having an interest in special needs transportation in Portland when the demonstration began fall into three groups. Table 8-1 lists these groups and their primary goals with respect to SNT and, consequently, the LIFT demonstration.

TABLE 8-1.
KEY ORGANIZATIONS AND THEIR PRIMARY GOALS

1. Social service agencies	Assure cost-effective, reliable, high-quality transportation for their clients.
2. Private providers	Protect their business interests and, if possible, gain an increased share of the special needs transportation market.
3. Tri-Met	Assume a leadership role in the provision of special needs transportation to the TH in Portland.

Tri-Met's assuming a leadership role through the operation of the LIFT as well as coordination of transportation resources, produced a potential for concern among social service agencies and private providers. With Tri-Met in control of SNT, the social service agencies ran the risk of losing control over the quantity and quality of their clients' transportation service. Private providers were potentially threatened with government-subsidized competition's decreasing their business. Thus, the LIFT program

and the changes it implied posed an apparent threat to the primary interests of the private operators and social service agencies. In turn, there was a potential for concern for Tri-Met: its efforts to coordinate and consolidate would be thwarted to the extent that social service agencies and private providers would not cooperate with them. Also, the demonstration was a risk for Tri-Met in that it was possible that the LIFT program, if it failed, would jeopardize further efforts to establish the transit agency as the SNT coordinator.

These potential conflicts were avoided. To understand why, one has to understand the relative power of these three groups, their perceptions of the probable impact of the LIFT program and of Tri-Met's emerging leadership role on their operation, the actions Tri-Met took to avoid the conflict, and the circumstances surrounding the events that took place in 1976-78.

8.2.2 Factors Supporting Tri-Met's Role as SNT Coordinator and Operator

Several factors contributed to Tri-Met's successful emergence as the key coordinator of special needs transportation. First, there was an acknowledged leadership vacuum with regard to SNT in Portland. As was true in most cities, there was a large number of fragmented social-service-agency transportation programs operating with duplication of effort and inefficiency in providing SNT. Furthermore, there was a large number of transportation handicapped people who were not affiliated with a social service agency. The needs of these people were not being met. None of the special transportation companies (i.e., SMS, taxi companies, Metro Mobility) was large enough or had the incentive to assume a leadership role in this area. One reason for this was that they realized, in the words of one nonprofit transportation

company director, that assuming this role meant "taking a lot of political heat" and the private providers were fearful that they could not withstand such political pressure. In addition, they did not have the experience or resources (e.g., planning and marketing skills, community stature, and reputation) to undertake this leadership role even if they had been prepared to deal with the political pressure. Social service agencies had operated or contracted for special transportation for their clients but had been reluctant to assume any coordinating responsibilities. They felt that they did not have the skills required to expand beyond filling their own transportation needs. Taxi operators felt qualified to serve the transportation handicapped but were new to the special transportation function and were not prepared to assume the coordination role. In contrast, Tri-Met, through its experience with fixed-route service, its familiarity with the intergovernmental programs and funding channels, and its experience in dealing with local political forces, felt more comfortable assuming an SNT leadership role and exerting its influence to bring about improved coordination. Since consensus was growing that this role in Portland was needed, and because many of the institutions that could play that role were at best reluctant, Tri-Met surfaced as the lead agency for the coordination function.

Though part of Tri-Met's emergence as a leader was due to the leadership vacuum, an equally important reason was this agency's responsiveness, innovativeness, political stature, and willingness to assume the risks involved in taking on the SNT leadership role. The agency is governed by a Governor-appointed Board of Directors that represents all political segments in the community. This board takes an active part in running the agency and attempts to assure responsiveness to community needs. Examples of this responsiveness include a new transit mall in the downtown area, a

variety of fare innovations for fixed-route transit, a marketing and promotion program that has resulted in increased fixed-route ridership over the years, and a multifaceted program for special needs transportation (of which the LIFT is just one part). Currently, Tri-Met is examining light rail transit as a public transportation option for the 1990's. The agency management staff are young, dynamic, and forward-looking; hiring practices and promotion are not constrained by rigid civil service procedures. The organization has political "savvy" by virtue of having been on the political "hot seat" with regard to such issues as the highly visible and controversial transit innovations discussed above. Finally, Tri-Met has a relatively secure source of funding: a payroll tax on City workers. All of these characteristics seemed to support Tri-Met's leadership position for the SNT effort.

Another factor solidifying Tri-Met's emergence as the central SNT institution was its ability to attract funds. In 1976, there was a growing awareness of the needs of the transportation handicapped. Federal money for local governments was available from the U.S. Department of Transportation and Tri-Met was the likely funding channel. As mentioned above, they were experienced in intergovernmental funding relationships and were clearly good at attracting outside funding. This ability to garner funding, perhaps more than any other factor, defused the reservations that social service agencies and private providers had. Even though it was clear that the LIFT would be assuming some formerly private business, it also was clear that Tri-Met's serving as the funding channel would eventually bring in more money for SNT overall. The taxicab operators were not as concerned about public competition, because they did not feel that the LIFT would be "taking over" many of their trips; i.e., the poor, handicapped, and elderly did not use cabs much anyway.

Tri-Met took several propitious steps to make sure that resistance from social service agencies and private providers was lessened. First, as explained earlier, the fare for agency clients was $3.00, slightly below the price that social service agencies had been paying previously. Second, the service was designed in coordination with the social service agencies in order to assure maximum compatibility with agency clients' needs and to take much of the scheduling burden out of their hands. These two factors made the LIFT program attractive enough to the agencies to outweigh any reservations they might have had about turning over control of their clients' transportation to Tri-Met.

Another action taken by Tri-Met was to offer increased SNT transportation business outside of the city limits to those private providers whose business they were taking over in the city. Although these private providers were genuinely threatened by the public competition, the Tri-Met service contracts in the Tri-County area and the obvious potential for increased future funding due to Tri-Met's funding capacity assuaged their fears of being driven out of business.

Tri-Met guaranteed support from the other potential competitor, the taxicab companies, by subcontracting to them for LIFT overflow. Thus, the cab companies were assured a share of the obviously growing SNT trip market in Portland.

The picture that emerges is one of a delicate balance of power between the three institutions. Tri-Met—with its money resources, transportation expertise, political savvy, and willingness to assume coordinating responsibilities—was able to take on the coordinating and operating challenge of operating the LIFT. Social service agencies were willing to grant them this role—and to even support them—because they saw that it was in their interest in terms of transferring some of the financial and operational burden to someone else

without sacrificing appreciable control over service quality. The private providers agreed to Tri-Met's operator and coordinator role because they recognized that (1) the role needed to be played and they were unwilling and unprepared to assume the role themselves, and (2) the LIFT program did not threaten their survival. Taxicab interests did not feel that the LIFT was diverting many trips from cabs anyway, and felt that more subsidized taxi service to the transportation handicapped market would emerge in the long run.

8.3 COORDINATION WITH SOCIAL SERVICE AGENCIES

As of mid-November 1978, agency passengers constituted 45% of total ridership on the LIFT system; the impact of the service on the social service agencies, then, constitutes an especially important area of analysis. This agency impact is assessed primarily through scrutiny of the AAA (Area Agency on Aging) agencies, who accounted for more than 85% of all agency trips during the two-year demonstration period.

Three sets of agency surveys were conducted during the demonstration period: the "before" surveys, conducted before the start of the LIFT service; the "interim" surveys, conducted after the service had operated for a certain period of time; and the "final" surveys, conducted at the completion of the two-year evaluation period. This section will examine and compare the findings yielded by the three agency surveys. The surveys consisted of structured, face-to-face interviews* with knowledgeable personnel in selected agencies and organizations which have contracted with Tri-Met for LIFT service. The original intent of these surveys, as delineated in the Portland SNT Project Evaluation Plan, was to focus on:

*Some follow-up interviews were conducted by telephone.

1. Improvements, if any, in the agencies' transportation costs,
2. The impacts of the LIFT on the transportation services furnished by the agencies,
3. The impacts of the LIFT on the core services offered by agencies, and
4. The way in which the Special Needs Transportation (SNT) system deals with the operational and accountability problems involved in coordinating human services transportation.

Appendix C contains a list of the agencies interviewed. The three surveys in combination were designed to examine such specific variables as:

1. The types of transportation service provided to clients by the agency,
2. The effect of the LIFT on the agency's ability to service client transportation needs,
3. Agency client demand for transportation services, including the LIFT,
4. The cost to the agency of providing transportation services, including the LIFT,
5. Agency financing of transportation services,
6. Scheduling and administrative problems imposed by the LIFT on the agencies,
7. Suggestions of agency personnel regarding potential improvements to the LIFT service, and
8. Probable impact on agencies when the demonstration ends.

Not all of these variables are relevant or readily measurable for all contracting agencies and organizations.

8.3.1 Agency Profile

As of December 1978, twenty agencies and organizations were under contract with Tri-Met for LIFT service. Of these,

eight were AAA agencies, two were state agencies (Public Welfare Division and Vocational Rehabilitation Division), and the rest consisted of various nonprofit organizations. Table 8-2 constitutes a list of contracting agencies as of December 1978. The Area Agency on Aging centers had relied on SMS and Metro Mobility prior to LIFT service and the other agencies had used either their own vehicles, cabs, or other services.

TABLE 8-2.

AGENCIES AND ORGANIZATIONS
UNDER CONTRACT FOR THE LIFT SERVICE

1. Area Agency on Aging
   a. Gresham Senior Adult Center
   b. Hollywood Senior Center
   c. Neighborhood House
   d. Northwest Pilot Project
   e. Friendly House Senior Center
   f. Peninsula Project ABLE
   g. Senior Adult Service Center
   h. PACT Senior Service Center
2. Metropolitan Family Service
3. State of Oregon Vocational Rehabilitation Division
4. Goodwill Industries of Oregon
5. University of Oregon Health Sciences Center
6. Volunteers of America, Inc.
7. Good Samaritan Child Neurology Clinic
8. State of Oregon Adult and Family Services Division (Welfare)
9. Westside Schools
10. Muscular Dystrophy Association
11. Veterans Administration Hospital
12. Portland Public Schools
13. Urban Indian Council

However, only three agencies—AAA, Vocational Rehabilitation, and the Public Welfare Division—utilized the LIFT service to an appreciable extent. The LIFT billings for September 1977 and 1978 shown in Table 8-3 are typical of

the LIFT usage patterns of the agencies and organizations under contract to Tri-Met.

TABLE 8-3.
LIFT BILLINGS

Passenger Affiliation	Sept. 1977 #	Sept. 1977 %	Sept. 1978 #	Sept. 1978 %
Area Agencies on Aging (AAA)	3337	50%	2783	35%
Public Welfare Division	359	5	169	2
Vocational Rehabilitation	152	2	269	3
Crippled Childrens' Division	73	1	5	-
Muscular Dystrophy Association	2	-	5	-
Veterans Administration Hospital	-	-	16	-
Unaffiliated (general passenger)	2700	41	4625	59
Total	6623	99%	7872	99%

8.3.2 LIFT Impact on Agency Transportation and Core Services

As stated before, not all of the variables which the agency surveys were designed to examine were relevant or measurable for all agencies. For example, in the case of the eight Area Agency on Aging agencies, AAA is billed directly for the costs of the LIFT rides delivered to clients. Therefore, the budgets of these agencies have not been directly affected by the LIFT. Moreover, Table 8-4 shows that some of the contracting agencies and organizations subsidize only one or two LIFT clients; the impact of the LIFT on their transportation costs has been minimal. It also should be noted that some contracting agencies or organizations never did furnish transportation service to their clients; thus, in some cases the LIFT has replaced social service agency transportation, while in other cases the LIFT is replacing taxis, relatives, and friends as the primary means of transportation utilized by the clients of these agencies and organizations. In short, the agency surveys did not yield

TABLE 8-4.

AGENCY CLIENTS REGISTERED WITH THE LIFT

Contracting Agency or Organization*	No. of Clients Registered**	% of Total Registration
Area Agency on Aging	2049	30.2%
State of Oregon Public Welfare Division	1361	20.1
Metropolitan Family Services	78	1.2
State of Oregon Vocational Rehabilitation Division	56	0.8
Muscular Dystrophy Association	25	0.4
University of Oregon Health Sciences Center	24	0.4
Portland Public Schools	4	0.1
Volunteers of America, Inc.	3	0.0
Good Samaritan Child Neurology Clinic	2	0.0
Veterans Administration	2	0.0
Urban Indian Council	2	0.0
Westside Schools	1	0.0
General Passengers (no agency affiliation)	3173	46.8
	6780	100.0%

*As of mid-November 1978. Note that some agencies and organizations under contract for LIFT service have no clients registered with the LIFT.

**Many clients are registered with more than one agency or as both an agency-sponsored and a general passenger. There are 5914 unduplicated persons registered for LIFT service.

a great deal of "hard" data regarding agencies' pre-LIFT and present transportation costs, nor did the surveys measure, in quantitative terms, the impact of the LIFT on the agencies' ability to furnish transportation service.

However, the surveys did elicit a number of comments, criticism, and suggestions from agency personnel regarding

the LIFT service. While such findings are necessarily qualitative and subjective in nature, they are, nonetheless, of value; as agencies constitute the primary link between Tri-Met and the LIFT target population, the reactions of agency personnel to the LIFT will greatly affect Tri-Met's ability to increase agency ridership on the service.

The LIFT has had the largest impact by far upon the eight senior citizen centers funded by AAA. These centers within the city of Portland provide information, referral, and counseling services to clients over 60, for the purpose of promoting client independence. The types of services furnished include transportation, housing aid, homemaker service, escort service, legal aid, meals-on-wheels, home health and telephone reassurance, and, in some cases, group recreational activities. Centers with group facilities sponsor such activities as dances, potlucks, card games, craft programs, and tours.

AAA clients fall into two categories: "limited access" clients, who have incomes below the poverty level, suffer from isolation, and live within the service area; and "open access" clients, who have incomes above the poverty level, can benefit from the AAA centers' activities, and live within the service area. Only "limited access" clients are subsidized by AAA to ride the LIFT.

All AAA trips are funded by Title III of the Older Americans Act and constitute many-to-many service, primarily for medical and shopping purposes. During its two years of operation, the LIFT was furnishing an average of 3,000 AAA trips per month, or 35,000 AAA trips per year.

Prior to the demonstration, during 1975 and 1976, the majority of AAA-funded trips were contracted out to Special Mobility Services (SMS), a private, nonprofit transportation coordinating service. The number of trips furnished to AAA

clients during this period fluctuated from a high of 3,500 a month down to 2,500. The cost per passenger trip fluctuated over this time-period from $3.00 to $4.00. Beginning in July 1976, the trips previously contracted to SMS (and provided by SMS) began to be contracted through Tri-Met. However, as the LIFT was not yet operational, SMS continued to provide trips to AAA clients under a subcontract with Tri-Met.

In December 1976, the LIFT began providing the old SMS trips on the basis of a $3.00-per-trip contract with AAA, with a maximum allocation of $10,000 per month (i.e., 3,333 trips). Table 8-5 presents trip data for the eight senior centers for the fall of 1976, when SMS was the chief provider, and for the fall of 1977 and 1978, the first and second year of LIFT operation. A comparison of the three time-periods reveals the following LIFT impacts on AAA transportation:

1. During the first year of LIFT operation (1977) the eight AAA agencies increased the number of trips provided by approximately 7%.
2. During the second year of LIFT operation (1978) the eight AAA agencies decreased the number of trips provided by 20% (compared to 1977 levels).
3. Trips provided by modes other than the LIFT decreased by a third during the first year of LIFT operation and remained at that level.

In general, then, during the first year of LIFT operation, the contract with Tri-Met allowed the individual AAA agencies to increase the contracted number of trips since the price was fixed at $3.00 per trip. Increased transportation was provided, with some savings in price, to the AAA agencies.

The second year of operation presents a different picture. Budgetary cutbacks in the AAA agencies forced them to

TABLE 8-5.

PORTLAND AAA TRANSPORTATION BY MODE[1]

	Fall 1976 (Before Project)			Fall 1976-Fall 1977			Fall 1977-Fall 1978		
	SMS	Other[2] Modes	Total	LIFT	Other Modes	Total	LIFT	Other Modes	Total
PACT	7,800	2,000	9,800	7,980	420	8,400	6,210	210	6,420
SASC	7,200	450	7,650	10,200	600	10,800	4,800	240	5,040
Project Able	5,400	5,400	10,800	8,640	3,170	11,810	6,520	2,530	9,050
FHSCC	2,650	1,500	4,150	2,500	2,450	4,950	1,880	3,530	5,410
Hollywood	2,400	100	2,500	1,800	650	2,450	1,020	70	1,090
SW Neighbor	1,860	2,100	3,960	2,220	900	3,120	2,590	990	3,580
NW Pilot	2,100	5,760	7,860	4,320	2,660	6,980	4,140	3,560	7,700
MFS[3]	360	1,440	1,800	1,800	1,560	3,360	1,800	1,530	3,330
Totals	29,770	18,750	48,520	39,460	12,410	51,870	28,960	12,560	41,620
	61%	39%		76%	24%		70%	30%	

[1]One-way trips provided per year.

[2]Includes Metro Mobility, agency-owned vehicles, paid drivers, staff, volunteer drivers.

[3]Funded by AAA.

reduce the number of trips they would subsidize for clients. To implement this cutback, AAA agencies reviewed their client records to identify limited access clients who were still eligible for agency support and to terminate or cancel clients judged no longer eligible. In many cases, the people whose agency-sponsored registration was cancelled registered as general passengers, and in other cases they simply continued to ride as general passengers, having previously established their eligibility. AAA assisted former AAA clients in gaining general passenger status with the LIFT. Although figures are not available to indicate the extent of this switch in passenger status, interviews with AAA staff and Tri-Met personnel indicate that this change did occur.

Thus, whereas agency-sponsored transportation was reduced during 1978, it is likely that publicly subsidized transportation to the AAA client group did not decrease as much as the 10,500 trip difference indicates over the two-year period. The difference is that Tri-Met's share of the trip cost has increased; i.e., there was a shift in the subsidy burden from AAA to Tri-Met during the second year of operation. Whereas AAA once paid for $3 of the client's trip cost, the client, now riding as a general passenger, pays only 50¢ per trip.

The time required to schedule clients' rides on the LIFT is considerably shorter than before the LIFT was in operation, according to the director of one of the AAA centers. Ride arrangements for a number of clients are now made through a single telephone call. This center also previously used a full-time driver who called the center to determine when to pick up each client for the return trip; this procedure is now arranged by LIFT personnel. Thus, in some cases, the LIFT has allowed staff time previously used for scheduling purposes to be freed for other tasks.

In general, those non-AAA agencies with staff cars and vans appear to utilize their own vehicles to the same extent

now that the LIFT is available as they did before. However, some agency representatives indicated that their usage of taxi service to transport clients had decreased due to the availability of the LIFT. The State Public Welfare Division, the State Vocational Rehabilitation Division, and the Muscular Dystrophy Association were among the agencies citing this LIFT impact.

While almost every agency representative interviewed expressed some degree of appreciation and support for the LIFT service, most said that the latter had not fundamentally altered their clients' usage of their core services. However, a few AAA agencies indicated that their clients' usage of their services had, in fact, increased due to the LIFT, and three agencies stated flatly that the LIFT was transporting clients who otherwise would have been unable to take advantage of their core services.

In sum, the effect of the LIFT on agency transportation has been to increase slightly the number of trips they have been able to provide. No agency vehicles have been eliminated. Many trips previously delivered by less expensive sources (e.g., Metro Mobility, SMS) have been diverted to the LIFT.

8.3.3 Agency Perceptions of the LIFT Service

8.3.3.1 Area Agency on Aging - When interviewed in July of 1977, most administrators of the AAA agencies expressed strong enthusiasm for the LIFT; their overall attitude toward Tri-Met drivers, dispatchers, and management was very favorable. In addition, AAA agency administrators generally expressed satisfaction with the mechanics of registering clients for the LIFT, scheduling LIFT rides, and completing the LIFT-related paperwork required by AAA each month. Most complaints regarding the LIFT centered around the chronic lateness of the buses and Tri-Met's failure to contact the agencies when problems arose (e.g., when the LIFT client was not waiting at the

pick-up point). The questions of whether or not drivers were supposed to provide escort assistance to clients and, correspondingly, whether or not agencies must provide escort workers to accompany clients also arose frequently in discussions with agency administrators. On balance, however, most remarks resembled this sample of AAA remarks:

> "The Tri-Met people are super."
>
> "Most clients are much more positive about the LIFT than they expected to be."
>
> "The older people have gradually been educated to call in their requests well ahead of time."
>
> "Some clients are joining our center just to get the LIFT pass."

By December 1977, dissatisfaction with the LIFT service had increased among the AAA agencies. From interviews with the contracting agencies, it became apparent that the LIFT could not meet the total transportation needs of the agencies; thus the need for non-LIFT trips would continue. This conclusion is corroborated by the data in Table 8-5. The 48-hour to 10-day reservation period required by the LIFT was of major concern to the central contractor for the eight AAA agencies, who indicated that the agencies would demand that higher priority be accorded their clients if they were to pay the "full cost."*

Thus, the AAA agencies interviewed in December made the following general comments with respect to the LIFT:

> "The initial pick-up reliability can be okay, but the return pick-up reliability is very bad—up to two or two-and-a-half hours."
>
> "Taxi service is more reliable."
>
> "The LIFT is a source of tremendous frustration right now; they're not able to accept any more rides."

*The irony is, of course, that the $3 per trip paid by AAA covers less than half of the trip cost to Tri-Met. Thus, the LIFT and Tri-Met are confronted with the impossible task of providing the expected level of service at a high cost while recovering sufficient revenue from the agencies.

"Trying to coordinate an escort is a problem with such a wide-ranging pick-up time."

"The publicity about the 48-hour notice is misleading."

"Clients get nervous when the pick-up time can range from 15 minutes to one and one-half hours before an appointment."

"There is a definite need for agency back-up transportation for the LIFT."

The directors of three AAA agencies were interviewed in December 1978; each expressed overall satisfaction with LIFT service. One specifically commented that in its two years of operation, the LIFT had improved in terms of getting people to appointments on time. Another stated that the overall service had improved dramatically during the second year—"The system is starting to work." Drivers continue to receive a high rating and are very much appreciated by the elderly clients whom AAA serves. Complaints regarding the LIFT again centered on the lateness of the buses, particularly for the return trip. This problem becomes most acute when a client is not feeling well or must have an escort.

An internal problem of concern to the AAA agencies regards the difficult decision to terminate a client's subsidy for LIFT trips. One goal of the AAA centers is to decrease the isolation of their elderly clients. Because transportation services help to achieve this goal, trips on the LIFT are subsidized for "limited access" clients. However, when this goal is achieved and clients are considered "socialized," the agency must frequently terminate them as clients, due to budgetary restrictions. The irony, of course, is that the most important factor in helping to socialize a client—subsidized transportation service—is withdrawn, and many of them slip back into their former isolated condition.

Each of the AAA agencies interviewed in 1978 is unaware of how many of their clients whose rides were once subsidized by

the agency are now riding as general passengers. Both feel it is probably a small portion. This is particularly true of one center located in downtown Portland; their clients are poor and cannot afford the $1.00 round-trip fare for general passengers.

8.3.3.2 The Division of Public Welfare (DPW) - This State agency has five branches within the LIFT service area. These branches serve varying types of clientele: for example, one serves predominantly elderly and disabled clients, whereas the clients of another consist mainly of mothers receiving ADC assistance. DPW subsidizes LIFT trips for medical purposes only; DPW clients account for approximately 20% of LIFT registrations.

Members of the DPW staff were interviewed in December 1977 and again in December 1978. Although the staff expressed support for the LIFT concept, several problems with the LIFT were cited. Table 8-3 shows that during a one-year period, monthly trips provided by the LIFT to clients of the Public Welfare Division dropped from 359 trips to 169. According to staff at the Albina branch and the control division, there are several reasons why they now transport few of their clients on the LIFT:

1. Many clients can't get to the waiting area. (This is an example of the recurrent confusion over whether the service is curb-to-curb or door-to-door. DPW assumes the former, whereas other participating agencies assume the latter, thereby putting the drivers in the position of having to escort clients to and from their doors without official sanction or recognition of their efforts.)
2. Reservations must be made too far in advance to accommodate their clients' needs. Many of the medical trips for which DPW provides transportation are

trips of an emergency nature. Also, they state that their clients do not plan ahead well and are unable to state what their needs are a week in advance. Even when DPW calls Tri-Met 48 hours in advance, Tri-Met has often been too booked to schedule their rides. According to staff members, the LIFT turns down half of all of their requests.

3. Many medical trips are local ones (Emmanuel Hospital, for example, is located near the Albina branch) and are less expensive if provided by taxi than by LIFT.
4. About two-thirds of the rides shown on the computer print-out received from Tri-Met by DPW were not ordered by DPW, according to staff members. One possible explanation for this relates to the Special Needs bus passes: some clients who hold two cards (an agency card and a welfare card) may have presented the wrong card to the LIFT driver.

There is little client criticism about the service itself except that a few passengers feel that the ride is too bumpy and that they are taken on a rather circuitous route. Drivers again receive high praise. The LIFT is seen as most successful in providing for shopping trips (which DPW does not subsidize), and agency staff indicate that their clients traveling as general passengers do use the LIFT for this purpose. They are unable to estimate what percentage of their clients use the LIFT in this capacity, but state that one-third to one-half would be eligible.

8.3.3.3 Vocational Rehabilitation Division (VRD) - The Vocational Rehabilitation Division of the State of Oregon subsidizes LIFT transportation for clients who use the service to attend a training program or course of study. Staff members who were interviewed in July 1977 stated that the

availability of the LIFT had decreased VRD's usage of taxi service. Client usage was expected to increase further in September (1977), due to the start of academic programs. However, a number of factors inhibit LIFT usage by VRD clients, according to VRD staff:

1. There is a problem related to the scheduling of client rides on the LIFT. This function is performed by the counselors, who are difficult to reach by telephone; thus, while a client may attempt to schedule his or her ride 48 hours in advance, the counselor may not be available to perform this function until after the 48-hour deadline has passed. Moreover, the counselors are not accustomed to scheduling rides; when using taxi service, counselors authorize rides and the clients themselves call for service. Also, counselors react negatively to the paperwork required to register clients for the LIFT; they tend not to do so unless the LIFT is the only feasible means of transportation for the clients.
2. Many trips taken by VRD clients, such as job interviews and emergency medical appointments, are difficult to schedule 48 hours in advance.
3. The long wait-times imposed by the LIFT on frequent occasions pose "real problems" for paraplegics and quadriplegics. Moreover, clients who have lost salary or missed exams because of the lateness of the LIFT are unwilling to rely on the LIFT on a regular basis; instead, they have made transportation arrangements with relatives and friends.
4. Some clients have complained that they feel unsafe on the LIFT; they say that the wheelchair lift has experienced numerous mechanical failures, that the wheelchair tie-downs aren't secure, and that the ride is bumpy.

VRD staff were interviewed again in March 1979. Table 8-3 shows that VRD usage has increased from 152 trips in September 1977 to 269 trips in September 1978. However, staff members are still not satisfied with LIFT service because it does not meet their needs: the LIFT cannot promise exact pick-up and drop-off times, which is a necessity for the severely disabled clients whom VRD serves. Their regional manager states that he much prefers to use the LIFT because alternative forms of transportation (e.g., medi-care car) are three times as costly.

8.3.3.4 Veterans Administration Hospital (VA) - The Veterans Administration Hospital in Portland provides hospitalization and outpatient treatment for any veteran living in the service area who has an honorable discharge and has had at least one day of active military duty. Patients are expected to pay for transportation costs to and from treatment based on their income; however, there is no check made of indicated income. Transportation costs in Portland run from $100,000 to $130,000 every quarter. (This includes plane fares.) All treatment is free regardless of income.

The VA provides for the transportation of clients through VA-owned cars (they employ three full-time drivers to transport patients), taxi service, ambulance, medi-care car, and by reimbursing patients for bus fare. Early in 1977 the VA contracted with Tri-Met to provide transportation service for about 10 persons a week. As of December 1978, the number of VA clients using the LIFT dropped to only one who visits the hospital twice a week. There are several reasons for this decline in LIFT usage. First, some patients were switched from the LIFT back to Care-Car because their personnel will enter the house to get patients whereas LIFT personnel will not. Second, the VA drivers who were providing service for patients residing outside of the

city limits (and who are thereby ineligible for LIFT service) could, with minor rerouting, also accommodate city dwellers who were being served by the LIFT. Third, some passengers who complained about the LIFT's longer wait-time and bumpier ride, compared to their previous auto mode, were taken off the LIFT. This move is in keeping with VA philosophy that "The veteran comes first"; when a patient complains, his wishes are accommodated if at all possible.

The director of transportation services for the VA indicated that he would like to use the LIFT to transport patients home after 3 PM when the VA drivers are diverted to other duties. However, because these needs vary from day to day, the LIFT's 24-hour advance scheduling requirement precludes his using LIFT service for these patients.

8.3.3.5 Portland City Schools - The Portland School District uses their own fleet of lift-equipped vans to transport children to special schools or classes for handicapped children. The LIFT could be of service to them in providing service for the isolated, handicapped child attending a regular school* who could not ride a regular school bus. When the school district was assured that Tri-Met could guarantee definite scheduling for their handicapped students, they contracted for service. The LIFT now provides service twice a day, to and from school, for three students.

The indefinite pick-up time is a major problem which precludes the school district's using LIFT service for more of its handicapped children. It was this issue that delayed their signing a contract with Tri-Met earlier in the demonstration period. According to their transportation coordinator, a wheelchaired child frequently must wait up to 45

*Such instances will become increasingly common: a federal law now mandates that, whenever possible, handicapped children are to be "mainstreamed;" that is, integrated into regular classes or schools.

minutes alone in the hall to be picked up after school; this can be a frightening experience for a young child. Also, because a different LIFT driver may pick up the child each day, the driver may not know precisely where to pick up or deposit the child. In contrast, their own system allows school personnel or parents to call the dispatcher directly, and the same driver transports the same children each day. Relinquishing a child to the LIFT cuts down communication between parent, child, driver, and the district. If these problems could be solved, the school district would put more of their handicapped children on the LIFT: it costs $10 a day to transport a child (round-trip) in one of their 5- to 8-passenger vans; they pay the LIFT $6. The district would particularly like to use the LIFT for children who must be transported to and from therapy sessions during the day, but this program demands exact scheduling, something the LIFT is unable to guarantee.

8.3.3.6 Small Agencies - The smaller, nonprofit organizations contracting with the LIFT generally seemed well pleased with the service. For example, for Westside Schools, whose clients are severely retarded adults, the LIFT service has largely replaced volunteer transportation.* (The program also operates a 15-passenger van.) Problems with the LIFT concern the wide span of time which clients must allow in scheduling LIFT trips; the LIFT often arrives very early or very late, making it difficult for the client's parents to plan. Nevertheless, program staff say that the LIFT's administrative problems are outweighed by the trouble spared the

*Because the school has little money to subsidize client trips, the students mostly ride as general passengers, paying the $1 round-trip fare themselves. This is an example of the problem discussed in Section 8.3.2: clients riding in a general passenger status who could be agency funded. The $2.50 cost difference between agency-sponsored and general fare must be borne, then, by Tri-Met.

parents, who must otherwise drive the clients themselves. (As the clients are adults, many of their parents are quite elderly.) Staff members also suggested that education of the clients' parents regarding the LIFT might result in increased LIFT usage.

Another small, nonprofit organization, the Muscular Dystrophy Association, also finds the service useful. On the whole, according to MDA staff, the LIFT makes it easier to serve clients requiring regular transportation, as MDA can now contract with one provider rather than multiple providers. However, lateness has become a real problem, and return trips generally entail very long waits. More clients would be able to ride the LIFT if:

1. It ran on schedule,
2. Service extended beyond the city limits to the Tri-County area, and/or
3. Service were provided in the evening hours and on weekends.

8.3.3.7 Summary - The agencies and organizations contracting with the LIFT have experienced certain problems, such as vehicle lateness, the confusion over whether or not LIFT drivers are to escort clients to their doors, and the difficulty of scheduling rides. Despite the unequivocal statements by some agencies that the LIFT was providing an indispensable service to a number of their clients, the level of dissatisfaction with the LIFT among agencies contracting for LIFT service appears to be increasing.

The LIFT appears to best serve the needs of elderly clients whose trip purposes do not always require exact scheduling. It is less effective in serving the severely disabled clients of Vocational Rehabilitation Division or the students of Portland Public Schools whose needs demand precise scheduling.

Two problems cited by a number of the agencies have been resolved as follows:

1. The concern raised in agency interviews as to whether or not drivers were to provide escort assistance to clients was resolved in September 1978 when Tri-Met officially changed their service provision to read door-to-door rather than curb-to-curb. The majority of LIFT passengers need assistance from their door to the bus and from the bus to the door upon arriving at their destination. Agencies had difficulty finding escorts to assist their passengers, due to the long wait required of such volunteers while the passenger visited a doctor, hospital, or some other service organization. This policy change should ease this difficulty and also formally grant LIFT drivers recognition for the escort service that many of them have been providing for passengers since LIFT service began.
2. The 48-hour prescheduling requirement was cited as a problem by several agencies. This call-ahead time was lowered to 24 hours in August 1978. However, according to the AAA agencies interviewed in December 1978, this time reduction means little, as the LIFT can rarely accommodate trips scheduled 24 hours in advance. In actuality, the agencies continue to schedule most of their clients' trips a week in advance.

8.3.4 Impacts on Agencies When the Demonstration Ends

During the demonstration period, over 50% of LIFT costs have been met by a federal grant. If trip costs increase or the specialized service is discontinued once the demonstration ends, undoubtedly the AAA centers would be hardest hit financially, as they are the major contractor for LIFT

service. During the final survey, three of the senior centers were asked how these probable changes would affect their agencies.

Transportation costs for the eight AAA senior centers are paid for by the Department of Human Resources (DHR). If the price per LIFT trip were to increase when the demonstration ends, the effect on these individual centers "will be out of our hands," according to their directors. The majority of their trips are medical and shopping trips. If the central agency (DHR) were to continue subsidizing all medical trips, the number of trips provided would change little, because the shopping trips are already provided by an agency car or volunteer drivers (using their own cars) in order to provide the escort needed for shopping trips. (As noted earlier, the uncertain LIFT pick-up time becomes a heightened problem when an escort is involved.) On the other hand, the central agency could decide to fund trips on a percentage basis; i.e., allowing each of the centers a certain number of trips based on their client population. Such a policy would probably result in a reduction of the number of trips the downtown center could provide for its clients.

If the LIFT service were to be discontinued at the end of the demonstration period, another center states, "We would really be in bad shape. We have daily requests to provide free transportation service to supplement what the LIFT provides now." The staff would attempt to fill the void with other resources but question their ability to do this. When the demonstration began, this center was able to cut back their time and energy relative to providing transportation services because the LIFT system coordinated the provision of services for them and eliminated many of the problems they had in combining the previous diverse array of services. Discontinuation of LIFT service now would be a real loss.

The director of a third AAA center said that in spite of problems they have experienced with the LIFT, "It is still

the best idea I have seen and a better system than the one it replaced." He views Tri-Met as the best possible provider because of their overview of the transportation needs of the entire community. Private providers may be more "folksy" but do not have the same administrative competency and reliability. His final opinion: "I would hate to see the LIFT discontinued."

The Department of Vocational Rehabilitation spends $10,000 a month to transport their clients in the Portland metropolitan area. Of this amount, $1,000 is paid for trips provided by the LIFT (approximately 333 trips per month). If LIFT service were discontinued, providing these trips by alternative means would be much more costly, about $20 per round-trip vs. the LIFT cost of $6. If LIFT prices were increased, the effect would not be as great.

Impacts on the Division of Public Welfare (DPW) would be less severe than those on the two agencies discussed above because the 169 monthly trips now provided by the LIFT to welfare clients (see Table 8-3) are only a small portion of the total number of trips subsidized by DPW each month.

8.4 COORDINATION WITH PRIVATE PROVIDERS

8.4.1 LIFT Impact on Private, Nonprofit Transportation Providers

Two private, nonprofit transportation providers in the Portland area, Special Mobility Services and Metro Mobility, were affected by LIFT service. Personnel from these two organizations were interviewed in December 1978 in order to determine the impact of LIFT service on the transportation services they provide.

8.4.1.1 Special Mobility Services - Special Mobility Services (SMS) is a private, nonprofit organization providing transportation to seniors and handicapped persons. Through their Odyssey Club

they also run recreational and cultural programs. They operate 14 vans using retired persons as drivers.

As discussed previously, before the LIFT began operation, SMS provided transportation services for all Area Agency on Aging (AAA) clients at the eight senior service centers in Portland, averaging about 2500 trips per month. They provided service for two and a half years, the last six months under contract to Tri-Met. When SMS was informed, about a year in advance, that this contract would be awarded to the LIFT, they were promised a contract to provide services for four AAA agencies in adjacent Washington County. They now provide transportation services for three of these agencies; approximately 100,000 trips are provided per year.

In addition to this Washington County service, SMS provides service for Loaves and Fishes, transporting elderly persons to nutritional centers for a daily hot meal. In 1978 the Bureau of Human Resources (the organization through which the Title VII funds for meal delivery were channeled) decided to contract for these transportation services with the LIFT. However, pro-SMS forces embarked on an extensive letter-writing campaign to the City Council and staged demonstrations at city hall. As a result of these activities, the Council voted to allow SMS to continue providing this meal delivery service.* They are now under subcontract to Tri-Met to provide 43,000 trips per year for this purpose.

Thus, although the advent of LIFT service has had a significant impact on SMS in terms of the nature and location of transportation services the organization provides, it has not had the adverse impact of forcing them out of business or even significantly curtailing the amount of transportation services they provide. The total budget of SMS is now about $10,000-20,000 a

*Thus, due to a political turn of events the LIFT failed to receive a contract to provide this many-to-one type of trip, precisely the type of trip that is most cost-effective to provide.

year less than what it was before the LIFT began operation; the number of total client trips they provide is about the same.

8.4.1.2 Metro Mobility - Metro Mobility, a private, nonprofit organization, went out of business early in 1979. Prior to that time they provided door-to-door transportation service for handicapped and elderly persons in East Multnomah County using four 10-12 passenger vans.

Because Metro Mobility operated outside the Portland metropolitan area, they were not in competition with LIFT service which is limited, by contract, to operations within the city limits. LIFT personnel, in fact, at times called MM requesting that they transport a particular client, or if the LIFT had to turn down a client's transportation request, suggested that the agency or general passenger call MM as an alternative. LIFT service, thus, had no significant impact on Metro Mobility. The organization was forced out of business due to mismanagement.

8.4.2 LIFT Impact on Subcontracting Taxicab Companies

The LIFT contracted with three private companies for transportation service: Broadway Cab Company, Radio Cab Company, and Buck Ambulance Company. The two taxi providers were employed in those cases when taxi transportation was more cost-effective than LIFT bus transportation, as when a client's trip could not readily be combined with other trips scheduled for a given LIFT bus. By contract with Tri-Met, the two taxi companies, through a joint venture, have provided service to the LIFT on alternate months -- Broadway one month, Radio the next, etc. Service is provided at their standard meter rate (they also charge $9.00/hour for wait time) and includes other basic provisions such as insurance and licensing. The ambulance company operates three wheelchair vans, each of which is equipped to carry up to four wheelchairs; these were hired by

the LIFT in those instances when the client whose trip could not readily be accommodated by the LIFT bus is wheelchair-bound and therefore unable to transfer from the wheelchair to the seat of a taxi. This service proved expensive and complicated for Tri-Met, however, and by the end of the demonstration period, only the taxicab companies were being used by the LIFT.

Interviews with personnel from Broadway and Radio Cab Companies and Buck Ambulance Company were conducted in 1977 in order to determine the impacts of the LIFT service as reflected by total company billings, driver attitudes, and other aspects of company operations. In early 1979, a follow-up interview was conducted with the manager of Radio Cab to determine the impact of LIFT service then and his perspective on special needs transportation in Portland. These reports are presented later in this section.

According to Tri-Met staff, the operational history and experience with the private operators' providing supplemental special transportation services to the LIFT have been very positive. During the first months of the project, ride referral to the private providers was minimal. Specifically, between the start of LIFT service on December 20, 1976 and April 30, 1977, only 58 rides were referred by the LIFT controllers to private operators. However, with the advent of service to general passengers on May 2, 1977, and an increase in usage by clients of the Public Welfare Division, referrals jumped to 283 rides in May, 583 rides in June, and 986 rides in July, 1977. In general, the private providers handled the quantum leaps and ride referrals from Tri-Met well during the summer of 1977. Operational reliability and timeliness were generally good. Although, as with any transportation system, the private providers were sometimes late, the number of complaints received by the LIFT on the performance of the private providers has been minimal.

By 1979, the cab companies reported providing approximately 60-70 LIFT trips per day or 1950 trips per month, more than doubling the number provided a year before. Buck Ambulance Company, as mentioned before, was no longer being used for LIFT service. Radio Cab and Broadway Cab differed in their handling of the Tri-Met trips; on the whole, Radio Cab has been better able to accommodate to this special needs service and the manager expressed interest in expanding their ability to do so. Both cab companies were responsible for collecting the $.50 fare from general passengers.

8.4.2.1 Broadway Cab Company - Broadway Cab Company has 103 vehicles, all of which are operated by driver/owners; 17 vehicles are kept in reserve. Taxi rates are $1.00 for the flag drop and $.90 per mile.

The procedure for dispatching taxis to pick up and deliver LIFT clients works in the following way: one of the dispatchers places an order with the taxi company; the order lists the pick-up information, delivery information, and passenger information. In addition, the invoice number, in the upper right hand corner of Figure 8-1, is relayed over the phone to the taxi company. The taxi company copies down all the required information by hand. Then, at the time the client is to be picked up, the dispatch unit at the taxi company radios the necessary information to the taxi closest to the pick-up point; this taxi picks up the client. The driver records certain information on a special sales draft; included on the sales draft are the invoice number, starting mileage, ending mileage, date, address, and fare for the trip. When the client is ready to make his or her return trip home, the client calls Tri-Met, which calls the taxi company; the driver again records the necessary information. At the end of the day, these sales drafts are delivered to the taxi office where they are grouped with other appropriate invoices and stored. At the end of the month, the invoices and sales drafts are forwarded to Tri-Met.

SUBCONTRACTOR SPECIAL-NEEDS TRANSPORTATION INVOICE NO.: _____

DATE	ORDER TIME	SUBCONTRACTOR COMPANY
ORDERED BY	TAKEN BY	

Item	PICK-UP INFORMATION			SEQ	DELIVERY INFORMATION			PASSENGER				CARD	FARE
	Address	Actual Time	Agreed Time	SEQ	SEQ	Agreed Time	Address	Name	Hand	N/P	N/S	Reg'n. Number	CARD	FARE
A														
B														
C														
D														
E														
F														

Vehicle No.: _____ End Mileage: _____

Driver: _____ Start Mileage: _____

Dispatched by: _____ Trip Mileage: _____

Time: _____ Meter Fare or Mileage Charge: $_____

Extras (list): _____

Base Charge: $_____

Mileage Charge: (if applicable) $_____

Extras: $_____

No Shows: $_____

Fares Collected $[_____]

Invoice Amount: $_____

Form 31-623

ORIGINAL TO TRI-MET

FIGURE 8-1. DISPATCHER ORDER FORM

According to Broadway personnel, the taxi drivers carry passengers' parcels and packages and escort them to and from their doors when necessary. In such cases, the standard waiting charge of $9.00 per hour is applied. Apparently, however, some difficulties in collecting client fares have arisen: one general comment is that some LIFT clients are confused by the fare policy and, as a result, fail to bring sufficient money to pay for the taxi ride. In such cases, taxi operators have been providing the ride anyway.*

Broadway staff reported that the procedures involved in servicing Tri-Met have caused them some problems. Management changes at Broadway** and their unsophisticated bookkeeping system account for some of these problems. Drivers sometimes do not record all the information they need to bill Tri-Met. In addition, the fact that the drivers cannot turn in their Tri-Met tickets for cash until the end of the month means the slips are often lost and accounting problems arise. There are sometimes disputes between Tri-Met and the taxicab companies over the amounts charged for trips; the management changes at Broadway have meant that Tri-Met has often had difficulty finding the person responsible for handling and settling such disputes.

Another set of problems for Broadway Cab has arisen in scheduling the LIFT trips. They have tended to schedule recurring LIFT trips with specific drivers, thinking the driver's familiarity with the trip makes his service more efficient. However, this leaves the dispatcher out of the picture, and the company loses control over the drivers' timeliness and performance on these trips. Broadway Cab staff

*When general passengers ride the LIFT, they have occasionally forgotten the 50¢ fare; in this case, also, drivers have at times still delivered passengers.

**In the year 1978, Broadway had six new managers.

feel that some scheduling problems are due to the fact that passengers do not fully understand how to schedule a ride on LIFT service. For example, a client who has been taken to a certain destination by taxi will often simply call the taxi back when ready, thereby end-running the dispatch procedure. Both taxicab companies have difficulty because the Tri-Met generated trips come at the busiest part of the day.

Nevertheless, the Broadway Cab personnel feel, on the whole, that the service has been a boon to them. Of the total number of calls serviced per day by Broadway, the LIFT trips constitute less than 5%. The staff feels that the problems will work out in time, and that the number of trips obtained through the contract with Tri-Met far exceeds the number of trips lost due to the availability of the LIFT. They estimate that many of the trips being delivered by Tri-Met to handicapped and elderly persons, either through the taxi service or through the LIFT, are new trips: i.e., trips that would not have been made before the LIFT was available.

8.4.2.2 Radio Cab Company - Radio Cab Company is collectively owned and operated by 195 cab owners/drivers; many of the 121 cabs serving the Portland metropolitan area are owned by two owner/drivers. As noted above, Radio Cab alternates with Broadway Cab in providing back-up taxi service to the LIFT every other month. Radio Cab's rates are the same as those of Broadway: $1.00 is charged for the flag drop and an additional $.90 for each mile; 25¢ is charged for each additional passenger; $9.00 per hour is charged for waiting time in heavily congested traffic and similar circumstances. However, Radio Cab Company does not charge Tri-Met for time spent providing door-to-curb or curb-to-cab escort assistance to LIFT clients. According to a spokesman for the company, few of the LIFT clients served use wheelchairs or are otherwise severely handicapped; consequently, the amount of escort required is minimal.

Approximately 107 of Radio Cab's total fleet operate within the city limits of Portland. Radio treats Tri-Met generated trips like other trips, spreading them among available drivers and cars more or less randomly. As the company has transported many clients for the County's Welfare Division in the past, the drivers are well-accustomed to transporting disabled people. Few drivers have complained about the LIFT clients.

Like Broadway Cab, Radio reports that misunderstandings occur because of the way the system is set up. For example, sometimes the cab arrives on time but the passenger is not yet ready. The instructions are for the cab to wait five minutes and then leave. Then the person calls Tri-Met, perhaps ten minutes later, complaining that the cab never showed up and that they are now ready to be picked up. In circumstances like these, the cab company gets a bad reputation.

According to the company spokesman, the present system of coordination with Tri-Met is 98% efficient. Discrepancies between Tri-Met's records and those of Radio Cab are settled by the company manager. By agreement with Tri-Met, Radio Cab charges Tri-Met the basic $1.00 flag drop charge for "no-shows"; the incidence of "no-shows" among LIFT clients is no greater (or less) than among the general public, according to company personnel.

Radio Cab provides 7-9,000 trips per day overall and approximately 60-70 LIFT trips per day during their months of service. The LIFT trips, then, are about 1% of their business. During the months when they do Tri-Met business, they hire an additional dispatcher for three hours a day or 60 hours a month to help with bookkeeping and dispatching. In January 1979 the average cost per taxi trip was $5.37.

On the whole, the company is very pleased with their participation in the LIFT system. The scheduled LIFT rides are blending well with the cab's regular business, the

drivers have no complaints about the LIFT clients, and the billing and record-keeping procedures have not proved unduly burdensome. The company would be very willing to serve LIFT clients every month rather than just every other month.

In early February 1979, the Radio manager spoke of a growing plan to come up with a fixed rate for cab trips and to allow group riding in taxicabs. Under this new system the cab companies would get $5 for a single trip and $3 per person for shared riding. Under this system the cab companies will be able to group Tri-Met passengers with non-Tri-Met passengers. This is a purely experimental system, and Radio Cab has agreed to it. Broadway, however, has not agreed, possibly because it places such a burden on the dispatch staff in order to make money. For example, in order to make money on group trips, dispatchers would actually have to work at grouping them. Also, they would have to build an economical tour. Radio Cab is willing to do it alone in order to test the idea.

The manager of Radio Cab said that he felt that the LIFT would be continued because it is so well-integrated into the community. The big question is where the money will come from. He feels strongly that the existing equipment (i.e., the LIFT buses) should be utilized. He saw room for improvement in the eligibility in registration procedures. His drivers as well as LIFT drivers can see that people who really don't need the service are using it while others are not eligible who need it. A possible answer to this is to let Tri-Met certify eligibles.

8.4.2.3 Buck Ambulance Company - As discussed earlier, Tri-Met also contracted with the Buck Ambulance Company in September 1977 for wheelchair van service to be provided to wheelchair-bound LIFT clients who are unable to transfer from their wheelchairs to taxis. The company's main business is its ambulance division, which operates 35 ambulances. In

addition, Buck operates three wheelchair-equipped vans, each of which can carry up to four wheelchairs. The service operates 24 hours per day, seven days per week; its peak periods are weekdays from 8 AM to 5 PM.

Regular rates for the wheelchair van are $10.00 for pickup and $.60 per mile; however, under the terms of the contract with Tri-Met, Buck charged Tri-Met only $4.80 for pickup and $.45 per mile for each one-way trip. According to company personnel, the rates charged to Tri-Met did not cover transportation costs.

The dispatch procedure was similar to that employed by the taxi companies: Tri-Met called Buck to schedule a ride, at which time Buck took down the pick-up point and destination, the invoice number and passenger's name and Tri-Met ID number. Tri-Met also told Buck whether or not the client was a general passenger; if so, Buck collected $.50 from the client and deducted that amount from the client fare billed to Tri-Met. The van drivers provided door-to-door service without extra charge.

As of November 1977, Buck had only provided wheelchair van service to LIFT clients for three months, and monthly billings had not been great: $44.41 for the month of September (three clients served), and $50.60 for the month of October (six clients served). According to Buck personnel, Tri-Met rarely gave Buck advance notice of LIFT rides, and to that point, Buck provided no LIFT rides on a regularly-scheduled basis. Nevertheless, the company experienced no significant problems coordinating with Tri-Met for dispatching or billing.

The availability of the LIFT and of Metro Mobility caused a drop in business for the company, according to Buck personnel. Furthermore, the expense and need for advance notice in scheduling Buck trips meant using Buck was not a workable solution for Tri-Met; by 1979, Tri-Met had stopped contracting for trips with them altogether.

8.5 TRI-MET'S RESPONSE TO NEW LIFT/SNT RESPONSIBILITIES

This section covers Tri-Met's performance in its dual role as operator and coordinator of special needs transportation in Portland. The section begins by describing the impact of the LIFT demonstration on Tri-Met's internal operations. Then the emphasis shifts to an evaluation of Tri-Met's performance in these two roles. The analysis draws upon the material in Section 8.2 and the information in Chapters 6 and 7.

As Chapter 4 reported, Tri-Met's special needs transportation functions are carried out principally by the LIFT operations group and the special transportation coordinator in the Planning Department. The operations group, as the name implies, was responsible for operating the LIFT buses. This includes scheduling and dispatching trips and coordinating with private transportation providers as well as providing LIFT bus service. The special transportation coordinator has planning responsibility for Tri-Met's SNT policy, negotiates contracts with social service agencies and private providers, and serves as a day-to-day liaison to these outside parties on matters of a nonoperational nature. In addition to the LIFT operations group and the SNT coordinator, the Marketing Department, the Finance Department, and the legislative and press relations group within Tri-Met all participated in the LIFT/SNT effort. Finally, the presence of a transit union for drivers had a significant impact on both the operations, and indirectly the coordination, functions. This union presence must be considered when describing and evaluating Tri-Met's performance during this demonstration.

8.5.1 Operations Response

8.5.1.1 Drivers - The drivers for the LIFT buses were a carefully selected group. From the total population of 800

drivers, 170 volunteered for the LIFT service; of those, 20 were selected. Through negotiations with the union, Tri-Met arranged to select the LIFT drivers on the basis of five criteria: safety record, absenteeism record, sick-leave abuse, passenger complaints, and seniority. Despite the fact that the seniority criterion was accorded the least emphasis in the selection process, the union agreed to the criteria in an effort to assist the LIFT program in its initial phases, according to the director of LIFT operations.

Initially, the LIFT drivers experienced a number of problems. For example, although they were thoroughly familiar with the city of Portland, they did not always know precisely where to go when picking up and dropping off passengers, even though some of them had been taxi drivers before working for Tri-Met; this situation caused scheduling delays. Another early problem concerned the use of the radio: for the radio to be functional, dispatchers must use a variety of abbreviations, such as "J.C.C." for Jewish Community Center; this vernacular was confusing to drivers at first. A third start-up problem related to driver morale. Most drivers were unprepared for the experience of dealing for a full day with disabled people; in fact, some drivers have been on the verge of quitting their jobs as a result, according to the director of operations.

Many of the LIFT drivers interviewed by Crain & Associates expressed satisfaction with their shift from driving regular Tri-Met buses to driving LIFT buses: they found that the LIFT clientele are more appreciative, their schedules were less pressured, and the overall job was more psychologically satisfying. However, the drivers also articulated a number of issues which concerned them. The problems mentioned most frequently during the first year of the demonstration included the following:

1. The wheelchair lift apparatus often failed to operate correctly.
2. The diesel engines were very noisy.
3. The air-conditioning equipment in the LIFT buses often malfunctioned; also, the air vent is located near the roof of the bus so that the cool air failed to circulate through the bus satisfactorily.
4. Due to lack of available maintenance expertise, drivers often had to repair their own buses.*
5. LIFT drivers did not receive overtime pay nearly as frequently as the regular Tri-Met drivers, due to the limited hours of operation of the LIFT.
6. Agencies often failed to notify Tri-Met of ride cancellations; thus, LIFT drivers wasted time on unnecessary trips.
7. Tri-Met's official curb-to-curb policy was at odds with the needs of the LIFT clients and with the actual behavior of the LIFT drivers.

Many of these early driver concerns were addressed by management during the course of the demonstration or were resolved through experience gained in the early months of operation. First, in response to the complaint about noisy engines (passengers also had commented on this), sound-absorbing hoods for the diesel motors were purchased. This reduced the noise noticeably. Second, as the maintenance department became better trained in the repair of the Mercedes-Benz diesel engine, the maintenance problems lessened. With regard to irksome late cancellations and no-shows: as the demonstration progressed, agencies and general passengers grew more reliable in their scheduling and use of the LIFT and the incidence of no-shows and late cancellations was reduced to a negligible number.

*Each driver was assigned to a specific bus.

The issue of pick-up policy affected the agencies contracting for LIFT service as well as LIFT clients and drivers, and therefore merits further elaboration. According to Tri-Met regulations, the LIFT provided door-to-door service; drivers were expected to assist passengers onto the buses and off again at their destinations. LIFT drivers were not required to provide escort assistance to passengers; i.e., to assist them from their homes to the curb and vice versa. According to LIFT drivers, they were only insured on the sidewalk and within the LIFT buses; they enter passengers' homes (to drop off groceries, etc.) at their own risk. Nevertheless, on-board survey data show that a significant proportion (at least 50%) of LIFT riders require escort assistance from their doors to the LIFT bus.

This situation created a fair amount of confusion and ill will among LIFT drivers, passengers, and agency personnel. Most drivers provided the additional escort assistance when required, despite the official Tri-Met curb-to-curb policy. Accordingly, many agencies scheduled rides for clients requiring such assistance without providing a client escort. However, other agencies, such as the Department of Public Welfare (DPW), assumed that the LIFT provided only curb-to-curb service. Because many DPW clients could not get to the waiting area for the LIFT bus, DPW staff generally sought an alternative means of transportation rather than use the LIFT for these clients.

Midway through the second year of the demonstration, Tri-Met changed the curb-to-curb policy to a door-to-door policy, thereby officially recognizing the fact that drivers inevitably had to assist a good number of clients to and from their residences. The present policy encourages passengers to be ready and waiting at the curb, if possible, but acknowledges that many clients require door-to-door assistance.

Thus, while the driver's job has not been made any easier by this policy revision, at least the conflicting pressures and expectations on drivers have been somewhat eased.

8.5.1.2 Accounting - One issue of the demonstration was the transit operator's ability to handle the multiple billing arrangements required in providing social service agency-sponsored trips on the LIFT. In the Portland demonstration, billings were to have been handled automatically by the AFIR equipment and the Boeing software services. As the experiment evolved, however, the AFIRs were discontinued. Trip information is now normally keypunched to disk instead, and at the end of the month is processed by the Boeing software system. This computerized billing information is then forwarded by the finance department to the respective agencies. So far, this procedure has worked reasonably well. Agencies accept the computer print-out they receive from Tri-Met as the billing document, according to Tri-Met staff; apparently, the agency records are not sufficient to doublecheck Tri-Met's bills. So far there have been no late payments, although some agencies take longer than others. Tri-Met is planning to handle its own data processing for billing purposes when the demonstration ends.

Some Tri-Met staff members feel, however, that the taxi operators, Broadway and Radio Cab Companies, are not geared up to handle the large volume of charges, that their record-keeping capabilities are inadequate to process all of the paperwork. Problems arose when the drivers' trip sheets did not match the dispatcher's records or Tri-Met's records; for example, according to Tri-Met's records, some people have ridden in taxis but their rides have not been billed to Tri-Met by the taxi companies. Some of these problems arose because clients are not aware of how the system works. For example, a client who has been transported to a hospital by

Broadway Cab and is ready to leave might simply call the cab again, assuming that the return trip will be paid for by Tri-Met. This conflicts with the dispatch and coordination procedures that have been worked out between Tri-Met and the taxi company, whereby the client calls Tri-Met and Tri-Met notifies the taxi company that the client is ready. In other instances, drivers may not accurately record all of the information needed for a bill. These types of problems were gradually resolved through continuing communication as the demonstration progressed.

8.5.1.3 Marketing - When the LIFT project began, the advertising and promotion manager was given responsibility for overseeing development of the logo and paint design for the LIFT service, developing the LIFT brochures and user's guides, and updating the brochures and advertising posters that were sent to all agencies. The LIFT did not constitute a major burden for the Marketing Department: since the entire Tri-Met marketing program is broken out into projects, the LIFT is simply regarded as another project, and not a very big one at that. Furthermore, no advertising is purchased for the LIFT; however, according to staff estimates, approximately $1500 worth of air-time for LIFT publicity was donated free of charge during the first year through televised public service announcements. In addition, radio stations have publicized the LIFT service via 20-second announcements. The public response to this type of advertising has been good, according to marketing staff.

The Customer Service Department assumed much of the responsibility for furnishing LIFT information to general passengers who require assistance in registering for, and training in the use of, the LIFT. Agency passengers have generally received such instruction from their respective agencies.

8.5.1.4 Legislative and Press Relations - The manager of LIFT legislative and press relations writes press releases and monthly newsletters for the LIFT; the LIFT newsletter is sent to all agencies and organizations who have contracted with Tri-Met for LIFT service. Legislators and neighborhood associations are also contacted; they publicize the LIFT in their own newsletters. In this way, the LIFT receives broad exposure. Nevertheless, maintaining a high level of public exposure on the LIFT service is difficult, according to staff members, since the latter is not characterized by recurrent "attention-getting" events.

8.5.2 Union Response

The Tri-Met union has had a major impact on the special needs transportation program as it evolved during the demonstration. The impact was most significantly felt (1) in the cost of LIFT operations, (2) in the various work rules governing LIFT drivers, and (3) on the policy decisions regarding who would provide special needs transportation in Portland. Since the impacts on (1) and (2) are described in Chapter 6, there is no need to repeat them here.

Union impacts discussed here on SNT policy decisions regarding the provision of SNT services fall into two categories: direct impacts on policy and constraints or perceived constraints on management SNT policy decisions.

An example of a direct union impact on policy occurred midway in the demonstration when it became clear that increased use of taxi services, particularly for the many-to-many trips, would be more cost-effective than use of the union driver-operated LIFT buses. Because the LIFT is partially funded by federal demonstration funds, all expenditures for non-union labor must be cleared with the local union in accordance with 13(c) provisions. These provisions guarantee some amount of union control over how demonstration funds are spent.

Thus, when Tri-Met wanted to redirect some of the demonstration funds towards purchase of non-union taxi services, the union had to be consulted. Ultimately, the union agreed that the budget allotment for taxis could be doubled from around $50,000/year to about $100,000/year; however, reaching this agreement took several months during which time total service capacity was constrained and average SNT trip costs remained higher than they would have been if the taxis had been more fully utilized.

Implicit union constraints on policy decisions are exemplified by Tri-Met's options for deploying LIFT vehicles. Analysis shows that Tri-Met could save money, after the demonstration ends, by leasing the Tri-Met owned vehicles to a private operator and contracting with the operator to provide SNT trips. This strategy would avoid the high labor costs associated with Tri-Met operations. However, management has not fully explored this alternative because of the union's position that as long as Tri-Met owns the buses, union drivers will drive them. Thus, the union impacts SNT policy by constraining the options management may have to provide the service.

The above discussion should not be construed to mean that the union presence removes all management flexibility. Tri-Met's union has been most cooperative in such issues as driver selection (discussed earlier) and adherence to negotiated work rules governing main line operations. (The LIFT drivers have not always followed these rules.) One reason for union cooperation is that the LIFT drivers are a very small part of total union membership and therefore their control over union policy is not significant. Another reason is that provision of special needs transportation is perceived as a valuable and popular public service in Portland and the union does not wish to be viewed as an impediment to the provision of this service.

LIFT drivers and controllers at times feel the union does not represent their interests as well as it could. Specifically, they feel their job is harder than that of the main line operators and that they should be paid more. To date the union has not recognized this difference.

8.5.3 Evaluation of Tri-Met's Performance as Operator

In evaluating Tri-Met's performance in its operator role we consider here both Tri-Met's capability in providing the service and the appropriateness of its role as an operator. Appropriateness in this sense means cost-effectiveness of the LIFT vis-à-vis alternative forms of SNT service.

The two-year LIFT demonstration has clearly proven that a transit operator can successfully operate a special needs transportation service. The LIFT service marketed, scheduled, dispatched and transported over 150,000 trips during the period. Passengers were enthusiastic about the quality of the service; agencies who used it have grown to rely on it for many of their clients' trip needs. Tri-Met, although having some internal problems and initial adjustments, seems to have successfully integrated the LIFT operations into its overall operations.

In addition, Tri-Met has demonstrated an impressive ability to be responsive to both agencies and clients and has implemented a number of measures to improve operations. Some examples of this responsiveness, cited previously in the report, are:

1. Change in service hours to meet demand,
2. Operational improvements to lower costs during the second year,
3. Revision of LIFT eligibility policies to eliminate the income criterion,
4. Improved timeliness and reliability during the second year, and

5. Doubling of the budget for taxi trips during the second year.

Despite these successes, Tri-Met never did meet its original ridership goals (850 rides per day) or cost targets ($3.00 per trip). Furthermore, agency registration and LIFT use by agency passengers did not materialize as expected.

The gap between demand goals and results can be principally explained by the fact that the goals were unrealistically high to begin with and the type of demand expected did not materialize, i.e., the high number of difficult and time-consuming many-to-many medical trips which developed precluded the opportunity of obtaining higher ridership figures. The LIFT capacity with this type of demand proved to be less than one-half of the original goal.

The gap between agency use of the service and expectations of that use has several explanations. As the discussion in Section 8.3 showed, many of the agencies had very specific trip and travel time needs. The LIFT simply could not -- and should never have been expected to -- meet these needs. Secondly, the demonstration nature of the project probably made agencies reluctant to abandon their own transportation resources in favor of the LIFT, particularly when they also wished to be assured of being able to control the timeliness of the service.

In addition to these reservations about the LIFT's ability to service the range of SNT demand that existed in Portland, the major reservation about Tri-Met's role as an operator is cost. As Chapter 7 documented, the cost of a LIFT trip is much higher than the private sector alternative, primarily due to the higher union wage rates. This means that with a fixed set of funds many more trips could be offered through the private sector than through the LIFT. Tri-Met simply cannot operate an SNT service in a cost-

effective manner when compared with available private alternatives. Any justification for continuation of LIFT service must be derived from reasons other than cost. These reasons are presented and assessed in the next section.

8.5.4 Tri-Met as Coordinator of SNT Service

8.5.4.1 Coordination/Consolidation Criteria - Coordination or consolidation of special needs transportation efforts should be undertaken when there is a reasonable opportunity to either reduce the unit cost of transportation services and/or increase the effectiveness of the SNT service. Therefore, in evaluating Tri-Met's coordination/consolidation role during the two-year demonstration period, the report will analyze the degree to which these efforts resulted in increased SNT efficiency and effectiveness. Efficiency can be assessed by analyzing the criterion of cost per unit of transportation delivered; effectiveness criteria must take into account any improvements in coverage, service reliability or safety obtained through increased coordination/consolidation. The Tri-Met LIFT project has elements of both a coordination and consolidation transportation system management approach. The consolidation aspect is the control provision of service: service that was formerly provided by several agencies has now been centralized and consolidated in the LIFT program. However, there is extensive coordination in the scheduling of service, and in the overall planning of SNT service for the areas served.

8.5.4.2 Efficiency - Section 8.3 concluded that the LIFT only slightly increased (by 7%) the number of trips for AAA clients between 1976 (before the LIFT project) and 1977 and that this same client group received about the same number

of trips in 1978. This section focuses on the following question: what has been the LIFT impact on the government's cost of transporting this client group over the two-year demonstration period? The analysis is based upon the following assumptions:

1. The cost of providing a trip by non-LIFT modes, i.e., Metro Mobility, paid staff, volunteer drivers, averaged $3.00 to $4.00 over the demonstration period.
2. LIFT system trip costs used in the analysis are a prorated average of taxi and LIFT system costs for the respective years based upon the percentage of taxi and LIFT trips provided.
3. The actual number of AAA client trips on the LIFT was the same in 1978 as it was in 1977 -- 39,460. Although AAA agencies estimate that only 28,960 LIFT trips were provided in 1978, this analysis assumes that the 10,500 trip difference (39,460 - 28,960) between 1977 and 1978 is accounted for by AAA clients who rode as general passengers in 1978.

Table 8-6 shows that in 1976 the AAA client group was transported by SMS and other modes described above. In 1977 the LIFT assumed SMS' role and transportation by other modes decreased, partially due to the availability of the LIFT. Total costs to the government between 1976 and 1977 increased from $145,560 to $343,830. In 1978 AAA clients were again transported by the LIFT system and other modes and the total cost was $308,260. Throughout the three-year period the total annual number of AAA client trips was stable at about 50,000 trips.

The cost implications of this analysis are clear. Introduction of the LIFT service to AAA agencies more than doubled the public cost of transporting this client group. Second year (1978)

efforts to increase productivity and thereby reduce costs were moderately successful, but 1978 costs still did not come close to the 1976 figures. Ironically, a small part of the 1978 cost reduction--$5,000--was achieved because AAA clients subsidized by their agencies in 1977 paid $.50 as general passengers in 1978. If we assume that 1978 trips could still be provided at the $3.00 to $4.00 cost, the $308,260 in government funds could have purchased 103,000 trips in 1978 for AAA clients instead of the 52,000 actually provided.

TABLE 8-6.

GOVERNMENT COST OF TRANSPORTING AAA CLIENTS[a]

	(Before Project)	Year	
	1976	1977	1978
Mode			
LIFT	-	$306,600[b]	$270,580[d]
SMS	$89,310		
Other	$56,250	$37,230[c]	$37,680[e]
TOTAL	$145,560	$343,830	$308,260
Cost/Trip	$3.00	$6.63	$5.94

a. It is estimated that about 50,000 trips were delivered each year

b. 39,460 trips x $7.77 average cost/trip

c. 12,410 trips at a cost of $3.00/trip

d. 28,960 trips x $6.99 cost/trip + 10,500 trips x ($6.00 - .50).

e. 12,560 trips x $3.00/trip

8.5.4.3 Effectiveness - The LIFT program has clearly improved the SNT coverage for Portland. Before 1976, unaffiliated transportation handicapped persons had no alternative public transportation available. By November 1978, 5914 persons had registered for the LIFT as general passengers (not affiliated with a social service agency) and in a given month 25% of these people took 7600 trips on the LIFT. Chapter 5 documented the impact of the LIFT on this general TH group.

The LIFT did not extend coverage for agency-affiliated passengers, but, as Table 8-6 showed, simply assumed responsibility for transporting agency TH from private providers.

Chapter 6 showed that there were negligible differences between levels of service (as indicated by reliability, wait time, etc.) of the LIFT program and the private providers. Scheduling was slightly more difficult with the LIFT than with taxis or SMS because the LIFT had to serve a more diverse group of trip needs and therefore had to schedule two (later reduced to one) day in advance.

8.5.5 Summary

Figure 8-2 shows how the roles of the three groups involved in SNT in Portland evolved during the LIFT demonstration. Since 1976 Tri-Met has emerged as a clear leader of the SNT coordination effort in Portland. There appear to be several reasons for the role shifts that have taken place.

1. The LIFT program symbolically positioned Tri-Met as the lead agency for special needs transportation. The buses are a visible sign that Tri-Met has a concern for the needs of Portland's TH and is assuming responsibility for the SNT function. The community is now supporting Tri-Met in that role.
2. The presence of federal funding for the LIFT project lessened the potential for resistance

FIGURE 8-2.

ROLES IN PORTLAND SPECIAL NEEDS TRANSPORTATION

	Before Demonstration	During Demonstration	After Demonstration
TRI-MET	None	Planning, coordination, provision of SNT scheduling operation	Enhanced role in planning, coordination; diminished role in providing service; increased funding role
SOCIAL SERVICE AGENCIES	Scheduled and provided SNT; bought services from private providers	Funded, operated transportation for clients; subcontracted trips to LIFT	Decreased role in funding, maintained operator status; continued to use contracted services, e.g., LIFT
TAXICABS	None	Increasing share of SNT market as contractor	Increasing share of SNT market as contractor
PRIVATE NONPROFIT PROVIDERS	Major operators of SNT service	Role as SNT operator in Portland eliminated	SNT operator in Portland again
Metro Mobility	Numerous trips outside city; few within city limits	Confined to markets outside city	Went out of business
SMS	Serviced AAA agencies	Confined to markets outside city	Regained a share of Portland market via subcontract to Tri-Met

from the private providers and social service agencies. With more money available, the social service agencies could easily transfer some of the financial and operational burden of special needs transportation to another agency. The private providers saw that in the long run this meant opportunities for increased business due to the growing emphasis on special needs transportation. Thus all institutions could realize their goals because of the increased funding.

3. No other agency in Portland was prepared to assume the SNT leadership role. Governmental institutions other than Tri-Met did not have the knowledge of transportation marketing, planning and operations that Tri-Met had. Private providers (i.e., taxi companies and nonprofit groups such as SMS) were not large enough to assume city-wide responsibility and were fearful of the regulations, red tape, and political pressure that would accompany the role.
4. Tri-Met is a convenient and logical funding channel for special needs transportation monies. Furthermore, the agency has its own taxing base and is therefore a source of continuing SNT funding.

Tri-Met's coordination leadership through the LIFT program has increased effectiveness of special needs transportation in Portland by making public transit available to persons who would not otherwise have been able to make key trips or would have had to rely on a less convenient mode. Furthermore, the project has demonstrated that a paratransit service operated by a public transit operator can be responsive to the needs of passengers and their social service agency sponsors. Finally, the LIFT

program has demonstrated that a transit operator can implement operational changes to improve efficiency.

The cost savings potential in Tri-Met's coordination of agency trips has not yet materialized. The LIFT program has increased the money available for SNT service, but these extra dollars have been consumed by the higher cost of the LIFT service. The short-run impact of the LIFT has been to double the cost of agency transportation without providing more trips. Moreover, social service agencies have not significantly decreased the number of drivers and vehicles they use to transport clients themselves. Agency staff time devoted to transporting clients has decreased somewhat, however.

Despite the short term increase in cost of special needs transportation for agency trips, there is an indication that the potential cost savings that increased coordination promises can be achieved in the long run. As the demonstration drew to a close, Tri-Met had proposed a 14% increase in special transportation monies but had decided to increase utilization of the less expensive private sector resources and to decrease use of the more expensive LIFT. Table 8-7 compares the regional TH budget estimates for fiscal years 1978-79 with 1979-80. The table indicates a proposed cut in the LIFT budget from %540,000 to $445,000; meanwhile subcontracts to taxis and non-profit private providers will almost double.

TABLE 8-7.

PORTLAND REGIONAL TH BUDGETS:
Estimates FY 78-79 and 79-80

	FY 78-79	FY 79-80
LIFT	$540,000	$445,000
Subcontracted Services	156,000	308,000
Planning/Coordination	25,000	35,000
Rural Services	60,000	100,000
Programs for the Retarded	2,000	3,000
Accessible Buses	-0-	?
	$783,000	$891,000

Tri-Met's dual role as operator and coordinator of special needs transportation presents the potential for conflict. As coordinator, Tri-Met's duty is to maximize SNT efficiency by utilizing the most cost-effective transportation services available to the maximum extent possible. As an operator of the LIFT, Tri-Met has a natural tendency to perpetuate and improve on the service it provides, i.e., the LIFT. These goals came into conflict because the LIFT is much more expensive than other modes. As shown above, Tri-Met resolved that conflict on an interim basis by increasing the subcontract budget and decreasing LIFT monies. One cannot help wondering, however, what the fate of the LIFT would have been if it had not been part of the agency responsible for much of the SNT funding.

In summary, the LIFT program, while not cost-effective compared with available SNT alternatives, has proven invaluable in establishing Tri-Met as the lead agency for regional coordination efforts. Furthermore, the program has made public transportation available for the first time to non-agency affiliated TH passengers. Its operation has been a visible sign of community and institutional commitment to the needs of the transportation handicapped. It appears that Tri-Met, in its new role as regional coordinator of SNT funding and programs, is making progress towards realizing the supposed efficiencies associated with increased coordination and consolication of transportation resources. It is too soon to tell, however, whether the transit operator can successfully achieve these coordination/consolidation objectives.

9. SUMMARY AND CONCLUSIONS

The purpose of this chapter is to summarize the results of the two-year LIFT demonstration in Portland, to report findings regarding the workability, cost-effectiveness, and impact of this method of providing special needs transportation, and to indicate transferable findings applicable to other cities planning to coordinate or consolidate transportation resources to serve the handicapped and elderly market. This summary is based on the results and analysis reported in the preceding chapters.

Lessons from the Portland experiment can be useful in addressing two distinct issues regarding the workability of the LIFT concept:

1. The usefulness of paratransit per se as a means of providing special needs transportation, and
2. Specifically, the appropriateness of a transit operator's operating this dial-a-ride service for the TH market.

Findings from the Portland experience address both of these issues.

While attention has focused on the operational aspects of the LIFT demonstration, it is important to understand that the transit operator was (and is) assuming a leadership role in special needs transportation (SNT) in the Portland metropolitan area through coordinating the funding and resources of all users and suppliers of SNT service. This chapter reports useful transferable findings regarding Tri-Met's role as coordinator of SNT service and the integration of the LIFT into the overall coordination effort.

The Portland demonstration offers complete documentable results on the operations aspect of the LIFT. The two

years of experience have produced transferable findings on the transit operator's capability to operate an SNT service and on Tri-Met's ability to coordinate--from an operational and procedural standpoint--the efforts of users and suppliers of the service. However, it is not clear that the coordination efforts Tri-Met has undertaken will lead to the supposed benefits of coordination; i.e., improved efficiency and effectiveness of service to the TH market.

9.1 DEMAND

By the end of the two-year demonstration period, 5914 persons had been registered for LIFT service. Forty percent were general passengers who apply for registration and arrange their trips on an individual basis; sixty percent were agency-sponsored passengers. The Area Agency on Aging, which sponsors eight senior service centers throughout Portland, and the Public Welfare Division account for about 90% of the agency-sponsored clients. Registration records indicate that the demographic profile of the registered group closely parallels the profile of the overall TH population in terms of sex, age, and mobility-limiting handicaps.

The number of persons in Portland who have trouble using regular bus service, the transportation handicapped population, is estimated to be 22,000 persons.* Thus market penetration, in terms of the 5914 persons registered for LIFT service, is 27%. This penetration rate is much higher if the target market is more realistically defined as being those TH persons who do not have access to alternative forms of transportation, i.e., an automobile or taxis. The predemonstration survey indicates that 54% of the overall TH

*Based on the predemonstration household survey and the report cited earlier.

population state that an auto is "always" or "usually" available (either as a driver or as a passenger) for their transportation needs. If this group (approximately 12,000 persons) were subtracted from the total TH group, a more realistic target market figure of 10,000 would result, and the LIFT has achieved a penetration rate of 59%.

LIFT ridership rose steadily during the two-year demonstration. During 1978, the LIFT provided an average of 370 trips per day; 18% of these trips were by LIFT-sponsored taxis and 17% of all trips were taken by persons using a wheelchair. The average number of trips taken by users in a given week is two. General passengers have a slightly higher trip rate than do agency-sponsored passengers; 55% of all LIFT trips are taken by general passengers, although they comprise only 40% of registered clients. Major trip purposes are medical/dental visits, school attendance, and social/recreational activities.

Although only 20-25% of registered persons actually use LIFT service in a given month, the LIFT has a significant impact on the lives of these regular users. Survey data indicate that the LIFT accounts for a high percentage of trips for those people using the LIFT frequently. One-fourth of the riders surveyed state that without LIFT service they would be forced to forego the trips they are making, and those who have the option of switching to alternative modes view them as more costly and less convenient than LIFT service. Thus, it is clear that the LIFT provides an important and in many cases unduplicable service to a significant portion of the TH population.

The main reason why many eligible people do not use the LIFT is that they do not need this specialized type of service; they are better able to provide alternative means of transportation than are persons who do use the LIFT. Seventy-five percent of the trips the nonuser group reported making were accomplished in their own car, as a

passenger in another's car, or on a regular bus. In contrast, only 25% of user trips were made by these modes. Thus, car ownership and availability is the most significant indicator of the likelihood of a person's registering for and using LIFT service.

9.2 LEVEL OF SERVICE

9.2.1 Description of Service

The LIFT SNT system consists of transportation service provided by LIFT buses supplemented by local taxi service. Once the program was fully under way, the LIFT provided between 88 and 96 hours of service per day during the two-year period, the number of taxi trips per day ranged from 30-40 during the first year (when only $55,000 was available for taxi service) to about 70-80 trips per day in the second year (when the money for taxi service was doubled).

The LIFT service is priced significantly lower than the alternative available SNT modes. General passengers pay 50¢ per trip compared with $5.20 they would have to pay for a taxi ride of the same length. Agencies which pay $3.00 per regular trip and $1.50 for grouped passengers on the LIFT save between zero and $2.50 per trip compared with modes they had been using before December 1976.

In addition to the buses, the LIFT system includes the centralized dispatching and control function. Controllers receive and record trip requests from agencies for their clients and from general passengers, schedule LIFT buses, and assign groups to a LIFT tour or to the supplemental taxi service. The controllers are in communication with LIFT drivers via radio.

9.2.2 System Performance

9.2.2.1 Equipment - Overall, Tri-Met has been satisfied with the performance of the Mercedes-Benz buses. Initial maintenance problems have been overcome, and the buses have proven themselves to be reliable equipment.

The reservations that have been registered relate to the jerkiness of the ride (particularly when the buses shift gears) and the noise the diesel engines make. Passengers, drivers, and managers agree that these features of the bus are less than desirable. Early in the demonstration, Tri-Met installed hoods on the engines to deaden the noise. The only way to lessen the passenger discomfort caused when the buses shift gears is for the drivers to accelerate as smoothly as possible.

The Automated Fare Identification Recorders (AFIRs) were automated fare boxes installed on the buses to facilitate the collection of fares and the billing of social service agencies. The fare boxes were designed to read ID numbers from the passenger's card and to encode that information on computer tape for processing at the end of the day. This technological innovation, the AFIRs, did not receive a complete test in Portland due to mechanical failure of the fare boxes. The three major reasons for the failure of the equipment were:

1. Inadequate performance with regard to original specifications and a series of component failures,
2. Tri-Met's failure to maintain the fare boxes to the standards prescribed, and
3. The original specifications not taking into account the extreme temperatures, wear, and dirt that occurred in the operating environment, i.e., the machines not being built to withstand the conditions on the bus.

9.2.2.2 Scheduling - In order to provide the LIFT dispatch system with enough time to schedule productive tours, a two-day advance reservation system was implemented. This advance planning requirement was also thought to restrict demand to the most pressing needs. In practice, this two-day advance planning stretched into longer periods, as the LIFT schedule was often filled as much as five days beforehand.

Both agencies and general passengers complained about this advance scheduling time-period: passengers were simply not able to plan their trips that far in advance. In response to this complaint, Tri-Met reduced the advance reservation time to 24 hours. However, due to the limited LIFT capacity and the large number of trips that are scheduled on a recurring basis, users are still not assured of reserving a ride if they call in close to the 24-hour deadline.

9.2.2.3 Reliability - LIFT bus reliability varies depending upon the time of day and the vehicle coverage. In 1977, the LIFT was, on average, 20 minutes late for pick-ups during the 9-10 AM peak period, and for the rest of the day fluctuated but declined to an average low of 6 minutes late between 4-5 PM. Overall, the buses averaged 12 minutes late for pick-up during 1977; in 1978, reliability improved somewhat. This improvement was due to increased efficiency in the dispatch and scheduling functions and the increased use of taxis to relieve peak-period pressures. Average lateness was nine minutes for the periods sampled in 1978. It is important to remember that in both years the controllers were aware of critical delivery times (i.e., work, doctors' appointments) and could adjust bus schedules to meet these times. The survey results show that the mean delivery time was eight minutes early. Another measure of system performance is trip time, i.e., the amount of time the passenger

must spend traveling to arrive at his/her destination. The 1977 and 1978 average trip times were 22 and 28 minutes, respectively. Assuming a 4.3 mile average trip length, the travel speed from origin to destination was 12 mph in 1977 and 9 mph in 1978.

9.2.2.4 Client Assessment of LIFT Service - LIFT users, by and large, are enthusiastic about the LIFT and particularly complimentary of the Tri-Met drivers who also serve as escorts. There is some dissatisfaction about the noise and jerky ride but, generally, clients seemed pleased with the service. They seem to understand and accept the reliability problems reported earlier as a necessary by-product of the special needs transportation system.

9.2.2.5 Taxi Service - The taxi component of the LIFT SNT system also receives favorable ratings from users. In fact, more people who have used both modes prefer taxis because of ride comfort, timeliness, ease of scheduling, and the shorter travel times involved. Passengers potentially have more scheduling flexibility with taxis because the trips do not have to be grouped into a tour, as on the LIFT, and taxis agree to make pick-ups at any time. For obvious reasons, wheelchair passengers much prefer the LIFT to taxi service. LIFT drivers are rated slightly higher than taxi drivers on courtesy and helpfulness, although most taxi passengers feel that the cab drivers were satisfactory also.

By most objective level-of-service measures, the taxi provides better service than the LIFT. Taxis are more reliable in picking up people on time and, because they travel a direct route, travel times in a cab are less than half the time required on the LIFT. The comfort of the ride is naturally greater and passengers report less noise with taxis than on the LIFT.

In spite of the clear objective superiority of taxis as a travel mode for most passengers, taxis are not heavily preferred to the LIFT mode. The LIFT drivers contribute to that mode's image as the service that "understands the needs of the handicapped" and for this reason the LIFT is very popular among its TH clientele.

9.3 COST-EFFECTIVENESS

The LIFT is not a cost-effective means of providing special needs transportation to handicapped and elderly persons. There are available alternatives in Portland that provide equivalent or better service at less cost. This conclusion was reported in the interim report after the first year of experience with the LIFT system; however, at that time, there was hope that recommended operational improvements could significantly lower costs. During 1978, most of these recommended changes were implemented, efficiency improved, and trip costs decreased slightly despite the rise in labor and materials costs. The LIFT was operating as efficiently as could be expected given the nature of the clientele it was serving. Nevertheless, total LIFT trip cost is still about $2.00 above the private-sector rate for similar service. The factors contributing to the high cost of LIFT service (see below) make it clear that the LIFT will never be competitive with privately financed and privately operated special needs transportation.

The primary reasons for high LIFT costs are the fact that the service is very labor-intensive and union wage rates are high. Labor costs, including payroll and payroll-related overhead expenses, account for 86% of LIFT operating cost (72% of total cost). The wage rates (excluding benefits) for drivers as of the end of 1978 were $8.61 per hour; controllers earned $9.11 per hour. These rates are more than

60% above the market rate in the private sector. Furthermore, there is reason to believe that the differential between the Tri-Met and private-sector wage rates will grow: between 1977 and 1978, LIFT driver wage rates rose over 8% while the taxi fares, an indirect measure of private-sector wage rates, remained stable.

Other reasons for the relatively high LIFT costs are as follows:

1. Low demand density. The LIFT only serves TH people and therefore consumes considerable time deadheading to reach a widely dispersed clientele.
2. Relatively high capital and finance costs. These run at about $1.55 per trip (17% of total trip cost) at current operating levels. This $1.55 capital and finance cost is about $1.20 per trip greater than the taxi cost, estimated at 35¢ for a five-mile trip.
3. Inflexible union work rules. These make it difficult to match service supply with demand. Drivers and controllers are guaranteed a fixed schedule and a 40-hour work week regardless of demand. Therefore, when demand is slack, Tri-Met still incurs labor costs. In contrast, taxi companies do not incur labor costs when demand is down—the drivers simply do not get paid for dead time.
4. It appears that the dispatch level of effort is high, at about 6 minutes per trip compared with the estimated taxi labor cost of 1-1/2 minutes per trip.
5. Tri-Met's agency-wide budgetary cutbacks in the second year of the demonstration resulted in the LIFT's operating at a higher cost level than could have been obtained if full capacity had been utilized. In 1978, only 11 of the 15 buses were used

regularly. Analysis performed in 1978 showed that as trips per day increased, LIFT-system costs per day decreased when the fixed costs (e.g., controllers) were spread over a higher volume of trips. Thus, a decrease in the capacity and demand served to raise unit trip costs.

9.4 PARATRANSIT AS AN SNT OPTION

Paratransit is one of two main policy options available for serving the needs of the transportation handicapped. The following conclusions from the LIFT demonstration address some advantages of paratransit's serving the needs of this TH segment.

1. The LIFT demonstration proves that a coordinated paratransit system can serve the needs of the TH. The LIFT, supplemented by taxi and local nonprofit provider service, has scheduled and delivered more than 200,000 trips since December 1976. About half of these trips have been general passenger trips, i.e., trips to unsponsored passengers who heretofore did not have access to publicly provided transportation.
2. Paratransit extends coverage to ALL transportation handicapped. Research conducted in Portland shows that less than one-third of the TH who cannot use the current transit system could use accessible transit. The other two-thirds need door-to-door service, which can only be provided by paratransit.
3. The TH market is quite satisfied with the LIFT service and the supplemental taxi services provided. They particularly appreciate the helpfulness and courtesy of drivers.

4. The LIFT buses and the entire demonstration served as a reminder of the TH needs to the community and a visible demonstration of community commitment to addressing those needs.
5. Paratransit is inherently flexible, in terms of providing transit resources to meet demand. The LIFT demonstration shows that coordinated use of private-sector providers to serve specialty or unanticipated demand is, indeed, feasible. Furthermore, the results indicate that the capacity of this reserve on-call adjunct service, is far greater than would have been needed.

   One key lesson from the LIFT demonstration is that short-term demand for SNT service is very difficult to predict: LIFT usage by both agency and general passengers fell below original estimates drawn from extensive market research. In the face of this highly uncertain demand, a flexible strategy which allows expansion or contraction of service in response to demand seems advisable.
6. The dwell-time analysis shows that boarding times for LIFT passengers average 2.4 minutes and unboarding times average 3.8 minutes (times include escort time).
7. The small-scale nature of coordinated paratransit—i.e., several different small providers serving several markets—tends to make that mode less vulnerable to union organizing and, consequently, union wage rates. The Portland demonstration indicates that any economies of scale that might be achieved through consolidation of transportation resources in Tri-Met are more than outweighed by the high union wage rates. It is well documented that large organizations tend to attract union

organizing efforts: As the President of SMS said, "If I were as big as Tri-Met I would have a union." Therefore, a decentralized but coordinated source of paratransit providers would appear to lead to a more cost-effective means of providing SNT service.

The demonstration indicates that a fixed-capacity paratransit fleet is limited in its ability to meet client time demands. Agency clients, in particular, had a very diverse set of trip and transportation reliability needs: managers of agencies which did not utilize LIFT service reported that the LIFT's inability to meet their time demands was the main reason. Even agencies that used the LIFT commented that reliability was a slight problem.

Chapter 6 showed that LIFT reliability was inversely proportional to level of demand, i.e., as demand approached capacity, reliability decreased. The LIFT's reliability was only fair. Yet, given the nature of the trips and passengers served and the fixed capacity of the LIFT fleet, LIFT on-time performance is as good as could be expected. It appears, then, that the only way to meet agency reliability expectations would be to increase capacity. It would be expensive to add buses to an SNT fleet, but coordinating available excess capacity (i.e., taxis and other private providers) on an as-needed basis would be a paratransit strategy that could come closer to meeting agency time demands without a great increase in cost.

9.5 APPROPRIATENESS OF A TRANSIT OPERATOR'S PROVIDING SNT SERVICE

The Portland LIFT demonstration indicates that, in the long run, the transit operator should not provide SNT service: there are less expensive, equal-quality transportation services available to address TH needs in Portland. The primary reason a transit operator should not provide this

service is that the costs resulting from higher-than-market wage rates that must be paid to union drivers outweigh any economies that could have been achieved through larger-scale operations or greater expertise.

In the short run, a transit operator's providing service can be valuable as a means of establishing a leadership role in coordinating SNT and as a way to attract additional resources to this critical need area. Once these roles and the funding channels are established, the transit operator's providing service should be phased out in favor of less expensive, private paratransit options. When the transit operator-provided SNT service is not cost-effective, as is the case in Portland, there may be organizational barriers or resistance to cutting back or eliminating the more expensive service. This is because the organization develops a commitment to the service that makes it difficult to objectively assess its cost-effectiveness.

The Portland experience indicates that there is a potential conflict in a transit operator's serving both as SNT operator and coordinator. As a coordinator, the transit operator has the responsibility of maximizing the cost-effectiveness of SNT. As an SNT operator, the organizational pressures to maintain the service exist, i.e., to preserve the role as operator.

9.6 TRI-MET'S ROLE AS COORDINATOR AND PROVIDER OF SERVICE

SNT coordination efforts are intended to improve effectiveness of service, measured primarily by increased coverage, and by efficiency, which is summarized by the cost per trip measure. The following conclusions about Tri-Met's performance in its coordination efforts emerge from the LIFT demonstration.

1. Through operation of the LIFT, Tri-Met extended coverage to that segment of the TH market not affiliated with social service agencies. Increased coverage here means both increase in the number of people who have access to the special needs transportation system and slight increase in the number of trips provided to the TH market.
2. From the results of the two-year demonstration, it must be concluded that Tri-Met's coordination efforts through the LIFT program did not result in increased SNT system efficiency. Rather, costs of SNT, as measured by cost per trip, rose during that period.
3. It is too soon to tell whether or not Tri-Met can bring about government cost savings through coordination. Preliminary indications are that it can decrease operational costs through increased efficiency but whether or not it can make the tough political choices (e.g., eliminating the LIFT) and manage SNT transportation resources, has not yet been determined.

APPENDIX A

SURVEYS OF LIFT CLIENTS

LIFT ON-BOARD SURVEY

1. I.D. Number ☐☐☐☐☐☐☐

CIRCLE ONE:

NE SE

NW SW

2. Date _____ Time _____ ☐ AM ☐ PM

3. Driver assistance (by observation):

Getting from door to bus ☐ Yes ☐ No

Getting on bus ☐ Yes ☐ No

4. Trip Purpose: Shop Med/Dent Pers. Bus. Soc/Rec. Church Work

Other _____

5. How often do you make this trip?

Frequently (2 x's/wk+) Weekly Occasionally Monthly

6. What appeals most to you about the LIFT service?

_____

_____

_____

7. What do you dislike most about the LIFT service?

_____

_____

_____

8. What types of transportation have you used during this past week?

	Number of times used	
None	____	
Driven an auto	____	
Driven by friend or relative	____	Confidence
Agency provided (other than LIFT)	____	
LIFT	____	1
Taxicab	____	2
Bus	____	3
Walked	____	
Other (specify)	____	

9. How were you making most of your trips before the LIFT service started?

		Confidence
☐ Special Mobility Service	☐ Care Car or Medi Car	1
☐ Metro Mobility	☐ Taxi	2
☐ Agency car or van	☐ Bus	3
☐ Friend or relative drove me	☐ Walked	
	☐ Other _____	

10. If the LIFT service were not available, how would you have made this trip?

☐ Would not take trip	1
☐ Don't know	2
☐ Would switch to a different mode	3

If switch--

Mode: _____

☐ Same convenience	1
☐ Less convenience	2
☐ Don't know	3

Would you have taken this trip at the same time?

☐ Same time	1
☐ Different and that's OK	2
☐ Different and less convenient	3
☐ Don't know	

Would you have taken this trip to the same place?

☐ Same place	1
☐ Different and that's OK	2
☐ Different and less convenient	3
☐ Don't know	

11. (By observation) Number of other passengers on bus with this person. _____ (Number)

TRI-MET SURVEY

IT WILL TAKE ONLY A FEW MINUTES TO COMPLETE THIS BRIEF QUESTIONNAIRE. YOUR RESPONSES WILL PROVIDE VALUABLE INFORMATION TO TRI-MET.

A. PLEASE TELL US WHETHER YOU FEEL THE FOLLOWING THINGS ABOUT THE LIFT SERVICE ARE SATISFACTORY OR NEED IMPROVEMENT.

	SATISFACTORY	NEEDS IMPROVEMENT
1. CALLING IN ADVANCE FOR A RIDE	○	○
2. PLANNING YOUR TRIP TIME TO FIT WHEN A BUS CAN COME FOR YOU	○	○
3. GETTING PICKED UP ON TIME	○	○
4. GETTING UP ONTO THE BUS	○	○
5. USING YOUR SPECIAL NEEDS BUS PASS	○	○
6. COURTESY AND HELPFULNESS OF THE DRIVERS	○	○
7. RIDING ON THE BUS WITH PEOPLE YOU DON'T KNOW	○	○
8. COMFORT OF THE RIDE	○	○
9. NOISE LEVEL ON THE BUS	○	○
10. LENGTH OF TIME YOU SPEND ON THE BUS	○	○
11. WAITING AROUND FOR THE BUS ONCE YOU COMPLETE THE PURPOSE OF YOUR TRIP	○	○

B. WOULD YOU LIKE TO TAKE MORE TRIPS ON THE LIFT THAN YOU DO NOW?

☐ YES ☐ NO ☐ MAYBE

DISCUSSION FORMAT FOR FOLLOW-UP INTERVIEWS

The following is a follow-up interview discussion guide used to obtain more in-depth data from people who had been surveyed during the first Portland On-Board Survey. The On-Board Survey was conducted between April 18 and April 22 and the follow-up interviews between May 2 and May 24.

Three broad topics were discussed with the respondents during the follow-up interviews:

1. Client profile, including:
   - o With whom they live;
   - o Transportation needs and present activities (include here trips they generally make, i.e., places, mode, frequency and transportation needs); and
   - o Description of the nature of their transit dependence: handicaps, problems, etc.

2. Corroboration of questionnaire contents regarding alternative plans if the Lift had not been available.

   You can start with a statement like the following:

   "When (someone) last spoke with you, you were riding the LIFT to go to _____. I would like to find out more about why you wanted to make that trip that day and what you would have done if the LIFT had not been available. You said that ----" . . . (only prompt the respondent, don't relay to them exactly what they said. Let them tell the story.)

People tend to respond to this alternative trip question at different levels. Our purpose in the case study is to probe to a deeper level (if possible) and to check the first survey to see if that initial response was fairly accurate.

3. What the LIFT has meant to them, e.g.: how has "quality of life" changed?

Some possible responses are:

- Get out more
- Make trips I would not have been able to make
- Save money
- Socializing
- New Activities (describe)

TRI-MET TAXI RIDER TELEPHONE SURVEY

Hello. My name is _____, and I'm calling on behalf of Tri-Met. I understand that you rode in a taxi today in place of a LIFT bus, and I'd like to ask you a few questions about your taxi ride. Your responses will enable us to improve transportation services to you and others who ride in taxis.

Now I'd like to ask your opinion about some aspects of your taxi ride today.

A. Can you tell me whether the following aspects of the taxi ride you took today were satisfactory, or whether they need improvement?

	Satisfactory	Needs Improvement	Client Remarks
1. Calling in advance for your ride	◯	◯	_____
2. Getting picked up on time	◯	◯	_____
3. Getting into the taxi	◯	◯	_____
4. Using your Special Needs Bus Pass	◯	◯	_____
5. Courtesy and helpfulness of the taxi drivers	◯	◯	_____
6. Comfort of the ride	◯	◯	_____
7. Waiting for the taxi to pick you up after you have completed your trip purpose	◯	◯	_____

B. How would you compare the experience of taking the taxi provided by Tri-Met with the experience of riding the Tri-Met LIFT bus?

_____

_____

_____

Thanks very much for your help.

Dear Portland Resident,

Do you have a problem using Tri-Met's regular fixed-route service because your health or age make it hard to:

	YES	NO		YES	NO
Get on or off a bus	◯	◯	Move in crowds	◯	◯
Walk more than 2 or 3 blocks	◯	◯	Read information signs	◯	◯
Wait, standing, for more than 10 minutes	◯	◯	Grasp coins, tickets or handles	◯	◯
Keep balance while standing in a moving bus	◯	◯	Understand or follow transit directions	◯	◯

If you checked YES to any of the above, you may be eligible for the LIFT, Tri-Met's special transportation service for people who have difficulty riding the bus.

Are you aware of the LIFT? ◯ Yes ◯ No

Have you signed up for LIFT service? ◯ Yes ◯ No

If you have not signed up, please tell us why not: (You may mark more than one reason)

◯ I didn't know about the LIFT service.

Please send me further information. My name and address are: _____

_____

Please have someone call me. My name and phone number are: _____

_____

◯ I don't know how to sign up for LIFT service.

◯ I can use regular bus service.

◯ I drive myself.

◯ I get rides from friends or relatives

◯ I don't need the service; I don't travel much.

◯ Another organization provides for my transportation needs.

◯ I don't live in Portland.

◯ The LIFT is not suitable for my trips because _____

_____

◯ Other _____
(please explain)

Please turn over ⟶

Are you? ◯ Male ◯ Female

What is your age? _____

Any other comments? _____

_____

_____

_____

_____

_____

We may need to ask you some further questions. Could we please have your name and phone number for this purpose?

_____ _____

(name) (phone number)

Thank you for your help.

PLEASE MAIL TO TRI-MET TODAY IN THE ENCLOSED ENVELOPE.

PORTLAND NONUSER SURVEY

Phone #_ _ _ - _ _ _ _

Calls:

1_____ 4_____

2_____ 5_____

3_____ 6_____

Household Survey 1 1

Interviewer's # ___ 2

ID# _ _ x _ _ _ _ _ 3-9

#Trips on LIFT ___ 10-11

Hello. My name is _____ and I'm calling from Tri-Met. Two years ago we conducted a survey about the transportation needs of handicapped and elderly Portland residents and interviewed (name) (someone) in your household. Now we are doing a brief, follow-up study of those people. May I please speak to (name) (that person)?

If target person is not home or available, set up appointment to call back.

Date_____ Time_____

When target person is on the phone, reintroduce yourself and purpose of call, if necessary.

As a result of the survey Tri-Met did two years ago, a special transportation service, THE LIFT, was established.

1. Are you aware of THE LIFT? ___12

1 ☐ Yes - go to Q.2

2 ☐ No

If No, describe LIFT service briefly (minibus, curb to curb, wheelchair lifts) *and ask if the person would like to have more information sent about the LIFT or would like a staff member to call.*

☐ Send Info-address_____

☐ Have staff member call

Proceed to Question 5.

2. Are you registered for LIFT Service?

1 ☐ Yes - go to Q. 4 ___13

If first and last name are unknown, ask:
Would you please tell me the name under which you are registered?_____
NAME

2 ☐ No

PORTLAND NONUSER SURVEY

Phone #_ _ _ - _ _ _ _

Calls:

1_____ 4_____

2_____ 5_____

3_____ 6_____

Registrant 2 1

Interviewer's # __ 2

ID# _ _ x _ _ _ _ _ 3-9

#Trips on LIFT __ __ 10-11

Hello. My name is _____ and I'm calling from Tri-Met. We're doing a survey of people who are registered for LIFT service and I would like to speak with _____. Is (she, he) available?

If target person is not home or available, set up an appointment to call back.

Date_____ Time_____

When target person is on the phone, reintroduce yourself and reason for calling, if necessary.

According to our records (check appropriate box)

☐ 1. You are registered for the LIFT but have (not taken any trips on the LIFT), (taken only ____ trips on the LIFT). Can you tell me why you have not used the LIFT service?

(Check responses on next page, Question 3.)

☐ 2. You have made only a few trips on the LIFT in the past 5 months. Can you tell me why you do not use the LIFT service more often?

(Check responses on next page, Question 3.)

☐ 3. You are a regular user of the LIFT service.

(Proceed to Question 4.)

PORTLAND NONUSER SURVEY

Phone #_ _ _ - _ _ _ _ Mail-back Questionnaire 3 1

Calls: Interviewer's # __ 2

1_____ 4_____ ID# _ _ x _ _ _ _ _ 3-9

2_____ 5_____ #Trips on LIFT __ __ 10-11

3_____ 6_____

Hello. My name is _____and I'm calling for Tri-Met. (_____in your household) (Someone in your household) recently returned a questionnaire to our office and we would like to ask (him/her) (that person) a few more questions. May I please speak to (Name) (this person)?

If target person is not home or available, set up an appointment to call back.

Date_____ Time_____

When target person is on phone, reintroduce yourself and reason for calling, if necessary.

Thank them for their participation in survey.

If they have checked more than one item in Question 3, determine PRIMARY reason and number (1). Then continue with Question 4.

__ 12

__ 13

3. Can you tell me why you haven't registered for the LIFT Service?

Do not read choices. Check all answers which apply. If more than one, ask which is PRIMARY reason and code.

01	☐	Didn't know about LIFT service	
02	☐	Don't know how to sign up for LIFT service	
03	☐	Didn't know I was eligible	PRIMARY __ __ 14 - 15
04	☐	Drive self	2) __ __ 16 - 17
05	☐	Get rides with others	3) __ __ 18 - 19
06	☐	Use bus	
07	☐	Don't need, don't travel much	
08	☐	Intend to register, just haven't gotten around to it	
09	☐	Too handicapped to use	
10	☐	Agency won't fund my trip	
11	☐	Another agency provides for my transportation needs	
12	☐	Cannot afford it	
13	☐	LIFT service not reliable	
14	☐	Scheduling too difficult	
15	☐	Trip takes too long	
16	☐	Does not go where I need to go	
17	☐	Doesn't serve my type of trip	
18	☐	No escort available	
19	☐	Fear	
20	☐	Other_____	

4. We are interested in finding out which of our advertising efforts has worked best. We would like to know if you have heard about the LIFT in any of the following ways.

Check all which apply.

☐ Newspaper articles __ 20

☐ Radio spots: 1 ☐ ads 2 ☐ news 3 ☐ talk show __ __ __ 21 - 23

☐ TV spots: 1 ☐ ads 2 ☐ news 3 ☐ talk show __ __ __ 24 - 26

☐ Brochures __ 27

Available at_____

☐ Agency promoted - which one?_____ __ 28

☐ Other _____ __ 29

5. During the last two days did you make any trips for the following purposes? *If answer is "yes" ask,* "How many_____trips did you make? What method of transportation did you use for this trip?" *Code according to mode. Continue as above for all purposes.*

	Today			Yesterday		
	# of trips	Mode		# of trips	Mode	
Shopping	___ 30	___ 31	___ 32	___ 33	___ 34	___ 35
Medical/Dental	___ 36	___ 37	___ 38	___ 39	___ 40	___ 41
Personal Business e.g., bank, hairdresser	___ 42	___ 43	___ 44	___ 45	___ 46	___ 47
Recreation/Social	___ 48	___ 49	___ 50	___ 51	___ 52	___ 53
Church	___ 54	___ 55	___ 56	___ 57	___ 58	___ 59
Work	___ 60	___ 61	___ 62	___ 63	___ 64	___ 65

Code modes as follows: 1) Drive self, 2) Ride with others, 3) Bus, 4) LIFT, 5) Taxi, 6) Agency provided, 7) Walk, 8) Bicycle/motorcycle, 9) Mixed Mode.

6. Which of the following aids, if any, do you use? ___ 66

1 ☐ Crutches
2 ☐ Walker
3 ☐ Wheelchair
4 ☐ Escort
5 ☐ Wheelchair and escort
6 ☐ No aid used

Now I would like to ask you a few questions for statistical purposes. *If interviewee is from pre-demo survey, reaffirm that previous answers are still correct.*

7. Sex *(by observation)* 1 ☐ Male 2 ☐ Female ___ 67

8. Please stop me when I read the category that includes your age: ___ 68

1 ☐ 10-15 yrs. 3 ☐ 21-59 yrs. 5 ☐ 65 and over
2 ☐ 16-20 yrs. 4 ☐ 60-64 yrs.

9. What is the number of persons in your household? ___ 69

10. What is the number of autos in your household? ___ 70

11. What is the number of drivers in your household? ___ 71

12. Is an auto available to you as a driver or a passenger for trips you need to make: always, usually, sometimes or never?

1 ☐ Always 2 ☐ Usually 3 ☐ Sometimes 4 ☐ Never ___ 72

13. Do you have a driver's license? 1 ☐ Yes 2 ☐ No ___ 73

14. What is your employment status? ___ 74

1 ☐ Work full time 4 ☐ Keep house
2 ☐ Work part time 5 ☐ Retired or not looking for work
3 ☐ Student 6 ☐ Unemployed, looking for work
7 ☐ Disability prevents employment

15. I am going to read a list of income categories. Please stop me when I read the category that includes the combined annual income of all members of your household before taxes are taken out. ___ 75

1 ☐ Less than $5,000 4 ☐ $15,000 to $24,999
2 ☐ $5,000 to $9,999 5 ☐ $25,000 and over
3 ☐ $10,000 to $14,999

APPENDIX B

INSTITUTIONAL SURVEYS

"BEFORE" AGENCY SURVEY

PORTLAND AGENCY INTERVIEW

(Pre-Demonstration)*

1. Agency Name _____

   Address _____

   Contacted Person _____

2. General Description of Agency:

   (a) General Function _____

   _____

   _____

   (b) Type and number of social service programs offered _____

   _____

   _____

3. Client population served:

   (a) Characteristics or definitions _____

   _____

   _____

   (b) Number of persons served _____

   (c) Number of enrolled clients (if different) _____

   (d) Average number clients attending agency sponsored events

   _____

4. Relationship of Transportation Services to Agency Function:

   (a) Is transportation a problem in providing services for your clients?

   _____ Major problem _____ Minor problem _____ No problem

   (b) What are your specific transportation problems?

   _____

   _____

   _____

*This form serves as a discussion guide for face-to-face agency interviews.

(c) Does lack of transportation limit the trips your clients are taking?

_____ Yes _____ No _____ Don't know

(d) How adequately does public transportation serve client needs?

_____

_____

_____

(e) Why are you in the transportation business? How does it enhance your provision of services? _____

_____

_____

5. Transportation Resources

(a) How does your agency provide transportation services for your clients?

_____ No transportation provided

_____ Clients reimbursed for travel costs:

___ Public Transit ___ Charter Bus ___ Taxi ___ Private Vehicle ___ Other

_____ Purchased services:

___ Public Transit ___ Charter Bus ___ Taxi ___ Vehicle ___ Other

_____ Agency owned vehicle(s)

_____ Other agency vehicle(s)

_____ Volunteer drivers use own vehicle:

Number volunteers ___, Pay for gas? ___ No ___ Yes, How much per mile? ____

_____ Other _____

_____

(b) If agency owns or borrows vehicles:

Number of vehicles: ____ Own ____ Borrowed

Type of vehicle, e.g., 5 passenger sedan

(1) _____

(2) _____

(3) _____

(4) _____

Are any equipped for wheelchair users? _____

Primary Uses

(1) _____

(2) _____

(3) _____

(4) _____

When used, when idle? _____

_____

Allow other agency to use? _____

_____

6. Demand for Transportation Services

	What Mode?				
	Public Transit	Charter Bus	Taxi	Agency Vehicle	Private Vehicle
(a) # one-way person trips/week					
(b) # psgrs. provided w/service per wk/mo					
(c) Psgr. miles or average trip length					
(d) # Psgrs. elderly or handicapped					

7. Cost of Services

(a) How much do you budget for transportation services each year? _____

(b) If agency has vehicles...

	1	2	3	4	5
Purchase price					
Total operating cost/ vehicle mile					

Fuel _____ Insurance _____

Oil _____ Licensing _____

Tires _____ Labor _____

Maintenance _____ Depreciation _____

How are these costs financed?

Continuing: _____

_____

Limited: _____

_____

8. Agency Attitudes toward Provision of Transportation Services

(a) How do you rate the overall efficiency of your services?

_____

_____

_____

(b) Do you feel there is overlap between what you and other agencies are doing? _____

_____

_____

_____

(c) What are your feelings about the administrative hassle involved? _____

_____

_____

(d) Are you able to get your clients where they need to go on time? _____

_____

_____

_____

(e) What percentage of your clients are you able to provide services for? _____

9. How would you rate client satisfaction regarding the transportation services you provide? _____

_____

_____

"INTERIM" AGENCY SURVEY
PORTLAND AGENCY INTERVIEW*

1. Agency Name _____

   Address _____

   Contacted Person _____

2. General Description of Agency:
   (a) General Function _____

   _____

   _____

   (b) Type and number of social service programs offered _____

   _____

   _____

3. Client population served:
   (a) Characteristics or definitions _____

   _____

   _____

   (b) Number of persons served _____

   (c) Number of enrolled clients (if different) _____

   (d) Average number clients attending agency sponsored events

   _____

4. Relationship of Transportation Services to Agency Function:
   (a) Is transportation a problem in providing services for your clients?

   _____Major problem _____Minor problem _____No problem

   (b) What are your specific transportation problems?

   _____

   _____

   _____

*This form serves as a discussion guide for face-to-face agency interviews.

(c) Does lack of transportation limit the trips your clients are taking?

_____Yes _____No _____Don't Know

(d) How adequately does public transportation serve client needs now that the LIFT is available?

_____

_____

_____

5. Transportation Resources:

(a) How does your agency provide transportation services for your clients?

_____No transportation provided

_____Clients reimbursed for travel costs:

____Public Transit ____Charter Bus ___ Taxi ___Private Vehicle ___Other

_____Purchased services:

____Public Transit ____Charter Bus ___ Taxi ___Private Vehicle ___Other

_____Agency owned vehicle(s)

_____Other agency vehicle(s)

_____Volunteer drivers use own vehicle:

Number volunteers___, Pay for gas?___No ___Yes How much per mile?____

_____Staff members use own vehicle:

Number staff____, Pay for gas?___No ___Yes How much per mile?____

(b) If agency owns or borrows vehicles:

Number of vehicles: _____Own _____Borrowed

Type of vehicle, e.g., 5 passenger sedan

(1)_____

(2)_____

(3)_____

Are any equipped for wheelchair users?_____

Primary Uses

(1)_____

(2)_____

(3)_____

% Used, % Idle? _____

_____

Allow other agency to use?_____

_____

6. Demand for Transportation Services

		What Mode?					
		Public Transit	Charter Bus	Taxi	Agency Vehicle	Private Vehicle	LIFT
(a)	# one-way person trips/week						
(b)	# psgrs. provided w/service per wk/mo						
(c)	Psgr. miles or average trip length						
(d)	# Psgrs. elderly or handicapped						

7. Cost of Services:

(a) How much do you budget for transportation services each year?_____

Capital Costs?_____ Operating Costs?_____

Administrative Costs? _____

(b) How are these costs financed?

Continuing:_____

_____

Limited:_____

_____

How much do you spend on the LIFT?_____

Transportation profile:

	Before LIFT	Now
$ Spent on Transportation		
# Passenger-trips Provided		
# Clients Served		

If you have more than one source of funding, have you experienced any accounting problems paying for the LIFT?

(c) Is your funding limited to providing trips for a specific purpose? Age group? Income group? _____

_____

_____

(d) If agency has vehicles...

	1	2	3	4	5
Purchase price					
Total operating cost/ vehicle mile					

Fuel_____ Insurance_____ Maintenance_____

Oil_____ Licensing_____ Depreciation

Tires_____ Labor_____ _____

8. Agency Attitudes toward Provision of Transportation Services:

(a) How do you rate the overall efficiency of your services? (Scale: 1 = inefficient, 5 = efficient)

_____

_____

_____

(b) Is there an overlap between what you and other agencies are doing? _____

_____

_____

_____

(c) What are your feelings about the administrative hassle involved? _____

_____

_____

_____

Specific problems with the Lift:

How does the agency interact with the clients to plan the LIFT trips?

Mechanics: _____

_____

Prescheduling: _____

_____

Coordination with the dispatch unit: _____

_____

_____

(d) Are you able to get your clients where they need to go on time? _____

_____

_____

_____

(e) What percentage of your clients are you able to provide services for? _____

9. How would you rate client satisfaction regarding the transportation services you provide? _____

_____

_____

10. Client perceptions of the LIFT: _____

_____

_____

Specific problems: _____

_____

11. Has your clients' usage of your agency's services increased due to the LIFT? _____

_____

_____

12. (a) Agency perceptions of Tri-Met:

(b) Agency assessment of the LIFT reporting and billing system:

(c) Agency perceptions of the amount of paperwork entailed by the LIFT:

13. If/when LIFT usage increases, and the LIFT priority system rules out some lower priority client trips, how will such an eventuality affect your clients and programs?

14. Agency suggestions for improving LIFT service:

FINAL AGENCY SURVEY DISCUSSION GUIDE

1. Agency perception of LIFT service re:

   scheduling procedure
   reliability of service
   drivers
   dispatchers
   ride itself

2. Problems agencies have experienced managing or controlling clients' usage.

3. Number of client trips provided in 1978 via
   LIFT, Own vehicles, Staff, Metro Mobility, SMS

4. Coordination Costs

   Staff hours spent coordinating with LIFT
   Flexibility of LIFT versus other modes (cabs)

5. Changes in transportation expenditures due to LIFT service.

6. Effect on agency if demonstration ends or cost per trip rises.

7. (Ask of new agencies) Why didn't contract for service earlier?
   What finally motivated agency to join?

PRIVATE TRANSPORTATION SERVICES

DISCUSSION GUIDE

1. Name and address of Co. contracting with Tri-Met:

2. Number of vehicles:
3. Number of drivers:
4. Regular rates:
5. Rate charged for SNT clients: Discount?
6. Dispatch procedure:

7. Number of calls per day for SNT clients:
   Percentage of total daily workload comprised by SNT clients:
8. Percentage of total monthly billings comprised by SNT fares:
9. Has business generated by SNT system exceeded business lost to the LIFT buses?
10. Proportion of SNT clients to which drivers provide door-to-curb escort:
    Rate charged (per hour) for escort:

11. Management's assessment of the ease and efficiency of dispatch, recording, billing, and record-keeping procedures required by the SNT system:

12. Driver perceptions of SNT procedures:

13. Driver perceptions of SNT clients:

14. Overall comments:

APPENDIX C

SURVEY SAMPLE

AGENCIES AND ORGANIZATIONS SURVEYED

Before Survey

PACT Senior Service Center
Senior Adult Service Center
Peninsula Project Able
Friendly House Senior Center
Hollywood Senior Center
Neighborhood House
Northwest Pilot Project
Metropolitan Family Services
Gresham Senior Center
Vocational Rehabilitation Division, State of Oregon
University of Oregon Health Sciences Center,
Crippled Children's Division
Goodwill Industries
Public Welfare Division, State of Oregon

Interim Surveys

Metropolitan Family Services
Gresham Senior Center
University of Oregon Health Sciences Center,
Crippled Children's Division
Volunteers of America
Muscular Dystrophy Association
Westside Schools
Child Neurology Clinic, Good Samaritan Hospital

Final Surveys

PACT Senior Service Center
Senior Adult Service Center
Northwest Pilot Project
Vocational Rehabilitation Division, State of Oregon
Public Welfare Division, State of Oregon
Veterans Administration
Portland City Schools
Metro Mobility
Special Mobility Services

TRI-MET PERSONNEL INTERVIEWED

Dennis Chapman, Special Needs Transportation Coordinator; Thomas King, formerly General Manager; Steven McCarthy, Assistant General Manager; Dallas Jackson, Superintendent of LIFT Operations; William Gregg, Director of Finance; Sharon Beelart, LIFT Project Accountant; Adela Kretzinger, Advertising and Promotion Manager; Pamela Durham, Legislation and Press Relations Manager.

NONUSER SURVEY - SAMPLE DESCRIPTION

The Nonuser Survey was conducted in the spring of 1978 to determine why people who are eligible for LIFT service do not use it. Three different groups of people were contacted in this survey:

1. The first group consisted of those people who were identified as transportation handicapped during the pre-demonstration random household survey. Everyone whom it was possible to recontact from the pre-demonstration survey was interviewed by telephone.* This procedure produced 184 completed interviews and constitutes a random sample of Portland's TH population.

2. The second group was a sample of persons registered for LIFT service. Based on trip data (for a three-month period, October - December 1977), registrants were classified as nonusers, moderate users or regular users.** Approximately equal numbers of persons in each of these categories were interviewed, a total of 284 persons.

3. The third group was nonusers identified through community organizations. A self-administered questionnaire (attached) was distributed through various handicapped and senior organizations. Persons who identified themselves as transportation handicappped

*471 transportation handicapped persons were interviewed in the pre-demonstration survey: name and phone numbers were available for 361 of these persons because giving this information was optional.

**The sample of moderate and regular users was drawn for comparative purposes.

returned the questionnaire to Tri-Met and were interviewed by phone. Although numerous questionnaires were distributed, this procedure produced only 17 persons.

The final sample, by subgroups, is as follows:

	n	%
By respondent type:		
Pre-demonstration survey	184	37.9
LIFT registrants	284	58.6
Mail-back questionnaire	17	3.5
	485	100.0
By registration:		
Registered for LIFT	307	63.3
Not registered	178	36.7
	485	100.0
By LIFT usage		
Nonusers	306	63.7
Users	174	36.3
	480	100.0

The term "nonusers" above includes all unregistered persons (178) and registered persons who make less than three one-way trips on the LIFT over a three-month period (128). The total number of users and nonusers is less than the sample total of 485 as it was not possible to determine the degree of usage of 5 registered persons.

APPENDIX D

LIFT RIDERSHIP BY MONTH

Month	Total Trips	Agency Trips	General Trips	Taxi Trips	Wheelchair Trips	Trips/ Day	Number Service Days
Dec 76	896			0	62	90	10
Jan 77	2730			14	245	144	19
Feb	3265			0	392	163	20
Mar	3878			19	465	169	23
Apr	3684			25	448	175	21
May	4662	3931	731	287	701	222	21
June	5760	4148	1612	551	863	262	22
July	6412	4483	1929	986	962	321	20
Aug	6663	4478	2185	780	934	289	23
Sept	6623	4124	2499	876	993	315	21
Oct	7147	4387	2760	888	1144	340	21
Nov	6563	3797	2766	773	1181	328	20
Dec	6599	3535	3064	702	993	314	21
Jan 78	6647	3357	3290	827	1297	350	19
Feb	7117	3505	3612	903	1244	356	20
Mar	8230	4115	4115	1244	1400	358	23
Apr	7575	3642	3933	1197	1381	379	20
May	8016	3575	4441	1370	1565	364	22
June	7825	3484	4341	1461	1341	356	22
Jul	6829	3039	3790	1298	1159	341	20
Aug	8132	3611	4521	1741	1277	354	23
Sept	7824	3251	4573	1700	1139	391	20
Oct	8771	3946	4825	1846	1351	398	22
Nov	7038	3094	3944	1609	1016	414	17
Dec	7020	3251	3769	1739	993	351	20

APPENDIX E

NEW TECHNOLOGY

The work performed under this contract, while not leading to any new technology, has made use of existing methodologies as required to complete a comprehensive analysis of findings available on the implementation and operation of the demonstration project. These findings will be useful to other communities throughout the United States in the planning and design of improved public transportation services.

*U.S. GOVERNMENT PRINTING OFFICE : 1980 0-621-742/1003