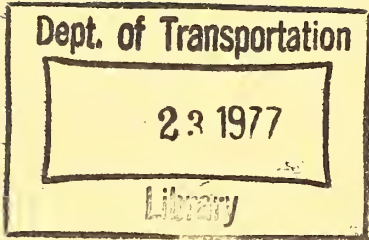


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**A/TSC Project Evaluation Series**

# **Cleveland Neighborhood Elderly Transportation Demonstration Project**

**Final Report  
April 1977**

## **Service and Methods Demonstration Program**



**U.S. DEPARTMENT OF TRANSPORTATION  
Transportation Systems Center**

*Prepared for*

**Urban Mass Transportation Administration  
Office of Transportation Management  
and Demonstrations**

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1. Report No. UMTA-OH-06-0018-77-1		2. Government Accession No. <i>DOT-TSC-UMTA 77-17</i>		3. Recipient's Catalog No.	
4. Title and Subtitle CLEVELAND NEIGHBORHOOD ELDERLY TRANSPORTATION DEMONSTRATION PROJECT		5. Report Date April 1977		6. Performing Organization Code	
7. Author(s) John Crain		8. Performing Organization Report No. DOT-TSC-UMTA-77-17			
9. Performing Organization Name and Address * Crain & Associates 873 Santa Cruz Avenue Menlo Park CA 94025		10. Work Unit No. (TRAIS) UM727/R7710		11. Contract or Grant No. DOT-TSC-1081	
12. Sponsoring Agency Name and Address U.S. Department of Transportation Urban Mass Transportation Administration Office of Transportation Management and Demonstrations Washington DC 20590		13. Type of Report and Period Covered Final Report March 1975-April 1976		14. Sponsoring Agency Code	
15. Supplementary Notes * Under Contract to:		U.S. Department of Transportation Transportation Systems Center Kendall Square Cambridge MA 02142			
16. Abstract <p>This documentation describes the Cleveland Neighborhood Elderly Transportation (NET) Demonstration Project in terms of descriptions of the transportation system and how it was operated, the operational agencies involved in the project, the test area, and the operational results. There is also an analysis of the operational problems encountered, the costs incurred, and suggested means for improving the service and reducing costs. Results of surveys of users and non-users of the service are also presented in an attempt to assess the social impacts and benefits relative to costs. Finally, observations are given on how the demonstration was ended, the type of post-demonstration system that has been implemented by the responsible local government agencies and the analysis/decision making process used by these agencies in formulating their plans. A specific section is included on transferability of results to other areas.</p>					
17. Key Words Transit Dependent, Elderly, Demand Responsive, Demonstration Project			18. Distribution Statement  DOCUMENT IS AVAILABLE TO THE U.S. PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22161		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages 168	22. Price



## PREFACE

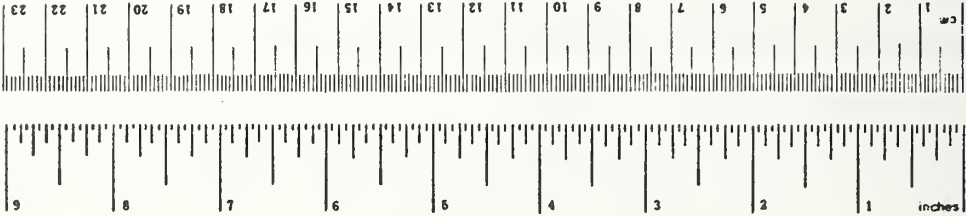
This document is a final evaluation report of the Cleveland Neighborhood Elderly Transportation (NET) System and reflects the efforts of three separate contractors: DAVE Systems, Inc., the Human Services Design Laboratory at Case Western Reserve University (CWRU), and Crain & Associates. DAVE Systems, a firm specializing in the development of dial-a-ride systems who acted as consultant for system design and operations, was responsible for preparing a detailed operational description of the system and operational results. Case Western Reserve was responsible for an evaluation of the effects of NET on its three neighborhoods, its riders, and various social service agencies. Crain & Associates, under contract to the Transportation Systems Center of the U.S. Department of Transportation, was responsible for preparing this final report incorporating the work of the other two organizations. This function entailed writing certain sections and editing other sections prepared by DAVE Systems and Case Western Reserve University.

The demonstration project was partially sponsored by the Urban Mass Transportation Administration under their Services and Methods Demonstration Program. The project manager at UMTA was Marvin Futrell. Additional sponsors included HEW Social and Rehabilitation Services, the City of Cleveland, the Cleveland Foundation, the Buckeye Area Development Corporation, and the Cleveland Transit System. The project was conducted by the City of Cleveland with Goldie Lake acting as program manager. The DAVE Systems work was done by Bruce McLaughlin and their final report written by Tony Simpson. The principal CWRU work and writing was done by Gordon Cosgrove. The final report was prepared under the direction of TSC staff member Robert Waksman and the writing done by John Crain of Crain & Associates.

METRIC CONVERSION FACTORS

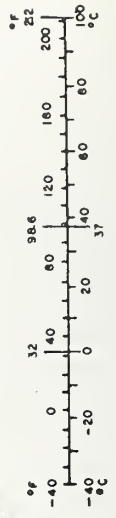
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
<b>AREA</b>				
in <sup>2</sup>	square inches	6.5	square centimeters	cm <sup>2</sup>
ft <sup>2</sup>	square feet	0.09	square meters	m <sup>2</sup>
yd <sup>2</sup>	square yards	0.8	square meters	m <sup>2</sup>
mi <sup>2</sup>	square miles	2.6	square kilometers	km <sup>2</sup>
	acres	0.4	hectares	ha
<b>MASS (weight)</b>				
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
<b>VOLUME</b>				
teaspoon	teaspoons	5	milliliters	ml
fl oz	fluid ounces	15	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 <sup>3</sup>	cubic feet	0.03	cubic meters	m <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.76	cubic meters	m <sup>3</sup>
<b>TEMPERATURE (exact)</b>				
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
<b>LENGTH</b>				
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
<b>AREA</b>				
cm <sup>2</sup>	square centimeters	0.16	square inches	in <sup>2</sup>
m <sup>2</sup>	square meters	1.2	square yards	yd <sup>2</sup>
km <sup>2</sup>	square kilometers	0.4	square miles	mi <sup>2</sup>
ha	hectares (10,000 m <sup>2</sup> )	2.5	acres	acres
<b>MASS (weight)</b>				
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	short tons
<b>VOLUME</b>				
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 <sup>3</sup>	cubic meters	35	cubic feet	ft <sup>3</sup>
m <sup>3</sup>	cubic meters	1.3	cubic yards	yd <sup>3</sup>
<b>TEMPERATURE (exact)</b>				
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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SYMBOLS AND ABBREVIATIONS

ATU	Amalgamated Transit Union
CRT	Community-Responsive Transit
CTS	Cleveland Transit System
DRT	Demand-Responsive Transit
HEW	(Dept. of) Health, Education and Welfare
NET	Neighborhood Elderly Transportation
RTA	(Greater Cleveland) Regional Transit Authority
SMD	Service and Methods Demonstration
UMTA	Urban Mass Transportation Administration

## EXECUTIVE SUMMARY

### The Project

The Cleveland NET (Neighborhood Elderly Transportation) Demonstration Project was implemented in March 1975 with the purpose of providing personalized door-to-door transportation services for elderly persons, 60 and over, within three inner-city neighborhoods. Operations and vehicle maintenance were provided by the Cleveland Transit System (CTS)/Regional Transit Authority (RTA)\* on a daily basis, with 12 buses specifically designed and equipped to serve the needs of the elderly including elderly handicapped. Service was obtained at 10 cents per ride by telephoning a scheduling/dispatching center which re-routed one of the buses to make the required pick-up and delivery. Service was provided for both immediate and advance reservation requests. Originally scheduled for completion in December 1975, the project was extended through June 1976. The demonstration was jointly funded by UMTA, the HEW Social and Rehabilitation Service, the City of Cleveland, and a variety of local agencies and organizations. UMTA provided supplementary funds for the extension of the project from March 1976 to July 1976.

### The Findings

1. The demand-responsive service, using the specially equipped buses, was well liked by the seniors who used it. The most popular features were the door-to-door service, the features of the buses that made getting on and off feasible, the special assistance in boarding given by the driver, and the assurance of personal safety inherent in the service.
2. Although a rigorous benefit analysis was not conducted, surveys of users and non-users suggested that the mobility of users was increased and that user cost was reduced.

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\* CTS provided public transit in Cleveland until July 1975, when the system was absorbed by the RTA.

3. The demonstration service provided competition to the existing fixed-route service. Three-fourths of users reported they were capable of using the existing service, and the largest "before-to-after" mode shift was from the existing bus service to the demand-responsive demonstration service.

4. Based on surveys conducted, users of the system, compared to a control group of non-users, were less handicapped and more capable of using the existing public transportation. Users were more likely to be female, to have lower incomes, and to have less automobile mobility than non-users. The certification process was, in general, a self-certification process by those who could prove themselves to be over 60. There was no continuing outreach program implemented to reach the severely disabled elderly. More aggressive and able-bodied individuals seemed to utilize the service more often than those needing it more.

5. The cost of providing a reasonable level of "many-to-many"\* demand-responsive bus service, including the use of unionized CTS/RTA drivers earning transit industry wages, was about \$20 per vehicle-hour and \$4 per passenger. If vehicle depreciation is added, these costs rise to \$22 and \$4.40. Productivity averaged about 6 passengers per "in service" vehicle hour after ridership reached its maximum level.

6. The training and use of CTS/RTA drivers as schedulers/dispatchers was generally successful, although difficulty was encountered. Drivers were allowed to volunteer for this new project, with selection based on seniority. This probably did not produce the best obtainable personnel, relative to efficiency and customer service, since driver attitudes and public relations skills are more pertinent prerequisites than seniority for the scheduling/dispatching work. Use of drivers as dispatchers

---

\* Carrying all passengers from all origin points to all desired destination points within the prescribed areas.

also produced some conflicts-of-interest since the dispatchers had to oversee the performance of their fellow drivers and fellow union members.

7. The system, as demonstrated, proved too costly to be acceptable to Cleveland as a permanent arrangement for providing mobility to their elderly citizens. Some of those high costs are inherent in the nature of the demonstration. For example, the NET operational areas and the available garages and refueling depots for the NET vehicles were not in close proximity, causing considerable dead-head mileage. Thus, some minor cost reductions would be readily obtained by developing a permanent operation.

8. It was concluded that more significant cost reductions would be possible if certain operational changes were made -- limiting the hours of operation, requiring advance reservation of certain trips, and handling less important trips only if the system has the capacity to handle them. This would allow better "packaging" of trips, thus increasing productivity.

#### Cleveland Post-Demonstration System

At the close of the demonstration, the RTA and the City of Cleveland performed considerable analysis of the transportation needs of the region's elderly and the options for continuing the NET-type service. This included a review of the findings listed above. The analysis resulted in demand-responsive service, provided and funded by RTA, being continued in the three demonstration neighborhoods on a modified basis, with planned expansion of service to other neighborhoods. The hours of service have been curtailed slightly, the age limit raised from 60 to 65, service changed to a 24-hour advance reservation system, and the fare was changed to 10 cents during peak periods and free at other times.

The major change, however, aimed at significant cost reduction, came through labor negotiations that allowed a new driver classification at a reduced wage scale for this special service. The base wage, exclusive of fringe benefits, is \$4.40 per hour, 69% of the wage of regular drivers. Also, a portion of the transportation service may be subcontracted to taxi companies who have proposed performing the demand-responsive service for about \$10 per vehicle-hour.

#### Transferability

The Cleveland experiment demonstrated a process by which a large American city grappled with the "elderly transportation problem" and carved out at least a tentative solution based on its needs, its resources and its political constraints. This was a major test of whether a transit operator, conditioned by years of fixed-route, conventional operations, could adjust its organizational structure, its operational procedures, its financial arrangements, and its union work rules to provide a radically different type of service. The major adjustments worthy of attention by other cities are the development of the new labor category and pay scale, and the ability to subcontract work to the taxi operator.



## 1. INTRODUCTION

### 1.1 PROJECT OVERVIEW

On March 16, 1975 the City of Cleveland inaugurated the NET (Neighborhood Elderly Transportation) Demonstration Project to provide transportation services to meet the needs of the elderly (those persons 60 years of age and over) within three inner-city demonstration neighborhoods.

The twelve-month experimental demonstration was funded through a joint grant of \$450,000 from the Urban Mass Transportation Administration (UMTA) and \$250,000 from HEW Social and Rehabilitation Services, with matching funds from the City of Cleveland (\$230,000); the Cleveland Foundation (\$50,000); the Buckeye Area Development Corporation (\$6,000); and the Cleveland Transit System\* through an \$18,000 in-kind contribution.

Through subcontracts from the City, the Cleveland Transit System (CTS), and later the RTA, operated and maintained the system. A consulting firm (DAVE Systems, Inc.) helped to establish the system and train CTS personnel in this new type of transportation operation.

The NET demonstration, using specially equipped small buses, provided personalized door-to-door transportation to disabled and non-disabled elderly citizens. Service was provided on a demand-responsive or advance reservation basis to and from desired destinations in each selected neighborhood. The method of determining eligibility for the service required that the patron show the driver either a medicare card or a NET Identification Card

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\* The Cleveland Transit System (CTS), which provided public transit for the city of Cleveland, was absorbed by the Greater Cleveland Regional Transit Authority (RTA) shortly after RTA's creation in July, 1975. Thus references will be made in this report to CTS when discussing the earlier portions of the demonstration and to RTA when discussing the ending of the project.

signed by an NET representative. The three neighborhoods selected for the project on the basis of largest concentrations of elderly (as well as other considerations) are Buckeye, Model Cities, and Tremont. Some 17,000 persons 60 years of age and older reside within these three service areas, which total about 8 square miles.

This service was provided by 12 Airstream "Argosy" buses equipped with two-way radio capabilities, and two Dodge "Maxivans" equipped with wheelchair lifts and tie-down devices. These vehicles were operated as a combined demand-responsive and advance reservation service for both elderly and handicapped clients and their assistants for a fixed fare of 10 cents each. In addition to the door-to-door service, drivers were required to give personal attention and assistance to each passenger.

Service was offered from 7 AM to 7 PM five days a week and from 7 AM to 3:30 PM on weekends. Eligible patrons would telephone the dispatching center and give their trip information. Although prescheduling was encouraged, advanced reservations were not required.

The demonstration was the coordinated effort of over 12 agencies and organizations including the Cleveland Transit System, the Mayor's Commission on Aging, Model Cities and the Areawide Model Project on Aging.

The UMTA participation in the project is through their Service and Methods Demonstration (SMD) Program which sponsors projects intended to further five basic public transportation objectives:

1. Reduced transit travel time
2. Increased transit coverage
3. Increased transit reliability
4. Improved transit vehicle productivity
5. Improved service for the transit dependent.

The Cleveland project was in response to objective number five.

Additional project objectives, both local and national, are briefly outlined below. The NET Demonstration Program was designed to determine:\*

1. The extent to which a specially designed neighborhood transit system enables elderly and handicapped persons to maintain a state of independent living
2. The characteristics of both users and non-users
3. The feasibility of a public transportation system providing specialized services for the elderly and handicapped as part of its everyday operations
4. The extent to which basic transportation needs of the elderly can be satisfied within the neighborhoods in which they reside, through the use of a specially designed system
5. The level of increase or decrease of activity in social services and health organizations due to a neighborhood level of transit, and
6. The necessity of serving all neighborhood residents, not just the elderly, to improve the economic feasibility of the system.

The major issues to be examined in the evaluation were:

1. Would the cost of this service, as provided by RTA and using organized labor wage rates, produce a system that would be too costly to continue after the grant was terminated?
2. Will this form of service, with what is essentially a self-certification system, really reach the hard-core handicapped and transit dependent?
3. What, if any, compatibility or competition would there be with the existing transit system using the self-certification process?
4. Can the existing system of job classification be modified and can drivers be retrained to carry out the new work requirements of a demand-responsive service?

---

\*Taken from "Proposal to Urban Mass Transportation Administration for Neighborhood Elderly Transportation Project," submitted by City of Cleveland, December 8, 1972.

With these goals and issues in mind, planning began for Cleveland's NET system in December 1972. The grant was awarded by UMTA and HEW on July 8, 1973.\* Further implementation planning, with the assistance of a transportation firm experienced in NET-type operations, continued until the commencement of the demonstration period on March 16, 1975. The project was to have been completed by December 31, 1975, but since unspent project funds were available, the service was continued until March 31, 1976, to provide the City of Cleveland with additional time to plan a continuation of services. UMTA later provided funding to extend the project to July 1, 1976.

As was mentioned, efforts were made to ensure the continuation of transportation service within the target areas. The evaluations leading to the final project report were used in deliberations on the type of continuation service which should be implemented. Relative to these deliberations, the RTA Policy Body, in January 1976, adopted a set of recommendations on community-responsive transit (CRT).\*\* This statement generally does not contain specific operational detail but discusses broader ideas on potential ways of applying CRT to Cleveland and Cuyahoga County. It does address some detailed issues concerning fares, service allocation, and expenditures which may be part of CRT services.

In March 1976, the NET operations were taken over by RTA. After examination of all available data, RTA decided to continue the CRT service to the same target areas used during the demonstration period. RTA also included in its analyses estimates of required service levels with the

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\* Under an inter-agency agreement, HEW transferred funds to UMTA to study the problems of the elderly/handicapped.

\*\* Community Responsive Transit, a Cleveland phrase, connotes a personalized form of transit oriented to the needs of the neighborhood it serves. It may or may not be a demand-responsive service.

ultimate goal of reducing the cost per trip from that amount experienced by NET. Development of future operations are being guided by this RTA Policy Body and its recommendations. A free fare policy has already been adopted and future plans may include an increased fleet of operational vehicles, fixed neighborhood routes, or charter taxis on a shared ride basis; depending on which method, or methods, of CRT service are put into effect.

## 1.2 SITE OVERVIEW

The service area consisted of three distinct low income neighborhoods: Buckeye, Model Cities and Tremont. The relevant characteristics of each demonstration neighborhood were:

	<u>Buckeye</u>	<u>Model Cities</u>	<u>Tremont</u>
Area (sq. mi.)	2.4	2.3	2.9
# of Residents 65+ Years of Age	4,302	3,911	3,534
# of 65+/sq. mi.	1,790	1,700	1,220
% of Residents 65+	14%	10%	12%
# of Residents 60+ Years of Age	6,296	5,723	5,172
% of Residents 60+	20%	15%	17%
Ethnic Origin(s)	Hungarian, Slovak, Black	Black	Polish, Greek, Slovak, Philippino

The three neighborhoods also contain sufficient activity centers and services to satisfy most of the basic daily needs of elderly residents. The neighborhoods are located within the service area of the new Areawide Model Project on Aging, which was established to improve the existing service delivery

system in order to prevent life crises among older persons. Efforts have been made to establish lines of communication with elderly residents of each neighborhood. More detailed demographic and geographic data on the test site is included in Section 2, Service Area Characteristics.

### 1.3 EVALUATION OVERVIEW

The evaluation work was performed by the three contractors involved—DAVE Systems, Case Western Reserve University (CWRU) and Crain & Associates.

DAVE Systems has developed a detailed operational description of the system and has analyzed the demonstration results based on data taken during the course of operations. These are mainly time series data of ridership, vehicle productivity, costs, scheduling/dispatching records and maintenance results. These are supplemented by DAVE Systems' observations of problems encountered and perceptions of those who were closely associated with the project.

The CWRU work was an after-the-fact evaluation of the impacts of the system on users of the demonstration service. They performed a survey of users and non-users of the service in an attempt to measure demographics, changes in travel behavior, and perceptions of both the user group and the non-user control group. They then attempted to conclude what benefits the system provided and whether or not these benefits outweighed the costs inherent in this type of operation.

Crain & Associates observed the post-demonstration decision-making process as the RTA and the City of Cleveland made judgments on whether and how the NET type of operation would be continued. These observations were documented and interpreted in this report. Crain & Associates was also responsible for preparing the final report incorporating the work of DAVE Systems and CWRU. These functions entailed writing certain sections and editing the sections prepared by the other two organizations. The following specifically identifies which group wrote which section:

<u>Section</u>	<u>Written By</u>
1.0 Introduction	Crain & Associates
2.0 Project Description	DAVE Systems
3.0 System Operational Results	DAVE Systems
4.0 Impact of Project on Users	Case Western Reserve
5.0 Future of NET Operations	Crain & Associates
6.0 Findings and Implications Regarding Transferability	Crain & Associates

## 2. PROJECT DESCRIPTION

### 2.1 SERVICE AREA CHARACTERISTICS

The three NET sites showed similar concentrations of elderly residents, and each was relatively self-contained in terms of basic services and facilities. Model cities was the site of extensive urban renewal, was predominantly Black, and had the lowest average income. Tremont and Buckeye were older neighborhoods with large concentrations of first- and second-generation Eastern Europeans. Buckeye was the least poor of the three neighborhoods. The three test areas were selected on the basis of the following factors:

1. Density of elderly population per square mile.
2. Availability of the needed shopping, medical, religious, social, and recreational outlets within the boundaries of possible service areas.
3. Spread of cultural, economic, and race/national origin backgrounds representative of the overall Cleveland elderly population.

Figure 2-1 identifies the test areas within the city. The most relevant demographic data for each area were cited in Section 1.2.

A factor of interest is that the Buckeye and Model Cities neighborhoods had higher levels of public transportation service to and from the downtown areas than did other areas of the city of Cleveland. Because of the poor street distribution system in the Tremont area, however, the quality of transit service was much less in some parts of this neighborhood.

Figures 2-2, 2-3 and 2-4 describe in greater detail each of the three test areas. The origins and destinations most important to the elderly are shown, as are the fixed-route bus lines and rail lines that passed through the areas. Bus headways were from 5 to 10 minutes during rush periods and from 10 to 30 minutes



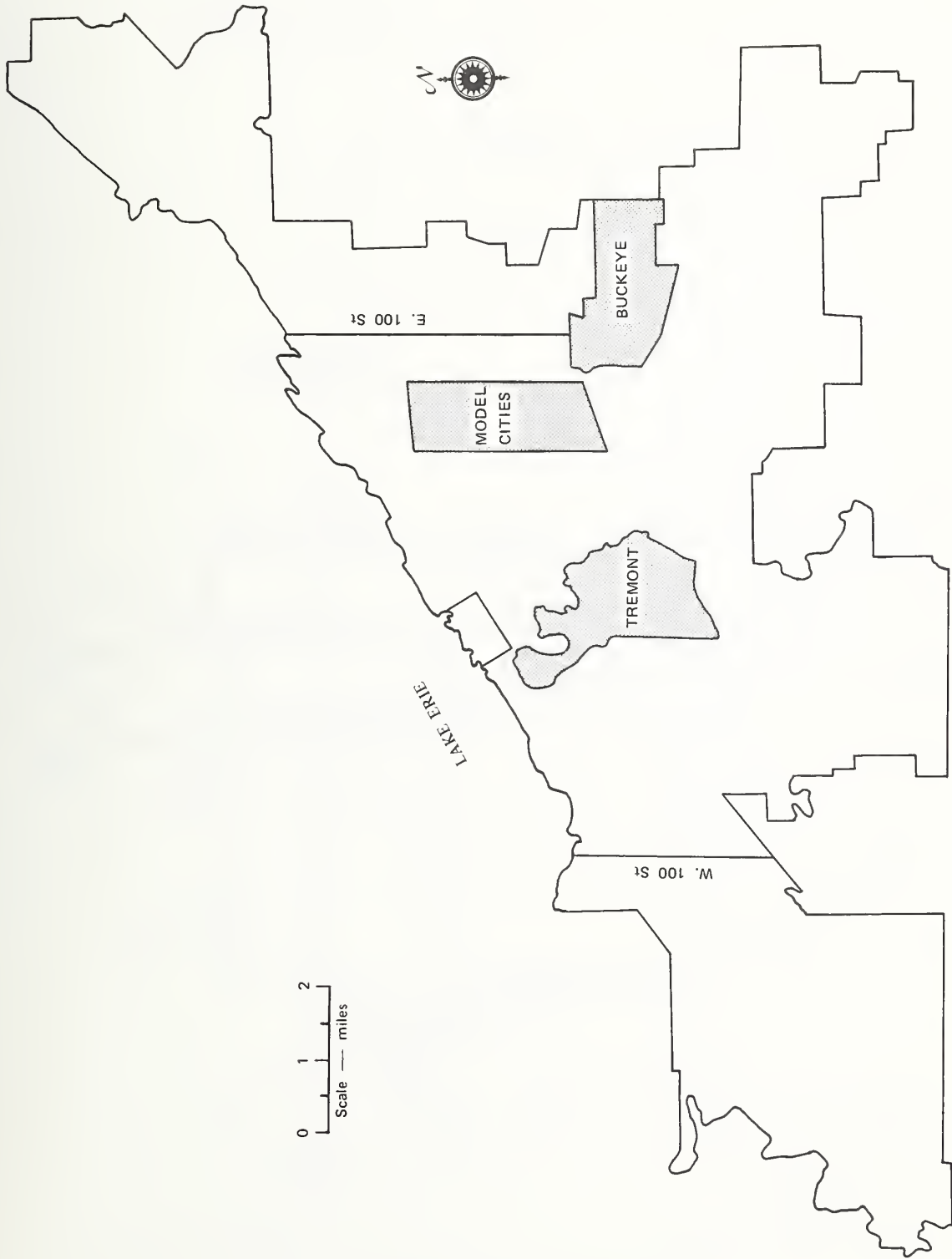


FIGURE 2-1. CITY OF CLEVELAND, ELDERLY TRANSPORTATION DEMONSTRATION NEIGHBORHOODS

# BUCKEYE

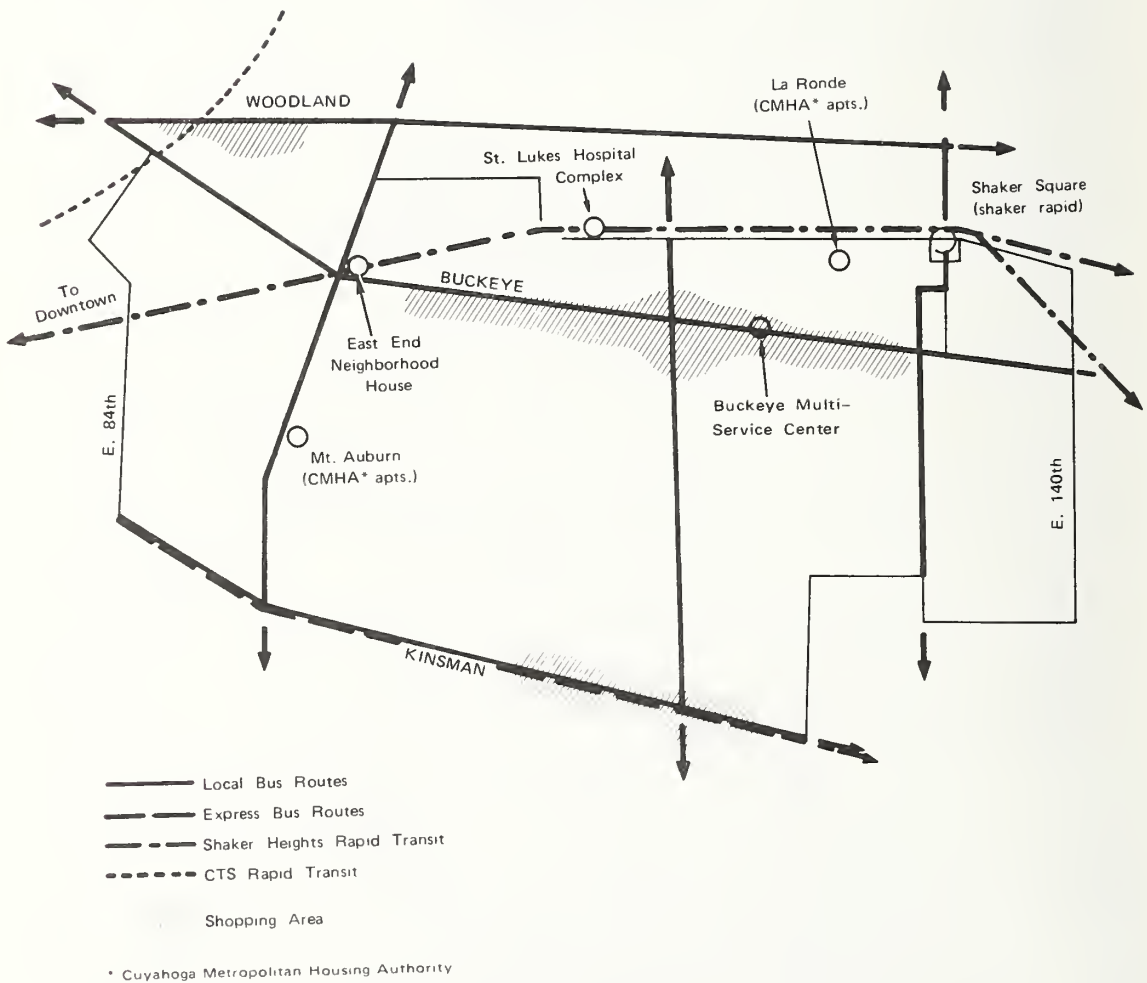
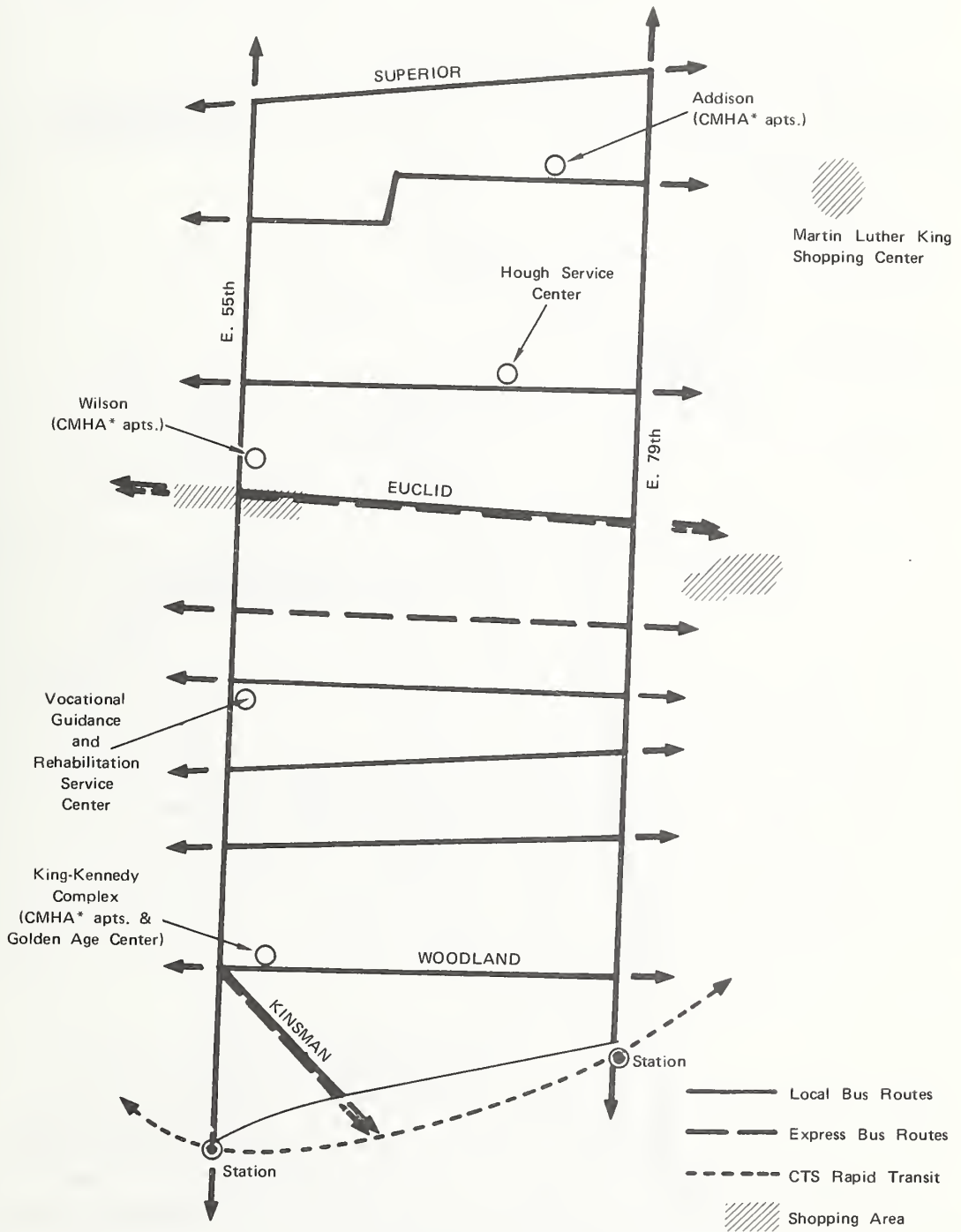


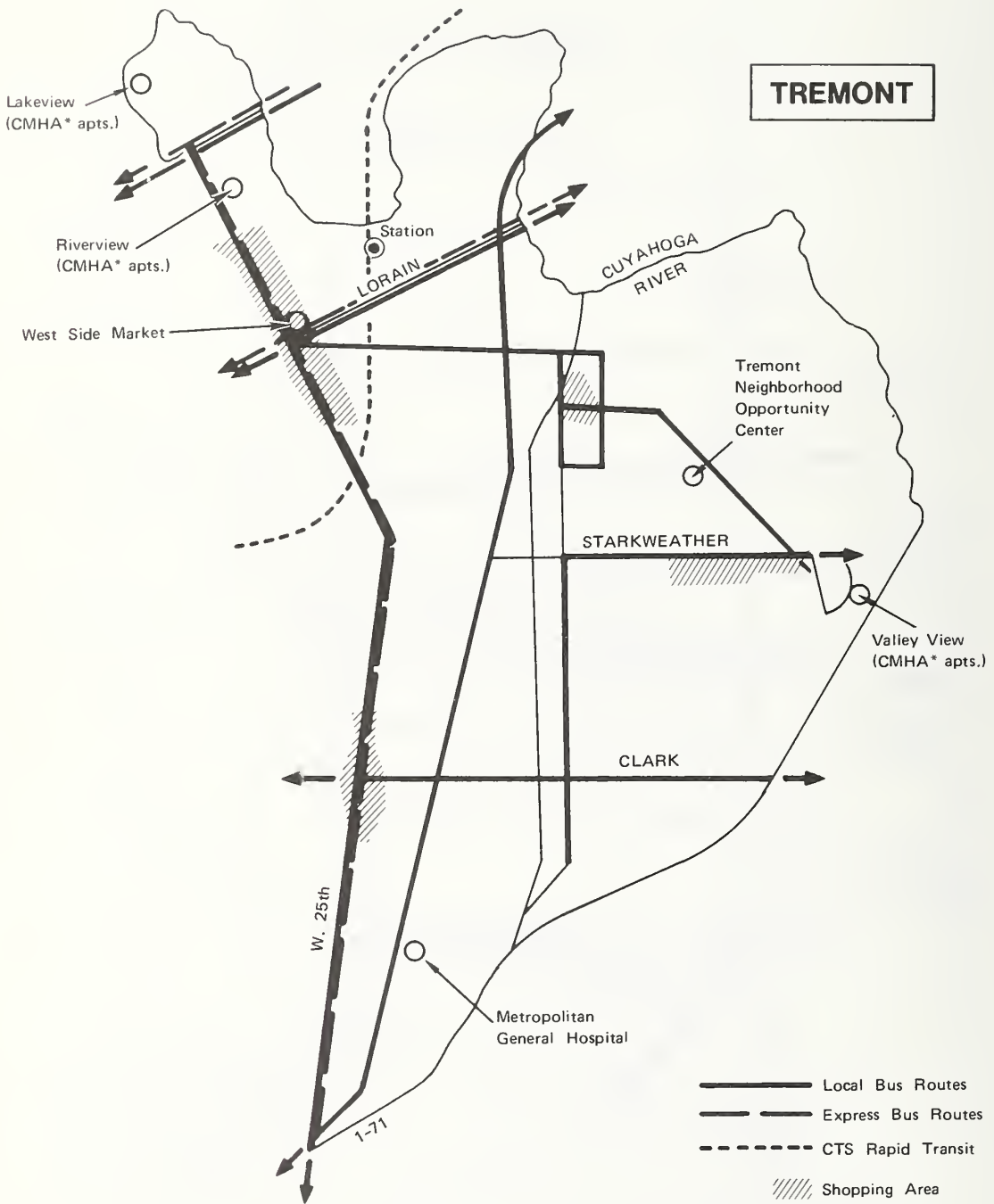
FIGURE 2-2 MAP OF BUCKEYE

# MODEL CITIES



\* Cuyahoga Metropolitan Housing Authority

FIGURE 2-3 MAP OF MODEL CITIES



\* Cuyahoga Metropolitan Housing Authority

FIGURE 2-4 MAP OF TREMONT

during non-rush periods. The bus network led to all sections of Cleveland. Additionally, there was a high level of taxi service operating in the test areas. Fares were 30¢ for flag-drop and 20¢ per third of a mile. Some of the social agencies provided their own transportation service to clients living in the test area although few of these services were offered to senior citizens.

## 2.2 SERVICE DESCRIPTION

### 2.2.1 Eligibility

Service was available to anyone 60 years of age or older. Persons under 60 traveling as companions to elderly riders could also use the service. Eligibility was established by a Medicare I.D. card, a Dial-A-Bus I.D. card, or a CTS I.D. card. The two latter cards were easily obtainable with proof of age. Dial-A-Bus included service to persons confined to wheelchairs.

### 2.2.2 Types of Service Offered

Users could arrange for service on an "immediate" or demand-responsive basis (e.g., patrons are ready to leave when they call, and the first available bus will be assigned to them). They also could arrange for advance reservation service at a later time during the same day or on a repetitive or "subscription" basis. Drivers were required to assist persons in wheelchairs in boarding and leaving the bus. Drivers also aided other passengers as needed.

### 2.2.3 Service Availability

Service during the demonstration period was offered five days a week from 7 AM to 7 PM, and on Saturdays and Sundays from 7 AM to 3:30 PM (including holidays). In April 1976, the hours of operation were cut back as a part of the transition to post-demonstration service. This cutback with heavy loss in ridership is discussed in Section 5.

#### 2.2.4 Fares

The fare for NET service was 10¢ for each one-way trip. In accordance with local practice, exact fare was required and drivers did not carry change. Informally, the staff had been instructed to board any persons for whom the fare represented a hardship or persons who did not have the exact change. Occurrences of this type were less than five percent.

#### 2.3 CONTROL, DISPATCHING PROCEDURES

The control system used to schedule and dispatch the vehicles for the Neighborhood Elderly Transportation (NET) project is described below. The purpose of the control system was to apply the vehicular resources of NET to meet the needs of the passengers in the most efficient manner possible.

Requests for service were received primarily by telephone, but a small fraction came in from drivers via the radio and from written communications from customers. Most requests were for immediate pickup (called a "current" request). Others wanted to be picked up at some subsequent time the same day or at a future date (called a "deferred" request). Finally, some requests were of a repeat nature, where a passenger took the same trip on a regular basis (called a "periodic" request). Passengers could also hail an NET vehicle on the street.

The NET control room was staffed by controllers who had four principal functions: receive calls, schedule, dispatch, and perform clerical accounting duties. Because the controllers were trained in more than one function, as few as one or as many as four controllers could be used to operate the system. This provided management the flexibility of staffing to meet the workload demand.

When a request for service was received, a trip ticket was typed or handwritten on carbon-like paper which automatically produced a duplicate copy. Information recorded on the trip ticket included pickup address, delivery address, telephone number, and

number of persons riding, estimated pickup time, and passenger's name. A code was marked on the pickup ticket to indicate the time that the customer expected to be picked up, and other critical data were indicated, such as whether or not a wheelchair vehicle must be used or if an important medical appointment must be kept. The telephone number was taken so that passengers could be informed of any significant changes in their scheduled pickup times or advised that a bus was waiting for them.

A time clock was used to punch the times on the back of the trip tickets—the call time and pickup time on the back of one copy of the ticket, and the delivery time on the back of the duplicate copy of the ticket, as these times were called in by the driver. This time information was later utilized for analysis of system performance.

If the request was for a deferred trip, it was stored in a slotted board which had times marked on it. An alarm was set for 30 minutes before the requested pickup time to alert the controllers to process the trip in a timely manner as a current request.

If the request was for current service (and when deferred requests became current), one copy of the trip ticket, referred to as the pickup ticket, was placed in a pointed black magnetic holder. The other copy, referred to as the delivery ticket, was placed in a white magnetic holder.

These magnetic holders were then placed on enlarged maps of the appropriate service areas (Figure 2-5)—each of the three service areas was represented by a separate map. The holders were oriented to show the vector from pickup to delivery point. Colored markers were later placed on the pickup and delivery holders to indicate which vehicle was to be used. Each bus had its own color code, and the colored markers traced the route for each bus. As the bus traveled along its route and each passenger was picked up, the holders representing later passengers were taken off the board and given to the dispatcher (Figure 2-6). The dispatcher subsequently relayed the addresses to the drivers in such a way as to ensure that the drivers always knew where to go for the next passenger one or two stops ahead of their current location.

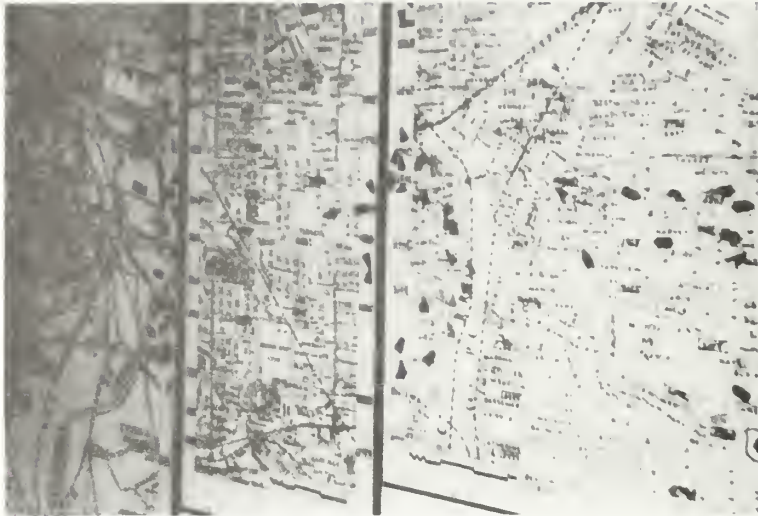


FIGURE 2-5. MAPS OF THE THREE SERVICE AREAS WITH MAGNETIC PIECES FOR SCHEDULING AND ROUTING.



FIGURE 2-6. DISPATCHER WITH QUEUE OF SCHEDULED TRIPS AWAITING TRANSMITTAL TO DRIVERS.



The scheduler made the decision about which vehicle to assign for each passenger on the basis of a number of algorithm and pattern recognition techniques. In essence, he was trying to maximize vehicle utilization while meeting the constraint of each passenger's expectation.

Communications were usually initiated by the drivers when they called in by two-way radio at each stop. The driver was then given the next stop, which he recorded along with the probable second stop. Thus, if the driver got to his next stop but could not get through on the radio, he could go ahead without delay to his second stop. At all times, the control center knew which passengers were on each vehicle and the approximate position of each vehicle.

The system provided an exceptional level of security as a result of: instant driver communications that could be relayed to police, identification of passengers, position of each vehicle known to within a few blocks, locked fare vaults, and door-to-door service.

For subscription service a card that specified the desired repeated pickup time and origin and destination location was made. Each day the card (request) was automatically processed.

Often a bus would be assigned to pick up a group of customers who wanted to return from a hospital, shopping center, etc. In this case, the driver made up a 'tour' from the addresses given him by the passengers that boarded his vehicle and did not have to receive instructions from the control center.

## 2.4 VEHICLES

Identification, selection, and actual purchase of the vehicles were a very time-consuming aspect of the preparatory work. While a number of small buses are available on the market, and most manufacturers can point to at least one similar operation using their vehicle, none can be termed a true "transit coach." Often these small buses are fabricated from various

component parts and/or are mounted on light truck/motor-home chassis, none of which were designed or intended for use in a public transit vehicle. Written or telephone communications were made with present users of many of the potential vehicles. Some of these users reported vehicle downtimes as high as 25 percent, and all indicated a combination of several major design shortcomings and a chronic occurrence of miscellaneous minor flaws.

The purchasing decision was complicated by several factors: 1) the need to obtain an acceptable combination of desirable features; 2) buying a sufficient number of vehicles to meet planned operation levels; 3) budget constraints; 4) Task Force perceptions as to the physical acceptability of the different vehicles; and 5) city and federal procedural purchasing requirements. Every effort was made to reach an acceptable balance between these factors.

The request for bids specified a modified van with a gasoline engine. Six responses were received. A Task Force appointed by the Commission on Aging examined four of the six vehicles and was given a verbal presentation by a CTS representative wherein the comparative features of each of the vehicles were analyzed. The Task Force then selected Airstream's "Argosy" bus for the NET Project (see Figure 2-7).

Twelve Argosy compact buses were purchased for the NET Dial-A-Bus Service. The purchase price for ten of these was \$14,700 each. The other two had lift mechanisms and cost \$16,100 each. The Argosy buses are equipped with handgrips at the doors and stepwell, a low (10") step from the street and short (8") risers, stanchions at convenient intervals, seats with aisle handgrips, wide aisles, place for storing packages, and ample lighting for the stepwell and sidewalk area. Oversized windows, low noise level, and air-conditioning were also provided for in the vehicle specifications.

Two Dodge vans with elaborate modifications were also purchased. These were equipped with hydraulic lifts for wheelchairs



FIGURE 2-7. ARGOSY BUS

for the handicapped. These vans underwent custom conversion work to bring them up to a level of safety, comfort and convenience equal to that of the other buses; and, in fact, were used daily in regular patron service when no handicapped patrons were waiting for service.

## 2.5 FACILITIES

### 2.5.1 Project Office

Shortly after award of the grant, a project office was opened in the CTS building, 1404 East 9th Street. (See Figure 2-8 for location of office and other facilities.) This location made it possible for the Project Director to have close liaison with the CTS personnel involved with the NET project. Other necessary facilities (such as conference rooms, duplicating machines, etc.) were made available to the Director at cost. Not having to duplicate these facilities represented a significant cost savings to NET. In addition, most City supportive services necessary to the Director (such as Legal Department, Purchasing, Finance, and the Mayor's Office) were located within three city blocks of the CTS building.

### 2.5.2 Garage

Vehicle maintenance and storage were centralized at the CTS Woodhill Station, 2440 Woodhill Road, because of its geographic location in relation to the three NET service areas and because of the amounts and types of facilities available there. Travel time between Woodhill Station and the NET areas was approximately as follows:

Buckeye	0 minutes	(Woodhill Road forms part of the area boundary.)
Model Cities	7-10 minutes	
Tremont	20-25 minutes	

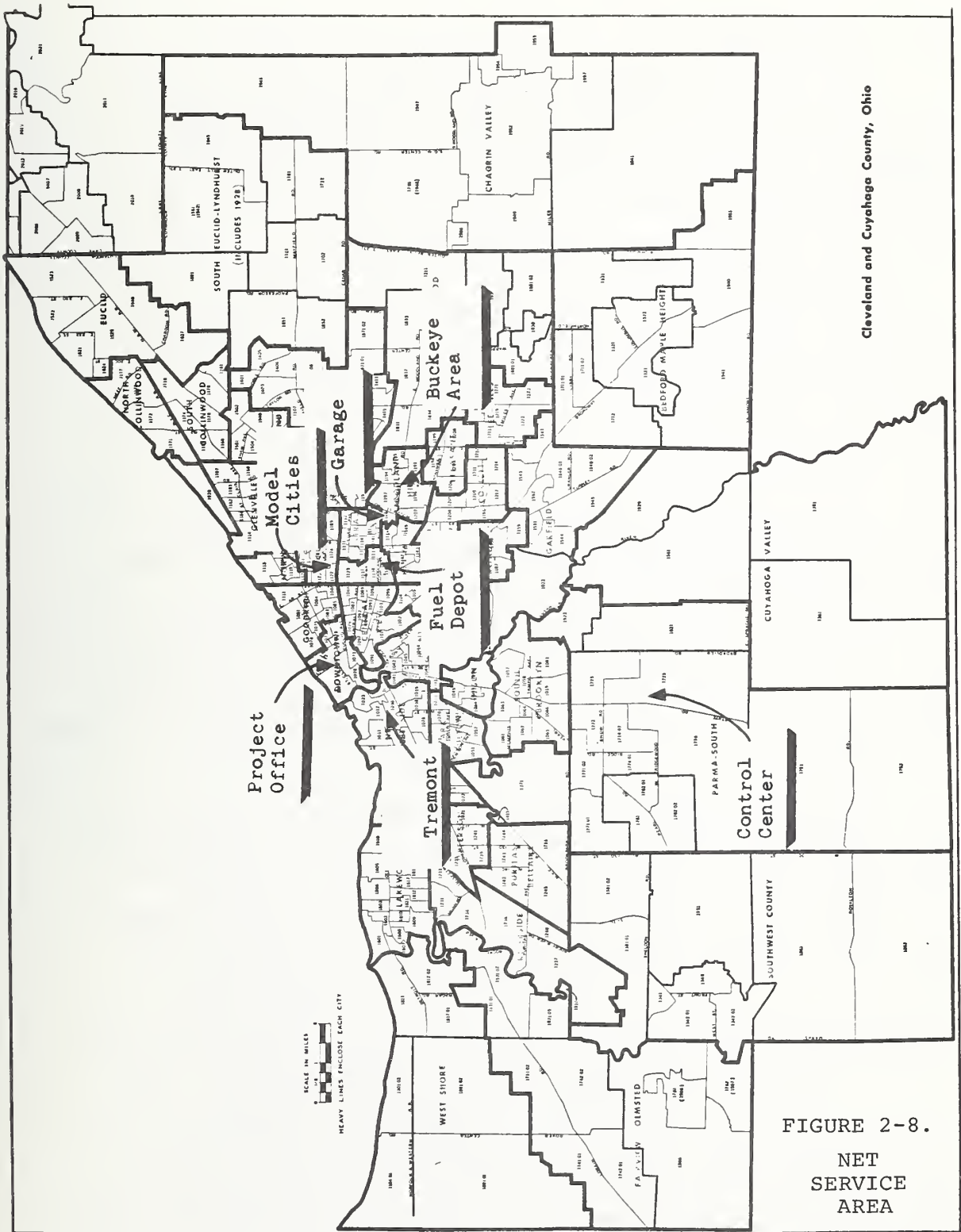


FIGURE 2-8.  
NET  
SERVICE  
AREA

### 2.5.3 Fuel Depot

Since the NET vehicles were municipally owned, they were fueled at the City fueling facilities located at 7300 Dell Avenue. Travel time between the Woodhill Station and the fuel depot was 10-12 minutes.

### 2.5.4 Control Center

Due to the elevation and transmitting tower facilities, CTS maintained its radio communications at leased facilities on Pleasant Valley Road, Parma. Arrangements were made to lease additional space at that facility for the NET control center adjacent to the CTS rooms. In early March, the rooms were refurbished with paint, acoustical tile, and carpets; CTS radio equipment (supplied as an in-kind contribution to the project) and service area maps and other special operational equipment were installed.

The control center was set up for four work positions: two telephonists, one dispatcher, and one scheduler. In addition, an adjoining office was set up for the Operations Supervisor with interconnecting telephone lines so that the Supervisor could assist during periods of high incoming calls.

The Parma location of the control center was more than 15 miles from each of the three service areas and the garage where the vehicles were stored and maintained (see Figure 2-8). It was anticipated that this physical separation of the different functional parts of the operation would create logistics problems, but every effort to locate closer was unsuccessful. Ideally, the control center would have been located on the same Woodhill Station property. Many of the small, day-to-day occurrences which could be handled quickly by the Operations Supervisor if he were on site had to be handled by telephone or written communications. Also, close observation of the vehicles on the streets was not possible. In those situations requiring the Supervisor's presence, the control center was left without supervisory guidance/assistance.

## 2.6 MANAGEMENT AND PLANNING

### 2.6.1 Organization

The grantee, the City of Cleveland, operated the project through a project staff titled the Neighborhood Elderly Transportation Project Office. This office provided the administrative leadership, with the actual operations contracted to CTS, and later to RTA. Figure 2-9 illustrates the organization of the project and some of the responsibilities of the various agencies. The special role of the Task Force to obtain community participation is discussed below.

### 2.6.2 Task Force

The Mayor of the City of Cleveland, after receipt of the federal grant, assigned the Commission on Aging to conduct a search for a Project Director and to form a Task Force for the project. Unlike many similar situations in which community representation is provided for, but not actually encouraged, this Task Force was active and supportive from its inception. The Task Force consisted of representatives from each community serviced by NET—one from an agency providing services to the elderly/handicapped and one who was an elderly resident. In addition, each Task Force member was encouraged to invite other elderly persons from the communities to be serviced. Included in the responsibilities of the Task Force were the following:

1. Interviewing prospective Project Directors and making recommendations to the Mayor.
2. Inspecting/evaluating possible vehicles which might be used in the NET project, and making recommendations regarding the proposed manufacturers.
3. Assisting in dissemination of NET promotional materials, and serving as coordinators by working with the neighborhood organizations and the Project Director. (The Task Force also helped to stimulate the utilization of social, welfare, and health resources.)

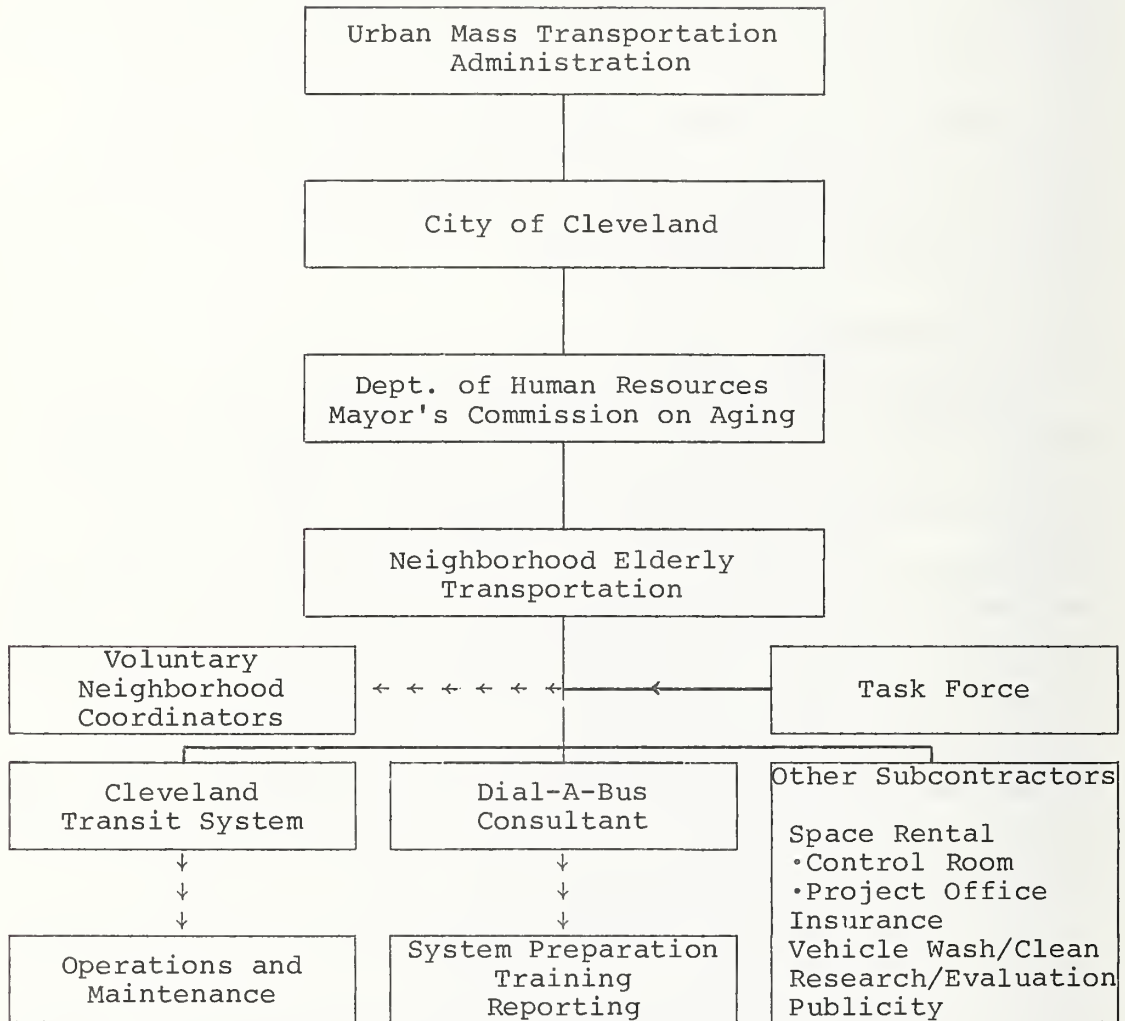


FIGURE 2-9. NEIGHBORHOOD ELDERLY TRANSPORTATION ORGANIZATION CHART



4. Reviewing the overall progress of the project at regularly scheduled meetings and assisting the Director as required.

The active involvement of the Task Force is evident from the fact that over a period of about 18 months, attendance at each meeting was approximately 20 persons.

### 2.6.3 Implementation

Preparation for the start of the operational period can generally be grouped into the following efforts:

1. Purchasing equipment/supplies (such as vehicles, furniture, etc.)
2. Contractual agreements for services/equipment—including drivers, controllers, vehicle washing, control room and central office space, radio equipment/frequency usage, promotion and advertising materials, insurance, and maintenance
3. Consultant services for development of service design, operating procedures, staff training, reporting, and operational evaluation
4. Disseminating information regarding the envisioned service
5. Gathering public reaction/opinions by means of the Task Force and personal visits to elderly service organizations; and revising, as indicated, various aspects of the service
6. Preparing for the specific scope of the research and evaluation
7. Customary administrative and financial management, and progress reporting
8. Staff selection and training

9. Coordinating the efforts and needs of the various agencies/parties participating in the project
10. Inaugural planning.

Several delays in the start of revenue service were experienced. Service began in Buckeye on March 16, 1975, and in Model Cities and Tremont one week later—March 23, 1975. Unlike many similar experiences in which anticipated schedules cannot be maintained due to tardy deliveries of needy equipment/hardware, all necessary NET vehicles and equipment were available in a timely fashion.

In the NET experience, the five-month delay in the start of service was caused by what might be termed "institutionalism." There were a number of public and private parties involved with the project, each with its own organizational/procedural differences—many, in the case of government entities, dictated by statute. Securing approvals "through channels" of any organization also required considerable time.

Following a formal two-week training period, revenue operations began on March 16, 1975, in the Buckeye area, and on March 23rd in the Model Cities and Tremont areas. Mayor Ralph Perk and other city and state officials presided at both inaugural ceremonies.

#### 2.6.4 Staffing

The Cleveland Transit System provided the operating staff—supervisor, controllers and drivers. All were represented by the Amalgamated Transportation Union (ATU). Prior to the start of training, CTS employees were interviewed as to their interest in the project. Those who expressed an interest were placed, according to seniority, on the list of persons to be assigned to the new project. Tests for qualifying skills were not permitted since, in their promotional process, CTS stated that all of the assigned personnel had been "equivalently tested" during their past period of employment.

Twelve drivers and three controllers were assigned as the regular operations staff. In addition, three more controllers and three more drivers were assigned as "alternates" who also could be called upon to cover absenteeism, illness and vacations of the regular staff. One management-level CTS employee was assigned to the project as the Operations Supervisor.

Work rules and agreements between CTS and the ATU were formulated prior to demand-responsive transit (DRT) operations. (Existing work rules do not adequately cover a DRT operation.) Minor inconsistencies between existing work rules and the nature of a DRT operation caused inconveniences to both the project and CTS operations staff. Due to a generally cooperative attitude between NET and personnel of CTS, however, the service was able to meet day-to-day operational needs without incident. Although a cooperative attitude between the CTS personnel and NET staff existed, there were built-in constraints to the efficiency of the operation. For example, personnel were assigned to the project on a seniority basis. In a demand-responsive system, the function of a controller is a critical and demanding job. Not all personnel placed in these positions on the basis of their seniority can be expected to have the ability to cope with the complex problems of DRT control.

In DRT, the control center must exercise complete control over the operation, including the activities of the drivers. Under the work rules, this was impossible. Controllers were restricted from admonishing, or reporting, infractions by their fellow workers.

#### 2.6.5 Training

A two-week formal training program was developed and administered to the drivers and controllers by DAVE Systems, Inc. Classes covered all aspects of the NET service, personnel policies, data collection needs of the Demonstration, and approved NET operation procedures. Special emphasis was given to understanding the needs/limitations of the elderly and handicapped.

Guest speakers from health and welfare agencies and local Cleveland universities conducted these special lectures and demonstrations. Reaction to these lectures was very enthusiastic.

The formal classroom sessions were held in space donated by a parochial grade school located in Buckeye. In addition to lectures and audio-visual presentations, simulations were used as an important training technique in order to duplicate actual operational situations that could be expected.

Service was inaugurated in two stages—Buckeye being first, followed in one week by Tremont and Model Cities. During the interim week, the staff not needed for actual operations in Buckeye were given additional training in the other two service areas—particularly regarding area familiarization.

After the start of actual operations in all three areas, additional training was given to each driver/controller on an individual basis as needed to improve any deficiency in skills.

#### 2.6.6 Advertising/Promotion

Because the service was confined to certain areas of the city as opposed to being city-wide, advertising/promotion efforts were generally confined to direct mailings and efforts through the various service organizations for the elderly which were located in the three areas. Some city-wide coverage, however, was given by the major newspapers and television stations.

The mailing list used had to be compiled from a number of source lists. This was due to the defined NET service areas, which did not coincide with other categorization methods (such as property tax records, wards, etc.). In some instances, statutes prevented public agencies from providing information regarding names and addresses. (These statutes or operating policies are intended to protect an individual's privacy.) The agencies which were able to cooperate included private community agencies, educational institutions offering classes with reduced fees to the elderly; nutrition programs, and local civic

organizations. The list was compiled by merging the various source lists and eliminating duplications.

The materials issued by direct mail were as follows:

1. 9" x 16" brochure, two colors, four-fold, printed both sides, describing how the service operates, days of service, and hours of service. Three different brochures—one for each service area—were printed, in different color combinations, on the same theme, each depicting the appropriate service area map (See Figures 2-10, 2-11)
2. 1-1/2" x 2" adhesive telephone sticker, printed with service name and phone number
3. Large store-window display posters, giving service name and phone number
4. User identification cards.

An initial mailing of 7,000 was done in mid-March. This represented about 41 percent of the eligible elderly population, although the brochure was probably read by a larger number of the potential riders. Because of the high ridership growth rate during the first weeks of service, the remainder of the mailings were deferred, but distribution of informative materials continued on a limited basis through the neighborhood service organizations for the elderly. Resumption of the direct mailings took place during the summer.

Supportive press coverage also took place from time to time when city-wide publicity was advantageous to the project and to the subject of specialized transit for the elderly. Assistance with the preparation and dissemination of these releases was provided by the Mayor's office.

Ride  
anywhere  
in your  
neighborhood  
for 10¢ Buckeye, Tremont,  
Model Cities

... if you are 60 or over  
... if you want to go

shopping,  
to work, to visit,  
go to the doctor  
or dentist, to church,  
to a social club, or to  
a rapid stop or CTS stop.

... or for any other reason



Persons under 60 years of age cannot use NET Dial-a-Bus except when helping someone who is 60 or over.

#### HOURS

Dial-a-Bus will run seven (7) days per week, Mon. through Fri., 7:00 A.M. to 7:00 P.M. Sat. & Sun. — 7:30 A.M. to 3:30 P.M.

#### COST

10¢ per ride — you must have exact change. Anyone helping an older person is also entitled to ride for 10¢.

#### IDENTIFICATION

Use your Medicare I.D. Card, the Dial-a-Bus I.D. Card or C.T.S. I.D. to show the driver you are 60 or over. If you don't have any of these, call 842-5100 to find the closest place you can get a Dial-a-Bus I.D. Card.

#### DOOR TO DOOR SERVICE

A phone call to the Dial-a-Bus Dispatch Center — 842-5100, will bring a bus to your door, usually within 30 minutes.

When you get on your Dial-a-Bus, there may be people already on board. These people may get off, and others may get on, while you proceed to your destination. There is no fixed route. The bus goes where you and others want it to go, when you want it.

Dial-a-Buses are air conditioned and will seat 15 people in comfort. Entering and leaving are easy with low steps and hand rails to hold on to. There is plenty of storage space for shopping bags and packages. The bus driver will assist you on or off and with your packages. There are Dial-a-Buses for the handicapped equipped with hydraulic lifts.

All buses are equipped with two-way radios for dispatch and safety reasons. When it is dark, your walk will be lighted with a spotlight from the Dial-a-Bus for your safety.

#### GOING HOME

If you know exactly when you will be ready to go back home, you can make arrangements ahead of time, and the bus will be there to pick you up at the appointed time. Otherwise, another phone call will bring the bus to wherever you are.



FIGURE 2-10.  
DIAL-A-BUS  
BROCHURE



DOES SOMEONE YOU KNOW NEED A  
 NEIGHBORHOOD ELDERLY TRANSPORTATION (DIAL-A-BUS)  
 IDENTIFICATION CARD?

If that person is 60 years of age or over, and lives in  
 BUCKEYE, MODEL CITIES or TREMONT, have him/her fill out and  
 mail this postcard and we will send information on how to  
 obtain an I.D. Card.

NAME \_\_\_\_\_  
 (Please Print) PHONE \_\_\_\_\_

ADDRESS \_\_\_\_\_ NO. \_\_\_\_\_

CITY OF CLEVELAND  
 RALPH J. PERK, MAYOR

Drop This In The Mailbox No Stamp Needed

FREE RETURN POSTCARD TO LOCATE ELDERLY



TELEPHONE STICKER

FIGURE 2-11. (cont.)  
 PROMOTIONAL MATERIALS



### 3. SYSTEM OPERATIONAL RESULTS

The operational period from March 16 through December 31, 1975, is reviewed in this section. For some analyses the ridership data have been extended to include the first five months of 1976. Included in this section is an analysis of ridership trends, market penetration, service levels (including trip times, wait time deviations, no-shows, etc.), and productivity rates.

#### 3.1 PROJECT RIDERSHIP

##### 3.1.1 Trends over Demonstration Period

The initial demand for service during the first two weeks of operations was low. Beginning about the last week of March, however, the number of requests for service grew very rapidly. Controllers and drivers had to operate at levels of demand for which they had insufficient experience. Numerous lengthy telephone calls for information about the new service were received. By mid-April, the rate of growth had eased considerably.

Table 3.1 shows the overall trend in ridership from the start of the project until services were cut back in May of 1976, when the system was changed into its post-demonstration configuration.

TABLE 3-1. MONTHLY RIDERSHIP

<u>Month</u>	<u>Ridership</u>	<u>% Increase</u>
March,* 75	2,566	
April	8,915	
May	9,797	9.9
June	9,906	1.1
July	11,632	17.4
August	11,839	1.8
September	11,600	(2.0)
October	11,915	2.7
November	10,775	(9.6)
December	<u>11,452</u>	<u>6.3</u>
Total for 1975	100,397	Average 3.6
January, 76	11,233	(1.9)
February	10,444	(7.0)
March	11,674	10.5
April**	7,627	(34.7)
May***	856	--

\*Service in Buckeye area only during March 16-22. Service in all areas started March 23.

\*\*Service hours reduced from 12 to 7 hours daily beginning April 5.

\*\*\*Data through May 7, official end of NET service.

As these data indicate, the monthly ridership climbed to over 11,000 after four months of operation and held at that level until the transition period began. One significant increase in growth occurred from June to July and probably can be related to the additional promotion/advertising that took place at that time. As the reduced service post-demonstration period took effect in April and May 1976, ridership declined drastically. Appendix A gives additional, detailed data on daily ridership trends by area over the ten month 1975 period.

### 3.1.2 Ridership by Service Area

Initial public reception was higher than expected in Buckeye and lower than expected in the Model Cities and Tremont areas. The distribution of ridership in March was approximately 74 percent in Buckeye, 9 percent in Model Cities, and 17 percent in Tremont. During the operational period, the distribution evened out somewhat: December ridership distribution was 51 percent in Buckeye, 20 percent in Model Cities, and 29 percent in Tremont. Table 3-2 gives the monthly ridership by service area.

TABLE 3-2. MONTHLY RIDERSHIP BY SERVICE AREA\*

	<u>Buckeye</u>	<u>Model Cities</u>	<u>Tremont</u>	<u>Distribution Among the Three Areas (%)</u>
March*	1,925	221	420	75- 9-16
April	5,810	979	2,126	65-11-24
May	5,845	1,305	2,647	60-13-27
June	5,259	1,642	3,005	53-17-30
July	5,836	2,230	3,566	50-19-31
August	5,796	2,263	3,780	49-19-32
September	5,603	2,277	3,720	48-20-32
October	6,017	2,458	3,440	50-21-28
November	5,567	2,235	2,973	52-21-28
December	5,845	2,283	3,324	51-20-29
January	5,846	1,992	3,395	52-18-30
February	5,400	1,847	3,197	51-18-31
March	6,155	2,017	3,502	53-17-30
April	3,865	1,282	2,480	50-;7-33
May	856	253	547	52-15-33

\*Service in Buckeye area only during March 16-22.

Several major trip generators (major shopping areas, Senior multi-purpose centers, hospital/medical centers, apartment complexes, etc.) were identified in each of the three service areas. The following table shows the concentration of trip making at these locations.

<u>Area</u>	<u>Number of Generators</u>	<u>% of All Origins</u>	<u>% of All Destinations</u>
Buckeye	8	32	42
Tremont	9	59	58
Model Cities	8	44	45

The percentages of origins and destinations cited are for weekday travel.

### 3.1.3 Ridership by Weekday and Weekend

Throughout the project there was a rather constant relationship between weekend and weekday ridership. As Table 3-3 indicates, average weekend riding was about one-half of average weekday riding.

Ridership did vary considerably through the week as shown by Figure 3-1. Ridership increased during the week, peaking on Friday before falling off to the lower weekend rates.

TABLE 3-3. AVERAGE DAILY RIDERSHIP  
BY WEEKDAYS/WEEKENDS

<u>Month</u>	<u>Weekdays</u>	<u>Weekends</u>	<u>Weekend % of Weekday</u>
March*	117	118	
April	310	185	60
May	382	178	47
June	390	189	48
July	440	216	49
August	453	232	51
September	466	201	43
October	442	215	49
November	452	218	48
December	444	211	48
January	444	211	48
February	432	200	46
March	430	233	54
April**	303	193	64
May***	295	177	60

\*Service starting on the Buckeye area only from March 16-22.  
Service in all areas starting March 23.

\*\*Service hours reduced from 12 hours to 7 hours daily  
beginning April 5.

\*\*\*NET service ended May 7.

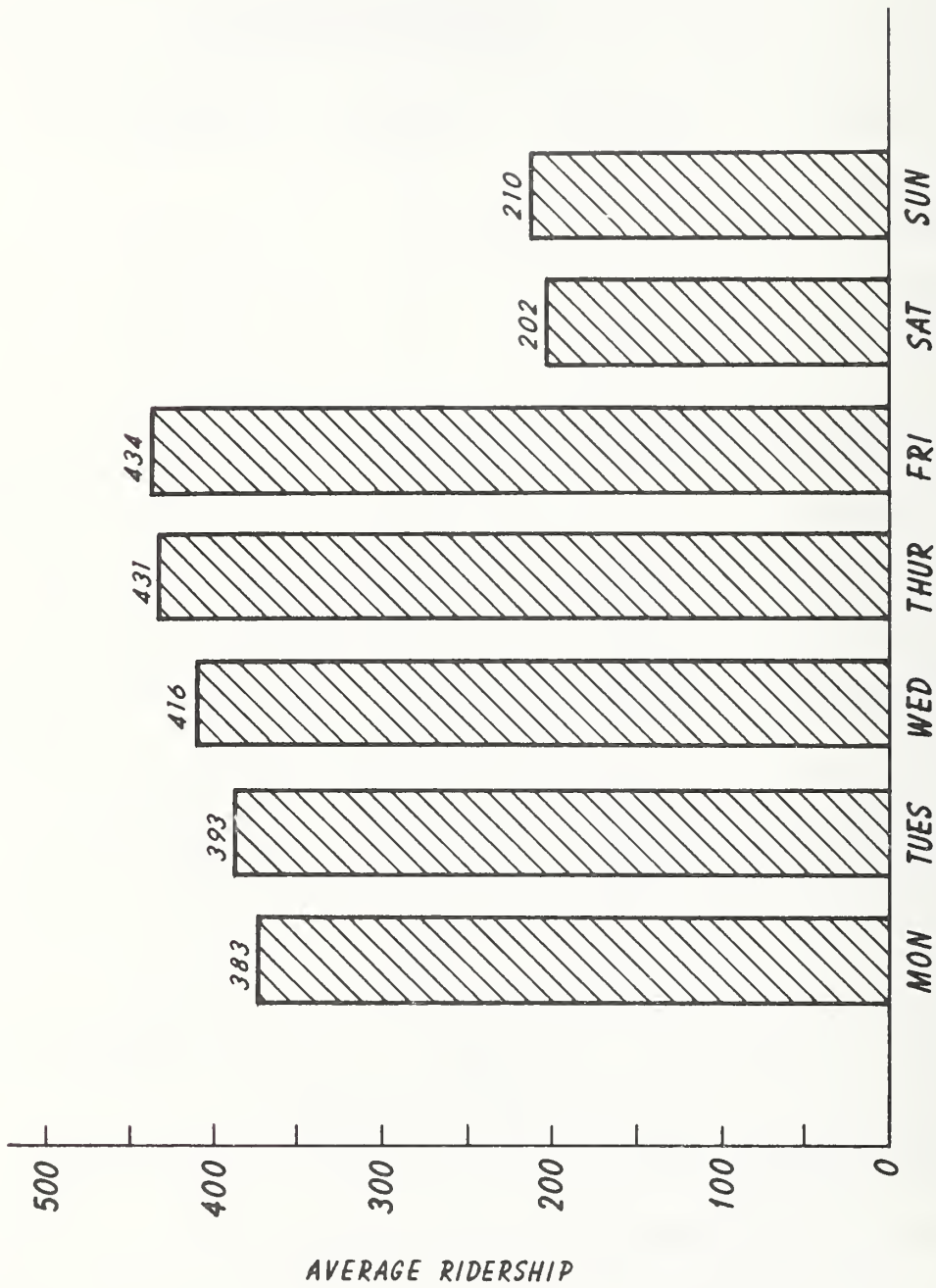


FIGURE 3-1. AVERAGE RIDERSHIP BY DAY OF WEEK

#### 3.1.4 Ridership within the Month

Although it might be expected that ridership would be higher the first few days of the month (due to Social Security checks being issued), surprisingly, there was little noticeable increase during these periods. Ridership distribution by weeks of the month was analyzed and there was little change in percentage of ridership during these periods. Ridership during the first seven-day period of the month accounted for 24 percent of the total ridership. Ridership then decreased only one percent per week during the remainder of the month (see Table 3-4).

#### 3.1.5 Ridership by Time of Day

The largest percentage of ridership was between the hours of 10:00 AM and 4:00 PM. This period accounted for 69 percent of the total daily ridership. The least frequently used hours were from 7:00 to 8:00 AM and 6:00 to 7:00 PM. A complete breakdown by hour of the day is illustrated in Figure 3-2.

TABLE 3-4.  
RIDERSHIP DISTRIBUTION BY WEEKS OF MONTH

<u>Month</u>	<u>First 7-Day Period</u>	<u>Second 7-Day Period</u>	<u>Third 7-Day Period</u>	<u>Fourth 7-Day Period</u>	<u>Excess<sup>a</sup></u>
March <sup>b</sup>					
April	1,954	2,203	2,046	2,001	711
May	2,483	2,269	2,203	1,884	958
June	2,455	2,148	2,360	2,367	576
July	2,524	2,583	2,623	2,576	1,326
August	2,861	2,683	2,722	2,684	889
September	2,582	2,760	2,615	2,698	945
October	3,046	2,623	2,504	2,495	1,247
November	2,966	2,730	2,579	2,086	414
December	<u>2,982</u>	<u>2,703</u>	<u>2,639</u>	<u>1,907</u>	<u>1,221</u>
TOTAL	<u>23,853</u>	<u>22,702</u>	<u>22,291</u>	<u>20,698</u>	<u>8,287</u>

<sup>a</sup>Ridership after the 28th day of the month.

<sup>b</sup>Incomplete -- service inaugurated mid-month.



— MARCH - MAY 1975  
 - - - AUGUST 1975  
 ..... DECEMBER 1975

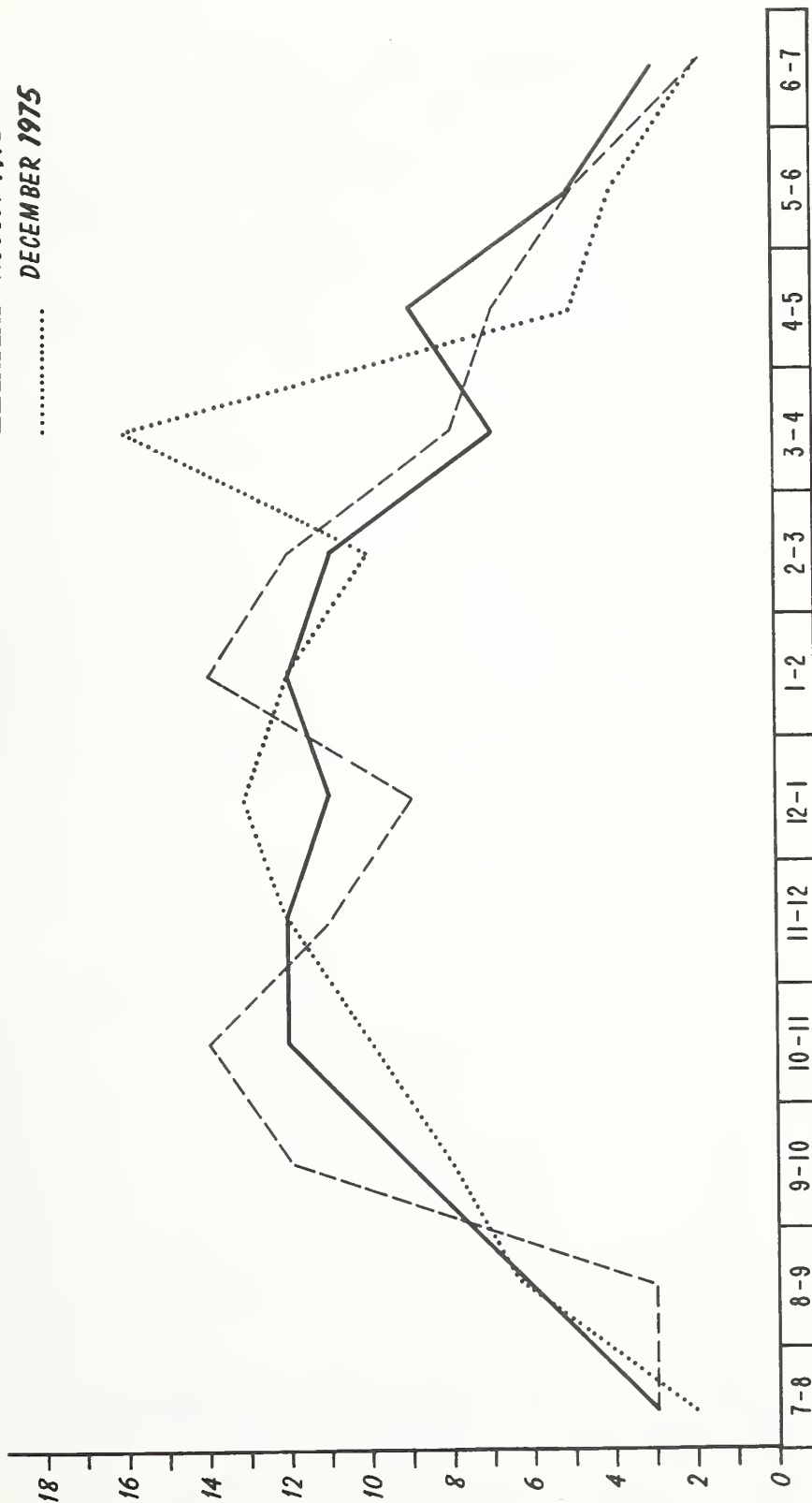


FIGURE 3-2. AVERAGE RIDERSHIP BY TIME OF DAY

### 3.1.6 Subscription (Periodic) Service

Subscription service, by which a person traveling from the same origin to the same destination each day (or on specified days) can place a single phone call to establish repetitive service, was provided by NET for the convenience of the patrons. As might be expected, however, this service did not develop substantially because elderly persons, in general, are not part of the work force. Subscription service accounted for 8.6 percent of the weekday ridership. At the end of December, subscription requests for service on a daily basis (Monday through Friday) totaled 34. The distribution by hour was:

7:00 AM - 8:00 AM	9	1:00 PM - 2:00 PM	4
8:00 AM - 9:00 AM	2	2:00 PM - 3:00 PM	1
9:00 AM -10:00 AM	6	3:00 PM - 4:00 PM	1
10:00 AM -11:00 AM	1	4:00 PM - 5:00 PM	1
11:00 AM -12 noon	1	5:00 PM - 6:00 PM	3
12 noon - 1:00 PM	2	6:00 PM - 7:00 PM	3

In addition, there were 14 Sunday requests and three Saturday requests on file.

### 3.1.7 Market Penetration

Figures are not available to show the total number of users as a proportion of the eligible population. However, we can compare the number of user trips to an estimate of the total amount of trips that could be taken in the NET system by target group persons in the service area. Section 1.2 of this report shows that there were approximately 17,190 persons residing in the test areas who were 60 years old or older. Surveys and analyses indicate that persons in this age bracket, with low incomes, average about 1.3 one-way, non-walking trips per day.<sup>1</sup> This suggests that the Cleveland target group takes

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<sup>1</sup>Transportation, 1971 White House Conference on Aging, by Joseph S. Reves, U.S. Government Printing Office. This report gives trip rates for various ages and incomes. The 1.3 non-walking trip rate is estimated by Crain & Associates from these numbers.

about 22,300 trips per day. Probably about one-third<sup>2</sup> or 7500 of these would be short trips within the service areas. The NET system, when it obtained its maximum ridership, from July 1975 through March 1976, carried about 450 person-trips per weekday and about 380 per day (including weekends) (see Table 3-3). Thus, the NET obtained a maximum market penetration of 5 percent, i.e., it served about 5 percent of the eligible trips taken in the test areas.

### 3.2 LEVEL OF SERVICE

Among the most important measures of the level-of-service of a demand-responsive transit system are system response time and customer wait time deviation. Response is the elapsed time between the time a customer calls for immediate or current service and the time the pick up is made. Wait time deviation is the difference between the promised and actual pick up time. Response time pertains only to calls for immediate service; wait time deviation pertains to calls for immediate service, advance registration or deferred service, and to subscription service.

#### 3.2.1 Response Time

The vast majority of all trip making on the NET system was by requests for current service. Response time fluctuated in NET from a low of two minutes to a high of 77 minutes. The overall average was 24 minutes. Figure 3-3 shows that response time increased during the first few months of operation, corresponding to a rapid rise in ridership. As the growth in ridership slowed, and controllers became more proficient, average response time decreased.

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<sup>2</sup>Estimated from National Personal Transportation Study, Report No. 10, U.S. DOT-FHWA, May 1974.

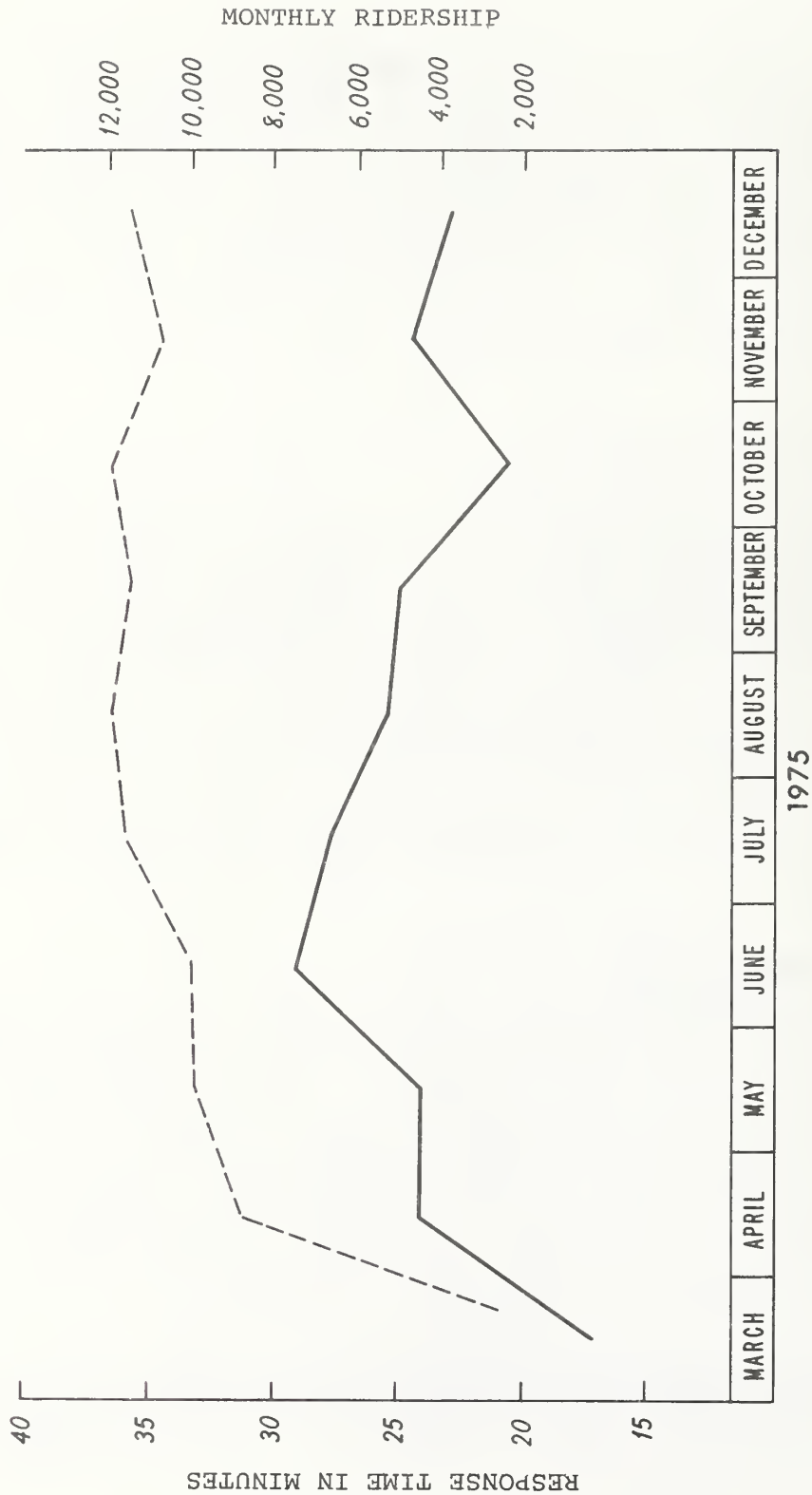


FIGURE 3-3. AVERAGE RESPONSE TIME VS. MONTHLY RIDERSHIP

### 3.2.2 Wait Time Deviation

As stated above, wait time deviation or pickup-time deviation is the difference between what the patron is told -- "The bus will arrive within 15 to 20 minutes," -- and the time the bus actually picks up the patron. The latest pickup time represented by the estimate was placed on the trip ticket by the controller taking the call. This was matched against the actual pickup time stamped on the trip ticket by the dispatcher when the bus driver confirmed the pickup by radio. Early or late pickups were recorded as plus (+) minutes or minus (-) minutes.

Ideally, the bus should have arrived about two or three minutes early. The NET Project Office felt that their controllers were doing a satisfactory job if 70 percent of actual pickups fell within a range of five to ten minutes early or no more than five minutes late.

Wait time deviation has averaged 2.3 minutes early overall during the periods sampled (see Figure 3-4 and Table 3-5).

### 3.2.3 Travel Time

Travel time, or ride time, is the amount of elapsed time between the time a patron boards the bus and the time the patron leaves the bus at his/her destination. With NET, travel times averaged 10.6 minutes overall during the periods sampled. This average was considered acceptable for the operation and reflective of the comparatively small size of each of the three service areas (three square miles or less), the typically short trips made by the elderly, and the degree of street congestion which occurred in several places within the areas. Average trip length on NET vehicles was about 0.9 miles.

The average travel time of 10.6 minutes did not reflect the fluctuation that occurred on an individual basis --

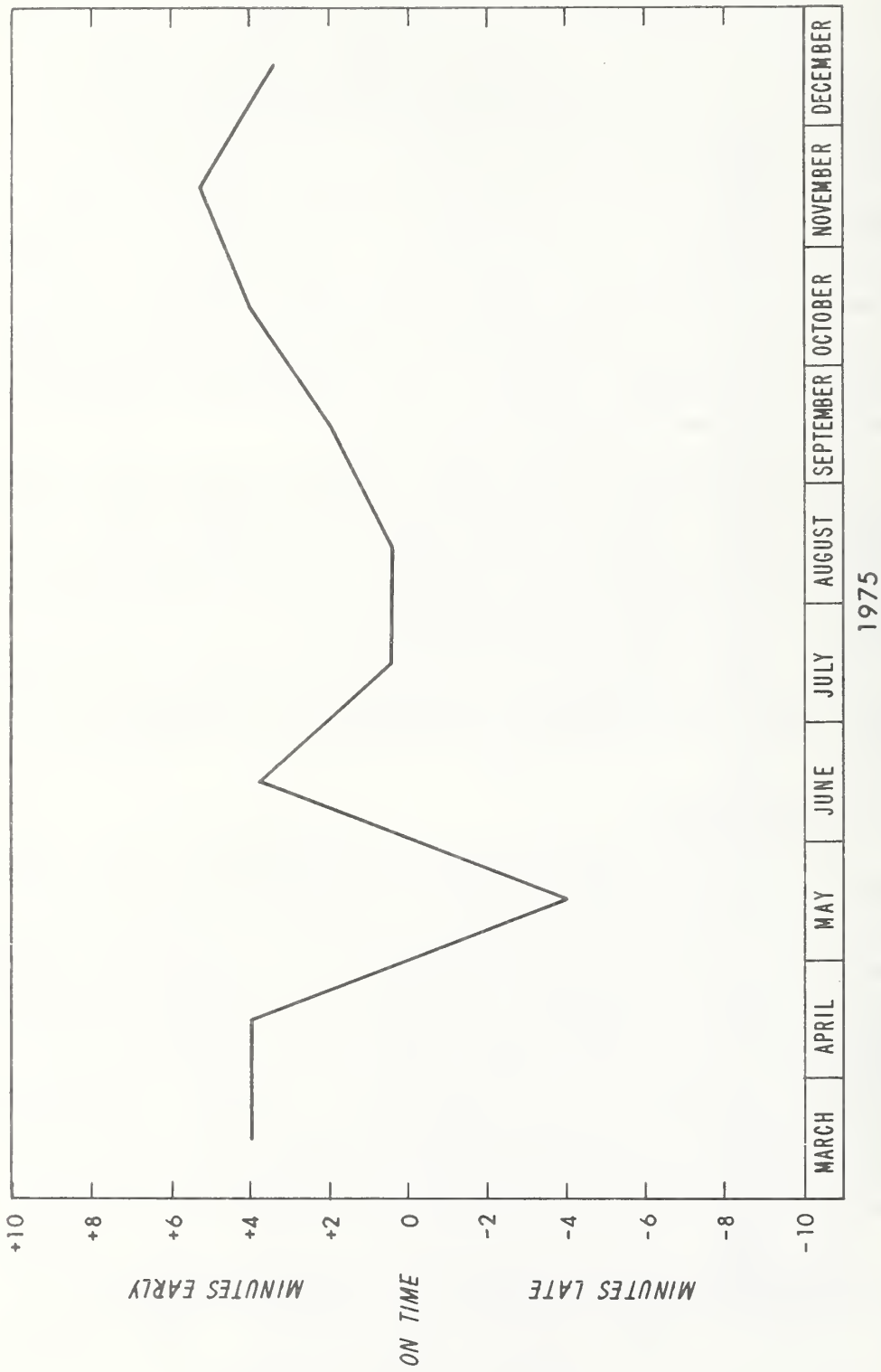


FIGURE 3-4. AVERAGE WAIT TIME DEVIATION BY MONTH

TABLE 3-5. DISTRIBUTION OF WAIT TIME DEVIATIONS

Date: July 28, 1975		Number of Tickets Sampled: 92						
		Minutes Early						
		<u>0-5</u>	<u>6-10</u>	<u>11-15</u>	<u>16-20</u>	<u>21-25</u>	<u>26-30</u>	<u>30+</u>
No. Calls		21	26	8	3	2	2	0
Percent		22.8	28.3	8.7	3.2	2.2	2.2	
		Minutes Late						
		<u>0-5</u>	<u>6-10</u>	<u>11-15</u>	<u>16-20</u>	<u>21-25</u>	<u>26-30</u>	<u>30+</u>
No. Calls		9	10	3	5	2	0	1
Percent		9.8	10.9	3.2	5.4	2.2		1.1
- - - - -								
Date: December 12, 1975		Number of Tickets Sampled: 100						
		Minutes Early						
		<u>0-5</u>	<u>6-10</u>	<u>11-15</u>	<u>16-20</u>	<u>21-25</u>	<u>26-30</u>	<u>30+</u>
No. Calls		14	16	12	7	7	1	0
Percent		14.0	16.0	12.0	7.0	7.0	1.0	
		Minutes Late						
		<u>0-5</u>	<u>6-10</u>	<u>11-15</u>	<u>16-20</u>	<u>21-25</u>	<u>26-30</u>	<u>30+</u>
No. Calls		14	9	6	6	4	3	1
Percent		14.0	9.0	6.0	6.0	4.0	3.0	1.0

a situation similar to that of wait time deviation. For example, detailed data for May 7 showed travel time on individual trips to range as low as two or three minutes and as high as 30 minutes. As in the case of wait time deviations, a continuing effort is needed to achieve a smaller range of travel times. Figure 3-5 illustrates that the average travel time remained fairly consistent throughout the program.

#### 3.2.4 No-Shows

A "no-show" occurs when the bus goes to a location for a pick up, but cannot locate that person. The NET "no shows" policy was to wait one minute and then to leave if the person was not in sight. Exceptions were made for special cases.

During the ten-month period the system averaged 3.8 percent no-shows. There were a number of reasons for a no-show situation -- some of which were a function of the NET service and some of which were not.

1. After calling for service, patrons may have been offered a ride by a friend, decided to stay longer at the place they called from, or walked to another nearby place without calling to cancel their trip request.
2. Patrons may have gone back inside a store to wait, may have gotten into a conversation, or may not have watched for the bus. The driver, unable to locate the person, called in a no-show.
3. Patrons, if they were accepted by the driver, may have boarded the first bus that came along and not bothered to tell him they had called for a ride. Meanwhile, the control center had scheduled a



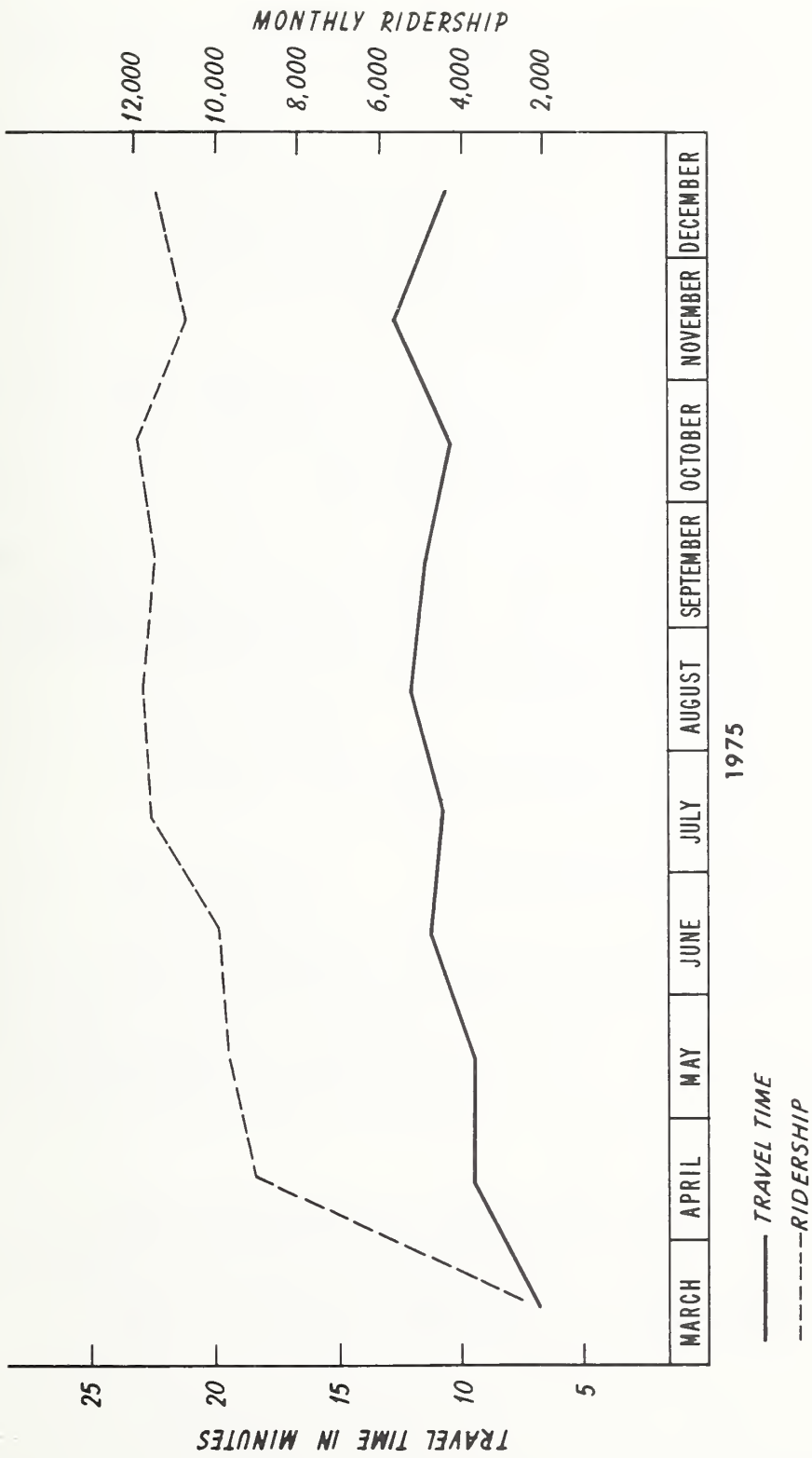


FIGURE 3-5. AVERAGE TRAVEL TIME VS. MONTHLY RIDERSHIP

different bus to service that patron. When the scheduled bus arrived, no one was at the pickup location.

4. Poor service reliability was a major cause for no-shows. In other demand-responsive systems, extensive analysis of no-shows reveals that wait time deviation is usually the determining factor in whether a patron will be a no-show. In all likelihood, if the bus arrived too early or too late compared to the time the patron was told to expect the bus, the patron will not have been ready to board. In addition, if the bus arrived very much later than promised, the patron may have walked, since most trips in the service area were short. This was evident from the higher percentage of no-shows during the summer months when the weather was nice.

### 3.3 PRODUCTIVITY AND ECONOMICS

#### 3.3.1 System Financial Data

3.3.1.1 Total Cost Breakdown - Table 3-6 provides a breakdown of NET system monthly operating cost. This operating cost, estimated at \$52,000 per month, is based on the April through November 1975 time period when the service was fully operational. It does not include vehicle depreciation or project start-up costs.

The CTS costs were based on negotiated prices for rendering certain services, e.g., providing one driver for one hour at \$11.75. The following (page 52) are specific cost components and the related negotiated prices.

TABLE 3-6. NET MONTHLY SYSTEM COSTS

I. <u>Administration</u>			
A. Personnel (salaries & 10% fringes):			
1.	Project Director	\$1820	
2.	Secretary	740	
3.	Part-Time Fiscal Officer	<u>240</u>	
	Total Personnel		\$2,800
B. Other Expenses:			
1.	Project Office	250	
2.	Car Rental & Parking	220	
3.	Promotional Activities	<u>150</u>	
	Total Office Expenses		620 \$3,420
II. Operating and Maintenance			
A. C.T.S. Contract Costs:			
1.	Operators	26,200	
2.	Project Sup. & Contrl's	14,250	
3.	Maintenance	2,900	
4.	Bus Storage	700	
5.	Parts Handling & Storage	250	
6.	Radios and Console	180	
7.	Fare Collection	<u>110</u>	44,590
B. Other Expenses:			
1.	Insurance	1,960	
2.	Fuel, Oil & Parts	1,700	
3.	Control Room	530	
4.	Car Wash	<u>300</u>	4,490 <u>49,080</u>
<u>Total Program Costs</u>			<u>\$52,500</u>

Operators: 13 operators, 40 hours per week, at \$11.64/hr.

Hourly charge includes:

1. Wages	\$8.08
2. Fringe Benefits	2.36
3. Admin. & Gen.Exp.	1.20
TOTAL	<u>\$11.64</u>

Project Supervisor and Controllers: 1 project supervisor and 6 controllers, 40 hours per week at \$11.75/hr.

Hourly charge includes:

1. Wages	\$8.17
2. Fringe Benefits	2.38
3. Admin. & Gen.Exp.	1.20
TOTAL	<u>\$11.75</u>

Maintenance: Approximately 276 man-hours per month at \$10.52/hr.

Hourly charge includes:

1. Wages	\$6.57
2. Fringe Benefits	1.92
3. Admin. & Gen.Exp.	1.20
4. Shop Expenses	.83
TOTAL	<u>\$10.52</u>

Bus Storage: \$50.00 per vehicle per month for 14 vehicles.

(To date CTS has absorbed 68% of this charge as an in-kind contribution.)

Parts Handling and Storage: \$4 per day, 365 days per year for parts storage and \$6 per day, 255 days per year for parts handling.

Radios and Console: \$300 per year for lease of the radio console, plus \$375 per year for maintenance of the console plus \$1,400 per year for maintenance of vehicle radios.

(To date CTS has absorbed 61% of these charges as an in-kind contribution.)

Fare Collection: \$25 per week for pulling and auditing of fare boxes.

The vehicle depreciation expense, if the \$208,600 investment in the 14 vehicles is amortized over four years, would add an additional \$4,346 in monthly costs. The cost analysis performed and resulting decisions made in Cleveland have not included capital costs. Thus, depreciation has been included as a supplemental item in the cost analysis presented here.

The start-up costs, mostly incurred by CTS, were excluded from this analysis. They were considered as unusual costs related to the demonstration and would not be a significant factor in an on-going operation.

3.3.1.2 Operating Costs, Revenues by Month - Table 3-7 lists the specific CTS contract charges that were billed to the project each month. A constant \$3420 administrative cost, the monthly cost of the project office, has been added. The \$4346 monthly depreciation cost is not included. Note that actual costs were less than the negotiated costs shown on Table 3-6.

There is no accurate monthly record of revenues since the revenues received in a given time period were not necessarily posted in that time. The best record of monthly revenues can be deduced from the monthly ridership, using a factor of 10¢ per passenger carried. (A few persons were allowed to ride without paying but the number of such people was insignificant.)

### 3.3.2 Productivity Data

3.3.2.1 Total Vehicle Hours - Following (page 55) are the vehicle hours operated each month.

TABLE 3-7. NET OPERATING COST HISTORY

<u>Month</u>	<u>CTS Operating Costs</u>	<u>Project Office Costs</u>	<u>Total Operating Costs<sup>a</sup></u>
March '75	3,885	3420	7,305
April	41,028		44,448
May	41,620		45,040
June	41,174		44,594
July	43,533		46,953
Aug.	42,957		46,377
Sept.	40,410		43,830
Oct.	42,361		45,781
Nov.	38,936		42,356
Dec.	42,466		45,886
Jan. '76	42,090		45,510
Feb.	41,192		44,612
March	42,411		45,831
April	27,293		30,713

<sup>a</sup> Excludes vehicle amortization of about \$4346 per month.

<u>MONTH</u>	<u>TOTAL HOURS</u>	<u>IN-SERVICE</u>
April '75	2124	1848
May	2151	1871
June	2086	1815
July	2290	1992
August	2232	1942
Sept	2185	1901
Oct	2270	1975
Nov	2052	1785
Dec	2560	2227
Jan '76	2520	2192
Feb	2371	2063
March	3224	2805
<u>April</u>	<u>1605</u>	<u>1396</u>
<u>TOTAL</u>	<u>29,607</u>	<u>25,812</u>

The total hours are as recorded; the in-service hours are calculated as 87% of total hours.

3.3.2.2 Vehicle Miles - The vehicle miles of service that were provided each month were:

<u>MONTH</u>	<u>TOTAL MILES</u>	<u>IN-SERVICE</u>
April	11,733	9,621
May	15,775	12,936
June	17,536	14,380
July	16,425	13,469
August	20,471	16,786
Sept	18,533	15,197
Oct	18,254	14,968
Nov	19,267	15,799
Dec	16,876	13,838
<u>TOTAL</u>	<u>154,870</u>	<u>126,994</u>

The total vehicle-miles are as recorded; the total in-service miles are calculated as 82 percent of the total miles. Data after December are not available.

3.3.2.3 Passengers per Vehicle Hour - Figure 3-6 shows vehicle productivity expressed as passengers per vehicle hour by month. Two curves are shown, one based on total vehicle-hours, the other based on in-service hours. If the garage facility had been closer to the operational areas, the productivity on a total vehicle hour basis would have been closer to the productivity on an in-service vehicle hour basis.

Vehicle productivity on the NET Project fluctuated from a low of 2.4 to a high of 8.0 passengers per vehicle hour on specific days. As Figure 3-6 shows, during the July 1975 through March 1976 period, when ridership was high, the productivity reached and held at about 6 passengers per in-service hour. These productivity figures are somewhat lower than those of other DRT sites. At other sites, however, the service is available to the general public with the elderly representing only a portion of the ridership. Allowing for the reduced speed of movement of the elderly and their reduced ability to cope with certain situations, which reflects in vehicle productivity, NET productivity could be expected to be lower than that of other sites. Even allowing for the impairments of the elderly, DAVE Systems believes that the NET operation should be able to achieve improvement in vehicle productivity (as they have on occasion) and that there were factors contributing to the productivity which could be minimized with corrective action. These factors are discussed under "Problems/Corrective Action."



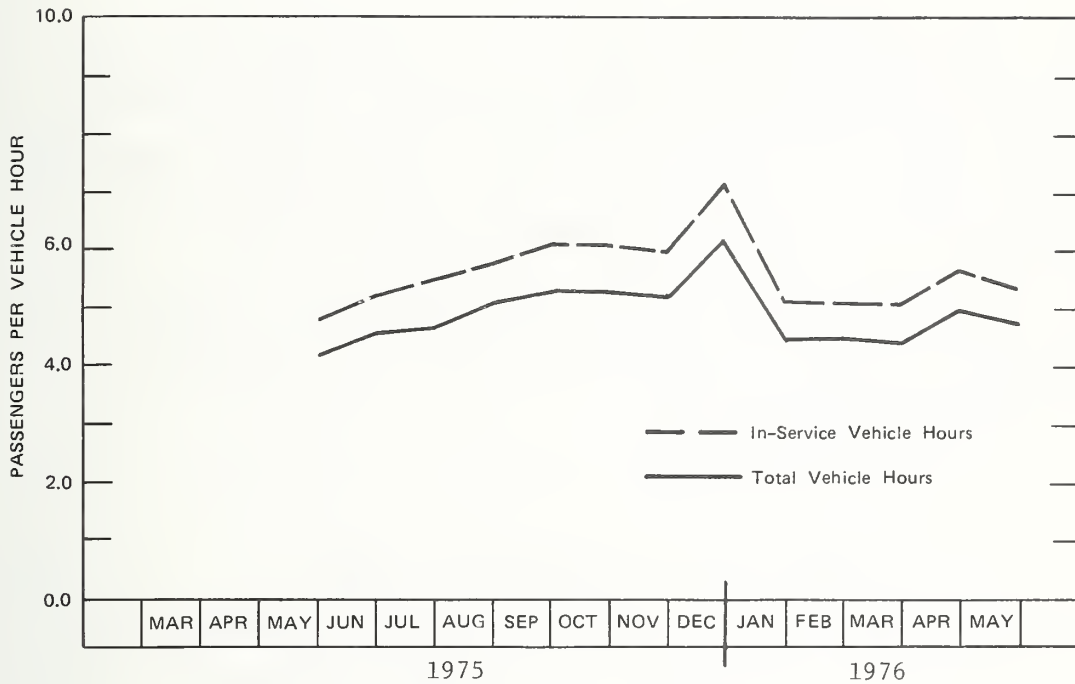


FIGURE 3-6 PASSENGERS PER VEHICLE HOUR BY MONTH

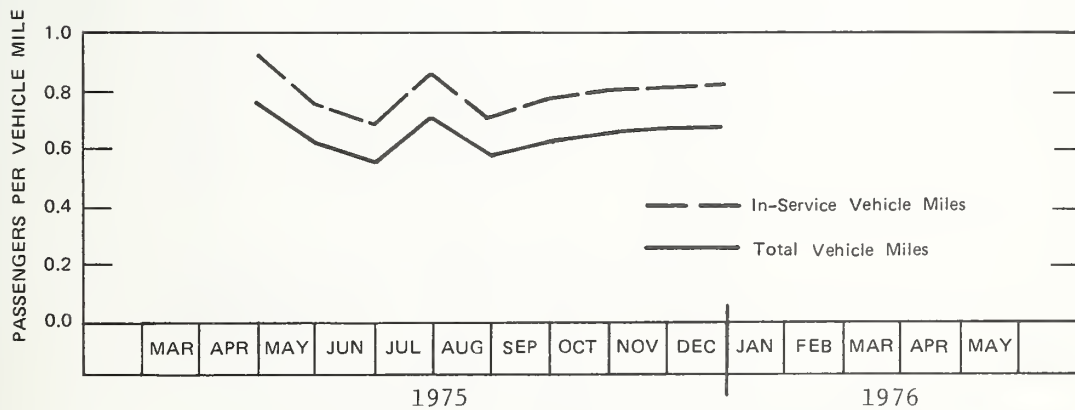


FIGURE 3-7 PASSENGERS PER VEHICLE MILE BY MONTH

3.3.2.4 Passengers per Vehicle Mile - Passengers-per-mile is another measure of system performance in transit operations and is illustrated in Figure 3-7 (on the same page with Figure 3-6). Again, the productivity figures are calculated for both total and in-service vehicle miles.

3.3.2.5 Cost per Vehicle Hour, per Vehicle Mile and per Passenger - Table 3-8 shows the various unit costs of operating the NET service.

TABLE 3-8. UNIT OPERATING COSTS

Month	Dollars per		
	Vehicle Hr.	Vehicle Mi.	Passenger
April '75	\$20.92	3.79	4.99
May	20.94	2.86	4.60
June	21.38	2.54	4.50
July	20.50	2.86	4.04
Aug	20.78	2.26	3.92
Sept	20.06	2.36	3.78
Oct	20.17	2.51	3.84
Nov	20.64	2.20	3.32
Dec	17.92	2.72	4.01
Jan '76	18.06	NA	4.05
Feb	18.82	NA	4.27
March	17.30	NA	3.93
April	19.13	NA	4.03
Average (excluding both Aprils)	19.69	2.54	4.02

These data indicate that the cost per vehicle hour averaged approximately \$20, falling to lower values in early 1976. The decline in total costs per vehicle hour can be attributed to fleet expansion. While the vehicle operating cost component of total operating costs rose, overhead expenses such as project office costs remained fixed and, therefore, total costs per vehicle hour declined. The cost per passenger carried averaged \$4, falling to around \$3.75 during periods of maximum ridership.

If vehicle depreciation were added to the above unit costs the cost per vehicle hour would be raised about \$2, the cost per vehicle mile would be raised about 25¢, and the cost per passenger raised about 40¢.

#### 3.4 PROBLEMS/CORRECTIVE ACTIONS

A number of operational problems occurred during the initial weeks of operations -- most of which were minor and of a logistical or procedural nature. These problems could be termed "expectable," as with any new service in which the city provides certain portions of the service, an existing transit operator (CTS) provides others, and still other portions are supplied by additional subcontractors. The major problem was meeting the public's expectations regarding the amount and level of service to be provided. The most prevalent problems are presented along with the corrective actions taken.

##### 3.4.1 Lack of Patron Understanding

###### 1. Problem

It was evident that most of the NET patrons did not understand how demand-responsive transportation works and how they could best utilize the service.

In some cases, the patrons considered it the same as a fixed-route, fixed-schedule bus and attempted to flag down the vehicles along major arteries. In other cases, the patrons would not accept the shared-ride concept and insisted that the bus take them directly to their destinations without any intermediate stops for other patrons. And in still other cases, the patrons insisted that the first bus to arrive at a spot where more than one person was waiting should be able to take all of them regardless of the fact that a different bus had been scheduled for those going in a different direction. Still others expected the bus to arrive immediately and were not tolerant of the fact that the bus had other stops and could not be at their personal disposal.

## 2. Corrective Action

In order to better educate the public to demand-responsive transportation, a series of presentations were held at locations in all three service areas where the elderly congregate. At these presentations, visual aids were used to explain the "how" and "why" of Dial-A-Bus and to answer questions. Meetings were also held with NET staff to emphasize the need for their individual role in orienting the public to Dial-A-Bus. In addition, an automatic answering device was installed to give information about the service to those who called during non-operating hours.

### 3.4.2 Adherence to Procedures

#### 1. Problem

In some cases, drivers did not follow established operating procedures. In numerous instances, drivers would not accomplish the stops in the sequence that they had been assigned, would pick up flag-downs or patrons that had been assigned to a different bus, or would move the bus to a different location without notifying the dispatcher. This meant that the response and ride times the controllers had to predict for each passenger were frequently based on inaccurate information about each vehicle's location and assigned stops. This situation not only caused erroneous pickup times to be quoted to the patrons, but also (by assenting to each patron's wants and/or demands) prevented the needed "public training" on how to use the Dial-A-Bus.

On the surface, it appeared that either the training program had failed to convey to the drivers the concept of DRT or that the operation lacked adequate discipline.

#### 2. Corrective Action

Recalling that the staff had done well during the training program and that they had all volunteered for the new Dial-A-Bus operation after having had it explained to them, staff meetings (supervisors, controllers, drivers and consultants) were held to review operational problems, including driver adherence to procedures. It was at these meetings that it became apparent that what had been considered a lack of discipline was, in fact, a very strong empathy for the elderly by the drivers and a really sincere desire on the part of the drivers that the new service be a success.

The drivers knew they were not supposed to pick up anyone other than those passengers assigned, but they just could not board some and tell others they had to wait for a different bus. They also knew they were not supposed to carry passengers' groceries to upper floors of apartment buildings, but they were "afraid the old ladies' groceries might be stolen," so they took them upstairs for them. Further, they knew they were supposed to follow the sequence of stops assigned, but "an old lady's frozen food was thawing," so she was taken directly home! Others, when told to standby at a certain location, would "cruise for a fare" in order to increase ridership. It was explained to the drivers that while each of these examples of concern was admirable on an individual basis, they were adversely affecting the quality of service provided on an overall basis. In addition, they would impose a much lower limit on the total ridership capability of the NET operation than could otherwise be achieved.

Meetings were held with controllers and drivers to review operational problems and specifically show the drivers what adverse effects on the overall service occurred when instructions were not followed. Drivers also were sent to the control room to individually observe the work there and for individual counseling regarding adherence to established procedures. Some drivers did not appreciate the role of the control room as the "nerve center" of the operation, and seemed to view it as merely a "recordkeeper after the fact."

### 3.4.3 Communications

#### 1. Problem

Many of the elderly in Buckeye and Tremont do not speak English. It was difficult, therefore, to secure the needed trip information from them, tell them when the bus could be expected to arrive, call them back to explain that the bus was waiting or would arrive earlier or later than anticipated, or explain to them that they must not board just any bus but rather the bus that had been assigned to their stop.

#### 2. Corrective Action

To remedy this communication problem, elderly volunteers were trained in the general concepts of Dial-A-Bus and the NET project. These volunteers agreed to assist the control room staff with telephone calls and to ride the vehicles to explain the service to other patrons. Translators were also available at presentations given to the elderly throughout the service areas.

### 3.4.4 Congested Areas

#### 1. Problem

In several commercial areas of Buckeye and Tremont, considerable vehicle congestion/blockage exists. Unlike many DRT sites, NET operated in an older, inner-city setting. Several of the NET major trip generators were located within these areas of street congestion causing long travel times between stops and an inability to load and unload patrons quickly and safely. Frequently, drivers were unable to locate their assigned passengers in such areas, had to search for a parking spot, and then walked back several blocks to locate the patron.

## 2. Corrective Action

Community leaders were contacted about the possibility of securing bus loading points at these locations. This idea was discouraged simply because private autos do not respect existing parking ordinances or CTS bus loading points. Central staff reminded patrons calling from these areas to be alert for their bus.

### 3.4.5 Dwell Time

#### 1. Problem

No-shows and patrons not being ready to board the bus when it arrived continued to be operational problems. Dwell time, the time that a vehicle is at a stop, was as high as five or six minutes; and frequently a callback to the patron (which was an early procedure) to inform him/her that the bus was outside waiting was not answered.

There were other factors which contributed to the long dwell time and overall lower productivity of the system which could be best described as "characteristics" of the elderly. These included slowness of movement; the inability to comprehend elapsed time, or to state street/building numbers; need to stay at the location where they have asked to have the bus come and not wander about; their expectation that the driver wait for them while they do their banking or shopping; and not knowing where they are when they call in for service.

#### 2. Corrective Action

Controllers attempted to be more accurate in meeting their promised response times so the customer would have the bus arrive when they were told to expect it. To a certain degree, this lengthy dwell time may have been



unavoidable when dealing with the elderly. It must be remembered that the aging process sometimes takes its toll not only in physical debilitation but also in mental debilitation.

#### 3.4.6 Changes in Population Density of the Service Areas

##### 1. Problem

Ridership anticipated in the Model Cities service area did not materialize. Between the time the initial demonstration planning was performed and award of the grant and subsequent start of revenue operations, a major urban renewal effort was underway in this part of the city which included demolition of many single- and two-family dwellings. Also during this period, the Cleveland Metropolitan Housing Authority constructed several high-rise apartment complexes for the elderly which drew away some inhabitants of the Model Cities area. It is believed that these factors and natural mortality considerably decreased the density of elderly in the Model Cities service area from that which existed at the time the demonstration service areas were selected.

##### 2. Corrective Action

Initial operating experience suggested that the southern part of the Model Cities service area should have been included in the Buckeye service area, and that the Model Cities area would preferably have been an elongated east-west rectangle centered at the northern portion of the present area. In order to provide a more usable service to those in Model Cities, NET added service to a number of churches, supermarkets, medical facilities, and the Martin Luther King Shopping Center which were located near the area boundaries.

From operational experience, it was also learned that a number of the elderly in the Tremont area patronized a certain drug store and some small businesses adjacent to it which were situated one block outside the NET service area boundary. Service for the Tremont residents was extended to this small complex.

#### 4. IMPACT OF PROJECT ON USERS

The purpose of this section is to answer two basic questions: (1) Does Dial-A-Bus have an impact on the mobility of the aged users?, and (2) Is there an increase in their independent living as a result of this increased mobility? The answers are provided by a survey conducted of users of the Dial-A-Bus program and a sample of non-users from the same neighborhoods. A question-by-question tabulation of the results is included as Appendix B. A survey also was conducted of social agencies that should have been affected by the project. This survey was only marginally successful; the results are given in Appendix C.

##### 4.1 METHODOLOGY

To draw inferences about the effects of the Dial-A-Bus program, it was necessary to interview some of those who had used the program and compare the responses to those of a similar group who had not. Since the evaluation of the program did not begin until September 1975, there was no possibility of using a "true experimental design" which would involve a randomly assigned control group. However, a control group was obtained from the same neighborhoods and it was assumed that this group of non-users would reflect the general qualities of the users. Thus, a stratified random sample of users and the control group of non-users was chosen for interviewing. A random sample of 1,000 users of Dial-A-Bus was chosen by the program staff from the entries of pick-up points made in the dispatchers' logs with the aid of a Haines Criss-Cross Directory. For each user sampled, the address of the house four houses away on the same street was checked off against the sample of users and, if not

on the list, was identified as being the residence of a potential non-user. A random sample of 100 was then chosen from the master samples of 1,000 users and 1,000 non-users. Interviewers were instructed that if an older person (60 and over) did not reside at a "potential non-user's household" they were allowed to get referrals from that household. The referral had to reside in the immediate neighborhood, however. They got no such referrals from users. It was felt that this modification would result in a sample of non-users comparable to that of users without serious "contamination" effects, as statisticians usually call that effect on data due to similar experiences shared by different subjects. For example, non-users who might be referred by users could have been a part of conversations about the Dial-A-Bus program and, hence, their attitudes might have been influenced or "contaminated" by this information.

It must be noted that the sample was stratified by area. That is, each area contributed about the same number of persons to the total sample. This procedure produced enough respondents in each area to allow meaningful findings regarding area characteristics and inter-area comparisons. However, this procedure also created a bias where results are presented for the entire group of users or non-users. For example, the Model Cities area produced about 20 percent of all users, and 35 percent of all users sampled. Thus, respondents in Model Cities, which has a different income and racial mix than the other two areas, are given more "weight" in the overall figures.

The questions asked fell into several categories, which were somewhat mixed on the actual questionnaire. The first category asked for demographic characteristics, including age, sex, race, income, auto availability, home ownership, physical disabilities, and the like. The second set of questions examined transportation use, including use of Dial-A-Bus,

and activity levels. The third category asked for an evaluation of the Dial-A-Bus service.

#### 4.2 DEMOGRAPHIC CHARACTERISTICS OF USERS AND NON-USERS

Of the 100 users of the Dial-A-Bus program who were interviewed for this study, 35 were from the Buckeye area, 30 were from the Tremont area, and 35 were from the Model Cities area. Some of the most significant demographic characteristics, compared with the non-user group, are listed below.

<u>Characteristic</u>	<u>Users</u>		<u>Non-Users</u>	
Males; Females	17	83	36	64
Black; White	44	55	47	53
Born in U.S.; Born in Europe	84	16	74	26
Mean age	71		72	
Living alone	56		57	

As to their dwellings, 23 of the users lived in apartments, 49 lived in homes, and 28 lived in units of the Cuyahoga Metropolitan Housing Authority. Of the total, 65 percent rented and 34 percent owned their dwellings. It was found that 56 were living alone, 24 were living with a spouse, 10 were living with grown children, three were living with a sibling, and seven listed other living arrangements.

Between the user and non-user groups there were no significant differences in nativity, type of dwelling, owning or renting dwellings, living alone, marital status, age, race, and length of time at present residence. The only significant difference found between user and non-user samples was that the non-user sample had a higher proportion of males. This difference is to be expected. The user group had an above-average percentage of females; the non-user group would be expected to have a percentage of females at or below the average for all elderly.

The user sample appeared to be less affluent than the non-user sample. For example, there was a significant difference between the two samples in their sources of income received from either Supplementary Social Insurance (SSI) or Welfare Assistance (the former designation of SSI) -- 22 of the users and 12 of the non-users. It should be noted that 25 of the non-users would not or could not state their yearly income to interviewers compared to 16 of the users. Of all users of Dial-A-Bus who would give their sources of income, 26 percent were on welfare compared to 16 percent of non-users who gave their sources of income. As will be discussed, there are little differences in impairments between the two samples.

An analysis was undertaken of the user and non-user samples who would not give their yearly income. For the 16 users who would not give their incomes the data suggest that they were not any more affluent than those who did give their income. About a quarter of this group owned their own cars. The majority of the sample of 21 non-users who failed to give their yearly income indicated that they received only Social Security, three indicated Social Security and pensions, and four indicated a combination of Social Security, pensions, savings, and stocks and bonds. Seven out of the 21 indicated that they did own a car, a figure comparable to the whole group of non-users. Thus it would appear that the estimations of average income of the user and non-user groups is not significantly biased by the lack of data on those who would not give their incomes.

The availability of alternative forms of transportation was compared between users and non-users. It was found that 12 users had their own cars compared to 30 non-users, 51 users utilized the cars of relatives compared to 56 of the non-users, and 51 users were driven in the car of a non-relative compared

to 33 of the non-users. Therefore, while similar proportions of both groups had at least some access to car transportation, the user group was more dependent on others for such transportation. The higher non-user rate of car ownership could be due to the income/sex differences noted above.

A comparison was made of the respondents' reported abilities to do several activities of daily living with and without assistance. Findings appear in Table 4-1. The user sample appeared to be less impaired than the non-user sample (except for grocery shopping) as determined by the ability to perform various activities without assistance. Thus, those who need less help seem to be more apt to use the NET system.

TABLE 4-1.  
ABILITY TO PERFORM DAILY ACTIVITIES -- USERS/NON-USERS

		Not Able To Do	Need Help	Can Do Without Assistance
<u>Primary Activities</u>				
Dressing	Users	2	1	97
	Non-Users	0	33	67
Using stairs	Users	17	11	72
	Non-Users	18	31	51
Walking around home	Users	3	2	95
	Non-Users	4	29	67
Bathing	Users	5	5	90
	Non-Users	3	31	66
<u>Secondary Activities</u>				
Laundry	Users	13	7	80
	Non-Users	11	36	53
Cooking meals	Users	9	6	85
	Non-Users	4	36	60
Heavy cleaning	Users	31	21	48
	Non-Users	27	38	35
Using public trans.	Users	15	9	76
	Non-Users	23	28	49
Grocery Shopping	Users	30	26	44
	Non-Users	20	36	44

One interpretation of these findings is that the Dial-A-Bus program was not reaching and serving the most impaired elderly within the demonstration areas -- those who might best benefit from such a transportation program. This was indicated by the 15 users who said they were unable to use public transportation and the nine who could use such transportation only with some assistance. This was in comparison to 23 non-users who indicated that they were unable to use public transportation and 28 who could use such transportation only with assistance. (However, as will be seen, there was virtually no difference in the number of severely impaired within each group.)

While 76 users of Dial-A-Bus and 49 non-users indicated that they could use public transportation without assistance, only 44 from both groups indicated their ability to grocery-shop without assistance. This may indicate the need for a transportation program such as Dial-A-Bus among the elderly, which provides door-to-door service and assistance with packages by drivers.

Comparison made of the number of aged who appear to be the most disabled (that is, cannot function without assistance at all) reveals great similarities between the two samples. The first column of Table 4-1 indicates this breakdown between samples for primary activities (basic to daily living) and secondary activities (supplementary to primary activities).

With the exception of public transportation use, the user sample had more individuals unable to perform secondary activities, and about the same number in both groups were unable to perform primary activities.



### 4.3 BEHAVIOR OF DIAL-A-BUS USERS

#### 4.3.1 Use of Transportation

Table 4-2 shows the various forms of transportation utilized by the Dial-A-Bus users. Interestingly, 88 of the users never use or do not have their own cars, and 49 do not use a taxi. Walking is the most prevalent form of daily transportation and, after that, Dial-A-Bus is utilized more frequently on a weekly and monthly basis than the other forms of transportation.

TABLE 4-2  
TRANSPORTATION MODES  
(NET Users)

Mode	Frequency of Use			
	Daily	Daily* or Weekly	At* Least Monthly	Do Not Use
Walking **	21	46	59	36
Dial-A-Bus	12	86	94	0
Bus or rapid	6	54	70	16
Own car	4	5	5	88
Other's car	2	23	40	49
Relative's car	0	10	28	49
Taxi	0	4	40	49

\* Cumulative total

\*\* The top line is interpreted as 59 percent take walking trips at least once a month (5 percent less often) and 36 percent don't take walking trips at all.

#### 4.3.2 Purpose of Trip

The use of transportation to get to certain activities was investigated, as shown in Table 4-3. Note that those activities for which transportation is heavily relied upon include going to the doctor, to church, shopping, and visiting.

TABLE 4-3.  
USE OF TRANSPORTATION\* BY TRIP PURPOSE  
(NET Users)

Destination	Frequency of Use		
	Always	Some- times	Never, Don't Go
Doctor	76	15	9
Shopping	66	25	9
Church	63	8	29
Recreation	36	7	57
Visiting	36	46	18
Social Worker	7	1	91
Work	1	7	91

\*Including public transportation, Dial-a-Bus, car, and taxi but excluding walking.

#### 4.3.3 Friends Accompanying Users

It was found that half of the users had a friend accompany them on Dial-A-Bus trips. Of the 50, such joint ventures were based upon companionship for 39 users (78 percent), physical assistance needed for six users (12 percent), and both reasons were given by five users (10 percent).

#### 4.3.4 Diverted Travel

How has the creation of the Dial-A-Bus program affected transportation patterns? Table 4-4 shows which travel modes were used for which trip purposes, before and during the demonstration. Table 4-5 summarizes Table 4-4 in terms of the changes in modes used.

TABLE 4-4.  
PERCENTAGE USE OF TRANSPORTATION MODES  
BY TRIP PURPOSE  
(NET Users)

Trip Purpose	Primary Mode Used									
	Public Trans.	Own Car	ReL. Car	Other Car	Taxi	Walk	Dial A-Bus	Other	None	Total*
	<u>Pre-Demonstration Period</u>									
Shopping	38	10	15	11	1	16		2	5	96
Work	21	5	1	4	0	4		1	67	103
Visiting	34	10	22	6	1	10		2	15	100
Doctor, Medical	53	7	12	6	11	7		1	2	99
Social Worker	6	0	1	0	1	27		1	88	97
Church	17	11	13	16	0	27		3	10	97
Recreation	12	7	4	4	0	15		3	51	96
	<u>During Demonstration</u>									
Shopping	12	4	10	6	0	14	44	4	6	100
Work	1	1	0	2	0	2	5	1	86	98
Visiting	15	7	15	6	0	13	23	1	19	99
Doctor, Medical	35	4	7	5	6	5	32	2	4	99
Social Worker	3	0	1	0	0	0	1	3	90	98
Church	4	2	2	7	0	15	21	2	14	100
Recreation	4	2	2	7	0	15	21	2	47	100

\* Variation from 100 percent due to rounding error.

TABLE 4-5.  
AVERAGE CHANGE IN PERCENTAGE USE OF TRANSPORTATION MODES

Mode	Average Change in Mode Share*
Public transportation	-58
Own car	-34
Relative's car	-31
Other's car	-21
Taxi	-57
Walking	- 7

\*Percent of change is computed by summing the columns of Table 4-4, obtaining the difference between the two sums and converting to percentages; i.e., the Public Transportation columns add up to 181 and 76 for a difference of 105, which represents a 58

These data strongly suggest that the major effect was a diversion to Dial-A-Bus from the existing public transportation system and from taxi service, closely followed by diversions from the use of private automobiles. The diversion from public transportation is of questionable value since most Dial-A-Bus users claimed they were physically capable of using the existing transit service. The diversion from automobile use appears to be beneficial, particularly for those who would like to avoid driving or depending upon others for transportation.

#### 4.3.5 Advantages of Special Transportation Program

The user sample was asked to enumerate the advantages of the Dial-A-Bus form of transportation. The number of persons who did and did not mention various features and characteristics is shown in Table 4-6. In descending order, the top six features mentioned were: door-to-door service, help from drivers, low fare, low steps, security, and reliability.

TABLE 4-6  
ADVANTAGES OF DIAL-A-BUS

Feature or Characteristic	Mentioned	Not Mentioned
Door-to-door service	66	34
Assistance from drivers	48	50
Low fare	40	60
Low steps	34	65
Security	31	68
Reliability	21	77
Special design of bus	19	79
Wide doors	15	84
Special handles	12	87
Information received	11	87
Wheelchair lift	8	90

#### 4.3.6 Improvements Suggested

The users of Dial-A-Bus were asked for their suggestions to improve the program. Leading the list of improvements mentioned, by 36 users, was "increasing services." It was found that 34 users believed nothing further was needed, 14 referred to "decreased waiting periods," six alluded to "greater reliability," and four hoped for "more direct routes."

#### 4.3.7 Increasing Fares

The users were asked if they could afford to use the Dial-A-Bus program if fares were increased. The present service costs ten cents for each ride. Forty-seven respondents stated they would be unable to continue using the program if fares went up to 25 cents, 82 would not be able to pay 50 cents for each trip, 90 could not pay 75 cents a trip, and a cumulative total of 94 would not be able to pay \$1.00 per trip.\*

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\*These data are difficult to interpret, since it is unlikely that a user of the system would volunteer the information that he/she could afford to pay more.

#### 4.3.8 Impact of Termination

The user sample was asked how their various activities would be affected if the Dail-A-Bus program were terminated. The responses are shown in Table 4-7. Leading the list of activities that would be curtailed were shopping, visiting, and going to a doctor. The table shows the number of respondents who stated that their getting to the following activities would be adversely "affected" if the Dial-A-Bus program was discontinued.

One might think it possible that respondents overstated the adverse effects to assure the continuation of the program. However, the response of agency personnel tended to confirm such negative impacts.

TABLE 4-7.  
IMPACT OF TERMINATION

Activity	Elderly Adversely Affected	Number Making this Type of Trip*	Percent Affected*
Shopping	52	94	55
Visiting	37	80	46
Doctor	26	96	27
Church	23	86	27
Recreation	21	53	39
Other	12	N.A.	N.A.
Work	5	12	41
Social Worker	1	N.A.	N.A.

\* Columns 2 and 3 are added by the editors; the "amount of trip-making" was taken from Table 4-4 and the "percentage affected" is the first column divided by the second. These additions imply that when related to the amount of trips taken for each purpose, all trip purposes appear to be significantly affected and it is unclear for this sample size where the greatest effect might occur.

#### 4.4 SUMMARY OF DIFFERENCES BETWEEN USER SAMPLES IN THREE PROJECT AREAS

The following data highlight the differences in characteristics between the three samples.

Persons in the Model Cities area sample were native-born Blacks. More than half lived in units of the Cleveland Metropolitan Housing Authority. This group used Dial-A-Bus less often than the other two samples. The respondents from Model Cities utilized the Dial-A-Bus for going to medical facilities more frequently and were least affected in their shopping patterns by the introduction of Dial-A-Bus. Finally, the Model Cities group were the poorest, with over 80 percent having yearly incomes below \$3,000.

Although all areas are characterized as lower income, the most affluent was Buckeye. The respondents in Buckeye believed that they now "bought more" as a result of Dial-A-Bus. Generally widowed, they most often owned their homes. Only one-quarter of this group was Black.

The Tremont sample was all-White and had the highest percentage of males (26%). Daily use of the Dial-A-Bus system was more prevalent, particularly for shopping. This group was more likely to indicate that their independence as well as their ability to shop would be strongly affected should the service be discontinued.

#### 4.5 COMPARATIVE ANALYSIS BETWEEN USERS AND NON-USERS

##### 4.5.1 Mode of Transportation

Some differences were found to exist between the transportation modes used by the two groups. For example, while 43 of the non-users indicated that they never used regular

public transportation, this was true for only 16 of the users of Dial-A-Bus. While almost the same number of users and non-users had at least some access to automobile transportation, non-users were more likely to have their own car, which allowed greater frequency of use. Table 4-8 summarizes the findings of differences between the users and non-users for the period following the creation of the Dial-A-Bus program.

TABLE 4-8.  
USE OF TRANSPORTATION MODES

Mode	Frequency	Users	Non-Users
Public transportation	At least weekly	42	32
	Less than weekly	42	25
	Do not use	16	43
Personal automobile	At least weekly	11	28
	Less than weekly	1	2
	Do not use	88	70
Relative's automobile	At least weekly	22	22
	Less than weekly	29	34
	Do not use	49	44
Other's automobile	At least weekly	23	13
	Less than weekly	28	20
	Do not use	49	67
Commercial taxi	At least weekly	4	2
	Less than weekly	26	20
	Do not use	70	78
Dial-A-Bus	At least weekly	73	--
	Less than weekly	26	--
	Do not use	1	--

Recall that 76 Dial-A-Bus users and 49 non-users indicate that they were able to use public transportation without assistance. From this table it is learned that 16 users of Dial-A-Bus and 43 non-users do not use public transportation at all. Explanations might include the availability of an automobile, safety, weather, and disability factors.



#### 4.5.2 Activity Changes Since Advent of Dial-A-Bus

Table 4-9 tells some of the differences between users and non-users in their frequency of undertaking various activities. Dial-A-Bus users are more likely to engage in every type of activity mentioned, at least at a minimal level.

Users reported more increases in their activities since the creation of the Dial-A-Bus program compared to non-users. These differences are summarized in Table 4-10.

TABLE 4-9.  
ACTIVITY LEVELS

Activity	Percent Who "Don't Go To This Place"	
	USERS	NON-USERS
Medical	2	7
Shopping	6	15
Church	11	22
Visiting	14	16
Recreation	40	61
Work	85	86
Social Worker	87	90

TABLE 4-10.

## ACTIVITY LEVEL CHANGES SINCE THE BEGINNING OF NET SERVICE

Activity	Users	Non-Users
Shop more	48	7
See more friends	39	4
Join new groups	14	0
Attend church more	22	3
Buy more	32	1
More medical care	27	14

NOTE: Again these data are of uncertain value because it would be seemingly to the user's advantage, if he/she wanted to see the demonstration service continued, to indicate how the service has been beneficial.

#### 4.5.3 Perceived Advantages of Dial-A-Bus

Both samples believed that low fares, door-to-door service, wheelchair lifts, and special handles were advantages of the program. However, significantly more users than non-users saw advantages in the low steps, wider doors, special design, reliability of service, security, information available from drivers, and assistance received from drivers. Furthermore, more Dial-A-Bus users than non-users believed that they participated more actively in neighborhood, community, and church activities since the creation of the Dial-A-Bus program. Users also believed that because of the Dial-A-Bus program they saw friends more often, shopped more often, used medical facilities more often, and generally were more independent than previously.

#### 4.6 NON-USERS EXPLANATIONS FOR NOT USING DIAL-A-BUS

Ninety-seven out of the 100 non-users who were contacted said they had heard of the Dial-A-Bus program. These individuals were asked to explain why they did not utilize the Dial-A-Bus program. Table 4-11 highlights responses. The most frequent reason was that the respondent, or the respondent's spouse, had a car and did not need the special transportation. Auto availability was twice as frequent in Buckeye as in the Model Cities and Tremont samples. The second most common reason given was poor health. Respondents alluded to such problems as: blindness, being a cripple, having a broken hip, arthritis, difficulty in walking, and sickness. These individuals believed that they could not get to the Dial-A-Bus to take advantage of it. The question of whether or not the perceived impairments of the non-users could be medically verified was not answered by this study. Transportation provided by friends and children, and walking to where they wanted to go, were the next most common reasons for not needing to use Dial-A-Bus. The fact that there were geographic boundaries for the Dial-A-Bus was another reason given, in that some of the places where the non-users wanted to go were outside the boundaries of the Dial-A-Bus program. One individual had a bad experience with a Dial-A-Bus driver and another with a dispatcher. Two others had heard that there were long waits involved for the Dial-A-Bus. Other reasons given included having no phone to call for the Dial-A-Bus, not speaking English fluently, and nowhere to go. Others had no reasons to give.

TABLE 4-11.  
REASONS FOR NOT USING DIAL-A-BUS

Reason	Number Giving Reason
Have a car	27
Physical impairments	16
Get rides from children and friends	11
Able to walk	11
Geographic limits of service	9
Use other public transp.	7
Negative information about NET service	4

#### 4.7 VALIDATION OF SURVEY

Twenty-two of the elderly users interviewed were contacted by phone to validate the interviews. They were again asked what they felt the major advantages of the program were. Their answers agreed with those previously reported (Table 4-6). All of the users who were contacted by telephone expressed the hope that the service would continue.

## 5. FUTURE OF NET OPERATIONS

This section addresses the status and future of NET operations, now that the demonstration phase is completed. The foremost change is the assumption of operating responsibility of NET by the Greater Cleveland Regional Transit Authority (RTA). This organization is responsible for multimodal transportation and, within this, NET-type\* operations in the Greater Cleveland area. A policy statement recently enacted by RTA concerning NET-type operations is described in the succeeding paragraphs.

As will be discussed later in this section, RTA's policies in NET service are based on several factors. First, there are the agreements between local and regional authorities, which delineate funding resources and, hence, give boundaries to the level of financial commitment by RTA to NET-type operations. Second, there are socio-economic aspects of the population which were examined, which became the planning criteria for policy decisions on changes to NET. Third, there is an overall goal of achieving a cost-effective solution to the transportation needs of Cleveland's elderly and handicapped populations. This is possible through the use of one or more operating techniques discussed in this section, including an examination of the role of social service agencies.

### 5.1 REGIONAL TRANSIT AUTHORITY

In July 1975, the Greater Cleveland Regional Transit Authority (RTA) was created. It was given the responsibility of providing transit service in Cuyahoga county and the city

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\*The Demonstration Project has been referred to as the "NET" System or operation. Since RTA anticipates operating similar systems within the Greater Cleveland Area, these are referred to herein as "NET-type" operations.

of Cleveland. As part of the initiation of RTA's activities, a Memorandum of Understanding between RTA and the City of Cleveland was signed. This agreement delineated the funding guidelines under which RTA would operate. First, RTA directly serves the city of Cleveland and Cuyagoga county. It is able to provide transit to the remaining four counties under its jurisdiction if that service is either run on a break-even basis from fare-box revenues or is subsidized by the locality which it serves. Also, under an agreement negotiated by the City, the County, and suburban municipalities within the county, the service improvements put into effect by RTA must be split equally between the city and the remainder of the county. Cleveland opted to have one-half of the projected service improvements for the next five years in the form of community-responsive transit (CRT). Similar to NET, the name CRT indicates a personalized level of service within specific neighborhoods. There are different methods of accomplishing an effective CRT operation, and the options are discussed in the following pages.

NET was initiated by the City of Cleveland through the process described in Section 1. Operational control of this program was assumed by RTA on March 1, 1976.\* The City of Cleveland had received additional funds from the Urban Mass Transportation Administration to carry the NET project from the original expiration date of the demonstration grant to mid-1976. Service in the NET areas continued without interruption during the time of transition from City operation to that of RTA.

## 5.2 POLICY STATEMENT

RTA's Board of Trustees adopted a report prepared by the RTA Planning Committee at its January 20, 1976 meeting (see

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\*Since July 1975, when RTA absorbed CTS, RTA buses and personnel had actually operated the NET service. Operational control, however, had rested with the City.

Appendix D). The committee looked at possible options for continuation of NET-type service on an area-wide basis under the name of Community-Responsive Transit (CRT). They also considered ways of using financial and technological resources most effectively. Recommendations were made for future service, which, upon adoption by the Trustees, became policy for RTA to carry out. Under this directive and the operational arrangements between RTA and the City of Cleveland. NET service continues as provided during the demonstration until such specific service changes that might be warranted, as specified in the policy statement, can be put into effect.

### 5.3 PLANNING CRITERIA

RTA has identified a need for continuing community-responsive transit which will serve people on a personalized basis in their neighborhoods. Fiscal constraints have led RTA to plan CRT for only the two most transit-dependent groups, the elderly and physically handicapped.

There are forty-two planning areas in Greater Cleveland, of which three are the NET target neighborhoods. Each one was examined in light of several factors described in the following paragraphs. Neighborhood characteristics, population, and other aspects -- some of which were considered in the initial NET demonstration planning -- were considered relative to applicability of CRT service.

The initial decision to use the Buckeye, Tremont, and Model Cities areas as the NET demonstration sites was based on several factors. These areas were similar in that they had easily definable boundaries, were ethnically mixed, were approximately the same size, had a high concentration of elderly people, and had those services within their own boundaries which met the basic needs of the areas' elderly populations. The areas are further described in Section 2. These characteristics have

since been reexamined in light of the applicability to a larger CRT system, and additional elements have been considered.

One of the additional elements which enters into the trip-making characteristics of the elderly is crime. Street robberies constitute a major problem for elderly people who do not have the agility to avoid or resist criminal activity. For these reasons, the incidence of crime has been used as one criterion in selecting those neighborhoods most in need of CRT, as the elderly may find it hazardous to walk to and wait for conventional transit in these areas. Additional considerations are the population 65 years of age and older per square mile and the percent of the population 65 and older that falls below the poverty level. These three indices have been used to establish one set of priorities in providing CRT in particular areas.

RTA also examined two operations which were similar to NET, located in neighboring Lakewood and Cleveland Heights. The information gathered from NET and these two projects has been combined with data provided by other elderly transportation demonstration projects throughout the country. Statistics have been generated which enable RTA to make estimates of trip demand for this type of service on the part of the elderly populations in each of the 42 Greater Cleveland planning areas, of which three are Buckeye, Tremont, and Model Cities. An approximation of expected ridership demand has been produced, which has enabled RTA to determine what level of service might be applied to each of the planning areas.

All of these criteria--area characteristics, crime incidence, incidence of poor elderly, trip demand--are used to indicate those neighborhoods with the greatest need for CRT, and to determine a logical level of service for each of those neighborhoods. This has led RTA to decide to use the three NET neighborhoods for initial CRT operations. The next step in the RTA policy-making process has been to find ways of providing CRT service at a lower cost per passenger than was experienced with NET.



#### 5.4 COST REDUCTION

The costs of operating the NET system were a major factor in determining future service of this type. Approximately \$500,000 was spent during the first ten months of operation to carry in excess of 100,000 passengers. The average cost of \$4.35 per ride was considered excessive, and this expenditure was examined closely for ways to effect a reduction. Thus RTA's CRT policy is directed at the joint goals of lowering the cost per vehicle-hour and increasing vehicle productivity.

RTA determined that a modification in the type of service offered in the Buckeye, Tremont, and Model Cities neighborhoods was necessary to reduce the cost per trip. Although the main feature of door-to-door service will be retained, trips under the new policy will be prescheduled. Passengers will call at least 24 hours in advance to reserve a seat for a particular day and time. This, it is felt, will enable more efficient scheduling and routing as well as better overall equipment utilization than is presently possible.

Better equipment usage will also result from a reduction in both days and hours during which service is currently available. The policy also determined that some neighborhoods may have needs which can best be met by other forms of community-level service. These might include fixed routes or route deviation systems, but the prescheduled door-to-door method of operation would remain as the main type of service.

As part of its efforts to reduce cost and to minimize direct competition with local taxi service (even though CRT will not have the immediate demand-responsiveness of taxis), RTA is considering putting a portion of the new service out for bid to local cab companies. Preliminary discussions indicate that the cost of one hour of service by taxi operators (who are

unionized through the Teamsters rather than RTA's Amalgamated Transit Union) is approximately half the cost for RTA to provide the same service. RTA has approached their own union and has negotiated a new labor agreement (see Appendix E).

The new agreement between RTA and the Amalgamated Transit Union officials has resulted in a new job classification called "CRT Operator". Drivers will be assigned to CRT service for a minimum of one year at a wage rate of \$4.40 per hour--31 percent below the regular wage level of \$6.38 per hour. This 31 percent differential will continue for a 5-year period. Also, the union will not object to having as much as one-third of the work contracted out to other carriers. The idea discussed was that RTA drivers might operate in the high density areas with other carriers more efficiently covering the lower density areas.

As another way of providing less costly CRT, RTA was also considering the possibility of shifting drivers from presently low-demand line-haul runs to this new service during non-peak hours. This approach, although not taken, would have been implemented by dropping existing non-productive runs so that drivers would be available for CRT runs. An evaluation would have been made of the impacts that would be caused by a reduction of off-peak service, as well as determinations of how routes and service levels could be improved. By allocating the drivers' costs to the peak hours, drivers who were needed during heavy demand hours would have been made available to CRT at a "reduced" cost.

## 5.5 FARES

An important consideration in providing service to transit-dependents is the fare charged. RTA examined many different aspects of fare costs for CRT before establishing its policy.

Recent legislation of the Urban Mass Transportation Administration addresses the question of fares for the elderly and disabled. It states quite clearly that those groups shall not be required to pay during non-rush periods over one-half the normal fare collected on regular routes of any system which wished to be eligible for federal funding. In response, RTA has instituted a policy of free service for the elderly and handicapped during off-peak hours and a 10¢ fare during peak hours.

This same UMTA legislation is open to interpretation as to its application to special services. One interpretation is that special services do not fall under this mandate and can, in fact, charge more than normal fares. RTA's decision to have free or low cost CRT, recognizing that CRT constitutes a special service, was based on a conservative interpretation of UMTA regulations. Additionally, RTA policy makers recognized the cost savings which would accrue to the older persons who use the service and, in turn, the positive effect that this would have on the elderly's perception of RTA.

Having no fares during off-peak hours on CRT will probably increase CRT ridership over levels experienced with NET. Whether this increase will cause overloading of the system remains to be seen. The NET project evaluation, contained in Section 4, brings out an interesting point here. It was shown that a significant fraction of the dial-a-ride trips could have and would have been made on the regular mass transit service. NET, therefore, was in fact competing with existing RTA regular bus operations. The RTA policy statement, in explaining overall CRT operations, does not discuss what future operational decisions may or may not be needed because of the potential competition between line-haul and special services. Of course, the exact nature of the competition is uncertain at present because CRT requires reservations. However, it is

important to note that the free and low cost fares in this case do remove some price discipline in terms of consumer use of this system, which has a higher operating cost per passenger trip than regular line-haul service.

#### 5.6 SOCIAL SERVICE AGENCIES

Some social service agencies in Cleveland currently make provisions for client transportation. With one major exception, agencies are expected to maintain their current level of client transportation despite the initiation of CRT. The major exception in the social service transportation role will be the Cuyahoga County Mental Health Organization, which is planning to purchase a sizeable vehicle fleet. This equipment may be available at some future time to RTA for expansion of the CRT system during times when it is not being used to provide transportation for mentally retarded individuals participating in agency programs. It is felt that there is a good chance of accomplishing effective coordination in this case.

Furthermore, RTA has entered into an agreement with Harvard University, which will provide planning assistance for the implementation of the CRT program. Of particular importance is a task which will result in recommendations on ways to coordinate transit opportunities of RTA and social service organizations. Currently little is known about the role of agencies in providing or arranging transportation for their clients. The agency survey conducted by Case Western Reserve University did not determine this information. The Harvard effort is designed to provide more detailed data on the level of social service agency involvement in client transportation.

## 5.7 IMPLEMENTATION

All of the factors discussed above were taken into consideration by RTA in determining where and how CRT would be implemented. It was decided that initial CRT operations would occur in the three NET target areas. However, the original boundaries will eventually be somewhat expanded in order to provide transportation to some nearby service centers not currently served. Also, the need for larger service areas was cited by a number of people during the evaluation interviews. Further expansion of CRT will await operating experience, vehicle availability, further labor negotiations, and negotiations with taxi companies.

With the termination of the NET demonstration project and the introduction of CRT service, it may be helpful to list key features of each in order to compare the two. Some of the CRT features have already been put into effect; others will be implemented in stages to enable adequate employee training and an examination of previous changes. These features are compared in Table 5-1.

TABLE 5-1. COMPARISONS OF NET AND CRT

	<u>NET</u>	<u>CRT</u>
Fare	10¢	Free- Non-peak hours 10¢ - Peak hours
Area Served	Buckeye, Model Cities, Tremont (7.6 sq. mi.)	Initially the same; to be expanded through- out the RTA service area (456 sq. mi.)
Eligible Population	17,200	Not yet determined
Age	60+	65+ & handicapped of all ages
Number of Vehicles	14	33-53
Days, Hours of Operation	M-F 7 AM - 7 PM SAT 7 AM - 7 PM SUN 7 AM - 7 PM	M-F 9 AM - 3 PM SAT None SUN 8:30 AM - 1:30 PM
Service	Dial-A-Bus (short notice)	Reserve-A-Ride (at least 24-hr. notice)

The CRT operations are being implemented in three phases. Phase I, described above, officially commenced May 10, 1976 with RTA take-over of responsibilities for project management. Phase II was to occur within 90 days. Service would then be expanded from the original three areas to approximately half of the full service visualized in the January 20 RTA Policy statement. Phase III will be the final and full implementation step. Costs are estimated at \$1,000,000 per year to serve the full county. A Regional Transit Authority Community Responsive Transit (CRT) Advisory Committee has been established to guide the implementation of the program.

## 6. FINDINGS, RECOMMENDATIONS AND IMPLICATIONS REGARDING TRANSFERABILITY

### 6.1 SUMMARY OF OPERATIONAL RESULTS

#### 6.1.1 Ridership

Ridership rose quickly during the first four months (see Table 3-1) and then remained relatively constant for the remainder of the demonstration. During the initial four months of service, vehicle productivity increased as ridership increased.

The largest increase in ridership occurred during the month of July (17.4 percent). This increase can be related to promotional/advertising efforts undertaken at the end of June. It is unknown whether or not the program would have experienced another significant increase in ridership if additional promotional/advertising activities had been undertaken.

By the end of August, the system had adjusted to the ridership increase which took place during July. At that time it might have been advisable to undertake additional promotional/advertising activities. However, by early September, critical financial issues confronted the NET staff. NET's demonstration funds were to be exhausted by early 1976. Since no provision had been made for continuation of service beyond the grant period, the Project Director focused upon securing a commitment for continued support, rather than attempt to attract more riders. Thus, the fact that both ridership and vehicle productivity leveled off from August through December should not be interpreted as indicating that the achievable limits of either of these measures had been reached.

During the months of highest ridership the system obtained a market penetration of about 5 percent, i.e., it served about 5 percent of all trips that could have been taken on the NET system.

Subscription service accounted for only about 9 percent of all project trips, since few elderly persons work and need to travel at set times. However, the subscription service was a workable concept and had a net benefit on the dispatching/scheduling operation since such trips can be anticipated in advance.

On the average, ridership decreased steadily from the beginning to the end of the month, with total variation of 15 percent over four weeks. Ridership was highest on weekdays and between the hours of 9:00 AM and 4:00 PM.

Educating the elderly and handicapped to use the system effectively was even more difficult than anticipated. Language, age and isolation factors were found to be important. The most effective solution was the introduction of volunteer counselors to help users on an individual basis. This should be repeated for any expansion of service.

In general, the demand-responsive service, using the specially equipped buses, was well liked by the seniors who used it. They particularly identified the door-to-door service, the features of the buses that made getting on and off feasible, the special assistance in boarding given by the driver, and the assurance of personal safety inherent in the service as the most desired features.

#### 6.1.2 Level of Service

System response time increased with ridership during the first four months, but decreased steadily throughout the remainder of the demonstration while ridership remained almost constant. This reflects a steady improvement in the skill of the operations personnel as they continued to use their resources more and more effectively.

Other measures of system reliability include patron wait time deviations and travel time. The distribution of wait time deviation has remained fairly stable over the demonstration period,



with the average bus arriving about two minutes earlier than the controller's prediction. However, there has been considerable variation around this average. Average travel time has also remained relatively fixed at about 11 minutes, for an average trip of about one mile. Again, individual travel times may vary widely, usually due to factors, such as congestion, that are beyond the driver's control.

Two characteristics of the NET project labor force may have contributed to lower levels of service than was desired. First, project employees were selected on the basis of seniority instead of skills relevant to the special demands of the NET service. Second, the fact that the supervisor, controllers, and drivers shared the same labor union limited the monitorial roles of the first two.

### 6.1.3 Productivity and Economic Performance

After ridership increased to the volume it sustained through most of the demonstration the system operated at productivity values of about 5.5 passengers per vehicle hour and about .67 passengers per vehicle mile. These values are slightly lower than values obtained on comparable projects in other urban areas.

But of more importance, the high unit costs incurred in the project were critical relative to continuing the service after the demonstration had ended. Total operational costs were about \$20 per vehicle hour, \$2.50 per vehicle mile and \$4 per passenger carried. If vehicle depreciation costs were included the above numbers would rise to \$22 per vehicle hour, \$2.75 per vehicle mile and \$4.40 per passenger.

Some of these high costs are inherent in the nature of the demonstration. For example, the NET operational areas and the available garaging for the NET vehicles were not in close proximity, causing considerable deadhead mileage.

Thus, some minor cost reductions would be readily obtainable in developing a permanent operation.

It was concluded that more significant cost reductions would be possible if certain operational changes were made-- limiting the hours of operation, requiring advance reservation of certain trips, and handling less important trips only if the system has the capacity to handle them. These would allow better "packaging" of trips, thus increasing productivity. However, the fact that the NET project employed regular transit drivers at standard wages was perhaps the most critical component of the total cost picture.

#### 6.1.4 User Impacts

The surveys of project impacts on users and non-users that were conducted suggested that the mobility of users was increased and that they were able to make more trips to more desirable destinations at less cost to them. However, the demonstration service provided competition to the existing fixed-route service. Three-fourths of users reported they were physically capable of using the existing public transportation. The certification process was, in general, a self-certification process by those who could prove themselves to be over 60. There was no continuing outreach program implemented to reach the severely disabled elderly. More aggressive and able-bodied individuals seemingly utilized the service more often than the handicapped. On the other hand, it appeared that males, persons of higher income, and automobile owners were less likely to use NET.

#### 6.1.5 Cleveland Post-Demonstration System

At the close of the demonstration, the RTA and the City of Cleveland performed considerable analysis of the transportation needs of the region's elderly and the options for continuing the NET-type service. This has resulted in demand-

responsive service, provided and funded by RTA, being continued in the three demonstration neighborhoods on a modified basis with planned expansion of service to other neighborhoods. The hours of service have been curtailed slightly, the age limit raised from 60 to 65, service changed to a 24-hour advance reservation system, and the fare was reduced to 10 cents during peak periods and free at other times.

The major change, however, aimed at significant cost reduction, came through labor negotiations that allowed a new driver classification at a reduced wage scale for this special service. The base wage, exclusive of fringe benefits, is \$4.40 per hour, 69 percent of the wage of the regular drivers. Also, a portion of the transportation service may be subcontracted to taxi companies who had proposed performing the demand-responsive service for about \$10 per vehicle hour.

## 6.2 DAVE SYSTEMS RECOMMENDATIONS

The recommendations which follow were made by DAVE Systems at the conclusion of the demonstration.

### 6.2.1 Consolidation of Facilities

In order to minimize initial costs and make maximum use of existing capabilities at the start of the NET demonstration, it was decided that available garaging, fueling and dispatching facilities would be used despite their wide physical separation. This resulted in significant deadhead mileage and communications costs which can be tolerated in a demonstration but which should be corrected in an ongoing program. It is recommended, therefore, that in the future multiple facilities be consolidated into single units close to each group of service areas.

### 6.2.2 Advanced Bookings

Many trips (such as doctor appointments, health care, etc.) are known well in advance. To better serve these more important trips, advance requests should be given priority over current requests. To achieve this, it is recommended that the agencies concerned with the health, nutrition, etc., of the elderly and handicapped (and who generally know most about their key needs) should be encouraged to submit advance-reservation lists on a weekly basis.

A significant current-request capability, however, must be retained--especially in the afternoon periods. Many of these advance-request users cannot know "in advance" the time of their return trip; consequently, they must be handled on a current basis. Moreover, if advance requests were made mandatory for less important trips (e.g., recreation, etc.), many such advance requests would be made on a contingency basis, and often users would change their minds and not show when the bus arrives. This would result in serious loss of efficiency. (This effect has been observed in other demand-responsive services for the elderly where mandatory advance-request policies resulted in a high proportion of "no-shows.") Thus, it is recommended that less important trips be handled on a current-request basis if and when the system has the capacity to handle them.

### 6.2.3 Service Hours

Ridership between 9:00 AM and 4:00 PM is far heavier than from 7:00 to 9:00 AM and 4:00 and 7:00 PM, as shown in Figure 3-2. Also, ridership on weekends is far less than on weekdays, as shown in Table 3-3. In order to reduce operating costs, it is recommended that hours of service be cut back to correspond more closely with the hours of maximum demand.

#### 6.2.4 Operating Costs

Generally, the cost per trip of providing the service during the demonstration is perceived as too high by those associated with the program. A major increase in productivity would reduce the cost per trip, but is unlikely unless the nature of the service is changed completely. Therefore, to reduce the cost per trip, consideration should be given to reducing the operating cost of a vehicle. Since the cost of operations is mostly labor, this means reducing the real or apparent labor cost per hour.

Two methods are available to achieve this. First, the number of drivers on the Regional Transit Authority (RTA) fixed-route services is dictated by peak-period needs. In off-peak periods drivers are used on routes, some of which are unproductive. By eliminating some of these off-peak routes, drivers would then be available to the NET program continuation. Effectively, these drivers can be made available "below cost" by allocating their costs to the peak hours, when they are needed. Thus, the apparent cost per trip of NET would be reduced. Determination will have to be made of the possible service cuts, to reduce negative neighborhood impacts. The second method is to buy the NET services from private operators (e.g., taxi, school bus, and transit management companies) whose labor rates are significantly lower than for RTA's fixed-route bus drivers. (This also would recognize the lesser responsibility and more attractive job of driving a small vehicle, compared with the large, fixed-route buses.)

#### 6.2.5 Service Area Size

If the existing NET areas are expanded or new service areas established, it will be important to keep them as small as possible, consistent with including at least one of each major facility (e.g., hospital, shopping center, etc.). By keeping each area small and separate, long and very expensive

cross-town trips will be avoided. (Such trips can usually be made by transferring to fixed-route buses, or special arrangements can be made on an individual-need basis.)

#### 6.2.6 Utilization of Staff Resources

The demonstration was performed under the fixed-route work rules of the Amalgamated Transit Union (ATU) and Cleveland Transit System (CTS). This created some inefficiencies which should be corrected in an ongoing program. For example, the positions in the control center were bid on the basis of seniority, whereas certain mental and public-relations skills are a more pertinent prerequisite. It is recommended that, in the future, appropriate tests be administered to select those best suited for the control positions. It may not be necessary to fill these positions with people from driver's ranks. Qualified, trained office workers whose costs are below that of ATU are performing the functions of these positions in other cities.

Another reason for selecting office workers for these positions is that, when control room personnel and drivers are members of the same union, some conflict of interest is inevitable. There is a tendency for improper procedures to be followed unless management keeps a close eye on all details-- a difficult thing for this type of operation. For example, in other cities providing demand-responsive services, control staff were loyal to drivers in their union and did not report the fact that some drivers were taking long, unauthorized rest periods. Though the management and supervision on the NET demonstration were conscientious in monitoring and controlling the operation, it is recommended that control staff personnel not be from the same union as the drivers in order to avoid long-term problems.

It takes several months before drivers become efficient at knowing their way around the service area; consequently, a

high turnover rate is expensive. If drivers continue to be RTA employees, it is recommended that turnover be limited to about 20 percent of the drivers every year. Also, as senior drivers bid, there will be a concentration of vacations since most senior drivers pick the same summer months for their vacations. It is recommended that vacations be bid on a separate NET board thereby distributing them uniformly throughout the year.

In the early phases of the demonstration, it was apparent that the learning period of the personnel operating the system was a critical constraint on system growth and service reliability. It would have been better to have started each of the three service areas separately, staggered by about one month. It is recommended that future expansions be carefully sequenced to avoid excessive demands on new personnel.

### 6.3 IMPLICATIONS REGARDING TRANSFERABILITY

There appear to be five aspects of the Cleveland NET experience which would be of interest to other cities and which relate to transferable findings. These are:

1. The post-demonstration re-design of the demand-responsive service to cut costs and improve productivity.
2. The laissez-faire or self-certification process that apparently did not lead to the most handicapped seniors being certified to use the service.
3. The problems encountered in using RTA drivers for the scheduling/dispatching function.
4. The post-demonstration development of the new labor classification and pay rate for drivers of the NET-type service.

5. The development of the capability to subcontract a portion of the NET-type operation to taxi operators.

Some commentary on each of these aspects is given below.

#### 6.3.1 Service Re-Design

One major lesson learned from the demonstration and post-demonstration experience is that seniors find the door-to-door demand-actuated responsive service exceedingly attractive but are often able to modify their travel behavior in response to a more restricted service level. Scheduling can be done on a 24-hour reservation basis, the hours of service can be restricted, yet many people can shift their travel times or, more commonly, find other means of transportation.

When the NET hours of service were cut back in April 1976 there was an expected drop in ridership. As the Case Western Reserve University analysis shows, the majority of riders had the physical capability to use the fixed route service and when the service cut-back was made, they apparently did so.

#### 6.3.2 Laissez-Faire Certification

The offering of the NET service to all seniors, regardless of physical condition, may have been a rational and desirable policy. Although it allowed considerable diversion from the fixed-route service, it did offer a higher level of service with considerably more personal security. This trade-off must be dealt with by any city or regional planning body in offering specialized services to the elderly. More importantly, many of the more handicapped seniors apparently did not receive the service. This suggests that if the object is to serve the extremely handicapped and shut-in person, some form of outreach is needed to inform these people and help them to learn how to use the service.



### 6.3.3 Drivers as Dispatchers

There did appear to be significant problems resulting from the use of senior RTA drivers as dispatchers. As one would expect, years of experience in bus driving or rapid transit operation is not related to such dispatching tasks as making transportation arrangements by phone, making quick re-routing and re-scheduling decisions, dealing with customer complaints, late arrivals, and so forth. These types of activities are the exact opposite

There were also very real conflict-of-interest problems. The nature of demand-responsive operations is such that a bus driver has considerable flexibility. He/she can take a work break any time the bus is without passengers and only the dispatcher can possibly know. The work rules of many transit properties forbid one member of the union bargaining unit to report on the work performance of another member. As DAVE Systems has suggested in this report, it may be more appropriate that individuals from the transit property office staff, who are often in another bargaining unit, be trained for the dispatcher roles.

### 6.3.4 Contracts with Taxi Operators

Although this provision has not yet been implemented, it is quite significant, particularly to other urban regions that anticipate provision of special services into the suburbs. It can be expected that vehicle productivity rates in low density areas will be considerably less than those obtainable in the central city.

The use of taxis in these areas can reduce the vehicle-per-hour costs dramatically. In Cleveland's case, the taxi hourly costs are about one-half the RTA vehicle hour costs with regular drivers and two-thirds of RTA costs with the lower paid CRT operators.



APPENDIX A

DAILY RIDERSHIP BY AREA

TABLE A-1 (a)

DAILY RIDERSHIP BY AREA

March 1975

<u>Date</u>	<u>Buckeye</u>	<u>Model Cities</u>	<u>Tremont</u>	<u>Daily Total</u>
3-16 <sup>a</sup>	120			120
3-17	94			94
3-18	118			118
3-19	106			106
3-20	126			126
3-21	130			130
3-22	50			50
3-23 <sup>a</sup>	52	59	75	186
3-24	172	12	24	208
3-25	162	24	31	217
3-26	165	27	32	224
3-27	243	21	81	345
3-28	135	40	71	246
3-29	42	6	57	105
3-30	72	23	19	114
3-31	<u>138</u>	<u>9</u>	<u>30</u>	<u>177</u>
Totals	<u>1,925</u>	<u>221</u>	<u>420</u>	<u>2,566</u>

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<sup>a</sup>Service inaugural

TABLE A-1 (b)  
DAILY RIDERSHIP BY AREA  
April 1975

<u>Date</u>	<u>Buckeye</u>	<u>Model Cities</u>	<u>Tremont</u>	<u>Daily Total</u>
4-01	263	15	61	339
4-02	142	33	89	264
4-03	172	30	61	263
4-04	277	22	97	396
4-05	111	23	63	197
4-06	118	23	30	171
4-07	226	34	64	324
4-08	269	47	61	377
4-09	226	32	74	332
4-10	267	40	110	417
4-11	246	33	121	400
4-12	110	23	53	186
4-13	97	32	31	160
4-14	200	29	102	331
4-15	201	45	68	314
4-16	210	23	90	323
4-17	232	39	85	356
4-18	228	60	86	374
4-19	136	16	44	196
4-20	121	28	38	187
4-21	195	32	69	296
4-22	199	26	77	302
4-23	212	26	83	321
4-24	249	34	78	361
4-25	225	39	76	340
4-26	109	33	52	194
4-27	105	49	35	189
4-28	200	28	66	294
4-29	232	47	61	340
4-30	232	38	101	371
Totals	<u>5,810</u>	<u>979</u>	<u>2,126</u>	<u>8,915</u>

TABLE A-1(c)  
DAILY RIDERSHIP BY AREA  
May 1975

<u>Date</u>	<u>Buckeye</u>	<u>Model Cities</u>	<u>Tremont</u>	<u>Daily Total</u>
5-01	246	35	103	384
5-02	263	61	126	450
5-03	142	26	70	238
5-04	127	44	24	195
5-05	268	54	99	421
5-06	252	50	101	403
5-07	247	48	97	392
5-08	292	48	106	446
5-09	225	56	125	406
5-10	127	24	43	194
5-11	109	41	36	186
5-12	202	36	81	319
5-13	208	62	102	372
5-14	179	50	117	346
5-15	213	50	68	331
5-16	248	58	96	402
5-17	111	20	51	182
5-18	90	35	40	165
5-19	205	58	89	352
5-20	243	37	79	359
5-21	234	37	141	412
5-22	211	52	87	350
5-23	224	38	119	381
5-24	109	19	54	182
5-25	96	42	51	189
5-26	35	10	36	81
5-27	189	47	94	330
5-28	193	43	135	371
5-29	228	46	92	366
5-30	240	54	134	428
5-31	89	24	51	164
<b>Totals</b>	<u>5,845</u>	<u>1,305</u>	<u>2,647</u>	<u>9,797</u>

TABLE A-1(d)  
DAILY RIDERSHIP BY AREA  
June 1975

<u>Date</u>	<u>Buckeye</u>	<u>Model Cities</u>	<u>Tremont</u>	<u>Daily Total</u>
6-01	100	75	36	211
6-02	186	55	119	360
6-03	230	55	118	403
6-04	244	52	140	436
6-05	185	64	146	395
6-06	228	70	149	447
6-07	117	23	63	203
6-08	99	63	54	216
6-09	217	48	100	365
6-10	193	65	108	366
6-11	200	37	118	355
6-12	197	52	143	392
6-13	207	50	127	384
6-14 <sup>a</sup>	41	3	26	70
6-15	99	47	33	179
6-16	176	43	126	345
6-17	222	60	118	400
6-18	216	87	117	420
6-19	212	83	120	415
6-20	231	68	114	413
6-21	103	32	53	188
6-22	113	58	44	215
6-23	184	58	127	369
6-24	196	60	107	363
6-25	214	73	103	390
6-26	207	54	113	374
6-27	217	71	169	457
6-28	94	43	62	199
6-29	143	47	37	227
6-30	188	46	115	349
Totals	<u>5,259</u>	<u>1,642</u>	<u>3,005</u>	<u>9,906</u>

<sup>a</sup>Loss of approximately 125 riders. The Saturday average is about 195 riders. Buses were vandalized, only one bus in service until about 12:00 noon.

TABLE A-1 (e)  
 DAILY RIDERSHIP BY AREA  
 July 1975

<u>Date</u>	<u>Buckeye</u>	<u>Model Cities</u>	<u>Tremont</u>	<u>Daily Total</u>
7-01	219	94	142	455
7-02	230	148	126	504
7-03	245	81	164	490
7-04	44	20	45	109
7-05	123	34	92	249
7-06	110	76	47	233
7-07	265	56	163	484
7-08	226	69	115	410
7-09	193	92	141	426
7-10	267	59	121	447
7-11	224	63	151	438
7-12	113	38	68	219
7-13	126	52	44	222
7-14	218	67	136	421
7-15	249	56	145	450
7-16	202	63	139	404
7-17	205	72	172	449
7-18	247	69	154	470
7-19	132	30	64	226
7-20	120	58	41	219
7-21	183	101	121	405
7-22	221	100	152	473
7-23	183	89	144	416
7-24	211	106	122	439
7-25	217	71	138	426
7-26	139	51	60	250
7-27	121	61	38	220
7-28	173	77	102	352
7-29	223	81	114	418
7-30	189	133	147	469
7-31	218	63	158	439
Totals	<u>5,836</u>	<u>2,230</u>	<u>3,566</u>	<u>11,632</u>

TABLE A-1(f)  
 DAILY RIDERSHIP BY AREA  
 August 1975

<u>Date</u>	<u>Buckeye</u>	<u>Model Cities</u>	<u>Tremont</u>	<u>Daily Total</u>
8-01	255	77	155	487
8-02	133	40	84	257
8-03	125	73	26	224
8-04	222	83	162	467
8-05	284	66	147	497
8-06	194	86	193	473
8-07	236	82	138	456
8-08	211	68	177	456
8-09	113	51	92	256
8-10	119	60	50	229
8-11	189	73	111	373
8-12	228	82	131	441
8-13	187	59	173	419
8-14	228	98	183	509
8-15	247	65	155	467
8-16	154	44	59	257
8-17	124	56	39	219
8-18	182	111	126	419
8-19	222	91	120	433
8-20	156	83	244	483
8-21	231	87	126	444
8-22	200	107	158	465
8-23	120	38	85	243
8-24	116	62	45	223
8-25	171	81	119	371
8-26	202	77	121	400
8-27	237	111	162	510
8-28	234	85	153	472
8-29	243	90	143	476
8-30	140	30	71	241
8-31	93	47	32	172
Totals	<u>5,796</u>	<u>2,263</u>	<u>3,780</u>	<u>11,839</u>



TABLE A-1 (g)  
 DAILY RIDERSHIP BY AREA  
 September 1975

<u>Date</u>	<u>Buckeye</u>	<u>Model Cities</u>	<u>Tremont</u>	<u>Daily Total</u>
9-01	33	17	16	66
9-02	226	97	155	478
9-03	224	119	188	531
9-04	271	69	194	534
9-05	259	85	167	511
9-06	128	43	71	242
9-07	113	77	30	220
9-08	214	85	175	474
9-09	221	87	149	457
9-10	204	87	161	452
9-11	226	89	140	455
9-12	237	93	157	487
9-13	86	31	81	198
9-14	118	71	48	237
9-15	193	91	137	421
9-16	212	74	103	389
9-17	209	89	176	474
9-18	215	71	137	423
9-19	222	81	167	470
9-20	100	40	46	186
9-21	134	77	41	252
9-22	196	89	136	421
9-23	205	80	192	477
9-24	187	84	172	443
9-25	252	61	152	465
9-26	257	97	131	485
9-27	101	32	49	182
9-28	125	65	35	225
9-29	219	94	139	452
9-30	<u>216</u>	<u>102</u>	<u>175</u>	<u>493</u>
Totals	<u>5,603</u>	<u>2,277</u>	<u>3,720</u>	<u>11,600</u>

TABLE A-1(h)  
 DAILY RIDERSHIP BY AREA  
 October 1975

<u>Date</u>	<u>Buckeye</u>	<u>Model Cities</u>	<u>Tremont</u>	<u>Daily Total</u>
10-01	189	112	151	452
10-02	258	103	152	513
10-03	276	106	180	562
10-04	115	38	95	248
10-05	117	71	46	234
10-06	247	77	190	514
10-07	274	99	150	523
10-08	239	115	127	481
10-09	203	104	134	441
10-10	253	92	170	515
10-11	121	28	49	198
10-12	121	64	47	232
10-13	185	101	85	371
10-14	208	57	120	385
10-15	212	84	119	415
10-16	218	100	115	433
10-17	241	94	129	464
10-18	106	36	61	203
10-19	110	52	39	201
10-20	178	77	77	332
10-21	236	97	123	456
10-22	185	94	150	429
10-23	227	73	143	443
10-24	218	108	143	469
10-25	101	31	58	190
10-26	118	62	33	213
10-27	173	68	106	347
10-28	236	75	93	404
10-29	175	82	118	375
10-30	242	81	108	431
10-31	235	77	129	441
Totals	<u>6,017</u>	<u>2,458</u>	<u>3,440</u>	<u>11,915</u>

TABLE A-1(i)  
 DAILY RIDERSHIP BY AREA  
 November 1975

<u>Date</u>	<u>Buckeye</u>	<u>Model Cities</u>	<u>Tremont</u>	<u>Daily Total</u>
11-01	159	31	52	242
11-02	125	82	31	238
11-03	232	90	155	477
11-04	266	80	180	526
11-05	225	117	142	484
11-06	246	102	156	504
11-07	246	108	141	495
11-08	111	29	51	191
11-09	122	73	36	231
11-10	230	94	119	443
11-11	233	74	93	400
11-12	203	112	135	450
11-13	258	78	123	459
11-14	261	118	177	556
11-15	140	29	50	219
11-16	112	85	32	229
11-17	229	81	129	439
11-18	206	83	144	433
11-19	192	98	110	400
11-20	235	101	139	475
11-21	204	63	117	384
11-22	126	36	35	197
11-23	110	70	44	224
11-24	267	79	140	486
11-25	248	83	110	441
11-26	179	90	151	420
11-27	-	-	-	-
11-28	147	76	95	318
11-29	123	30	48	201
11-30	132	43	38	213
Totals	<u>5,567</u>	<u>2,235</u>	<u>2,973</u>	<u>10,775</u>

TABLE A-1 (j)  
 DAILY RIDERSHIP BY AREA  
 December 1975

<u>Date</u>	<u>Buckeye</u>	<u>Model Cities</u>	<u>Tremont</u>	<u>Daily Total</u>
12-01	241	99	169	509
12-02	217	90	120	427
12-03	213	106	145	464
12-04	273	107	177	557
12-05	280	120	157	557
12-06	119	51	37	207
12-07	146	76	39	261
12-08	282	89	140	511
12-09	276	71	111	458
12-10	196	85	124	405
12-11	237	86	162	485
12-12	235	74	137	446
12-13	105	29	36	170
12-14	113	75	40	228
12-15	177	76	139	392
12-16	248	90	125	463
12-17	219	100	147	466
12-18	272	76	115	463
12-19	216	116	126	458
12-20	116	25	47	188
12-21	131	47	31	209
12-22	216	91	151	458
12-23	233	81	153	467
12-24	126	67	79	272
12-25	-	-	-	-
12-26	131	54	101	286
12-27	116	18	71	205
12-28	127	50	42	219
12-29	202	78	150	430
12-30	213	77	154	444
12-31	169	79	99	347
Totals	<u>5,845</u>	<u>2,283</u>	<u>3,324</u>	<u>11,452</u>

APPENDIX B  
CLEVELAND NEIGHBORHOOD ELDERLY  
TRANSPORTATION USER AND NON-USER SURVEYS

These are the percentage distributions recorded by Case Western Reserve University from their survey of user/non-user impacts.

USER SURVEY  
 TABULATION OF RESULTS

1. Area where survey was conducted.

Tremont	30%
Buckeye	35
Model Cities	35

2. How did you hear about the program?

Friend	14%
Relative	6
Agency	12
Television, Radio, Newspaper	21
Mail	20
Other	27

3. Average age: 71 years.

3a. In what country were you born?

American	84%
Canadian	-0-
British	-0-
Western or Central European	6%
Eastern European	7
Southern European	3
Central American	-0-
South American	-0-
African/Asian	-0-

4. (IF IT CANNOT BE OBSERVED ASK) Is this an:

Apartment	23%
House	49
Rooming house	-0-
Nursing home	-0-
Senior housing	-0-
CMHA public housing	28%

4a. Do you rent or own this home?

Rent	65%
Own	34%

5. With whom do you currently live?

Alone	56%
Spouse	24
Children	10
Brother or Sister	3
Other	7

6. Are you presently:

Married	22%
Widowed	62
Divorced, separated	14
Never married	2

7. INTERVIEWER NOTE SEX

Male	17%
Female	83

7a. INTERVIEWER NOTE RACE

Black	44%
White	55
Other	1

8. Have you lived at your present residence longer than one year?

Yes	95%
No	5

9. I am going to read you a list of activities that most people usually do and I would like to know if you are unable to do any of them or if you need any help with some of them.

	<u>Not Able To Do</u>	<u>Need Help</u>	<u>Can Do</u>
Dressing	2%	1%	97%
Going up and down stairs	17	11	72
Heavy cleaning	31	21	48
Bathing	5	5	90
Laundry	13	7	80
Cooking	9	6	85
Walking around the house	3	2	95
Using public transportation	15	9	76
Grocery shopping	30	36	44

10. I am going to mention some forms of transportation and would like you to indicate how often you use them.

	<u>Daily</u>	<u>Every Few Days</u>	<u>Weekly</u>	<u>Weekly to Monthly</u>	<u>Monthly</u>	<u>Less Than Monthly</u>	<u>Don't Use</u>
City Bus or Rapid	6%	27%	9%	12%	16%	14%	16%
Own Car	4	2	5	-0-	-0-	1	88
Relative's Car	-0-	11	10	7%	10%	13	49
Other Car	2%	7	14	8	9	11	49
Taxi	-0-	2	2	1	6	19	70
Walking*	21%	16	9	11	2	5	36
Dial-a-Bus	12	48	13	13	8	5	1

\*Walking at least one block.

11. How often do you use transportation to get to these places?

	<u>Always</u>	<u>Sometimes</u>	<u>Never</u>	<u>Don't Go to This Place</u>
Shopping	66%	25%	3%	6%
Work	7	1	6	85
Visiting	36	46	4	14
Medical	76	15	7	2
Social Worker	7	1	4	87
Church	63	8	18	11
Recreation*	36	7	17	40

12. Before using the Dial-a-Bus, what kind of transportation would you use to get to:

	<u>City Bus or Rapid</u>	<u>Own Car</u>	<u>Rel. Car</u>	<u>Other Car</u>	<u>Taxi</u>	<u>Walking</u>	<u>Other</u>	<u>None</u>
Shopping	38%	10%	15%	11%	1%	16%	2%	5%
Work	21	5	1	4	0	4	1	67
Visiting	34	10	22	6	1	10	2	15
Medical	53	7	12	6	11	7	1	2
Social Worker	6	0	1	0	1	0	1	88
Church	17	11	13	16	0	27	3	10
Recreation*	12	7	4	4	0	15	3	51

\*Senior Citizen Center.

12a. Since the Dial-a-Bus has started, what kind of transportation do you use to get to:

	City Bus or Rapid	Own Car	Rel. Car	Other Car	Taxi	Walking	Dial- a-Bus	Other	None
Shopping	12%	4%	10%	6%	0	14%	44%	4%	6%
Work	1	1	0	2	0	2	5	1	86
Visiting	15	7	15	6	0	13	23	1	19
Medical	35	4	7	5	6%	5	32	2	4
Social Worker	3	0	1	0	0	0	1	3	90
Church	6	5	12	11	0	24	24	4	14
Recreation*	4	2	2	7	0	15	21	2	47

13. Does a friend or relative ever accompany you on the Dial-a-Bus?

Yes 50%  
No 50

13a. (IF YES TO 13a) Does he or she come for companionship or to physically help you?

Companionship 39%  
Physical assistance 6  
Both 7  
Other 37

14. Would any of your activities be affected if the Dial-a-Bus program were to end?

Yes 74%  
No 23  
Don't Know 3

IF YES, ask 14a

14a. Which of the following activities would be affected if the Dial-a-Bus program were to end? (Check all appropriate)

Shopping 52%  
To work 5  
Visiting 37  
Doctor, Dentist, etc. 26  
Social Worker 1  
Church 23  
Recreation Facility\* 21  
Other 12

\*Senior Citizen Center.



15. Have there been any major changes in your activities since last April when the Dial-a-Bus program began? For example, have you:

	<u>Yes</u>	<u>No</u>
Shopped at more stores	48%	52%
Seen friends more	39	61
Joined new groups	14	86
Attended church more often	22	78
Bought more in stores	32	68
Gotten more medical care	27	73

15a. Since last April, when the Dial-a-Bus program began, have you spent less money on transportation?

Yes	84%
No	14
Don't know	2

16. What do you think are the major advantages of the Dial-A-Bus program? (Multiple answers allowed)

Door-to-door service	66%
Assistance from drivers	48
Low fare	40
Low steps	34
Security	31
Reliability	21
Special design of bus	19
Wide doors	15
Special handles	12
Information received	11
Wheelchair lift	8

17. Are there any particular features of the buses themselves and the bus program that you particularly like? (LET RESPONDENT ANSWER AND PUT A '1' NEXT TO THOSE MENTIONED)

Low fare	40%	Reliability	23%
Door-to-door service	66	Security	31
Low step	34	Information system	11
Special handles	12	Help from bus driver	48
Wide doors	15	Wheelchair lift	
Specially designed vehicle	19	or ramp	8
		Others	38

18a. Are there any things you do not like about the services?

(IF YES, SPECIFY WHAT) \_\_\_\_\_

Yes	48%
No	52%

18b. What improvements would you suggest? (Number responding)

Increasing services	36
None	34
Decrease waiting time	14
Greater reliability	6
More direct routes	4

18c. When could you no longer afford to use Dial-a-Bus in the same way you use it now?

If the fare was:

10¢	12%
25¢	35
50¢	35
75¢	8
\$1.00	4
Other	6

18d. Where would you like to take the bus if the service would become city wide? \_\_\_\_\_

19. Since last April, have you participated in neighborhood, community or church activities more or less or the same as before?

More	31%
Less	6
About the same	63

20. And since last April, have you seen friends more often, less often or about the same as before?

More	32%
Less	5
About the same	63

21. Since last April, do you feel more independent (able to get around more) or do you feel less independent than before?

More	73%
Less	4
About the same	23

22. Now that you have free fare on the buses and rapid lines, are you using or going to use Dial-a-Bus more than you did before, less than before or about the same as you did before the free fares?

More	18%
Less	4
About the same	77

23. Lastly I would like to know if you get income from any of these sources?

Social Security	88%
Pension	29
SSI	20
Savings	12
Stocks and Bonds	3
Welfare Assistance	2
Relatives' Assistance	5
Other	20

24. Would you please look at this and tell me which letter best describes your (family's) total income before taxes.

a. Under \$1,000	1%	h. \$7,000 to \$7,999	1%
b. \$1,000 to \$1,999	15	i. \$8,000 to \$9,999	0
c. \$2,000 to \$2,999	41	j. \$10,000 to \$14,999	0
d. \$3,000 to \$3,999	16	k. \$15,000 to \$19,999	0
e. \$4,000 to \$4,999	8	l. \$20,000 to \$29,999	0
f. \$5,000 to \$5,999	1	m. \$30,000 and over	0
g. \$6,000 to \$6,999	1	n. Don't know/Refused	16

25. Is there anything you'd like to add or ask about the interview?

NON-USER SURVEY  
TABULATION OF RESULTS

1. Area where survey was conducted.
 

Tremont	31%
Buckeye	34
Model Cities	35
  
2. Have you heard about the Dial-a-Bus program?
 

Yes	97%
No	3
  
- 2a. (If yes) How did you hear about the program?
 

Friend	26%
Relative	2
Agency	2
Television, Radio, Newspaper	19
Mail	15
Other	33
  
- 2b. (If Yes) Why do you not use the buses?
 

	n
Have a car	27
Physical Impairments	16
Get rides from children and friends	11
Able to walk	11
Geographic limits of service	9
Use other public transportation	7
Negative information about NET service	4
  
3. Average age: 72 years.
  
- 3a. In what country were you born?
 

American	74%
Canadian	0
British	1
Western or Central European	13
Eastern European	9
Southern European	2
Central American	0
South American	0
African/Asian	1

4. (IF IT CANNOT BE OBSERVED ASK) Is this an:
- |                |     |
|----------------|-----|
| Apartment      | 16% |
| House          | 51  |
| Rooming house  | 0   |
| Nursing home   | 0   |
| Senior Housing | 33  |
- 4a. Do you rent or own this home?
- |      |     |
|------|-----|
| Rent | 62% |
| Own  | 38  |
5. With whom do you currently live?
- |                   |     |
|-------------------|-----|
| Alone             | 57% |
| Spouse            | 25  |
| Children          | 10  |
| Brother or Sister | 2   |
| Other             | 6   |
6. Are you presently:
- |                     |     |
|---------------------|-----|
| Married             | 26% |
| Widowed             | 59  |
| Divorced, separated | 9   |
| Never married       | 6   |
7. INTERVIEWER NOTE SEX
- |        |     |
|--------|-----|
| Male   | 36% |
| Female | 64  |
- 7a. INTERVIEWER NOTE RACE
- |       |     |
|-------|-----|
| Black | 47% |
| White | 53  |
8. Have you lived at your present residence longer than 1 year?
- |     |     |
|-----|-----|
| Yes | 95% |
| No  | 5   |

9. I am going to read a list of activities that most people usually do and I would like to know if you are unable to do any of them or if you need any help with some of them.

	<u>Not Able to Do</u>	<u>Need Help</u>	<u>Can Do</u>
Dressing	0%	33%	67%
Going up and down stairs	18	31	51
Heavy cleaning	27	38	35
Bathing	3	31	66
Laundry	11	36	53
Cooking meals	4	36	60
Walking around house	4	29	67
Using public transportation	23	28	49
Grocery shopping	20	36	44

10. I am going to mention some forms of transportation and would like you to indicate how often you use them.

	<u>Daily</u>	<u>Every Few Few Days</u>	<u>Weekly</u>	<u>Weekly to Monthly</u>	<u>Monthly</u>	<u>Less than Monthly</u>	<u>Don't Use</u>
City Bus or Rapid	5%	17%	10%	8%	8%	11%	43%
Own Car	12	14	2	0	2	0	70
Relative's Car	1	9	12	10	9	15	44
Other Car	3	3	7	6	8	6	67
Taxi	0	0	2	7	1	11	78
Walking*	26	15	9	6	1	3	40

\*Walking at least one block.

11. Other than walking, how often do you use transportation to get to these places?

	<u>Always</u>	<u>Sometimes</u>	<u>Never</u>	<u>Don't Go to This Place</u>
Shopping	57%	20%	7%	15%
Work	10	0	2	86
Visiting	49	27	8	16
Medical	74	10	8	7
Social worker	2	0	8	90
Church	51	12	12	22
Recreation	22	9	6	61

12. Have there been any major changes in your activities since last April?

	<u>Yes</u>	<u>No</u>
Shopped at more stores	7%	93%
Seen friends more	4	96
Joined new groups	0	100
Attended church more often	3	97
Bought more in stores	1	99
Gotten more medical care	14	86

13. What do you think would be the advantage of a program providing transportation for the elderly? \_\_\_\_\_

14. Do you think that there are advantages to a special transportation program for the elderly? (No Data)

14a. If yes to 14, what are they? (Place a 1 next to items mentioned)

Low fare	34%
Door-to-door service	59
Low step	10
Special handles	4
Wide doors	1
Specially designed vehicle	2
Reliability	2
Security	15
Information system	1
Help from bus driver	11
Wheelchair lift or ramp	4
Other	0

15. Since last April, have you participated in neighborhood, community or church activities more or less or the same as before?

More	6%
Less	8
About the same	86

16. Since last April, have you seen friends more often, less often or about the same as before?

More	4%
Less	3
About the same	93

17. Since last April, do you feel more independent (able to get around more) or do you feel less independent than before?

More	11%
Less	15
About the same	74

18. Lastly, I would like to know if you get income from any of these sources?

Social Security	80%
Pension	23
SSI	6
Savings	13
Stocks and Bonds	4
Welfare Assistance	6
Relatives' Assistance	2
Other	12
Refused	4

19. Would you please look at this card and tell me which letter best describes your (family's) total income before taxes.

a. Under \$1,000	2%	h. \$7,000 to \$7,999	0%
b. \$1,000 to \$1,999	17	i. \$8,000 to \$9,999	1
c. \$2,000 to \$2,999	25	j. \$10,000 to \$14,999	1
d. \$3,000 to \$3,999	15	k. \$15,000 to \$19,999	0
e. \$4,000 to \$4,999	7	l. \$20,000 to \$29,999	0
f. \$5,000 to \$5,999	6	m. \$30,000 and over	0
g. \$6,000 to \$6,999	1	n. Don't know/ Refused	25

20. Is there anything you would like to add or ask about the interview? \_\_\_\_\_



## APPENDIX C

### AGENCY SURVEY ANALYSIS

In order to determine how the Dial-A-Bus project may have had an impact upon the services offered by agencies or commercial establishments within the three project neighborhoods, an agency (or destination) survey was conducted. Brief one-page questionnaires, accompanied by a letter of transmittal from the Director of the program, were sent to 140 agencies. (This list was supplied by the project Director.) Of the total, 75 of the agencies were in the Buckeye area, 26 were in the Model Cities area, and 41 were in the Tremont area.

Unfortunately, the response to the questionnaire was extremely low. Only one questionnaire was returned from the Model Cities and Tremont areas; 25 were returned from the Buckeye area. This may indicate that the Buckeye area is a more cohesive area. There are several possible explanations for the low rate of return:

1. Representatives from the agencies were too busy to respond,
2. The impact of Dial-A-Bus upon the utilization of agency services may not have been known, and
3. There may not have been any impact perceived by the agency representatives.

Because of the sparse mail-back response, it was decided to switch to a phone survey. A total of 77 agencies provided information over the phone: eight from Tremont, 22 from Model Cities, and 47 from Buckeye. The reason phone interviews were not accomplished with all the agencies include the following:

1. Some agencies had moved or closed,
2. The correct phone number was not obtained for others, and
3. Some agency representatives would not cooperate, indicating that they were too busy or could not tell which of their clientele were users of Dial-A-Bus.

A breakdown of response by agency type and project neighborhood is presented below.

<u>Type of Agency</u>	<u>Model Cities</u>	<u>Buckeye</u>	<u>Tremont</u>	<u>Total</u>
Bank/Savings	1	9	1	11
Drug/food	7	8	1	16
Church	5	3	2	10
Beauty parlor	0	4	0	4
Restaurant	1	3	0	4
Clothing store	0	9	1	10
Social Services	8	5	2	15
Others	0	3	1	4
Cleaners	<u>0</u>	<u>3</u>	<u>0</u>	<u>3</u>
Total	22	47	8	77

Responses to the five questions asked of agency representatives are presented on the following pages. For the purposes of analysis, agencies are grouped in three categories: commercial, church, and community services (including health, housing, and social services).

1. Have any of your programs been affected in any way by the NET program?  
(Number responding in the affirmative over total in category)

	<u>Tremont</u>	<u>Model Cities</u>	<u>Buckeye</u>	<u>Total</u>
Commercial	0/4	2/9	14/39	16/52
Churches	0/2	2/5	3/3	5/10
Community services	<u>1/2</u>	<u>4/8</u>	<u>3/5</u>	<u>8/15</u>
Total	1/8	8/22	20/47	29/77

2. Have clients been able to better use your services since the NET program? (Number responding in the affirmative over total in category)

	<u>Tremont</u>	<u>Model Cities</u>	<u>Buckeye</u>	<u>Total</u>
Commercial	2/4	3/9	22/39	27/52
Churches	1/2	3/5	3/3	7/10
Community services	<u>1/2</u>	<u>5/8</u>	<u>4/5</u>	<u>10/15</u>
Total	4/8	11/22	29/47	44/77

3. Do you feel that the effectiveness of your program has been increased as a result of the NET program? (Number responding in the affirmative over total in category)

	<u>Tremont</u>	<u>Model Cities</u>	<u>Buckeye</u>	<u>Total</u>
Commercial	0/4	2/9	12/39	14/52
Churches	0/2	3/5	3/3	6/10
Community services	<u>1/2</u>	<u>4/8</u>	<u>2/5</u>	<u>7/15</u>
Total	1/8	9/22	17/47	27/77

4. Has the NET program had any impact upon your costs of providing service?  
(Number responding in the affirmative over total in category)

	<u>Tremont</u>	<u>Model Cities</u>	<u>Buckeye</u>	<u>Total</u>
Commercial	0/4	1/9	1/39	2/52
Churches	0/2	0/5	0/3	0/10
Community services	<u>1/2</u>	<u>2/8</u>	<u>1/5</u>	<u>4/15</u>
Total	1/8	3/22	2/47	6/77

5. What is your overall assessment of the NET program?

In Tremont, three out of the four commercial enterprises were neutral, one was positive. One church was neutral and one was positive. One social service was positive while a housing service was neutral.

In Model Cities, all eight community services were positive, as were all five churches. For the nine business concerns, six were positive and three were neutral.

In Buckeye, all three churches were positive. For community services, four were positive and one was neutral. Finally, for the 39 commercial concerns in the sample, 32 were positive, five were neutral, and two were negative.

An interpretation of this data is that a good number of commercial concerns, churches, and social service agencies believe that the Dial-A-Bus program has provided the opportunity for riders to better use their services. More than a third of the agencies believed both that their services had been affected by this demonstration program and that the effectiveness of their services was increased as a result of the Dial-A-Bus program. However, only six agencies believed that the program had any impact upon their costs for providing services. The great majority of agencies positively assessed the Dial-A-Bus program and those who were neutral generally indicated that they did not know enough about the program to make an assessment.

APPENDIX D  
RTA POLICY STATEMENT

FEDERAL POLICIES RELATIVE TO CRT FOR ELDERLY AND HANDICAPPED

The Associate Administrator for Policy and Program Development of the Urban Mass Transportation Administration (UMTA), Mr. C. Kenneth Orski, told a transit industry conference recently that in the last ten years regular transit services have been reaching a rapidly shrinking proportion of urban population. He added:

As a result, millions of urban Americans - those who are too young, too old or too incapacitated to drive, those who are too poor to own a car, and the countless persons whose spouses preempt the use of the family car - have become virtual prisoners in their own neighborhoods for lack of convenient and economical means of public transportation.

Federal policy is more and more being directed towards encouraging new types of transit services that will offer more relief to the transit-dependent elements of our population. These new types of transit services are called "paratransit" services and they are designed to provide better service to residents of the inner city as well as to suburban residents in the lower density population areas.

Mr. Orski stated that potentially the most far-reaching opportunity for paratransit lay in the concept of integrating regular transit services with paratransit services in the large metropolitan areas. The RTA Planning Committee believes that the recommendations it is making today with respect to CRT for the elderly and handicapped will greatly assist the more transit dependent residents of our County and the tie in between the CRT service and RTA's regular main line service will permit us to benefit from the far-reaching opportunity referred to by Mr. Orski.

UMTA has proposed new rules, not yet in effect, requiring that applications for Federal capital grants "shall provide assurance that a definite plan and program for meeting the transportation needs of the elderly and handicapped has been developed...". Grant applications will have to identify the provisions in the proposed project for the elderly and handicapped, and the relationship of the project to the plan and program for meeting the transportation needs of the elderly and handicapped.

RTA is presently providing services to the elderly and handicapped through RTA's reduced fare program. This program more than satisfies Section 5 of the Urban Mass Transportation Act of 1974, as amended, which specifically requires reduced fares for elderly and handicapped individuals as a condition for approval of projects proposed to be funded under this section.

While neither existing nor proposed federal laws and regulations require supplemental transportation services for the elderly and handicapped (as opposed to improvements to existing service), such services could become necessary when it is not desirable or feasible to alter existing service to the extent necessary to meet such specialized needs.

In summary, RTA is presently providing transportation services for the elderly and handicapped in accordance with existing Federal rules and regulations. UMTA will require additional services and service features according to its proposed new rules calling for a plan and program to meet the transportation needs of the elderly and handicapped. The initiation of CRT for the elderly and handicapped in accordance with the recommendations being made today

could be an important step in the direction of meeting those needs.

#### 5-COUNTY TRANSIT STUDY AND MEMORANDUM OF UNDERSTANDING

The short-range plan produced by the 5-County Transit Study included a comprehensive CRT special service program. This program was proposed to be areawide, with no restriction as to user eligibility, and it was intended to respond to needs for transportation on a neighborhood scale. It called for dividing the entire service area into a series of communities or neighborhoods, and the establishment of a miniature transit organization within each community. CRT was to be funded in the 5-County Study at \$3 per capita.

The negotiations between the City of Cleveland and the Suburbs surrounding the creation of the RTA and the transfer of the Cleveland Transit System to RTA ended with a much lower level of commitment to CRT than the \$3 per capita envisioned by the 5-County Transit Study. The Memorandum of Understanding executed by the City, the County and the Suburbs, called for a CRT commitment to the City of Cleveland alone as a part of the City's entitlement to one-half of the service improvements to be effected by RTA in the first five years of operations. The level of RTA's commitment to the City of Cleveland for CRT calls for an expenditure by RTA in the first year of approximately \$500,000 and grows to approximately \$1.4 million in the fifth year (1980).

#### NET DEMONSTRATION PROJECT

For the past ten months, Cleveland's Neighborhood Elderly Transportation (NET) demonstration project has been providing dial-a-bus in three areas for senior citizens. This project has been supported by UMTA special demonstration project dollars and the

operating costs have been at a rate of approximately \$600,000 per year. It should be noted that the NET project covers only approximately 9.9% of the City of Cleveland's land area but the annual operating costs are \$100,000 greater than the entire first year RTA commitment RTA has to the City of Cleveland (\$500,000). Ridership has been increasing steadily but average vehicle productivity has reached only approximately six (6) passengers per vehicle hour of service. Experience nationally has demonstrated that an average vehicle productivity of ten (10) passengers per vehicle hour is realistic and the RTA Planning Committee believes that such increased productivity will be achieved here in Cleveland as RTA's CRT program for the elderly and handicapped gets underway. This will be important because the average cost of a ride taken by the senior citizens in the NET demonstration project was in excess of \$4.35 for each ride taken. To the extent productivity can be increased, to this same extent can a given amount of dollars be stretched to provide more service to more transit dependent people.

Another way in which the average cost of \$4.35 per ride could be reduced would be to contract the service out to experienced cab companies on a bid basis. Mr. Orski noted in his recent remarks that the taxi industry already carries more revenue passengers than rail transit and over one-half as many as bus transit. He added:

Paratransit offers a significant opportunity for private operators, including taxi and limousine operators, to assert themselves as providers of mass transportation services.

Mrs. Goldie Lake, Director of the NET Project, received, last August, from the Yellow Cab Company of Cleveland a proposal to oper-



ate the dial-a-bus program in the future at half the cost experienced during the project. The RTA Planning Committee understands that comparable cost figures are that RTA operation of the CRT program for the elderly and the handicapped would be at approximately \$24.82 per operating hour while the Yellow Cab figure would be at approximately \$11.80 per operating hour. As will be seen later in this report, the RTA Planning Committee believes that contracting the CRT service to cab companies on a bid basis is an important part of the format RTA should use in implementing supplementary transportation service for the elderly and handicapped in Cuyahoga County.

As indicated above, the present NET service is quite low in productivity and efficiency. The average vehicle occupancy is below one passenger per bus, i.e., there are more bus-miles operated than there are passenger-miles carried. In terms of fuel and energy efficiency, it would appear that the performance of NET has not been as good as either automobiles or taxis.

Immediate improvements can be achieved by cutting back the hours of service, withdrawing operation during the least-used times of day, and by operating in a given part of the service area only on certain days of the week. These choices can be made so as to minimize the inconvenience to users of the service while substantially lowering costs and raising average vehicle occupancy and productivity.

Further economies appear to be possible by pre-scheduling instead of or in conjunction with the use of radio dispatching to serve some of the regularly-recurring trips made by users of the service.

CRT SERVICE TO BE RESTRICTED TO ELDERLY AND HANDICAPPED

Because available funds are limited for CRT in the Cleveland area, the RTA Planning Committee is recommending that CRT service be restricted to the elderly and the handicapped on the theory that these segments of the population are the most transit dependent. We recognize that the identification of individuals who would be eligible may not be easily achieved and we also recognize that the overall level of CRT service in order to be applicable on a county-wide basis will have to be at a reduced level from that of the present NET service in the three demonstration project areas.

"Elderly" will be defined as all persons 65 years of age and above and "handicapped" will be defined in accordance with the definition being developed by the special RTA Task Force on Transit For The Handicapped. Generally speaking, for purposes of the CRT service, the "handicapped" individual (either above or below 65) would be thought of as a person who is disabled to the extent that the walking to and from, and the exposure to weather incident to the use of, RTA's regular transit services are unacceptable conditions of travel.

It is clear that an even more specialized type of service must be provided at some time in the future for the extremely handicapped. Social agencies do provide some of this service now, and two of the NET demonstration project vehicles are Dodge vans specially equipped with lifts for wheelchairs. It is recommended that another 20 lift-equipped vehicles be provided for in RTA's next capital budget to permit an expansion of this particularly specialized type of service.

CRITERIA FOR DETERMINATION OF LEVEL OF SERVICE BASED UPON NEED

Consistent with the theory that specialized transportation services need to be offered to the elderly and handicapped, criteria need to be developed for determining the level of service at which the supplementary transportation will be provided to any particular area. In order to arrange the various communities within the county according to a need ranking, the RTA Planning Committee relied upon three (3) basic criteria:

- (1) Concentration of elderly persons per square mile;
- (2) Percent of elderly population living on incomes below the poverty level; and
- (3) Incidence of crimes against persons per 1,000 population.

There may well be other relevant criteria by means of which various communities and neighborhoods could be ranked for the receipt of such supplementary transportation service but these three criteria seemed to be the most universally applicable and rationally sound of all the criteria examined.

It is recommended that all of the social planning areas in the county (some 42 in number) should be examined and ranked according to an index based upon the above three criteria. The resulting index could be thought of as an "index of need" on the theory that the lower the median income in a given community and the higher the incidence of crimes against persons, the greater the need for supplementary door to door transportation for persons 65 years of age and above.

If these criteria are applied objectively to all of the social planning areas in Cuyahoga County, approximately 28% of

whatever dollars are available for CRT in Cuyahoga County would be devoted to the suburban areas and 72% would be devoted to the City of Cleveland.

Consultants have advised us that there is an eligible population of elderly, 65 years of age and over, and handicapped in Cuyahoga County of something in excess of 200,000 persons. Additionally, over half of these eligible persons reside in the suburbs. The RTA Planning Committee believes that the needs of the elderly and handicapped residing in the suburban areas need to be taken into consideration at this point in time even though the only legal commitment resting upon RTA at the present time is to provide CRT service to residents of the City of Cleveland.

It should also be noted that the same criteria described above can be used to rank different neighborhoods and communities within the City of Cleveland as to the extent of need present and that this same process can be used in ranking different suburban areas as against other suburban areas.

The RTA Planning Committee has not attempted to make any final determination as to the total number of communities or neighborhoods that the City of Cleveland and the suburban areas should be divided into for the purpose of calculating the "index of need" according to the criteria set forth above. It is recommended that if the criteria themselves are found to be acceptable by the RTA Board, qualified experts should be requested to study the make up of the social planning areas and arrive at the appropriate number of communities for the purpose of applying this analysis.

OVERALL LEVEL OF SERVICE DURING FIRST YEAR OF CRT

The City of Cleveland's entitlement to CRT funding in order to equalize the service improvements being placed in the suburban areas is approximately \$500,000 during the first year. The RTA Planning Committee believes that the concept of CRT for the elderly and handicapped is among the highest priorities RTA faces and as a consequence recommends that a total of \$1 million be earmarked for this type of supplementary service during the first year. It is further recommended that the additional increment of \$500,000 be viewed in the same light as service improvements are viewed, i.e., half of the benefit to derive to the City of Cleveland and half of the benefit to derive to the suburbs.

The RTA Planning Committee is under the impression that underspending in the first 12 months of operations will make this level of CRT expenditure realistic and that this order of magnitude of expenditure is necessary in order to make the CRT service for the elderly and handicapped significant and meaningful.

At the same time, RTA should attempt to determine whether this additional expenditure of \$500,000 in the first year (i.e., over and above the committed amounts which must be spent) should be made in the form of CRT to the elderly and handicapped in the opinion of the appropriate elected officials of the respective jurisdictions as well as the people residing in those jurisdictions. Representatives of the City of Cleveland have already indicated that this additional expenditure for CRT in the first year would be appropriate although it is conceivable, for example, that the needs of the elderly and handicapped in the less densely populated areas might be better served by an expenditure of \$250,000 in some form other than CRT as described in this Report and an attempt

should be made to determine this through discussions with elected officials, etc.

#### FARE STRUCTURE

While the NET Project presently charges 10¢ per ride and while various fare structures have been considered by the RTA Planning Committee, it is recommended that CRT for the elderly and handicapped be on a totally free basis.

#### TYPES OF CRT SERVICE TO BE PROVIDED

The emphasis should be placed upon a pre-scheduled door-to-door service in contrast with the radio-dispatched dial-a-bus service presently being provided in the NET Project. The reason for this, is that of all the various service alternatives, this form of service meets to the largest extent the following criteria:

- (1) Providing direct, non-transfer service not to exceed a certain maximum length;
- (2) Maximizing personal security; and
- (3) Minimizing the walking required by the recipient of the service.

The dial-a-bus service of the NET Project clearly meets all of these criteria but maximum productivity is hard to achieve when the last minute travel decisions of the recipients of the service must be taken into consideration.

Pre-scheduled door-to-door service, on the other hand, meets the three criteria set forth above and permits a maximizing of the efficiency of the operation. This increased efficiency will have to be relied upon to raise the productivity level from the six (6) passenger per vehicle hour of service to the expected productivity

level experienced nationally of ten (10) passengers per vehicle hour of service.

It is possible that in certain neighborhoods loop services on more or less of a fixed route basis would make sense. It is also possible that in some neighborhoods a fixed route service with deviations to special locations might be considered.

The RTA Planning Committee has not attempted to identify all of the types of service which might make sense in any particular neighborhood but it has reached the recommendation that the basic format of the CRT service for the elderly and handicapped should be a pre-scheduled door-to-door service.

BOTH RTA AND THE TAXI CAB COMPANIES SHOULD PROVIDE CRT SERVICE

The RTA Planning Committee recommends that as a means of making the available dollars stretch as far as possible, a significant portion of CRT service be contracted out on a bid basis to taxi cab companies. RTA would furnish some of this service itself and the balance of use as between RTA and taxis should be left to later negotiations.

LIMITATION ON TRIP LENGTH

While it makes sense to divide up the county into communities or neighborhoods for the purpose of determining which areas get the maximum amount of service (based upon crime statistics, income levels and concentration of population as mentioned above) it does not make any sense to require that a person's trip must be confined to such a community or neighborhood.

Obviously, trips have to be limited in length but if a person

lives near the boundary line of the community or neighborhood, that person should be able to take a trip of the specified length regardless of whether the destination is in the same community or in an adjoining community.

#### EXAMPLES OF LEVELS OF SERVICE

The RTA Planning Committee studied the amount of service which might be placed in representative communities assuming the level of funding described above.

By applying the three (3) criteria of concentration of population, crimes against persons and income levels, the West Shore planning area in the north westerly corner of the county would receive approximately sixty (60) rides a week. This might represent the presence of one (1) bus in that area one (1) day a week. This is an approximate figure, of course, and if the productivity could reach or rise above ten (10) passengers per vehicle hour, more than sixty (60) rides could be achieved in a given day.

The central west planning area, on the other hand, would probably receive something on the order of 300 rides per week which would be the equivalent of a bus in that area five (5) days per week.

These figures are intended only as illustrations. The exact allocations will have to be made to the various communities only after the program gets under way. Even at that point, the system will have to be flexible so that alterations can be made based upon experience.



### CRT SERVICE BEING FURNISHED BY SOCIAL AGENCIES

Various social agencies already provide supplementary transportation services within Cuyahoga County. This would include the Cuyahoga County Office on the Aging; the City of Cleveland Mayor's Commission on Aging; the Cuyahoga County Welfare Department's Office of Income Maintenance; and various hospital and church programs supported either with governmental funds, philanthropic funds and/or private funds.

The Red Cross has an important program which it operates with respect to elderly and handicapped persons and even the Green Bus service offered by University Circle, Inc. could be considered as CRT to a certain extent. The University Circle, Inc. bus service, for example, carries in excess of 750,000 riders per year with the costs of this operation being borne by some 18 to 20 institutions in the general University Circle area.

It is anticipated that the social agencies, both public and private, would continue to furnish the same CRT services presently being furnished. At the same time, RTA could, if necessary, act as a coordinator of the special transit and paratransit services now offered by these agencies.

### CRT ADVISORY COMMITTEE

A host of operating decisions will have to be made as RTA's CRT service is implemented for the elderly and handicapped. The RTA Planning Committee recommends that a CRT Advisory Committee be formed to counsel with RTA in this enterprise.

The objectives and role of the CRT Advisory Committee would have to be spelled out in detail but the concept is that RTA will

be better able to serve these important community needs if there is a group of interested and qualified people ready and able to render advice and consultation.

PROFESSIONAL EVALUATION BY CASE WESTERN RESERVE UNIVERSITY

Whenever an important new project gets started, it is helpful to have an on-going evaluation supplied by competent professionals. For example, the Human Services Design Laboratory at Case Western Reserve University is participating in the evaluation of the NET demonstration project. This is pursuant to a contract let by UMTA and the other professionals involved in this evaluation of the NET demonstration project are John Crain & Associates and DAVE Systems, Inc.

The RTA Planning Committee has had discussions with Dr. Thomas P. Holland, Director of the Human Services Design Laboratory, and Dr. Jordan I. Kosberg, Associate Professor and Assistant Director of the Human Services Design Laboratory. These highly qualified and competent researchers have developed significant expertise in the present evaluation which they are making of the current NET demonstration project and the results of this evaluation will be made available to RTA and should be of significant assistance in the implementation of the new CRT service.

PROFESSIONAL EVALUATION BY HARVARD UNIVERSITY

The RTA Planning Committee has also been in communication with the Department of City and Regional Planning of Harvard University. An agreement has been reached whereby between 10 and 20 graduate students will concentrate the spring semester's workshop in the

Harvard Department of City and Regional Planning on RTA's implementation of its CRT service for elderly and handicapped.

All faculty salaries are being donated by Harvard University and the only costs which will need to be met are out-of-pocket costs for travel expenses, computer time, telephone expenses, reproduction of documents, etc. A total budget of \$15,000 has been received by RTA from the Harvard Department of City and Regional Planning and \$2,500 of this amount is to cover the cost of payments to be made to cooperating consultants, such as the Human Services Design Laboratory of Case Western Reserve University mentioned above.

The RTA Planning Committee recommends that the RTA Board appropriate the sum of \$15,000 to cover the cost of this Harvard workshop. The potential benefits that could be received by RTA in the way of suggestions for improving the CRT service to the elderly and handicapped far and away exceed the out-of-pocket expenses which will be incurred.

Further, the Cleveland Foundation has made a tentative commitment to RTA that it will pick up the \$15,000 worth of out-of-pocket expenses to permit this Harvard workshop to go forward so that in all likelihood the residents of Cuyahoga County, at no public expense, can benefit from a professional evaluation of RTA's new CRT service, which evaluation will be carried out by acknowledged leaders in the field.

REQUEST FOR TRANSITION GRANT FROM UMTA FOR EXTENSION OF NET PROJECT

In an effort to make the transition as smooth as possible from the present NET project to the new CRT service for the elderly and handicapped, RTA has requested and received the cooperation and assistance of the Honorable Ralph J. Perk, Mayor of the City of Cleveland. Mayor Perk has been asked to seek a 90-day extension of the present NET Project so that the dial-a-bus service now being offered in the three (3) demonstration areas will not have to be terminated on February 1st.

Discussions with Mayor Perk and with UMTA officials have already taken place with respect to this possible transition grant and Mayor Perk has assured the RTA Planning Committee that he will submit tomorrow a letter to UMTA requesting this transition grant. UMTA has not made any commitment as to whether or not such a transition grant is possible, but the City of Cleveland and RTA will do everything possible in an effort to cause favorable consideration to be given by UMTA to this request.

If the transition grant request is approved by UMTA, RTA would intend to gradually reduce the service levels in the three (3) demonstration areas down to the levels of service which would be allocated to these three (3) areas in accordance with the criteria which will be applicable county-wide as described above.

Should the transition grant request not be approved by UMTA, the RTA Planning Committee strongly recommends that some service be maintained in the three (3) demonstration areas so that the elderly and handicapped of those areas will not be cut off abruptly from the dial-a-bus service which means so much to them.

The RTA Planning Committee has had lengthy discussions with the officers of the Senior Citizens' Coalition and the cooperation of this fine group of people can be relied upon. Additionally, it would be hoped that representatives of the Coalition would agree to serve on a CRT Advisory Committee so that coordination between RTA and the elderly and handicapped residents of the County could be maximized.

Respectfully submitted,

RTA PLANNING COMMITTEE

By: William B. Norris  
William B. Norris  
Chairman



APPENDIX E  
LABOR AGREEMENT

MEMORANDUM OF UNDERSTANDING AND AGREEMENT  
BETWEEN GREATER CLEVELAND REGIONAL TRANSIT  
AUTHORITY AND LOCAL 268 AMALGAMATED TRANSIT  
UNION MODIFYING THE CONDITIONS OF EMPLOYMENT  
TO PROVIDE FOR OPERATION OF CRT VEHICLES.

It has been agreed by the parties that the CRT funds will be split with 1/3 used to provide taxicab contracted service to areas of lower density and 2/3 used to provide service manned by RTA (Amalgamated) personnel serving areas of higher density. (Contracted service may include vehicles other than taxicabs.)

With an estimate of 45 vehicles required in the first year of operation, this should result in approximately 18 taxis and 27 RTA vehicles.

It has been agreed that a new classification, CRT Operator, will be established. The CRT operator will operate a vehicle with seating capacity less than 30 passengers, with or without a wheelchair lift. (In the event that RTA takes over operation of the county vehicles for mentally retarded, the operation of those vehicles would come under this classification.)

It has been agreed that the rate for the CRT operator will be established at \$4.40 per hour. This rate is 69% of the present RTA operators' rate and it was agreed that a differential of 31% will be maintained for a minimum of 5 years.

All of the provisions of Article I of the Conditions of Employment will apply to the CRT operators. (Including vacations, holidays, insurance, pensions, etc.)

Unless and until specifically negotiated between the parties, the provisions of Article II of the Conditions of Employment shall not apply to these employees except as indicated below.

1. a. At the outset of the program, CRT operators and extras will be guaranteed 30 hours of work per week of five days.
- b. In the event that a contract is entered into with Cuyahoga County for transporting the mentally retarded, that

work shall be combined with the CRT work. At that time, a 40-hour weekly guarantee will apply.

2. Seniority provisions shall apply.
3. CRT operators shall have the right to pick schedules a minimum of two (2) times per year.
4. CRT operators shall have an opportunity to qualify for regular RTA operator work after a minimum of one year of service as a CRT operator.
5. Daily, weekly and day off overtime provisions shall apply.
6. The uniform provision shall apply.
7. Article II, Section 9, cancellation of assignment, provision shall apply.

CRT work and regular RTA work will not be combined on the schedules.

CRT controllers will be regular RTA Grade 5 personnel.

ATU

Peter Alberino  
Murphy Lucas

RTA

David H. Brown



APPENDIX F  
REPORT OF INVENTIONS

The contract, DOT-TSC-1081, Task Directive 1081-9, required a synthesis of a final report of the project as developed from reports prepared by other consultants and from other project data. A number of innovations were incorporated within the demonstration project. However, there was nothing in the nature of the report preparation which should have or did lead to any inventions or improvements of inventions.



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