transit and shopping centers

an initial investigation

INCREASING TRANSIT'S SHARE OF THE REGIONAL SHOPPING CENTER TRAVEL MARKET: AN INITIAL INVESTIGATION

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16. Abstract

This report examines the explosive growth of the shopping center during the last 23 years as well as factors influencing travel to large regional malls, and the current trends that will affect regional malls in the future. The focus herein is on large shopping malls (ranging in size from 800,000-2,000,000 square feet of gross leasable area; having 4,000-15,000 auto parking spaces; and located 6-20 miles from "downtown" of the central city). The objectives of this study are to (1) examine current approaches to providing transit service to these malls, and (2) develop recommendations for gaining a larger share of this travel market for public transit.

The results of 27 case studies in 18 U.S. and one Canadian City are presented. They describe what transit service is being provided, how and why it is being used (or ignored) at these 27 regional malls. Nine case studies describe innovative transit projects that are still in the planning stage. The case studies were written primarily for transit operators and should be of interest to others--urban planners, traffic engineers, mall developers and operators, architects, and both transit system and retailer marketing people. Recommendations are presented that would assist U.S. transit agencies in gaining a ten percent share of this huge (6-7 billion trips annually) travel market in the 1980's. The authors state that to achieve said objective, private/public sector cooperation is needed as well as experimentation with innovative transit provision techniques, development of improved analysis and planning methods, and basic data gathering efforts.

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FORWARD

Transit service to shopping centers has become an important priority for many transit operators. Shopping centers have grown explosively over the past twenty years and are now a major focus of urban area travel. To assist these operators, UMTA through its University Research and Training Program initiated a study of shopping centers with the University of Washington. The purpose of this study was to examine current approaches to providing transit service to large shopping centers and develop recommendations regarding how to effectively provide this service.

This document represents the final report from this study. It summarizes case studies of 27 shopping centers throughout the United States and Canada where transit service exists or is planned to be provided. We believe this "State-of-the-Art" review will be of great interest to transit operators who are interested in providing transit service to shopping centers.

Additional copies of this report are available from the National Technical Information Service (NTIS), Springfield, Virginia 22161. Please reference PB 80-131360 on your request.

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A large number of people responded to our call for information which was published in Passenger Transport at the beginning of the project. We received a lot of information that we have not been able to include in this report but are grateful for the interest shown by these people. We have benefited greatly from phone conversations with many of them and have been impressed with the amount of interest in this topic. We anticipated finding only an oasis or two in an otherwise vast and empty desert. We found much more activity and a lot more interest than we anticipated. A list of most of the people who provided helpful information is provided on the following pages. We are most grateful for this help and hope that this report will be helpful to those people in return.

As usual, errors and omissions are the sole responsibility of the authors. We are aware of some very recent developments in some of our case studies that cannot be included in this report because of our deadline for completing it. Rapid changes are occurring in this field and the reader should recognize that the status of the various projects included in this report is very dynamic. However, our conclusions should retain their validity well into the 1980's.

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EXECUTIVE SUMMARY

The shopping center industry has grown explosively during the past twenty years and has become a very important part of American life. An article entitled "The Malling of America" in New Times (May, 1978) describes how important regional malls have become in the social lives of a large part of our society, as well as filling an important role in our consumption-oriented economy. At present, there are more than 19,000 shopping centers in the United States. This study is focused on the largest of these, defined as the 390 centers containing more than 800,000 square feet of gross leasable area in 1979. The purposes of this study are to (1) describe current approaches to providing transit service to these large regional malls, and (2) develop some recommendations as to how transit could gain a larger share of this huge travel market in the 1980's.

At present, it is estimated that three per cent or less of all shopping trips to regional malls use some type of public transportation. Our question is: What could be done to raise transit's share of this market to about 10 per cent during the 1980's? Using figures from various sources, we have estimated that in 1977 about 6.5 billion trips were made to the 340 largest regional malls in the United States. This is almost 1.4 times the total number of all the transit trips made on non-rail transit systems in this country during 1977. If transit could gain a 10 per cent share of this market, more than 600 million more transit patrons would be added nationally, or about 15 times more than the current annual patronage of the Bay Area Rapid Transit System. Furthermore, the market is actually a lot bigger than this because there are more than 18,500 other smaller malls that are not included in this calculation, some of which could utilize transit services if they were provided.

Shopping Travel Behavior

While the shopping trip market is huge, it is also a very auto-oriented market and therefore likely to be very difficult for transit to penetrate. These shopping trips tend to be quite short, having an average length of between two and four miles. While two-thirds are home-based, the other third is non-home based. About 60 per cent are made by women. The average auto occupancy is about 1.7 persons/car and about half of shoppers go to a center more than twice a month while others go once a month or less. Evenings and weekends are the peak travel periods and pre-holiday shopping travel far exceeds any other time of the year. Free parking is abundant at most regional centers and surplus parking spaces are likely to arise as the size

of the automobile continues to decline. Congestion and the resulting air pollution are growing problems at many older regional malls which are now often totally hemmed in by other developments around their periphery.

Current Status of Transit Service to Regional Malls

Transit agencies have largely ignored the developments in the shopping center industry during the past twenty years. During this time, the transit industry has undergone tremendous changes itself. Largely privately owned, the industry was experiencing rapid decline, when in 1964, the Urban Mass Transportation Assistance Act was passed by the Congress. Since 1964, most of these private transit systems have been purchased by the public and transit is now almost totally a public enterprise, supported heavily by public funds. During this transition, the major effort has been to keep these acquired systems running and to reverse the decline of transit ridership throughout the country. By 1980, many old buses have been replaced and a few new rail transit systems have been started. Much attention has been given to testing new types of paratransit (demand-responsive systems using small vehicles) and a downtown people-mover program has been initiated to test the more innovative automated guideway transit systems (AGT). Vanpool and carpool programs are now viewed as part of the transit system, broadly defined, as are taxi companies in some cities. Nationally, the decline in transit ridership has been stemmed and is rising slowly as the result of investments of more than $15 billion (Federal and local) since 1964.

With only a few exceptions, present U.S. transit systems are designed primarily to carry work trips to and from the traditional core or downtown of the city. Few provide any substantial level of service to non-downtown destinations. Typically, a transit patron must travel to downtown and transfer to another route to reach a non-downtown destination. The regional malls which are the focus of this report are typically located at least eight or more miles from the downtown area of the region. In most cases, they are served by the bus system at stops located on adjacent streets and with schedules that are infrequent or non-existent during the peak shopping periods (i.e., evenings and weekends). When the buses have been routed into the shopping malls to provide front door service, they have broken up the pavement, had their schedules delayed because of auto congestion in the parking lots, had difficulty turning in spaces not designed for buses and have produced problems for retailers caused by people in waiting areas not designed for waiting. Despite the fact that the "father of the modern shopping center," Victor Gruen, designed bus-only roadways and loading areas in the earliest shopping centers in the Detroit area (Northland and Eastland in the early 1950's), his wisdom has not been emulated

by other architects (and the developers who hired them). The result has been that very few of the large shopping centers in the U.S. today have been designed to allow reasonable access by large transit vehicles.

Today, shoppers who wish to (or must) use transit to reach a regional mall are not treated well. Schedules are infrequent and poorly matched to prime shopping periods, there is usually a long walk (through a hazardous parking lot with no sidewalks) from the bus stop to a mall entrance, comfortable waiting areas with all-weather protection are rarely provided and no provisions for packages on the vehicles are usually available. Safety is a concern among older persons who do not feel secure with packages on a bus filled with young people. Mall operators are typically unconcerned about this dismal situation as they believe that bus riders contribute little to their enterprise. Transit agencies have more important problems to solve (e.g., providing good commuter service to downtown) and the riders themselves are typically among the less vocal, articulate and organized members of the community.

Case Studies

Transit presently serves only a tiny share of the shopping center travel market, with very few exceptions. Chapter II of this report presents the results of 18 case studies of the way in which transit is being provided to regional malls in the U.S. It also contains nine case studies that describe some innovative proposals for providing transit service to several malls in the future. Together, these case studies represent the best examples we could find, during a 12-month investigative period, of how a transit system can be designed to serve a regional mall.

These case studies (located in 19 different cities) have been grouped into four categories to aid the reader in locating those which are likely to be of most interest. These categories are as follows:

I. Conventional, Average Transit Service/Use (5 case studies)
II. Conventional, Above Average Transit Service/Use (6 case studies)
III. Innovative, Past or Existing Transit Service/Use (7 case studies)
IV. Innovative, Proposed Transit Service (9 case studies)

A very brief description of each case study is given on pages 24-26 at the beginning of Chapter II of this report.

Our basic objectives have been to determine what transit service is being provided, how it has been designed, and how it is working out. When possible, we have also tried to determine the reasons behind the failures and successes we have encountered.

Overall, we have found a few malls that obtain close to or more than 10 per cent of their patrons from the transit system. Two are in Canada (Lougheed Mall, pp. 186-190, and Guildford Town Centre, pp. 190-194). Others are the Stonestown Mall in San Francisco (pp. 58-67), the Ala Moana Mall in Honolulu (pp. 129-135), Mission/Fashion Valley in San Diego (pp. 117-128), and Roosevelt Field on Long Island, New York (pp. 157-160). Other malls included in the case studies either receive 5 to 10 per cent of their patrons on transit or are still in the planning stage.

The case studies were written primarily for the transit operator who might wish to emulate these experiences or proposals that are suited to his situation. Others who should find them to be of interest are urban planners, traffic engineers, mall developers and operators, architects, and both transit system and retailer marketing people. The case studies are not a representative sample of the current and proposed transit-regional mall situations in the U.S. Instead, they are "leading edge" cases, for the most part, and are worthy of emulation, in one respect or another. They are uneven and highly varied, as little is currently known about operational transit-regional mall relationships. With only a few exceptions, neither the mall operator nor the transit operator has evaluated how well existing service is performing and methods for forecasting the performance of a proposed transit service are quite underdeveloped.

Conclusions

An overall comparative assessment of the case studies is especially difficult as they are so uneven in content because of the unavailability of information on many aspects of the existing operations or the tentative nature of those still in the planning stage. Still, it is clear that direct demand estimates are not typically prepared and routes are usually designed and scheduled in ways that have little to do with the habits of shoppers. There has been little analysis or evaluation of the impact of providing transit services to regional malls, although the service has been generally well-accepted by both mall and transit operators in most of the cases examined. It is clear that services must be more closely tailored to the travel desires of shopping center patrons before even a 10 per cent share of this market can be captured.

In our opinion, there is ample evidence in the case studies to suggest that a goal of attaining 10 per cent of the trips to regional malls for transit is feasible and well within the capabilities of the transit industry. The attainment of this objective will probably not happen "naturally." The combined efforts of several of the major actors will be required, in most cases.

Recommendations

There are at least three major strategies that could be pursued to gain a 10 per cent share of this travel market for transit by the mid or late 1980's. One is to engage in direct competition with the automobile. Demand-responsive transit modes like taxis, vanpools and dial-a-bus systems appear to have the most potential for competing directly with the automobile. Case study results in Rochester (p. 161) and La Habra (p. 110) indicate that dial-a-ride may be able to attract a significant ridership if properly designed, operated and marketed. A second strategy is to concentrate only on serving the transit dependent, many of whom travel only very infrequently, if at all, to regional malls. Many special transit service programs are currently in operation or are being planned to serve the mobility needs of the elderly and handicapped at present. The implementation of this strategy could be most easily accomplished by extending and broadening these efforts. A third strategy is to provide specialized services for special groups who define their own needs and make them known to the transit agency. The Shopper's Special service for elderly persons in Denver (p. 147) is an example of this type of service. This service could take many forms and would use a variety of vehicle types. Its major characteristic would be that the people who want a shopping travel service define their own needs (when and to which malls) and then apply to the transit agency which would provide it, if possible.

Although all three strategies have strong and weak points, the direct competition and specialized services strategies are recommended as having the greatest near-term potential. A number of specific recommendations for both short-term and long-term actions on the part of the major actors in this arena are given on pages 195-204 in Chapter III of this report.

Agencies of the Federal government can sponsor demonstrations, data gathering and planning methods projects to aid both public and private transit service providers who have innovative ideas about how malls can be served best with available transit technologies. The American Public Transit Association and the International Council of Shopping Centers, the two major trade organizations in this field, could work cooperatively to develop better relationships between their respective industries. State and local governments are key organizations in terms of providing both incentives and disincentives to both transit and mall operators, and should encourage them to work more closely together for their mutual benefit.

The future of this topic will be determined largely by the availability and price of gasoline. The crunch that occurred during the spring and summer of 1979 has raised the interest of mall operators in transit service from a very low to a

somewhat higher plane. If gasoline problems persist into the 1980's, this budding interest is likely to grow. Now is the time to make a determined effort to find ways to serve regional malls effectively with transit services which are well-matched to the travel needs of shoppers in the outer city. Some promising pathways toward this goal have been defined but there are still many more questions than answers available. Shopping travel behavior is much more discretionary than journey-to-work travel and can be influenced strongly by a large number of factors that are beyond the control of the government and private sector actors involved. The shopping center industry is particularly wary of government intervention in or regulation of their activities. Close cooperation with the public agencies that provide transit services is only one avenue open to them. Other private or quasi-public arrangements are possible and should also be explored. This report is a small but important step in the direction of bringing these and other issues identified in this report up for discussion. The provision of improved transit services to regional malls can be accomplished but will be only if such a discussion takes place in open forums around the country. If workable public and private policies can be derived from these forums that can gain wide acceptance from both industries and can guide public and private investments in ways that will be productive of mutual benefits, the 10 per cent ridership goal can surely be achieved.

I. INTRODUCTION

In most American cities, large regional shopping malls are poorly served by public transportation. Yet, a significant amount of travel occurs to these malls and there are many signs that this type of travel will increase in the future. Currently, there are about 19,200 shopping centers in the United States, of which about 390 are very large (i.e., more than 800,000 square feet of gross leasable floor area). The objectives of this study are to (1) examine current approaches to providing transit service to these large regional malls, and (2) develop some recommendations for gaining a larger share of this travel market for public transit.

At present, most of these malls are served by regularly scheduled buses. In a few cases these buses enter the mall, providing close-in service. In most cases the buses stop only at the edge of the mall and the patrons must walk several hundred feet to gain access to the mall. In a few instances, five per cent or slightly more of the shoppers arrive by bus but in most cases, transit has captured only one - two per cent of this market. While it is widely acknowledged that this is a tough market for transit, some feel that a well-designed service might be able to attract as much as 10 per cent of these shopping trips. It is clear that the key term is "well-designed" and that means that the service must be very responsive to the travel needs of the shoppers. The service must be well-matched to observed shopper behavior patterns and must be derived from a thorough understanding of them. The conventional response of modifying existing service to stop at or near a large shopping mall will not usually result in much patronage, as has been amply demonstrated to date across the country.

This study is limited in several ways because of time and funding constraints. First, only large shopping malls will be examined. Typically, these malls range in size from 800,000 to 2,000,000 square feet of gross leasable area, have from 4,000 to 15,000 parking spaces for autos, are located 6 - 20 miles from the "downtown" of the central city in the region and are usually five to ten miles from their nearest large competitor. Most are less than 15 years old, have three to five large department stores as anchors, are usually located near one or more freeways and have several points of access and egress. Smaller planned and unplanned retail areas will not be considered specifically and downtowns are not included either as they typically already have reasonably good transit service. Our major assumption is that shopping-oriented transit service has the best chance of penetrating the market for travel to the large regional malls. If it can do

this, then service to the smaller malls and unplanned commercial clusters could be developed at a later time.

Second, the investigation is limited to those malls that are not presently served directly by any type of heavy rail transit and that do not expect such service in the next 10 years. This means we are looking at only conventional scheduled fixed-route light rail or bus service plus paratransit services of various types. The great majority of the regional malls in existence today do not have access to heavy rail transit nor is any such service expected. We will include the concept of a bus shuttle service to nearby heavy rail stations when appropriate.

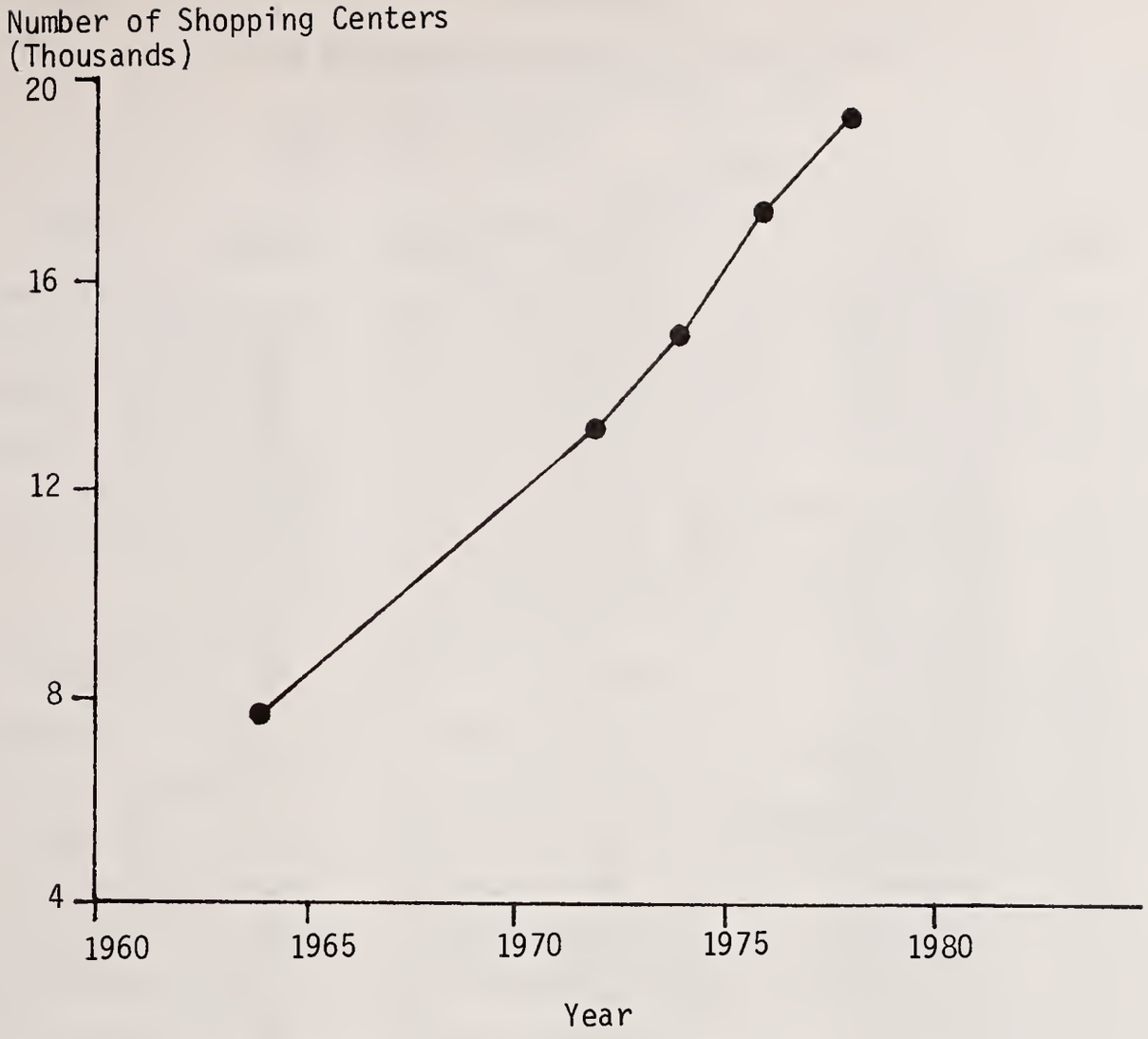
The time horizon of the investigation is near-term (i.e., five to ten years) and is limited to actions that could be implemented in the 1980's. A balanced view of the current situation has been obtained from interviews with three main groups of people: (1) transit system planners and operators, (2) shopping center planners and operators and (3) current and potential transit system riders.

The investigation is organized along conventional lines and uses a supply-demand framework. First, a brief description of the evolution of the shopping center industry is presented. Then, the characteristics of the travel demand patterns to these centers is examined. The results of several case studies of existing or proposed service to several large malls in various parts of the United States are presented next. Finally, some recommendations are formulated for increasing transit's share of the shopping travel market.

A. Evolution of the Shopping Center Industry

In 1976, the International Council of Shopping Centers (ICSC) celebrated its 20th birthday. During this 20-year period (1956-1976), the number of shopping centers in the United States grew from fewer than 1,000 to more than 17,500. In 1979, it is estimated that there are 19,201 shopping centers in the United States. Figure 1.1 shows the growth in the number of centers since 1964. The great majority (about two-thirds) of these are small neighborhood or community centers. Only 393 (or 2.1 per cent) of these centers have 800,000 or more square feet of retail space and are of particular interest to this study. These large centers account for 17.3 per cent of all the floor space in shopping centers in the U.S. See Table 1.1 for a description of the number and size of centers in the U.S. as of January, 1979.

Table 1.1 shows the location of the largest centers, by state. Only nine states have no large center. California has by far the largest number of large



Source: Shopping Center World, January 1979, pp. 71-72.

Figure 1.1
Growth in Number of U.S. Shopping Centers since 1964

centers with almost 16 per cent of the nation's total. Table 1.2 is a list of the 27 largest shopping centers in the U.S. today. Case studies of existing and proposed transit services to some of these centers are included in Part II of this report.

It is important to realize that the introduction of 19,200 shopping centers into the national retailing picture represents a revolutionary change in the way the nation's people conduct their shopping activities. The proportion of all department store sales that occur in shopping centers has been estimated to be 80 per cent. Shopping centers have been rapidly increasing their share of total retail sales in the nation, moving from 27.4 per cent (in 1972) to 38.0 per cent (in 1978) of the total in just six years. Since automobiles are a large part of the retail sales total, and since they are not sold at shopping centers, these figures

Table 1.1

Location of Largest Shopping Centers, by State

Rank	State	Gross Leasable Area (000's of sq. ft.) 800-1000	1000+	Total
1	California	32	30	62
2	Texas	13	20	33
3	New York	10	17	27
4	Florida	19	7	26
5	Illinois	6	17	23
6	Ohio	13	8	21
7	Pennsylvania	7	11	18
8	Michigan	7	7	14
8	New Jersey	6	8	14
9	Missouri	6	7	13
10	Arizona	6	3	9
10	Georgia	4	5	9
11	Indiana	3	5	8
11	Maryland/DC	3	5	8
11	Minnesota	4	4	8
11	North Carolina	2	6	8
12	Virginia	4	3	7
12	Wisconsin	3	4	7
13	Louisiana	4	2	6
13	Tennessee	5	1	6
13	Washington	2	4	6
14	Colorado	2	3	5
14	Kansas	3	2	5
14	Massachusetts	2	3	5
15	Connecticut	1	3	4
15	Nevada	2	2	4
15	Oregon	1	3	4
15	Utah	3	1	4
16	Iowa	1	2	3
16	Kentucky	3	0	3
16	Oklahoma	1	2	3
16	West Virginia	2	1	3
17	Alabama	1	1	2
17	Hawaii	0	2	2
17	Mississippi	0	2	2
17	Nebraska	1	1	2
17	New Mexico	2	0	2
17	South Carolina	1	1	2
18	Arkansas	1	0	1
18	Delaware	1	0	1
18	Rhode Island	1	0	1
		188*	203	391*

*A summary tabulation in Shopping Center World, January 1979, gives these figures as 190 and 393, respectively, but the data by state sum to these totals.

Source: Shopping Center World, January, 1979, pp. 63-70.

Table 1.2

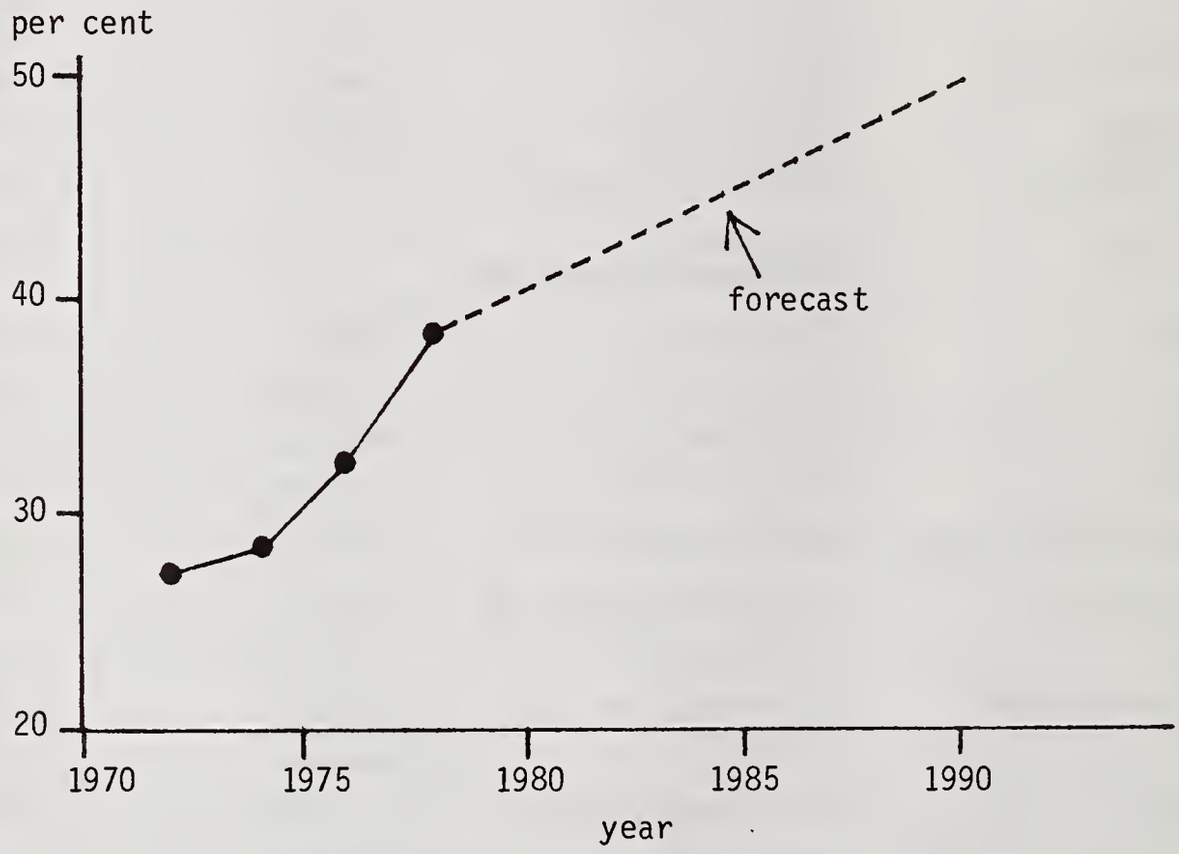
The Twenty-Seven Largest Shopping Centers in the United States, 1978

Rank	Name	Location		Size
		SMSA	City	Gross Leasable Area (000 ft^2)
1	Woodfield Mall	Chicago, IL	Schaumberg	2,267
2	Roosevelt Field Mall	Nassau-Suffolk, NY	Garden City	2,264
3	Lakewood Center Mall	LA-Long Beach, CA	Lakewood	2,230
4	Randall Park Mall	Cleveland, OH	North Randall	2,196
5	Del Amo Fashion Square	LA-Long Beach, CA	Torrance	2,031
6	South Coast Plaza	Anaheim-Santa Ana-Garden Grove, CA	Costa Mesa	2,000
7	Cinderella City	Denver, CO	Englewood	1,800
8	Northwest Plaza	St. Louis, MO	St. Anne	1,750
9	Lakeside	Detroit, MI	Sterling Heights	1,727
10	Fox Valley Center	Chicago, IL	Aurora	1,700
10	Panorama City	LA-Long Beach, CA	Panorama City	1,700
11	Fairlane Town Center	Detroit, MI	Dearborn	1,664
12	Midtown Plaza	Rochester, NY	Rochester	1,600
12	Northpark Center	Dallas-Ft. Worth, TX	Dallas	1,600
12	Baystate West	Springfield-Chicopee-Holyoke, MA	Springfield	1,600
12	Metrocenter	Phoenix, AZ	Phoenix	1,600
12	Eastridge	San Jose, CA	San Jose	1,600
13	Park City	Lancaster, PA	Lancaster	1,550
14	Sunrise Mall	Nassau-Suffolk, NY	Massapequa	1,500
14	Mid Island Fashion Plaza	Nassau-Suffolk, NY	Hicksville	1,500
14	Willowbrook Mall	Paterson-Passaic, NJ	Wayne	1,500
14	Northland	Detroit, MI	Southfield	1,500
14	Galleria at Worcester	Worcester, MA	Worcester	1,500
14	Yorktown	Chicago, IL	Lombard	1,500
14	Cortana Mall	Baton Rouge, LA	Baton Rouge	1,500
14	Northshore	Boston, MA	Peabody	1,500
14	Northridge Fashion Center	LA-Long Beach, CA	Northridge	1,500

Source: Directory of Regional Malls, 2nd Edition, published by Shopping Center Digest, Suffern, NY, Murray Shor, Editor, 1978.

are even more significant than they appear. Figure 1.2 is a graph of these market share data. Estimates are that this share will rise to 50 per cent by 1990, which would represent a shopping center sales figure of about $400 billion.

The design of the large centers has not changed greatly over the past two decades. Two early Detroit malls, designed by architect Victor Gruen (regarded by some as the father of the shopping center), did provide exclusive lanes and shelters for bus transit service but this practice has not been continued by other architects. The mall shape has changed somewhat from a linear form to one that is more compact and irregular. Large paved parking areas are still being designed around all large malls and the parking ratio has remained above five spaces per 1000 square feet of gross leasable area over the past two decades. Typically, the paving thicknesses used is insufficient to support large conventional buses and the turning radii used for internal circulation roads is too short for easy bus movement as well.



Source: Shopping Center World, January 1979, pp. 71-72.

Figure 1.2
Shopping Center Market Share of Total Retail Sales in the U.S.

More shopping centers will be built in the 1980's. The main questions are where they will be built and how much money will be spent on building new malls as opposed to renewing and expanding the older malls in the inner city, many of which are now between 15 and 25 years old. Many of the leaders in the shopping center field have stated that there are very few good locations left for regional malls in our large metropolitan areas. They see three main areas of activity in the 1980's: (1) construction of new mid-size malls in smaller cities (population of 50,000 to 100,000) around the U.S., (2) renewal and expansion of the older inner city malls, and (3) redevelopment of dying downtown areas into malls. Only the second of these activities has particular relevance to our study in that the older malls will be very good candidates for improved transit facilities and services in most cases. Still, if transit is to capture a 10 per cent share of shopping trips to large regional malls, then much of the action required will be in finding ways to bring transit facilities and services into mall areas that were designed only for automobile access and circulation. Thus, a certain amount of "retrofitting" would be required in most cases.

The number of trips made to the large regional shopping centers each year is very large. This number can be roughly estimated in the manner shown in Table 1.3. The estimate of total person-trips to the regional malls by shoppers and employees in Table 1.3 amounts to more trips than were carried in 1977 by all of the non-heavy rail transit services in the nation. According to the Transit Fact Book [1], the total number of linked transit person-trips, less heavy rail trips/year, was 4.388 billion. The number of person-trips to the large shopping centers estimated in Table 1.3 is 1.38 times this national transit patronage figure. If transit agencies were able to capture 10 per cent of this market, they would carry about 600 million additional passengers per year. This patronage figure is roughly 15 times that of the Bay Area Rapid Transit System (BART) (using a figure of 40 million rides/year for BART). It is also 15 times the patronage of Seattle's all-bus transit system, which has an annual patronage about equal to that of the BART system. It would be very difficult to estimate what it would cost to add the facilities and services needed to attract a 10 per cent share of six billion shopping center trips but it does not seem like it would be nearly as much as 15 times the cost of the BART system (i.e., 15 x $2 billion = $30 billion).

B. The Demand for Travel to Large Regional Centers

1. Overview

As we have seen in the previous section, a very large number of trips are

Table 1.3

Estimate of Person-Trips to Regional Shopping Centers During 1977

FOR SHOPPERS:

Size of Center (ft^2 of GLA)	January, 1977 No. of Centers	Total GLA (ft^2)		Assumed Inbound Vehicle Trips/1000 ft.		Daily Inbound Vehicle Trips
801,000 - 1,000,000	177	160,536,000	x	.013	=	2,086,968
Greater than 1,000,000	163	204,588,000	x	.013	=	2,659,644
						4,745,612

4,745,612 = total inbound vehicle trips/day
x 1.72 = multiplier to determine person-trips
8,162,452 = total inbound vehicle person-trips/day
x 359 = number of shopping days/year
2,930,320,268 = number of inbound vehicle person-trips/year
x 2
5,860,640,436 = number of in- and outbound vehicle person-trips/year
x 1.03 = multiplier to determine vehicle and transit person-trips/year
6,036,459,649 = number of inbound & outbound, vehicle & transit person-trips/year

FOR EMPLOYEES:

Size of Center (ft^2 of GLA)	January, 1977 No. of Centers	Total GLA (ft^2)		Assumed Inbound Employee Trips/1000 ft.		Total Inbound Employee Person-Trips
801,000 - 1,000,000	177	160,536,000	x	.002	=	321,072
Greater than 1,000,000	163	204,588,000	x	.002	=	409,176
						730,248

730,248 = total employee inbound person-trips/day
x 359 = number of shopping days/year
252,159,032 = total employee inbound person-trips/year
x 2
504,318,064 = total employee inbound & outbound person-trips/year (auto & transit)

FOR SHOPPERS AND EMPLOYEES:

504,318,064 = total employee person-trips/year (two-way)
6,036,459,649 = total two-way transit + vehicle person shopping trips

6,540,777,713 = total person-trips to shopping centers/year

made to large shopping centers each year. More than 95 per cent of these trips are made in automobiles. If we wish to increase the proportion of those trips that are made on transit, then transit facilities and services will have to be designed to match, as closely as possible, the desires of the persons who make those trips. Unfortunately, there is little current information available that can be used to answer the basic travel characteristics questions: who, when, where, how often, and by what means. The only comprehensive study of the characteristics of shopping center patrons and their trips was conducted in 1966 by Keefer and others [7]. The data used in this study were collected in the early 1960's and are quite old. However, their analyses are the best available and will be reviewed and updated, where possible, by more recent information.

The Keefer study examined tripmaking to 23 major shopping centers in Atlanta, Buffalo, Chicago, Denver, Miami, Minneapolis-St. Paul, Philadelphia, Pittsburgh, Providence, Seattle and Wilmington, Delaware. Most of these centers were regional malls although some were just the largest in their area. Total floor area ranged from 155,000 to 800,000 square feet and so they were, on the average, smaller than the large regional malls of today (i.e., 800,000 square feet or more).

2. Market Area Characteristics

In examining the travel to shopping centers, one normally will want to start with the delineation of a market area for each center. Definitions of this term are numerous and none are uniformly accepted and used. Typically, a line is drawn at a given time or distance from the center and all the people within that line are considered to be in the market area of the center. Keefer found that a 20-minute driving time line accounted for 95 per cent of the center's shopping trips, on the average, in the cases studied. Today, it is common practice to use 15 minutes of driving time to delineate the primary market area of a large regional mall. Since there are almost three times as many centers in operation now as there were in 1964, a smaller driving time figure seems reasonable due to increased competition.

Keefer found that the average length of shopping trips in all nine cities studied was 2.60 miles for convenience goods and 3.11 miles for comparison goods. Assuming a road speed of 15 miles per hour, these figures represent average travel times of 10.4 and 12.5 minutes, respectively.

More recently, a 1979 study conducted by the Puget Sound Council of Governments found that the length of the average shopping trip has changed only slightly between 1961 and 1971 [8]. Their results are as follows:

Trip Purpose	Average Length of Trip, 1961 (minutes)	Average length of Trip, 1971 (minutes)	Change, 1961-1971
Home-based work	22.62	20.59	- 2.03
Home-based shopping, convenience goods	9.88	11.35	+ 1.47
Home-based shopping, general merchandise, apparel and furnishings (GAF)	17.76	16.63	- 1.13

Source: [8, p. 23]

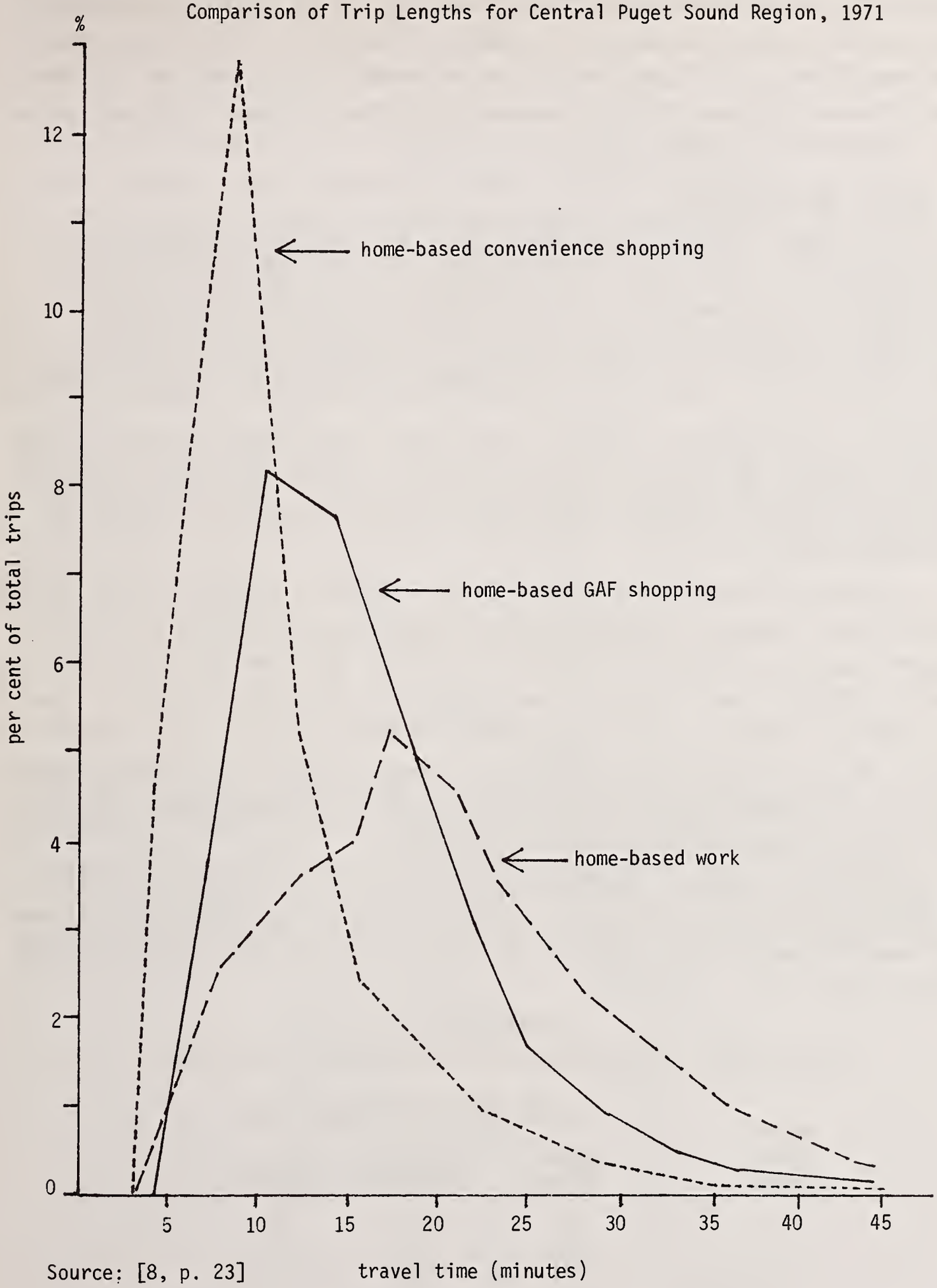
These data show that shopping trips are much shorter, on the average, than work trips, and that convenience shopping trips are much shorter, on the average, than comparison shopping trips. The differences in the lengths of these three types of trips can be more clearly seen when looking at the entire distribution of trip lengths. A graph of trip length data for the central Puget Sound region is given in Figure 1.3. These data show the trip length distribution for two types of shopping trips in relation to work trips for 1971 in the Seattle area. It is probable that the same general relationships would be found in other metropolitan areas although the absolute values would be different.

There are several other complicating factors that must be considered when dealing with the market area concept. First, there is considerable overlap in the market areas of competing centers. Typically, the members of a family will shop several times at five or more shopping centers during the course of a year. Simply put, this means that a transit planner should not assume that all of the people in a center's primary market area will shop at that center all of the time. Second, the shape of a primary market area will, more often than not, be irregular to account for the effect of freeways, competing centers, the CBD, barriers to travel and other factors. Most large centers have conducted studies designed to precisely define their primary market area and how it changes over time. Such information is vital to the conduct of transit planning studies.

Third, Keefer found that home-based shopping trips accounted for only two-thirds of all tripmaking to centers. The other one-third are non-home-based trips, some of which may originate outside of the primary market area. No more recent information is available that would indicate that this situation has changed. Assuming that little change has occurred, it seems likely that transit has less chance of attracting non-home-based trips than home-based trips because their origins are more likely to be dispersed widely over the metropolitan area. This

Figure 1.3

Comparison of Trip Lengths for Central Puget Sound Region, 1971



Source: [8, p. 23]

means that if transit planners concentrate on serving home-based trips, they are dealing with only about two-thirds of all the trips to the center. Since many more women are working now than in the 1960's, it may well be that the non-home-based shopping trip is a larger proportion of the total than it was in the 1960's. If this is true, the market for a home-to-shopping transit service may well be no more than half of all shopping trips.

3. Shopper Characteristics

Keefer found that women made from 64 to 77 per cent of all shopping trips. Data obtained in a 1976 survey of 1000 shoppers at four large shopping centers in the Seattle area showed that, on the average, 61 per cent of the shoppers interviewed were female [7]. Keefer also found that women made two-thirds or more of all transit trips to malls and at least 80 per cent of all auto passenger trips.

The age distribution of shoppers is not dealt with by Keefer. Data from the Seattle survey of four centers indicates that about 10 per cent of the shoppers interviewed were 18 or younger, about 5 per cent were 65 or older, with 85 per cent being 19-64.

The incomes of shoppers were not included in Keefer's study but are of interest to the transit planner. The Seattle survey showed that about 20 per cent of the shoppers reported an income of $10,000 or less while about one-third reported incomes of $20,000 or more. About 10 per cent of the respondents refused to answer this question. Typically, the income profile of the shoppers at large suburban centers can be expected to be higher than an areawide profile in a large metropolitan area. This means that these people will typically have more access to automobiles, on the average, than the general population.

Automobile ownership is another important factor which will strongly affect the tripmaking behavior of shoppers. Keefer had data on the relationships between auto ownership and shopping trips for only one city, Pittsburgh. His results are shown in Table 1.4.

Table 1.4

Shopping Trip Characteristics, by Auto Ownership and Mode

No. of Cars Owned	Per Cent of Trips by Mode		
	Auto Driver	Auto Passenger	Transit Passenger
0	3	21	76
1	58	32	10
2	71	23	6
3 or more	71	23	6

As the number of automobiles increases, the proportion of auto driver trips increases. The proportion of auto passenger trips does not vary greatly and a strong inverse relation was found between auto ownership and transit use. Since the 1960's the proportion of households who own one or more cars has risen substantially and this probably means that auto driver trips (single occupancy) may be even more common today than in the 1960's. Auto occupancy is, of course, closely related to auto ownership. Keefer found that the average auto occupancy for shopping trips before 1958 was 2.0 persons per car. Data for the period after 1961 showed an average auto occupancy of 1.89. Barton-Aschman Associates, a consulting firm, currently uses an average auto occupancy figure of 1.72 persons per car. These figures are consistent with the trend of more autos per household and they indicate that auto passengers are much more common on shopping trips than on work trips where the auto occupancy tends to be 1.3 or less. No information is available on the proportion of those trips that have a common origin. Certainly, many auto shopping trips involve picking up one or more persons enroute to the shopping center. Data from the 1976 Seattle survey of four centers gave the following results to the question: How many people, including yourself, came shopping with you today?

one	20%
two	37
three	19
four	13
five	6
six or more	4
no response	1
	100%

These data show that about 80 per cent of shopping trips involve groups of two or more people. When the people in these groups have different origins, the ability of transit to serve this desire to "go shopping together" will be lessened.

The 1976 Seattle survey also provides information on three other aspects of shopping travel behavior. The frequency of shopping at the four centers surveyed was as follows:

Average Frequency	Per Cent of Shoppers
More than twice/week	6
Twice/week	7
Once/week	18
Twice/month	22
Once/month	17
Less than once/month	28
No response	2
	100

Transit service would probably be more attractive to the more frequent shopper but special studies would be needed to ascertain the relationship of the frequency variable to the likelihood of using transit.

The amount of time spent at the center was also examined in the Seattle survey. The findings were as follows:

Length of Time Spent at Center	Per Cent of Shoppers
Less than 1 hour	19
1 - 2 hours	48
3 - 4 hours	23
More than 4 hours	9
Don't know	1
	100

These data are too crude to enable one to determine what frequency of transit service would be most likely to match the desires of shoppers. More detailed studies of this question are required.

Another part of the Seattle survey that is of interest deals with the question of why the shopper was at the center. These results are as follows:

Reasons for Being at the Center	Per Cent of Shoppers
Saw an advertised item	11
Shopping for a particular item	40
Just looking/shopping	42
Errands	2
Waiting for/meeting someone	1
Other	3
No particular reason	1
	100

These data suggest that only about half of the shoppers are there with something particular in mind. The other half are there for other reasons. If travel to shopping centers becomes more difficult, many of this latter group might not come so often. For example, if gasoline became hard to get and much more expensive, these people might have to choose between using transit or not going to the shopping center. The definition of this trade-off would be important to the planning of any center-oriented transit service.

4. Shopping Trip Characteristics

The three most important dimensions of the shopping trip are length; time of day, week and season; and mode. Length and mode have been discussed previously. Information on the time dimension is available from several sources.

Keefer's study includes several graphs that show how shopping trips vary with the time of day. However, the hours and days that shopping centers are open have changed so much since the 1960's that these data are not very relevant to our present task. More recent information has been published by the Urban Land Institute [2] and it is reviewed here.

This study was conducted for the Urban Land Institute by Barton-Aschman Associates, Inc. It utilized data collected at 32 regional shopping centers across the nation during 1973-75. The results show that the peak travel period is during the mid-afternoon between 1:00 p.m. and 4:00 p.m. The two heaviest shopping days are Saturday and Sunday. Figures 1.4 and 1.5 show the hourly and daily peak parking demands identified by Barton-Aschman. It is clear that the peak auto travel times for shopping travel do not coincide with peak work-trip travel periods, either in terms of hour of the day or day of the week. This suggests that a shopping center transit service might be able to make effective use of transit vehicles that tend to be underutilized during the time between the morning and afternoon work-trip peaks and after the evening work-trip peak. Of course, this presumes that the primary transit marketing strategy would be to attract people to transit who presently drive or ride as an auto passenger.

Looking at a broader time frame, the Barton-Aschman study has identified some very high peak demand days in the year. These are as follows:

Highest day	Friday after Thanksgiving
2nd highest day	Third Saturday before Christmas
3rd highest day	Second Saturday before Christmas
4th highest day	Saturday after Thanksgiving
5th highest day	Saturday before Christmas

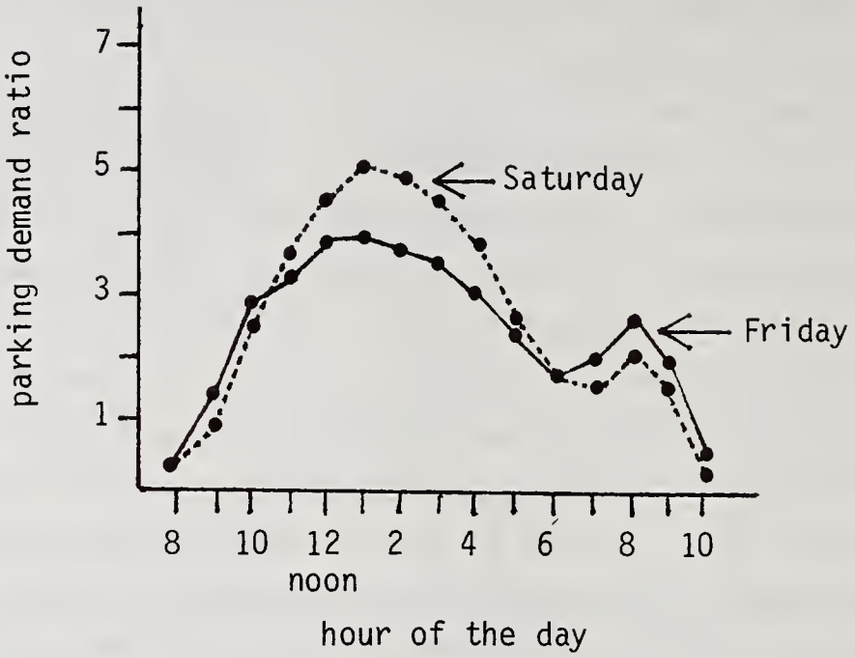
These data indicate that November-December may be the peak season for shopping center travel although one cannot be sure of this inference because data are not available for all periods of the year. However, it is clear that shopping center travel is not uniformly spread throughout the year but tends to be concentrated in certain pre-holiday periods.

No data are available about the arrival times of transit patrons at various centers but they probably vary somewhat from those of automobile drivers and passengers.

5. Shopping Center Employee Trip Characteristics

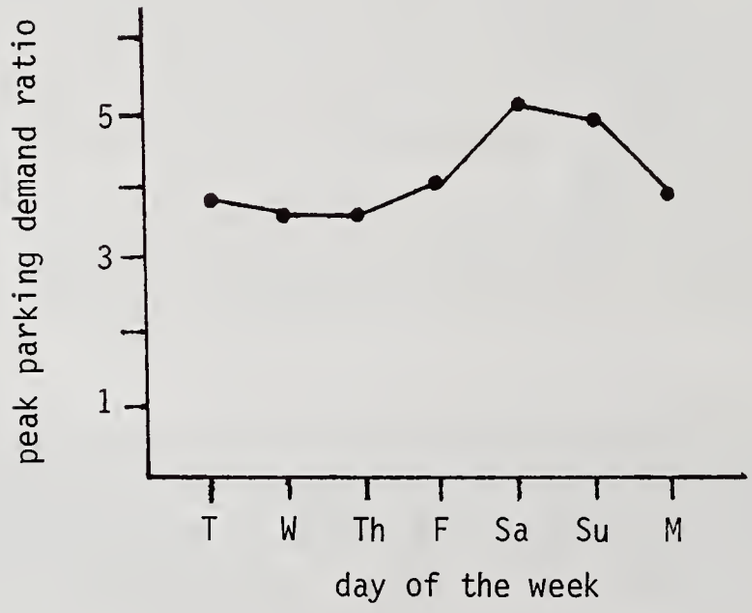
Keefer analyzed "work-trips" to shopping centers as a separate category. These data include the employees of the center as well as salespersons and others who visit the center for business purposes. He found that, in the 1960's, there were from 0.97 to 4.05 work trips per 1000 square feet of gross leasable area,

Figure 1.4
Hourly Parking Demands



Source: [2, Figure 4]

Figure 1.5
Daily Peak Parking Demands



Source: [2, Figure 3]

with an average of 2.5 trips/1000 square feet. He concluded that the variation was probably due to differences in the amount of non-retail activity at the various centers examined.

The rule of thumb that is currently used in the industry is 2.0 employees/1000 square feet. It is assumed that this figure does not vary with the size of the center. This means that a center with 1,000,000 square feet of GLA will typically have 2000 employees. If this center has 5.5 parking spaces per 1000 square feet of GLA, it would have 5,500 parking spaces. No data are available on the average auto occupancy of employee auto trips or their use of transit. But if the auto occupancy is typical of the work trip (1.3) then 2000 employees would need about 1520 parking spaces or about 28 per cent of the total available. This is one of the reasons why mall operators tend to be interested in proposals that would encourage larger proportions of their employees to use transit for their work trips.

Keefer has derived a plot of the arrival times of auto driver trips at three Miami centers in the 1960's. This plot is shown as Figure 1.6. Departure time data were not plotted in a similar manner. This could be because many employees in shopping centers work less than eight hours per day and the departure pattern might be quite different from the converse of the arrival pattern.

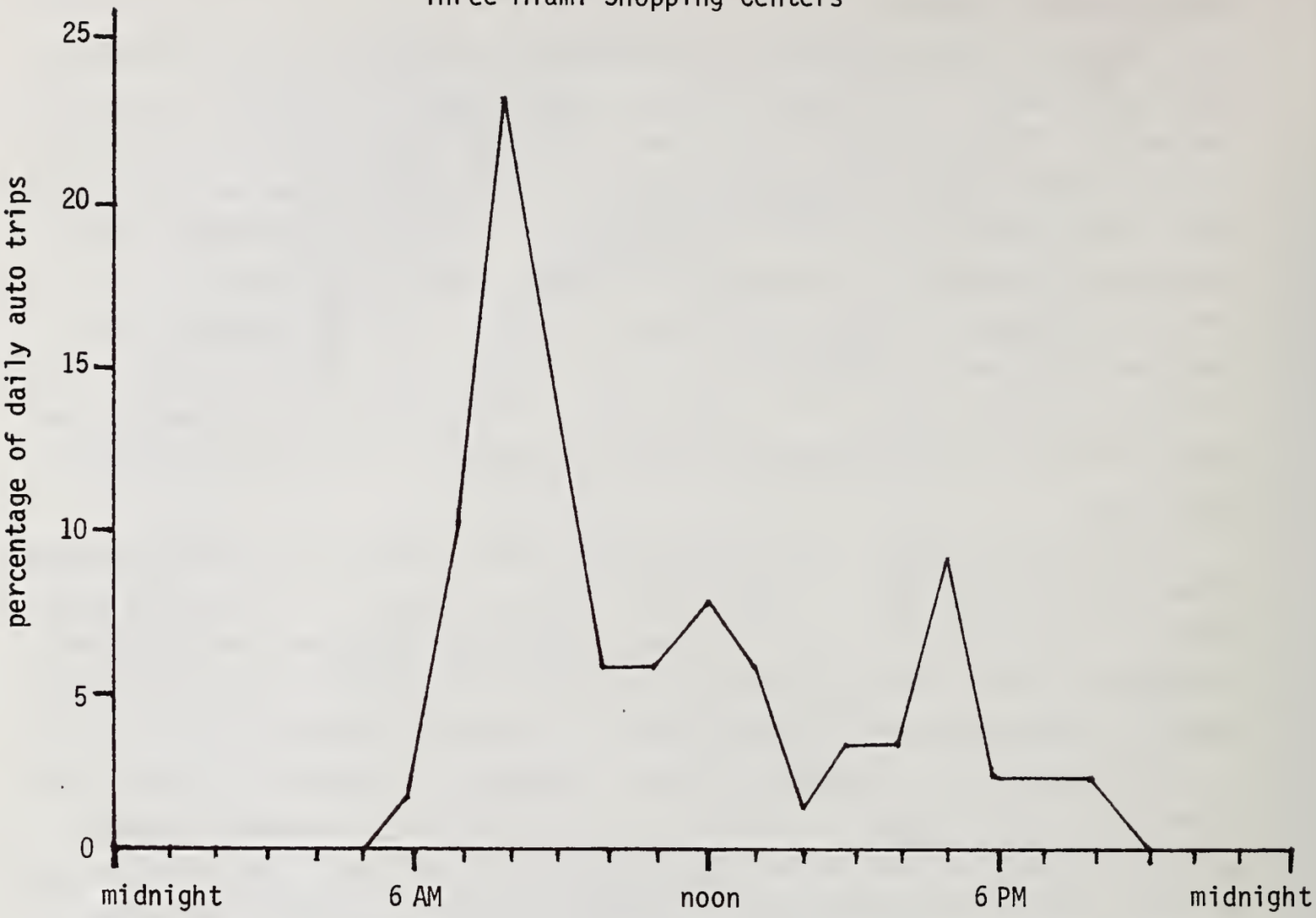
No information is currently available regarding the locations of the origins of employee trips. However, it is quite likely that they are widely scattered and more distant, on the average, than shopping trip origins. They would probably be fairly difficult to serve with conventional transit but might be effectively served with vanpools or some other form of paratransit.

C. Some Speculations About the Future of Shopping Centers and Shopping Travel

During the past several years, the shopping center industry has paused twice, in the midst of its very rapid growth, to take a look at the trends and how they might change in the future. An early look ahead, entitled "The Middle-Age Spread of Regional Shopping Centers -- the 1970's," was published by Richard Gern in Traffic Engineering in August, 1970 [3]. The next exercise of this kind was a conference of industry leaders, held in April, 1975. This conference resulted in a monograph entitled, Shopping Centers, The Next Fifteen Years [5]. More recently, a conference of industry leaders was held in September, 1978 and it produced a monograph entitled, Shopping Centers 1988: Answers for the Next Decade [6].

Figure 1.6

Auto Driver Trips to Work by Arrival Time,
Three Miami Shopping Centers



Source: [7, Figure 25, p. 39]

For the most part, the forecasts made in the 1970 article by Gern and the 1975 conference report have been met or exceeded by 1979. The 1978 report contains several sections that relate directly to the topic of this study. Some of the most relevant sections of this report will be reviewed.

No lack of business opportunities for shopping center developers was foreseen through the mid-1980's. In fact, the baby boom group, now 25 - 35 years of age, will be in their peak earning and spending years in the 1980's. One analyst forecast that one new regional shopping center will be required in each of our 276 metropolitan areas just to serve the needs of this group.

Of the 19,200 shopping centers in existence in 1979, it was estimated that more than half (11,000) will become more than 13 years old during the 1980's. Renewing these centers will be a large part of the action during this period.

Shopping travel was mentioned frequently. In the overview paper, the author stated that:

> "The fifth key trend is changing modes of travel. This trend will be apparent in the change of automobile size to keep American cars within government-regulated fuel efficiency ratios. The cars of the next decade will be smaller than today's cars, and will require less space in center parking lots. We may begin to see electric cars and perhaps a proliferation of pooling to conserve fuel. The future may see a return to the rails--either with monorails or with high-speed train service--and increased dependence on mass transit of all kinds. Center owners and managers must keep wary eyes on these changes in modes of transportation so that the industry will be able to adapt to them as they arise." [6, p. 7]

A representative from the automobile industry followed up by stating that:

> "Of all the changes discussed so far, the one that will have the greatest impact on shopping centers can be summed up in one word--size. Because the cars of the 1980's are going to be smaller on the outside, they will take up a lot less room. An average 1975 car takes up about 112 square feet. An average car in 1985 will take up only 85 to 90 square feet. And because smaller cars take up less space, shopping center developers will find themselves with a steadily increasing surplus of parking space over the next six years. In fact, by 1985 you may find yourself with up to 30 per cent more parking space than you need." [6, p. 34]

Clearly, the use of this surplus parking area will be a matter of great concern to shopping center owners and operators. One potential use would be for transit facilities, such as transfer centers or park-and-ride lots.

Transit awareness was urged by another speaker:

> "There is the distinct possibility that transportation regulations may spill over into the shopping center industry if the government requires centers to make arrangements for car pooling, van pooling and various forms of public transit. Center owners must keep these possibilities in mind and they should make strong efforts to ensure that centers are served adequately by mass transit where possible. In addition, center owners need not wait for government to require car pooling and van pooling; they can only benefit if they encourage the establishment of such operations in centers." [6, p. 96]

The potential for using existing and new transit technologies to provide access and circulation within the mall site and to the surrounding area is high according to one participant but less so according to another:

> "Many people work in offices in the vicinity of centers, so there is a tremendous opportunity to establish a convenient transportation linkage between major employers and shopping centers for at least a midday shopping trip." [6, p. 42]

"Although parking lots and cars are expected to change, it is doubtful that people movers, such as monorails and trackless trains, will be significant factors in mall design in the next ten years. Such vehicles may come into use in the more distant future, however." [6, p. 102]

The trend toward increasing the diversity of activities at or near the mall was noted by a mall design person:

"Elements of mall design will be dictated to a greater degree than before by demographic and life-style factors of the surrounding market areas. The public has come to expect shopping centers to be places of excitement and glamor. To gear the center to the life style of its customers, use of mall space will be broadened to include community facilities, ancillary services and entertainment centers. Examples of such uses are day care centers, medical clinics, and library branches. Naturally, the inclusion of such features will affect overall center design. Even if mixed use is not possible at the time of construction, the design will have to be flexible enough to admit the possibility of construction of hotels and office buildings at a later date. Provision for parking decks and 'footprints' of future buildings should be made in the original design." [6, pp. 102-103]

In summary, it appears that there are a number of ways that transit agencies can relate to the shopping center industry in the future. They should become involved in the design of new centers and the renewal of older centers. A voluntary approach would be most likely to succeed but regulations may also be required. It does not seem likely that shopping centers will be short of parking in the future and a key question is: How will they use the surplus parking areas? If offices, apartments and other types of buildings are constructed on these lots, then the increased density that would result should make the provision of transit service more likely in the future. This will undoubtedly happen in some cases but the extent of such action on a national scale is hard to foresee.

Much will depend on the future viability of the private automobile. As both the initial cost and operating costs of automobiles rises, one might expect to see fewer autos available for shopping trips in the future. A transit service that is well-matched to the desires of shoppers might well be able to compete more effectively with autos for the shopping travel market in the future should these auto costs increase more rapidly than the general inflation rate.

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7. Keefer, Louis, Urban Travel Patterns for Airports, Shopping Centers, and Industrial Plants, National Cooperative Highway Research Program, Report No. 24, 1966.

II. CASE STUDIES

In this chapter are presented the results from investigations of 27 transit-shopping center case studies. Some are operational situations while others are still in the planning stage. No attempt has been made to develop a representative sample of transit-shopping center situations across the country. Instead, these cases focus (for the most part) on above average to very innovative situations. A few cases have been included that are quite average or that appear to have a large unserved potential as a way of defining the nature and level of the term "innovative." Generally, the intent has been to include only those cases that are, in our opinion, worthy of emulation, in some way, by other transit properties or shopping center owners and developers.

None of the cases examined can be considered to be totally satisfactory. All have had problems, some more severe than others. Together, they provide a considerable amount of experience that can be of assistance to others who wish to try to become involved in serving the travel needs of shoppers at large regional malls.

The basic framework for the case studies has been to determine what transit service is being provided (or is proposed), its operational characteristics and its utility, to both the transit operator and the shopping mall operator. Context information has also been gathered to show the nature of the operating environment and an effort has been made to identify what works and what does not work in each case. The availability of information varied greatly, so the content of the case studies is quite non-uniform. However, each one has some useful information in it that should be helpful in other locations.

The cases have been written with the transit system planner and operator in mind as the primary audience. Secondary audiences are mall developers and operators, mall designers (architects), planning agency personnel (local or regional) and federal officials of the Urban Mass Transportation Administration. It is hoped that all of these people will find information of interest in most of the case studies.

As a brief overview of the case studies, Table 2.1 is intended to assist the reader in identifying those sections that might be most helpful. Category I includes five case studies that illustrate situations where an average level of conventional service is now being provided but where the potential for higher levels of service appears to be substantial. These situations are believed to be typical of a large number of regional shopping centers around the country. Category II includes six case studies that involve the use of conventional transit service in ways that have achieved quite high (in relative terms) patronage levels.

Table 2.1

Classification of Case Studies by
Nature of Transit Service Provided or Proposed

Category

I	II
Conventional, Average	Conventional, Above Average
Northgate (p. 27)	Stonestown (p. 58)
Southcenter (p. 32)	Mission/Fashion Valley (p. 117)
South Coast Plaza (p. 106)	Ala Moana (p. 129)
Woodfield Mall (p. 152)	Roosevelt Field (p. 157)
King of Prussia Plaza (p. 171)	Lougheed Mall (p. 186)
	Guildford Town Centre (p. 190)

III	IV
Innovative, Past or Existing	Innovative, Proposed
Washington Square (p. 35)	Clackamas Town Center (p. 52)
La Habra (p. 110)	Cedar Hills (p. 50)
Aurora Mall (p. 138)	Eastridge (p. 67)
Northglenn (p. 138)	Vallco Park (p. 76)
Shopper's Special (p. 147)	Glendale Galleria (p. 81)
Rochester (p. 161)	Newport Center (p. 94)
Bergen County (p. 175)	Irvine Center (p. 114)
	Villa Italia (p. 138)
	Southdale (p. 180)

All of these cases are operational at the present time. Category III includes seven cases that involve the testing of some new ideas. Some have been more successful than others. All are operational but some have only a short history. Category IV includes nine cases that are still in the planning stage (or are only very recently operational) which are intended to describe the kinds of transit service that are being tried by the innovators in the field. Some of these will probably not be successful but they will be quite instructive and worth watching over the next few years.

As a further aid to the reader, a brief summary of each case study is provided as follows, using the categories and sequence of Table 2.1 above.

CATEGORY I. CONVENTIONAL, AVERAGE

1. Northgate, Seattle, Washington (pp. 27-32)

   Conventional, scheduled fixed-route bus service coming onto mall property, not heavily used by shoppers.

2. Southcenter, Seattle, Washington (pp. 32-34)

   Conventional, scheduled fixed-route bus service coming onto mall property, not heavily used by shoppers.

3. South Coast Plaza, Costa Mesa, California (pp. 106-109)

   Conventional, scheduled fixed-route bus service coming onto mall property, not heavily used by shoppers, service level deteriorating but potential great.

4. Woodfield Mall, Schaumburg, Illinois (pp. 152-156)

   Conventional, scheduled fixed-route bus service coming onto mall property, not heavily used but potential is great.

5. King of Prussia Plaza, King of Prussia, Pennsylvania (pp. 171-174)

   Conventional, scheduled fixed-route bus service coming onto mall property, not heavily used but potential is great.

CATEGORY II. CONVENTIONAL, ABOVE AVERAGE

6. Stonestown, San Francisco, California (pp. 58-67)

   Conventional, scheduled fixed-route bus and trolley service coming onto mall property, probably the highest level of transit use on the West Coast.

7. Mission/Fashion Valley, San Diego, California (pp. 117-128)

   Conventional, scheduled fixed-route bus service coming onto mall property, heavily used until recently.

8. Ala Moana, Honolulu, Hawaii (pp. 129-135)

   Conventional, scheduled fixed-route bus service coming onto mall property, heavily used.

9. Roosevelt Field, Nassau County, New York (pp. 157-160)

   Conventional, scheduled fixed-route service coming onto mall property, heavily used.

10. Lougheed Mall, Vancouver, B.C., Canada (pp. 186-190)

    Conventional, scheduled fixed-route service coming onto mall property at a timed-transfer focal point, heavily used.

11. Guildford Town Centre, Surrey, B.C., Canada (pp. 190-195)

    Conventional, fixed-route service adjacent to mall, heavily used, timed-transfer focal point.

CATEGORY III. INNOVATIVE, PAST OR EXISTING

12. Washington Square, Portland, Oregon (pp. 35-50)

    Conventional, scheduled fixed-route service plus local circulator (the London Bus), not successful but instructive.

13. La Habra Mall, La Habra, California (pp. 110-113)

    Conventional, scheduled fixed-route bus service plus dial-a-ride service, heavily used.

14. Aurora Mall, Denver, Colorado (pp. 138-147)

    Conventional, scheduled fixed-route bus service plus local circulator, not heavily used but instructive.

15. Northglenn Mall, Denver, Colorado (pp. 138-147)

    Conventional, scheduled fixed-route bus service plus local circulator, proposed transit center, not currently heavily used but instructive.

16. Shopper's Special Service, Denver, Colorado (pp. 147-151)

    Specially scheduled buses that take elderly persons shopping during off-peak periods, heavily used.

17. Greece Towne Center, Longridge Mall, Ridgemont Plaza, Rochester, New York (pp. 161-170)

    Large scale dial-a-ride experiment in Rochester, New York that was quite heavily used by shoppers.

18. Bergen Mall, Fashion Center, Garden State, Paramus Park, Bergen County, New Jersey (pp. 175-179)

    Innovative shuttle service among four malls in northern New Jersey during the Christmas shopping crush to make inter-mall trips much easier.

CATEGORY IV. INNOVATIVE, PROPOSED

19. Clackamas Town Center, Portland, Oregon (pp. 52-57)

    Mall now under construction, includes bus-only lane and transit center, illustrates cooperative effort between mall developer and transit agency.

20. Cedar Hills Shopping Center, Portland, Oregon (pp. 50-52)

    New transfer center constructed adjacent to small mall, timed-transfer service.

21. Eastridge Mall, San Jose, California (pp. 67-76)

New transfer center proposed on mall property in place of some close-in parking spaces, illustrates mall operator-transit agency cooperation.

22. Vallco Fashion Park, Cupertino, California (pp. 76-79)

New transfer center proposed on mall property in place of some close-in parking spaces, illustrates mall operator-transit agency cooperation.

23. Glendale Galleria, Glendale, California (pp. 81-89)

Innovative vanpool/dial-a-ride service proposed by Chrysler Realty Corporation as experiment to serve employee and patron needs in Los Angeles area, totally privately funded.

24. Newport Center, Newport Beach, California (pp. 94-105)

Transit center and circulator system proposed for large complex of office and retail activities that is currently quite congested during peak periods.

25. Irvine Center, Irvine, California (pp. 114-116)

Large area to be developed in early 1980's that will include world's largest shopping center plus numerous other office and retail facilities.

26. Villa Italia, Lakewood, Colorado (pp. 138-147)

Proposed development of a transit center as part of development of a large office-retail complex built around existing regional mall.

27. Southdale Mall, Edina, Minnesota (pp. 180-185)

Proposal for a transit center adjacent to large regional mall, on mall property.

The material for these case studies was gathered during the July 1978 - July 1979 period and some of it is undoubtedly already out-of-date as the gasoline scarcity of the spring and summer of 1979 and other events, like the financial difficulties of the Chrysler Corporation and Proposition 13 in California, have caused rapid change in some situations. However, the case studies do provide some perspective for the reader who will want to do some follow-on investigations on his or her own.

A. Western Cities

1. Seattle

Seattle, with a current population of 497,300 (1978) is Washington State's largest city. Recent population figures show that Seattle's population has increased by 1.5 per cent this past year, reversing a decline for the first time in ten years. King County's population (which includes Seattle) is currently estimated at 1,186,900. This figure is expected to increase to 1,400,439 by 1990, according to the Puget Sound Council of Governments' latest projections, which represents an estimated growth rate of approximately 1.5 per cent per year. The median income for the City of Seattle in 1978 was $14,900. This is much less than the county-wide figure of $17,473.

a. Northgate

Northgate Shopping Center, one of the region's largest, is located within the Seattle city limits, about seven miles north of the central business district and adjacent to the Interstate-5 Freeway (see Figures 2.1 and 2.2). Like the Stonestown Center in San Francisco, Northgate was among the first suburban regional centers to be built on the West Coast. The first store openings took place in April, 1950. The center presently covers 52 acres and recent expansion has brought its gross leasable area to 1,100,000 square feet. Seven thousand parking spaces are provided. Two national chain department stores, two large family clothing stores, 115 smaller shops and services plus a theater and hospital are included within the center.

Although the Northgate community is still predominantly a single-family residential area, there has been an increasing amount of multi-family and condominium construction close to the mall in recent years. The area immediately surrounding the shopping center has experienced considerable growth within the past ten years. The North Seattle Community College and a national insurance company's regional headquarters are located on the opposite side of the freeway. Directly south of the center property four six- to seven-story office park complexes have recently opened, with two more similar developments in the planning stages.

The Municipality of Metropolitan Seattle (METRO) operates the King County-wide bus system. METRO is a public service agency, formed in 1958 to coordinate water quality and sewage systems in the area. In 1972, King County voters authorized METRO to operate the county-wide transit system and also approved the levy of a 0.3 per cent retail sales tax to help fund it. METRO's total service area covers approximately 2,128 square miles and includes a population of 1,186,903. The transit system carries about 40 million people annually. The cost per passenger

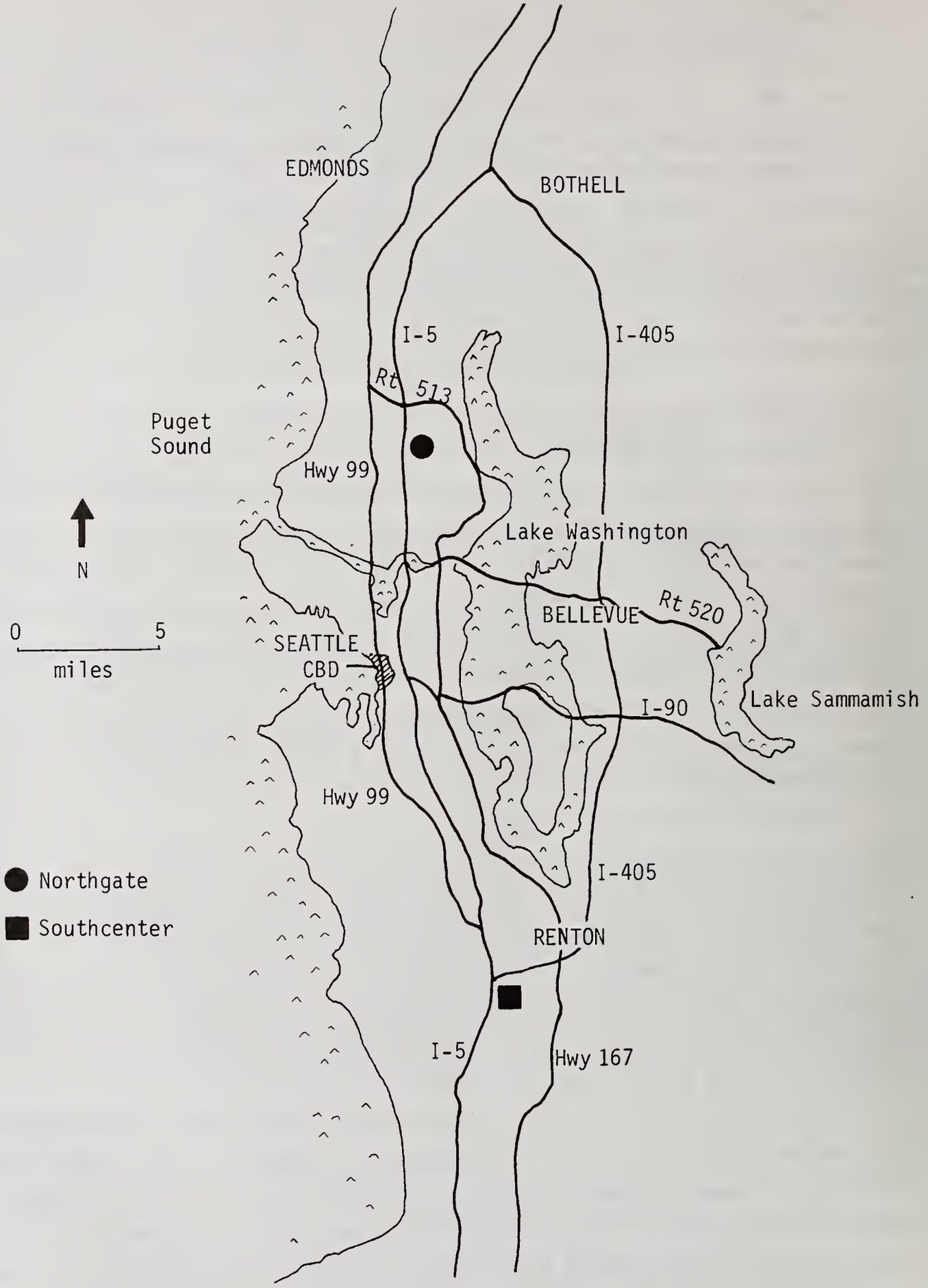


Figure 2.1. Location of Northgate and Southcenter Malls in the Seattle Metropolitan Area

Figure 2.2. View of Northgate Shopping Center and Vicinity, Looking South, 1977

figure is listed at 93¢ while revenue per passenger is listed at 32.5¢, according to the agency's Monthly Management Report for March, 1979.

METRO Transit currently operates eight routes which serve the Northgate mall. One route (#41) provides surrounding neighborhoods, the mall itself and a park-and-ride lot one block north of the mall with express service via I-5 to downtown Seattle during the weekday peak period. Two routes, #8 and #22, serve the Northgate area and the University of Washington area to the south as well as to downtown Seattle. The remaining five routes serve the northern suburban communities of Richmond Beach, Edmonds, Bothell and North Kirkland. These suburban routes offer express service to downtown Seattle during the peak periods. At other times they serve as locals to Northgate and then combine with routes #8 and #22 to provide additional express and local service to downtown. Operating characteristics and headways for these eight routes are shown in Table 2.2.

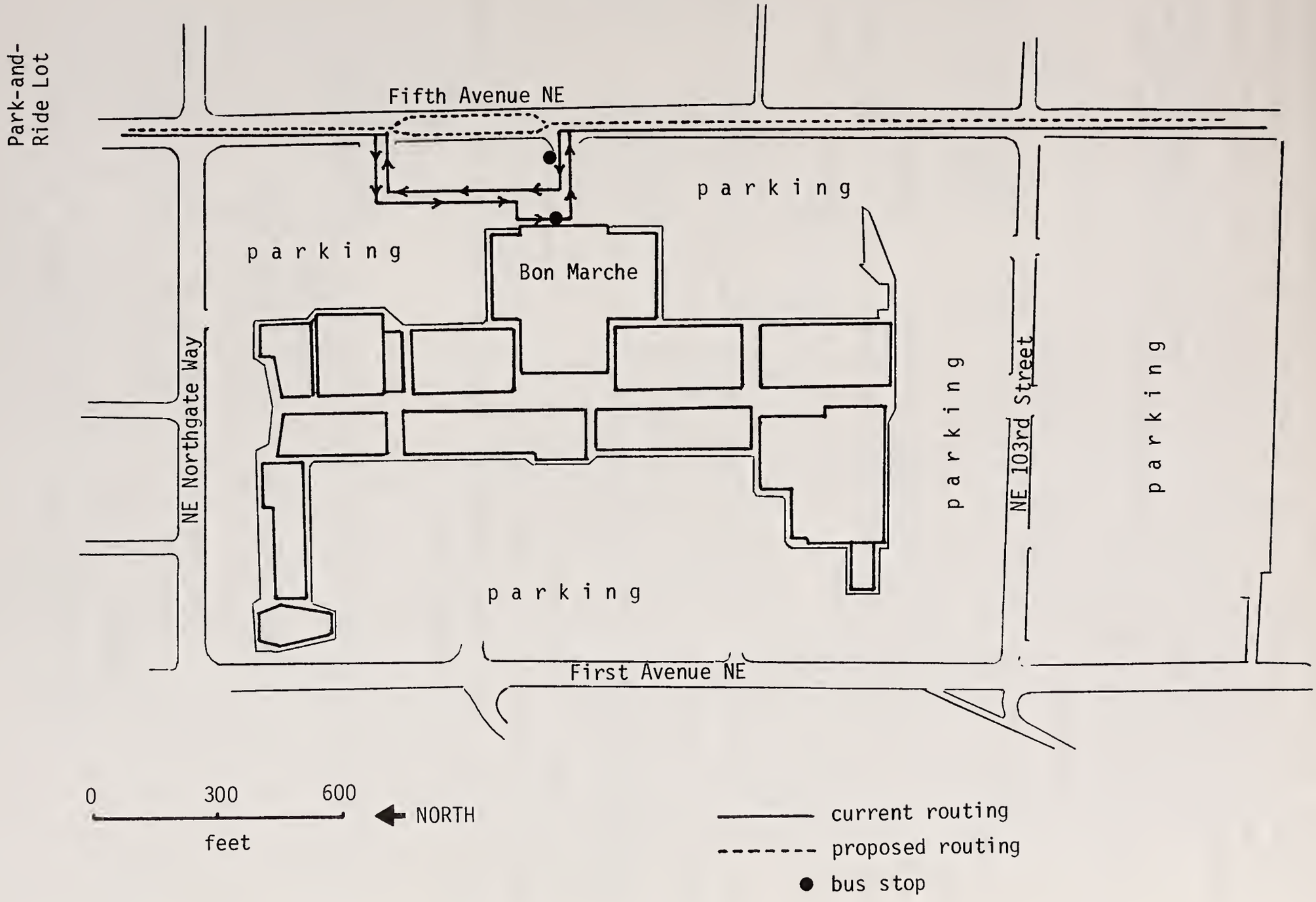
Table 2.2
Operating Characteristics of METRO Bus Routes Serving Northgate

	Bus Routes							
Headways (in minutes):	#22	#41	#8	#305	#307	#308	#316	#317
Peak	30	10	30	30	30	--	--	--
Off-peak	30	--	30	60	60	120	90	60
Weekend	30	--	30	60	60	120	120	60
Daily trips to Northgate:	38	30	56	32	33	9	30	28

Currently, inbound (southbound) buses enter the east side of the shopping center in a one-way loop, stopping at the main eastern entrance to the Bon Marche, and then exit by the main eastern entrance/exit. Outbound (northbound) buses enter and deposit passengers at a sheltered bay just inside the center's main east side driveway. The outbound stop is approximately 75 feet from the same Bon Marche main entrance. Shelters with benches are provided at each stop. A prominent transit route map with listing of schedules is also included at these stops. Schedules and maps are displayed within the mall area itself as well. Figure 2.3 shows both current and proposed bus circulation at the Northgate mall.

Due to the difficulties of maneuvering buses in driveways designed for automobiles and time delays caused by traffic congestion, METRO is negotiating with the shopping center management and the various public agencies involved to run the buses along Fifth Avenue, N.E. at the eastern edge of the center (See Figure 2.3). Buses

Figure 2.3. Present and Proposed Bus Routing through Northgate Mall



would no longer enter the center, and the change would mean a 100-foot walk for inbound patrons, while for outbound patrons the change also involves crossing Fifth Avenue, N.E., which is a busy arterial. A pedestrian signal light and shelters would be installed.

No data are currently available as to the number of people who use the bus at the Northgate Mall but it is believed to be in the three to six per cent range, slightly better than the national average.

b. Southcenter

Southcenter, the second case study for the greater Seattle area, is a more typical example of a large regional shopping center in a low-density developing area. It was built 11 years ago and is located 14 miles south of the Seattle CBD, adjacent to the Interstate-5 and Highway 405 freeways. Predominantly large-scale, low-density commercial and industrial use characterize the surrounding area. The Boeing Company operates three large employment centers in the nearby suburbs of Kent, Renton and Auburn.

Opened in 1968, Southcenter contains 1,400,000 square feet of gross leasable area and covers some 1 20 acres of land. Seven thousand three hundred spaces are provided for parking. A theater and motor hotel complex are included on the site.

METRO transit also serves this shopping center with three routes. The #150 is an express service between Auburn and Kent, Southcenter, and downtown Seattle. Route #155 is a local route serving Southcenter, a regional hospital and the Renton Boeing operations. Route #240 serves suburban Burien and the Seattle-Tacoma International Airport as well as Southcenter and the communities of Bellevue and Kirkland on the eastern side of Lake Washington. Operating characteristics and headways for these routes are provided in Table 2.3.

Table 2.3

Operating Characteristics of METRO Bus Routes Serving Southcenter

	Bus Routes		
Headways (minutes):	#150	#155	#240
Peak	30	30	30
Off-peak	30	60	60
Weekend	30	60	60
Number of trips:			
Weekday	32	17	19
Saturday	28	10	16
Sunday	25	6	16

The buses now enter the center at the main northern entrance on Tukwila Parkway and stop just outside the main northern entrance of the mall building (see Figure 2.4). The building's arcade provides shelter with seating, along with information kiosks. No data are currently available as to the number of people who use the bus to shop at Southcenter.

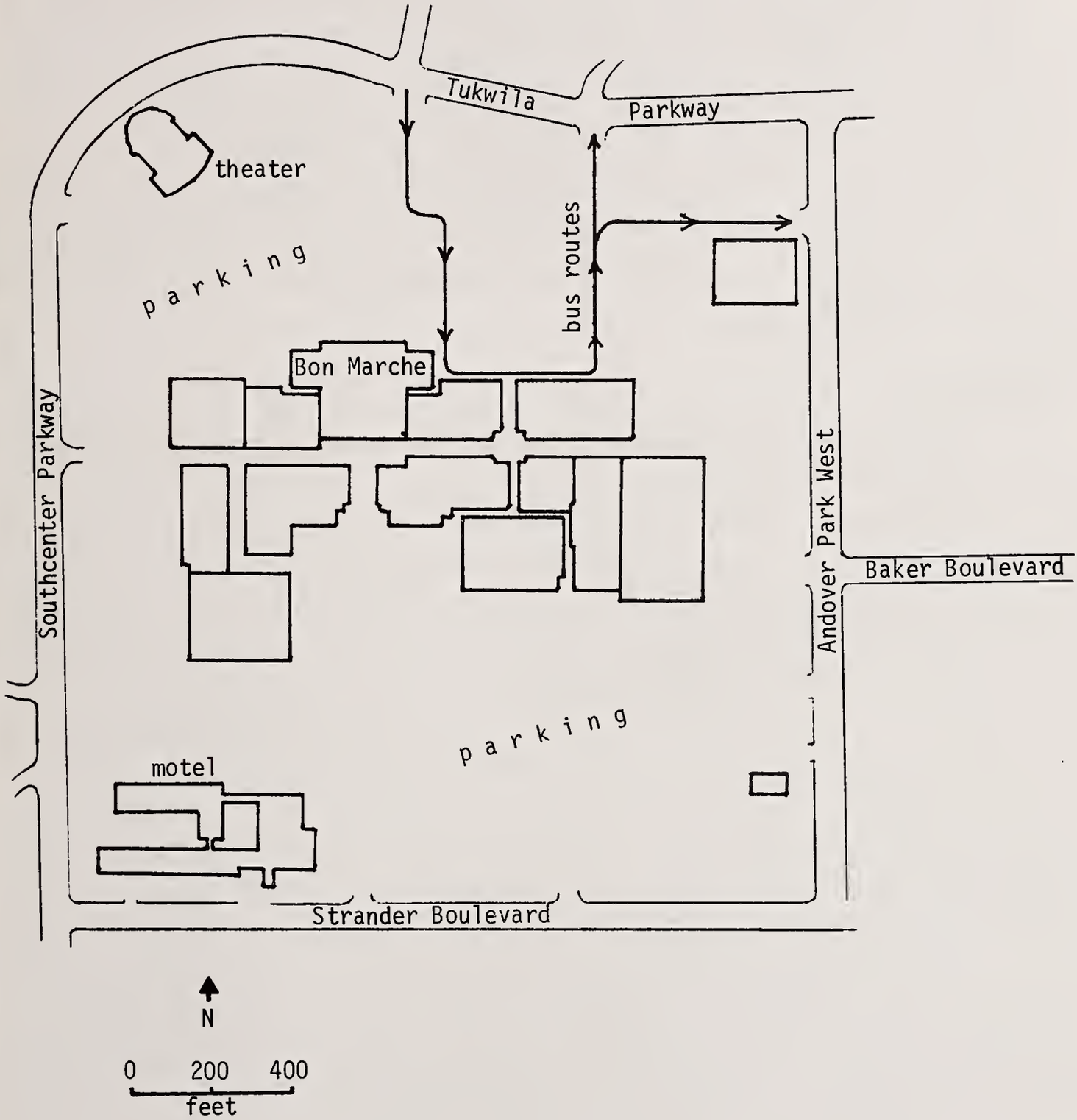


Figure 2.4. Present Bus Routing through Southcenter Mall

As with Northgate, negotiations are underway between METRO and Southcenter officials to move the transit stop to the northern edge of the center property. Buses would stop on Tukwila Parkway and not enter the mall as they currently do. Heavy congestion is again cited as the reason for the requested change.

The experience of METRO Transit in serving two of Seattle's largest regional shopping centers illustrates the difficulties encountered when buses attempt to penetrate the congestion which commonly occurs in shopping center lots. METRO will improve its operating efficiency by not routing its buses through the lots, but the convenience of transit service to the malls will be substantially reduced. This method of avoiding parking lot congestion does not provide the transit agency with the service ability of a bus-only roadway through the shopping center parking lot, as is planned for Clackamas Town Center in Portland, Oregon. These two cases illustrate the importance of including transit access facilities in the initial design of large regional malls.

References:

Data for this section were derived from interviews with officials of the following organizations:

Allied Stores Limited
METRO Transit
Northgate Shopping Center
Southcenter Shopping Center
City of Tukwila Planning Department

2. Portland, Oregon

a. Washington Square

(1) Brief History

Washington Square Shopping Center, opened in April, 1974, is the second largest regional shopping center in Oregon and has about 1,000,000 square feet of gross leasable area. Six major department stores and 105 smaller shops, which employ over 3000 people, are located along the one-level, L-shaped mall in southwest Portland. The center is surrounded by 5500 free parking spaces, and is presently served by four bus lines of Tri-MET, the local transit agency. Figure 2.5 is an aerial photo of the mall taken in 1976, and Figure 2.6 shows its location in the metropolitan area.

The development of Washington Square is an interesting account of a retail corporation's efforts to comply with legislation which was passed as a result of the environmental awareness movement of the late 1960's. On November 17, 1972, Washington Square, a subsidiary of Winmar Pacific Corporation, applied to the Oregon Environmental Quality Commission for permission to build a 5219-space parking facility for its shopping center, which was already under construction. The size of the parking facility was based on a ratio of five spaces per 1000 square feet of gross leasable area. At that time, the shopping center was planned to be smaller than its present size. Washington Square was required to apply to the Commission because shopping center parking facilities are viewed, in legal terms, as an indirect source of air pollution (indirect because the pollution is derived not from the mall itself but from the autos which park there).

The State Department of Environmental Quality studied the situation and, in a 12-page report, concluded that the quality of air, water, and noise would be "substantially and undesirably affected" through the construction of such a parking facility. On May 29, 1973, the Commission acted on the Department's recommendations and prohibited the construction of the parking facility. The Commission did allow Washington Square to file a new application, subject to certain conditions.

Primary among the conditions was the submission of a detailed public transit plan and implementation schedule for maximizing transit use at Washington Square. The plan was to include the implementation of a feeder bus service to and from the shopping center and its surrounding residential areas, and a high-speed transit service to downtown Portland. The goal of the transit plan was to minimize degradation of air quality to the maximum extent possible.

In response to this requirement, Washington Square hired Alan M. Voorhees and Associates to help design a transit service, and in July, 1973 the consulting firm

Figure 2.5. Washington Square Shopping Mall Located South of Portland, Oregon, 1976

Source: [5]

Figure 2.6.

Location of Washington Square, Cedar Hills and
Clackamas Town Center in the Portland Metropolitan Area

produced a report entitled, "Transit Program for Washington Square." The Voorhees report advised that the mall management introduce a three-line bus feeder system to serve the nearby residential areas of Beaverton, Tigard and Raleigh Hills. It was also suggested that Tri-MET extend four of its existing bus routes to Washington Square to provide a link between the shopping center and downtown Portland. Persuaded by the promise of Washington Square's management to implement the suggestions of Voorhees and Associates on a trial basis, the Environmental Quality Commission approved the construction of a 5000-space parking facility in late September 1973, about four months after the initial application was denied.

The resulting feeder bus system became known as the London Bus System. This term evolved from the use of five London Transport buses which were operated on the three lines of the system. Although there was some routing difficulty during its inception, the London Bus System began service when the shopping center opened in April of 1974.

Washington Square had more difficulty, however, in acquiring Tri-MET service to the Portland City Center. Tri-MET, at that time, was not in a position to finance route extensions of the required magnitude. It agreed to extend three bus lines to serve the mall, but only if Washington Square provided $25,000 to finance the operating costs of the extension for one year, and to provide advertising and promotion for these lines. Washington Square agreed to the requirements, so Tri-MET service was also available from downtown Portland on opening day.

The patronage of the Tri-MET lines to Washington climbed rapidly during the first six months of operation, and in early 1975 the transit agency diverted a cross-town line to provide additional service to the shopping center. By April 1975, Tri-MET's ridership had increased by 67 per cent, from 3000 to 5000 passengers per week. This was approximately four per cent of all Washington Square shoppers.

The Washington Square management was not pleased, on the other hand, with the performance of the London Bus System. In early April, 1975, it requested that it be allowed to terminate this service due to lack of ridership. The Environmental Quality Commission agreed that the London Bus System was no longer feasible, but determined that Washington Square and Tri-MET should join forces to provide greater Tri-MET service to the shopping center.

As a result, in late April, 1975, the two parties signed a two-year agreement. Tri-MET agreed to extend considerably the hours of service on three of the four bus lines already serving the center and to reroute another line to provide service to the mall. Washington Square agreed to pay for the construction and upkeep of two transit shelters to be located at the main entrance to the mall, to pay $33,030 each year for two years as an operating subsidy for the added service, and to pay for promotion of Tri-MET service to Washington Square on radio, TV, and in the newspapers.

On May 15, 1975, Washington Square discontinued the London Bus System.

(2) Planning and Design

The Seattle office of Alan M. Voorhees and Associates, as previously mentioned, was commissioned by Washington Square to plan and design its feeder bus transit service under a contract of about $4,330. The results of the Voorhees report were based on data from the 1970 Census. The population densities of those Census tracts that were determined to be in the shopping center's primary and secondary markets, as well as average income and autos per family for these areas, were analyzed to determine those sections with the highest relative trip-generating potential. Existing patterns of single-family and multi-family residential areas were identified from aerial surveys and existing land use maps were to be used as additional guides.

Four potential service areas were identified from this investigation. Preliminary routes were then laid out in these primary areas. A special field investigation of road quality was performed because of the type of buses that were to be used. Routes with narrow or bumpy roads or low overhanging trees or wires were discarded. Finally, the routes in one primary service area were discarded because it was felt that with Tri-MET cooperation, this area would be provided extensive transit service. The routes recommended by the consultant are shown in Figure 2.7. The actual routes used for the London Bus System are shown in Figure 2.8.

The recommendation to use the London Transport double decker buses was made by the marketing firm retained by Washington Square to develop the marketing plan for its bus services. Voorhees suggested that four buses be acquired from Omnibus Promotions Limited. These buses were available at an approximate cost of $10,000 each, which included shipping and license fees. Although the buses were used, they had been fully overhauled and were under six months' warranty. Each bus was capable of seating 56 adults and had standing room for eight persons. At that time, new standard General Motors buses would have cost more than $50,000 each.

Voorhees suggested that the three bus lines be operated from 10:00 a.m. to 6:00 p.m. every weekday. A blanket fare of 25¢ was to be charged for outbound service and inbound service would be free. Weekend and expanded weekday service was not considered, because the consultants felt it would require an inefficient increase in personnel.

A total staff of seven people was considered optimal. This staff was to consist of one driver and one attendant on each bus line and a supervisor who would act as relief driver and attendant and serve as general administrator of the system.

The total market potential of each service area was calculated by Voorhees and Associates based on trip generation experience from other shopping areas. The average daily number of person-trips from each of the service areas was forecast to be as shown in Table 2.4.

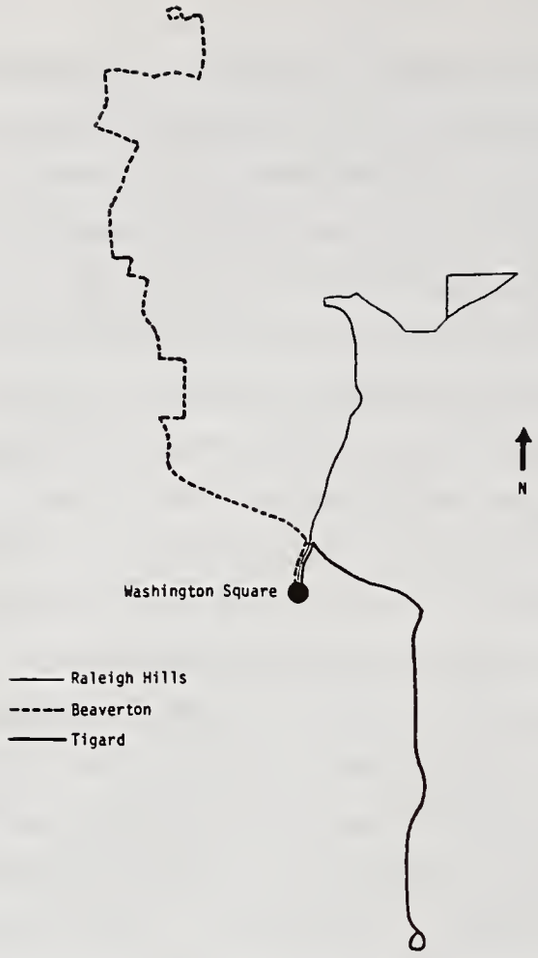


Figure 2.7. Routes Suggested by the Voorhees Report

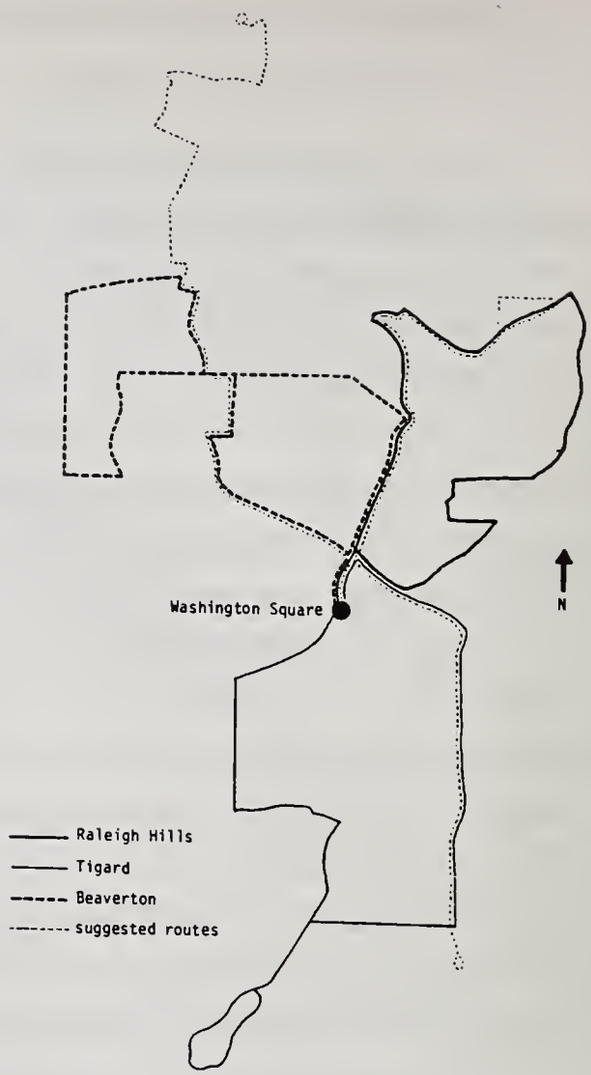


Figure 2.8. Comparison of Actual and Suggested Routes for London Bus System

Table 2.4.

Estimated Daily Trips from Primary Service Areas

Service Area	Route Name	Daily Person-Trips
A	Beaverton	2,418
B	Raleigh Hills	1,670
C	Tigard	1,376

Source: [4]

It was stated in the report that the ability of the Washington Square transit system to attract patronage was dependent on the success of the promotional campaign. Transit's share of the patrons from each of the service areas was forecast according to the intensity of the promotion, as shown in Table 2.5.

Voorhees and Associates conceded that these were ad hoc estimates. For promotion level one, patronage was estimated from regional shopping trip modal split curves. It was assumed for promotion level two that travelers would ride the

Table 2.5.

Forecast of Transit's Share of Total Patrons

	Beaverton	Tigard	Raleigh Hills
Level 1. Low-key promotion	3%	5%	4%
Level 2. Extensive route and schedule advertising	7%	10%	9%
Level 3. Extraordinary achievement of charismatic appeal	25%	31%	29%

Source: [4]

Washington Square routes at about the same rate as workers destined for jobs outside the Portland CBD. Promotion level three percentages assumed that travelers in the service areas would ride at the same rate as workers destined for jobs inside the Portland CBD.

Voorhees also recommended the extension of four Tri-MET routes to Washington Square. These extensions were designed to connect the shopping center to the Portland CBD. The initiation of a crosstown route running from Beaverton to Lake Oswego (northwest-southeast) was also advocated to provide direct Tri-MET service from these nearby suburban communities.

(3) Implementation

Washington Square's implementation of the London Bus System varied in many respects from the Voorhees plan. Figure 2.8 shows that while the actual routes covered the same general service areas, they were longer and more circuitous than the recommended routes. The average length of the suggested routes was 10 miles, while their actual average length was 11 miles. The management of Washington Square stated that the reasons the routes were changed were that low overhanging trees and poor roadbed conditions made the original routes unfeasible. Once the system was started, the routes were not changed because this would have caused confusion among the patrons.

While the routes were longer than those in the Voorhees report, the headway of each route was nearly the same as those of the suggested routes. The number of bus trips per route per day, therefore, was approximately the same as the report estimated. One other major difference between the plan and the actual system was that five buses were purchased instead of four. It was felt that because the buses were old it would be best to have two spares instead of only one.

The Voorhees report estimated that the total cost to Washington Square of capital, operation, and monitoring of the bus system for one year would be $156,300 (see Table 2.6). The management of the shopping center was reluctant to give the actual

cost of the program, but estimates from other sources are that the actual cost was about $120,000 for one year of service.

Table 2.6

Annual Cost Estimates for London Bus System

Capital Acquisitions Costs:		
4 London style buses @ $10,000 each		$ 40,000
Startup Costs:		10,000
Transit Operations:		
7 employees	72,700	
Bus operations	21,600	94,300
Surveys:		
Cordon counts and license plate checks (2/year @ $6,000 each)		12,000
GRAND TOTAL		$156,300

Source: [4]

There were also differences in Tri-MET's implementation of the Voorhees recommendations. Instead of extending Tri-MET route #43, route #45 was diverted to serve Washington Square. The creation of the crosstown Beaverton/Lake Oswego route did occur, but not until some eight months after the mall opened (i.e., December, 1975).

(4) Market Analysis of Transit Service to Washington Square

The Voorhees report suggested that an intensive study of the characteristics of Washington Square patrons be undertaken. Therefore, Washington Square hired Dr. Edward Grubb of the Marketing Department of Portland State University. Dr. Grubb presented his findings on October 21, 1974 [2]. In one chapter of his report, he presented and analyzed data identifying mall users and their attitudes toward Tri-MET and London Bus services. These data were based on 4368 interviews that were conducted at Washington Square during the week of September 9, 1974. The interviews were conducted every day of the week between 9:00 a.m. and 8:00 p.m.

From an analysis of the data, the average patron was described to be between the ages of 12 and 35 who arrived from southwest Portland, Beaverton, Tigard or Lake Oswego with another person to shop at the mall. This person visits the center on the average of four times per month and therefore makes two less trips to the Portland CBD and two less trips to other shopping centers per month.

It was further concluded that 29 per cent of the patrons felt that Tri-MET provided them with service to the mall and that nine per cent made occasional or regular use of the system. Eight per cent of the patrons interviewed occasionally or

regularly used the Washington Square buses while 21 per cent felt that the system served them. Dr. Grubb concluded that a substantial fraction of the people who used Tri-MET also used the Washington Square system, which meant that probably only 10 per cent of the people used transit to come to Washington Square. Unfortunately, no data are presented to support this conclusion.

Dr. Grubb also observed that 59 per cent of those who used the Washington Square bus used it in place of an auto. He comments that this must mean the bus service was being used predominantly by young people under 16 who could not drive a car. It is also probable that some of these people used the bus as a substitute for an automobile trip, but this is not mentioned as a possibility.

(5) Evaluations of User Response to the Service

Ridership data for the London Bus System from April 1974 to March 1975 are presented in Table 2.7. It shows that the transit shares for the year are below the lowest level of the modal split forecasts made by Voorhees and Associates in only one case. The transit shares of the Beaverton and Tigard routes achieved the marginally acceptable levels of performance forecast by the consultant.

A more detailed description of the actual ridership is given in Table 2.8. This ridership table shows that the total number of riders was substantially higher in the summer months. Washington Square management indicated that this phenomenon was almost wholely due to an increase in ridership among schoolchildren and teenagers. The management viewed most of these patrons as joyriders who did not stop at the center. It was also remarked that many people boarded the bus at Washington Square and rode the complete loop without getting off. Some of these riders were tourists, and others were children whom mothers put on the bus while shopping. For these reasons the management felt that the modal split bus figures did not adequately reflect the facts. The bus program did acquire some acceptance, however. When termination of the London Bus System was announced, a petition containing about 100 signatures was presented to Washington Square to request its continuance.

The management of Tri-MET has been very pleased overall with the response to its service extensions to Washington Square. The ridership on the three routes connecting the shopping center to downtown Portland is fulfilling all expectations. The crosstown route from Beaverton to Lake Oswego is, however, weak in ridership.

The revenue accruing to Washington Square for one year of its London Bus service can be estimated. On January 31, 1975 Washington Square reported to the Department of Environmental Quality that its total revenue for regular bus service for 1974 was $10,626.77 for 41,336 total trips. If the revenue from the bus service continued at the same proportion to trips, Washington Square's revenue for one year would have been $12,818. If the cost of operating the London Bus System for one

Table 2.7.

Ridership Data for London Bus System

	Voorhees' Lowest Modal Split Estimates	Actual Transit Share 4/1/74 - 3/31/75
Beaverton	3%	3.2%
Tigard	4%	4.7%
Raleigh Hills	5%	2.9%

Source: [3]

Table 2.8.

Washington Square London Bus System
Actual Ridership, by Route

Month	Raleigh Hills	Tigard	Beaverton	TOTAL
April, 1974	584	750	925	2,259
May	880	1,057	1,167	3,104
June	1,549	2,009	2,365	5,923
July	2,006	2,747	3,367	8,120
August	2,535	3,040	3,830	9,405
September	605	881	860	2,346
October	560	750	956	2,266
November	813	1,288	1,546	3,647
December	1,110	1,558	1,598	4,266
January, 1975	601	1,054	1,228	2,883
February	356	544	690	1,590
March	1,076	1,300	1,674	4,050
TOTAL (12 months)	12,675	16,978	20,206	49,859

Source: [3]

year was somewhere between the estimate of $120,000 and the Voorhees estimate of $156,300, then the shopping center recouped between 8 and 11 per cent of its total cost.

It should be noted, however, that part of the capital costs are not really applicable to the analysis of the London Bus System. Standard accounting practices require that the cost of a capital item be amortized over its expected life and that only the amortized cost of the item be carried as an expense in any given accounting period. Therefore, it is clear that only the amortized cost of the buses for the 14-month period of operation should be included in the cost analysis. Unfortunately, neither the rate at which Washington Square amortized the buses, nor the amount for which they were resold, from which an amortization surrogate could be determined, are available.

(6) The Marketing Plan for the London Bus System

The marketing program for Washington Square's London Bus System was created by Rockey/Marsh Public Relations, Inc. of Portland. This firm has handled all public relations for the mall since it was first conceived. It was they who suggested that London Transport buses be used for the transit system, since they had a high degree of visibility and could immediately be connected with retail activity at Washington Square.

The actual public awareness program began three months prior to the start of the service with general announcements to the press and other media about the routes and types of buses to be used. Media parties aboard the buses were suggested. Special solicitations among editors of the Beaverton, Tigard and Raleigh Hills newspapers were made, and trial runs along the bus routes with television coverage were recommended to maximize public awareness.

Publicity was centered around the grand opening of the bus program. A ribbon-cutting and cannon-firing ceremony, with representatives from the Department of Environmental Quality and Washington Square on hand, was intended to receive maximum media coverage.

During the course of operations, media releases were made regularly -- interviews with passengers, short stories on the first week, first month, and so forth. Free bus tickets were handed out in the shopping center and promoted on local radio shows.

After the program began, advertising was centered in the press of the Beaverton, Tigard and Raleigh Hills communities. A flyer was also to be distributed to all homes within three blocks of the bus routes showing the routes and time schedules, and with a free ticket attached.

It was the opinion of Rockey/Marsh that the promotional scheme could not be based on the convenience of the system. Factors such as walking to the bus, waiting

in bad weather, and juggling packages on and off the bus tended to obviate the convenience appeal of the system. The firm suggested, therefore, that the focus of the advertising program be on glamor, charm and luxury, with strong suggestions that the user would be making a contribution to a better environment.

Washington Square stated that the program suggested by Rockey/Marsh was carried out in its entirety. The response, however, in relation to the Voorhees report, was far less than expected.

(7) Current Situation and Future Plans

During the two years the transit agreement between Washington Square and Tri-MET was in effect (April 1975 - April 1977), the relationship between the two firms was not without controversy. Tri-MET never changed the route of the bus line which was supposed to increase the number of lines serving the mall to five. It chose instead to increase the service of one of the routes already serving the shopping center. Washington Square claimed this did not fulfill the agreement and threatened to sue. The two firms were able, however, to resolve their differences without litigation, and although the two-year agreement has expired, Washington Square has continued to pay for advertising of the Tri-MET routes.

Washington Square and Tri-MET are presently negotiating a new contract. This contract is not being required by the Environmental Quality Commission but the management of both firms believe that it is in the best interest of each. Under the terms of the proposed agreement, the shopping center will continue to pay for a portion of the promotion for the routes serving Washington Square. Tri-MET in return plans to make the center a node of its timed-transfer system. This system will synchronize the arrival and departure of buses at Washington Square. It is hoped that this will attract more use of transit by shopping center patrons.

At this time the four Tri-MET bus lines make 219 stops at Washington Square every weekday, 78 stops every Saturday, and 61 stops every Sunday. Forty-two per cent of the weekday stops are made by buses originating from the Portland CBD. The others are made by buses which come from suburban areas. On Saturday and Sunday, 56 and 60 per cent of the stops respectively come from the Portland CBD. Current Tri-MET routes that serve Washington Square are shown in Figure 2.9.

Stops made between 6:00 p.m. and 10:30 p.m., which covers the peak shopping period, are 20 per cent of the total weekday stops made by buses at Washington Square. Thirty-nine per cent of the total weekday stops are made before noon, when the lowest period of shopping activity takes place.

In May of 1977, Washington Square applied to the Department of Environmental Quality to expand the shopping center. It proposed to build facilities to contain two restaurants, a 1200-seat theater, a 200-unit motel, a 70,000 square foot

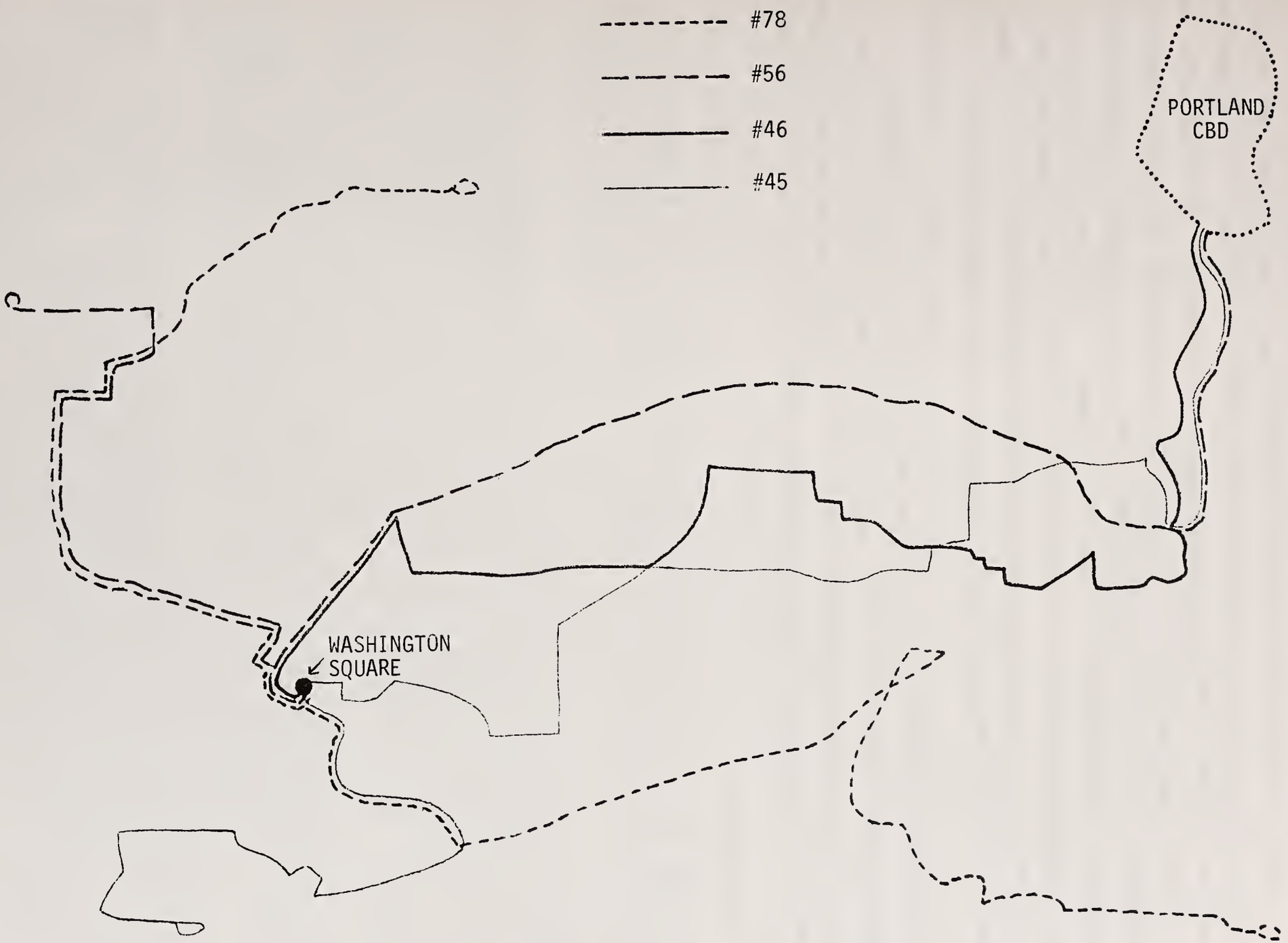


Figure 2.9. Present Tri-MET Routes to Washington Square

convenience shopping center, and an 80,000 square foot office building. To service the new facilities, it also petitioned the DEQ for permission to expand its parking facilities.

On March 28, 1978, the DEQ issued an indirect source construction permit that permitted the construction of the theater and the two restaurants. It also permitted the construction of a 1950-space parking facility that will raise the total number of parking spaces to 7150. This construction was allowed with the stipulation that transit service to Washington Square continue to be operated at or above the level of service existing when the permit was issued. Tri-MET would be permitted to make adjustments, however, if it deemed that such service were underutilized.

On the other hand, Washington Square will be permitted to construct the motel, office building and convenience center only after certain requirements are met. These include street widening, traffic control systems and special turning lanes. A further requirement under the permit is a program to facilitate the collection of annual air quality and traffic volume data. The DEQ hopes that this program will provide reliable information about the effect of the shopping center on its surroundings, and will use the data in the formation of future policies concerning Washington Square.

(8) Conclusions

In order to analyze the events concerning the failure of the original transit program for Washington Square, it is necessary to examine the objectives and strategies of each of the actors involved. The controversy that took place is rooted in the conflicting objectives and strategies of the actors.

The expressed objective of the DEQ was minimizing the degradation of Washington Square's ambient air quality. It chose limitation of parking spaces and the provision by Washington Square of transit service to the mall as strategies to effect this objective. Washington Square had two objectives in the first year of its existence. First, it desired to provide what it considered to be an adequate number of parking spaces at the minimum cost. It also wished to maximize potential patrons' awareness of the shopping center. Tri-MET's objective was to provide adequate transit service to Washington Square while remaining within budgetary constraints. Its strategy, therefore, was to offer service to the mall only if Washington Square subsidized the service.

The strategies of the two public agencies obviously conflicted with the primary objective of Washington Square. The DEQ could not limit the number of parking spaces without denying the mall the number it found desirable. Neither could it require the mall to provide transit service, as a condition for permission to build parking spaces, without raising the total cost of these spaces to what Washington Square

considered undesirably high. Subsidization of Tri-MET service was unacceptable to the shopping center management for the same reason.

The London Bus System was consistent with the secondary objective of Washington Square. The London Transport buses provided residents of Beaverton, Tigard and Raleigh Hills with a daily reminder of the existence of a nearby shopping center. The greater the area that the buses covered, the greater would be their effectiveness as a marketing tool. This may account for the difference between the actual and suggested routes. After Washington Square penetrated the Portland retail market, however, the need for additional marketing was substantially lessened. The London Bus System then ceased to be consistent with any Washington Square objective, and the atmosphere of confrontation that existed between the DEQ and the mall caused by differing objectives reached a level that made the failure of the transit program inevitable.

The success of the Tri-MET service is due to the ultimate reconciliation of the objectives of Tri-MET and Washington Square. After the two-year transit agreement between them ended, Tri-MET was able to serve Washington Square without direct route subsidization. The cost of the new transit agreement will not be what Washington Square considers prohibitive. In addition, maintaining Tri-MET transit service allows Washington Square to substantially increase both parking and retailing facilities under the DEQ's new Indirect Source Construction Permit. The cooperation between Washington Square and Tri-MET on the new transit agreement is directly attributable to the lower level of conflict that has recently existed between their objectives.

It is interesting to speculate on what would have happened had Washington Square implemented the London Bus System by following the routing suggestions of Voorhees and Associates. It is reasonable to assume that more people would have ridden the bus to shop if the routes had been the shorter, less circuitous ones suggested by Voorhees. It is also possible that there would have been less joyriding on the less scenic, more functional routes.

If the suggested routes had achieved a transit share similar to the modal split of other regional shopping centers, the modal splits would have been the lowest modal split estimates of the Voorhees report: 3 per cent for the Beaverton route, 4 per cent for the Tigard route and 5 per cent for the Raleigh Hills route.

Assuming these transit shares and the Voorhees daily trip estimates for the residential areas, the London Bus System would have accrued yearly revenues of $13,065, if they charged the recommended 25¢ per outbound ride. With an annual cost of something less than the $156,300 estimate (less because of capital cost amortization), the London Bus System would have run a deficit of something less than $143,235 per year. This would make the approximate cost per square foot of leasable area to

be 13¢. Whether or not this cost per square foot of leasable area is too much to increase the rent per square foot which the stores of the shopping center pay is something we cannot determine.

b. Cedar Hills and Clackamas Town Center

The Tri-MET Transit Authority, the local carrier for metropolitan Portland, has operated a very CBD-oriented service in the past. The radial route structure employed by Tri-MET has long been considered the most efficient method by which to serve the CBD, but it is recognized that such a route structure does not provide well for the non-CBD oriented transit trip. While Tri-MET desires to continue its emphasis on easy access by transit to the CBD, it has sought an alternative to the radial route structure which would better serve the needs of the transit patron who desires to travel somewhere other than the CBD.

In 1978, Tri-MET service planners began to consider seriously a transit service oriented around regional subcenters. In this service concept, local routes and regional trunk routes come together at regional subcenters on a pulsed schedule basis. The pulsed schedule system, also called the timed-transfer system, means that local and regional routes arrive at the same point at the same time, which allows for quick and convenient transfers, and thereby increases the number of destinations that can be reached quickly and easily by transit.

Subregional transfer stations which are located in or near major activity centers can be expected to perform a dual function. Besides providing quick and easy access to the CBD and other destinations, transit becomes a significant mode of travel for patrons of the local activity center. Tri-MET expects, therefore, that a route structure based on regional transfer stations will be of greater utility to transit patrons, and will attract many more local trips, especially trips to activity centers near the transfer station, than the traditional radial route structure.

Tri-MET's first application of the regional subcenter concept began in mid-June, 1979, in the Beaverton/Cedar Hills suburban area west of the Portland CBD. There will be two main subregional transfer centers where the timed-transfer system will be initiated as well as several smaller timed-transfer points. One of the two main transfer centers will be located at Cedar Hills (see Figure 2.10).

Cedar Hills is a community shopping center with a gross leasable area of 94,000 square feet located five miles west of the Portland CBD. The shopping center contains no major department stores. Its main tenants consist of a supermarket and a drug-store. The shopping center also contains 31 smaller shops and a branch bank.

The transit center has been located on the southern side of the mall (see Figure 2.10) and is built partially on the shopping center's property and partially on a street right-of-way. The construction of the transit center includes the provision

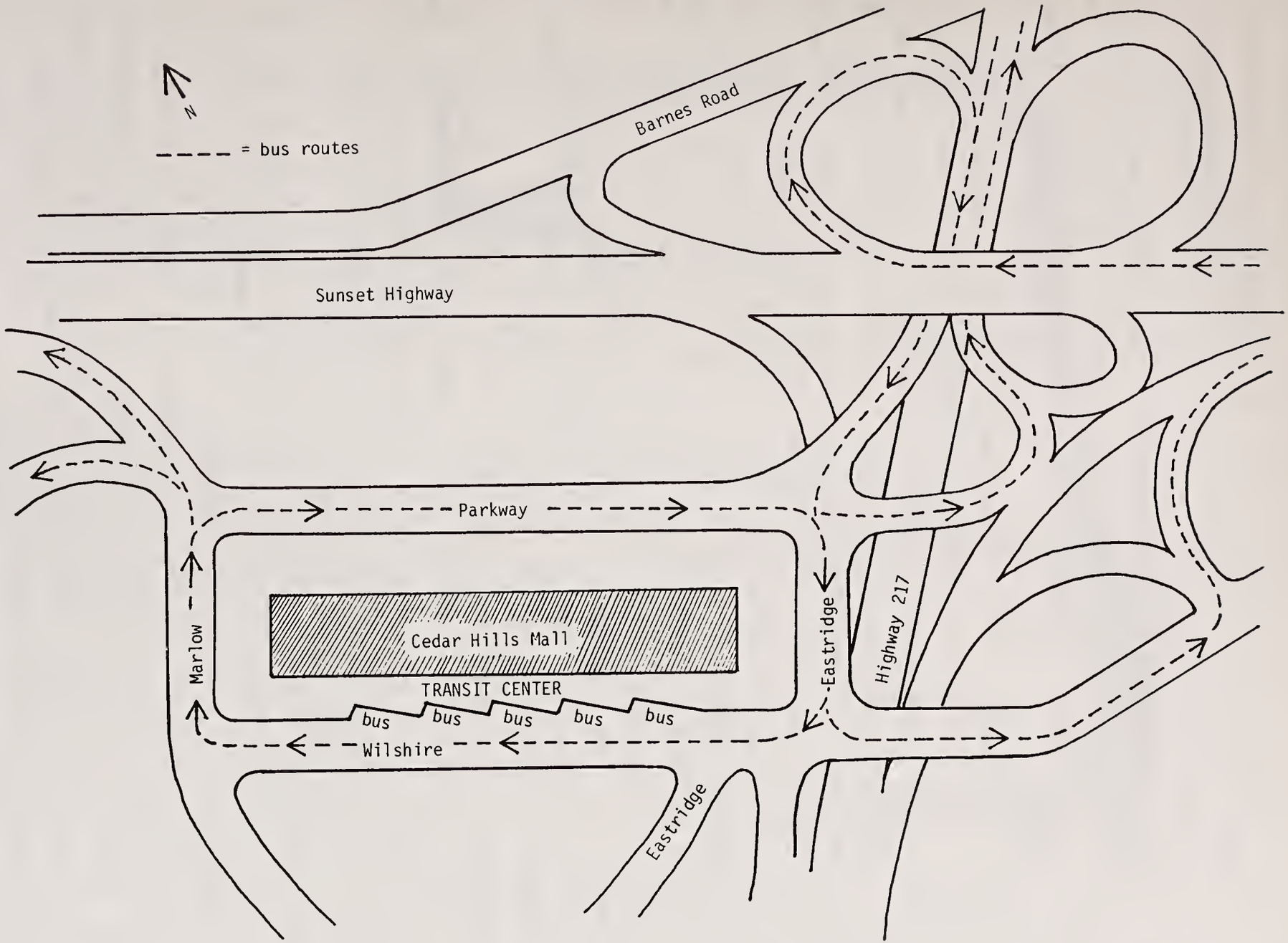


Figure 2.10. Cedar Hills Mall Transit Center Showing Bus Circulation

of a passenger waiting area, two passenger shelters, bus loading areas, and bus information signs. The bus loading areas are able to accommodate up to nine buses at one time. The total cost of the project including street work and signage was approximately $135,000.

Four transit routes meet at the transfer center. Two of these are local routes, and two are trunk routes which travel to the CBD. On weekdays, 262 buses stop at the transit center. On Saturdays and Sundays, 92 and 78 buses respectively will stop at the center.

The location of a transit center at the Cedar Hills mall is an example of how such a facility can be located to the advantage of shopping center patrons, although it is a relatively small project serving a small shopping center. A much more ambitious project is under construction at the site of Clackamas Town Center (Figure 2.11).

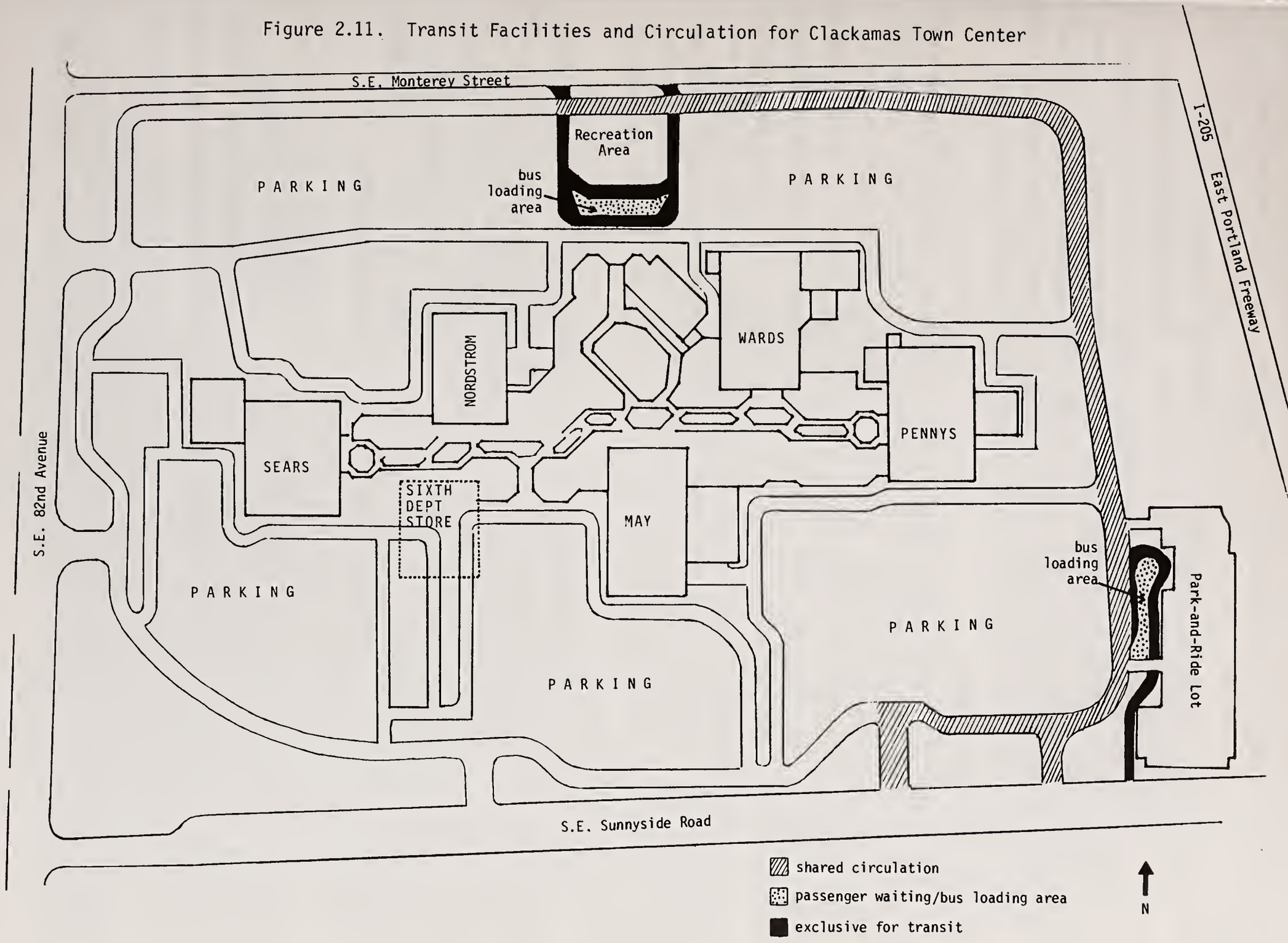
Clackamas Town Center is presently under construction on a 115-acre site approximately 8.5 miles southeast of Portland in Clackamas County. The shopping center will contain 1.2 million square feet of retail space, the major portion of which will be occupied by five major department stores, and 6000 parking spaces. The Town Center is envisioned to be not only a shopping center, but also a community focal point, containing such community-oriented facilities as a public library, meeting rooms, an outdoor theater and an ice rink. Clackamas Town Center will be opened in the fall of 1980, and it is expected that the Town Center will precipitate substantial new residential and commercial development in the immediate vicinity.

The development of Clackamas Town Center began in 1974, when the Ernest W. Hahn Corporation filed a voluntary Environmental Impact Statement for the development. The EIS stressed the importance of pedestrian, bicycle and transit access to the shopping center. A local bus route connecting the Town Center to surrounding residential areas was discussed, as well as an on-site minibus service.

The Hahn Croporation first applied for zoning changes for the proposed site of the shopping center in 1975. Legal challenges from two environmental groups delayed the required changes until February 1978. In March 1978 the Hahn Corporation settled out of court with the environmental groups. The settlement included the stipulation that the developer include transit-related improvements on the site in cooperation with Tri-MET. Specific references were made to a central transit stop area, a park-and-ride lot, an enclosed passenger waiting area, on-site circulation improvements and provision of prominent transit information.

The Hahn Corporation was required by yet another agreement to consider the construction of transit facilities on the shopping center site. The Clackamas Town Center will have 6000 parking spaces when it is opened. Because of the large number of parking spaces, the Oregon Department of Environmental Quality required the Hahn Corportation to apply for an indirect source construction permit (because of possible

Figure 2.11. Transit Facilities and Circulation for Clackamas Town Center



air pollution from auto emissions). The Hahn Corporation acquired this permit in the fall of 1976 under the condition that it make provisions for on-site transit stops, including one central stop, shelters, space for a park-and-ride lot, and active participation in an employee transit and carpooling program.

The requirements of the out-of-court settlement and the indirect source construction permit meshed well with Tri-MET's plans. The Town Center site is within the Tri-MET service district in an area where the provision and orientation of transit service has not kept up with recent development. The Clackamas County area south of Portland, which includes the suburbs of Milwaukee and Oregon City as well as Clackamas Town Center, has been considered an appropriate area for application of the regional subcenter concept.

Tri-MET became an active participant in the planning of Clackamas Town Center in the summer of 1978, when the desirability of establishing a timed-transfer subregional center at the shopping center became increasingly apparent. Eight months of discussions between representatives of the Town Center, Clackamas County, and Tri-MET led to the development of an agreement which, though as yet unsigned, is expected to create a lasting commitment to a subregional transit center located at Clackamas Town Center.

The agreement, which is expected to be signed in 1979 by Tri-MET and Clackamas Town Center representatives, is a preliminary agreement concerning the provision for and construction of transit facilities for use by Tri-MET. The agreement is contingent on an UMTA assistance grant which would be used to pay for the capital costs of the transit improvements.

Under the terms of the preliminary agreement, there will be two passenger waiting areas designated on the property of Clackamas Town Center (see Figure 2.11). One of these areas will be in a transit center to be located immediately north of the mall entrance. This transit center will include, besides a single large, enclosed passenger waiting area, general amenities such as heating, lighting, seats, public phones, vending machines and possibly a small manned newspaper kiosk. It will not have restrooms. Also contained in the waiting area will be transit-service aids such as information displays, schedule racks and ticket machines.

The transit center will be constructed with eight loading bays. They will be arranged on both sides of the passenger waiting area in a contraflow arrangement, five westbound and three eastbound. A clearly defined walkway passing north through the loading platform from the mall entrance, about 120 feet away, to the pedestrian plaza will also be constructed.

The second passenger waiting area will be in a park-and-ride facility to be located at the shopping center property at the southwest corner of the mall area. The passenger waiting area will be heated, lighted and sheltered. The park-and-ride

facility will contain approximately 400 parking spaces with special parking for the handicapped and kiss-and-ride purposes. The facility will also contain a pedestrian walkway and crosswalk connection to the mall.

Certain roadways on the Town Center property are designated in the agreement as shared circulation areas. The roadways will connect the transit center and the park-and-ride facility as well as provide access to public streets. In order to reduce potential traffic delays, it has been agreed that certain improvements will be made to those roadways in the shared circulation areas. The road between the transit center and the park-and-ride lot will be widened to include four 12-foot lanes instead of two.

Some of the most significant transit facilities provided for by the agreement are the exclusive bus circulation areas. Certain roads leading to the transit center and others heading to the park-and-ride lot will be set aside for exclusive transit use. This provision allows buses to enter and leave the shopping center property without being hindered by other shopping center traffic. The exclusive roads are expected to increase considerably the ability of the buses to efficiently serve the transit center and the park-and-ride lot.

The agreement also contains a section addressing the liability in the case of negligence by Tri-MET or Clackamas Town Center. Each will agree to hold the other harmless from any claims arising out of legal action as the result of negligence by one of the parties.

The costs of the development of the transfer center and the park-and-ride facility under the terms of the preliminary agreement are shown in Table 2.9. It can be observed that federal funding is expected to cover the majority of the costs of development. Approximately 18 per cent of the development will be paid for by the shopping center developer, while about one per cent will be underwritten by Tri-MET and another one per cent by Clackamas County. The remaining 80 per cent is expected to be federally funded. The maintenance and repair costs of the transit facilities will be shared by Tri-MET and Clackamas Town Center. The division of responsibility for these costs is also shown in Table 2.9.

Tri-MET's involvement in the preconstruction planning of Clackamas Town Center is a significant achievement. Such involvement will assure Tri-MET of the acquisition of some desirable circumstances for transit development. The inclusion of Tri-MET in the preconstruction planning is also beneficial to the developers, who will be able to integrate the transit facilities to the advantage of shoppers.

The construction of a transfer center at Cedar Hills Shopping Center will provide a preliminary indication of the success of the symbiosis of transit and shopping center interests by use of regional transit centers. If the number of shoppers who

Table 2.9.

Development Costs and Maintenance Responsibilities
of Transit Facilities at Clackamas Town Center

Cost Estimates and Funding Proposal

Item	Cost	(Funding Source) Federal	Developer	Tri-MET	County
TRANSIT CENTER:					
1. Shelter	$ 50,000	$ 40,000	$10,000	---	---
2. Curb, passenger waiting platform	20,000	16,000	4,000	---	---
3. Bus circulation road	100,000	80,000	20,000	---	---
subtotal	$170,000	$136,000	$34,000	---	---
PARK-AND-RIDE FACILITY:					
1. Paving, landscaping	$200,000	$160,000	$40,000	---	---
2. Bus shelter	10,000	8,000	2,000	---	---
3. Bus roadway	90,000	72,000	18,000	---	---
subtotal	$300,000	$240,000	$60,000	---	---
SIGNALIZATION:	$ 75,000	$ 60,000	$ 5,000	$5,000	$5,000
TOTAL IMPROVEMENTS	$545,000	$436,000	$99,000	$5,000	$5,000

Division of Responsibilities and Costs

Item	Major Maintenance	Routine Maintenance
TRANSIT CENTER:		
Waiting/loading platform	Tri-MET	Town Center
Shelter(s)	Tri-MET	Tri-MET
Waiting area amenities:		
General (lighting, heat, vending machines, etc.)	Town Center	Town Center
Transit related (ticket machines, info displays, etc.)	Tri-MET	Tri-MET
Bus circulation and layover areas	Tri-MET	Town Center
PARK-AND-RIDE FACILITY:		
Parking area and auto access roads	Tri-MET	Town Center
Bus circulation roads	Tri-MET	Town Center
Pedestrian paths	Town Center	Town Center
Waiting/loading platform	Tri-MET	Town Center
Shelter(s)	Tri-MET	Tri-MET
Waiting area amenities:		
general (lighting, heat)	Town Center	Town Center
transit-related (info displays)	Tri-MET	Tri-MET
Parking lot amenities (landscaping, lighting)	Town Center	Town Center
SIGNALIZATION:		
82nd and Monterey	ODOT/County	ODOT/County
Sunnyside bus exit	ODOT/County	ODOT/County

Source: [1]

use transit to travel to the shopping center increases or if the number of people who shop at the center is maintained, the project will be successful from the shopping center's point of view. The developments at Clackamas Town Center, because of the combined efforts of the two parties to find the most beneficial alternative, should provide a more conclusive experience to help assess the success of attracting transit patrons to shopping centers via the regional subcenter concept.

References:

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3. San Francisco Bay Region

a. Stonestown

San Francisco, with a current population of about 666,500, is California's third largest city in terms of population. This figure is expected to decrease to about 639,000 by 1990. San Francisco city is relatively well-integrated, as 57.2 per cent of its people are white, 13.4 per cent black, and 14.2 per cent Latin-American. The median income in San Francisco is about $18,000. Outside of the central business district, only one major regional shopping center exists with the city limits of San Francisco.

This shopping center is Stonestown Mall, located in the lakeside district of San Francisco, just north of the San Mateo county line (see Figure 2.12). The Stonestown shopping center, opened in 1950, was one of the first suburban shopping centers constructed on the West Coast. The mall presently covers about 40 acres and contains over 864,000 square feet of gross leasable area (see Figure 2.13). The Stonestown Development Corporation also has developed four multi-story apartment buildings directly adjacent to the shopping center that cover approximately 20 acres of land. These apartments were developed and marketed primarily on the basis of their location with respect to Stonestown Mall.

Currently, there are 2,730 off-street prime customer parking spaces provided for customers at the Stonestown shopping center. An additional 546 parking spaces are provided for employees and customers in the northeast section of the shopping center site. There also exist approximately 120 curb spaces located on the streets fronting Stonestown Mall that can be used by employees or customers. This parking supply is significantly below the average for a shopping center, yet has been adequate to meet peak parking demand. The Urban Land Institute recommends approximately 5.5 parking spaces per 1,000 square feet of building space, yet Stonestown Mall provides only about 3.8 parking spaces per 1,000 square feet, which has been adequate to meet the parking demand at the center.

This can be explained in part by the fact that Stonestown Mall has the highest transit patronage of any regional shopping center in California [2]. The high proportion of transit usage yields a much lower trip generation rate for the shopping center itself, consequently reducing the number of parking spaces that are required. About ten years ago, Wilbur Smith Associates conducted a full count survey of the center over a day-long period and found that 19 per cent of the people who entered the center came by way of transit or walking. Last year, Barton-Aschman Associates did an update of this count, during the peak hours,

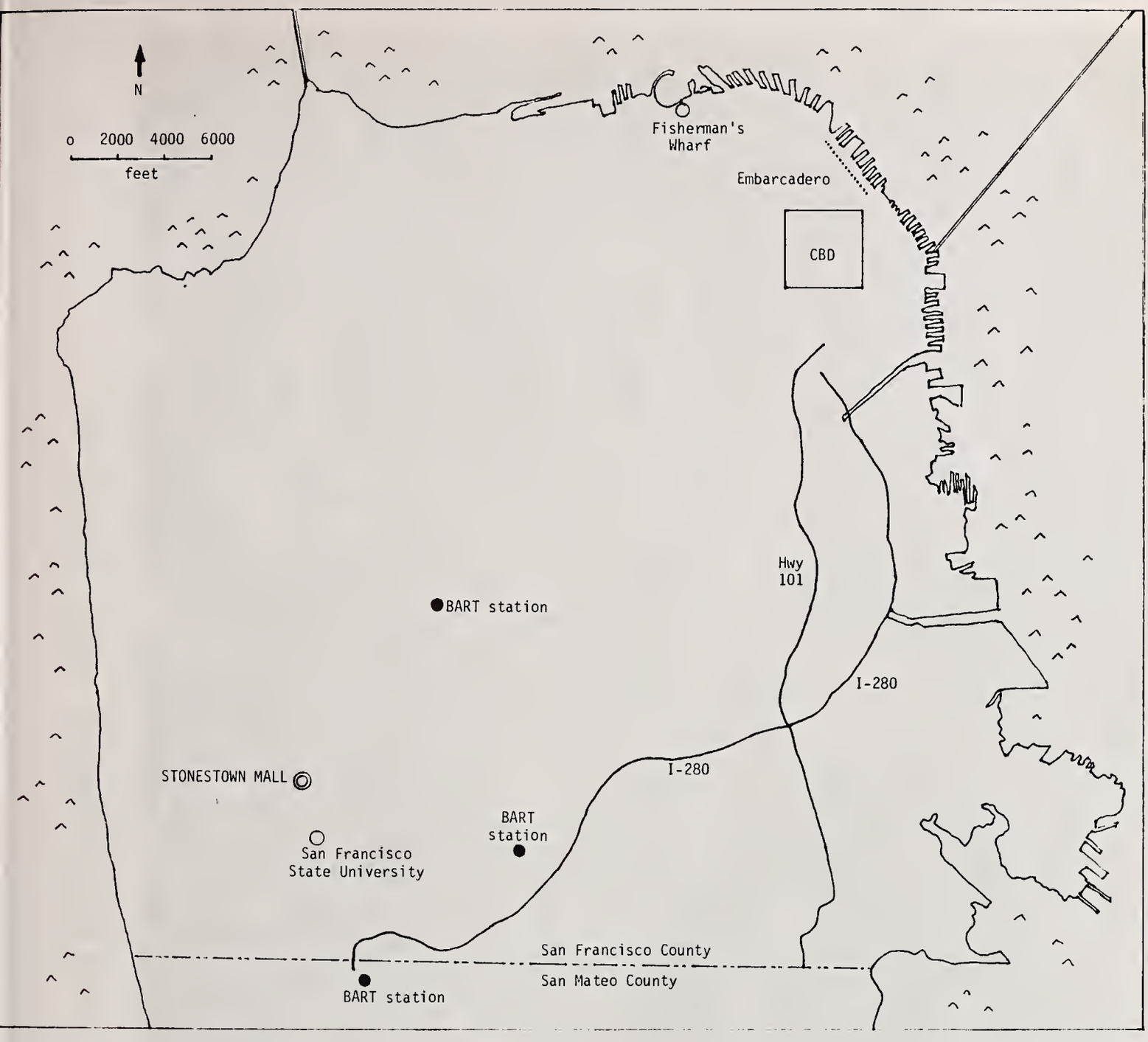


Figure 2.12

San Francisco Map Showing Trip Generators, BART Stations and Major Highways

and found that between 12 and 15 per cent of the actual patrons to the center were coming in by way of transit or as pedestrians. Their further breakdown distributed approximately 10 per cent of these trips to transit, and between two and five per cent to pedestrian access. Stonestown is situated in a fairly dense area of San Francisco and is surrounded by low, medium and high density residential uses. This accounts for the high proportion of pedestrian traffic to the mall.

Stonestown Mall is served by the San Francisco Municipal Railway (Muni) and the San Mateo County Transit District (Samtrans). Together these transit operators

Figure 2.13. Aerial View of Stonestown, Looking Northwest, 1970

combine to serve Stonestown Mall with eight regular fixed bus routes and one streetcar route.

The San Francisco Municipal Railway provides most of the transit service to Stonestown. In 1912, Muni began operation as the first publicly owned and operated transit system in the United States. Today, Muni is one of the largest and most heavily used transit systems in the country. The railway operates 24,461,000 scheduled miles annually, carrying about 486,500 initial boarding passengers and 210,250 transfer passengers on an average weekday [3]. Muni operates a wide variety of vehicles -- streetcars, electric trolley coaches, diesel motor coaches, and cable cars, and has designated 77 different transit routes.

Presently, San Francisco Municipal Railway serves Stonestown Mall with one streetcar, three feeder routes, two crosstown routes, and one radial route. Figure 2.14 shows the routes for the transit lines now serving Stonestown that are operated by Muni. Lines 18 and 28 use 20th Avenue and have stops immediately adjacent to the stores. Lines 70 and 72 traverse Winston Drive, while lines 17 and 19 and the M streetcar all use 19th Avenue past the center. The operational characteristics of these routes are shown in Table 2.10.

Stonestown Mall provides protected shelters for transit patrons, and thus the waiting areas and walking distances are very favorable for transit patronage. The M streetcar line is one of San Francisco's major streetcar lines and runs immediately adjacent to the center (see Figure 2.14). Patrons coming to the center by streetcar have to walk only about 300 feet from the nearest streetcar stop to the store entrance. The other two regular fixed bus routes also run immediately adjacent to Stonestown Mall, necessitating only a short walk for transit patrons to the mall.

The Bay Area Rapid Transit (BART) is only minutes away from Stonestown Mall, with two stations nearby and easily accessible (see Figure 2.12). In addition, three of the regular bus routes and the M streetcar line serving Stonestown provide convenient transfer service to the nearby BART station.

The San Mateo County District (Samtrans) serves Stonestown Mall with two regular fixed bus routes. The operational characteristics of these routes are shown in Table 2.11. The San Mateo County line is located just four blocks south of Stonestown, which creates the unusual situation whereby a shopping center is being served by two different transit operators. Five hundred and fifty thousand people currently live in San Mateo County, and this figure is expected to increase to 640,400 by 1990. Racially, San Mateo County is a remarkable contrast to San Francisco, as about 75 per cent of its people are white, while only 7 per cent

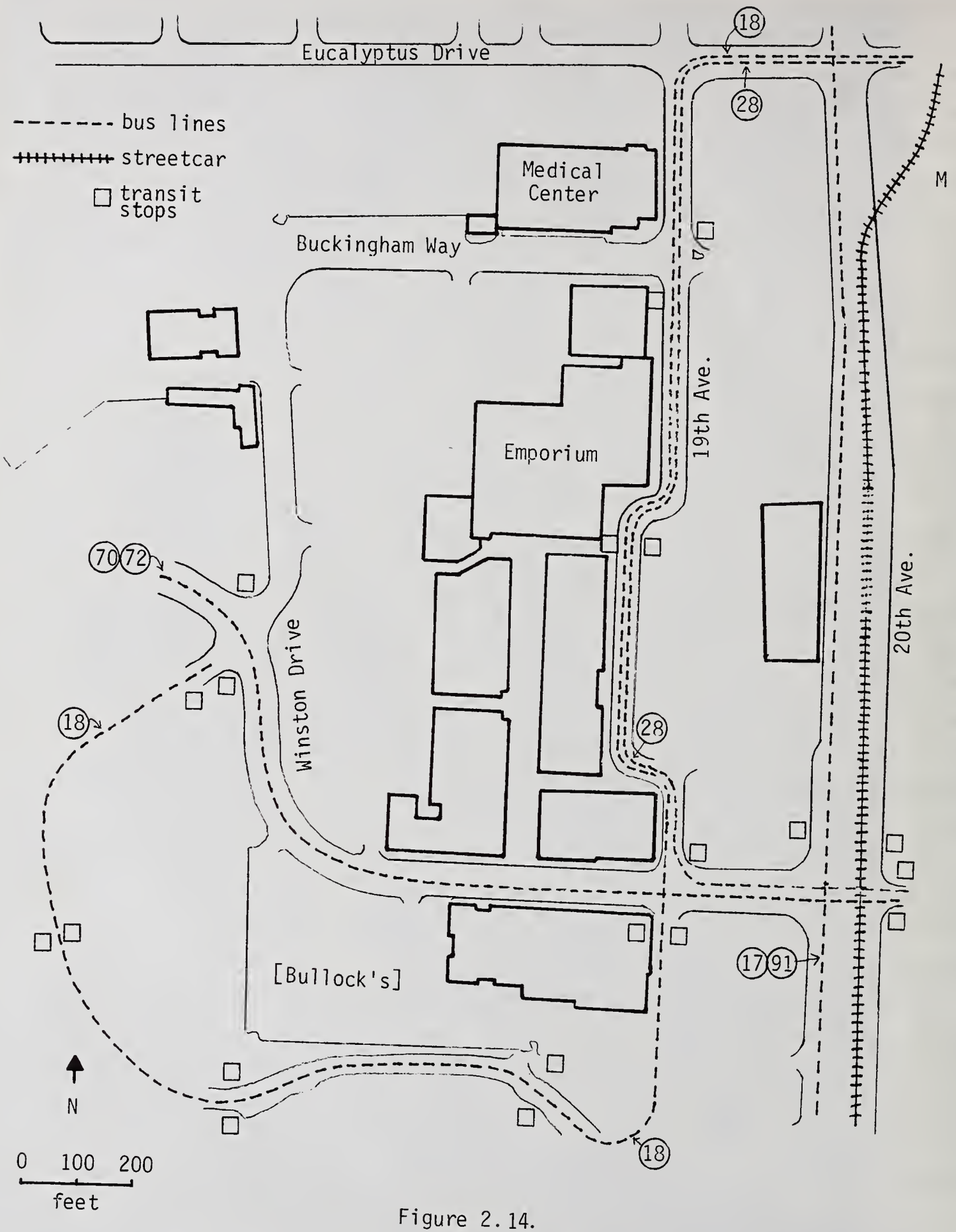


Figure 2.14.
Muni Transit Routes Serving Stonestown Mall

Source: [2]

Table 2.10. San Francisco Muni Operating Characteristics

OPERATING CHARACTERISTICS	Street-Car M	Transit Route Number					
		Feeder Routes			Crosstown Routes		Radial Route
		17	70	91	18	28	71-2
Headways:							
Weekday peak	4	30	20	20	13	6	9
off-peak	6	30	40	0	18	12	15
Saturday	20	30	40	0	20	12	20
Sunday	20	60	40	0	20	12	20
Number of Vehicles Required:							
Weekday peak	16	7	2	3	5	17	17
off-peak	10	3	1	0	4	11	14
Saturday	6	1	1	0	4	11	13
Sunday	5	1	1	0	4	11	11
Peak Day Boarding (000's):	18.7	1.5	N/A	0.3	4.4	14.8	16.5
Route Miles (Round Trip):	16.7	5.5	17.2	4.5	13.7	27.7	28.8

Source: [5]

Table 2.11. Samtrans Operating Characteristics

OPERATING CHARACTERISTICS	Bus Routes	
	3b	21a
Headways:		
Peak	30	30
Off-Peak	30	30/60
Weekend	30	30
Daily Bus Trips to Stonestown:		
Weekday	33	30
Weekend	23	20
Average Weekday Ridership:	727	1230

Source: [5]

are black, and 12 per cent Latin-American. The median income in San Mateo County is the highest in California, $24,000 per household, while the median income in San Francisco is only about $18,000.

Samtrans is a far younger organization than Muni, as service was not initiated until July of 1976. Samtrans carried about 11,521,000 patrons in 1977-78, while operating 55 local bus routes and eight mainline routes.

One reason for the success of Stonestown Mall in attracting transit riders is the fact that it is located near another major activity generator in southern San Francisco, San Francisco State University (see Figure 2.12). Most of the routes serving Stonestown have San Francisco State University as a nearby stop, generating a good deal of transfer activity at both locations. Public transit service between the two generators is very good, making it easy for students to shop at Stonestown Mall. Forty to sixty per cent of the employees at Stonestown Mall use public transit to get to work [9]. This can be attributed, in part, to part-time student employees working before or after classes at San Francisco State University, who take advantage of the frequency of service between Stonestown Mall and San Francisco State University.

An interesting development that could seriously affect transit ridership to Stonestown Mall is that Muni is considering rerouting its buses to the center to avoid the traffic congestion on 20th Avenue. Longer walking distances from the center to the bus stops on 19th Avenue, resulting from route redirection, would reduce the desirability of using public transit for shopping trips to Stonestown Mall.

Another development that may affect public transit to Stonestown Mall is that the Stonestown Development Corporation has proposed to expand and enclose part of the mall. This project would increase Stonestown's retail sales area by 92,000 square feet, an increase of about 10.6 per cent over the existing 864,000 square feet. The resulting mall area would be two stories in height and would employ an additional 185 persons [4].

A three-level parking structure is also proposed on the present parking lot area, east of the mall (see Figure 2.15) to accommodate the expected increase in business. This parking structure is envisioned to connect shopping and parking areas by two pedestrian bridges, and would increase parking spaces at the mall by about 400 over present capacity. A new access road is also planned to accommodate an increase of customer business and to mitigate potential traffic congestion surrounding Stonestown Mall. This 52-foot wide road would connect 19th Avenue with 20th Avenue just north of the proposed parking garage and at the intersection

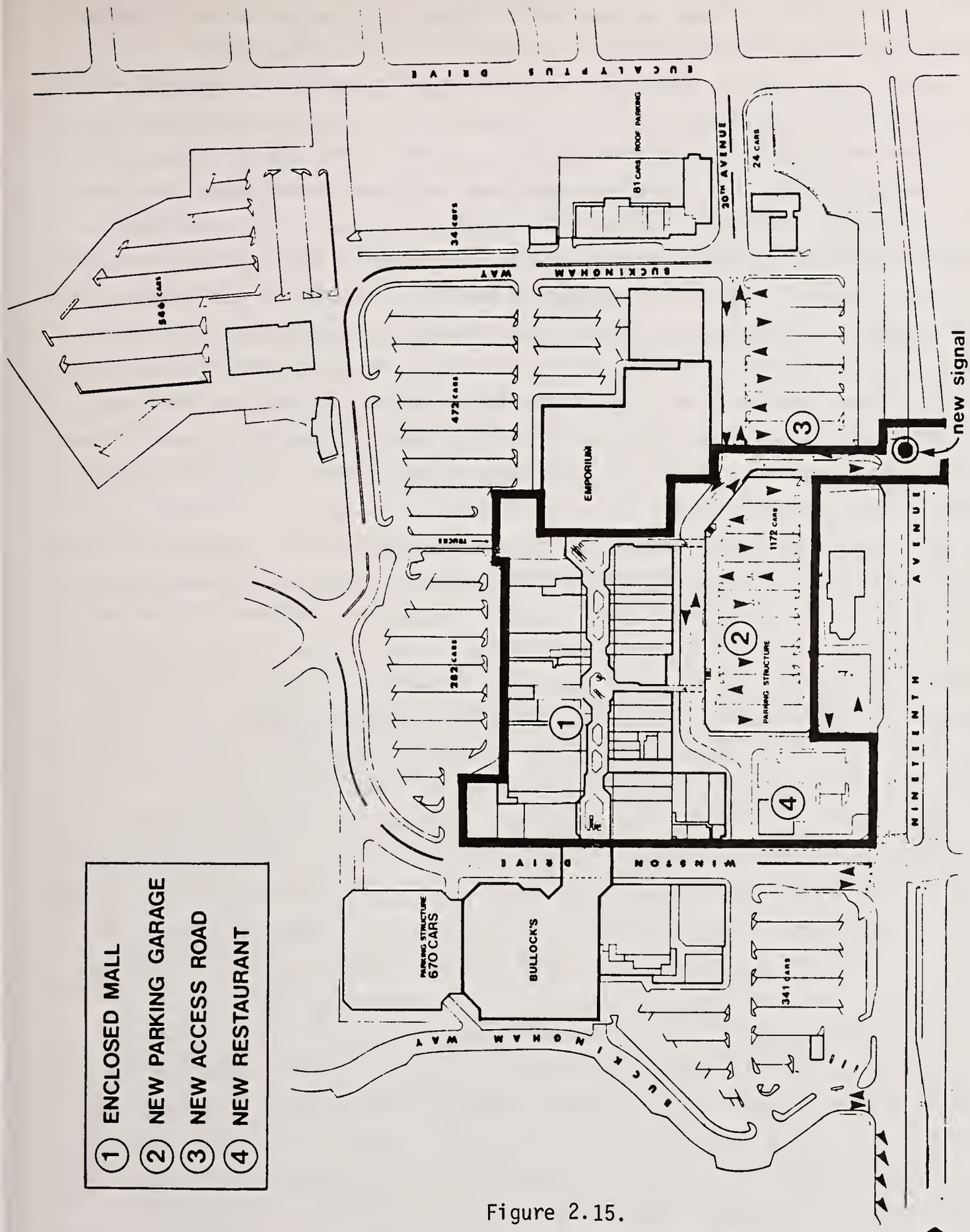


Figure 2.15.

Proposed Expansion of Stonestown Mall

SITE PLAN

Source: [2]

of this road and 19th Avenue. A new traffic signal would be installed to further mitigate increased traffic problems as a result of the mall expansion.

Transit patronage is forecast to increase by 275 one-way trips per day, and approximately 25 during the peak hour, as result of the proposed expansion. A transit preferential lane is presently being considered that would follow 20th Avenue between Winston Drive and Buckingham Way only, and would improve Muni and Samtrans transit service to and from Stonestown Mall. The transit-only lane is planned to mitigate problems created by the mall expansion that would hinder transit vehicle flow while passing the shopping center. The transit preferential lane also represents an effort by the Stonestown Development Corporation to counter Muni's threat of rerouting transit from 20th Avenue, reducing congestion problems for buses through the center. The transportation element of the San Francisco Comprehensive Plan has designated 19th Avenue, adjacent to the center, as a transit preferential street, though no other nearby streets have been so designated, including 20th Avenue [3].

The major factor of interest concerning the proposed mall expansion is the proposed number of increased parking spaces forecast to accommodate the expected increase of business activity at the center. The increase of about 400 parking spaces, in the proposed structure, is only about 4.3 spaces per 1,000 square feet of the 92,000 square foot area mall expansion proposal. In fact, in a previous expansion of Stonestown Mall, the existing major department stores and the new department stores being added to the center (Bullock's) agreed to accept a post-expansion parking ratio of less than 4.0 spaces per 1,000 square feet.

These facts are evidence that shopping centers and major retailers have recognized the importance of public transit service to their location, as in most cases a ratio of less than 5.5 parking spaces per 1,000 square feet would not even have been considered. Well-patronized transit service to shopping centers can reduce the costs of construction, operation and maintenance of parking lots and structures for shopping center developers. If Stonestown Mall were the rule rather than the exception, public transit operators would be in an extremely advantageous position to request subsidies from shopping center developers, specifically for routes serving the centers. The savings realized by shopping center developers from a reduction in parking spaces required to construct and maintain could be transferred directly to the transit agency to help pay for the bus routes serving the shopping center. It would seem that such a subsidy would benefit both parties, as transit service would be improved to the shopping center, bringing more customers for the retailers, and more riders for the transit operator.

Stonestown Mall provides evidence that a shopping center on the West Coast can attract a large number of transit riders. The expansion of Stonestown Mall provides further proof that regional shopping centers are increasing their roles as major activity generators. It appears that the Stonestown Development Corporation is working closely with Muni concerning the proposed mall expansion, which may indicate that transit operators, developers and mall managers are beginning to work together to effectuate well-integrated transit service to shopping centers. The higher the proportion of shopping center patrons who use public transit to get to the center, the better the bargaining situation is for public transit operators.

This case study reveals another significant factor for public transit operators. The fact that Stonestown Mall is located near another major activity generator, San Francisco State University, may be a significant reason why the mall does so well in terms of transit patronage. With two major activity generators located close to each other, an area of San Francisco is transformed into one super major activity generator, serving as a tremendous draw for public transit lines and consequent ridership. This evidence would seem to support planned efforts to cluster activity generators near each other, as this results in a more favorable environment for public transit.

b. Eastridge Mall

Santa Clara County is located just south of the San Francisco Bay area, between San Mateo, Alameda and Santa Cruz counties (see Figure 2.16). Fifteen incorporated cities join to form Santa Clara County, generating a population of approximately 1,230,000. This figure is estimated to increase to 1,400,000 by the year 1990. Santa Clara County's racial composition is predominantly white, 78.9 per cent, and Latin-American, 10.27 per cent. Blacks compose only 2.59 per cent of the county's population. The median income in Santa Clara County is approximately $20,225. Over 90 per cent of all trips made in Santa Clara County are made with an automobile.

San Jose is the county's major city, as it accounts for over 47 per cent of Santa Clara County's total population, with a population of 588,000. San Jose is forecast to assume an even higher percentage of the county's population by 1990, as its population is estimated to grow to 678,000 by 1990. The median income in San Jose is somewhat less that that of the county as a whole, $19,970; and its racial composition is somewhat more mixed, as 74.6 per cent are white, 13.8 per cent Latin-American and 3.6 per cent black.

The Eastridge shopping center is located in San Jose, near the intersection of the Capitol Expressway and a major California Interstate Freeway (the 101),

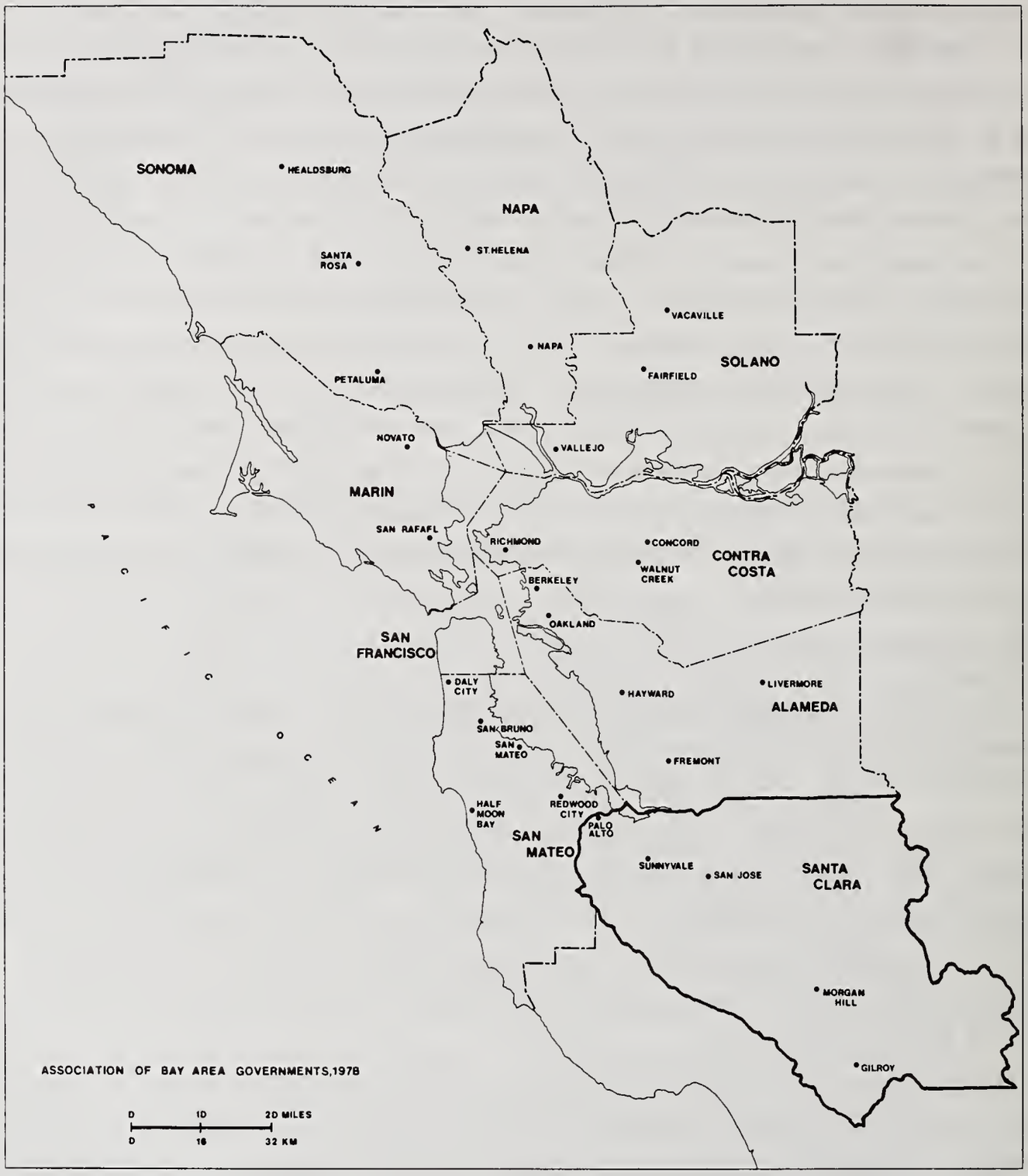


Figure 2.16. San Francisco Bay Region

which provides for convenient automobile access to the center (see Figures 2.17 and 2.18). Eastridge Mall, opened in May of 1971, is the largest regional shopping center in Santa Clara County and was the twelfth largest shopping center in the United States in 1978. The center is a three-level, enclosed structure that contains 1,600,000 square feet of gross leasable area, and covers some 200 acres of land. Sixty-three additional acres are forecast to be developed when the center is fully completed. Eastridge Mall presently provides customers with 9,000 parking spaces (a parking ratio of 5.6 spaces/1000 square feet) and an additional 1,000 spaces are planned for its final development.

Santa Clara County Transit District (SCCTD) serves the urbanized portions of Santa Clara County, an area of approximately 250 square miles. The district was founded in January, 1973 when three privately operated carriers were consolidated under public ownership. SCCTD inaugurated service with 50 buses to serve Santa Clara County; today SCCTD operates over 320 buses, and by the year 1980, 516 buses are anticipated to be in use. In 1978, SCCTD carried 12 - 14 million passengers and had one of the lowest operating costs to passenger revenue ratios of all the major transit operators in California (i.e., 0.8). [8]

SCCTD serves Eastridge Mall with four traditional fixed routes and one "handicoach" route, which is a fixed route which also serves handicapped persons. This handicoach uses a special "gillig" bus that has three tie downs and a hydraulic lift to accommodate wheelchairs. Handicoach seats 33 persons with all seats and wheelchair spaces occupied. Performance indicators and operational characteristics of the five routes serving Eastridge Mall are shown in Table 2.12.

These routes combine to generate 231 daily bus trip ends to Eastridge Mall. Recent traffic checks conducted by SCCTD have indicated approximately 6,000 daily ons and offs are generated at Eastridge Mall, of which approximately 30 per cent are transfer related, resulting in 4,200 of the daily ons and offs having Eastridge as their origin and/or destination.

Eastridge Mall generates an average of 71,552 person-trip ends daily, of which approximately 5.8 per cent are served by public transit. A recent survey conducted at Eastridge Mall has indicated that 57 per cent of these person-trips are produced in San Jose, with the other 14 incorporated cities in Santa Clara County sharing 43 per cent of the person-trip production to Eastridge Mall. The same survey has shown that an incredible 67 per cent of Eastridge's customers patronize the mall on Saturdays, leaving the other six days of the week sharing only 33 per cent of the activity at Eastridge Mall. This survey has further indicated that only 14

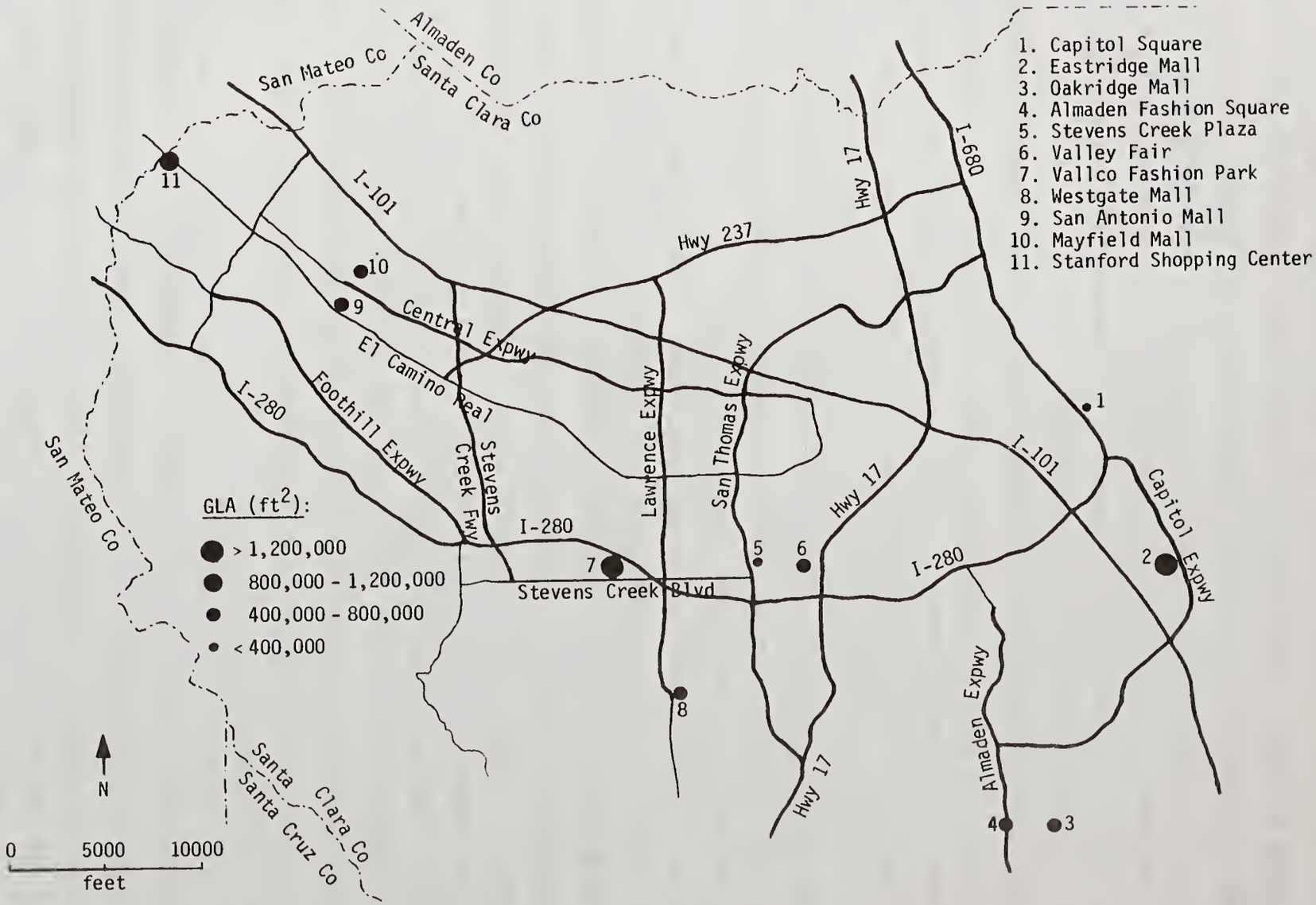


Figure 2.17. Santa Clara County Shopping Centers

Figure 2.18. Aerial View of Eastridge, Looking Northeast, 19//.

Table 2.12

Performance Indicators and Operational Characteristics of Bus Routes Serving Eastridge Mall

Operating Characteristics	Bus Routes 18	22	26	70	71
Riders per Hour:	40	32	26.9	27.2	30.6
Average Load:	19	12.4	9.8	8.6	9.8
Fare Box Ratio (% of operational costs recovered from fares):	1.0	12.1	8.0	7.6	7.8
% of Passengers by Age:					
Weekday					
under 17	43	33	56	71	82
18-64	45	48	31	17	14
65+	12	19	13	12	4
Weekend					
under 17	0	35	65	70	91
18-64	0	43	27	24	7
65+	0	22	8	6	2
Headways:					
Weekday					
peak	90	15	30	30	30
off-peak	110	30/60	30	30	30
Weekend	0	60	60	30/60	60
Monthly Revenue Passengers:	3,534	163,133	41,440	29,356	40,463
% Handicapped Using Line:					
Weekday	12.4	6.0	0.8	1.0	1.0
Weekend	0	4.6	13.7	0.6	0.4

Source: [6]

per cent of the customers patronizing Eastridge Mall live within five minutes or less driving time to the mall; 37 per cent live within a 6 - 15 minute drive to Eastridge Mall; 18 per cent live within an 18 - 24 minute drive; and 31 per cent of Eastridge Mall's customers live more than 24 minutes from the shopping center. These figures demonstrate the tremendous regional draw of a major shopping center such as Eastridge Mall. This notion is further demonstrated by the fact that, in

1978, SCCTD carried approximately 40,149 passengers on a weekday [3], of whom approximately 4,200 had Eastridge Mall as their origin and/or destination. Eastridge Mall consequently accounted for over 10.4 per cent of the total daily trips made on public transportation in Santa Clara County.

As a result of this observed activity, Eastridge Mall has been identified as a major transferring point in Santa Clara County for public transportation users. Accordingly, a transfer center which would be constructed at Eastridge Mall is presently being planned by SCCTD. It will provide such amenities as shelters, information signs, benches, trash containers, and telephones (see Figures 2.19 and 2.20). This transfer center will provide 10 parking spaces for buses, which will eliminate 62 parking spaces presently being used for automobiles. The route the buses are to follow in and out of Eastridge Mall can be seen in Figure 2.19. The buses will all enter from the south entrance to the mall and exit on the south side as well, following the path indicated in Figure 2.20.

An alternate route has been delineated to mitigate traffic and congestion problems at especially busy periods of activity for the mall and transfer center. This path is indicated by a broken line and arrow in Figure 2.19. The transfer center is forecast to accommodate 23 buses per hour on each side of the transfer center (or 46 buses/hour in all).

According to the county transportation agency of Santa Clara County, for transfer center improvements within existing private developments, such as major shopping centers, the county and property owner will cooperate on the improvement [7]. The county may assist in funding and the property owner may provide land and funds needed beyond county standard facility improvements.

Recent traffic checks have indicated that the average on and off activity per bus at Eastridge Mall peaked between 2:00 p.m. and 3:00 p.m. This unique peak hour for ons and offs at Eastridge Mall can be explained in part by the fact that San Jose and Santa Clara County schools terminate class sessions for the day between 2:00 p.m. and 3:00 p.m., and Eastridge Mall serves as a major transferring point for these schoolchildren and teenagers. The five bus routes serving Eastridge Mall together average over 55 per cent of their daily riders under the age of 17, with one route carrying over 80 per cent of its riders under the age of 17 (see Table 2.12).

The high percentages of young riders going to or transferring at Eastridge Mall have contributed to several problems presently being experienced at this shopping center. Often schoolchildren do not transfer immediately, and prefer to loiter at the mall. Eastridge Mall is located in a racially mixed area, which

Figure 2.19. Eastridge Transfer Center Site Plan

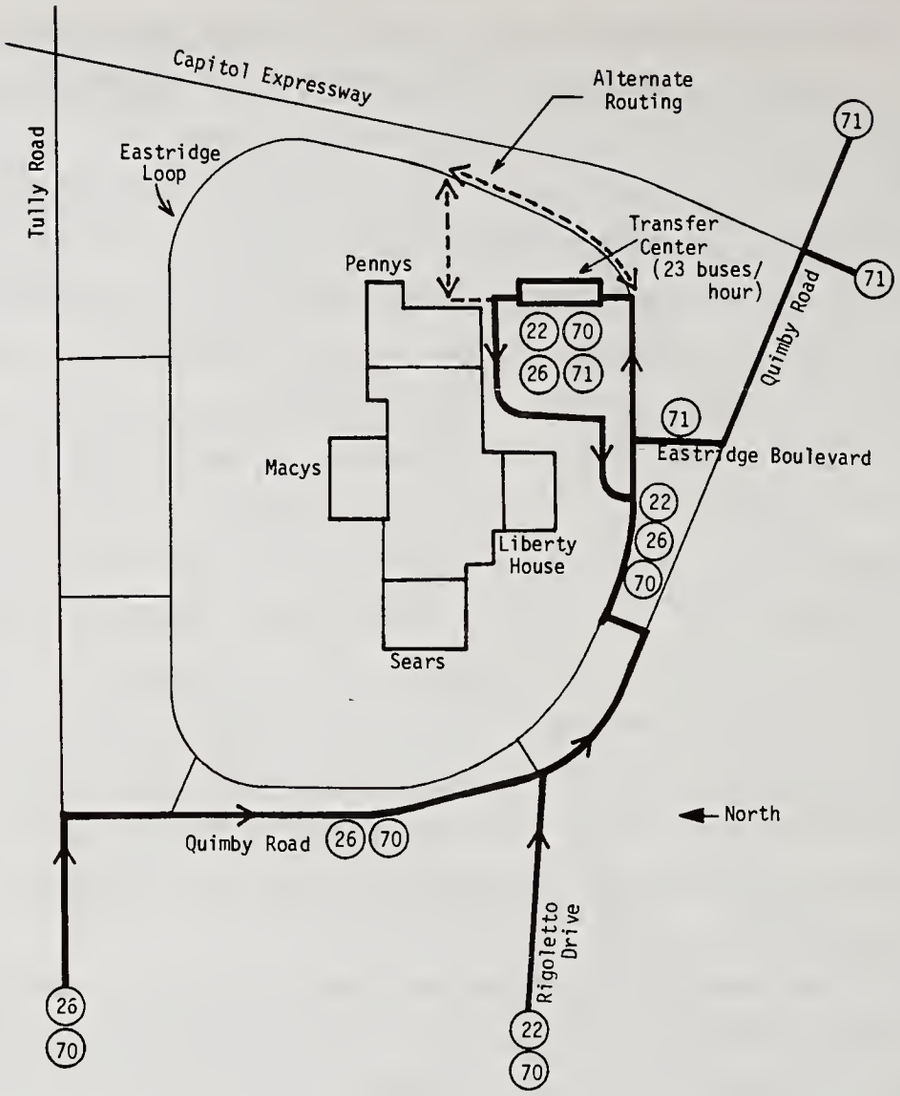
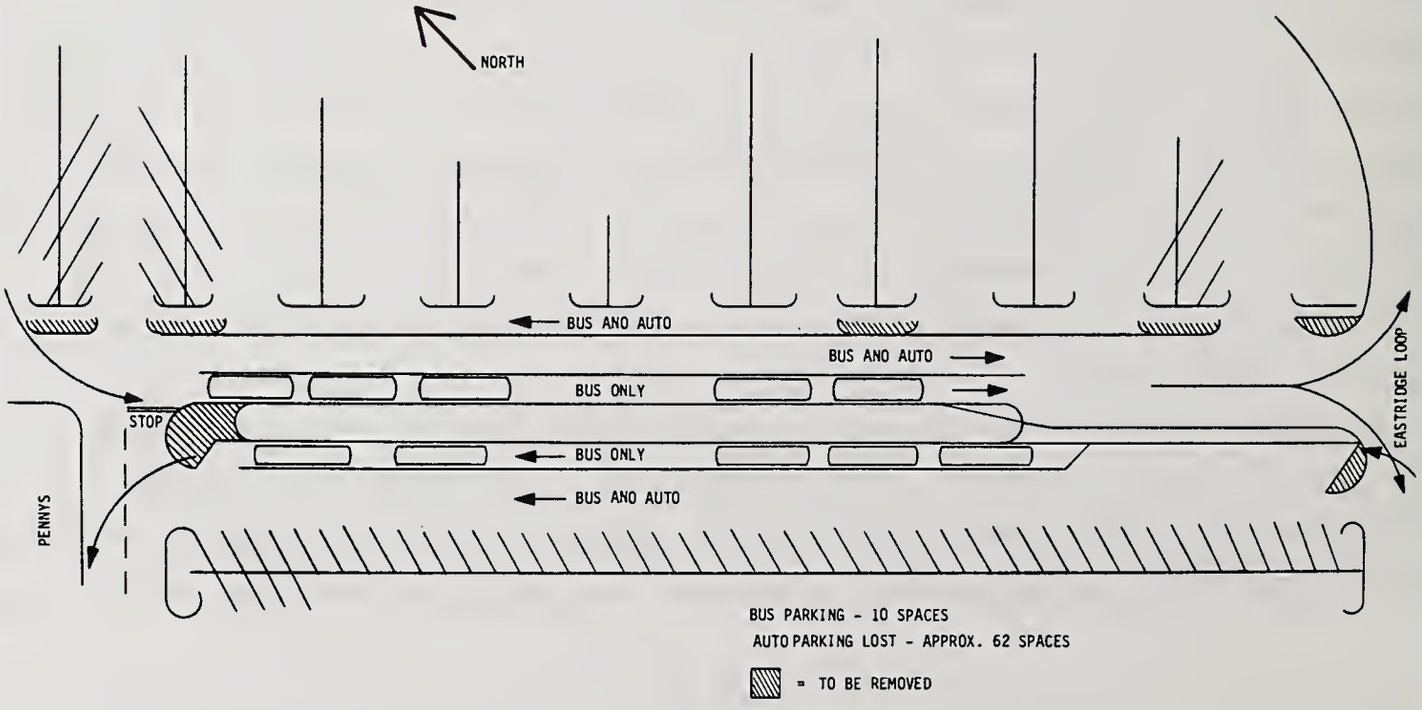


Figure 2.20. Diagram of Eastridge Transfer Center



Source: Data from Santa Clara County Transit Authority

has also contributed to some of the problems the mall has experienced with young people. For some time now, Eastridge Mall has served as an arena for gang fights between blacks and Chicanos, as both groups have apparently claimed Eastridge Mall as their "turf." Both violence and drug abuse appear to be related to the "gang wars" and loitering of young people at Eastridge Mall. Some older people are now afraid to ride the bus to the mall, as some of this violence takes place on the bus as well as near the bus stop. Young people have also taken to congregating and throwing footballs and frisbees inside the three-level mall, creating additional problems for the mall management.

The loitering, fighting and playing of young people at Eastridge Mall has resulted in more than security problems for the mall management. Such activity deters shoppers from patronizing Eastridge Mall, which has led to a serious attempt by the mall management to crack down on such activities pursued by young people at Eastridge. The management has requested that two full-time police officers be present at the mall and has already increased its security significantly.

Eastridge Mall is planned to be a major stop on a new bus line that will extend up from Morrill Avenue and Capitol Expressway [1]. This is especially significant as only two new arterial lines are planned to be implemented by 1980. Selection of this route is based on customer requests and partly on the analysis of current ridership, which shows that other routes in the same area have attracted significant ridership. In addition, this line is expected to serve school transportation needs, which could create additional problems for Eastridge Mall in terms of numbers of loitering young people.

In addition, all alternative transportation studies (heavy rail, express bus, light rail) that are presently underway at SCCTD have indicated Eastridge Mall as a major transferring point and frequently as a station location for the various modes and route paths studied.

Eastridge Mall represents further evidence that shopping centers are increasing their roles as major activity generators and that public transit operators are responding to this. The range of Eastridge Mall in economic terms of market area, and the fact that the mall accounts for over 10.4 per cent of all daily trips made on public transportation in Santa Clara County, both point to Eastridge Mall as a significant activity generator in Santa Clara County. The construction of a transfer center at Eastridge Mall, the planned implementation of a new regular fixed route through Eastridge Mall, and the recognition of Eastridge Mall as a central transferring point and potential station location in future oriented transportation alternative studies, all demonstrate SCCTD's awareness of the

importance of Eastridge Mall to public transit in Santa Clara County, today and in the future.

The major lesson that can be learned from this case study on Eastridge Mall concerns the problems this mall has experienced with young persons. Shopping centers are becoming gathering places for young people throughout the United States, partially because they are accessible by public transit. This presents a significant problem to public transit operators, as the volume of young people riding buses to shopping centers has resulted in reduction in patronage by older people, especially senior citizens. The image that public transit maintains, especially to shopping centers, will have to be improved to satisfy shopping center management and older bus riders. One effective step that could be taken in this regard would be for transit operators to shift transferring locations for school children from shopping centers such as Eastridge to other locations where young persons waiting for bus connections would not present a significant problem. Even if such a step were to be taken, young people will still use public transit and other modes of transportation to get to shopping centers. The solution to this problem, it would appear, lies in a coordinated effort by the shopping center, public transit operator and possibly the local police force to control young persons' access to and activity within shopping centers.

c. Vallco Fashion Park

Vallco Fashion Park, Santa Clara County's newest regional shopping center, is located east of San Jose, in Cupertino (see Figure 2.17). Automobile access is made convenient, as the mall is directly adjacent to a major California Inter-State Freeway, the 280, and a major arterial highway that bisects Santa Clara County, Stevens Creek Boulevard. Opened in October of 1970, Vallco Fashion Park covers some 60 acres while providing 1,200,000 square feet of gross leasable area. Presently, 4,270 parking spaces are available for customers and employees, a ratio of only 3.5 parking spaces per 1000 square feet of commercial area, which is noteworthy, as it is significantly under the recommended 5.5 parking spaces per 1000 square feet of commercial business space recommended by the Urban Land Institute. Apparently, this is adequate parking supply for Vallco Fashion Park, as additional parking is not being planned for.

Vallco Fashion Park is uniquely planned, as it includes climate-controlled pedestrian malls, a series of indoor parks and rest stops, and a bridge spanning an arterial road that contains restaurants, department stores and smaller shops. Automobile traffic flows into the center through a uniquely designed access tunnel.

SCCTD provides the public transportation service to Vallco Fashion Park. Presently, six lines serve the shopping center. The number 01 bus is an express route, operating only during peak traffic hours and the 96 bus is a local community fixed route that serves only off-peak, daytime trips. The remaining four lines serving Vallco Fashion Park are standard fixed bus routes.

Future transit systems improvement plans show preferential transit treatment planned for routes 01 and 23, presently serving Vallco Fashion Park. Such transit preferential treatment would include "opticom" emitters and signal pre-emption equipment to be installed at various intersections as well as transit-exclusive lanes. Vallco Fashion Park is also planned as a major stop for an express bus transit alternative and as a station location for a "futuristic" heavy rail line that would connect Santa Clara County with surrounding counties.

A transfer center has been planned for Vallco Fashion Park that will incorporate various features such as shelters, information displays, bicycle lockers, telephones, and landscaping. The location for the transfer center with respect to Vallco Fashion Park is indicated by a "T" in Figure 2.21 and will remove about 35 customer parking spaces. A diagram of the proposed transfer center is shown in Figure 2.22. Buses will approach the transfer center from the east and west, and will load and unload onto the two islands displayed. The specific routing of buses through the transfer terminal and the mall is also displayed by arrows in Figure 2.22. Thirty-seven buses per hour are expected to stop at this transfer center. Construction is expected to begin about the beginning of August, 1979.

A unique financial arrangement has been reached by SCCTD and Vallco Fashion Park regarding the transfer center's funding. SCCTD will contribute $30,000 to its construction, the remainder being provided by the shopping center. This remainder has been estimated at about $90,000, bringing the construction costs of the center to about $120,000. No federal funding will be used either in the construction or maintenance of the transfer terminal.

Vallco Fashion Park management and developers are working closely with SCCTD on the planning and construction of the transfer center. This is indicative of a trend toward greater cooperation between shopping centers and transit operators. This cooperation should lead to improved public transit service to shopping centers as major activity generators in urban regions, in turn improving transit patronage for the urban area as a whole. The role that Vallco Fashion Park plays in future transportation plans and alternatives in Santa Clara County is evidence that these trends will most likely continue in the near future.

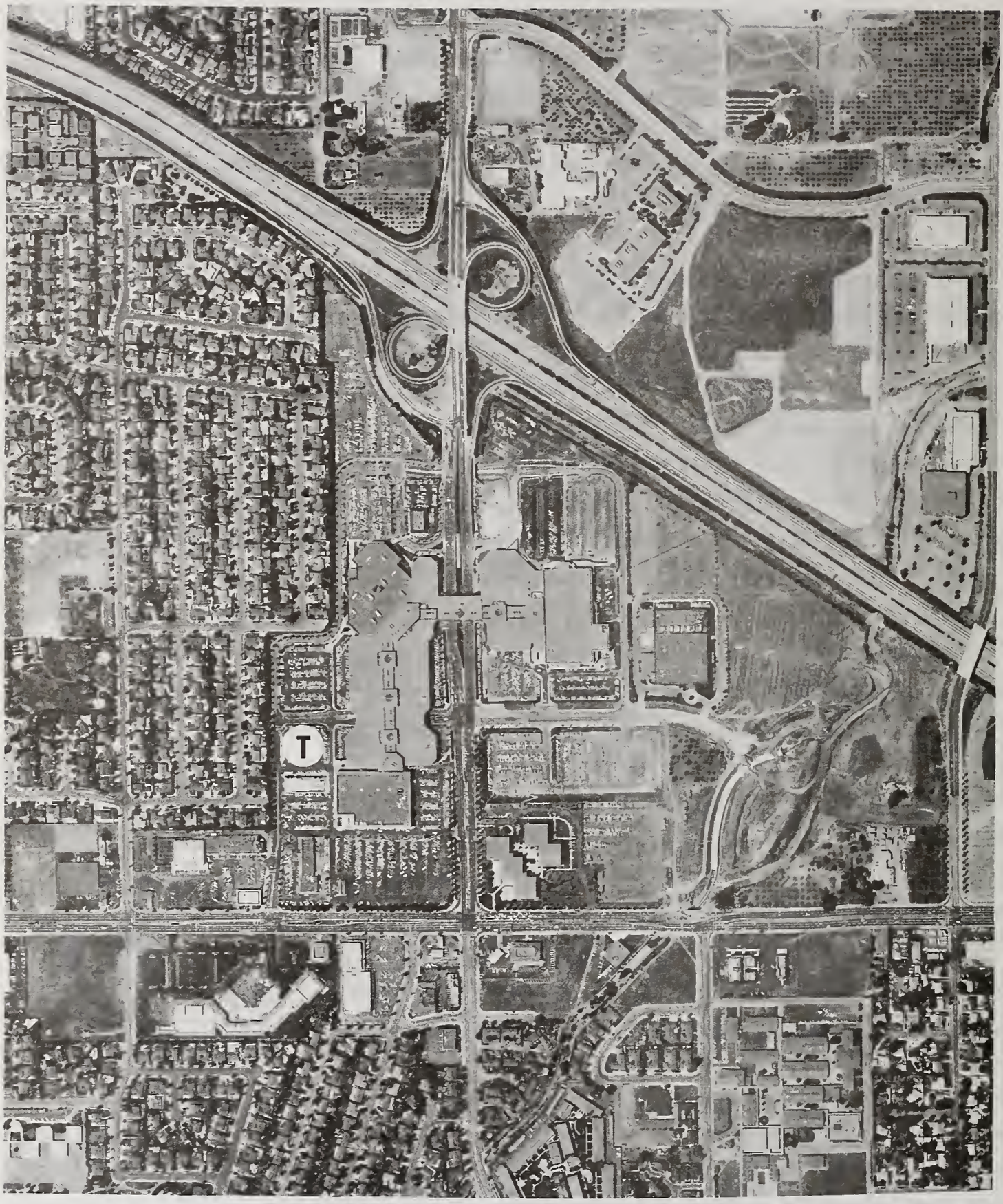


Figure 2.21. Aerial View of Vallco Fashion Park Showing Location of Transfer Center, Looking North, 1978

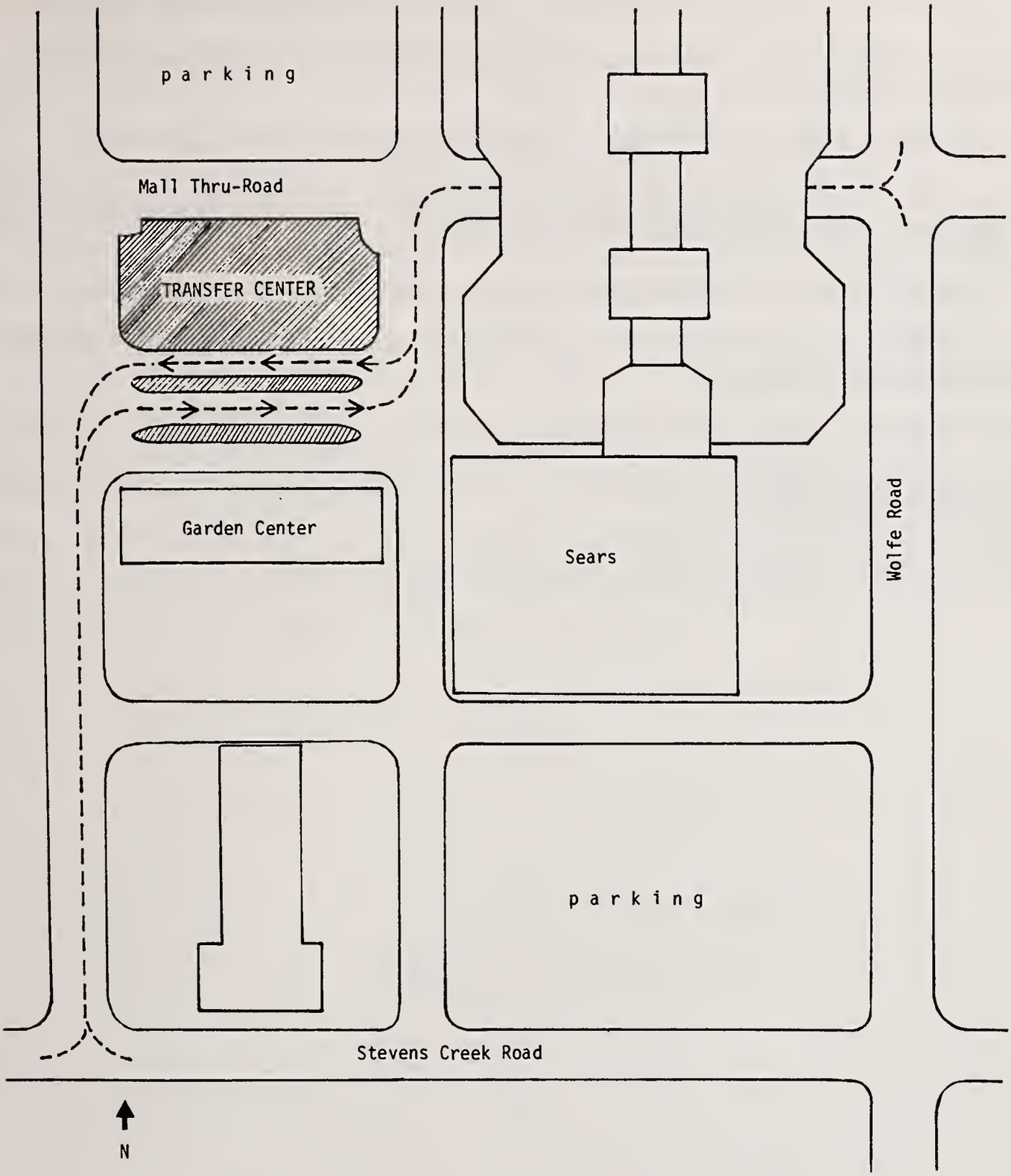


Figure 2.22

Transit Movement Through Vallco Fashion Park
and Proposed Transfer Center

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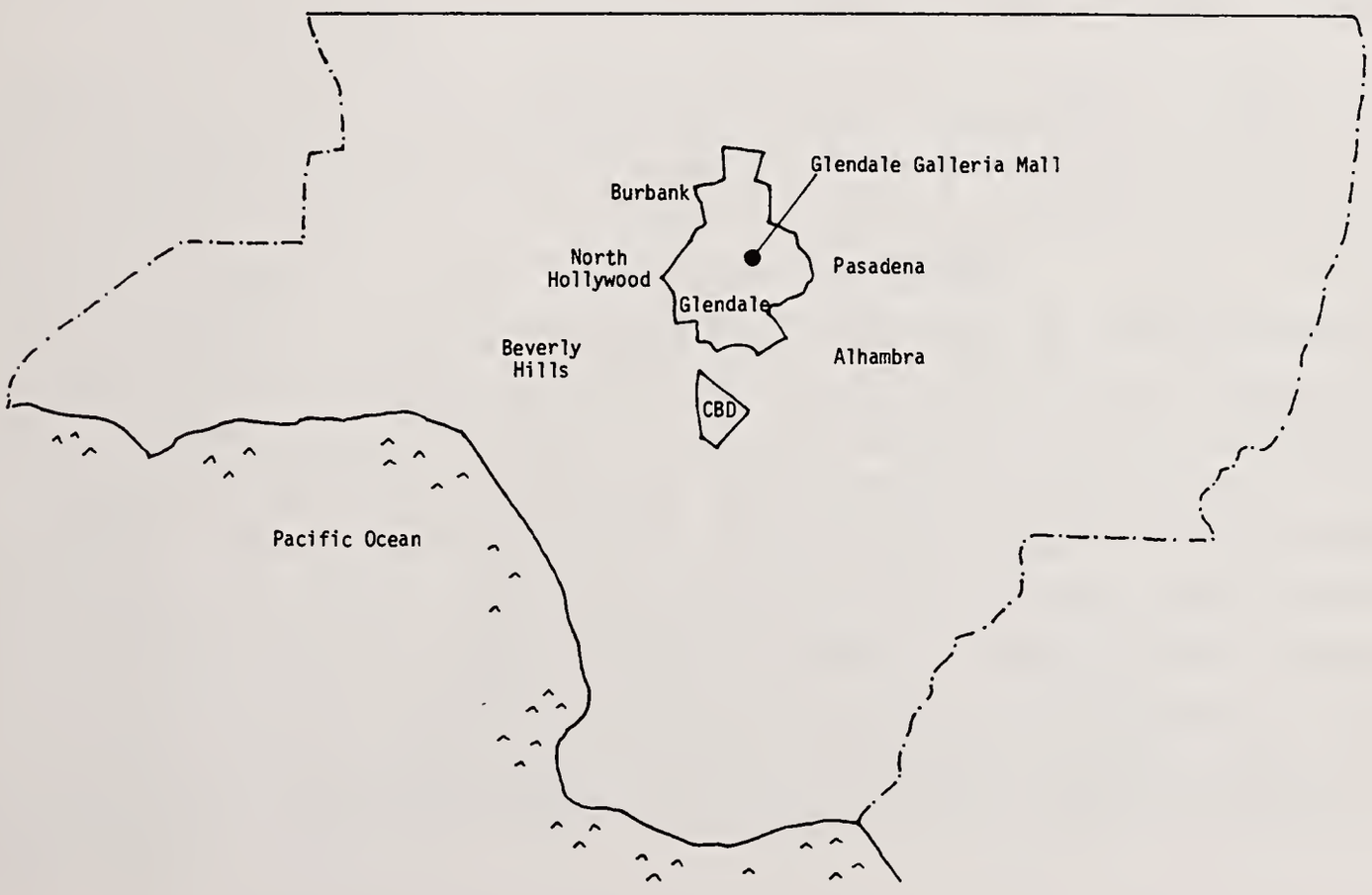
4. Los Angeles

a. Glendale Galleria Mall

Los Angeles County covers some 4,083 square miles and is one of the larger counties, geographically, in California. With a current population of 7,083,431 [3], it is the most heavily populated county in California. Growth projections indicate an increase to about 7,770,000 by the year 2000, which is the lowest simple annual growth rate of any county in southern California [4].

Glendale is one of the 81 incorporated cities that make up Los Angeles County, and is located just northeast of central Los Angeles, near the San Bernardino National Forest (see Figure 2.23). Glendale's present population of 136,500 is not projected to grow significantly in the 1980's, as the city has been very stable in terms of population since 1970 [4]. The city of Glendale covers about 30 square miles, making it the third largest incorporated area in Los Angeles County. The per capita income in 1974 was $6,316, which is considerably higher than the national figure of $4,572 at that time [1]. Glendale is predominantly white, but includes a relatively high proportion of Spanish-speaking people and elderly people, leading to a population highly dependent upon public transit.

Figure 2.23. Location of Glendale in Los Angeles County



Glendale Galleria Mall is a $70 million, two-level, enclosed shopping center, with 1,034,000 square feet of gross leasable area. The mall has four anchor tenants and some 155 shops and restaurants that are connected to a three-level parking structure by a series of pedestrian bridges. The parking structure provides customers and employees of the Galleria Mall with about 4,400 spaces, creating a parking ratio of only 4.0 spaces per 1,000 square feet of commercial area, which which is considerably under the Urban Land Institute's recommended 5.5 spaces per 1,000 square feet of commercial area. One reason for this low parking ratio is that the Galleria Mall is located in the heart of downtown Glendale and was constructed in 1972, under the framework and guidelines of urban redevelopment. It is one of the largest urban redevelopment projects of its kind in the United States. The Galleria Mall is the result of a partnership between private and government interests working together to redevelop an area within an existing central business district. The government interests were chiefly responsible for the low parking ratio existing at the mall, as they were attempting to encourage more public transit ridership to the central business district of Glendale.

The Galleria is currently poorly served by public transportation, creating significant problems for the mall during peak shopping seasons, as the parking supply is simply inadequate to meet demand. The Galleria was designed to allow public transit routes to directly serve the center, but bus lines do not enter the center directly because of the increase in headway times that would result from the path that buses would have to follow to get through the mall.

Several proposals to deal with the poor public transit service to the Galleria have been put forth. The most interesting response has been initiated by the Chrysler Corporation's Realty Division, which has proposed an employee vanpool service to and from the mall that would double as a dial-a-ride service for the Galleria during the off-peak hours. The vanpool program is currently being advertised to employees of the Galleria on a subscription basis. One employee would be selected as the driver of each van and would be responsible for picking up and taking home the other employee-patrons of the vanpool program who reside in his zone. Five vehicles would initially be implemented, one serving as a backup vehicle, and up to twelve employees can be transported in each van. The incentives for the employee to act as driver of the van are that: (1) the van driver may use this van at no cost up to 50 miles per month in excess of commute miles, and thereafter at a cost of 11¢ per mile; (2) the van driver gets free transportation to the Galleria and back home, as he will not be required to pay the subscription fee for the service; (3) if the driver carries over 10 employees, including himself,

the 11th and 12th passenger's fees for the service will be divided evenly between the driver and the vanpool program. The vanpool service is designed to break even if 10 passengers are transported, so the surplus is viewed as shared profit between the vanpooling program and the employee/driver.

The vanpool fares are structured as follows:

Daily Round Trip Distance of Van	Within City	10 Miles	20 Miles	30 Miles
Monthly fares per 9 riders	$26.15	$27.35	$29.65	$30.00
Monthly fares per 10 riders	$23.55	$24.60	$26.70	$28.80

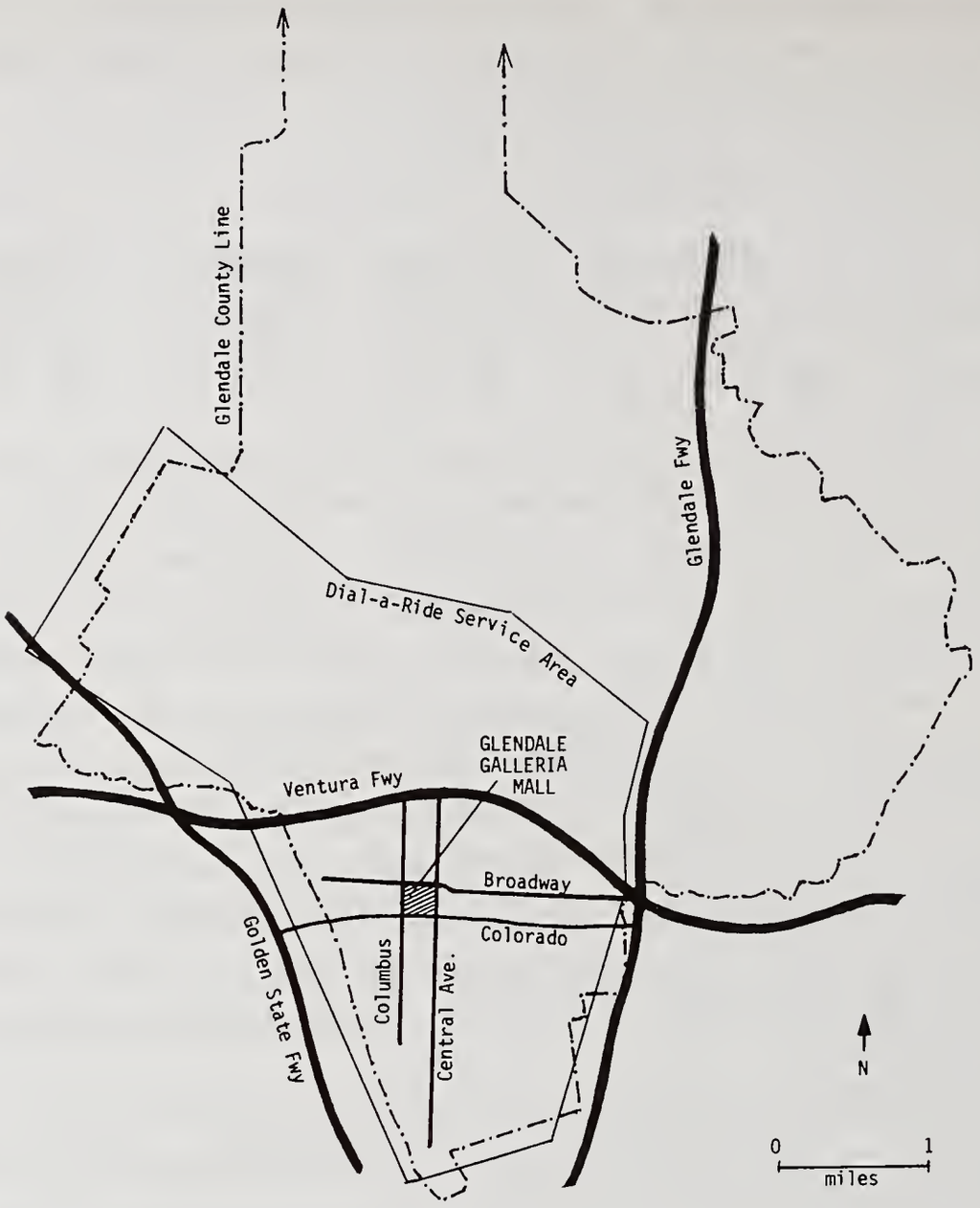
The Galleria employs 1,520 persons, of whom 600 are employed on a full-time basis. Essentially, the vanpool program can only draw from these 600 employees, as the part-time employees' schedules are irregular. A maximum of 48 employees (4 vans x 12 employees) can be transported during the beginning phases of the vanpooling program; therefore, only about eight per cent of the employee work force at the Galleria need participate in the vanpooling program for it to be a success.

Several organizations near the Galleria have expressed interest in the vanpooling program for their employees. If employee response is not adequate at the mall, it is likely that these other employment centers will be integrated into the program. Otherwise, they will have to wait until additional vans are purchased by the vanpool program. It is very conceivable that within one year, several employment bases near the Galleria will be integrated into the vanpool program, according to the project coordinator.

Once the vans reach their destination of the mall, about 9:00 a.m., they will serve as a demand-responsive dial-a-ride service to the Glendale Galleria Mall. This service will operate only until 3:30 p.m., and only on weekdays. After 3:30, the vans will be used to pool the Galleria's employees home.

The area being served by the dial-a-ride program covers the bulk of Glendale's population, yet only covers about one-half of its geographic area (see Figure 2.24). Because of gerrymandering, Glendale's city boundaries are awkward, and the city is difficult to serve efficiently with public transportation. The dial-a-ride service area contains a high proportion of elderly and handicapped persons, because several retirement centers and special hospitals are located in this area. Also a significant proportion of Spanish-speaking persons reside in the area defined in Figure 2.24, creating a highly transit-dependent population to be served by the dial-a-ride program. The wealthier areas of Glendale generally will not be served, as these residences are primarily located in hilly terrain, and furthest from the shopping center.

Figure 2.24. Glendale Dial-a-Ride Service Area



The dial-a-ride service area has been divided into four zones, with each driver being responsible for one zone. Four vehicles and one spare will also initially be used in the dial-a-ride program. The patron will simply call in for the service, whereupon a dispatcher will take the call and assign the caller a vehicle and driver according to the location of the caller's address with respect to the appropriate zone. Some calls will be taken in advance, and each driver is responsible for establishing his own route. The radio dispatcher will radio the drivers as requests are made for dial-a-ride service during the day, giving the caller's location and the time requested for pickup. Return trips can be established during the initial call, or the patron may walk into the dial-a-ride office located in the mall and request return service from there.

The cost of the service is 75¢ for each trip, so it would cost the dial-a-ride user $1.50 for round-trip service to the Galleria and back to his residence. It has been estimated by the Chrysler Corporation's Realty Division that 300-350 daily dial-a-ride trips must be served in order for the dial-a-ride program to break even. This means that each driver will have to carry approximately 80 riders during a six-hour period (9:30 a.m. - 3:30 p.m.), or between 13 and 14 riders per hour. Such ridership will be extremely difficult to achieve for a demand-responsive, door-to-door service, especially as traditionally, a high proportion of dial-a-ride patrons are elderly or handicapped and require more time and assistance to board and alight the vehicles.

Chrysler anticipates subsidizing both the vanpool and dial-a-ride programs for the first six to eight months. After this time it is hoped that these programs will become self-supporting. For the dial-a-ride program, any cost of service over the 75¢ per trip charge will be written off by Chrysler Realty; for that matter, any loss accruing from either program can be underwritten by Chrysler as an unprofitable venture. Employers within the Galleria will not be subsidizing these programs, as the Chrysler Corporation is assuming the entire financial backing of the vanpooling and dial-a-ride programs. The Galleria management is contributing office space and various services to the programs, but no direct financial assistance.

Fixed costs for the vehicles have been set at $225 per vehicle per month, and operating costs are estimated to be about 10% per vehicle per mile. These operating costs will be affected bythe recent increases in fuel costs. Actual operating costs are presently undeterminable, as actual distances travelled by each vehicle are unknown.

The vehicles to be used are standard Plymouth Voyager vans that have been adapted for these programs. The seating arrangement within each vehicle consists of six bench seats, all facing forward, which have been specially upholstered for passenger comfort. Each seat has an ashtray in the armrest, and passengers will access these seats through a sliding side door that opens to all seats. An FM stereo radio system will also be provided, and rear vents will be installed for air conditioning throughout the van. About seven cubic feet of storage space is built into the rear of each van to accommodate packages and walking aids (e.g., crutches). An extra step for boarding the van will be installed in each van, as will special safety grips and fire extinguishers. With these features, the cost of each vehicle is about $13,000.

Six full-time employees will be used to operate the vanpool/dial-a-ride programs initially. One manager - program coordinator, one radio dispatcher and four

part-time vehicle drivers (six hours/day) will make up the entire staff. Both programs are expected to begin service the last week in May of 1979.

The Chrysler Realty Division had to acquire a permit before initiating this service. This permit is the same as that required for an organization which proposes a mass transit, for-hire service. An inspection was conducted, whereupon the city required the installation of the additional step, safety grips, and fire extinguishers to the vehicles, and evidence of adequate insurance protection. A handicapped persons' advocate group presented a significant problem to the acquisition of this permit, as they demanded that each van be accessible to wheelchairs. This would have added significantly to the fixed cost of each van and moreover, insurance premiums would have doubled. Chrysler protested on the grounds that the program was experimental and possibly temporary. The extra step was eventually installed as a compromise that satisfied both parties' interests.

The vanpooling program has been advertised to the Galleria's employees via brochures and various meetings. Employees are also encouraged to walk into the vanpool/dial-a-ride office, located in the center of the mall, and discuss the vanpooling program with the coordinator-manager. Aggressive marketing of this service has not yet been pursued, however, and consequently employee response has been less than anticipated. Individual employers have been requested to talk to their employees about the vanpooling program, but thus far they have not accomplished a great deal. The major objection by employees at the mall appears to be, "It's a great idea, but you can't help me because my hours are not regular."

The dial-a-ride program will be advertised in local papers before service is implemented. Flyers may be handed out to Galleria customers shopping at the center to inform them of the dial-a-ride service. At this point, the marketing of the dial-a-ride program appears to be less than sophisticated, and if the Chrysler Corporation is interested in attracting 300 - 350 riders a day to this service, marketing will have to be intensified and upgraded. Television and radio advertising are inappropriate, as no local radio or television stations exist which could focus on the specific service area.

After the implementation of these programs, press coverage will be sought by the Chrysler Corporation, but not until they "have something to show the public." Such press coverage could effectively market the dial-a-ride program for Glendale residents and others wishing for such a service to be instigated at their shopping centers.

If the Glendale Galleria vanpool/dial-a-ride programs are a success, the Chrysler Corporation plans to initiate similar services at the Lennox Square Mall in northern Atlanta, and possibly several other shopping centers in southern

California. The Chrysler Corporation is no stranger to vanpooling programs, as it has coordinated vanpooling programs in Duluth and Minneapolis, Minnesota and is just beginning a third-party vanpooling program in Denver, Colorado. This is, however, Chrysler's first attempt to organize a dial-a-ride service and its first effort at dealing with shopping centers in terms of employee vanpooling. The Chrysler Corporation is willing to sell these programs to shopping centers where needed (i.e., marketing and training assistance, vans, etc.).

Weekend and evening service of both vanpooling and dial-a-ride programs will depend on the relative success of weekday operations of these programs. If enough employees desired the vanpooling service on weekends, and if the coordination of vehicles to drivers could be effectively managed, the dial-a-ride service would be implemented on weekends as well. This would appear to be an important consideration, as the Galleria does a very high proportion of its business on the weekends, and these might be the two days of greatest demand for a dial-a-ride service to the mall, and the greatest need for parking availability at the mall.

The Chrysler Corporation is planning on adding six vans to the vehicle supply in six to eight months, depending on the success of the programs. These additional vans would certainly facilitate weekend and evening service to the mall. With this increase in vehicle inventory, it is expected that the dial-a-ride and vanpooling service areas would expand, eventually to include the entire city of Glendale, and possibly parts of Pasadena and Burbank.

Probably the major obstacle to implementing such programs will be perceived competition as viewed by local taxi companies and public transit operators. Providing that these programs (i.e., vanpool and dial-a-ride) remain focused on specific areas and specific clients (e.g., elderly and handicapped and generally transit-dependent persons), there will most likely be little opposition. However, if programs such as the Galleria vanpooling and dial-a-ride services experience broad success and application, agreements will probably be required between the program organizer and local transportation agencies. At present, Chrysler is hoping that the local transit operator (Southern California Rapid Transit District, SCRTD) will eventually take over the operation of its vanpooling and dial-a-ride programs to the Galleria if they are successful.

Public transportation to the Galleria mall may also be improved by the region's transit operator, SCRTD. The mall is planned to receive five additional regular fixed bus routes in 1980. The Galleria has been identified by SCRTD as a major activity center of the Glendale region and as a result will receive a good deal of attention concerning public transportation. Before construction of the Galleria,

the Glendale CBD was lacking in one specific point of activity centralization, and now that the Galleria has been designated to serve such a role in the region's development, the public transit operator can focus transportation services on the center.

The Galleria is also planned as a major stop on a "mini-train" that would operate only within the Glendale CBD area. This mini-train is being planned by the Glendale planning agency in cooperation with the city's traffic engineers and will serve the Galleria directly, following a route that goes into and through the mall's circulation road, stopping two or three times at the mall alone. Only about 15 - 16 stops and 8 - 10 streets are planned for this mini-train project; consequently, the Galleria will serve as one of its main foci. The actual path the mini-train would follow and specific stop locations are presently undetermined. It appears that this mini-train concept would primarily benefit Glendale CBD employees' access to the Galleria, though shoppers in other parts of the CBD could benefit just as well.

The Glendale Galleria obviously has a bright future in terms of receiving the attention of public transportation. Concerning the Chrysler vanpool/dial-a-ride program, the mall may demonstrate the potential effectiveness of the private sector in providing public transit to shopping centers. The fact that this vanpool/dial-a-ride program is entirely a private venture is significant in that it opens the door to a relatively new source of transit service to major activity centers. It is also significant because it demonstrates the increasing realization by the private sector of the importance of shopping centers in urban areas as major activity generators. If Chrysler's vanpool/dial-a-ride system proves successful, it may encourage the private sector to plan an important role in the provision of transportation services to major activity centers of all kinds. Further, such a program may lead to increased cooperation between the public and private sectors in establishing transportation services to major activity centers of all kinds.

The Galleria appears to have also established itself as a transit center for the Glendale area. Because of this recognition by the transit operator, the mall should realize a great deal of transportation services in the future. A focus of activity has been established in Glendale that whould serve to improve public transit for the city as a whole. The Galleria mall experiment is interesting because of the fact that it is a major urban redevelopment project, designed to revitalize Glendale's downtown. The mini-train project may increase the center's importance in Glendale's CBD and serve to complement the other modes of public transit serving the mall.

All of this points to the importance of shopping centers, both as transportation generators and as tools for redeveloping downtown areas by creating new major activity generators.

References:

1. City County Data Book, Bureau of the Census, U.S. Department of Commerce, 1977.

2. Glendale Galleria News

3. Los Angeles County Department of Regional Planning, Quarterly Bulletin, No. 139, January 1, 1978.

4. Southern California Association of Governments, Growth Forecast Policy, (Draft), 1978, p. 4

5. Orange County

Orange County is located in Southern California, just south of Los Angeles (see Figure 2.25). It contains 26 incorporated cities, which together have a population of approximately 1.8 million persons. Population estimates for the year 2000 indicate an increase of about 60 per cent for Orange County, about one million more people. It is expected to absorb the largest amount of population growth of any of the counties in the Los Angeles region during the 1976-2000 period. [5]

Orange County has a predominantly low-density urban form, with little high-density development and no real "downtowns," or "urban cores." However, regional shopping centers are serving parts of the role of urban cores and are major activity generators. Orange County is notorious for its traffic problems today and with a projected population increase of 60 per cent by the year 2000, the resulting increase in projected vehicle miles traveled and transportation energy consumption can be expected to intensify concern for public transportation services, especially to major activity center areas. Consequently, special emphasis has been placed on providing public transportation services to the major shopping centers in Orange County.

Presently there are 15 major shopping centers in Orange County which have 400,000 square feet or more of gross leasable area (see Table 2.13). The location of these shopping centers in relation to freeways and major arterials of Orange County is shown in Figure 2.26. Two additional centers are planned, one for Mission Viejo that will have 900,000 square feet of gross leasable area, and what is expected to be the world's largest shopping center, planned for Irvine, that will have over 2,500,000 square feet of gross leasable area when it is completely developed.

Public transportation now serves each of these shopping centers. It is operated by the Orange County Transit District (OCTD), which initiated service in 1974. OCTD currently offers a variety of service by which one may reach a shopping center. In selected communities, an "easyrider service" is provided that consists of fixed routes, allowing for intensified local service in the given community area. "Easyrider" presently serves only the shopping centers in Buena Park and Westminster.

OCTD also offers a dial-a-ride service, which employs special minibuses that can be ordered by phone to provide door-to-door service within limited areas. Currently, dial-a-ride serves shopping centers in La Habra, Brea, Fullerton, Orange, Saddleback Valley and Villa Park. An extension of this service is offered to

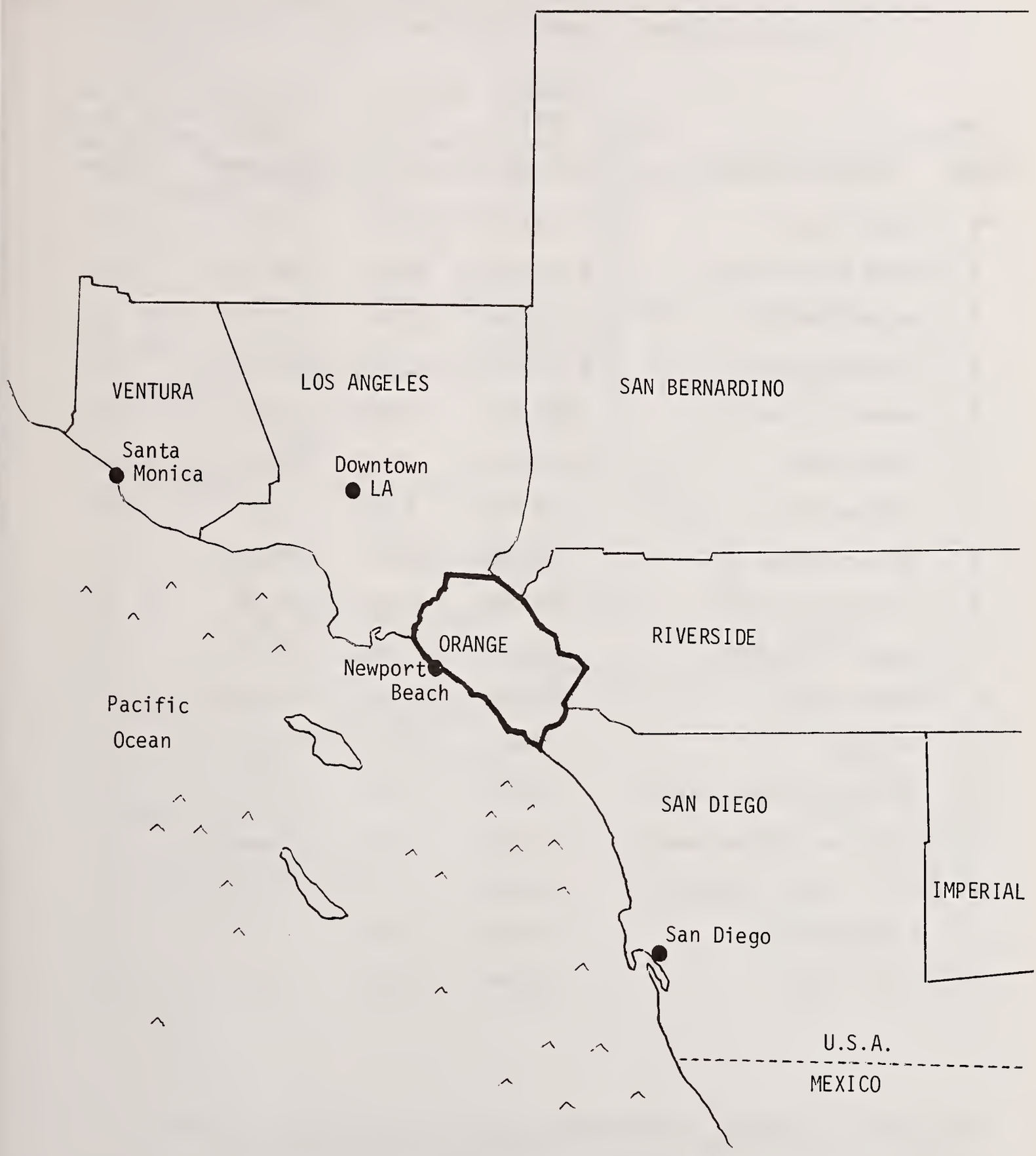


Figure 2.25. Counties in Southern California

Table 2.13

Existing and Planned Major Shopping Centers
in Orange County, California, 1978

Size & Rank	Shopping Centers	Gross Leasable Area (Sq. Ft.)	Parking Spaces per 1000 Sq. Ft.	Average Daily Person Trip Ends*	No. of Bus Routes Serving Center
**1	Irvine Center	2,500,000+	N/A	N/A	N/A
2	South Coast Plaza	2,000,000	8,300	89,440	5
3	Newport Center	1,380,000	5,460	61,710	4
4	Westminster Mall	1,031,000	6,300	46,110	4
5	Buena Park Center	1,000,000	7,000	44,720	5
6	Brea Center	1,000,000	N/A	44,720	2
**7	Mission Viejo	900,000	N/A	N/A	N/A
8	Mall of Orange	900,000	4,500	40,250	7
9	Huntington Center	856,000	3,950	38,280	5
10	Laguna Hills Mall	850,000	4,800	38,010	7
11	Anaheim Plaza	797,000	5,100	35,640	3
12	The City	617,000	6,000	27,950	4
13	La Habra Fashion Square	566,000	3,000	25,310	2
14	Santa Ana Fashion Square	556,000	3,400	24,860	1
15	Bristol Town & Country	520,000	1,410	23,250	3
16	Orangefair Mall	485,000	2,000	21,680	4
17	Honer Plaza	400,000	2,600	17,890	3

*Estimated by assuming 13 automobile trip ends per 1,000 square feet of GLA and 1.72 persons per car, after Barton-Aschman Associates.

**Planned shopping centers.

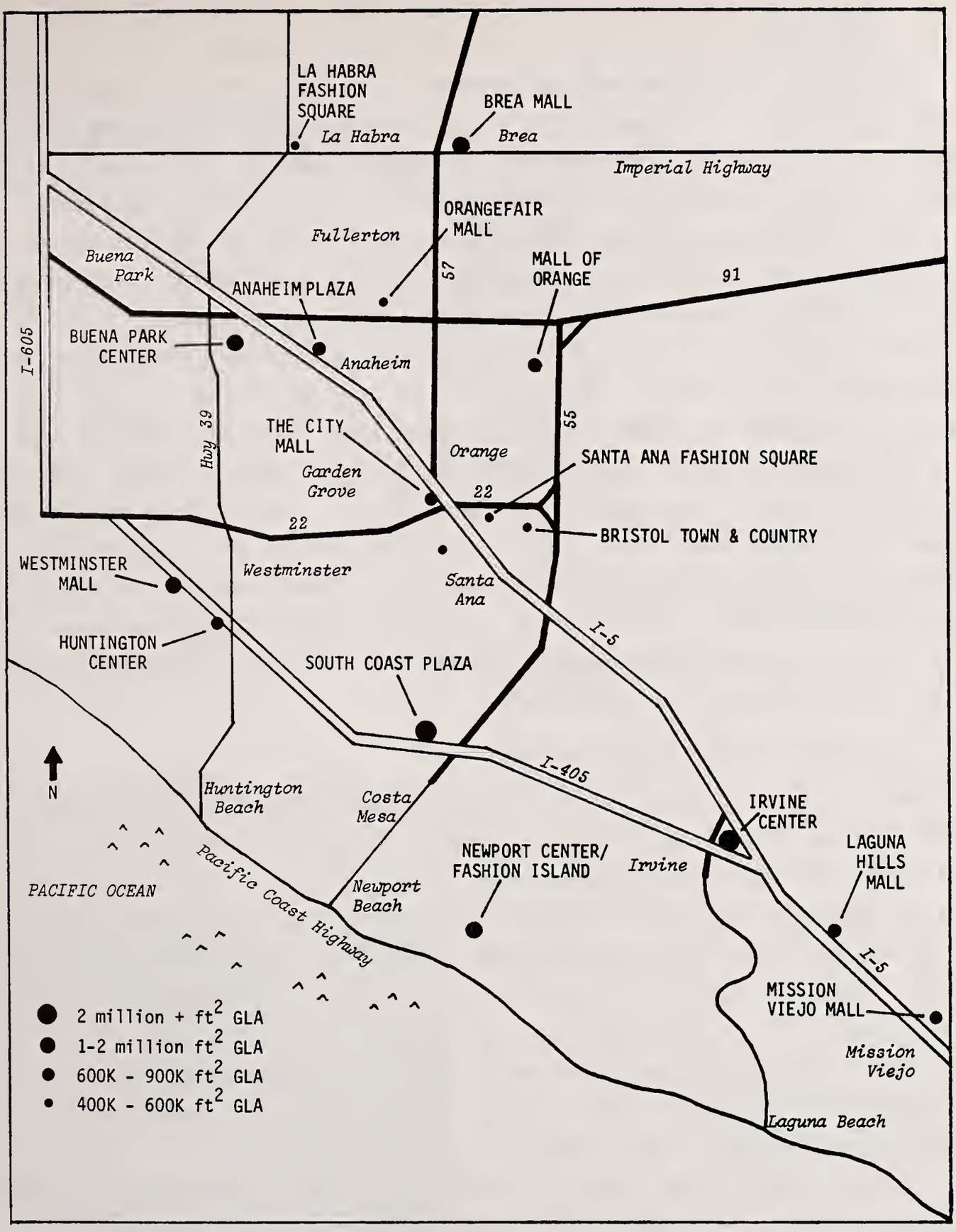


Figure 2.26
Major Shopping Centers in Orange County

those disabled persons unable to use regular buses. This service is termed dial-a-lift, and can be reserved only by phone 24 hours in advance.

OCTD also participates with Los Angeles, Long Beach and Riverside counties in the operation of a regional rapid transit service (RTD), connecting Orange County with Los Angeles, Long Beach and Riverside counties. At present, the only shopping center served by this line is La Habra Fashion Square, in La Habra.

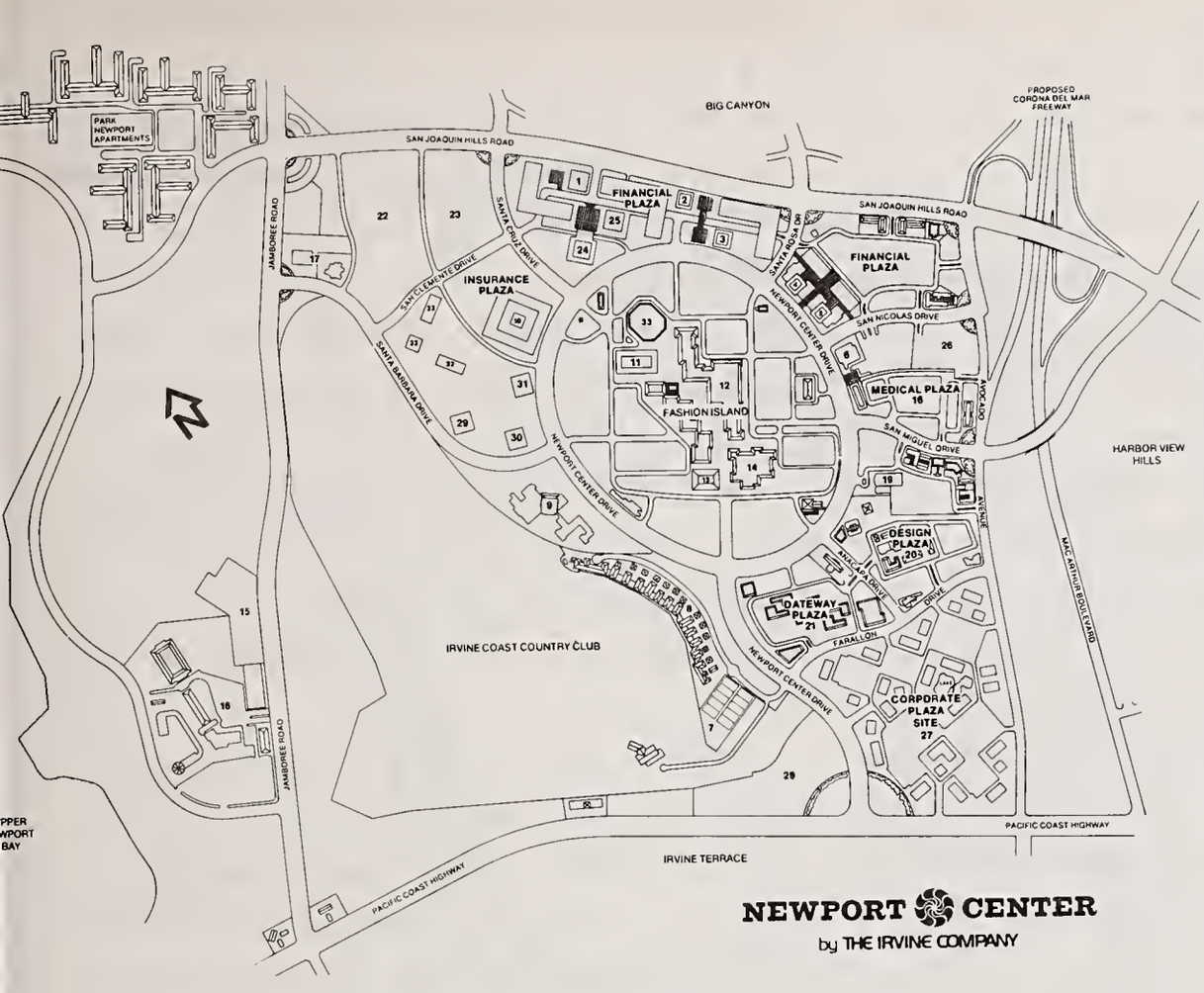
OCTD, of course, provides extensive regular fixed-route service and it generates almost 95 per cent of the total ridership in Orange County. Each shopping center is served in varying degrees by these regular fixed routes.

The shopping centers listed are each served by different combinations of the various public transportation services offered by OCTD. Three of these centers have been selected for a more detailed examination. They are: Newport Center/Fashion Island, located in Newport Beach; South Coast Plaza in Costa Mesa; and La Habra Fashion Square in La Habra (see Figure 2.26). Each of these centers has some unique problems and conditions of public transit service, but together they are reasonably representative of the present state of transit service to shopping centers in Orange County. Irvine Center, a proposed regional shopping center, will also be briefly discussed in terms of planning transit into a shopping center before any development has taken place.

a. Newport Center/Fashion Island

Newport Center/Fashion Island is a major commercial, financial and professional complex located in the heart of Newport Beach (see Figure 2.27). Currently, over 9,000 employees, two million square feet of office space and one million square feet of commercial space are located within this approximately one square mile area. Office and commercial space and employees are planned for the center in the near future. This will result in a total of over 22,000 employees and over six million square feet of office and commercial space by 1990 [3]. This amount of growth would make Newport Center/Fashion Island one of the biggest concentrations of employment and commercial activity in Orange County. Figure 2.27 is an aerial photograph of Newport Center, looking south along the California coast.

Fashion Island is the regional shopping mall which is located in the middle of Newport Center (see Figure 2.27). Fashion Island currently has a gross leasable area of 1,380,000 square feet, and provides 5,460 parking spaces. Altogether it covers an area of about 75 acres. Opened in 1967, Fashion Island is an uncovered mall that generates 35,880 automobile trip ends on an average day, assuming an attraction rate of 13 autos per 1,000 square feet of GLA. This translates into



EXISTING DEVELOPMENT

1. Wells Fargo Building
2. Avco Building
3. Union Bank Building
4. Security Pacific Building
5. Bank of America Building
6. Great Western Building
7. Balboa Bay Tennis Club
8. Granville Apartments
9. Marriott Hotel
10. Pacific Mutual Building
11. Broadway
12. Penneys
13. Buffums
14. Robinson's
15. John Wayne Tennis Club
16. Newporter Inn
17. Police & Fire Facilities
18. Medical Plaza
19. Edwards Cinema
20. Design Plaza
21. Gateway Plaza

FUTURE DEVELOPMENT SITES

22. Low-rise office site
23. Low-rise office site
24. High-rise office site
25. High-rise office site
26. High-rise office site
27. Corporate Plaza site
28. Low-rise office site
29. High-rise office site
30. High-rise office site
31. High-rise office site
32. High-rise condominium site
33. Neiman Marcus site

LEASING OPTIONS

1. Office space in existing new buildings.
   a. Wells Fargo Building, high-rise with harbor views. (Bldg. #1)
   b. Gateway Plaza, low-rise with views and free parking. (#21)

*2. Ground lease and build your own building.

*3. Ground lease and we'll build-to-suit.

*Interim space in existing buildings may be arranged while your building is under construction.

SERVICES

1. Space planning assistance by our in-house team, if desired.
2. Employee relocation program.
3. On-site management to serve you.

NEWPORT CENTER
by THE IRVINE COMPANY

Figure 2.27

Plan View and Aerial View (Looking South) of Newport Center

approximately 61,714 average person trip ends per day on the average, assuming an average occupancy of 1.72 persons per auto. [1]

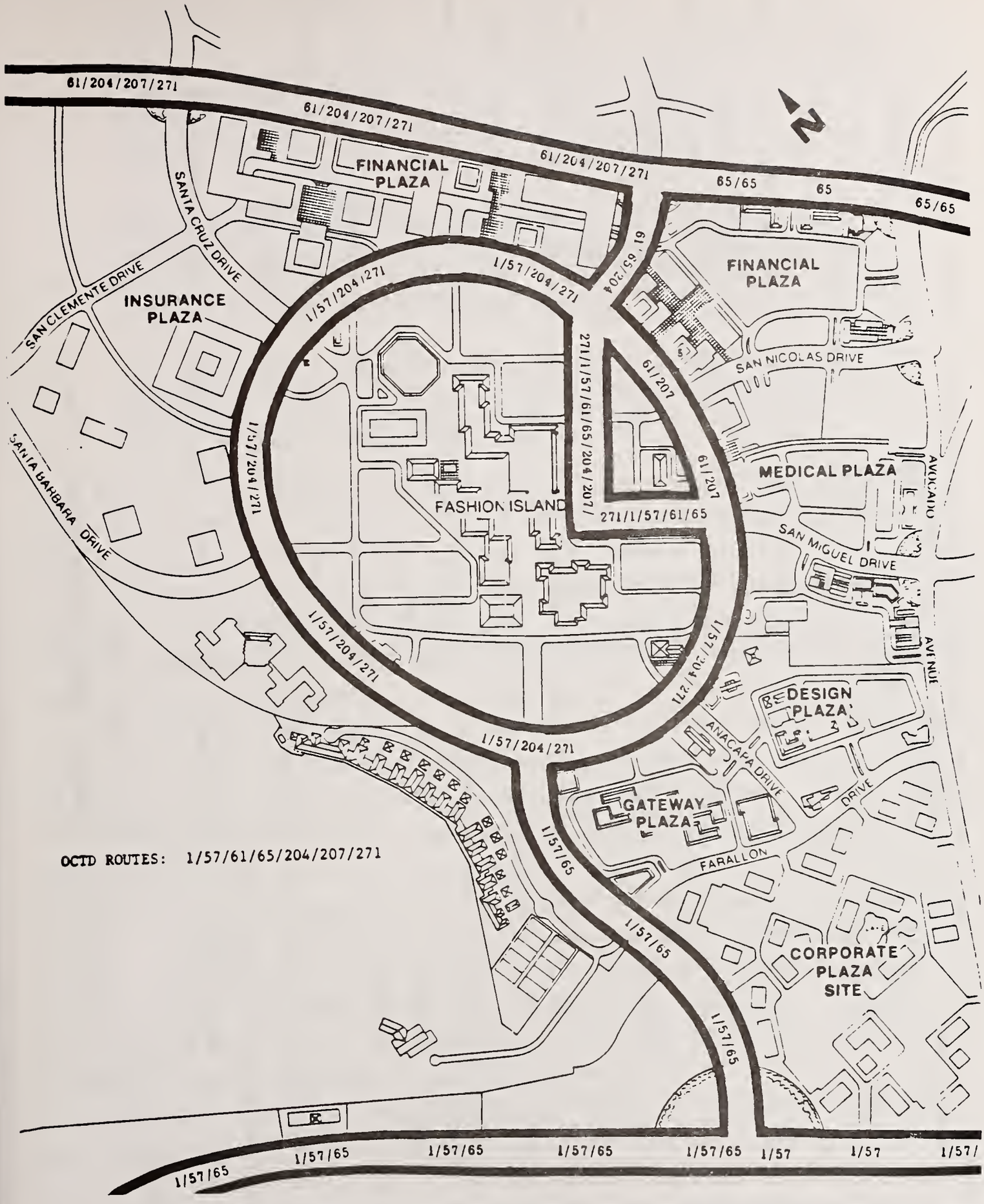
Currently, four regular fixed routes and three park-and-ride routes serve Newport Center/Fashion Island, with approximately 1,800 ons and offs daily. Figure 2.28 shows the routings through Newport Center for regular fixed-route and park-and-ride service. Table 2.14 shows operating statistics for regular fixed-route and park-and-ride service including daily trips, number of buses daily, headway and hours of service. Curb-to-curb demand-responsive service for transportation of handicapped patrons is provided by dial-a-lift. The bus stop at Fashion Island handles 80 per cent of the passenger activity, or approximately 1,440 ons and offs daily. Therefore, in relation to the average daily person trip ends, public transit riders account for only 2.3 per cent of the patronage at Fashion Island shopping center. Together, these bus routes provide 413 daily buses at Fashion Island (390 on weekends).

With seven bus routes serving Fashion Island attracting only 2.3 per cent of the total trip ends, it is obvious that public transportation is currently not a significant means of transporting shoppers to the center. Some kind of improvement has been sought regarding this low mode split, as traffic congestion surrounding Newport Center/Fashion Island has reached intolerable limits. Potential service improvements could be of two types: refinement of existing service or implementation of a new service. A combination of both types of improvements would provide an increased level of transit service to Newport Center/Fashion Island.

Specific route recommendations have been made by OCTD regarding each line serving Newport Center/Fashion Island. These recommendations are designed to increase the productivity of weekend service and to attract additional passengers. Refinement of the existing service to Newport Center/Fashion Island is a continual, ongoing process at OCTD.

The development of a new service for Newport Center/Fashion Island is currently in the planning stage at OCTD. In 1975, when the Irvine Company (TIC) first proposed development of a 40-acre corporate plaza in Newport Center, the California Coastal Commission (CCC) set various conditions to be fulfilled by TIC as part of its project. The CCC was mainly concerned with reducing the environmental impacts as a part of its responsibility for protecting coastal resources. The conditions set forth by the CCC relating to transit included the following:

- "An agreement between OCTD and TIC providing for a central transit station within the Newport Center. The site shall be available to OCTD for at least 25 years.



Source: OCTD

Figure 2.28

Existing OCTD Routes Serving Newport Center/Fashion Island

OCTD ROUTES	NUMBER OF RUNS[1] DAILY			NUMBER OF BUSES DAILY			HEADWAY (Minutes)[1]			HOURS OF OPERATIONS[1]		
Fixed	Week-day	Satur-day	Sundays + Holidays	Week-day	Satur-day	Sundays + Holidays	Week-day	Satur-day	Sundays + Holidays	Week-day	Satur-day	Sundays + Holidays
1	32	28	28	16	14	14	60	60	60	5:30 a.m. to 10:00 p.m.	5:30 a.m. to 10:00 p.m.	5:30 a.m. to 10:00 p.m.
57	91	65	46	46	33	23	20/30/60	30	30/60	5:30 a.m. to 11:00 p.m.	5:30 a.m. to 9:00 p.m.	5:30 a.m. to 9:00 p.m.
61	26	16	No Service	13	8	--	60	60	--	5:30 a.m. to 7:30 p.m.	9:30 p.m. to 5:30 p.m.	---
65	44	28	21	22	14	11	30/60	60	60	6:00 a.m. to 11:00 p.m.	6:30 a.m. to 8:30 p.m.	7:30 a.m. to 7:30 p.m.
SUB TOTAL	193	137	95	97	69	48	--	--	--	--	--	--
Park-And Ride[2]												
204	8	No Service	No Service	8	--	--	20/30	--	--	--	--	--
207	5	No Service	No Service	5	--	--	30/60	--	--	--	--	--
271	10	No Service	No Service	10	--	--	30	--	--	--	--	--
SUB TOTAL	23	--	--	23	--	--	--	--	--	--	--	--
TOTAL	216	137	95	120	69	48	--	--	--	--	--	--

[1]From OCTD Route Schedules effective February 12, 1978.

[2]Park-And-Ride is an express commuter service that operates during peak periods, at variable service frequencies, on Monday through Friday only.

Source: OCTD

Table 2.14

OCTD Activity at Newport Center/Fashion Island by Route

- "An agreement between OCTD and TIC to undertake a joint transit planning study ... which shall provide OCTD's recommendations regarding the designation of transit routes necessary to serve Newport Center's current and projected levels of development, designation of shuttle routes within the Center, levels of service needed, the amount of financing required to service these levels of development, and the respective roles of public agencies and lessees of Newport Center in financing the required levels of public transit.

- "The applicant's commitment to implement a mini-bus shuttle service within Newport Center, acceptable to OCTD, connecting the transit center with the remainder of Newport Center. This shuttle service may be operated by TIC or OCTD and TIC shall assure that the level of service be acceptable to OCTD for a service time totaling six bus-years.

- "Assurances that a system of validating bus fares for users and employees of Newport Center facilities acceptable to OCTD will be in effect for at least 25 years or the lifetime of the transit station, whichever is the shorter period." [4]

Recently, TIC and OCTD staff have been working toward fulfilling the conditions set by the CCC. In May 1976, OCTD staff produced a report entitled, "An Evaluation of Transit Service for Newport Center/Fashion Island." [4] In March 1977, TIC and OCTD executed an agreement detailing the conditions regarding conveyance of a 2.5 acre lot in Newport Center to OCTD, for a future transit terminal. TIC also earmarked $300,000 for support of the operating costs of an intra-Newport Center/Fashion Island shuttle on April 27, 1977.

Regarding the shuttle service, an analysis of employee, shopper, motel guest and visitor activities in Newport Center/Fashion Island yielded an estimate of 61,000 daily intra-Newport Center/Fashion Island trips in 1979. It was estimated that between 1,100 and 4,200 of these trips could be attracted to the shuttle. Approximately 10 per cent of the employees surveyed by OCTD said that a shuttle bus would definitely increase their likelihood of taking a regular fixed route bus to work. Presently 90 per cent of the employees use private automobiles to get to work. These 9,000 employees make approximately 27,400 one-way intra-Newport Center/Fashion Island trips daily, about 43 per cent by automobile. A shuttle bus was estimated to be able to attract 600 to 3000 of these one-way employee trips (primarily former auto trips) per day (see Table 2.15).

Figure 2.29 illustrates the importance of Fashion Island shopping center within Newport Center as an activity generator for employees working within Newport Center. A majority of the 27,400 daily one-way internal trips made by employees in Newport Center were made between various office buildings and Fashion Island (approximately 14,000 each day). Thirty-two per cent of these trips were made for

Table 2.15

1979 Estimated Ridership for an
Intra-Newport Center/Fashion Island Shuttle

	1979 Total Internal Trips*	Estimated Modal Split	1979 Estimated Daily Shuttle Ridership
Employees	33,000	2 - 9% (survey)	660 - 3,000
Shoppers	13,800	1 - 3% (assumed)	140 - 415
Hotel Guests	4,600	5 - 10% (assumed)	230 - 460
Visitors, etc.	9,600	1 - 3% (assumed)	96 - 290
TOTAL	61,000		1,126 - 4,165

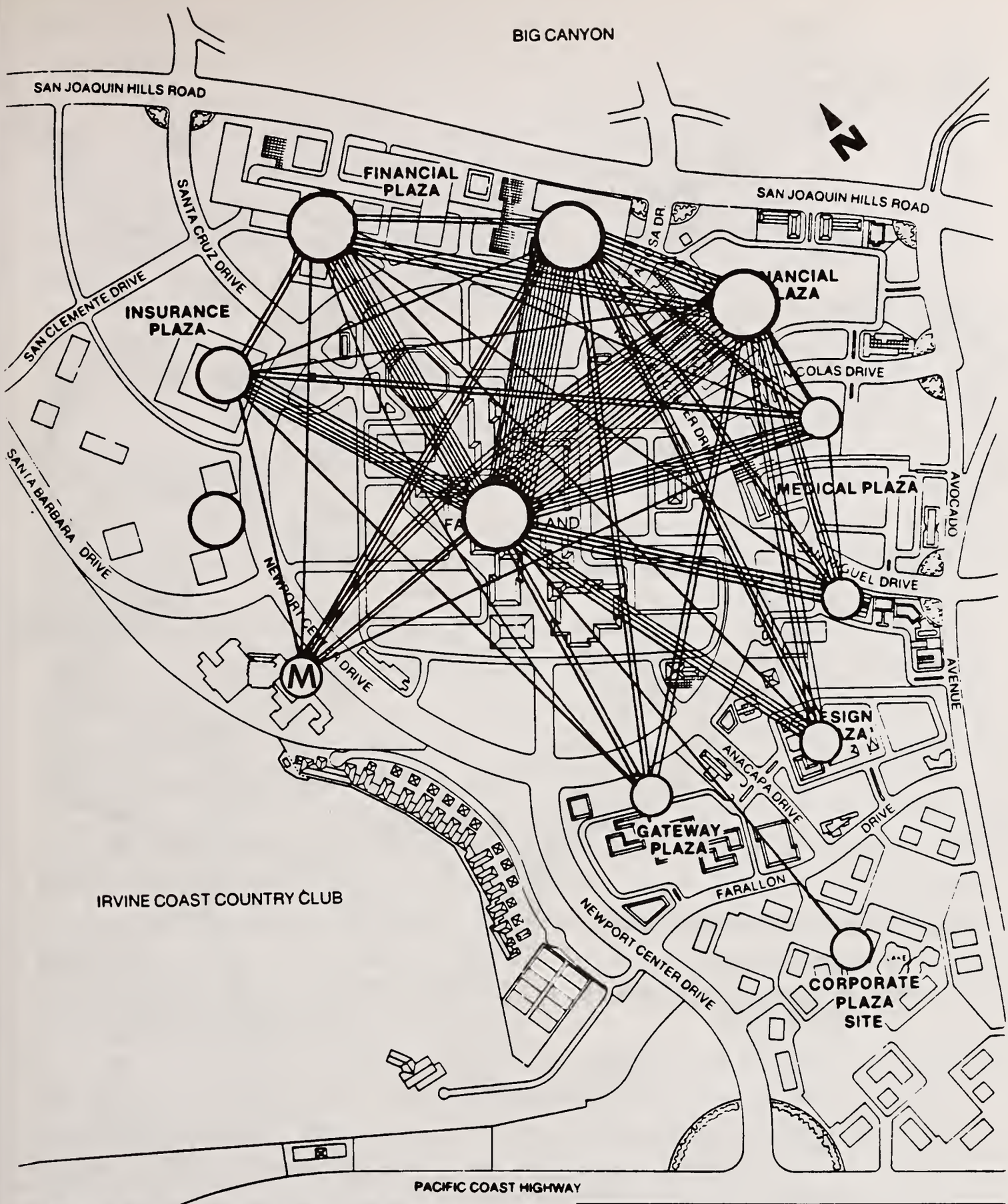
*including walking trips

shopping purposes. Fifty-seven per cent of the Newport Center/Fashion Island employee trips are walking trips, and 43 per cent are driving or carpooling trips. This high percentage of automobile trips is indicative of a favorable market for the shuttle service. The period of heaviest potential shuttle bus trip activity is 11:00 a.m. to 2:00 p.m., representing lunch hour shoppers and diners.

In addition to intra-Newport Center/Fashion Island employee trips, OCTD has estimated that 11,500 one-way internal trips are made by shoppers patronizing the Fashion Island shopping mall (Table 2.15). It was also estimated by OCTD that between one and three per cent of these trips are likely to be served by a shuttle. Considering the shopping growth between 1977 and 1979, a potential daily shuttle ridership for 1979 is 140-415 shoppers.

Finally, according to a study done by Crommelin, Pringle and Associates in June 1976, 3,800 daily trips to Newport Center/Fashion Island are generated by the Marriott Hotel, indicated as "M" on Figure 2.29. This figure is projected to increase to 4,600 by 1979, with an estimated shuttle ridership of 230-460 trips per day, assuming a 5 - 10 per cent transit modal split (Table 2.15). A majority of these trips would be for shopping purposes (percentage estimates are presently unavailable) to the Fashion Island shopping mall.

The shuttle bus system recommended for implementation would employ a fixed route of approximately 2.6 miles in length (see Figure 2.30). Three vehicles

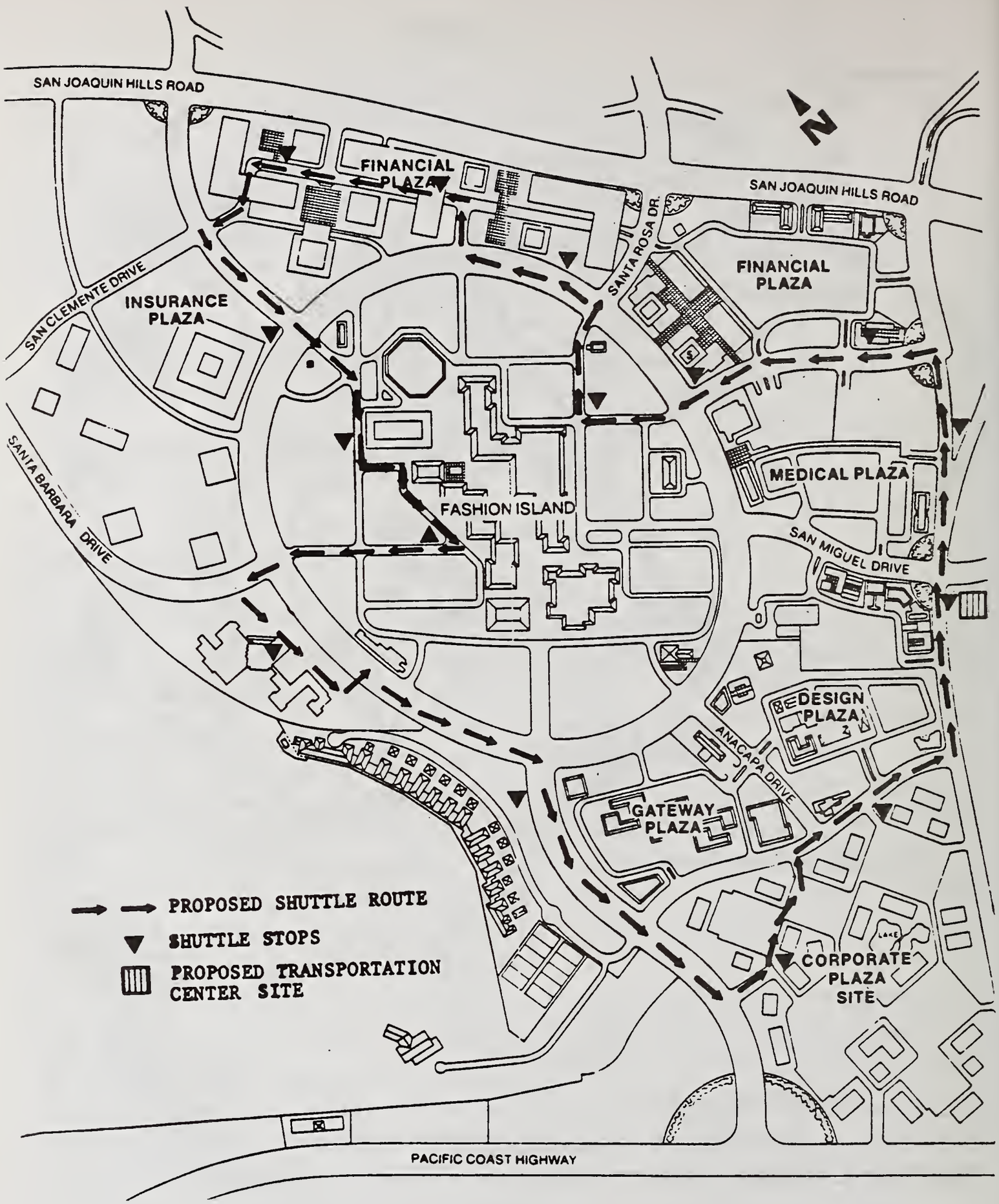


Each line represents 200 employee trips.

Source: OCTD

Figure 2.29

1977 Employee Intra-Newport Center/Fashion Island Trip Distribution



Source: OCTD

Figure 2.30

Proposed Intra-Newport Center/Fashion Island Shuttle Route

were suggested with five-minute headways that would stop for passengers at 16 different designated locations. Vehicle capacity was recommended to be 19-21 seated, plus 10 standees, with no fare charged the first month, and 10¢ thereafter. The service would be provided only on weekdays from 7:00 a.m. to 6:00 p.m., as the shuttle would seek employee patronage primarily.

Operating costs were estimated to range from $150,000 for the first year to $190,000 in the fourth year. Capital costs would approximate $120,000 for the vehicles, including three actives plus one spare.

To finance this shuttle, OCTD would apply for Article 4.5 Community Transit Service funds (State of California) for a total of $358,000. Use of the $300,000 from TIC funds would be made for continuation of the shuttle service for the second, third and fourth years. Approximately $139,000 was forecasted to be available from the farebox revenue to support the system.

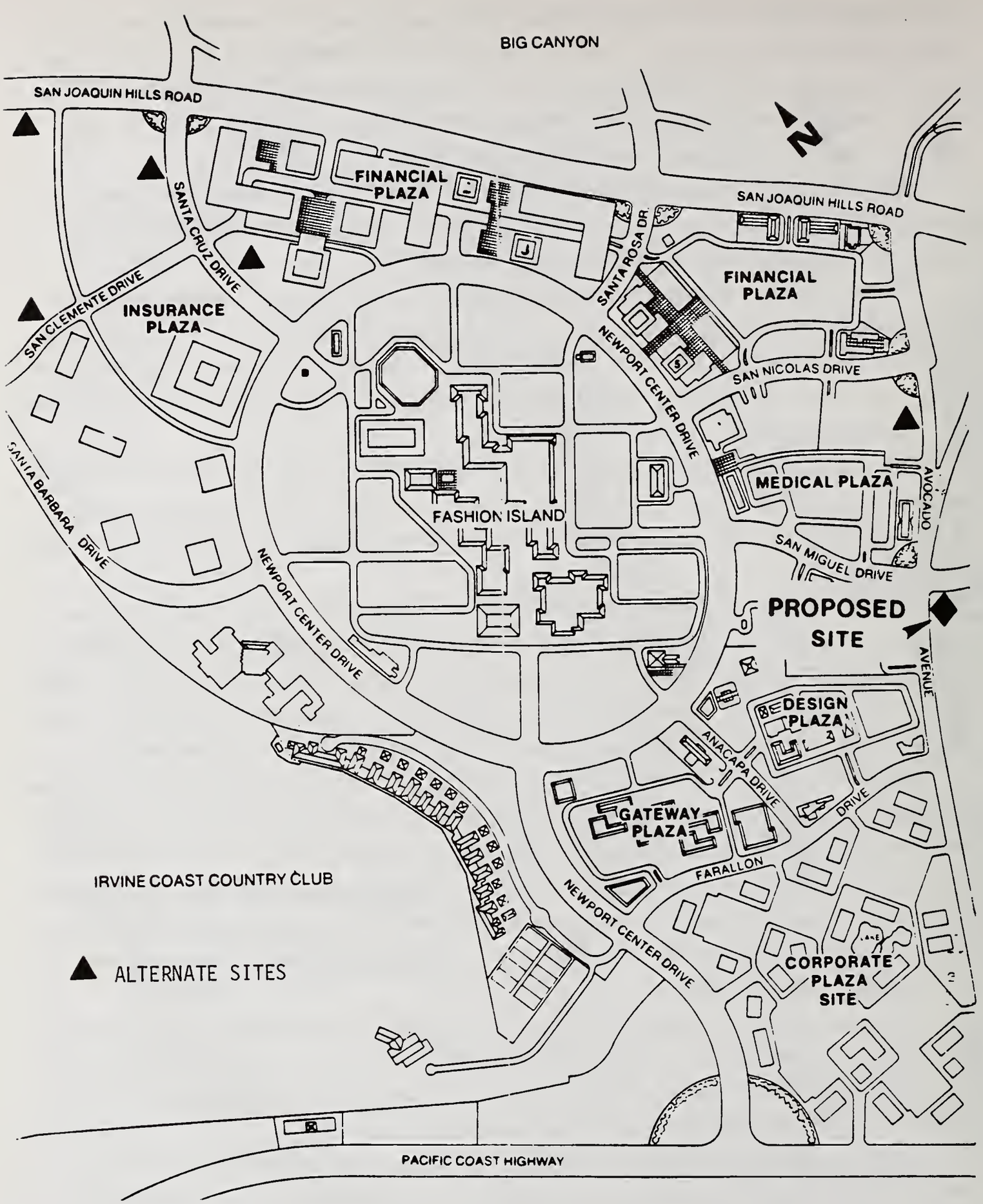
The present curbside loading space in Newport Center/Fashion Island will be adequate for OCTD's needs for a few more years. However, with increased growth in Newport Center, additional capacity for bus loading and passenger transfers will be required.

Because of the previously described agreement between TIC and the CCC, the Irvine Company has conveyed a 2.5 acre site near MacArthur Boulevard and Avocado Street to OCTD for development of a transportation center (see Figure 2.31). The estimated value of this donated parcel is $750,000. Altogether, the action of the CCC has caused TIC to allocate more than $1 million for transit improvement.

The development of a transportation terminal for Newport Center/Fashion Island would enable a better, more efficient interface of the various existing and future transportation modes operating within the Newport Center area. The ultimate terminal is envisioned as accommodating a regular fixed-route, park-and-ride, community fixed-route, dial-a-ride, and dial-a-lift services. In addition, it is seen as a potential busway station for the Corona del Mar and possibly the San Joaquin Hills transportation corridors.

The cost of this proposed facility is estimated to be $620,000, exclusive of the land. The donated land, valued at $750,000, will serve as the district's local matching share. UMTA Section 3 funds, in the amount of $620,000, will be sought to cover engineering, design and construction costs.

OCTD has recently revealed its plans for scheduling implementation of the transit terminal and the shuttle bus service. The terminal is to be completed and available for use by the fall of 1983. The shuttle service is planned to be



Source: OCTD

Figure 2.31

Sites Evaluated for the Newport Center/Fashion Island Transportation Terminal

initiated in February 1984, roughly coincident with the completion of the transit terminal.

An interesting development that could seriously affect the implementation of such services and further development in Newport Center concerns three ordinances [2] of the City of Newport Beach establishing a traffic phasing plan to coordinate development of certain projects with transportation facilities in Newport Beach. The City Council of the City of Newport Beach felt that street and intersection congestion within its city was posing serious threats to emergency vehicles' ease of circulation and creating countless traffic accidents. This situation, the Council maintained, has resulted from inadequate phasing of commercial, industrial and residential growth in relation to traffic capacity. The City Council declared that,

> "Aggravation of these conditions can be avoided, eliminated or alleviated by enacting an ordinance designed to permit major development only in those areas of the City of Newport Beach where adequate transportation facilities exist, or will be installed in conjunction with the development to accommodate the traffic generated by such development."

The ordinance prohibits any building that will increase traffic during peak hours more than one per cent, unless the developer can demonstrate plans to mitigate such increased traffic or prove that the benefits of the project outweigh the project's anticipated negative impact on transportation facilities. This ordinance could clearly terminate any future development at Newport Center/Fashion Island, although with the implementation of the shuttle service and transit terminal, the Irvine Company may be able to demonstrate that it is providing adequate transportation facilities and thereby mitigating any traffic increases.

The future of public transportation to and within Newport Center hinges on many unanswered questions and presently unpredictable events. Many people believe that public transit service to the center will have to be increased, although the actual form and timing of these increases is uncertain. Clearly, Newport Center was designed primarily for the automobile. It will be interesting to see how easily it can be adapted to demands of increased transit service that are being forced by high levels of automobile congestion. OCTD and TIC seem to be working together to find ways of providing increased transit accessibility to Newport Center/Fashion Island in the early 1980's. The lessons learned from this experience should be very helpful to other areas faced with similar problems.

b. South Coast Plaza

South Coast Plaza, the sixth largest shopping center in the nation, is conveniently situated adjacent to a California Interstate freeway, the San Diego Freeway (405) and a major state freeway (SR 55) in Orange County (see Figure 2.32). It contains 2,000,000 square feet of gross leasable area, and is Orange County's largest shopping center. South Coast Plaza also does the largest volume of business among Orange County shopping centers, with annual sales exceeding $135 million in 1977. The shopping mall is located in Costa Mesa, which has a population of about 78,000 and is composed of an almost exclusively white population, as about only about four per cent of the city's population is in a minority category.

South Coast Plaza opened in March 1976, and is an enclosed, two-level mall with 8,300 parking spaces for its customers and employees. This shopping mall generates on the average 89,440 person trip ends each day. It is presently served by five regular fixed bus routes, the 51, 53, 57, 65 and 146. These routes combine to generate 606 buses daily at the shopping center. The operational characteristics of each route are displayed in Table 2.16. The poor usage of public transit to South Coast Plaza is apparent in this table. Out of a total of 13,522 daily unlinked passenger trips on these five bus routes, an average of 10.8 per cent were distributed to the shopping trip category. However, this series of bus routes serves a variety of shopping centers in addition to South Coast Plaza, leading to the probability that public transit is not a significant mode of transportation for shoppers going to South Coast Plaza at present. This low usage of public transit to South Coast Plaza can be explained in part by the center's convenient location for automobile access -- almost at the intersection of two major freeways in Orange County, I-405 and SR 55.

Over time, OCTD has experienced difficulties with the location of its bus stop at South Coast Plaza shopping center. Initially, the primary OCTD bus stop was located at the Sears store, indicated as "S" on Figure 2.32. Sears was unhappy with this arrangement as the OCTD buses soon broke up their pavement (owned by Sears in this case) and brought people to their store who were "troublesome." Sears told OCTD to move their bus stop, so it was transferred to the Bullock's store ("B" on Figure 2.32. After a brief period of time, the Bullock's department store manager demanded that the OCTD stop be removed from in front of his store. He said that the buses were bringing undesirable persons to his store, and their behavior while waiting for the bus outside his store was totally unacceptable. His statements were widely quoted in the local press and he was

Figure 2.32. Aerial View of South Coast Plaza, Looking East, 1977

Table 2.16

OCTD Transit Service to South Coast Plaza

Operational Characteristics	Bus Route				
	51	53	57	65	146
Daily trip ends to South Coast Plaza	56	108	186	88	168
Total daily unlimited trips	943	1,869	6,925	1,722	2,063
Headways:					
peak periods	60	30/60	20	30/60	30
other	60	30/60	20	60	30
weekends	0	30/60	30	60	60
% using route for shopping	3.1	10.7	14.7	16.1	9.6
Load coefficient:					
northbound	.22	.37	.51	.33	.18
southbound	.06	.38	.51	.33	.18
1976-1977 $ deficit	150,777	331,272	1,018,189	593,632	285,132

Source: Service Improvement Program, February 1979, OCTD.

subsequently fired from his position. However, the OCTD bus stop was soon shifted to its present location, indicated as "C" on Figure 2.32. South Coast Plaza offered to build a minimal shelter at this location and has done so.

At present, persons patronizing the bus for shopping at South Coast Plaza must walk uphill, either along a street, or through the parking lot, to reach an entrance to the mall (Figure 2.32). This, in turn, has generated some concern regarding potential insurance problems associated with letting passengers off at such a location, where they must walk across a street or parking lot to reach the mall. If a passenger were to be injured while walking to the mall, would the transit operator, or the shopping center, or both (neither) parties, be responsible? This question has not yet been answered, as the situation has not yet arisen, although it appears that OCTD would very likely be sued should a passenger be injured while walking to the mall from its stop.

The traffic congestion in the surrounding arterials to South Coast Plaza is presently very heavy, and will undoubtedly increase in severity in the coming years. Figures 2.32 clearly demonstrates the potential for new, high-density development around South Coast Plaza. Recently a fifth major department store was constructed in South Coast Plaza, which includes a new parking structure to replace surface area parking lost to the construction of the store, and it has already generated increased automobile traffic in the surrounding area.

South Coast Plaza lacks public transportation integration in its design and clearly encourages automobile use as opposed to public transit use. It is clear that this will have to change, and public transit will have to be encouraged and utilized if the growth of this area is to increase substantially.

Evidence of anticipation of this trend is a special transit service recently inaugurated by South Coast Plaza for its employees. This transit service is operated solely during the Christmas season for employees working at South Coast Plaza, as they are encouraged to park in a lot away from the shopping center and utilize a minibus to get to the mall. The purpose of this is to create more parking area for customers during peak shopping seasons, such as Christmas.

This special service was tried on an experimental basis in 1977, and was termed a "huge success" by the shopping center managers. The service will be made available only during peak shopping seasons, although full-time, year round service is being considered and evaluated. The special transit service is paid for, in part, by the mall owners and, in part, by each merchant leasing space in the center.

The experience at South Coast Plaza may be indicative of future trends for shopping centers situated in areas where traffic congestion is reaching very high levels, to the point of affecting customer accessibility. Such trends would include shopping centers in the operation and financing of special transit systems, designed to mitigate surrounding traffic problems and parking problems at the center itself. An additional result of traffic congestion in and around shopping centers may be a trend toward intra-center shuttle buses operating within the shopping center itself, or intra-area shuttle service operating between the center and other nearby activity generators.

Another lesson that may be learned from the case study at South Coast Plaza would include foresight on the part of the transit operator and shopping center developer with the design of public transit circulation through the center and transit stops at the center during the initial designing and planning of the shopping center itself. Designing a shopping center with public transit in mind could effectively result in the avoidance of such problems with public transit as experienced by South Coast Plaza, and also lead to more effective public transit service to the center.

c. La Habra Fashion Square

La Habra Fashion Square is located at the intersection of two major highways, Beach Boulevard and Imperial Highway. It covers an area of approximately 40 acres and has 566,000 square feet of gross leasable area. It is an uncovered, single-level mall generating 22,660 daily trip ends. The center provides 3,000 parking spaces for its customers and employees.

La Habra Fashion Square is served by three varieties of public transit at present. One is a regular fixed route, the second is a long-distance transit route and the third is a dial-a-ride service. Together, these services provide shoppers with a variety of means for getting to the center.

Route 29 is the only regular fixed route serving La Habra Fashion Square currently. This route generates a total of 2,947 daily unlinked passenger trips, 7 per cent of which are distributed to the shopping trip category. Route 29 maintains 30-minute headways and provides 62 buses daily at La Habra Fashion Square. In FY 1976-1977, Route 29 maintained a load coefficient of approximately 0.38 northbound and 0.35 southbound, creating a deficit of $666,985 in this time period.

With only one regular fixed route serving La Habra Fashion Square, it was obvious that other modes of public transit were required to meet shopper demands and needs. OCTD responded to this need with the creation of a dial-a-ride service, initiated in February of 1973. Dial-a-ride is a public transportation system that uses small, radio-dispatched buses to provide door-to-door service for its patrons in response to their telephone requests. Passengers share the use of the small buses, and thereby benefit from the economies made possible by this shared-ride mode. The convenience of an automobile or a taxicab is provided at only a slightly higher cost than that of a fixed-route bus.

A customer requests service by telephoning the control center and giving his trip information. The control center advises the customer of the expected pickup time after relating his trip information with information on current vehicle location and tentative route and trip requirements of other users. Meanwhile, the customer waits at his location for the arrival of the assigned vehicle. While conveying one passenger to his destination, the vehicle can also stop to collect or deliver other passengers.

The City of La Habra has a population of 43,000 and covers 6.3 square miles. The socio-economic composition of the city is mixed -- young, old, black, white, Mexican-American, rich and poor. La Habra has several distinct clusters of commercial, recreational and residential activity. These characteristics combine to make La Habra an ideal setting for application of the dial-a-ride concept.

La Habra Fashion Square is the major node of retail activity in La Habra. This mall presently is the location of approximately 8.2 per cent of all the trip ends associated with OCTD's dial-a-ride services. On Saturdays, La Habra Fashion Square accounts for over 25 per cent of all trip ends made via dial-a-ride. Shopping trips, in general, account for over one-third of the total trips made with dial-a-ride. The door-to-door service aspect of the dial-a-ride concept is ideal for shoppers, as walking distances with packages are eliminated. The vehicle is a small minibus, seating about 15 persons, and has overhead racks designed for packages and personal belongings. The service offered by dial-a-ride is very personalized, with a limited number of passengers able to ride together, creating a more secure feeling for the shopper carrying packages.

This dial-a-ride service has received a strong response, both from those in its service area and those in other cities wishing that dial-a-ride would serve them as well. Service was inaugurated in La Habra on February 1, 1973 and ridership increased steadily from 5,900 in the first month to 13,000 in the 14th month. This figure has since stabilized, as in May of 1978 ridership was about 13,000 as well. A good deal of this stabilization can be attributed to fare increases instituted in 1978, which raised the fare from 50¢ to 70¢. Within a service area of only seven square miles and 47,000 people, 104,000 rides were made on dial-a-ride the first year. The success of this dial-a-ride concept is evidenced by the fact that La Habra has recently expanded its service area to include Brea, a neighboring city. Up-to-date figures for service characteristics on this additional service area are presently unavailable.

Operating seven vehicles over a 12-hour day, six days per week, the system returned an average revenue of 33¢ (children ride free) per passenger. This has yielded a gross operating cost of $1.16 per mile, and a net cost of 86¢ per mile. While the per-passenger cost was $2.02, it is interesting to note that the entire City of La Habra was provided a high level of service for a gross cost of $211,000, and a net cost of $160,000. This is approximately $4 per capita per year, or about 8¢ a week per resident. Present figures (February, 1979) indicate an increase in per-passenger cost to $4.48. This cost increase can be explained in part by inflation and in part by the increased cost of providing service to an expanded service area, La Habra/Brea.

Informal driver-conducted surveys have indicated that children under 12 constitute the largest group of dial-a-ride users in La Habra, approximately 30 per cent. Senior citizens represent 5.5 per cent of La Habra's population, but account for nearly 10 per cent of total dial-a-ride users, and 10 - 15 per cent of all revenue riders. This figure is believed to have increased significantly, as

senior citizens have since become eligible for a pass valid throughout the OCTD system. With it they can ride a fixed-route bus free, and dial-a-ride for 35¢, instead of the usual 70¢.

The Mexican-American population of La Habra made up about 15 per cent of dial-a-ride patronage in 1974. This population group represents the lowest income group of La Habra. Ridership has gradually been shifting from the lower income areas in La Habra to higher income areas as knowledge of the service has increased.

Elapsed time from phone call to actual pickup is normally 15 - 30 minutes, and the average trip time is about 11 minutes. The potentials for this kind of service are great. The dial-a-ride mode can serve the need for local transit trips that cannot be accommodated with conventional fixed-route bus service. La Habra Fashion Square has been an important element in the success of the dial-a-ride in La Habra. This shopping center, while being one of the smallest in Orange County in terms of gross leasable area and annual sales, is the major activity generator in La Habra for dial-a-ride, accounting for approximately 12,500 trips in 1978. This is evidence that, in a suburban setting where fixed-route service is limited, a shopping center can aid in the generation of alternative forms of public transportation. By serving the roles of major activity generators, shopping centers create considerable demand for transportation to serve them. For the carless, who comprise over one-half of the population in La Habra and Orange County, a major activity generator can create a single destination demand significant enough to mandate some form and degree of public transportation, in this case dial-a-ride.

The Rapid Transit District line serves a very limited number of shoppers. Riders on this service are mainly traveling across the county, on fairly long trips. It is estimated that persons from the city of Whittier use this line as a means to get to La Habra Fashion Square, although such use is very limited.

Recent trends are that a steadily increasing percentage of riders in La Habra are using the dial-a-ride service for shopping trips in general, and to Fashion Square in particular. In 1973 it was estimated that 29 per cent of total trips made on dial-a-ride were distributed to shopping trips in general, and 6.2 per cent of the total trips had Fashion Square as the destination. These figures have increased steadily since 1973, to where presently approximately 37 per cent of all trips made on dial-a-ride are distributed to shopping purposes and 8.2 per cent of all trips are made with La Habra Fashion Square as the final destination. It is also apparent that a significant percentage of shopping trip demands in general, and to Fashion Square in particular, occur on Saturdays. (The system does not operate on Sundays.) Shopping trips in general represent about 67 per cent of

all trip purposes on Saturdays and over 25 per cent of the total trips are to Fashion Square. Such evidence is proof that shopping centers will be playing an increasingly important role in public transit operations in Orange County.

It is also evident from this case study that minorities, elderly persons and females use the dial-a-ride system in a significantly greater proportion than their respective percentages of the total population in La Habra (see Table 2.17). While females compose approximately 50 per cent of La Habra's population, they account for 75 per cent of total trips made on dial-a-ride. Also, elderly persons, who comprise about 10 per cent of La Habra's population, account for about 32 per cent of all trips made on the dial-a-ride system. Finally, while minorities comprise about 16 per cent of the population in La Habra, they represent about 20 per cent of total-dial-a-ride system patrons.

Table 2.17

Demographic Characteristics of Revenue Passengers
La Habra Dial-A-Ride System*

	Date of Sample					
	March 7, 1973		March 14, 1973		July 20, 1973	
User Group	No.	%	No.	%	No.	%
Male	37	21	52	35	38	25
Female	143	79	96	65	114	75
Total	180	100	148	100	152	100
Senior Citizen	34	19	44	30	48	32
Other	146	81	104	70	104	68
Total	180	100	148	100	152	100
Minority	22	12	41	28	30	20
Other	158	88	107	72	122	80
Total	180	100	148	100	152	100

*Informal driver-conducted surveys

Source: La Habra DAR Progress Report, 1974.
OCTD, Santa Ana, California.

d. Irvine Center

Irvine Center is a major commercial/office/industrial complex now being planned by the Taubman Company. When fully developed, this complex is expected to contain the world's largest shopping complex and will include about eight million square feet of total floor space when completed. It will be located only a few miles southeast of the previously described Newport Center, about midway between Los Angeles and San Diego, in southwest Orange County (see Figure 2.33). The site planned is 470 acres and is bounded by freeways on three sides, the San Diego Freeway (405), the Interstate-5 Freeway, and the Laguna Freeway, a local interchange.

The Taubman Company estimates that there will be approximately 550,000 people living in the market area served by Irvine Center in 1990 (up from 300,000 in 1979. The Taubman Company has further estimated that when fully developed, Irvine Center will generate approximately 19,000 jobs. These figures indicate a significant potential market for public transportation, which is presently being investigated by OCTD and the Taubman Company. The planning of Irvine Center seems to be aimed at a somewhat greater degree of physical integration than Newport Center, although the separation of activities and ample provision for the automobile are clearly evident.

Several factors indicate the potential for effective public transportation to this planned center. First, the proposed site is directly adjacent to a major stop in the proposed high-speed rail transit system serving the Los Angeles-San Diego corridor. It is not presently certain when this service may be initiated, but a link between this station and the Irvine Center complex could significantly increase transit accessibility to the center.

Also being planned is a county-wide bus rapid transit system that will run adjacent to the proposed site. This system, being studied at present by OCTD, would take advantage of the right-of-way available from the rail line passing through Orange County, and is perceived as an effective tool for connecting northern Orange County with southern Orange County.

Public transit to Irvine Center is presently only in the beginning stages of planning. Consequently, exactly what the Taubman Company proposes to do in terms of accommodating the described public transit systems and any public transit is presently uncertain.

Automobile circulation will be provided by a hierarchical system of roadways. The internal road system will be divided into one-way arterial parkways which will encircle the center's building complexes. The one-way circular pattern is designed

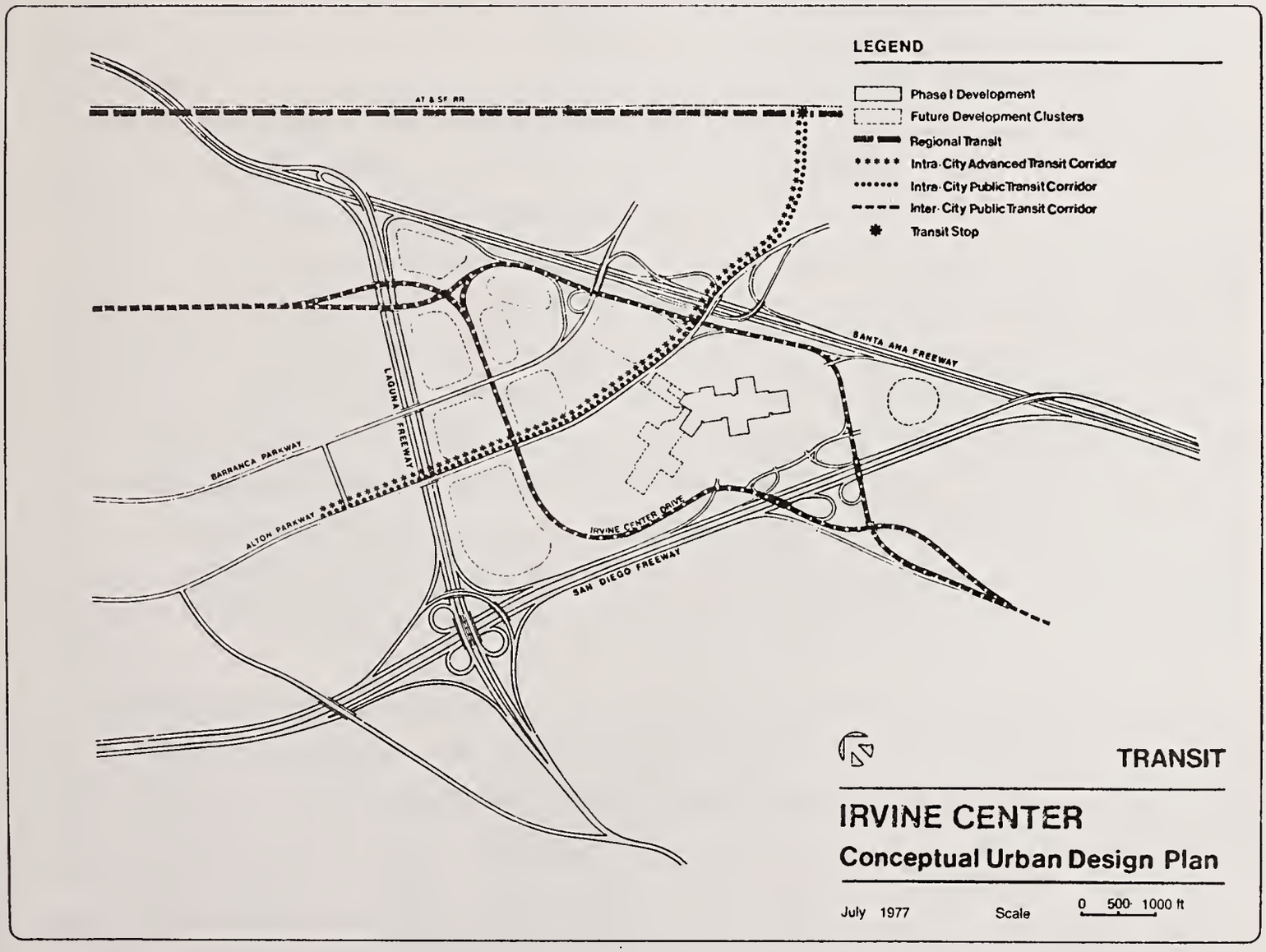


Figure 2.33. Irvine Center Location Map and Planning Concept Diagram

Source: The Irvine Company

to improve and accelerate traffic flow and improve access to various sectors of Irvine Center. A bicycle and pedestrian trail is also planned which will bisect the regional center and provide for safe and convenient travel within the proposed center.

References:

1. Barton-Aschman Associates, Inc.

2. Newport Beach Traffic Phasing Ordinance, #1765, June 26, 1978; amendments #1777, August 28, 1978 and #1787, February 12, 1979.

3. Orange County Transit District, Newport Center Transit Study (Draft), October 15, 1978, p. 1.

4. Orange County Transit District, Newport Center/Fashion Island Transit Needs Study, January, 1979, revised June, 1979. p. 2.

5. Southern California Association of Governments, Growth Forecast Policy, 1978, p. 31.

6. San Diego

Located in Southern California, the San Diego region covers some 4,261 square miles and contains over 1.5 million people. The City of San Diego is the region's major urban area, containing over 800,000 people within its 323 square miles. The area contains three major universities, the University of California at San Diego, San Diego State and the University of San Diego; and a naval base and Marine camp to the north. Overall the region contains over 200,000 elderly persons. In San Diego over the past five years, this segment of the population has increased 23 per cent versus about 15 per cent for the total population. Although a transportation system designed to link the major activity centers with the central business district is being studied, the region is presently served only by an all-bus transit system.

This region has not adopted the concept of major diversified centers although it has examined the idea; instead it has focused almost entirely on revitalizing its CBD. Even so, at last count, San Diego County had about 147 shopping centers of various sizes. The shopping centers, especially the regional malls, are major traffic generators. Their relationship to transit service in this region is not well-known. For our purposes, six regional shopping centers (centers under one management which have one or more major department stores, cover 38 - 80 acres and contain 50 to 100 stores) were chosen within the San Diego region and their relationships to the bus transit system studied.

The six shopping centers selected for this case study are: (1) Fashion Valley Shopping Center, (2) Mission Valley Shopping Center, (3) Parkway Plaza, (4) Grossmont Center, (5) College Grove Center, and (6) University Towne Center (see Figure 2.34). Fashion Valley and Mission Valley shopping centers are located in Mission Valley along the San Diego River, about three miles north of the San Diego CBD. University Towne Center is located further to the north near La Jolla and the University of California at San Diego. Grossmont, Parkway Plaza and College Grove are located northeast of the CBD and east of the Fashion Valley/Mission Valley shopping centers. Table 2.18 gives some characteristics of these six centers. All are open air malls.

There are three major transit operators serving the San Diego region, the San Diego Transit Corporation, the North County Transit District and Chula Vista Transit. The San Diego Transit Corporation (SDTC) provides public service to the greater San Diego area and is the largest operator in the region, serving nearly 90 per cent of the region's transit riders. SDTC serves a population base of over 1.2 million people over an area of 385.3 square miles. It operates 350 buses on 695 route-miles of service over 43 routes and provides three types of service: (1) shuttle,

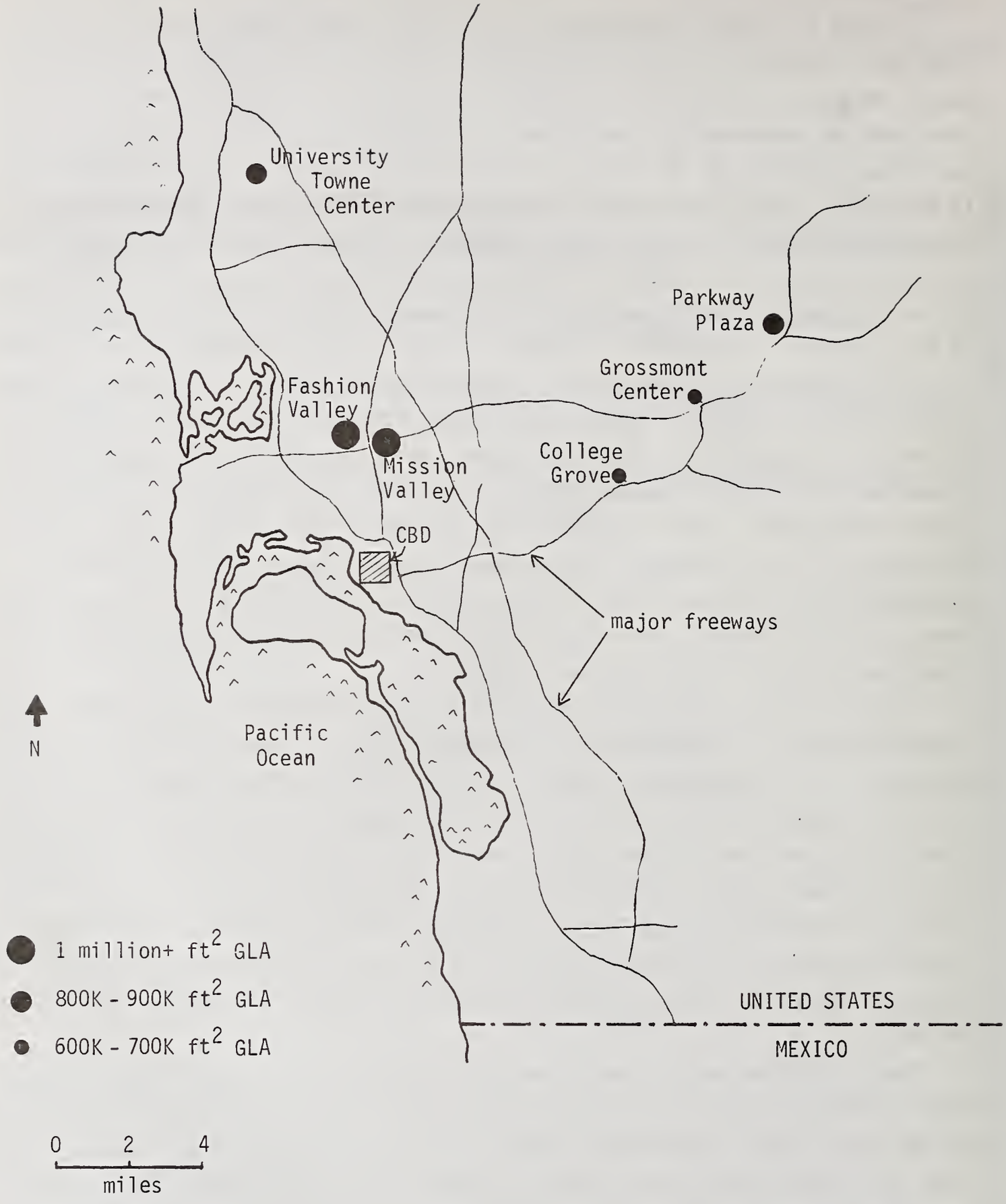


Figure 2.34. San Diego Region Shopping Centers

Table 2.18.

Characteristics of Six Large Shopping Centers in the San Diego Region

Shopping Center	Date Opened	No. of Stores	GLA (000 ft^2)	No. of Parking Spaces	Parking Spaces (000 ft^2)	Gross Sales (mils. of $)
Mission Valley	1961	92	1,333	5,500	4.1	110
Fashion Valley	1969	82	1,100	6,500	5.9	111
University Towne	1977	123	900	4,000	4.4	N/A
Parkway Plaza	1969	115	867	5,500	6.3	85
Grossmont	1961	115	656	4,800	7.3	48
College Grove	1960	70	616	6,000	9.7	31

providing intracommunity service; (2) local, providing intracommunity service with bus stops placed approximately one-quarter mile apart; and (3) express, providing intercommunity service with bus stops placed approximately one-half mile apart with some utilization of the freeway system. SDTC is a non-profit corporation, and they can neither make a profit nor have an operating deficit for any fiscal period. Their operating funds come from the local governments, the federal government (UMTA Sections 3 and 5 funds) and from operating revenues.

The North County Transit District (NCTD) is the second largest transit operator in the region. The NCTD began operations July 1, 1976 by combining the Oceanside Transportation System with the Escondido City Transit to create one transit district serving the entire North San Diego County region; included within this service are the six incorporated cities of Oceanside, Escondido, Vista, Carlsbad, Del Mar and San Marcos. NCTD serves over 400,000 people and covers an area of 960 square miles, operating 28 routes that include some 485 one-way route miles.

Chula Vista Transit (CVT), the smallest of the three transit properties, provides intracommunity shuttle service between the city of Chula Vista and the smaller communities to the south and east of San Diego with seven routes and 10 buses. However, none of the shopping center routes studied in this report belonged to Chula Vista Transit.

Table 2.19 summarizes some characteristics of these three transit agencies, and Tables 2.20 and 2.21 give operating characteristics and other data on those bus routes serving the shopping centers examined in this case study.

Table 2.19.

San Diego Region Transit Agency Characteristics

Characteristics	Agencies		
	SDTC	NCTD	CVT
No. of passengers, 1977	36,990,000	4,640,000	448,000
No. of routes, 1977	43	28	7
No. of buses	350	85	10
No. of buses/peak period	285	63	7
Weekday bus miles	44,104	14,000	1,700
Weekday service hours	3,197	900	104

Table 2.20.

Bus Service to Selected Shopping Centers

Shopping Center	Number of Buses								
	Mon - Fri (per day)			Saturday			Sunday		
	AM	PM	Total	AM	PM	Total	AM	PM	Total
Fashion Valley	118	138	256	95	135	230	72	107	179
Mission Valley	71	104	175	61	103	164	35	79	114
Parkway Plaza	84	99	183	63	77	140	no service		
College Grove	65	84	149	42	59	101	10	22	32
University Towne	66	84	150	28	40	68	25	30	55
Grossmont	44	55	99	22	31	53	19	32	51

Table 2.21.

Characteristics of Routes Serving Shopping Centers

	Route No.	Route Type	Days Operated	Hours Operated to Center (M-F)	Headways (min.) Peak Periods AM	Midday	PM	Evening
Fashion Valley	6	crosstown/ local	M-Sun	6:44am - 7:14pm	30	30	30	30
	20	express	M-Sun	6:13am - 6:23pm	10	30	10	60
	25	local	M-Sun	6:14am - 7:30pm	30	30	30	30
	41	local	M-Sun	6:35am - 8:02pm	30	30	30	30
	80	express	M-Sun	6:55am - 7:10pm	25	30	30	60
Mission Valley	6	crosstown/ local	M-Sun	6:37am - 7:07pm	30	30	30	30
	25	local	M-Sun	7:36am - 7:42pm	30	30	30	30
	80	express	M-Sun	6:45am - 7:00pm	25	30	30	60
Parkway Plaza	46	shuttle	M-Sat	5:56am - 9:00pm	60	60	60	--
	47	shuttle	M-Sat	6:00am - 9:54pm	60	60	60	--
	48	shuttle	M-Sat	6:00am - 9:00pm	60	60	60	--
	90	express	M-F	6:00am - 6:40pm	15	60	15	60
	115	local/ express	M-Sat	6:39am - 6:50pm	10	30	10	60
College Grove	5	local	M-Sun	7:28am - 8:55pm	30	30	30	60
	16	local	M-Sun	5:40am - 7:15pm	60	60	60	--
	36	crosstown/ local	M-Sat	6:15am - 6:11pm	30	30	30	30
	90	express	M-F	6:25am - 6:05pm	15	60	15	60
University Towne	5	local	M-Sun	5:00am - 7:28pm	30	30	30	60
	41	local	M-Sun	6:09am - 7:37pm	30	30	30	30
	50	express	M-F	5:47am - 6:26pm	15	60	15	--
Grossmont	15	local/ express	M-Sun	6:27am - 7:59pm	10	30	10	60
	80	express	M-Sun	6:20am - 7:07pm	25	30	30	60
	90	express	M-F	6:11am - 5:20pm	15	60	15	--

The six regional shopping centers studied are served by a total of 15 different bus routes, with many routes serving more than one shopping center. Overall, every shopping center has at least three routes which serve it. Fashion Valley and Parkway Plaza have the largest number of routes, with five apiece. However, Fashion Valley has, by far, the largest number of buses serving it with 256 stops per day. Parkway Plaza and Mission Valley are second and third with 183 and 175 stops per day, respectively. Service to all shopping centers drops off somewhat on the weekend, although this is less so for Fashion Valley and Mission Valley malls. Parkway Plaza, for example, has no Sunday service at all. However, this is the only case where this occurs. In all cases, Sunday service is the most limited. Only Fashion Valley and Mission Valley continue to be served by over 100 stops/day on both Saturday and Sunday.

In terms of hours of operation to the shopping centers, bus service begins to decline in the evening period, ending in most cases between 7:00 and 8:00 p.m. Headways also increase and are about one hour in some cases. Morning bus operation is tailored to the home-work trip, and evening hours are not arranged to fit shopping center travel demands, which are high from the late afternoon until about 9:00 p.m.

Four of the six shopping centers studied serve as timed-transfer points for the system. Timed-transfer points within the SDTC system assume that the transfer connection to another route can be made within a five-minute period. For example, a transfer connection rate of 100 per cent means that transfer to another route within five minutes is possible at all times. The four centers which serve as timed-transfer points are: (1) Fashion Valley, with a 96 per cent transfer connection rate; (2) College Grove, with a 100 per cent transfer connection rate; Grossmont Center, with an 82 per cent transfer connection rate; and (4) Parkway Plaza, with an 85 per cent transfer connection rate. Fashion Valley is the highest volume transfer location in the region outside of the CBD.

There are five major non-CBD activity centers within the San Diego region. These concentrations of jobs have a large number of transit trips either originating or terminating at them. The five transit activity centers are the University of California at San Diego, San Diego State University, Fashion Valley and Mission Valley shopping centers, 32nd Street Naval Station, and the international border. The actual number of transit trips/day in 1977 at these locations were as follows:

Activity Center	Total Transit Trips/Day, 1978
Fashion/Mission Valley	27,000
San Diego State University	3,300
Univ. of California at San Diego	3,100
International border	2,700
32nd Street Naval Base	2,500

The Fashion Valley/Mission Valley malls are especially important in a shopping center transit study of the San Diego region. Owned by different companies, Fashion Valley by Ernest W. Hahn, Inc. and Mission Valley by the Mission Valley Partnership, they are located within a half-mile of each other in San Diego's Mission Valley. Together they offer over 2.4 million square feet of gross leasable area. Compared to the CBD's eight million square feet of GLA, they represent a considerable concentration of retail activity outside of the CBD.

Fashion Valley and Mission Valley are different in a number of ways. In terms of bus access, Fashion Valley has one major bus stop on its property and all buses must drive in and out of the shopping center area. Bus movement, however, is highly organized and efficient with incoming buses entering using the Fashion Valley Road entrance and exiting buses using Friar's Road. Mission Valley's bus access is a perimeter type of service with buses operating only on the roads around the center, Camino de la Reina and Camino del Rio North. However, since the stores extend to these roads, bus service is available almost at the doorstep of three of the center's major stores (see Figure 2.35).

Both Fashion Valley and Mission Valley are open-air malls; Mission Valley, however, has a little underground parking while Fashion Valley has none at all. Fashion Valley has one major bus stop while Mission Valley has four located around the mall. At this time, all bus stops at both centers are open-air parkbench type stops with no protection from the elements except where a roof extends over a bus stop, which is the case at one of the stops at Mission Valley. It must be noted that there have been no reports of serious traffic delays or accidents from the buses serving either center (or any of the other centers).

Fashion Valley has been having a problem with the breakup of its pavement due to the weight of the buses. This is due to the very poor soil conditions in the Mission Valley region and suitable foundations for buses are not possible. Therefore, the pavement must be repaired periodically. Thus far, repairs have been made and paid for by the Fashion Valley center. However, it has been noted that the pavement breakup is a minor problem when compared with those caused by the people waiting at the main bus stop in front of the Broadway store at Fashion Valley. Many

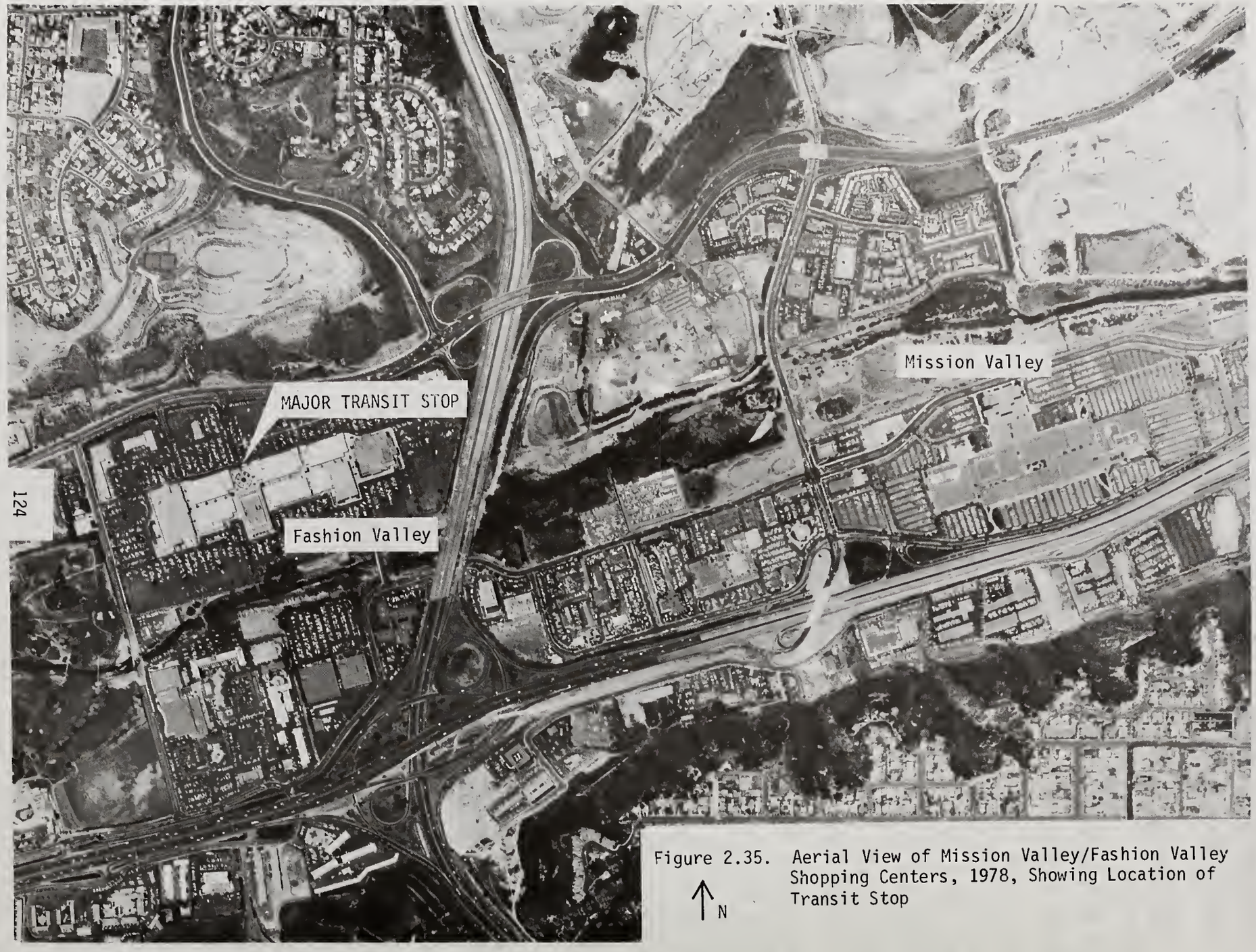


Figure 2.35. Aerial View of Mission Valley/Fashion Valley Shopping Centers, 1978, Showing Location of Transit Stop

times during the day, there are as many as 200 people waiting for a bus. The area is open and only two benches are provided, causing people to sit on nearby walls or to stand around inside store doors. The situation is an annoyance to all the people involved.

A transfer facility has been proposed for this area by SDTC, the idea being to offer a pleasant place for passengers to transfer by providing adequate seating, shelter, security and transit information. This would create an additional incentive for non-transit riders to use the bus. Another location identified as a possible site for a transfer center is the University Towne Center. One hundred thousand dollars have been budgeted for these two transfer facilities by UMTA and SDTC, using an 80/20 funding split.

However, the prospects for these facilities have been placed in doubt by two recent events. The first is that Fashion Valley plans to expand within the next two years into the area which is now its only bus stop. It is still not certain what is going to be done with the bus stop or bus service to the center. The second and more serious event has been a drastic reduction in operating funds for SDTC due to the passage of the property tax cutback (Proposition 13). The result of this tax cut has been a $4 million reduction in local transit operating funds. With no help in sight from the local governments and forced by law to keep a balanced budget, SDTC had to cut back 17 of 44 routes at the beginning of 1979. With only 27 routes remaining, SDTC has lost much of its UMTA Section 5 operating funds.

The effect on patronage can only be estimated at this time. Reports have it that passengers/day have dropped from 120,000 down to 100,000 - 105,000. There has been an extensive cutback in night service and headways have been increased from 20 minutes to one hour in some cases. The situation has stabilized for the time being, but reports indicate a possible cutback of six to seven more routes depending on whether SDTC has a large deficit by July of 1979.

What has been the use of transit for shopping center travel to the six malls studied here? To what degree has the amount of transit service available to shopping centers affected its use for this purpose? Some data which give some insights into these questions relate to the number of people boarding the bus at each shopping center each day. These figures are presented on the following page.

It can be seen that the total number of people using shopping centers as transit access points is not large, only 6,000 people/day. Note that over half of these riders board at the Fashion/Mission Valley shopping centers, which shows their importance as activity centers. None of the other centers by themselves constitute a major transit access point, although they might be considered minor

Location	No. of People Boarding/Day
Fashion Valley	2,500
Mission Valley	900
Parkway Plaza	800
Grossmont Center	700
College Grove Center	600
University Towne Center	500
	6,000

Source: [3]

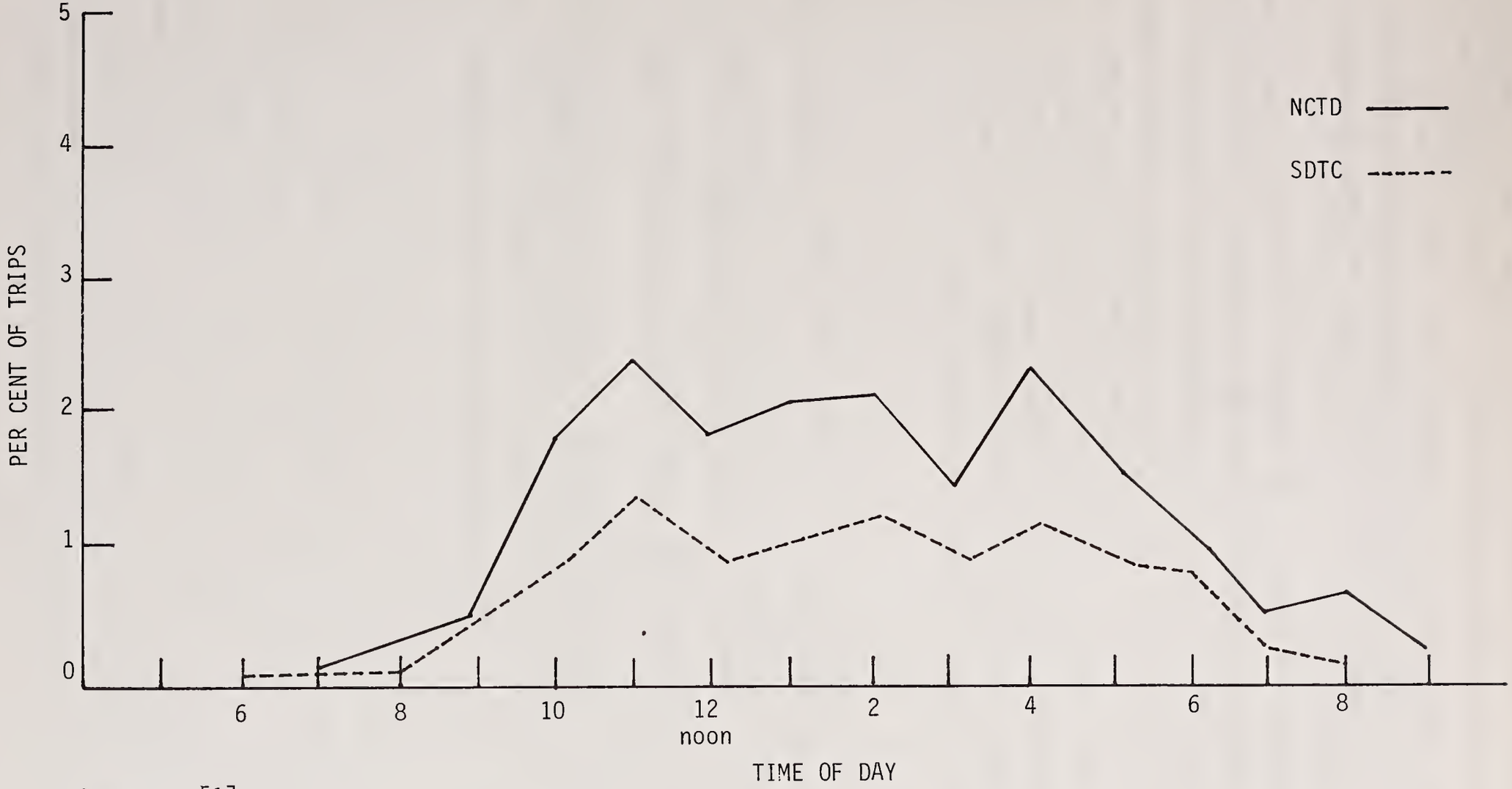
transit centers. It should be remembered that many of these boarding passengers may be just transferring and may not have been involved in any shopping activity at all.

The fact remains that the automobile is still the major mode of travel to all of these centers. This is especially brought out in the results of a recent survey of regional shopping centers in San Diego County conducted by the Marketing Service Department of the San Diego Union and Evening Tribune [2]:

Mode	College Grove	Fashion Valley	Mission Valley	Gross-mont	Parkway Plaza	University Towne Center
Car	94%	91%	93%	94%	97%	N/A
Bus	4%	7%	4%	4%	2%	N/A
Walk	1%	1%	-	1%	-	N/A
Other	1%	1%	3%	1%	1%	N/A

As can be seen, the major mode of travel to the shopping center is the automobile. Transit's share of mode split to shopping center travel probably averages about three per cent in the United States. Transit use is slightly higher than this for College Grove, Grossmont and Mission Valley and slightly lower for Parkway Plaza. It is interesting to note that use of transit to Fashion Valley is much higher than the national average. There are several factors which contribute to this, the first being the high level of bus service to the center and the second being the fact that Fashion Valley is a timed-transfer point, thus making it convenient to utilize the transit system to the center. However, no one knows for sure what proportion of these bus patrons actually do shop at Fashion Valley.

In conclusion, there does not seem to be any definite correlation between the level of bus service to shopping centers and mode split to transit. For



Source: [1]

Figure 2.36.

Distribution of Trips, Home-to-Shop, by Hour of Day
San Diego Transit Corporation (SDTC)
North County Transit District (NCTD)

example, both Mission Valley and Parkway Plaza have higher levels of bus service than Grossmont and College Grove, and yet mode split to transit remains the same. In fact, in Parkway Plaza's case it is actually lower. Only at Fashion Valley do high levels of bus service result in higher transit mode split to the center. However, it is still not known exactly what percentage of the bus patronage shops at Fashion Valley.

In all, bus service to centers is not tailored to fit shopping center demand. Shopping centers normally operate from 10:00 a.m. to 9:00 p.m., with shopping center demand/patronage peaking in the late afternoon and evening until 9:00 p.m. Bus service to shopping centers begins to decline in the evening, with fewer buses and longer headways. Service usually stops at around 8:00 p.m., an hour before centers normally close. This is shown in Figure 2.36, which compares distribution of home-to-shop/shop-to-home bus trips to shopping center demand. The distribution of trips declines steadily from its peak at 4:00 p.m. until service ceases at 8:00 p.m. while shopping center demand continues on until 9:00 p.m.

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7. Honolulu

a. Ala Moana

Ala Moana Center is located in Honolulu on the Island of Oahu (see Figure 2.37). Situated between Waikiki and the central business district, it is Oahu's major retail center, attracting shoppers from all over the island to central Honolulu. Although a bus/rail transit system is being planned for the future, Oahu is presently served by an all-bus system with Ala Moana Center as the major transit stop on the island. In all, Honolulu's location on a narrow strip of land creates a unique situation not only for a regional shopping center such as Ala Moana, but also for the transportation system serving it.

Honolulu is the largest city in the State of Hawaii in both size and population. It is also the most important, housing the seat of the State government as well as being the major tourist stopover in the islands. Today Honolulu contains about 725,000 people with 40 per cent (290,000) of them living in central Honolulu. Central Honolulu is concentrated into a 24 square mile strip of land bordered on one side by the Kuulau Mountain Range and on the other by the Pacific Ocean. This acts as a natural funnel which has intensified the land use and the traffic situation. As opposed to a city like Phoenix, Arizona, which is built on a plain and is free to develop in all directions, central Honolulu, constricted between the mountains and the sea, has developed into a "linear city," a city in which growth is concentrated along a narrow corridor. Today it contains more than 50 per cent of the jobs as well as Oahu's major activity generators in Waikiki: the central business district, the University of Hawaii and Ala Moana Center.

Ala Moana Center is Honolulu's major retail center. It offers 155 stores, services, and restaurants that are open seven days a week. The complex covers 50 acres and has over 1.4 million square feet of gross leasable area. It is a two-level, dumbbell-shaped, open-air mall with third level additions. Ala Moana Center is located in central Honolulu next to a large beach park and is just minutes from both Waikiki and the CBD (two miles away). The center is not located next to a freeway, but instead is situated between several major arterials. Due to the density of development within the city, a freeway location is not needed.

Ala Moana Center has been in operation since 1959. Through the years it has evolved into somewhat more than a shopping center. The center has offered free shows and exhibits, many with a cultural slant, on stage or in exhibition areas within the center for years. For example, the Young People's Hula Show has been offered every Sunday since it began in 1969. There is also a large hotel next to one end of the center and a large office building is located within the center

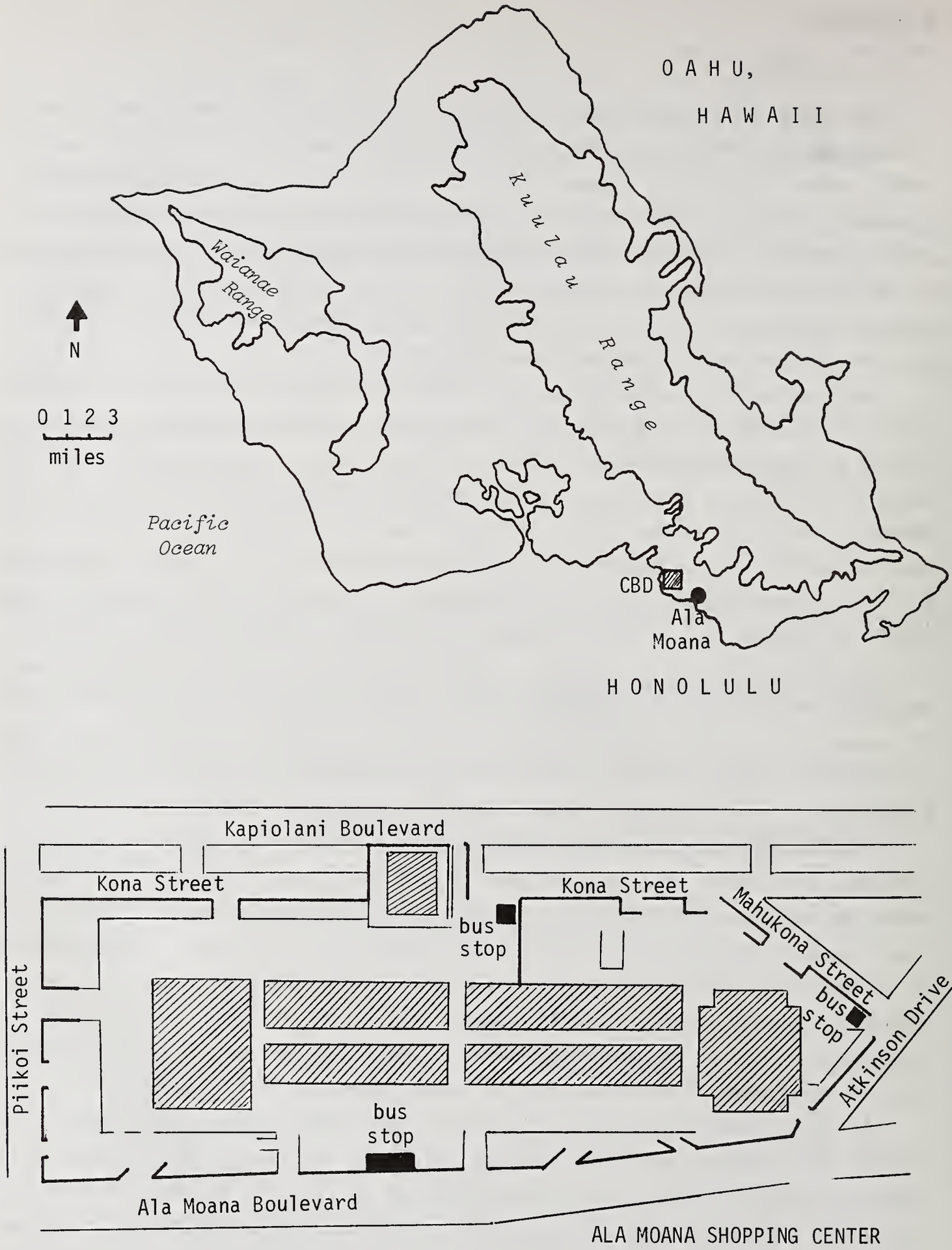

Figure 2.37. Island of Oahu Showing Location of Ala Moana Center and Diagram of Mall

boundary. Much of the surrounding area is built up with high-rise apartments and office buildings. This entire area constitutes a major traffic generator within the city. Table 2. lists further information on Ala Moana Center.

Table 2.22
Some Characteristics of Ala Moana Center

Opened	GLA (ft^2)	No. of Stores	Parking	Parking per 1000 ft^2 GLA	1977 Gross Sales (mils. $)
1959	1,400K	155	7,800	5.6	285

The linearity of the city has both helped and hurt the transportation system. Forcing traffic to flow along a narrow corridor intensifies it, increases it, and in many cases restricts it. Oahu has over 423,000 registered motor vehicles. In 1978, 315,000 vehicles/day (Average Daily Traffic, ADT) traveled through the corridor, running through a count line extending from the Ala Moana area on through to the mountains. By contrast, the Santa Monica Freeway in Los Angeles has an ADT of only 240,000 vehicles/day. With an average net increase of 30,000 automobiles per year coming into the state, Honolulu's traffic problem is just beginning. On the other hand, because the traffic pattern is forced to travel along a corridor, Honolulu's bus system can more easily serve the demand. Also because the density is greater, more efficient use is made of available resources.

The City and County of Honolulu began its program to achieve an integrated island-wide bus system in 1971 by acquiring the Honolulu Rapid Transit Company (HRT). HRT was then carrying 17 million passengers per year on 65 buses. The City and County completed its program in 1973, purchasing the four independent bus operations on Oahu to unify the transit system. Today the system carries 65 million passengers per year on 350 buses, or 180,000/day, without counting transfers. Currently, plans are underway to expand the present system. New bases and maintenance facilities are being built and the Department of Transportation Services plans to build the bus fleet up to 650 by 1985 to operate in conjunction with a proposed fixed guideway system being planned.

Transit service to Ala Moana Center is very good. It is served by 18 different routes each day and is the major transit station in the island-wide system. The center is presently served by three kinds of bus service: urban, suburban and express. Over 1300 bus trips a day operate to Ala Moana Center. Because the center operates as a major transit stop for the entire system (18 out of 37 routes stop there), bus hours to the center far exceed the mall operating hours. In some cases,service operates until 12:00 or 1:00 o'clock in the morning. In 1978, a total

of 167 buses or 48 per cent of the entire system operated through the center. Tables 2.23 and 2.24 give further details of bus service to the center.

Table 2.23.
Bus Service to Ala Moana Center

Number of Buses

	Mon-Fri (per day)			Saturday			Sunday		
Type of Route	A.M.	P.M.	Total	A.M.	P.M.	Total	A.M.	P.M.	Total
Urban	263	434	697*	251	398	649*	170	342	512*
Suburban	252	348	600	177	278	455	145	259	404
Express	2	2	4						
Total:	517	784	1301*	428	676	1104*	315	601	916*

*does not include Route 17

Ala Moana Center was not originally planned as a major transit stop when it first opened in 1959. However, as Ala Moana emerged as the major retail outlet on the island, bus service to it was increased. In 1970, a major survey of Oahu's transit system found that Ala Moana was generating about 15,000 transit trips per day. Table 2.25 shows that the center ranked third behind the central business district and Waikiki as a major transit generator. Ala Moana was then being served by six routes operated in Honolulu by Honolulu Rapid Transit Company.

Today Ala Moana Center has three major bus stops on the center grounds (see Figure 2.37). Two stops (on Kona Street and on Mahukona Street) are covered by the multideck parking structure surrounding the mall complex. The third is a sheltered bus stop located away from the center complex on Ala Moana Boulevard. An open-air bus stop is also located just north of the center property on Kapiolani Boulevard in front of the Ala Moana (office) Building. The Department of Transportation Services estimates a load factor of 37 for urban buses utilizing these stops. This works out to about 21,000 transit trips a day utilizing the different bus stops located at Ala Moana Center (from urban service alone). Sample calculation:

load factor = 37 = .37 utilization
seats on bus = 42
average bus load = .37 x 42 = 15 passengers/bus
number of urban buses/day = 700
number of bus trips into & out of Ala Moana Center/day = 1400
estimated transit trips/day = 1400 x 15 = 21,000

The overall working relationship between the center management and the city transit agency is good. Both realize the importance of maintaining Ala Moana as

Table 2.24 .

Characteristics of Routes Serving Ala Moana Center

Route No.	Route Type	Days of Operation	Hours of Operation to Center, M-F	Headways (min.) Peak Period A.M.	Midday	P.M.	Evening
3	urban	M-Sun	5:27am-1:05pm	15	15	20	30
5	urban	M-Sun	6:10am-9:15pm	25	15	15	45
6	urban	M-Sun	5:40am-11:35pm	15	15	15	30
8	urban	M-Sun	5:14am-11:57pm	15	30/10	10/20	15
9	urban	M-Sun	6:25am-9:50pm	30	30	15/30	40
11	urban	M-Sun	6:45am-8:55pm	60	60	60	60
12	urban	M-Sun	6:20am-9:20pm	20	30	25	80
17	urban	M-Sun					
50A	suburban	M-Sun	6:02am-10:20pm	30	30	15/30	40
50B	suburban	M-Sun	6:16am-10:05pm	30	35	30	65
51	suburban	M-Sun	5:38am-10:20pm	30	30	15	60
52	suburban	M-Sun	6:09am-11:30pm	30	30	10/20	60
53	suburban	M-Sun	6:22am-10:00pm	20/30	30	20	60
54	suburban	M-Sun	5:55am-10:15pm	20/30	30	30	60
56	suburban	M-Sun	6:23am-9:15pm	30	30	20	75
57A	suburban	M-Sun	7:05am-6:05pm	30	30	30	--
57B	suburban	M-Sun	6:28am-10:28pm	5/15	30	30	60
87	express	M-F	(only four runs/day - 2 out/2 back)				

Table 2.25.

Major Generators of Transit Trips (1970)

Zone	Total Trips (O & D)
CBD	23,729
Waikiki	19,984
Ala Moana	14,856
University area	9,213
Pearl Harbor	2,870
Airport	1,581
Hickham AFB	1,280

Source: [6]

a major transit stop. In utilizing an existing site no new investments for shelters or waiting areas were needed by the transit agency. As a major transit stop, Ala Moana becomes a focal point for the community and for transit-dependent shoppers (including tourists). Actual data is not available as to what percentage of the transit ridership actually shops at the center. The center management has reported difficulty in conducting a survey to determine this. The large number of transit users spread out over three transit stops has presented problems. Ala Moana has also experienced problems with pavement breakup. Constructed partially on land fill, the center pavement has been unable to withstand the stresses originating from the large number of buses operating throughout the center each day. This has caused the center management to effect periodic repairs to mall pavement surfaces.

Traffic congestion is also becoming a problem in the area. Piikoi Street, as well as Kapiolani and Ala Moana Boulevards, is experiencing severe traffic congestion during the peak hours (6:00 - 8:30 a.m., 3:00 - 6:00 p.m.), creating problems for buses operating during these times. Although it is not known what is being planned to cope with this situation, Oahu is studying the possibility of limiting the use of motor vehicles during the peak hours or even controlling the number of motor vehicles on Oahu (an unlikely possibility). However, because Hawaii is so oil dependent, the possibility of fuel shortages offers interesting possibilities in future mode split.

The City and County of Honolulu has been planning an integrated bus/rail alternative traversing the central Honolulu corridor since the 1971 PEEP I study (Preliminary Engineering and Evaluation Program). An Ala Moana transit station is proposed as part of the rail system. An elevated guideway, if constructed, would run along Kona Street and be constructed near the Kona Street bus stop, utilizing

some of the second level parking deck for access to as well as becoming part of a transit station. There are many differing opinions concerning the financing, construction and operation of a bus/rail system. The present status of the proposed 14-mile system is still in debate, with the City and the State split between two entirely different transportation projects.

In conclusion, it would be difficult to generalize the existing situation in Honolulu into any overall guideline for transit service to shopping centers because the very factors which contribute to the high level of transit service also separate Ala Moana Center from other transit case studies. Honolulu's geographic location creates unique situations in land use and transportation. However, if shopping center complexes are built in the CBD (a definite possibility), Ala Moana might be used as an example of how transit service can be coordinated to serve it.

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8. Denver

The Regional Transportation District (RTD) in Denver has been in operation for only four years but is already regarded as one of the best transit properties in the nation. It is especially noted for its willingness to try innovative approaches to improving service and increasing patronage. Currently, RTD operates 586 buses with about 1600 employees and serves a six-county area having a total population of about 1.5 million. [1]. In 1978, the RTD had a total ridership of about 43 million. [3]

Denver is a sprawling, low-density city that is very automobile-oriented. It is well-served by 12 major shopping centers which are located as shown in Figure 2.38. Some of the characteristics of these regional malls are shown in Table 2.26.

Table 2.26

Major Shopping Centers in the Denver Area

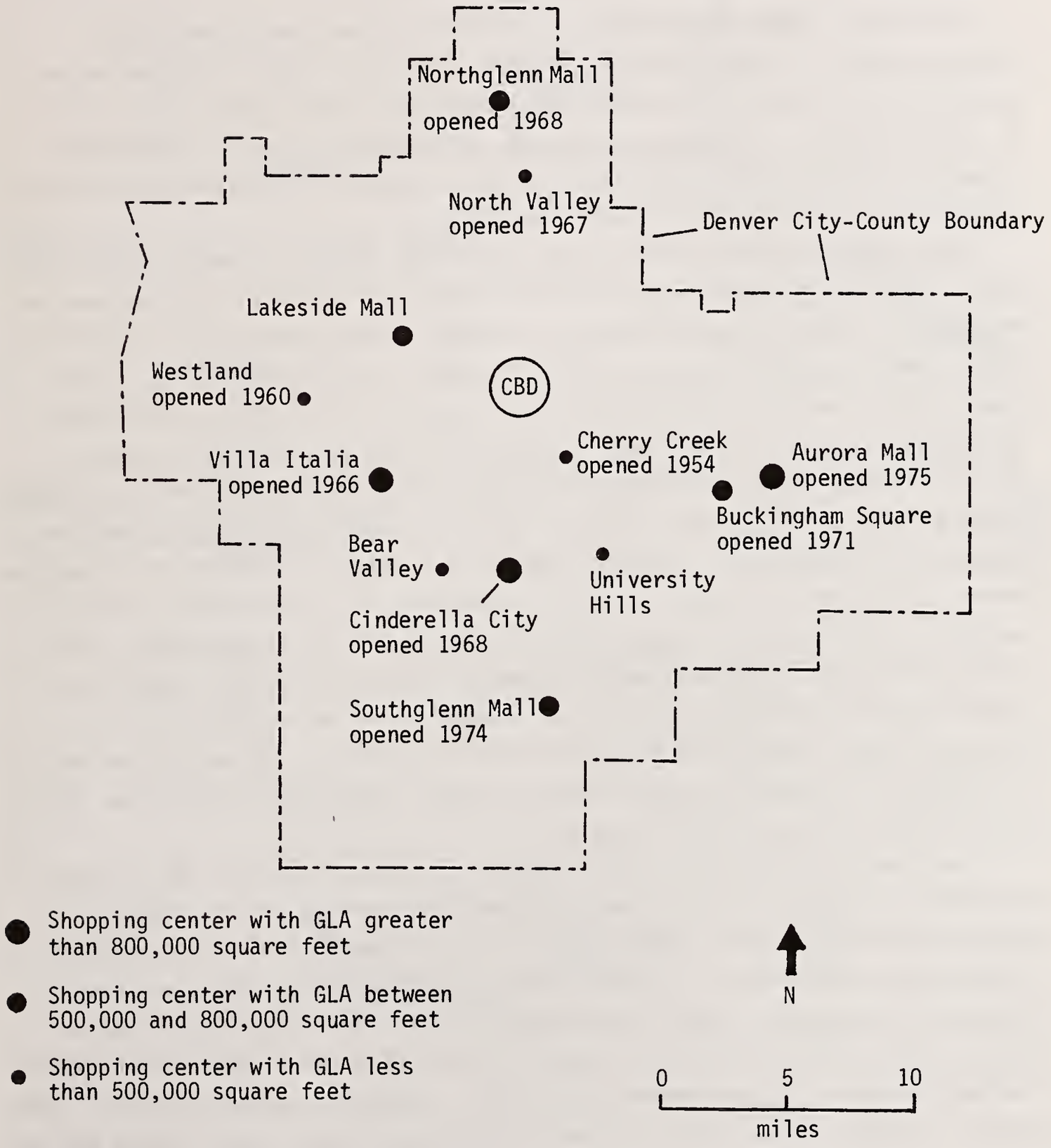
Shopping Center	GLA (1000 ft^2)	Per cent of respondents who shopped there in last 7 days	Per cent of respondents who shopped there in last 30 days
Cherry Creek	400	12	19
Cinderella City	1850	12	22
Villa Italia	850	12	20
Buckingham Square	755	11	15
Aurora Mall	1152	10	13
Lakeside Mall	555	10	12
University Hills	N/A	10	14
Westland	596	10	13
Northglenn Mall	758	9	10
North Valley	469	7	8
Bear Valley	370	6	9
Southglenn Mall	760	6	9

Source: Denver Post market survey

It is interesting to note that the number of shoppers who indicated that they had shopped in the Denver CBD in the past seven days was only 13 per cent, while 15 per cent indicated that they had shopped in the CBD in the past 30 days. Furthermore, 72 per cent of the respondents indicated they rarely, if ever, shopped

Figure 2.38

Location of Major Shopping Centers in the
Denver Metropolitan Area



in the CBD. These data indicate that downtown Denver is only one of several major shopping destinations in the Denver region.

This case study will examine the way in which bus service has been provided to three major malls (Aurora, Northglenn and Villa Italia) as well as describing a shopping service for the elderly that services several malls.

a. Northglenn, Aurora and Villa Italia Malls

At present, these three malls are served by conventional, fixed route, scheduled service. No data are available as to how many shopping center patrons use this service but it is believed to be three per cent or less of total shoping center patrons. Instead of describing this service, we will concentrate instead on the more innovative aspects of RTD's efforts to develop higher patronage in the low density areas around these malls.

RTD presently operates four collector systems within its general route structure. The concept behind these collector systems is to bring people who are not presently on a major transit route to a transfer center where several different routes converge so that they can easily transfer to their desired bus. This timed-transfer or pulse-point concept is believed by RTD to be an inexpensive and effective way to substantially increase patronage in low-density areas.

Of the four collector systems, two have been designed to converge at regional shopping centers (see Figures 2.39 and 2.40). The Adams circulator system converges at Northglenn Mall, located in Northglenn, about 11 miles north of downtown Denver. The Aurora circulator system is focused at the Aurora Mall, which is located in the suburb of Aurora, about 10 miles east of downtown Denver. The buses do not stop on shopping center property, but at bus shelters located on public arterials at the edge of the mall property. At Northglenn Mall, a bus pullout has been designed at the site of the bus shelter. The pullout is simply a widening of the road at the bus shelter so that loading and unloading can occur without hindering auto traffic movement.

The Adams circulator has three routes -- N (north), W (west), and E (east). Each route serves the mall 19 times each weekday from 6:00 a.m. to 6:00 p.m., with a 40-minute headway. Only one route, the N, operates on Saturday, and no routes operate on Sunday. The buses which are used on these routes are Flex coaches, which look very much like Winnebago recreational vehicles and seat 25 people. This circulator serves primarily the shopping center and its surrounding residential area. The only other major traffic attractor served is North College, which is located at the end of the route. Table 2.27 shows route lengths and the

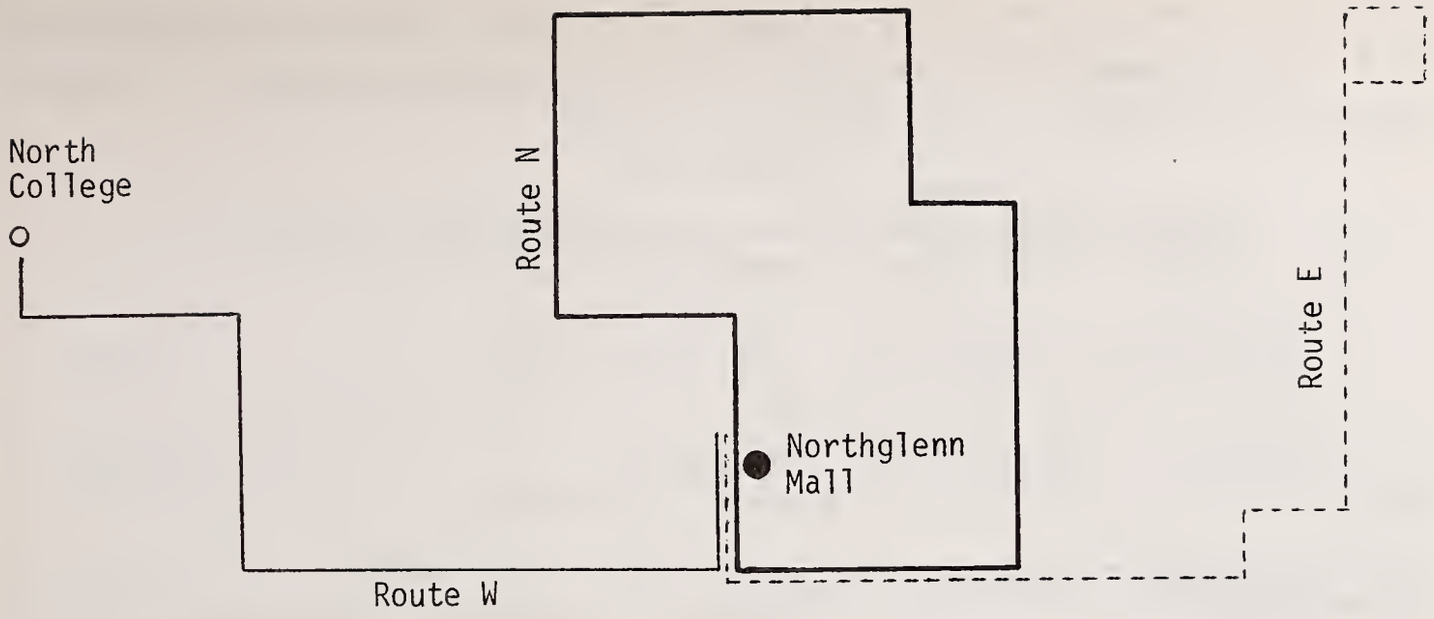


Figure 2.39. Adams Circulator Routes

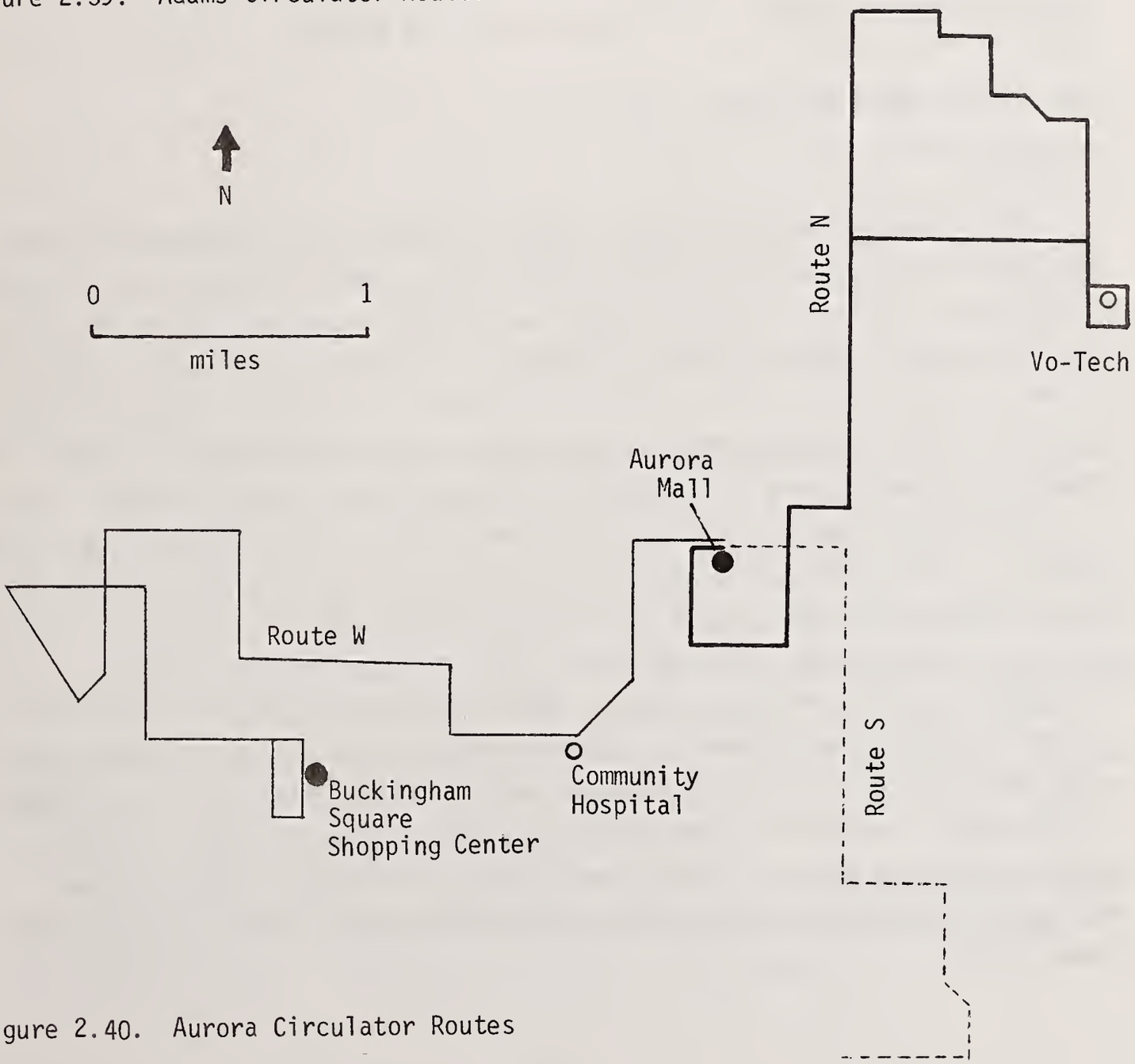


Figure 2.40. Aurora Circulator Routes

travel times from the most distant stop to the shopping center are fairly short. The N route is comparatively much longer in both length and travel time because the route is a loop.

Table 2.27

Route Lengths, Travel Times and Average Weekly Ridership for the Adams Circulator

	Route		
	N	E	W
Length	4.2 miles	3.6 miles	2.9 miles
Travel time from most distant stop to Northglenn shopping center	21 minutes	15 minutes	13 minutes
Average weekly ridership (Sept. - Dec., 1978)	28 persons	68 persons	45 persons
Per cent of total patronage	20	48	32

Source: RTD

The circuitous nature of the N route is probably one of the major reasons that the ridership on this route is significantly lower than the other two routes of the Adams circulator system. The N route accounts for only 20 per cent of the total circulator system ridership. Route E is the best route, with 48 per cent of the ridership of the total circulator system. A possible reason for this is that the E route does not compete with a local route for patronage. Both of the other routes overlap over part of their distance with at least one local route.

The Aurora circulator consists of three routes, the N (north), S (south) and W (west). The N route serves Aurora Mall 23 times a day starting at 6:55 a.m. with a 30-minute headway, while the W serves the mall from 6:00 a.m. to 6:07 p.m. with an average headway of 40 minutes. The S route serves the mall from 7:00 a.m. to 6:00 p.m. with a one-hour headway. The buses which serve these routes are standard 48-passenger GM buses. The area served by the Aurora circulator not only covers the surrounding residential area and Aurora Mall, but also a community hospital, vocational-technical school, and Buckingham Square, another regional shopping center. RTD believes this to be the reason that ridership has been considerably higher on this system than on the Adams circulator (see Table 2.28).

Table 2.28

Route Lengths, Travel Times and Average Weekly Ridership for the Aurora Circulator

	Route N	Route S	Route W
Length	4.6 miles	3.4 miles	4.3 miles
Travel time from most distant stop to Aurora Mall	25 minutes	25 minutes	25 minutes
Average weekly ridership (Sept. - Dec., 1978)	114 persons	90 persons	135 persons
Per cent of total patronage	34	26	40

Source: RTD

RTD concedes that, relative to regular local routes, the ridership of both of these circulator routes is abysmal. It believes that part of the reason for this is that the routes were designed on the theory that if they were staggered to run at different times and on different streets than the local routes, they would attract patrons who desired to ride to the transfer center for a speedy transfer. It now appears, however, that patrons would rather wait at their homes, and walk the extra distance to a local bus stop, than to have to wait for a transfer at a transfer center.

Part of the reason for this result may be the present nature of the transfer center. It is actually no more than a bus shelter at a stop served by several local bus routes. It is the opinion of RTD that more people would ride the circulator system, and the quality of local bus service would be generally and substantially improved, if large off-street transit centers were constructed with many bus bays and shelters as well as other amenities which would provide a comfortable environment for making a transfer. Such transit centers have been proposed by RTD, including one at a site across the street from the Northglenn Mall and one adjacent to the Aurora and Villa Italia malls. Funding for the transit center near the Northglenn Mall has been requested from UMTA.

The Northglenn transit center project would require the acquisition of 1.07 acres of land and the construction of eight bus bays and shelters with two enclosed waiting areas. The purpose of such a center would be:

> "... the provision of both a facility where pulsing, transfers, boarding and de-boarding can occur in a protected, attractive and easily accessible environment, as well as a transit focus in a community activity center which serves to advertise and promote the use of the system." [2]

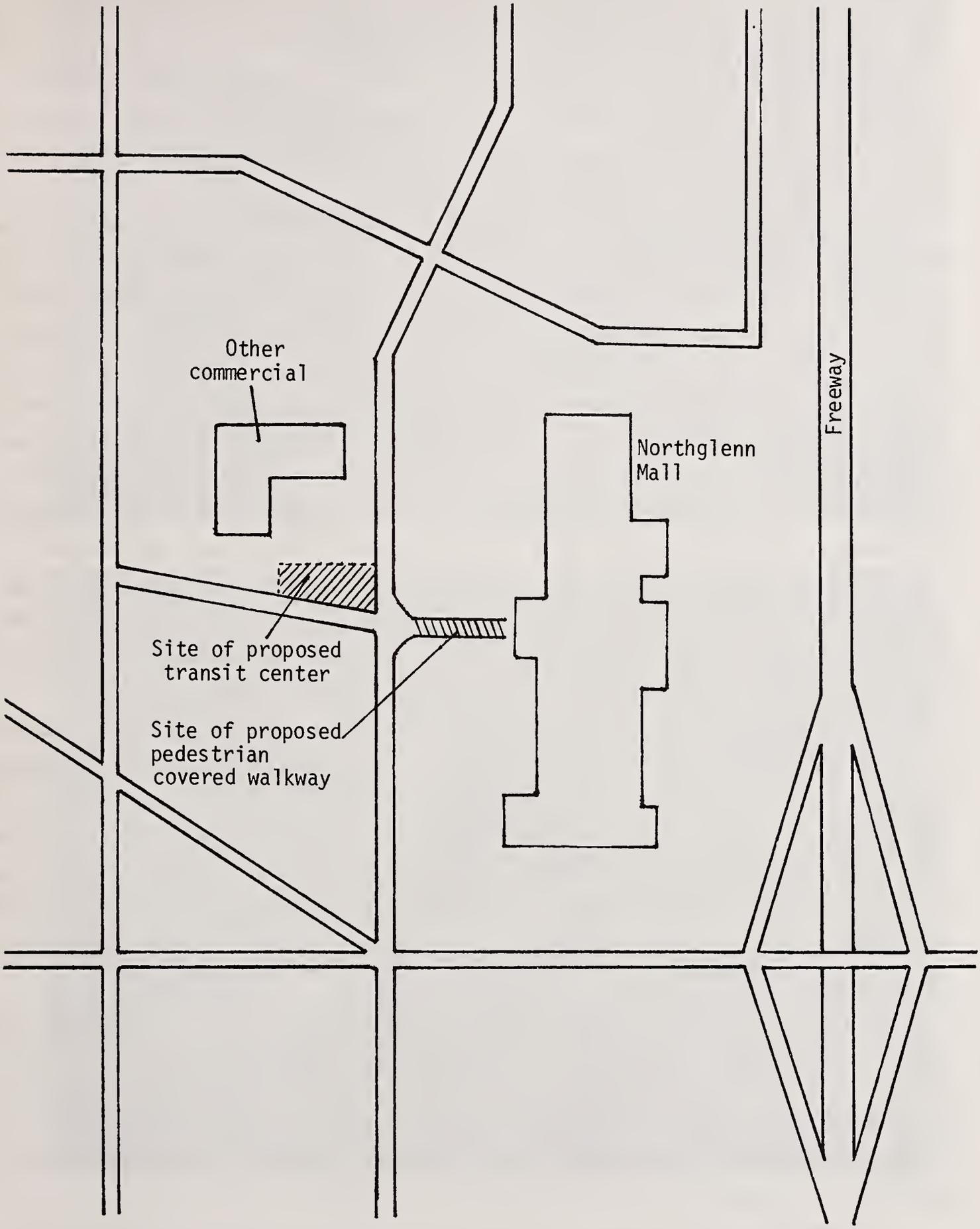
This center would include amenities such as telephones, posting kiosks, transit information, display devices, newspaper machines, and restrooms. Bicycle storage facilities would be located along a pedestrian plaza which will be between two lines of four bus bays. The total cost of the project is estimated to be about $1,535,000 and capital grant funding from UMTA is presently being sought [2]. Figure 2.41 shows the location of the proposed transit center for Northglenn Mall.

This transit center would be served by four local routes and two express routes as well as the three routes of the Adams circulator system. A pedestrian-actuated signal has been suggested at the intersection of 106th Avenue and Melody Drive to allow transit patrons to safely cross the street on their walk to the entrance of Northglenn Mall, approximately 250 feet away. The plan for the transit center further suggests that a pedestrian mall be built on the shopping center's property along the walkway from the transit center to the mall. The shopping center management has made no plans to construct such a mall as yet.

RTD estimates that under optimum conditions the Northglenn transit center would achieve a daily passenger flow of 2,700 persons in 1979. By 1990 they estimate that the daily passenger flow would be 5,900. At present, the management of the shopping center estimates the total number of persons who arrive daily at their shopping center averages about 19,600. If three per cent of this number arrive by transit, this means that presently 588 persons arrive daily by transit at Northglenn Mall. The development of the transit center may have a positive effect on the number of persons who use transit to reach the shopping center. In 1979, more than 70 per cent of the 1979 estimated daily passenger flow at the transit center would have to be shoppers going to Northglenn Mall to attain a 10 per cent share of this market for transit. If achieved, this would be an unusually high utilization of transit for the shopping trip purpose. RTD's experience in this respect should be closely monitored as it is an innovative attempt to relate a timed-transfer facility to a major shopping destination in the northern Denver area.

The proposal for a transit center adjacent to Villa Italia mall was first made in March, 1975, in Concept Lakewood: A Development Plan and Planning Process,

Figure 2.41. Northglenn Transit Center



a development plan adopted by the City of Lakewood. This document addressed, among other things, the possibility of making the area around the Villa Italia mall into a major diversified activity center. The circumstances surrounding this situation are quite unique in that the site where the Villa Italia mall is located is surrounded by a large amount of vacant land under single ownership. The proposed development of this vacant land would produce a mixed-use complex which would include a maximum of 2.2 million square feet of commercial floor space, and up to 3,400 dwelling units. [4]

A key element in the current proposal is the provision of an urban crossover plaza, and a transit center in the approximate center of the complex. This would primarily be a pedestrian area. The transit center would initially be designed to serve as an RTD bus terminal but could be modified to accommodate other forms of transit, both local and regional in nature, in the future. It is anticipated that the transit center could eventually be used as part of an internal people-mover system that would allow people to move about the major diversified center without using their autos. Figure 2.42 shows the present situation in relation to the development concept that has been proposed. The plaza and transit center are located in the upper right hand part of the lower photograph.

This proposed development obtained formal approval from the Council of the City of Lakewood in 1978, and is being actively supported by the Equitable Life Assurance Society of America, the owners of the Villa Italia mall. RTD expects to develop a design and apply to UMTA for funding in the near future.

In the past, RTD has provided service to two shopping centers in the Denver area by acquiring permission to establish a bus stop with a shelter on the shopping centers' property. RTD buses would enter the parking area of these centers to load and unload passengers. After a short period of operation, however, it was discovered that the pavement in the parking area was unable to support heavy use by buses. The pavement over which the buses traveled deteriorated rapidly to such a degree that the management of the shopping centers ultimately revoked their agreement to allow buses on their property.

RTD continued to find it desirable to be able to establish bus stops on shopping center property, and therefore proposed to assist in the construction of a bus pad on the property of several shopping centers in order to solve the problem of pavement deterioration. Such a pad consists of an eight-inch thick slab of concrete 205 feet long and 40 feet wide with reinforced curbs, and has the capacity to serve four buses at once.

The proposal to assist in the construction of such a pad is contingent on the formal agreement that RTD will provide two-thirds of the funds needed for pad

Figure 2.42. View of Present and Proposed Villa Italia Center, Lakewood, Colorado, Looking Northeast, 1978

construction, while the shopping center will provide the land, the remaining one-third of the construction costs, and will maintain the area. Furthermore, the shopping center will agree that RTD may operate on its premises for a period of five years, or if the agreement is cancelled before that time the shopping center will pay RTD for the costs that RTD incurred in pad construction, prorated over the five year period. Also contained in the agreement is a "hold harmless" clause, which states that RTD will not be held responsible for any damage caused to the parking area, roadway, or any other shopping center property unless it is caused solely by the negligence of RTD or its employees. Moreover, the agreement provides that RTD will not be held liable for any of the actions of transit patrons.

At present, such an agreement has been signed and a bus pad and shelter have been built at the Villa Italia mall, which is located in the City of Lakewood about six miles west of downtown Denver. The pad and shelter are located in the parking lot approximately midway between the street and the shopping center. This is about 250 feet from the shopping center itself. Bus pads are being considered at Aurora Mall, which is about 10 miles east of downtown Denver, and Applewood shopping center, a community shopping center located in Wheat Ridge, six miles northwest of the Denver CBD.

The management of Villa Italia has allowed the bus pad to be built on shopping center property as a hedge against the forecasted increase of gasoline prices. Although there are no data to support its opinion, the management believes that presently, only a nominal percentage of its patrons arrive by bus. It feels, however, that if the price of gasoline continues to rise, the journey-to-shop will more frequently be made by transit. A bus stop located on shopping center property is, therefore, a functional element that is deemed necessary to satisfy the future needs of its customers.

There have been some problems associated with the location of the bus pad. Although the shopping center had reinforced the circulation roadway which leads to the pad, it was nevertheless unable to support heavy bus traffic. Within one year the roadway needed resurfacing, which was undertaken by the shopping center at a cost of $18,000. The shopping center believes this will be an annual occurrence if the bus pad continues to be used where it is now located. It has also been noted that the bus drivers occasionally deviate from the reinforced roadway onto other roads which deteriorate even more quickly. For these reasons, the management would like to close the operation of the present bus pad, and have another pad constructed at a site about 350 feet from the shopping center. If the new pad were built, it reasons, maintenance costs, which are wholly paid by the shopping center, would decrease substantially.

In several other cases, RTD has attempted to acquire permission to establish a bus stop and to enter the shopping center's property without the offer of physical amenities to the shopping center. RTD has attempted to reach a formal agreement with these centers, which would allow it to operate its transit vehicles on their roadways and parking lots for an unspecified time period which could be terminated by either of the parties. In return, RTD would "agree to promote these locations to RTD patrons as 'park 'n ride' sites, thereby attracting potential patronage to the owner's premises." Also included in the agreement is a "hold harmless" clause identical to that of the previously mentioned agreement. RTD has, however, been unsuccessful in its attempts to implement such an agreement with any shopping center in the Denver area to date.

b. Shopper's Service for Elderly Persons

During the past three and one-half years, the RTD has operated a special bus service that is designed to take elderly persons from their homes to a nearby shopping center. The buses serve locations where concentrations of elderly persons live and these tend to include one or more high-rise buildings. There are 44 such locations that are presently included in this special RTD service (see Figure 2.43).

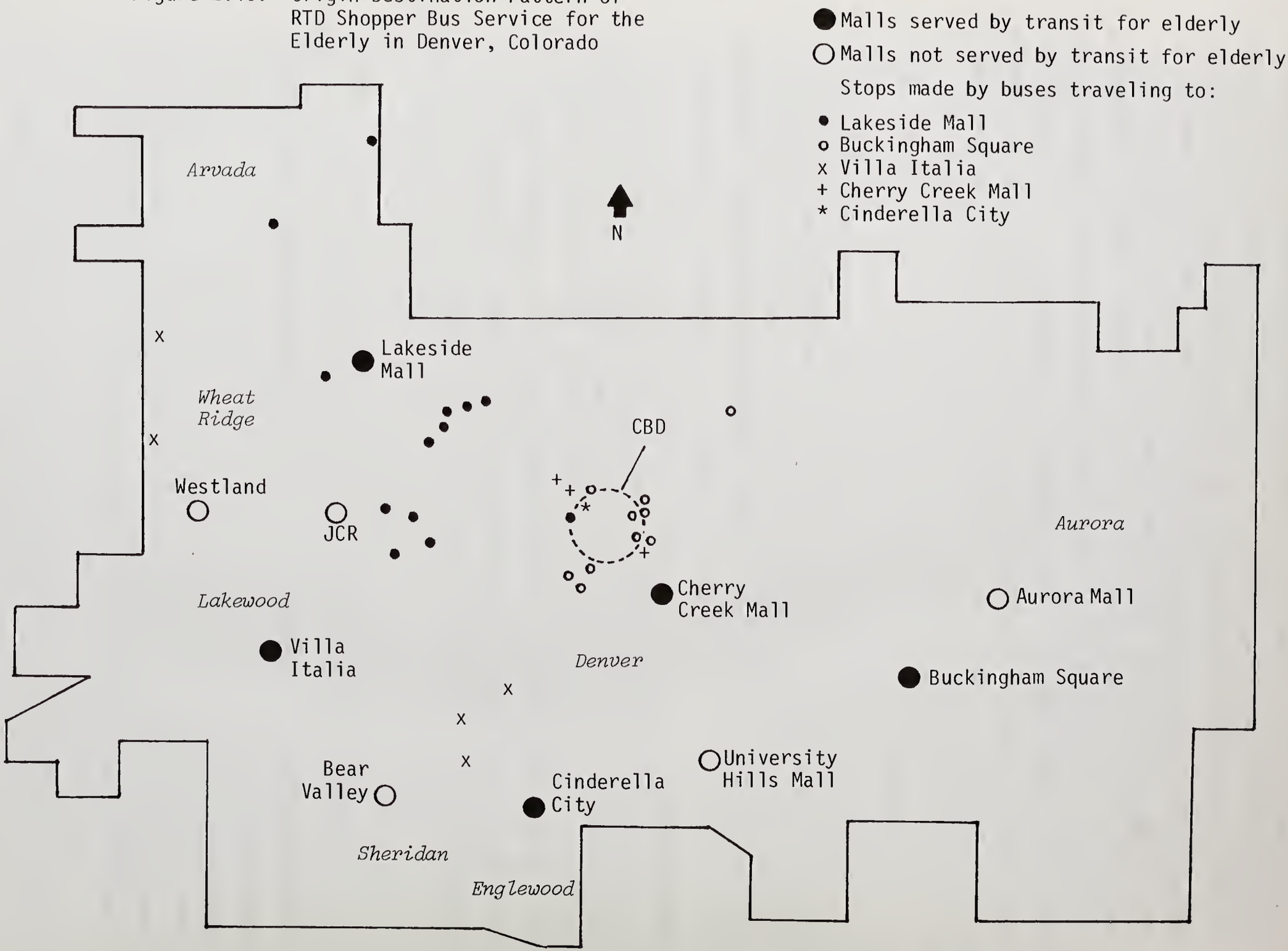
The service usually provides one trip per week for each of the locations served. Typically buses arrive at the location about 10:00 a.m. and they return by 2:00 p.m. at the latest. They operate Monday through Friday and use standard size, 48-passenger coaches. The buses often stop at more than one location in order to get a full load. The routes are worked out with participation from representatives of the elderly people at each location and the choice of the destination shopping center is determined by a majority rule of interested persons.

Table 2.29

Shopping Centers Served by Special Bus Service for the Elderly

Shopping Center	GLA (ft^2)	No. of Shopping Trips to Center/Week
Lakeside Mall	555,000	16
Buckingham Square	755,000	7
Villa Italia	850,000	5
Cherry Creek	400,000	2
Cinderella City	1,850,000	1

Figure 2.43. Origin-Destination Pattern of RTD Shopper Bus Service for the Elderly in Denver, Colorado



The locations presently served were not determined by RTD but evolved from inquires from the elderly people themselves about getting this service. As these calls came in, buses were assigned until all available buses had been allocated. There is now a waiting list for this service and RTD estimates that another 20 buses could be assigned to this service and filled if they were available.

Some RTD patronage figures for the service are as follows:

December, 1977	3,463 person-trips/month
July, 1978	4,022
August, 1978	5,765
September, 1978	4,601

The ridership is strongly affected by the weather and tends to be higher when it is warmer. Detailed cost figures are not available, but RTD estimates that the cost per passenger is about $1.00. The fare was 50¢ initially and then was free during the free fare experiment that was conducted by RTD in 1978-79. At present, it is again 50¢.

The operators of the shopping centers involved are reported to generally welcome the people on these buses. Some provide attendants for the blind and help with carrying groceries. It has been noted that some of the elderly persons have difficulty with shopping carts (the two-wheeled variety) and that the drivers are sometimes helpful and sometimes not. On one route, an elderly person has chosen to serve as hostess to aid her companions. Part-time drivers are not used and the drivers generally have a long layover period at the shopping mall. No other particular problems have been found with this service. The elderly people seem very pleased with it and find that the time at the mall is about right -- generally two to three hours. Some socialization benefits to the people involved have also been noted as the same group of people generally travels together on these shopping trips.

The present shopping service for the elderly serves only a small portion of the elderly population in the Denver region. Census data show that the population of the Denver SMSA in 1970 was 1,227,429. Since about 10 per cent of this population is over 65, there were some 123,000 elderly people in the Denver area in 1970. With an average of 4,000 round trips per month made on the elderly transit service, only 2,000 people ride these buses every month. This is only 1.6 per cent of the 1970 elderly population. The number who ride the bus, of course, is not a complete indicator of service availability since there are elderly people who live in the apartment houses which are served but who do not use it. If one out of three eligible persons in the service area uses the service, the total percentage of elderly persons served by the shopper's service would be 4.9 per cent. This is still a

very small percentage of the total number of people who might like to have this service available.

RTD realizes this, but observes that the majority of the elderly population is dispersed throughout the city so that it is not possible to serve them efficiently with a special service. Moreover, many of these people presumably have the ability to ride the regular service to shopping centers. RTD recognizes that there is a percentage of elderly patrons in some areas who are concentrated to the degree that a special service is possible. It is planned to expand the amount of shopper's service for the elderly as funding becomes available.

c. Conclusions

The actions taken by RTD to operate a collector bus service to a pulse-point adjacent to a shopping center appear to be ineffective so far. If collector bus routes continue to overlap with local routes, if transfer points lack comforts, and if no effort is made to promote quick transfers through some sort of timed-transfer system, then RTD can expect continued poor patronage on the collector systems. By the introduction of off-road transit centers, RTD hopes to remedy at least some of these problems and thereby increase both its ridership in low density areas and the number of shopping trips made by transit. The progress which is made toward these objectives by the introduction of transit centers should be interesting to monitor, since the transit center concept is one that is being considered by other transit properties.

Increasing the ability of transit to serve regional shopping centers seems to be the mutual desire of both RTD and the management of at least some regional shopping centers. It seems clear, however, that in the recent past the shopping center planners have not considered the ability of public buses to use shopping center roadways in their designs, or have not considered it cost-effective. The result has been remedial planning, which RTD has not found to be totally effective. It would be desirable, therefore, to involve the transit property in the preliminary stages of the shopping center's design process to help determine if transit service on the shopping center's property would be desirable, what facilities for transit should be made available, what the transit property's role should be in financing, constructing, upkeep, and legal obligations concerning these facilities.

The shopper's service for elderly persons appears to be a truly successful operation. All of the participants of the program feel that they receive some benefit. The only difficulty appears to be that the demand has exceeded the supply. Such service seems easy to implement where there are large concentrations of elderly people, and it is not excessively expensive. Furthermore, it can be easily implemented by transit properties that have excess service capacity in non-peak hours.

References:

1. American Public Transit Association, Membership Directory '78.

2. Regional Transportation District, Transit Centers: Project Description, RTD, Denver.

3. RTD management interviews.

4. Schneider, Jerry B. et al., Transit's Role in the Creation of the Polycentric City, Research Report 78-3, Urban Transportation Program, Departments of Civil Engineering and Urban Planning, University of Washington, Seattle, September, 1978.

B. Other Cities

1. Chicago

a. Woodfield Mall

Woodfield Shopping Mall is located in the suburb of Schaumburg, Illinois, about 25 miles northwest of Chicago. It is the largest enclosed mall in the world, offering over 2.2 million square feet of gross leasable area. The greater Woodfield area (surrounding Woodfield Mall) has been undergoing a rapid expansion of office, retail and residential development in recent years. In spite of the high growth (or possibly because of it), transit service to the Woodfield Mall area appears to be minimal at this time.

Woodfield Mall is located near the intersection of the Interstate-90 Freeway and Northwest Tollway. The arterial system in the area is also quite extensive, offering access to much of the region. The area surrounding Woodfield Mall is shared by the communities of Rolling Meadows and Schaumburg. Since the 1960's, this area has been undergoing rapid growth. In 1956, when the I-90 Freeway was scheduled to be built, Schaumburg had a population of 130. In 1977 the population had increased to 46,686, a 4700 per cent increase in twenty years.

This kind of rapid growth is not unusual for this region. Chicago's northwest suburban corridor is sometimes called the "Golden Corridor." It has grown from 55,000 in 1950 to 420,000 in 1970. Over 285,000 people are located within a ten-mile radius of Woodfield Mall. According to surveys, 82,000 office workers live within a five-mile radius of the Woodfield Mall area, a considerable resource.

This growth has had a direct impact on Schaumburg. The area is young, with a median age of 27, and wealthy; 48 per cent earn between $15,000 and $24,999 per year, 32 per cent earn $25,000 to $34,999 and 10 per cent earn over $35,000 per year. One result of this wealth can be seen in the auto ownership and home ownership statistics -- 99.6 per cent own cars (23 per cent own one car, 68 per cent own two cars, 9 per cent own three or more cars) and 75 per cent own their own homes. It is believed that with this rapid growth, this area will become another urban core with a population approaching one million in the near future.

One of the major reasons for the growth in Schaumburg can be traced to the development of the Woodfield area. After the Interstate Freeway was constructed, the area became an ideal location for development. The Taubman Company developed and completed the first phase of Woodfield Mall in 1971. The second phase of the shopping center complex was completed in 1973, bringing the gross leasable area to over 2.2 million square feet. Today Woodfield Mall contains over 230 stores and offers a 22,000 square foot ice arena. It is a totally enclosed, environmentally

controlled, multi-level mall, and it does about $450 million of retail sales per year. Table 2.30 offers more characteristics of Woodfield Mall.

Table 2.30.
Some Characteristics of Woodfield Mall

Gross Leasable Area (ft^2)	Mall Type	Date Opened	No. of Stores	No. of Parking Spaces	Parking per 1000 ft^2 GLA	Retail Sales (millions $)
2,267,000	enclosed, multi-level	1971, 1973	231	10,823	4.8	450

Since the development of Woodfield Mall, a corporate office community has been developed in the surrounding area. Three million square feet of office space were added between 1973 and 1975 with more planned in the future. A Woodfield Office Association has been formed from some of the major realtors, including J. Emil Anderson & Son, Equity Associates, IDC Real Estate and Farnsworth-Palmerin, in an attempt to maintain a planned environment and growth pattern. A number of corporate, regional and divisional offices have been located in the area including: Addressograph-Multigraph, Motorola, Data General, Gould Incorporated, Union Oil, Mobil Oil Corporation and the State of Illinois Department of Transportation. Along with the rapid growth has come an increase of jobs. Presently, there are about 25,000 jobs in the Woodfield area, with Woodfield Mall employing over 6,000.

The area offers good accessibility by various modes. Woodfield is located only 10 - 15 minutes from O'Hare International Airport. Since it first opened in 1955, O'Hare has become one of the world's busiest airports, with over 1900 flights a day and 250 scheduled international flights a week. Schaumburg itself does not have a commuter airport capable of handling anything larger than a small twin engine aircraft. O'Hare is located about equidistant from both Woodfield and Chicago's CBD.

The northwest corridor is served by two commuter rail lines, the Chicago & Northwestern Railway and the Milwaukee Road. They offer hourly service throughout the week and express trains during the peak hours. Milwaukee Road connects downtown Chicago with the outlying western suburbs and the Chicago & Northwestern connects the northwest suburbs with the city. It presently takes 33 minutes for the Chicago & Northwestern and 44 minutes for the Milwaukee Road express lines to travel the distance from the stations closest to Woodfield Mall to Chicago. There is also a drawback in that both lines are a 10-minute drive from the Woodfield area and there is no scheduled shuttle service between the two.

Woodfield Mall is served by four bus routes and acts as a terminal in each case. Two routes, 695 and 696, connect the community with the rail lines in the area, and the other two operate as a local and suburban run. Tables 2.31 and 2.32 present further characteristics of this service. As can be seen, bus service to Woodfield Mall is minimal. Only 62 buses operate to the center on a weekday with average headways of an hour in most cases. Saturday service is reduced to 46 buses and only Route 209 operates on Sundays. Bus hours are not tailored to fit mall operating hours and do not extend past 7:00 p.m. in any case.

Table 2.31.
Characteristics of Bus Routes Serving Woodfield

Route No.	Type	Hours Operated to Center	Headway (minutes)			
			Peak Period			
			AM	Midday	PM	Evening
209	suburban	6:15 a.m. - 6:45 p.m.	30	30	30	-
405	local	6:40 a.m. - 5:30 p.m.	60	60	60	-
695	feeder	6:30 a.m. - 6:25 p.m.	60	60	60	-
696	feeder	6:40 a.m. - 5:43 p.m.	60	60	60	-

Table 2.32.
Number of Buses Inbound to Woodfield per Day

Route No.	Weekdays			Saturday			Sunday		
	AM	PM	Total	AM	PM	Total	AM	PM	Total
209	12	14	26	5	11	16	3	6	9
405	6	6	12	4	6	10	-	-	-
695	6	6	12	4	6	10	-	-	-
696	6	6	12	4	6	10	-	-	-
Totals	30	32	62	17	29	46	3	6	9

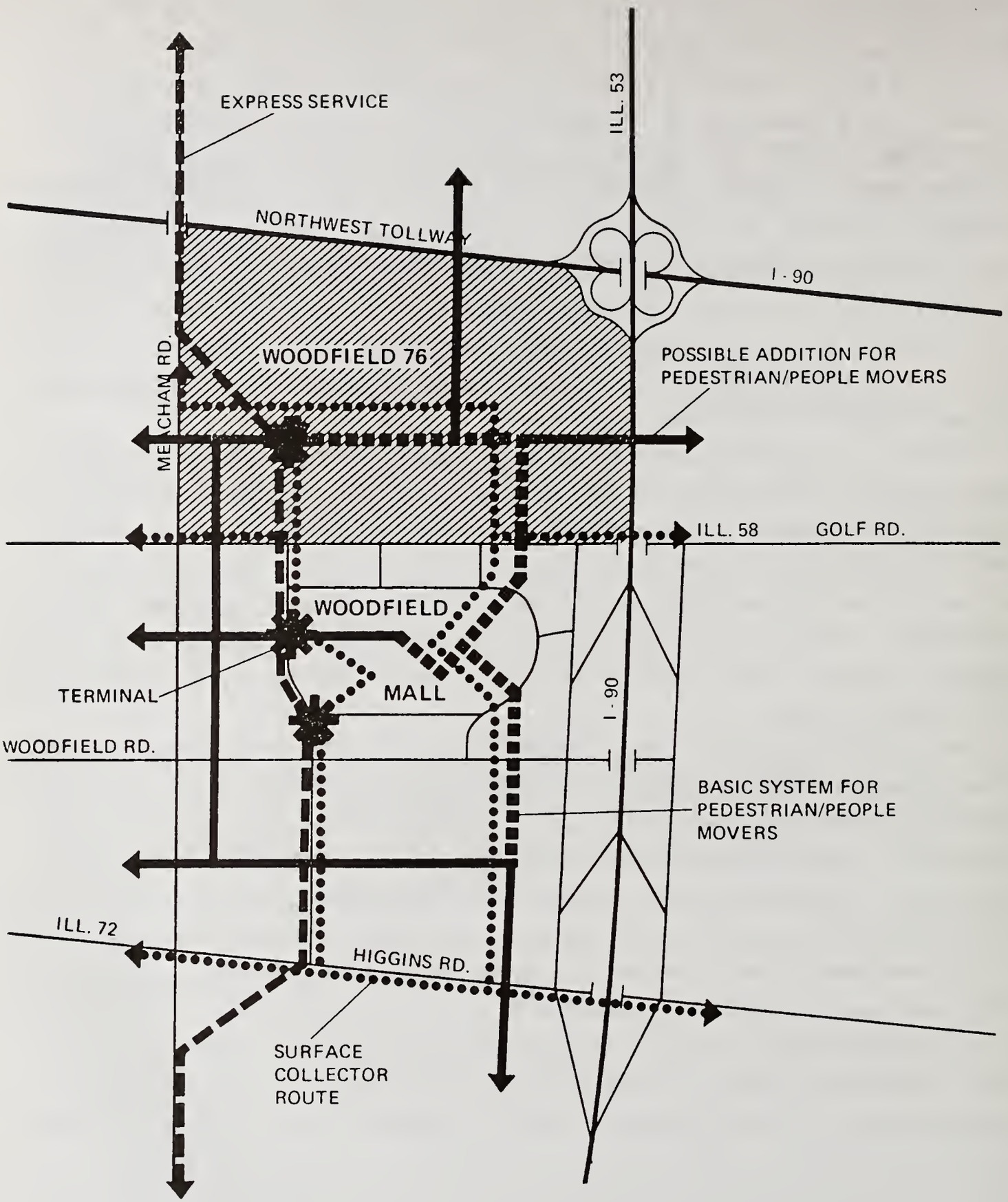
Woodfield Mall has been designed for the automobile; every major road has been provided with a 100-foot right-of-way and 100-foot setbacks on each side so that further improvements can be made without too much trouble. The arterial system had originally been designed with 20-year requirements in mind. However, there is no easy way to get from Chicago to Woodfield Mall to shop except by car. Although it was originally possible to drive to the Chicago CBD in 30 minutes from the Woodfield

area, today it can take up to an hour or more. The traffic congestion in the area has increased and major upgrading of the arterial system is planned.

To this end, a variety of programs and demonstration projects have been initiated in the Schaumburg area. A demand-responsive dial-a-ride operated with 13 small buses was set up as a service development demonstration program and was funded by UMTA. A senior citizen minibus program was also initiated in 1976 and provided 5,143 rides and traveled 41,000 miles. However, the problem in the area can be traced to two causes: (1) lack of funds to study the problem and identify solutions, and (2) lack of assistance to initiate, implement and operate any future transit system serving the Woodfield area. Both the Village of Schaumburg and the regional Transit Authority (RTA) have declined the responsibility for developing and operating any future system.

Recently, a non-profit group of major landowners, including Motorola, Western Electric, Pure Oil and Woodfield Mall contracted Barton-Aschman Associates, Inc. to investigate the transportation problems and to devise solutions. Their proposed transit and people-mover system is presented in Figure 2.44. This system would utilize and incorporate an express service with a people-mover. Implementation of the proposed improvements has not yet been undertaken. It is unknown at this point whether any action will be taken in the near future to improve transit accessibility to the Woodfield area.

The situation encountered in the Woodfield area is not unique. Only the tremendous growth in the surrounding area and the large size of Woodfield Mall make this case study different. The Woodfield area was developed for accessibility by the automobile. Large scale development began with the completion of a major freeway connection. The road system was designed with the large amounts of right-of-way so that improvements might easily be made at a later date. Clearly, a transit service for this area would have to be very carefully designed to serve those shpping trips that cannot easily be made by automobile if it is to be successful. Careful analysis of the market would be the first step and some segmentation into submarkets would probably be required. Tailored transit service might then be possible for some submarkets and could establish a base for expansion should they be successful.



Source: Barton-Aschman Associates, Inc.

Figure 2.44. Proposed Transit and People-Mover Routes for Woodfield Mall

2. Nassau County, New York

a. Roosevelt Field

Roosevelt Field Shopping Center is located in Garden City, in the center of Nassau County on Long Island, New York. The 100-acre shopping center, situated on what was once an historic airfield, is part of a large and diverse concentration of commerce and industry in the area. Surrounding development includes over 1,183,000 square feet of office space, numerous department stores and smaller strip-commercial concerns, a 200-acre racetrack complex, industrial and warehousing facilities, and a 3600-student community college. According to the Nassau County Planning Commission's 1977 report on Roosevelt Field, this area provides over 20,000 jobs [1].

The shopping center is one of the most successful in the country. It has a gross leasable area of 2.2 million square feet, and contains over 175 retail establishments and services, including 22 offices and nine basement warehouses. According to a recent survey, 77.5 per cent of shopping center patrons reside in Nassau County, which consists of predominantly upper middle class suburbs. The remaining patronage is attracted mostly from Queens (14 per cent) and Suffolk (8 per cent) Counties.

The intensity of land use in the Roosevelt Field area has presented a major problem for transportation planners. Traffic volumes on most area roadways and major intersections near the shopping center exceed design capacities. On several links of the arterial network, volumes approach 50,000 vehicles a day. Severe peak-hour traffic congestion is commonplace. While travel from almost any point in Nassau County to a boundary of the Roosevelt Field region can be accomplished in about 30 minutes, 15 or more minutes is often required for a short distance trip within the region itself [1].

Bus service to Roosevelt Field is provided by the Metropolitan Suburban Bus Authority (MSBA), which in 1973 assumed responsibility for providing mass transit to Nassau county, served previously by various private companies operating in the area. In 1976, MSBA instituted a 50¢ county-wide fare with free transfer privileges in an effort to alleviate the cumbersome fare structures, route franchises, and restrictive contracts left over from the days of private operation. Before the change in route structure, a trip from within Nassau County to Roosevelt Field could cost as much as 95¢.

Presently, Roosevelt Field is either a terminus point or a major stop for seven bus routes operating within Nassau County and neighboring Queens and Suffolk Counties. The large number of routes that converge at Roosevelt Field make it one of the major transfer points in the MSBA system. Unfortunately, buses are prevented

by law and by bridge design from using the parkway system, so some routes are unavoidably more circuitous than is desirable.

Among the seven bus routes there is substantial variation in the frequency of service to Roosevelt Field. As a general rule, the timetables of these routes are constructed to facilitate midday shopping trips. Employee trips are handled as a secondary consideration. Operating characteristics of these bus routes are given in Table 2.33.

Table 2.33

Operating Characteristics of Bus Routes Serving Roosevelt Field

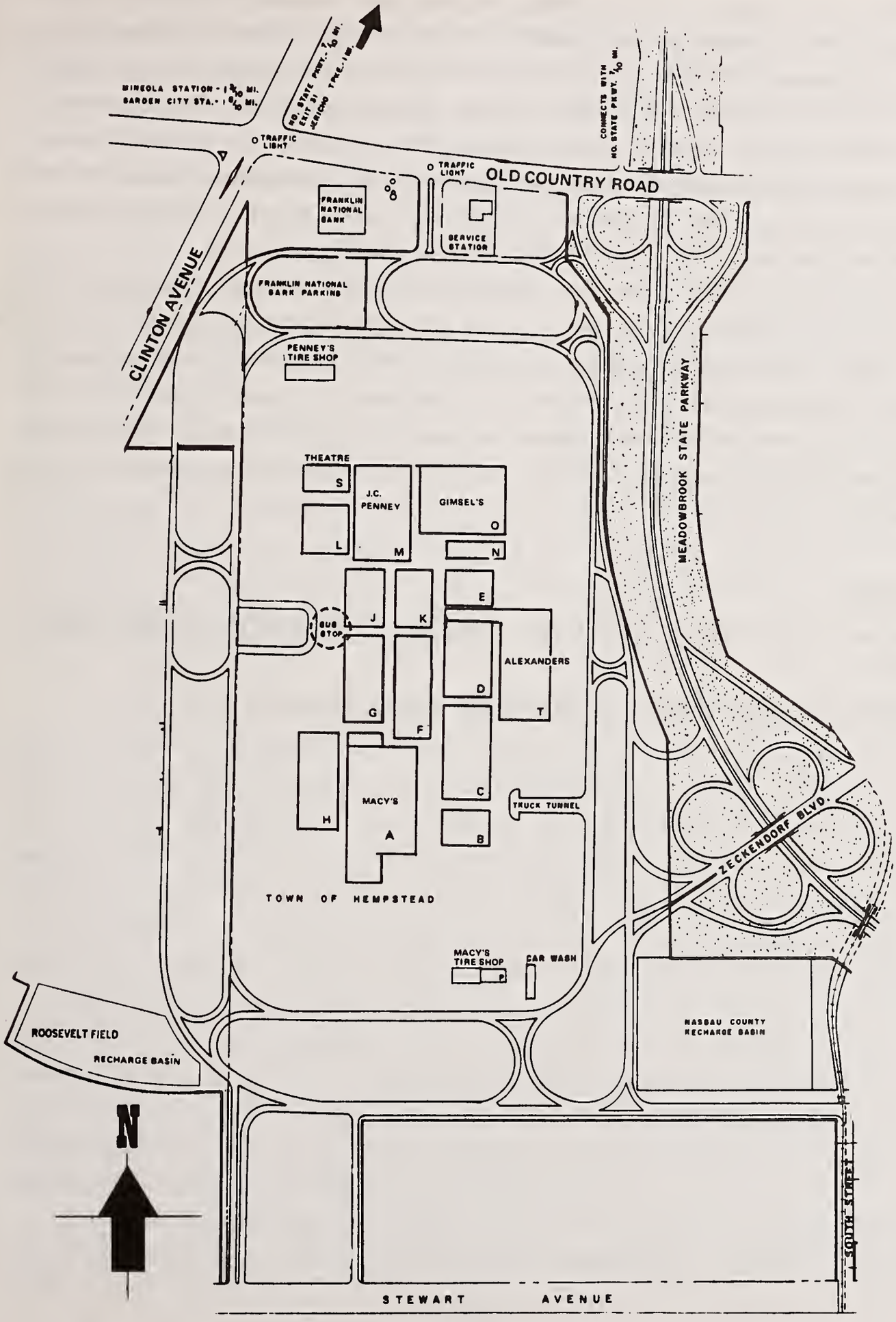
	Hours Operating to Center		Headways (minutes)			Number of Inbound Buses	
Route No.	Weekday	Saturday	Peak	Off-Peak	Sat.	Weekday	Saturday
N15	7:30am-10:03pm	8:22am-9:48pm	12	20	20	49	38
N22/N22A	7:04am-10:20pm	7:13am-8:50pm	10-20	20	35	47	22
N24	7:44am-10:30pm	8:12am-7:28pm	20	30	35	35	20
N27	7:52am- 8:22pm	7:52am-8:11pm	30	60	30-60	18	13
N35	7:22am- 9:57pm	7:27am-7:27pm	10	30	30	41	24
N45	7:55am- 6:25pm	9:55am-6:15pm	50	50	45	13	12
N79	6:35am- 8:32pm	8:32am-6:58pm	30	30	30	25	20
					Totals:	228	149

A special bus loop was provided in the original design of the center. Buses use the access road to the west of the center, then loop through the transit stop. Space for ten bus stops has been provided as well as a layover area for three buses. Patrons are deposited a few hundred feet from a major mall entrance and shelters are provided. Figure 2.45 gives a diagram of the mall and the bus loop plan. The transit authority estimates that 6,000 passengers use the buses to Roosevelt Field per day. The Roosevelt Field Merchants' Association estimates the center traffic at 250,000 people per week, with 600,000 people per week in the peak season [2].

The location of Roosevelt Field about one-half mile south of the Long Island Railroad's (LIRR) busiest passenger corridor provides transit opportunities for patrons who live some distance from the mall. Interchange between the railroad and mall-bound buses is available at three stations close to the mall, and most buses are scheduled to meet trains. Taxis are also available from the railroad stations, although the fare is in the $2.00 - $2.50 range.

The operating rationale for the LIRR, however, has been to provide fast and efficient commuter service between Long Island and New York City. Travel between

Figure 2.45. Roosevelt Field Shopping Center Showing Location of Transit Stop



Source: Roosevelt Field Shopping Center

intermediate stations is considered only of secondary importance. While commuter service between stations in the vicinity of Roosevelt Field and New York City is frequent at all hours, service between stations near Roosevelt Field and others on Long Island is sporadic, particularly in the morning and evening when express trains are common. Patrons of Roosevelt Field are also discouraged from train travel by a 90¢ minimum fare. While figures for the number of shopping center patrons who ride the train are not available, it is interesting to note that a 1977 survey of mall employees indicated that none of the employees used the train to commute to work. One can assume, therefore, that the number of patrons who use the train to make the shopping trip is also small.

The efforts of MSBA to attract those who wish to travel to Roosevelt Field has been very successful. According to MSBA and Roosevelt Field Merchants' Association figures, approximately 14 per cent of the shopping center's patrons travel by bus on an average day. The intensity of bus service, combined with the high density of the residential development surrounding the mall and the problems of traffic congestion around the center, no doubt contribute to the success of the bus service.

References:

1. Nassau County Planning Commission, Roosevelt Field Area Development Guide, 1977.

2. Roosevelt Field Merchants' Association, Garden City, New York.

3. Rochester, New York Region

a. Introduction

Since August, 1973, the Rochester-Genessee Regional Transportation Authority (RGRTA) has operated a dial-a-ride service in the town of Greece, which is a suburb of Rochester, New York. The Greece dial-a-ride service was the experimental first phase of a planned region-wide suburban dial-a-ride system. The objectives of this service were the expansion of transit coverage in suburban areas having little or no transit service, replacement of unprofitable fixed-route service in low-density areas, and the development of increased transit ridership. The program has experienced major difficulties in its development, as discussed in Dial-A-Ride in Rochester, New York: A Six Year Search for a Viable Suburban Transit Alternative, a paper prepared by Michael Holoszyc of SYSTAN, Inc. for the 1979 meeting of the Transportation Research Board. Local commitment continues, however, and dial-a-ride services have been developed in three other suburbs of Rochester. In the Greece service area, there are three suburban shopping centers: Ridgemont Plaza, Greece Towne Center, and Longridge Shopping Center, which have been major destinations of dial-a-ride patrons ever since the service was initiated. The Greece dial-a-ride experience provides interesting insights into the perceived desirability of this transit mode for making shopping trips.

b. History

On August 6, 1973, the dial-a-ride service was first initiated in Greece, with the assistance of an UMTA grant. Originally, the service area contained 9.6 square miles of primarily low density residential development. The population of the service area was approximately 51,000 people. The dial-a-ride service operated on weekdays from 8:15 a.m. to 5:30 p.m. and had a fleet of seven small (25 passenger) Twin Coach buses. Patrons could call for immediate service, or could make reservations in advance. Statistics for 1973 indicated that response time on an immediate service call averaged about 25 minutes, and pickups were made, on the average, about six minutes after the time predicted by the dispatcher on both an immediate service call and an advance reservation. Fare for the service for one person was $1.00. However, if a group boarded at the same location and had the same destination, only the first person paid a dollar and the rest of the group paid 25¢ each. At the beginning of the Greece dial-a-ride program, three local bus routes which served the Rochester CBD also operated in the service area.

Over the next two and a half years, dial-a-ride service in Greece experienced several major changes. The service area was incrementally expanded to ultimately

contain 15.2 square miles with a population of approximately 69,000. Also, the service hours were extended to 10:15 p.m., Saturday service with the same hours was initiated, and the vehicle fleet was expanded from seven to 16 vans. The new vehicles were minibuses made by several different manufacturers. The purpose of the purchase of different vehicle models was to test their performance so that the most desirable vehicle type could be purchased when other dial-a-ride service areas were brought on line. In addition, the off-peak service on two of the three bus routes which operated in the service area was eliminated.

These service changes, and an intensive promotional effort, produced a substantial increase in ridership. In the first three months of service, ridership averaged about 170 passengers per day. By 1975, ridership had increased to 490 daily passengers. Although ridership had considerably increased, vehicle productivity was considered low during this time period. As reported in the paper by Holoszyc, the average number of passengers carried per hour in the summer of 1974 was 5.8. During 1975, although the total number of passengers carried was higher, an average of only 5.2 passengers were carried per hour. This decline in vehicle productivity was attributed to the trip length increase. Both of these figures are, in any case, much lower than the estimate of a vehicle productivity of ten passengers per hour made before the dial-a-ride program was implemented.

The low vehicle productivity figures were in part blamed on the fact that actual demand was much lower than had been expected previously. In the implementation market analysis, it was believed that demand would probably range from eight to 12 requests per square mile per hour. However, demand actually averaged only about two requests per hour. Another reason given for lower vehicle productivity was that vehicle operating speed was found to be less than had been expected. It had been projected that an average vehicle operating speed of 15 miles per hour could be achieved by the system. It was discovered, though, that operating speed averaged only 11 miles per hour.

As a result of the low vehicle productivity, revenue recovery by the system was considerably less than had been expected. The operating costs per vehicle in 1975 amounted to approximately $18.00 per hour. The vehicle productivity figure of 5.2 passengers per hour meant that the average cost of operation per passenger in 1975 was nearly $3.50. The average passenger fare at this time, including accompanying passengers, was about 70¢. Passenger fares, therefore, covered only 20 per cent of the operating costs, instead of the 55 to 70 per cent that had been expected.

Several dial-a-ride passenger surveys were made during this time period and some interesting results were discovered. It appears that car ownership was not

significantly related to dial-a-ride use. Only 20 per cent of the people surveyed in 1975 came from households which had no car, while 35 per cent came from households with two or more cars, and 45 per cent had valid drivers' licenses. The availability of a car at the time the trip was taken was significant, however, since 79 per cent of the patrons did not have access to a car. While neither age nor occupation appeared to have an effect on the use of dial-a-ride, it is significant to note that 70 per cent of the patrons were female.

The most interesting data to come out of the surveys taken in this time period were those data concerned with the trip purpose and destinations of riders. It was discovered in a 1974 survey that 36 per cent of all trips made using dial-a-ride was for the purpose of shopping. This was the second most frequent of all trip purposes. Only the trip to work, which accounted for 38 per cent of all trips, was more frequently made. A survey taken among riders during 1975 indicated that the frequency of the shopping trip as a percentage of all trips made on dial-a-ride had declined. In this survey, shopping trips accounted for only 27 per cent of all trips, while the work trip accounted for 41 per cent.

The increase in the percentage of work trips during 1975 is attributed to the elimination of off-peak service on two of the three local bus routes which served the Greece area. The people who began work in off-peak hours and did not have access to a car were now forced to use dial-a-ride. Since the local bus routes had not served those shopping malls in the dial-a-ride service area, the elimination of off-peak service did not significantly affect the number of shopping trips made using dial-a-ride. The increase in the number of work trips, therefore, caused a decrease in the relative frequency of shopping trips made using dial-a-ride, although the actual number of shopping trips did not decline.

In two different surveys taken in 1974, dial-a-ride passengers were questioned about their destinations. These surveys revealed that between 43 and 48 per cent of all trips were destined for three shopping centers. These centers were Greece Towne Center, Longridge Mall, and Ridgemont Plaza, which are the largest centers in the dial-a-ride area. All three are located relatively close to one another in the southwest corner of the service area.

Although no individual statistics are available, conversations with the dial-a-ride management indicated that Longridge Mall attracted by far the largest number of these trips. It is believed that the size of the center and its recent construction are the reasons for its attractiveness. Longridge Mall was opened in 1972 while Greece Towne Center was opened in 1967. Ridgemont Plaza attracted far fewer dial-a-ride trips than the other two centers. Again, size is given as the

reason for this phenomenon. The size characteristics of the shopping centers are as follows:

Shopping Center	GLA (ft^2)
Longridge Mall	800,000
Greece Towne Center	417,000
Ridgemont Plaza	249,000

It is interesting to note that the total percentage of dial-a-ride trips to the three shopping centers as estimated by the survey of destinations is quite a bit larger than the estimate of shopping trips by the survey of trip purposes. It has been suggested that the reason for this discrepancy is that many people who work at these shopping centers use dial-a-ride to travel to work, and that some of the trips classified as "other purposes" have a shopping center as their destination.

The information gathered in the 1975 survey of riders revealed significant statistics concerning those people who used dial-a-ride for shopping purposes. Table 2.34 shows that the great majority of shoppers who used dial-a-ride on weekdays were women, and on Saturdays the percentage of women shoppers was even greater. The largest percentage of shoppers who used dial-a-ride on weekdays was between the ages of 20 and 44. On weekends, however, the majority were under 20 years of age.

Table 2.34.
Characteristics of Dial-a-Ride Shoppers, June, 1975

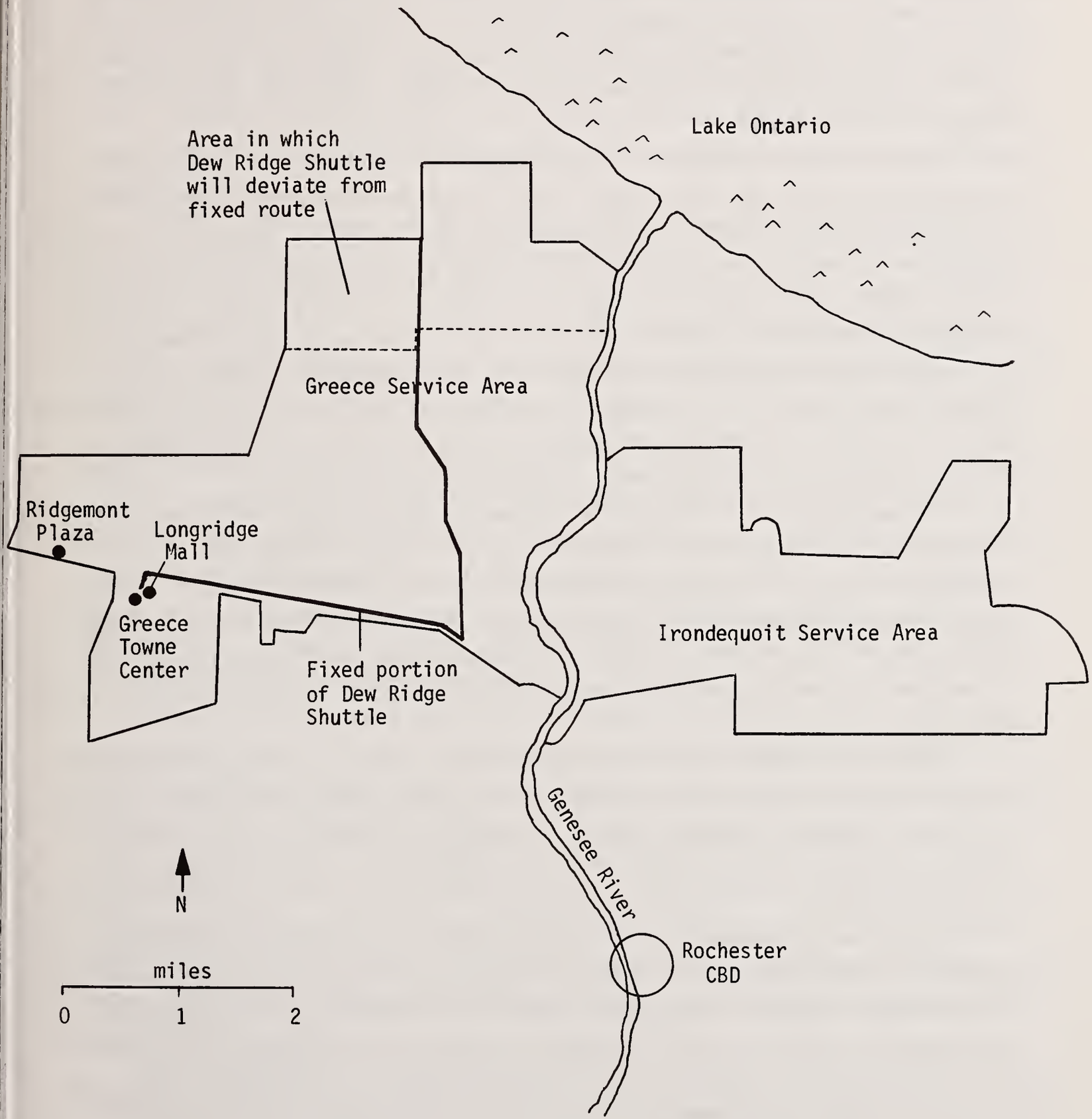
	Friday	Saturday
Total shoppers:	70	73
% male	22.9	9.6
% female	77.1	90.4
% under 16	10.3	23.9
% 16 - 19	22.4	26.9
% 20 - 44	41.4	23.9
% 45 - 64	19.0	13.4
% 65 and over	6.9	11.9

The recongition of the low vehicle productivity in 1975 precipitated several major service changes in the Greece dial-a-ride system, and in the Irondequoit dial-a-ride system, which was initiated in 1976. Irondequoit is a suburb of Rochester, located adjacent to Greece. Figure 2.46 shows the Greece/Irondequoit service areas.

Primary among these changes was the establishment of a computerized dispatching service in the autumn of 1975. The development of computerized dispatching was viewed as a method of optimizing vehicle travel routes, thereby increasing vehicle productivity and improving the quality of service. It was also believed that this

Figure 2.46.

Greece/Irondequoit Dial-a-Ride Service Areas
and Dew Ridge Shuttle Route



method of dispatching could increase control over the system, and lower overall operating costs by reducing labor requirements.

The development of the computerized dispatching element of the dial-a-ride system met with many difficulties, however. Delay in the delivery of required equipment slowed the implementation of the system. It was not until the spring of 1976 that the system was operating full-time. Even then, computer hardware facilities, excessive computer response time, street network and software coding errors, and deficiencies in the scheduling algorithm caused many disruptions in the dial-a-ride service.

Two other major changes also were made at this time. First a shuttle bus service, called the Dew Ridge Shuttle, was introduced along those streets where off-peak bus service had been eliminated (see Figure 2.46). The shuttle ran north-south for the length of the dial-a-ride service area, and connected at the service area's border with regular local bus service, which allowed passengers to transfer to complete the trip to the Rochester CBD. During the midday hours when the shuttle service operated, the Greece dial-a-ride service area was reduced to 10.7 square miles. The service area was reduced because dial-a-ride vehicles were being used for shuttle purposes, but it was also hoped that such a reduction would result in shorter trips which could be served more efficiently.

The purpose of the Dew Ridge Shuttle was to restore fixed route service to areas where it had previously existed. The route of the shuttle, however, was not entirely fixed. In the northern quarter of the dial-a-ride service area, the shuttle would deviate from the fixed route to provide direct service to a rider's destination if the rider so desired. The fare for the shuttle service was 30¢ along the fixed route, and an additional 75¢ for pickups and dropoffs that required deviation.

Another important difference between the previous local bus service and the shuttle service was the service which the Dew Ridge Shuttle provided to the three previously mentioned shopping centers. These shopping centers were located on the fixed portion of the shuttle route, but had not been served by the previous local bus routes.

The second major change was the development of a zone fare system for the Greece and Irondequoit service areas. Originally, the fare for a trip anywhere in the Greece service area was $1.00. When the Irondequoit dial-a-ride service was brought on line, a transfer between the Greece and Irondequoit service areas cost only a nickel, so that the total fare was $1.05. In September of 1976, however, the Greece and Irondequoit service areas were divided into six zones. A base fare of 75¢ was charged for travel within one zone. For each additional

zone entered in a trip, a charge of 50¢ was added. This meant that a trip within the Greece service area could now cost as much as $1.75, while a trip between the Irondequoit and Greece service areas could cost as much as $2.75.

These changes were supposed to increase the efficiency of the dial-a-ride system. Their effects cannot really be judged, however, because of new difficulties which occurred in 1976 that greatly reduced the dial-a-ride service capabilities. The most serious problem that occurred was frequent breakdowns of vehicles. From November, 1975 to February, 1977, dial-a-ride vehicles were incapacitated 35 per cent of the time, on the average. Since there were few backup vehicles for the system, there were frequent vehicle shortages, and dial-a-ride service suffered accordingly.

Part of this problem was due to the severe winters of 1975 and 1976, which were the worst in Rochester's history. The inability to keep vehicles in service is also a reflection of the quality of the vehicles used. Of the seven types of vehicles employed, six were new models recently developed by manufacturers who saw a growing market for small buses. These bus models were relatively untested, and with the exception of the Twin Coaches, did not have all of the bugs worked out.

Servicing the broken-down vehicles was also a problem. Almost all of these models were equipped with gasoline engines. The mechanics, however, were used to working on regular diesel-powered transit coaches and this presented adaptation problems. Furthermore, the number of different models made it difficult for the mechanics to become familiar with every design. There was also a problem with spare parts. It was too expensive to stock complete spare parts for all the different vehicle models, so it was inevitable that vehicles were sometimes kept out of service for lengthy periods while parts were on order.

Organizational difficulties were also detrimental to dial-a-ride operations. The Regional Transit Service, Inc. (RTS), a subsidiary of the RGRTA, was technically responsible for the operation of the dial-a-ride system, but it did not view the system as a cost-effective technique for the expansion of suburban transit service. On the contrary, the management of RTS believed dial-a-ride to be prohibitively expensive, and a waste of funds which could be better spent elsewhere. For this reason, RTS never really supported the dial-a-ride system. Lack of support was so great, in fact, that the dial-a-ride system had to be managed by RGRTA staff, and staff of the Massachusetts Institute of Technology, which was acting as a consultant for the system.

The organizational problems reached a peak in January, 1976, when the Executive Director of RGRTA, a zealous supporter of dial-a-ride, resigned after a dispute with

RGRTA commissioners. From that time until the summer of 1976, when an MIT staff member took a full-time management role in the system, the dial-a-ride service suffered greatly because of the lack of leadership.

The effect of the service delays caused by vehicle breakdown, computer dispatching difficulties, and organizational problems, together with the increased cost of dial-a-ride service caused by the introduction of the new fare system, was a marked decrease in system ridership. In the summer of 1976, approximately 390 passengers per day used dial-a-ride. This is 21 per cent less than the peak of 1975. It is interesting to note that the number of persons requesting service at this time was only 11 per cent below the 1975 figures, which means that another 10 per cent daily cancelled their ride or simply did not show up. This can only be a reflection of the poor service offered at this time. By September, 1976, ridership had dropped even further to 260 passengers per day, or 53 per cent of the 1975 peak.

Vehicle productivity was also greatly reduced during this period as a result of the drop in ridership. During 1976, vehicle productivity averaged about four passengers per vehicle hour. The Dew Ridge Shuttle part of the dial-a-ride system fared significantly better than the regular dial-a-ride service. In 1976, vehicle productivity on the shuttle averaged nine passengers per vehicle hour. The overall revenue recovery of the system had not improved since 1975, however, and rising costs caused a larger net deficit in 1976.

A survey of dial-a-ride passengers in 1976 showed little change in trip purposes from 1975. The shopping trip was still the second most commonly made trip after the work trip. Twenty-six per cent of all dial-a-ride trips were made for the purpose of shopping, while 38 per cent were work-related trips. Again, neither age nor occupation appeared to be a significant determinant of the dial-a-ride user, and a high percentage of riders were women. However, although dial-a-ride patronage had dropped significantly because of poor service, the percentage of patrons who did not have a car available to make the trip actually declined from 79 per cent in 1975 to 77 per cent in 1976, which indicates that some people would still rather use dial-a-ride than drive themselves.

In a study of origins and destinations of riders in 1976, it was discovered that 34 per cent of all riders in the Greece service area had one of the above-mentioned shopping centers as their destination. This is a considerable decline from the 1974 figure of 43 - 48 per cent, but it is still considered only another manifestation of the elimination of off-peak service on local bus routes in the Greece area.

A new executive director of RGRTA was appointed in October, 1976 who, after assessing the status of the dial-a-ride service, determined that cutbacks were needed to reduce costs. Many of the cutbacks were made in the Irondequoit service area, where demand for dial-a-ride had been exceptionally dismal. In the Greece service area, dial-a-ride service hours were reduced seven hours, from 8:00 a.m. - 10:15 p.m. to 8:00 a.m. - 3:00 p.m. on weekdays, and Saturday service was dropped completely. It was also determined that the complex zonal system should be eliminated, and a flat $1.25 fare was introduced.

As a result of the service cutbacks, annual operating costs dropped sharply. Total dial-a-ride costs went from $1.1 million in 1976 to only $300,000 in 1977. Daily ridership was also reduced, however. During 1977, dial-a-ride patronage hovered at around 150 people per day. Vehicle productivity also remained low at four passengers per vehicle hour, so that the cost of carrying one rider increased to about $6.00.

Federal assistance from UMTA for the Rochester dial-a-ride project ended in October, 1977, and because the costs of the system made it impossible to continue operations in the accustomed manner without such assistance, RGRTA sought a new method of providing dial-a-ride service to suburban areas that would meet financial constraints. It was determined that the least cost solution could best be achieved by selecting a private operator through competitive bidding that would provide dial-a-ride service. To implement the transition from public to private service, RGRTA applied for and received another UMTA demonstration grant of $2.2 million. The new grant began in November of 1977 and will continue through 1979.

Under this grant, RTS will continue to operate the service in Greece and Irondequoit. All new dial-a-ride service areas will be operated by Paratransit Associates, Inc., the private company which submitted the lowest bid. Paratransit Associates will use Checker cabs provided by RGRTA, and will be paid between $11.70 and $14.20 per vehicle hour to provide service. RGRTA will keep all fares collected by the service.

Suburban communities which desire to have dial-a-ride service will assume that amount of the dial-a-ride service costs caused by operation in their communities. Since UMTA funding is available to pay part of this deficit, it is expected that the local communities' share of the deficit will not exceed 50 per cent. Two suburban towns currently have this new dial-a-ride service.

c. Conclusions

The extensive use of dial-a-ride for shopping purposes in comparison to regular fixed-route bus service indicates that there is some characteristic of

this transit mode which makes it more desirable for this type of trip. This characteristic seems to be the ability to provide direct service between the shopper's home and the shopping center. The most frequently given reasons by shoppers for not using normal fixed route transit service are the lack of storage area for merchandise, and the difficulty of carrying the merchandise from the bus stop to the home. The latter of these problems is probably most difficult for women, who are the majority of all shoppers. It is not surprising, therefore, to observe an increased incidence of shopping trips made using this service in comparison to fixed route service, and an especially high incidence of women users.

The low overall demand for dial-a-ride in Greece is, in part, a result of the difficulties encountered in the implementation of the service, and the lack of extensive promotion of the service. The demand for shopping by dial-a-ride, as well as all other trip purposes, could be expected to have been higher had dial-a-ride been operated more effectively and promoted more aggressively. Still, the Rochester experience indicates that dial-a-ride does not appear to provide service comparable to that provided by the personal car. The overwhelming incidence of dial-a-ride trips which were made when a personal auto was not available seems to support this. Dial-a-ride service, therefore, does not appear to be a way of replacing the use of the auto for shopping purposes. It is possible, however, that some people would use dial-a-ride to go shopping immediately rather than wait for a time when a car would be available. It appears, then, that dial-a-ride would be an effective mode for attracting shoppers who would otherwise not be able to make shopping trips as frequently as they might like.

4. Philadelphia

a. King of Prussia Plaza

King of Prussia Plaza is the nucleus of a large industrial, retail and office complex located northwest of Center City in Philadelphia, at the intersection of the Pennsylvania Turnpike, Schuylkill Expressway and three other main suburban highways 20 miles northwest of downtown Philadelphia (see Figure 2.47). The mall was opened in 1962 and is the largest shopping center in metropolitan Philadelphia. It contains 1,300,000 square feet of gross leasable area, five major department stores and 125 smaller shops, and provides 8,000 parking spaces.

Located in the immediate vicinity is one of the region's largest industrial park complexes containing the plants and warehouses of Western Electric, GM-Chevrolet, Borg-Warner, Sears, Philco-Ford, three major pharmaceutical manufacturers, and 30 smaller companies. Also located near the center is one of General Electric's major research and manufacturing facilities, the American Baptist Center convention headquarters, and a variety of home offices and office parks. Figure 2.48 shows the cluster of employment centers in this area.

The suburban residential areas surrounding the shopping center and other commercial developments are very affluent. The Shopping Center Digest's Directory of Regional Malls estimates the average household income of residents living within five miles of the shopping center to be over $20,000 per year.

King of Prussia Plaza is presently served by two different transit agencies. Southeastern Pennsylvania Transit Authority (SEPTA), the major carrier, operates three bus routes which stop at the shopping center. The Werner Bus Company, a small, largely suburban carrier, operates one route which serves King of Prussia Plaza.

The three SEPTA routes consist of two suburban routes which connect King of Prussia Plaza to two nearby suburbs, Norristown and Bridgeport, located northeast of the shopping center, and one express route which connects King of Prussia Plaza with downtown Philadelphia.

The two suburban routes were designed to provide the residents with convenient access to the shopping center. The central business districts of the two suburbs are antiquated and run-down, and King of Prussia Plaza provides the nearest modern retail facilities.

The suburban routes operate every weekday until 6:00 p.m. The 99 route connects both Norristown and Bridgeport with King of Prussia Plaza. This route operates every half hour during the peak periods, and hourly during the midday. The 99 route carries approximately 1,000 people per day and a large number of these are believed to travel to the shopping center. The 95 route connects Bridgeport,

Source: Koffman, David and Richard Edminster, Streets for Pedestrians and Transit: Examples of Transit Malls in the United States, UMTA-MA-06-0049-77-11, Final Report, Transportation Systems Center, U.S. DOT, Cambridge, MA, August 1977.

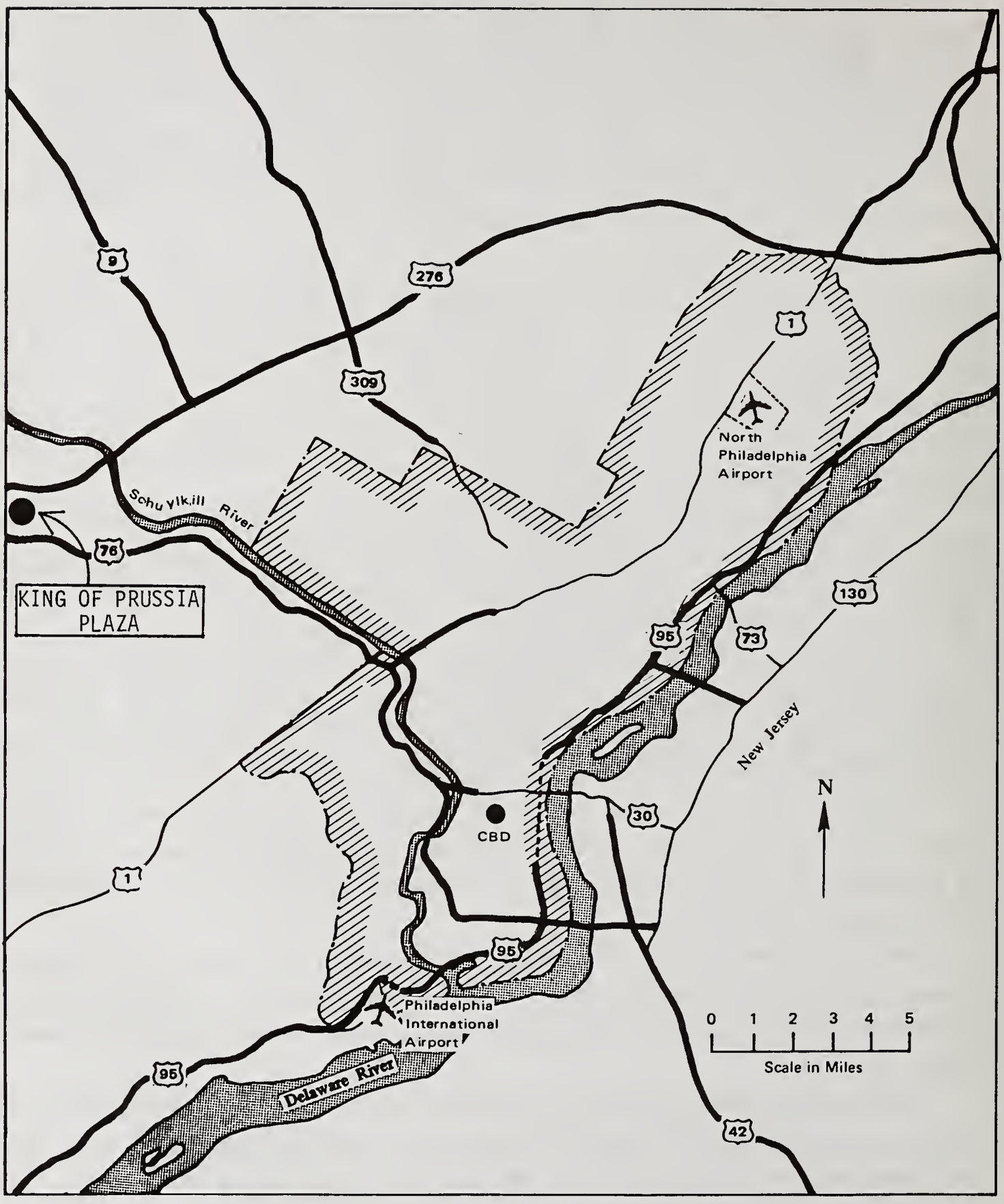
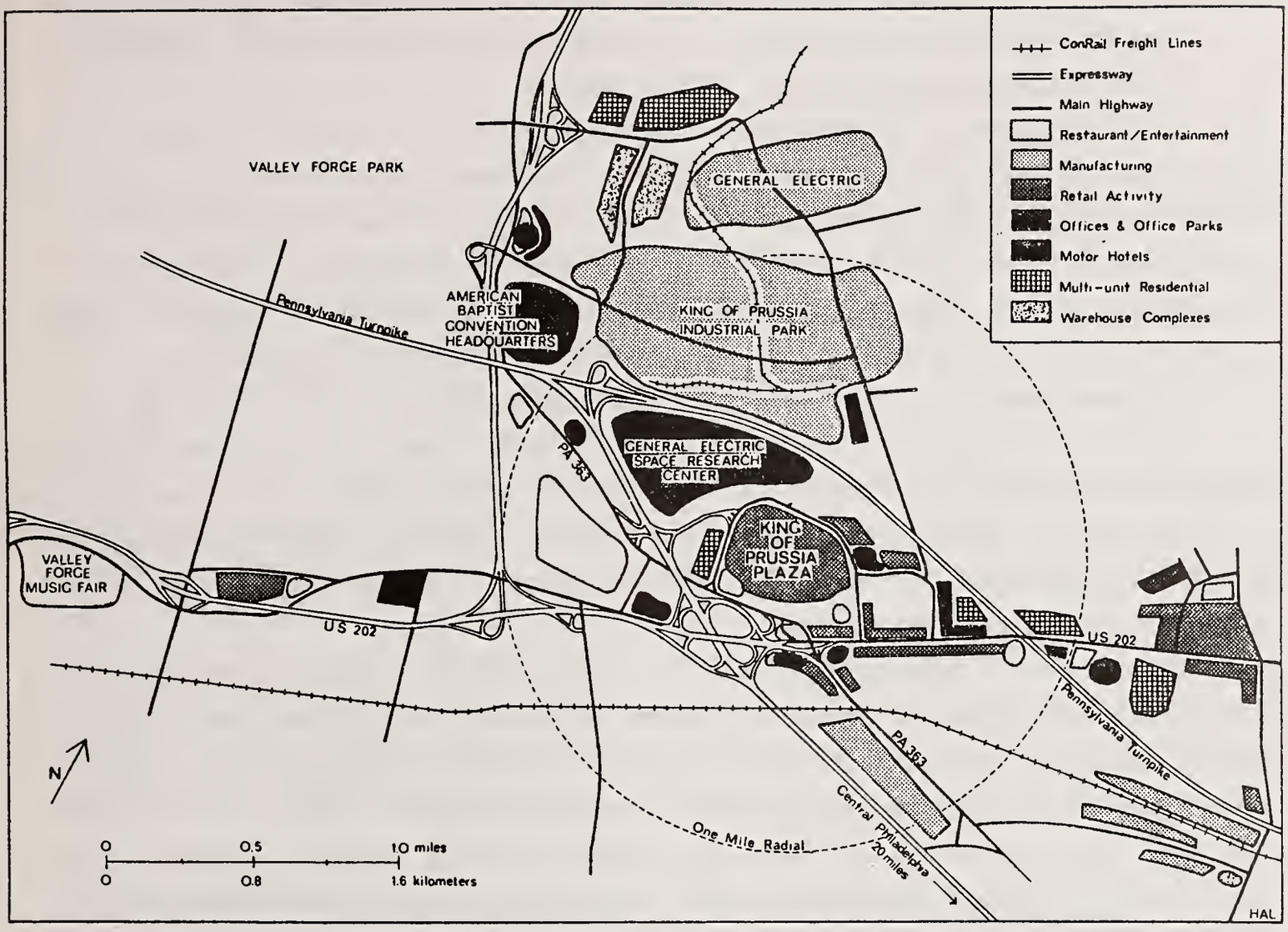


Figure 2.47.
Location of King of Prussia Plaza in Relation to Philadelphia CBD

Figure 2.48.

King of Prussia Plaza and Nearby Employment Generators



[Reprinted by permission of the author and the Association of American Geographers, Muller, Peter O., The Outer City: Geographical Consequences of the Urbanization of the Suburbs, Resource Paper No. 75-2, Figure 10, "Internal Economic Geography of the Minicity: King of Prussia, Pennsylvania," Washington, D.C.: Association of American Geographers, 1976, page 41.]

the smaller of the two suburbs, with the shopping center, providing hourly service. It carries approximately 500 people a day, a large portion of whom are believed to travel to King of Prussia Plaza.

Service by the express route 45 to King of Prussia Plaza began when it was discovered in a survey that a large number of passengers on this route, predominantly people who work in the nearby industrial parks and offices, traveled to the shopping center at some time during the day. SEPTA determined that many of these trips could be captured if the express route stopped at the shopping center. The management of the shopping center considered the idea attractive and proposed to contribute to the

success of the service by allowing part of its parking lot to be set aside for use as a park-and-ride lot, and allowing a bus shelter to be built. The park-and-ride lot was established and the passenger shelter built in the north parking lot approximately 250 feet from the shopping center itself. Both SEPTA and the mall management consider the service successful, although no figures are available concerning its effect on the patronage of the express route.

The route operated by the Werner Bus Company provides service to King of Prussia Plaza from Pottstown, a town located 20 miles northwest of the shopping center. The Werner Bus Company route provides five round trips to the mall on weekdays and carries about 75 people a day. On Saturdays the route provides seven round trips to the shopping center and carries about 200 people, a large number of whom are teenagers and elderly, who by state law are allowed to ride free on Saturdays.

The management of King of Prussia Plaza has stated that only a very small minority of their patrons travel to the mall by bus. They note that the location of the shopping center near so many highways and the provision of a large number of parking spaces makes auto trips much more convenient. They are nevertheless happy to receive bus service, and believe if gasoline prices climb much higher, the bus service will become more important.

The success of transit service to a shopping center located in the heart of so many large industrial and office activities appears to be enhanced when transit service is provided between these major activities and the shopping center, especially when there are a large number of transit commuters to these industries and offices. The ability of the Werner Bus Company to attract a large number of patrons on Saturdays seems to indicate a greater demand for Saturday service to shopping centers than most transit authorities believe exists.

5. Bergen County, New Jersey

In recent years, Bergen County has experienced traffic congestion problems which make it very difficult for the public transportation system to operate buses effectively in some areas. This situation is particularly evident within the Borough of Paramus, where the location of four major shopping centers within a few miles of each other has added to an already badly congested situation (see Figure 2.49). This congestion has adversely affected the employment opportunities and tax ratables generated by these shopping centers. In an effort to solve this problem, in November, 1978, Bergen County instituted a Shopper's Shuttle Service to serve these four centers during the Christmas holiday shopping season, a period when traffic congestion problems are the most severe.

During the past 20 years, four major shopping centers have been built in Paramus along the intersection of two major state highways, Routes 4 and 17. These include Garden State Plaza, Bergen Mall, Paramus Park and Fashion Center. These shopping centers serve a large population base, attracting shoppers not only from Bergen County (population 875,000) but also from New York City and neighboring counties in New York (see Figure 2.49). Together these four shopping centers comprise nearly 300 shops, stores and service centers, over 3.7 million square feet of retail floor area and 19,000 parking spaces. Each of these shopping centers is independently owned and operated; some of their anchor tenants include Bambergers, Gimbels, and Lord & Taylor. Table 2.35 gives some characteristics of these four centers.

Table 2.35

Characteristics of Four Shopping Centers in Paramus, New Jersey

	Date Opened	# of Stores	GLA ft^2	# Parking Spaces	Parking per 1000 ft^2 of GLA	1977 Gross Sales ($ mil.)	Type of Center
Garden State	1957	65	1360K	8000	5.9	125	open, 1-level
Bergen Mall	1957	85	1100K	4800	4.4	79	enclosed, 1-level
Paramus Park	1974	115	760K	4600	6.0	150	enclosed, 2-level
Fashion Center	1967	30	542K	2200	4.1	N/A	enclosed, 1-level

Source: Directory of Regional Malls, Shopping Center Digest, 1979.

The Bergen County Board of Transportation operates ten local routes with assistance from the New Jersey Department of Transportation. In 1978, over one million passengers were carried county-wide. The shopping centers in Paramus are directly served by a total of eight routes. Table 2.36 presents some of the characteristics of bus service to these four centers. With infrequent evening service,

Figure 2.49. Paramus, New Jersey and Surrounding Area

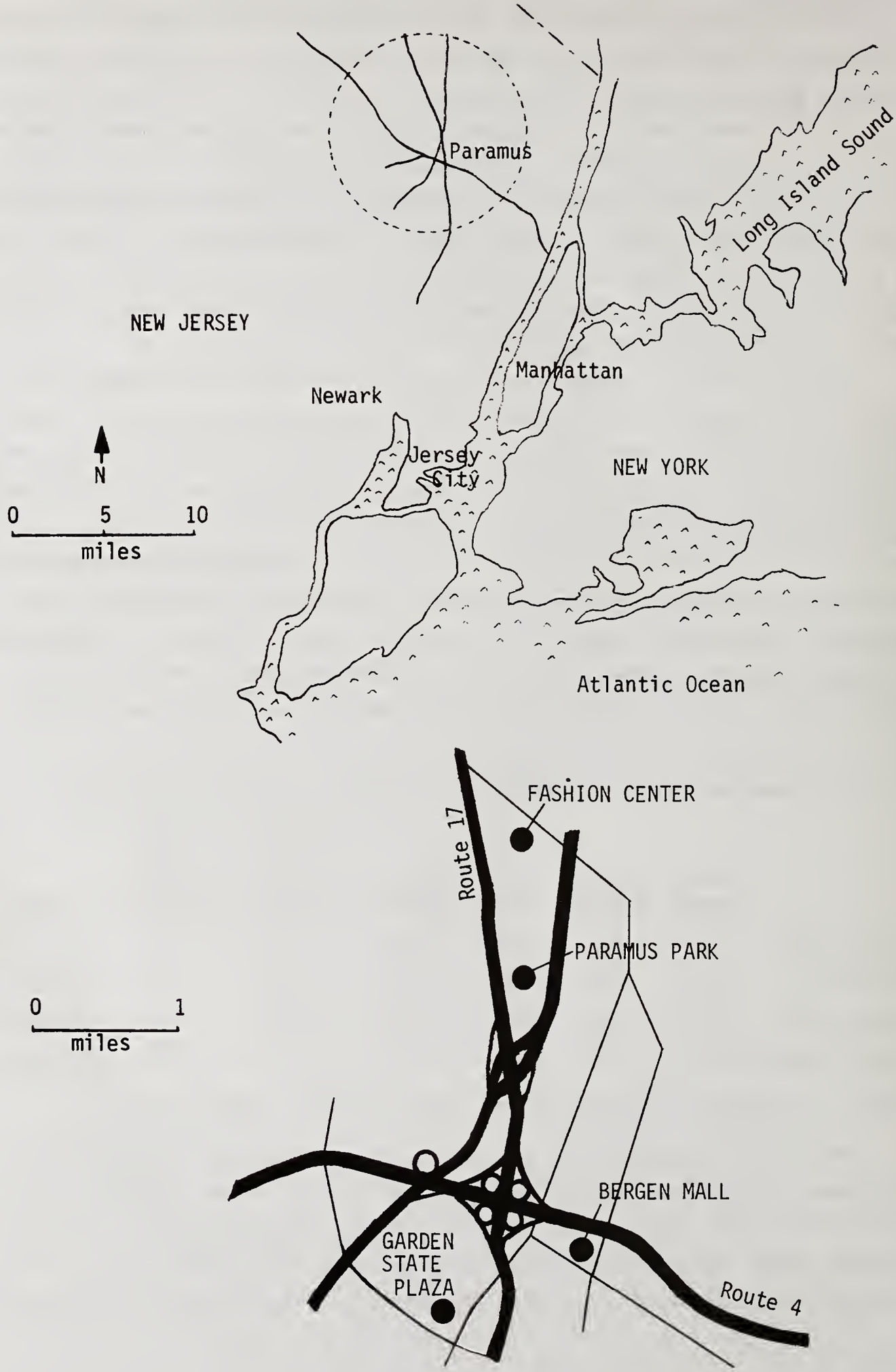


Table 2.36.

Characteristics of Bus Routes Serving Shopping Centers

	Route No.	Hours Operated to Center (M-F)	Headways (min.) Peak Periods AM	Midday	PM	Evening	No. Buses/Day Total M-F	Sat.	
Garden State	B1	8:49 AM - 9:45 PM	60	60	30	140			
	B2	9:47 AM - 4:25 PM	--	95	--	--			
	B3	9:08 AM - 7:08 PM	45	60	60	60			
	B4	10:00 AM - 4:00 PM	90	90	75	--	115	91	
	B6	8:55 AM - 7:10 PM	50	85	60	115			
	B7	8:09 AM - 4:58 PM	75	105	37	--			
	B8	8:05 AM - 6:50 PM	60	60	60	--			
Bergen Mall	B1	6:02 AM - 9:52 PM	30	60	30	140			NO SUNDAY SERVICE
	B2	6:38 AM - 8:35 PM	30	90	65	140			
	B3	9:01 AM - 7:01 PM	45	60	60	60			
	B4	10:08 AM - 4:08 PM	90	90	75	--	113	85	
	B6	8:47 AM - 7:16 PM	60	85	60	115			
	B8	7:10 AM - 6:40 PM	60	60	60	--			
Paramus Park	B1	10:44 AM - 9:35 PM	--	60	55	140			
	B2	8:39 AM - 8:40 PM	40	90	120	--			
	B6	9:05 AM - 7:00 PM	60	85	60	115			
	B7	8:00 AM - 5:10 PM	75	105	37	--	105	80	
	B8	7:20 AM - 6:30 PM	60	60	60	--			
	B12	9:08 AM - 5:10 PM	90	90	35	--			
Fashion Center	B2	6:33 AM - 6:18 PM	60	60	65	--			
	B7	7:56 AM - 5:15 PM	75	105	36	--	51	32	
	B12	9:03 AM - 5:15 PM	90	90	35	--			

average headways of between 30 and 90 minutes and no Sunday service, total bus service to these shopping centers can be described as limited, especially when compared to some urbanized areas. However, it must be remembered that these are local routes which serve only Bergen County, an area characterized for the most part by suburbs and medium-density development.

The major problem developing in Paramus is one of traffic congestion. Garden State Plaza, Bergen Mall, Paramus Park and Fashion Center were all developed within three miles of the intersection of two major state highways. Routes 4 and 17 are both major arterials which handle a heavy mix of local and interstate traffic. This intersection has attracted other retail development which has spread out around the area and further adds to the traffic problem.

On an average weekday 185,000 cars pass this intersection. Traffic tie-ups and accidents occur almost daily. For example, in 1977 there were 420 accidents at this point. The New Jersey Commission of Transportation has cited this intersection as the most critical in the state in terms of traffic congestion and accidents.

A major traffic problem develops during the holiday shopping season. According to the Paramus Police Department, the traffic volume can increase nearly 20 per cent during the period from Thanksgiving to the New Year. The traffic congestion on the approaches to the four shopping centers often backs up to the intersection and has extended away from it in all directions for as much as three miles on some occasions, causing long delays and problems to both shoppers and through traffic.

The situation as it existed was a problem. However, Bergen County has no jurisdiction over Routes 4 and 17 because they are state highways. Also, engineering cost estimates for highway reconstruction in this area approach $100 million, not including land acquisition. These factors effectively restricted many actions that could be taken by the county. However, it was felt that something had to be done to alleviate the delays to shoppers and the traffic congestion in the area.

In an attempt to reduce the shopper's dependence on the automobile, in November, 1978 the Bergen County Board of Transportation proposed and implemented a special Shopper's Shuttle Service during the holiday season. This shuttle service differed from the existing bus service in several important ways. First, this service was operated only between Garden State Plaza, Bergen Mall, Paramus Park and Fashion Center, picking up and depositing shoppers at the various shopping center bus stops. Second, instead of operating over a fixed route, the shuttle used a completely flexible route format (since only the destination was important). With the cooperation of the local police, access to side streets in nearby residential neighborhoods as well as right-of-way at strategic points were used to provide fast, free-flowing routes. Also dispatchers stationed at the regular center bus stops directed the various shuttles along the least congested roads based on incoming traffic reports. All this allowed the shuttle buses to avoid becoming entangled and delayed in the holiday traffic and it was possible to keep on schedule, unlike the existing service.

This shuttle service was operated by a private carrier under contract to the county. A 25¢ fare purchased a ticket good for an unlimited number of rides on the day of purchase. With three buses operating on weekdays and five buses operating on Saturdays, headways of 15 minutes and 10 minutes respectively were scheduled during shopping center hours. These specially marked buses allowed shoppers to park their autos at any one center and shop at all four. Arrangements were made with the New

Jersey Board of Transportation allowing passengers to transfer from other franchised bus lines to the shuttle service. This eliminated possible route infringement problems.

An advertising campaign was undertaken by both Bergen County and the malls themselves to advertise and promote the use of the shuttle service. Signs were placed within the centers explaining the service to customers. The media also co-operated and publicized the Shopper's Shuttle Service with photographs, articles, television news coverage and radio announcements.

In all, the service attracted 16,000 riders during the six weeks of operation, or about 2,600 a week. It was operated at a total cost of $19,800 with fare revenues paying for $1,800 (9.1 per cent) of this figure. The remainder was underwritten by the Bergen County Board of Chosen Freeholders (it was fully expected from the beginning that the revenues would not pay for this service).

Information is not available as to whether or not the traffic congestion was actually reduced by any significant amount. All parties involved seemed enthusiastic about the project and the service will be continued next year. The passenger profile was reported to be a mix of all ages although the young and senior citizen were thought to be more noticeable (they are also more transit dependent). Although one could be skeptical as to whether the publicity had more impact than the actual service, this was one attempt at solving a problem which is becoming more widespread. In areas where traffic congestion makes it difficult to operate traditional modes of transportation, this experience shows how important centers can be served by transit.

6. Minneapolis-St. Paul

a. Southdale

The Twin Cities region centers around Minneapolis-St. Paul and currently has a population of about 2,000,000 people, making it the nation's 15th largest urban area [2]. Population growth has diminished greatly during the 1970's. From 1971 to 1976, the Twin Cities region grew by 60,045, compared with 149,173 in the previous five years, and this growth slowdown is projected to continue in the near future. The Twin Cities region covers some 3,000 square miles, of which only about 400 are urbanized. The rest is open or farmland. The population is relatively young, as more than half of the residents are under 30 years of age, and predominantly white. Only 2.1 per cent of the county's population was black in 1970. The median income in the Twin Cities region is above that of most metropolitan areas (i.e., $15,000 in 1975).

There are ten major regional shopping centers in the Twin Cities region, including St. Paul and Minneapolis (see Figure 2.50). These regional centers have been identified as focal points of transportation activity and consequently as major activity generators in the Twin Cities region [3]. The Metropolitan Council has developed specific policies regarding shopping centers in the Twin Cities region:

(1) Focus transportation services upon major activity centers to encourage patterns whereby people live, work and shop within subregions in order to reduce private auto travel and fuel consumption.

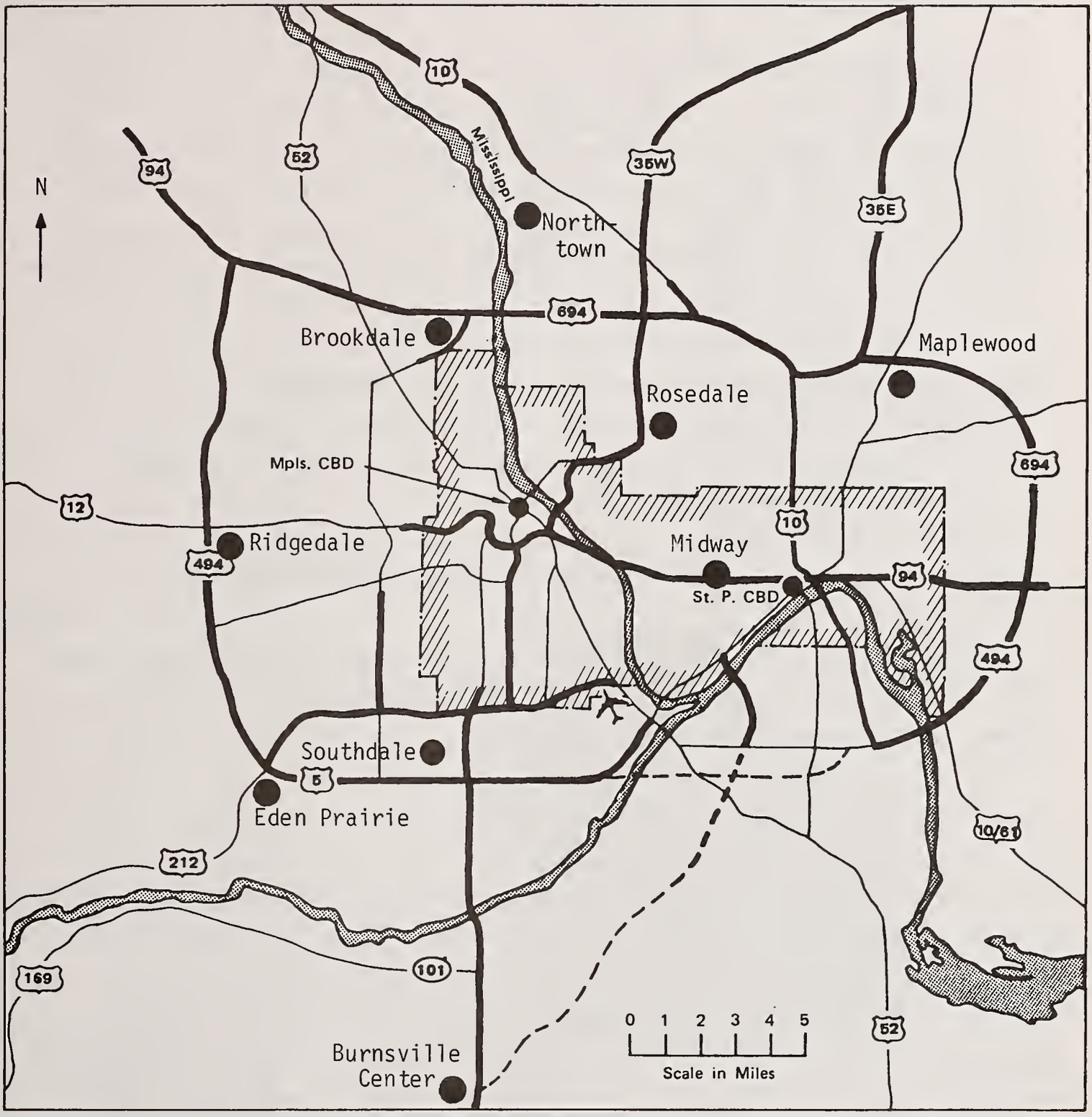
(2) Integrate transportation terminals within major activity centers for public transit, taxis, airport service, and shared-ride transit, including information booths, schedules, etc. [2]

Hennepin County is located adjacent to Minneapolis-St. Paul, somewhat to the northwest, and appears to be absorbing a high proportion of the population increase in the Twin Cities region. The county is forecast to grow to 983,000 by 1980, an 8.3 per cent increase over 1977 population estimates. Hennepin County also has a significant proportion of the region's higher economic class population, with a median family income over $23,000, and is almost exclusively white [1].

Southdale Center is located in southeast Hennepin County, about eight miles southwest of Minneapolis. The shopping center has been identified as a major activity center and serves as the major retail center for a subregion of the Twin Cities composed of Edina, Bloomington, Richfield and part of South Minneapolis (shaded portion of Figure 2.51). Southdale, opened in 1956, contains some 1,200,000 square feet of gross leasable area and was the first enclosed shopping mall built in the

Figure 2.50.

Locations of Major Regional Shopping Centers
in the Minneapolis-St. Paul Area



Source: [5]

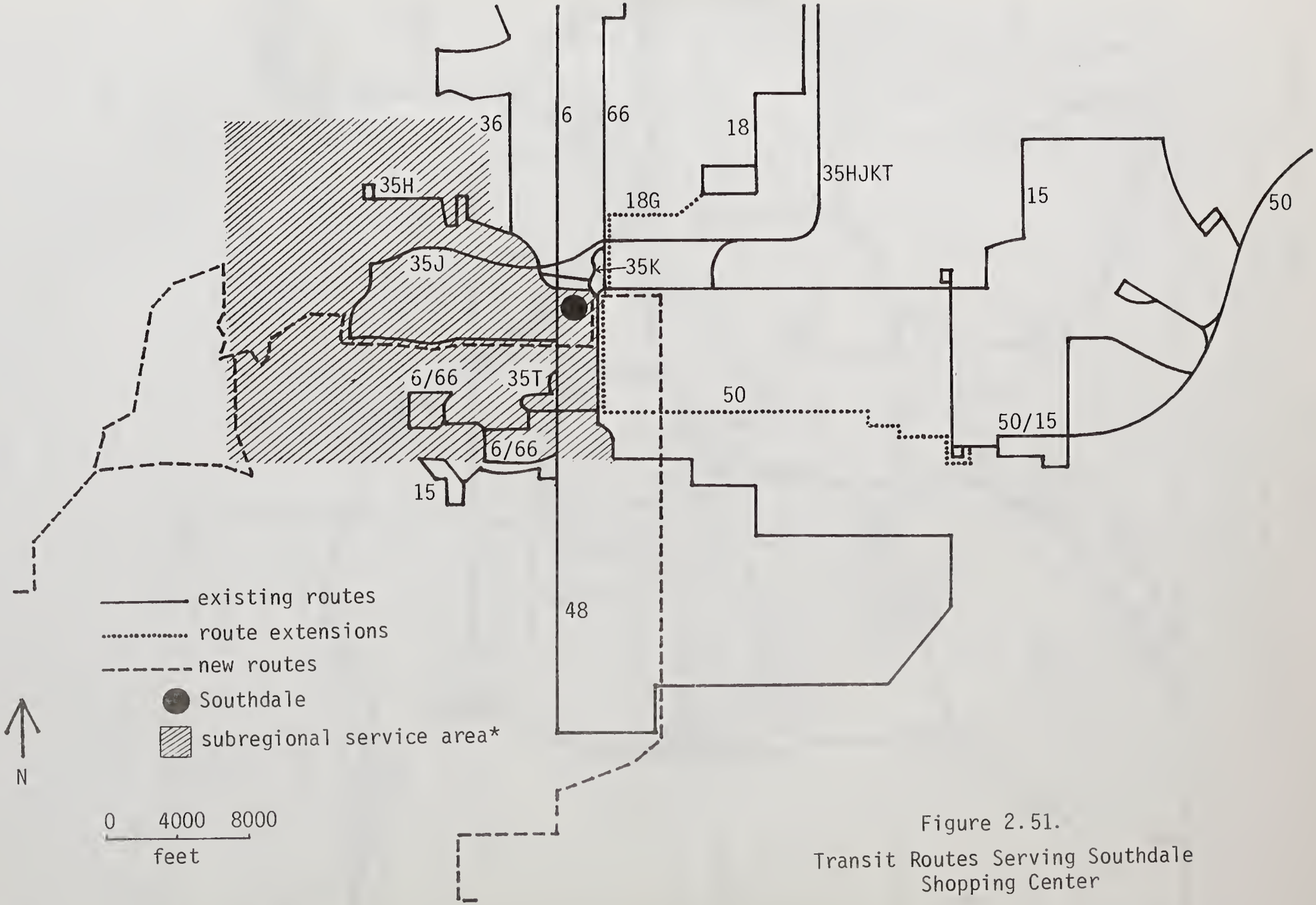


Figure 2.51.

Transit Routes Serving Southdale Shopping Center

*Edina, Bloomington, Richfield, part of South Minneapolis

Source: [4]

country. In 1972, Southdale Center surpassed St. Paul's CBD in terms of gross sales, yet remains second to the Minneapolis CBD in sales for the entire Twin Cities region [1]. The Southdale area is also approaching the CBD of St. Paul in terms of employment opportunities, although Minneapolis remains the major employment base of the region.

Southdale Center is currently served by five regional fixed bus routes that provide both regional and subregional service to the mall. These lines generate 360 weekday bus trips to the center and their routing is displayed in Figure 2.51. Several route changes have been recommended by the Twin Cities Metropolitan Transit Commission to improve existing service to Southdale. These recommendations include increased frequency of service, improved weekend service and better area coverage by these five routes. Two routes, presently not serving Southdale Center, have been recommended to extend service to the center on a regular basis. Also, two new routes have been recommended for implementation by the Metropolitan Transit Commission that would focus on Southdale Center. One of these proposed routes would connect Southdale Center with another major regional shopping center, Eden Prairie, and the other would serve a primarily local market area. A demand-responsive, shared-ride taxi service that would serve Southdale is presently under investigation by the Metropolitan Transit Commission, although no recommendations have been proposed as yet.

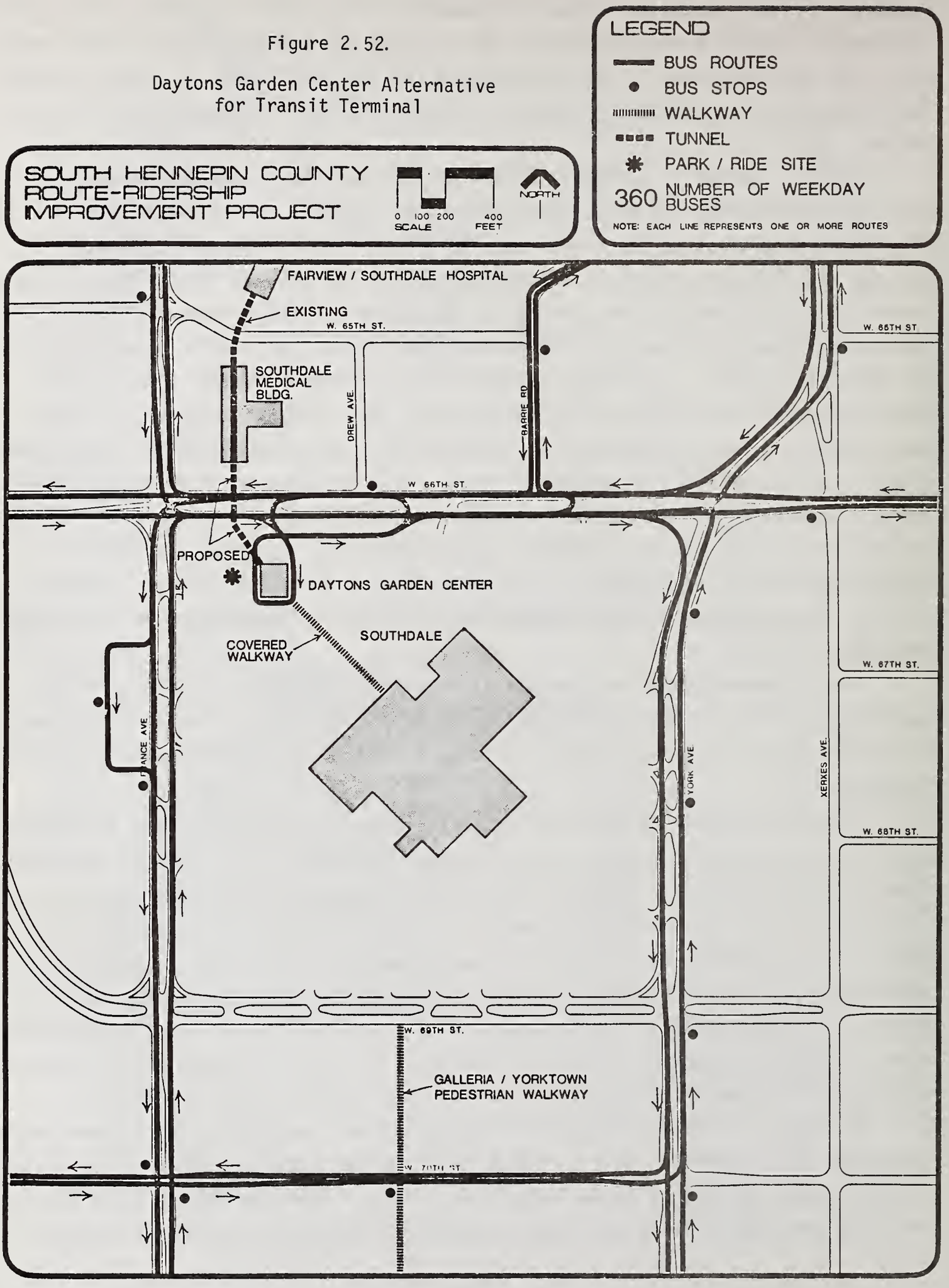
These recommendations and investigations indicate that the specific policy developed by the Twin Cities Metropolitan Council to "focus on transportation services upon major activity centers" is being carried out by the Metropolitan Transit Commission.

A transit terminal is presently being planned for Southdale Center to accommodate increasing transit service and patronage to the mall [4]. Both the center and the Metropolitan Transit Commission are working together to determine the best location and structure of the transit terminal. Four alternative locations on the periphery of the Southdale parking lot have been examined. Two major advantages suggested for locating the transit terminal on the periphery of the parking lot were (1) minimal traffic conflict among pedestrians, autos and buses; and (2) the convenient, adjacent location of a park-and-ride lot. The major disadvantage is the inconvenience to Southdale Center patrons who must walk to the transit terminal.

Of the five alternative locations for the transit terminal, one has been recommended by the community. This is the existing garden center, located at the corner of 66th Street and France Avenue (see Figure 2.52). This alternative would use the building presently serving as a garden center/ski shop as the Southdale terminal.

Figure 2.52.

Daytons Garden Center Alternative
for Transit Terminal



The area adjacent would be used as a park-and-ride lot. A covered walkway might be constructed to link to the center; a link under 66th Street could be constructed to tie directly into the tunnel between Fairview Hospital and the Southdale Medical Building. This garden center could be used as a community transit information center, sheltered waiting area, and a transfer terminal. A major advantage of this alternative is that sufficient parking facilities exist for park-and-ride lots and for a collection point for carpools and vanpools. While all of this is still in the planning stages, the Metropolitan Transit Commission feels reasonably certain that a close facsimile of the previously described plan will be implemented.

Southdale Center provides direct evidence that public transit organizations have recognized the importance of shopping centers as transportation generators. The policy developed by the Twin Cities Metropolitan Council has specifically indicated that the area's regional shopping centers are to be recognized as major activity generators and consequently as foci for public transit. This kind of recognition and policy can significantly increase public transit service to shopping centers, permitting the exploration and implementation of a variety of transit modes to the centers. The route improvements and additions, and the transit terminal planned by the Metropolitan Transit Commission for Southdale Center, demonstrate the potential impact of a specifically developed policy regarding public transportation to shopping centers. The policy developed by the Twin Cities Metropolitan Council has enabled the Metropolitan Transit Commission to direct a good deal of attention and effort toward improving the variety and quantity of public transportation to Southdale Center.

References:

1. Hennepin County, Office of Planning and Development.

2. Metropolitan Council of the Twin Cities Area, State of the Region: Twin Cities Metropolitan Area, February, 1977, 170 pp.

3. Schneider, Jerry B. et al., Transit's Role in the Creation of the Polycentric City, Research Report 78-3, Urban Transportation Program, Departments of Civil Engineering and Urban Planning, University of Washington, Seattle, September, 1978, 372 pp.

4. Twin Cities Area Metropolitan Transit Commission, South Hennepin County Route-Ridership Improvement Project, June, 1977.

5. Koffman, David and Richard Edminster, Streets for Pedestrians and Transit: Examples of Transit Malls in the United States, UMTA-MA-06-0049-77-11, Final Report, Transportation Systems Center, U.S. DOT, Cambridge, MA, August, 1977, 181 pp.

7. Vancouver, British Columbia

In 1973, the Province of British Columbia, Canada, undertook an extensive transit expansion program. As part of this program, new systems were introduced into several of the rapidly-growing suburbs around Vancouver. In each case, transit planners had identified regional shopping centers as natural focal points and from the start sought to integrate the centers into the new services. Figure 2.53 shows the location of these shopping centers in the greater Vancouver region. This case study examines two of the region's largest shopping centers -- the Guildford Town Centre in Surrey and the Lougheed Mall in Burnaby -- as examples of centers which have benefited from integrated transit planning. The new service in these case studies has been provided by the existing transit system operator for the Vancouver area, B.C. Hydro and Power Authority, as part of the expanded transit network throughout the region.

The total population for the greater Vancouver region in 1976 was 1,085,242. The population forecast for the region in 1981 is 1,138,300 and 1,191,000 for 1986, according to the Greater Vancouver Regional District (GVRD), the region's council of governments. These figures are based on 1976 census data tabulated through their offices. The City of Vancouver's population is currently 550,000 (1978). Present populations for the suburban communities in this study are as follows: Burnaby with 131,600 people; Coquitlam with 55,500; and Surrey with a population of 116,500.

a. Lougheed Mall, Burnaby

The Lougheed Mall, opened in 1969, is approximately 15 miles east of downtown Vancouver. With 1,062,500 square feet of gross leasable area, the Lougheed Mall is the greater Vancouver region's fourth largest shopping center. There are a total of 87 stores, including two major department stores and some professional offices. Twenty-four hundred spaces are provided for parking, which is only about half as many as the Urban Land Institute's suggested figure of five parking spaces per 1000 feet of gross leasable area.

The mall is actually located in the Municipality of Burnaby, but the mall property borders the adjoining Municipality of Coquitlam. The Coquitlam area is a fairly typical residential suburb with most heads of households commuting to places of employment in Vancouver, Burnaby and the neighboring city of New Westminster to the south and west. The built-up urban area of Coquitlam has been largely settled in single-family, detached dwellings on typical city lots. There are limited areas of apartments and condominiums adjacent to the commercial centers. There are three small community business and shopping districts in the study area, two of which are the older centers of Port Moody and Port Coquitlam.

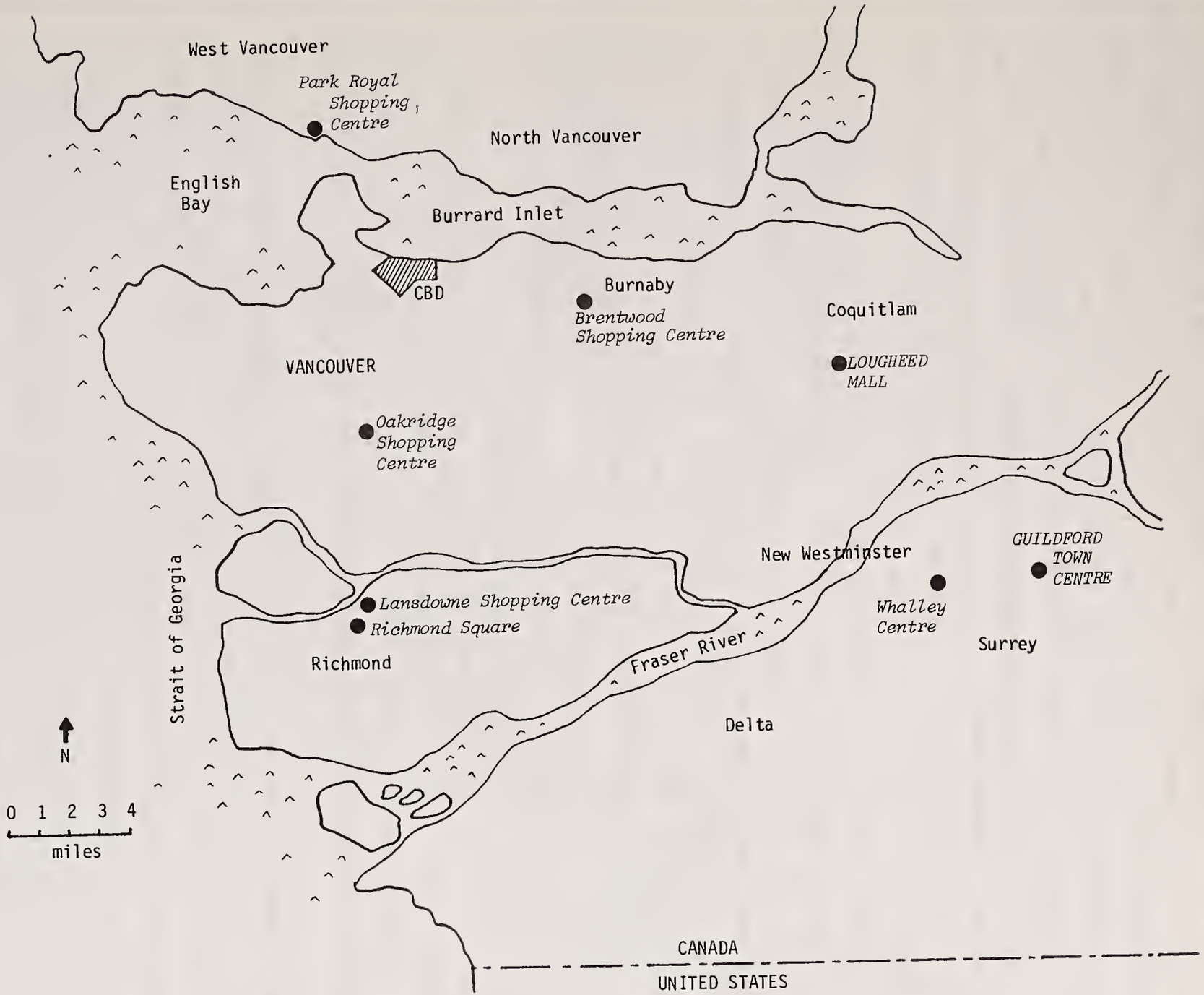


Figure 2.53. Shopping Centers Serving the Greater Vancouver Region

Using the data base provided by the GVRD and drawing a ring of a 10-minute travel radius around the Lougheed Mall area, we would find a population of 24,279 in an area of approximately 2,473 acres, yielding a density of 9.2 persons per acre.

In developing the new transit system, planners had approached the mall management with a proposal to locate a main timed-transfer point on a corner portion of the mall's property. The local collector routes were scheduled to arrive within a few minutes of each other at this particular exchange, thus providing a faster, more convenient expanded network of service. An agreement was reached whereby the mall leases the property to B.C. Hydro and Power Authority, and 70 parking spaces were removed to make way for bus service.

The initial service in the Coquitlam area included six local routes running at least half-hourly and within a quarter-mile of most residences. Figure 2.54 provides a route and stop plan for the area. In addition, express service (termed FASTbus) to downtown Vancouver was provided every 15 minutes during rush hours, and half-hourly otherwise. The routes and schedules were designed to insure convenience of transfers among local buses and between locals and expresses. Ridership grew quickly in both services; within two months after start-up ridership had reached a level of 4.5 rides per capita per year, where ridership before had been virtually nonexistent. Table 2.37 gives operating characteristics and estimated ridership figures of bus routes serving Lougheed Mall.

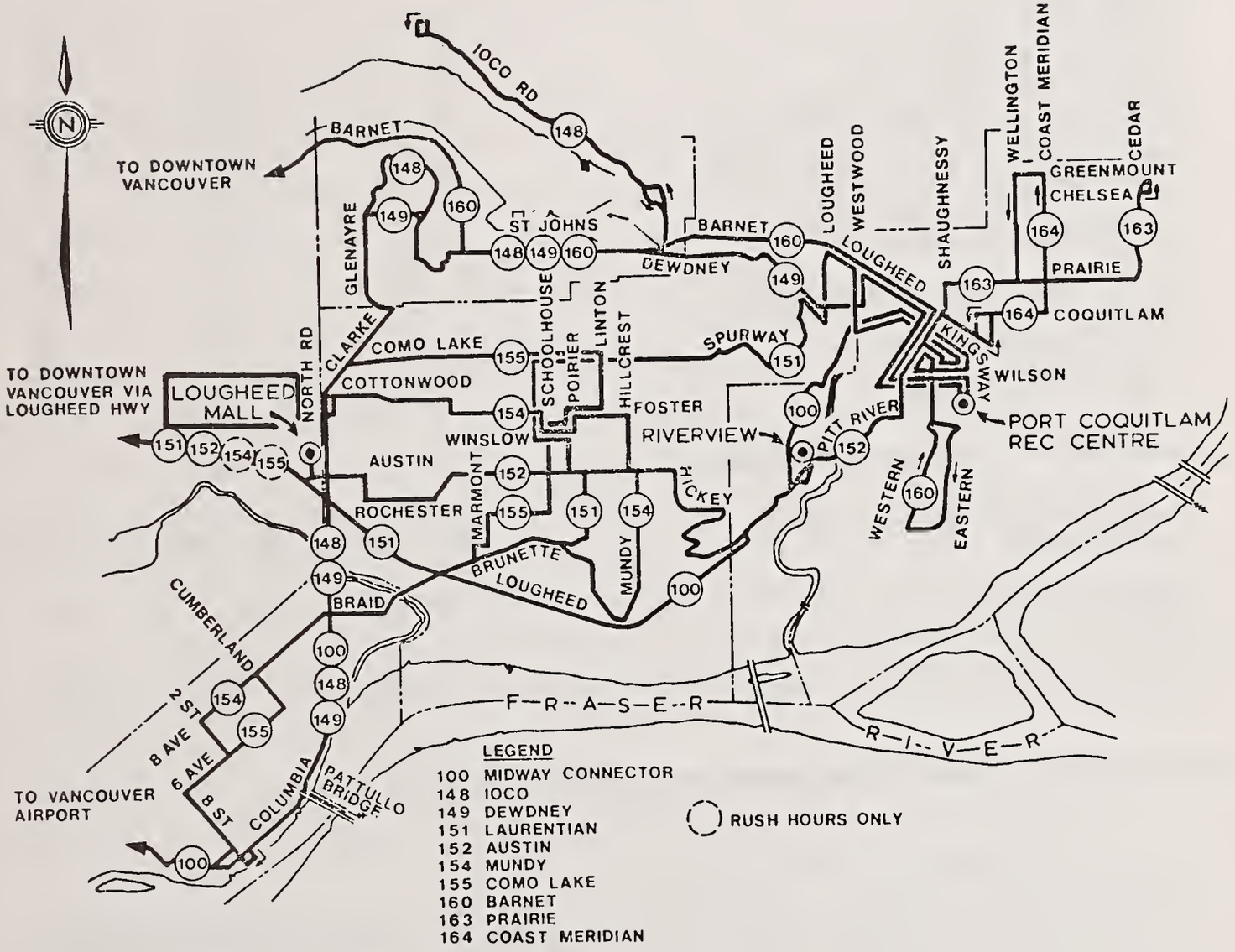
Today, the service has been expanded with the addition of two local routes making direct express trips to downtown Vancouver during rush hours. With eight routes, 15-minute express service during rush hours, 30-minute day base, and 60-minute evening operating service, the timed-transfer center handles over 500 buses per day.

Buses presently enter and exit the center by the same route, which has caused time delays when auto traffic is heavy. The bus stop is presently located on the eastern portion of the parking lot about 150 feet from a main entrance to the mall. B.C. Hydro and the Lougheed Mall management are currently negotiating for an alternate stop to the southwest of the property. The change would allow buses to enter and exit in a one-way loop, thus reducing delays in mall traffic. The new stop will also include a shelter, which the station has lacked to date.

The mall management appears pleased with the transit service and according to a market survey conducted for the center in June, 1978, 11.4 per cent of the mall patrons came by bus. The Lougheed Mall management maintains the lighting at their own expense early in the morning and several hours after the stores have closed to accommodate the buses. The main difficulties have been delays in traffic, for which an alternative site is now being negotiated, and the breakup of pavement by the heavy buses, which had to be repaired and prepared for heavier equipment by B.C. Hydro this past year.

Figure 2.54

Route Plan for Coquitlam Area



Source: B.C. Hydro Transportation Operations Planning

Table 2.37

Operating Characteristics and Estimated Ridership
for Bus Routes Serving Lougheed Mall

Bus Routes and Headways	Rush Hour Peak Direction)	Day Base (Mon-Sat)	Evening and Sunday
151, 152 (154, 155 peak only) to Vancouver	3 - 5	15	30
151 to Port Coquitlam	15 - 30	30	60
152 to Port Coquitlam	15 - 30	30	60
154 to Winslow & New Westminster	15 - 30	30	60
155 to Winslow & New Westminster	15 - 30	30	60
148, 149 to New Westminster	15	15	30
148, 149 to Port Moody	15	15	30
145 to Simon Fraser University	15	30	30
95 to New Westminster	30	30	60
33 to Kootenay Loop	30	60	60
Basic Focal Point Cycle Frequency:	15	15	30
Estimated Passengers per Hour on all Buses:	1200 - 1500	400 - 600	200 - 300
Total Buses per Cycle:	7 - 10	6 - 7	7
Total Buses per Hour:	36 - 40	25	14

Source: B.C. Hydro Transportation Operations Planning

b. Guildford Town Centre, Surrey

The Guildford Town Centre, the second example, is the greater Vancouver region's largest shopping center with 1,310,500 square feet of gross leasable area. First opened in 1967, the center has undergone several major expansions and today includes three department stores, over 170 smaller shops, and a twin theater complex as well as a library and offices. There are approximately 4,500 parking spaces provided, again below U.S. standards. The center is located in the Municipality of Surrey, a residential suburb about 18 miles to the southeast of Vancouver. The center's market area is quite large, encompassing Surrey and neighboring Coquitlam, Delta and White Rock. The ten-minute travel time ring around the Guildford Town Centre gives an immediate population of 32,211 in an 11,841-acre area with a density of 2.72 persons per acre, less than one-third that of Lougheed Mall.

As part of a province-wide program of transit expansion, transit service was introduced into the Surrey area in three phases from May to October, 1975. The new service would be operated by B.C. Hydro and Power Authority, thus providing a link with the existing transit network in the greater Vancouver region. Bus service in the area to that date had been rather limited; one public carrier made approximately ten trips daily linking Surrey, White Rock, New Westminster and Vancouver. As a result, the routes were circuitous and time-consuming. There were in addition several bus runs operated by private commuter clubs.

The particular pattern in which Guildford Town Centre has developed has been fortunate for transit access. The center is anchored on either side of a major arterial by a department store, and a pedestrian mall was built over the roadway to join the two stores. As the center was identified as a main generator of activity and a main timed-transfer point for the new system, buses are able to drive under the mall overpass and deposit patrons within 30 feet of the mall entrance (see Figure 2.55). The overpass also serves as a shelter.

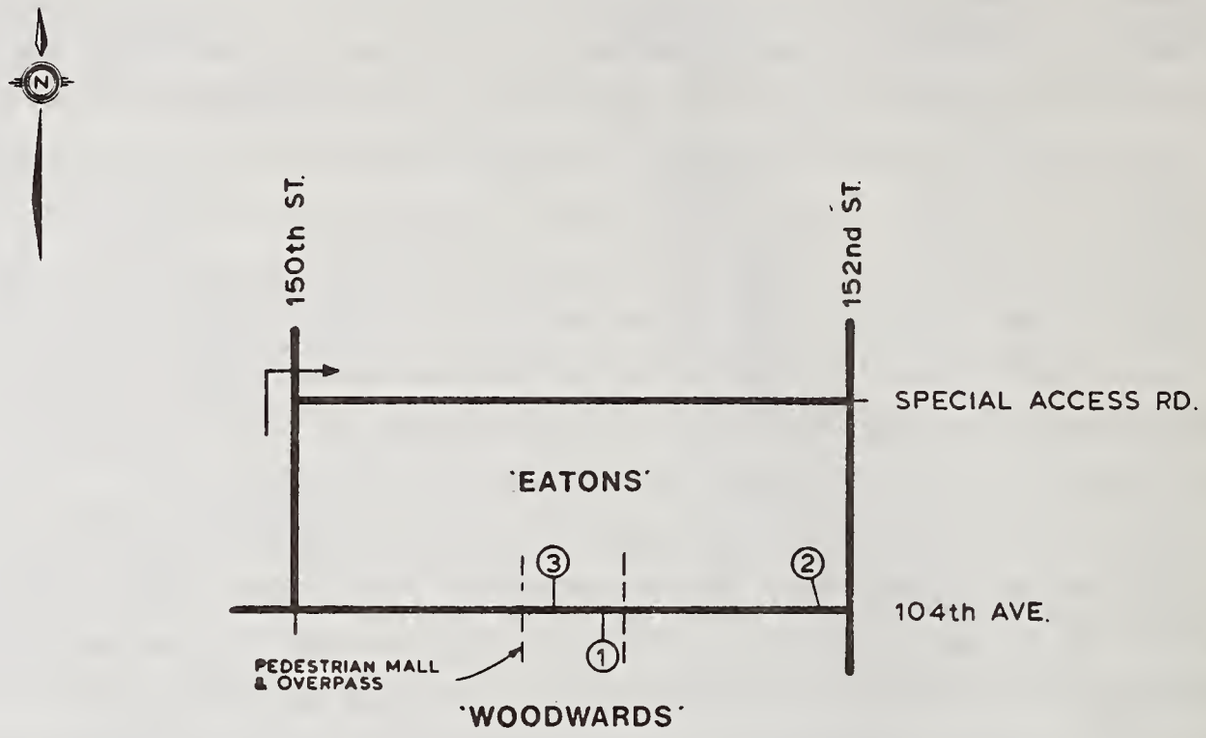
The five routes serving the center act as locals through the area and continue to Vancouver as express runs during rush hours (see Figure 2.56). The service emphasis and volume are slightly different from that at the Lougheed Mall. The focus appears to be on the commuter market, which is generally easier to define and serve, as well as being the prime generator of fares. As mentioned before, the extremely low density has made serving the area in an efficient manner very difficult. As a result, the response in Surrey to the service has been moderate to date. Estimated passengers per hour on all buses at Guildford during rush hours are between 400 and 600 persons, with day base estimates at 150 to 200 persons per hour on all buses (see Table 2.38).

The Guildford Town Centre management reported satisfaction with transit service to the mall, estimating about five per cent of their patrons arrive by bus.

Marketing strategies for these new transit services included public meetings for residents of Coquitlam and Surrey during the planning phase. For both new services, promotion included full-page advertising in the daily newspapers shortly before start-up. The advertising, prepared by a professional agency, included information on routes, connections, fares, etc. Students also were hired to give out information and answer questions at main activity centers throughout the two municipalities.

Figure 2.55.

GUILDFORD EXCHANGE



① FASTBUS

TO LANGLEY

320 HJORTH

TO VANCOUVER

323 128th STREET (Rush Hours Only)
324 132nd STREET (Rush Hours Only)
330 FERGUSON
334 PORT MANN (Rush Hours Only)

PACIFIC STAGE LINES

② BUS

TO SCOTTSDALE MALL

323 128th STREET
324 132nd STREET (Daytime service Mon. thru Sat.)
335 BRIDGEVIEW (Daytime service Mon. thru Sat.)

TO NEWTON

326 ARCHIBALD (Midday service, Mon. thru Fri.)

FASTBUS

320 HJORTH (To New Westminster & beyond to Vancouver during rush hours)
330 FERGUSON (To Whalley Exchange)
334 PORT MANN (To 145A ST. & 117th Ave., rush hours only)

③ FASTBUS

TO NEW WESTMINSTER

320 HJORTH (& beyond to Vancouver during rush hours)
330 FERGUSON (To Whalley Exchange)
334 PORT MANN (To 145A ST. & 117th Ave., rush hours only)

PACIFIC STAGE LINES

BUS

TO SCOTTSDALE MALL

323 128th STREET
324 132nd STREET (Daytime service Mon. thru Sat.)
335 BRIDGEVIEW (Daytime service Mon. thru Sat.)

TO NEWTON

326 ARCHIBALD (Midday service Mon thru Fri.)

B.C. HYDRO TRANSPORTATION
TRANSPORTATION ENGINEERING DEPT.

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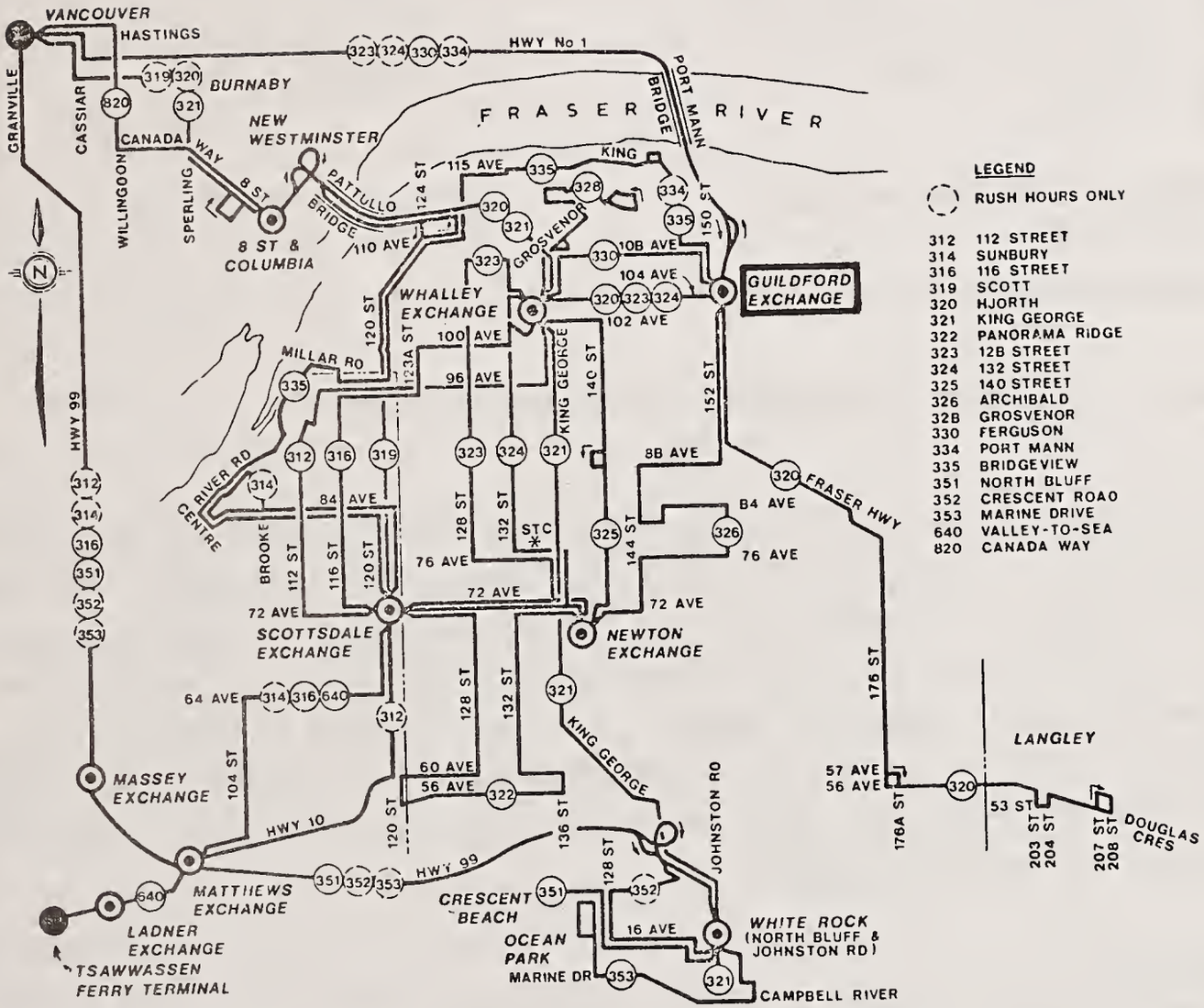
Figure 2.56

Route Plan for Surrey Area



Source: B.C. Hydro Transportation Operations Planning

Table 2.38

Operating Characteristics and Estimated Ridership for Bus Routes Serving Guildford Town Centre

Bus Routes and Headways	Rush Hour (Peak Direction)	Day Base (Mon-Sat)	Evening and Sunday
330 (334, 323, 324 peak only) to Vancouver	5 - 8	30	60
320 to Langley	30	30	60
330 to Whalley via 108th Avenue	15 - 30	30	60
320 to Whalley & New Westminster	30	30	60
334, 335 to Port Mann	30 (PM only)	120	--
326 to Newton	--	2 trips only	--
Estimated Passengers per Hour on All Buses:	400 - 600	150 - 250	50 - 100
Total Buses per Hour	16 - 19	10 - 11	5

Source: B.C. Hydro Transportation Operations Planning

These two Canadian experiences show that a shopping center can do with less parking if it is served with a high level of public transit service. The timed-transfer focal point concept that uses the regional mall as a primary location appears to have had a positive influence on the relatively high levels of transit patrons who shop at these two centers. However, it should be remembered that transit ridership is quite a bit higher among Canadians than Americans and that this alone may explain why these two malls derive eight or more per cent of their patrons from the transit system.

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6. Dave Roberts, Planning, B.C. Hydro and Power Authority.

III. CONCLUSIONS AND RECOMMENDATIONS

A. Some Near-Term Strategies for Improving Transit Service to Regional Malls

The diversity of the case studies presented in Chapter II makes it quite difficult to construct a summary that can describe the present status of transit service to outlying regional malls in this country. Clearly, transit has not penetrated this shopping center travel market to any significant extent in the great majority of the cases studied. It is also clear that there have been few efforts by transit agencies to directly provide a transit service tailored to the needs of shoppers in the outer city. While there are a few projects that have been proposed to do this, it will be some time before it will be possible to determine how successful they have been. Most of the cases examined illustrate the difficulty of trying to provide bus service to malls that were not designed to allow for bus access. Pavement failures, bus slowdowns in parking lot traffic, waiting area problems, and long and often hazardous walking trips for bus patrons are the result. In many cases, the buses do not even operate during the times (evenings and weekends) when shopping travel demand is highest.

Solving these problems will require the cooperative effort of several types of people and some investment of both private and public funds. The benefits of such solutions would be more shoppers at the centers and more utilization of the bus system. Whether the benefits would be greater than the costs is a question that cannot be answered at this time. A good deal of experimentation and analysis will be required before convincing answers to this question can be developed.

There are three main strategies to solving these problems that appear to be feasible, given some national policy, funding and commitment to the objective of gaining a larger share of the shopping travel market for transit. One alternative would be to design transit services that would compete directly with the automobile for the shopping trip. This direct competition strategy would require quite sophisticated planning and analysis work as well as the investment of public and private funds to construct transit shelters and roadways to make the transit trip much more comfortable and convenient than it is at present. The buses would have to be scheduled frequently during peak shopping periods (generally evenings and weekends) and some special attention would need to be given to the storage of packages, special group and children's fares and other amenities that would allow the service to compare favorably with the automobile. The market research techniques used by the mall operators would have to be extensively employed to find ways to tailor the service closely to the travel desires of the shoppers. Extensive survey research work that includes interviews with shoppers are conducted by mall operators periodically. The travel behavior information needed to devise ways of competing with the automobile

could be derived by extending or modifying these surveys in many cases. Transit service planning tools such as the Interactive Graphic Transit Design System [4] [8][9] are also available that can assist the design of a bus service that can economically serve travel patterns to a major shopping mall.

The two case studies that describe how dial-a-ride services have been provided to malls in La Habra (pp. 110-113) and Rochester (pp. 161-170) indicate that this approach could probably provide service that competes well with the automobile. The major problem is that it is expensive and would require financial assistance from both the public and the shopping center industry. It can be expected that ways will be found to reduce the cost of dial-a-ride service in the future and that this approach will be more cost/effective than at present.

A third case study that describes a proposal to use vans to provide both employee and shopper dial-a-ride transportation to the Glendale Galleria (pp. 81-89) offers another way that a transit service could be designed that could compete effectively with the automobile. It is still too early to tell how effective this idea will be as it is not yet fully operational.

It should not be assumed that public transit agencies are the only ones that could provide this type of demand-responsive service to regional malls. In fact, it may be that mall operators, singly or jointly, should design, fund and operate such services themselves. It may be that they could provide the services they want more effectively in less time and at less cost than many public transit agencies, accustomed to operating only large buses on a fixed route and fixed schedule basis. To do this, they would have to overcome the various institutional barriers (licensing, insurance, labor regulations, etc.) that have plagued efforts to provide specialized or non-conventional transit services all over the country to date [3][5].

The possibility of developing carpools for mall employees should also not be overlooked as this form of ride-sharing can be included as well under a broad definition of the term "transit." No cases have been found where this has been tried and some believe that it would be difficult to do because of the highly variable working hours that are typical of many mall workers. Together with a widely dispersed residential pattern, these varied working hours would probably make carpool matching difficult, except in the very largest malls. If there are other activities near the mall that have employees who could be included, then carpool arrangements might be more feasible for the smaller of the large malls as well.

A second strategy would be to concentrate on serving those persons who do not have ready access to an automobile for the shopping trip. This <u>transit dependent</u> strategy would be designed to serve persons, typically the young, the handicapped, the old and the poor, who either do not have a car or lack the ability to drive a car.

Some of these people probably already (infrequently) use the bus to reach a shopping mall. Others simply never have the opportunity to shop at a mall unless a friend with a car provides them with the ability to reach it. The service needs and travel desires of these people are likely to be quite different from those who currently travel to the malls in an automobile. It would be very difficult to get the kind of information from these people that would allow various transit services to be designed to meet their travel desires simply because they cannot be interviewed at the mall in the traditional manner. They would have to be located at their places of residence and interviewed there. They would be responding to questions that deal with travel and shopping experiences not now performed and so the design and provision of services based on their responses might tend to be somewhat more risky than doing so for shoppers who currently use autos. Moreover, the shopping mall operators might not be willing to invest their funds to provide facilities for shoppers (the young, old, poor and handicapped) who would probably not tend to spend much money at their malls.

Since there are a number of efforts now being made to serve the elderly and handicapped as required by Section 16 of the Urban Mass Transportation Assistance Act of 1964, as amended, it may make more sense to try to insure that some of these activities include services to regional malls rather than try to start any new programs aimed at meeting shopping travel needs of the transit dependent. One characteristic of these programs is that they generally do not place any restrictions on the type of trip that the participants desire to make. This "free choice" philosophy avoids the necessity of the public agency specifying which kinds of trips are more important than others and also avoids possible complaints from various business activities about unequal treatment. An example of an innovative effort of this type is Seattle METRO's taxi script program. It began in December of 1978 and is designed to provide taxi service to low-income or disabled people who have no other means of travel. To qualify, a person must be age 65 or over and have a household income of less than $6,678 if living alone, $8,736 if two people are in the household and $10,795 if three people are living together. Once qualified, a person can purchase $10 worth of taxicab script for $6.00. It may be used to pay the taxi fare (but not tips) for any trip that is desired. There is no limit on the number of $10 books one can buy. This program will be evaluated in the near future but no data on how it is being used are available at this time. It is certainly likely that a substantial proportion of these taxi trips are to some type of shopping facility but whether any have gone to the regional malls in the Seattle area is presently unknown.

A third type of strategy would be to concentrate on special transit services for self-identified groups. The Shopper's Special service for elderly people in Denver (see pages 147-151) is a good example of this type of service. This demand-responsive concept is not unlike that of a subscription bus service for the work trip. Any group that could get together a busload (using vehicles of various sizes) could apply for a regularly scheduled service to one or more shopping centers. The analytical and planning requirements for such a service would be minimal as the shoppers themselves would provide much of the information required (i.e., when and to where the service was needed). More of a problem would be the allocation of available buses should the demand prove to be much greater than the transit system could deliver. Another type of problem could arise if most of the groups wanted to go only to one or two malls, leaving the other malls out of the special program. A sophisticated marketing program would be needed to let everyone know that such a shopping travel opportunity was available and the same kinds of physical facilities at the shopping centers would need to be developed to accommodate the many buses that could be involved in such a program. These groups would probably tend to spend reasonable amounts of money at the mall and so would be welcomed by mall operators.

This type of service could be designed to serve very specific self-organized groups or could be operated along specific routes on a subscription basis. A variety of neighborhood organizations exist in most cities and some of these could quickly determine what service to what locations would be most useful to them. In other cases, new groups might form at the block or block group level and present a request for service. Another mode of operation would be to design a subscription service. For example, a monthly pass might be offered that would provide for eight shopping trips per month. Buses would be routed and scheduled to pick up the subscribers at prespecified times and places on certain days of the week. This type of service might work better in areas where the residents do not know each other well or do not care to be a part of any organized effort.

In both cases, there are a number of ways that the retailers at the mall or the mall operator could share in the cost of providing the service. Tickets, good for a full or partial fare, could be issued to customers making a purchase. Or, the retailers could agree to fund a percentage of the cost of providing the service. Or, the retailers could design and operate the service themselves, without any public support or involvement.

All of the major strategies appear to have some chance of success but the first and third appear to be the more likely to succeed, in our opinion. In all cases, a variety of bus transit vehicles should be employed so that the service could be tailored to fit the many special groups that would probably arise, given this shopping travel opportunity. Some type of cost-sharing scheme could probably

be worked out between the transit provider and the mall operators if the mall operators could be convinced that they would obtain substantial benefits from the service. These benefits could be of several types: (1) a reduced parking space requirement, (2) reduced congestion in and around the mall, (3) reduced air pollution, (4) increased sales, (5) more uniform shopping activity over the week, producing more effective use of sales personnel and (6) better response to special sales and other promotions.

The benefits to the transit operator would derive from a more productive utilization of vehicles in off-peak periods and the public support that could result from their delight with a transit service that goes beyond serving just the work trip in the peak period.

The problems with the direct competition strategy are basically those that arise from the high cost of providing dial-a-ride service. Much has been learned about the ways and means of providing such service and there are some indications that it may be possible to cut some of the costs of providing such service in the future. Some interesting developments in Germany show several ways that such cost-cutting could be accomplished [1][6]. A second approach would be to obtain some cost-sharing from the mall operators or retailers themselves to offset the cost to the public of providing this type of service. Various types of cost sharing agreements have already been achieved, as shown in two of the case studies: Clackamas Town Center, pages 52 - 57, and Newport Center, pages 94 - 105. Presumably, such agreements will be easier to negotiate in the future as the mall operators get more interested in having good transit service at their entrances.

The problems with the transit-dependent strategy are primarily those associated with the probable reluctance of many mall operators to encourage the use of their facilities by the elderly, handicapped, the young and the poor. Aside from their lack of money, these people do not fit well into the environment that most mall operators are trying to create. Clearly, the mall operators cannot prevent the arrival and use of their facilities by these people, but it is not likely that they will do very much to assist increases in the provision of transit services to these people. In fact, they may even resist efforts to do so, in some situations. Still, Federal efforts to provide more mobility to elderly and handicapped persons will undoubtedly include shopping trips in their programs and so the cooperation or cost-sharing participation by the mall operators is probably not going to be needed in most situations.

The problems with the self-originated demand-responsive strategy are several. First, there is the question of how many people would be interested in a scheduled shopping trip. Older people are obviously more willing to conform to a predetermined shopping trip schedule (e.g., every Tuesday at 10:00 a.m.) than are younger

and busier people. Also, older people often have no choice as they have no other means of making these shopping trips. Younger people and families might be less regular in their use of such a scheduled service but if it fit their shopping pattern reasonably well, they might use it frequently. Second, the issue of providing a service to a private business would probably arise. If the service were totally publicly-funded, then questions regarding the subsidization of certain private businesses would be raised. If a cost-sharing plan were devised, then these questions would become less critical to the adoption of this strategy. Third, the problem of determining which malls are to be served could be difficult to solve. If most of the groups wanted to travel only to certain malls, then those malls which get no service could become very upset. Moreover, all the non-mall businesses who pay taxes to help support the transit system might also become quite upset and protest the selective provision of such transit services. Of particular importance would be the attitude of the downtown retailers who might interpret the provision of transit services to shopping centers as a significant threat to the viability of their own interests. At present, downtown retail establishments typically get high levels of transit services in relation to regional malls. It is likely that these people would not like to see this competitive advantage weakened by the provision of comparable levels of transit service to the regional malls. Still, it must be remembered that many of the downtown retailers also have outlets at the regional malls, so perhaps their self-interest in the malls would reduce their protests to a minimal level.

Fourth, to be successful, each group that was scheduled to receive transit service would probably need a coordinator to look after the details of making sure the service was working properly and that the people being served have the information they need to access it properly. Perhaps most of these people could be volunteers but they might need to be paid for their services in some cases. Fifth, attention would have to be given to insuring that the service was allocated among the various communities in the service area on an equitable basis. Typically, some areas would be more able to organize and request the service while others would need some assistance. Some transit agency or mall people would probably be needed to provide this type of help in some areas of the city. A sixth problem would be finding ways to pay for the construction of the heavy duty pavements, bus pads, shelters and waiting areas that would have to be built on private property. A cost-sharing arrangement would appear to be the most appropriate way of solving this problem.

The problems associated with a subscription service that is demand-responsive would be quite similar. The major difference would be that much more work would be required to determine routes and schedules for the buses that would produce the

desired service at a minimal cost. For example, it might be that an economical route and schedule would call for the pick-up of person A at 10:00 a.m. every Tuesday and Thursday but person A may want service only on Wednesdays and Fridays. Solving these types of scheduling and routing problems might make the provision of this type of service very expensive. Since the subscriptions would be constantly changing, the routes and schedules would also have to change constantly but perhaps within tolerable limits. Clearly, a computer-assisted routing and scheduling system would have to be devised that is similar to those developed for the dial-a-ride services in Rochester. The problem is the same but since it does not have to be solved so quickly, it somewhat less demanding. An alternative way of providing such a service would be to move more toward the dial-a-ride mode. People who wanted to go shopping could be monthly subscribers but could phone in requests for service a certain number of times per month instead of having to conform to a prespecified schedule. Since most people typically spend a constant number of hours per month shopping, they would probably be willing to subscribe to the service on a monthly basis. It would even be possible to operate the service in two ways, serving subscribers at a somewhat reduced rate and also serving non-subscribers in the traditional dial-a-ride mode.

Overall, none of these problems appears to be too severe and all could probably be worked out in a cooperative manner in most cities, given the desire to do so on the part of both the mall and transit system operators. As stated previously, the benefit/cost relationship that would result from such a demand-responsive shopping service cannot be determined without some experimental work of the type that has been undertaken in recent years by the Service and Methods Demonstrations branch of the Urban Mass Transportation Administration.

B. Longer-Term Strategies for Improving Transit Service to Regional Malls

Beyond the three short-term strategies that have been briefly discussed above are several other ideas that have been developed or identified in the course of this study that are longer-term in nature. There are several things that could be done by each of the major actors involved in the current interaction between shopping malls and transit systems. These are as follows:

Federal Government

There are several things that officials of the Urban Mass Transportation Administration could do that would assist the development of better transit services to regional shopping centers. Some possibilities are:

1. Conduct several demonstration projects that would test various ways of serving regional malls with improved transit service.

2. Support the conduct of a series of workshops and conferences designed to provide opportunities for transit operators and mall operators to exchange views and ideas on ways to increase the availability of transit service to regional malls. The physical requirements of transit vehicles would be especially helpful to the architects who will be designing the next thousand or two malls that will be built in this country during the 1980's. An example of the kind of publication needed was produced in the Minneapolis-St. Paul region in 1975 [7][11].

3. Devise ways that will allow the use of Federal funds for transit facilities built by public transit agencies on private property. The joint development arrangements that have been worked out in many rail transit station area projects provide examples of the way that these problems might be addressed at the Federal level.

4. Develop and make available better planning tools that will assist the transit planner in the design of services that are closely tailored to the shopping habits of various segments of the market. Some of these tools already exist but are not yet widely known or in use. Examples are the Interactive Graphic Transit Design System (IGTDS) [4][8][9] and the Employment Center Bus Service approach devised by the Aerospace Corporation [10][12]. IGTDS is currently (1979) being demonstrated for the first time in the City of Bellevue, Washington. Bus service to its small downtown area that includes a large shopping center is being designed with the system.

5. Support the conduct of marketing research studies designed to identify the characteristics of the travel patterns to large regional malls. Data on length of trip, time of day, day of the week, seasonal variations, size of shopping group, age, sex, mode of travel, frequency of shopping travel and other behavioral characteristics are sorely needed and should be developed to assist the further analysis of this travel market.

6. Encourage the adoption of procedures at the local level that will insure that applications for permits to construct new regional malls not be approved unless the design has provided for transit access in an adequate manner. An example of this type of material is the Model Code for Transit Improvement adopted by the Transportation Advisory Board of the Metropolitan Council in the Minneapolis-St. Paul, Minnesota region in 1977 [7]. Other descriptions of the various ways that local governments can devise procedures that will insure that transit access is considered in the design of shopping malls are provided in a recent article by Jeff Carpenter in Practicing Planner [2].

Department of Energy and the Environmental Protection Agency

These two agencies should be involved in the development of any national programs designed to improve transit service to regional malls. DOE should recognize the potential for the conservation of energy that increased use of transit vehicles represents and EPA should be involved in relation to its efforts to reduce the air pollution which arises in mall areas due to the large number of vehicles operating at low (and highly polluting) speeds in their vicinity. Any efforts that UMTA makes in developing service improvement programs in this area should be coordinated with these two agencies.

The American Public Transit Association and the International Council of Shopping Centers

These two major trade organizations could do several things to stimulate the development of improved transit service to regional malls. These are:

1. Include sessions that deal with various transit-shopping center issues on the programs of their annual meetings or at special workshops or regional conferences.

2. Develop a liaison with the American Institute of Architects and the American Planning Association that would look for ways to encourage architects and planners to become more sensitive to the needs of transit vehicles and patrons in the design of regional shopping centers. Another organization that should be involved in such discussions would be the Urban Land Institute, whose membership includes many of the developers who hire the architects and planners and give them the specifications that control their design work. The results of these discussions should be published in a handbook that would provide guidelines for and information about transit vehicles, facilities and patrons needed by developers, architects and planners in their design and implementation activities.

3. Publish case studies of transit-shopping center relationships that are worthy of emulation and distribute them widely to their members.

4. Assist UMTA in the design and evaluation of a series of demonstration programs that are needed to provide more answers to the travel behavior questions and transit service approaches outlined earlier in this report.

5. Assist UMTA in the dissemination of improved planning and analysis techniques to transit planners and mall operators so that tailored transit services can be designed quickly and economically.

State and Local Governments

As is normally the case, the actions that are required to achieve the policy and objectives set at the national level must be taken at the State and local levels. Since most transit agencies are now owned, operated and financed by the public, it will be up to these units of government to devise the procedures and regulations needed to get transit access designed into new regional malls, to get new service programs implemented and to find ways to retrofit the older malls with transit access facilities. Any national program that is devised to encourage this type of activity must recognize the very large variety of situations that exist and the flexibility that is needed at the local level to cope with these different situations. It is suggested that the participation of representatives of these local agencies be heavily involved in the efforts of national organizations to devise programs, guidelines, funding procedures and regulations so that action programs can be devised at the local level which have a high probability of meeting both national and local requirements.

C. Future Prospects

Until the summer of 1979, the shopping center industry was generally unconcerned with the provision of transit services to its facilities. The gas crunch has changed this attitude to some degree as evidenced by the attention given to the topic of transit service in the August 1979 issue of Shopping Centers Today, the monthly newsletter of the International Council of Shopping Centers. Two articles in this issue deal with this topic. One ("Centers Weather Gas Crunch, But Shopping Patterns Change") reports on a survey of 300 mall developers and managers around the country which has been made and is now being analyzed. Very preliminary results showed that during the worst weeks of the gas shortage, California regional malls experienced sales reductions of as much as 25 per cent in May and early June. In the Northeast, June and July sales were down by 15 to 20 per cent. Other noticeable impacts were (1) the loss of customers from distant places, (2) a reduction in people's willingness to shop at more than one mall, (3) fewer shopping trips with larger average purchases, (4) longer stays at the malls, (5) more multi-purpose trips, (6) more purposeful shopping (less browsing and impulse buying), (7) more telephone and catalog sales and (8) sales increases at malls that have mass transit service. Sales in those parts of the country that did not experience severe gas shortages were generally up 7 - 15 per cent over the previous year. Weekend sales have been higher in most areas, probably due to the reduction in weekend travel by many families. Overall, the article suggests that while shopping habits may change somewhat, sales are not expected to suffer much in the future. The Research Division

of ICSC in New York is currently analyzing the returns from the survey in detail and will have more definitive results to report in the next few months.

The second article ("Gas Woes Spur Bus Use") describes how several malls have promoted the use of bus transit. Special advertising and promotional campaigns have been launched by several centers to encourage use of bus transit and transit agencies have been asked to extend service to previously unserved malls in a few cases. Some success is reported in this article.

Clearly, if the gasoline shortage and price increase experience of the summer of 1979 persists well into the 1980's, one can expect mall developers and operators to become much more receptive to ideas regarding the provision of transit services to their malls. The industry is quite used to coping with change, its communications channels are well-developed and its financial resources and personnel capabilities are substantial. All of these factors suggest that some significant movement of the industry toward acquiring more transit services could occur rapidly in the next few years, given that gasoline availability remains tight and its price increases steadily.

There are, of course, many other factors besides gasoline that will affect shopping travel to the major malls in the future. As the gasoline crunch of 1979 has shown, the smaller centers suffered less than the regionals as their proximity to their primary markets is greater. The trend toward small cars will probably produce surplus parking space that may be developed with non-retail buildings, turning the mall into a major diversified center with a higher density which would make an economical transit service much easier to provide. If the number of women in the labor force continues to rise, so will catalog and telephone sales and, consequently, shopping center travel will decline. Television-based shopping services may also produce less shopping travel, if they become widely used.

The combined effect of all of these trends cannot be easily ascertained. Some would encourage transit use, others would mitigate against it. Selective use of available transit services can undoubtedly be helpful in many cases. Our hope is that this report will contribute to the achievement of that objective.

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